ROBINSON & COLE LLP

KENNETH C. BALDWIN

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 3, 2013

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

Re: **EM-VER-029-120106- 161 Pinney Street, Colebrook, Connecticut**
EM-VER-125-120423- 7 Surdan Mountain, Sharon, Connecticut
EM-VER-040-120420- 116 Newgate Road, East Granby, Connecticut
EM-VER-065-120319B- 22 Welsh Road, Hartland, Connecticut
EM-VER-039-120514- 35 Old Route 44, Eastford, Connecticut
EM-VER-065-120319A- 350 Hartland Road, Hartland, Connecticut
EM-VER-066-120117- 64 Hungerford Lane, Harwinton, 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 this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

12321674-v1

ROBINSON & COLE LLP

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Also admitted in Massachusetts

May 3, 2013

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

Re: **EM-VER-011-130125 – 811 Blue Hills Avenue, Bloomfield, Connecticut**
EM-VER-029-120106 – 161 Pinney Street, Colebrook, Connecticut
EM-VER-066-120117 – 64 Hungerford Lane, Harwinton, Connecticut
EM-VER-065-120319 – 22 Welsh Road, Hartland, Connecticut
EM-VER-084-120924 – 1052 Boston Post Road, Milford, Connecticut
EM-VER-065-120319A – 350 Hartland Boulevard, Hartland, 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 this facility please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

12218582-v1

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

January 24, 2012

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

RE: **EM-VER-029-120106**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 161 Pinney Street, Colebrook, 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 January 4, 2012. 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 Thomas D. McKeon, First Selectman, Town of Colebrook
Karen Griswold Nelson, Zoning Enforcement Officer, Town of Colebrook
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

January 9, 2012

The Honorable Thomas D. McKeon
First Selectman
Town of Colebrook
Town Hall
558 Colebrook Road
P. O. Box 5
Colebrook, CT 06021

RE: **EM-VER-029-120106**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 161 Pinney Street, Colebrook, Connecticut.

Dear First Selectman McKeon:

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 January 24, 2012.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Karen Griswold Nelson, Zoning Enforcement Officer, Town of Colebrook

CONNECTICUT SITING COUNCIL

ROBINSON & COLE LLP

EM-VER-029-120106

KENNETH C. BALDWIN

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kbaldwin@rc.com
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January 4, 2012

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

Re: **Notice of Exempt Modification – Antenna Swap**
161 Pinney Street, Colebrook, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 130-foot level on the existing 150-foot tower at the above-referenced address. The tower and underlying property are owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2006. Cellco now intends to modify its installation by replacing eight (8) of its existing antennas with two (2) model LPA-80080/6CF_6 cellular antennas; three (3) model BXA-171085-12BF PCS antennas; two (2) model BXA-70080/6CF LTE antennas; and one (1) model BXA-70080/6CF_6 LTE antenna, all at the same 130-foot level on the tower. Cellco also intends to install six 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 Thomas D. McKeon, First Selectman of the Town of Colebrook.

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 overall height of the existing tower. Cellco's replacement antennas and diplexers will be located at the 130-foot level on the existing 150-foot tower.

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

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

4. The operation of the 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 confirming that the tower and foundation can support Cellco's proposed modifications. (See Tab 3).

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Thomas D. McKeon, Colebrook First Selectman
Sandy M. Carter

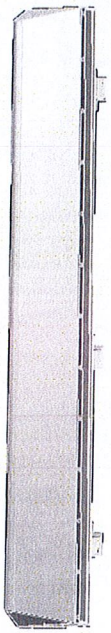
Amphenol ANTENNA SOLUTIONS

LPA-80080-6CF-EDIN-X

V-Pol | Log Periodic | 80° | 14.0 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.

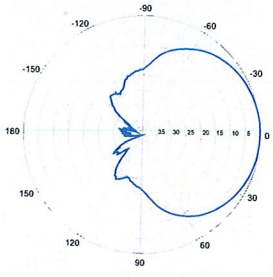


Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	80°
Vertical beamwidth	10°
Gain	14.0 dBd (16.1 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10
Impedance	50Ω
VSWR	≤1.4:1
Upper sidelobe suppression (0°)	-22.6 dB
Null fill	10% (-20.0 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)

Mechanical Characteristics		
Dimensions Length x Width x Depth	1800 x 140 x 335 mm	70.9 x 5.5 x 13.2 in
Depth of antenna with z-bracket	375 mm	14.8 in
Weight without mounting brackets	9.5 kg	21.0 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.25 m² Side: 0.61 m²	Front: 2.7 ft² Side: 6.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 415 N Side: 878 N	Front: 93 lbf Side: 198 lbf

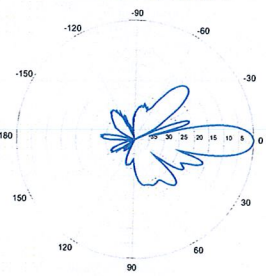
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit (0-20°)	21700000	50-102 mm 2.0-4.0 in	11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.		

LPA-80080-6CF-EDIN-X



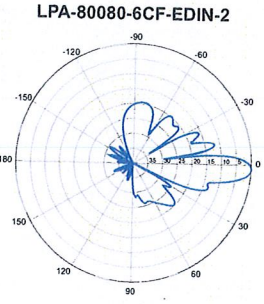
Horizontal | 750 MHz

LPA-80080-6CF-EDIN-0



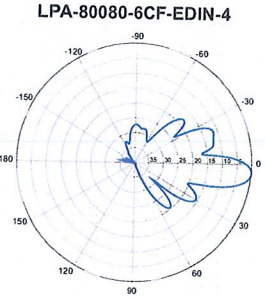
0° | Vertical

LPA-80080-6CF-EDIN-2



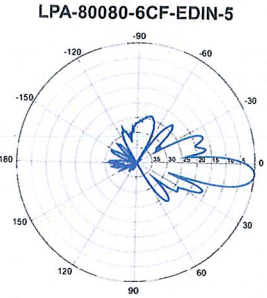
2° | Vertical

LPA-80080-6CF-EDIN-4



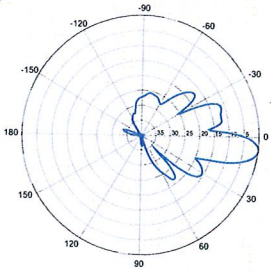
4° | Vertical

LPA-80080-6CF-EDIN-5



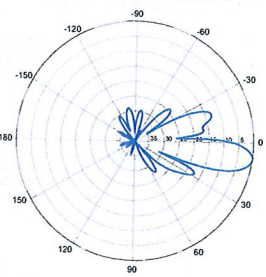
5° | Vertical

LPA-80080-6CF-EDIN-6



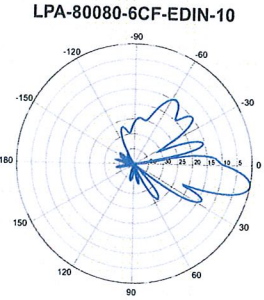
6° | Vertical

LPA-80080-6CF-EDIN-8



8° | Vertical

LPA-80080-6CF-EDIN-10



10° | Vertical

Amphenol ANTENNA SOLUTIONS

BXA-171085-12BF-EDIN-X

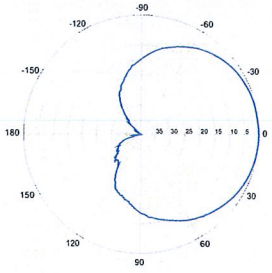
Replace "X" with desired electrical downtilt

X-Pol | FET Panel | 85° | 18.0 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	4.5°	4.5°	4.5°
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 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	1820 x 154 x 105 mm		71.7 x 6.1 x 4.1 in
Depth with z-brackets	133 mm		5.2 in
Weight without mounting brackets	6.8 kg		15 lbs
Survival wind speed	> 201 km/hr		> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

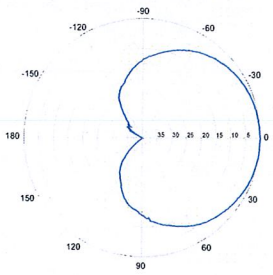
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-12BF-EDIN-X-FP		

BXA-171085-12BF-EDIN-X



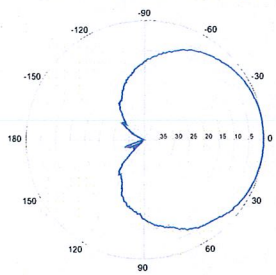
Horizontal | 1710-1880 MHz

BXA-171085-12BF-EDIN-X



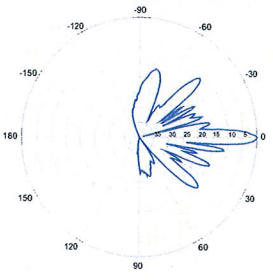
Horizontal | 1850-1990 MHz

BXA-171085-12BF-EDIN-X



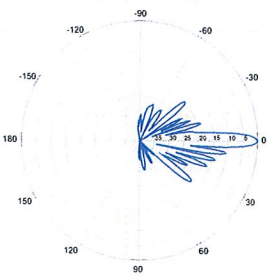
Horizontal | 1920-2170 MHz

BXA-171085-12BF-EDIN-0



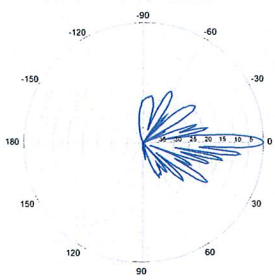
0° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-0

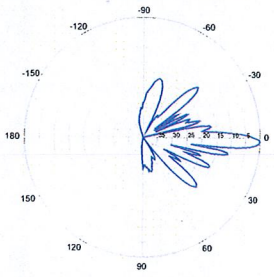


0° | Vertical | 1920-2170 MHz

BXA-171085-12BF-EDIN-X

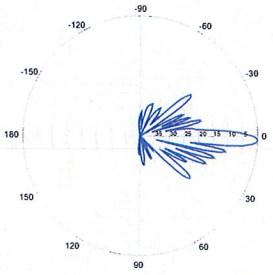
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12BF-EDIN-2



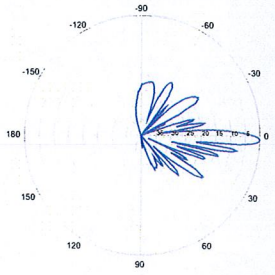
2° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-2



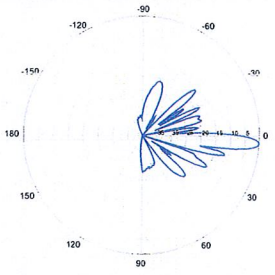
2° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-2



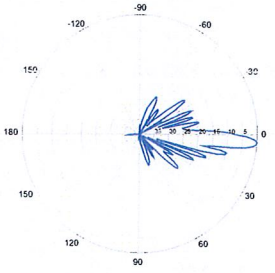
2° | Vertical | 1920-2170 MHz

BXA-171085-12BF-EDIN-4



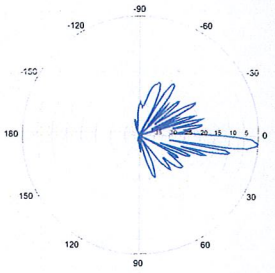
4° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-4



4° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-4



4° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70080-6CF-EDIN-X

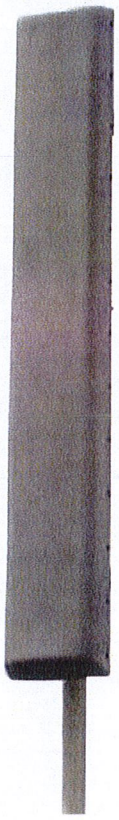
X-Pol | FET Panel | 80° | 13.5 dBd

Replace "X" with desired electrical downtilt.

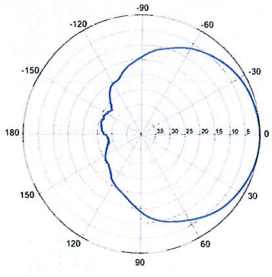
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	82°	80°
Vertical beamwidth	12°	10°
Gain	13.0 dBd (15.1 dBi)	13.5 dBd (15.6 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.6 dB
Front-to-back ratio (+/-30°)	-26.9 dB	-25.6 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 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 204 x 151 mm	71.0 x 8.0 x 5.9 in
Depth with z-brackets	191 mm	7.5 in
Weight without mounting brackets	8.2 kg	18 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.37 m² Side: 0.27 m²	Front: 3.9 ft² Side: 2.9 ft²
Wind load @ 161 km/hr (100 mph)	Front: 531 N Side: 475 N	Front: 119 lbf Side: 104 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-70080-6CF-EDIN-X-FP		

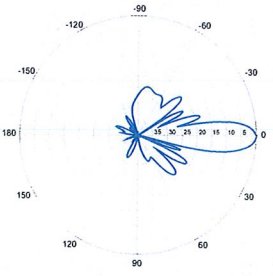


BXA-70080-6CF-EDIN-X



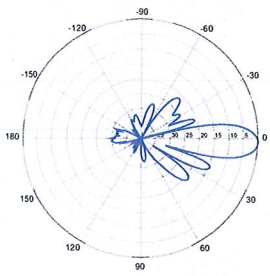
Horizontal | 750 MHz

BXA-70080-6CF-EDIN-0



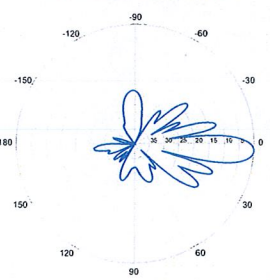
0° | Vertical | 750 MHz

BXA-70080-6CF-EDIN-2

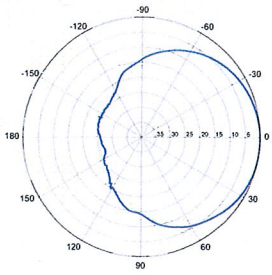


2° | Vertical | 750 MHz

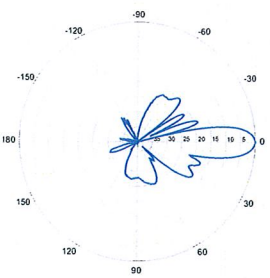
BXA-70080-6CF-EDIN-4



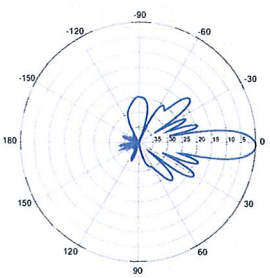
4° | Vertical | 750 MHz



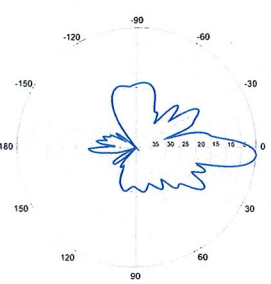
Horizontal | 850 MHz



0° | Vertical | 850 MHz



2° | Vertical | 850 MHz



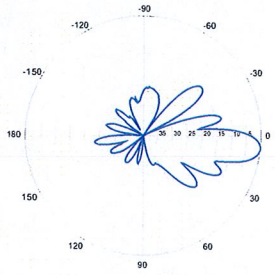
4° | Vertical | 850 MHz

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-70080-6CF-EDIN-X

X-Pol | FET Panel | 80° | 13.5 dBd

BXA-70080-6CF-EDIN-6



6° | Vertical | 750 MHz

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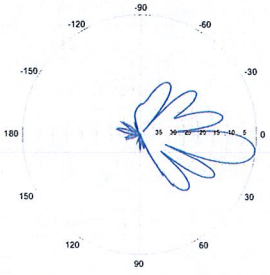
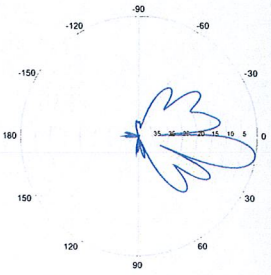
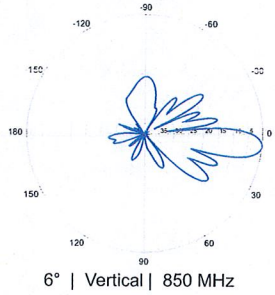


8° | Vertical | 750 MHz

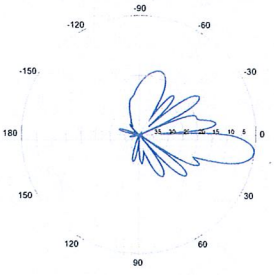
BXA-70080-6CF-EDIN-10



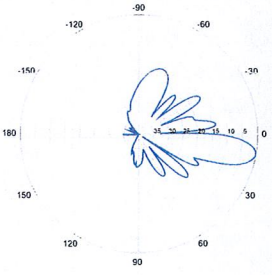
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



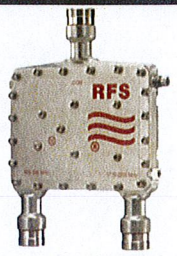
10° | Vertical | 850 MHz

Product Data Sheet **FD9R6004/2C-3L**

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

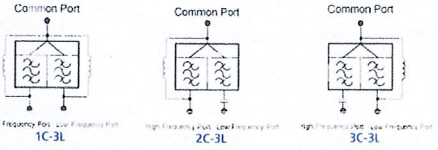
Notes

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

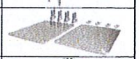
Other Documentation

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)	

	General	Power	Density					
Site Name: Colebrook SW								
Tower Height: Verizon @ 130 ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint	11	250	147	0.0458	1962.5	1.0000	4.58%	
*Cingular GSM	4	296	137	0.0227	880	0.5867	3.87%	
*Cingular GSM	2	427	137	0.0164	1900	1.0000	1.64%	
*Cingular UMTS	1	500	137	0.0096	880	0.5867	1.63%	
Verizon PCS	**7**	**281**	**130**	**0.0419**	**1970**	**1.0000**	**4.19%**	
Verizon Cellular	**9**	**305**	**130**	**0.0584**	**869**	**0.5793**	**10.08%**	
Verizon AWS	**1**	**702**	**130**	**0.0149**	**2145**	**1.0000**	**1.49%**	
Verizon 700	**2**	**636**	**130**	**0.0271**	**698**	**0.4653**	**5.82%**	
								33.29%
* Source: Siting Council								

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

Date: **November 30, 2011**

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518.433.6250

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

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Colebrook SW
Crown Castle Designation:	**Crown Castle BU Number:**	876377
	Crown Castle Site Name:	HORTON 2 / FREDSALL PROPERTY
	Crown Castle JDE Job Number:	172020
	Crown Castle Work Order Number:	453278
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37511-1853
Site Data:	**161 Pinney Street, COLEBROOK, Litchfield County, CT**	
	Latitude *41° 57' 58.57"*, Longitude *-73° 7' 19.65"*	
	148 Foot - Monopole Tower	

Dear Eva Morales,

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 440195, in accordance with application 134412, revision 1.

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

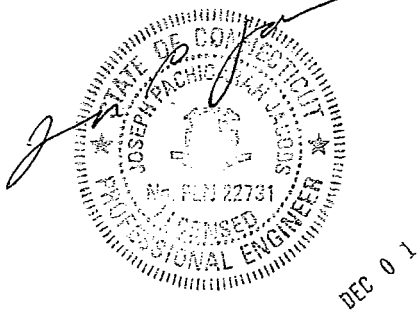
LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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, 28.1 mph with 1 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:

Kyle Thorpe, E.I.
Structural Engineer



DEC 0 1 2011

RISA Tower Report - version 5.4.2.0

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RISATower Output

6) APPENDIX B
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7) APPENDIX C
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1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by PJF in September of 2000 and manufactured by SUMMIT.. The tower was originally designed for a wind speed of 85 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 80 mph with no ice, 28.1 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
130	130	3	antel	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	-	-	-
		1		BXA-70080-6CF-EDIN-6 w/ Mount Pipe			
		2		BXA-70080/6CF w/ Mount Pipe			
		2		LPA-80080-6CF-EDIN-6 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

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
148	148	9	ems wireless	FV65-14-00NA2 w/ Mount Pipe	9 (I)	1-5/8	3
		6	decibel	DB980H90E-M w/ Mount Pipe	6 (I)	1-5/8	1
		1	tower mounts	Platform Mount [LP 401-1]			
140	140	6	powerwave technologies	7770.00 w/ Mount Pipe	12 (I)	1-5/8	1
		6		LGP 17201			
		6		LGP21901			
		1	tower mounts	T-Arm Mount [TA 602-3]			
130	130	6	antel	LPA-185080/12CFx2 w/ Mount Pipe	-	-	2
		2		LPA-80080/6CF w/ Mount Pipe			
		4		LPA-80080/6CF w/ Mount Pipe	12 (I)	1-5/8	1
		1	tower mounts	Platform Mount [LP 305-1]			
100	102	1	lucent	KS24019-L112A	1 (I)	1/2	1
	100	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed
3) MLA Equipment Controlling

(I) Coax to be mounted internally and shielded from the wind. See coax layout in Appendix B

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	SEA Cpmsultants, 99674.03-A, 09/05/2000	1532992	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41708-0177_Record, 02/11/2009	2385953	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF/Summit, 29200-1364/11163, 09/11/2000	1629428	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF/Summit, 29200-1364/11163, 09/11/2000	1883532	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	PJF, 41708-0177_Record, 02/11/2009	2385952	CCISITES

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) Monopole was reinforced in conformance with the referenced modification drawings.

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 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	148 - 117.25	Pole	TP27.227x22x0.1875	1	-5.99	755.23	54.1	Pass
L2	117.25 - 97.25	Pole	TP30.2515x26.2571x0.25	2	-8.74	1142.41	75.4	Pass
L3	97.25 - 80.75	Pole	TP33.056x30.2515x0.419	3	-10.82	2036.58	53.3	Pass
L4	80.75 - 40	Pole	TP39.483x31.4957x0.3856	4	-18.61	2430.91	71.9	Pass
L5	40 - 13.25	Pole	TP43.4677x37.8244x0.3984	5	-26.15	2831.53	78.8	Pass
L6	13.25 - 12.75	Pole	TP43.5527x43.4677x0.3934	6	-26.27	2801.62	79.9	Pass
L7	12.75 - 5.3333	Pole	TP44.8134x43.5527x0.3849	7	-27.93	2821.71	82.8	Pass
L8	5.3333 - 4.75	Pole	TP44.9126x44.8134x0.3897	8	-28.07	2863.18	81.9	Pass
L9	4.75 - 0	Pole	TP45.72x44.9126x0.3927	9	-29.17	2936.97	82.0	Pass
							Summary	
						Pole (L7)	82.8	Pass
						RATING =	82.8	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.2	Pass
1	Base Plate	0	74.7	Pass
1,2	Base Foundation Soil Interaction	0	88.0	Pass
1	Base Foundation Structural Steel	0	87.2	Pass

Structure Rating (max from all components) =	87.2%

Notes:

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

2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held 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:

Tower is located in Litchfield 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 28 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	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ 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	148.0000-117.2500	30.7500	3.50	18	22.0000	27.2270	0.1875	0.7500	A572-60 (60 ksi)
L2	117.2500-97.2500	23.5000	0.00	18	26.2571	30.2514	0.2500	1.0000	A572-60 (60 ksi)
L3	97.2500-80.7500	16.5000	4.25	18	30.2514	33.0560	0.4190	1.6758	Reinf 60.00 ksi (60 ksi)
L4	80.7500-40.0000	45.0000	5.00	18	31.4957	39.4830	0.3856	1.5422	Reinf 65.00 ksi (65 ksi)
L5	40.0000-13.2500	31.7500	0.00	18	37.8244	43.4677	0.3984	1.5937	Reinf 65.00 ksi (65 ksi)
L6	13.2500-	0.5000	0.00	18	43.4677	43.5527	0.3934	1.5736	Reinf 65.00 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
	12.7500								(65 ksi)
L7	12.7500-5.3333	7.4167	0.00	18	43.5527	44.8134	0.3849	1.5396	Reinf 65.00 ksi (65 ksi)
L8	5.3333-4.7500	0.5833	0.00	18	44.8134	44.9126	0.3897	1.5589	Reinf 65.00 ksi (65 ksi)
L9	4.7500-0.0000	4.7500		18	44.9126	45.7200	0.3927	1.5707	Reinf 65.00 ksi (65 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	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	27.6470	16.0919	1486.4203	9.5990	13.8313	107.4677	2974.7964	8.0475	4.4620	23.797
L2	27.2662	20.6366	1763.4291	9.2325	13.3386	132.2051	3529.1786	10.3203	4.1812	16.725
	30.7181	23.8062	2707.1425	10.6505	15.3677	176.1575	5417.8471	11.9053	4.8843	19.537
L3	30.7181	39.6706	4460.5195	10.5905	15.3677	290.2522	8926.9083	19.8391	4.5869	10.948
	33.5659	43.4001	5840.4892	11.5861	16.7924	347.8045	11688.663 5	21.7041	5.0805	12.126
L4	32.7476	38.0716	4655.2399	11.0441	15.9998	290.9559	9316.6053	19.0394	4.8647	12.617
	40.0921	47.8462	9240.1987	13.8796	20.0574	460.6886	18492.555 9	23.9276	6.2704	16.263
L5	39.3103	47.3295	8375.5948	13.2862	19.2148	435.8930	16762.210 5	23.6693	5.9559	14.948
	44.1382	54.4661	12764.339 0	15.2896	22.0816	578.0537	25545.473 7	27.2382	6.9491	17.441
L6	44.1382	53.7848	12607.611 2	15.2914	22.0816	570.9560	25231.811 9	26.8975	6.9579	17.687
	44.2245	53.8909	12682.386 9	15.3215	22.1248	573.2215	25381.461 7	26.9506	6.9729	17.725
L7	44.2245	52.7369	12415.697 6	15.3246	22.1248	561.1677	24847.732 1	26.3735	6.9878	18.155
	45.5047	54.2771	13535.600 5	15.7721	22.7652	594.5739	27089.011 6	27.1437	7.2097	18.731
L8	45.5047	54.9522	13700.985 5	15.7704	22.7652	601.8387	27419.999 1	27.4813	7.2012	18.477
	45.6054	55.0749	13792.928 8	15.8056	22.8156	604.5399	27604.006 7	27.5427	7.2187	18.522
L9	45.6054	55.4881	13894.570 0	15.8046	22.8156	608.9948	27807.422 8	27.7493	7.2135	18.37
	46.4253	56.4944	14664.365 6	16.0912	23.2258	631.3837	29348.027 0	28.2526	7.3556	18.732

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 148.0000-117.2500				1	1	1		
L2 117.2500-97.2500				1	1	1		
L3 97.2500-80.7500				1	1	1		
L4 80.7500-40.0000				1	1	1		
L5 40.0000-13.2500				1	1	1		
L6 13.2500-12.7500				1	1	1		
L7 12.7500-5.3333				1	1	1		
L8 5.3333-4.7500				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L9 4.7500-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
LDF7-50A(1-5/8")	C	No	Inside Pole	148.0000 - 0.0000	9	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
LCF158-50A(1-5/8")	C	No	Inside Pole	140.0000 - 0.0000	12	No Ice	0.0000	0.80
						1/2" Ice	0.0000	0.80
						1" Ice	0.0000	0.80
						2" Ice	0.0000	0.80
						4" Ice	0.0000	0.80
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	130.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
LDF4-50A(1/2")	C	No	Inside Pole	100.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
***								
LDF4-50A(1/2")	C	No	Inside Pole	8.2500 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
**********								
Aero MP3-05	C	No	CaAa (Out Of Face)	99.5000 - 0.0000	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	148.0000-117.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.57
L2	117.2500-97.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.783	0.54
L3	97.2500-80.7500	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	5.739	0.45
L4	80.7500-40.0000	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	14.173	1.10

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L5	40.0000-13.2500	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	9.304	0.72
L6	13.2500-12.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.174	0.01
L7	12.7500-5.3333	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	2.579	0.20
L8	5.3333-4.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.203	0.02
L9	4.7500-0.0000	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	1.652	0.13

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.0000-117.2500	A	1.181	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.57
L2	117.2500-97.2500	A	1.152	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	1.568	0.54
L3	97.2500-80.7500	A	1.126	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	11.296	0.45
L4	80.7500-40.0000	A	1.075	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	27.898	1.10
L5	40.0000-13.2500	A	1.000	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	18.007	0.72
L6	13.2500-12.7500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.328	0.01
L7	12.7500-5.3333	A	1.000	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	4.869	0.20
L8	5.3333-4.7500	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.383	0.02
L9	4.7500-0.0000	A	1.000	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	3.119	0.13

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.0000-117.2500	0.0000	0.0000	0.0000	0.0000
L2	117.2500-97.2500	-0.0526	0.0304	-0.0961	0.0555
L3	97.2500-80.7500	-0.3992	0.2305	-0.6683	0.3859
L4	80.7500-40.0000	-0.4047	0.2337	-0.6884	0.3975
L5	40.0000-13.2500	-0.4101	0.2368	-0.7002	0.4043
L6	13.2500-12.7500	-0.4123	0.2380	-0.6951	0.4013
L7	12.7500-5.3333	-0.4128	0.2383	-0.6970	0.4024

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L8	5.3333-4.7500	-0.4133	0.2386	-0.6990	0.4036
L9	4.7500-0.0000	-0.4137	0.2388	-0.7002	0.4043

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(3) FV65-14-00NA2 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.9458 8.1266 9.0212 10.8440 14.8507	0.06 0.12 0.20 0.38 0.89
(3) FV65-14-00NA2 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.9458 8.1266 9.0212 10.8440 14.8507	0.06 0.12 0.20 0.38 0.89
(3) FV65-14-00NA2 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6375 9.2903 9.9098 11.1763 13.8289	6.9458 8.1266 9.0212 10.8440 14.8507	0.06 0.12 0.20 0.38 0.89
Platform Mount [LP 401-1]	C	None		0.0000	148.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.3300 30.2200 36.1100 47.8900 71.4500	24.3300 30.2200 36.1100 47.8900 71.4500	1.65 2.03 2.41 3.18 4.72
***									
(2) 7770.00 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.1194 6.6258 7.1283 8.1643 10.3599	4.2543 5.0137 5.7109 7.1553 10.4117	0.06 0.10 0.16 0.29 0.66
(2) LGP 17201	A	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.9460 2.1337 2.3301 2.7488 3.6900	0.5180 0.6396 0.7699 1.0564 1.7331	0.03 0.04 0.06 0.09 0.19
(2) LGP 17201	B	From Face	4.0000 0.00 0.00	0.0000	140.0000	No Ice 1/2" Ice 1" Ice	1.9460 2.1337 2.3301 2.7488	0.5180 0.6396 0.7699 1.0564	0.03 0.04 0.06 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	3.6900	1.7331	0.19
						4" Ice			
(2) LGP 17201	C	From Face	4.0000	0.0000	140.0000	No Ice	1.9460	0.5180	0.03
			0.00			1/2" Ice	2.1337	0.6396	0.04
			0.00			1" Ice	2.3301	0.7699	0.06
						2" Ice	2.7488	1.0564	0.09
						4" Ice	3.6900	1.7331	0.19
(2) LGP21901	A	From Face	4.0000	0.0000	140.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2" Ice	0.3432	0.2483	0.01
			0.00			1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
(2) LGP21901	B	From Face	4.0000	0.0000	140.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2" Ice	0.3432	0.2483	0.01
			0.00			1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
(2) LGP21901	C	From Face	4.0000	0.0000	140.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2" Ice	0.3432	0.2483	0.01
			0.00			1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
T-Arm Mount [TA 602-3]	C	None		0.0000	140.0000	No Ice	11.5900	11.5900	0.77
						1/2" Ice	15.4400	15.4400	0.99
						1" Ice	19.2900	19.2900	1.21
						2" Ice	26.9900	26.9900	1.64
						4" Ice	42.3900	42.3900	2.50
***									
(2) LPA-80080/6CF w/ Mount Pipe	A	From Face	4.0000	0.0000	130.0000	No Ice	4.5639	10.7282	0.05
			0.00			1/2" Ice	5.1051	11.9896	0.11
			0.00			1" Ice	5.6116	12.9683	0.19
						2" Ice	6.6508	14.9795	0.36
						4" Ice	8.8342	19.2168	0.86
(2) LPA-80080/6CF w/ Mount Pipe	B	From Face	4.0000	0.0000	130.0000	No Ice	4.5639	10.7282	0.05
			0.00			1/2" Ice	5.1051	11.9896	0.11
			0.00			1" Ice	5.6116	12.9683	0.19
						2" Ice	6.6508	14.9795	0.36
						4" Ice	8.8342	19.2168	0.86
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000	0.0000	130.0000	No Ice	4.9710	5.2283	0.04
			0.00			1/2" Ice	5.5211	6.3892	0.08
			0.00			1" Ice	6.0361	7.2610	0.14
						2" Ice	7.0911	9.0462	0.27
						4" Ice	9.3593	12.8165	0.67
BXA-70080/6CF w/ Mount Pipe	A	From Face	4.0000	0.0000	130.0000	No Ice	6.0736	6.0983	0.04
			0.00			1/2" Ice	6.6306	7.2558	0.09
			0.00			1" Ice	7.1524	8.1258	0.16
						2" Ice	8.2495	9.9156	0.31
						4" Ice	10.7781	13.7095	0.75
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000	0.0000	130.0000	No Ice	4.9710	5.2283	0.04
			0.00			1/2" Ice	5.5211	6.3892	0.08
			0.00			1" Ice	6.0361	7.2610	0.14
						2" Ice	7.0911	9.0462	0.27
						4" Ice	9.3593	12.8165	0.67
BXA-70080/6CF w/ Mount Pipe	B	From Face	4.0000	0.0000	130.0000	No Ice	6.0736	6.0983	0.04
			0.00			1/2"	6.6306	7.2558	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	7.1524	8.1258	0.16
						1" Ice	8.2495	9.9156	0.31
						2" Ice	10.7781	13.7095	0.75
						4" Ice			
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	C	From Face	4.0000	0.0000	130.0000	No Ice	4.9710	5.2283	0.04
			0.00			1/2"	5.5211	6.3892	0.08
			0.00			Ice	6.0361	7.2610	0.14
						1" Ice	7.0911	9.0462	0.27
						2" Ice	9.3593	12.8165	0.67
						4" Ice			
BXA-70080-6CF-EDIN-6 w/ Mount Pipe	C	From Face	4.0000	0.0000	130.0000	No Ice	6.0062	6.2035	0.04
			0.00			1/2"	6.5619	7.3594	0.10
			0.00			Ice	7.0826	8.2293	0.16
						1" Ice	8.1672	10.0193	0.31
						2" Ice	10.6907	13.8398	0.75
						4" Ice			
(2) LPA-80080-6CF-EDIN-6 w/ Mount Pipe	C	From Face	4.0000	0.0000	130.0000	No Ice	4.5604	10.7396	0.05
			0.00			1/2"	5.1019	12.0018	0.11
			0.00			Ice	5.6085	12.9809	0.19
						1" Ice	6.6479	14.9930	0.36
						2" Ice	8.8318	19.2318	0.86
						4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.0000	0.0000	130.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.0000	0.0000	130.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.0000	130.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
Platform Mount [LP 305-1]	C	None		0.0000	130.0000	No Ice	18.0100	18.0100	1.12
						1/2"	23.3300	23.3300	1.35
						Ice	28.6500	28.6500	1.58
						1" Ice	39.2900	39.2900	2.05
						2" Ice	60.5700	60.5700	2.97
						4" Ice			
***									
Side Arm Mount [SO 701-1]	C	None		0.0000	100.0000	No Ice	0.8500	1.6700	0.07
						1/2"	1.1400	2.3400	0.08
						Ice	1.4300	3.0100	0.09
						1" Ice	2.0100	4.3500	0.12
						2" Ice	3.1700	7.0300	0.18
						4" Ice			
KS24019-L112A	C	From Face	2.0000	0.0000	100.0000	No Ice	0.1556	0.1556	0.01
			0.00			1/2"	0.2247	0.2247	0.01
			2.00			Ice	0.3025	0.3025	0.01
						1" Ice	0.4840	0.4840	0.02
						2" Ice	0.9506	0.9506	0.06
						4" Ice			

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	24	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	23	47.586	A	0.000	47.586	47.586	100.00	0.000	0.000
					B	0.000	47.586		100.00	0.000	0.000
					C	0.000	47.586		100.00	0.000	0.783
L3 97.2500-80.7500	88.8782	1.327	22	43.524	A	0.000	43.524	43.524	100.00	0.000	0.000
					B	0.000	43.524		100.00	0.000	0.000
					C	0.000	43.524		100.00	0.000	5.739
L4 80.7500-40.0000	60.1862	1.187	19	121.797	A	0.000	121.797	121.797	100.00	0.000	0.000
					B	0.000	121.797		100.00	0.000	0.000
					C	0.000	121.797		100.00	0.000	14.173
L5 40.0000-13.2500	26.3671	1	16	91.597	A	0.000	91.597	91.597	100.00	0.000	0.000
					B	0.000	91.597		100.00	0.000	0.000
					C	0.000	91.597		100.00	0.000	9.304
L6 13.2500-12.7500	12.9999	1	16	1.813	A	0.000	1.813	1.813	100.00	0.000	0.000
					B	0.000	1.813		100.00	0.000	0.000
					C	0.000	1.813		100.00	0.000	0.174
L7 12.7500-5.3333	9.0240	1	16	27.308	A	0.000	27.308	27.308	100.00	0.000	0.000
					B	0.000	27.308		100.00	0.000	0.000
					C	0.000	27.308		100.00	0.000	2.579
L8 5.3333-4.7500	5.0415	1	16	2.181	A	0.000	2.181	2.181	100.00	0.000	0.000
					B	0.000	2.181		100.00	0.000	0.000
					C	0.000	2.181		100.00	0.000	0.203
L9 4.7500-0.0000	2.3679	1	16	17.938	A	0.000	17.938	17.938	100.00	0.000	0.000
					B	0.000	17.938		100.00	0.000	0.000
					C	0.000	17.938		100.00	0.000	1.652

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	3	1.1812	69.126	A	0.000	69.126	69.126	100.00	0.000	0.000
						B	0.000	69.126		100.00	0.000	0.000
						C	0.000	69.126		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	3	1.1517	51.524	A	0.000	51.524	51.524	100.00	0.000	0.000
						B	0.000	51.524		100.00	0.000	0.000
						C	0.000	51.524		100.00	0.000	1.568
L3 97.2500-80.7500	88.8782	1.327	3	1.1262	46.621	A	0.000	46.621	46.621	100.00	0.000	0.000
						B	0.000	46.621		100.00	0.000	0.000
						C	0.000	46.621		100.00	0.000	11.296
L4 80.7500-40.0000	60.1862	1.187	2	1.0748	129.446	A	0.000	129.446	129.446	100.00	0.000	0.000
						B	0.000	129.446		100.00	0.000	0.000
						C	0.000	129.446		100.00	0.000	27.898
L5 40.0000-13.2500	26.3671	1	2	1.0000	96.389	A	0.000	96.389	96.389	100.00	0.000	0.000
						B	0.000	96.389		100.00	0.000	0.000
						C	0.000	96.389		100.00	0.000	18.007
L6 13.2500-12.7500	12.9999	1	2	1.0000	1.896	A	0.000	1.896	1.896	100.00	0.000	0.000
						B	0.000	1.896		100.00	0.000	0.000
						C	0.000	1.896		100.00	0.000	0.328
L7 12.7500-5.3333	9.0240	1	2	1.0000	28.544	A	0.000	28.544	28.544	100.00	0.000	0.000
						B	0.000	28.544		100.00	0.000	0.000
						C	0.000	28.544		100.00	0.000	4.869
L8 5.3333-4.7500	5.0415	1	2	1.0000	2.278	A	0.000	2.278	2.278	100.00	0.000	0.000
						B	0.000	2.278		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L9 4.7500-0.0000	2.3679	1	2	1.0000	18.729	C	0.000	2.278		100.00	0.000	0.383
						A	0.000	18.729	18.729	100.00	0.000	0.000
						B	0.000	18.729		100.00	0.000	0.000
						C	0.000	18.729		100.00	0.000	3.119

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 148.0000-117.2500	132.2079	1.487	10	63.072	A	0.000	63.072	63.072	100.00	0.000	0.000
					B	0.000	63.072		100.00	0.000	0.000
					C	0.000	63.072		100.00	0.000	0.000
L2 117.2500-97.2500	107.0516	1.4	9	47.586	A	0.000	47.586	47.586	100.00	0.000	0.000
					B	0.000	47.586		100.00	0.000	0.000
					C	0.000	47.586		100.00	0.000	0.783
L3 97.2500-80.7500	88.8782	1.327	8	43.524	A	0.000	43.524	43.524	100.00	0.000	0.000
					B	0.000	43.524		100.00	0.000	0.000
					C	0.000	43.524		100.00	0.000	5.739
L4 80.7500-40.0000	60.1862	1.187	8	121.797	A	0.000	121.797	121.797	100.00	0.000	0.000
					B	0.000	121.797		100.00	0.000	0.000
					C	0.000	121.797		100.00	0.000	14.173
L5 40.0000-13.2500	26.3671	1	6	91.597	A	0.000	91.597	91.597	100.00	0.000	0.000
					B	0.000	91.597		100.00	0.000	0.000
					C	0.000	91.597		100.00	0.000	9.304
L6 13.2500-12.7500	12.9999	1	6	1.813	A	0.000	1.813	1.813	100.00	0.000	0.000
					B	0.000	1.813		100.00	0.000	0.000
					C	0.000	1.813		100.00	0.000	0.174
L7 12.7500-5.3333	9.0240	1	6	27.308	A	0.000	27.308	27.308	100.00	0.000	0.000
					B	0.000	27.308		100.00	0.000	0.000
					C	0.000	27.308		100.00	0.000	2.579
L8 5.3333-4.7500	5.0415	1	6	2.181	A	0.000	2.181	2.181	100.00	0.000	0.000
					B	0.000	2.181		100.00	0.000	0.000
					C	0.000	2.181		100.00	0.000	0.203
L9 4.7500-0.0000	2.3679	1	6	17.938	A	0.000	17.938	17.938	100.00	0.000	0.000
					B	0.000	17.938		100.00	0.000	0.000
					C	0.000	17.938		100.00	0.000	1.652

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

Comb. No.	Description
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
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 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	148 - 117.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-14.44	0.00	-0.00
			Max. Mx	5	-5.99	-218.85	-0.00
			Max. My	8	-5.99	0.00	-218.80
			Max. Vy	5	12.28	-218.85	-0.00
			Max. Vx	8	12.27	0.00	-218.80
			Max. Torque	5			-0.03
L2	117.25 - 97.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.24	0.00	-0.04
			Max. Mx	5	-8.74	-525.25	-0.02
			Max. My	8	-8.74	0.00	-525.06
			Max. Vy	5	13.85	-525.25	-0.02
			Max. Vx	8	13.85	0.00	-525.06
			Max. Torque	5			-0.05
L3	97.25 - 80.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.84	0.00	-0.04
			Max. Mx	5	-10.82	-700.83	-0.02
			Max. My	8	-10.82	0.00	-700.57
			Max. Vy	5	14.83	-700.83	-0.02
			Max. Vx	8	14.82	0.00	-700.57
			Max. Torque	12			0.07
L4	80.75 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.46	0.00	-0.04
			Max. Mx	5	-18.61	-1354.47	-0.02
			Max. My	8	-18.61	0.00	-1354.00
			Max. Vy	5	17.76	-1354.47	-0.02
			Max. Vx	8	17.76	0.00	-1354.00
			Max. Torque	13			0.18
L5	40 - 13.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.52	0.00	-0.04
			Max. Mx	5	-26.15	-1950.08	-0.02
			Max. My	8	-26.15	-0.00	-1949.45
			Max. Vy	5	19.69	-1950.08	-0.02
			Max. Vx	8	19.69	-0.00	-1949.45
			Max. Torque	13			0.27
L6	13.25 - 12.75	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
			Max. Compression	14	-39.65	0.00	-0.04
			Max. Mx	5	-26.27	-1959.92	-0.02
			Max. My	8	-26.27	-0.00	-1959.30
			Max. Vy	5	19.72	-1959.92	-0.02
			Max. Vx	8	19.71	-0.00	-1959.30
			Max. Torque	13			0.27
L7	12.75 - 5.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.61	0.00	-0.04
			Max. Mx	5	-27.93	-2107.64	-0.02
			Max. My	8	-27.93	-0.00	-2106.97
			Max. Vy	5	20.14	-2107.64	-0.02
			Max. Vx	8	20.13	-0.00	-2106.97
			Max. Torque	13			0.29
L8	5.3333 - 4.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.77	0.00	-0.04
			Max. Mx	5	-28.07	-2119.38	-0.02
			Max. My	8	-28.07	-0.00	-2118.72
			Max. Vy	5	20.16	-2119.38	-0.02
			Max. Vx	8	20.16	-0.00	-2118.72
			Max. Torque	13			0.30
L9	4.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.08	0.00	-0.04
			Max. Mx	5	-29.17	-2215.77	-0.02
			Max. My	8	-29.17	0.00	-2215.08
			Max. Vy	5	20.44	-2215.77	-0.02
			Max. Vx	8	20.43	0.00	-2215.08
			Max. Torque	13			0.31

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	43.08	0.00	-0.00
	Max. H_x	11	29.18	20.43	-0.00
	Max. H_z	2	29.18	0.00	20.42
	Max. M_x	2	2215.04	0.00	20.42
	Max. M_z	5	2215.77	-20.43	-0.00
	Max. Torsion	13	0.31	10.21	17.69
	Min. Vert	5	29.18	-20.43	-0.00
	Min. H_x	5	29.18	-20.43	-0.00
	Min. H_z	8	29.18	0.00	-20.42
	Min. M_x	8	-2215.08	0.00	-20.42
	Min. M_z	11	-2215.77	20.43	-0.00
	Min. Torsion	7	-0.31	-10.21	-17.69

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	29.18	0.00	0.00	0.02	0.00	0.00
Dead+Wind 0 deg - No Ice	29.18	-0.00	-20.42	-2215.04	0.00	-0.25
Dead+Wind 30 deg - No Ice	29.18	10.21	-17.69	-1918.33	-1108.12	-0.12
Dead+Wind 60 deg - No Ice	29.18	17.69	-10.21	-1107.54	-1919.31	0.04
Dead+Wind 90 deg - No Ice	29.18	20.43	0.00	0.02	-2215.77	0.19
Dead+Wind 120 deg - No Ice	29.18	17.69	10.21	1107.57	-1919.31	0.29
Dead+Wind 150 deg - No Ice	29.18	10.21	17.69	1918.36	-1108.12	0.31
Dead+Wind 180 deg - No Ice	29.18	-0.00	20.42	2215.08	0.00	0.25

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+Wind 210 deg - No Ice	29.18	-10.21	17.69	1918.36	1108.12	0.12
Dead+Wind 240 deg - No Ice	29.18	-17.69	10.21	1107.57	1919.31	-0.04
Dead+Wind 270 deg - No Ice	29.18	-20.43	0.00	0.02	2215.77	-0.19
Dead+Wind 300 deg - No Ice	29.18	-17.69	-10.21	-1107.54	1919.31	-0.29
Dead+Wind 330 deg - No Ice	29.18	-10.21	-17.69	-1918.33	1108.12	-0.31
Dead+Ice+Temp	43.08	0.00	0.00	0.04	0.00	0.00
Dead+Wind 0 deg+Ice+Temp	43.08	-0.00	-3.19	-365.90	0.00	-0.06
Dead+Wind 30 deg+Ice+Temp	43.08	1.60	-2.76	-316.82	-183.01	-0.03
Dead+Wind 60 deg+Ice+Temp	43.08	2.76	-1.60	-182.90	-316.99	0.01
Dead+Wind 90 deg+Ice+Temp	43.08	3.19	-0.00	0.04	-365.98	0.04
Dead+Wind 120 deg+Ice+Temp	43.08	2.76	1.60	182.98	-316.99	0.07
Dead+Wind 150 deg+Ice+Temp	43.08	1.60	2.76	316.90	-183.01	0.08
Dead+Wind 180 deg+Ice+Temp	43.08	-0.00	3.19	365.98	0.00	0.06
Dead+Wind 210 deg+Ice+Temp	43.08	-1.60	2.76	316.90	183.01	0.03
Dead+Wind 240 deg+Ice+Temp	43.08	-2.76	1.60	182.98	316.99	-0.01
Dead+Wind 270 deg+Ice+Temp	43.08	-3.19	-0.00	0.04	365.98	-0.04
Dead+Wind 300 deg+Ice+Temp	43.08	-2.76	-1.60	-182.90	316.99	-0.07
Dead+Wind 330 deg+Ice+Temp	43.08	-1.60	-2.76	-316.82	183.01	-0.08
Dead+Wind 0 deg - Service	29.18	-0.00	-7.98	-866.37	0.00	-0.10
Dead+Wind 30 deg - Service	29.18	3.99	-6.91	-750.26	-433.39	-0.05
Dead+Wind 60 deg - Service	29.18	6.91	-3.99	-433.15	-750.65	0.02
Dead+Wind 90 deg - Service	29.18	7.98	0.00	0.02	-866.64	0.07
Dead+Wind 120 deg - Service	29.18	6.91	3.99	433.19	-750.65	0.11
Dead+Wind 150 deg - Service	29.18	3.99	6.91	750.29	-433.39	0.12
Dead+Wind 180 deg - Service	29.18	-0.00	7.98	866.41	0.00	0.10
Dead+Wind 210 deg - Service	29.18	-3.99	6.91	750.29	433.39	0.05
Dead+Wind 240 deg - Service	29.18	-6.91	3.99	433.19	750.65	-0.02
Dead+Wind 270 deg - Service	29.18	-7.98	0.00	0.02	866.64	-0.07
Dead+Wind 300 deg - Service	29.18	-6.91	-3.99	-433.15	750.65	-0.11
Dead+Wind 330 deg - Service	29.18	-3.99	-6.91	-750.26	433.39	-0.12

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-29.18	0.00	0.00	29.18	0.00	0.000%
2	0.00	-29.18	-20.42	0.00	29.18	20.42	0.013%
3	10.21	-29.18	-17.69	-10.21	29.18	17.69	0.000%
4	17.69	-29.18	-10.21	-17.69	29.18	10.21	0.000%
5	20.43	-29.18	0.00	-20.43	29.18	-0.00	0.011%
6	17.69	-29.18	10.21	-17.69	29.18	-10.21	0.000%
7	10.21	-29.18	17.69	-10.21	29.18	-17.69	0.000%
8	0.00	-29.18	20.42	0.00	29.18	-20.42	0.013%
9	-10.21	-29.18	17.69	10.21	29.18	-17.69	0.000%
10	-17.69	-29.18	10.21	17.69	29.18	-10.21	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
11	-20.43	-29.18	0.00	20.43	29.18	-0.00	0.011%
12	-17.69	-29.18	-10.21	17.69	29.18	10.21	0.000%
13	-10.21	-29.18	-17.69	10.21	29.18	17.69	0.000%
14	0.00	-43.08	0.00	0.00	43.08	-0.00	0.000%
15	0.00	-43.08	-3.19	0.00	43.08	3.19	0.001%
16	1.60	-43.08	-2.76	-1.60	43.08	2.76	0.001%
17	2.77	-43.08	-1.60	-2.76	43.08	1.60	0.001%
18	3.19	-43.08	0.00	-3.19	43.08	0.00	0.002%
19	2.77	-43.08	1.60	-2.76	43.08	-1.60	0.001%
20	1.60	-43.08	2.76	-1.60	43.08	-2.76	0.001%
21	0.00	-43.08	3.19	0.00	43.08	-3.19	0.001%
22	-1.60	-43.08	2.76	1.60	43.08	-2.76	0.001%
23	-2.77	-43.08	1.60	2.76	43.08	-1.60	0.001%
24	-3.19	-43.08	0.00	3.19	43.08	0.00	0.002%
25	-2.77	-43.08	-1.60	2.76	43.08	1.60	0.001%
26	-1.60	-43.08	-2.76	1.60	43.08	2.76	0.001%
27	0.00	-29.18	-7.98	0.00	29.18	7.98	0.002%
28	3.99	-29.18	-6.91	-3.99	29.18	6.91	0.001%
29	6.91	-29.18	-3.99	-6.91	29.18	3.99	0.001%
30	7.98	-29.18	0.00	-7.98	29.18	-0.00	0.005%
31	6.91	-29.18	3.99	-6.91	29.18	-3.99	0.001%
32	3.99	-29.18	6.91	-3.99	29.18	-6.91	0.001%
33	0.00	-29.18	7.98	0.00	29.18	-7.98	0.002%
34	-3.99	-29.18	6.91	3.99	29.18	-6.91	0.001%
35	-6.91	-29.18	3.99	6.91	29.18	-3.99	0.001%
36	-7.98	-29.18	0.00	7.98	29.18	-0.00	0.005%
37	-6.91	-29.18	-3.99	6.91	29.18	3.99	0.001%
38	-3.99	-29.18	-6.91	3.99	29.18	6.91	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	19	0.00000001	0.00011221
3	Yes	22	0.00000001	0.00010154
4	Yes	22	0.00000001	0.00010154
5	Yes	16	0.00009980	0.00011207
6	Yes	22	0.00000001	0.00010190
7	Yes	22	0.00000001	0.00010134
8	Yes	19	0.00000001	0.00011221
9	Yes	22	0.00000001	0.00010168
10	Yes	22	0.00000001	0.00010170
11	Yes	16	0.00009980	0.00011207
12	Yes	22	0.00000001	0.00010135
13	Yes	22	0.00000001	0.00010188
14	Yes	6	0.00000001	0.00000001
15	Yes	27	0.00000001	0.00000000
16	Yes	18	0.00000001	0.00009119
17	Yes	18	0.00000001	0.00009121
18	Yes	17	0.00013232	0.00014294
19	Yes	18	0.00000001	0.00009129
20	Yes	18	0.00000001	0.00009119
21	Yes	27	0.00000001	0.00000000
22	Yes	18	0.00000001	0.00009125
23	Yes	18	0.00000001	0.00009126
24	Yes	17	0.00013232	0.00014294
25	Yes	18	0.00000001	0.00009118
26	Yes	18	0.00000001	0.00009125
27	Yes	26	0.00000001	0.00000000
28	Yes	18	0.00000001	0.00010987
29	Yes	18	0.00000001	0.00010987
30	Yes	16	0.00010456	0.00005640
31	Yes	18	0.00000001	0.00011092
32	Yes	18	0.00000001	0.00010931

33	Yes	26	0.00000001	0.00000000
34	Yes	18	0.00000001	0.00011028
35	Yes	18	0.00000001	0.00011034
36	Yes	16	0.00010456	0.00005640
37	Yes	18	0.00000001	0.00010931
38	Yes	18	0.00000001	0.00011086

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	37.528	30	2.1981	0.0003
L2	120.75 - 97.25	25.397	30	1.9741	0.0003
L3	97.25 - 80.75	16.565	30	1.5661	0.0002
L4	85 - 40	12.761	30	1.3975	0.0002
L5	45 - 13.25	3.644	30	0.7401	0.0001
L6	13.25 - 12.75	0.314	30	0.2282	0.0000
L7	12.75 - 5.3333	0.291	30	0.2196	0.0000
L8	5.3333 - 4.75	0.050	30	0.0902	0.0000
L9	4.75 - 0	0.040	30	0.0803	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.0000	(3) FV65-14-00NA2 w/ Mount Pipe	30	37.528	2.1981	0.0003	20543
140.0000	(2) 7770.00 w/ Mount Pipe	30	33.861	2.1547	0.0003	12839
130.0000	(2) LPA-80080/6CF w/ Mount Pipe	30	29.368	2.0811	0.0003	5705
100.0000	Side Arm Mount [SO 701-1]	30	17.494	1.6108	0.0003	3136

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	148 - 117.25	95.796	5	5.6132	0.0008
L2	120.75 - 97.25	64.855	5	5.0420	0.0007
L3	97.25 - 80.75	42.316	5	4.0009	0.0006
L4	85 - 40	32.602	5	3.5706	0.0006
L5	45 - 13.25	9.313	5	1.8916	0.0003
L6	13.25 - 12.75	0.803	5	0.5834	0.0001
L7	12.75 - 5.3333	0.743	5	0.5615	0.0001
L8	5.3333 - 4.75	0.129	5	0.2306	0.0000
L9	4.75 - 0	0.102	5	0.2052	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.0000	(3) FV65-14-00NA2 w/ Mount Pipe	5	95.796	5.6132	0.0008	8181

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.0000	(2) 7770.00 w/ Mount Pipe	5	86.443	5.5025	0.0008	5112
130.0000	(2) LPA-80080/6CF w/ Mount Pipe	5	74.984	5.3149	0.0008	2270
100.0000	Side Arm Mount [SO 701-1]	5	44.688	4.1150	0.0006	1240

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 $\frac{P}{P_a}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	30.7500	0.0000	0.0	36.000	15.7378	-5.99	566.56	0.011
L2	117.25 - 97.25 (2)	TP30.2515x26.2571x0.25	23.5000	0.0000	0.0	36.000	23.8062	-8.74	857.02	0.010
L3	97.25 - 80.75 (3)	TP33.056x30.2515x0.419	16.5000	0.0000	0.0	36.000	42.4394	-10.82	1527.82	0.007
L4	80.75 - 40 (4)	TP39.483x31.4957x0.3856	45.0000	0.0000	0.0	39.000	46.7601	-18.61	1823.64	0.010
L5	40 - 13.25 (5)	TP43.4677x37.8244x0.3984	31.7500	0.0000	0.0	39.000	54.4661	-26.15	2124.18	0.012
L6	13.25 - 12.75 (6)	TP43.5527x43.4677x0.3934	0.5000	0.0000	0.0	39.000	53.8909	-26.27	2101.74	0.012
L7	12.75 - 5.3333 (7)	TP44.8134x43.5527x0.3849	7.4167	0.0000	0.0	39.000	54.2771	-27.93	2116.81	0.013
L8	5.3333 - 4.75 (8)	TP44.9126x44.8134x0.3897	0.5833	0.0000	0.0	39.000	55.0749	-28.07	2147.92	0.013
L9	4.75 - 0 (9)	TP45.72x44.9126x0.3927	4.7500	0.0000	0.0	39.000	56.4944	-29.17	2203.28	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	218.86	25.554	36.000	0.710	0.00	0.000	36.000	0.000
L2	117.25 - 97.25 (2)	TP30.2515x26.2571x0.25	525.28	35.782	36.000	0.994	0.00	0.000	36.000	0.000
L3	97.25 - 80.75 (3)	TP33.056x30.2515x0.419	700.87	25.296	36.000	0.703	0.00	0.000	36.000	0.000
L4	80.75 - 40 (4)	TP39.483x31.4957x0.3856	1354.58	36.950	39.000	0.947	0.00	0.000	39.000	0.000
L5	40 - 13.25 (5)	TP43.4677x37.8244x0.3984	1950.24	40.486	39.000	1.038	0.00	0.000	39.000	0.000
L6	13.25 - 12.75 (6)	TP43.5527x43.4677x0.3934	1960.09	41.033	39.000	1.052	0.00	0.000	39.000	0.000
L7	12.75 - 5.3333 (7)	TP44.8134x43.5527x0.3849	2107.82	42.541	39.000	1.091	0.00	0.000	39.000	0.000
L8	5.3333 - 4.75 (8)	TP44.9126x44.8134x0.3897	2119.57	42.073	39.000	1.079	0.00	0.000	39.000	0.000
L9	4.75 - 0 (9)	TP45.72x44.9126x0.3927	2215.96	42.116	39.000	1.080	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	148 - 117.25 (1)	TP27.227x22x0.1875	12.28	0.780	24.000	0.065	0.02	0.001	24.000	0.000
L2	117.25 - 97.25 (2)	TP30.2515x26.2571x0.25	13.86	0.582	24.000	0.048	0.04	0.001	24.000	0.000
L3	97.25 - 80.75 (3)	TP33.056x30.2515x0.419	14.83	0.350	24.000	0.029	0.07	0.001	24.000	0.000
L4	80.75 - 40 (4)	TP39.483x31.4957x0.3856	17.76	0.380	26.000	0.029	0.18	0.002	26.000	0.000
L5	40 - 13.25 (5)	TP43.4677x37.8244x0.3984	19.69	0.362	26.000	0.028	0.25	0.003	26.000	0.000
L6	13.25 - 12.75 (6)	TP43.5527x43.4677x0.3934	19.71	0.366	26.000	0.028	0.25	0.003	26.000	0.000
L7	12.75 - 5.3333 (7)	TP44.8134x43.5527x0.3849	20.14	0.371	26.000	0.029	0.27	0.003	26.000	0.000
L8	5.3333 - 4.75 (8)	TP44.9126x44.8134x0.3897	20.17	0.366	26.000	0.028	0.28	0.003	26.000	0.000
L9	4.75 - 0 (9)	TP45.72x44.9126x0.3927	20.44	0.362	26.000	0.028	0.29	0.003	26.000	0.000

Pole Interaction Design Data

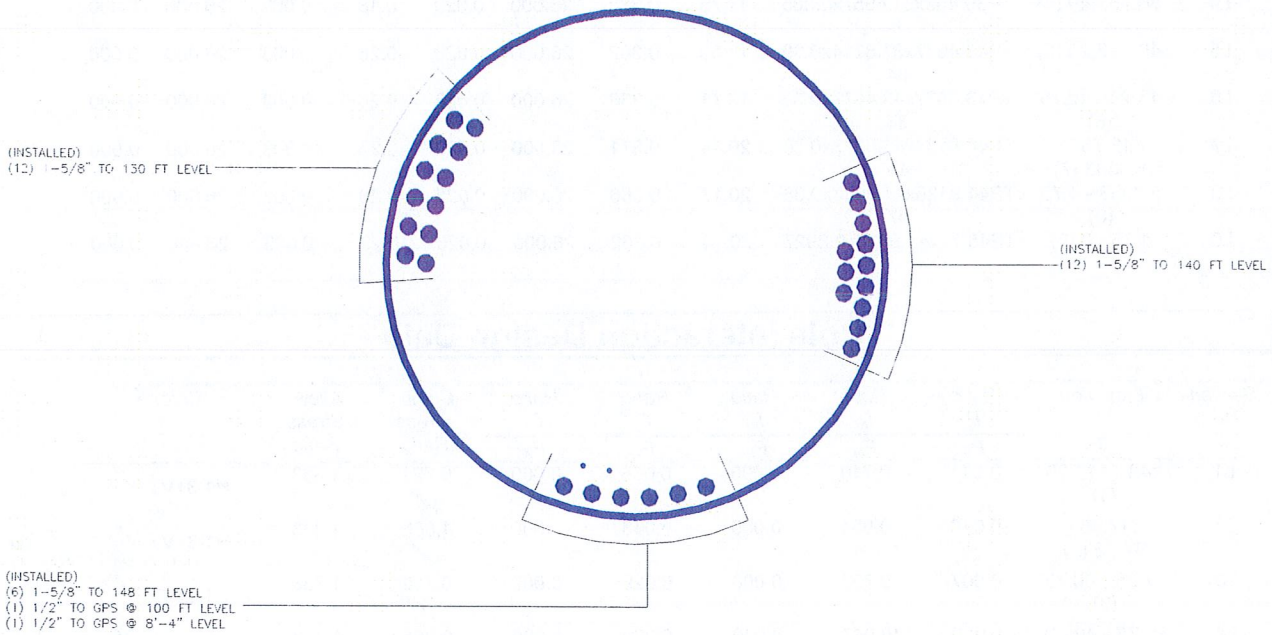
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 117.25 (1)	0.011	0.710	0.000	0.065	0.000	0.721 ✔	1.333	H1-3+VT ✔
L2	117.25 - 97.25 (2)	0.010	0.994	0.000	0.048	0.000	1.005 ✔	1.333	H1-3+VT ✔
L3	97.25 - 80.75 (3)	0.007	0.703	0.000	0.029	0.000	0.710 ✔	1.333	H1-3+VT ✔
L4	80.75 - 40 (4)	0.010	0.947	0.000	0.029	0.000	0.958 ✔	1.333	H1-3+VT ✔
L5	40 - 13.25 (5)	0.012	1.038	0.000	0.028	0.000	1.051 ✔	1.333	H1-3+VT ✔
L6	13.25 - 12.75 (6)	0.012	1.052	0.000	0.028	0.000	1.065 ✔	1.333	H1-3+VT ✔
L7	12.75 - 5.3333 (7)	0.013	1.091	0.000	0.029	0.000	1.104 ✔	1.333	H1-3+VT ✔
L8	5.3333 - 4.75 (8)	0.013	1.079	0.000	0.028	0.000	1.092 ✔	1.333	H1-3+VT ✔
L9	4.75 - 0 (9)	0.013	1.080	0.000	0.028	0.000	1.093 ✔	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	148 - 117.25	Pole	TP27.227x22x0.1875	1	-5.99	755.23	54.1	Pass
L2	117.25 - 97.25	Pole	TP30.2515x26.2571x0.25	2	-8.74	1142.41	75.4	Pass
L3	97.25 - 80.75	Pole	TP33.056x30.2515x0.419	3	-10.82	2036.58	53.3	Pass
L4	80.75 - 40	Pole	TP39.483x31.4957x0.3856	4	-18.61	2430.91	71.9	Pass
L5	40 - 13.25	Pole	TP43.4677x37.8244x0.3984	5	-26.15	2831.53	78.8	Pass
L6	13.25 - 12.75	Pole	TP43.5527x43.4677x0.3934	6	-26.27	2801.62	79.9	Pass
L7	12.75 - 5.3333	Pole	TP44.8134x43.5527x0.3849	7	-27.93	2821.71	82.8	Pass
L8	5.3333 - 4.75	Pole	TP44.9126x44.8134x0.3897	8	-28.07	2863.18	81.9	Pass
L9	4.75 - 0	Pole	TP45.72x44.9126x0.3927	9	-29.17	2936.97	82.0	Pass
							Summary	
						Pole (L7)	82.8	Pass
						RATING =	**82.8**	**Pass**

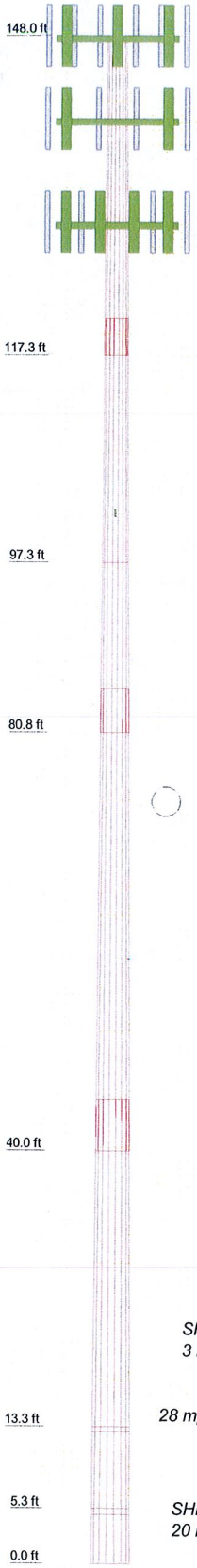
APPENDIX B

BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS



Section	9	8	7	6	5	4	3	2	1
Length (ft)	4.7500	5.3333	7.4167	0.5000	31.7500	45.0000	16.5000	23.5000	30.7500
Number of Sides	18	18	18	18	18	18	18	18	18
Thickness (in)	0.3927	0.3897	0.3849	0.3934	0.3984	0.3856	0.4190	0.2500	0.1875
Socket Length (ft)						5.0000	4.2500		3.5000
Top Dia (in)	44.9126	44.3813	43.5522	43.4677	37.8244	31.4957	30.2514	26.2571	22.0000
Bot Dia (in)	45.7260	44.8126	44.8134	43.5527	43.4677	39.4830	33.0560	30.2514	27.2270
Grade					Reinf 65.00 ksi			A572-60	
Weight (K)	20.2	0.9	0.1	1.4	0.1	5.5	6.6	2.3	1.8	1.5

AXIAL
43 K

SHEAR
3 K

MOMENT
366 kip-ft

TORQUE 0 kip-ft
28 mph WIND - 1.0000 in ICE

AXIAL
29 K

SHEAR
20 K

MOMENT
2216 kip-ft

TORQUE 0 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(3) FV65-14-00NA2 w/ Mount Pipe	148	BXA-70080/6CF w/ Mount Pipe	130
(3) FV65-14-00NA2 w/ Mount Pipe	148	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	130
(3) FV65-14-00NA2 w/ Mount Pipe	148	BXA-70080/6CF w/ Mount Pipe	130
Platform Mount [LP 401-1]	148	BXA-171085-12BF-EDIN-2 w/ Mount Pipe	130
(2) 7770.00 w/ Mount Pipe	140	BXA-70080-6CF-EDIN-6 w/ Mount Pipe	130
(2) 7770.00 w/ Mount Pipe	140	(2) LPA-80080-6CF-EDIN-6 w/ Mount Pipe	130
(2) 7770.00 w/ Mount Pipe	140	(2) FD9R6004/2C-3L	130
(2) LGP 17201	140	(2) FD9R6004/2C-3L	130
(2) LGP 17201	140	(2) FD9R6004/2C-3L	130
(2) LGP 17201	140	Platform Mount [LP 305-1]	130
(2) LGP21901	140	Side Arm Mount [SO 701-1]	100
(2) LGP21901	140	KS24019-L112A	100
(2) LGP21901	140		
T-Arm Mount [TA 602-3]	140		
(2) LPA-80080/6CF w/ Mount Pipe	130		
(2) LPA-80080/6CF w/ Mount Pipe	130		
BXA-171085-12BF-EDIN-2 w/ Mount Pipe	130		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-60	60 ksi	75 ksi	Reinf 65.00 ksi	65 ksi	65 ksi
Reinf 60.00 ksi	60 ksi	65 ksi			

TOWER DESIGN NOTES

1. Tower is located in Litchfield 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 28 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: 82.8%

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250 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: ***Ex. 148-ft Monopole / Horton 2 / Fredsall Property***		
Project: ***PJF#37511-1853 / BU#876377***		
Client: Crown Castle	Drawn by: Kyle Thorpe	App'd:
Code: TIA/EIA-222-F	Date: 12/01/11	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2011\37511-1853 BU 876377\37511-1853 Reinforced.en		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#: *876377*
Site Name: *Horton 2 / Fredsall Propert*
App #:

Anchor Rod Data		
Qty:	12	
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:	51	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	8	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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

Pole Data		
Diam:	45.72	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2216	ft-kips
Unfactored Axial, P:	29	kips
Unfactored Shear, V:	20	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	168.0 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	86.2% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	41.1 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	74.7% **Pass**

PL Ref. Data
Yield Line (in): 26.40
Max PL Length: 26.40

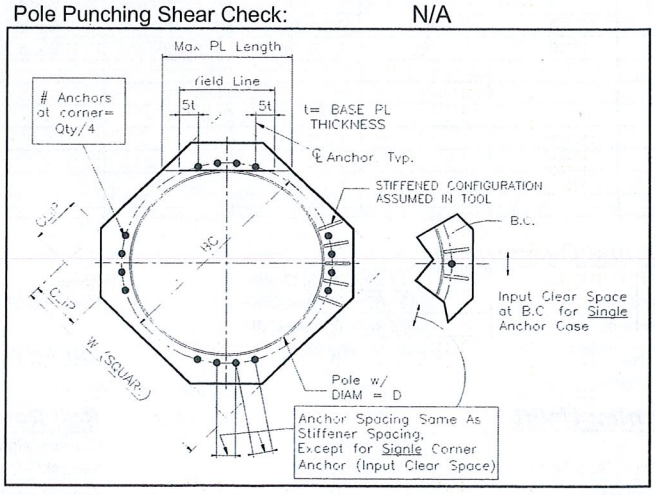
N/A - Unstiffened

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



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

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Job Number:	37511-1853	**Page:**	1
Site Number:	876377	**By:**	KAT
Site Name:	Horton 2 / Fredsall Property	**Date:**	12/1/2011

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

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	2216.0		k-ft
Shear, V =	20.0		kips
Axial Load, P =	29.0		kips
OTM =	2226.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ 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 =	6 ft
Height Above Grade =	0.5 ft
Depth Below Grade =	18.5 ft
fc' =	3 ksi
εc =	0.003 in/in
Mat Ftdn. Cap Width =	10 ft
Mat Ftdn. Cap Length =	10 ft
Depth Below Grade =	5.5 ft

	Safety Factor	Φ 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	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00
+ Effective Soil Wt. - Buoyant Conc. Wt. ≥ Compression
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	16
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	3 in

Soil Parameters

Water Table Depth =	11.00 ft
Depth to Ignore Soil =	3.33 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 Strengh = 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	3	100	0	0	Sand				3
2	8	140	0	38	Sand	8000			11
3	3	139	0	38	Sand	8000			14
4	4	160	0	40	Sand	12000			18
5	6	160	0	40	Sand	12000			24
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	13.29 ft, from Grade	Shear, V =	20.00 kips
Bending Moment, M =	2491.87 k-ft, from COR	Resisting Shear, Va =	22.73 kips
Resisting Moment, Ma =	2832.28 k-ft, from COR		
MOMENT RATIO =	**88.0% OK**	**SHEAR RATIO =**	**88.0% OK**

Soil Results: Uplift

Uplift, T =	0.00 kips
Allowable Uplift Cap., Ta =	105.52 kips
UPLIFT RATIO =	**0.0% OK**

Soil Results: Compression

Compression, C =	29.00 kips
Allowable Comp. Cap., Ca =	430.33 kips
COMPRESSION RATIO =	**6.7% OK**

Steel Results (ACI 318-02):

Minimum Steel Area =	20.36 sq in
Actual Steel Area =	24.96 sq in
Allowable Min Axial, Pa =	-1036.80 kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	4726.51 kips, Where Ma = 0 k-ft
Axial Load, P =	37.68 kips @ 5.50 ft Below Grade
Moment, M =	2277.69 k-ft @ 5.50 ft Below Grade
Allowable Moment, Ma =	2611.34 k-ft
MOMENT RATIO =	**87.2% 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#: *876377*
Site Name: *Horton 2 / Fredsall Property*
App #:

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	2277.69	ft-kips (* Note)
Max. Service Shaft P:	37.68	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:	2960.997	ft-kips
1.30	Pu:	48.984	kips

Pier Properties

Concrete:

Pier Diameter =	6.0	ft
Concrete Area =	4071.5	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.28	ft
Vert. Cage Diameter =	63.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	16	
As Total=	24.96	in^2
A s/ Aconc, Rho:	0.0061	0.61%

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	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

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tesnion Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027	
200 / Fy:	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%**

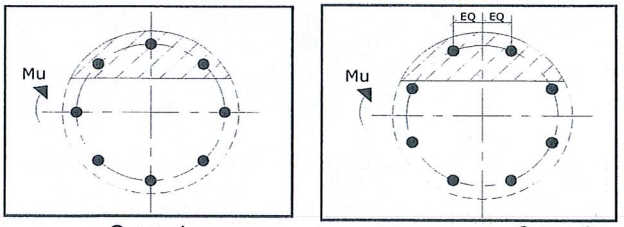
Minimum Rho Check:

Actual Req'd Min. Rho:	0.50%	Flexural Member
Provided Rho:	0.61%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	6144.47	kips
at Mu=(ϕ=0.65)Mn=	3192.16	ft-kips
Max Tu, (φ=0.9) Tn =	1347.84	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Extreme Steel Strain, εt: **0.0134**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Dist. From Edge to Neutral Axis: **12.23** in

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu =	48.98	kips
Drilled Shaft Moment Capacity, φMn:	**3394.75**	ft-kips
Drilled Shaft Superimposed Mu:	**2961.00**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	87.22%