

ROBINSON & COLE LLP

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March 26, 2012

RECEIVED
MAR 27 2012
CONNECTICUT
SITING COUNCIL

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

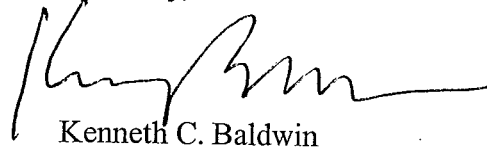
Re: **Completion of Construction Activity**
EM-VER-009-111207 – Spring Hill Road, Bethel, Connecticut
EM-VER-014-111021 – 21 Acorn Road, Branford, Connecticut
EM-VER-023-120110 – 650 Albany Turnpike, Canton, Connecticut
EM-VER-032-111108 – 330 Middletown Road, Coventry, Connecticut
EM-VER-030-111005 – 400 Riley Mountain Road, Coventry, Connecticut
EM-VER-111-111213 – 297 North Adams Street, Plymouth, Connecticut
EM-VER-099-111101 – 83 Reeds Gap Road, North Branford, Connecticut

Dear Ms. Roberts:

The purpose of this letter is to notify you and the Connecticut Siting Council that construction activity associated with each of the above-referenced facility modification filings has now 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



Law Offices

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WHITE PLAINS

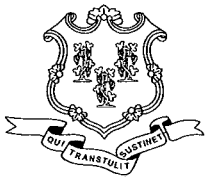
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STATE OF CONNECTICUT

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

November 4, 2011

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

RE: **EM-VER-014-111021** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 21 Acorn Road, Branford, 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 Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated October 20, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

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

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

- c: The Honorable Anthony "Unk" DaRos, First Selectman, Town of Branford
Diana Ross, Inland Wetland Enforcement Officer, Town of Branford
Laura Magaraci, Zoning Enforcement Officer, Town of Branford
Crown Castle USA, Inc.





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

October 21, 2011

The Honorable Anthony "Unk" DaRos
First Selectman
Town of Branford
Town Hall
1019 Main Street
P. O. Box 150
Branford, CT 06405-0150

RE: **EM-VER-014-111021** - Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 21 Acorn Road, Branford, Connecticut.

Dear First Selectman DaRos:

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

If you have any questions or comments regarding this proposal, please call me or inform the Council by November 4, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Diana Ross, Inland Wetland Enforcement Officer, Town of Branford
Laura Magaraci, Zoning Enforcement Officer, Town of Branford

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ORIGINAL

RECEIVED
October 20, 2011
OCT 21 2011
CONNECTICUT
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap
21 Acorn Road, Branford, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the 116-foot level on the existing 150-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s shared use of the existing tower in 2005. Cellco now intends to modify its installation by replacing ten (10) of its existing antennas with two (2) model LPA-80080/4CF cellular antennas; two (2) model APL 868013-42T0 cellular antennas; three (3) model BXA-171085-8BF PCS antennas; and three (3) model BXA-70063/6CF LTE antennas, all at the same 116-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers on its antenna platform. Attached behind Tab 1 are the specifications for the proposed replacement antennas and cable diplexers.

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 Anthony DaRos, First Selectman of the Town of Branford. A copy of this letter is also being sent to Altrio Investment Group 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).



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Linda Roberts
October 20, 2011
Page 2

1. The proposed modifications will not result in an increase in the overall height of the existing tower. Cellco's antennas and diplexers will be located at the same 116-foot level on the existing 150-foot tower.
2. The proposed modifications will not involve any modifications to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.
4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 3).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Anthony DaRos, Branford First Selectman
Altrio Investment Group LLC
Sandy M. Carter

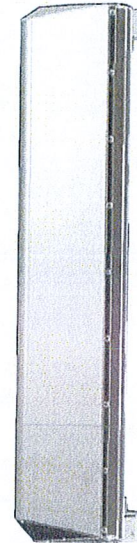


LPA-80080-4CF-EDIN-X

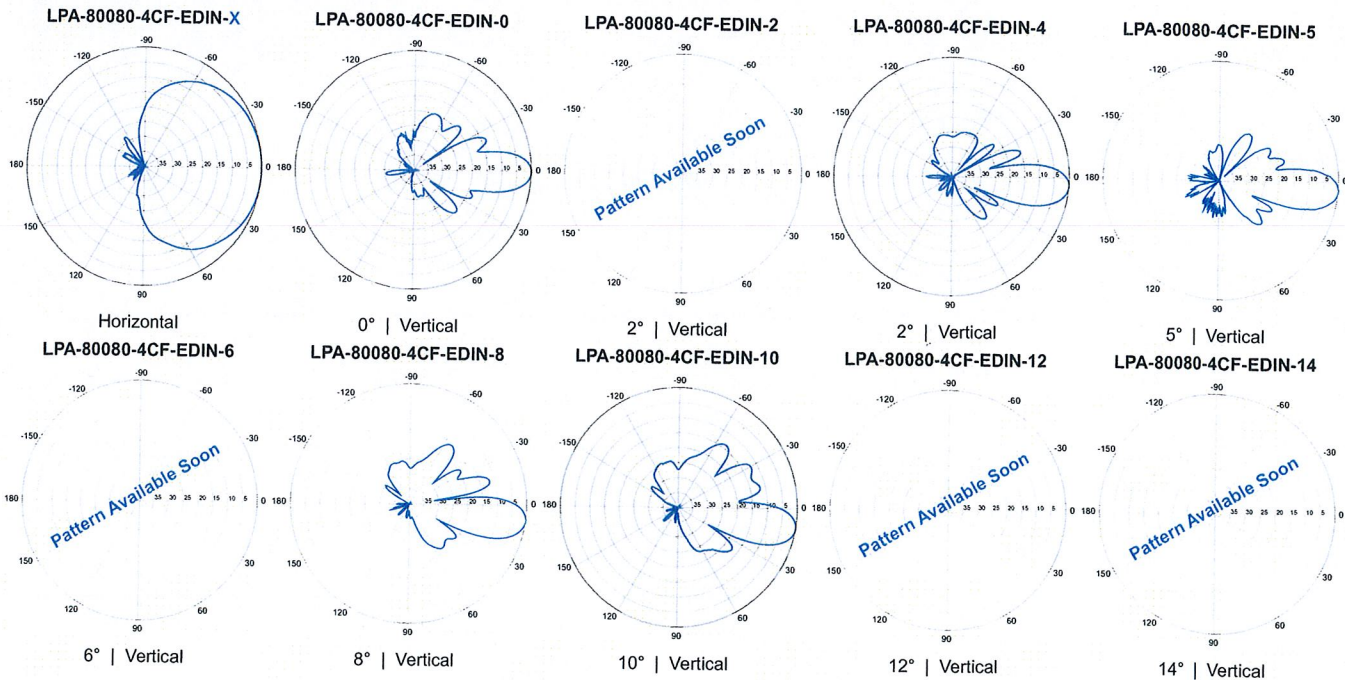
V-Pol | Log Periodic | 80° | 12.5 dBd

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		
Frequency bands	806-960 MHz	
Polarization	Vertical	
Horizontal beamwidth	80°	
Vertical beamwidth	15°	
Gain	12.5 dBd (14.6 dBi)	
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-14.2 dB	
Front-to-back ratio (+/-30°)	-34.7 dB	
Null fill	15% (-16.48 dB)	
Input power	500 W	
Lightning protection	Direct Ground	
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1200 x 140 x 335 mm 47.2 x 5.5 x 13.2 in	
Depth of antenna with z-bracket	375 mm 14.8 in	
Weight without mounting brackets	5.4 kg 12 lbs	
Survival wind speed	> 201 km/hr > 125 mph	
Wind area	Front: 0.17 m ² Side: 0.40 m ² Front: 1.8 ft ² Side: 4.3 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 254 N Side: 574 N Front: 57 lbf Side: 129 lbf	
Mounting Options		
Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit (0-20°)	21699999	50-102 mm 2.0-4.0 in 5.4 kg 12 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.	



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.



Maximizer® Log Periodic Antenna, 806-894, 80deg, 14.1dBi, 1.2m, FET, 0deg

Product Description

The Celwave® Maximizer series is a log periodic dipole array which uses a patented design to achieve a front-to-back ratio of 45 dB, the highest front-to-back ratio in the industry. Maximizers are available to cover ESMR, AMPS, PCS and DCS frequency ranges. They use RFS's patented monolithic CELite® technology, which eliminates cable and soldered joints to reduce the possibility of inter-modulation products. The CELite technology assures high reliability and excellent repeatability of electrical characteristics. The cellular Maximizers are available in 65°, 80° and 90° horizontal beamwidths and the PCS/DCS Maximizers are available in 65° and 90° horizontal beamwidths. Patent number 6,133,889.

Features/Benefits

- 45 dB front-to-back ratio reduces co-channel interference.
- Monolithic construction reduces IM.
- No solder joints, high reliability.
- Surface treated components prevent galvanic corrosion.
- UV stabilized radome assures long life without radome deterioration due to UV exposure.



Technical Specifications

Electrical Specifications

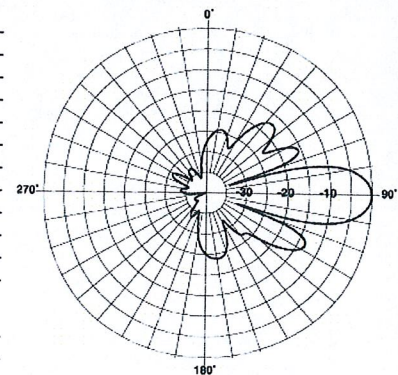
Frequency Range, MHz	806-894
Horizontal Beamwidth, deg	80
Vertical Beamwidth, deg	15
Electrical Downtilt, deg	0
Gain, dBi (dBd)	14.1 (12)
Front-To-Back Ratio, dB	45
Polarization	Vertical
VSWR	< 1.5:1
Impedance, Ohms	50
Maximum Power Input, W	500
Lightning Protection	Direct Ground
Connector Type	7-16 DIN Female

Mechanical Specifications

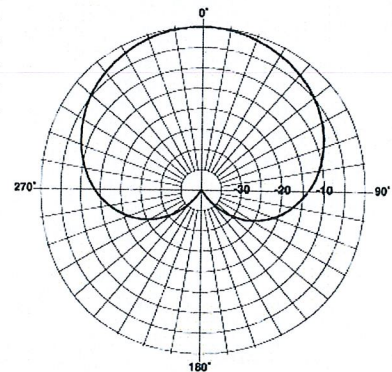
Dimensions - HxWxD, mm (in)	1219 x 152 x 203 (48 x 6 x 8)
Weight w/o Mtg Hardware, kg (lb)	2.8 (6.32)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	200 (125)
Max Wind Loading Area, m ² (ft ²)	0.307 (3.3)
Maximum Thrust @ Rated Wind, N (lbf)	916 (206)
Wind Load - Side @ Rated Wind, N (lbf)	743 (167)
Radome Material	UV Stabilized High Impact ABS
Shipping Weight, kg (lb)	7.9 (17.5)
Packing Dimensions, HxWxD, mm (in)	1270 x 305 x 203 (50 x 12 x 8)

Ordering Information

Mounting Hardware	APM21-3
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Vertical Pattern



Horizontal Pattern

Other Documentation

RFS The Clear Choice ®

APL868013-42T0

Rev: A1

Print Date: 08.08.2011

Please visit us on the internet at <http://www.rfsworld.com/>

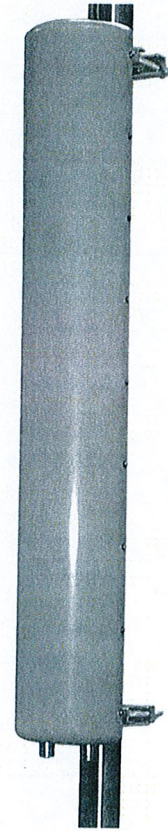
Radio Frequency Systems

BXA-171085-8BF-EDIN-X

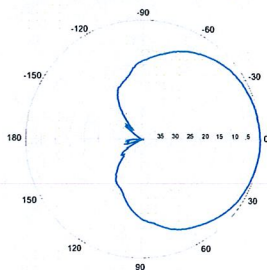
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 16.4 dBi

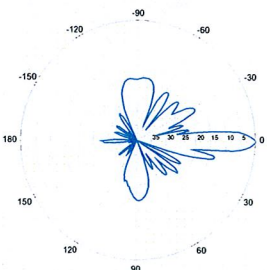
Electrical Characteristics	1710-2170 MHz			
	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz	
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz	
Polarization	±45°	±45°	±45°	
Horizontal beamwidth	88°	85°	80°	
Vertical beamwidth	7°	7°	7°	
Gain	13.5 dBd / 15.6 dBi	13.9 dBd / 16.0 dBi	14.3 dBd / 16.4 dBi	
Electrical downtilt (X)	0, 2, 4			
Impedance	50Ω			
VSWR	≤1.5:1			
First upper sidelobe	< -17 dB			
Front-to-back isolation	> 30 dB			
In-band isolation	> 28 dB			
IM3 (20W carrier)	< -150 dBc			
Input power	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN / Female / Bottom			
Operating temperature	-40° to +60° C / -40° to +140° F			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in	
Depth with t-brackets	133 mm		5.2 in	
Weight without mounting brackets	4.8 kg		10.5 lbs	
Survival wind speed	296 km/hr		184 mph	
Wind area	Front: 0.19 m ² Side: 0.14 m ²	Front: 2.0 ft ² Side: 1.5 ft ²		
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf		
Mounting Options				
	Part Number	Fits Pipe Diameter		Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm	2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm	2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-8BF-EDIN-X-FP			



BXA-171085-8BF-EDIN-X

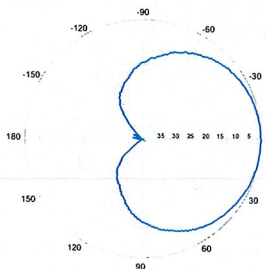


Horizontal | 1710-1880 MHz
BXA-171085-8BF-EDIN-0

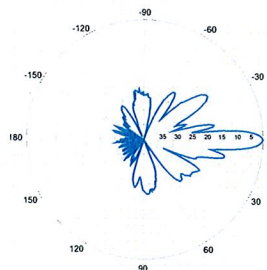


0° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-X

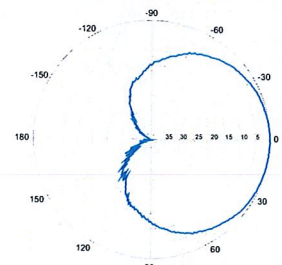


Horizontal | 1850-1990 MHz
BXA-171085-8BF-EDIN-0

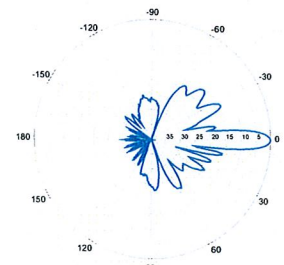


0° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171085-8BF-EDIN-0



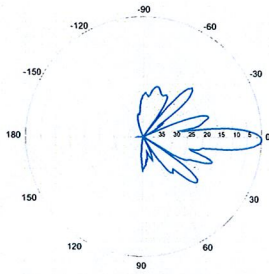
0° | Vertical | 1920-2170 MHz

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-171085-8BF-EDIN-X

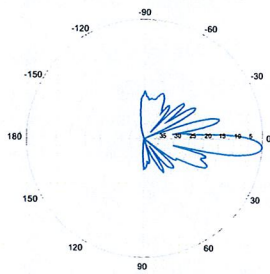
X-Pol | FET Panel | 85° | 16.4 dBi

BXA-171085-8BF-EDIN-2



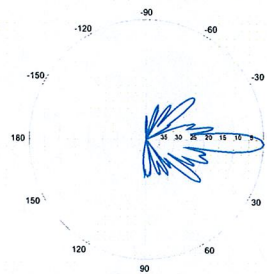
2° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-4



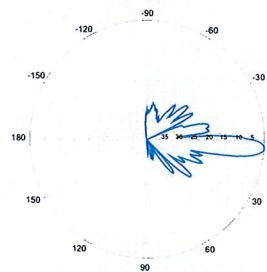
4° | Vertical | 1710-1880 MHz

BXA-171085-8BF-EDIN-2



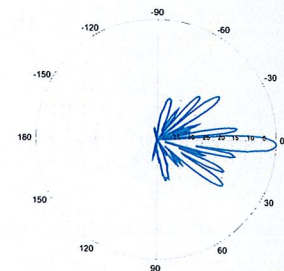
2° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-4



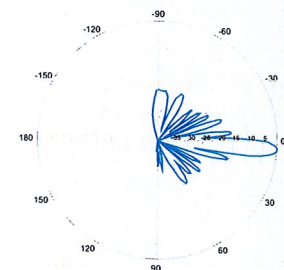
4° | Vertical | 1850-1990 MHz

BXA-171085-8BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

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BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

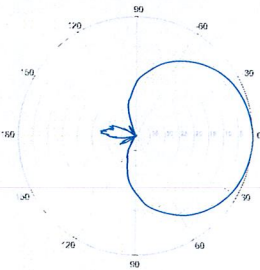
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz				
	696-806 MHz		806-900 MHz		
Frequency bands	696-806 MHz		806-900 MHz		
Polarization	±45°				
Horizontal beamwidth	65°		63°		
Vertical beamwidth	13°		11°		
Gain	14.0 dBd (16.1 dBi)		14.5 dBd (16.6 dBi)		
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10				
Impedance	50Ω				
VSWR	≤1.35:1				
Upper sidelobe suppression (0°)	-18.3 dB		-18.2 dB		
Front-to-back ratio (+/-30°)	-33.4 dB		-36.3 dB		
Null fill	5% (-26.02 dB)				
Isolation between ports	< -25 dB				
Input power with EDIN connectors	500 W				
Input power with NE connectors	300 W				
Lightning protection	Direct Ground				
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)				
Mechanical Characteristics					
Dimensions Length x Width x Depth	1804 x 285 x 132 mm		71.0 x 11.2 x 5.2 in		
Depth with z-brackets	172 mm		6.8 in		
Weight without mounting brackets	7.9 kg		17 lbs		
Survival wind speed	> 201 km/hr		> 125 mph		
Wind area	Front: 0.51 m 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 Bracket Kit	36210003	50-160 mm	2.0-6.3 in	6.3 kg	14 lbs
3-Point Downtilt Bracket Kit (0-14°)	36210004	50-160 mm	2.0-6.3 in	7.3 kg	16 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications				
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP				

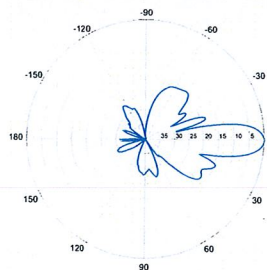


BXA-70063-6CF-EDIN-X



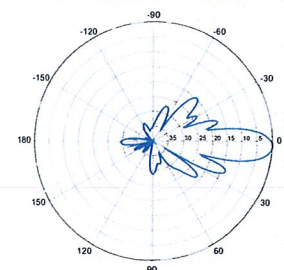
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

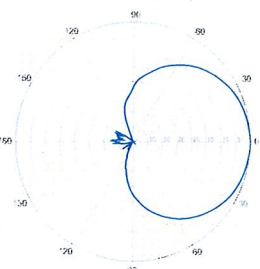


0° | Vertical | 750 MHz

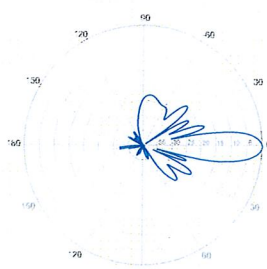
BXA-70063-6CF-EDIN-2



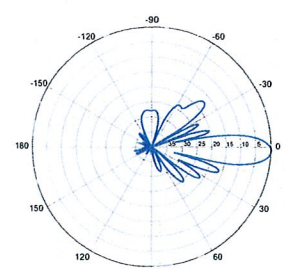
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



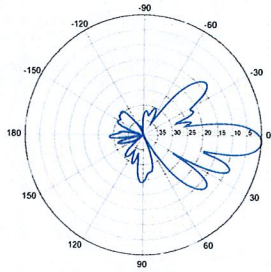
2° | Vertical | 850 MHz

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BXA-70063-6CF-EDIN-X

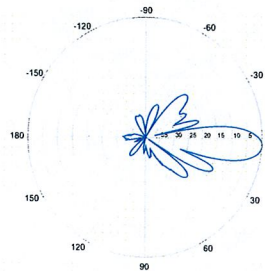
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



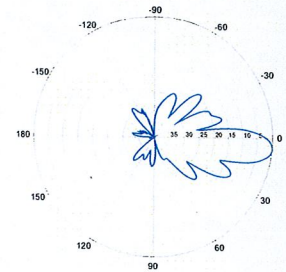
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

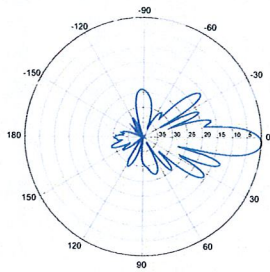


4° | Vertical | 750 MHz

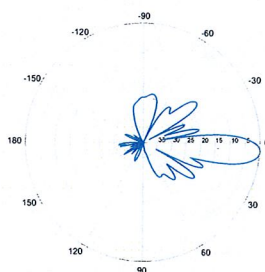
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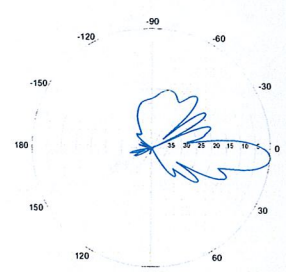
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

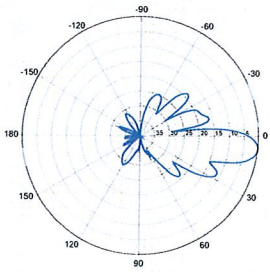


4° | Vertical | 850 MHz



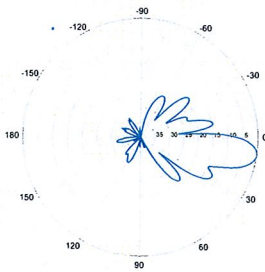
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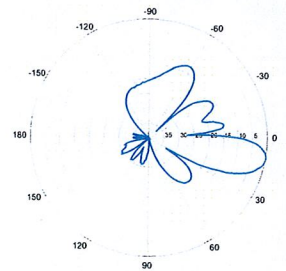
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

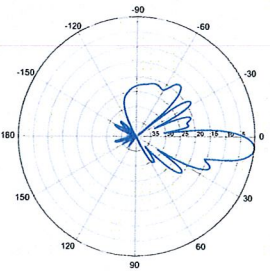


8° | Vertical | 750 MHz

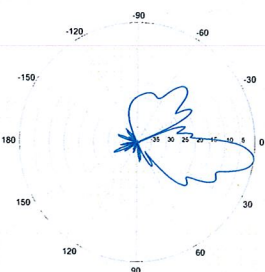
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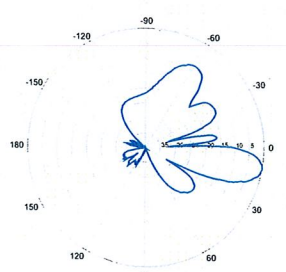
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

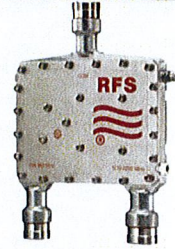
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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



ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



Features/Benefits

- LTE ready design
- Extremely Low Insertion Loss
- High level of Rejection between bands – Protection against interferences
- Extremely High Power Handling Capability
- Integrated DC block/bypass versions available
- Very compact & small size design – Easy installation and reduced tower load
- In-line long-neck connectors for easy connection & waterproofing
- Exceptional reliability & environmental protection (IP 67)
- Equipped with 1 * Breathable Vent – Prevent any humidity inside the product
- Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)
- Grounding already provided through the mounting bracket
- Kit available for easy dual mount

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

Notes

All information contained in the present datasheet is subject to confirmation at time of ordering

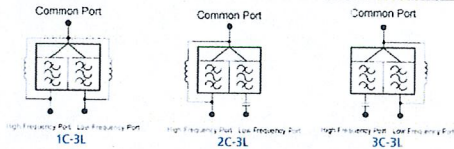


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: Wideband_Diplexer_Installation_Rev5.pdf

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information	
Model Number	Description
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)
CA020-2	Ground Cable, 2m, includes lugs (Optional)
CA030-2	Ground Cable, 2m, includes lugs (Optional)
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)

All information contained in the present datasheet is subject to confirmation at time of ordering

		General		Power		Density							
Site Name: Branford 3													
Tower Height: Verizon @ 116ft													
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T UMTS	13	500	105	0.2120	1900	1.0000	21.20%						
*AT&T GSM	6	296	105	0.0579	880	0.5867	9.87%						
*AT&T GSM	9	427	105	0.1253	1900	1.0000	12.53%						
*AT&T LTE	1	500	105	0.0163	740	0.4933	3.31%						
*Pocket	3	631	137	0.0363	2130	1.0000	3.63%						
*Sprint	11	122	150	0.0214	1957.5	1.0000	2.14%						
*Nextel	9	100	130	0.0191	851	0.5673	3.38%						
Verizon PCS	7	288	116	0.0539	1970	1.0000	5.39%						
Verizon Cellular	9	276	116	0.0664	869	0.5793	11.46%						
Verizon AWS	1	719	116	0.0192	2145	1.0000	1.92%						
Verizon 700	2	722	116	0.0386	698	0.4653	8.29%						
								83.12%					
* Source: Siting Council													



PAUL J. FORD AND COMPANY
 STRUCTURAL ENGINEERS
 250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: August 22, 2011

Veronica Harris
 Crown Castle USA Inc.
 1200 McArthur Blvd
 Mahwah, NJ 07430
 201-236-9094

Paul J Ford and Company
 250 E. Broad Street Suite 1500
 Columbus, OH 43215
 614.221.6679
 uyerra@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: Verizon Wireless Co-Locate
 Carrier Site Number: N/A
 Carrier Site Name: Branford 3

Crown Castle Designation: Crown Castle BU Number: 876316
 Crown Castle Site Name: SECONDINO PROPERTY
 Crown Castle JDE Job Number: 164272
 Crown Castle Work Order Number: 430223

Engineering Firm Designation: Paul J Ford and Company Project Number: 37511-0162 R1

Site Data: 21 Acorn Road, BRANFORD, New Haven County, CT
 Latitude 41° 17' 35.06", Longitude -72° 45' 46.4"
 147 Foot - Monopole Tower

Dear Veronica Harris,

Paul J Ford and Company 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 427199, in accordance with application 129135, revision 2.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local Code Requirement based upon a wind speed of 85 mph fastest mile with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Udaykiran Yerra *KY*
 Structural Engineer

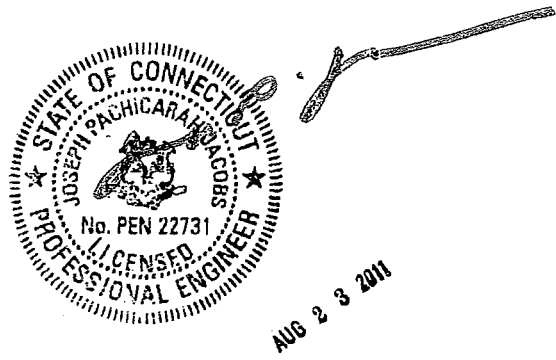


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1) INTRODUCTION

This tower is a 147 ft Monopole tower designed by SUMMIT in August of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 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
116	116	3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	-	-	1
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		2	antel	LPA-80080/4CF w/ Mount Pipe			
		2	rfs celwave	APL868013 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

Notes:
 1) Proposed Equipment

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
147	147	1	tower mounts	Platform Mount [LP 401-1]	6	1-5/8	1
	145	9	ems wireless	FV65-14-00NA2 w/Mount Pipe	9	1-5/8	3
	144	4	decibel	DB980H90E -M w/ Mount Pipe	6	1-5/8	1
		2	decibel	DB950F85E-M w/ Mount Pipe			
135	135	3	celwave	Celwave APXV18-206515L-03 w/Mount Pipe	6	1-5/8	1
126	127	1	tower mounts	Pipe Mount [PM 601-3]	12	1-1/4	1
	126	12	decibel	844G90VTA-SX w/ Mount Pipe			
	126	1	tower mounts	Platform Mount [LP 401-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116	116	2	adc	ADC DUAL BAND 800/1900 FULL BAND	12	1-5/8	1
		2	antel	LPA-80063/6CF w/ Mount Pipe			
		6	antel	Antel LPA-185090/8CFx2 w/ mount pipe	-	-	4
		4	decibel	DB844H80-XY w/Mount Pipe	-	-	1
		1	tower mounts	Platform Mount [LP 401-1]	-	-	1
		6	ericsson	RRUS-11	-	-	1
105	108	3	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe	2	7/8	2
		1	raycap	DC6-48-60-18-8F	1	1/4	
		6	powerwave technologies	Technologies 7770 w/ Mount Pipe	-	-	1
		12	powerwave technologies	Technologies LGP2140X	12	1-5/8	1
		1	tower mounts	Platform Mount (LP 101-1)	-	-	1
		1	kathreinscala	Kathrein OG-860/1920/GPS-A	3	1/2	1
80	81	2	lucent	KS24019-L112A	3	1/2	1
	80	1	tower mounts	Pipe Mount [PM 501-3]	-	-	1

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) MLA Equipment Controlling
- 4) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Associates, Inc.	1529736	CCSITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit	1632435	CCSITES
4-TOWER MANUFACTURER DRAWINGS	Summit	1632399	CCSITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF	2251030	CCSITES

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

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) Monopole has been reinforced in accordance with referenced documents.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company 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	147 - 105	Pole	TP29.141x22x0.25	1	-8.69	1075.85	56.8	Pass	
L2	105 - 88	Pole	TP31.5319x28.0034x0.3125	2	-14.44	1485.99	86.1	Pass	
L3	88 - 84.5	Pole	TP32.127x31.5319x0.4815	3	-15.19	2320.86	60.2	Pass	
L4	84.5 - 73.75	Pole	TP33.955x32.127x0.4415	4	-16.69	2205.08	71.8	Pass	
L5	73.75 - 42.75	Pole	TP38.601x32.3493x0.5144	5	-24.92	2918.10	83.9	Pass	
L6	42.75 - 8	Pole	TP43.7597x36.7298x0.5547	6	-37.75	3650.33	93.4	Pass	
L7	8 - 6.5	Pole	TP44.0148x43.7597x0.568	7	-38.24	3758.77	91.6	Pass	
L8	6.5 - 0	Pole	TP45.12x44.0148x0.5643	8	-40.42	3829.59	93.4	Pass	
							Summary		
							Pole (L6)	93.4	Pass
							Rating =	93.4	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	94.1	Pass
1	Base Plate	0	84.7	Pass
1, 2	Base Foundation	0	58.0	Pass
1, 2	Base Foundation Soil Interaction	0	91.7	Pass

Structure Rating (max from all components) =	94.1%
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

APPENDIX A

RISA TOWER OUTPUT

Tower Input Data

There is a pole section.

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

The following design criteria apply:

- 2) Tower is located in New Haven County, Connecticut.
- 3) Basic wind speed of 85 mph.
- 4) Nominal ice thickness of 0.7500 in.
- 5) Ice thickness is considered to increase with height.
- 6) Ice density of 56 pcf.
- 7) A wind speed of 38 mph is used in combination with ice.
- 8) Temperature drop of 50 °F.
- 9) Deflections calculated using a wind speed of 50 mph.
- 10) A non-linear (P-delta) analysis was used.
- 11) Pressures are calculated at each section.
- 12) Stress ratio used in pole design is 1.333.
- 13) Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

- | | | |
|-------------------------------------|------------------------------------|--------------------------------------|
| Consider Moments - Legs | Distribute Leg Loads As Uniform | v Treat Feedline Bundles As Cylinder |
| Consider Moments - Horizontals | Assume Legs Pinned | Use ASCE 10 X-Brace Ly Rules |
| Consider Moments - Diagonals | v Assume Rigid Index Plate | Calculate Redundant Bracing Forces |
| Use Moment Magnification | v Use Clear Spans For Wind Area | Ignore Redundant Members in FEA |
| v Use Code Stress Ratios | Use Clear Spans For KL/r | SR Leg Bolts Resist Compression |
| v Use Code Safety Factors - Guys | Retension Guys To Initial Tension | All Leg Panels Have Same Allowable |
| v Escalate Ice | v Bypass Mast Stability Checks | Offset Girt At Foundation |
| Always Use Max Kz | v Use Azimuth Dish Coefficients | v Consider Feedline Torque |
| Use Special Wind Profile | v Project Wind Area of Appurt. | Include Angle Block Shear Check |
| Include Bolts In Member Capacity | v Autocalc Torque Arm Areas | Poles |
| Leg Bolts Are At Top Of Section | SR Members Have Cut Ends | v Include Shear-Torsion Interaction |
| Secondary Horizontal Braces Leg | Sort Capacity Reports By Component | Always Use Sub-Critical Flow |
| Use Diamond Inner Bracing (4 Sided) | Triangulate Diamond Inner Bracing | Use Top Mounted Sockets. |
| Add IBC .6D+W Combination | | |

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	147.00-105.00	42.00	3.75	18	22.0000	29.1410	0.2500	1.0000	A607-60 (60 ksi)
L2	105.00-88.00	20.75	0.00	18	28.0034	31.5319	0.3125	1.2500	A607-60 (60 ksi)
L3	88.00-84.50	3.50	0.00	18	31.5319	32.1270	0.4815	1.9260	A607-60 (60 ksi)
L4	84.50-73.75	10.75	4.25	18	32.1270	33.9550	0.4415	1.7660	A607-60 (60 ksi)
L5	73.75-42.75	35.25	4.75	18	32.3493	38.6010	0.5144	2.0576	A607-60 (60 ksi)
L6	42.75-8.00	39.50	0.00	18	36.7298	43.7597	0.5547	2.2188	A607-60 (60 ksi)
L7	8.00-6.50	1.50	0.00	18	43.7597	44.0148	0.5680	2.2720	A607-60 (60 ksi)

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
L8	6.50-0.00	6.50		18	44.0148	45.1200	0.5643	2.2572	A607-60 (60 ksi)

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	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	29.5905	22.9250	2417.5313	10.2563	14.8036	163.3067	4838.2436	11.4647	4.6888	18.755
L2	29.0829	27.4659	2660.7626	9.8303	14.2257	187.0387	5325.0263	13.7356	4.3786	14.012
	32.0183	30.9657	3813.0109	11.0829	16.0182	238.0423	7631.0391	15.4858	4.9996	15.999
L3	32.0183	47.4537	5780.1920	11.0229	16.0182	360.8514	11567.989	23.7314	4.7022	9.766
	32.6226	48.3632	6118.9450	11.2342	16.3205	374.9235	12245.941	24.1862	4.8069	9.983
L4	32.6226	44.4016	5631.9239	11.2484	16.3205	345.0825	11271.258	22.2050	4.8773	11.047
	34.4788	46.9632	6663.9916	11.8973	17.2491	386.3376	13336.751	23.4860	5.1990	11.776
L5	33.6137	51.9770	6655.1199	11.3014	16.4334	404.9741	13318.996	25.9935	4.7881	9.308
	39.1965	62.1842	11396.249	13.5207	19.6093	581.1653	22807.494	31.0980	5.8884	11.447
L6	38.1548	63.6905	10530.058	12.8422	18.6587	564.3504	21073.972	31.8513	5.4882	9.894
	44.4348	76.0675	17939.261	15.3378	22.2299	806.9870	35902.128	38.0410	6.7254	12.124
L7	44.4348	77.8674	18352.431	15.3331	22.2299	825.5731	36729.010	38.9411	6.7020	11.799
	44.6938	78.3273	18679.536	15.4236	22.3595	835.4177	37383.651	39.1711	6.7469	11.878
L8	44.6938	77.8237	18562.597	15.4249	22.3595	830.1877	37149.621	38.9192	6.7534	11.968
	45.8160	79.8032	20015.398	15.8173	22.9210	873.2356	40057.133	39.9092	6.9480	12.313

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _r	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 147.00-105.00				1	1	1		
L2 105.00-88.00				1	1	1		
L3 88.00-84.50				1	1	1		
L4 84.50-73.75				1	1	1		
L5 73.75-42.75				1	1	1		
L6 42.75-8.00				1	1	1		
L7 8.00-6.50				1	1	1		
L8 6.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face Allow or Shield Leg	Component Type	Placement ft	Total Number	C _A A _A ft ² /ft	Weight plf
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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	CAAA		Weight plf
						ft ² /ft		
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	147.00 - 0.00	9	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
**								
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	135.00 - 0.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	135.00 - 0.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF6-50A (1-1/4 FOAM)	C	No	Inside Pole	126.00 - 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
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	116.00 - 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
VXL5-50 (7/8 FOAM)	C	No	Inside Pole	105.00 - 0.00	2	No Ice	0.00	0.29
						1/2" Ice	0.00	0.29
						1" Ice	0.00	0.29
						2" Ice	0.00	0.29
						4" Ice	0.00	0.29
LDF1-50A (1/4 FOAM)	C	No	Inside Pole	105.00 - 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
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	105.00 - 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
LDF4RN-50A (1/2 FOAM)	C	No	Inside Pole	80.00 - 0.00	3	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
Aero MP3-05	C	No	CaAa (Out Of Face)	90.00 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
						2" Ice	0.88	0.00
						4" Ice	1.32	0.00
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	CAAA In Face ft ²	CAAA Out Face ft ²	Weight K
L1	147.00-105.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.940	0.73
L2	105.00-88.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.062	0.69
L3	88.00-84.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation	Face	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		ft ²	ft ²	ft ²	ft ²	K
L4	84.50-73.75	C	0.000	0.000	0.000	1.910	0.14
		A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
L5	73.75-42.75	C	0.000	0.000	0.000	5.867	0.44
		A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
L6	42.75-8.00	C	0.000	0.000	0.000	16.920	1.27
		A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
L7	8.00-6.50	C	0.000	0.000	0.000	18.966	1.42
		A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
L8	6.50-0.00	C	0.000	0.000	0.000	0.819	0.06
		A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.548	0.27

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation	Face or Leg	Ice Thickness	A _R	A _F	C _A A _A In Face	C _A A _A Out Face	Weight
n	ft		in	ft ²	ft ²	ft ²	ft ²	K
L1	147.00-105.00	A	0.880	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.221	1.30
L2	105.00-88.00	A	0.853	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.549	1.01
L3	88.00-84.50	A	0.842	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.296	0.20
L4	84.50-73.75	A	0.833	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.056	0.63
L5	73.75-42.75	A	0.803	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	28.999	1.81
L6	42.75-8.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	31.759	2.00
L7	8.00-6.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.314	0.08
L8	6.50-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.696	0.37

Feed Line Center of Pressure

Section	Elevation	CP _x	CP _z	CP _x	CP _z
	ft	in	in	Ice in	Ice in
L1	147.00-105.00	-0.1792	0.1034	-0.3022	0.1745
L2	105.00-88.00	-0.2854	0.1648	-0.4700	0.2713
L3	88.00-84.50	-0.5880	0.3395	-0.8688	0.5016
L4	84.50-73.75	-0.5917	0.3416	-0.8741	0.5047
L5	73.75-42.75	-0.5995	0.3461	-0.8938	0.5160
L6	42.75-8.00	-0.6107	0.3526	-0.9069	0.5236
L7	8.00-6.50	-0.6169	0.3562	-0.8937	0.5160
L8	6.50-0.00	-0.6182	0.3569	-0.8966	0.5177

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K	
(3) FV65-14-00NA2 w/Mount Pipe	A	From Face	3.00 0.00 -2.00	0.0000	147.00	No Ice	8.64	6.95	0.06
						1/2" Ice	9.29	8.13	0.12
						1" Ice	9.91	9.02	0.20
						2" Ice	11.18	10.84	0.38
						4" Ice	13.83	14.85	0.89
(3) FV65-14-00NA2 w/Mount Pipe	B	From Face	3.00 0.00 -2.00	0.0000	147.00	No Ice	8.64	6.95	0.06
						1/2" Ice	9.29	8.13	0.12
						1" Ice	9.91	9.02	0.20
						2" Ice	11.18	10.84	0.38
						4" Ice	13.83	14.85	0.89
(3) FV65-14-00NA2 w/Mount Pipe	C	From Face	3.00 0.00 -2.00	0.0000	147.00	No Ice	8.64	6.95	0.06
						1/2" Ice	9.29	8.13	0.12
						1" Ice	9.91	9.02	0.20
						2" Ice	11.18	10.84	0.38
						4" Ice	13.83	14.85	0.89
Platform Mount [LP 401-1]	C	None		0.0000	147.00	No Ice	24.33	24.33	1.65
						1/2" Ice	30.22	30.22	2.03
						1" Ice	36.11	36.11	2.41
						2" Ice	47.89	47.89	3.18
						4" Ice	71.45	71.45	4.72
6'x2" Pipe Mount	A	From Face	3.00 0.00 -2.00	0.0000	147.00	No Ice	1.20	1.20	0.07
						1/2" Ice	1.80	1.80	0.08
						1" Ice	2.17	2.17	0.09
						2" Ice	2.93	2.93	0.13
						4" Ice	4.57	4.57	0.27
6'x2" Pipe Mount	B	From Face	3.00 0.00 -2.00	0.0000	147.00	No Ice	1.20	1.20	0.07
						1/2" Ice	1.80	1.80	0.08
						1" Ice	2.17	2.17	0.09
						2" Ice	2.93	2.93	0.13
						4" Ice	4.57	4.57	0.27
6'x2" Pipe Mount	C	From Face	3.00 0.00 -2.00	0.0000	147.00	No Ice	1.20	1.20	0.07
						1/2" Ice	1.80	1.80	0.08
						1" Ice	2.17	2.17	0.09
						2" Ice	2.93	2.93	0.13
						4" Ice	4.57	4.57	0.27
** Pipe Mount [PM 601-3]	C	None		0.0000	135.00	No Ice	4.39	4.39	0.20
1/2" Ice						5.48	5.48	0.24	
1" Ice						6.57	6.57	0.28	
2" Ice						8.75	8.75	0.36	
4" Ice						13.11	13.11	0.53	
Celwave APXV18- 206515L-03 w/Mount Pipe	A	From Face	0.50 0.00 0.00	0.0000	135.00	No Ice	3.48	3.24	0.04
						1/2" Ice	3.90	3.97	0.07
						1" Ice	4.31	4.64	0.11
						2" Ice	5.23	6.03	0.21
						4" Ice	7.27	9.01	0.51
Celwave APXV18- 206515L-03 w/Mount Pipe	B	From Face	0.50 0.00 0.00	0.0000	135.00	No Ice	3.48	3.24	0.04
						1/2" Ice	3.90	3.97	0.07
						1" Ice	4.31	4.64	0.11
						2" Ice	5.23	6.03	0.21
						4" Ice	7.27	9.01	0.51

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight	
			Horz	Lateral Vert						
			ft	ft	°	ft	ft ²	ft ²	K	
Celwave APXV18-206515L-03 w/Mount Pipe	C	From Face	0.50	0.00	0.0000	135.00	2" Ice	7.27	9.01	0.51
							4" Ice			
							No Ice	3.48	3.24	0.04
							1/2"	3.90	3.97	0.07
							Ice	4.31	4.64	0.11
							1" Ice	5.23	6.03	0.21
** (4) 844G90VTA-SX w/ Mount Pipe	A	From Face	3.00	0.00	0.0000	126.00	2" Ice	7.27	9.01	0.51
							4" Ice			
							No Ice	3.30	4.92	0.03
							1/2"	3.69	5.60	0.07
							Ice	4.12	6.28	0.11
							1" Ice	5.01	7.71	0.23
(4) 844G90VTA-SX w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	126.00	2" Ice	6.92	10.83	0.55
							4" Ice			
							No Ice	3.30	4.92	0.03
							1/2"	3.69	5.60	0.07
							Ice	4.12	6.28	0.11
							1" Ice	5.01	7.71	0.23
(4) 844G90VTA-SX w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	126.00	2" Ice	6.92	10.83	0.55
							4" Ice			
							No Ice	3.30	4.92	0.03
							1/2"	3.69	5.60	0.07
							Ice	4.12	6.28	0.11
							1" Ice	5.01	7.71	0.23
Platform Mount [LP 401-1]	C	None			0.0000	126.00	2" Ice	6.92	10.83	0.55
							4" Ice			
							No Ice	24.33	24.33	1.65
							1/2"	30.22	30.22	2.03
							Ice	36.11	36.11	2.41
							1" Ice	47.89	47.89	3.18
** (2) LPA -80063/6CF w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	116.00	2" Ice	71.45	71.45	4.72
							4" Ice			
							No Ice	10.58	10.67	0.05
							1/2"	11.24	11.93	0.14
							Ice	11.87	12.91	0.24
							1" Ice	13.16	14.92	0.48
BXA-70063-6CF-2 w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	116.00	2" Ice	15.87	19.16	1.09
							4" Ice			
							No Ice	7.97	5.80	0.04
							1/2"	8.61	6.95	0.10
							Ice	9.22	7.82	0.17
							1" Ice	10.46	9.60	0.34
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	B	From Face	3.00	0.00	0.0000	116.00	2" Ice	13.07	13.37	0.80
							4" Ice			
							No Ice	3.18	3.35	0.03
							1/2"	3.56	3.97	0.06
							Ice	3.97	4.60	0.10
							1" Ice	4.86	5.90	0.19
(2) APL868013 w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	116.00	2" Ice	6.77	8.89	0.49
							4" Ice			
							No Ice	3.10	4.92	0.02
							1/2"	3.48	5.60	0.06
							Ice	3.88	6.28	0.11
							1" Ice	4.76	7.71	0.22
BXA-70063-6CF-2 w/ Mount Pipe	C	From Face	3.00	0.00	0.0000	116.00	2" Ice	6.66	10.83	0.54
							4" Ice			
							No Ice	7.97	5.80	0.04
							1/2"	8.61	6.95	0.10
							Ice	9.22	7.82	0.17
							1" Ice	10.46	9.60	0.34
BXA-171085-8BF-EDIN-2	C	From Face	3.00	0.0000	0.0000	116.00	2" Ice	13.07	13.37	0.80
							4" Ice			
							No Ice	3.18	3.35	0.03
							1/2"	3.56	3.97	0.06
							Ice	3.97	4.60	0.10
							1" Ice	4.86	5.90	0.19

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} A _{Front} ft ²	C _{AA} A _{Side} ft ²	Weight K	
w/ Mount Pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	3.56 3.97 4.86 6.77	3.97 4.60 5.90 8.89	0.06 0.10 0.19 0.49
** (2) FD9R6004/2C-3L	A	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) LPA-80080/4CF w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.07 0.13 0.25 0.61
BXA-70063-6CF-2 w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	A	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.97 4.86 6.77	3.35 3.97 4.60 5.90 8.89	0.03 0.06 0.10 0.19 0.49
(2) ADC DUAL BAND 800/1900 FULL BAND	B	From Face	3.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.65 0.76 0.89 1.16 1.82	0.81 0.94 1.09 1.40 2.12	0.03 0.04 0.05 0.09 0.19
Platform Mount [LP 401-1]	C	None		0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.33 30.22 36.11 47.89 71.45	24.33 30.22 36.11 47.89 71.45	1.65 2.03 2.41 3.18 4.72
** AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Face	4.00 0.00 3.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	0.03 0.08 0.13 0.25 0.61
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Face	4.00 0.00 3.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice	5.74 6.20 6.66 7.62	4.02 4.63 5.28 6.68	0.03 0.08 0.13 0.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment	Placement ft	C _{AA} A _A Front ft ²	C _{AA} A _A Side ft ²	Weight K	
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Face	4.00 0.00 3.00	0.0000	105.00	2" Ice	9.67	9.74	0.61
						4" Ice			
						No Ice	5.74	4.02	0.03
						1/2"	6.20	4.63	0.08
						Ice	6.66	5.28	0.13
(2) RRUS-11	A	From Face	4.00 0.00 3.00	0.0000	105.00	1" Ice	7.62	6.68	0.25
						2" Ice	9.67	9.74	0.61
						4" Ice			
						No Ice	4.42	1.63	0.06
						1/2"	4.71	1.84	0.08
(2) RRUS-11	B	From Face	4.00 0.00 3.00	0.0000	105.00	Ice	5.00	2.06	0.11
						1" Ice	5.61	2.52	0.18
						2" Ice	6.94	3.55	0.37
						4" Ice			
						No Ice	4.42	1.63	0.06
(2) RRUS-11	C	From Face	4.00 0.00 3.00	0.0000	105.00	1/2"	4.71	1.84	0.08
						Ice	5.00	2.06	0.11
						1" Ice	5.61	2.52	0.18
						2" Ice	6.94	3.55	0.37
						4" Ice			
DC6-48-60-18-8F	A	From Face	4.00 0.00 3.00	0.0000	105.00	No Ice	1.27	1.27	0.02
						1/2"	1.46	1.46	0.04
						Ice	1.66	1.66	0.05
						1" Ice	2.09	2.09	0.10
						2" Ice	3.10	3.10	0.21
(2) Powerwave Technologies 7770 w/ Mount Pipe	A	From Face	3.00 0.00 3.00	0.0000	105.00	4" Ice			
						No Ice	6.01	4.42	0.07
						1/2"	6.46	5.08	0.12
						Ice	6.93	5.74	0.18
						1" Ice	7.89	7.13	0.32
(2) Powerwave Technologies 7770 w/ Mount Pipe	B	From Face	3.00 0.00 3.00	0.0000	105.00	2" Ice	9.94	10.41	0.70
						4" Ice			
						No Ice	6.01	4.42	0.07
						1/2"	6.46	5.08	0.12
						Ice	6.93	5.74	0.18
(2) Powerwave Technologies 7770 w/ Mount Pipe	C	From Face	3.00 0.00 3.00	0.0000	105.00	1" Ice	7.89	7.13	0.32
						2" Ice	9.94	10.41	0.70
						4" Ice			
						No Ice	6.01	4.42	0.07
						1/2"	6.46	5.08	0.12
(4) Powerwave Technologies LGP2140X	A	From Face	3.00 0.00 3.00	0.0000	105.00	Ice	6.93	5.74	0.18
						1" Ice	7.89	7.13	0.32
						2" Ice	9.94	10.41	0.70
						4" Ice			
						No Ice	1.23	0.37	0.02
(4) Powerwave Technologies LGP2140X	B	From Face	3.00 0.00 3.00	0.0000	105.00	1/2"	1.38	0.48	0.02
						Ice	1.54	0.60	0.03
						1" Ice	1.89	0.87	0.06
						2" Ice	2.69	1.51	0.14
						4" Ice			
(4) Powerwave Technologies LGP2140X	C	From Face	3.00 0.00 3.00	0.0000	105.00	No Ice	1.23	0.37	0.02
						1/2"	1.38	0.48	0.02
						Ice	1.54	0.60	0.03
						1" Ice	1.89	0.87	0.06
						2" Ice	2.69	1.51	0.14

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft ²	ft ²	K
Platform Mount (LP 101-1)	C	None			0.0000	105.00	1" Ice	1.89	0.87	0.06
							2" Ice	2.69	1.51	0.14
							4" Ice			
							No Ice	36.21	36.21	1.50
							1/2" Ice	42.82	42.82	2.30
							Ice	49.43	49.43	3.10
6'x2" Pipe Mount	A	From Face	3.00	0.00	0.0000	105.00	1" Ice	62.65	62.65	4.70
							2" Ice	89.09	89.09	7.89
							4" Ice			
							No Ice	1.20	1.20	0.07
							1/2" Ice	1.80	1.80	0.08
							Ice	2.17	2.17	0.09
6'x2" Pipe Mount	B	From Face	3.00	0.00	0.0000	105.00	1" Ice	2.93	2.93	0.13
							2" Ice	4.57	4.57	0.27
							4" Ice			
							No Ice	1.20	1.20	0.07
							1/2" Ice	1.80	1.80	0.08
							Ice	2.17	2.17	0.09
6'x2" Pipe Mount	C	From Face	3.00	0.00	0.0000	105.00	1" Ice	2.93	2.93	0.13
							2" Ice	4.57	4.57	0.27
							4" Ice			
							No Ice	1.20	1.20	0.07
							1/2" Ice	1.80	1.80	0.08
							Ice	2.17	2.17	0.09
** Pipe Mount [PM 501-3]	C	None			0.0000	80.00	1" Ice	12.14	12.14	0.24
							2" Ice	18.50	18.50	0.32
							4" Ice			
							No Ice	5.78	5.78	0.16
							1/2" Ice	7.37	7.37	0.18
							Ice	8.96	8.96	0.20
KS24019-L112A	A	From Face	3.00	0.00	0.0000	80.00	1" Ice	0.42	0.42	0.01
							2" Ice	0.74	0.74	0.02
							4" Ice			
							No Ice	0.10	0.10	0.01
							1/2" Ice	0.18	0.18	0.01
							Ice	0.26	0.26	0.01
Kathrein OG-860/1920/GPS-A	B	From Face	3.00	0.00	0.0000	80.00	1" Ice	0.57	0.57	0.02
							2" Ice	1.17	1.17	0.05
							4" Ice			
							No Ice	0.14	0.14	0.00
							1/2" Ice	0.23	0.23	0.00
							Ice	0.33	0.33	0.01
KS24019-L112A	C	From Face	3.00	0.00	0.0000	80.00	1" Ice	0.42	0.42	0.01
							2" Ice	0.74	0.74	0.02
							4" Ice			
							No Ice	0.10	0.10	0.01
							1/2" Ice	0.18	0.18	0.01
							Ice	0.26	0.26	0.01

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K _z	q _z psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 147.00-105.00	125.27	1.464	27	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000
					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	5.940
L2 105.00-88.00	96.36	1.358	25	42.623	A	0.000	42.623	42.623	100.00	0.000	0.000
					B	0.000	42.623		100.00	0.000	0.000
					C	0.000	42.623		100.00	0.000	4.062
L3 88.00-84.50	86.24	1.316	24	9.284	A	0.000	9.284	9.284	100.00	0.000	0.000
					B	0.000	9.284		100.00	0.000	0.000
					C	0.000	9.284		100.00	0.000	1.910
L4 84.50-73.75	79.08	1.284	24	29.599	A	0.000	29.599	29.599	100.00	0.000	0.000
					B	0.000	29.599		100.00	0.000	0.000
					C	0.000	29.599		100.00	0.000	5.867
L5 73.75-42.75	58.15	1.176	22	92.618	A	0.000	92.618	92.618	100.00	0.000	0.000
					B	0.000	92.618		100.00	0.000	0.000
					C	0.000	92.618		100.00	0.000	16.920
L6 42.75-8.00	24.97	1	19	117.766	A	0.000	117.766	117.766	100.00	0.000	0.000
				6	B	0.000	117.766		100.00	0.000	0.000
					C	0.000	117.766		100.00	0.000	18.966
L7 8.00-6.50	7.25	1	18	5.486	A	0.000	5.486	5.486	100.00	0.000	0.000
					B	0.000	5.486		100.00	0.000	0.000
					C	0.000	5.486		100.00	0.000	0.819
L8 6.50-0.00	3.24	1	18	24.141	A	0.000	24.141	24.141	100.00	0.000	0.000
					B	0.000	24.141		100.00	0.000	0.000
					C	0.000	24.141		100.00	0.000	3.548

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K _z	q _z psf	t _z in	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 147.00-105.00	125.27	1.464	5	0.8802	95.658	A	0.000	95.658	95.658	100.00	0.000	0.000
						B	0.000	95.658		100.00	0.000	0.000
						C	0.000	95.658		100.00	0.000	11.221
L2 105.00-88.00	96.36	1.358	5	0.8529	45.116	A	0.000	45.116	45.116	100.00	0.000	0.000
						B	0.000	45.116		100.00	0.000	0.000
						C	0.000	45.116		100.00	0.000	7.549
L3 88.00-84.50	86.24	1.316	5	0.8416	9.775	A	0.000	9.775	9.775	100.00	0.000	0.000
						B	0.000	9.775		100.00	0.000	0.000
						C	0.000	9.775		100.00	0.000	3.296
L4 84.50-73.75	79.08	1.284	5	0.8329	31.092	A	0.000	31.092	31.092	100.00	0.000	0.000
						B	0.000	31.092		100.00	0.000	0.000
						C	0.000	31.092		100.00	0.000	10.056
L5 73.75-42.75	58.15	1.176	4	0.8028	96.921	A	0.000	96.921	96.921	100.00	0.000	0.000
						B	0.000	96.921		100.00	0.000	0.000
						C	0.000	96.921		100.00	0.000	28.999
L6 42.75-8.00	24.97	1	4	0.7500	122.415	A	0.000	122.415	122.415	100.00	0.000	0.000
						B	0.000	122.415		100.00	0.000	0.000
						C	0.000	122.415		100.00	0.000	31.759
L7 8.00-6.50	7.25	1	4	0.7500	5.673	A	0.000	5.673	5.673	100.00	0.000	0.000
						B	0.000	5.673		100.00	0.000	0.000
						C	0.000	5.673		100.00	0.000	1.314
L8 6.50-0.00	3.24	1	4	0.7500	24.953	A	0.000	24.953	24.953	100.00	0.000	0.000
						B	0.000	24.953		100.00	0.000	0.000
						C	0.000	24.953		100.00	0.000	5.696

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	Kz	qz psf	A _G ft ²	F a c e	A _F ft ²	A _R ft ²	A _{leg} ft ²	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
L1 147.00-105.00	125.27	1.464	9	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000
					B	0.000	89.497	89.497	100.00	0.000	0.000
					C	0.000	89.497	89.497	100.00	0.000	5.940
L2 105.00-88.00	96.36	1.358	9	42.623	A	0.000	42.623	42.623	100.00	0.000	0.000
					B	0.000	42.623	42.623	100.00	0.000	0.000
					C	0.000	42.623	42.623	100.00	0.000	4.062
L3 88.00-84.50	86.24	1.316	8	9.284	A	0.000	9.284	9.284	100.00	0.000	0.000
					B	0.000	9.284	9.284	100.00	0.000	0.000
					C	0.000	9.284	9.284	100.00	0.000	1.910
L4 84.50-73.75	79.08	1.284	8	29.599	A	0.000	29.599	29.599	100.00	0.000	0.000
					B	0.000	29.599	29.599	100.00	0.000	0.000
					C	0.000	29.599	29.599	100.00	0.000	5.867
L5 73.75-42.75	58.15	1.176	7	92.618	A	0.000	92.618	92.618	100.00	0.000	0.000
					B	0.000	92.618	92.618	100.00	0.000	0.000
					C	0.000	92.618	92.618	100.00	0.000	16.920
L6 42.75-8.00	24.97	1	6	117.766	A	0.000	117.766	117.766	100.00	0.000	0.000
					B	0.000	117.766	117.766	100.00	0.000	0.000
					C	0.000	117.766	117.766	100.00	0.000	18.966
L7 8.00-6.50	7.25	1	6	5.486	A	0.000	5.486	5.486	100.00	0.000	0.000
					B	0.000	5.486	5.486	100.00	0.000	0.000
					C	0.000	5.486	5.486	100.00	0.000	0.819
L8 6.50-0.00	3.24	1	6	24.141	A	0.000	24.141	24.141	100.00	0.000	0.000
					B	0.000	24.141	24.141	100.00	0.000	0.000
					C	0.000	24.141	24.141	100.00	0.000	3.548

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 90 deg - No Ice
4	Dead+Wind 180 deg - No Ice
5	Dead+Ice+Temp
6	Dead+Wind 0 deg+Ice+Temp
7	Dead+Wind 90 deg+Ice+Temp
8	Dead+Wind 180 deg+Ice+Temp
9	Dead+Wind 0 deg - Service
10	Dead+Wind 90 deg - Service
11	Dead+Wind 180 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	147 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-17.27	-0.47	0.43
			Max. Mx	3	-8.69	-349.07	1.39
			Max. My	2	-8.69	-1.40	349.40
			Max. Vy	3	16.52	-349.07	1.39
			Max. Vx	2	-16.57	-1.40	349.40
			Max. Torque	3			1.61
L2	105 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-27.06	0.24	0.26
			Max. Mx	3	-14.44	-808.57	4.86
			Max. My	2	-14.44	-4.70	810.05
			Max. Vy	3	23.42	-808.57	4.86
			Max. Vx	2	-23.47	-4.70	810.05
			Max. Torque	3			1.74
L3	88 - 84.5	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L4	84.5 - 73.75	Pole	Max. Compression	5	-27.95	0.34	0.21
			Max. Mx	3	-15.19	-891.10	5.43
			Max. My	2	-15.19	-5.26	892.74
			Max. Vy	3	23.76	-891.10	5.43
			Max. Vx	2	-23.81	-5.26	892.74
			Max. Torque	3			1.72
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-29.77	0.52	0.11
			Max. Mx	3	-16.69	-1047.92	6.49
			Max. My	2	-16.69	-6.29	1049.89
L5	73.75 - 42.75	Pole	Max. Vy	3	24.62	-1047.92	6.49
			Max. Vx	2	-24.66	-6.29	1049.89
			Max. Torque	3			1.71
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-39.33	1.40	-0.40
			Max. Mx	3	-24.92	-1841.10	11.48
			Max. My	2	-24.92	-11.19	1844.56
			Max. Vy	3	27.30	-1841.10	11.48
			Max. Vx	2	-27.35	-11.19	1844.56
			Max. Torque	3			1.69
L6	42.75 - 8	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-53.68	2.64	-1.12
			Max. Mx	3	-37.75	-2975.40	17.79
			Max. My	4	-37.75	18.43	-2980.81
			Max. Vy	3	30.03	-2975.40	17.79
			Max. Vx	2	-30.07	-17.38	2980.79
			Max. Torque	3			1.60
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-54.23	2.69	-1.15
			Max. Mx	3	-38.25	-3020.46	18.03
L7	8 - 6.5	Pole	Max. My	4	-38.25	18.69	-3025.96
			Max. Vy	3	30.12	-3020.46	18.03
			Max. Vx	2	-30.16	-17.61	3025.92
			Max. Torque	3			1.51
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-56.61	2.90	-1.27
			Max. Mx	3	-40.42	-3217.34	19.04
			Max. My	4	-40.42	19.78	-3223.19
			Max. Vy	3	30.51	-3217.34	19.04
			Max. Vx	2	-30.56	-18.60	3223.11
L8	6.5 - 0	Pole	Max. Torque	3			1.51
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	5	-56.61	2.90	-1.27
			Max. Mx	3	-40.42	-3217.34	19.04
			Max. My	4	-40.42	19.78	-3223.19
			Max. Vy	3	30.51	-3217.34	19.04
Max. Vx	2	-30.56	-18.60	3223.11			
Max. Torque	3			1.51			

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	5	56.61	0.00	-0.00
	Max. H _x	4	40.43	0.16	-30.54
	Max. H _z	2	40.43	-0.16	30.54
	Max. M _x	2	3223.11	-0.16	30.54
	Max. M _z	3	3217.34	-30.50	0.16
	Max. Torsion	3	1.49	-30.50	0.16
	Min. Vert	4	40.43	0.16	-30.54
	Min. H _x	3	40.43	-30.50	0.16
	Min. H _z	4	40.43	0.16	-30.54
	Min. M _x	4	-3223.19	0.16	-30.54
	Min. M _z	4	-19.78	0.16	-30.54
	Min. Torsion	2	-0.61	-0.16	30.54

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	40.43	-0.00	0.00	0.14	0.57	0.00
Dead+Wind 0 deg - No Ice	40.43	0.16	-30.54	-3223.11	-18.60	0.61
Dead+Wind 90 deg - No Ice	40.43	30.50	-0.16	-19.04	-3217.34	-1.49
Dead+Wind 180 deg - No Ice	40.43	-0.16	30.54	3223.19	19.78	-0.62
Dead+Ice+Temp	56.61	-0.00	0.00	1.27	2.90	0.00
Dead+Wind 0 deg+Ice+Temp	56.61	0.03	-7.36	-803.71	-0.51	0.09
Dead+Wind 90 deg+Ice+Temp	56.61	7.35	-0.03	-2.25	-800.43	-0.30
Dead+Wind 180 deg+Ice+Temp	56.61	-0.03	7.36	806.34	6.62	-0.09
Dead+Wind 0 deg - Service	40.43	0.06	-10.57	-1116.63	-6.06	0.22
Dead+Wind 90 deg - Service	40.43	10.55	-0.06	-6.51	-1114.33	-0.52
Dead+Wind 180 deg - Service	40.43	-0.06	10.57	1116.90	7.23	-0.22

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-40.43	0.00	0.00	40.43	0.00	0.000%
2	0.16	-40.43	-30.54	-0.16	40.43	30.54	0.002%
3	30.50	-40.43	-0.16	-30.50	40.43	0.16	0.002%
4	-0.16	-40.43	30.54	0.16	40.43	-30.54	0.006%
5	0.00	-56.61	0.00	0.00	56.61	-0.00	0.000%
6	0.03	-56.61	-7.36	-0.03	56.61	7.36	0.000%
7	7.35	-56.61	-0.03	-7.35	56.61	0.03	0.000%
8	-0.03	-56.61	7.36	0.03	56.61	-7.36	0.000%
9	0.06	-40.43	-10.57	-0.06	40.43	10.57	0.002%
10	10.55	-40.43	-0.06	-10.55	40.43	0.06	0.002%
11	-0.06	-40.43	10.57	0.06	40.43	-10.57	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00002470	0.00008668
3	Yes	15	0.00002471	0.00012892
4	Yes	14	0.00006020	0.00008876
5	Yes	6	0.00000001	0.00000001
6	Yes	16	0.00000001	0.00007408
7	Yes	16	0.00000001	0.00007388
8	Yes	16	0.00000001	0.00007417
9	Yes	14	0.00000001	0.00004382
10	Yes	14	0.00000001	0.00005417
11	Yes	14	0.00000001	0.00004030

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	35.173	9	1.9882	0.0023
L2	108.75 - 88	19.930	9	1.7202	0.0017

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	88 - 84.5	13.082	9	1.3836	0.0009
L4	84.5 - 73.75	12.086	11	1.3341	0.0008
L5	78 - 42.75	10.341	11	1.2291	0.0007
L6	47.5 - 8	3.888	11	0.7562	0.0003
L7	8 - 6.5	0.107	11	0.1276	0.0000
L8	6.5 - 0	0.071	11	0.1038	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	(3) FV65-14-00NA2 w/Mount Pipe	9	35.173	1.9882	0.0037	33526
135.00	Pipe Mount [PM 601-3]	9	30.202	1.9432	0.0037	13969
126.00	(4) 844G90VTA-SX w/ Mount Pipe	9	26.548	1.8940	0.0036	7981
116.00	(2) LPA-80063/6CF w/ Mount Pipe	9	22.633	1.8094	0.0033	5406
105.00	AM-X-CD-14-65-00T-RET w/ Mount Pipe	9	18.586	1.6634	0.0028	3993
80.00	Pipe Mount [PM 501-3]	11	10.864	1.2625	0.0014	3967

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	101.316	2	5.7294	0.0068
L2	108.75 - 88	57.446	2	4.9583	0.0049
L3	88 - 84.5	37.724	2	3.9897	0.0025
L4	84.5 - 73.75	34.854	2	3.8472	0.0023
L5	78 - 42.75	29.823	2	3.5448	0.0019
L6	47.5 - 8	11.216	4	2.1815	0.0008
L7	8 - 6.5	0.309	4	0.3683	0.0001
L8	6.5 - 0	0.204	4	0.2997	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	(3) FV65-14-00NA2 w/Mount Pipe	2	101.316	5.7294	0.0109	11853
135.00	Pipe Mount [PM 601-3]	2	87.011	5.5998	0.0108	4937
126.00	(4) 844G90VTA-SX w/ Mount Pipe	2	76.495	5.4584	0.0104	2819
116.00	(2) LPA-80063/6CF w/ Mount Pipe	2	65.228	5.2149	0.0096	1907
105.00	AM-X-CD-14-65-00T-RET w/ Mount Pipe	2	53.578	4.7948	0.0079	1406
80.00	Pipe Mount [PM 501-3]	2	31.332	3.6411	0.0040	1387

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	147 - 105 (1)	TP29.141x22x0.25	42.00	0.00	0.0	36.000	22.4191	-8.69	807.09	0.011
L2	105 - 88 (2)	TP31.5319x28.0034x0.312 5	20.75	0.00	0.0	36.000	30.9657	-14.44	1114.77	0.013
L3	88 - 84.5 (3)	TP32.127x31.5319x0.4815	3.50	0.00	0.0	36.000	48.3632	-15.19	1741.08	0.009
L4	84.5 - 73.75 (4)	TP33.955x32.127x0.4415	10.75	0.00	0.0	36.000	45.9504	-16.69	1654.22	0.010
L5	73.75 - 42.75 (5)	TP38.601x32.3493x0.5144	35.25	0.00	0.0	36.000	60.8088	-24.92	2189.12	0.011
L6	42.75 - 8 (6)	TP43.7597x36.7298x0.554 7	39.50	0.00	0.0	36.000	76.0675	-37.75	2738.43	0.014
L7	8 - 6.5 (7)	TP44.0148x43.7597x0.568	1.50	0.00	0.0	36.000	78.3273	-38.24	2819.78	0.014
L8	6.5 - 0 (8)	TP45.12x44.0148x0.5643	6.50	0.00	0.0	36.000	79.8032	-40.42	2872.91	0.014

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	147 - 105 (1)	TP29.141x22x0.25	349.41	26.852	36.000	0.746	0.00	0.000	36.000	0.000
L2	105 - 88 (2)	TP31.5319x28.0034x0.31 25	810.06	40.836	36.000	1.134	0.00	0.000	36.000	0.000
L3	88 - 84.5 (3)	TP32.127x31.5319x0.481 5	892.76	28.574	36.000	0.794	0.00	0.000	36.000	0.000
L4	84.5 - 73.75 (4)	TP33.955x32.127x0.4415	1049.9	34.074	36.000	0.947	0.00	0.000	36.000	0.000
L5	73.75 - 42.75 (5)	TP38.601x32.3493x0.514	1844.5	39.842	36.000	1.107	0.00	0.000	36.000	0.000
L6	42.75 - 8 (6)	TP43.7597x36.7298x0.55 47	2980.8	44.326	36.000	1.231	0.00	0.000	36.000	0.000
L7	8 - 6.5 (7)	TP44.0148x43.7597x0.56 8	3026.0	43.466	36.000	1.207	0.00	0.000	36.000	0.000
L8	6.5 - 0 (8)	TP45.12x44.0148x0.5643 6	3223.2	44.294	36.000	1.230	0.00	0.000	36.000	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	147 - 105 (1)	TP29.141x22x0.25	16.57	0.739	24.000	0.062	1.31	0.049	24.000	0.002
L2	105 - 88 (2)	TP31.5319x28.0034x0.31 25	23.47	0.758	24.000	0.063	1.01	0.025	24.000	0.001
L3	88 - 84.5 (3)	TP32.127x31.5319x0.481 5	23.81	0.492	24.000	0.041	0.99	0.015	24.000	0.001
L4	84.5 - 73.75 (4)	TP33.955x32.127x0.4415	24.66	0.537	24.000	0.045	0.97	0.015	24.000	0.001
L5	73.75 - 42.75 (5)	TP38.601x32.3493x0.514 4	27.35	0.450	24.000	0.037	0.83	0.009	24.000	0.000
L6	42.75 - 8 (6)	TP43.7597x36.7298x0.55 47	30.07	0.395	24.000	0.033	0.66	0.005	24.000	0.000
L7	8 - 6.5 (7)	TP44.0148x43.7597x0.56 8	30.16	0.385	24.000	0.032	0.65	0.005	24.000	0.000
L8	6.5 - 0 (8)	TP45.12x44.0148x0.5643	30.56	0.383	24.000	0.032	0.62	0.004	24.000	0.000

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}
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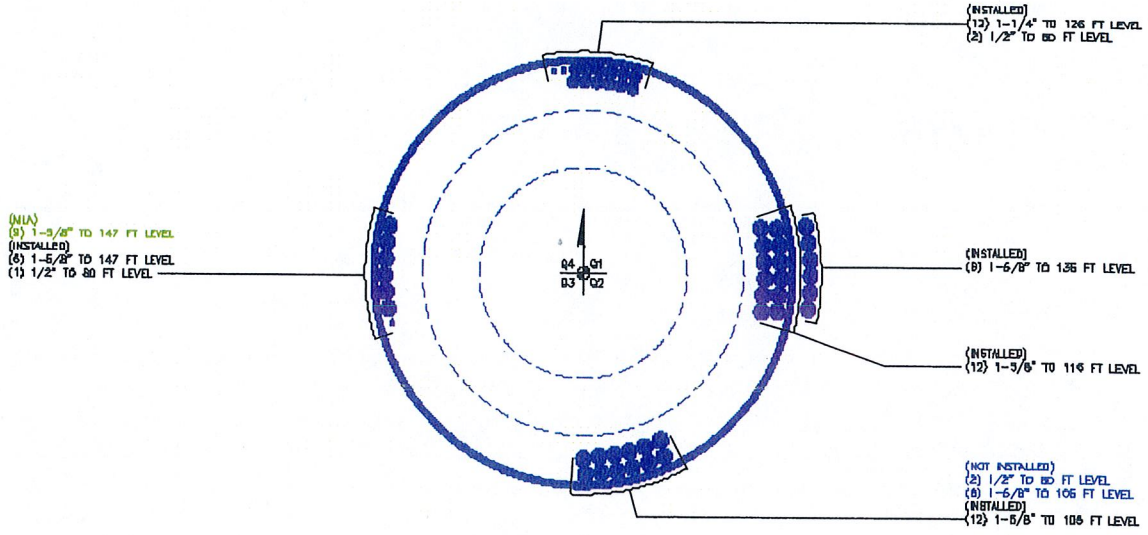
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147 - 105 (1)	0.011	0.746	0.000	0.062	0.002	0.758	1.333	H1-3+VT ✓
L2	105 - 88 (2)	0.013	1.134	0.000	0.063	0.001	1.148	1.333	H1-3+VT ✓
L3	88 - 84.5 (3)	0.009	0.794	0.000	0.041	0.001	0.803	1.333	H1-3+VT ✓
L4	84.5 - 73.75 (4)	0.010	0.947	0.000	0.045	0.001	0.957	1.333	H1-3+VT ✓
L5	73.75 - 42.75 (5)	0.011	1.107	0.000	0.037	0.000	1.118	1.333	H1-3+VT ✓
L6	42.75 - 8 (6)	0.014	1.231	0.000	0.033	0.000	1.245	1.333	H1-3+VT ✓
L7	8 - 6.5 (7)	0.014	1.207	0.000	0.032	0.000	1.221	1.333	H1-3+VT ✓
L8	6.5 - 0 (8)	0.014	1.230	0.000	0.032	0.000	1.245	1.333	H1-3+VT ✓

Section Capacity Table

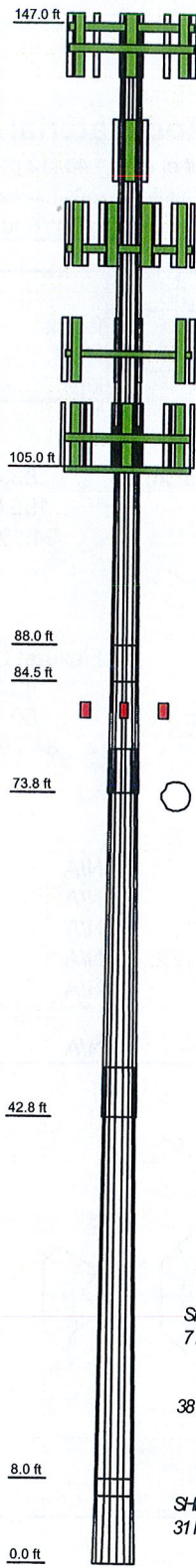
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF* P_{allow} K	% Capacity	Pass Fail
L1	147 - 105	Pole	TP29.141x22x0.25	1	-8.69	1075.85	56.8	Pass
L2	105 - 88	Pole	TP31.5319x28.0034x0.3125	2	-14.44	1485.99	86.1	Pass
L3	88 - 84.5	Pole	TP32.127x31.5319x0.4815	3	-15.19	2320.86	60.2	Pass
L4	84.5 - 73.75	Pole	TP33.955x32.127x0.4415	4	-16.69	2205.08	71.8	Pass
L5	73.75 - 42.75	Pole	TP38.601x32.3493x0.5144	5	-24.92	2918.10	83.9	Pass
L6	42.75 - 8	Pole	TP43.7597x36.7298x0.5547	6	-37.75	3650.33	93.4	Pass
L7	8 - 6.5	Pole	TP44.0148x43.7597x0.568	7	-38.24	3758.77	91.6	Pass
L8	6.5 - 0	Pole	TP45.12x44.0148x0.5643	8	-40.42	3829.59	93.4	Pass
Summary								
Pole (L6)							93.4	Pass
RATING =							93.4	Pass

APPENDIX B BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8
Length (ft)	42.00	20.75	3.50	10.75	35.25	39.50	6.50	6.50
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.4815	0.4415	0.5144	0.5547	0.56430	0.5690
Socket Length (ft)	3.75			4.25	4.75			
Top Dia (in)	22.0000	28.0034	31.5319	32.1270	32.3493	36.7298	44.01483	47.497
Bot Dia (in)	29.1410	31.5319	32.1270	33.9650	38.8010	43.7597	45.12094	47.448
Grade					A607-60			
Weight (K)	2.9	2.1	0.6	1.7	6.8	9.4	1.7	0.4



DESIGNED APPURTENANCE LOADING

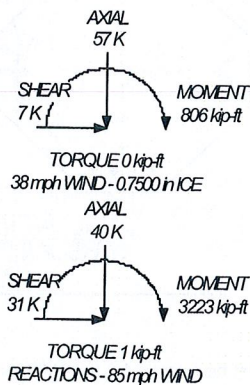
TYPE	ELEVATION	TYPE	ELEVATION
(3) FV65-14-00NA2 w/Mount Pipe	147	(2) ADC DUAL BAND 800/1900 FULL BAND	116
(3) FV65-14-00NA2 w/Mount Pipe	147		
(3) FV65-14-00NA2 w/Mount Pipe	147	Platform Mount [LP 401-1]	116
Platform Mount [LP 401-1]	147	AM-X-CD-14-65-00T-RET w/ Mount Pipe	105
6x2" Pipe Mount	147		
6x2" Pipe Mount	147	AM-X-CD-14-65-00T-RET w/ Mount Pipe	105
6x2" Pipe Mount	147		
Pipe Mount [PM 601-3]	135	AM-X-CD-14-65-00T-RET w/ Mount Pipe	105
Celwave APXV18-206515L-03 w/Mount Pipe	135	(2) RRUS-11	105
Celwave APXV18-206515L-03 w/Mount Pipe	135	(2) RRUS-11	105
Celwave APXV18-206515L-03 w/Mount Pipe	135	(2) RRUS-11	105
Celwave APXV18-206515L-03 w/Mount Pipe	135	DC6-48-60-18-8F	105
(4) 844G90VTA-SX w/ Mount Pipe	126	(2) Powerwave Technologies 7770 w/ Mount Pipe	105
(4) 844G90VTA-SX w/ Mount Pipe	126	(2) Powerwave Technologies 7770 w/ Mount Pipe	105
(4) 844G90VTA-SX w/ Mount Pipe	126	(2) Powerwave Technologies 7770 w/ Mount Pipe	105
Platform Mount [LP 401-1]	126	(2) Powerwave Technologies 7770 w/ Mount Pipe	105
(2) LPA-80063/6CF w/ Mount Pipe	116	(4) Powerwave Technologies LGP2140X	105
BXA-70063-6CF-2 w/ Mount Pipe	116	(4) Powerwave Technologies LGP2140X	105
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	116	(4) Powerwave Technologies LGP2140X	105
(2) APL868013 w/ Mount Pipe	116	(4) Powerwave Technologies LGP2140X	105
BXA-70063-6CF-2 w/ Mount Pipe	116	Platform Mount (LP 101-1)	105
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	116	6x2" Pipe Mount	105
(2) FD9R6004/2C-3L	116	6x2" Pipe Mount	105
(2) FD9R6004/2C-3L	116	6x2" Pipe Mount	105
(2) FD9R6004/2C-3L	116	Pipe Mount [PM 501-3]	80
(2) LPA-80080/4CF w/ Mount Pipe	116	KS24019-L112A	80
BXA-70063-6CF-2 w/ Mount Pipe	116	Kathrein OG-860/1920/GPS-A	80
BXA-171085-8BF-EDIN-2 w/ Mount Pipe	116	KS24019-L112A	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 93.4%



<p>Paul J Ford and Company 250 E. Broad Street Suite 1500 Columbus, OH 43215 Phone: 614.221.6679 FAX: 614.448.4105</p>	Job: Ex. 147 ft Monopole, Secondino, Property Branford, CT
	Project: PJF #37511-0162/ BU #876316
	Client: Crown Castle International Drawn by: Udaykiran Yerra App'd:
	Code: TIA/EIA-222-F Date: 08/23/11 Scale: NTS
Path:	Dwg No: E-1

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

- Assumptions:** 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
 2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
 3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#:
 Site Name:
 App #:

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	5	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:	Both	**
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.3125	in
Width:	6	in
Height:	42	in
Thick:	1.25	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	45.12	in
Thick:	0.4375	in
Grade:	60	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor	
ASD ASIF:	1.333

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

Base Reactions

TIA Revision:	F	
Unfactored Moment, M:	3223	ft-kips
Unfactored Axial, P:	40	kips
Unfactored Shear, V:	31	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension: 183.4 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 94.1% **Pass**

Base Plate Results

Base Plate Stress: 42.3 ksi
 Allowable PL Bending Stress: 50.0 ksi
 Base Plate Stress Ratio: 84.7% **Pass**

Flexural Check

PL Ref. Data	
Yield Line (in):	29.83
Max PL Length:	29.83

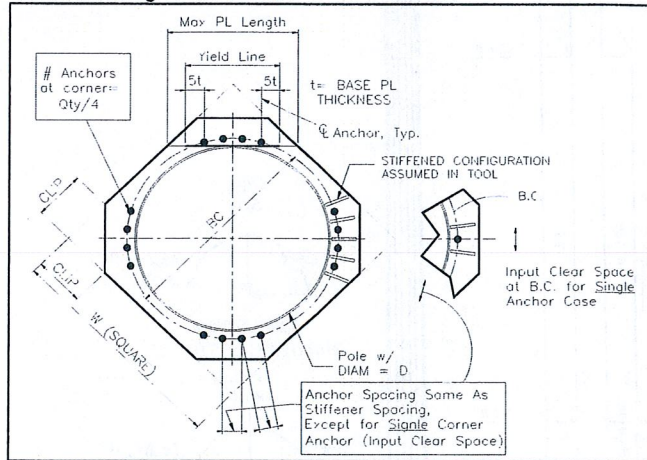
N/A - Unstiffened

Stiffener Results

Horizontal Weld: N/A
 Vertical Weld: N/A
 Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$: N/A
 Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$: N/A
 Plate Comp. (AISC Bracket): N/A

Pole Results

Pole Punching Shear Check: N/A



DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISAs

	Comp. (+)	Tension (-)	
Moment, M =	3223.0		k-ft
Shear, V =	31.0		kips
Axial Load, P =	40.0		kips
OTM =	3238.5	0.0	k-ft @ Ground

Safety Factors / Load Factors / F Factors

Tower Type =	Monopole
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	22.5	ft
fc' =	3	ksi
ec =	0.003	in/in
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	F Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Steel Parameters

Number of Bars =	32	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Load Combinations Checked per TIA/EIA-222-F

- Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. = Compression
- Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 = Uplift
- Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 = Uplift

Soil Parameters

Water Table Depth =	5.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?	Ground	
Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)		
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)		

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	5	100		36	Sand				5
2	2.5	135		36	Sand				7.5
3	18.5	135		40	Sand	16000			26
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	16.19	ft, from Grade
Bending Moment, M =	3740.30	k-ft, from COR
Resisting Moment, Ma =	4077.75	k-ft, from COR

Shear, V =	31.00	kips
Resisting Shear, Va =	33.80	kips

MOMENT RATIO = 91.7% OK

SHEAR RATIO = 91.7% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	72.60	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	40.00	kips
Allowable Comp. Cap., Ca =	285.27	kips

COMPRESSION RATIO = 14.0% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	27.71	sq in
Actual Steel Area =	49.92	sq in

Allowable Min Axial, Pa =	-2073.60	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	6799.77	kips, Where Ma = 0 k-ft
Axial Load, P =	72.59	kips @ 5.25 ft Below Grade
Moment, M =	3378.06	k-ft @ 5.25 ft Below Grade
Allowable Moment, Ma =	5825.90	k-ft

MOMENT RATIO = 58.0% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: 876316
 Site Name: *Site Name*
 App #:

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	3378.06	ft-kips (* Note)
Max. Service Shaft P:	72.59	kips
Max Axial Force Type:	Comp.	

(* Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Load Factor	Shaft Factored Loads	
1.30	Mu:	4391.478 ft-kips
1.30	Pu:	94.367 kips

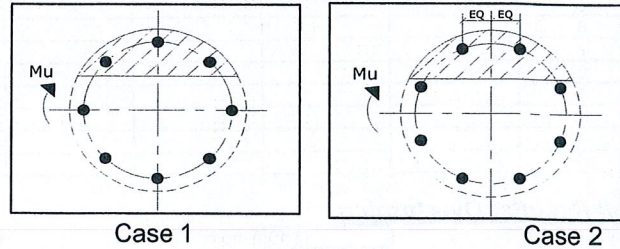
Pier Properties	
Concrete:	
Pier Diameter =	7.0 ft
Concrete Area =	5541.8 in ²
Reinforcement:	
Clear Cover to Tie =	4.00 in
Horiz. Tie Bar Size =	5
Vert. Cage Diameter =	6.11 ft
Vert. Cage Diameter =	73.34 in
Vertical Bar Size =	11
Bar Diameter =	1.41 in
Bar Area =	1.56 in ²
Number of Bars =	32
As Total =	49.92 in ²
A s/ Aconc, Rho:	0.0090 0.90%

Material Properties	
Concrete Comp. strength, f _c =	3000 psi
Reinforcement yield strength, F _y =	60 ksi
Reinforcing Modulus of Elasticity, E =	29000 ksi
Reinforcement yield strain =	0.00207
Limiting compressive strain =	0.003
ACI 318 Code	
Select Analysis ACI Code =	2002
Seismic Properties	
Seismic Design Category =	D
Seismic Risk =	High

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: 2



Case 1

Case 2

ACI 10.5, ACI 21.10.4, and IBC 1810.

Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f_c)/F_y): 0.0027
 200 / F_y: 0.0033
 IBC 1810.1.2: 0.0050 SDC D, E, or F
 Governing: 0.0050 0.50%

ACI 10.8 and 10.9

Min As for Columns, Comp. Controlled, Shafts:

Min As: 0.0100 1.00%

Minimum Rho Check:

Actual Req'd Min. Rho: 0.50% Flexural Member
 Provided Rho: 0.90% **OK**

Ref. Shaft Max Axial Capacities, f Max(P _n or T _n):	
Max Pu = (f = 0.65) P _n	
Pn per ACI 318 (10-2)	8839.70 kips
at Mu=(f = 0.65)M _n =	5309.39 ft-kips
Max Tu, (f = 0.9) T _n =	2695.68 kips
at Mu=f =(0.90)M _n =	0.00 ft-kips

Extreme Steel Strain, ?_t: 0.0108
 ?_t > 0.0050, Tension Controlled
 Reduction Factor, f : 0.900

Dist. From Edge to Neutral Axis: 17.11 in

Output Note: Negative Pu=Tension
 For Axial Compression, f P_n = Pu = 94.37 kips
 Drilled Shaft Moment Capacity, f M_n: 7573.66 ft-kips
 Drilled Shaft Superimposed Mu: 4391.48 ft-kips

(Mu/f M_n, Drilled Shaft Flexure CSR): 57.98%