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CONNECTICUT
SITING COUNCIL

ORIGINAL

November 10, 2014

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

Re: **EM-VER-014-130607 – 180 North Main Street, Branford, Connecticut**
EM-VER-103-130607 – West Rocks Road, Norwalk, Connecticut
TS-VER-072-130613 – 770 Long Cove Road, Ledyard, Connecticut
EM-VER-080-130613 – 119 Empire Avenue, Meriden, Connecticut
EM-VER-103-130620 – 11 Filbert Street, Norwalk, Connecticut
EM-VER-062-130703 – 150 Willow Street, Hamden, Connecticut
EM-VER-079-130715 – North Main Street, Marlborough, Connecticut

Completion of Construction Activity

Dear Ms. Bachman:

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

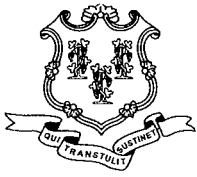
If you have any questions or need any additional information regarding these facilities please do not hesitate to contact me.

Sincerely,



Kenneth C. Baldwin

Copy to:
Sandy M. Carter



STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

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

E-Mail: siting.council@ct.gov

www.ct.gov/csc

August 7, 2013

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

RE: **EM-VER -079-130715** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at North Main Street, Marlborough, Connecticut.

Dear Attorney Baldwin:

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

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

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated July 12, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Catherine D. Gaudinski, First Selectman, Town of Marlborough
Peter F. Hughes, Zoning Enforcement Officer, Town of Marlborough
Crown Castle

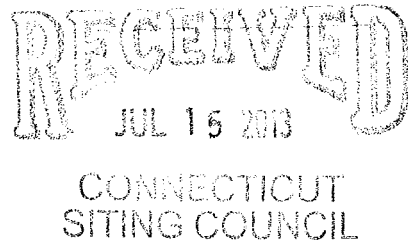


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts

July 12, 2013

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



Re: **Notice of Exempt Modification – Facility Modification
North Main Street, Marlborough, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 159-foot level on the existing 165-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of this tower in 1995 (Docket No. 169). Cellco now intends to replace three (3) of its existing antennas with three (3) model BXA-70063-6CF LTE antennas at the same 159-foot level. Attached behind Tab 1 are the specifications for Cellco’s replacement antennas.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Catherine D. Gaudinski, First Selectman for the Town of Marlborough. A copy of this letter is also being sent to Country Barn Properties LLC, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco’s replacement antennas will be located at the 159-foot level on the 165-foot tower.



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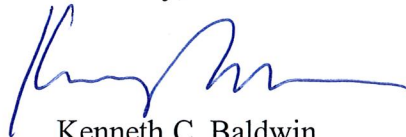
www.rc.com

Melanie A. Bachman
July 12, 2013
Page 2

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report attached behind Tab 3*).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Catherine D. Gaudinski, Marlborough First Selectman
Country Barn Properties LLC
Sandy M. Carter



BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

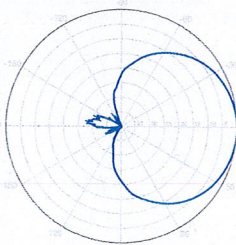
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz		
Frequency bands	696-806 MHz	806-900 MHz	
Polarization	±45°		
Horizontal beamwidth	65°	63°	
Vertical beamwidth	13°	11°	
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10		
Impedance	50Ω		
VSWR	≤1.35:1		
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB	
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB	
Null fill	5% (-26.02 dB)		
Isolation between ports	< -25 dB		
Input power with EDIN connectors	500 W		
Input power with NE connectors	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in	
Depth with z-brackets	172 mm	6.8 in	
Weight without mounting brackets	7.9 kg	17 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.51 m ² Side: 0.24 m ²	Front: 5.5 ft ² Side: 2.6 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

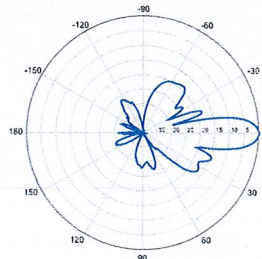


BXA-70063-6CF-EDIN-X



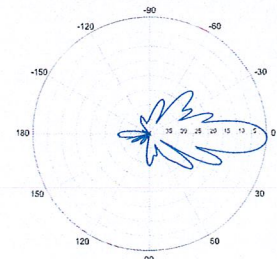
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

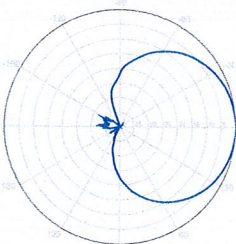


0° | Vertical | 750 MHz

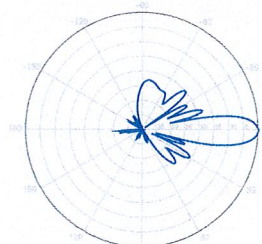
BXA-70063-6CF-EDIN-2



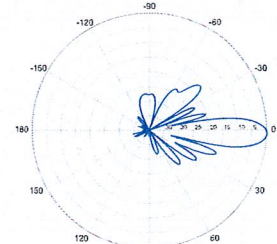
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



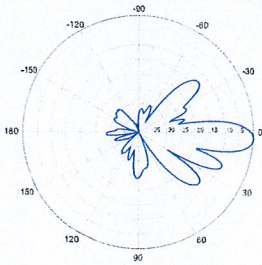
2° | Vertical | 850 MHz

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

BXA-70063-6CF-EDIN-X

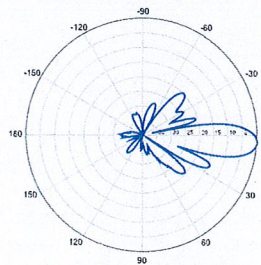
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



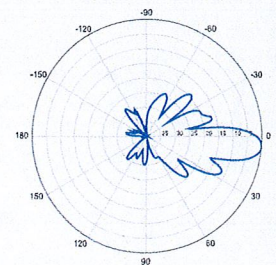
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

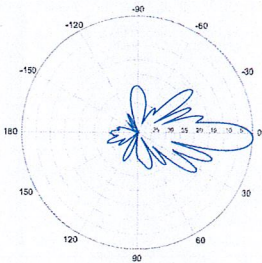


4° | Vertical | 750 MHz

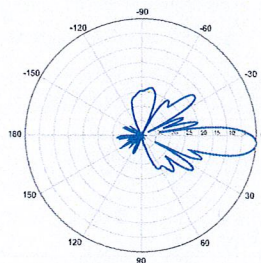
BXA-70063-6CF-EDIN-5



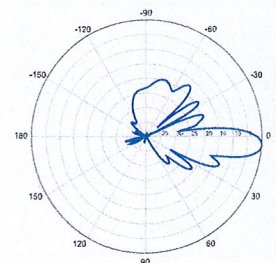
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

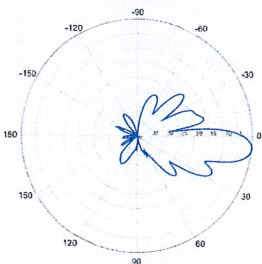


4° | Vertical | 850 MHz



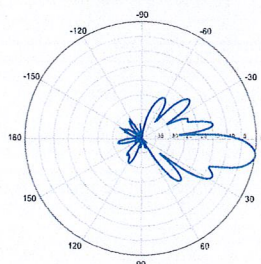
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



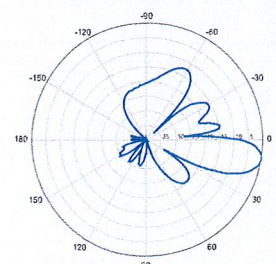
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

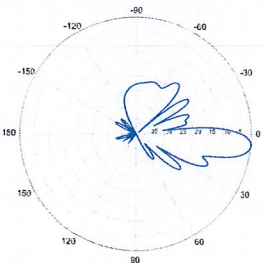


8° | Vertical | 750 MHz

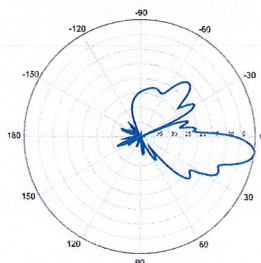
BXA-70063-6CF-EDIN-10



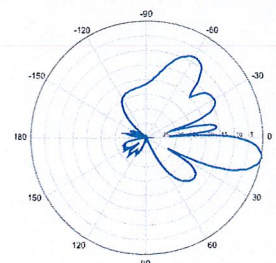
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

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

Site Name: Marlborough Tower Height: Verizon @ 159ft		General	Power	Density	Calc.	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	POWER DENS					
*AT&T UMTS	2	875	145	0.0299	1900	1.0000	2.99%		
*AT&T GSM	1	283	145	0.0048	880	0.5867	0.82%		
*AT&T GSM	4	525	145	0.0359	1900	1.0000	3.59%		
*AT&T LTE	1	1313	145	0.0225	734	0.4893	4.59%		
*Pocket (now MetroPCS)	3	631	135	0.0373	2130	1.0000	3.73%		
*Omniport			100	0.0351	1930	1.0000	3.51%		
*Town			130				6.03%		
*Sprint Nextel - IDEN	12	100	168	0.0153	851	0.5673	2.69%		
*Sprint Nextel -CDMA	11	411	164	0.0604	1962	1.0000	6.04%		
Verizon PCS	11	234	159	0.0366	1970	1.0000	3.66%		
Verizon Cellular	9	247	159	0.0316	869	0.5793	5.46%		
Verizon AWS	1	1750	159	0.0249	2145	1.0000	2.49%		
Verizon 700	1	813	159	0.0116	698	0.4653	2.49%		48.10%
* Source: Siting Council									

Date: **May 03, 2013**

Mitzi Parker
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277



FDH Engineering, Inc.
6521 Meridien Drive
Raleigh, NC 27616
(919) 755-1012

Subject: Structural Analysis Report

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Number: NA
Carrier Site Name: Marlborough, CT

Crown Castle Designation: **Crown Castle BU Number:** 806366
Crown Castle Site Name: HRT 107(C) 943204
Crown Castle JDE Job Number: 233926
Crown Castle Work Order Number: 606896
Crown Castle Application Number: 188112 Rev. 0

Engineering Firm Designation: **FDH Engineering, Inc. Project Number:** 1330271400

Site Data: **NORTH MAIN STREET, MARLBOROUGH, Hartford County, CT**
Latitude 41° 37' 47.3", Longitude -72° 27' 59.4"
165.5 Foot - Monopole Tower

Dear Mitzi Parker,

FDH Engineering, Inc. is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 543408, in accordance with application 188112, revision 0.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 Connecticut Building Code based upon a wind speed of 80 mph fastest mile.

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

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

Respectfully submitted by:

A handwritten signature in black ink, appearing to read "Will Hammond".

Will Hammond, EI
Project Engineer

Reviewed by:

A handwritten signature in black ink, appearing to read "Christopher M. Murphy".

Christopher M. Murphy, PE
President
CT PE License No. 25842

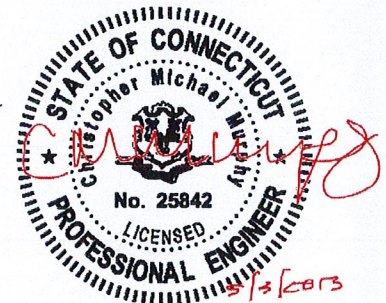


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1) INTRODUCTION

This tower is a 155.5 ft Monopole tower designed by FWT INC. in December of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. A future 10' extension to an elevation of 166.5 ft was considered in this analysis per Crown Castle request.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
156.0	159.0	3	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	-	-	-

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
165.5	168.0	12	decibel	DB846G90A-XY w/ Mount Pipe	12	1-5/8	3
	165.5	1	crown mounts	Platform Mount [LP 602-1]			
156.0	159.0	3	antel	BXA-70063/4CF w/ Mount Pipe	-	-	5
		3	decibel	DB809K-Y	3	1-5/8	2
		1	antel	BXA-171063-8BF-2 w/ Mount Pipe	12	1-5/8	1
		2	antel	BXA-171063-12BF w/ Mount Pipe			
		2	antel	LPA-80063/6CF-2 w/ Mount Pipe			
		4	antel	LPA-80080/6CF w/ Mount Pipe			
	4	rfs celwave	FD9R6004/2C-3L				
	4	rfs celwave	FD9R6004/2C-3L				
156.0	2	crown mounts	Platform Mount [LP 1001-1]				
144.0	144.0	1	crown mounts	Platform Mount [LP 1001-1]	12 2 1	1-1/4 3/4 3/8	1
		6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
	142.0	6	powerwave technologies	LGP 17201			
142.0	6	powerwave technologies	LGP21903				

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
135.0	135.0	1	crown mounts	Side Arm Mount [SO 102-3]	6	1-1/4	1
		3	kathrein	742 213 w/ Mount Pipe			
126.0	128.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1-1/4	1
	126.0	1	crown mounts	Sector Mount [SM 602-3]			
	120.0	3	decibel	DB809K-Y	5	1/2	4
100.0	100.0	1	crown mounts	Side Arm Mount [SO 101-3]	6	1-5/8	1
		6	ems wireless	RR90-17-02DP w/ Mount Pipe			

Notes:

- 1) Existing Equipment
- 2) Existing Equipment, carrier #2
- 3) Reserved Equipment
- 4) Abandoned Equipment, considered in this analysis
- 5) Existing Equipment to be removed, not considered in this analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
157.75	157.75	12	swedcom	ALP-9212-N	-	-
144.25	144.25	9	swedcom	ALP-9212-N	-	-
132.0	132.0	2	celwave	PD1142	-	-
		1	celwave	PD201		
		2	celwave	PD220		
		9	decibel	DB980		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2208816	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	FWT, Inc.	823125	CCISITES
4-TOWER MANUFACTURER DRAWINGS	FWT, Inc.	823126	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
 - 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
 - 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
 - 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
 - 5) Connection from top of existing pole to reserved 10' pole extension assumed adequate.
- This analysis may be affected if any assumptions are not valid or have been made in error. FDH Engineering, Inc. should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail	
L1	165.5 - 155.5	Pole	TP58.6x58.6x0.375	1	-7.63	2767.21	2.6	Pass	
L2	155.5 - 110	Pole	TP64.606x58.6x0.375	2	-24.30	3194.44	22.1	Pass	
L3	110 - 72.5	Pole	TP68.805x62.8x0.4375	3	-39.74	4260.83	38.0	Pass	
L4	72.5 - 36	Pole	TP72.748x66.8082x0.5	4	-57.76	5424.19	48.3	Pass	
L5	36 - 0	Pole	TP76.5x70.56x0.5	5	-81.76	5547.27	70.9	Pass	
							Summary		
							Pole (L5)	70.9	Pass
							RATING =	70.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	70.5	Pass
1	Base Plate	0	34.9	Pass
1	Base Foundation Soil Interaction	0	44.3	Pass

Structure Rating (max from all components) =	70.9%
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Notes:

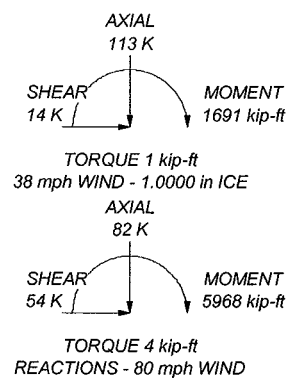
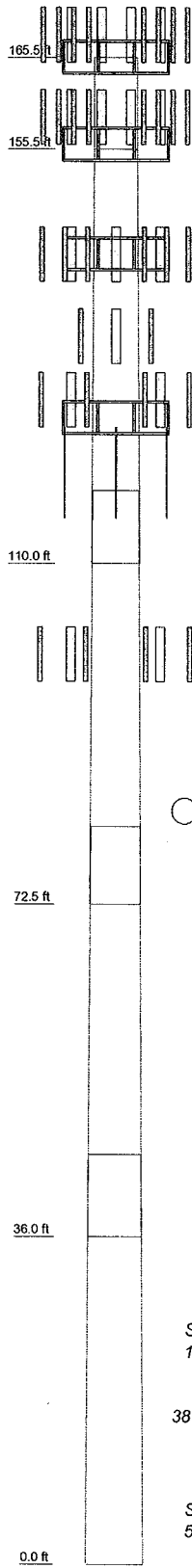
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	10.00	45.50	45.50	45.00	45.00
Number of Sides	1	12	12	12	12
Thickness (in)	0.3750	0.3750	0.4375	0.5000	0.5000
Socket Length (ft)		8.00	8.50	9.00	70.5600
Top Dia (in)	58.6000	58.6000	62.8000	66.8082	76.5000
Bot Dia (in)	58.6000	64.8060	66.8050	72.7480	
Grade			A572-65		
Weight (K)	2.3	11.4	14.3	17.1	18.0



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	165.5	(2) LGP21903	144
(4) DB846G90A-XY w/ Mount Pipe	165.5	(2) RRUS-11	144
(4) DB846G90A-XY w/ Mount Pipe	165.5	AM-X-CD-16-65-00T-RET w/ Mount Pipe	144
(4) DB846G90A-XY w/ Mount Pipe	165.5	(2) 7770.00 w/ Mount Pipe	144
Platform Mount [LP 602-1]	165.5	(2) LGP 17201	144
(2) LPA-80080/6CF w/ Mount Pipe	156	(2) LGP21903	144
(2) LPA-80080/6CF w/ Mount Pipe	156	(2) RRUS-11	144
(2) LPA-80063/6CF-2 w/ Mount Pipe	156	AM-X-CD-16-65-00T-RET w/ Mount Pipe	144
DB809K-Y	156	Platform Mount [LP 1001-1]	144
DB809K-Y	156	(2) Pipe Mount	144
DB809K-Y	156	(2) Pipe Mount	144
BXA-171063-12BF w/ Mount Pipe	156	(2) Pipe Mount	144
BXA-171063-12BF w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
BXA-171063-8BF-2 w/ Mount Pipe	156	742 213 w/ Mount Pipe	135
(2) FD9R6004/2C-3L	156	742 213 w/ Mount Pipe	135
(2) FD9R6004/2C-3L	156	Side Arm Mount [SO 102-3]	135
(2) FD9R6004/2C-3L	156	DB809K-Y	126
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	156	DB809K-Y	126
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	156	DB809K-Y	126
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	156	(2) DB980H90E-M w/ Mount Pipe	126
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	156	(2) DB980H90E-M w/ Mount Pipe	126
Platform Mount [LP 1001-1]	156	(2) DB980H90E-M w/ Mount Pipe	126
(2) 7770.00 w/ Mount Pipe	144	Sector Mount [SM 602-3]	126
(2) LGP 17201	144	Pipe Mount	126
(2) LGP21903	144	Pipe Mount	126
(2) RRUS-11	144	Pipe Mount	126
AM-X-CD-16-65-00T-RET w/ Mount Pipe	144	(2) RR90-17-02DP w/ Mount Pipe	100
DC6-48-60-18-8F	144	(2) RR90-17-02DP w/ Mount Pipe	100
(2) 7770.00 w/ Mount Pipe	144	(2) RR90-17-02DP w/ Mount Pipe	100
(2) LGP 17201	144	Side Arm Mount [SO 101-3]	100

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 70.9%

	FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031		Job: BU# 806366 Project: 1330271400 Client: Crown Castle Code: TIA/EIA-222-F Path:	Drawn by: Will Hammond Date: 05/03/13 Scale: NTS Dwg No. E-1
	App'd:			
	App'd:			
	App'd:			

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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 Hartford County, Connecticut.

Basic wind speed of 80 mph.

Nominal ice thickness of 1.0000 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

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing	Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check Poles ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
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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	165.50-155.50	10.00	0.00	Round	58.6000	58.6000	0.3750		A572-65 (65 ksi)
L2	155.50-110.00	45.50	8.00	12	58.6000	64.6060	0.3750	1.5000	A572-65 (65 ksi)
L3	110.00-72.50	45.50	8.50	12	62.8000	68.8050	0.4375	1.7500	A572-65 (65 ksi)
L4	72.50-36.00	45.00	9.00	12	66.8082	72.7480	0.5000	2.0000	A572-65 (65 ksi)
L5	36.00-0.00	45.00		12	70.5600	76.5000	0.5000	2.0000	A572-65 (65 ksi)

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Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	58.6000	68.5947	29090.5753	20.6117	29.3000	992.8524	58101.8996	34.2769	0.0000	0
	58.6000	68.5947	29090.5753	20.6117	29.3000	992.8524	58101.8996	34.2769	0.0000	0
L2	60.6672	70.3067	30422.9680	20.8446	30.3548	1002.2457	61645.1813	34.6028	14.6998	39.199
	66.8851	77.5589	40842.0131	22.9947	33.4659	1220.4065	82756.9913	38.1721	16.3094	43.492
L3	66.1084	87.8532	43610.4361	22.3258	32.5304	1340.6056	88366.5670	43.2387	15.6579	35.789
	71.2322	96.3127	57460.4440	24.4756	35.6410	1612.2011	116430.4378	47.4022	17.2672	39.468
L4	70.3265	106.7562	59911.9268	23.7383	34.6066	1731.2263	121397.8066	52.5421	16.5646	33.129
	75.3143	116.3193	77497.7893	25.8648	37.6835	2056.5463	157031.5318	57.2488	18.1565	36.313
L5	74.2790	112.7967	70668.0184	25.0815	36.5501	1933.4563	143192.5643	55.5151	17.5701	35.14
	79.1986	122.3600	90209.5680	27.2080	39.6270	2276.4673	182789.0418	60.2219	19.1620	38.324

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 ²	in					in	in
L1 165.50-155.50				1	1	1		
L2 155.50-110.00				1	1	1		
L3 110.00-72.50				1	1	1		
L4 72.50-36.00				1	1	1		
L5 36.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight	
				ft		ft ² /ft	plf	
LDF7-50A(1-5/8")	B	No	Inside Pole	165.50 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	156.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	B	No	Inside Pole	156.00 - 0.00	3	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight
						ft ² /ft	plf	
UCF114-50JA(1 1/4")	B	No	Inside Pole	144.00 - 0.00	12	No Ice	0.00	0.55
						1/2" Ice	0.00	0.55
						1" Ice	0.00	0.55
						2" Ice	0.00	0.55
						4" Ice	0.00	0.55
FB-L98B-002-75000(3/8")	B	No	Inside Pole	144.00 - 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-VG86ST-BRD(3/4)	B	No	Inside Pole	144.00 - 0.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
						2" Ice	0.00	0.59
						4" Ice	0.00	0.59
AVA6-50(1-1/4")	A	No	Inside Pole	135.00 - 0.00	6	No Ice	0.00	0.45
						1/2" Ice	0.00	0.45
						1" Ice	c.	0.45
						2" Ice	0.00	0.45
						4" Ice	0.00	0.45
LDF4-50A(1/2")	C	No	Inside Pole	126.00 - 0.00	5	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
LDF6-50A(1-1/4")	C	No	Inside Pole	126.00 - 0.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
LDF7-50A(1-5/8")	A	No	Inside Pole	100.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
* Safety Line 3/8	C	No	CaAa (Out Of Face)	165.50 - 0.00	1	No Ice	0.04	0.22
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	

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	165.50-155.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.10
		C	0.000	0.000	0.000	0.375	0.00
L2	155.50-110.00	A	0.000	0.000	0.000	0.000	0.07
		B	0.000	0.000	0.000	0.000	1.27
		C	0.000	0.000	0.000	1.706	0.09
L3	110.00-72.50	A	0.000	0.000	0.000	0.000	0.24
		B	0.000	0.000	0.000	0.000	1.12
		C	0.000	0.000	0.000	1.406	0.18
L4	72.50-36.00	A	0.000	0.000	0.000	0.000	0.28
		B	0.000	0.000	0.000	0.000	1.09

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Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L5	36.00-0.00	C	0.000	0.000	0.000	1.369	0.18
		A	0.000	0.000	0.000	0.000	0.27
		B	0.000	0.000	0.000	0.000	1.08
		C	0.000	0.000	0.000	1.350	0.18

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L1	165.50-155.50	A	1.209	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.10
		C		0.000	0.000	0.000	2.793	0.02
L2	155.50-110.00	A	1.182	0.000	0.000	0.000	0.000	0.07
		B		0.000	0.000	0.000	0.000	1.27
		C		0.000	0.000	0.000	12.460	0.14
L3	110.00-72.50	A	1.130	0.000	0.000	0.000	0.000	0.24
		B		0.000	0.000	0.000	0.000	1.12
		C		0.000	0.000	0.000	10.269	0.23
L4	72.50-36.00	A	1.062	0.000	0.000	0.000	0.000	0.28
		B		0.000	0.000	0.000	0.000	1.09
		C		0.000	0.000	0.000	9.617	0.22
L5	36.00-0.00	A	1.000	0.000	0.000	0.000	0.000	0.27
		B		0.000	0.000	0.000	0.000	1.08
		C		0.000	0.000	0.000	8.997	0.22

Feed Line Center of Pressure

Section	Elevation ft	CP_x in	CP_z in	CP_x Ice in	CP_z Ice in
L1	165.50-155.50	-0.0483	0.0279	-0.3303	0.1907
L2	155.50-110.00	-0.0484	0.0279	-0.3258	0.1881
L3	110.00-72.50	-0.0484	0.0279	-0.3278	0.1893
L4	72.50-36.00	-0.0484	0.0279	-0.3178	0.1835
L5	36.00-0.00	-0.0484	0.0280	-0.3037	0.1753

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	$C_A A_A$ Front ft ²	$C_A A_A$ Side ft ²	Weight K	
Lightning Rod	C	From Leg	0.00	0.0000	165.50	No Ice	0.25	0.25	0.03
			0.00			1/2" Ice	0.66	0.66	0.03
			2.00			1" Ice	0.97	0.97	0.04

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral	Vert					
							2" Ice	1.49	1.49	0.06
							4" Ice	2.68	2.68	0.14

(4) DB846G90A-XY w/ Mount Pipe	A	From Leg	4.00 0.00 2.50		0.0000	165.50	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.09 0.16 0.32 0.77
(4) DB846G90A-XY w/ Mount Pipe	B	From Leg	4.00 0.00 2.50		0.0000	165.50	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.09 0.16 0.32 0.77
(4) DB846G90A-XY w/ Mount Pipe	C	From Leg	4.00 0.00 2.50		0.0000	165.50	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.09 0.16 0.32 0.77
Platform Mount [LP 602-1]	C	None			0.0000	165.50	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.03 38.71 45.39 58.75 85.47	32.03 38.71 45.39 58.75 85.47	1.34 1.80 2.26 3.17 5.00

(2) LPA-80080/6CF w/ Mount Pipe	A	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80080/6CF w/ Mount Pipe	C	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.56 5.11 5.61 6.65 8.83	10.73 11.99 12.97 14.98 19.22	0.05 0.11 0.19 0.36 0.86
(2) LPA-80063/6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.28 5.81 6.33 7.40 9.76	6.52 7.54 8.42 10.22 14.06	0.05 0.11 0.17 0.32 0.75
DB809K-Y	A	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.85 4.03 5.21 7.17 10.06	2.85 4.03 5.21 7.17 10.06	0.03 0.05 0.08 0.16 0.42
DB809K-Y	B	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.85 4.03 5.21 7.17 10.06	2.85 4.03 5.21 7.17 10.06	0.03 0.05 0.08 0.16 0.42
DB809K-Y	C	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.85 4.03 5.21 7.17 10.06	2.85 4.03 5.21 7.17 10.06	0.03 0.05 0.08 0.16 0.42
BXA-171063-12BF w/ Mount Pipe	A	From Leg	4.00 0.00 3.00		0.0000	156.00	No Ice 1/2" Ice 1" Ice	4.97 5.52 6.04	5.23 6.39 7.26	0.04 0.08 0.14

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _{Front}	C _A A _{Side}	Weight	
			Horz	Lateral						Vert
			ft	ft						
BXA-171063-12BF w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	156.00	2" Ice	7.09	9.05	0.27
							4" Ice	9.36	12.82	0.67
							No Ice	4.97	5.23	0.04
							1/2" Ice	5.52	6.39	0.08
							1" Ice	6.04	7.26	0.14
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	156.00	2" Ice	7.09	9.05	0.27
							4" Ice	9.36	12.82	0.67
							No Ice	3.18	3.35	0.03
							1/2" Ice	3.56	3.97	0.06
							1" Ice	3.96	4.60	0.10
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.00	0.0000	156.00	2" Ice	4.85	5.89	0.19
							4" Ice	6.77	8.89	0.49
							No Ice	0.37	0.08	0.00
							1/2" Ice	0.45	0.14	0.01
							1" Ice	0.54	0.20	0.01
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.00	0.0000	156.00	2" Ice	0.75	0.34	0.02
							4" Ice	1.28	0.74	0.06
							No Ice	0.37	0.08	0.00
							1/2" Ice	0.45	0.14	0.01
							1" Ice	0.54	0.20	0.01
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.00	0.0000	156.00	2" Ice	0.75	0.34	0.02
							4" Ice	1.28	0.74	0.06
							No Ice	0.37	0.08	0.00
							1/2" Ice	0.45	0.14	0.01
							1" Ice	0.54	0.20	0.01
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	156.00	2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
							No Ice	7.97	5.80	0.04
							1/2" Ice	8.61	6.95	0.10
							1" Ice	9.22	7.82	0.17
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	156.00	2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
							No Ice	7.97	5.80	0.04
							1/2" Ice	8.61	6.95	0.10
							1" Ice	9.22	7.82	0.17
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	156.00	2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
							No Ice	7.97	5.80	0.04
							1/2" Ice	8.61	6.95	0.10
							1" Ice	9.22	7.82	0.17
Platform Mount [LP 1001-1]	C	None			0.0000	156.00	2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
							No Ice	47.70	47.70	3.02
							1/2" Ice	59.50	59.50	3.62
							1" Ice	71.30	71.30	4.22
*** (2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	144.00	2" Ice	94.90	94.90	5.43
							4" Ice	142.10	142.10	7.85
							No Ice	6.12	4.25	0.06
							1/2" Ice	6.63	5.01	0.10
							1" Ice	7.13	5.71	0.16
(2) LGP 17201	A	From Leg	4.00	0.00	0.0000	144.00	2" Ice	8.16	7.16	0.29
							4" Ice	10.36	10.41	0.66
							No Ice	1.95	0.52	0.03
							1/2" Ice	2.13	0.64	0.04
							1" Ice	2.33	0.77	0.06
			-2.00				2" Ice	2.75	1.06	0.09

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert	Lateral					
(2) LGP21903	A	From Leg	4.00	0.0000	144.00	4" Ice	3.69	1.73	0.19	
						No Ice	0.27	0.18	0.01	
						1/2" Ice	0.34	0.25	0.01	
						1" Ice	0.43	0.32	0.02	
						2" Ice	0.62	0.49	0.03	
(2) RRUS-11	A	From Leg	4.00	0.0000	144.00	4" Ice	1.10	0.94	0.07	
						No Ice	2.94	1.25	0.06	
						1/2" Ice	3.17	1.41	0.07	
						1" Ice	3.41	1.59	0.10	
						2" Ice	3.91	1.96	0.15	
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.0000	144.00	4" Ice	5.02	2.82	0.30	
						No Ice	8.50	6.30	0.07	
						1/2" Ice	9.15	7.48	0.14	
						1" Ice	9.77	8.37	0.21	
						2" Ice	11.03	10.18	0.38	
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	144.00	4" Ice	13.68	14.02	0.87	
						No Ice	2.57	4.32	0.02	
						1/2" Ice	2.80	4.60	0.05	
						1" Ice	3.04	4.88	0.09	
						2" Ice	3.54	5.49	0.17	
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	144.00	4" Ice	4.66	6.80	0.38	
						No Ice	6.12	4.25	0.06	
						1/2" Ice	6.63	5.01	0.10	
						1" Ice	7.13	5.71	0.16	
						2" Ice	8.16	7.16	0.29	
(2) LGP 17201	B	From Leg	4.00	0.0000	144.00	4" Ice	10.36	10.41	0.66	
						No Ice	1.95	0.52	0.03	
						1/2" Ice	2.13	0.64	0.04	
						1" Ice	2.33	0.77	0.06	
						2" Ice	2.75	1.06	0.09	
(2) LGP21903	B	From Leg	4.00	0.0000	144.00	4" Ice	3.69	1.73	0.19	
						No Ice	0.27	0.18	0.01	
						1/2" Ice	0.34	0.25	0.01	
						1" Ice	0.43	0.32	0.02	
						2" Ice	0.62	0.49	0.03	
(2) RRUS-11	B	From Leg	4.00	0.0000	144.00	4" Ice	1.10	0.94	0.07	
						No Ice	2.94	1.25	0.06	
						1/2" Ice	3.17	1.41	0.07	
						1" Ice	3.41	1.59	0.10	
						2" Ice	3.91	1.96	0.15	
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	144.00	4" Ice	5.02	2.82	0.30	
						No Ice	8.50	6.30	0.07	
						1/2" Ice	9.15	7.48	0.14	
						1" Ice	9.77	8.37	0.21	
						2" Ice	11.03	10.18	0.38	
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	144.00	4" Ice	13.68	14.02	0.87	
						No Ice	6.12	4.25	0.06	
						1/2" Ice	6.63	5.01	0.10	
						1" Ice	7.13	5.71	0.16	
						2" Ice	8.16	7.16	0.29	
(2) LGP 17201	C	From Leg	4.00	0.0000	144.00	4" Ice	10.36	10.41	0.66	
						No Ice	1.95	0.52	0.03	
						1/2" Ice	2.13	0.64	0.04	
						1" Ice	2.33	0.77	0.06	
						2" Ice	2.75	1.06	0.09	
(2) LGP21903	C	From Leg	4.00	0.0000	144.00	4" Ice	3.69	1.73	0.19	
						No Ice	0.27	0.18	0.01	
						No Ice	0.27	0.18	0.01	

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral	Vert					
			0.00				1/2" Ice	0.34	0.25	0.01
			-2.00				1" Ice	0.43	0.32	0.02
							2" Ice	0.62	0.49	0.03
							4" Ice	1.10	0.94	0.07
(2) RRUS-11	C	From Leg	4.00		0.0000	144.00	No Ice	2.94	1.25	0.06
			0.00				1/2" Ice	3.17	1.41	0.07
			0.00				1" Ice	3.41	1.59	0.10
							2" Ice	3.91	1.96	0.15
							4" Ice	5.02	2.82	0.30
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00		0.0000	144.00	No Ice	8.50	6.30	0.07
			0.00				1/2" Ice	9.15	7.48	0.14
			0.00				1" Ice	9.77	8.37	0.21
							2" Ice	11.03	10.18	0.38
							4" Ice	13.68	14.02	0.87
Platform Mount [LP 1001-1]	C	None			0.0000	144.00	No Ice	47.70	47.70	3.02
							1/2" Ice	59.50	59.50	3.62
							1" Ice	71.30	71.30	4.22
							2" Ice	94.90	94.90	5.43
							4" Ice	142.10	142.10	7.85
(2) Pipe Mount	A	From Leg	4.00		0.0000	144.00	No Ice	0.87	0.87	0.03
			0.00				1/2" Ice	1.12	1.12	0.03
			0.00				1" Ice	1.37	1.37	0.04
							2" Ice	1.91	1.91	0.07
							4" Ice	3.24	3.24	0.17
(2) Pipe Mount	B	From Leg	4.00		0.0000	144.00	No Ice	0.87	0.87	0.03
			0.00				1/2" Ice	1.12	1.12	0.03
			0.00				1" Ice	1.37	1.37	0.04
							2" Ice	1.91	1.91	0.07
							4" Ice	3.24	3.24	0.17
(2) Pipe Mount	C	From Leg	4.00		0.0000	144.00	No Ice	0.87	0.87	0.03
			0.00				1/2" Ice	1.12	1.12	0.03
			0.00				1" Ice	1.37	1.37	0.04
							2" Ice	1.91	1.91	0.07
							4" Ice	3.24	3.24	0.17

742 213 w/ Mount Pipe	A	From Leg	2.00		0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00				1/2" Ice	5.95	6.00	0.09
			0.00				1" Ice	6.50	6.98	0.14
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	B	From Leg	2.00		0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00				1/2" Ice	5.95	6.00	0.09
			0.00				1" Ice	6.50	6.98	0.14
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
742 213 w/ Mount Pipe	C	From Leg	2.00		0.0000	135.00	No Ice	5.37	4.62	0.05
			0.00				1/2" Ice	5.95	6.00	0.09
			0.00				1" Ice	6.50	6.98	0.14
							2" Ice	7.61	8.85	0.28
							4" Ice	9.93	12.79	0.68
Side Arm Mount [SO 102-3]	C	None			0.0000	135.00	No Ice	3.00	3.00	0.08
							1/2" Ice	3.48	3.48	0.11
							1" Ice	3.96	3.96	0.14
							2" Ice	4.92	4.92	0.20
							4" Ice	6.84	6.84	0.32

DB809K-Y	A	From Leg	4.00		0.0000	126.00	No Ice	2.85	2.85	0.03

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz Lateral	Vert						°
				0.00			1/2" Ice	4.03	4.03	0.05
				-6.00			1" Ice	5.21	5.21	0.08
							2" Ice	7.17	7.17	0.16
							4" Ice	10.06	10.06	0.42
DB809K-Y	B	From Leg	4.00	0.0000	126.00		No Ice	2.85	2.85	0.03
			0.00				1/2" Ice	4.03	4.03	0.05
			-6.00				1" Ice	5.21	5.21	0.08
							2" Ice	7.17	7.17	0.16
							4" Ice	10.06	10.06	0.42
DB809K-Y	C	From Leg	4.00	0.0000	126.00		No Ice	2.85	2.85	0.03
			0.00				1/2" Ice	4.03	4.03	0.05
			-6.00				1" Ice	5.21	5.21	0.08
							2" Ice	7.17	7.17	0.16
							4" Ice	10.06	10.06	0.42
(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.00	0.0000	126.00		No Ice	4.04	3.62	0.03
			0.00				1/2" Ice	4.50	4.48	0.06
			2.00				1" Ice	4.95	5.22	0.11
							2" Ice	5.87	6.74	0.22
							4" Ice	8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.00	0.0000	126.00		No Ice	4.04	3.62	0.03
			0.00				1/2" Ice	4.50	4.48	0.06
			2.00				1" Ice	4.95	5.22	0.11
							2" Ice	5.87	6.74	0.22
							4" Ice	8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.00	0.0000	126.00		No Ice	4.04	3.62	0.03
			0.00				1/2" Ice	4.50	4.48	0.06
			2.00				1" Ice	4.95	5.22	0.11
							2" Ice	5.87	6.74	0.22
							4" Ice	8.05	10.00	0.55
Sector Mount [SM 602-3]	C	None		0.0000	126.00		No Ice	33.11	33.11	1.54
							1/2" Ice	44.90	44.90	2.16
							1" Ice	56.69	56.69	2.78
							2" Ice	80.27	80.27	4.01
							4" Ice	127.43	127.43	6.49
Pipe Mount	A	From Leg	4.00	0.0000	126.00		No Ice	1.68	1.68	0.04
			0.00				1/2" Ice	2.41	2.41	0.05
			0.00				1" Ice	2.83	2.83	0.07
							2" Ice	3.72	3.72	0.12
							4" Ice	5.59	5.59	0.28
Pipe Mount	B	From Leg	4.00	0.0000	126.00		No Ice	1.68	1.68	0.04
			0.00				1/2" Ice	2.41	2.41	0.05
			0.00				1" Ice	2.83	2.83	0.07
							2" Ice	3.72	3.72	0.12
							4" Ice	5.59	5.59	0.28
Pipe Mount	C	From Leg	4.00	0.0000	126.00		No Ice	1.68	1.68	0.04
			0.00				1/2" Ice	2.41	2.41	0.05
			0.00				1" Ice	2.83	2.83	0.07
							2" Ice	3.72	3.72	0.12
							4" Ice	5.59	5.59	0.28

(2) RR90-17-02DP w/ Mount Pipe	A	From Leg	4.00	0.0000	100.00		No Ice	4.59	3.32	0.03
			0.00				1/2" Ice	5.09	4.09	0.07
			0.00				1" Ice	5.58	4.78	0.11
							2" Ice	6.59	6.23	0.22
							4" Ice	8.73	9.31	0.56
(2) RR90-17-02DP w/ Mount Pipe	B	From Leg	4.00	0.0000	100.00		No Ice	4.59	3.32	0.03
			0.00				1/2" Ice	5.09	4.09	0.07

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft ²	ft ²	K
			0.00						
(2) RR90-17-02DP w/ Mount Pipe	C	From Leg	4.00	0.0000	100.00	1" Ice	5.58	4.78	0.11
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
						No Ice	4.59	3.32	0.03
						1/2" Ice	5.09	4.09	0.07
						1" Ice	5.58	4.78	0.11
						2" Ice	6.59	6.23	0.22
Side Arm Mount [SO 101-3]	C	None	0.0000	100.00	4" Ice	8.73	9.31	0.56	
					No Ice	7.50	7.50	0.25	
					1/2" Ice	8.90	8.90	0.33	
					1" Ice	10.30	10.30	0.41	
					2" Ice	13.10	13.10	0.58	
					4" Ice	18.70	18.70	0.90	
					*				

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service

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Comb. No.	Description
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	165.5 - 155.5	13.747	37	0.5926	0.0013
L2	155.5 - 110	12.507	37	0.5912	0.0013
L3	118 - 72.5	7.999	37	0.5426	0.0008
L4	81 - 36	4.158	37	0.4282	0.0005
L5	45 - 0	1.436	37	0.2712	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.50	Lightning Rod	37	13.747	0.5926	0.0013	475994
156.00	(2) LPA-80080/6CF w/ Mount Pipe	37	12.569	0.5914	0.0013	231709
144.00	(2) 7770.00 w/ Mount Pipe	37	11.089	0.5842	0.0012	65921
135.00	742 213 w/ Mount Pipe	37	9.995	0.5738	0.0011	42099
126.00	DB809K-Y	37	8.924	0.5592	0.0010	30924
100.00	(2) RR90-17-02DP w/ Mount Pipe	37	6.031	0.4936	0.0006	20868

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	165.5 - 155.5	35.178	12	1.5166	0.0034
L2	155.5 - 110	32.005	12	1.5131	0.0034
L3	118 - 72.5	20.470	12	1.3885	0.0021
L4	81 - 36	10.641	12	1.0960	0.0013
L5	45 - 0	3.675	12	0.6942	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
165.50	Lightning Rod	12	35.178	1.5166	0.0034	186799

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
156.00	(2) LPA-80080/6CF w/ Mount Pipe	12	32.163	1.5135	0.0034	90894
144.00	(2) 7770.00 w/ Mount Pipe	12	28.377	1.4950	0.0032	25813
135.00	742 213 w/ Mount Pipe	12	25.578	1.4685	0.0028	16479
126.00	DB809K-Y	12	22.839	1.4310	0.0024	12103
100.00	(2) RR90-17-02DP w/ Mount Pipe	12	15.436	1.2633	0.0016	8164

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K.	Allow. P _a K	Ratio P/P _a
L1	165.5 - 155.5 (1)	TP58.6x58.6x0.375	10.00	0.00	0.0	30.264	68.5947	-7.63	2075.93	0.004
L2	155.5 - 110 (2)	TP64.606x58.6x0.375	45.50	0.00	0.0	31.415	76.2838	-24.30	2396.43	0.010
L3	110 - 72.5 (3)	TP68.805x62.8x0.4375	45.50	0.00	0.0	33.742	94.7324	-39.74	3196.42	0.012
L4	72.5 - 36 (4)	TP72.748x66.8082x0.5	45.00	0.00	0.0	35.568	114.4070	-57.76	4069.16	0.014
L5	36 - 0 (5)	TP76.5x70.56x0.5	45.00	0.00	0.0	34.010	122.3600	-81.76	4161.49	0.020

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} /F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} /F _{by}
L1	165.5 - 155.5 (1)	TP58.6x58.6x0.375	78.53	0.949	30.236	0.031	0.00	0.000	30.236	0.000
L2	155.5 - 110 (2)	TP64.606x58.6x0.375	879.22	8.937	31.415	0.284	0.00	0.000	31.415	0.000
L3	110 - 72.5 (3)	TP68.805x62.8x0.4375	2164.30	16.653	33.742	0.494	0.00	0.000	33.742	0.000
L4	72.5 - 36 (4)	TP72.748x66.8082x0.5	3710.68	22.384	35.568	0.629	0.00	0.000	35.568	0.000
L5	36 - 0 (5)	TP76.5x70.56x0.5	5968.23	31.461	34.010	0.925	0.00	0.000	34.010	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio f _v /F _v	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio f _{vt} /F _{vt}
L1	165.5 - 155.5 (1)	TP58.6x58.6x0.375	12.29	0.179	26.000	0.014	0.03	0.000	7.435	0.000
L2	155.5 - 110 (2)	TP64.606x58.6x0.375	30.00	0.393	26.000	0.031	0.96	0.005	26.000	0.000
L3	110 - 72.5 (3)	TP68.805x62.8x0.4375	39.29	0.415	26.000	0.032	0.93	0.003	26.000	0.000
L4	72.5 - 36 (4)	TP72.748x66.8082x0.5	46.38	0.405	26.000	0.032	0.90	0.003	26.000	0.000
L5	36 - 0 (5)	TP76.5x70.56x0.5	53.75	0.439	26.000	0.034	0.87	0.002	26.000	0.000

tnxTower FDH Engineering, Inc. 6521 Meridien Drive Raleigh, NC 27616 Phone: (919) 755-1012 FAX: (919) 755-1031	Job BU# 806366	Page 13 of 13
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	Client Crown Castle	Designed by Will Hammond

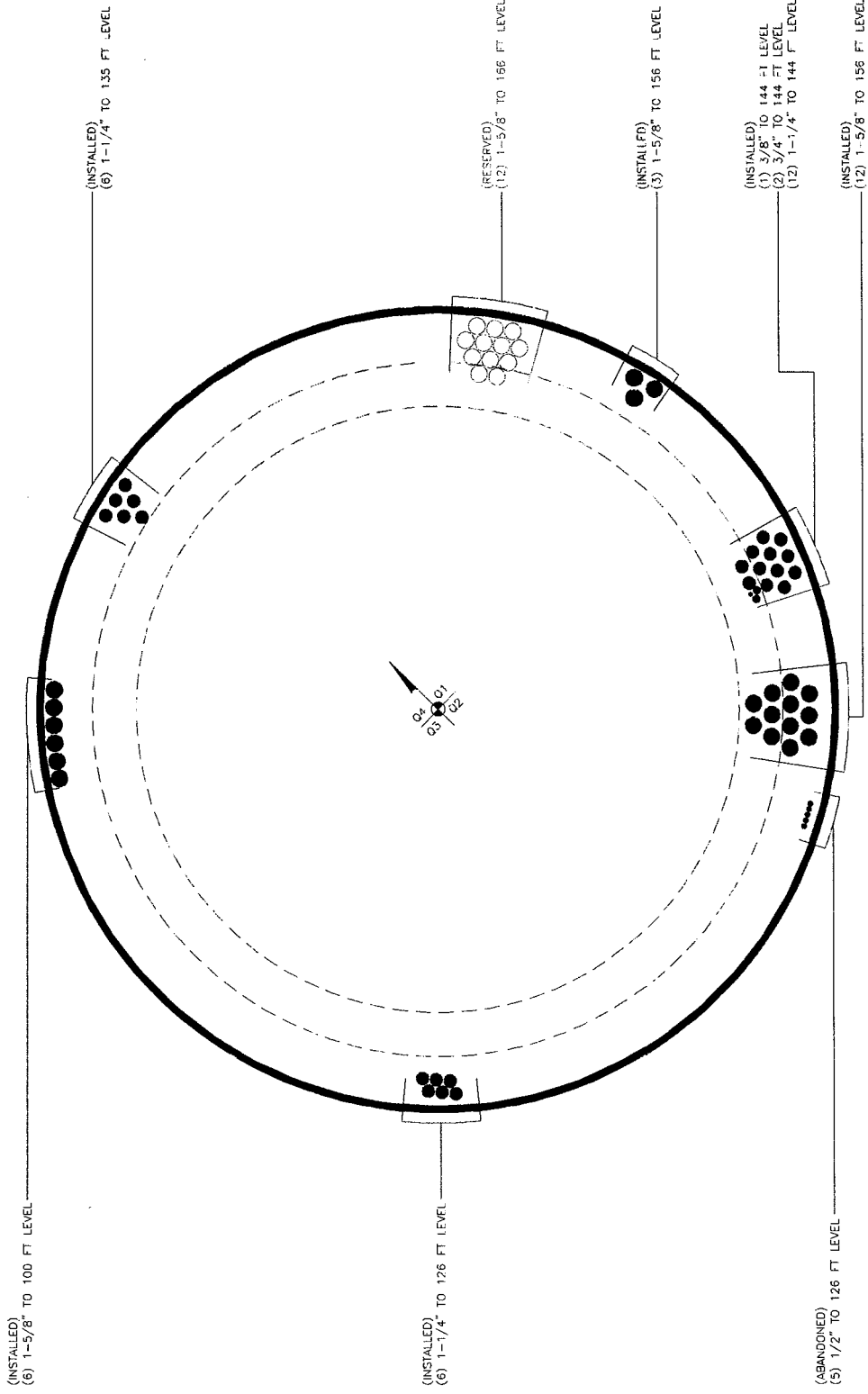
Pole Interaction Design Data

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}			
L1	165.5 - 155.5 (1)	0.004	0.031	0.000	0.014	0.000	0.035	1.333	H1-3+VT ✓
L2	155.5 - 110 (2)	0.010	0.284	0.000	0.031	0.000	0.295	1.333	H1-3+VT ✓
L3	110 - 72.5 (3)	0.012	0.494	0.000	0.032	0.000	0.506	1.333	H1-3+VT ✓
L4	72.5 - 36 (4)	0.014	0.629	0.000	0.032	0.000	0.644	1.333	H1-3+VT ✓
L5	36 - 0 (5)	0.020	0.925	0.000	0.034	0.000	0.945	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	165.5 - 155.5	Pole	TP58.6x58.6x0.375	1	-7.63	2767.21	2.6	Pass
L2	155.5 - 110	Pole	TP64.606x58.6x0.375	2	-24.30	3194.44	22.1	Pass
L3	110 - 72.5	Pole	TP68.805x62.8x0.4375	3	-39.74	4260.83	38.0	Pass
L4	72.5 - 36	Pole	TP72.748x66.8082x0.5	4	-57.76	5424.19	48.3	Pass
L5	36 - 0	Pole	TP76.5x70.56x0.5	5	-81.76	5547.27	70.9	Pass
Summary								
Pole (L5)							70.9	Pass
RATING =							70.9	Pass

APPENDIX B
BASE LEVEL DRAWING



BUSINESS UNIT: B06506 TOWER ID: C_BASELEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, UngROUTED, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

Project No.	
Site Name:	
Site ID:	806366
Pole Manufacturer:	Other

Reactions		
Moment:	5968	ft-kips
Axial:	82	kips
Shear:	54	kips

Anchor Rod Data

Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	84.75	in

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

Anchor Rod Results

Maximum Rod Tension: 137.4 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 70.5% Pass

Rigid
Service ASD
Fty*ASIF

Plate Data

Diam:	91	in
Thick:	3.25	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Base Plate Results

Base Plate Stress: 20.9 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 34.9% Pass

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length:
36.47

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

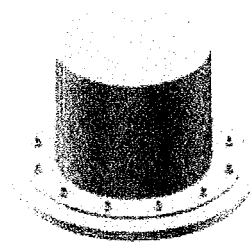
Pole Punching Shear Check: n/a

Pole Data

Diam:	76.5	in
Thick:	0.5	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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: 806366
Site Name:
App #:

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	82	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	54	kips
Unfactored WL Moment, M:	5968	ft-kips

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Load Factor	Shaft Factored Loads	
1.20	1.2D+1.6W, Pu:	98.4 kips
0.90	0.9D+1.6W, Pu:	73.8 kips
1.35	Vu:	72.9 kips
	Mu:	8056.8 ft-kips

Pad & Pier Data		
Base PL Dist. Above Pier:	3	in
Pier Dist. Above Grade:	6	in
Pad Bearing Depth, D:	7.5	ft
Pad Thickness, T:	4.5	ft
Pad Width=Length, L:	33.25	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	9	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	63.62	ft^2
Pier Height:	3.50	ft
Soil (above pad) Height:	3.00	ft

1.2D+1.6W Load Combination, Bearing Results:		
(No Soil Wedges) [Reaction+Conc+Soil]	1521.61	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	8517.63	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 = 5.60 ft
 Orthogonal qu= 2.30 ksf
 qu/φ*qn Ratio= **14.62%** Pass

Diagonal Direction:

ecc2 = (0.707M1)/P1 = 3.96 ft
 Diagonal qu= 2.37 ksf
 qu/φ*qn Ratio= **15.05%** Pass

<-- Press Upon Completing All Input

Soil Parameters		
Unit Weight, γ:	130.0	pcf
Ultimate Bearing Capacity, qn:	21.00	ksf
Strength Reduct. factor, φ:	0.75	
Angle of Friction, Φ:	40.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: φ*qn:	15.75	ksf
Passive Pres. Coeff., Kp	4.60	

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(w/ Soil Wedges) [Reaction+Conc+Soil]	1169.65	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	8116.27	ft-kips

Orthogonal ecc3 = M2/P2 = 6.94 ft
 Ortho Non Bearing Length, NBL= 13.88 ft
 Orthogonal qu= 1.94 ksf
 Diagonal qu= 2.13 ksf

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	72.9	kips
Pad Force Location Above D:	1.93	ft
φ(Passive Pressure Moment):	140.59	ft-kips
Factored O.T. M(WL), "1.6W":	8658.2	ft-kips
Factored OT (MW-Msoil), M1	8517.63	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	2.52	ft
Sum of Soil Wedges Wt:	31.59	kips
Soil Wedges ecc, K1:	14.12	ft
Ftg+Soil above Pad wt:	1186.0	kips
Unfactored (Total ftg-soil Wt):	1217.61	kips
1.2D. No Soil Wedges.	1521.61	kips
0.9D. With Soil Wedges	1169.65	kips

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating

Actual M:	5968.00		
M Orthogonal:	13488.33	44.25%	Pass
M Diagonal:	13488.33	44.25%	Pass

Resistance due to Cohesion (Vertical)		
φ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

