



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 20, 2012

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

RE: **EM-VER-168-120105**- Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1440 Main Street, Woodbury, Connecticut.

Dear Attorney Baldwin:

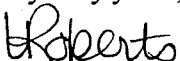
The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- 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 3, 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,

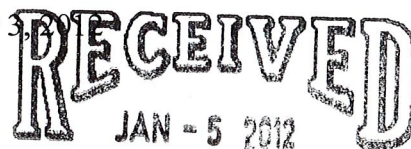

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Gerald D. Stomski, First Selectman, Town of Woodbury
Mark DeVoe, Town Planner, Town of Woodbury
Crown Castle USA, Inc.

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

January 3, 2012



CONNECTICUT
SITING COUNCIL

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

Re: **Notice of Exempt Modification – Antenna Swap
1440 Main Street, Woodbury, Connecticut**

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 150-foot level on the existing 163-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of the existing tower in 2003. Cellco now intends to modify its installation by replacing six (6) of its existing antennas with three (3) model BXA-171085-12BF PCS antennas and three (3) model BXA-70063/6CF LTE antennas. 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 Gerald Stomski, First Selectman of the Town of Woodbury. A copy of this letter is also being sent to Tikva Wolff, the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the overall height of the existing tower. Cellco’s antennas and diplexers will be located at the 150-foot level on the existing 163-foot tower.



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Linda Roberts
January 3, 2012
Page 2

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

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

4. The operation of the 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:

Gerald Stomski, Woodbury First Selectman
Tikva Wolff
Sandy M. Carter



BXA-171085-12BF-EDIN-X

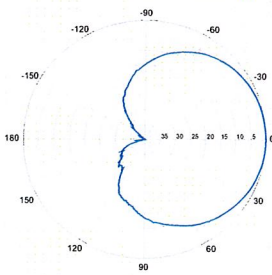
Replace "X" with desired electrical downtilt

X-Pol | FET Panel | 85° | 18.0 dBi

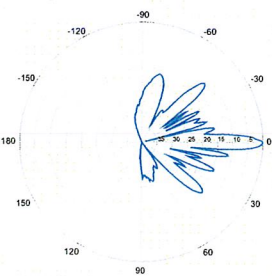


Electrical Characteristics	1710-2170 MHz				
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz		
Polarization	±45°	±45°	±45°		
Horizontal beamwidth	88°	85°	80°		
Vertical beamwidth	4.5°	4.5°	4.5°		
Gain	15.1 dBd / 17.2 dBi	15.5 dBd / 17.6 dBi	15.9 dBd / 18.0 dBi		
Electrical downtilt (X)	0, 2, 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 m ² Side: 0.19 m ²	Front: 3.1 ft ² Side: 2.1 ft ²			
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

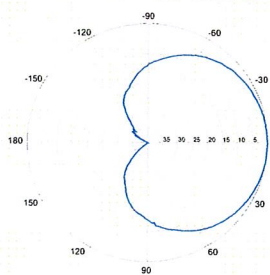


Horizontal | 1710-1880 MHz
BXA-171085-12BF-EDIN-0

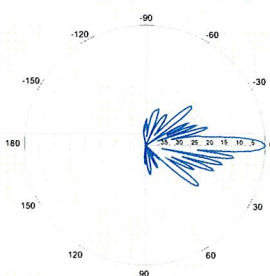


0° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-X

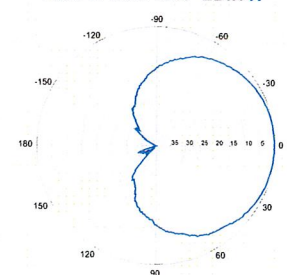


Horizontal | 1850-1990 MHz
BXA-171085-12BF-EDIN-0

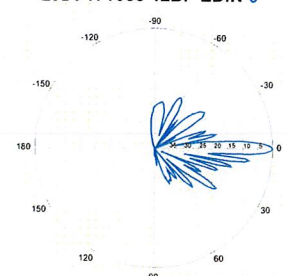


0° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-X



Horizontal | 1920-2170 MHz
BXA-171085-12BF-EDIN-0



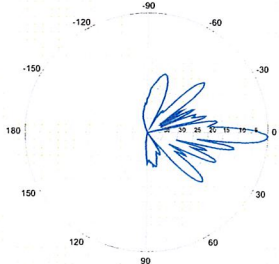
0° | Vertical | 1920-2170 MHz

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-171085-12BF-EDIN-X

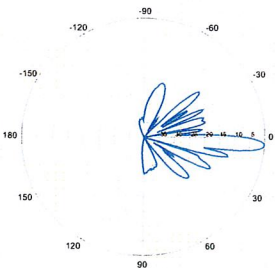
X-Pol | FET Panel | 85° | 18.0 dBi

BXA-171085-12BF-EDIN-2



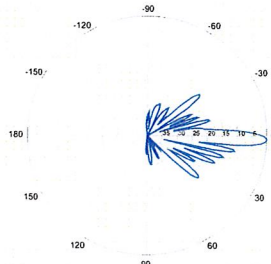
2° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-4



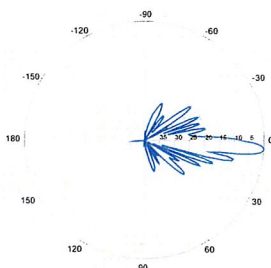
4° | Vertical | 1710-1880 MHz

BXA-171085-12BF-EDIN-2



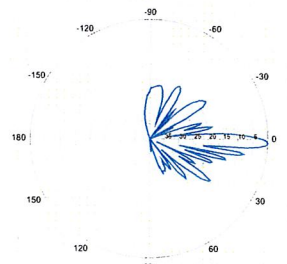
2° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-4



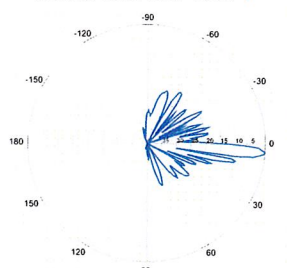
4° | Vertical | 1850-1990 MHz

BXA-171085-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171085-12BF-EDIN-4



4° | Vertical | 1920-2170 MHz

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BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

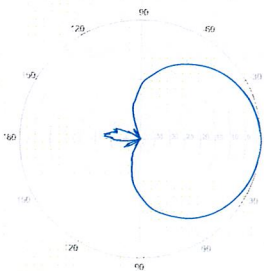
Replace "X" with desired electrical downtilt.

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



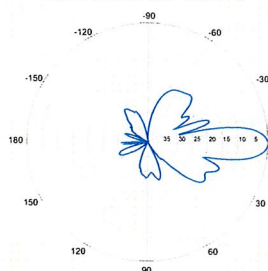
Electrical Characteristics	696-900 MHz		
Frequency bands	696-806 MHz	806-900 MHz	
Polarization	±45°		
Horizontal beamwidth	65°	63°	
Vertical beamwidth	13°	11°	
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10		
Impedance	50Ω		
VSWR	≤1.35:1		
Upper sidelobe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

BXA-70063-6CF-EDIN-X



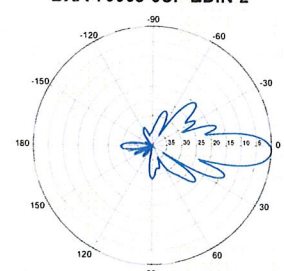
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

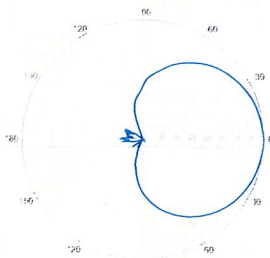


0° | Vertical | 750 MHz

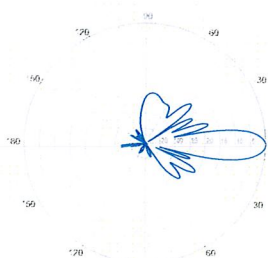
BXA-70063-6CF-EDIN-2



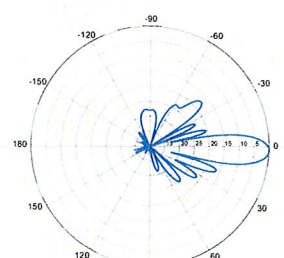
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



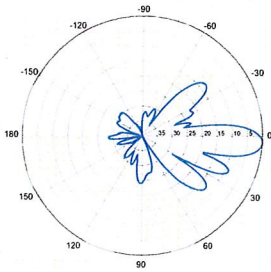
2° | Vertical | 850 MHz

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

BXA-70063-6CF-EDIN-X

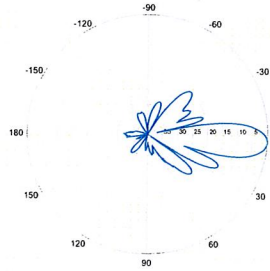
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



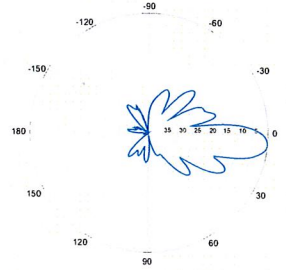
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

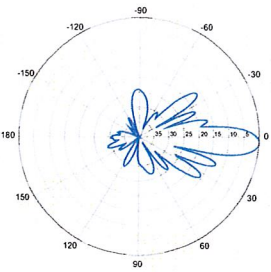


4° | Vertical | 750 MHz

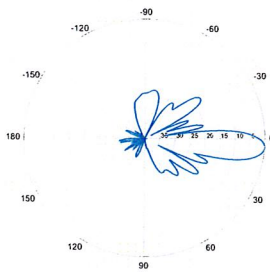
BXA-70063-6CF-EDIN-5



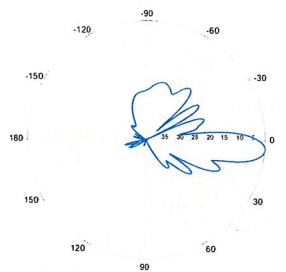
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

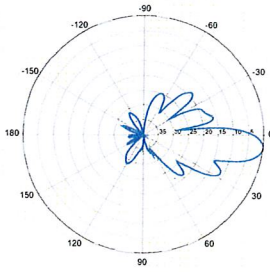


4° | Vertical | 850 MHz



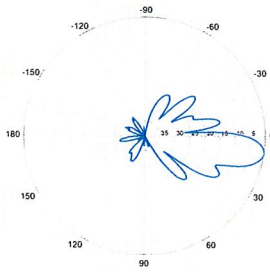
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



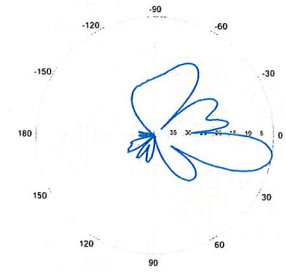
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

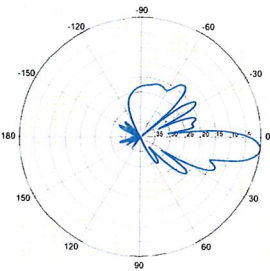


8° | Vertical | 750 MHz

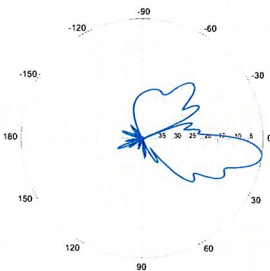
BXA-70063-6CF-EDIN-10



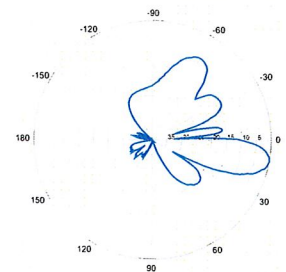
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

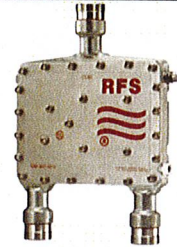
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product.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



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

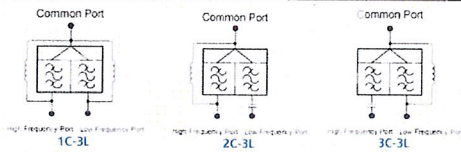


ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

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

Site Name: Woodbury N Tower Height: Verizon @ 150ft		General	Power	Density				
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Alltel	4	250	130	0.0213	1945	1.0000	2.13%	
*Alltel/CDMA	1	222	130	0.0047	878	0.5853	0.81%	
*Sprint	11	222	160	0.0343	1950	1.0000	3.43%	
*Nextel	9	100	140	0.0165	851	0.5673	2.91%	
*Cingular UMTS	9	485	150	0.0698	1970	1.0000	6.98%	
*Cingular GSM	9	200	150	0.0288	875	0.5833	4.93%	
*Cingular GSM	1	500	120	0.0125	880	0.5867	2.13%	
Verizon PCS	7	268	150	0.0300	1970	1.0000	3.00%	
Verizon Cellular	9	296	150	0.0426	869	0.5793	7.35%	
Verizon AWS	1	670	150	0.0107	2145	1.0000	1.07%	
Verizon 700	2	780	150	0.0249	698	0.4653	5.36%	
* Source: Siting Council								40.09%



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Specializing in Communication Tower Engineering

November 29, 2011

Veronica Harris, Tower Structural Analyst
 Crown Castle USA Inc.
 1200 McArthur Blvd
 Mahwah, NJ 07430

Subject: Structural Analysis Report

Carrier Designation: Carrier Co-Locate: Verizon Wireless
 Carrier Site Number: NA
 Carrier Site Name: Woodbury North

Crown Castle Designation: Crown Castle BU Number: 876379
 Crown Castle Site Name: N. WOODBURY / WOLFF PARCEL
 Crown Castle JDE Job Number: 172028
 Crown Castle WO Number: 452865

Engineering Firm Designation: P-SEC Project Number: 5717

Site Data: 1440 Main Street North, WOODBURY, Litchfield County, CT
 Latitude 41° 35' 23.81", Longitude -73° 10' 11.52"
 163-ft EEI Monopole

Dear Veronica Harris,

Pier Structural Engineering Corp. (P-SEC) 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 439784, in accordance with application 134433, 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:

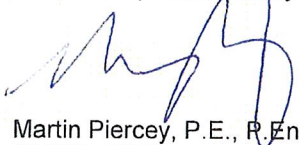
LC1: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
 Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local building code requirements based upon a wind speed of 80 mph fastest mile.

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

We at P-SEC 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:


 Martin Piercey, P.E., P.Eng.
 CT PE# 25582

RISA Tower Report - version 5.4.2.0



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1) INTRODUCTION

This tower is a 163-ft monopole designed by ENGINEERED ENDEAVORS, INC. in September of 1999. The tower was originally designed for a wind speed of 95 mph per TIA/EIA-222-F. The monopole was also design for a future extension of 30-ft, bringing the total height of the monopole to 190-ft.

2) ANALYSIS CRITERIA

The following design parameters have been used in our analysis:

Design Standard:		TIA/EIA-222-F standard and local building code requirements
County/State:		Litchfield County, CT
Wind Speeds:	CASE 1	80.0 mph (fastest mile)
	CASE 2	28.1 mph (fastest mile) with 3/4" radial solid ice (per ASCE7 ice map)
	CASE 3	50.0 mph (fastest mile) for Serviceability
Allowable Stress:		Increased 1/3rd

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
148	150	3	antel	BXA-70063-6CF-2			
		3	antel	BXA-171085-12BF-2	--	--	1
		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
160	171	1	sinclair	SC229-SFXLDF			
	160	1	--	Pipe Mount [PM 601-1]	1	1/2	1
156	158	9	mla	MLA_ANTENNA	9	1-5/8	3
		6	decibel	DB980H90E-M	6	1-5/8	1
	156	1	--	Platform Mount [LP 712-1]			
148	150	6	decibel	DB950F85E-M	--	--	2
		6	antel	LPA-80080/6CF	12	1-5/8	1
	148	1	--	Platform Mount [LP 401-1]			
141	142	12	decibel	DB846G90A-XY	12	1-5/8	1
	141	1	--	Platform Mount [LP 303-1]			
118	119	6	powerwave	7770.00			
		6	powerwave	LGP21401	12	1-5/8	1
		6	powerwave	LGP21901			
108	118	1	--	Platform Mount [LP 401-1]			
		1	telewave	ANT150D6-9	1	1/2	1
	108	1	--	Leg Mount			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
22	23	1	lucent	KS24019-L112A	1	1/2	1
	22	1	--	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing equipment
- 2) Equipment to be replaced by proposed
- 3) MLA equipment controlling

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
160	160	12	decibel	DB980H90		
145	145	12	decibel	DB980H90		
130	130	12	decibel	DB980H90	--	--
115	115	12	decibel	DB980H90		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C. dated 9/9/1999	1531966	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEl, Proj. No. 5621 dated 9/16/1999	1614612	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEl, Proj. No. 5621 dated 9/20/1999	1613543	CCISITES
APPLICATION	Verizon, Revision # 1 dated 11/21/2011	134433	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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. P-SEC should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary) - LC1

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail	
L1	163 - 121.602	Pole	TP42.1875x34.28x0.3125	1	-10.46	2102.19	20.8	Pass	
L2	121.602 - 84.6953	Pole	TP48.8438x40.4557x0.375	2	-21.14	2918.86	39.3	Pass	
L3	84.6953 - 41.9792	Pole	TP56.2813x46.7964x0.4375	3	-34.15	3926.79	49.3	Pass	
L4	41.9792 - 0	Pole	TP63.5x53.9574x0.5	4	-53.84	5197.71	53.8	Pass	
							Summary		
							Pole (L4)	53.8	Pass
							RATING =	53.8	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
2	Anchor Rods	--	53.2	Pass
2	Base Plate	--	54.6	Pass
2	Base Foundation - Soil	--	35.5	Pass
2	Base Foundation - Rebar	--	56.6	Pass
Structure Rating (max from all components) =				56.6%

- Notes: 1) See full member breakdown and section capacities in Appendix A.
 2) See additional documentation in Appendix C for supporting calculations.
 3) Stresses up to 105% (steel) and 110% (foundations) are within engineering tolerance and considered acceptable.

4.1) Recommendations

The existing 163-ft monopole located in Litchfield County (N. WOODBURY / WOLFF PARCEL), CT is **structurally acceptable** based on the TIA/EIA-222-F standard and local building code requirements based upon a wind speed of 80 mph fastest mile.

No modifications are required for the proposed loading.

Should you have any questions, please call us anytime at 519-885-3806.

encl.
 876379-134433 SA Report-20111129.doc

APPENDIX A
RISA TOWER OUTPUT

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
SC229-SFXLDF (Carrier 160' E)	160	Platform Mount [LP 401-1] (Carrier 148' E)	148
Pipe Mount [PM 601-1] (Carrier 160' E)	160	(4) DB846G90A-XY w/ Mount Pipe (Carrier 141' E)	141
(3) MLA_ANTENNA w/ Mount Pipe (Carrier 156' MLA)	156	(4) DB846G90A-XY w/ Mount Pipe (Carrier 141' E)	141
(3) MLA_ANTENNA w/ Mount Pipe (Carrier 156' MLA)	156	(4) DB846G90A-XY w/ Mount Pipe (Carrier 141' E)	141
(3) MLA_ANTENNA w/ Mount Pipe (Carrier 156' MLA)	156	Platform Mount [LP 303-1] (Carrier 141' E)	141
Platform Mount [LP 712-1] (Carrier 156' E)	156	(2) 7770.00 w/ Mount Pipe (Carrier 118' E)	118
(2) LPA-80080/6CF w/ Mount Pipe (Carrier 148' E)	148	(2) 7770.00 w/ Mount Pipe (Carrier 118' E)	118
(2) LPA-80080/6CF w/ Mount Pipe (Carrier 148' E)	148	(2) 7770.00 w/ Mount Pipe (Carrier 118' E)	118
(2) LPA-80080/6CF w/ Mount Pipe (Carrier 148' E)	148	(2) LGP21401 (Carrier 118' E)	118
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	148	(2) LGP21401 (Carrier 118' E)	118
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	148	(2) LGP21401 (Carrier 118' E)	118
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	148	(2) LGP21901 (Carrier 118' E)	118
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	148	(2) LGP21901 (Carrier 118' E)	118
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	148	(2) 5' x 2" Pipe Mount (Carrier 118' E)	118
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	148	(2) 5' x 2" Pipe Mount (Carrier 118' E)	118
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	148	Platform Mount [LP 401-1] (Carrier 118' E)	118
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	148	ANT150D6-9 (Carrier 108' E)	108
(2) FD9R6004/2C-3L (Carrier 148' P)	148	KS24019-L112A (Carrier 22' E)	22
(2) FD9R6004/2C-3L (Carrier 148' P)	148	Side Arm Mount [SO 701-1] (Carrier 22' E)	22
(2) FD9R6004/2C-3L (Carrier 148' P)	148		

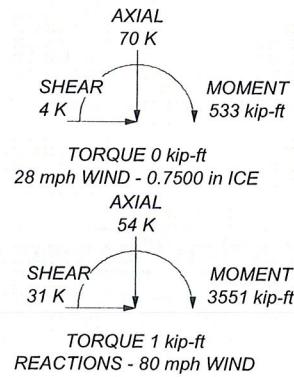
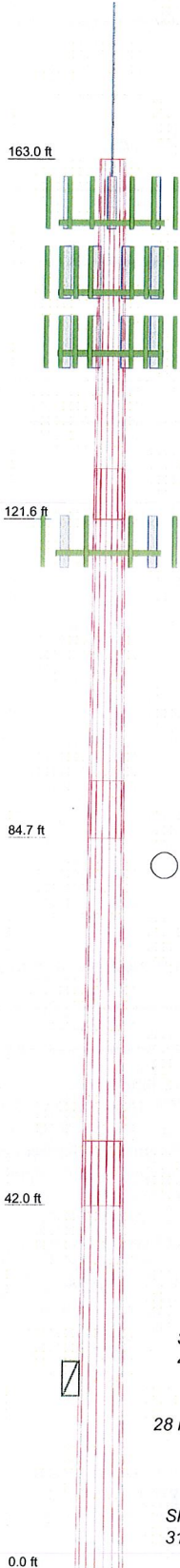
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 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 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. -----
6. E - Existing, R/MLA - Reserved, P - Proposed
7. Proposed loading at 148ft elevation
8. TOWER RATING: 53.8%

1	414'-13/16"	18	0.3125	5'9"-15/32"	34.2800	42.1875	5.3	
2	42'8"-13/32"	18	0.3750	6'7"-3/16"	40.4557	48.8438	7.7	
3	49'3"-27/32"	18	0.4375	7'6"-3/8"	46.7964	56.2813	11.9	
4	49'6"-1/8"	18	0.5000	53.9574	63.5000	15.6		
A572-65							84.7 ft	
A572-65							42.0 ft	
A572-65							0.0 ft	



<p>Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076</p>		<p>Job: PSEC 5717 (for VERIZON)</p>	
		<p>Project: 876379 - N. WOODBURY/ WOLFF PARCEL</p>	
<p>Consulting Engineers</p>	<p>Code: TIA/EIA-222-F</p>	<p>Drawn by: fchan</p>	<p>Date: 11/29/11</p>
	<p>Path: H:\PROJECTS\5717 - CCL - 876379 - N. WOODBURY - WOLFF PARCEL - IPI08763794.C1-20111129.dwg</p>	<p>App'd:</p>	<p>Scale: NTS</p>
			<p>Dwg No. E-1</p>

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	Project 876379 - N. WOODBURY/ WOLFF PARCEL	Date 15:30:14 11/29/11
	Client CROWN CASTLE	Designed by fchan

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 0.7500 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.

E - Existing, R/MLA - Reserved, P - Proposed.

Proposed loading at 148ft elevation.

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	163'-121'7-3/16"	41'4-13/16"	5'9-15/32"	18	34.2800	42.1875	0.3125	1.2500	A572-65 (65 ksi)
L2	121'7-3/16"-84'8-13/32"	42'8-13/32"	6'7-3/16"	18	40.4557	48.8438	0.3750	1.5000	1 鑽 1 針 1 軒 1 (65 ksi)
L3	84'8-13/32"-41'1-3/4"	49'3-27/32"	7'6-3/8"	18	46.7964	56.2813	0.4375	1.7500	A572-65 (65 ksi)

RISATower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job PSEC 5717 (for VERIZON)	Page 2 of 9
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	Client CROWN CASTLE	Designed by fchan

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
L4	41'11-3/4"-0'	49'6-1/8"		18	53.9574	63.5000	0.5000	2.0000	A572-65 (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	I/Q in ²	w in	w/t
L1	34.8088	33.6915	4911.1720	12.0585	17.4142	282.0205	9828.8063	16.8490	5.4833	17.546
	42.8383	41.5348	9201.5047	14.8656	21.4312	429.3499	18415.1171	20.7713	6.8750	22
L2	42.2356	47.7061	9682.3951	14.2287	20.5515	471.1280	19377.5306	23.8576	6.4602	17.227
	49.5972	57.6899	17122.2604	17.2064	24.8126	690.0624	34267.0508	28.8504	7.9365	21.164
L3	48.8080	64.3752	17479.2551	16.4574	23.7726	735.2692	34981.5099	32.1937	7.4662	17.066
	57.1495	77.5460	30552.4578	19.8245	28.5909	1068.6087	61145.1173	38.7804	9.1355	20.881
L4	56.2642	84.8369	30629.3755	18.9774	27.4104	1117.4377	61299.0539	42.4265	8.6165	17.233
	64.4796	99.9810	50134.4235	22.3650	32.2580	1554.1702	100334.815	50.0000	10.2960	20.592

2

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 163'-121'7-3/16"				1	1	1		
L2 121'7-3/16"-84' 8-13/32"				1	1	1		
L3 84'8-13/32"-41' 11-3/4"				1	1	1		
L4 41'11-3/4"-0'				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}	Weight plf
1/2" Line (Carrier 160' E)	C	No	Inside Pole	160' - 5'	1	No Ice	0.00
						1/2" Ice	0.00
						1" Ice	0.00
						2" Ice	0.00
						4" Ice	0.00
** 1-5/8" Line (Carrier 156' MLA)	C	No	Inside Pole	156' - 5'	9	No Ice	0.00
1/2" Ice						0.00	
1" Ice						0.00	
2" Ice						0.00	
4" Ice						0.00	
** 1-5/8" Line (Carrier 148' E)	C	No	Inside Pole	148' - 5'	12	No Ice	0.00
1/2" Ice						0.00	

<p>RISA Tower</p> <p>Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076</p>	Job	PSEC 5717 (for VERIZON)	Page	3 of 9
	Project	876379 - N. WOODBURY/ WOLFF PARCEL	Date	15:30:14 11/29/11
	Client	CROWN CASTLE	Designed by	fchan

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_{AA} ft ² /ft	Weight plf
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
** 1-5/8" Line (Carrier 141' E)	C	No	Inside Pole	141' - 5'	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
** 1-5/8" Line (Carrier 118' E)	C	No	Inside Pole	118' - 5'	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
** 1/2" Line (Carrier 108' E)	C	No	Inside Pole	108' - 5'	1	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
** 1/2" Line (Carrier 22' E)	C	No	CaAa (Out Of Face)	22' - 5'	1	No Ice	0.05	0.15
						1/2" Ice	0.10	0.84
						1" Ice	0.15	2.14
						2" Ice	0.25	6.58
						4" Ice	0.45	22.78

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_{AA} Front ft ²	C_{AA} Side ft ²	Weight K
SC229-SFXLDF (Carrier 160' E)	A	From Leg	1.00 0' 11'	0.0000	160'	No Ice	5.95	5.95	0.03
						1/2" Ice	7.97	7.97	0.07
						1" Ice	10.00	10.00	0.13
						2" Ice	14.12	14.12	0.28
						4" Ice	21.45	21.45	0.74
Pipe Mount [PM 601-1] (Carrier 160' E)	A	From Leg	0.50 0' 0'	0.0000	160'	No Ice	3.00	0.90	0.07
						1/2" Ice	3.74	1.12	0.08
						1" Ice	4.48	1.34	0.09
						2" Ice	5.96	1.78	0.12
						4" Ice	8.92	2.66	0.18
** (3) MLA_ANTENNA w/ Mount Pipe (Carrier 156' MLA)	A	From Leg	4.00 0' 2'	0.0000	156'	No Ice	8.64	6.95	0.07
						1/2" Ice	9.29	8.13	0.13
						1" Ice	9.91	9.02	0.21
						2" Ice	11.18	10.84	0.39
						4" Ice	13.83	14.85	0.90
(3) MLA_ANTENNA w/ Mount Pipe (Carrier 156' MLA)	B	From Leg	4.00 0' 2'	0.0000	156'	No Ice	8.64	6.95	0.07
						1/2" Ice	9.29	8.13	0.13
						1" Ice	9.91	9.02	0.21
						2" Ice	11.18	10.84	0.39

RISATower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job	PSEC 5717 (for VERIZON)	Page	4 of 9
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	Client	CROWN CASTLE	Designed by	fchan

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
(3) MLA_ ANTENNA w/ Mount Pipe (Carrier 156' MLA)	C	From Leg	4.00		0.0000	156'	4" Ice	13.83	14.85	0.90
			0'				No Ice	8.64	6.95	0.07
			2'				1/2" Ice	9.29	8.13	0.13
							1" Ice	9.91	9.02	0.21
							2" Ice	11.18	10.84	0.39
Platform Mount [LP 712-1] (Carrier 156' E)	C	None			0.0000	156'	4" Ice	13.83	14.85	0.90
							No Ice	24.53	24.53	1.34
							1/2" Ice	29.94	29.94	1.65
							1" Ice	35.35	35.35	1.96
							2" Ice	46.17	46.17	2.58
**						4" Ice	67.81	67.81	3.82	
(2) LPA-80080/6CF w/ Mount Pipe (Carrier 148' E)	A	From Leg	4.00		0.0000	148'	No Ice	4.56	10.73	0.05
			0'				1/2" Ice	5.11	11.99	0.11
			2'				1" Ice	5.61	12.97	0.19
							2" Ice	6.65	14.98	0.36
							4" Ice	8.83	19.22	0.86
(2) LPA-80080/6CF w/ Mount Pipe (Carrier 148' E)	B	From Leg	4.00		0.0000	148'	No Ice	4.56	10.73	0.05
			0'				1/2" Ice	5.11	11.99	0.11
			2'				1" Ice	5.61	12.97	0.19
							2" Ice	6.65	14.98	0.36
							4" Ice	8.83	19.22	0.86
(2) LPA-80080/6CF w/ Mount Pipe (Carrier 148' E)	C	From Leg	4.00		0.0000	148'	No Ice	4.56	10.73	0.05
			0'				1/2" Ice	5.11	11.99	0.11
			2'				1" Ice	5.61	12.97	0.19
							2" Ice	6.65	14.98	0.36
							4" Ice	8.83	19.22	0.86
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	A	From Leg	4.00		0.0000	148'	No Ice	4.97	5.23	0.04
			0'				1/2" Ice	5.52	6.39	0.08
			2'				1" Ice	6.04	7.26	0.14
							2" Ice	7.09	9.05	0.27
							4" Ice	9.36	12.82	0.67
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	B	From Leg	4.00		0.0000	148'	No Ice	4.97	5.23	0.04
			0'				1/2" Ice	5.52	6.39	0.08
			2'				1" Ice	6.04	7.26	0.14
							2" Ice	7.09	9.05	0.27
							4" Ice	9.36	12.82	0.67
BXA-171085-12BF-2 w/ Mount Pipe (Carrier 148' P)	C	From Leg	4.00		0.0000	148'	No Ice	4.97	5.23	0.04
			0'				1/2" Ice	5.52	6.39	0.08
			2'				1" Ice	6.04	7.26	0.14
							2" Ice	7.09	9.05	0.27
							4" Ice	9.36	12.82	0.67
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	A	From Leg	4.00		0.0000	148'	No Ice	7.97	5.80	0.04
			0'				1/2" Ice	8.61	6.95	0.10
			2'				1" Ice	9.22	7.82	0.17
							2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	B	From Leg	4.00		0.0000	148'	No Ice	7.97	5.80	0.04
			0'				1/2" Ice	8.61	6.95	0.10
			2'				1" Ice	9.22	7.82	0.17
							2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80
BXA-70063-6CF-2 w/ Mount Pipe (Carrier 148' P)	C	From Leg	4.00		0.0000	148'	No Ice	7.97	5.80	0.04
			0'				1/2" Ice	8.61	6.95	0.10
			2'				1" Ice	9.22	7.82	0.17
							2" Ice	10.46	9.60	0.34
							4" Ice	13.07	13.37	0.80

RISA Tower Pier Structural Engineering Corp. 198-55 Northfield Drive East Waterloo, Ontario N2K 3T6 Phone: (519) 885-3806 FAX: (519) 886-0076	Job	PSEC 5717 (for VERIZON)	Page	5 of 9
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	Client	CROWN CASTLE	Designed by	fchan

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
(2) FD9R6004/2C-3L (Carrier 148' P)	A	From Leg	4.00 0' 2'	0.0000	148'	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 (Carrier 148' P)	B	From Leg	4.00 0' 2'	0.0000	148'	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 (Carrier 148' P)	C	From Leg	4.00 0' 2'	0.0000	148'	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
Platform Mount [LP 401-1] (Carrier 148' E)	C	None		0.0000	148'	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
**									
(4) DB846G90A-XY w/ Mount Pipe (Carrier 141' E)	A	From Leg	4.00 0' 1'	0.0000	141'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.09 0.16 0.32 0.77
(4) DB846G90A-XY w/ Mount Pipe (Carrier 141' E)	B	From Leg	4.00 0' 1'	0.0000	141'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.09 0.16 0.32 0.77
(4) DB846G90A-XY w/ Mount Pipe (Carrier 141' E)	C	From Leg	4.00 0' 1'	0.0000	141'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.23 5.78 6.30 7.37 9.69	7.53 8.72 9.62 11.45 15.60	0.04 0.09 0.16 0.32 0.77
Platform Mount [LP 303-1] (Carrier 141' E)	C	None		0.0000	141'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
**									
(2) 7770.00 w/ Mount Pipe (Carrier 118' E)	A	From Leg	4.00 0' 1'	0.0000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe (Carrier 118' E)	B	From Leg	4.00 0' 1'	0.0000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe (Carrier 118' E)	C	From Leg	4.00 0' 1'	0.0000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.06 0.10 0.16 0.29 0.66

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	Client CROWN CASTLE	Designed by fchan

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
KS24019-L112A (Carrier 22' E)	C	From Leg	3.00	0.0000	22'	No Ice	0.16	0.16	0.01
			0'			1/2" Ice	0.22	0.22	0.01
			1'			1" Ice	0.30	0.30	0.01
						2" Ice	0.48	0.48	0.02
Side Arm Mount [SO 701-1] (Carrier 22' E)	C	From Leg	1.50	0.0000	22'	No Ice	0.85	1.67	0.07
			0'			1/2" Ice	1.14	2.34	0.08
			0'			1" Ice	1.43	3.01	0.09
						2" Ice	2.01	4.35	0.12
						4" Ice	3.17	7.03	0.18

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	163 - 121.602	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	14	-18.16	0.00	0.47
			Max. Mx	11	-10.47	354.73	0.19
			Max. My	2	-10.46	0.00	357.95
			Max. Vy	11	-16.30	354.73	0.19
			Max. Vx	2	-16.39	0.00	357.95
			Max. Torque	11			-0.72
			Max Tension	1	0.00	0.00	0.00
L2	121.602 - 84.6953	Pole	Max. Compression	14	-32.36	0.00	0.84
			Max. Mx	11	-21.15	1085.00	0.37
			Max. My	2	-21.14	0.00	1091.80
			Max. Vy	11	-22.74	1085.00	0.37
			Max. Vx	2	-22.84	0.00	1091.80
			Max. Torque	5			1.25
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-47.67	0.00	0.84
L3	84.6953 - 41.9792	Pole	Max. Mx	11	-34.16	2118.21	0.38
			Max. My	2	-34.15	0.00	2128.95
			Max. Vy	11	-26.60	2118.21	0.38
			Max. Vx	2	-26.70	0.00	2128.95
			Max. Torque	5			1.25
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-70.14	0.39	0.61
			Max. Mx	11	-53.84	3535.85	0.45
L4	41.9792 - 0	Pole	Max. My	2	-53.84	0.47	3551.03
			Max. Vy	11	-30.57	3535.85	0.45
			Max. Vx	2	-30.67	0.47	3551.03
			Max. Torque	5			1.25

Maximum Reactions

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	Client	CROWN CASTLE	Designed by	fchan

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	70.14	0.00	0.00
	Max. H _x	11	53.85	30.55	0.01
	Max. H _z	2	53.85	0.01	30.65
	Max. M _x	2	3551.03	0.01	30.65
	Max. M _z	5	3535.34	-30.55	-0.01
	Max. Torsion	5	1.14	-30.55	-0.01
	Min. Vert	2	53.85	0.01	30.65
	Min. H _x	5	53.85	-30.55	-0.01
	Min. H _z	8	53.85	-0.01	-30.65
	Min. M _x	8	-3550.56	-0.01	-30.65
	Min. M _z	11	-3535.85	30.55	0.01
	Min. Torsion	11	-1.14	30.55	0.01

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	163 - 121.602	19.446	27	0.9399	0.0014
L2	127.396 - 84.6953	12.570	27	0.8737	0.0009
L3	91.2995 - 41.9792	6.628	27	0.6660	0.0005
L4	49.513 - 0	2.005	27	0.3618	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160'	SC229-SFXLDF	27	18.851	0.9371	0.0013	99966
156'	(3) MLA_ANTENNA w/ Mount Pipe	27	18.060	0.9331	0.0013	71404
148'	(2) LPA-80080/6CF w/ Mount Pipe	27	16.486	0.9235	0.0012	33322
141'	(4) DB846G90A-XY w/ Mount Pipe	27	15.128	0.9117	0.0011	22719
118'	(2) 7770.00 w/ Mount Pipe	27	10.890	0.8323	0.0008	12217
108'	ANT150D6-9	27	9.198	0.7765	0.0007	10735
22'	KS24019-L112A	27	0.600	0.1601	0.0001	13526

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _n ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P/P _a
L1	163 - 121.602 (1)	TP42.1875x34.28x0.3125	41'4"-13/16"	0'	0.0	39.000	40.4370	-10.46	1577.04	0.007
L2	121.602 - 84.6953 (2)	TP48.8438x40.4557x0.375	42'8"-13/32"	0'	0.0	39.000	56.1458	-21.14	2189.69	0.010

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	Client CROWN CASTLE	Designed by fchan

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
L3	84.6953 - 41.9792 (3)	TP56.2813x46.7964x0.4375	49'3-27/32"	0'	0.0	39.000	75.5341	-34.15	2945.83	0.012
L4	41.9792 - 0 (4)	TP63.5x53.9574x0.5	49'6-1/8"	0'	0.0	39.000	99.9810	-53.84	3899.26	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	163 - 121.602 (1)	TP42.1875x34.28x0.3125	357.95	-10.557	39.000	0.271	0.00	0.000	39.000	0.000
L2	121.602 - 84.6953 (2)	TP48.8438x40.4557x0.375	1091.80	-20.049	39.000	0.514	0.00	0.000	39.000	0.000
L3	84.6953 - 41.9792 (3)	TP56.2813x46.7964x0.4375	2128.95	-25.203	39.000	0.646	0.00	0.000	39.000	0.000
L4	41.9792 - 0 (4)	TP63.5x53.9574x0.5	3551.03	-27.418	39.000	0.703	0.00	0.000	39.000	0.000

Pole Interaction Design Data

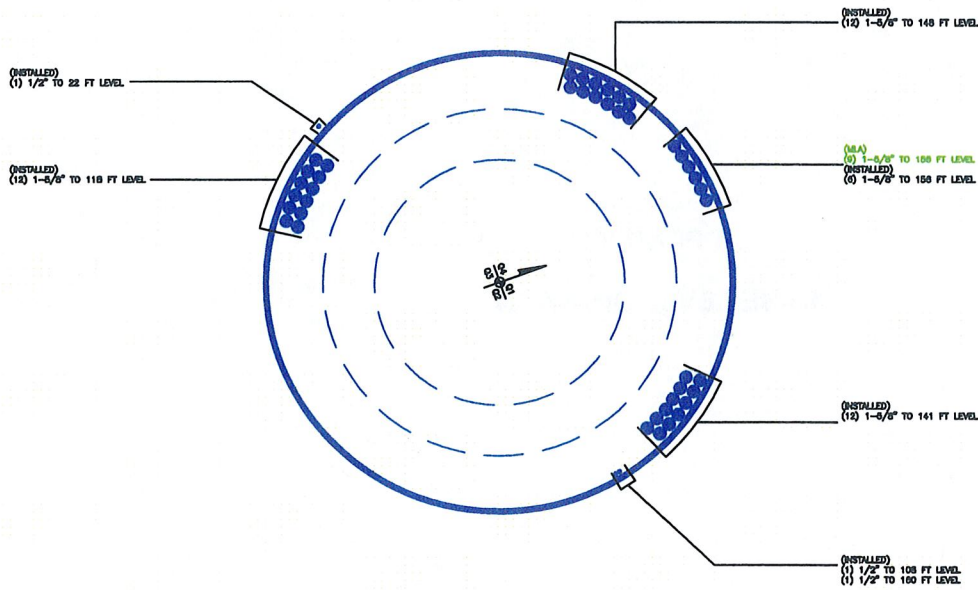
Section No.	Elevation ft	Size	Ratio P P _a	Ratio f _{bx} F _{bx}	Ratio f _{by} F _{by}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	163 - 121.602 (1)	TP42.1875x34.28x0.3125	0.007	0.271	0.000	0.277	1.333	H1-3 ✓
L2	121.602 - 84.6953 (2)	TP48.8438x40.4557x0.375	0.010	0.514	0.000	0.524	1.333	H1-3 ✓
L3	84.6953 - 41.9792 (3)	TP56.2813x46.7964x0.4375	0.012	0.646	0.000	0.658	1.333	H1-3 ✓
L4	41.9792 - 0 (4)	TP63.5x53.9574x0.5	0.014	0.703	0.000	0.717	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
L1	163 - 121.602	Pole	TP42.1875x34.28x0.3125	1	-10.46	2102.19	20.8	Pass
L2	121.602 - 84.6953	Pole	TP48.8438x40.4557x0.375	2	-21.14	2918.86	39.3	Pass
L3	84.6953 - 41.9792	Pole	TP56.2813x46.7964x0.4375	3	-34.15	3926.79	49.3	Pass
L4	41.9792 - 0	Pole	TP63.5x53.9574x0.5	4	-53.84	5197.71	53.8	Pass
Summary								
Pole (L4)							53.8	Pass
RATING =							53.8	Pass

APPENDIX B
BASE LEVEL DRAWING

TX LINE LAYOUT



8/26/11 67037048 C. BASSEVEL

Clients



Professional Stamp

Revisions

No.	Description	Date
A	ISSUED FOR REVIEW	11.29.11

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Engineering Firm

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www.p-sec.ca

PIER STRUCTURAL ENGINEERING CORP
55 NORTHFIELD DR. E, SUITE 198
WATERLOO, ON N2K 3T6

PSEC Job No.

5717

Site Name

876379
N. WOODBURY/
WOLFF PARCEL

Site Design

Sheet Title

TX LINES

Drawn by

FC

Sheet

Checked by

Approved By

A-1

APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: 876379
Site Name: N.Woodbury/Wolfe Parcel
App #: 134433 rev.1
Pole Manufacturer: <i>Other</i>

Reactions		
Moment:	3551	ft-kips
Axial:	54	kips
Shear:	31	kips

Anchor Rod Data

Qty:	22	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	73	in

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

Anchor Rod Results

Maximum Rod Tension: 103.7 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 53.2% **Pass**

Rigid
Service, ASD
Fty*ASIF

Plate Data

Diam:	79	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	9.16	in

Base Plate Results

Base Plate Stress: 32.8 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 54.6% **Pass**

Flexural Check

Rigid
Service ASD
0.75*Fy*ASIF
Y.L. Length: 36.01

Stiffener Data (Welding at both sides)

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

n/a

Stiffener Results

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

Pole Results

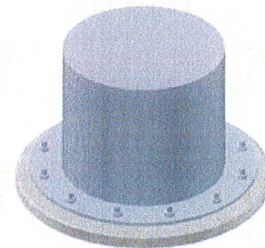
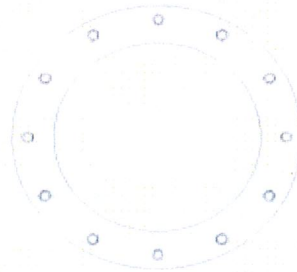
Pole Punching Shear Check: n/a

Pole Data

Diam:	63.5	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

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



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

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

P-SEC

 * PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
 *

*** ANALYSIS IDENTIFICATION : 96" Caisson (8')
 NOTES : 8769379 - N.WOODBURY/WOLFF PARCEL

*** PIER PROPERTIES CONCRETE STRENGTH (ksi) = 4.00 STEEL STRENGTH (ksi) = 60.00
 DIAMETER (ft) = 8.000 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 1.00

*** SOIL PROPERTIES

LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
1	S	4.00	0.00	135.0		1.000	-0.00
2	S	10.50	4.00	135.0		4.204	38.00
3	S	17.00	14.50	75.0		4.204	38.00

*** DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 3551.0 VERTICAL (k) = 54.0 SHEAR (k) = 31.0
 ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 2.00

*** CALCULATED PIER LENGTH (ft) = 20.500 <<< 29FT DESIGN PIER LENGTH [OK]

*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
S	1.00	4.00	135.0		1.000	25.92	3.67
S	5.00	9.97	135.0		4.204	1221.05	10.91
S	14.97	0.53	135.0		4.204	-101.89	15.24
S	15.50	5.00	75.0		4.204	-1082.11	18.07

*** SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR		WITHOUT ADDITIONAL SAFETY FACTOR	
	SHEAR (k)	MOMENT (ft-k)	SHEAR (k)	MOMENT (ft-k)
0.00	63.0	7693.0	31.5	3846.5
2.05	61.2	7821.4	30.6	3910.7
4.10	47.4	7935.1	23.7	3967.5
6.15	-34.6	7976.4	-17.3	3988.2
8.20	-207.0	7738.5	-103.5	3869.2
10.25	-436.7	7088.4	-218.4	3544.2
12.30	-723.6	5908.9	-361.8	2954.4
14.35	-1067.8	4082.5	-533.9	2041.3
16.40	-901.3	1891.1	-450.6	945.6
18.45	-466.5	483.6	-233.3	241.8
20.50	0.0	0.0	0.0	0.0

*** TOTAL REINFORCEMENT PCT = 0.44 REINFORCEMENT AREA (in^2) = 31.85
 *** USABLE AXIAL CAP. (k) = 54.0 USABLE MOMENT CAP. (ft-k) = 5788.6

- *** US Standard Re-Bars (Select one of the following):
- 160 BARS #4 (AREA = 0.20 in^2 DIA = 0.500 in) AT SPACING (in) = 1.69
 - 103 BARS #5 (AREA = 0.31 in^2 DIA = 0.625 in) AT SPACING (in) = 2.62
 - 73 BARS #6 (AREA = 0.44 in^2 DIA = 0.750 in) AT SPACING (in) = 3.70
 - 54 BARS #7 (AREA = 0.60 in^2 DIA = 0.875 in) AT SPACING (in) = 5.00
 - 41 BARS #8 (AREA = 0.79 in^2 DIA = 1.000 in) AT SPACING (in) = 6.59
 - 32 BARS #9 (AREA = 1.00 in^2 DIA = 1.128 in) AT SPACING (in) = 8.44
 - 26 BARS #10 (AREA = 1.27 in^2 DIA = 1.270 in) AT SPACING (in) = 10.39
 - 21 BARS #11 (AREA = 1.56 in^2 DIA = 1.410 in) AT SPACING (in) = 12.87
 - 15 BARS #14 (AREA = 2.25 in^2 DIA = 1.693 in) AT SPACING (in) = 18.01

*** WEIGHT OF CAISSON (kips) = 154.566
 *** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 1074.3

P-SEC

 * PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.*
 *

*** ANALYSIS IDENTIFICATION : 96" Caisson (8')
 NOTES : 876379 - N.WOODBURY/WOLFF PARCEL

*** PIER PROPERTIES CONCRETE STRENGTH (ksi) = 4.00 STEEL STRENGTH (ksi) = 60.00
 DIAMETER (ft) = 8.000 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 1.00

*** SOIL PROPERTIES	LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
	1	S	4.00	0.00	135.0		1.000	-0.00
	2	S	10.50	4.00	135.0		4.204	38.00
	3	S	17.00	14.50	75.0		4.204	38.00

*** DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 10000.0 VERTICAL (k) = 170.0 SHEAR (k) = 120.0
 ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 2.00

*** CALCULATED PIER LENGTH (ft) = 29.000

*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
S	1.00	4.00	135.0		1.000	25.92	3.67
S	5.00	10.50	135.0		4.204	1322.94	11.24
S	15.50	5.18	75.0		4.204	1123.80	18.17
S	20.68	8.32	75.0		4.204	-2232.06	25.00

*** SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR		WITHOUT ADDITIONAL SAFETY FACTOR	
	SHEAR (k)	MOMENT (ft-k)	SHEAR (k)	MOMENT (ft-k)
0.00	240.6	20420.0	120.3	10210.0
2.90	234.7	21114.0	117.4	10557.0
5.80	166.7	21741.5	83.4	10870.8
8.70	-80.1	21894.8	-40.1	10947.4
11.60	-441.6	21165.9	-220.8	10583.0
14.50	-917.6	19222.9	-458.8	9611.4
17.40	-1497.2	15740.3	-748.6	7870.1
20.30	-2143.5	10476.7	-1071.7	5238.4
23.20	-1610.8	4794.2	-805.4	2397.1
26.10	-837.2	1229.3	-418.6	614.7
29.00	-0.0	0.0	-0.0	0.0

*** TOTAL REINFORCEMENT PCT = 0.88 REINFORCEMENT AREA (in^2) = 63.70
 *** USABLE AXIAL CAP. (k) = 170.0 USABLE MOMENT CAP. (ft-k) = 11074.9

*** US Standard Re-Bars (Select one of the following):
 319 BARS #4 (AREA = 0.20 in^2 DIA = 0.500 in) AT SPACING (in) = 0.85
 206 BARS #5 (AREA = 0.31 in^2 DIA = 0.625 in) AT SPACING (in) = 1.31
 145 BARS #6 (AREA = 0.44 in^2 DIA = 0.750 in) AT SPACING (in) = 1.86
 107 BARS #7 (AREA = 0.60 in^2 DIA = 0.875 in) AT SPACING (in) = 2.53
 81 BARS #8 (AREA = 0.79 in^2 DIA = 1.000 in) AT SPACING (in) = 3.34
 64 BARS #9 (AREA = 1.00 in^2 DIA = 1.128 in) AT SPACING (in) = 4.22
 51 BARS #10 (AREA = 1.27 in^2 DIA = 1.270 in) AT SPACING (in) = 5.30
 41 BARS #11 (AREA = 1.56 in^2 DIA = 1.410 in) AT SPACING (in) = 6.59
 29 BARS #14 (AREA = 2.25 in^2 DIA = 1.693 in) AT SPACING (in) = 9.32

*** WEIGHT OF CAISSON (kips) = 218.655
 *** PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 3382.0

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#: 876379
 Site Name: N. Woodbury/Wolfe Parcel
 App #: 134433 rev.1

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	3988.2	ft-kips (* Note)
Max. Service Shaft P:	54	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: 5184.66	ft-kips
1.30	Pu: 70.2	kips

Pier Properties	
Concrete:	
Pier Diameter =	8.0 ft
Concrete Area =	7238.2 in ²
Reinforcement:	
Clear Cover to Tie =	4.00 in
Horiz. Tie Bar Size =	5
Vert. Cage Diameter =	7.11 ft
Vert. Cage Diameter =	85.34 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:	0.0069 0.69%

Material Properties		
Concrete Comp. strength, f _c =	4000	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 =	B	
Seismic Risk =	Low	

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

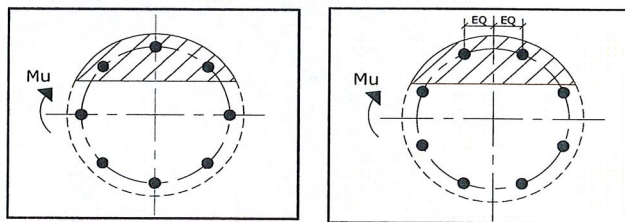
ACI 10.5 , ACI 21.10.4, and IBC 1810.
 Min As for Flexural, Tension Controlled, Shafts:
 (3)*(Sqrt(f_c)/F_y: 0.0032
 200 / F_y: 0.0033
 IBC 1810.1.2: None SDC A or B
 Governing: 0.0033 0.33%

ACI 10.8 and 10.9
 Min As for Columns, Comp. Controlled, Shafts:
 Min As: 0.0050 0.50%

Minimum Rho Check:
 Actual Req'd Min. Rho: 0.33% Flexural
 Provided Rho: 0.69% **OK**

Results:

Governing Orientation Case: 2



Case 1 Case 2
 Dist. From Edge to Neutral Axis: 14.77 in
 Extreme Steel Strain, ε_t: 0.0154
 ε_t > 0.0050, Tension Controlled
 Reduction Factor, ϕ: 0.90

 <-- Comment Box

Ref. Shaft Max Axial Capacities, ϕ Max(P _n or T _n):		
Max P _u = (ϕ=0.65) P _n .		
P _n per ACI 318 (10-2)	14266.44	kips
at Mu=(ϕ=0.65)M _n =	9928.66	ft-kips
Max T _u , (ϕ=0.9) T _n =	2695.68	kips
at Mu=ϕ=(0.90)M _n =	0.00	ft-kips

Output Note: Negative P_u=Tension
 For Axial Compression, ϕ P_n = P_u: 70.20 kips
 Drilled Shaft Moment Capacity, ϕM_n: 9164.88 ft-kips
 Drilled Shaft Superimposed Mu: 5184.66 ft-kips

(Mu/ϕM_n, Drilled Shaft Flexure CSR: 56.57%

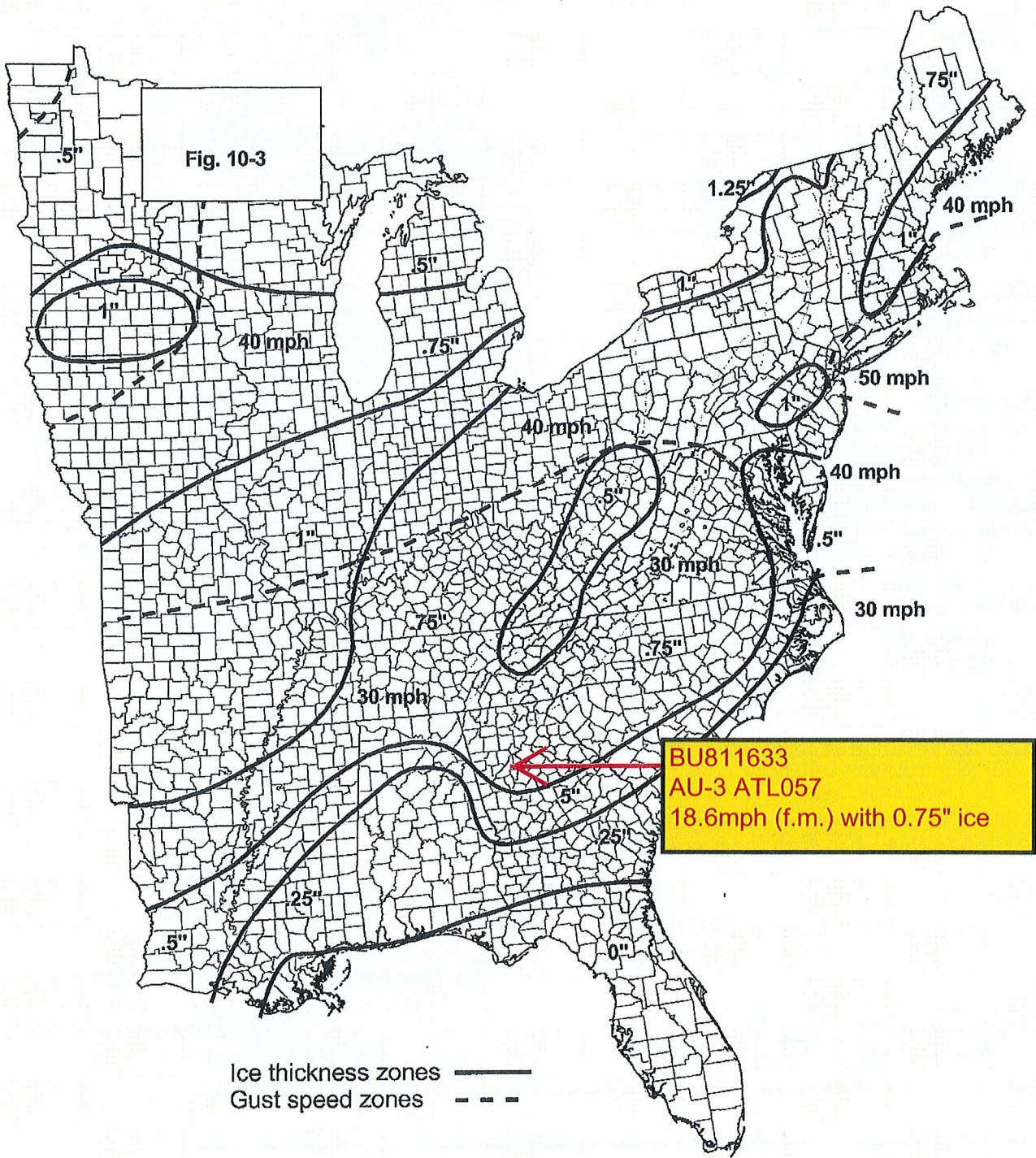


FIGURE 10-2 (continued) 50-YEAR MEAN RECURRENCE INTERVAL UNIFORM ICE THICKNESSES DUE TO FREEZING RAIN WITH CONCURRENT 3-SECOND GUST SPEEDS: CONTIGUOUS 48 STATES.