ROBINSON & COLE LLP

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
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Fax (860) 275-8299
kbaldwin@rc.com
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Also admitted in Massachusetts

September 25, 2012

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

Re: **Notice of Completion of Construction**
EM-VER-164-111020 – 340 Bloomfield Avenue, Windsor, CT
EM-VER-033-120620 – 201 Main Street, Cromwell, CT
EM-VER-078-120130 – 230 Clove Mill Road, Mansfield, CT
EM-VER-088-120314 – Clark Hill Road, Naugatuck, CT
EM-VER-129-120314 – 126 Pioneer Heights Road, Somers, CT

Dear Ms. Roberts:

The purpose of this letter is to notify the Council that construction activity associated with the above-referenced filings has been completed and all sites have now been activated.

If you have any questions or need any additional information regarding any of these facilities, please contact me.

Sincerely,

Kenneth C. Baldwin

Copy to:
Sandy M. Carter

11888218-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

July 11, 2012

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

RE: **EM-VER-033-120620-** Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 201 Main Street, Cromwell, 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 June 19, 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,

LRoberts

Linda Roberts
Executive Director

LR/CDM/jbw

c: The Honorable Mertie Terry, First Selectman, Town of Cromwell
Frederic Curtin, Zoning Enforcement Officer, Town of Cromwell
Crown Castle

ROBINSON & COLE

EM-VER-033-120620

KENNETH C. BALDWIN

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June 19, 2012

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

Re: **Notice of Exempt Modification – Antenna Swap**
201 Main Street, Cromwell, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 105-foot level of the existing 125-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 2001. Cellco now intends to replace its six (6) existing PCS antennas with three (3) model BXA-171063-8BF PCS antennas; two (2) model BXA-70063-6CF LTE antennas; and one (1) SLCP 2X6014 LTE antenna, all at the same 105-foot level. Cellco also intends to install six (6) coax cable diplexers on its existing antenna platform. Attached behind Tab 1 are the specifications for the 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 Mertie Terry, First Selectman for the Town of Cromwell. A copy of this letter is also being sent to S&S Partners, Inc., the owner of the property on which the tower is located.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas will be located at the 105-foot level on the 125-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) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report 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:
Mertie Terry, Cromwell First Selectman
S&S Partners, Inc.
Sandy M. Carter

BXA-171063-8BF-EDIN-X

Replace "X" with desired electrical downtilt.

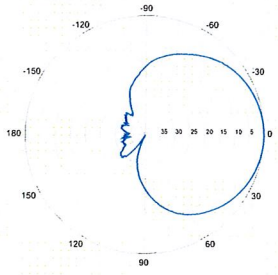
X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		

Mechanical Characteristics		
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm	5.2 in
Weight without mounting brackets	4.8 kg	10.5 lbs
Survival wind speed	296 km/hr	184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²	Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf

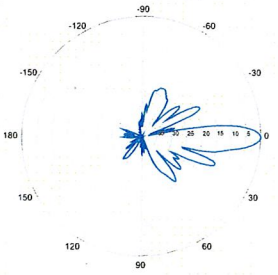
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

BXA-171063-8BF-EDIN-X



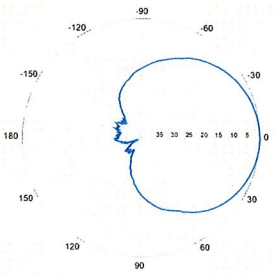
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



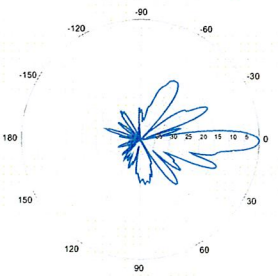
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



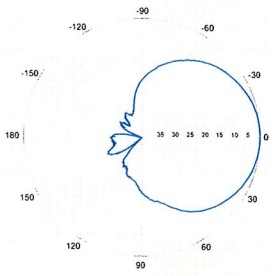
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-0



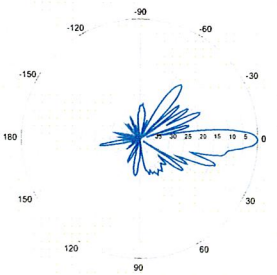
0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0

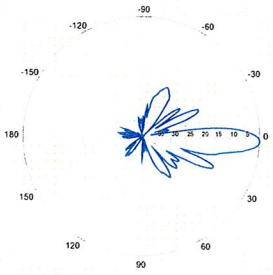


0° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-X

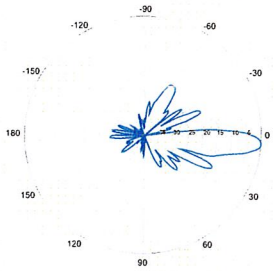
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



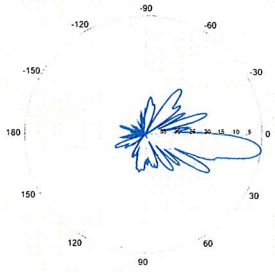
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



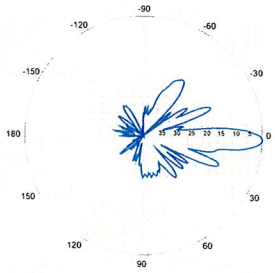
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



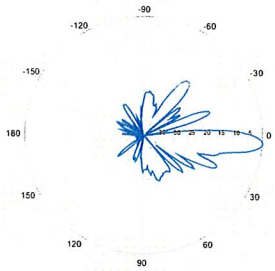
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



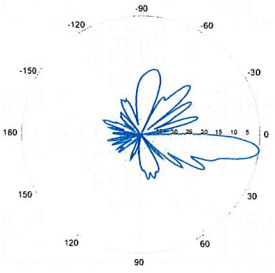
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



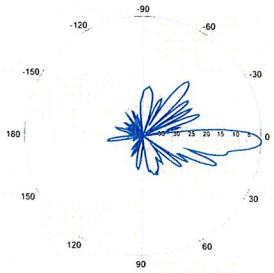
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



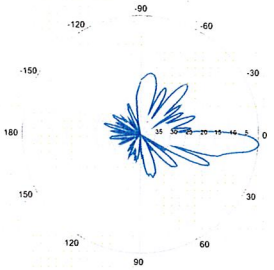
8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



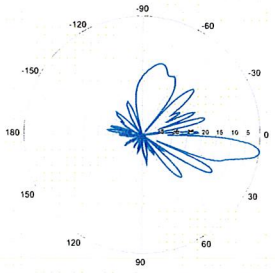
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

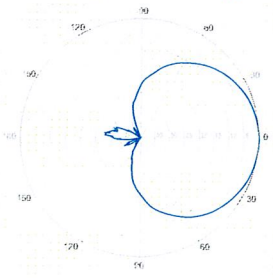
Replace "X" with desired electrical downtilt.

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

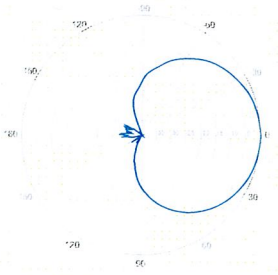
Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (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

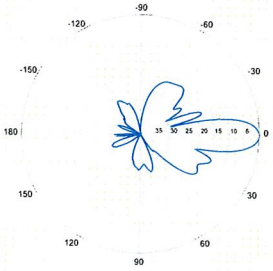


Horizontal | 750 MHz

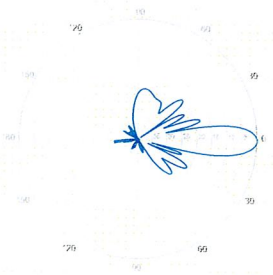


Horizontal | 850 MHz

BXA-70063-6CF-EDIN-0

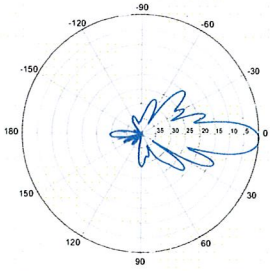


0° | Vertical | 750 MHz

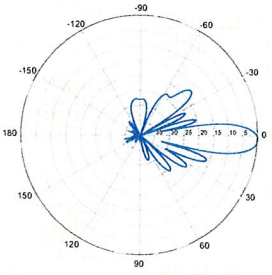


0° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-2



2° | Vertical | 750 MHz



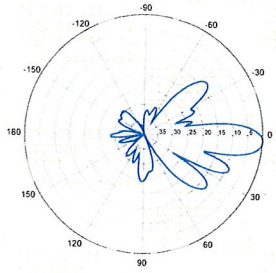
2° | Vertical | 850 MHz

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.

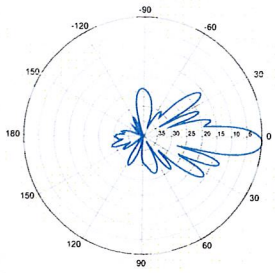
BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3

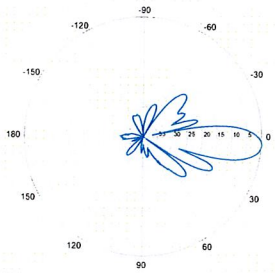


3° | Vertical | 750 MHz

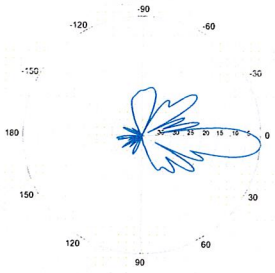


3° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-4

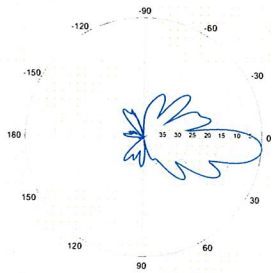


4° | Vertical | 750 MHz

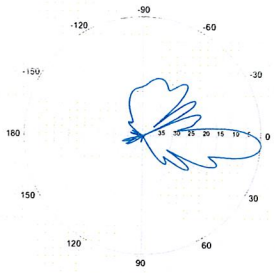


4° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-5

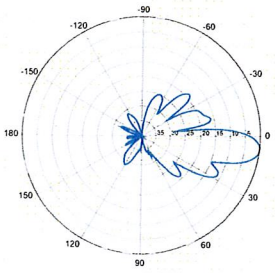


5° | Vertical | 750 MHz

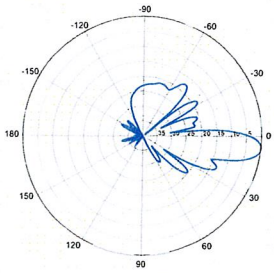


5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6

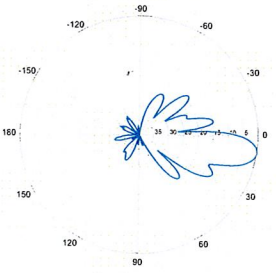


6° | Vertical | 750 MHz

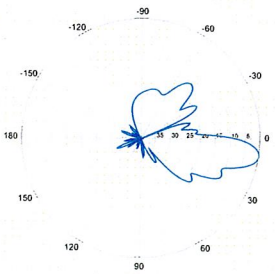


6° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-8

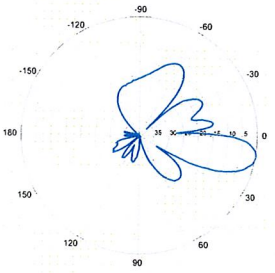


8° | Vertical | 750 MHz



8° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-10



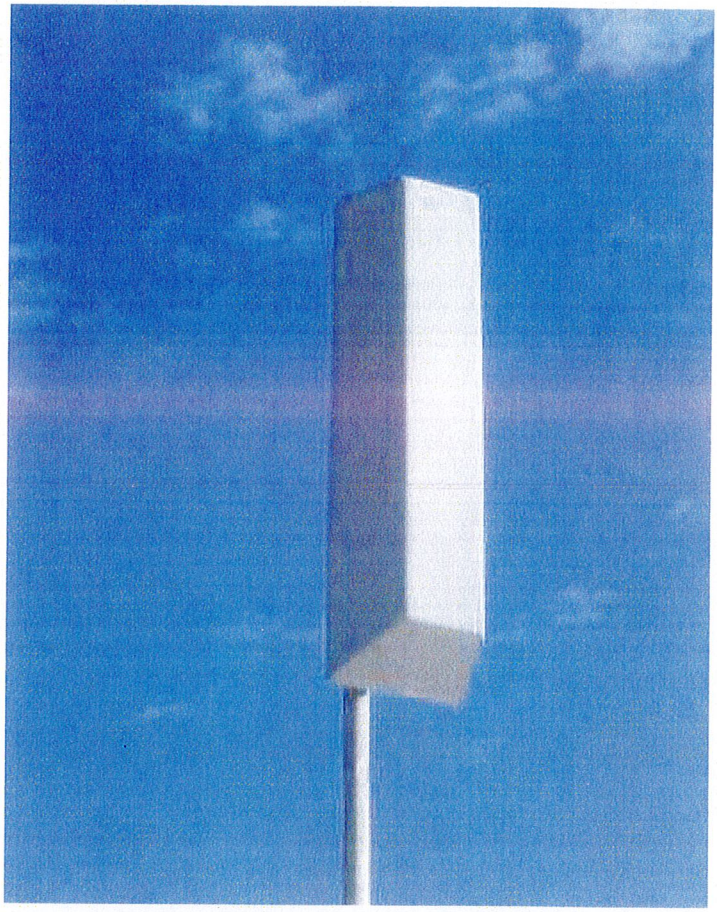
10° | Vertical | 750 MHz

10° | Vertical | 850 MHz

Swedcom

SLCP 2x6014

Dual (2x) Circularly Polarized log-periodic antenna



Features

- ❑ **Transmit Diversity Gain**
- ❑ **Can be configured to combine space & polarization diversity**
- ❑ **Outstanding performance over the entire band (700 - 800 MHz)**
- ❑ **Excellent Axial Ratio**
- ❑ **Optimized for 4G & 3G systems**
- ❑ **Low intermodulation**
- ❑ **Improved Side-to-side rejection**
- ❑ **Fading reduction**
- ❑ **Excellent isolation between ports**

Electrical specifications

Frequency range:	**700-800 MHz**
Impedance:	**50 ohm**
Connector type:	**7/16 Din**
Return loss:	**18 dB**
Polarization:	**Circular**
Gain ea. port [Circular]:	**2x14 dBdC**
Gain ea. port [Linear]:	**2x11 dBdL**
Axial Ratio:	**2 dB**
Isolation between ports (TX band):	**30 dB**
Front-to-back ratio:	**30 dB**
Intermodulation (2x20W):	**IM3 150 dB**
	IM5 160 dB
	IM7/9 170 dB
Power rating:	**2x 500 W**
H-plane (-3 dB point):	**2x 55°**
V-plane (-3 dB point):	**2x 16°**
Lightning protection:	**DC grounded**

Mechanical specifications

Overall height:	**53 in**	**[1346 mm]**
Width:	**14 in**	**[356 mm]**
Depth:	**11 in**	**[279 mm]**
Weight (excluding brackets):	**20 lbs**	**[9 Kg]**
Wind load measured up to:	**150 mph**	**[240 Km/h]**
Wind area (side of antenna):	**5.15 sq. ft.**	**[0.48 sq.m]**
Lateral thrust at 113 mph/ 180 Km/h (worst case):	**263 lbs**	**[1171 N]**

Materials

Radiating Elements:	**Aluminum**
Transformer (Power distribution)	**Ceramic PCB**
Chassis:	**Aluminum**
Radome:	**Grey Fiberglass/PVC**
Mounting bolts:	**Stainless steel**

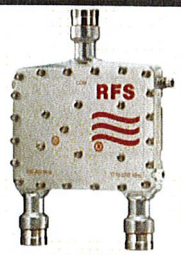
The SLCP 2x6014 is made in the U.S.A.

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
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
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; 57/70@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

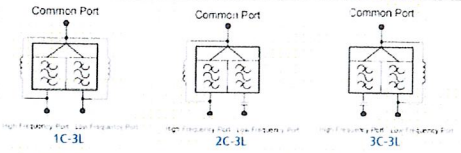
Notes

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: Cromwell SE								
Tower Height: Verizon @ 105Ft.								
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*Sprint			125	0.0309	1962.5	1.0000	3.09%	
*Clearwire	2	153	125	0.0070	2496	1.0000	0.70%	
*Clearwire	1	211	121	0.0052	11 GHz	1.0000	0.52%	
*Pocket	3	631	85	0.0942	2130	1.0000	9.42%	
*Nextel	12	100	95	0.0478	851	0.5673	8.43%	
*Cingular GSM	3	655	115	0.0534	1900	1.0000	5.34%	
*Cingular UMTS	1	500	115	0.0136	880	0.5867	2.32%	
Verizon PCS	**11**	**271**	**105**	**0.0972**	**1970**	**1.0000**	**9.72%**	
Verizon Cellular	**9**	**270**	**105**	**0.0793**	**869**	**0.5793**	**13.68%**	
Verizon AWS	**1**	**658**	**105**	**0.0215**	**2145**	**1.0000**	**2.15%**	
Verizon 700	**1**	**880**	**105**	**0.0287**	**698**	**0.4653**	**6.17%**	
								61.54%
* Source: Siting Council								

May 3, 2012

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The Piano Works 349 West Commercial Street
East Rochester, NY 14445
(585) 899-3445

B&T Engineering, Inc.
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
ctuttle@btengineering.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119617
	Carrier Site Name:	Cromwell SE
Crown Castle Designation:	**Crown Castle BU Number:**	876364
	Crown Castle Site Name:	Cromwell / First Line Emergenc
	Crown Castle JDE Job Number:	183851
	Crown Castle Work Order Number:	490600
	Crown Castle Application Number:	146566 Rev. 0
Engineering Firm Designation:	**B&T Engineering Project Number:**	84470.003
Site Data:	**201 Main St., Cromwell, CT, Middlesex County** **Latitude *41° 35' 0.11"*, Longitude *-72° 38' 59.14"*** **125 Foot - Monopole Tower**	

Dear Mr. Tuttle,

B&T Engineering 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 461556, in accordance with application 146566, revision 0.

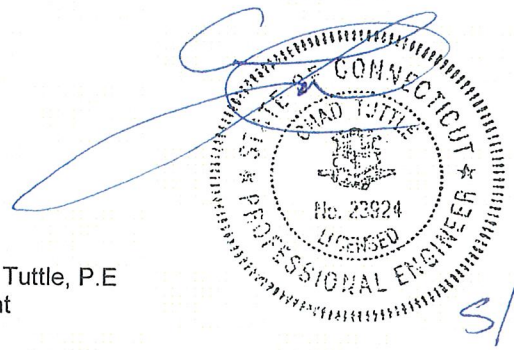
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Existing + Proposed Equipment — **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

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

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

Respectfully submitted by:



5/3/12

Zach Smith
Engineering Technician

Chad E. Tuttle, P.E
President

tnxTower Report - version 6.0.4.0

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 125 ft. Monopole tower designed by Engineered Endeavors, Inc. in February of 2002. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by Semaan Engineering Solutions, in December of 2004. Reinforcement consists of addition of baseplate stiffeners. The tower was later reinforced per reinforcement drawings prepared by Vertical Structures Inc., in October of 2007. Reinforcement consists of re-welding the baseplate stiffeners and the addition of concrete to the foundation pier.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
105.0	105.0	3	Antel	BXA-171063-8BF-EDIN-2	--	--	--
		2	Antel	BXA-70063-6CF-EDIN-0			
		6	RFS Celwave	FD9R6004/2C-3L			
		1	Swedcom	SLCP 2x6014			

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
125.0	129.0	3	Argus Technologies	LLPX310R-V1	6	1 5/8	1
		3	Samsung Telecommunications	WIMAX DAP HEAD	3	5/16	
					3	1/4	
	127.0	6	Decibel	DB980H90A-M	2	1/2	
		9(MLA)	Sprint MLA	SPRINT MLA_ANTENNA	9(MLA)	1 5/8	3
	125.0	1	--	Platform Mount [LP 712-1]	--	--	1
	124.0	1	Andrew	VHLP2-11			
		1	Andrew	VHLP2-18			
115.0	115.0	3	Powerwave Technologies	7770.00	6	1 1/4	1
		6	Powerwave Technologies	LGP21401			
		1	--	Pipe Mount [PM 601-3]			
105.0	105.0	**2**	**ADC**	**DUAL BAND 800/1900 FULL BAND MASTHEAD**	**--**	**--**	**4**
		6	**Decibel**	**DB948F85T2E-M**			
		6	Andrew	DB846F65ZAXY	12	1 5/8	1
		1	--	Platform Mount [LP 712-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
95.0	95.0	12	Decibel	DB844H65E-XY	12	1 5/8	1
		1	--	Platform Mount [LP 303-1]			
85.0	85.0	3	Kathrein	742 213	6	1 5/8	1

Notes:
1) Existing Equipment
2) Reserved Equipment
3) MLA Equipment; Not Considered in This Analysis
4) Equipment To Be Removed

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)
125	125	1	--	L.P. Platform	--	--
		6	Decibel	DB980H65		
		3	Decibel	DB980H90		
115	115	1	--	T-Arm	--	--
		6	Allgon	7250		
105	105	1	--	L.P. Platform	--	--
		12	Decibel	DB844		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Location Revision#0	146566	CCI Sites
Tower Manufacturer Drawings	EEI Job No.10554	2068958	CCI Sites
Structural Analysis	Crown Castle Project: 320820	2608627	CCI Sites
Tower Reinforcement Drawings	Semaan Engineering Solutions	2055765	CCI Sites
Post-Modification Inspection	VSI Job No. 2008-004-036	2182292	CCI Sites
Foundation Drawings	EEI Project No.6464	1613909	CCI Sites
Geotechnical Reports	Dr. Clarence Welti, P.E.	1532312	CCI Sites
Antenna Configuration	Crown CAD Package	Date:4/9/2012	CCI Sites

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	125 - 85.04	Pole	TP27.09x18.5x0.188	1	-7.084	806.281	66.5	Pass
L2	85.04 - 40.4567	Pole	TP36.18x25.873x0.25	2	-13.132	1437.614	98.4	Pass
L3	40.4567 - 0	Pole	TP44.25x34.6x0.313	3	-21.967	2265.620	93.2	Pass
							Summary	
						Pole (L2)	98.4	Pass
						Rating =	98.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	72.1	Pass
1	Base Plate	Base	70.8	Pass
1	Base Foundation	Base	55.5	Pass

Structure Rating (max from all components) =	98.4%

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

4.1) Recommendations

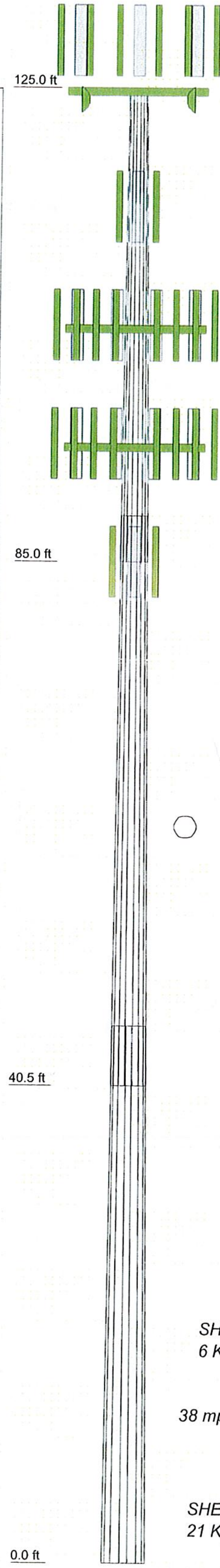
The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	39.960	48.500	45.540
Number of Sides	18	18	18
Thickness (in)	0.188	0.250	0.313
Socket Length (ft)	3.917	5.083	
Top Dia (in)	18.500	25.873	34.600
Bot Dia (in)	27.090	36.180	44.250
Grade		A572-65	
Weight (K)	1.8	4.0	6.0

Total Weight (K): 11.9



DESIGNED APPURTENANCE LOADING

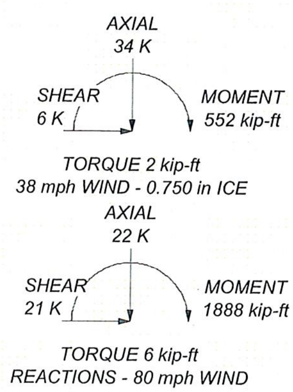
TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R-V1 w/ Mount Pipe (E)	129	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (P)	105
LLPX310R-V1 w/ Mount Pipe (E)	129	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (P)	105
LLPX310R-V1 w/ Mount Pipe (E)	129	BXA-171063-8BF-EDIN-2 w/ Mount Pipe (P)	105
WIMAX DAP HEAD (E)	129	SLCP 2x6014 w/ Mount Pipe (P)	105
WIMAX DAP HEAD (E)	129	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	105
WIMAX DAP HEAD (E)	129	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	105
(2) DB980H90A-M w/ Mount Pipe (E)	127	(2) FD9R6004/2C-3L (P)	105
(2) DB980H90A-M w/ Mount Pipe (E)	127	(2) FD9R6004/2C-3L (P)	105
(2) DB980H90A-M w/ Mount Pipe (E)	127	(2) FD9R6004/2C-3L (P)	105
6' x 2" Mount Pipe (E)	125	Platform Mount [LP 712-1] (E)	105
6' x 2" Mount Pipe (E)	125	(2) DB846F65ZAXY w/ Mount Pipe (E)	105
6' x 2" Mount Pipe (E)	125	(2) DB846F65ZAXY W/ MOUNT PIPE (E)	105
4' x 2" Pipe Mount (E)	125	(4) DB844H65E-XY w/ Mount Pipe (E)	95
4' x 2" Pipe Mount (E)	125	Platform Mount [LP 303-1] (E)	95
4' x 2" Pipe Mount (E)	125	(4) DB844H65E-XY w/ Mount Pipe (E)	95
Platform Mount [LP 712-1] (E)	125	(4) DB844H65E-XY w/ Mount Pipe (E)	95
VHLP2-11 (E)	124	742 213 w/ Mount Pipe (E)	85
VHLP2-18 (E)	124	742 213 w/ Mount Pipe (E)	85
7770.00 w/ Mount Pipe (E)	115	742 213 w/ Mount Pipe (E)	85
(2) LGP21401 (E)	115		
(2) LGP21401 (E)	115		
(2) LGP21401 (E)	115		
Pipe Mount [PM 601-3] (E)	115		
7770.00 w/ Mount Pipe (E)	115		
7770.00 w/ Mount Pipe (E)	115		
(2) DB846F65ZAXY w/ Mount Pipe (E)	105		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.4%



B&T Engineering Inc.
1717 S. Boulder Ave.
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

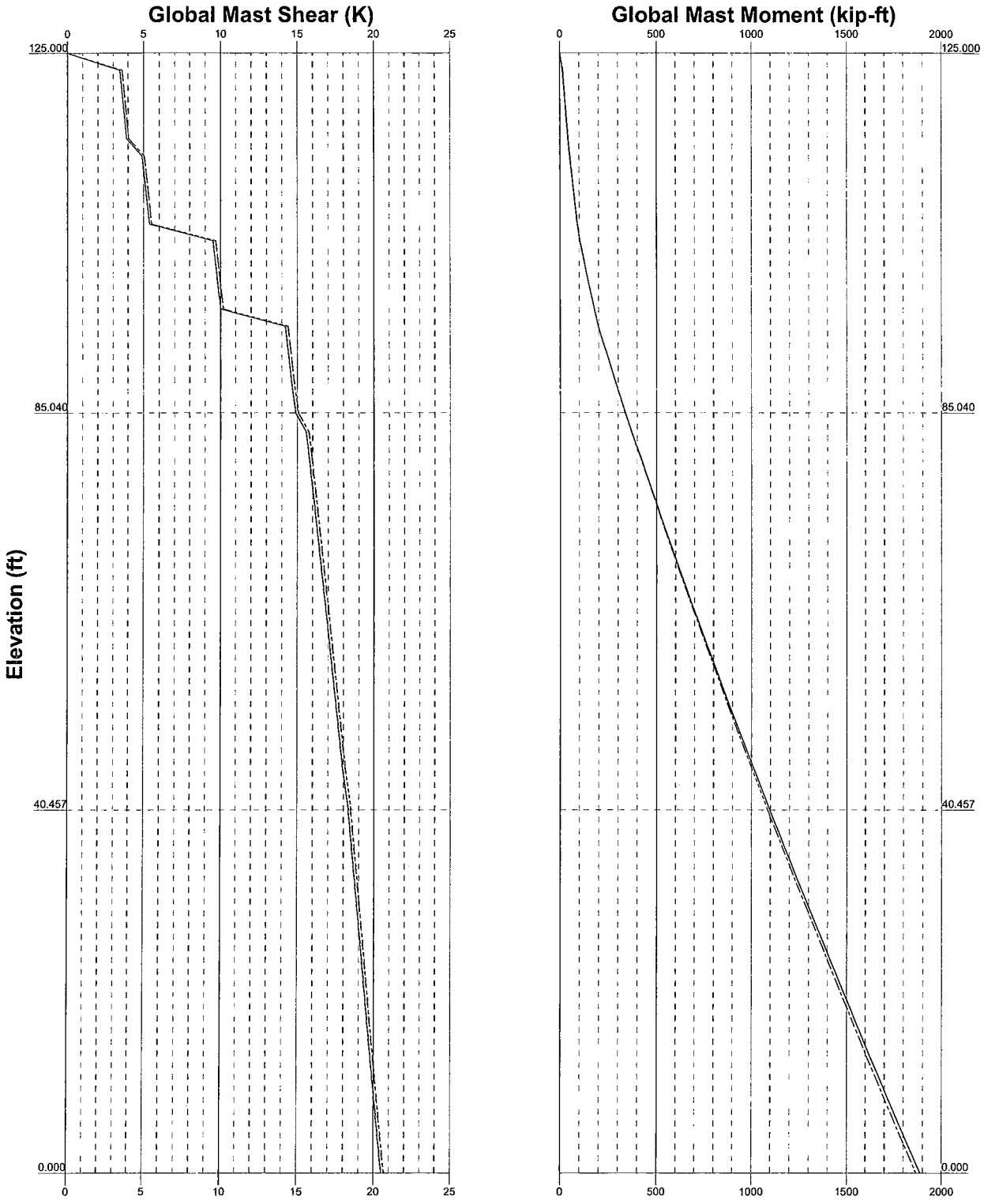
Job: 84470.002 - Cromwell, CT (BU# 876364)			
Project: 125' EEI Monopole / App ID: 146566; Rev# 0			
Client: Crown Castle	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 05/03/12	Scale: NTS	
Path:		Dwg No. E-1	

TIA/EIA-222-F - 80 mph/38 mph 0.750 in Ice

Maximum Values

Vx Vz

Mx Mz



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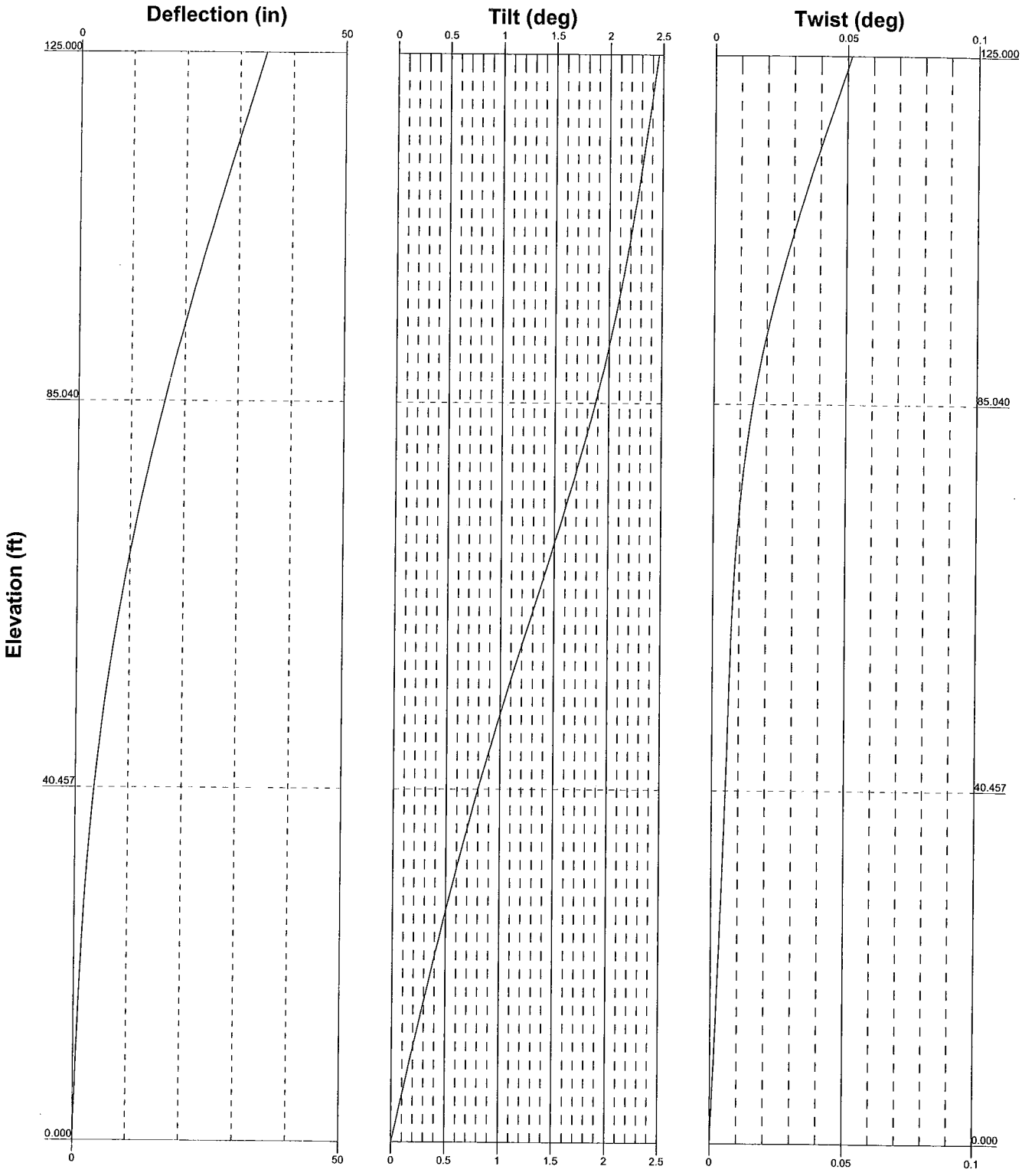
Code: TIA/EIA-222-F	Date: 05/03/12	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



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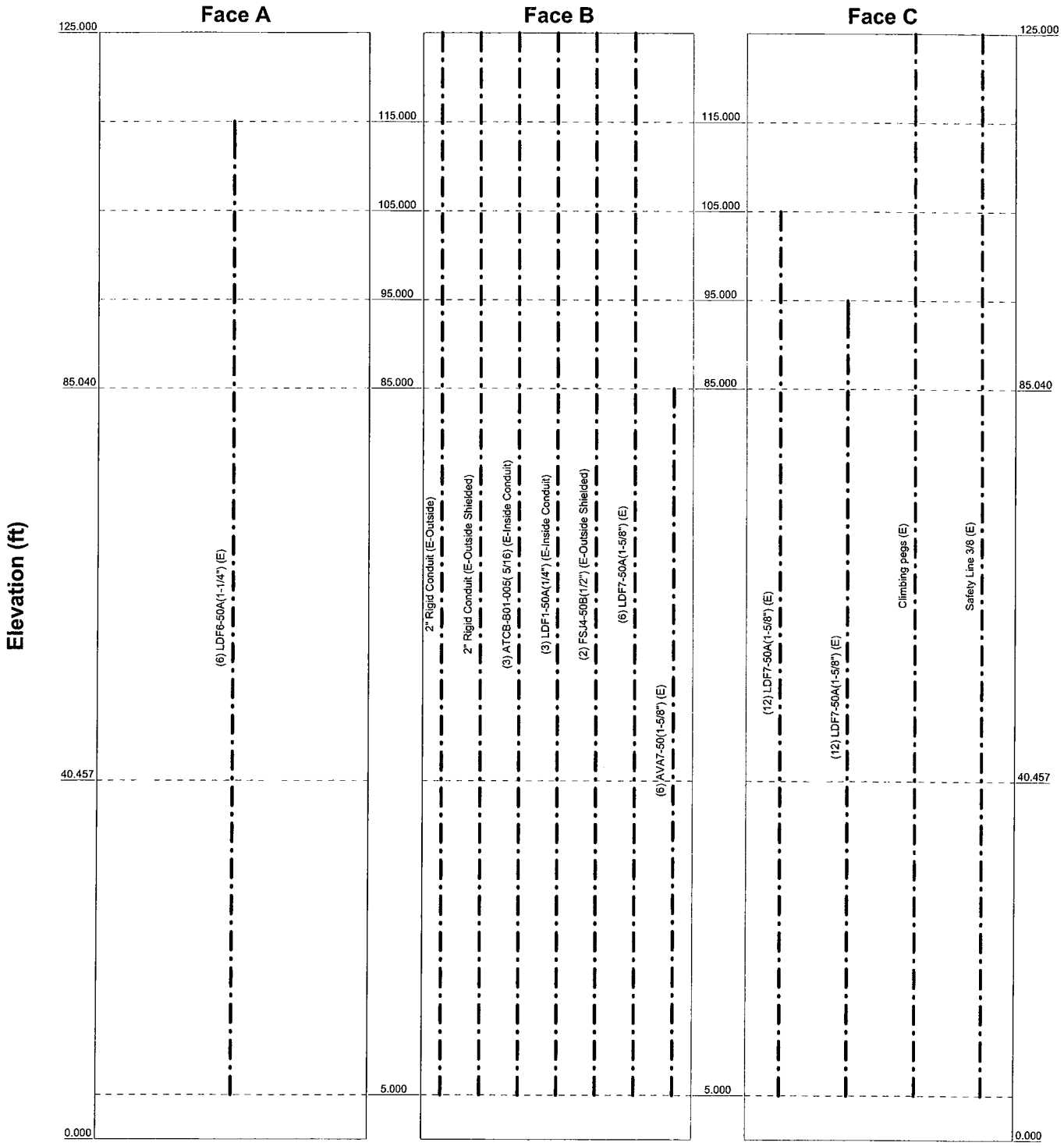
Project: *125' EEI Monopole / App ID: 146566; Rev# 0*			
Client: Crown Castle	Drawn by: zsmith	App'd:	
Code: TIA/EIA-222-F	Date: 05/03/12	Scale: NTS	
Path:		Dwg No. E-5	

Feedline Distribution Chart
0' - 125'

Round — Flat — App In Face — App Out Face — Truss Leg



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Project: 125' EEI Monopole / App ID: 146566; Rev# 0		
Client: Crown Castle	Drawn by: zsmith	App'd:
Code: TIA/EIA-222-F	Date: 05/03/12	Scale: NTS
Path:		Dwg No. E-7

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 Middlesex County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °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	125.000-85.040	39.960	3.917	18	18.500	27.090	0.188	0.750	A572-65 (65 ksi)
L2	85.040-40.457	48.500	5.083	18	25.873	36.180	0.250	1.000	A572-65 (65 ksi)
L3	40.457-0.000	45.540		18	34.600	44.250	0.313	1.250	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	It/Q in^2	w in	w/t
L1	18.785	10.898	461.730	6.501	9.398	49.131	924.069	5.450	2.926	15.605
	27.508	16.010	1463.941	9.550	13.762	106.378	2929.808	8.007	4.438	23.668
L2	27.117	20.332	1686.463	9.096	13.144	128.311	3375.144	10.168	4.114	16.455
	36.738	28.510	4650.033	12.755	18.379	253.002	9306.185	14.258	5.928	23.711
L3	36.227	34.009	5051.163	12.172	17.577	287.379	10108.973	17.008	5.540	17.727
	44.933	43.581	10629.196	15.598	22.479	472.850	21272.378	21.794	7.238	23.162

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 125.000-85.040				1	1	1		
L2 85.040-40.457				1	1	1		
L3 40.457-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
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Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
2" Rigid Conduit (E-Outside)	B	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
2" Rigid Conduit (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.004
						1" Ice	0.000	0.006
						2" Ice	0.000	0.013
						4" Ice	0.000	0.032
ATCB-B01-005(5/16) (E-Inside Conduit)	B	No	CaAa (Out Of Face)	125.000 - 5.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
LDF1-50A(1/4") (E-Inside Conduit)	B	No	CaAa (Out Of Face)	125.000 - 5.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
FSJ4-50B(1/2") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 5.000	2	4" Ice	0.000	0.021
						No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	125.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
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LDF6-50A(1-1/4") (E)	A	No	Inside Pole	115.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
-								
LDF7-50A(1-5/8") (E)	C	No	Inside Pole	105.000 - 5.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
-								
LDF7-50A(1-5/8") (E)	C	No	Inside Pole	95.000 - 5.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
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AVA7-50(1-5/8") (E)	B	No	Inside Pole	85.000 - 5.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
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Climbing pegs (E)	C	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.088	0.000
						1/2" Ice	0.188	0.001
						1" Ice	0.288	0.003
						2" Ice	0.488	0.007
						4" Ice	0.888	0.024
Safety Line 3/8 (E)	C	No	CaAa (Out Of Face)	125.000 - 5.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
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Feed Line/Linear Appurtenances Section Areas

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
L1	125.000-85.040	A	0.000	0.000	0.000	0.000	0.119
		B	0.000	0.000	0.000	7.992	0.448
		C	0.000	0.000	0.000	5.015	0.319
L2	85.040-40.457	A	0.000	0.000	0.000	0.000	0.177
		B	0.000	0.000	0.000	8.917	0.687

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
		C	0.000	0.000	0.000	5.595	0.905
L3	40.457-0.000	A	0.000	0.000	0.000	0.000	0.140
		B	0.000	0.000	0.000	7.091	0.546
		C	0.000	0.000	0.000	4.450	0.720

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	125.000-85.040	A	0.861	0.000	0.000	0.000	0.000	0.119
		B		0.000	0.000	0.000	14.871	1.129
		C		0.000	0.000	0.000	18.774	0.431
L2	85.040-40.457	A	0.809	0.000	0.000	0.000	0.000	0.177
		B		0.000	0.000	0.000	16.592	1.447
		C		0.000	0.000	0.000	20.946	1.030
L3	40.457-0.000	A	0.750	0.000	0.000	0.000	0.000	0.140
		B		0.000	0.000	0.000	12.830	1.102
		C		0.000	0.000	0.000	15.927	0.812

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	125.000-85.040	0.083	0.208	-0.084	0.416
L2	85.040-40.457	0.086	0.217	-0.092	0.459
L3	40.457-0.000	0.077	0.194	-0.078	0.420

Discrete Tower Loads

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
LLPX310R-V1 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	129.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.429 5.990 6.506 7.574 9.862	3.382 4.151 4.796 6.194 9.254	0.051 0.090 0.139 0.255 0.597
LLPX310R-V1 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	129.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.429 5.990 6.506 7.574 9.862	3.382 4.151 4.796 6.194 9.254	0.051 0.090 0.139 0.255 0.597
LLPX310R-V1 w/ Mount	A	From Leg	4.000	0.000	129.000	No Ice	5.429	3.382	0.051

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
Pipe			0.000			1/2" Ice	5.990	4.151	0.090
(E)			0.000			1" Ice	6.506	4.796	0.139
						2" Ice	7.574	6.194	0.255
						4" Ice	9.862	9.254	0.597
(2) DB980H90A-M w/ Mount Pipe	C	From Leg	4.000	0.000	127.000	No Ice	4.036	3.619	0.030
(E)			0.000			1/2" Ice	4.499	4.481	0.064
			0.000			1" Ice	4.947	5.219	0.107
						2" Ice	5.870	6.744	0.216
						4" Ice	8.046	9.995	0.549
(2) DB980H90A-M w/ Mount Pipe	B	From Leg	4.000	0.000	127.000	No Ice	4.036	3.619	0.030
(E)			0.000			1/2" Ice	4.499	4.481	0.064
			0.000			1" Ice	4.947	5.219	0.107
						2" Ice	5.870	6.744	0.216
						4" Ice	8.046	9.995	0.549
(2) DB980H90A-M w/ Mount Pipe	A	From Leg	4.000	0.000	127.000	No Ice	4.036	3.619	0.030
(E)			0.000			1/2" Ice	4.499	4.481	0.064
			0.000			1" Ice	4.947	5.219	0.107
						2" Ice	5.870	6.744	0.216
						4" Ice	8.046	9.995	0.549
WIMAX DAP HEAD	C	From Leg	4.000	0.000	129.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	B	From Leg	4.000	0.000	129.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	A	From Leg	4.000	0.000	129.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
6' x 2" Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
6' x 2" Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
4' x 2" Pipe Mount	C	From Leg	4.000	0.000	125.000	No Ice	0.866	0.866	0.015
(E)			0.000			1/2" Ice	1.111	1.111	0.022
			0.000			1" Ice	1.365	1.365	0.032
						2" Ice	1.901	1.901	0.062
						4" Ice	3.228	3.228	0.161
4' x 2" Pipe Mount	B	From Leg	4.000	0.000	125.000	No Ice	0.866	0.866	0.015
(E)			0.000			1/2" Ice	1.111	1.111	0.022
			0.000			1" Ice	1.365	1.365	0.032

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	1.901	1.901	0.062
						4" Ice	3.228	3.228	0.161
4' x 2" Pipe Mount	A	From Leg	4.000	0.000	125.000	No Ice	0.866	0.866	0.015
(E)			0.000			1/2" Ice	1.111	1.111	0.022
			0.000			1" Ice	1.365	1.365	0.032
						2" Ice	1.901	1.901	0.062
						4" Ice	3.228	3.228	0.161
Platform Mount [LP 712-1]	C	From Leg	4.000	0.000	125.000	No Ice	24.530	24.530	1.335
(E)			0.000			1/2" Ice	29.940	29.940	1.646
			0.000			1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
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7770.00 w/ Mount Pipe	C	From Leg	1.000	0.000	115.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.101
			0.000			1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	B	From Leg	1.000	0.000	115.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.101
			0.000			1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	A	From Leg	1.000	0.000	115.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.101
			0.000			1" Ice	7.128	5.711	0.155
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21401	C	From Leg	0.500	0.000	115.000	No Ice	0.258	0.233	0.014
(E)			0.000			1/2" Ice	0.289	0.313	0.021
			0.000			1" Ice	0.321	0.403	0.030
						2" Ice	0.383	0.608	0.055
						4" Ice	0.509	1.121	0.135
(2) LGP21401	B	From Leg	0.500	0.000	115.000	No Ice	0.258	0.233	0.014
(E)			0.000			1/2" Ice	0.289	0.313	0.021
			0.000			1" Ice	0.321	0.403	0.030
						2" Ice	0.383	0.608	0.055
						4" Ice	0.509	1.121	0.135
(2) LGP21401	A	From Leg	0.500	0.000	115.000	No Ice	0.258	0.233	0.014
(E)			0.000			1/2" Ice	0.289	0.313	0.021
			0.000			1" Ice	0.321	0.403	0.030
						2" Ice	0.383	0.608	0.055
						4" Ice	0.509	1.121	0.135
Pipe Mount [PM 601-3]	C	None		0.000	115.000	No Ice	4.390	4.390	0.195
(E)						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
						2" Ice	8.750	8.750	0.365
						4" Ice	13.110	13.110	0.534
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(2) DB846F65ZAXY w/	C	From Leg	4.000	0.000	105.000	No Ice	7.033	7.583	0.043
Mount Pipe			0.000			1/2" Ice	7.536	8.544	0.105
(E)			0.000			1" Ice	8.080	9.381	0.179
						2" Ice	9.195	11.166	0.352
						4" Ice	11.528	15.103	0.831
(2) DB846F65ZAXY W/	B	From Leg	4.000	0.000	105.000	No Ice	7.033	7.583	0.043
MOUNT PIPE			0.000			1/2" Ice	7.536	8.544	0.105
(E)			0.000			1" Ice	8.080	9.381	0.179

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) DB846F65ZAXY w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	105.000	2" Ice	9.195	11.166	0.352
						4" Ice	11.528	15.103	0.831
						No Ice	7.033	7.583	0.043
						1/2" Ice	7.536	8.544	0.105
						1" Ice	8.080	9.381	0.179
						2" Ice	9.195	11.166	0.352
						4" Ice	11.528	15.103	0.831
BXA-171063-8BF-EDIN-2 w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	3.179	3.353	0.029
						1/2" Ice	3.555	3.971	0.059
						1" Ice	3.964	4.595	0.098
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.487
BXA-171063-8BF-EDIN-2 w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	3.179	3.353	0.029
						1/2" Ice	3.555	3.971	0.059
						1" Ice	3.964	4.595	0.098
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.487
BXA-171063-8BF-EDIN-2 w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	3.179	3.353	0.029
						1/2" Ice	3.555	3.971	0.059
						1" Ice	3.964	4.595	0.098
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.487
SLCP 2x6014 w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	7.451	6.955	0.040
						1/2" Ice	7.961	7.756	0.102
						1" Ice	8.470	8.520	0.175
						2" Ice	9.519	10.100	0.343
						4" Ice	11.742	13.475	0.799
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	7.969	5.801	0.042
						1/2" Ice	8.609	6.953	0.100
						1" Ice	9.216	7.819	0.170
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.803
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	7.969	5.801	0.042
						1/2" Ice	8.609	6.953	0.100
						1" Ice	9.216	7.819	0.170
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.803
(2) FD9R6004/2C-3L (P)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (P)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (P)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
Platform Mount [LP 712-1] (E)	C	None		0.000	105.000	No Ice	24.530	24.530	1.335
						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820

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
-									
(4) DB844H65E-XY w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.038 10.551 11.073 12.150 14.438	5.154 5.833 6.523 7.959 11.092	0.038 0.104 0.179 0.351 0.813
(4) DB844H65E-XY w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.038 10.551 11.073 12.150 14.438	5.154 5.833 6.523 7.959 11.092	0.038 0.104 0.179 0.351 0.813
(4) DB844H65E-XY w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.038 10.551 11.073 12.150 14.438	5.154 5.833 6.523 7.959 11.092	0.038 0.104 0.179 0.351 0.813
Platform Mount [LP 303-1] (E)	C	None		0.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
-									
742 213 w/ Mount Pipe (E)	C	From Leg	1.000 0.000 0.000	0.000	85.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.373 5.950 6.501 7.611 9.933	4.620 6.000 6.982 8.852 12.794	0.049 0.091 0.144 0.277 0.682
742 213 w/ Mount Pipe (E)	B	From Leg	1.000 0.000 0.000	0.000	85.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.373 5.950 6.501 7.611 9.933	4.620 6.000 6.982 8.852 12.794	0.049 0.091 0.144 0.277 0.682
742 213 w/ Mount Pipe (E)	A	From Leg	1.000 0.000 0.000	0.000	85.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.373 5.950 6.501 7.611 9.933	4.620 6.000 6.982 8.852 12.794	0.049 0.091 0.144 0.277 0.682
-									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11 (E)	C	Paraboloid w/o Radome	From Leg	4.000 0.000 0.000	0.000		124.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.715 4.006 4.296 4.876 6.037	0.027 0.048 0.068 0.109 0.191

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
VHLP2-18 (E)	B	Paraboloid w/o Radome	From Leg	4.000 0.000 0.000	62.000		124.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.715 4.006 4.296 4.876 6.037	0.031 0.052 0.072 0.113 0.195
-											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
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	125 - 85.04	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-15.370	7.553	-5.568
			Max. Mx	11	-7.097	279.958	-3.587
			Max. My	8	-7.082	5.729	-280.940
			Max. Vy	5	14.615	-271.584	1.249
			Max. Vx	2	-14.791	-1.733	278.903
			Max. Torque	7			-5.580
L2	85.04 - 40.4567	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-23.518	6.952	-6.654
			Max. Mx	11	-13.150	994.423	-3.625
			Max. My	2	-13.132	-9.840	1003.964
			Max. Vy	5	17.944	-989.506	5.989
			Max. Vx	2	-18.118	-9.840	1003.964
			Max. Torque	7			-5.574
L3	40.4567 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-34.252	5.980	-7.576
			Max. Mx	11	-21.968	1867.259	-3.484
			Max. My	2	-21.967	-18.399	1887.832
			Max. Vy	5	20.512	-1866.144	10.974
			Max. Vx	2	-20.678	-18.399	1887.832
			Max. Torque	7			-5.557

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	22	34.252	2.867	-4.975
	Max. H_x	11	21.987	20.421	0.009
	Max. H_z	2	21.987	-0.178	20.658
	Max. M_x	2	1887.832	-0.178	20.658
	Max. M_z	5	1866.144	-20.491	0.113
	Max. Torsion	13	4.854	10.159	17.846
	Min. Vert	1	21.987	0.000	-0.000
	Min. H_x	5	21.987	-20.491	0.113
	Min. H_z	8	21.987	-0.002	-20.519
	Min. M_x	8	-1878.198	-0.002	-20.519
	Min. M_z	11	-1867.259	20.421	0.009
	Min. Torsion	7	-5.555	-10.224	-17.726

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	21.987	-0.000	0.000	4.094	5.075	0.001
Dead+Wind 0 deg - No Ice	21.987	0.178	-20.658	-1887.832	-18.401	-3.925
Dead+Wind 30 deg - No Ice	21.987	10.302	-17.886	-1634.180	-938.280	-1.681
Dead+Wind 60 deg - No Ice	21.987	17.755	-10.474	-961.080	-1616.812	1.213

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 90 deg - No Ice	21.987	20.491	-0.113	-10.975	-1866.144	3.112
Dead+Wind 120 deg - No Ice	21.987	17.838	10.138	925.006	-1627.019	4.941
Dead+Wind 150 deg - No Ice	21.987	10.224	17.726	1621.218	-927.266	5.555
Dead+Wind 180 deg - No Ice	21.987	0.002	20.519	1878.198	5.399	4.482
Dead+Wind 210 deg - No Ice	21.987	-10.226	17.766	1626.925	938.603	2.320
Dead+Wind 240 deg - No Ice	21.987	-17.721	10.257	941.261	1622.655	-0.624
Dead+Wind 270 deg - No Ice	21.987	-20.421	-0.009	3.483	1867.259	-3.426
Dead+Wind 300 deg - No Ice	21.987	-17.669	-10.425	-953.770	1615.335	-4.346
Dead+Wind 330 deg - No Ice	21.987	-10.159	-17.846	-1628.532	928.980	-4.854
Dead+Ice+Temp	34.252	-0.000	0.000	7.576	5.980	0.003
Dead+Wind 0 deg+Ice+Temp	34.252	0.046	-5.780	-540.160	-0.299	-1.325
Dead+Wind 30 deg+Ice+Temp	34.252	2.886	-5.006	-466.820	-267.477	-0.602
Dead+Wind 60 deg+Ice+Temp	34.252	4.974	-2.928	-271.440	-464.345	0.333
Dead+Wind 90 deg+Ice+Temp	34.252	5.740	-0.030	3.488	-536.571	1.012
Dead+Wind 120 deg+Ice+Temp	34.252	4.993	2.841	274.786	-466.798	1.613
Dead+Wind 150 deg+Ice+Temp	34.252	2.863	4.964	476.304	-264.270	1.812
Dead+Wind 180 deg+Ice+Temp	34.252	-0.001	5.745	550.703	6.272	1.475
Dead+Wind 210 deg+Ice+Temp	34.252	-2.867	4.975	477.986	276.909	0.771
Dead+Wind 240 deg+Ice+Temp	34.252	-4.966	2.873	279.344	475.209	-0.179
Dead+Wind 270 deg+Ice+Temp	34.252	-5.722	-0.001	7.629	546.214	-1.087
Dead+Wind 300 deg+Ice+Temp	34.252	-4.951	-2.913	-269.205	473.117	-1.456
Dead+Wind 330 deg+Ice+Temp	34.252	-2.847	-4.994	-465.151	274.076	-1.627
Dead+Wind 0 deg - Service	21.987	0.069	-8.069	-735.981	-4.095	-1.549
Dead+Wind 30 deg - Service	21.987	4.024	-6.987	-636.756	-363.932	-0.664
Dead+Wind 60 deg - Service	21.987	6.935	-4.091	-373.452	-629.356	0.478
Dead+Wind 90 deg - Service	21.987	8.004	-0.044	-1.789	-726.864	1.228
Dead+Wind 120 deg - Service	21.987	6.968	3.960	364.338	-633.333	1.951
Dead+Wind 150 deg - Service	21.987	3.994	6.924	636.669	-359.602	2.195
Dead+Wind 180 deg - Service	21.987	0.001	8.015	737.201	5.222	1.772
Dead+Wind 210 deg - Service	21.987	-3.994	6.940	638.911	370.262	0.917
Dead+Wind 240 deg - Service	21.987	-6.922	4.006	370.699	637.839	-0.246
Dead+Wind 270 deg - Service	21.987	-7.977	-0.004	3.871	733.506	-1.353
Dead+Wind 300 deg - Service	21.987	-6.902	-4.072	-370.583	634.976	-1.714
Dead+Wind 330 deg - Service	21.987	-3.968	-6.971	-634.529	366.495	-1.916

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	0.000	-21.987	0.000	0.000	21.987	-0.000	0.000%
2	0.178	-21.987	-20.658	-0.178	21.987	20.658	0.000%
3	10.302	-21.987	-17.886	-10.302	21.987	17.886	0.000%
4	17.755	-21.987	-10.474	-17.755	21.987	10.474	0.000%
5	20.491	-21.987	-0.113	-20.491	21.987	0.113	0.000%
6	17.838	-21.987	10.138	-17.838	21.987	-10.138	0.000%
7	10.224	-21.987	17.726	-10.224	21.987	-17.726	0.000%
8	0.002	-21.987	20.519	-0.002	21.987	-20.519	0.000%
9	-10.226	-21.987	17.766	10.226	21.987	-17.766	0.000%
10	-17.721	-21.987	10.257	17.721	21.987	-10.257	0.000%
11	-20.421	-21.987	-0.009	20.421	21.987	0.009	0.000%
12	-17.669	-21.987	-10.425	17.669	21.987	10.425	0.000%
13	-10.159	-21.987	-17.846	10.159	21.987	17.846	0.000%
14	0.000	-34.252	0.000	0.000	34.252	-0.000	0.000%
15	0.046	-34.252	-5.780	-0.046	34.252	5.780	0.000%
16	2.886	-34.252	-5.006	-2.886	34.252	5.006	0.000%
17	4.974	-34.252	-2.928	-4.974	34.252	2.928	0.000%
18	5.740	-34.252	-0.030	-5.740	34.252	0.030	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
19	4.993	-34.252	2.841	-4.993	34.252	-2.841	0.000%
20	2.863	-34.252	4.964	-2.863	34.252	-4.964	0.000%
21	-0.001	-34.252	5.745	0.001	34.252	-5.745	0.000%
22	-2.867	-34.252	4.975	2.867	34.252	-4.975	0.000%
23	-4.966	-34.252	2.873	4.966	34.252	-2.873	0.000%
24	-5.722	-34.252	-0.001	5.722	34.252	0.001	0.000%
25	-4.951	-34.252	-2.913	4.951	34.252	2.913	0.000%
26	-2.847	-34.252	-4.994	2.847	34.252	4.994	0.000%
27	0.069	-21.987	-8.069	-0.069	21.987	8.069	0.000%
28	4.024	-21.987	-6.987	-4.024	21.987	6.987	0.000%
29	6.935	-21.987	-4.091	-6.935	21.987	4.091	0.000%
30	8.004	-21.987	-0.044	-8.004	21.987	0.044	0.000%
31	6.968	-21.987	3.960	-6.968	21.987	-3.960	0.000%
32	3.994	-21.987	6.924	-3.994	21.987	-6.924	0.000%
33	0.001	-21.987	8.015	-0.001	21.987	-8.015	0.000%
34	-3.994	-21.987	6.940	3.994	21.987	-6.940	0.000%
35	-6.922	-21.987	4.006	6.922	21.987	-4.006	0.000%
36	-7.977	-21.987	-0.004	7.977	21.987	0.004	0.000%
37	-6.902	-21.987	-4.072	6.902	21.987	4.072	0.000%
38	-3.968	-21.987	-6.971	3.968	21.987	6.971	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00009844
3	Yes	5	0.00000001	0.00041488
4	Yes	5	0.00000001	0.00042703
5	Yes	5	0.00000001	0.00007734
6	Yes	5	0.00000001	0.00052964
7	Yes	5	0.00000001	0.00037708
8	Yes	5	0.00000001	0.00013222
9	Yes	5	0.00000001	0.00049277
10	Yes	5	0.00000001	0.00046028
11	Yes	5	0.00000001	0.00009768
12	Yes	5	0.00000001	0.00040100
13	Yes	5	0.00000001	0.00053342
14	Yes	4	0.00000001	0.00007122
15	Yes	5	0.00000001	0.00014211
16	Yes	5	0.00000001	0.00017546
17	Yes	5	0.00000001	0.00017818
18	Yes	5	0.00000001	0.00013301
19	Yes	5	0.00000001	0.00021580
20	Yes	5	0.00000001	0.00018720
21	Yes	5	0.00000001	0.00015418
22	Yes	5	0.00000001	0.00021820
23	Yes	5	0.00000001	0.00020793
24	Yes	5	0.00000001	0.00014348
25	Yes	5	0.00000001	0.00018914
26	Yes	5	0.00000001	0.00021925
27	Yes	4	0.00000001	0.00068214
28	Yes	5	0.00000001	0.00004591
29	Yes	5	0.00000001	0.00004845
30	Yes	4	0.00000001	0.00051856
31	Yes	5	0.00000001	0.00007658

32	Yes	5	0.00000001	0.00004639
33	Yes	4	0.00000001	0.00083608
34	Yes	5	0.00000001	0.00006796
35	Yes	5	0.00000001	0.00005937
36	Yes	4	0.00000001	0.00061813
37	Yes	5	0.00000001	0.00004804
38	Yes	5	0.00000001	0.00007787

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 85.04	34.947	35	2.460	0.051
L2	88.9567 - 40.4567	17.882	34	1.953	0.017
L3	45.54 - 0	4.487	34	0.915	0.005

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
129.000	LLPX310R-V1 w/ Mount Pipe	35	34.947	2.460	0.051	18813
127.000	(2) DB980H90A-M w/ Mount Pipe	35	34.947	2.460	0.051	18813
125.000	6' x 2" Mount Pipe	35	34.947	2.460	0.051	18813
124.000	VHLP2-11	35	34.446	2.448	0.049	18813
115.000	7770.00 w/ Mount Pipe	35	29.955	2.343	0.040	9406
105.000	(2) DB846F65ZAXY w/ Mount Pipe	35	25.091	2.215	0.030	4702
95.000	(4) DB844H65E-XY w/ Mount Pipe	34	20.486	2.062	0.021	3134
85.000	742 213 w/ Mount Pipe	34	16.265	1.873	0.014	2540

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 85.04	87.880	9	6.086	0.128
L2	88.9567 - 40.4567	45.425	2	4.934	0.042
L3	45.54 - 0	11.449	2	2.332	0.012

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
129.000	LLPX310R-V1 w/ Mount Pipe	9	87.880	6.086	0.128	7941
127.000	(2) DB980H90A-M w/ Mount Pipe	9	87.880	6.086	0.128	7941

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	6' x 2" Mount Pipe	9	87.880	6.086	0.128	7941
124.000	VHLP2-11	9	86.632	6.061	0.126	7941
115.000	7770.00 w/ Mount Pipe	2	75.499	5.831	0.101	3969
105.000	(2) DB846F65ZAXY w/ Mount Pipe	2	63.425	5.544	0.075	1982
95.000	(4) DB844H65E-XY w/ Mount Pipe	2	51.947	5.191	0.053	1319
85.000	742 213 w/ Mount Pipe	2	41.361	4.745	0.037	1060

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	125 - 85.04 (1)	TP27.09x18.5x0.188	39.960	0.000	0.0	39.0000	15.509	-7.084	604.862	0.012
L2	85.04 - 40.4567 (2)	TP36.18x25.873x0.25	48.500	0.000	0.0	39.0000	27.653	-13.132	1078.480	0.012
L3	40.4567 - 0 (3)	TP44.25x34.6x0.313	45.540	0.000	0.0	39.0000	43.581	-21.967	1699.640	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	125 - 85.04 (1)	TP27.09x18.5x0.188	283.258	34.0587	39.0000	0.873	0.000	0.0000	39.0000	0.000
L2	85.04 - 40.4567 (2)	TP36.18x25.873x0.25	1004.008	50.6297	39.0000	1.298	0.000	0.0000	39.0000	0.000
L3	40.4567 - 0 (3)	TP44.25x34.6x0.313	1887.925	47.9117	39.0000	1.229	0.000	0.0000	39.0000	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	125 - 85.04 (1)	TP27.09x18.5x0.188	14.608	0.9419	26.0000	0.072	0.518	0.0304	26.0000	0.001
L2	85.04 - 40.4567 (2)	TP36.18x25.873x0.25	18.119	0.6552	26.0000	0.050	3.954	0.0974	26.0000	0.004
L3	40.4567 - 0 (3)	TP44.25x34.6x0.313	20.679	0.4745	26.0000	0.036	3.926	0.0487	26.0000	0.002

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	125 - 85.04 (1)	0.012	0.873	0.000	0.072	0.001	0.886 ✔	1.333	H1-3+VT ✔
L2	85.04 - 40.4567 (2)	0.012	1.298	0.000	0.050	0.004	1.311 ✔	1.333	H1-3+VT ✔
L3	40.4567 - 0 (3)	0.013	1.229	0.000	0.036	0.002	1.242 ✔	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	125 - 85.04	Pole	TP27.09x18.5x0.188	1	-7.084	806.281	66.5	Pass
L2	85.04 - 40.4567	Pole	TP36.18x25.873x0.25	2	-13.132	1437.614	98.4	Pass
L3	40.4567 - 0	Pole	TP44.25x34.6x0.313	3	-21.967	2265.620	93.2	Pass
							Summary	
						Pole (L2)	98.4	Pass
						RATING =	**98.4**	**Pass**

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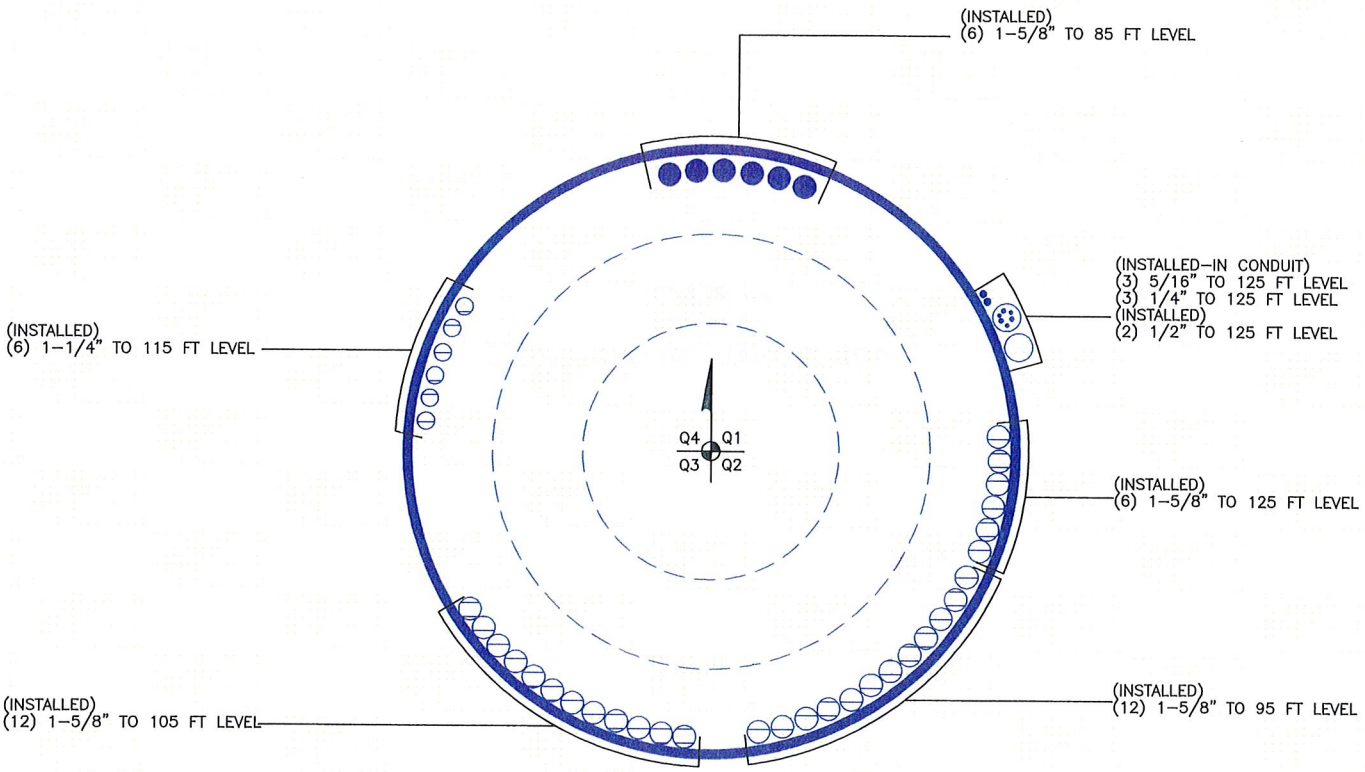
APPENDIX B

BASE LEVEL DRAWING


(INSTALLED)
(6) 1-5/8" TO 85 FT LEVEL
(INSTALLED-IN CONDUIT)
(3) 5/16" TO 125 FT LEVEL
(3) 1/4" TO 125 FT LEVEL
(INSTALLED)
(2) 1/2" TO 125 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 115 FT LEVEL
Q4
Q1
Q3
Q2
(INSTALLED)
(6) 1-5/8" TO 125 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 105 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 95 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *876364*
Site Name: *Cromwell, CT*
App #: *146566; Rev# 0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	1888	ft-kips
Axial:	22	kips
Shear:	21	kips

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

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	53	in

Plate Data		
Diam:	59	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	11.70	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	22	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	44.25	in
Thick:	0.3125	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	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	140.7 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	72.1% Pass	

Base Plate Results

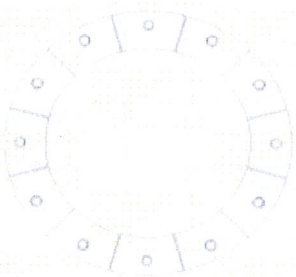
	Flexural Check	Stiffened
Base Plate Stress:	42.5 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	70.8% Pass	Y.L. Length: N/A, Roark

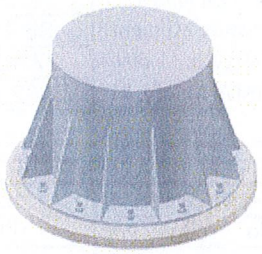
Stiffener Results

Horizontal Weld :	62.8% Pass
Vertical Weld:	33.4% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	12.4% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	54.0% Pass
Plate Comp. (AISC Bracket):	55.2% Pass

Pole Results

Pole Punching Shear Check:	10.4% Pass





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

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

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

Site Data

BU#: *876364*
Site Name: *Cromwell, CT*
App #: *146566 Rev#0*

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

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	12	in
Pad Bearing Depth, D:	5	ft
Pad Thickness, T:	3	ft
Pad Width=Length, L:	24	ft
Pier Cross Section Shape:	Square	<--Pull Down
Enter Pier Side Width:	14	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	196.00	ft^2
Pier Height:	3.00	ft
Soil (above pad) Height:	2.00	ft

Soil Parameters		
Unit Weight, γ:	125.0	pcf
Ultimate Bearing Capacity, qn:	8.00	ksf
Strength Reduct. factor, ϕ:	0.75	
Angle of Friction, Φ:	30.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: ϕ*qn:	6.00	ksf
Passive Pres. Coeff., Kp	3.00	

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	28.4	kips
Pad Force Location Above D:	1.29	ft
ϕ(Passive Pressure Moment):	36.45	ft-kips
Factored O.T. M(WL), "1.6W":	2718.9	ft-kips
Factored OT (MW-Msoil), M1	2682.45	ft-kips

Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	1.15	ft
Sum of Soil Wedges Wt:	7.09	kips
Soil Wedges ecc, K1:	9.37	ft
Ftg+Soil above Pad wt:	442.4	kips
Unfactored (Total ftg-soil Wt):	449.49	kips
1.2D. **No Soil Wedges.**	574.86	kips
0.9D. **With Soil Wedges**	444.95	kips

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

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	11.9	kips
Unfactored WL Axial, PW:	22	kips
Unfactored WL Shear, V:	21	kips
Unfactored WL Moment, M:	1888	ft-kips

Load Factor	Shaft Factored Loads		
1.20	1.2D+1.6W, Pu:	43.98	kips
0.90	0.9D+1.6W, Pu:	40.41	kips
1.35	Vu:	28.35	kips
	Mu:	2548.8	ft-kips

1.2D+1.6W Load Combination, Bearing Results:

(**No Soil Wedges**) [Reaction+Conc+Soil]	574.86	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	2682.45	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 =	4.67	ft
Orthogonal qu=	1.77	ksf
qu/ϕ*qn Ratio=	**29.57%**	**Pass**

Diagonal Direction:

ecc2 = (0.707M1)/P1 =	3.30	ft
Diagonal qu=	1.90	ksf
qu/ϕ*qn Ratio=	**31.64%**	**Pass**

Run <-- Press Upon Completing All Input

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

(**w/ Soil Wedges**) [Reaction+Conc+Soil]	444.95	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	2622.65	ft-kips

Orthogonal ecc3 = M2/P2 =	5.89	ft
Ortho Non Bearing Length,NBL=	11.79	ft
Orthogonal qu=	1.53	ksf
Diagonal qu=	1.81	ksf

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating			
Actual M:	1888.00		
M Orthogonal:	3399.19	**55.54%**	**Pass**
M Diagonal:	3399.19	**55.54%**	**Pass**