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Also admitted in Massachusetts

February 19, 2014

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

Re: **Notice of Exempt Modification – Antenna Swap**
Bright Meadow Boulevard, Enfield, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 134-foot level of the existing 150-foot tower off Bright Meadow Boulevard in Enfield, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of the existing tower in 1999. Cellco now intends to replace six (6) of its existing antennas with three (3) model BXA-70063-4CF, 850 MHz antennas and three (3) model BXA-171063-12BF, 2100 MHz antennas, all at the same 134-foot level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable inside the monopole tower. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

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 Matthew W. Coppler, Town Manager of the Town of Enfield. A copy of this letter is also being sent to Connecticut Light & Power, the owner of the Property.

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. The new antennas and RRHs will be located on Cellco's existing platform at the 134-foot level on the tower.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case RF emissions calculation for Cellco's modified facility is included in Attachment 2.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 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:
Matthew W. Coppler, Enfield Town Manager
Connecticut Light & Power
Sandy M. Carter

ATTACHMENT 1

Amphenol ANTENNA SOLUTIONS

BXA-70063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

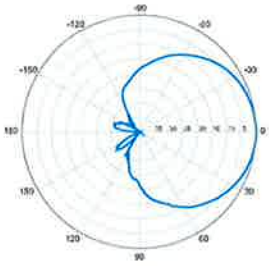
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	17°	15°
Gain	12.5 dBd (14.6 dBi)	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-16.3 dB	-22.1 dB
Front-to-back ratio (+/-30°)	-36.1 dB	-34.9 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	1205 x 285 x 133 mm	47.4 x 11.2 x 5.2 in
Depth with z-brackets	173 mm	6.8 in
Weight without mounting brackets	4.5 kg	9.9 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.34 m^2 Side: 0.16 m^2	Front: 3.7 ft^2 Side: 1.7 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 498 N Side: 260 N	Front: 111 lbf Side: 55 lbf

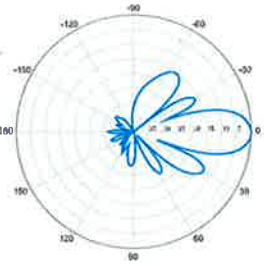
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP		

BXA-70063-4CF-EDIN-X



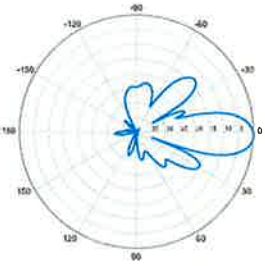
Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



0° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-2

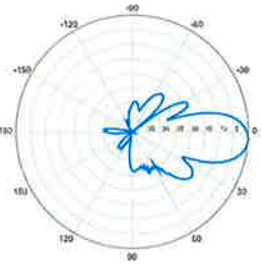


2° | Vertical | 750 MHz

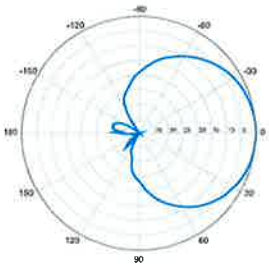
BXA-70063-4CF-EDIN-3

3° | Vertical | 750 MHz

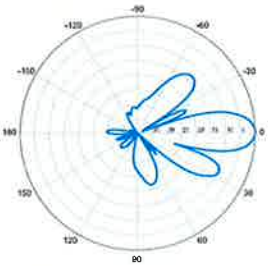
BXA-70063-4CF-EDIN-4



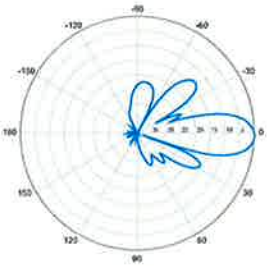
4° | Vertical | 750 MHz



Horizontal | 850 MHz

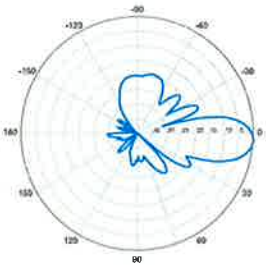


0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

3° | Vertical | 850 MHz



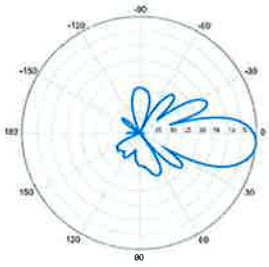
4° | Vertical | 850 MHz

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

BXA-70063-4CF-EDIN-X

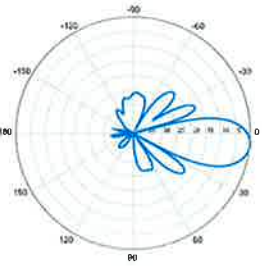
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-70063-4CF-EDIN-5



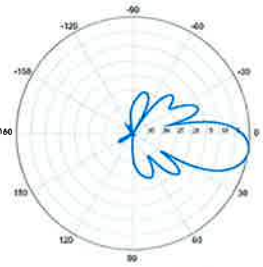
5° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-6



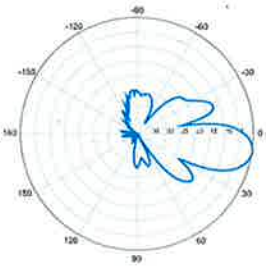
6° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-8



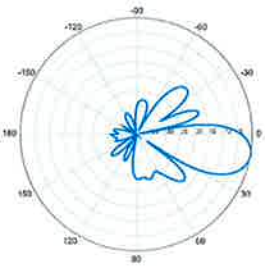
8° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-9

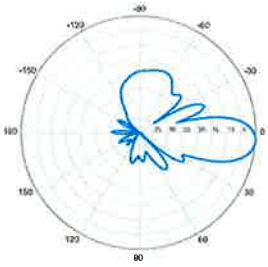


9° | Vertical | 750 MHz

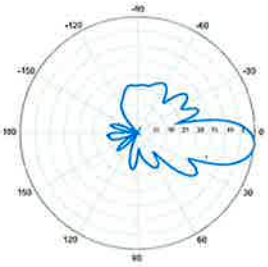
BXA-70063-4CF-EDIN-10



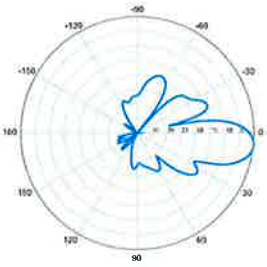
10° | Vertical | 750 MHz



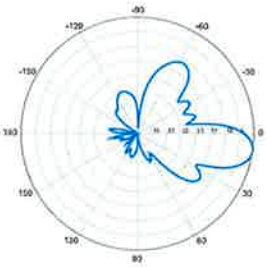
5° | Vertical | 850 MHz



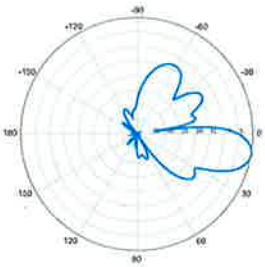
6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

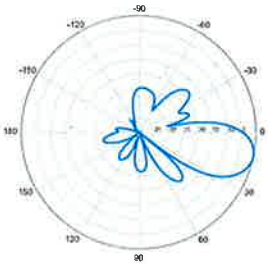


9° | Vertical | 850 MHz



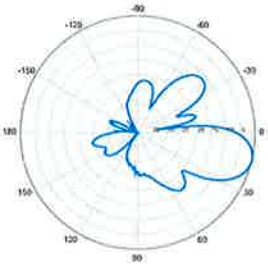
10° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-12

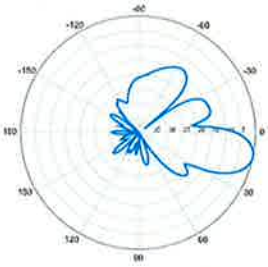


12° | Vertical | 750 MHz

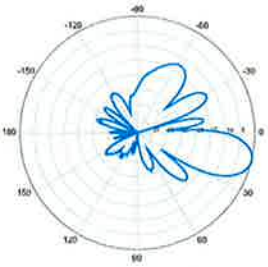
BXA-70063-4CF-EDIN-14



14° | Vertical | 750 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

BXA-171063-12BF-EDIN-X

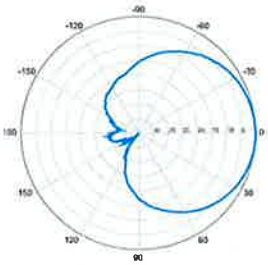
Replace "X" with desired electrical downtilt

X-Pol | FET Panel | 63° | 19.0 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	4.5°	4.5°	4.5°
Gain	16.1 dBd / 18.2 dBi	16.5 dBd / 18.6 dBi	16.9 dBd / 19.0 dBi
Electrical downtilt (X)	0, 2, 4, 5		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back ratio	> 30 dB		
In-band isolation	< -25 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	1842 x 154 x 105 mm		72.5 x 6.1 x 4.1 in
Depth with z-brackets	133 mm		5.2 in
Weight without mounting brackets	5.8 kg		12.8 lbs
Survival wind speed	> 201 km/hr		> 125 mph
Wind area	Front: 0.28 m² Side: 0.19 m²		Front: 3.1 ft² Side: 2.1 ft²
Wind load @ 161 km/hr (100 mph)	Front: 460 N Side: 304 N		Front: 103 lbf Side: 68 lbf

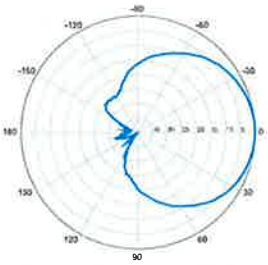
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-12BF-EDIN-X-FP		

BXA-171063-12BF-EDIN-X



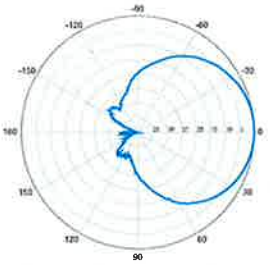
Horizontal | 1710-1880 MHz

BXA-171063-12BF-EDIN-X



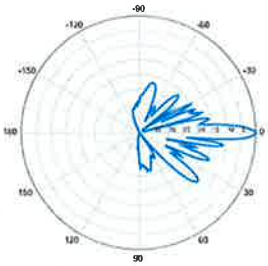
Horizontal | 1850-1990 MHz

BXA-171063-12BF-EDIN-X



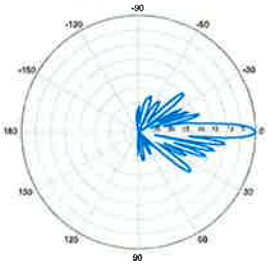
Horizontal | 1920-2170 MHz

BXA-171063-12BF-EDIN-0



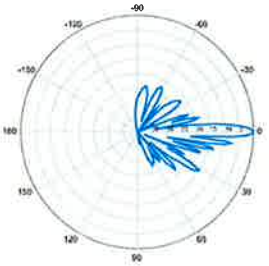
0° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-0



0° | Vertical | 1920-2170 MHz

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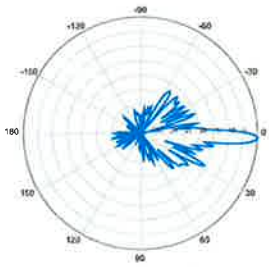
BXA-171063-12BF-EDIN-X

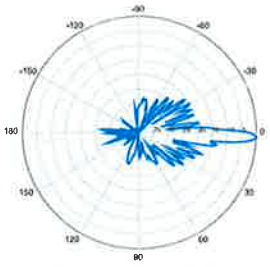
X-Pol | FET Panel | 63° | 19.0 dBi

BXA-171063-12BF-EDIN-2



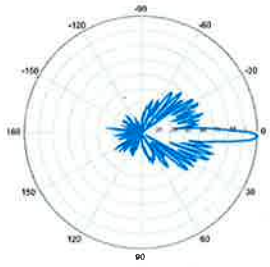
2° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-2



2° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-4

4° | Vertical | 1710-1880 MHz

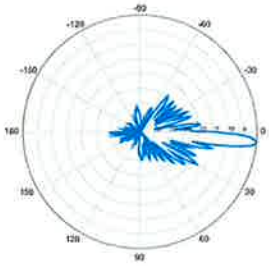
BXA-171063-12BF-EDIN-4

4° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-4

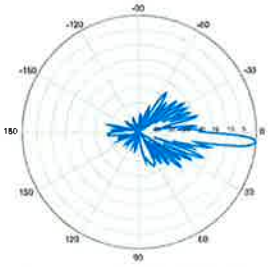
4° | Vertical | 1920-2170 MHz

BXA-171063-12BF-EDIN-5



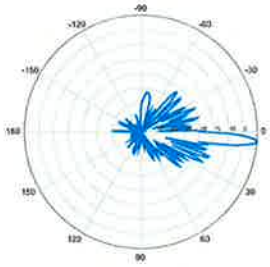
5° | Vertical | 1710-1880 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1850-1990 MHz

BXA-171063-12BF-EDIN-5



5° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.

A distributed eNodeB expands deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day — a fraction of the time required for a traditional BTS.

Excellent RF performance

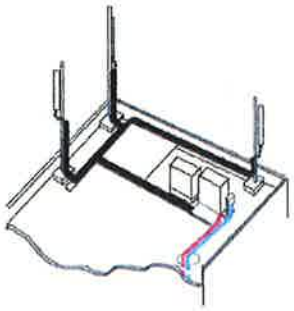
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced.
The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

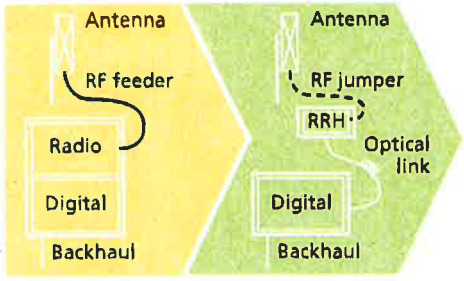
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

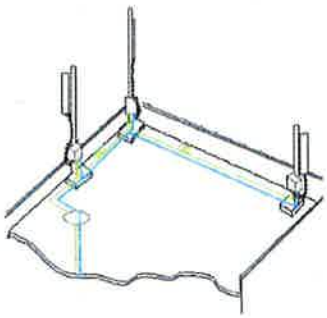
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

CPG2809100912 (09)

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

HYBRIFLEX™ RRH Hybrid Feeder Cabling Solution, 1-5/8", Single-Mode Fiber

Product Description

RFS' HYBRIFLEX Remote Radio Head (RRH) hybrid feeder cabling solution combines optical fiber and DC power for RRHs in a single lightweight aluminum corrugated cable, making it the world's most innovative solution for RRH deployments.

It was developed to reduce installation complexity and costs at Cellular sites. HYBRIFLEX allows mobile operators deploying an RRH architecture to standardize the RRH installation process and eliminate the need for and cost of cable grounding. HYBRIFLEX combines optical fiber (multi-mode or single-mode) and power in a single corrugated cable. It eliminates the need for junction boxes and can connect multiple RRHs with a single feeder. Standard RFS CELLFLEX® accessories can be used with HYBRIFLEX cable. Both pre-connectorized and on-site options are available.

Figure 1: HYBRIFLEX Series

Features/Benefits

- Aluminum corrugated armor with outstanding bending characteristics – minimizes installation time and enables mechanical protection and shielding
- Same accessories as 1 5/8" coaxial cable
- Outer conductor grounding – Eliminates typical grounding requirements and saves on installation costs
- Lightweight solution and compact design – Decreases tower loading
- Robust cabling – Eliminates need for expensive cable trays and ducts
- Installation of tight bundled fiber optic cable pairs directly to the RRH – Reduces CAPEX and wind load by eliminating need for interconnection
- Optical fiber and power cables housed in single corrugated cable – Saves CAPEX by standardizing RRH cable installation and reducing installation requirements
- Outdoor polyethylene jacket – Ensures long-lasting cable protection

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	.068 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

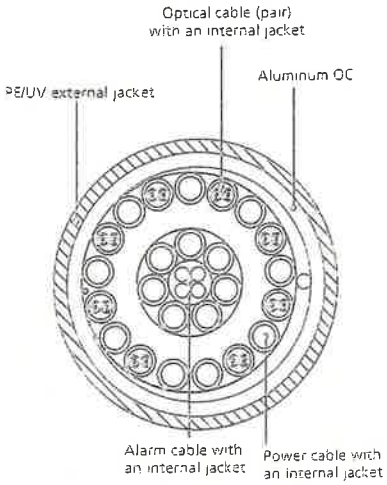


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: North Thompsonville (Enfield)								
Tower Height: Verizon @ 137ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	119	0.0287	880	0.5867	4.89%	
*AT&T UMTS	2	875	119	0.0444	1900	1.0000	4.44%	
*AT&T GSM	1	283	119	0.0072	880	0.5867	1.22%	
*AT&T GSM	4	525	119	0.0533	1900	1.0000	5.33%	
*AT&T LTE	1	1375	119	0.0349	734	0.4893	7.13%	
*MetroPCS CDMA	3	727	107	0.0685	2135	1.0000	6.85%	
*MetroPCS LTE	1	1200	107	0.0377	2130	1.0000	3.77%	
*Clearwire	2	153	147	0.0051	2496	1.0000	0.51%	
*Clearwire	1	211	147	0.0035	11 GHz	1.0000	0.35%	
*Sprint CDMA/LTE	3	693	148	0.0341	1900	1.0000	3.41%	
*Sprint CDMA/LTE	1	390	148	0.0064	850	0.5667	1.13%	
*Nextel	9	100	127	0.0201	851	0.5673	3.54%	
*XM Sat Radio	2	307	142	0.0109	2340	1.0000	1.09%	
Verizon	**11**	**421**	**134**	**0.0927**	**1970**	**1.0000**	**9.27%**	
Verizon	**9**	**393**	**134**	**0.0708**	**869**	**0.5793**	**12.23%**	
Verizon	**1**	**1750**	**134**	**0.0350**	**2145**	**1.0000**	**3.50%**	
Verizon	**1**	**1050**	**134**	**0.0210**	**698**	**0.4653**	**4.52%**	
								73.20%
* Source: Siting Council								

ATTACHMENT 3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **January 29, 2014**

Cheryl Schultz
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119680
	Carrier Site Name:	North Thompsonville CT
Crown Castle Designation:	**Crown Castle BU Number:**	876348
	Crown Castle Site Name:	ENFIELD
	Crown Castle JDE Job Number:	248970
	Crown Castle Work Order Number:	705665
	Crown Castle Application Number:	203393 Rev. 5
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-0644_R3
Site Data:	**Bright Meadow Blvd., ENFIELD, Hartford County, CT**	
	Latitude *42° 1' 14.91"*, Longitude *-72° 35' 6.59"*	
	147.5 Foot - Monopole Tower	

Dear Cheryl Schultz,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 612758, in accordance with application 203393, revision 5.

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:

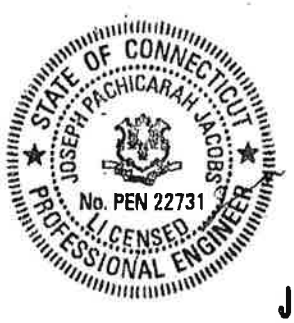
LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code based upon a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

We at *Paul J Ford and Company* 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:

Nick Parente, E.I.
Structural Designer



tnxTower Report - version 6.1.3.1

JAN 3 0 2014

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 147.5 ft Monopole tower designed by SUMMIT in September of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
132.0	134.0	3	alcatel lucent	RRH2X40-AWS	1	1-5/8	-
		3	antel	BXA-171063-12BF-EDIN-X w/ Mount Pipe			
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147.0	147.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	1
		1	tower mounts	Platform Mount [LP 712-1]			
145.0	146.0	2	alcatel lucent	800MHz 2X50W RRH W/FILTER			
		1	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
	145.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	144.0	1	alcatel lucent	800MHz 2X50W RRH W/FILTER			
		2	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
132.0	134.0	6	antel	LPA-80063/4CF w/ Mount Pipe	-	-	2
		3	antel	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	18	1-5/8	1
		3	antel	BXA-70063-6CF-EDIN-2 w/ Mount Pipe			
	132.0	1	tower mounts	Platform Mount [LP 712-1]			
127.0	129.0	12	decibel	DB844H90E-XY w/ Mount Pipe	12	7/8	1
	127.0	1	tower mounts	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
117.0	119.0	1	andrew	SBNH-1D6565C w/ Mount Pipe	1 2 18	3/8 3/4 1-5/8	1
		1	kmw communications	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
	117.0	1	tower mounts	Platform Mount [LP 712-1]			
115.0	119.0	3	ericsson	RRU-11			
		1	raycap	DC6-48-60-18-8F			
	115.0	1	tower mounts	Pipe Mount [PM 601-3]			
107.0	107.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
49.0	50.0	1	symmetricom	58532A	1	1/2	1
	49.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
GEOTECHNICAL REPORTS	FDH, 120604EG1, 8/20/12	1532963	CCISITES
TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29298-598, 9/15/98	1613614	CCISITES
TOWER MANUFACTURER DRAWINGS	Summit, 3960, 9/11/98	1613591	CCISITES
TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37513-0644, 2/27/13	3667620	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.3.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	147.5 - 108.5	Pole	TP29.41x22x0.25	1	-9.43	1083.24	51.6	Pass
L2	108.5 - 72.25	Pole	TP35.798x28.1975x0.25	2	-14.69	1431.15	97.1	Pass
L3	72.25 - 48	Pole	TP39.9048x34.4429x0.3125	3	-20.48	2041.56	96.2	Pass
L4	48 - 35.75	Pole	TP42.232x39.9048x0.3853	4	-22.07	2265.57	92.4	Pass
L5	35.75 - 0	Pole	TP48.4x40.4641x0.375	5	-32.82	2971.67	93.2	Pass
							Summary	
						Pole (L2)	97.1	Pass
						Rating =	97.1	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	86.3	Pass
1	Base Plate	0	77.7	Pass
1	Base Foundation (Steel)	0	50.8	Pass
1	Base Foundation Soil Interaction	0	64.0	Pass

Structure Rating (max from all components) =	97.1%

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

1) Tower is located in Hartford County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.0000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) Local bending stresses due to climbing loads, feed line 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	Use TIA-222-G Tension Splice	
	Capacity Exemption	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	147.5000-108.5000	39.0000	3.75	18	22.0000	29.4100	0.2500	1.0000	A572-60 (60 ksi)
L2	108.5000-72.2500	40.0000	4.50	18	28.1975	35.7980	0.2500	1.0000	A607-65 (65 ksi)
L3	72.2500-48.0000	28.7500	0.00	18	34.4429	39.9048	0.3125	1.2500	A607-65 (65 ksi)
L4	48.0000-35.7500	12.2500	5.25	18	39.9048	42.2320	0.3852	1.5410	Reinf 56.71 ksi (57 ksi)
L5	35.7500-0.0000	41.0000		18	40.4641	48.4000	0.3750	1.5000	A607-65 (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	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	29.8637	23.1385	2485.6899	10.3518	14.9403	166.3751	4974.6504	11.5714	4.7362	18.945
L2	29.3560	22.1763	2188.3323	9.9214	14.3243	152.7703	4379.5441	11.0903	4.5228	18.091
	36.3502	28.2073	4503.2898	12.6195	18.1854	247.6324	9012.5051	14.1063	5.8604	23.442
L3	35.8424	33.8531	4982.1874	12.1163	17.4970	284.7450	9970.9304	16.9298	5.5120	17.638

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
	40.5204	39.2706	7777.2418	14.0553	20.2716	383.6517	15564.7171	19.6390	6.4732	20.714
L4	40.5204	48.3238	9535.0287	14.0294	20.2716	470.3634	19082.6038	24.1665	6.3452	16.47
	42.8835	51.1695	11320.6724	14.8556	21.4539	527.6754	22656.2409	25.5896	6.7548	17.534
L5	42.1202	47.7161	9688.4702	14.2316	20.5558	471.3260	19389.6888	23.8626	6.4617	17.231
	49.1466	57.1618	16656.2703	17.0489	24.5872	677.4366	33334.4574	28.5863	7.8584	20.956

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 plf
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	147.0000 - 0.0000	3	No Ice	0.0000	1.08
						1/2" Ice	0.0000	1.08
						1" Ice	0.0000	1.08
						2" Ice	0.0000	1.08
						4" Ice	0.0000	1.08
***								
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	132.0000 - 0.0000	7	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	132.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
LDF5-50A (7/8 FOAM)	B	No	Inside Pole	127.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
***								
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	117.0000 - 0.0000	18	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
WR-VG86ST-BRD (3/4")	B	No	Inside Pole	117.0000 - 0.0000	2	No Ice	0.0000	0.88
						1/2" Ice	0.0000	0.88
						1" Ice	0.0000	0.88
						2" Ice	0.0000	0.88
						4" Ice	0.0000	0.88
FB-L98B-002-75000(3/8")	B	No	Inside Pole	117.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
***								
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	107.0000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
1-5/8 FOAM	C	No	CaAa (Out Of Face)	107.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
***								
LDF4-50A (1/2 FOAM)	C	No	Inside Pole	49.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
***								
Aero MP3-03	C	No	CaAa (Out Of Face)	49.0000 - 39.0000	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00
						2" Ice	0.7069	0.00
						4" Ice	1.1514	0.00

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	147.5000-108.5000	A	0.000	0.000	0.000	0.000	0.37
		B	0.000	0.000	0.000	0.000	0.21
		C	0.000	0.000	0.000	0.000	0.12
L2	108.5000-72.2500	A	0.000	0.000	0.000	0.000	0.56
		B	0.000	0.000	0.000	0.000	0.74
		C	0.000	0.000	0.000	6.880	0.29
L3	72.2500-48.0000	A	0.000	0.000	0.000	0.000	0.38
		B	0.000	0.000	0.000	0.000	0.50
		C	0.000	0.000	0.000	5.064	0.20
L4	48.0000-35.7500	A	0.000	0.000	0.000	0.000	0.19
		B	0.000	0.000	0.000	0.000	0.25
		C	0.000	0.000	0.000	4.788	0.10
L5	35.7500-0.0000	A	0.000	0.000	0.000	0.000	0.56
		B	0.000	0.000	0.000	0.000	0.73
		C	0.000	0.000	0.000	7.079	0.30

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	147.5000-108.5000	A	1.176	0.000	0.000	0.000	0.000	0.37
		B		0.000	0.000	0.000	0.000	0.21
		C		0.000	0.000	0.000	0.000	0.12
L2	108.5000-72.2500	A	1.128	0.000	0.000	0.000	0.000	0.56
		B		0.000	0.000	0.000	0.000	0.74
		C		0.000	0.000	0.000	15.053	1.27
L3	72.2500-48.0000	A	1.074	0.000	0.000	0.000	0.000	0.38
		B		0.000	0.000	0.000	0.000	0.50
		C		0.000	0.000	0.000	10.785	0.84
L4	48.0000-35.7500	A	1.029	0.000	0.000	0.000	0.000	0.19
		B		0.000	0.000	0.000	0.000	0.25
		C		0.000	0.000	0.000	9.366	0.38
L5	35.7500-0.0000	A	1.000	0.000	0.000	0.000	0.000	0.56
		B		0.000	0.000	0.000	0.000	0.73
		C		0.000	0.000	0.000	14.435	1.12

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	147.5000-108.5000	0.0000	0.0000	0.0000	0.0000
L2	108.5000-72.2500	-0.2314	0.1336	-0.4417	0.2550
L3	72.2500-48.0000	-0.2551	0.1473	-0.4820	0.2783
L4	48.0000-35.7500	-0.4540	0.2621	-0.7771	0.4487
L5	35.7500-0.0000	-0.2443	0.1410	-0.4547	0.2625

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	147.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.23 0.41 0.91
PCS 1900MHz 4x45W-65MHz	A	From Face	1.0000 0.00 1.00	0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Face	1.0000 0.00 -1.00	0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Face	1.0000 0.00 -1.00	0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
800MHz 2X50W RRH W/FILTER	A	From Face	1.0000 0.00 -1.00	0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Face	1.0000 0.00 1.00	0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Face	1.0000 0.00 1.00	0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
Side Arm Mount [SO 102-3]	C	None		0.00	145.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.0000 3.4800 3.9600 4.9200 6.8400	3.0000 3.4800 3.9600 4.9200 6.8400	0.08 0.11 0.14 0.20 0.32
(3) 6' x 2.375" Pipe Mount	A	From Face	4.0000 0.00	0.00	147.0000	No Ice 1/2"	1.4250 1.9250	1.4250 1.9250	0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
(3) 6' x 2.375" Pipe Mount	B	From Face	4.0000 0.00 0.00	0.00	147.0000	No Ice	1.4250	1.4250	0.02
						1/2"	1.9250	1.9250	0.03
						Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
(3) 6' x 2.375" Pipe Mount	C	From Face	4.0000 0.00 0.00	0.00	147.0000	No Ice	1.4250	1.4250	0.02
						1/2"	1.9250	1.9250	0.03
						Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.00	147.0000	No Ice	24.5300	24.5300	1.34
						1/2"	29.9400	29.9400	1.65
						Ice	35.3500	35.3500	1.96
						1" Ice	46.1700	46.1700	2.58
						2" Ice	67.8100	67.8100	3.82
						4" Ice			
***									
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	5.3988	3.6927	0.03
						1/2"	5.8435	4.2947	0.07
						Ice	6.2986	4.9133	0.12
						1" Ice	7.2405	6.2583	0.23
						2" Ice	9.2612	9.2851	0.58
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	5.3988	3.6927	0.03
						1/2"	5.8435	4.2947	0.07
						Ice	6.2986	4.9133	0.12
						1" Ice	7.2405	6.2583	0.23
						2" Ice	9.2612	9.2851	0.58
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	5.3988	3.6927	0.03
						1/2"	5.8435	4.2947	0.07
						Ice	6.2986	4.9133	0.12
						1" Ice	7.2405	6.2583	0.23
						2" Ice	9.2612	9.2851	0.58
						4" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	5.0373	5.2974	0.04
						1/2"	5.5919	6.4695	0.08
						Ice	6.1129	7.3603	0.14
						1" Ice	7.1769	9.1623	0.27
						2" Ice	9.4492	12.9662	0.68
						4" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	5.0373	5.2974	0.04
						1/2"	5.5919	6.4695	0.08
						Ice	6.1129	7.3603	0.14
						1" Ice	7.1769	9.1623	0.27
						2" Ice	9.4492	12.9662	0.68
						4" Ice			
BXA-171063-12BF-EDIN-X w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	5.0373	5.2974	0.04
						1/2"	5.5919	6.4695	0.08
						Ice	6.1129	7.3603	0.14
						1" Ice	7.1769	9.1623	0.27
						2" Ice	9.4492	12.9662	0.68
						4" Ice			
RRH2X40-AWS	A	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice	2.9764	1.5960	0.04
						1/2"	3.2363	1.8239	0.06
						Ice	3.5048	2.0605	0.08
						1" Ice	4.0678	2.5596	0.14
						2" Ice	5.2975	3.6614	0.29
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
RRH2X40-AWS	B	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.9764 3.2363 3.5048 4.0678 5.2975	1.5960 1.8239 2.0605 2.5596 3.6614	0.04 0.06 0.08 0.14 0.29
RRH2X40-AWS	C	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.9764 3.2363 3.5048 4.0678 5.2975	1.5960 1.8239 2.0605 2.5596 3.6614	0.04 0.06 0.08 0.14 0.29
DB-T1-6Z-8AB-0Z	A	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1789 3.5550 3.9637 4.8533 6.7671	3.3530 3.9709 4.5951 5.8933 8.8855	0.03 0.06 0.10 0.19 0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1789 3.5550 3.9637 4.8533 6.7671	3.3530 3.9709 4.5951 5.8933 8.8855	0.03 0.06 0.10 0.19 0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1789 3.5550 3.9637 4.8533 6.7671	3.3530 3.9709 4.5951 5.8933 8.8855	0.03 0.06 0.10 0.19 0.49
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.9686 8.6091 9.2158 10.4591 13.0655	5.8008 6.9529 7.8191 9.6015 13.3662	0.04 0.10 0.17 0.34 0.80
Platform Mount [LP 712-1]	C	None		0.00	132.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.5300 29.9400 35.3500 46.1700 67.8100	24.5300 29.9400 35.3500 46.1700 67.8100	1.34 1.65 1.96 2.58 3.82
***									
(4) DB844H90E-XY w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	127.0000	No Ice 1/2" Ice 1" Ice	3.2986 3.6900 4.1185 5.0070	4.9208 5.5962 6.2837 7.7123	0.03 0.07 0.12 0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	6.9197	10.8330	0.56
						4" Ice			
(4) DB844H90E-XY w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	127.0000	No Ice	3.2986	4.9208	0.03
						1/2" Ice	3.6900	5.5962	0.07
						1" Ice	4.1185	6.2837	0.12
						2" Ice	5.0070	7.7123	0.23
						4" Ice	6.9197	10.8330	0.56
(4) DB844H90E-XY w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	127.0000	No Ice	3.2986	4.9208	0.03
						1/2" Ice	3.6900	5.5962	0.07
						1" Ice	4.1185	6.2837	0.12
						2" Ice	5.0070	7.7123	0.23
						4" Ice	6.9197	10.8330	0.56
Platform Mount [LP 712-1]	C	None		0.00	127.0000	No Ice	24.5300	24.5300	1.34
						1/2" Ice	29.9400	29.9400	1.65
						1" Ice	35.3500	35.3500	1.96
						2" Ice	46.1700	46.1700	2.58
						4" Ice	67.8100	67.8100	3.82
***									
7770.00 w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
7770.00 w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
7770.00 w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	6.1194	4.2543	0.06
						1/2" Ice	6.6258	5.0137	0.10
						1" Ice	7.1283	5.7109	0.16
						2" Ice	8.1643	7.1553	0.29
						4" Ice	10.3599	10.4117	0.66
SBNH-1D6565C w/ Mount Pipe	A	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	11.5561	9.7151	0.10
						1/2" Ice	12.2227	11.1857	0.19
						1" Ice	12.8929	12.5942	0.28
						2" Ice	14.2911	14.8689	0.51
						4" Ice	17.4280	19.6184	1.15
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	5.7442	4.0153	0.03
						1/2" Ice	6.1977	4.6330	0.08
						1" Ice	6.6606	5.2765	0.13
						2" Ice	7.6178	6.6779	0.25
						4" Ice	9.6678	9.7441	0.61
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	8.4975	6.3042	0.07
						1/2" Ice	9.1490	7.4790	0.14
						1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
(2) LGP21401	A	From Face	4.0000 0.00 2.00	0.00	117.0000	No Ice	1.2880	0.2326	0.01
						1/2" Ice	1.4453	0.3134	0.02
						1" Ice	1.6112	0.4028	0.03
						2" Ice	1.9690	0.6076	0.05
						4" Ice	2.7882	1.1210	0.14
(2) LGP21401	B	From Face	4.0000 0.00	0.00	117.0000	No Ice	1.2880	0.2326	0.01
						1/2" Ice	1.4453	0.3134	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2.00			Ice	1.6112	0.4028	0.03
						1" Ice	1.9690	0.6076	0.05
						2" Ice	2.7882	1.1210	0.14
						4" Ice			
(2) LGP21401	C	From Face	4.0000	0.00	117.0000	No Ice	1.2880	0.2326	0.01
			0.00			1/2"	1.4453	0.3134	0.02
			2.00			Ice	1.6112	0.4028	0.03
						1" Ice	1.9690	0.6076	0.05
						2" Ice	2.7882	1.1210	0.14
						4" Ice			
(2) 6' x 2.375" Pipe Mount	A	From Face	4.0000	0.00	117.0000	No Ice	1.4250	1.4250	0.02
			0.00			1/2"	1.9250	1.9250	0.03
			0.00			Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
(2) 6' x 2.375" Pipe Mount	B	From Face	4.0000	0.00	117.0000	No Ice	1.4250	1.4250	0.02
			0.00			1/2"	1.9250	1.9250	0.03
			0.00			Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
(2) 6' x 2.375" Pipe Mount	C	From Face	4.0000	0.00	117.0000	No Ice	1.4250	1.4250	0.02
			0.00			1/2"	1.9250	1.9250	0.03
			0.00			Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice	4.7022	4.7022	0.23
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.00	117.0000	No Ice	24.5300	24.5300	1.34
						1/2"	29.9400	29.9400	1.65
						Ice	35.3500	35.3500	1.96
						1" Ice	46.1700	46.1700	2.58
						2" Ice	67.8100	67.8100	3.82
						4" Ice			
RRU-11	A	From Face	1.0000	0.00	115.0000	No Ice	1.9116	1.4717	0.04
			0.00			1/2"	2.1019	1.6452	0.06
			4.00			Ice	2.3009	1.8274	0.08
						1" Ice	2.7248	2.2176	0.12
						2" Ice	3.6763	3.1016	0.25
						4" Ice			
RRU-11	B	From Face	1.0000	0.00	115.0000	No Ice	1.9116	1.4717	0.04
			0.00			1/2"	2.1019	1.6452	0.06
			4.00			Ice	2.3009	1.8274	0.08
						1" Ice	2.7248	2.2176	0.12
						2" Ice	3.6763	3.1016	0.25
						4" Ice			
RRU-11	C	From Face	1.0000	0.00	115.0000	No Ice	1.9116	1.4717	0.04
			0.00			1/2"	2.1019	1.6452	0.06
			4.00			Ice	2.3009	1.8274	0.08
						1" Ice	2.7248	2.2176	0.12
						2" Ice	3.6763	3.1016	0.25
						4" Ice			
DC6-48-60-18-8F	A	From Face	1.0000	0.00	115.0000	No Ice	2.5667	2.5667	0.02
			0.00			1/2"	2.7978	2.7978	0.04
			4.00			Ice	3.0377	3.0377	0.07
						1" Ice	3.5432	3.5432	0.13
						2" Ice	4.6580	4.6580	0.30
						4" Ice			
Pipe Mount [PM 601-3]	C	None		0.00	115.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice	13.1100	13.1100	0.53
						4" Ice			

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXV18-206517S-C w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.4042 5.9597 6.4808 7.5467 9.9193	4.7000 5.8600 6.7338 8.5150 12.2774	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	B	From Face	1.0000 0.00 0.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.4042 5.9597 6.4808 7.5467 9.9193	4.7000 5.8600 6.7338 8.5150 12.2774	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-C w/ Mount Pipe	C	From Face	1.0000 0.00 0.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.4042 5.9597 6.4808 7.5467 9.9193	4.7000 5.8600 6.7338 8.5150 12.2774	0.05 0.10 0.15 0.28 0.68
***									
58532A	A	From Face	2.0000 0.00 1.00	0.00	49.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2209 0.2897 0.3672 0.5481 1.0137	0.2209 0.2897 0.3672 0.5481 1.0137	0.00 0.00 0.01 0.02 0.06
Side Arm Mount [SO 701-1]	A	From Face	1.0000 0.00 0.00	0.00	49.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.8500 1.1400 1.4300 2.0100 3.1700	1.6700 2.3400 3.0100 4.3500 7.0300	0.07 0.08 0.09 0.12 0.18

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 147.5000-108.5000	127.2746	1.471	24.07	83.541	A	0.000	83.541	83.541	100.00	0.000	0.000
					B	0.000	83.541		100.00	0.000	0.000
					C	0.000	83.541		100.00	0.000	0.000
L2 108.5000-72.2500	89.9920	1.332	21.78	97.736	A	0.000	97.736	97.736	100.00	0.000	0.000
					B	0.000	97.736		100.00	0.000	0.000
					C	0.000	97.736		100.00	0.000	6.880
L3 72.2500-48.0000	59.8774	1.186	19.42	75.986	A	0.000	75.986	75.986	100.00	0.000	0.000
					B	0.000	75.986		100.00	0.000	0.000
					C	0.000	75.986		100.00	0.000	5.064
L4 48.0000-35.7500	41.8172	1.07	17.53	41.924	A	0.000	41.924	41.924	100.00	0.000	0.000
					B	0.000	41.924		100.00	0.000	0.000
					C	0.000	41.924		100.00	0.000	4.788
L5 35.7500-0.0000	17.4163	1	16.38	133.884	A	0.000	133.884	133.884	100.00	0.000	0.000
					B	0.000	133.884		100.00	0.000	0.000
					C	0.000	133.884		100.00	0.000	7.079

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.5000-108.5000	127.2746	1.471	5.32	1.1758	91.184	A	0.000	91.184	91.184	100.00	0.000	0.000
						B	0.000	91.184		100.00	0.000	0.000
						C	0.000	91.184		100.00	0.000	0.000
L2 108.5000-72.2500	89.9920	1.332	4.81	1.1279	104.840	A	0.000	104.840	104.840	100.00	0.000	0.000
						B	0.000	104.840		100.00	0.000	0.000
						C	0.000	104.840		100.00	0.000	15.053
L3 72.2500-48.0000	59.8774	1.186	4.29	1.0741	80.545	A	0.000	80.545	80.545	100.00	0.000	0.000
						B	0.000	80.545		100.00	0.000	0.000
						C	0.000	80.545		100.00	0.000	10.785
L4 48.0000-35.7500	41.8172	1.07	3.87	1.0288	44.024	A	0.000	44.024	44.024	100.00	0.000	0.000
						B	0.000	44.024		100.00	0.000	0.000
						C	0.000	44.024		100.00	0.000	9.366
L5 35.7500-0.0000	17.4163	1	3.62	1.0000	140.014	A	0.000	140.014	140.014	100.00	0.000	0.000
						B	0.000	140.014		100.00	0.000	0.000
						C	0.000	140.014		100.00	0.000	14.435

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.5000-108.5000	127.2746	1.471	9.40	83.541	A	0.000	83.541	83.541	100.00	0.000	0.000
					B	0.000	83.541		100.00	0.000	0.000
					C	0.000	83.541		100.00	0.000	0.000
L2 108.5000-72.2500	89.9920	1.332	8.51	97.736	A	0.000	97.736	97.736	100.00	0.000	0.000
					B	0.000	97.736		100.00	0.000	0.000
					C	0.000	97.736		100.00	0.000	6.880
L3 72.2500-48.0000	59.8774	1.186	7.59	75.986	A	0.000	75.986	75.986	100.00	0.000	0.000
					B	0.000	75.986		100.00	0.000	0.000
					C	0.000	75.986		100.00	0.000	5.064
L4 48.0000-35.7500	41.8172	1.07	6.85	41.924	A	0.000	41.924	41.924	100.00	0.000	0.000
					B	0.000	41.924		100.00	0.000	0.000
					C	0.000	41.924		100.00	0.000	4.788
L5 35.7500-0.0000	17.4163	1	6.40	133.884	A	0.000	133.884	133.884	100.00	0.000	0.000
					B	0.000	133.884		100.00	0.000	0.000
					C	0.000	133.884		100.00	0.000	7.079

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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice

Comb. No.	Description
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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	147.5 - 108.5	Pole	Max Tension	24	0.00	-0.00	-0.00
			Max. Compression	14	-21.17	1.63	0.40
			Max. Mx	11	-9.44	320.20	1.42
			Max. My	2	-9.45	1.79	318.36
			Max. Vy	11	-16.79	320.20	1.42
			Max. Vx	8	16.74	-0.91	-318.16
			Max. Torque	9			-1.62
L2	108.5 - 72.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.10	3.03	-0.32
			Max. Mx	11	-14.70	978.81	3.61
			Max. My	8	-14.70	-2.92	-974.76
			Max. Vy	11	-19.86	978.81	3.61
			Max. Vx	8	19.80	-2.92	-974.76
			Max. Torque	8			-1.64
L3	72.25 - 48	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-36.93	4.60	-0.91
			Max. Mx	11	-20.48	1578.40	5.40
			Max. My	8	-20.49	-4.36	-1572.49
			Max. Vy	11	-21.82	1578.40	5.40
			Max. Vx	8	21.78	-4.36	-1572.49
			Max. Torque	8			-1.82
L4	48 - 35.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.94	4.90	-1.08
			Max. Mx	11	-22.08	1732.76	5.73
			Max. My	8	-22.08	-4.67	-1726.54
			Max. Vy	5	22.29	-1730.47	-5.86
			Max. Vx	8	22.25	-4.67	-1726.54
			Max. Torque	8			-1.84
L5	35.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.53	6.73	-2.14
			Max. Mx	11	-32.82	2696.14	7.63
			Max. My	8	-32.82	-6.41	-2688.15
			Max. Vy	11	-24.59	2696.14	7.63
			Max. Vx	8	24.56	-6.41	-2688.15
			Max. Torque	8			-1.90

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	52.53	6.97	0.00
	Max. H_x	11	32.84	24.57	0.05
	Max. H_z	2	32.84	0.05	24.53
	Max. M_x	2	2687.66	0.05	24.53
	Max. M_z	5	2693.18	-24.57	-0.05
	Max. Torsion	2	1.90	0.05	24.53
	Min. Vert	1	32.84	0.00	0.00
	Min. H_x	5	32.84	-24.57	-0.05
	Min. H_z	8	32.84	-0.05	-24.53
	Min. M_x	8	-2688.15	-0.05	-24.53
	Min. M_z	11	-2696.14	24.57	0.05
	Min. Torsion	8	-1.90	-0.05	-24.53

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	32.84	0.00	0.00	0.24	1.41	0.00
Dead+Wind 0 deg - No Ice	32.84	-0.05	-24.53	-2687.66	9.34	-1.90
Dead+Wind 30 deg - No Ice	32.84	12.24	-21.22	-2323.62	-1339.07	-1.86
Dead+Wind 60 deg - No Ice	32.84	21.25	-12.22	-1336.88	-2328.28	-1.33
Dead+Wind 90 deg - No Ice	32.84	24.57	0.05	8.13	-2693.18	-0.44
Dead+Wind 120 deg - No Ice	32.84	21.30	12.31	1350.99	-2336.10	0.57
Dead+Wind 150 deg - No Ice	32.84	12.33	21.27	2331.94	-1352.68	1.43
Dead+Wind 180 deg - No Ice	32.84	0.05	24.53	2688.15	-6.41	1.90
Dead+Wind 210 deg - No Ice	32.84	-12.24	21.22	2324.13	1342.00	1.87
Dead+Wind 240 deg - No Ice	32.84	-21.25	12.22	1337.39	2331.22	1.33
Dead+Wind 270 deg - No Ice	32.84	-24.57	-0.05	-7.63	2696.14	0.43
Dead+Wind 300 deg - No Ice	32.84	-21.30	-12.31	-1350.50	2339.04	-0.57
Dead+Wind 330 deg - No Ice	32.84	-12.33	-21.27	-2331.45	1355.62	-1.42
Dead+Ice	52.53	-0.00	0.00	2.14	6.73	-0.00
Dead+Wind 0 deg+Ice	52.53	-0.00	-6.97	-811.95	8.02	-0.58
Dead+Wind 30 deg+Ice	52.53	3.48	-6.03	-702.28	-399.89	-0.55
Dead+Wind 60 deg+Ice	52.53	6.03	-3.48	-403.85	-698.82	-0.38
Dead+Wind 90 deg+Ice	52.53	6.97	0.00	3.37	-808.62	-0.10
Dead+Wind 120 deg+Ice	52.53	6.04	3.49	410.26	-700.02	0.20
Dead+Wind 150 deg+Ice	52.53	3.49	6.03	707.81	-401.96	0.45
Dead+Wind 180 deg+Ice	52.53	0.00	6.97	816.28	5.62	0.58
Dead+Wind 210 deg+Ice	52.53	-3.48	6.03	706.61	413.53	0.55
Dead+Wind 240 deg+Ice	52.53	-6.03	3.48	408.18	712.47	0.38
Dead+Wind 270 deg+Ice	52.53	-6.97	-0.00	0.97	822.26	0.10
Dead+Wind 300 deg+Ice	52.53	-6.04	-3.49	-405.93	713.67	-0.20
Dead+Wind 330 deg+Ice	52.53	-3.49	-6.03	-703.47	415.61	-0.45
Dead+Wind 0 deg - Service	32.84	-0.02	-9.58	-1051.46	4.57	-0.75
Dead+Wind 30 deg - Service	32.84	4.78	-8.29	-909.02	-523.03	-0.74
Dead+Wind 60 deg - Service	32.84	8.30	-4.77	-522.94	-910.09	-0.53
Dead+Wind 90 deg - Service	32.84	9.60	0.02	3.33	-1052.88	-0.17
Dead+Wind 120 deg - Service	32.84	8.32	4.81	528.77	-913.17	0.22
Dead+Wind 150 deg - Service	32.84	4.82	8.31	912.60	-528.37	0.56
Dead+Wind 180 deg - Service	32.84	0.02	9.58	1051.95	-1.60	0.75
Dead+Wind 210 deg - Service	32.84	-4.78	8.29	909.52	526.00	0.74
Dead+Wind 240 deg - Service	32.84	-8.30	4.77	523.43	913.06	0.52
Dead+Wind 270 deg - Service	32.84	-9.60	-0.02	-2.84	1055.85	0.17
Dead+Wind 300 deg - Service	32.84	-8.32	-4.81	-528.28	916.14	-0.22
Dead+Wind 330 deg - Service	32.84	-4.82	-8.31	-912.11	531.34	-0.56

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-32.84	0.00	0.00	32.84	0.00	0.000%
2	-0.05	-32.84	-24.53	0.05	32.84	24.53	0.000%
3	12.24	-32.84	-21.22	-12.24	32.84	21.22	0.000%
4	21.25	-32.84	-12.22	-21.25	32.84	12.22	0.000%
5	24.57	-32.84	0.05	-24.57	32.84	-0.05	0.000%
6	21.30	-32.84	12.31	-21.30	32.84	-12.31	0.000%
7	12.33	-32.84	21.27	-12.33	32.84	-21.27	0.000%
8	0.05	-32.84	24.53	-0.05	32.84	-24.53	0.000%
9	-12.24	-32.84	21.22	12.24	32.84	-21.22	0.000%
10	-21.25	-32.84	12.22	21.25	32.84	-12.22	0.000%
11	-24.57	-32.84	-0.05	24.57	32.84	0.05	0.000%
12	-21.30	-32.84	-12.31	21.30	32.84	12.31	0.000%
13	-12.33	-32.84	-21.27	12.33	32.84	21.27	0.000%
14	0.00	-52.53	0.00	0.00	52.53	-0.00	0.000%
15	-0.00	-52.53	-6.97	0.00	52.53	6.97	0.000%
16	3.48	-52.53	-6.03	-3.48	52.53	6.03	0.000%
17	6.03	-52.53	-3.48	-6.03	52.53	3.48	0.000%
18	6.97	-52.53	0.00	-6.97	52.53	-0.00	0.000%
19	6.04	-52.53	3.49	-6.04	52.53	-3.49	0.000%
20	3.49	-52.53	6.03	-3.49	52.53	-6.03	0.000%
21	0.00	-52.53	6.97	-0.00	52.53	-6.97	0.000%
22	-3.48	-52.53	6.03	3.48	52.53	-6.03	0.000%
23	-6.03	-52.53	3.48	6.03	52.53	-3.48	0.000%
24	-6.97	-52.53	-0.00	6.97	52.53	0.00	0.000%
25	-6.04	-52.53	-3.49	6.04	52.53	3.49	0.000%
26	-3.49	-52.53	-6.03	3.49	52.53	6.03	0.000%
27	-0.02	-32.84	-9.58	0.02	32.84	9.58	0.000%
28	4.78	-32.84	-8.29	-4.78	32.84	8.29	0.000%
29	8.30	-32.84	-4.77	-8.30	32.84	4.77	0.000%
30	9.60	-32.84	0.02	-9.60	32.84	-0.02	0.000%
31	8.32	-32.84	4.81	-8.32	32.84	-4.81	0.000%
32	4.82	-32.84	8.31	-4.82	32.84	-8.31	0.000%
33	0.02	-32.84	9.58	-0.02	32.84	-9.58	0.000%
34	-4.78	-32.84	8.29	4.78	32.84	-8.29	0.000%
35	-8.30	-32.84	4.77	8.30	32.84	-4.77	0.000%
36	-9.60	-32.84	-0.02	9.60	32.84	0.02	0.000%
37	-8.32	-32.84	-4.81	8.32	32.84	4.81	0.000%
38	-4.82	-32.84	-8.31	4.82	32.84	8.31	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 108.5	43.22	37	2.46	0.01
L2	112.25 - 72.25	25.57	37	2.23	0.00
L3	76.75 - 48	11.54	37	1.46	0.00
L4	48 - 35.75	4.44	37	0.86	0.00
L5	41 - 0	3.28	37	0.73	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.0000	APXVSPP18-C-A20 w/ Mount Pipe	37	42.96	2.46	0.01	26442
145.0000	PCS 1900MHz 4x45W-65MHz	37	41.92	2.46	0.01	26442
132.0000	BXA-70063-4CF-EDIN-X w/ Mount Pipe	37	35.22	2.41	0.01	8529
127.0000	(4) DB844H90E-XY w/ Mount Pipe	37	32.70	2.38	0.01	6448

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
117.0000	7770.00 w/ Mount Pipe	37	27.80	2.29	0.00	4333
115.0000	RRU-11	37	26.85	2.27	0.00	4070
107.0000	APXV18-206517S-C w/ Mount Pipe	37	23.18	2.14	0.00	3452
49.0000	58532A	37	4.62	0.88	0.00	2759

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147.5 - 108.5	110.01	12	6.28	0.01
L2	112.25 - 72.25	65.15	12	5.68	0.01
L3	76.75 - 48	29.44	12	3.73	0.01
L4	48 - 35.75	11.33	12	2.19	0.00
L5	41 - 0	8.36	12	1.86	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.0000	APXVSPP18-C-A20 w/ Mount Pipe	12	109.35	6.27	0.01	10625
145.0000	PCS 1900MHz 4x45W-65MHz	12	106.71	6.26	0.01	10625
132.0000	BXA-70063-4CF-EDIN-X w/ Mount Pipe	12	89.69	6.14	0.01	3425
127.0000	(4) DB844H90E-XY w/ Mount Pipe	12	83.27	6.07	0.01	2588
117.0000	7770.00 w/ Mount Pipe	12	70.83	5.84	0.01	1737
115.0000	RRU-11	12	68.41	5.77	0.01	1631
107.0000	APXV18-206517S-C w/ Mount Pipe	12	59.08	5.46	0.01	1380
49.0000	58532A	12	11.80	2.24	0.00	1085

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	147.5 - 108.5 (1)	TP29.41x22x0.25	39.0000	0.0000	0.0	36.00	22.5731	-9.43	812.63	0.012
L2	108.5 - 72.25 (2)	TP35.798x28.1975x0.25	40.0000	0.0000	0.0	39.00	27.5289	-14.69	1073.63	0.014
L3	72.25 - 48 (3)	TP39.9048x34.4429x0.3125	28.7500	0.0000	0.0	39.00	39.2706	-20.48	1531.55	0.013
L4	48 - 35.75 (4)	TP42.232x39.9048x0.3853	12.2500	0.0000	0.0	34.03	49.9499	-22.07	1699.60	0.013
L5	35.75 - 0 (5)	TP48.4x40.4641x0.375	41.0000	0.0000	0.0	39.00	57.1618	-32.82	2229.31	0.015

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	147.5 - 108.5 (1)	TP29.41x22x0.25	320.98	24.33	36.00	0.676	0.00	0.00	36.00	0.000
L2	108.5 - 72.25	TP35.798x28.1975x0.25	980.99	49.92	39.00	1.280	0.00	0.00	39.00	0.000

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 $\frac{f_{by}}{F_{by}}$
L3	72.25 - 48 (3)	TP39.9048x34.4429x0.3125	1581.71	49.47	39.00	1.269	0.00	0.00	39.00	0.000
L4	48 - 35.75 (4)	TP42.232x39.9048x0.3853	1736.28	41.45	34.03	1.218	0.00	0.00	34.03	0.000
L5	35.75 - 0 (5)	TP48.4x40.4641x0.375	2700.93	47.84	39.00	1.227	0.00	0.00	39.00	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	147.5 - 108.5 (1)	TP29.41x22x0.25	16.84	0.75	24.00	0.062	0.40	0.01	24.00	0.001
L2	108.5 - 72.25 (2)	TP35.798x28.1975x0.25	19.90	0.72	26.00	0.056	0.44	0.01	26.00	0.000
L3	72.25 - 48 (3)	TP39.9048x34.4429x0.3125	21.86	0.56	26.00	0.043	0.48	0.01	26.00	0.000
L4	48 - 35.75 (4)	TP42.232x39.9048x0.3853	22.32	0.45	22.68	0.039	0.50	0.01	22.68	0.000
L5	35.75 - 0 (5)	TP48.4x40.4641x0.375	24.63	0.43	26.00	0.033	0.57	0.00	26.00	0.000

Pole Interaction Design Data

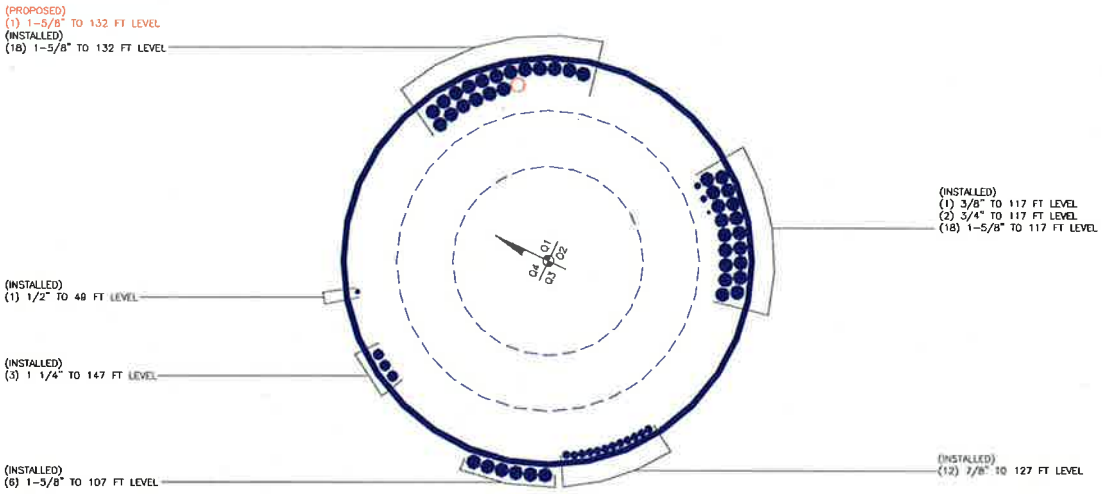
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147.5 - 108.5 (1)	0.012	0.676	0.000	0.062	0.001	0.688 ✔	1.333	H1-3+VT ✔
L2	108.5 - 72.25 (2)	0.014	1.280	0.000	0.056	0.000	1.294 ✔	1.333	H1-3+VT ✔
L3	72.25 - 48 (3)	0.013	1.269	0.000	0.043	0.000	1.282 ✔	1.333	H1-3+VT ✔
L4	48 - 35.75 (4)	0.013	1.218	0.000	0.039	0.000	1.231 ✔	1.333	H1-3+VT ✔
L5	35.75 - 0 (5)	0.015	1.227	0.000	0.033	0.000	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	147.5 - 108.5	Pole	TP29.41x22x0.25	1	-9.43	1083.24	51.6	Pass
L2	108.5 - 72.25	Pole	TP35.798x28.1975x0.25	2	-14.69	1431.15	97.1	Pass
L3	72.25 - 48	Pole	TP39.9048x34.4429x0.3125	3	-20.48	2041.56	96.2	Pass
L4	48 - 35.75	Pole	TP42.232x39.9048x0.3853	4	-22.07	2265.57	92.4	Pass
L5	35.75 - 0	Pole	TP48.4x40.4641x0.375	5	-32.82	2971.67	93.2	Pass
							Summary	
						Pole (L2)	97.1	Pass
						RATING =	**97.1**	**Pass**

APPENDIX B

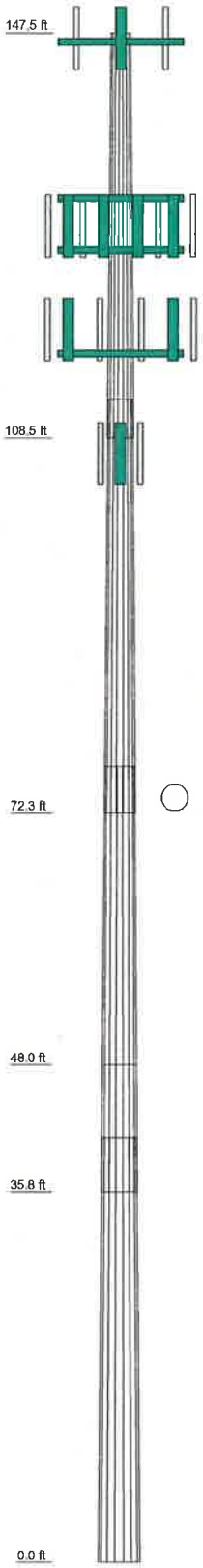
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	5	4	3	2	1
Length (ft)	41.0000	12.2500	28.7500	40.0000	39.0000
Number of Sides	18	18	18	18	18
Thickness (in)	0.3750	0.3852	0.3125	0.2500	0.2500
Socket Length (ft)		5.2500		4.5000	3.7500
Top Dia (in)	40.4641	39.9048	34.4429	28.1975	22.0000
Bot Dia (in)	48.4000	42.2320	39.9048	35.7980	29.4100
Grade	A607-65	Reinf 56.71 ksi	A607-65	A572-60	
Weight (K)	7.3	2.1	3.6	3.4	2.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	147	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	132
APXVSPP18-C-A20 w/ Mount Pipe	147	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	132
APXVSPP18-C-A20 w/ Mount Pipe	147	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	132
(3) 6' x 2.375" Pipe Mount	147	Platform Mount [LP 712-1]	132
(3) 6' x 2.375" Pipe Mount	147	(4) DB844H90E-XY w/ Mount Pipe	127
(3) 6' x 2.375" Pipe Mount	147	(4) DB844H90E-XY w/ Mount Pipe	127
Platform Mount [LP 712-1]	147	(4) DB844H90E-XY w/ Mount Pipe	127
800MHz 2X50W RRH W/FILTER	145	Platform Mount [LP 712-1]	127
800MHz 2X50W RRH W/FILTER	145	7770.00 w/ Mount Pipe	117
Side Arm Mount [SO 102-3]	145	7770.00 w/ Mount Pipe	117
PCS 1900MHz 4x45W-65MHz	145	7770.00 w/ Mount Pipe	117
PCS 1900MHz 4x45W-65MHz	145	SBNH-1D6565C w/ Mount Pipe	117
PCS 1900MHz 4x45W-65MHz	145	AM-X-CD-14-65-00T-RET w/ Mount Pipe	117
800MHz 2X50W RRH W/FILTER	145	AM-X-CD-16-65-00T-RET w/ Mount Pipe	117
BXA-70063-4CF-EDIN-X w/ Mount Pipe	132	(2) LGP21401	117
BXA-70063-4CF-EDIN-X w/ Mount Pipe	132	(2) LGP21401	117
BXA-70063-4CF-EDIN-X w/ Mount Pipe	132	(2) LGP21401	117
BXA-171063-12BF-EDIN-X w/ Mount Pipe	132	(2) 6' x 2.375" Pipe Mount	117
BXA-171063-12BF-EDIN-X w/ Mount Pipe	132	(2) 6' x 2.375" Pipe Mount	117
BXA-171063-12BF-EDIN-X w/ Mount Pipe	132	(2) 6' x 2.375" Pipe Mount	117
RRH2X40-AWS	132	Platform Mount [LP 712-1]	117
RRH2X40-AWS	132	RRU-11	115
RRH2X40-AWS	132	RRU-11	115
DB-T1-6Z-8AB-0Z	132	RRU-11	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	132	DC6-48-60-18-8F	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	132	Pipe Mount [PM 601-3]	115
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	132	APXV18-206517S-C w/ Mount Pipe	107
		APXV18-206517S-C w/ Mount Pipe	107
		APXV18-206517S-C w/ Mount Pipe	107
		58532A	49
		Side Arm Mount [SO 701-1]	49

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-60	60 ksi	75 ksi	Reinf 56.71 ksi	57 ksi	71 ksi
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

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

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *147' MP; Enfield, CT; Enfield*			
Project: *PJF 37513-0644 (BU 876348)*			
Client: Crown Castle	Drawn by: Nick Parente, E.I.	App'd:	
Code: TIA/EIA-222-F	Date: 01/30/14	Scale: NTS	
Path:		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3700

v4.4 - Effective 7-12-13

Date: 1/30/2014
PJF Project: 37513-0644_R1
Client Ref. # BU 876348
Site Name: Enfield
Description: 147.5' MP
Owner: Crown Castle
Engineer: NZP

Asymmetric Anchor Rod Analysis

Moment =	2701	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	33.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	25.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	15							

** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. **

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	32.4	55.00	0.00	3.98	168.50	163.72	163.72	0.00	195.00	84.0%
2	2.250	#18J A615 Gr 75	75	100	45.0	55.00	0.00	3.98	166.90	162.12	162.12	0.00	195.00	83.1%
3	2.250	#18J A615 Gr 75	75	100	57.6	55.00	0.00	3.98	165.38	160.60	160.60	0.00	195.00	82.4%
4	2.250	#18J A615 Gr 75	75	100	122.4	55.00	0.00	3.98	168.27	163.49	163.49	0.00	195.00	83.8%
5	2.250	#18J A615 Gr 75	75	100	135.0	55.00	0.00	3.98	170.67	165.89	165.89	0.00	195.00	85.1%
6	2.250	#18J A615 Gr 75	75	100	147.6	55.00	0.00	3.98	172.95	168.17	168.17	0.00	195.00	86.2%
7	2.250	#18J A615 Gr 75	75	100	212.4	55.00	0.00	3.98	172.95	168.17	168.17	0.00	195.00	86.2%
8	2.250	#18J A615 Gr 75	75	100	225.0	55.00	0.00	3.98	170.67	165.89	165.89	0.00	195.00	85.1%
9	2.250	#18J A615 Gr 75	75	100	237.6	55.00	0.00	3.98	168.27	163.49	163.49	0.00	195.00	83.8%
10	2.250	#18J A615 Gr 75	75	100	302.4	55.00	0.00	3.98	165.38	160.60	160.60	0.00	195.00	82.4%
11	2.250	#18J A615 Gr 75	75	100	315.0	55.00	0.00	3.98	166.90	162.12	162.12	0.00	195.00	83.1%
12	2.250	#18J A615 Gr 75	75	100	327.6	55.00	0.00	3.98	168.50	163.72	163.72	0.00	195.00	84.0%
13	1.750	A193 Gr B7	105	125	0.0	60.40	0.00	2.41	113.30	110.42	110.42	0.00	132.29	83.5%
14	1.750	A193 Gr B7	105	125	110.0	60.40	0.00	2.41	110.09	107.20	107.20	0.00	132.29	81.0%
15	1.750	A193 Gr B7	105	125	250.0	60.40	0.00	2.41	110.09	107.20	107.20	0.00	132.29	81.0%
								54.98						

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

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

Site Data

BU#:
Site Name:
App #:

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	55	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	52	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	4	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	48.4	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2345	ft-kips
Unfactored Axial, P:	28.7	kips
Unfactored Shear, V:	21.7	kips

Reactions adjusted to account for additional anchor rods

Anchor Rod Results

TIA F --> Maximum Rod Tension	168.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	86.3% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	38.8 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	77.7% **Pass**

PL Ref. Data
Yield Line (in):
25.14
Max PL Length:
25.14

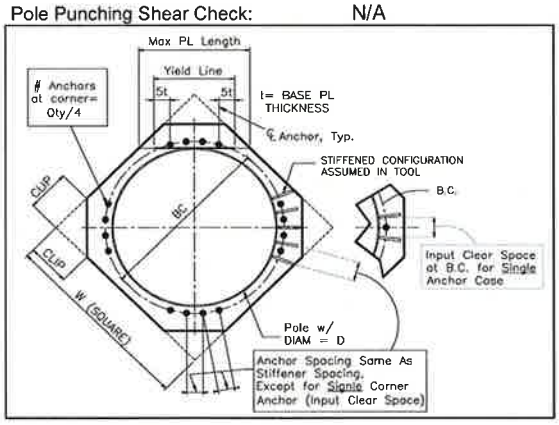
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

PJF job no. **37513-0644_R1** Project name **#**

Foundation Loads:

Pole weight or tower leg compression =	**33**	(kips)
Horizontal load at top of pier =	**25**	(kips)
Overturning moment at top of pier=	**2701**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	

Soil Properties:

Soil density =	**115**	(pcf)
Allowable soil bearing =	**3.25**	(ksf)
Depth to water table =	**4**	(ft)

Dimensions:

Pier shape (round or square)	**S**	("R" or "S")
Pier width =	**8**	(ft)
Pier height above grade =	**0.5**	(ft)
depth to bottom of footing =	**10**	(ft)
Footing thickness =	**3**	(ft)
Footing width =	**23.5**	(ft)
Footing length =	**23.5**	(ft)

Concrete:

Concrete strength =	**3**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

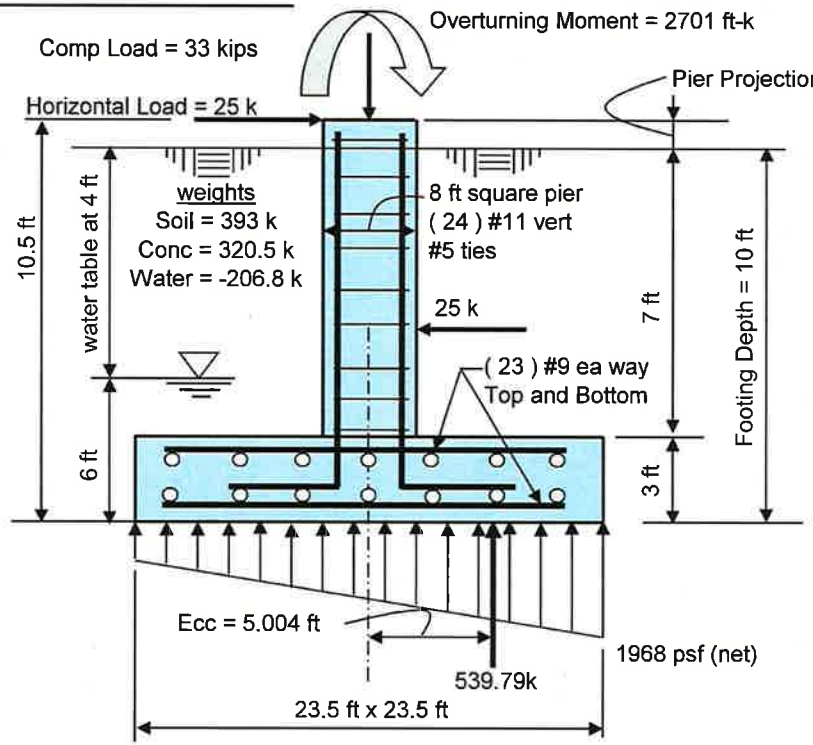
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#9**	bar
quantity of pad rebar =	**23**	(ea direction)

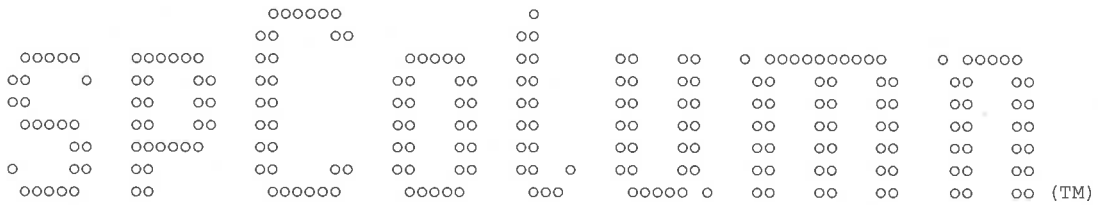
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#11**	bar
vertical rebar quantity =	**24**	
size of pier ties =	**#5**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = 79.1 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 1.968 ksf Allowable Net Soil Bearing = 3.25 ksf **Soil Bearing Stress Ratio = 0.61 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 27 psi **Bending Shear Stress Ratio = 0.25 Okay**
Ftg Overturning Resistance = 6343 ft-kips Overturning Moment = 2701 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 2.348 **Ratio = 0.64 Okay**	Pad Bending Moment Capacity= 3142 ft-k Pad Bending Moment = 1009 ft-k **Bending Moment Stress Ratio = 0.32 OK**



spColumn v4.80 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections

General Information:

File Name: G:\TOWER\375_Crown_Castle\2013\37513-0644 BU 876348\WO 705665 BU 876...\37513-0644_R3.col
Project: 37513-0644 BP
Column: Engineer:
Code: ACI 318-11 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Structural

Material Properties:

f'c = 3 ksi fy = 60 ksi
Ec = 3122.02 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:

Rectangular: Width = 96 in Depth = 96 in

Gross section area, Ag = 9216 in^2
Ix = 7.07789e+006 in^4 Iy = 7.07789e+006 in^4
rx = 27.7128 in ry = 27.7128 in
Xo = 0 in Yo = 0 in

Reinforcement:

Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #5 ties with #10 bars, #5 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Rectangular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 37.44 in^2 at rho = 0.41% (Note: rho < 0.50%)
Minimum clear spacing = 13.15 in

24 #11 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	33.00	3755.05	7637.46	2.034	6.45	91.67	0.03961	0.900

*** End of output ***