



# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)

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

April 5, 2013

Jennifer Young Gaudet  
HPC Wireless Services  
46 Mill Plain Road, Floor 2  
Danbury, CT 06811

RE: **EM-SPRINT-035-130322** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 126 Ledge Road, Darien, Connecticut.

Dear Ms. Gaudet:

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

- Prior to antenna installation, the modification depicted “Appendix D – Structural Modification Drawings” of the Structural Modification Analysis Report prepared by Tower Engineering Professionals dated December 10, 2012 and stamped by Andrew Haldane shall be implemented;
- Within 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the structure and foundation do not exceed 100 percent of the post-construction structural rating.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated March 21, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General

Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,



Linda Roberts  
Executive Director

LR/CDM/cm

c: The Honorable Jayme J. Stevenson, First Selectman, Town of Darien  
David J. Keating, Zoning Enforcement Officer, Town of Darien  
Crown Castle

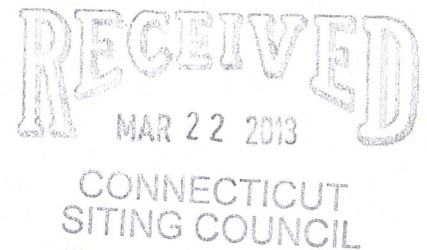


HPC Wireless Services  
46 Mill Plain Rd.  
Floor 2  
Danbury, CT, 06811  
**EM-SPRINT-035-130322**

March 21, 2013

VIA OVERNIGHT COURIER

Connecticut Siting Council  
10 Franklin Square  
New Britain, Connecticut 06051  
Attn: Ms. Linda Roberts, Executive Director



Re: Sprint Spectrum, L.P. – exempt modification  
126 Ledge Road, Darien, Connecticut

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. (“Sprint”). Sprint is undertaking modifications to certain existing sites in its Connecticut system in order to implement updated technology. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction that constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the First Selectman of the Town of Darien.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at 126 Ledge Road in the Town of Darien (coordinates 41°-04’-20.79”, 73°-28’-41.34”). Attached are a compound plan and elevation depicting the planned changes, and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration, subject to structure modifications submitted herewith. Also included is a power density report reflecting the modification to Sprint’s operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes (“C.G.S.”) Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. Sprint will replace three (3) existing CDMA antennas with three (3) dual-band panel antennas at the existing center line of approximately 117’. Six (6) RRHs (remote radio heads) will be mounted to the pole via separate mounts below the antenna mount. Sprint will also install three (3) hybridflex cables along the existing coaxial cable run, and

will remove the existing coaxial cable. The proposed modifications will not extend the height of the approximately 117' structure.

2. The proposed changes will not extend the site boundaries. Sprint will replace two (2) existing cabinets and will add a fiber distribution box on unistruts on the concrete pad. These changes will have no effect on the site boundaries.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standards as calculated for a mixed frequency site. As indicated on the attached report prepared by EBI Consulting, Sprint's operations at the site will result in a power density of approximately 24.231% of the standard for uncontrolled environments and 4.846% of the standard for controlled environments; the combined site operations will result in a total power density of approximately 136.601% of the standard for uncontrolled environments and 27.320% of the standard for controlled environments. As noted in the report provided by EBI Consulting, this site is in a controlled area.

Please feel free to contact me by phone at (860) 798-7454 or by e-mail at [jgaudet@hpcwireless.com](mailto:jgaudet@hpcwireless.com) with questions concerning this matter. Thank you for your consideration.

Respectfully yours,



Jennifer Young Gaudet

cc: Honorable Jayme Stevenson, First Selectman, Town of Darien  
Town of Darien (underlying property owner)



Date: **December 10, 2012**

Andrew Bazinet  
Crown Castle  
46 Broadway  
Albany, NY 12204  
(585) 899-3442



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

**Subject: Structural Modification Analysis Report**

**Carrier Designation:**

**Sprint PCS Co-Locate**

**Carrier Site Number:**

CT03XC357

**Carrier Site Name:**

N/A

**Crown Castle Designation:**

**Crown Castle BU Number:**

806352

**Crown Castle Site Name:**

BRG 302 943052

**Crown Castle JDE Job Number:**

206193

**Crown Castle Work Order Number:**

551125

**Crown Castle Application Number:**

164077 Rev. 1

**Engineering Firm Designation:**

**TEP Project Number:**

127875

**Site Data:**

**126 Ledge Road, Darien, Fairfield County, CT 06820**

**Latitude 41° 4' 20.75", Longitude -73° 28' 41.4"**

**117 Foot - Monopole Tower**

Dear Andrew Bazinet,

*Tower Engineering Professionals* is pleased to submit this "**Structural Modification 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 502137, in accordance with application 164077, revision 1.

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:

LC4.7: Existing + Reserved + Proposed Equipment with Proposed Modifications

**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, ASCE 7-05 Minimum Design Loads for Buildings and Other Structures and the 2005 Connecticut State Building Code (2003 International Building Code) based upon a wind speed of 85 mph fastest mile.

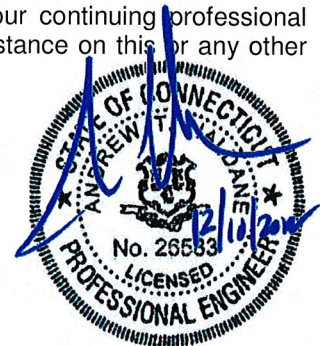
All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Tables 1 and 2 and the attached drawings for the determined available structural capacity to be effective.

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.

Structural analysis prepared by: Ryan J. Rimmele, P.E.

Respectfully submitted by:

Andrew T. Haldane, P.E.



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## 1) INTRODUCTION

This tower is a 100-ft monopole tower designed by Valmont in January of 1992. The tower was originally designed for a wind speed of 90 mph per EIA/TIA-222-E for the appurtenances listed in Table 3. The tower was extended by 17-ft per reinforcement drawings by Valmont in July of 2007 bringing the total height to 117-ft. The tower has been modified per reinforcement drawings prepared by TEP in November of 2010. All information provided to TEP was assumed to be accurate and complete.

## 2) ANALYSIS CRITERIA

The analysis has been performed in accordance with the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and ASCE 7-05 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
117.0	117.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER	3	1/2	1
		9	RFS Celwave	ACU-A20-N			
		3	RFS Celwave	APXVSP18-C-A20 w/ Mount Pipe			
115.0	115.0	3	Alcatel Lucent	TME-800MHZ RRH	-	-	1
		3	Alcatel Lucent	TME-PCS 1900MHz 4x45W-65MHz			
		1	Tower Mounts	Side Arm Mount [SO 102-3]			

Notes:

- 1) See "Appendix B – Base Level Drawing" for assumed 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
117.0	119.0	3	Decibel	932LG65VTE-B w/ Mount Pipe	7	1-1/4	1
	117.0	1	Tower Mounts	Side Arm Mount [SO 102-3]	-	-	2
110.0	110.0	3	Ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	3
		3	Ericsson	KRY 112 144/1			
		1	Tower Mounts	Side Arm Mount [SO 102-3]	12	1-1/4	2

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
98.0	102.0	3	Andrew	LNx-6514DS-T4M w/ Mount Pipe	-	-	3
		6	Decibel	DB844G65ZAXY w/ Mount Pipe			
		6	RFS Celwave	FD9R6004/2C-3L			
		3	RymSa Wireless	MG D3-800TV w/ Mount Pipe			
98.0	1	Tower Mounts	Platform Mount [LP 713-1]	12	7/8	2	
93.0	95.0	1	Andrew	VHLP1-23	4	1/2	2
	94.0	1	Andrew	VHLP2-11			
		1	Andrew	VHLP2.5-11			
	93.0	1	Tower Mounts	Side Arm Mount [SO 102-3]			
	92.0	1	Andrew	VHLP1-23			
87.0	91.0	6	Powerwave Technologies	7770.00 w/ Mount Pipe	12 2 1	1-1/4 5/8 3/8	2
		2	Powerwave Technologies	P65-16-XLH-RR w/ Mount Pipe			
		1	Powerwave Technologies	P65-17-XLH-RR w/ Mount Pipe			
		6	Ericsson	RRUS-11			
		6	Powerwave Technologies	LGP13519			
		6	Powerwave Technologies	LGP2140X			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount [LP 713-1]			
81.0	81.0	3	Kathrein	800 10504 w/ Mount Pipe	6	1-5/8	2
		1	Tower Mounts	Side Arm Mount [SO 102-3]			
70.0	72.0	3	Andrew	LBX-9012DS-VTM w/ Mount Pipe	9 6	7/8 5/16	2
		3	Argus Technologies	LLPX310R w/ Mount Pipe			
		3	Decibel	DB844H90E-XY w/ Mount Pipe			
		3	Samsung Telecommunications	FDD_R6_RRH			
	70.0	1	Tower Mounts	Platform Mount [LP 713-1]			
50.0	50.0	1	Tower Mounts	Side Arm Mount [SO 701-1]	-	-	2

- Notes:  
1) Existing equipment; to be removed  
2) Existing equipment  
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)
97.0	97.0	2	Celwave	PD100	-	-
		6	Sinclair	SRL410C4R105		
		1	Tower Mounts	Cellular Platform		
84.0	84.0	2	Celwave	PD100	-	-
		6	Sinclair	SRL410C4R105		
		1	Tower Mounts	Cellular Platform		

### 3) ANALYSIS PROCEDURE

**Table 4 - Documents Provided**

Document	Remarks	Reference	Source
Geotechnical Reports	Clarence Wetli Associates	217769	CCISites
Tower Foundation Drawings	SAC Engineering, Inc.	217771	CCISites
Tower Manufacturer Drawings	Valmont Industries, Inc.	217772	CCISites
Post-Modification Inspection	Tower Engineering Professionals	2785508	CCISites
Tower Reinforcement Design	Tower Engineering Professionals	2743848	CCISites
Tower Structural Analysis Report	Tower Engineering Professionals	3361744	CCISites
Tower Structural Analysis Report	Tower Engineering Professionals	3348940	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.

For analysis of monopole shaft reinforcements, the plates are modeled as linear appurtenances along the exterior of the pole. The loads calculated from tnxTower are then exported to a proprietary calculation sheet created by Tower Engineering Professionals, Inc. that analyzes each reinforcing element along each critical axis and presents percent capacities for each element and the pole shaft along each critical axis. The actual percent capacity of the tower structure including the reinforcing elements is reported in Table 5 - Section Capacity (Summary).

#### 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.

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 (K)	SF*P <sub>allow</sub> (K)	% Capacity	Pass / Fail
L1	117.0 - 110.0	Pole	TP15.94x14.36x0.188	1	Note 1	Note 1	9.9%	Pass
L2	110.0 - 100.0	Pole	TP18.20x15.94x0.188	2	Note 1	Note 1	27.4%	Pass
L3	100.0 - 63.50	Pole	TP26.45x18.20x0.250	3	Note 1	Note 1	97.5%	Pass
L4	63.50 - 47.42	Pole	TP30.09x26.45x0.412	4	Note 1	Note 1	61.6%	Pass
L5	52.00 - 35.00	Pole	TP32.39x28.23x0.490	5	Note 1	Note 1	71.9%	Pass
L6	35.00 - 0.00	Pole	TP40.30x32.39x0.496	6	Note 1	Note 1	83.8%	Pass
M1	35.00 - 0.00	Mod	(Sabre) MS-600	7	Note 1	Note 1	99.8%	Pass
M2	65.00 - 35.00	Mod	(Sabre) MS-450	8	Note 1	Note 1	98.6%	Pass
M3	1.75 - 0.00	Mod	(ts) 1.25x6.5-65ksi	9	Note 1	Note 1	64.4%	Pass
M4	10.50 - 0.50	Mod	(Aero) MP303	10	Note 1	Note 1	81.3%	Pass
M5	45.00 - 30.00	Mod	(Aero) MP303	11	Note 1	Note 1	72.8%	Pass
M6	70.00 - 52.00	Mod	(Aero) MP303	12	Note 1	Note 1	84.4%	Pass
							<b>Summary</b>	
							Pole (L3)	97.5% Pass
							Mod (M1)	99.8% Pass
							<b>Rating</b>	<b>99.8% Pass</b>

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	110	6.3	Pass
1	Flange Connection	100	26.0	Pass
1	Anchor Rods	-	92.8	Pass
1	Base Plate	-	68.0	Pass
1	Base Foundation	-	82.6	Pass

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

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

#### 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 modifications depicted in "Appendix D – Structural Modification Drawings" shall be installed and, upon completion, inspected. The tower and its foundation have sufficient capacity to carry the existing, future, and proposed loads once the proposed modifications are installed.

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	7.00	12	0.1875					215.2
2	10.00	12	0.1875					346.8
3	31.25	12	0.2500					1839.0
4	5.25	12	0.3694					368.3
5	16.08	12	0.5237	4.58	26.4530	30.0900		1233.9
6	8.25	12	0.5020		28.0067	30.2460		893.0
7	8.75	12	0.5883		30.2460	32.3850		1019.1
8	3.75	12	0.6308		32.3850	33.2330		457.9
9	22.00	12	0.5058		33.2330	38.2082		2926.7
10	7.50	12	0.4982		38.2082	39.9042		1092.1
11	1.75	12	0.4962		39.9042	40.3000		10653.761.7
A572-65 (50% Density)								

117.0 ft  
110.0 ft  
100.0 ft  
68.8 ft  
63.5 ft  
47.4 ft  
43.8 ft  
35.0 ft  
31.3 ft  
9.3 ft  
1.8 ft  
0.0 ft

### DESIGNED APPURTENANCE LOADING

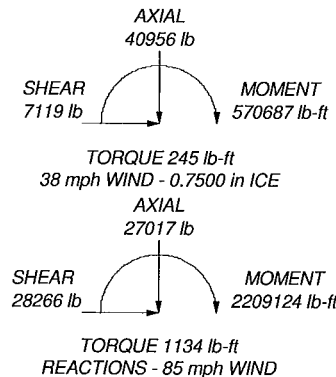
TYPE	ELEVATION	TYPE	ELEVATION
800 EXTERNAL NOTCH FILTER	117	2.4" x 6-ft pipe	93
800 EXTERNAL NOTCH FILTER	117	(2) 2.4" x 6-ft pipe	93
800 EXTERNAL NOTCH FILTER	117	VHLP2-11	93
(3) ACU-A20-N	117	VHLP1-23	93
(3) ACU-A20-N	117	VHLP2.5-11	93
(3) ACU-A20-N	117	VHLP1-23	93
APXVSP18-C-A20 w/ Mount Pipe	117	(2) LGP13519	87
APXVSP18-C-A20 w/ Mount Pipe	117	(2) LGP13519	87
APXVSP18-C-A20 w/ Mount Pipe	117	(2) RRUS-11	87
Side Arm Mount [SO 102-3]	117	(2) RRUS-11	87
TME-800MHZ RRH	115	(2) RRUS-11	87
TME-800MHZ RRH	115	(2) 7770.00 w/ Mount Pipe	87
TME-800MHZ RRH	115	(2) 7770.00 w/ Mount Pipe	87
TME-PCS 1900MHz 4x45W-65MHz	115	(2) 7770.00 w/ Mount Pipe	87
TME-PCS 1900MHz 4x45W-65MHz	115	(2) LGP2140X	87
TME-PCS 1900MHz 4x45W-65MHz	115	(2) LGP2140X	87
Side Arm Mount [SO 102-3]	115	(2) LGP2140X	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	DC6-48-60-18-8F	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	Platform Mount [LP 713-1]	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	P65-17-XLH-RR w/ Mount Pipe	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	P65-16-XLH-RR w/ Mount Pipe	87
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	110	P65-16-XLH-RR w/ Mount Pipe	87
KRY 112 144/1	110	(2) LGP13519	87
KRY 112 144/1	110	800 10504 w/ Mount Pipe	81
KRY 112 144/1	110	800 10504 w/ Mount Pipe	81
KRY 112 144/1	110	800 10504 w/ Mount Pipe	81
Side Arm Mount [SO 102-3]	110	Side Arm Mount [SO 102-3]	81
LNx-6514DS-T4M w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	70
LNx-6514DS-T4M w/ Mount Pipe	98	LLPX310R w/ Mount Pipe	70
LNx-6514DS-T4M w/ Mount Pipe	98	LBX-9012DS-VTM w/ Mount Pipe	70
(2) DB844G65ZAXY w/ Mount Pipe	98	LBX-9012DS-VTM w/ Mount Pipe	70
(2) DB844G65ZAXY w/ Mount Pipe	98	LBX-9012DS-VTM w/ Mount Pipe	70
(2) DB844G65ZAXY w/ Mount Pipe	98	LBX-9012DS-VTM w/ Mount Pipe	70
MG D3-800TV w/ Mount Pipe	98	FDD_R6_RRH	70
MG D3-800TV w/ Mount Pipe	98	FDD_R6_RRH	70
MG D3-800TV w/ Mount Pipe	98	FDD_R6_RRH	70
(2) FD9R6004/2C-3L	98	Platform Mount [LP 713-1]	70
(2) FD9R6004/2C-3L	98	DB844H90E-XY w/ Mount Pipe	70
(2) FD9R6004/2C-3L	98	DB844H90E-XY w/ Mount Pipe	70
(2) FD9R6004/2C-3L	98	DB844H90E-XY w/ Mount Pipe	70
Platform Mount [LP 713-1]	93	LLPX310R w/ Mount Pipe	70
Side Arm Mount [SO 102-3]	93	Side Arm Mount [SO 701-1]	50
2.4" x 6-ft pipe	93		


### MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	A572-65 (50% Density)	65 ksi	80 ksi

### TOWER DESIGN NOTES

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



 TEP	<b>Tower Engineering Professionals, Inc.</b> 3703 Junction Boulevard Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Job: <b>BRG 302 943052 (BU# 806352)</b> Project: <b>TEP No. 127875</b>		
	Client: Crown Castle Code: TIA/EIA-222-F Path:	Drawn by: rrimmele Date: 12/10/12	App'd: Scale: NTS Dwg No. E-1		



<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 1 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

## Tower Input Data

There is a pole section.

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

The following design criteria apply:

Tower is located in Fairfield County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.7500 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

## Options

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

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	117.00-110.00	7.00	0.00	12	14.3600	15.9400	0.1875	0.7500	A572-65 (65 ksi)
L2	110.00-100.00	10.00	0.00	12	15.9400	18.2000	0.1875	0.7500	A572-65 (65 ksi)
L3	100.00-68.75	31.25	0.00	12	18.2000	25.2659	0.2500	1.0000	A572-65 (65 ksi)
L4	68.75-63.50	5.25	0.00	12	25.2659	26.4530	0.3694	1.4775	A572-65 (50% Density)
L5	63.50-47.42	16.08	4.58	12	26.4530	30.0900	0.5237	2.0948	A572-65 (50% Density)

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Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade Density) (65 ksi)
L6	47.42-43.75	8.25	0.00	12	28.0067	30.2460	0.5020	2.0078	A572-65 (50% Density) (65 ksi)
L7	43.75-35.00	8.75	0.00	12	30.2460	32.3850	0.5883	2.3531	A572-65 (50% Density) (65 ksi)
L8	35.00-31.25	3.75	0.00	12	32.3850	33.2330	0.6308	2.5232	A572-65 (50% Density) (65 ksi)
L9	31.25-9.25	22.00	0.00	12	33.2330	38.2082	0.5058	2.0231	A572-65 (50% Density) (65 ksi)
L10	9.25-1.75	7.50	0.00	12	38.2082	39.9042	0.4982	1.9927	A572-65 (50% Density) (65 ksi)
L11	1.75-0.00	1.75		12	39.9042	40.3000	0.4962	1.9849	A572-65 (50% Density) (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	I/Q in <sup>2</sup>	w in	w/t
L1	14.8666	8.5566	219.3727	5.0738	7.4385	29.4916	444.5085	4.2113	3.3460	17.845
L2	16.5023	9.5106	301.2254	5.6394	8.2569	36.4816	610.3643	4.6808	3.7694	20.104
L3	18.8420	10.8750	450.3655	6.4485	9.4276	47.7710	912.5625	5.3524	4.3751	23.334
L4	20.1378	12.1378	608.5387	7.4557	10.8777	58.2569	1229.0002	6.1112	4.9112	26.405
L5	21.572	13.572	772.5317	8.5847	12.5866	70.2569	1529.3355	6.9112	5.5814	29.652
L6	23.1515	15.1515	956.1326	9.8467	14.5075	82.9172	1927.4148	7.8800	6.2606	33.078
L7	24.8129	16.8129	1168.8901	11.3680	16.7754	96.4816	2429.8504	8.9112	6.9887	36.988
L8	26.5274	18.5274	1414.0014	13.1616	19.7147	114.8793	3024.0226	10.1112	7.7159	41.444
L9	28.3527	20.3527	1693.2998	15.14023	23.4975	140.8887	3774.8159	11.5112	8.5510	47.029
L10	30.2817	22.2817	2009.5366	17.35002	27.7918	175.7508	4674.5179	13.1112	9.4843	53.566
L11	32.3119	24.3119	2368.6366	19.81074	33.6704	219.1148	5774.4144	14.8112	10.4593	60.788
	34.4563	26.4563	2861.5639	22.42498	40.8754	271.1110	7074.0155	16.6112	11.4705	68.871

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>f</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
117.00-110.00				1	1	1		

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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	Double Angle Stitch Bolt Spacing Horizontals
ft	ft <sup>2</sup>	in					in	in
L2 110.00-100.00				1	1	1		
L3 100.00-68.75				1	1	1		
L4 68.75-63.50				1	1	1.35986		
L5 63.50-47.42				1	1	0.963895		
L6 47.42-43.75				1	1	1.37513		
L7 43.75-35.00				1	1	1.17615		
L8 35.00-31.25				1	1	1.09807		
L9 31.25-9.25				1	1	1.36336		
L10 9.25-1.75				1	1	1.38368		
L11 1.75-0.00				1	1	1.38896		

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

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

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

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	$C_{AA}$	Weight	
				ft		ft <sup>2</sup> /ft	plf	
2" Flexible Conduit	A	No	CaAa (Out Of Face)	70.00 - 0.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	1.87
						1" Ice	0.00	4.01
						2" Ice	0.00	10.11
						4" Ice	0.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	10.50 - 0.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	1.87
						1" Ice	0.00	4.01
						2" Ice	0.00	10.11
						4" Ice	0.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	30.00 - 10.50	1	No Ice	0.20	0.34
						1/2" Ice	0.30	1.87
						1" Ice	0.40	4.01
						2" Ice	0.60	10.11
						4" Ice	1.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	45.00 - 30.00	1	No Ice	0.00	0.34
						1/2" Ice	0.00	1.87
						1" Ice	0.00	4.01
						2" Ice	0.00	10.11
						4" Ice	0.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	50.00 - 45.00	1	No Ice	0.20	0.34
						1/2" Ice	0.30	1.87
						1" Ice	0.40	4.01
						2" Ice	0.60	10.11
						4" Ice	1.00	29.66
2" Flexible Conduit	A	No	CaAa (Out Of Face)	70.00 - 50.00	1	No Ice	0.00	0.34
						4" Ice	1.00	29.66

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight
						ft <sup>2</sup> /ft	plf	
			Face)			1/2" Ice	0.00	1.87
						1" Ice	0.00	4.01
						2" Ice	0.00	10.11
						4" Ice	0.00	29.66
9207(5/16")	A	No	Inside Pole	70.00 - 0.00	6	No Ice	0.00	0.60
						1/2" Ice	0.00	0.60
						1" Ice	0.00	0.60
						2" Ice	0.00	0.60
						4" Ice	0.00	0.60
7983A(1/2")	A	No	CaAa (Out Of Face)	70.00 - 0.00	4	No Ice	0.00	0.08
						1/2" Ice	0.00	0.74
						1" Ice	0.00	2.01
						2" Ice	0.00	6.39
						4" Ice	0.00	22.47
7983A(1/2")	C	No	CaAa (Out Of Face)	93.00 - 70.00	3	No Ice	0.00	0.08
						1/2" Ice	0.00	0.74
						1" Ice	0.00	2.01
						2" Ice	0.00	6.39
						4" Ice	0.00	22.47
7983A(1/2")	C	No	CaAa (Out Of Face)	93.00 - 70.00	1	No Ice	0.06	0.08
						1/2" Ice	0.16	0.74
						1" Ice	0.26	2.01
						2" Ice	0.46	6.39
						4" Ice	0.86	22.47
*								
LDF5-50A(7/8")	A	No	Inside Pole	70.00 - 0.00	9	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
*								
LDF6-50A(1-1/4")	B	No	Inside Pole	87.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FB-L98-002-XXX( 3/8)	B	No	Inside Pole	87.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG82ST-BRDA( 5/8")	B	No	Inside Pole	87.00 - 0.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	0.31
						1" Ice	0.00	0.31
						2" Ice	0.00	0.31
						4" Ice	0.00	0.31
2" Rigid Conduit	B	No	Inside Pole	87.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
*								
HYBRIFLEX RRH 1-SECTOR(1/2")	B	No	CaAa (Out Of Face)	110.00 - 0.00	3	No Ice	0.00	0.15
						1/2" Ice	0.00	0.83
						1" Ice	0.00	2.13
						2" Ice	0.00	6.55
						4" Ice	0.00	22.73
HYBRIFLEX RRH 1-SECTOR(1/2")	B	No	CaAa (Out Of Face)	117.00 - 110.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.83
						1" Ice	0.00	2.13
						2" Ice	0.00	6.55



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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
HYBRIFLEX RRH 1-SECTOR(1/2")	B	No	CaAa (Out Of Face)	117.00 - 110.00	1	4" Ice	0.00	22.73
						No Ice	0.06	0.15
						1/2" Ice	0.16	0.83
						1" Ice	0.26	2.13
						2" Ice	0.46	6.55
						4" Ice	0.86	22.73
***								
MLE Hybrid 9Power/18Fiber RL 2( 1 5/8)	B	No	CaAa (Out Of Face)	81.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	2.37
						1" Ice	0.00	4.28
						2" Ice	0.00	9.93
						4" Ice	0.00	28.56
						No Ice	0.16	1.07
MLE Hybrid 9Power/18Fiber RL 2( 1 5/8)	B	No	CaAa (Out Of Face)	110.00 - 81.00	1	1/2" Ice	0.26	2.37
						1" Ice	0.36	4.28
						2" Ice	0.56	9.93
						4" Ice	0.96	28.56
						No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
LDF6-50A(1-1/4")	B	No	Inside Pole	110.00 - 0.00	12	1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
						No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
*								
AVA7-50(1-5/8)	A	No	CaAa (Out Of Face)	81.00 - 0.00	2	No Ice	0.20	0.70
						1/2" Ice	0.30	2.23
						1" Ice	0.40	4.38
						2" Ice	0.60	10.50
						4" Ice	1.00	30.07
						No Ice	0.00	0.70
AVA7-50(1-5/8)	A	No	CaAa (Out Of Face)	81.00 - 0.00	4	1/2" Ice	0.00	2.23
						1" Ice	0.00	4.38
						2" Ice	0.00	10.50
						4" Ice	0.00	30.07
						No Ice	0.00	0.70
						1/2" Ice	0.00	2.23
*								
LDF5-50A(7/8")	C	No	Inside Pole	98.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
						No Ice	0.00	0.33
***								
***								
Step Pegs (3/4" SR) 7-in w/15" step	B	No	CaAa (Out Of Face)	117.00 - 0.00	1	No Ice	0.03	0.33
						1/2" Ice	0.14	0.85
						1" Ice	0.23	1.98
						2" Ice	0.43	6.08
						4" Ice	0.83	21.59
						No Ice	0.04	0.22
Safety Line 3/8	B	No	CaAa (Out Of Face)	117.00 - 0.00	1	1/2" Ice	0.14	0.75
						1" Ice	0.24	1.28
						2" Ice	0.44	2.34
						4" Ice	0.84	4.46
						No Ice	0.04	0.22
						1/2" Ice	0.14	0.75
*****								
*SABRE Mods* Sabre (PL 1 x 6)	A	No	CaAa (Out Of Face)	35.00 - 0.00	1	No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						2" Ice	0.00	26.29
						4" Ice	0.00	37.70
						No Ice	0.00	20.42
Sabre (PL 1 x 6)	B	No	CaAa (Out Of Face)	35.00 - 0.00	1	1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
						No Ice	0.00	20.42

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C <sub>A</sub> A <sub>A</sub>		Weight plf
							ft <sup>2</sup> /ft	
Sabre (PL 1 x 6)	C	No	CaAa (Out Of Face)	35.00 - 0.00	1	2" Ice	0.00	26.29
						4" Ice	0.00	37.70
						No Ice	0.00	20.42
						1/2" Ice	0.00	21.37
						1" Ice	0.00	22.66
Sabre (PL 1 x 4.5)	A	No	CaAa (Out Of Face)	65.00 - 35.00	1	2" Ice	0.00	26.29
						4" Ice	0.00	37.70
						No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
Sabre (PL 1 x 4.5)	B	No	CaAa (Out Of Face)	65.00 - 35.00	1	2" Ice	0.00	20.80
						4" Ice	0.00	31.82
						No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
Sabre (PL 1 x 4.5)	C	No	CaAa (Out Of Face)	65.00 - 35.00	1	2" Ice	0.00	20.80
						4" Ice	0.00	31.82
						No Ice	0.00	15.31
						1/2" Ice	0.00	16.17
						1" Ice	0.00	17.36
****Proposed****								
Aero MP3-03	A	No	CaAa (Out Of Face)	10.50 - 0.50	1	2" Ice	0.00	20.80
						4" Ice	0.00	31.82
						No Ice	0.26	9.90
						1/2" Ice	0.37	11.06
						1" Ice	0.48	12.57
Aero MP3-03	A	No	CaAa (Out Of Face)	70.00 - 50.00	1	2" Ice	0.71	16.63
						4" Ice	1.15	28.88
						No Ice	0.26	9.90
						1/2" Ice	0.37	11.06
						1" Ice	0.48	12.57
Aero MP3-03	B	No	CaAa (Out Of Face)	70.00 - 50.00	1	2" Ice	0.71	16.63
						4" Ice	1.15	28.88
						No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
Aero MP3-03	C	No	CaAa (Out Of Face)	70.00 - 50.00	1	2" Ice	0.00	16.63
						4" Ice	0.00	28.88
						No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
Aero MP3-03	A	No	CaAa (Out Of Face)	45.00 - 30.00	1	2" Ice	0.00	16.63
						4" Ice	0.00	28.88
						No Ice	0.26	9.90
						1/2" Ice	0.37	11.06
						1" Ice	0.48	12.57
Aero MP3-03	B	No	CaAa (Out Of Face)	45.00 - 30.00	1	2" Ice	0.71	16.63
						4" Ice	1.15	28.88
						No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
Aero MP3-03	C	No	CaAa (Out Of Face)	45.00 - 30.00	1	2" Ice	0.00	16.63
						4" Ice	0.00	28.88
						No Ice	0.00	9.90
						1/2" Ice	0.00	11.06
						1" Ice	0.00	12.57
						2" Ice	0.00	16.63
						4" Ice	0.00	28.88

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	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

### Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight lb
L1	117.00-110.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.942	7.03
		C	0.000	0.000	0.000	0.000	0.00
L2	110.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	2.350	99.94
		C	0.000	0.000	0.000	0.000	0.00
L3	100.00-68.75	A	0.000	0.000	0.000	5.252	73.31
		B	0.000	0.000	0.000	5.353	532.71
		C	0.000	0.000	0.000	1.334	135.93
L4	68.75-63.50	A	0.000	0.000	0.000	3.484	136.82
		B	0.000	0.000	0.000	0.381	187.25
		C	0.000	0.000	0.000	0.000	95.73
L5	63.50-47.42	A	0.000	0.000	0.000	10.513	569.39
		B	0.000	0.000	0.000	1.166	723.87
		C	0.000	0.000	0.000	0.000	443.55
L6	47.42-43.75	A	0.000	0.000	0.000	2.286	111.83
		B	0.000	0.000	0.000	0.266	147.08
		C	0.000	0.000	0.000	0.000	83.11
L7	43.75-35.00	A	0.000	0.000	0.000	5.807	323.74
		B	0.000	0.000	0.000	0.634	407.79
		C	0.000	0.000	0.000	0.000	255.26
L8	35.00-31.25	A	0.000	0.000	0.000	2.489	157.89
		B	0.000	0.000	0.000	0.272	193.91
		C	0.000	0.000	0.000	0.000	128.54
L9	31.25-9.25	A	0.000	0.000	0.000	13.398	733.21
		B	0.000	0.000	0.000	1.595	932.18
		C	0.000	0.000	0.000	0.000	548.66
L10	9.25-1.75	A	0.000	0.000	0.000	4.978	315.77
		B	0.000	0.000	0.000	0.544	313.57
		C	0.000	0.000	0.000	0.000	182.83
L11	1.75-0.00	A	0.000	0.000	0.000	1.031	68.73
		B	0.000	0.000	0.000	0.127	73.17
		C	0.000	0.000	0.000	0.000	42.66

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

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	$A_R$ ft <sup>2</sup>	$A_F$ ft <sup>2</sup>	$C_A A_A$ In Face ft <sup>2</sup>	$C_A A_A$ Out Face ft <sup>2</sup>	Weight lb
L1	117.00-110.00	A	0.870	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	4.595	57.45
		C		0.000	0.000	0.000	0.000	0.00
L2	110.00-100.00	A	0.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	7.520	197.85
		C		0.000	0.000	0.000	0.000	0.00
L3	100.00-68.75	A	0.839	0.000	0.000	0.000	9.594	310.52
		B		0.000	0.000	0.000	19.023	830.71
		C		0.000	0.000	0.000	5.192	278.53
L4	68.75-63.50	A	0.815	0.000	0.000	0.000	6.147	302.07
		B		0.000	0.000	0.000	2.093	248.54
		C		0.000	0.000	0.000	0.000	109.25
L5	63.50-47.42	A	0.798	0.000	0.000	0.000	18.450	1074.84
		B		0.000	0.000	0.000	6.298	919.08
		C		0.000	0.000	0.000	0.000	496.60
L6	47.42-43.75	A	0.780	0.000	0.000	0.000	4.066	223.41

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 8 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

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>AA</sub> In Face ft <sup>2</sup>	C <sub>AA</sub> Out Face ft <sup>2</sup>	Weight lb
L7	43.75-35.00	B	0.766	0.000	0.000	0.000	1.437	187.86
		C		0.000	0.000	0.000	0.000	91.44
		A		0.000	0.000	0.000	9.977	587.73
L8	35.00-31.25	B	0.750	0.000	0.000	0.000	3.315	511.23
		C		0.000	0.000	0.000	0.000	285.51
		A		0.000	0.000	0.000	4.239	268.65
L9	31.25-9.25	B	0.750	0.000	0.000	0.000	1.397	237.60
		C		0.000	0.000	0.000	0.000	141.73
		A		0.000	0.000	0.000	23.340	1345.27
L10	9.25-1.75	B	0.750	0.000	0.000	0.000	8.195	1148.54
		C		0.000	0.000	0.000	0.000	586.23
		A		0.000	0.000	0.000	8.478	537.18
L11	1.75-0.00	B	0.750	0.000	0.000	0.000	2.794	386.51
		C		0.000	0.000	0.000	0.000	194.82
		A		0.000	0.000	0.000	1.764	119.43
		B		0.000	0.000	0.000	0.652	90.19
		C		0.000	0.000	0.000	0.000	45.46

### Feed Line Center of Pressure

Section	Elevation ft	CP <sub>x</sub> in	CP <sub>z</sub> in	CP <sub>x</sub> Ice in	CP <sub>z</sub> Ice in
L1	117.00-110.00	0.1579	0.0912	0.5216	0.3011
L2	110.00-100.00	0.2620	0.1513	0.5994	0.3461
L3	100.00-68.75	0.1298	-0.1001	0.3296	0.0404
L4	68.75-63.50	0.0702	-0.7015	0.2890	-0.8136
L5	63.50-47.42	0.0720	-0.7074	0.2976	-0.8343
L6	47.42-43.75	0.0735	-0.6876	0.3068	-0.8251
L7	43.75-35.00	0.0735	-0.7341	0.3018	-0.8744
L8	35.00-31.25	0.0742	-0.7415	0.3034	-0.8877
L9	31.25-9.25	0.0766	-0.6991	0.3176	-0.8611
L10	9.25-1.75	0.0768	-0.7675	0.3226	-0.9440
L11	1.75-0.00	0.0786	-0.6917	0.3336	-0.8493

### Discrete Tower Loads

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	
***									
***									
800 EXTERNAL NOTCH FILTER	A	From Leg	2.00 0.00 0.00	-10.0000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	11.00 16.81 24.26 44.81 114.01
800 EXTERNAL NOTCH	B	From Leg	2.00	-40.0000	117.00	No Ice	0.77	0.37	11.00



<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>		BRG 302 943052 (BU# 806352)		<b>Page</b>	9 of 28
	<b>Project</b>		TEP No. 127875		<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>		Crown Castle		<b>Designed by</b>	rrimmele

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	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
FILTER			0.00 0.00			1/2" Ice 0.89 1" Ice 1.02 2" Ice 1.30 4" Ice 1.97 No Ice 0.77	0.46 0.56 0.79 1.34 0.37	16.81 24.26 44.81 114.01 11.00
800 EXTERNAL NOTCH FILTER	C	From Leg	2.00 0.00 0.00	-20.0000	117.00	1/2" Ice 0.89 1" Ice 1.02 2" Ice 1.30 4" Ice 1.97 No Ice 0.08	0.46 0.56 0.79 1.34 0.14	16.81 24.26 44.81 114.01 1.04
(3) ACU-A20-N	A	From Leg	2.00 0.00 0.00	-10.0000	117.00	1/2" Ice 0.12 1" Ice 0.17 2" Ice 0.30 4" Ice 0.67 No Ice 0.08	0.19 0.25 0.40 0.80 0.14	2.32 4.41 11.80 44.85 1.04
(3) ACU-A20-N	C	From Leg	2.00 0.00 0.00	-40.0000	117.00	1/2" Ice 0.12 1" Ice 0.17 2" Ice 0.30 4" Ice 0.67 No Ice 0.08	0.19 0.25 0.40 0.80 0.14	2.32 4.41 11.80 44.85 1.04
(3) ACU-A20-N	B	From Leg	2.00 0.00 0.00	-20.0000	117.00	1/2" Ice 0.12 1" Ice 0.17 2" Ice 0.30 4" Ice 0.67 No Ice 0.08	0.19 0.25 0.40 0.80 0.14	2.32 4.41 11.80 44.85 1.04
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	2.00 0.00 0.00	-10.0000	117.00	1/2" Ice 9.15 1" Ice 9.77 2" Ice 11.03 4" Ice 13.68 No Ice 8.50	8.13 9.02 10.84 14.85 6.95	147.74 224.90 405.88 908.85 82.55
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	2.00 0.00 0.00	-40.0000	117.00	1/2" Ice 9.15 1" Ice 9.77 2" Ice 11.03 4" Ice 13.68 No Ice 8.50	8.13 9.02 10.84 14.85 6.95	147.74 224.90 405.88 908.85 82.55
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	2.00 0.00 0.00	-20.0000	117.00	1/2" Ice 9.15 1" Ice 9.77 2" Ice 11.03 4" Ice 13.68 No Ice 8.50	8.13 9.02 10.84 14.85 6.95	147.74 224.90 405.88 908.85 82.55
Side Arm Mount [SO 102-3]	C	None		0.0000	117.00	1/2" Ice 3.48 1" Ice 3.96 2" Ice 4.92 4" Ice 6.84 No Ice 3.00	3.48 3.96 4.92 6.84 3.00	111.00 141.00 201.00 321.00 81.00
***								
TME-800MHZ RRH	A	From Leg	2.00 0.75 0.00	-10.0000	115.00	1/2" Ice 2.71 1" Ice 2.93 2" Ice 3.41 4" Ice 4.46 No Ice 2.49	2.27 2.48 2.93 3.93 2.07	74.19 98.39 156.61 317.77 53.00
TME-800MHZ RRH	B	From Leg	2.00 0.75 0.00	-40.0000	115.00	1/2" Ice 2.71 1" Ice 2.93 2" Ice 3.41 4" Ice 4.46 No Ice 2.49	2.27 2.48 2.93 3.93 2.07	74.19 98.39 156.61 317.77 53.00
TME-800MHZ RRH	C	From Leg	2.00 0.75	-20.0000	115.00	1/2" Ice 2.71 No Ice 2.49	2.27 2.07	74.19 53.00

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 10 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
			0.00			1" Ice	2.93	2.48	98.39
						2" Ice	3.41	2.93	156.61
						4" Ice	4.46	3.93	317.77
TME-PCS 1900MHz	A	From Leg	2.00		-10.0000	No Ice	2.71	2.61	60.00
4x45W-65MHz			-0.75			1/2" Ice	2.95	2.85	83.13
			0.00			1" Ice	3.20	3.09	109.50
						2" Ice	3.72	3.61	172.72
						4" Ice	4.86	4.74	346.52
TME-PCS 1900MHz	B	From Leg	2.00		-40.0000	No Ice	2.71	2.61	60.00
4x45W-65MHz			-0.75			1/2" Ice	2.95	2.85	83.13
			0.00			1" Ice	3.20	3.09	109.50
						2" Ice	3.72	3.61	172.72
						4" Ice	4.86	4.74	346.52
TME-PCS 1900MHz	C	From Leg	2.00		-20.0000	No Ice	2.71	2.61	60.00
4x45W-65MHz			-0.75			1/2" Ice	2.95	2.85	83.13
			0.00			1" Ice	3.20	3.09	109.50
						2" Ice	3.72	3.61	172.72
						4" Ice	4.86	4.74	346.52
Side Arm Mount [SO 102-3]	C	None			0.0000	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
***									
ERICSSON AIR 21 B2A	A	From Face	2.00		0.0000	No Ice	6.83	5.64	112.18
B4P w/ Mount Pipe			0.00			1/2" Ice	7.35	6.48	166.73
			0.00			1" Ice	7.86	7.26	231.26
						2" Ice	8.93	8.86	382.99
						4" Ice	11.18	12.29	806.74
ERICSSON AIR 21 B2A	B	From Face	2.00		0.0000	No Ice	6.83	5.64	112.18
B4P w/ Mount Pipe			0.00			1/2" Ice	7.35	6.48	166.73
			0.00			1" Ice	7.86	7.26	231.26
						2" Ice	8.93	8.86	382.99
						4" Ice	11.18	12.29	806.74
ERICSSON AIR 21 B2A	C	From Face	2.00		0.0000	No Ice	6.83	5.64	112.18
B4P w/ Mount Pipe			0.00			1/2" Ice	7.35	6.48	166.73
			0.00			1" Ice	7.86	7.26	231.26
						2" Ice	8.93	8.86	382.99
						4" Ice	11.18	12.29	806.74
KRY 112 144/1	A	From Face	2.00		0.0000	No Ice	0.41	0.19	11.02
			0.00			1/2" Ice	0.50	0.26	14.12
			0.00			1" Ice	0.60	0.33	18.44
						2" Ice	0.82	0.51	31.51
						4" Ice	1.36	0.97	80.86
KRY 112 144/1	B	From Face	2.00		0.0000	No Ice	0.41	0.19	11.02
			0.00			1/2" Ice	0.50	0.26	14.12
			0.00			1" Ice	0.60	0.33	18.44
						2" Ice	0.82	0.51	31.51
						4" Ice	1.36	0.97	80.86
KRY 112 144/1	C	From Face	2.00		0.0000	No Ice	0.41	0.19	11.02
			0.00			1/2" Ice	0.50	0.26	14.12
			0.00			1" Ice	0.60	0.33	18.44
						2" Ice	0.82	0.51	31.51
						4" Ice	1.36	0.97	80.86
Side Arm Mount [SO 102-3]	C	None			0.0000	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00

<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>		BRG 302 943052 (BU# 806352)		<b>Page</b>		11 of 28	
	<b>Project</b>		TEP No. 127875		<b>Date</b>		10:40:47 12/10/12	
	<b>Client</b>		Crown Castle		<b>Designed by</b>		rrimmele	

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral						Vert
							2" Ice	4.92	4.92	201.00
							4" Ice	6.84	6.84	321.00
***							No Ice	8.68	7.42	79.33
LNx-6514DS-T4M w/ Mount Pipe	A	From Centroid-Face	4.00	2.00	-30.0000	98.00	1/2" Ice	9.31	8.45	149.39
			4.00				1" Ice	9.93	9.34	229.86
							2" Ice	11.20	11.18	420.01
							4" Ice	13.85	15.22	938.26
LNx-6514DS-T4M w/ Mount Pipe	B	From Centroid-Face	4.00	2.00	-30.0000	98.00	No Ice	8.68	7.42	79.33
			4.00				1/2" Ice	9.31	8.45	149.39
							1" Ice	9.93	9.34	229.86
							2" Ice	11.20	11.18	420.01
							4" Ice	13.85	15.22	938.26
LNx-6514DS-T4M w/ Mount Pipe	C	From Centroid-Face	4.00	2.00	-30.0000	98.00	No Ice	8.68	7.42	79.33
			4.00				1/2" Ice	9.31	8.45	149.39
							1" Ice	9.93	9.34	229.86
							2" Ice	11.20	11.18	420.01
							4" Ice	13.85	15.22	938.26
(2) DB844G65ZAXY w/ Mount Pipe	A	From Centroid-Face	4.00	0.00	-30.0000	98.00	No Ice	4.90	4.92	34.25
			4.00				1/2" Ice	5.35	5.60	78.27
							1" Ice	5.80	6.28	131.11
							2" Ice	6.73	7.71	256.96
							4" Ice	8.73	10.83	616.61
(2) DB844G65ZAXY w/ Mount Pipe	B	From Centroid-Face	4.00	0.00	-30.0000	98.00	No Ice	4.90	4.92	34.25
			4.00				1/2" Ice	5.35	5.60	78.27
							1" Ice	5.80	6.28	131.11
							2" Ice	6.73	7.71	256.96
							4" Ice	8.73	10.83	616.61
(2) DB844G65ZAXY w/ Mount Pipe	C	From Centroid-Face	4.00	0.00	-30.0000	98.00	No Ice	4.90	4.92	34.25
			4.00				1/2" Ice	5.35	5.60	78.27
							1" Ice	5.80	6.28	131.11
							2" Ice	6.73	7.71	256.96
							4" Ice	8.73	10.83	616.61
MG D3-800TV w/ Mount Pipe	A	From Centroid-Face	4.00	-2.00	-30.0000	98.00	No Ice	3.57	3.42	37.28
			4.00				1/2" Ice	3.98	4.12	68.91
							1" Ice	4.39	4.78	109.43
							2" Ice	5.33	6.16	210.30
							4" Ice	7.34	9.18	519.96
MG D3-800TV w/ Mount Pipe	B	From Centroid-Face	4.00	-2.00	-30.0000	98.00	No Ice	3.57	3.42	37.28
			4.00				1/2" Ice	3.98	4.12	68.91
							1" Ice	4.39	4.78	109.43
							2" Ice	5.33	6.16	210.30
							4" Ice	7.34	9.18	519.96
MG D3-800TV w/ Mount Pipe	C	From Centroid-Face	4.00	-2.00	-30.0000	98.00	No Ice	3.57	3.42	37.28
			4.00				1/2" Ice	3.98	4.12	68.91
							1" Ice	4.39	4.78	109.43
							2" Ice	5.33	6.16	210.30
							4" Ice	7.34	9.18	519.96
(2) FD9R6004/2C-3L	A	From Centroid-Face	4.00	0.00	-30.0000	98.00	No Ice	0.37	0.08	3.10
			4.00				1/2" Ice	0.45	0.14	5.40
							1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
							4" Ice	1.28	0.74	62.87
(2) FD9R6004/2C-3L	B	From Centroid-Face	4.00	0.00	-30.0000	98.00	No Ice	0.37	0.08	3.10
			4.00				1/2" Ice	0.45	0.14	5.40
							1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 12 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight	
			Horz	Lateral Vert						
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
(2) FD9R6004/2C-3L	C	From Centroid-Face	4.00	0.00	-30.0000	98.00	4" Ice	1.28	0.74	62.87
							No Ice	0.37	0.08	3.10
							1/2" Ice	0.45	0.14	5.40
							1" Ice	0.54	0.20	8.79
							2" Ice	0.75	0.34	19.61
Platform Mount [LP 713-1]	C	None			0.0000	98.00	4" Ice	1.28	0.74	62.87
							No Ice	31.27	31.27	1510.00
							1/2" Ice	39.68	39.68	1929.00
							1" Ice	48.09	48.09	2348.00
							2" Ice	64.91	64.91	3186.00
*** Side Arm Mount [SO 102-3]	C	None			0.0000	93.00	4" Ice	98.55	98.55	4862.00
							No Ice	3.00	3.00	81.00
							1/2" Ice	3.48	3.48	111.00
							1" Ice	3.96	3.96	141.00
							2" Ice	4.92	4.92	201.00
2.4" x 6-ft pipe	A	From Leg	2.00	0.00	0.0000	93.00	4" Ice	6.84	6.84	321.00
							No Ice	1.44	1.44	21.96
							1/2" Ice	1.93	1.93	32.88
							1" Ice	2.30	2.30	47.87
							2" Ice	3.07	3.07	90.64
2.4" x 6-ft pipe	B	From Leg	2.00	0.00	0.0000	93.00	4" Ice	4.71	4.71	231.64
							No Ice	1.44	1.44	21.96
							1/2" Ice	1.93	1.93	32.88
							1" Ice	2.30	2.30	47.87
							2" Ice	3.07	3.07	90.64
(2) 2.4" x 6-ft pipe	C	From Leg	2.00	0.00	0.0000	93.00	4" Ice	4.71	4.71	231.64
							No Ice	1.44	1.44	21.96
							1/2" Ice	1.93	1.93	32.88
							1" Ice	2.30	2.30	47.87
							2" Ice	3.07	3.07	90.64
*** P65-17-XLH-RR w/ Mount Pipe	A	From Centroid-Face	4.00	0.00	15.0000	87.00	4" Ice	4.71	4.71	231.64
							No Ice	11.70	8.94	91.85
							1/2" Ice	12.42	10.45	173.99
							1" Ice	13.15	11.99	271.15
							2" Ice	14.64	14.31	498.33
P65-16-XLH-RR w/ Mount Pipe	B	From Centroid-Face	4.00	0.00	15.0000	87.00	4" Ice	17.91	19.14	1125.47
							No Ice	8.64	6.36	78.55
							1/2" Ice	9.29	7.54	141.50
							1" Ice	9.91	8.43	216.37
							2" Ice	11.18	10.24	392.63
P65-16-XLH-RR w/ Mount Pipe	C	From Centroid-Face	4.00	0.00	15.0000	87.00	4" Ice	13.83	14.10	885.51
							No Ice	8.64	6.36	78.55
							1/2" Ice	9.29	7.54	141.50
							1" Ice	9.91	8.43	216.37
							2" Ice	11.18	10.24	392.63
(2) LGP13519	A	From Centroid-Leg	4.00	6.00	22.0000	87.00	4" Ice	13.83	14.10	885.51
							No Ice	0.34	0.21	5.30
							1/2" Ice	0.42	0.28	8.02
							1" Ice	0.51	0.36	11.91
							2" Ice	0.73	0.55	23.96
(2) LGP13519	B	From Centroid-Leg	4.00	6.00	22.0000	87.00	4" Ice	1.25	1.03	70.63
							No Ice	0.34	0.21	5.30
							1/2" Ice	0.42	0.28	8.02
							1" Ice	0.51	0.36	11.91
							2" Ice	0.73	0.55	23.96

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 13 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
			Vert	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb	
(2) LGP13519	C	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	1.25	1.03	70.63
			6.00			No Ice	0.34	0.21	5.30
			4.00			1/2" Ice	0.42	0.28	8.02
						1" Ice	0.51	0.36	11.91
						2" Ice	0.73	0.55	23.96
(2) RRUS-11	A	From Centroid-Face	4.00	15.0000	87.00	4" Ice	1.25	1.03	70.63
			0.00			No Ice	3.25	1.37	47.62
			4.00			1/2" Ice	3.49	1.55	68.42
						1" Ice	3.74	1.74	92.25
						2" Ice	4.27	2.14	149.81
(2) RRUS-11	B	From Centroid-Face	4.00	15.0000	87.00	4" Ice	5.43	3.04	309.89
			0.00			No Ice	3.25	1.37	47.62
			4.00			1/2" Ice	3.49	1.55	68.42
						1" Ice	3.74	1.74	92.25
						2" Ice	4.27	2.14	149.81
(2) RRUS-11	C	From Centroid-Face	4.00	15.0000	87.00	4" Ice	5.43	3.04	309.89
			0.00			No Ice	3.25	1.37	47.62
			4.00			1/2" Ice	3.49	1.55	68.42
						1" Ice	3.74	1.74	92.25
						2" Ice	4.27	2.14	149.81
(2) 7770.00 w/ Mount Pipe	A	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	5.43	3.04	309.89
			0.00			No Ice	6.12	4.25	55.38
			4.00			1/2" Ice	6.63	5.01	100.55
						1" Ice	7.13	5.71	155.33
						2" Ice	8.16	7.16	286.50
(2) 7770.00 w/ Mount Pipe	B	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	10.36	10.41	664.71
			0.00			No Ice	6.12	4.25	55.38
			4.00			1/2" Ice	6.63	5.01	100.55
						1" Ice	7.13	5.71	155.33
						2" Ice	8.16	7.16	286.50
(2) 7770.00 w/ Mount Pipe	C	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	10.36	10.41	664.71
			0.00			No Ice	6.12	4.25	55.38
			4.00			1/2" Ice	6.63	5.01	100.55
						1" Ice	7.13	5.71	155.33
						2" Ice	8.16	7.16	286.50
(2) LGP2140X	A	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	10.36	10.41	664.71
			-6.00			No Ice	1.26	0.38	14.10
			4.00			1/2" Ice	1.42	0.49	21.23
						1" Ice	1.58	0.62	30.24
						2" Ice	1.94	0.89	54.70
(2) LGP2140X	B	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	2.75	1.54	134.81
			-6.00			No Ice	1.26	0.38	14.10
			4.00			1/2" Ice	1.42	0.49	21.23
						1" Ice	1.58	0.62	30.24
						2" Ice	1.94	0.89	54.70
(2) LGP2140X	C	From Centroid-Le g	4.00	22.0000	87.00	4" Ice	2.75	1.54	134.81
			-6.00			No Ice	1.26	0.38	14.10
			4.00			1/2" Ice	1.42	0.49	21.23
						1" Ice	1.58	0.62	30.24
						2" Ice	1.94	0.89	54.70
DC6-48-60-18-8F	A	From Centroid-Face	4.00	22.0000	87.00	4" Ice	2.75	1.54	134.81
			0.00			No Ice	1.27	1.27	20.00
			4.00			1/2" Ice	1.46	1.46	35.12
						1" Ice	1.66	1.66	52.57
						2" Ice	2.09	2.09	95.09
Platform Mount [LP 713-1]	C	None		0.0000	87.00	4" Ice	3.10	3.10	214.90
						No Ice	31.27	31.27	1510.00

<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>	BRG 302 943052 (BU# 806352)	<b>Page</b>	14 of 28
	<b>Project</b>	TEP No. 127875	<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>	Crown Castle	<b>Designed by</b>	rrimmele

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>A</sub> Front	C <sub>A</sub> A <sub>A</sub> Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
						1/2" Ice	39.68	39.68	1929.00
						1" Ice	48.09	48.09	2348.00
						2" Ice	64.91	64.91	3186.00
						4" Ice	98.55	98.55	4862.00
***									
800 10504 w/ Mount Pipe	A	From Face	2.00	0.0000	81.00	No Ice	3.59	3.18	37.75
						1/2" Ice	4.01	3.91	68.19
						1" Ice	4.42	4.58	107.66
						2" Ice	5.34	5.98	206.58
						4" Ice	7.38	8.98	513.48
800 10504 w/ Mount Pipe	B	From Face	2.00	0.0000	81.00	No Ice	3.59	3.18	37.75
						1/2" Ice	4.01	3.91	68.19
						1" Ice	4.42	4.58	107.66
						2" Ice	5.34	5.98	206.58
						4" Ice	7.38	8.98	513.48
800 10504 w/ Mount Pipe	C	From Face	2.00	0.0000	81.00	No Ice	3.59	3.18	37.75
						1/2" Ice	4.01	3.91	68.19
						1" Ice	4.42	4.58	107.66
						2" Ice	5.34	5.98	206.58
						4" Ice	7.38	8.98	513.48
Side Arm Mount [SO 102-3]	C	None		0.0000	81.00	No Ice	3.00	3.00	81.00
						1/2" Ice	3.48	3.48	111.00
						1" Ice	3.96	3.96	141.00
						2" Ice	4.92	4.92	201.00
						4" Ice	6.84	6.84	321.00
***									
DB844H90E-XY w/ Mount Pipe	A	From Centroid-Le g	4.00 -6.00 2.00	30.0000	70.00	No Ice	3.30	4.92	32.25
						1/2" Ice	3.69	5.60	69.80
						1" Ice	4.12	6.28	115.95
						2" Ice	5.01	7.71	227.74
						4" Ice	6.92	10.83	556.54
DB844H90E-XY w/ Mount Pipe	B	From Centroid-Le g	4.00 -6.00 2.00	30.0000	70.00	No Ice	3.30	4.92	32.25
						1/2" Ice	3.69	5.60	69.80
						1" Ice	4.12	6.28	115.95
						2" Ice	5.01	7.71	227.74
						4" Ice	6.92	10.83	556.54
DB844H90E-XY w/ Mount Pipe	C	From Centroid-Le g	4.00 -6.00 2.00	30.0000	70.00	No Ice	3.30	4.92	32.25
						1/2" Ice	3.69	5.60	69.80
						1" Ice	4.12	6.28	115.95
						2" Ice	5.01	7.71	227.74
						4" Ice	6.92	10.83	556.54
LLPX310R w/ Mount Pipe	A	From Centroid-Le g	4.00 0.00 2.00	25.0000	70.00	No Ice	4.98	2.87	43.87
						1/2" Ice	5.38	3.40	79.25
						1" Ice	5.78	3.94	122.33
						2" Ice	6.62	5.12	226.49
						4" Ice	8.44	7.89	531.18
LLPX310R w/ Mount Pipe	B	From Centroid-Le g	4.00 0.00 2.00	35.0000	70.00	No Ice	4.98	2.87	43.87
						1/2" Ice	5.38	3.40	79.25
						1" Ice	5.78	3.94	122.33
						2" Ice	6.62	5.12	226.49
						4" Ice	8.44	7.89	531.18
LLPX310R w/ Mount Pipe	C	From Centroid-Le g	4.00 0.00 2.00	35.0000	70.00	No Ice	4.98	2.87	43.87
						1/2" Ice	5.38	3.40	79.25
						1" Ice	5.78	3.94	122.33
						2" Ice	6.62	5.12	226.49
						4" Ice	8.44	7.89	531.18
LBX-9012DS-VTM w/	A	From	4.00	30.0000	70.00	No Ice	5.44	4.00	45.16

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	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral Vert					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	lb
Mount Pipe		Centroid-Le g	6.00			1/2" Ice	5.91	4.67	86.88
			2.00			1" Ice	6.39	5.33	137.66
						2" Ice	7.37	6.71	259.73
						4" Ice	9.45	9.86	614.09
LBX-9012DS-VTM w/ Mount Pipe	B	From	4.00		30.0000	No Ice	5.44	4.00	45.16
		Centroid-Le g	6.00			1/2" Ice	5.91	4.67	86.88
			2.00			1" Ice	6.39	5.33	137.66
						2" Ice	7.37	6.71	259.73
						4" Ice	9.45	9.86	614.09
LBX-9012DS-VTM w/ Mount Pipe	C	From	4.00		30.0000	No Ice	5.44	4.00	45.16
		Centroid-Le g	6.00			1/2" Ice	5.91	4.67	86.88
			2.00			1" Ice	6.39	5.33	137.66
						2" Ice	7.37	6.71	259.73
						4" Ice	9.45	9.86	614.09
FDD_R6_RRH	A	From	4.00		25.0000	No Ice	1.79	0.78	33.00
		Centroid-Le g	0.00			1/2" Ice	1.97	0.92	44.50
			2.00			1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
FDD_R6_RRH	B	From	4.00		35.0000	No Ice	1.79	0.78	33.00
		Centroid-Le g	0.00			1/2" Ice	1.97	0.92	44.50
			2.00			1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
FDD_R6_RRH	C	From	4.00		35.0000	No Ice	1.79	0.78	33.00
		Centroid-Le g	0.00			1/2" Ice	1.97	0.92	44.50
			2.00			1" Ice	2.16	1.07	58.31
						2" Ice	2.57	1.39	93.60
						4" Ice	3.49	2.14	200.35
Platform Mount [LP 713-1]	C	None			0.0000	No Ice	31.27	31.27	1510.00
						1/2" Ice	39.68	39.68	1929.00
						1" Ice	48.09	48.09	2348.00
						2" Ice	64.91	64.91	3186.00
						4" Ice	98.55	98.55	4862.00
***									
Side Arm Mount [SO 701-1]	A	From Leg	1.50		0.0000	No Ice	0.85	1.67	65.00
			0.00			1/2" Ice	1.14	2.34	79.00
			0.00			1" Ice	1.43	3.01	93.00
						2" Ice	2.01	4.35	121.00
						4" Ice	3.17	7.03	177.00

## Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets:		Azimuth Adjustment	3 dB Beam Width	Elevation	Outside Diameter	Aperture Area	Weight	
				Horz	Lateral Vert							
			ft	ft	°	°	ft	ft	ft <sup>2</sup>	lb		
VHLP2-11	A	Paraboloid w/Shroud (HP)	From Leg	2.00		48.0000		93.00	2.00	No Ice	3.72	30.00
				0.00						1/2" Ice	4.01	50.00
				1.00						1" Ice	4.30	70.00

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 16 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight lb
VHLP1-23	B	Paraboloid w/Shroud (HP)	From Leg	2.00	-52.0000		93.00	1.27	2" Ice	110.00
				0.00					4" Ice	190.00
				2.00					No Ice	10.00
									1/2" Ice	20.00
									1" Ice	20.00
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	2.00	-2.0000		93.00	2.92	2" Ice	40.00
				-1.00					4" Ice	60.00
				1.00					No Ice	47.60
									1/2" Ice	83.89
									1" Ice	120.17
VHLP1-23	C	Paraboloid w/Shroud (HP)	From Leg	2.00	90.0000		93.00	1.27	2" Ice	192.74
				1.00					4" Ice	337.88
				-1.00					No Ice	10.00
									1/2" Ice	20.00
									1" Ice	20.00
	2" Ice	40.00								
	4" Ice	60.00								

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>n</sub> ft	KL/r	F <sub>a</sub> ksi	A in <sup>2</sup>	Actual P lb	Allow. P <sub>a</sub> lb	Ratio P/P <sub>a</sub>
L1	117 - 116	TP15.94x14.36x0.1875	7.00	0.00	0.0	39.000	8.6929	-260.29	339024.00	0.001
	116 - 115					39.000	8.8292	-284.83	344339.00	0.001
	115 - 114					39.000	8.9655	-647.26	349653.00	0.002
	114 - 113					39.000	9.1018	-672.74	354968.00	0.002
	113 - 112					39.000	9.2380	-698.70	360283.00	0.002
	112 - 111					39.000	9.3743	-725.16	365598.00	0.002
	111 - 110					39.000	9.5106	-752.10	370912.00	0.002
L2	110 - 109	TP18.2x15.94x0.1875	10.00	0.00	0.0	39.000	9.6470	-1138.30	376234.00	0.003
	109 - 108					39.000	9.7835	-1175.35	381555.00	0.003
	108 - 107					39.000	9.9199	-1212.98	386877.00	0.003
	107 - 106					39.000	10.0564	-1251.20	392198.00	0.003
	106 - 105					39.000	10.1928	-1290.01	397520.00	0.003
	105 - 104					39.000	10.3293	-1329.41	402841.00	0.003
	104 - 103					39.000	10.4657	-1369.40	408162.00	0.003
	103 - 102					39.000	10.6022	-1409.98	413484.00	0.003
	102 - 101					39.000	10.7386	-1451.14	418805.00	0.003
	101 - 100					39.000	10.8750	-1492.90	424127.00	0.004
L3	100 - 98.4375	TP25.2659x18.2x0.25	31.25	0.00	0.0	39.000	14.7342	-1598.26	574632.00	0.003
	98.4375 - 96.875					39.000	15.0186	-3393.38	585724.00	0.006
	96.875 - 95.3125					39.000	15.3030	-3507.75	596815.00	0.006
	95.3125 - 93.75					39.000	15.5874	-3665.51	607907.00	0.006
	93.75 - 92.1875					39.000	15.8718	-3920.81	618999.00	0.006
	92.1875 - 90.625					39.000	16.1562	-4050.35	630091.00	0.006
	90.625 - 89.0625					39.000	16.4406	-4176.37	641182.00	0.007



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	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

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>
	89.0625 - 87.5					39.000	16.7250	-4302.73	652274.00	0.007
	87.5 - 85.9375					39.000	17.0094	-6556.30	663366.00	0.010
	85.9375 - 84.375					39.000	17.2938	-6699.74	674458.00	0.010
	84.375 - 82.8125					39.000	17.5782	-6846.81	685549.00	0.010
	82.8125 - 81.25					39.000	17.8626	-6997.30	696641.00	0.010
	81.25 - 79.6875					39.000	18.1470	-7304.06	707733.00	0.010
	79.6875 - 78.125					39.000	18.4314	-7462.28	718825.00	0.010
	78.125 - 76.5625					39.000	18.7158	-7623.73	729916.00	0.010
	76.5625 - 75					39.000	19.0002	-7788.33	741008.00	0.011
	75 - 73.4375					39.000	19.2846	-7955.98	752100.00	0.011
	73.4375 - 71.875					39.000	19.5690	-8126.60	763192.00	0.011
	71.875 - 70.3125					39.000	19.8534	-8300.12	774283.00	0.011
	70.3125 - 68.75					39.000	20.1378	-10271.50	785375.00	0.013
L4	68.75 - 67.7	TP26.453x25.2659x0.3694	5.25	0.00	0.0	39.000	29.8934	-10458.50	1165840.00	0.009
	67.7 - 66.65					39.000	30.1758	-10632.70	1176860.00	0.009
	66.65 - 65.6					39.000	30.4582	-10808.20	1187870.00	0.009
	65.6 - 64.55					39.000	30.7406	-10984.80	1198880.00	0.009
	64.55 - 63.5					39.000	31.0229	-11162.60	1209890.00	0.009
L5	63.5 - 62.4545	TP30.09x26.453x0.5237	16.08	0.00	0.0	39.000	44.1241	-11366.90	1720840.00	0.007
	62.4545 - 61.4091					39.000	44.5229	-11568.50	1736390.00	0.007
	61.4091 - 60.3636					39.000	44.9216	-11771.00	1751940.00	0.007
	60.3636 - 59.3182					39.000	45.3204	-11974.50	1767490.00	0.007
	59.3182 - 58.2727					39.000	45.7191	-12178.90	1783050.00	0.007
	58.2727 - 57.2273					39.000	46.1179	-12384.30	1798600.00	0.007
	57.2273 - 56.1818					39.000	46.5166	-12590.70	1814150.00	0.007
	56.1818 - 55.1364					39.000	46.9154	-12797.90	1829700.00	0.007
	55.1364 - 54.0909					39.000	47.3142	-13006.10	1845250.00	0.007
	54.0909 - 53.0455					39.000	47.7129	-13215.30	1860800.00	0.007
	53.0455 - 52					39.000	48.1117	-13425.30	1876350.00	0.007
	52 - 47.42					39.000	49.8586	-7789.79	1944480.00	0.004
L6	52 - 47.42	TP30.246x28.0067x0.502	8.25	0.00	0.0	39.000	46.4656	-7057.72	1812160.00	0.004
	47.42 - 46.1967					39.000	47.0023	-15129.20	1833090.00	0.008
	46.1967 - 44.9733					39.000	47.5390	-15401.40	1854020.00	0.008
	44.9733 - 43.75					39.000	48.0757	-15675.20	1874950.00	0.008
L7	43.75 - 42.6563	TP32.385x30.246x0.5883	8.75	0.00	0.0	39.000	56.6845	-15942.60	2210700.00	0.007
	42.6563 - 41.5625					39.000	57.1910	-16207.90	2230450.00	0.007
	41.5625 - 40.4688					39.000	57.6975	-16474.40	2250200.00	0.007
	40.4688 - 39.375					39.000	58.2039	-16742.20	2269950.00	0.007
	39.375 - 38.2813					39.000	58.7104	-17011.20	2289710.00	0.007
	38.2813 -					39.000	59.2169	-17281.40	2309460.00	0.007

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 18 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

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>
	37.1875									
	37.1875 - 36.0938					39.000	59.7233	-17552.80	2329210.00	0.008
L8	36.0938 - 35	TP33.233x32.385x0.6308	3.75	0.00	0.0	39.000	60.2298	-17825.40	2348960.00	0.007
	35 - 33.75					39.000	65.0716	-18155.40	2537790.00	0.007
	33.75 - 32.5					39.000	65.6458	-18487.60	2560190.00	0.007
	32.5 - 31.25					39.000	66.2199	-18821.40	2582580.00	0.007
L9	31.25 - 30.15	TP38.2082x33.233x0.5058	22.00	0.00	0.0	39.000	53.7049	-19090.00	2094490.00	0.009
	30.15 - 29.05					39.000	54.1100	-19360.90	2110290.00	0.009
	29.05 - 27.95					39.000	54.5151	-19632.90	2126090.00	0.009
	27.95 - 26.85					39.000	54.9203	-19906.10	2141890.00	0.009
	26.85 - 25.75					39.000	55.3254	-20180.50	2157690.00	0.009
	25.75 - 24.65					39.000	55.7305	-20456.00	2173490.00	0.009
	24.65 - 23.55					39.000	56.1357	-20732.70	2189290.00	0.009
	23.55 - 22.45					39.000	56.5408	-21010.60	2205090.00	0.010
	22.45 - 21.35					39.000	56.9459	-21289.60	2220890.00	0.010
	21.35 - 20.25					39.000	57.3510	-21569.80	2236690.00	0.010
	20.25 - 19.15					39.000	57.7562	-21851.20	2252490.00	0.010
	19.15 - 18.05					39.000	58.1613	-22133.70	2268290.00	0.010
	18.05 - 16.95					39.000	58.5664	-22417.40	2284090.00	0.010
	16.95 - 15.85					39.000	58.9715	-22702.20	2299890.00	0.010
	15.85 - 14.75					39.000	59.3767	-22988.20	2315690.00	0.010
	14.75 - 13.65					39.000	59.7818	-23275.40	2331490.00	0.010
	13.65 - 12.55					39.000	60.1869	-23563.70	2347290.00	0.010
	12.55 - 11.45					39.000	60.5921	-23853.20	2363090.00	0.010
	11.45 - 10.35					39.000	60.9972	-24143.80	2378890.00	0.010
	10.35 - 9.25					39.000	61.4023	-24435.60	2394690.00	0.010
L10	9.25 - 8.17857	TP39.9043x38.2082x0.4982	7.50	0.00	0.0	39.000	60.8788	-24729.70	2374270.00	0.010
	8.17857 - 7.10714					39.000	61.2675	-25024.60	2389430.00	0.010
	7.10714 - 6.03571					39.000	61.6561	-25320.70	2404590.00	0.011
	6.03571 - 4.96429					39.000	62.0448	-25617.90	2419750.00	0.011
	4.96429 - 3.89286					39.000	62.4335	-25916.10	2434910.00	0.011
	3.89286 - 2.82143					39.000	62.8221	-26215.50	2450060.00	0.011
	2.82143 - 1.75					39.000	63.2108	-26516.00	2465220.00	0.011
L11	1.75 - 0 (11)	TP40.3x39.9043x0.4962	1.75	0.00	0.0	39.000	63.6003	-26995.60	2480410.00	0.011

### Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M <sub>x</sub> lb-ft	Actual f <sub>bx</sub> ksi	Allow. F <sub>bx</sub> ksi	Ratio f <sub>bx</sub> /F <sub>bx</sub>	Actual M <sub>y</sub> lb-ft	Actual f <sub>by</sub> ksi	Allow. F <sub>by</sub> ksi	Ratio f <sub>by</sub> /F <sub>by</sub>
L1	117 - 116	TP15.94x14.36x0.1875	1396.40	0.550	39.000	0.014	0.00	0.000	39.000	0.000
	116 - 115		2856.90	1.091	39.000	0.028	0.00	0.000	39.000	0.000
	115 - 114		5226.94	1.936	39.000	0.050	0.00	0.000	39.000	0.000
	114 - 113		7663.10	2.754	39.000	0.071	0.00	0.000	39.000	0.000
	113 - 112		10166.3	3.546	39.000	0.091	0.00	0.000	39.000	0.000
			3							
	112 - 111		12737.5	4.313	39.000	0.111	0.00	0.000	39.000	0.000
			8							
	111 - 110		15377.7	5.058	39.000	0.130	0.00	0.000	39.000	0.000
			5							

<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>	BRG 302 943052 (BU# 806352)	<b>Page</b>	19 of 28
	<b>Project</b>	TEP No. 127875	<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>	Crown Castle	<b>Designed by</b>	rrimmele

Section No.	Elevation ft	Size	Actual $M_x$ lb-ft	Actual $f_{bx}$ ksi	Allow. $F_{bx}$ ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual $M_y$ lb-ft	Actual $f_{by}$ ksi	Allow. $F_{by}$ ksi	Ratio $\frac{f_{by}}{F_{by}}$
L2	110 - 109	TP18.2x15.94x0.1875	19125.4 2	6.113	39.000	0.157	0.00	0.000	39.000	0.000
	109 - 108		22946.6 7	7.130	39.000	0.183	0.00	0.000	39.000	0.000
	108 - 107		26842.3 3	8.112	39.000	0.208	0.00	0.000	39.000	0.000
	107 - 106		30813.5 8	9.059	39.000	0.232	0.00	0.000	39.000	0.000
	106 - 105		34861.1 7	9.975	39.000	0.256	0.00	0.000	39.000	0.000
	105 - 104		38986.0 8	10.861	39.000	0.278	0.00	0.000	39.000	0.000
	104 - 103		43189.2 5	11.719	39.000	0.300	0.00	0.000	39.000	0.000
	103 - 102		47471.6 7	12.550	39.000	0.322	0.00	0.000	39.000	0.000
	102 - 101		51834.2 5	13.355	39.000	0.342	0.00	0.000	39.000	0.000
	101 - 100		56277.8 3	14.137	39.000	0.362	0.00	0.000	39.000	0.000
L3	100 - 98.4375	TP25.2659x18.2x0.25	63392.2 5	11.604	39.000	0.298	0.00	0.000	39.000	0.000
	98.4375 - 96.875		86832.5 0	15.294	39.000	0.392	0.00	0.000	39.000	0.000
	96.875 - 95.3125		101144. 17	17.155	39.000	0.440	0.00	0.000	39.000	0.000
	95.3125 - 93.75		115910. 00	18.944	39.000	0.486	0.00	0.000	39.000	0.000
	93.75 - 92.1875		131826. 67	20.775	39.000	0.533	0.00	0.000	39.000	0.000
	92.1875 - 90.625		148272. 50	22.547	39.000	0.578	0.00	0.000	39.000	0.000
	90.625 - 89.0625		164926. 67	24.214	39.000	0.621	0.00	0.000	39.000	0.000
	89.0625 - 87.5		181825. 83	25.789	39.000	0.661	0.00	0.000	39.000	0.000
	87.5 - 85.9375		217008. 33	29.753	39.000	0.763	0.00	0.000	39.000	0.000
	85.9375 - 84.375		241760. 83	32.059	39.000	0.822	0.00	0.000	39.000	0.000
	84.375 - 82.8125		266732. 50	34.229	39.000	0.878	0.00	0.000	39.000	0.000
	82.8125 - 81.25		291925. 00	36.272	39.000	0.930	0.00	0.000	39.000	0.000
	81.25 - 79.6875		318054. 17	38.283	39.000	0.982	0.00	0.000	39.000	0.000
	79.6875 - 78.125		344543. 33	40.194	39.000	1.031	0.00	0.000	39.000	0.000
	78.125 - 76.5625		371255. 83	41.997	39.000	1.077	0.00	0.000	39.000	0.000
	76.5625 - 75		398193. 33	43.699	39.000	1.120	0.00	0.000	39.000	0.000
	75 - 73.4375		425357. 50	45.307	39.000	1.162	0.00	0.000	39.000	0.000
	73.4375 - 71.875		452749. 17	46.826	39.000	1.201	0.00	0.000	39.000	0.000
	71.875 - 70.3125		480370. 00	48.262	39.000	1.237	0.00	0.000	39.000	0.000
	70.3125 - 68.75		515181. 67	50.301	39.000	1.290	0.00	0.000	39.000	0.000



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	<b>Project</b>	TEP No. 127875	<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>	Crown Castle	<b>Designed by</b>	rrimmele

Section No.	Elevation ft	Size	Actual $M_x$ lb-ft	Actual $f_{bx}$ ksi	Allow. $F_{bx}$ ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual $M_y$ lb-ft	Actual $f_{by}$ ksi	Allow. $F_{by}$ ksi	Ratio $\frac{f_{by}}{F_{by}}$
	33.75 - 32.5		1345566	31.489	39.000	0.807	0.00	0.000	39.000	0.000
	32.5 - 31.25		1376791	31.658	39.000	0.812	0.00	0.000	39.000	0.000
L9	31.25 - 30.15	TP38.2082x33.233x0.5058	1404408	39.212	39.000	1.005	0.00	0.000	39.000	0.000
	30.15 - 29.05		1432133	39.385	39.000	1.010	0.00	0.000	39.000	0.000
	29.05 - 27.95		1459983	39.552	39.000	1.014	0.00	0.000	39.000	0.000
	27.95 - 26.85		1487950	39.713	39.000	1.018	0.00	0.000	39.000	0.000
	26.85 - 25.75		1516041	39.868	39.000	1.022	0.00	0.000	39.000	0.000
	25.75 - 24.65		1544250	40.017	39.000	1.026	0.00	0.000	39.000	0.000
	24.65 - 23.55		1572575	40.161	39.000	1.030	0.00	0.000	39.000	0.000
	23.55 - 22.45		1601025	40.299	39.000	1.033	0.00	0.000	39.000	0.000
	22.45 - 21.35		1629600	40.433	39.000	1.037	0.00	0.000	39.000	0.000
	21.35 - 20.25		1658300	40.562	39.000	1.040	0.00	0.000	39.000	0.000
	20.25 - 19.15		1687116	40.685	39.000	1.043	0.00	0.000	39.000	0.000
	19.15 - 18.05		1716058	40.805	39.000	1.046	0.00	0.000	39.000	0.000
	18.05 - 16.95		1745125	40.920	39.000	1.049	0.00	0.000	39.000	0.000
	16.95 - 15.85		1774316	41.031	39.000	1.052	0.00	0.000	39.000	0.000
	15.85 - 14.75		1803633	41.138	39.000	1.055	0.00	0.000	39.000	0.000
	14.75 - 13.65		1833075	41.241	39.000	1.057	0.00	0.000	39.000	0.000
	13.65 - 12.55		1862641	41.340	39.000	1.060	0.00	0.000	39.000	0.000
	12.55 - 11.45		1892341	41.435	39.000	1.062	0.00	0.000	39.000	0.000
	11.45 - 10.35		1922158	41.528	39.000	1.065	0.00	0.000	39.000	0.000
	10.35 - 9.25		1952108	41.616	39.000	1.067	0.00	0.000	39.000	0.000
L10	9.25 - 8.17857	TP39.9043x38.2082x0.4982	1981408	42.312	39.000	1.085	0.00	0.000	39.000	0.000
	8.17857 - 7.10714		2010833	42.393	39.000	1.087	0.00	0.000	39.000	0.000
	7.10714 - 6.03571		2040383	42.472	39.000	1.089	0.00	0.000	39.000	0.000
	6.03571 - 4.96429		2070050	42.548	39.000	1.091	0.00	0.000	39.000	0.000
	4.96429 - 3.89286		2099841	42.621	39.000	1.093	0.00	0.000	39.000	0.000
	3.89286 - 2.82143		2129758	42.692	39.000	1.095	0.00	0.000	39.000	0.000
	2.82143 - 1.75		2159800	42.760	39.000	1.096	0.00	0.000	39.000	0.000
L11	1.75 - 0 (11)	TP40.3x39.9043x0.4962	2209125	43.027	39.000	1.103	0.00	0.000	39.000	0.000

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	<b>Project</b>	TEP No. 127875	<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>	Crown Castle	<b>Designed by</b>	rrimmele

Section No.	Elevation ft	Size	Actual $M_x$ lb-ft	Actual $f_{bx}$ ksi	Allow. $F_{bx}$ ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual $M_y$ lb-ft	Actual $f_{by}$ ksi	Allow. $F_{by}$ ksi	Ratio $\frac{f_{by}}{F_{by}}$
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### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V$ lb	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual $T$ lb-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	117 - 116	TP15.94x14.36x0.1875	1428.34	0.164	26.000	0.013	56.00	0.010	26.000	0.000
	116 - 115		1493.02	0.169	26.000	0.013	56.93	0.010	26.000	0.000
	115 - 114		2403.05	0.268	26.000	0.021	73.99	0.013	26.000	0.000
	114 - 113		2469.66	0.271	26.000	0.021	74.95	0.013	26.000	0.000
	113 - 112		2537.22	0.275	26.000	0.021	75.93	0.012	26.000	0.000
	112 - 111		2605.74	0.278	26.000	0.022	76.92	0.012	26.000	0.000
	111 - 110		2675.21	0.281	26.000	0.022	77.93	0.012	26.000	0.000
L2	110 - 109	TP18.2x15.94x0.1875	3784.55	0.392	26.000	0.031	79.67	0.012	26.000	0.000
	109 - 108		3858.63	0.394	26.000	0.031	81.44	0.012	26.000	0.000
	108 - 107		3933.65	0.397	26.000	0.031	83.24	0.012	26.000	0.000
	107 - 106		4009.61	0.399	26.000	0.031	85.05	0.012	26.000	0.000
	106 - 105		4086.51	0.401	26.000	0.031	86.90	0.012	26.000	0.000
	105 - 104		4164.35	0.403	26.000	0.032	88.77	0.012	26.000	0.000
	104 - 103		4243.13	0.405	26.000	0.032	90.66	0.012	26.000	0.000
	103 - 102		4322.84	0.408	26.000	0.032	92.58	0.012	26.000	0.000
	102 - 101		4403.48	0.410	26.000	0.032	94.52	0.011	26.000	0.000
	101 - 100		4485.05	0.412	26.000	0.032	96.49	0.011	26.000	0.000
L3	100 - 98.4375	TP25.2659x18.2x0.25	4620.47	0.314	26.000	0.025	97.14	0.008	26.000	0.000
	98.4375 - 96.875		9092.09	0.605	26.000	0.047	99.82	0.008	26.000	0.000
	96.875 - 95.3125		9228.78	0.603	26.000	0.047	100.51	0.008	26.000	0.000
	95.3125 - 93.75		9888.51	0.634	26.000	0.050	96.67	0.007	26.000	0.000
	93.75 - 92.1875		10409.5	0.656	26.000	0.051	142.97	0.011	26.000	0.000
	92.1875 - 90.625		0							
	90.625 - 89.0625		10592.3	0.656	26.000	0.051	305.44	0.022	26.000	0.001
	89.0625 - 87.5		0							
	87.5 - 85.9375		10733.8	0.653	26.000	0.051	305.37	0.021	26.000	0.001
	85.9375 - 84.375		0							
	84.375 - 82.8125		10895.8	0.651	26.000	0.051	97.08	0.006	26.000	0.000
	82.8125 - 81.25		0							
	81.25 - 79.6875		15778.3	0.928	26.000	0.072	446.98	0.029	26.000	0.001
	79.6875 - 78.125		0							
	78.125 - 76.5625		15919.2	0.921	26.000	0.072	447.15	0.028	26.000	0.001
	76.5625 - 75		0							
	75 - 73.4375		16060.7	0.914	26.000	0.071	447.31	0.027	26.000	0.001
	73.4375 - 71.875		0							
	71.875 - 70.3125		16202.9	0.907	26.000	0.071	447.47	0.026	26.000	0.001
	70.3125 - 68.75		0							
68.75 - 67.1875	16890.5	0.931	26.000	0.073	447.61	0.025	26.000	0.001		
67.1875 - 65.625	0									
65.625 - 64.0625	17033.9	0.924	26.000	0.072	447.76	0.025	26.000	0.001		
64.0625 - 62.5	0									
62.5 - 60.9375	17178.1	0.918	26.000	0.072	447.92	0.024	26.000	0.001		
60.9375 - 59.375	0									
59.375 - 57.8125	17322.9	0.912	26.000	0.071	448.07	0.023	26.000	0.001		
57.8125 - 56.25	0									
56.25 - 54.6875	17468.6	0.906	26.000	0.071	448.23	0.023	26.000	0.001		
54.6875 - 53.125	0									

<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>	BRG 302 943052 (BU# 806352)	<b>Page</b>	23 of 28
	<b>Project</b>	TEP No. 127875	<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>	Crown Castle	<b>Designed by</b>	rrimmele

Section No.	Elevation ft	Size	Actual V lb	Actual f <sub>v</sub> ksi	Allow. F <sub>v</sub> ksi	Ratio f <sub>v</sub> F <sub>v</sub>	Actual T lb-ft	Actual f <sub>vt</sub> ksi	Allow. F <sub>vt</sub> ksi	Ratio f <sub>vt</sub> F <sub>vt</sub>
	73.4375 - 71.875		17615.0	0.900	26.000	0.070	448.39	0.022	26.000	0.001
	71.875 - 70.3125		17762.2	0.895	26.000	0.070	448.55	0.021	26.000	0.001
	70.3125 - 68.75		20879.3	1.037	26.000	0.081	391.44	0.018	26.000	0.001
L4	68.75 - 67.7	TP26.453x25.2659x0.3694	20985.9	0.702	26.000	0.055	312.77	0.010	26.000	0.000
	67.7 - 66.65		21099.8	0.699	26.000	0.055	318.30	0.010	26.000	0.000
	66.65 - 65.6		21214.3	0.697	26.000	0.054	323.89	0.010	26.000	0.000
	65.6 - 64.55		21329.5	0.694	26.000	0.054	329.53	0.010	26.000	0.000
	64.55 - 63.5		21445.2	0.691	26.000	0.054	335.23	0.010	26.000	0.000
L5	63.5 - 62.4545	TP30.09x26.453x0.5237	21555.7	0.489	26.000	0.038	340.57	0.007	26.000	0.000
	62.4545 - 61.4091		21668.7	0.487	26.000	0.038	345.97	0.007	26.000	0.000
	61.4091 - 60.3636		21782.4	0.485	26.000	0.038	351.42	0.007	26.000	0.000
	60.3636 - 59.3182		21896.7	0.483	26.000	0.038	356.91	0.007	26.000	0.000
	59.3182 - 58.2727		22011.5	0.481	26.000	0.038	362.45	0.007	26.000	0.000
	58.2727 - 57.2273		22127.1	0.480	26.000	0.037	368.04	0.007	26.000	0.000
	57.2273 - 56.1818		22243.2	0.478	26.000	0.037	373.68	0.007	26.000	0.000
	56.1818 - 55.1364		22360.0	0.477	26.000	0.037	379.36	0.007	26.000	0.000
	55.1364 - 54.0909		22477.4	0.475	26.000	0.037	385.09	0.007	26.000	0.000
	54.0909 - 53.0455		22595.4	0.474	26.000	0.037	390.87	0.007	26.000	0.000
	53.0455 - 52		22714.1	0.472	26.000	0.037	396.70	0.007	26.000	0.000
	52 - 47.42		12610.4	0.253	26.000	0.020	331.98	0.005	26.000	0.000
L6	52 - 47.42	TP30.246x28.0067x0.502	10741.9	0.231	26.000	0.018	226.70	0.004	26.000	0.000
	47.42 - 46.1967		23471.9	0.499	26.000	0.039	564.89	0.010	26.000	0.000
	46.1967 - 44.9733		23599.6	0.496	26.000	0.039	571.17	0.009	26.000	0.000
	44.9733 - 43.75		23728.3	0.494	26.000	0.039	577.52	0.009	26.000	0.000
L7	43.75 - 42.6563	TP32.385x30.246x0.5883	23840.3	0.421	26.000	0.033	583.43	0.008	26.000	0.000
	42.6563 - 41.5625		23955.0	0.419	26.000	0.033	589.39	0.008	26.000	0.000
	41.5625 - 40.4688		24070.5	0.417	26.000	0.033	595.41	0.008	26.000	0.000
	40.4688 - 39.375		24186.6	0.416	26.000	0.032	601.48	0.008	26.000	0.000
	39.375 - 38.2813		24303.4	0.414	26.000	0.032	607.61	0.008	26.000	0.000
	38.2813 - 37.1875		24420.9	0.412	26.000	0.032	613.78	0.008	26.000	0.000

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	<b>Project</b>	TEP No. 127875	<b>Date</b>	10:40:47 12/10/12
	<b>Client</b>	Crown Castle	<b>Designed by</b>	rrimmele

Section No.	Elevation ft	Size	Actual V lb	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	37.1875 - 36.0938		24539.0	0.411	26.000	0.032	620.02	0.008	26.000	0.000
	36.0938 - 35		24657.9	0.409	26.000	0.032	626.30	0.008	26.000	0.000
L8	35 - 33.75	TP33.233x32.385x0.6308	24788.4	0.381	26.000	0.030	633.20	0.007	26.000	0.000
	33.75 - 32.5		24919.1	0.380	26.000	0.030	640.16	0.007	26.000	0.000
	32.5 - 31.25		25050.4	0.378	26.000	0.030	647.18	0.007	26.000	0.000
L9	31.25 - 30.15	TP38.2082x33.233x0.5058	25158.8	0.468	26.000	0.037	652.83	0.009	26.000	0.000
	30.15 - 29.05		25266.9	0.467	26.000	0.036	658.51	0.008	26.000	0.000
	29.05 - 27.95		25375.4	0.465	26.000	0.036	664.24	0.008	26.000	0.000
	27.95 - 26.85		25484.4	0.464	26.000	0.036	670.02	0.008	26.000	0.000
	26.85 - 25.75		25593.8	0.463	26.000	0.036	675.83	0.008	26.000	0.000
	25.75 - 24.65		25703.7	0.461	26.000	0.036	681.69	0.008	26.000	0.000
	24.65 - 23.55		25814.1	0.460	26.000	0.036	687.60	0.008	26.000	0.000
	23.55 - 22.45		25924.9	0.459	26.000	0.036	693.54	0.008	26.000	0.000
	22.45 - 21.35		26036.1	0.457	26.000	0.036	699.53	0.008	26.000	0.000
	21.35 - 20.25		26147.9	0.456	26.000	0.036	705.57	0.008	26.000	0.000
	20.25 - 19.15		26260.1	0.455	26.000	0.036	711.65	0.008	26.000	0.000
	19.15 - 18.05		26372.7	0.453	26.000	0.035	717.77	0.008	26.000	0.000
	18.05 - 16.95		26485.9	0.452	26.000	0.035	723.94	0.008	26.000	0.000
	16.95 - 15.85		26599.4	0.451	26.000	0.035	730.15	0.008	26.000	0.000
	15.85 - 14.75		26713.5	0.450	26.000	0.035	736.41	0.008	26.000	0.000
	14.75 - 13.65		26828.0	0.449	26.000	0.035	742.71	0.008	26.000	0.000
	13.65 - 12.55		26943.0	0.448	26.000	0.035	749.05	0.008	26.000	0.000
	12.55 - 11.45		27058.5	0.447	26.000	0.035	755.44	0.008	26.000	0.000
	11.45 - 10.35		27174.5	0.446	26.000	0.035	761.87	0.008	26.000	0.000
	10.35 - 9.25		27290.9	0.444	26.000	0.035	768.35	0.008	26.000	0.000
L10	9.25 - 8.17857	TP39.9043x38.2082x0.4982	27404.0	0.450	26.000	0.035	775.35	0.008	26.000	0.000
	8.17857 - 7.10714		27517.7	0.449	26.000	0.035	782.39	0.008	26.000	0.000
	7.10714 - 6.03571		27631.8	0.448	26.000	0.035	789.48	0.008	26.000	0.000
	6.03571 - 4.96429		27746.4	0.447	26.000	0.035	796.62	0.008	26.000	0.000
	4.96429 - 3.89286		27861.4	0.446	26.000	0.035	803.80	0.008	26.000	0.000



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	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Section No.	Elevation ft	Size	Actual V lb	Actual $f_v$ ksi	Allow. $F_v$ ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual $f_{vt}$ ksi	Allow. $F_{vt}$ ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	3.89286 - 2.82143		27976.8	0.445	26.000	0.035	811.03	0.008	26.000	0.000
	2.82143 - 1.75		28092.6	0.444	26.000	0.035	818.31	0.008	26.000	0.000
L11	1.75 - 0 (11)	TP40.3x39.9043x0.4962	28285.7	0.445	26.000	0.035	828.77	0.008	26.000	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio P	Ratio $f_{bx}$	Ratio $f_{by}$	Ratio $f_v$	Ratio $f_{vt}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P_a$	$F_{bx}$	$F_{by}$	$F_v$	$F_{vt}$			
L1	117 - 116	0.001	0.014	0.000	0.013	0.000	0.015	1.333	H1-3+VT
	116 - 115	0.001	0.028	0.000	0.013	0.000	0.029	1.333	H1-3+VT
	115 - 114	0.002	0.050	0.000	0.021	0.000	0.052	1.333	H1-3+VT
	114 - 113	0.002	0.071	0.000	0.021	0.000	0.073	1.333	H1-3+VT
	113 - 112	0.002	0.091	0.000	0.021	0.000	0.093	1.333	H1-3+VT
	112 - 111	0.002	0.111	0.000	0.022	0.000	0.113	1.333	H1-3+VT
	111 - 110	0.002	0.130	0.000	0.022	0.000	0.132	1.333	H1-3+VT
L2	110 - 109	0.003	0.157	0.000	0.031	0.000	0.160	1.333	H1-3+VT
	109 - 108	0.003	0.183	0.000	0.031	0.000	0.186	1.333	H1-3+VT
	108 - 107	0.003	0.208	0.000	0.031	0.000	0.211	1.333	H1-3+VT
	107 - 106	0.003	0.232	0.000	0.031	0.000	0.236	1.333	H1-3+VT
	106 - 105	0.003	0.256	0.000	0.031	0.000	0.259	1.333	H1-3+VT
	105 - 104	0.003	0.278	0.000	0.032	0.000	0.282	1.333	H1-3+VT
	104 - 103	0.003	0.300	0.000	0.032	0.000	0.304	1.333	H1-3+VT
	103 - 102	0.003	0.322	0.000	0.032	0.000	0.325	1.333	H1-3+VT
	102 - 101	0.003	0.342	0.000	0.032	0.000	0.346	1.333	H1-3+VT
	101 - 100	0.004	0.362	0.000	0.032	0.000	0.366	1.333	H1-3+VT
L3	100 - 98.4375	0.003	0.298	0.000	0.025	0.000	0.300	1.333	H1-3+VT
	98.4375 - 96.875	0.006	0.392	0.000	0.047	0.000	0.399	1.333	H1-3+VT
	96.875 - 95.3125	0.006	0.440	0.000	0.047	0.000	0.446	1.333	H1-3+VT
	95.3125 - 93.75	0.006	0.486	0.000	0.050	0.000	0.492	1.333	H1-3+VT
	93.75 - 92.1875	0.006	0.533	0.000	0.051	0.000	0.540	1.333	H1-3+VT
	92.1875 - 90.625	0.006	0.578	0.000	0.051	0.001	0.585	1.333	H1-3+VT
	90.625 - 89.0625	0.007	0.621	0.000	0.051	0.001	0.628	1.333	H1-3+VT
	89.0625 - 87.5	0.007	0.661	0.000	0.051	0.000	0.669	1.333	H1-3+VT
	87.5 - 85.9375	0.010	0.763	0.000	0.072	0.001	0.774	1.333	H1-3+VT
	85.9375 - 84.375	0.010	0.822	0.000	0.072	0.001	0.833	1.333	H1-3+VT
	84.375 - 82.8125	0.010	0.878	0.000	0.071	0.001	0.889	1.333	H1-3+VT
	82.8125 - 81.25	0.010	0.930	0.000	0.071	0.001	0.941	1.333	H1-3+VT
	81.25 - 79.6875	0.010	0.982	0.000	0.073	0.001	0.993	1.333	H1-3+VT
	79.6875 - 78.125	0.010	1.031	0.000	0.072	0.001	1.042	1.333	H1-3+VT
	78.125 - 76.5625	0.010	1.077	0.000	0.072	0.001	1.089	1.333	H1-3+VT

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	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P$	$f_{bx}$	$f_{by}$	$f_v$	$f_{vt}$			
		$P_a$	$F_{bx}$	$F_{by}$	$F_v$	$F_{vt}$			
	76.5625								
	76.5625 - 75	0.011	1.120	0.000	0.071	0.001	1.132	1.333	H1-3+VT
	75 - 73.4375	0.011	1.162	0.000	0.071	0.001	1.174	1.333	H1-3+VT
	73.4375 - 71.875	0.011	1.201	0.000	0.070	0.001	1.213	1.333	H1-3+VT
	71.875 - 70.3125	0.011	1.237	0.000	0.070	0.001	1.249	1.333	H1-3+VT
	70.3125 - 68.75	0.013	1.290	0.000	0.081	0.001	1.304	1.333	H1-3+VT
L4	68.75 - 67.7	0.009	0.906	0.000	0.055	0.000	0.916	1.333	H1-3+VT
	67.7 - 66.65	0.009	0.925	0.000	0.055	0.000	0.935	1.333	H1-3+VT
	66.65 - 65.6	0.009	0.944	0.000	0.054	0.000	0.954	1.333	H1-3+VT
	65.6 - 64.55	0.009	0.963	0.000	0.054	0.000	0.972	1.333	H1-3+VT
	64.55 - 63.5	0.009	0.980	0.000	0.054	0.000	0.990	1.333	H1-3+VT
L5	63.5 - 62.4545	0.007	0.716	0.000	0.038	0.000	0.723	1.333	H1-3+VT
	62.4545 - 61.4091	0.007	0.727	0.000	0.038	0.000	0.734	1.333	H1-3+VT
	61.4091 - 60.3636	0.007	0.738	0.000	0.038	0.000	0.746	1.333	H1-3+VT
	60.3636 - 59.3182	0.007	0.749	0.000	0.038	0.000	0.756	1.333	H1-3+VT
	59.3182 - 58.2727	0.007	0.760	0.000	0.038	0.000	0.767	1.333	H1-3+VT
	58.2727 - 57.2273	0.007	0.770	0.000	0.037	0.000	0.777	1.333	H1-3+VT
	57.2273 - 56.1818	0.007	0.780	0.000	0.037	0.000	0.787	1.333	H1-3+VT
	56.1818 - 55.1364	0.007	0.789	0.000	0.037	0.000	0.796	1.333	H1-3+VT
	55.1364 - 54.0909	0.007	0.798	0.000	0.037	0.000	0.805	1.333	H1-3+VT
	54.0909 - 53.0455	0.007	0.807	0.000	0.037	0.000	0.814	1.333	H1-3+VT
	53.0455 - 52	0.007	0.815	0.000	0.037	0.000	0.823	1.333	H1-3+VT
L6	52 - 47.42	0.004	0.454	0.000	0.020	0.000	0.458	1.333	H1-3+VT
	52 - 47.42	0.004	0.436	0.000	0.018	0.000	0.440	1.333	H1-3+VT
	47.42 - 46.1967	0.008	0.943	0.000	0.039	0.000	0.951	1.333	H1-3+VT
	46.1967 - 44.9733	0.008	0.947	0.000	0.039	0.000	0.956	1.333	H1-3+VT
	44.9733 - 43.75	0.008	0.952	0.000	0.039	0.000	0.961	1.333	H1-3+VT
L7	43.75 - 42.6563	0.007	0.824	0.000	0.033	0.000	0.832	1.333	H1-3+VT
	42.6563 - 41.5625	0.007	0.829	0.000	0.033	0.000	0.836	1.333	H1-3+VT
	41.5625 - 40.4688	0.007	0.833	0.000	0.033	0.000	0.841	1.333	H1-3+VT
	40.4688 - 39.375	0.007	0.837	0.000	0.032	0.000	0.845	1.333	H1-3+VT
	39.375 - 38.2813	0.007	0.841	0.000	0.032	0.000	0.849	1.333	H1-3+VT
	38.2813 - 37.1875	0.007	0.845	0.000	0.032	0.000	0.853	1.333	H1-3+VT
	37.1875 - 36.0938	0.008	0.849	0.000	0.032	0.000	0.857	1.333	H1-3+VT
	36.0938 - 35	0.008	0.852	0.000	0.032	0.000	0.860	1.333	H1-3+VT
L8	35 - 33.75	0.007	0.803	0.000	0.030	0.000	0.810	1.333	H1-3+VT
	33.75 - 32.5	0.007	0.807	0.000	0.030	0.000	0.815	1.333	H1-3+VT
	32.5 - 31.25	0.007	0.812	0.000	0.030	0.000	0.819	1.333	H1-3+VT

<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> BRG 302 943052 (BU# 806352)	<b>Page</b> 27 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

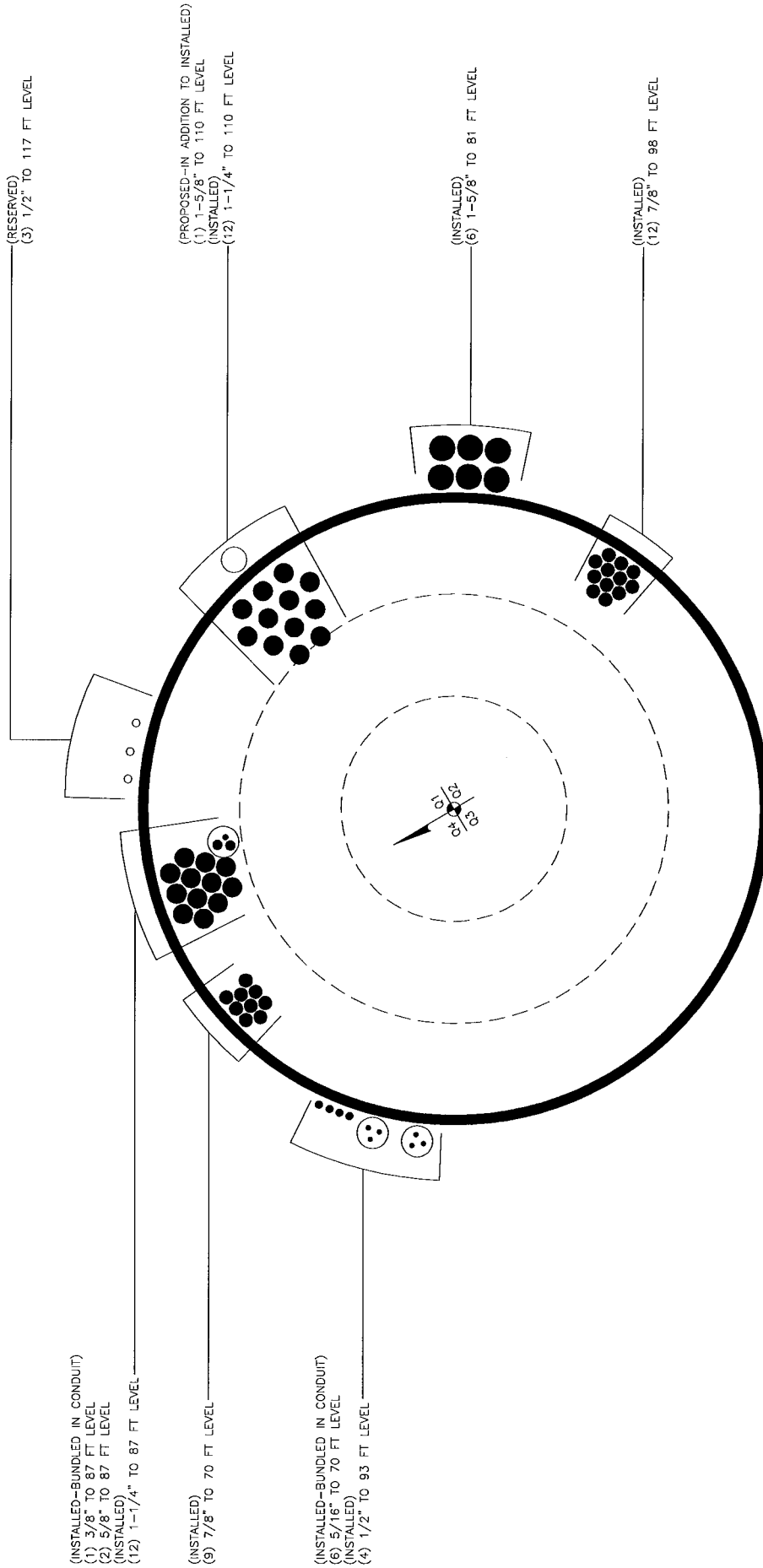
Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		$P$	$f_{bx}$	$f_{by}$	$f_v$	$f_{vt}$		$P_a$	
L9	31.25 - 30.15	0.009	1.005	0.000	0.037	0.000	1.015	1.333	H1-3+VT
	30.15 - 29.05	0.009	1.010	0.000	0.036	0.000	1.019	1.333	H1-3+VT
	29.05 - 27.95	0.009	1.014	0.000	0.036	0.000	1.024	1.333	H1-3+VT
	27.95 - 26.85	0.009	1.018	0.000	0.036	0.000	1.028	1.333	H1-3+VT
	26.85 - 25.75	0.009	1.022	0.000	0.036	0.000	1.032	1.333	H1-3+VT
	25.75 - 24.65	0.009	1.026	0.000	0.036	0.000	1.036	1.333	H1-3+VT
	24.65 - 23.55	0.009	1.030	0.000	0.036	0.000	1.040	1.333	H1-3+VT
	23.55 - 22.45	0.010	1.033	0.000	0.036	0.000	1.043	1.333	H1-3+VT
	22.45 - 21.35	0.010	1.037	0.000	0.036	0.000	1.047	1.333	H1-3+VT
	21.35 - 20.25	0.010	1.040	0.000	0.036	0.000	1.050	1.333	H1-3+VT
	20.25 - 19.15	0.010	1.043	0.000	0.036	0.000	1.053	1.333	H1-3+VT
	19.15 - 18.05	0.010	1.046	0.000	0.035	0.000	1.056	1.333	H1-3+VT
	18.05 - 16.95	0.010	1.049	0.000	0.035	0.000	1.059	1.333	H1-3+VT
	16.95 - 15.85	0.010	1.052	0.000	0.035	0.000	1.062	1.333	H1-3+VT
	15.85 - 14.75	0.010	1.055	0.000	0.035	0.000	1.065	1.333	H1-3+VT
	14.75 - 13.65	0.010	1.057	0.000	0.035	0.000	1.068	1.333	H1-3+VT
	13.65 - 12.55	0.010	1.060	0.000	0.035	0.000	1.070	1.333	H1-3+VT
12.55 - 11.45	0.010	1.062	0.000	0.035	0.000	1.073	1.333	H1-3+VT	
11.45 - 10.35	0.010	1.065	0.000	0.035	0.000	1.075	1.333	H1-3+VT	
10.35 - 9.25	0.010	1.067	0.000	0.035	0.000	1.078	1.333	H1-3+VT	
L10	9.25 - 8.17857	0.010	1.085	0.000	0.035	0.000	1.096	1.333	H1-3+VT
	8.17857 - 7.10714	0.010	1.087	0.000	0.035	0.000	1.098	1.333	H1-3+VT
	7.10714 - 6.03571	0.011	1.089	0.000	0.035	0.000	1.100	1.333	H1-3+VT
	6.03571 - 4.96429	0.011	1.091	0.000	0.035	0.000	1.102	1.333	H1-3+VT
	4.96429 - 3.89286	0.011	1.093	0.000	0.035	0.000	1.104	1.333	H1-3+VT
	3.89286 - 2.82143	0.011	1.095	0.000	0.035	0.000	1.106	1.333	H1-3+VT
	2.82143 - 1.75	0.011	1.096	0.000	0.035	0.000	1.107	1.333	H1-3+VT
L11	1.75 - 0 (11)	0.011	1.103	0.000	0.035	0.000	1.114	1.333	H1-3+VT

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	SF*P <sub>allow</sub> lb	% Capacity	Pass Fail	
L1	117 - 110	Pole	TP15.94x14.36x0.1875	1	-752.10	494425.68	9.9	Pass	
L2	110 - 100	Pole	TP18.2x15.94x0.1875	2	-1492.90	565361.27	27.5	Pass	
L3	100 - 68.75	Pole	TP25.2659x18.2x0.25	3	-10271.50	1046904.83	97.9	Pass	
L4	68.75 - 63.5	Pole	TP26.453x25.2659x0.3694	4	-11162.60	1612783.30	74.3	Pass	
L5	63.5 - 47.42	Pole	TP30.09x26.453x0.5237	5	-13425.30	2501174.45	61.7	Pass	
L6	47.42 - 43.75	Pole	TP30.246x28.0067x0.502	6	-15675.20	2499308.25	72.1	Pass	
L7	43.75 - 35	Pole	TP32.385x30.246x0.5883	7	-17825.40	3131163.55	64.5	Pass	
L8	35 - 31.25	Pole	TP33.233x32.385x0.6308	8	-18821.40	3442579.00	61.5	Pass	
L9	31.25 - 9.25	Pole	TP38.2082x33.233x0.5058	9	-24435.60	3192121.64	80.8	Pass	
L10	9.25 - 1.75	Pole	TP39.9043x38.2082x0.4982	10	-26516.00	3286138.12	83.1	Pass	
L11	1.75 - 0	Pole	TP40.3x39.9043x0.4962	11	-26995.60	3306386.39	83.6	Pass	
							Summary		
							Pole (L3)	97.9	Pass
							<b>RATING =</b>	<b>97.9</b>	<b>Pass</b>

<b><i>tnxTower</i></b>  <b><i>Tower Engineering Professionals, Inc.</i></b> <i>3703 Junction Boulevard</i> <i>Raleigh, NC 27603</i> <i>Phone: (919) 661-6351</i> <i>FAX: (919) 661-6350</i>	<b>Job</b> BRG 302 943052 (BU# 806352)	<b>Page</b> 28 of 28
	<b>Project</b> TEP No. 127875	<b>Date</b> 10:40:47 12/10/12
	<b>Client</b> Crown Castle	<b>Designed by</b> rrimmele

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



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







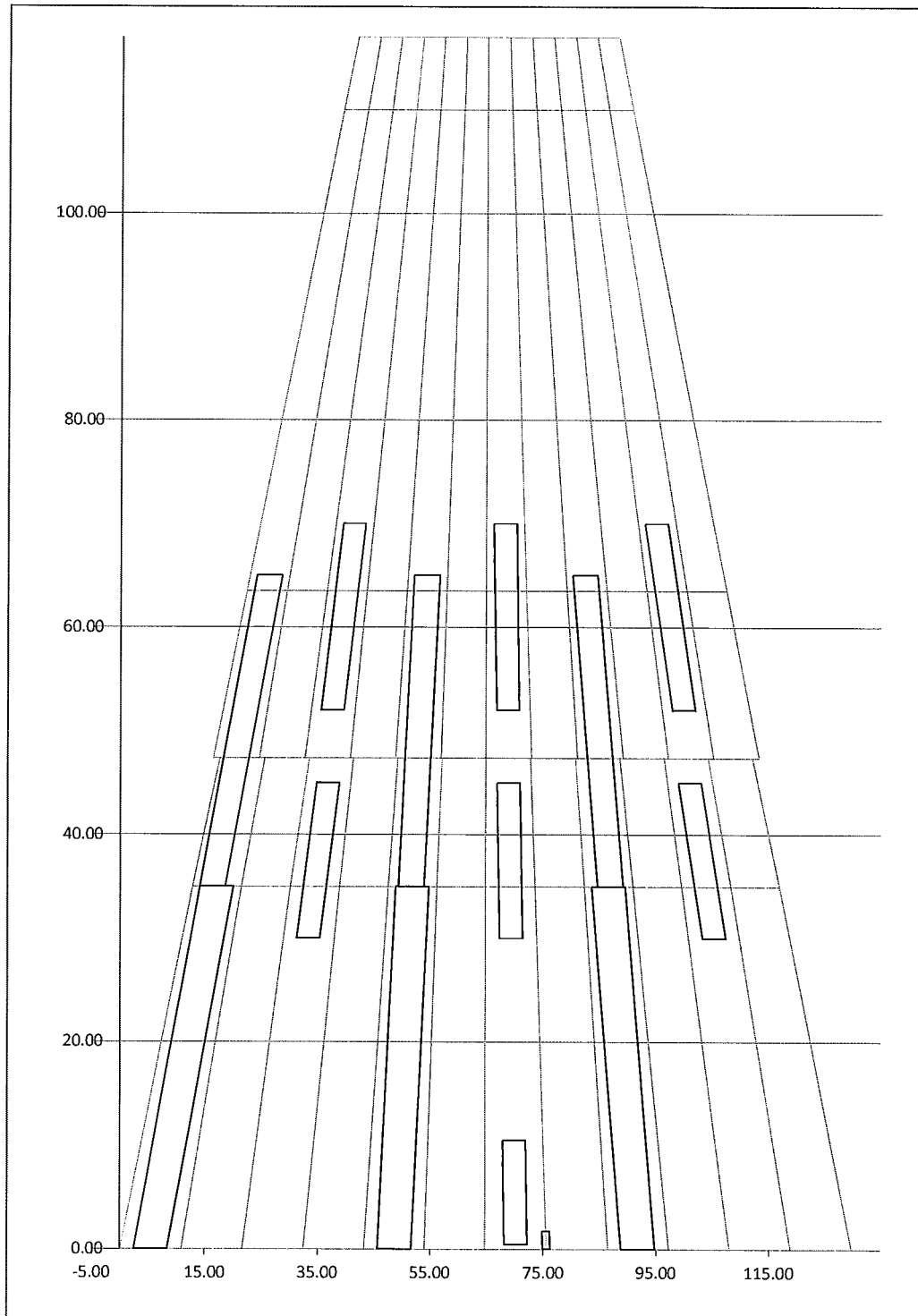
806352\_BRG 302 943052

TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Reinforcement Layout





806352\_BRG 302 943052

TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 0.00-ft

**Loads**

<b>Axial:</b>	26,995.6 lb
<b>Moment:</b>	2,209,125.0 ft-lb
<b>Shear:</b>	28,285.7 lb
<b>Torsion:</b>	828.8 ft-lb

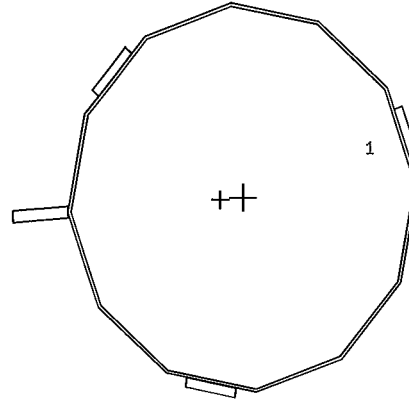
<b>OD:</b>	40.30 in
<b>t:</b>	0.343 in
<b>t<sub>eff</sub>:</b>	0.496 in

**Equivalent Loads to Pole**

<b>Axial:</b>	16,953.6 lb
<b>Moment:</b>	1,542,840.7 ft-lb
<b>Shear:</b>	17,763.8 lb
<b>Torsion:</b>	828.8 ft-lb

**Shear Flow**

<b>Controlling Mod:</b>	3
<b>q:</b>	0.287 k/in
<b>Bolt Capacity:</b>	1000.0 k/bolt
<b>Max Spacing:</b>	3486.54 in
<b>Capacity:</b>	0.0%



	(in <sup>4</sup> )	Angle
<b>I<sub>comp,min</sub>:</b>	12880.0	75.0°
<b>I<sub>comp,cont</sub>:</b>	12905.9	70.5°
<b>I<sub>mods,cont</sub>:</b>	3890.4	70.5°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
6	0.384	43.167	52.000	52.000	70.5°	83.8%

Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
1	0.384	41.257	41.734	41.667	70.5°	99.8%
3	0.384	33.084	52.000	52.000	165.0°	64.4%



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TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 1.75-ft

**Loads**

Axial: 26,516.0 lb  
 Moment: 2,159,800.0 ft-lb  
 Shear: 28,092.6 lb  
 Torsion: 818.3 ft-lb

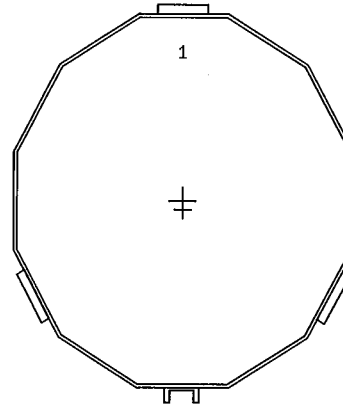
OD:	39.90 in
t:	0.343 in
t <sub>eff</sub> :	0.498 in

**Equivalent Loads to Pole**

Axial: 17,927.6 lb  
 Moment: 1,378,398.3 ft-lb  
 Shear: 18,993.6 lb  
 Torsion: 818.3 ft-lb

**Shear Flow**

Controlling Mod: 4  
 q: 0.117 k/in  
 Bolt Capacity: 30.0 k/bolt  
 Max Spacing: 255.79 in  
 Capacity: 7.0%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	12547.2	90.0°
I <sub>comp,cont</sub> :	13717.7	0.0°
I <sub>mods,cont</sub> :	4931.8	0.0°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
6	0.411	42.896	52.000	52.000	75.0°	83.3%
Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
1	0.411	40.396	41.734	41.667	0.0°	97.8%
4	0.411	37.057	46.063	46.313	0.0°	81.3%



TOWER  
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TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 9.25-ft

**Loads**

**Axial:** 24,435.6 lb  
**Moment:** 1,952,108.3 ft-lb  
**Shear:** 27,290.9 lb  
**Torsion:** 768.3 ft-lb

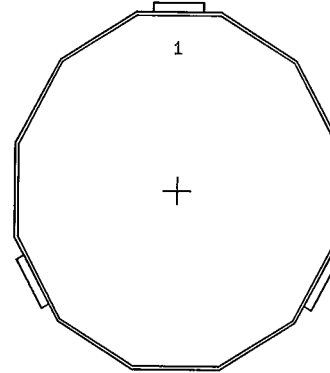
OD:	38.21 in
t:	0.343 in
t <sub>eff</sub> :	0.506 in

**Equivalent Loads to Pole**

**Axial:** 17,080.0 lb  
**Moment:** 1,389,422.7 ft-lb  
**Shear:** 19,075.8 lb  
**Torsion:** 768.3 ft-lb

**Shear Flow**

**Controlling Mod:** 1  
**q:** 0.288 k/in  
**Bolt Capacity:** 30.0 k/bolt  
**Max Spacing:** 104.27 in  
**Capacity:** 15.7%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	11157.3	45.0°
I <sub>comp,cont</sub> :	11157.3	0.0°
I <sub>mods,cont</sub> :	3486.6	0.0°

Pole Seg.	Axial	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
		Bending		Bending			
6	0.409	41.525		52.000	52.000	15.0°	80.6%

Mod	Axial	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
		Bending		Comp.	Tension		
1	0.409	41.160		41.734	41.667	0.0°	99.6%



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TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 31.25-ft

**Loads**

**Axial:** 18,821.4 lb  
**Moment:** 1,376,791.7 ft-lb  
**Shear:** 25,050.4 lb  
**Torsion:** 647.2 ft-lb

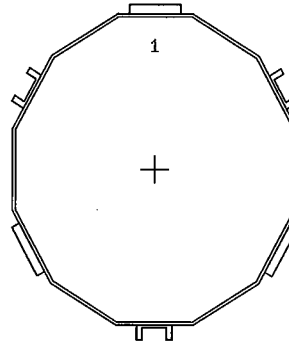
OD:	33.23 in
t:	0.343 in
t <sub>eff</sub> :	0.631 in

**Equivalent Loads to Pole**

**Axial:** 10,835.0 lb  
**Moment:** 796,225.6 ft-lb  
**Shear:** 14,420.9 lb  
**Torsion:** 647.2 ft-lb

**Shear Flow**

**Controlling Mod:** 5  
**q:** 0.140 k/in  
**Bolt Capacity:** 30.0 k/bolt  
**Max Spacing:** 214.50 in  
**Capacity:** 8.4%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	8999.2	195.0°
I <sub>comp,cont</sub> :	8999.2	0.0°
I <sub>mods,cont</sub> :	3972.1	0.0°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
6	0.298	31.582	52.000	52.000	15.0°	61.3%
Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
1	0.298	31.424	41.734	41.667	0.0°	76.0%
5	0.298	31.589	46.063	46.313	0.0°	69.2%



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TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 35.00-ft

**Loads**

**Axial:** 17,825.4 lb  
**Moment:** 1,283,608.3 ft-lb  
**Shear:** 24,657.9 lb  
**Torsion:** 626.3 ft-lb

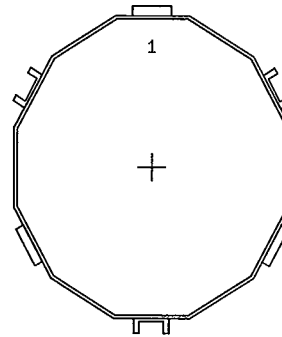
**OD:** 32.38 in  
**t:** 0.343 in  
**t<sub>eff</sub>:** 0.588 in

**Equivalent Loads to Pole**

**Axial:** 10,940.1 lb  
**Moment:** 793,395.5 ft-lb  
**Shear:** 15,133.4 lb  
**Torsion:** 626.3 ft-lb

**Shear Flow**

**Controlling Mod:** 5  
**q:** 0.155 k/in  
**Bolt Capacity:** 30.0 k/bolt  
**Max Spacing:** 193.29 in  
**Capacity:** 9.3%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	7785.5	90.0°
I <sub>comp,cont</sub> :	7785.5	0.0°
I <sub>mods,cont</sub> :	3137.3	0.0°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
5	0.309	33.167	52.000	52.000	15.0°	64.4%

Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
2	0.309	33.026	37.814	37.778	0.0°	88.2%
5	0.309	33.204	46.063	46.313	0.0°	72.8%



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TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 43.75-ft

**Loads**

Axial:	15,675.2 lb
Moment:	1,071,983.3 ft-lb
Shear:	23,728.3 lb
Torsion:	577.5 ft-lb

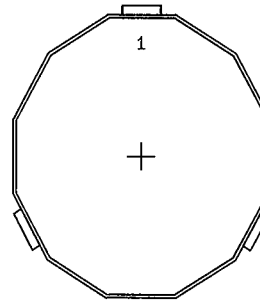
OD:	30.25 in
t:	0.343 in
t <sub>eff</sub> :	0.502 in

**Equivalent Loads to Pole**

Axial:	11,125.1 lb
Moment:	771,104.0 ft-lb
Shear:	16,840.6 lb
Torsion:	577.5 ft-lb

**Shear Flow**

Controlling Mod:	2
q:	0.307 k/in
Bolt Capacity:	30.0 k/bolt
Max Spacing:	97.79 in
Capacity:	21.1%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	5437.6	0.0°
I <sub>comp,cont</sub> :	5437.6	0.0°
I <sub>mods,cont</sub> :	1659.5	0.0°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
5	0.337	37.039	52.000	52.000	15.0°	71.9%

Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
2	0.337	36.959	37.814	37.778	0.0°	98.6%



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TEP #: 127875  
 Analysis: WHM 12/2/2012  
 Check: RJR 12/3/2012

Elevation: 52.00-ft

**Loads**

Axial:	13,425.3	lb
Moment:	880,058.3	ft-lb
Shear:	22,714.1	lb
Torsion:	396.7	ft-lb

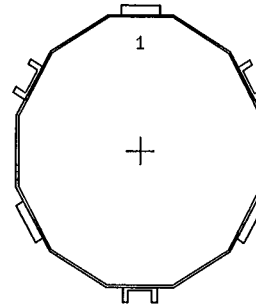
OD:	29.05 in
t:	0.250 in
t <sub>eff</sub> :	0.524 in

**Equivalent Loads to Pole**

Axial:	6,844.8	lb
Moment:	447,452.4	ft-lb
Shear:	11,580.6	lb
Torsion:	396.7	ft-lb

**Shear Flow**

Controlling Mod:	6
q:	0.200 k/in
Bolt Capacity:	30.0 k/bolt
Max Spacing:	149.81 in
Capacity:	12.0%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	5006.9	90.0°
I <sub>comp,cont</sub> :	5006.9	0.0°
I <sub>mods,cont</sub> :	2548.0	0.0°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
4	0.296	31.722	52.000	52.000	15.0°	61.6%
Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
	2	0.296	31.695	37.814		
6	0.296	31.885	46.063	46.313	0.0°	69.9%





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TEP #: 127875  
 Analysis: WHM 12/2/2012  
 Check: RJR 12/3/2012

Elevation: 63.50-ft

**Loads**

Axial:	11,162.6	lb
Moment:	626,245.8	ft-lb
Shear:	21,445.2	lb
Torsion:	335.2	ft-lb

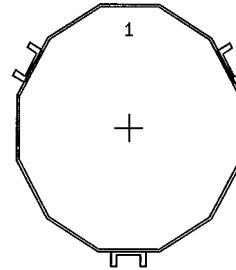
OD:	26.45 in
t:	0.250 in
t <sub>eff</sub> :	0.369 in

**Equivalent Loads to Pole**

Axial:	7,883.8	lb
Moment:	444,819.1	ft-lb
Shear:	15,146.1	lb
Torsion:	335.2	ft-lb

**Shear Flow**

Controlling Mod:	6
q:	0.321 k/in
Bolt Capacity:	30.0 k/bolt
Max Spacing:	93.56 in
Capacity:	19.2%



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	2698.1	195.0°
I <sub>comp,cont</sub> :	2698.1	0.0°
I <sub>mods,cont</sub> :	847.0	0.0°

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
3	0.374	38.138	52.000	52.000	15.0°	74.1%

Mod	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Comp.	Tension		
6	0.374	38.482	46.063	46.313	0.0°	84.4%



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TEP #: 127875  
 Analysis: WHM 12/2/2012  
 Check: RJR 12/3/2012

Elevation: 68.75-ft

**Loads**

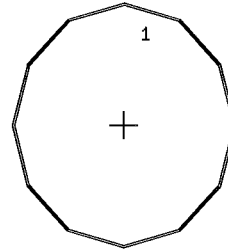
Axial: 10,271.5 lb  
 Moment: 515,181.7 ft-lb  
 Shear: 20,879.3 lb  
 Torsion: 391.4 ft-lb

OD:	25.27 in
t:	0.250 in
t <sub>eff</sub> :	0.250 in

**Equivalent Loads to Pole**

Axial: 10,271.5 lb  
 Moment: 515,181.7 ft-lb  
 Shear: 20,879.3 lb  
 Torsion: 391.4 ft-lb

Shear Flow N/A



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	1610.8	0.0°
I <sub>comp,cont</sub> :	1610.8	15.0°
I <sub>mods,cont</sub> :		

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
3	0.511	50.194	52.000	52.000	15.0°	97.5%



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TEP #: 127875

Analysis: WHM 12/2/2012

Check: RJR 12/3/2012

Elevation: 100.00-ft

**Loads**

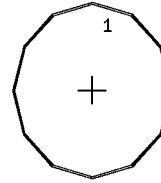
Axial:	1,492.9	lb
Moment:	56,277.8	ft-lb
Shear:	4,485.0	lb
Torsion:	96.5	ft-lb

OD:	18.20 in
t:	0.188 in
t,eff:	0.188 in

**Equivalent Loads to Pole**

Axial:	1,492.9	lb
Moment:	56,277.8	ft-lb
Shear:	4,485.0	lb
Torsion:	96.5	ft-lb

Shear Flow N/A



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	451.0	0.0°
I <sub>comp,cont</sub> :	451.0	15.0°
I <sub>mods,cont</sub> :		

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
2	0.137	14.107	52.000	52.000	15.0°	27.4%



806352\_BRG 302 943052

TEP #: 127875  
 Analysis: WHM 12/2/2012  
 Check: RJR 12/3/2012

Elevation: 110.00-ft

**Loads**

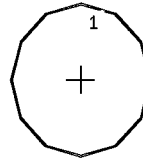
Axial:	752.1	lb
Moment:	15,377.7	ft-lb
Shear:	2,675.2	lb
Torsion:	77.9	ft-lb

OD:	15.94 in
t:	0.188 in
t <sub>eff</sub> :	0.188 in

**Equivalent Loads to Pole**

Axial:	752.1	lb
Moment:	15,377.7	ft-lb
Shear:	2,675.2	lb
Torsion:	77.9	ft-lb

Shear Flow N/A



	(in <sup>4</sup> )	Angle
I <sub>comp,min</sub> :	301.7	0.0°
I <sub>comp,cont</sub> :	301.7	15.0°
I <sub>mods,cont</sub> :		

Pole Seg.	Applied Stress (ksi)		Allowable Stress (ksi)		Angle	Capacity
	Axial	Bending	Axial	Bending		
1	0.079	5.047	52.000	52.000	15.0°	9.9%

# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 806352  
 Site Name: BRG 302 943052  
 App #: 168181 Rev.1

Pole Manufacturer: Other

## Bolt Data

Qty:	12	Bolt Fu:	120
Diameter (in.):	1	Bolt Fy:	92
Bolt Material:	A325		
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	22		

## Plate Data

Diam:	28	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.76	in

## Stiffener Data (Welding at Both Sides)

Config:	1	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.1875	in
Fillet V. Weld:	0.1875	in
Width:	6	in
Height:	12	in
Thick:	1	in
Notch:	1	in
Grade:	36	ksi
Weld str.:	70	ksi

## Pole Data

Diam:	18.2	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	0	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

## Stress Increase Factor

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

## Reactions

Moment:	56.28	ft-kips
Axial:	1.49	kips
Shear:	4.49	kips
Elevation:	100	feet

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

## Flange Bolt Results

Bolt Tension Capacity, **B**: 46.07 kips  
 Max Bolt directly applied T: 10.11 Kips  
 Min. PL "tc" for **B** cap. **w/o** Pry: Stiffened in  
 Min PL "treq" for actual **T w/** Pry: Stiffened in  
 Min PL "t1" for actual **T w/o** Pry: Stiffened in  
 T allowable: 46.07 kips <-- B, Stiffened  
 Prying Force, Q: 0.00 kips Stiffened  
 Total Bolt Tension=T+Q: 10.11 kips  
 Non-Prying Bolt Stress Ratio, T/B: 21.9% **Pass**

Stiffened
Service, ASD
Fty*ASIF

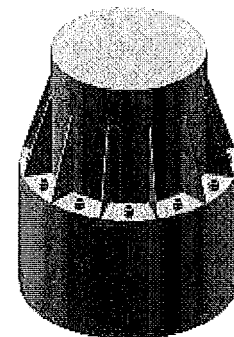
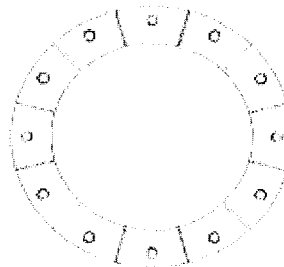
## Exterior Flange Plate Results

Flexural Check  
 Compression Side Plate Stress: 6.7 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Compression Plate Stress Ratio: 18.6% **Pass**  
**Stiffened**  
 Tension Side Stress Ratio, (treq/t)^2: N/A

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

## Stiffener Results

Horizontal Weld : 26.0% **Pass**  
 Vertical Weld: 12.3% **Pass**  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 1.9% **Pass**  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 7.6% **Pass**  
 Plate Comp. (AISC Bracket): 8.4% **Pass**  
**Pole Results**  
 Pole Punching Shear Check: 3.9% **Pass**



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

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

# Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

## Site Data

BU#: 806352  
 Site Name: BRG 302 943052  
 App #: 168181 Rev.1

## Reactions

Moment:	15.4	ft-kips
Axial:	0.75	kips
Shear:	2.68	kips
Elevation:	110	feet

Pole Manufacturer: Other

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

## Bolt Data

Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	22		

## Flange Bolt Results

Bolt Tension Capacity, **B**: 46.07 kips  
 Max Bolt directly applied T: 2.74 Kips  
 Min. PL "tc" for **B** cap. **w/o** Pry: Stiffened in  
 Min PL "treq" for actual **T w/** Pry: Stiffened in  
 Min PL "t1" for actual **T w/o** Pry: Stiffened in  
 T allowable: 46.07 kips <-- B, Stiffened  
 Prying Force, Q: 0.00 kips Stiffened  
 Total Bolt Tension=T+Q: 2.74 kips  
 Non-Prying Bolt Stress Ratio, T/B: 5.9% **Pass**

Stiffened
Service, ASD
Fty*ASIF

## Plate Data

Diam:	28	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.17	in

## Exterior Flange Plate Results

Flexural Check: Stiffened  
 Compression Side Plate Stress: 1.5 ksi  
 Allowable Plate Stress: 36.0 ksi  
 Compression Plate Stress Ratio: 4.2% **Pass**  
**Stiffened**  
 Tension Side Stress Ratio, (treq/t)^2: N/A

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

## Stiffener Data (Welding at Both Sides)

Config:	1	*
Weld Type:	Both	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.1875	in
Fillet V. Weld:	0.1875	in
Width:	6	in
Height:	12	in
Thick:	1	in
Notch:	1	in
Grade:	36	ksi
Weld str.:	70	ksi

## Stiffener Results

Horizontal Weld : 6.3% **Pass**  
 Vertical Weld: 4.0% **Pass**  
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: 0.7% **Pass**  
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: 1.8% **Pass**  
 Plate Comp. (AISC Bracket): 2.5% **Pass**

## Pole Results

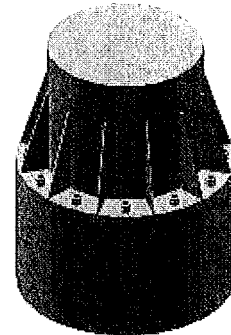
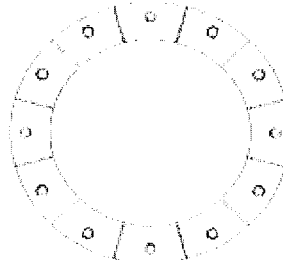
Pole Punching Shear Check: 1.4% **Pass**

## Pole Data

Diam:	15.94	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	0	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

## Stress Increase Factor

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



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

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

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

## TIA Rev F

### Site Data

BU#: 806352
Site Name: BRG 302 943052
App #: 168181 Rev.1
Pole Manufacturer: Other

Reactions		
Moment:	2209	ft-kips
Axial:	27	kips
Shear:	28	kips

### Anchor Rod Data

Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	48.22	in

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

### Anchor Rod Results

Maximum Rod Tension:	181.0 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	92.8% Pass

Rigid
Service, ASD
Fty*ASIF

### Plate Data

Diam:	54.22	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	10.80	in

### Base Plate Results

Base Plate Stress:	40.8 ksi	Flexural Check
Allowable Plate Stress:	60.0 ksi	
Base Plate Stress Ratio:	68.0% Pass	

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
26.48

### Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

### Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

### Pole Results

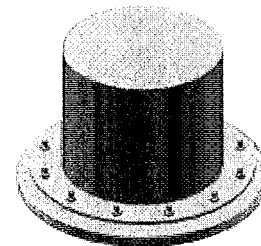
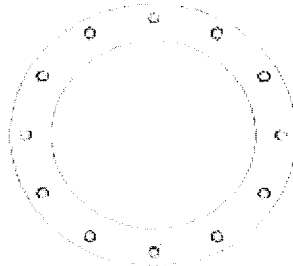
Pole Punching Shear Check:	n/a
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### Pole Data

Diam:	40.3	in
Thick:	0.344	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

### Stress Increase Factor

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



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

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

JOB: 127875  
 SHEET NUMBER: 1 OF 2  
 CALCULATED BY: RJR DATE 12/10/2012  
 CHECKED BY: AJO DATE 12/10/2012

**Pad and Pier Foundation for Monopole - TIA-222-F**

<b>Q<sub>a</sub></b> , ALLOWABLE SOIL PRESS. (ksf)	6
NET or GROSS	NET
SOIL DENSITY (pcf)	134
TOWER ECCENTRICITY	1.50

<b>F'<sub>c</sub></b> (ksi)	3
<b>F'<sub>y</sub></b> (ksi)	60

**Base Reactions LC1: Maximum Wind**

<b>M</b> , MOMENT (k-ft)	2209.0
<b>P<sub>t</sub></b> , TOTAL DOWNLOAD (k)	27.0
<b>H</b> , HORIZONTAL SHEAR (k)	28.3

**Base Reaction LC 2: Ice Wind + Ice**

<b>M</b> (k-ft)	571.0
<b>P<sub>t</sub></b> (k)	41.0
<b>H</b> (k)	7.1

Try:	<b>L</b> (ft.)	<b>B</b> (ft.)	<b>t</b> (ft.)	<b>Soil depth to TOP of mat</b> (ft.)	<b>Soil depth to BOT. of mat</b> (ft.)	<b>Pier dia./width</b> (ft.)	<b>Pier Height, h</b> (cu.ft.)	<b>Pier Shape</b>
	23	20	5	0	5	5.00	0.67	Round

<b>W<sub>m</sub></b> , Weight of Mat (k) =	345.0
<b>W<sub>p</sub></b> , Weight of Pier (k) =	2.0
<b>W<sub>2</sub></b> , Weight of Pier (k) =	17
<b>W<sub>s</sub></b> , WEIGHT OF SOIL (k) =	0.0

Concrete Vol. (cu ft) 85.67

**CHECK DESIGN CRITERIA**

**CHECK STABILITY:**

	LC1	LC2
<b>Mst = P * (L/2) + (V<sub>f+s</sub> * L/2) =</b>	4427.2 k-ft	4567.2 k-ft
<b>Mot = M+H*(t+h) =</b>	2438.4 k-ft	701 k-ft
<b>SF = Mot/Mst =</b>	1.82 > 1.5	6.51 > 1.5

**Capacity: 82.6%**



**APPENDIX D**  
**STRUCTURAL MODIFICATION DRAWINGS**

# STRUCTURAL MODIFICATION DRAWINGS

SITE NAME:  
**BRG 302 943052**

BU NUMBER:  
**806352**

SITE ADDRESS:  
**126 LEDGE ROAD  
 DARIEN, CT 06820  
 (FAIRFIELD COUNTY)**

PLANS PREPARED FOR:



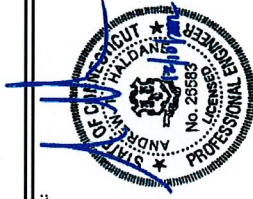
45 BROADWAY  
 ALBANY, NY 12204  
 OFFICE: (585) 899-3442

PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**  
 3703 JUNCTION BOULEVARD  
 RALEIGH, NC 27603-5263  
 OFFICE: (919) 861-6351  
 www.tepgroup.net

SEAL:



December 10, 2012

REV	DATE	ISSUED FOR:
0	12-10-12	MODIFICATION DRAWINGS

DRAWN BY: JLP CHECKED BY: JAB  
 SHEET TITLE:

**TITLE SHEET**

SHEET NUMBER: **T-1**  
 REVISION: **0**  
 SEP # : 127875

PROJECT TEAM	
<b>PROJECT CONTACT:</b>	
NAME	CROWN CASTLE
ADDRESS	45 BROADWAY
CITY, STATE, ZIP	ALBANY, NY 12204
CONTACT	ANDREW BAZINET
PHONE	(585) 899-3442
<b>TOWER MANUFACTURER:</b>	
NAME	VALMONT INDUSTRIES
ADDRESS	7002 N. 28TH STREET
CITY, STATE, ZIP	VALLEY, NB 68064-0358
CONTACT	ENGINEERING DEPARTMENT
PHONE	(402) 359-2201
<b>STRUCTURAL ENGINEER:</b>	
NAME	TOWER ENGINEERING PROFESSIONALS, INC.
ADDRESS	3703 JUNCTION BOULEVARD
CITY, STATE, ZIP	RALEIGH, NC 27603
CONTACT	ANDREW T. HALDANE, P.E., C.W.I.
PHONE	(919) 861-6351
<b>GEOTECHNICAL ENGINEER:</b>	
NAME	CLARENCE WETLI ASSOCIATES
ADDRESS	227 WILLIAMS STREET P.O. BOX 397
CITY, STATE, ZIP	GLASTONBURY, CT 06033
CONTACT	DR. CLARENCE WETLI, P.E., P.C.
PHONE	(203) 633-4623

INDEX OF SHEETS			
NO.	SHEET TITLE	REV	REV
T-1	TITLE SHEET	0	0
N-1	MI CHECKLIST AND NOTES	0	0
N-2	PROJECT NOTES I	0	0
N-3	PROJECT NOTES II	0	0
N-4	AJAX BOLT INSTALLATION DETAILS	0	0
N-5	FOUNDATION NOTES	0	0
S-1	TOWER ELEVATION AND MODIFICATION SCHEDULE	0	0
S-2	MONOPOLE REINFORCEMENT DETAILS	0	0
S-3	BASE PLATE AND TRANSITION STIFFENER DETAILS	0	0
S-4	FOUNDATION REINFORCEMENT DETAILS I	0	0
S-5	FOUNDATION REINFORCEMENT DETAILS II	0	0


MODIFICATION PROVISIONS	
THE MODIFICATIONS DEPICTED ON THESE DRAWINGS ARE BASED ON THE RECOMMENDATIONS OUTLINED IN THE STRUCTURAL MODIFICATION ANALYSIS REPORT COMPLETED BY TOWER ENGINEERING PROFESSIONALS (TEP), JOB#: 127875 DATED DECEMBER 10, 2012 (REV 0). THIS REPORT IS BASED ON A SPECIFIC ANTENNA LOADING AND COAX LOADING INFORMATION. SEE THE REPORT FOR THE ANTENNA AND COAX LOADING INFORMATION. ANY OTHER ANTENNA OR COAX CONFIGURATION REQUIRES REVISIONS TO THE STRUCTURE WHICH WILL RESULT IN THE STRUCTURE MEETING THE REQUIREMENTS OF THE SPECIFICATIONS UNDER WHICH THE STRUCTURAL WAS COMPLETED.	

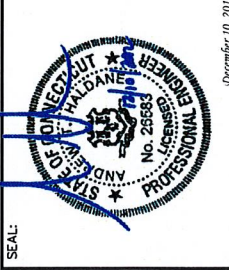
REFERENCED DOCUMENTS	
DOCUMENT	DATE
GEOTECHNICAL REPORT	01-13-93
TOWER FOUNDATION DRAWINGS	02-93
MANUFACTURER DRAWINGS	07-24-07

CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, QUANTITIES, BAR NUMBERS, AND COAX/ANTENNA PLACEMENTS PRIOR TO BIDDING ORDERING MATERIALS, AND CONSTRUCTION.



PROJECT INFORMATION:  
**BRG 302 943052**  
**BU # 806352**  
 126 LEDGE ROAD  
 DAREN, CT 06820  
 (FAIRFIELD COUNTY)

PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
 3703 JUNCTION BOULEVARD  
 RALEIGH, NC 27603-5283  
 OFFICE: (919) 861-6331  
 www.tepgroup.net



REV	DATE	ISSUED FOR:
0	12-10-12	MODIFICATION DRAWINGS

DRAWN BY: JUF  
 CHECKED BY: JAB  
 SHEET TITLE:  
**MI CHECKLIST AND NOTES**

SHEET NUMBER:  
**N-1**  
 REVISION:  
 0  
 TEP #: 127675

**MODIFICATION INSPECTION NOTES:**

**GENERAL**  
 THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).  
 THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF. NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.  
 TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).  
 REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

**MI INSPECTOR**  
 THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:  
 • REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.  
 • WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

**GENERAL CONTRACTOR**  
 THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:  
 • REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.  
 • WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.  
 • BE CLEAR, UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.  
 THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

**RECOMMENDATIONS**  
 THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:  
 • IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE FOR THE MI TO BE CONDUCTED.  
 • THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.  
 • WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.  
 • IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTORS TO COMPLETE WORK WITH ONE VISIT.  
 • WHEN POSSIBLE, IT IS PREFERRED TO HAVE AN AEV AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

**CANCELLATION OR DELAYS IN SCHEDULED MI**  
 IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE. CROWN REVIEWERS WILL NOT BE HELD LIABLE FOR ANY DELAYS OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

**CORRECTION OF FAILING MIs**  
 IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILING MI"), THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:  
 • CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.  
 • CORRECT FAILING ISSUES TO COMPLY WITH THE AS-BUILT SPECIFICATIONS. THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

**MI VERIFICATION INSPECTIONS**  
 CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTIONS(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS AS THE MI INSPECTIONS(S) IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "CLASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

**REQUIRED PHOTOS**  
 BETWEEN THE GC AND THE MI INSPECTOR, THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:  
 • PRE-CONSTRUCTION GENERAL SITE CONDITION  
 • PHOTOGRAPHS DURING THE REINFORCEMENT/REINFORCEMENT CONSTRUCTION/ERECTION AND INSPECTION:  
 • PHOTOS OF ALL CRITICAL DETAILS  
 • FOUNDATION MODIFICATIONS  
 • BELT INSTALLATION AND TORQUE  
 • WELD INSPECTION AND TORQUE  
 • SURFACE COATING REPAIR  
 • POST CONSTRUCTION PHOTOGRAPHS  
 • FINAL IN FIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.  
 THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS. PLEASE REFER TO ENG-SOW-10007.

**MI CHECKLIST**


CONSTRUCTION/INSTALLATION REQUIRED (COMPLETED BY EOR)	REPORT ITEM
<b>PRE-CONSTRUCTION</b>	
X	MI CHECKLIST DRAWING
NA	EOR APPROVED SHOP DRAWINGS
NA	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
-----	
<b>CONSTRUCTION</b>	
X	CONSTRUCTION INSPECTIONS
X	CONTINUOUS FOUNDATION INSPECTIONS
X	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
-----	
<b>POST-CONSTRUCTION</b>	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	
-----	

NOTE: X DENOTES A DOCUMENT NEEDED FOR THE PMI REPORT  
 NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE PMI REPORT

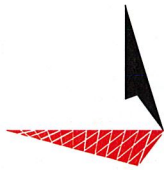



**GENERAL NOTES:**

1. ALL REFERENCES TO THE OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED CROWN CASTLE OR ITS DESIGNATED REPRESENTATIVE.
2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PERFORMANCE OF WORK SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PERFORMANCE OF WORK SHOWN ON THESE DRAWINGS. THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF CONNECTICUT.
3. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 2005 CONNECTICUT STATE BUILDING CODE.
4. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.
5. ALL HAZARDOUS ASSEMBLY MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE DOWNS THAT WILL BE NECESSARY TO COMPLETE THE PROJECT.
7. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OF CONSTRUCTION WORK OR CONSTRUCTION. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, AND DIRECT ERECTION SEQUENCES. THE CONTRACTOR SHALL NOT INCLUDE INSPECTION OF THE PROCEDURES, AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES OR THE PROCEDURES.
8. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND CONFORMANT WITH THE WRITING BY THE OWNER AND ENGINEER, PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.
10. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.
11. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
12. IF APPLICABLE, ALL CONCRETE WORK SHALL COMPLY TO LOCAL CODES AND THE ACI 318-05, "BUILDING REQUIREMENTS FOR STRUCTURAL CONCRETE".
13. 24 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.
14. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.
15. ALL TOWER DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. NOTIFY THE ENGINEER IMMEDIATELY IF ANY DISCREPANCIES ARE DISCOVERED. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.

PLANS PREPARED FOR:  
  
**CROWN CASTLE**  
 45 BROADWAY  
 ALBANY, NY 12204  
 OFFICE: (518) 889-3442

PROJECT INFORMATION:  
**BRG 302 943052**  
**BU #: 806352**  
 126 LEDGE ROAD  
 DARIEN, CT 06820  
 (FAIRFIELD COUNTY)

PLANS PREPARED BY:  
  
**TOWER ENGINEERING PROFESSIONALS**  
 3703 JUNCTION BOULEVARD  
 RALEIGH, NC 27603-5263  
 OFFICE: (919) 661-6351  
 www.tepgroup.net

SEAL:  
  
 December 10, 2012

0	12-10-12	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:
DRAWN BY: JLF		
CHECKED BY: JAB		

SHEET TITLE:  
**PROJECT NOTES I**

SHEET NUMBER:  
**N-2**  
 REVISION: **0**  
 TEP #: 127075









## FOUNDATION NOTES:

### GENERAL NOTES:

- FOUNDATION INSTALLATION SHALL BE SUPERVISED BY PERSONNEL KNOWLEDGEABLE AND EXPERIENCED WITH THE PROPOSED FOUNDATION TYPE. CONSTRUCTION SHALL BE IN ACCORDANCE WITH GENERALLY ACCEPTED PRACTICES AND IN A GOOD WORKMANLIKE MANNER.
- CONTRACTOR SHALL VERIFY DIMENSIONS WITH ORIGINAL DRAWINGS.
- FOR FOUNDATION AND ANCHOR TOLERANCES, SEE ORIGINAL DRAWINGS.
- FOUNDATION DESIGN ASSUMES LEVEL GRADE AT THE SITE.
- THE FOUNDATION DESIGN IS IN ACCORDANCE WITH GENERALLY ACCEPTED PROFESSIONAL ENGINEERING PRINCIPLES AND PRACTICES WITHIN THE LIMITS OF THE SUBSURFACE DATA PROVIDED.
- FOUNDATION DESIGN MODIFICATIONS MAY BE REQUIRED IN THE EVENT THE DESIGN PARAMETERS ARE NOT APPLICABLE FOR THE SUBSURFACE CONDITIONS ENCOUNTERED DURING CONSTRUCTION.
- THE FOUNDATION DESIGN ASSUMES FIELD INSPECTIONS WILL BE PERFORMED TO VERIFY THAT CONSTRUCTION MATERIALS, INSTALLATION METHODS, AND ASSUMED DESIGN PARAMETERS ARE ACCEPTABLE BASED ON THE CONDITIONS AT THE SITE.
- THE FOUNDATION DESIGN ASSUMES NO CONSTRUCTION JOINTS. HOWEVER, CONSTRUCTION JOINTS SHALL BE PERMITTED UPON APPROVAL BY THE OWNER/ENGINEER.

### EXCAVATION:

- WORK SHALL BE IN ACCORDANCE WITH LOCAL CODES AND SAFETY REGULATIONS. PROCEDURES FOR THE PROTECTION OF EXCAVATIONS, EXISTING CONSTRUCTION, AND UTILITIES SHALL BE ESTABLISHED PRIOR TO BEGINNING WORK.
- INTIMATE CONTACT BETWEEN THE CONCRETE AND THE SOIL WALLS OF THE DRILLED SHAFT IS ESSENTIAL. THE CONCRETE SHALL BE APPROPRIATELY VIBRATED DURING CONSTRUCTION.
- THE SIDES OF THE EXCAVATION SHALL BE ROUGH AND FREE OF LOOSE CUTTINGS.
- LOOSE MATERIAL TO BE REMOVED FROM THE BOTTOM OF EXCAVATION PRIOR TO CONCRETE PLACEMENT.
- DRILLING FLUID, IF USED, SHALL BE FULLY DISPLACED BY CONCRETE AND SHALL NOT BE DETRIMENTAL TO THE CONCRETE OR SURROUNDING SOIL. CONTAMINATED CONCRETE SHALL BE REMOVED AND REPLACED WITH FRESH CONCRETE.

### REINFORCING STEEL:

- THE REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-615, GRADE 60. IT SHALL BE DEFORMED AND SPICES SHALL NOT BE ALLOWED UNLESS OTHERWISE NOTED.
- WELDING IS PROHIBITED ON REINFORCING STEEL AND EMBEDMENTS.
- REINFORCING CAGES SHALL BE BRACED TO RETAIN PROPER DIMENSIONS DURING HANDLING AND THROUGHOUT PLACEMENT OF CONCRETE. WHEN TEMPORARY CASING IS UTILIZED, BRACING SHALL BE ADEQUATE TO RESIST FORCES OCCURRING FROM FLOWING CONCRETE DURING CASING EXTRACTION.
- SPACERS SHALL BE ATTACHED INTERMITTENTLY THROUGHOUT THE ENTIRE LENGTH OF TIEBACK REINFORCING TO INSURE CONCENTRIC PLACEMENT OF CAGES IN EXCAVATIONS.
- MINIMUM CONCRETE COVER FOR REINFORCEMENT SHALL BE 3" UNLESS OTHERWISE NOTED. APPROVED SPACERS SHALL BE USED TO INSURE A 3" MINIMUM COVER ON REINFORCEMENT.
- THE CONCRETE COVER FROM THE TOP OF THE FOUNDATION TO THE ENDS OF THE VERTICAL REINFORCEMENT SHALL NOT EXCEED 4" NOR BE LESS THAN 2".
- THE CONCRETE COVER FROM THE BOTTOM OF THE FOUNDATION TO THE ENDS OF THE VERTICAL REINFORCEMENT SHALL NOT EXCEED 4" NOR BE LESS THAN 3".

### CONCRETE:

- WORK SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF THE ACI-318, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE."
- THE CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI IN 28-DAYS.
- PROPORTIONS OF CONCRETE MATERIALS SHALL BE SUITABLE FOR THE INSTALLATION METHOD UTILIZED AND RESISTIVE TO CURING AND DRYING SHRINKAGE. LOCAL REQUIREMENTS FOR DURABILITY CONDITIONS, THE DURABILITY REQUIREMENTS OF ACI-318 SHALL BE SATISFIED BASED ON THE CONDITIONS EXPECTED AT THE SITE.
- CONCRETE SHALL BE PLACED IN A MANNER THAT WILL PREVENT SEGREGATION OF CONCRETE MATERIALS, INFILTRATION OF WATER OR SOIL, AND OTHER OCCURRENCES THAT MAY DECREASE THE STRENGTH OR DURABILITY OF THE FOUNDATION.

### CONCRETE (CONTINUED):

- FREE FALL CONCRETE MAY BE USED PROVIDED FALL IS VERTICAL DOWN WITHOUT HITTING THE SIDES OF THE EXCAVATION. FORMWORK REINFORCING SHALL BE FULLY BRACED, OR OTHER OBSTRUCTIONS. UNDER NO CIRCUMSTANCES SHALL CONCRETE FALL THROUGH WATER.
  - THE MAXIMUM SIZE OF THE AGGREGATE SHALL NOT EXCEED A SIZE SUITABLE FOR THE INSTALLATION METHOD UTILIZED OR 1/3-CLEAR DISTANCE BEHIND OR BETWEEN REINFORCING. THE MAXIMUM SIZE MAY BE INCREASED TO 2/3-CLEAR DISTANCE PROVIDED WORKABILITY AND METHODS OF CONSOLIDATION SUCH AS VIBRATING WILL PREVENT HONEYCOMBS AND VOIDS.
  - A TEMPORARY PROTECTIVE STEEL CASING WILL BE REQUIRED TO KEEP THE SHAFT OPEN DURING CONSTRUCTION AND INSPECTIONS PRIOR TO PLACING CONCRETE. THIS CASING SHOULD BE EXTRACTED AS THE CONCRETE IS PLACED.
- FINISHING:
- THE TOP OF THE FOUNDATION SHALL BE SLOPED TO DRAIN WITH A FLOATED FINISH.
  - THE EXPOSED EDGES OF THE CONCRETE SHALL BE CHAMFERED 1" x 1".

PLANS PREPARED FOR:  
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OFFICE: (518) 899-3442

PROJECT INFORMATION:  
**BRG 302 943052**  
**BU # 806352**  
126 LEDGE ROAD  
DARLEN, CT 06820  
(FAIRFIELD COUNTY)

PLANS PREPARED BY:



**TOWER ENGINEERING PROFESSIONALS**  
3703 JUNCTION BOULEVARD  
RALEIGH, NC 27603-5263  
OFFICE: (919) 861-6351  
www.tepgroup.net

SEAL:



December 10, 2012

REV	DATE	ISSUED FOR:
0	12-10-12	MODIFICATION DRAWINGS

DRAWN BY: JUP    CHECKED BY: JAB  
SHEET TITLE:

## FOUNDATION NOTES

SHEET NUMBER: **N-5**  
REVISION: **0**  
TEP #: 127875

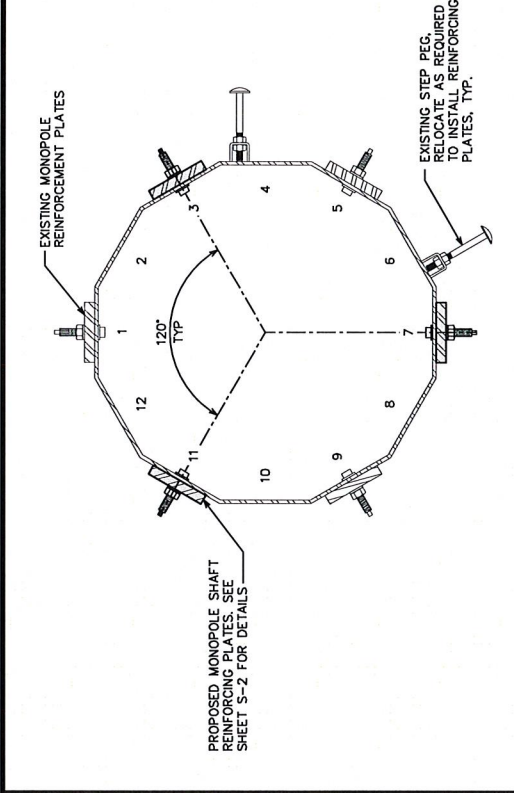
REV	DATE	ISSUED FOR:
0	12-10-12	MODIFICATION DRAWINGS
DRAWN BY: JUP CHECKED BY: JAB		


**TOWER ELEVATION AND MODIFICATION SCHEDULE**

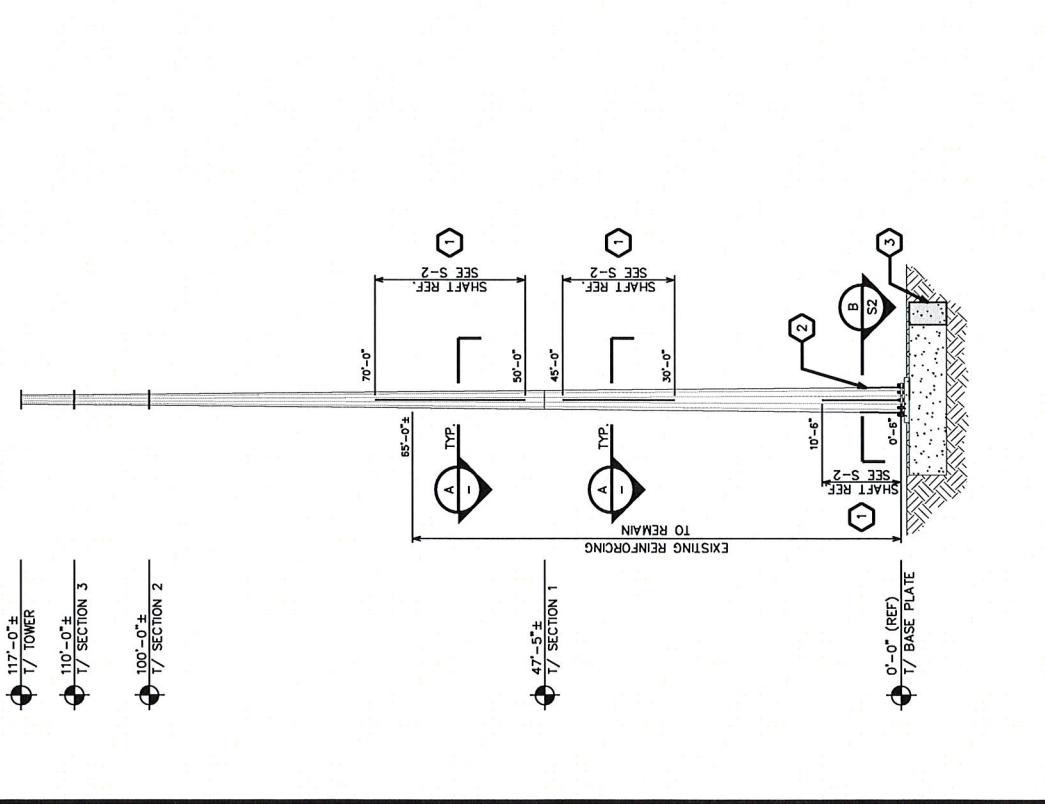
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TEP #:	127575

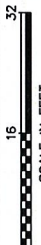
MODIFICATION SCHEDULE		
NO.	MODIFICATION DESCRIPTION	ELEVATION (FT.)
1	INSTALL PROPOSED MONOPOLE REINFORCEMENT PLATES	0.5 - 10.5 30 - 45 50 - 70
2	INSTALL PROPOSED TRANSITION STIFFENERS	0 - 5.5
3	INSTALL PROPOSED FOUNDATION REINFORCEMENT	0
4	MODIFICATION INSPECTION BY TEP CONTACT TEP FOR FEE: PM@TEPGROUP.NET	-

- NOTES:**
- IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROVIDE THE MODIFICATION INSPECTOR/ ENGINEER OF RECORD WITH A SEPARATE CERTIFIED INSPECTION REPORT. THIS REPORT SHALL COVER THE ENTIRE WELDING PROCESS (PRE/DURING/POST) WITH PROPER PHOTOS, WELDING SKETCHES, AND CONFORM TO AWS D1.1/SI.1M: 2008 "STRUCTURAL WELDING CODE-STEEL"; FOR ADDITIONAL NOTES, SEE WELDING NOTES.
  - ANTENNAS AND OTHER APPURTENANCES MAY NEED TO BE TEMPORARILY REMOVED OR MOVED DURING THE INSTALLATION OF THE MODIFICATIONS SHOWN ABOVE.
  - NDE OF THE CIRCUMFERENTIAL WELD OF THE BASE PLATE TO SHAFT CONNECTION IS REQUIRED. NOTIFY THE EOR AND CROWN ENGINEERING IMMEDIATELY IF ANY CRACKS ARE SUSPECTED OR HAVE BEEN IDENTIFIED. THE NDE SHALL INCLUDE ALL EXISTING MODIFICATIONS THAT HAVE BEEN WELDED TO THE BASE PLATE. THE NDE REPORT SHALL BE INCLUDED IN THE NDE SCOPE OF WORK.
  - NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE FABRICATING MATERIALS AND PROCEEDING WITH THE WORK. REPORT AND ALL DISCREPANCIES TO TOWER ENGINEERING PROFESSIONALS, INC., AND CROWN CASTLE CONSTRUCTION MANAGER IMMEDIATELY.




**SECTION**  
 SCALE: 1" = 1'-0"  




**TOWER ELEVATION**  
 SCALE: 1/8" = 1'-0"  




PLANS PREPARED FOR:



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 OFFICE: (518) 899-3442

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 RALEIGH, NC 27603-5263  
 OFFICE: (919) 861-6351  
 www.tepgroup.net

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December 10, 2012

0	12-10-12	MODIFICATION DRAWINGS
REV	DATE	ISSUED FOR:
DRAWN BY: JUF CHECKED BY: JAB		
SHEET TITLE: <b>MONOPOLE REINFORCEMENT DETAILS</b>		

SHEET NUMBER:  
**S-2**  
 REVISION: 0  
 TEP #: 127975

**SABRE REINFORCEMENT SCHEDULE (OPTION 3)**

ELEVATION	FLAT #	MS PLATE (65 KSI)
0.5 - 10.5	7	MS450 (1 TOTAL)
30 - 45	3, 7, 11	MS450 (3 TOTAL)
50 - 70	3, 7, 11	MS450 (3 TOTAL)

**AEROSOLUTIONS REINFORCEMENT SCHEDULE (OPTION 2)**

ELEVATION	FLAT #	MP PLATE (65 KSI)
0.5 - 10.5	7	MP303 (1 TOTAL)
30 - 45	3, 7, 11	MP303 (3 TOTAL)
50 - 70	3, 7, 11	MP303 (3 TOTAL)

CONTACT AEROSOLUTIONS FOR SPLICE DETAIL INFORMATION.

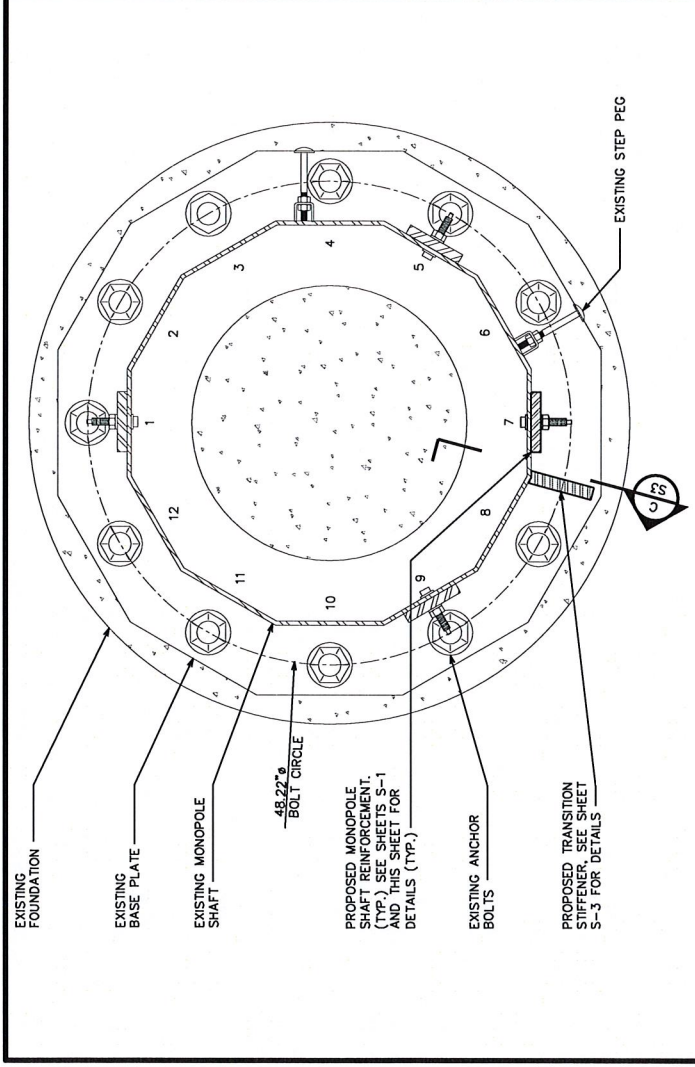
**CROWN CASTLE REINFORCEMENT SCHEDULE (OPTION 1)**

ELEVATION	FLAT #	CROWN PLATE (100 KSI)
0.5 - 10.5	7	1"x4" (1 TOTAL)
30 - 45	3, 7, 11	1"x4" (3 TOTAL)
50 - 70	3, 7, 11	1"x4" (3 TOTAL)


**FLAT PLATE INSTALLATION CHART**

FLAT PLATE THICKNESS	FLAT PLATE WIDTH	TERMINATION BOLTS	MAX. STITCH BOLT SPACING <sup>1</sup>
1"	4"	7	20"
1"	5"	9	18"
1"	6"	11	16"
1"	7"	14	14"
1"	8"	16	14"
1.5"	9"	20	22"
1.5"	10"	24	22"
1.5"	11"	27	20"
1.5"	12"	31	20"

- NOTES:**
- MAXIMUM STITCH BOLT SPACING SHALL BE REDUCED BY ONE-HALF AT LOCATIONS WHERE THE FLAT PLATE IS OFFSET FROM THE SHAFT.
  - REINFORCING BAR SPLICE DETAILS TO BE COORDINATED BY RESPECTIVE CONTRACTORS.
  - DO NOT FIELD WELD DIRECTLY TO THE 100 KSI MATERIAL.
  - THE 100 KSI MATERIAL SHALL CONFORM TO THE FOLLOWING:
    - MATERIAL SHALL BE ASTM A514, GRADE A, GRADE E, OR GRADE P, HAVING A MINIMUM TENSILE STRENGTH (FU) OF 110 KSI AND A MINIMUM YIELD STRENGTH (FY) OF 100 KSI.
    - MATERIAL SHALL BE HEAT TREATED, QUENCHED AND TEMPERED PER ASTM A514.
    - MATERIAL SHALL HAVE CHARPY V-NOTCH (CVN) IMPACT VALUES OF NOT LESS THAN 15 FT-LB AT -20 DEGREES F, IN ACCORDANCE WITH ASTM A370
    - ANY AN ALL WELDING TO THE MATERIAL SHALL BE PERFORMED ACCORDING TO AN APPROVED WELDING PROCEDURE SPECIFICATION (WPS) SUITABLE FOR THE GRADE AND INTENDED USE AND SERVICE. THE WPS SHALL BE DEVELOPED BY A QUALIFIED WELDER WITH THE WPS FOR THE WELDING OF ANY WELDING FABRICATION OR WELDING. THE WPS SHALL BE SUBMITTED TO CROWN CASTLE AND TOWER ENGINEERING PROFESSIONALS, INC. FOR REVIEW.
    - ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. FU = 105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURE.



**SECTION B**  
 SCALE: 1" = 1'-0"



SCALE IN FEET






PLANS PREPARED FOR:  
**CROWN CASTLE**  
 46 BROADWAY  
 ALBANY, NY 12204  
 OFFICE: (585) 899-3442

PROJECT INFORMATION:  
**BRG 302 943052**  
**BU #: 806352**  
 126 LEDGE ROAD  
 DAREN, CT 06820  
 (FAIRFIELD COUNTY)

PLANS PREPARED BY:  
  
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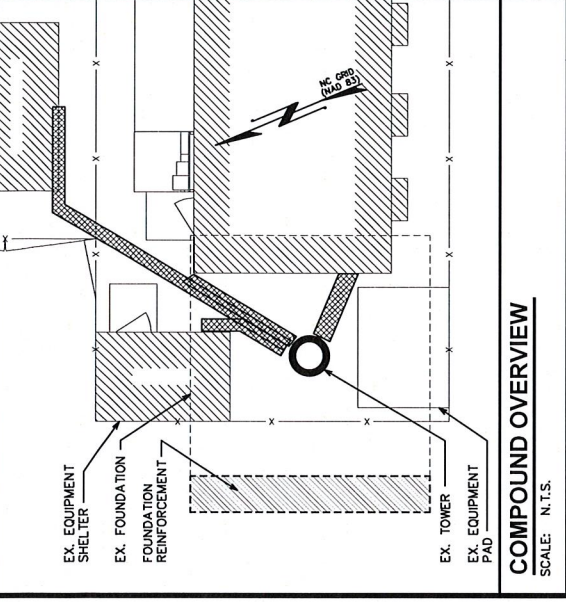
SEAL:  
  
 December 10, 2012

REV	DATE	ISSUED FOR:
0	12-10-12	MODIFICATION DRAWINGS

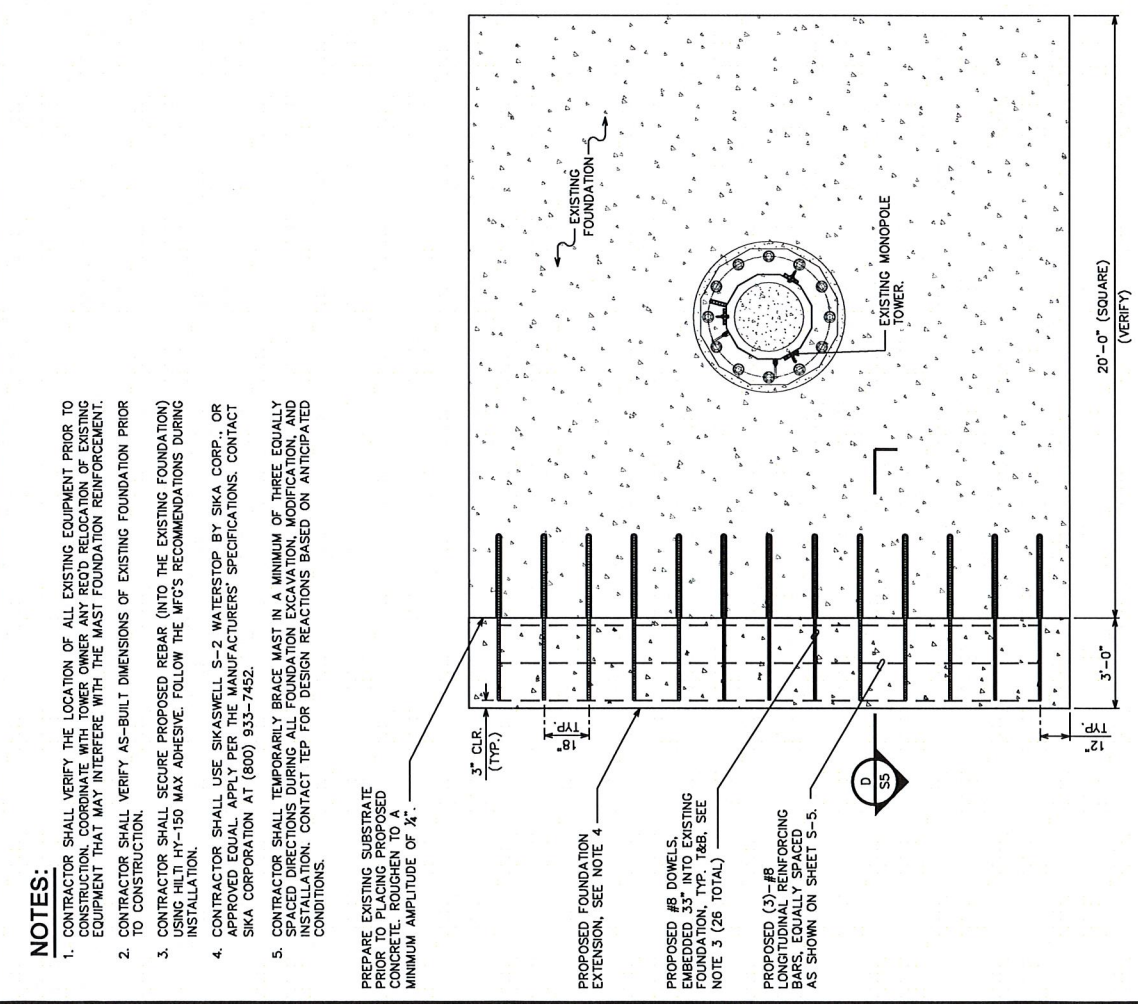
DRAWN BY: JJP | CHECKED BY: JAB

SHEET TITLE:  
**FOUNDATION REINFORCEMENT DETAILS I**

SHEET NUMBER:  
**S-4**  
 REVISION: 0  
 TEP #: 127675



**COMPOUND OVERVIEW**  
 SCALE: N.T.S.



**FOUNDATION PLAN VIEW**  
 SCALE: 1/4" = 1'-0"

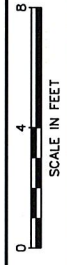
- NOTES:**
- CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING EQUIPMENT PRIOR TO CONSTRUCTION. COORDINATE WITH TOWER OWNER ANY RECD RELOCATION OF EXISTING EQUIPMENT THAT MAY INTERFERE WITH THE MAINT FOUNDATION REINFORCEMENT.
  - CONTRACTOR SHALL VERIFY AS-BUILT DIMENSIONS OF EXISTING FOUNDATION PRIOR TO CONSTRUCTION.
  - CONTRACTOR SHALL SECURE PROPOSED REBAR (INTO THE EXISTING FOUNDATION) USING HILTI HY-150 MAX ADHESIVE. FOLLOW THE MFG'S RECOMMENDATIONS DURING INSTALLATION.
  - CONTRACTOR SHALL USE SIKASWELL S-2 WATERSTOP BY SIKA CORP., OR APPROVED EQUAL. APPLY PER THE MANUFACTURERS' SPECIFICATIONS. CONTACT SIKA CORPORATION AT (800) 933-7452.
  - CONTRACTOR SHALL TEMPORARILY BRACE MAST IN A MINIMUM OF THREE EQUALLY SPACED DIRECTIONS DURING ALL FOUNDATION EXCAVATION, MODIFICATION, AND INSTALLATION. CONTACT TEP FOR DESIGN REACTIONS BASED ON ANTICIPATED CONDITIONS.

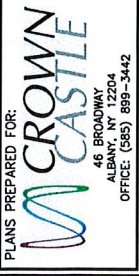
PREPARE EXISTING SUBSTRATE PRIOR TO PLACING PROPOSED CONCRETE. ROUGHEN TO A MINIMUM AMPLITUDE OF 1/4".

PROPOSED FOUNDATION EXTENSION, SEE NOTE 4

PROPOSED #8 DOWELS ENBEDDED 33" INTO EXISTING FOUNDATION. TYP. TAB. SEE NOTE 3 (26 TOTAL)

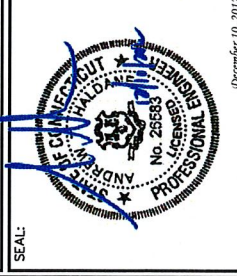
PROPOSED (3) #8 LONGITUDINAL REINFORCING BARS, EQUALLY SPACED AS SHOWN ON SHEET S-5.





PROJECT INFORMATION:  
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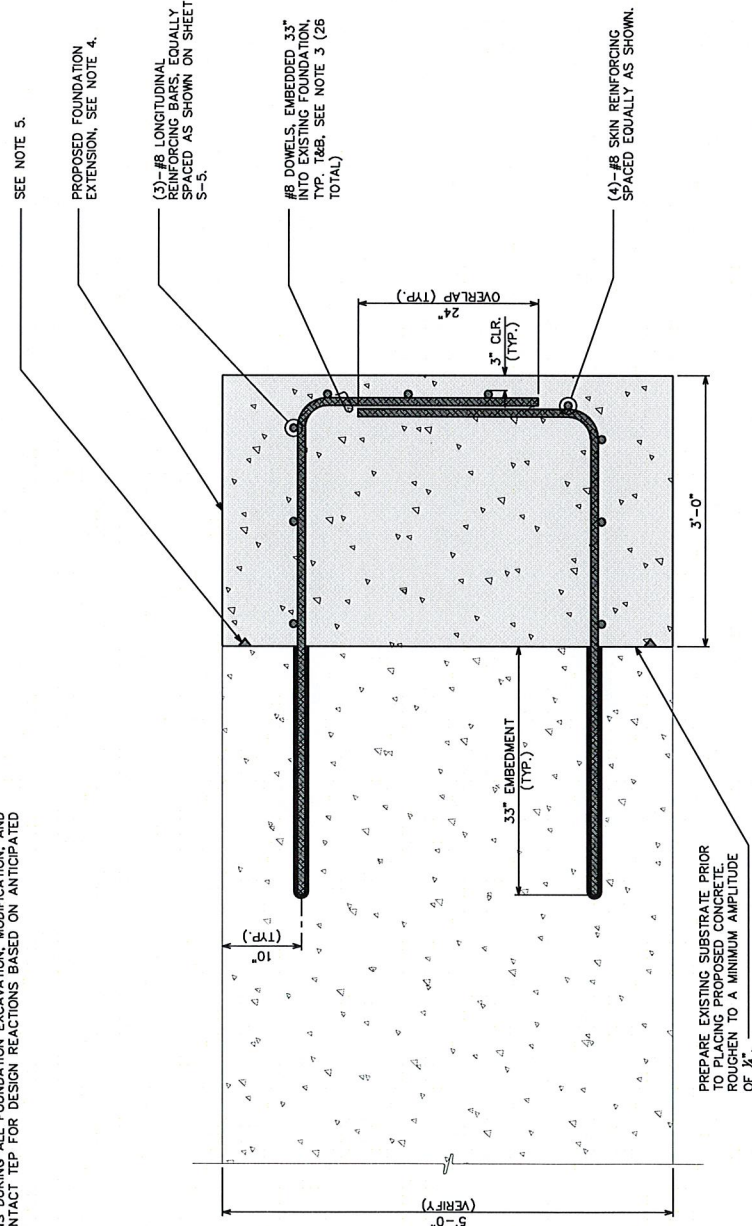


REV	DATE	ISSUED FOR:
0	12-10-12	MODIFICATION DRAWINGS

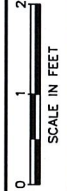
DRAWN BY: JLP | CHECKED BY: JAG  
 SHEET TITLE:  
**FOUNDATION REINFORCEMENT DETAILS II**

SHEET NUMBER:  
**S-5**  
 REVISION: **0**  
 TEP #: 127975

- NOTES:**
- CONTRACTOR SHALL VERIFY THE LOCATION OF ALL EXISTING EQUIPMENT PRIOR TO CONSTRUCTION. COORDINATE WITH TOWER OWNER ANY RELOC. OF EXISTING EQUIPMENT THAT MAY INTERFERE WITH THE MAST FOUNDATION REINFORCEMENT.
  - CONTRACTOR SHALL VERIFY AS-BUILT DIMENSIONS OF EXISTING FOUNDATION PRIOR TO CONSTRUCTION.
  - CONTRACTOR SHALL SECURE PROPOSED REBAR (INTO THE EXISTING FOUNDATION) USING HILTI HY-150 MAX ADHESIVE. FOLLOW THE MFG'S RECOMMENDATIONS DURING INSTALLATION.
  - CONTRACTOR SHALL USE SIKASWELL S-2 WATERSTOP BY SIKA CORP., OR APPROVED EQUAL. APPLY PER THE MANUFACTURERS' SPECIFICATIONS. CONTACT SIKA CORPORATION AT (800) 933-7452.
  - CONTRACTOR SHALL TEMPORARILY BRACE MAST IN A MINIMUM OF THREE EQUALLY SPACED LOCATIONS. BRACING SHALL BE REMOVED PRIOR TO CONCRETE POUR AND INSTALLATION. CONTACT TEP FOR DESIGN REACTIONS BASED ON ANTICIPATED CONDITIONS.



PREPARE EXISTING SUBSTRATE PRIOR TO PLACING PROPOSED CONCRETE. ROUGHEN TO A MINIMUM AMPLITUDE OF 1/4".



**SECTION**  
 SCALE: 3/4" = 1'-0" **D**





# STATE OF CONNECTICUT

## CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)

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

August 10, 2015

Camille M. Mulligan  
Alcatel-Lucent  
1 Robbins Road  
Westford, MA 01886

### RE: Compliance Extension Request

EM-SPRINT-008-130130	93 Old Amity Road	Bethany
EM-SPRINT-009-131008	8 Sky Edge Drive	Bethel
EM-SPRINT-017-131008	371 Terryville Avenue	Bristol
EM-SPRINT-018-130322	39 Carmen Hill Road	Brookfield
EM-SPRINT-033-130920	179 Shunpike Road	Cromwell
EM-SPRINT-034-130920	41 Padanaram Road	Danbury
EM-SPRINT-069-130409	246 East Franklin Street	Danielson
EM-SPRINT-035-130322	126 Ledge Road	Darien
EM-SPRINT-043-130311	310 Prestige Park Road	East Hartford
EM-SPRINT-047-131008	232 South Main Street	East Windsor
EM-SPRINT-051-130606	280 Morehouse Drive	Fairfield
EM-SPRINT-052-130606	45 Maple Ridge Road	Farmington
EM-SPRINT-057-120122	363 Riversville Road	Greenwich
EM-SPRINT-057-131127	9 Sound Shore Dr., a/k/a 12 Sound Shore Drive	Greenwich
EM-SPRINT-059-130819	99 Briar Road	Groton
EM-SPRINT-062-130509	Talmadge Road	Hamden
EM-SPRINT-068-121226	136 Bulls Bridge Road	Kent
EM-SPRINT-076-130819	135 New Road	Madison
EM-SPRINT-077-130828	Olcott Street a/k/a 250 Olcott Street	Manchester
EM-SPRINT-080-131024	21 West Peak Drive	Meriden
EM-SPRINT-081-130716	1 Service Road	Middlebury
EM-SPRINT-084-130124	528 Wheeler's Farm Rd.	Milford
EM-SPRINT-091-130606	302 Ball Pond Road	New Fairfield
EM-SPRINT-095-131008	26 Washinton Street	New London
EM-SPRINT-097-131008	8 Ferris Road	Newtown
EM-SPRINT-097-131129	201 South Main St.	Newtown
EM-SPRINT-103-121226	173/177 West Rocks Road	Norwalk
EM-SPRINT-104-131112	2 Hinkley Hill Road	Norwich
EM-SPRINT-108-130215	20 Great Oak Road	Oxford
EM-SPRINT-108-130401	133 Coppermine Road	Oxford
EM-SPRINT-108-130712	338 Oxford Road	Oxford
EM-SPRINT-119-130314	47 Inwood Road	Rocky Hill

EM-SPRINT-119-130819	52 New Britain Avenue	Rocky Hill
EM-SPRINT-120-130828	Lower County Road a/k/a 35 Lower County Road	Roxbury
EM-SPRINT-126-130325	219 Nells Rock Road	Shelton
EM-SPRINT-126-130515	70 Platt Road	Shelton
EM-SPRINT-128-131112	22 Wintonbury Road (aka 49a and 53 Wintonbury Road)	Simsbury
EM-SPRINT-130-130531	1432 Old Waterbury Road	Southbury
EM-SPRINT-135-130128	69 Guinea Road	Stamford
EM-SPRINT-135-131112	366 Old Long Ridge Road	Stamford
EM-SPRINT-143-130712	350 Burr Mountain Road	Torrington
EM-SPRINT-151-131209	184 Garden Circle	Waterbury
EM-SPRINT-155-130828	345 North Main Street a/k/a 333 North Main Street	West Hartford
EM-SPRINT-157-130701	56 Norfield Road	Weston
EM-SPRINT-164-130920	Windsor Avenue a/k/a 494 Windsor Avenue	Windsor
EM-SPRINT-NEXTEL-166-130116	164 County Road	Wolcott

Dear Ms. Mulligan:

The Connecticut Siting Council (Council) is in receipt of your letter dated August 10, 2015, submitted on behalf of Sprint, requesting an extension of time to submit notices of completion of construction and associated post modification inspection reports for the above-referenced exempt modifications that were approved in 2013.

Please be advised that Council approval of these exempt modifications has expired. Therefore, any additional changes to these facilities will require explicit notice to the Council pursuant to Regulations of Connecticut State Agencies Section 16-50j-73 and a filing fee.

Thank you for your attention to this matter.

Sincerely,



Melanie A. Bachman  
Acting Executive Director

MAB/cm