ROBINSON & COLE LLP

KENNETH C. BALDWIN

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Hartford, CT 06103-3597
Main (860) 275-8200
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kbaldwin@rc.com
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Also admitted in Massachusetts

June 19, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
782 Old Clinton Road, Westbrook, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 118-foot level on an existing 160-foot tower at 782 Old Clinton Road in Westbrook, Connecticut (the "Property"). The tower is owned by Crown Castle. Cellco's use of the tower was approved by the Council in 2001. Cellco now intends to modify its facility by removing six (6) 850 MHz antennas and replacing them with three (3) model LNX-6514DS-VTM, 850 MHz antennas and three (3) model HBX-6517DS-VTM, 2100 MHz antennas, all at the same 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. 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 notice is being sent to Noel Bishop, First Selectman of the Town of Westbrook. A copy of this letter is also being sent to Catherine A. Wade, 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. Cellco's new and replacement antennas and RRHs will be installed at the 118-foot level on the existing 160-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 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 replacement antennas 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 General Power Density table 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:
Noel Bishop, Westbrook First Selectman
Catherine A. Wade
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.7	16.3
Beamwidth, Horizontal, degrees	65	65
Beamwidth, Horizontal Tolerance, degrees	±3	±3
Beamwidth, Vertical, degrees	12.5	11.2
Beam Tilt, degrees	0–10	0–10
USLS, typical, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	20	20
CPR at Sector, dB	10	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Product Specifications

LNX-6514DS-VTM

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	17.6 kg | 38.8 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6514DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBX-6517DS-VTM

Andrew® Teletilt® Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry to minimize any sector overlap
- Rugged, reliable design with excellent passive intermodulation suppression
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**1710–1880**	**1850–1990**	**1920–2180**
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.9
Gain by all Beam Tilts Tolerance, dB	±0.2	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.3	0 ° | 18.4	0 ° | 18.8
	3 ° | 18.6	3 ° | 18.7	3 ° | 19.1
	6 ° | 18.4	6 ° | 18.6	6 ° | 18.7
Beamwidth, Horizontal, degrees	67	66	64
Beamwidth, Horizontal Tolerance, degrees	±1.8	±0.9	±2.8
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.2	±0.2	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	19	19	18
Front-to-Back Total Power at 180° ± 30°, dB	26	26	26
CPR at Boresight, dB	22	22	22
CPR at Sector, dB	11	11	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	1710 – 2180 MHz
Number of Ports, all types	2

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom

Product Specifications

HBX-6517DS-VTM

RF Connector Quantity, total	2
Wind Loading, maximum	393.0 N @ 150 km/h 88.3 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	83.0 mm | 3.3 in
Length	1902.0 mm | 74.9 in
Width	166.0 mm | 6.5 in
Net Weight	6.2 kg | 13.7 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	HBX-6517DS-R2M
Model with Factory Installed AISG 2.0 Actuator	HBX-6517DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

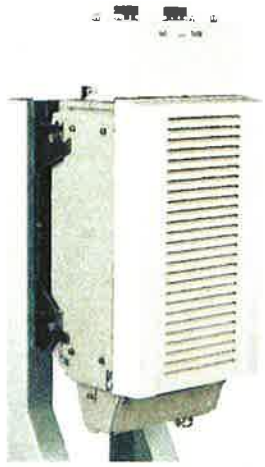
DB390 — Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Use for narrow panel antennas. Includes two pipe mounts.

DB5098E — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members

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

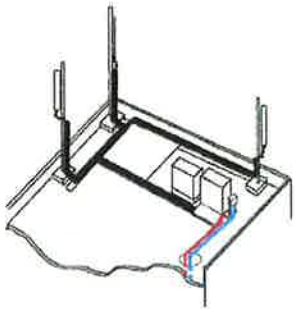
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation 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

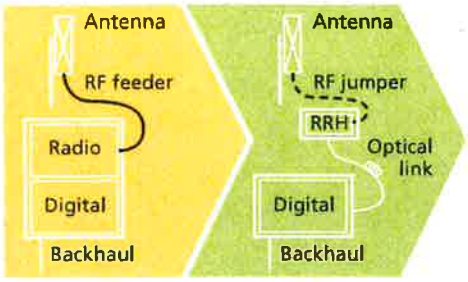
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

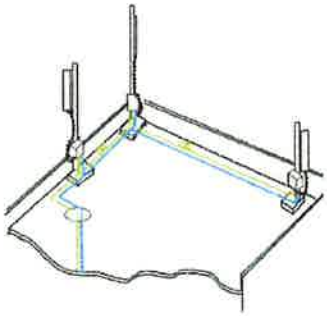
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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

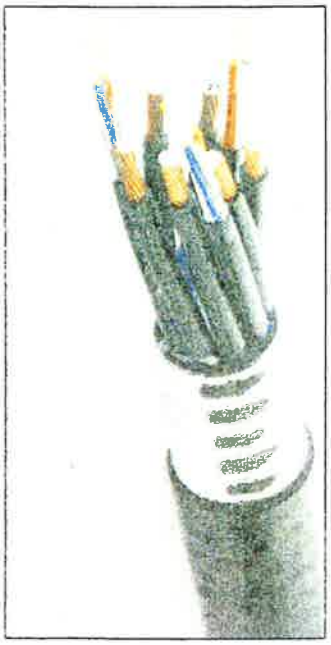


Figure 1: HYBRIFLEX Series

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
Mechanical Properties			
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)
Electrical Properties			
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)
Fiber Optic Properties			
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
Copper Wire Properties			
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-93-638 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Operating Conditions			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

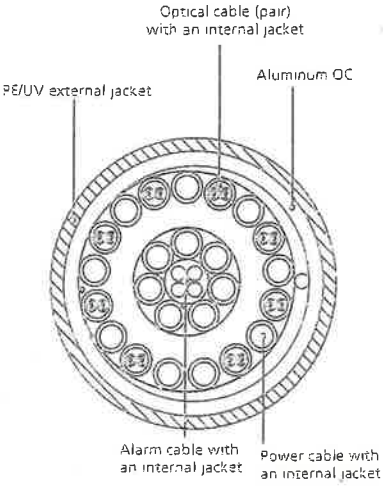


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Westbrook 2								
Tower Height: 160Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Nextel	9	100	152	0.0140	851	0.5673	2.47%	
*Sprint CDMA/LTE	3	693	159	0.0296	1900	1.0000	2.96%	
*Sprint CDMA/LTE	1	390	159	0.0055	850	0.5667	0.98%	
*T-Mobile LTE	2	24	145	0.0008	2100	1.0000	0.08%	
*T-Mobile GSM/UMTS	2	12	145	0.0004	1950	1.0000	0.04%	
*T-Mobile UMTS	2	12	145	0.0004	2100	1.0000	0.04%	
*Pocket (now MetroPCS)	3	631	130	0.0403	2130	1.0000	4.03%	
*AT&T GSM	6	296	100	0.0639	880	0.5867	10.89%	
*AT&T GSM	6	427	100	0.0921	1900	1.0000	9.21%	
*AT&T UMTS	1	500	100	0.0180	880	0.5867	3.06%	
*AT&T UMTS	1	500	100	0.0180	1900	1.0000	1.80%	
*AT&T LTE	1	500	100	0.0180	740	0.4933	3.64%	
Verizon	**11**	**296**	**118**	**0.0841**	**1970**	**1.0000**	**8.41%**	
Verizon	**9**	**372**	**118**	**0.0865**	**869**	**0.5793**	**14.92%**	
Verizon	**1**	**1918**	**118**	**0.0495**	**2145**	**1.0000**	**4.95%**	
Verizon	**1**	**838**	**118**	**0.0216**	**698**	**0.4653**	**4.65%**	
								72.14%
* Source: Siting Council								

ATTACHMENT 3

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

Date: **March 19, 2014**

Holly Haas
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 East Broad Street, Suite 600
Columbus, Ohio 43215
614.221.6679

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	119640
	Carrier Site Name:	Westbrook 2 CT
Crown Castle Designation:	**Crown Castle BU Number:**	876339
	Crown Castle Site Name:	POND MEADOW RD. STABLE
	Crown Castle JDE Job Number:	265158
	Crown Castle Work Order Number:	726148
	Crown Castle Application Number:	218593 Rev. 0
Engineering Firm Designation:	**Paul J. Ford Project Number:**	37513-0634
Site Data:	**782 Old Clinton Road, WESTBROOK, Middlesex County, CT** **Latitude *41° 17' 25.7"*, Longitude *-72° 28' 7.9"*** **160 Foot - Monopole Tower**	

Dear Holly Haas,

Paul J. Ford 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 626526, In accordance with application 218593, 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:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code using a fastest mile wind speed of 85 mph with no Ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

This analysis assumes all the coax going to the 141' elevation will be installed internally.

We at *Paul J. Ford* 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:

Kevin Mahlum, E.I.
Structural Designer

tnxTower Report - version 6.1.4.1

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

MAR 2 0 2014

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by VALMONT in July 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 the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut Building Code using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116.0	118.0	3	alcatel lucent	RRH2X40-AWS	1	1-5/8	-
		3	andrew	HBX-6517DS-VTM w/ Pipe			
		3		LNX-6514DS-VTM w/ Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

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
159.0	160.0	1	rfs celwave	APXV9ERR18-C-A20 w/ Pipe	3	1-1/4	1
		2		APXVSPP18-C-A20 w/ Pipe			
	159.0	1	tower mounts	Platform Mount [LP 602-1]			
155.0	156.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-	1
	155.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	154.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
151.0	153.0	12	allgon	7130.16 w/ Pipe	12	1-1/4	1
	151.0	1	tower mounts	T-Arm Mount [TA 602-3]			
141.0	145.0	3	ems wireless	RR65-18-02DP w/ Pipe	-	-	3
		3	ericsson	AIR 21 B2A B4P w/ Pipe	7	1-5/8	2
		3		AIR 21 B4A B2P w/ Pipe			
		3		KRY 112 144/1			
	141.0	1	tower mounts	Platform Mount [LP 602-1]	6	1-5/8	1
130.0	130.0	3	rfs celwave	APXV18-206517S-ACU w/ Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
116.0	118.0	4	antel	LPA-80063-4CF-EDIN-5 w/ Pipe	-	-	3
		2		LPA-80080-4CF-EDIN-0 w/ Pipe			
		2		BXA-171063-8BF-EDIN-2 w/ Pipe	12	1-5/8	1
		3		BXA-70063-6CF-EDIN-2 w/ Pipe			
		1	swedcom	SPXW 8515 w/ Pipe			
	116.0	6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
96.0	103.0	1	gps	GPS_A	1	1/2	1
		1	adc	DB 800/1900 FB MASTHEAD	-	-	3
	98.0	6		DB 800/1900 FB MASTHEAD			
		6	css	DUO1417-8686 w/ Pipe			
		3	powerwave technologies	7770.00 w/ Pipe			
		6		LGP13519			
		6		7770.00 w/ Pipe	1 2	3/8 5/8	2
		6		TT19-08BP111-001			
		6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-14-65-00T-RET w/ Pipe			
		1	raycap	DC6-48-60-18-8F			
	96.0	1	tower mounts	T-Arm Mount [TA 602-3]	12	1-5/8	1
92.0	93.0	1	lucent	KS24019-L112A	1	1/2	1
	92.0	1	tower mounts	Side Arm Mount [SO 701-1]			
71.0	72.0	2	gps	GPS_A	2	1/2	1
	71.0	2	tower mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 10-12295E G1, 01/10/2011	1532966	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Semaan, 17818, 07/06/1998	1533020	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 17618-98, 07/14/1998	1531985	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 111347, 07/18/2011	2923975	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.876339, 08/23/2013	4023333	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), 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.
5) All coax going to the 141' elevation will be installed internally.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford 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	160 - 117.33	Pole	TP30.46x22.35x0.2188	1	-7.02	1015.10	72.4	Pass
L2	117.33 - 94	Pole	TP34.4549x29.1348x0.281	2	-14.30	1599.24	97.9	Pass
L3	94 - 82.5	Pole	TP36.64x34.4549x0.3817	3	-15.60	1970.09	89.7	Pass
L4	82.5 - 72.75	Pole	TP37.9427x34.8315x0.375	4	-19.63	2358.28	96.2	Pass
L5	72.75 - 56	Pole	TP41.1385x37.9427x0.4482	5	-24.11	2974.47	93.0	Pass
L6	56 - 40.583	Pole	TP44.08x41.1385x0.6042	6	-27.16	3331.82	91.3	Pass
L7	40.583 - 31.5	Pole	TP45.0389x41.6473x0.6915	7	-34.93	3778.19	93.8	Pass
L8	31.5 - 28.75	Pole	TP45.5593x45.0389x0.7353	8	-36.09	4065.20	89.1	Pass
L9	28.75 - 11	Pole	TP48.9184x45.5593x0.6172	9	-42.95	4203.64	96.8	Pass
L10	11 - 8.5	Pole	TP49.3915x48.9184x0.698	10	-44.05	4789.58	86.6	Pass
L11	8.5 - 0	Pole	TP51x49.3915x0.5706	11	-47.32	4349.94	99.7	Pass
							Summary	
						Pole (L11)	99.7	Pass
						Rating =	99.7	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Anchor Rods	0	74.3	Pass
1	Base Plate	0	49.8	Pass
1	Base Foundation Steel Interaction	0	70.0	Pass
1	Base Foundation Soil Interaction	0	55.0	Pass

Structure Rating (max from all components) =	99.7%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between existing and post installed anchors.

5) Recommendations

See base level for the layout of the proposed coax.

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:

Tower is located in Middlesex County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

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	160.00-117.33	42.67	4.67	12	22.3500	30.4600	0.2188	0.8752	A572-65 (65 ksi)
L2	117.33-94.00	28.00	0.00	12	29.1348	34.4549	0.2810	1.1240	A572-65 (65 ksi)
L3	94.00-82.50	11.50	5.50	12	34.4549	36.6400	0.3817	1.5269	Reinf 56.91 ksi (57 ksi)
L4	82.50-72.75	15.25	0.00	12	34.8315	37.9427	0.3750	1.5000	A572-65 (65 ksi)
L5	72.75-56.00	16.75	0.00	12	37.9427	41.1385	0.4482	1.7928	Reinf 63.33 ksi (63 ksi)
L6	56.00-40.58	15.42	6.42	12	41.1385	44.0800	0.6042	2.4167	Reinf 50.68 ksi (51 ksi)
L7	40.58-31.50	15.50	0.00	12	41.6473	45.0389	0.6915	2.7660	Reinf 47.84 ksi (48 ksi)
L8	31.50-28.75	2.75	0.00	12	45.0389	45.5593	0.7353	2.9414	Reinf 47.89 ksi (48 ksi)
L9	28.75-11.00	17.75	0.00	12	45.5593	48.9184	0.6172	2.4689	Reinf 54.75 ksi (55 ksi)
L10	11.00-8.50	2.50	0.00	12	48.9184	49.3915	0.6980	2.7919	Reinf 54.72 ksi (55 ksi)
L11	8.50-0.00	8.50		12	49.3915	51.0000	0.5706	2.2824	Reinf 58.70 ksi (59 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	23.1384	15.5922	974.7742	7.9230	11.5773	84.1970	1975.1568	7.6740	5.4034	24.696
	31.5345	21.3060	2487.0596	10.8263	15.7783	157.6255	5039.4571	10.4862	7.5769	34.629
L2	31.0812	26.1075	2774.3254	10.3297	15.0918	183.8296	5621.5354	12.8493	7.0550	25.107

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
	35.6704	30.9213	4609.2822	12.2343	17.8477	258.2570	9339.6554	15.2185	8.4808	30.181
L3	35.6704	41.8818	6206.3643	12.1982	17.8477	347.7411	12575.7767	20.6129	8.2109	21.51
	37.9325	44.5676	7478.5836	12.9805	18.9795	394.0344	15153.6378	21.9348	8.7965	23.044
L4	37.2219	41.6062	6305.0277	12.3354	18.0427	349.4499	12775.6955	20.4773	8.3298	22.213
	39.2811	45.3629	8171.7520	13.4492	19.6543	415.7744	16558.1850	22.3263	9.1636	24.436
L5	39.2811	54.1121	9709.8973	13.4230	19.6543	494.0344	19674.8844	26.6323	8.9675	20.008
	42.5897	58.7244	12410.4071	14.5671	21.3097	582.3820	25146.8495	28.9024	9.8239	21.919
L6	42.5897	78.8579	16537.7537	14.5113	21.3097	776.0656	33509.9727	38.8114	9.4059	15.568
	45.6350	84.5805	20405.7007	15.5643	22.8334	893.6761	41347.4819	41.6279	10.1942	16.873
L7	44.5701	91.1921	19524.2448	14.6622	21.5733	905.0189	39561.4132	44.8820	9.3083	13.461
	46.6277	98.7439	24787.5378	15.8764	23.3302	1062.4673	50226.2719	48.5988	10.2172	14.776
L8	46.6277	104.9018	26281.2956	15.8607	23.3302	1126.4942	53253.0300	51.6295	10.0997	13.735
	47.1665	106.1340	27218.3529	16.0470	23.5997	1153.3328	55151.7623	52.2359	10.2392	13.924
L9	47.1665	89.3216	23027.6290	16.0893	23.5997	975.7578	46660.2194	43.9614	10.5557	17.102
	50.6440	95.9976	28586.4826	17.2918	25.3397	1128.1298	57923.9640	47.2471	11.4559	18.56
L10	50.6440	108.3751	32164.4912	17.2629	25.3397	1269.3314	65173.9794	53.3389	11.2395	16.103
	51.1338	109.4384	33120.5272	17.4323	25.5848	1294.5404	67111.1675	53.8622	11.3663	16.285
L11	51.1338	89.6986	27288.6795	17.4779	25.5848	1066.5983	55294.2631	44.1469	11.7077	20.519
	52.7991	92.6539	30075.8312	18.0537	26.4180	1138.4598	60941.7881	45.6015	12.1388	21.274

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 160.00-117.33				1	1	1		
L2 117.33-94.00				1	1	1		
L3 94.00-82.50				1	1	1		
L4 82.50-72.75				1	1	1		
L5 72.75-56.00				1	1	1		
L6 56.00-40.58				1	1	1		
L7 40.58-31.50				1	1	1		
L8 31.50-28.75				1	1	1		
L9 28.75-11.00				1	1	1		
L10 11.00-8.50				1	1	1		
L11 8.50-0.00				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 plf
******										

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	159.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
						2" Ice	0.00	1.08
						4" Ice	0.00	1.08
***								
LDF6-50A(1-1/4")	C	No	Inside Pole	151.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
****								
LDF7-50A(1-5/8")	C	No	Inside Pole	141.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
AL7-50(1 5/8)	C	No	Inside Pole	141.00 - 0.00	7	No Ice	0.00	0.52
						1/2" Ice	0.00	0.52
						1" Ice	0.00	0.52
						2" Ice	0.00	0.52
						4" Ice	0.00	0.52
****								
AVA7-50(1-5/8")	C	No	Inside Pole	130.00 - 0.00	6	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
						2" Ice	0.00	0.72
						4" Ice	0.00	0.72
****								
LDF7-50A(1-5/8")	C	No	Inside Pole	116.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
LDF7-50A(1-5/8")	C	No	Inside Pole	116.00 - 0.00	1	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
****								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	96.00 - 0.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	96.00 - 0.00	10	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	96.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
FB-L98-002-XXX(3/8)	C	No	CaAa (Out Of	96.00 - 0.00	1	No Ice	0.00	0.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.00	0.61
						1" Ice	0.00	1.77
						2" Ice	0.00	5.91
						4" Ice	0.00	21.54
WR-VG82ST-BRDA(5/8")	C	No	CaAa (Out Of Face)	96.00 - 0.00	2	No Ice	0.00	0.31
						1/2" Ice	0.00	1.01
						1" Ice	0.00	2.32
						2" Ice	0.00	6.77
						4" Ice	0.00	23.01
***								
LDF4-50A(1/2")	C	No	Inside Pole	92.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
****								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	71.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	58.25 - 0.00	1	No Ice	0.21	0.00
						1/2" Ice	0.32	0.00
						1" Ice	0.43	0.00
						2" Ice	0.65	0.00
						4" Ice	1.10	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	74.00 - 44.00	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
						2" Ice	0.57	0.00
						4" Ice	1.01	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	13.00 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	42.25 - 27.25	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	96.00 - 86.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
						2" Ice	0.61	0.00
						4" Ice	1.06	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	160.00-117.33	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.66
L2	117.33-94.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.125	0.82
L3	94.00-82.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.887	0.52
L4	82.50-72.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.017	0.44

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L5	72.75-56.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.196	0.77
L6	56.00-40.58	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.095	0.71
L7	40.58-31.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.003	0.42
L8	31.50-28.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.120	0.13
L9	28.75-11.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.310	0.81
L10	11.00-8.50	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.928	0.11
L11	8.50-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.553	0.39

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	160.00-117.33	A	0.890	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.66
L2	117.33-94.00	A	0.862	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.233	0.91
L3	94.00-82.50	A	0.844	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.270	1.00
L4	82.50-72.75	A	0.831	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.543	0.85
L5	72.75-56.00	A	0.812	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.069	1.48
L6	56.00-40.58	A	0.785	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	21.008	1.34
L7	40.58-31.50	A	0.758	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.023	0.79
L8	31.50-28.75	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.862	0.23
L9	28.75-11.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	20.177	1.50
L10	11.00-8.50	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.511	0.21
L11	8.50-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.937	0.72

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	160.00-117.33	0.0000	0.0000	0.0000	0.0000
L2	117.33-94.00	-0.0654	0.0378	-0.1212	0.0700
L3	94.00-82.50	-0.5658	0.3267	-0.9214	0.5320
L4	82.50-72.75	-0.4725	0.2728	-0.7758	0.4479
L5	72.75-56.00	-0.6124	0.3536	-1.0258	0.5922
L6	56.00-40.58	-0.7771	0.4487	-1.2455	0.7191
L7	40.58-31.50	-0.8277	0.4779	-1.3059	0.7540
L8	31.50-28.75	-0.8317	0.4802	-1.2983	0.7496
L9	28.75-11.00	-0.7126	0.4114	-1.1185	0.6458
L10	11.00-8.50	-0.8429	0.4867	-1.3283	0.7669
L11	8.50-0.00	-0.8457	0.4883	-1.3359	0.7713

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 Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	7.47 8.66 9.56 11.39 15.53	0.09 0.16 0.24 0.42 0.94
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.0000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
Platform Mount [LP 602-1]	C	None		0.0000	159.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.03 38.71 45.39 58.75 85.47	32.03 38.71 45.39 58.75 85.47	1.34 1.80 2.26 3.17 5.00
****									
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0.00 1.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0.00 1.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00 0.00 1.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35

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
						4" Ice			
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0.00 -1.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.00 -1.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 -1.00	0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0.06 0.09 0.11 0.17 0.34
Side Arm Mount [SO 102-3]	C	None		0.0000	155.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.00 3.48 3.96 4.92 6.84	3.00 3.48 3.96 4.92 6.84	0.08 0.11 0.14 0.20 0.32
****									
(4) 7130.16 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	151.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.00 6.48 6.97 7.97 10.11	7.03 7.81 8.57 10.13 13.48	0.04 0.10 0.16 0.32 0.74
(4) 7130.16 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	151.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.00 6.48 6.97 7.97 10.11	7.03 7.81 8.57 10.13 13.48	0.04 0.10 0.16 0.32 0.74
(4) 7130.16 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	151.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.00 6.48 6.97 7.97 10.11	7.03 7.81 8.57 10.13 13.48	0.04 0.10 0.16 0.32 0.74
T-Arm Mount [TA 602-3]	C	None		0.0000	151.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	0.77 0.99 1.21 1.64 2.50
****									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	141.00	No Ice 1/2"	6.83 7.35	5.64 6.48	0.11 0.17

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
			4.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.16	5.63 6.47 7.25 8.85 12.28	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.16	5.63 6.47 7.25 8.85 12.28	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.16	5.63 6.47 7.25 8.85 12.28	0.11 0.17 0.23 0.38 0.81
KRY 112 144/1	A	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	B	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Leg	4.00 0.00 4.00	0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.41 0.50 0.59 0.81 1.36	0.20 0.27 0.35 0.53 1.00	0.01 0.01 0.02 0.03 0.08
Platform Mount [LP 602-1]	C	None		0.0000	141.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.03 38.71 45.39 58.75 85.47	32.03 38.71 45.39 58.75 85.47	1.34 1.80 2.26 3.17 5.00
****									
APXV18-206517S-ACU w/ Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-ACU w/ Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68
APXV18-206517S-ACU w/ Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.96 6.48 7.55 9.92	4.70 5.86 6.73 8.51 12.28	0.05 0.10 0.15 0.28 0.68

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
Pipe Mount [PM 601-3]	C	None		0.0000	130.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48	5.48	0.24
						1" Ice	6.57	6.57	0.28
						2" Ice	8.75	8.75	0.36
						4" Ice	13.11	13.11	0.53
****									
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	7.97	5.80	0.04
						1/2" Ice	8.61	6.95	0.10
						1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	7.97	5.80	0.04
						1/2" Ice	8.61	6.95	0.10
						1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	7.97	5.80	0.04
						1/2" Ice	8.61	6.95	0.10
						1" Ice	9.22	7.82	0.17
						2" Ice	10.46	9.60	0.34
						4" Ice	13.07	13.37	0.80
SPXW 8515 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	3.48	3.86	0.03
						1/2" Ice	3.89	4.45	0.07
						1" Ice	4.31	5.11	0.11
						2" Ice	5.18	6.46	0.21
						4" Ice	7.07	9.46	0.52
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.96	4.60	0.10
						2" Ice	4.85	5.89	0.19
						4" Ice	6.77	8.89	0.49
BXA-171063-8BF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	3.18	3.35	0.03
						1/2" Ice	3.56	3.97	0.06
						1" Ice	3.96	4.60	0.10
						2" Ice	4.85	5.89	0.19
						4" Ice	6.77	8.89	0.49
(2) FD9R6004/2C-3L	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
						4" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
						4" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice	0.37	0.08	0.00
						1/2" Ice	0.45	0.14	0.01
						1" Ice	0.54	0.20	0.01
						2" Ice	0.75	0.34	0.02
						4" Ice	1.28	0.74	0.06
LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	8.63	7.07	0.06
						1/2" Ice	9.29	8.25	0.13
						1" Ice	9.90	9.15	0.21
						2" Ice	11.17	10.98	0.39

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	13.82	15.01	0.90
						4" Ice			
LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	8.63	7.07	0.06
						1/2" Ice	9.29	8.25	0.13
						1" Ice	9.90	9.15	0.21
						2" Ice	11.17	10.98	0.39
						4" Ice	13.82	15.01	0.90
LNX-6514DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	8.63	7.07	0.06
						1/2" Ice	9.29	8.25	0.13
						1" Ice	9.90	9.15	0.21
						2" Ice	11.17	10.98	0.39
						4" Ice	13.82	15.01	0.90
HBX-6517DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	5.54	5.02	0.05
						1/2" Ice	6.11	6.22	0.09
						1" Ice	6.65	7.17	0.15
						2" Ice	7.75	9.01	0.28
						4" Ice	10.11	12.90	0.69
HBX-6517DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	5.54	5.02	0.05
						1/2" Ice	6.11	6.22	0.09
						1" Ice	6.65	7.17	0.15
						2" Ice	7.75	9.01	0.28
						4" Ice	10.11	12.90	0.69
HBX-6517DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	5.54	5.02	0.05
						1/2" Ice	6.11	6.22	0.09
						1" Ice	6.65	7.17	0.15
						2" Ice	7.75	9.01	0.28
						4" Ice	10.11	12.90	0.69
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	5.60	2.33	0.04
						1/2" Ice	5.92	2.56	0.08
						1" Ice	6.24	2.79	0.12
						2" Ice	6.91	3.28	0.21
						4" Ice	8.37	4.37	0.45
RRH2X40-AWS	A	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	2.98	1.60	0.04
						1/2" Ice	3.24	1.82	0.06
						1" Ice	3.50	2.06	0.08
						2" Ice	4.07	2.56	0.14
						4" Ice	5.30	3.66	0.29
RRH2X40-AWS	B	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	2.98	1.60	0.04
						1/2" Ice	3.24	1.82	0.06
						1" Ice	3.50	2.06	0.08
						2" Ice	4.07	2.56	0.14
						4" Ice	5.30	3.66	0.29
RRH2X40-AWS	C	From Leg	4.00 0.00 2.00	0.0000	116.00	No Ice	2.98	1.60	0.04
						1/2" Ice	3.24	1.82	0.06
						1" Ice	3.50	2.06	0.08
						2" Ice	4.07	2.56	0.14
						4" Ice	5.30	3.66	0.29
Platform Mount [LP 303-1]	C	None		0.0000	116.00	No Ice	14.66	14.66	1.25
						1/2" Ice	18.87	18.87	1.48
						1" Ice	23.08	23.08	1.71
						2" Ice	31.50	31.50	2.18
						4" Ice	48.34	48.34	3.10
****									
GPS_A	C	From Leg	4.00 0.00	0.0000	96.00	No Ice	0.30	0.30	0.00
						1/2" Ice	0.37	0.37	0.00

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
			7.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	96.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			2.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	96.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			2.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	96.00	No Ice	6.12	4.25	0.06
			0.00			1/2"	6.63	5.01	0.10
			2.00			Ice	7.13	5.71	0.16
						1" Ice	8.16	7.16	0.29
						2" Ice	10.36	10.41	0.66
						4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Leg	4.00	0.0000	96.00	No Ice	5.74	4.02	0.05
			0.00			1/2"	6.20	4.63	0.10
			2.00			Ice	6.66	5.28	0.15
						1" Ice	7.62	6.68	0.27
						2" Ice	9.67	9.74	0.63
						4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Leg	4.00	0.0000	96.00	No Ice	5.74	4.02	0.05
			0.00			1/2"	6.20	4.63	0.10
			2.00			Ice	6.66	5.28	0.15
						1" Ice	7.62	6.68	0.27
						2" Ice	9.67	9.74	0.63
						4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Leg	4.00	0.0000	96.00	No Ice	5.74	4.02	0.05
			0.00			1/2"	6.20	4.63	0.10
			2.00			Ice	6.66	5.28	0.15
						1" Ice	7.62	6.68	0.27
						2" Ice	9.67	9.74	0.63
						4" Ice			
(2) RRUS-11	A	From Leg	4.00	0.0000	96.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS-11	B	From Leg	4.00	0.0000	96.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS-11	C	From Leg	4.00	0.0000	96.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			2.00			Ice	3.74	1.74	0.09
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) TT19-08BP111-001	A	From Leg	4.00	0.0000	96.00	No Ice	0.64	0.52	0.02
			0.00			1/2"	0.75	0.62	0.02
			2.00			Ice	0.87	0.73	0.03
						1" Ice	1.13	0.98	0.05
						2" Ice	1.77	1.58	0.12
						4" Ice			
(2) TT19-08BP111-001	B	From Leg	4.00	0.0000	96.00	No Ice	0.64	0.52	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	0.75	0.62	0.02
			2.00			Ice	0.87	0.73	0.03
						1" Ice	1.13	0.98	0.05
						2" Ice	1.77	1.58	0.12
						4" Ice			
(2) TT19-08BP111-001	C	From Leg	4.00	0.0000	96.00	No Ice	0.64	0.52	0.02
			0.00			1/2"	0.75	0.62	0.02
			2.00			Ice	0.87	0.73	0.03
						1" Ice	1.13	0.98	0.05
						2" Ice	1.77	1.58	0.12
						4" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	96.00	No Ice	2.57	2.57	0.02
			0.00			1/2"	2.80	2.80	0.04
			2.00			Ice	3.04	3.04	0.07
						1" Ice	3.54	3.54	0.13
						2" Ice	4.66	4.66	0.30
						4" Ice			
T-Arm Mount [TA 602-3]	C	None		0.0000	96.00	No Ice	11.59	11.59	0.77
						1/2"	15.44	15.44	0.99
						Ice	19.29	19.29	1.21
						1" Ice	26.99	26.99	1.64
						2" Ice	42.39	42.39	2.50
						4" Ice			
****									
KS24019-L112A	C	From Leg	4.00	0.0000	92.00	No Ice	0.16	0.16	0.01
			0.00			1/2"	0.22	0.22	0.01
			1.00			Ice	0.30	0.30	0.01
						1" Ice	0.48	0.48	0.02
						2" Ice	0.95	0.95	0.06
						4" Ice			
Side Arm Mount [SO 701-1]	C	None		0.0000	92.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
****									
GPS_A	B	From Leg	4.00	0.0000	71.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			1.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
GPS_A	C	From Leg	4.00	0.0000	71.00	No Ice	0.30	0.30	0.00
			0.00			1/2"	0.37	0.37	0.00
			1.00			Ice	0.46	0.46	0.01
						1" Ice	0.65	0.65	0.02
						2" Ice	1.15	1.15	0.08
						4" Ice			
Side Arm Mount [SO 701-1]	B	None		0.0000	71.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
Side Arm Mount [SO 701-1]	C	None		0.0000	71.00	No Ice	0.85	1.67	0.07
						1/2"	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice	3.17	7.03	0.18
						4" Ice			
******									

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 160.00-117.33	137.81	1.504	28	93.892	A	0.000	93.892	93.892	100.00	0.000	0.000
					B	0.000	93.892		100.00	0.000	0.000
					C	0.000	93.892		100.00	0.000	0.000
L2 117.33-94.00	105.40	1.393	26	62.677	A	0.000	62.677	62.677	100.00	0.000	0.000
					B	0.000	62.677		100.00	0.000	0.000
					C	0.000	62.677		100.00	0.000	1.125
L3 94.00-82.50	88.19	1.324	24	34.066	A	0.000	34.066	34.066	100.00	0.000	0.000
					B	0.000	34.066		100.00	0.000	0.000
					C	0.000	34.066		100.00	0.000	5.887
L4 82.50-72.75	77.58	1.277	24	30.020	A	0.000	30.020	30.020	100.00	0.000	0.000
					B	0.000	30.020		100.00	0.000	0.000
					C	0.000	30.020		100.00	0.000	4.017
L5 72.75-56.00	64.26	1.21	22	55.192	A	0.000	55.192	55.192	100.00	0.000	0.000
					B	0.000	55.192		100.00	0.000	0.000
					C	0.000	55.192		100.00	0.000	9.196
L6 56.00-40.58	48.20	1.114	21	54.742	A	0.000	54.742	54.742	100.00	0.000	0.000
					B	0.000	54.742		100.00	0.000	0.000
					C	0.000	54.742		100.00	0.000	11.095
L7 40.58-31.50	36.01	1.025	19	33.339	A	0.000	33.339	33.339	100.00	0.000	0.000
					B	0.000	33.339		100.00	0.000	0.000
					C	0.000	33.339		100.00	0.000	7.003
L8 31.50-28.75	30.12	1	18	10.381	A	0.000	10.381	10.381	100.00	0.000	0.000
					B	0.000	10.381		100.00	0.000	0.000
					C	0.000	10.381		100.00	0.000	2.120
L9 28.75-11.00	19.77	1	18	69.874	A	0.000	69.874	69.874	100.00	0.000	0.000
					B	0.000	69.874		100.00	0.000	0.000
					C	0.000	69.874		100.00	0.000	11.310
L10 11.00-8.50	9.75	1	18	10.241	A	0.000	10.241	10.241	100.00	0.000	0.000
					B	0.000	10.241		100.00	0.000	0.000
					C	0.000	10.241		100.00	0.000	1.928
L11 8.50-0.00	4.23	1	18	35.555	A	0.000	35.555	35.555	100.00	0.000	0.000
					B	0.000	35.555		100.00	0.000	0.000
					C	0.000	35.555		100.00	0.000	6.553

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 160.00-117.33	137.81	1.504	5	0.8903	100.224	A	0.000	100.224	100.224	100.00	0.000	0.000
						B	0.000	100.224		100.00	0.000	0.000
						C	0.000	100.224		100.00	0.000	0.000
L2 117.33-94.00	105.40	1.393	5	0.8621	66.139	A	0.000	66.139	66.139	100.00	0.000	0.000
						B	0.000	66.139		100.00	0.000	0.000
						C	0.000	66.139		100.00	0.000	2.233
L3 94.00-82.50	88.19	1.324	5	0.8439	35.684	A	0.000	35.684	35.684	100.00	0.000	0.000
						B	0.000	35.684		100.00	0.000	0.000
						C	0.000	35.684		100.00	0.000	11.270
L4 82.50-72.75	77.58	1.277	5	0.8310	31.392	A	0.000	31.392	31.392	100.00	0.000	0.000
						B	0.000	31.392		100.00	0.000	0.000
						C	0.000	31.392		100.00	0.000	7.543
L5 72.75-56.00	64.26	1.21	4	0.8124	57.460	A	0.000	57.460	57.460	100.00	0.000	0.000
						B	0.000	57.460		100.00	0.000	0.000
						C	0.000	57.460		100.00	0.000	18.069

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
L6 56.00-40.58	48.20	1.114	4	0.7849	56.759	A	0.000	56.759	56.759	100.00	0.000	0.000
						B	0.000	56.759		100.00	0.000	0.000
						C	0.000	56.759		100.00	0.000	21.008
L7 40.58-31.50	36.01	1.025	4	0.7579	34.527	A	0.000	34.527	34.527	100.00	0.000	0.000
						B	0.000	34.527		100.00	0.000	0.000
						C	0.000	34.527		100.00	0.000	13.023
L8 31.50-28.75	30.12	1	4	0.7500	10.725	A	0.000	10.725	10.725	100.00	0.000	0.000
						B	0.000	10.725		100.00	0.000	0.000
						C	0.000	10.725		100.00	0.000	3.862
L9 28.75-11.00	19.77	1	4	0.7500	72.093	A	0.000	72.093	72.093	100.00	0.000	0.000
						B	0.000	72.093		100.00	0.000	0.000
						C	0.000	72.093		100.00	0.000	20.177
L10 11.00-8.50	9.75	1	4	0.7500	10.553	A	0.000	10.553	10.553	100.00	0.000	0.000
						B	0.000	10.553		100.00	0.000	0.000
						C	0.000	10.553		100.00	0.000	3.511
L11 8.50-0.00	4.23	1	4	0.7500	36.618	A	0.000	36.618	36.618	100.00	0.000	0.000
						B	0.000	36.618		100.00	0.000	0.000
						C	0.000	36.618		100.00	0.000	11.937

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 160.00-117.33	137.81	1.504	10	93.892	A	0.000	93.892	93.892	100.00	0.000	0.000
					B	0.000	93.892		100.00	0.000	0.000
					C	0.000	93.892		100.00	0.000	0.000
L2 117.33-94.00	105.40	1.393	9	62.677	A	0.000	62.677	62.677	100.00	0.000	0.000
					B	0.000	62.677		100.00	0.000	0.000
					C	0.000	62.677		100.00	0.000	1.125
L3 94.00-82.50	88.19	1.324	8	34.066	A	0.000	34.066	34.066	100.00	0.000	0.000
					B	0.000	34.066		100.00	0.000	0.000
					C	0.000	34.066		100.00	0.000	5.887
L4 82.50-72.75	77.58	1.277	8	30.020	A	0.000	30.020	30.020	100.00	0.000	0.000
					B	0.000	30.020		100.00	0.000	0.000
					C	0.000	30.020		100.00	0.000	4.017
L5 72.75-56.00	64.26	1.21	8	55.192	A	0.000	55.192	55.192	100.00	0.000	0.000
					B	0.000	55.192		100.00	0.000	0.000
					C	0.000	55.192		100.00	0.000	9.196
L6 56.00-40.58	48.20	1.114	7	54.742	A	0.000	54.742	54.742	100.00	0.000	0.000
					B	0.000	54.742		100.00	0.000	0.000
					C	0.000	54.742		100.00	0.000	11.095
L7 40.58-31.50	36.01	1.025	7	33.339	A	0.000	33.339	33.339	100.00	0.000	0.000
					B	0.000	33.339		100.00	0.000	0.000
					C	0.000	33.339		100.00	0.000	7.003
L8 31.50-28.75	30.12	1	6	10.381	A	0.000	10.381	10.381	100.00	0.000	0.000
					B	0.000	10.381		100.00	0.000	0.000
					C	0.000	10.381		100.00	0.000	2.120
L9 28.75-11.00	19.77	1	6	69.874	A	0.000	69.874	69.874	100.00	0.000	0.000
					B	0.000	69.874		100.00	0.000	0.000
					C	0.000	69.874		100.00	0.000	11.310
L10 11.00-8.50	9.75	1	6	10.241	A	0.000	10.241	10.241	100.00	0.000	0.000
					B	0.000	10.241		100.00	0.000	0.000
					C	0.000	10.241		100.00	0.000	1.928
L11 8.50-0.00	4.23	1	6	35.555	A	0.000	35.555	35.555	100.00	0.000	0.000
					B	0.000	35.555		100.00	0.000	0.000
					C	0.000	35.555		100.00	0.000	6.553

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	160 - 117.33	Pole	Max Tension	11	0.00	-0.00	-0.00
			Max. Compression	14	-14.83	-0.04	-0.02
			Max. Mx	5	-7.02	-434.19	0.44
			Max. My	8	-7.02	0.41	-434.69
			Max. Vy	5	16.92	-434.19	0.44
			Max. Vx	2	-16.93	-0.46	434.64
			Max. Torque	9			0.12
L2	117.33 - 94	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.89	0.14	0.82
			Max. Mx	5	-14.32	-1073.70	1.00
			Max. My	2	-14.30	-0.75	1078.18
			Max. Vy	5	28.24	-1073.70	1.00
			Max. Vx	8	28.39	0.77	-1077.62
			Max. Torque	11			-1.16
L3	94 - 82.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.61	0.58	0.56
			Max. Mx	11	-15.62	1245.98	-0.65
			Max. My	2	-15.60	-0.72	1251.32
			Max. Vy	5	29.18	-1245.89	1.02
			Max. Vx	8	29.34	0.95	-1250.89

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	11			-1.16
L4	82.5 - 72.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.83	1.63	-0.05
			Max. Mx	11	-19.64	1708.62	-0.94
			Max. My	2	-19.63	-0.68	1715.98
			Max. Vy	5	31.39	-1708.14	1.08
			Max. Vx	8	31.55	1.34	-1715.80
			Max. Torque	11			-1.10
L5	72.75 - 56	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.41	2.91	-0.83
			Max. Mx	11	-24.13	2256.38	-1.28
			Max. My	8	-24.11	1.80	-2266.03
			Max. Vy	5	33.89	-2255.41	1.13
			Max. Vx	8	34.05	1.80	-2266.03
			Max. Torque	11			-1.06
L6	56 - 40.583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.04	3.63	-1.25
			Max. Mx	11	-27.17	2567.21	-1.47
			Max. My	8	-27.16	2.06	-2578.17
			Max. Vy	5	35.18	-2565.96	1.15
			Max. Vx	8	35.33	2.06	-2578.17
			Max. Torque	4			0.94
L7	40.583 - 31.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.15	4.90	-1.98
			Max. Mx	11	-34.94	3130.98	-1.80
			Max. My	8	-34.93	2.51	-3144.22
			Max. Vy	5	37.45	-3129.24	1.17
			Max. Vx	8	37.60	2.51	-3144.22
			Max. Torque	4			0.94
L8	31.5 - 28.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.49	5.12	-2.11
			Max. Mx	11	-36.10	3234.48	-1.86
			Max. My	8	-36.09	2.59	-3248.12
			Max. Vy	5	37.82	-3232.65	1.18
			Max. Vx	8	37.97	2.59	-3248.12
			Max. Torque	4			0.94
L9	28.75 - 11	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.39	6.63	-2.98
			Max. Mx	11	-42.95	3925.30	-2.26
			Max. My	8	-42.95	3.12	-3941.50
			Max. Vy	5	40.03	-3922.85	1.19
			Max. Vx	8	40.18	3.12	-3941.50
			Max. Torque	3			0.94
L10	11 - 8.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-62.65	6.85	-3.11
			Max. Mx	11	-44.05	4025.78	-2.31
			Max. My	8	-44.05	3.20	-4042.34
			Max. Vy	5	40.36	-4023.25	1.19
			Max. Vx	8	40.51	3.20	-4042.34
			Max. Torque	3			0.96
L11	8.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.41	7.62	-3.55
			Max. Mx	11	-47.32	4373.40	-2.51
			Max. My	8	-47.32	3.46	-4391.17
			Max. Vy	5	41.44	-4370.55	1.19
			Max. Vx	8	41.58	3.46	-4391.17
			Max. Torque	3			1.01

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	66.41	0.00	-0.00

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. H_x	11	47.34	41.42	-0.01
	Max. H_z	2	47.34	-0.01	41.57
	Max. M_x	2	4389.86	-0.01	41.57
	Max. M_z	5	4370.55	-41.42	0.01
	Max. Torsion	3	1.01	-20.72	36.01
	Min. Vert	8	47.34	0.01	-41.57
	Min. H_x	5	47.34	-41.42	0.01
	Min. H_z	8	47.34	0.01	-41.57
	Min. M_x	8	-4391.17	0.01	-41.57
	Min. M_z	11	-4373.40	41.42	-0.01
	Min. Torsion	9	-1.00	20.72	-36.01

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	47.34	-0.00	0.00	0.65	1.59	0.00
Dead+Wind 0 deg - No Ice	47.34	0.01	-41.57	-4389.86	-0.23	-0.81
Dead+Wind 30 deg - No Ice	47.34	20.72	-36.01	-3803.12	-2186.17	-1.01
Dead+Wind 60 deg - No Ice	47.34	35.88	-20.80	-2196.53	-3785.92	-0.94
Dead+Wind 90 deg - No Ice	47.34	41.42	-0.01	-1.18	-4370.55	-0.61
Dead+Wind 120 deg - No Ice	47.34	35.87	20.78	2194.66	-3784.08	-0.11
Dead+Wind 150 deg - No Ice	47.34	20.70	36.00	3802.60	-2182.97	0.40
Dead+Wind 180 deg - No Ice	47.34	-0.01	41.57	4391.17	3.46	0.81
Dead+Wind 210 deg - No Ice	47.34	-20.72	36.01	3804.44	2189.40	1.00
Dead+Wind 240 deg - No Ice	47.34	-35.88	20.80	2197.85	3789.14	0.92
Dead+Wind 270 deg - No Ice	47.34	-41.42	0.01	2.51	4373.40	0.61
Dead+Wind 300 deg - No Ice	47.34	-35.87	-20.78	-2193.34	3787.31	0.13
Dead+Wind 330 deg - No Ice	47.34	-20.70	-36.00	-3801.29	2186.21	-0.39
Dead+Ice+Temp	66.41	-0.00	0.00	3.55	7.62	0.00
Dead+Wind 0 deg+Ice+Temp	66.41	0.00	-9.71	-1052.61	7.51	-0.31
Dead+Wind 30 deg+Ice+Temp	66.41	4.84	-8.41	-911.29	-518.57	-0.30
Dead+Wind 60 deg+Ice+Temp	66.41	8.39	-4.86	-524.82	-903.59	-0.21
Dead+Wind 90 deg+Ice+Temp	66.41	9.68	-0.00	3.25	-1044.38	-0.07
Dead+Wind 120 deg+Ice+Temp	66.41	8.38	4.85	531.42	-903.21	0.10
Dead+Wind 150 deg+Ice+Temp	66.41	4.84	8.41	918.17	-517.92	0.23
Dead+Wind 180 deg+Ice+Temp	66.41	-0.00	9.71	1059.87	8.26	0.31
Dead+Wind 210 deg+Ice+Temp	66.41	-4.84	8.41	918.55	534.34	0.30
Dead+Wind 240 deg+Ice+Temp	66.41	-8.39	4.86	532.08	919.36	0.21
Dead+Wind 270 deg+Ice+Temp	66.41	-9.68	0.00	4.01	1060.14	0.07
Dead+Wind 300 deg+Ice+Temp	66.41	-8.38	-4.85	-524.17	918.98	-0.09
Dead+Wind 330 deg+Ice+Temp	66.41	-4.84	-8.41	-910.92	533.69	-0.23
Dead+Wind 0 deg - Service	47.34	0.00	-14.38	-1520.65	0.98	-0.28
Dead+Wind 30 deg - Service	47.34	7.17	-12.46	-1317.33	-756.43	-0.35
Dead+Wind 60 deg - Service	47.34	12.41	-7.20	-760.65	-1310.73	-0.33
Dead+Wind 90 deg - Service	47.34	14.33	-0.00	0.02	-1513.18	-0.21
Dead+Wind 120 deg - Service	47.34	12.41	7.19	760.86	-1310.09	-0.04
Dead+Wind 150 deg - Service	47.34	7.16	12.46	1318.00	-755.33	0.14
Dead+Wind 180 deg - Service	47.34	-0.00	14.38	1521.96	2.26	0.28

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 210 deg - Service	47.34	-7.17	12.46	1318.64	759.67	0.35
Dead+Wind 240 deg - Service	47.34	-12.41	7.20	761.97	1313.96	0.32
Dead+Wind 270 deg - Service	47.34	-14.33	0.00	1.30	1516.42	0.21
Dead+Wind 300 deg - Service	47.34	-12.41	-7.19	-759.54	1313.32	0.04
Dead+Wind 330 deg - Service	47.34	-7.16	-12.46	-1316.69	758.56	-0.14

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-47.34	0.00	0.00	47.34	0.00	0.000%
2	0.01	-47.34	-41.57	-0.01	47.34	41.57	0.008%
3	20.72	-47.34	-36.01	-20.72	47.34	36.01	0.000%
4	35.88	-47.34	-20.80	-35.88	47.34	20.80	0.000%
5	41.42	-47.34	-0.01	-41.42	47.34	0.01	0.003%
6	35.87	-47.34	20.78	-35.87	47.34	-20.78	0.000%
7	20.70	-47.34	36.00	-20.70	47.34	-36.00	0.000%
8	-0.01	-47.34	41.57	0.01	47.34	-41.57	0.008%
9	-20.72	-47.34	36.01	20.72	47.34	-36.01	0.000%
10	-35.88	-47.34	20.80	35.88	47.34	-20.80	0.000%
11	-41.42	-47.34	0.01	41.42	47.34	-0.01	0.008%
12	-35.87	-47.34	-20.78	35.87	47.34	20.78	0.000%
13	-20.70	-47.34	-36.00	20.70	47.34	36.00	0.000%
14	0.00	-66.41	0.00	0.00	66.41	-0.00	0.000%
15	0.00	-66.41	-9.71	-0.00	66.41	9.71	0.000%
16	4.84	-66.41	-8.41	-4.84	66.41	8.41	0.000%
17	8.39	-66.41	-4.86	-8.39	66.41	4.86	0.000%
18	9.68	-66.41	-0.00	-9.68	66.41	0.00	0.000%
19	8.38	-66.41	4.85	-8.38	66.41	-4.85	0.000%
20	4.84	-66.41	8.41	-4.84	66.41	-8.41	0.000%
21	-0.00	-66.41	9.71	0.00	66.41	-9.71	0.000%
22	-4.84	-66.41	8.41	4.84	66.41	-8.41	0.000%
23	-8.39	-66.41	4.86	8.39	66.41	-4.86	0.000%
24	-9.68	-66.41	0.00	9.68	66.41	-0.00	0.000%
25	-8.38	-66.41	-4.85	8.38	66.41	4.85	0.000%
26	-4.84	-66.41	-8.41	4.84	66.41	8.41	0.000%
27	0.00	-47.34	-14.38	-0.00	47.34	14.38	0.004%
28	7.17	-47.34	-12.46	-7.17	47.34	12.46	0.001%
29	12.41	-47.34	-7.20	-12.41	47.34	7.20	0.001%
30	14.33	-47.34	-0.00	-14.33	47.34	0.00	0.004%
31	12.41	-47.34	7.19	-12.41	47.34	-7.19	0.001%
32	7.16	-47.34	12.46	-7.16	47.34	-12.46	0.001%
33	-0.00	-47.34	14.38	0.00	47.34	-14.38	0.004%
34	-7.17	-47.34	12.46	7.17	47.34	-12.46	0.001%
35	-12.41	-47.34	7.20	12.41	47.34	-7.20	0.001%
36	-14.33	-47.34	0.00	14.33	47.34	-0.00	0.004%
37	-12.41	-47.34	-7.19	12.41	47.34	7.19	0.001%
38	-7.16	-47.34	-12.46	7.16	47.34	12.46	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	13	0.00008925	0.00010561
3	Yes	18	0.00000001	0.00007007

4	Yes	18	0.00000001	0.00007131
5	Yes	14	0.00003587	0.00006559
6	Yes	18	0.00000001	0.00006992
7	Yes	18	0.00000001	0.00007059
8	Yes	13	0.00008925	0.00011034
9	Yes	18	0.00000001	0.00007125
10	Yes	18	0.00000001	0.00006996
11	Yes	13	0.00008930	0.00014202
12	Yes	18	0.00000001	0.00007096
13	Yes	18	0.00000001	0.00007034
14	Yes	6	0.00000001	0.00000001
15	Yes	16	0.00000001	0.00007573
16	Yes	16	0.00000001	0.00008536
17	Yes	16	0.00000001	0.00008539
18	Yes	16	0.00000001	0.00007518
19	Yes	16	0.00000001	0.00008535
20	Yes	16	0.00000001	0.00008554
21	Yes	16	0.00000001	0.00007590
22	Yes	16	0.00000001	0.00008648
23	Yes	16	0.00000001	0.00008622
24	Yes	16	0.00000001	0.00007591
25	Yes	16	0.00000001	0.00008605
26	Yes	16	0.00000001	0.00008610
27	Yes	13	0.00009557	0.00004941
28	Yes	15	0.00000001	0.00006832
29	Yes	15	0.00000001	0.00007188
30	Yes	13	0.00009559	0.00005255
31	Yes	15	0.00000001	0.00006814
32	Yes	15	0.00000001	0.00007010
33	Yes	13	0.00009556	0.00004952
34	Yes	15	0.00000001	0.00007173
35	Yes	15	0.00000001	0.00006798
36	Yes	13	0.00009558	0.00005231
37	Yes	15	0.00000001	0.00007118
38	Yes	15	0.00000001	0.00006940

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 117.33	39.292	33	2.2302	0.0011
L2	122 - 94	22.411	33	1.8809	0.0012
L3	94 - 82.5	12.706	33	1.3655	0.0008
L4	88 - 72.75	11.056	33	1.2599	0.0007
L5	72.75 - 56	7.372	33	1.0079	0.0004
L6	56 - 40.583	4.356	33	0.7099	0.0003
L7	47 - 31.5	3.133	33	0.5879	0.0002
L8	31.5 - 28.75	1.443	33	0.4303	0.0001
L9	28.75 - 11	1.205	33	0.3979	0.0001
L10	11 - 8.5	0.182	33	0.1535	0.0000
L11	8.5 - 0	0.110	33	0.1233	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	APXVSPP18-C-A20 w/ Mount Pipe	33	38.826	2.2240	0.0011	26522
155.00	PCS 1900MHz 4x45W-65MHz	33	36.964	2.1989	0.0011	26522
151.00	(4) 7130.16 w/ Mount Pipe	33	35.109	2.1728	0.0012	14734
141.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	33	30.541	2.0980	0.0012	6979

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	APXV18-206517S-ACU w/ Mount Pipe	33	25.718	1.9881	0.0013	4419
116.00	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	33	20.071	1.7825	0.0012	3238
96.00	GPS_A	33	13.289	1.4026	0.0008	2655
92.00	KS24019-L112A	33	12.141	1.3294	0.0007	3082
71.00	GPS_A	33	7.005	0.9768	0.0004	2896

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 117.33	113.123	8	6.4237	0.0031
L2	122 - 94	64.573	8	5.4194	0.0036
L3	94 - 82.5	36.630	8	3.9367	0.0022
L4	88 - 72.75	31.876	8	3.6323	0.0019
L5	72.75 - 56	21.259	8	2.9062	0.0013
L6	56 - 40.583	12.564	8	2.0475	0.0008
L7	47 - 31.5	9.037	8	1.6956	0.0006
L8	31.5 - 28.75	4.164	8	1.2412	0.0004
L9	28.75 - 11	3.476	8	1.1477	0.0004
L10	11 - 8.5	0.525	8	0.4427	0.0001
L11	8.5 - 0	0.316	8	0.3557	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
159.00	APXVSPP18-C-A20 w/ Mount Pipe	8	111.783	6.4058	0.0031	9422
155.00	PCS 1900MHz 4x45W-65MHz	8	106.428	6.3337	0.0032	9422
151.00	(4) 7130.16 w/ Mount Pipe	8	101.094	6.2587	0.0034	5233
141.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	87.958	6.0437	0.0036	2476
130.00	APXV18-206517S-ACU w/ Mount Pipe	8	74.088	5.7277	0.0037	1566
116.00	BXA-70063-6CF-EDIN-2 w/ Mount Pipe	8	57.839	5.1363	0.0034	1143
96.00	GPS_A	8	38.310	4.0435	0.0023	931
92.00	KS24019-L112A	8	35.003	3.8325	0.0021	1080
71.00	GPS_A	8	20.201	2.8167	0.0012	1010

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	160 - 117.33 (1)	TP30.46x22.35x0.2188	42.67	0.00	0.0	36.823	20.6807	-7.02	761.52	0.009
L2	117.33 - 94 (2)	TP34.4549x29.1348x0.281	28.00	0.00	0.0	38.800	30.9213	-14.30	1199.73	0.012
L3	94 - 82.5 (3)	TP36.64x34.4549x0.3817	11.50	0.00	0.0	34.146	43.2831	-15.60	1477.94	0.011
L4	82.5 - 72.75 (4)	TP37.9427x34.8315x0.375	15.25	0.00	0.0	39.000	45.3629	-19.63	1769.15	0.011
L5	72.75 - 56 (5)	TP41.1385x37.9427x0.4482	16.75	0.00	0.0	37.998	58.7244	-24.11	2231.41	0.011

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 $\frac{P}{P_a}$
L6	56 - 40.583 (6)	TP44.08x41.1385x0.6042	15.42	0.00	0.0	30.408	82.1985	-27.16	2499.49	0.011
L7	40.583 - 31.5 (7)	TP45.0389x41.6473x0.6915	15.50	0.00	0.0	28.704	98.7439	-34.93	2834.35	0.012
L8	31.5 - 28.75 (8)	TP45.5593x45.0389x0.7353	2.75	0.00	0.0	28.734	106.1340	-36.09	3049.66	0.012
L9	28.75 - 11 (9)	TP48.9184x45.5593x0.6172	17.75	0.00	0.0	32.850	95.9976	-42.95	3153.52	0.014
L10	11 - 8.5 (10)	TP49.3915x48.9184x0.698	2.50	0.00	0.0	32.832	109.4380	-44.05	3593.08	0.012
L11	8.5 - 0 (11)	TP51x49.3915x0.5706	8.50	0.00	0.0	35.220	92.6539	-47.32	3263.27	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	160 - 117.33 (1)	TP30.46x22.35x0.2188	434.96	35.154	36.823	0.955	0.00	0.000	36.823	0.000
L2	117.33 - 94 (2)	TP34.4549x29.1348x0.281	1078.18	50.098	38.800	1.291	0.00	0.000	38.800	0.000
L3	94 - 82.5 (3)	TP36.64x34.4549x0.3817	1251.32	40.416	34.146	1.184	0.00	0.000	34.146	0.000
L4	82.5 - 72.75 (4)	TP37.9427x34.8315x0.375	1715.98	49.526	39.000	1.270	0.00	0.000	39.000	0.000
L5	72.75 - 56 (5)	TP41.1385x37.9427x0.4482	2266.03	46.692	37.998	1.229	0.00	0.000	37.998	0.000
L6	56 - 40.583 (6)	TP44.08x41.1385x0.6042	2578.18	36.669	30.408	1.206	0.00	0.000	30.408	0.000
L7	40.583 - 31.5 (7)	TP45.0389x41.6473x0.6915	3144.22	35.512	28.704	1.237	0.00	0.000	28.704	0.000
L8	31.5 - 28.75 (8)	TP45.5593x45.0389x0.7353	3248.12	33.795	28.734	1.176	0.00	0.000	28.734	0.000
L9	28.75 - 11 (9)	TP48.9184x45.5593x0.6172	3941.51	41.926	32.850	1.276	0.00	0.000	32.850	0.000
L10	11 - 8.5 (10)	TP49.3915x48.9184x0.698	4042.35	37.471	32.832	1.141	0.00	0.000	32.832	0.000
L11	8.5 - 0 (11)	TP51x49.3915x0.5706	4391.18	46.285	35.220	1.314	0.00	0.000	35.220	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	160 - 117.33 (1)	TP30.46x22.35x0.2188	16.94	0.819	26.000	0.064	0.12	0.005	26.000	0.000
L2	117.33 - 94 (2)	TP34.4549x29.1348x0.281	28.39	0.918	26.000	0.072	0.03	0.001	26.000	0.000
L3	94 - 82.5 (3)	TP36.64x34.4549x0.3817	29.34	0.678	22.764	0.060	0.04	0.001	22.764	0.000
L4	82.5 - 72.75 (4)	TP37.9427x34.8315x0.375	31.55	0.695	26.000	0.054	0.14	0.002	26.000	0.000
L5	72.75 - 56 (5)	TP41.1385x37.9427x0.4482	34.05	0.580	25.332	0.047	0.26	0.003	25.332	0.000
L6	56 - 40.583 (6)	TP44.08x41.1385x0.6042	35.33	0.430	20.272	0.043	0.35	0.002	20.272	0.000
L7	40.583 - 31.5 (7)	TP45.0389x41.6473x0.6915	37.60	0.381	19.136	0.040	0.51	0.003	19.136	0.000
L8	31.5 - 28.75 (8)	TP45.5593x45.0389x0.7353	37.97	0.358	19.156	0.038	0.53	0.003	19.156	0.000
L9	28.75 - 11 (9)	TP48.9184x45.5593x0.6172	40.18	0.419	21.900	0.039	0.69	0.003	21.900	0.000
L10	11 - 8.5 (10)	TP49.3915x48.9184x0.698	40.51	0.370	21.888	0.034	0.71	0.003	21.888	0.000

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 $\frac{f_{vt}}{F_{vt}}$
L11	8.5 - 0 (11)	TP51x49.3915x0.5706	41.58	0.449	23.480	0.039	0.81	0.004	23.480	0.000

Pole Interaction Design Data

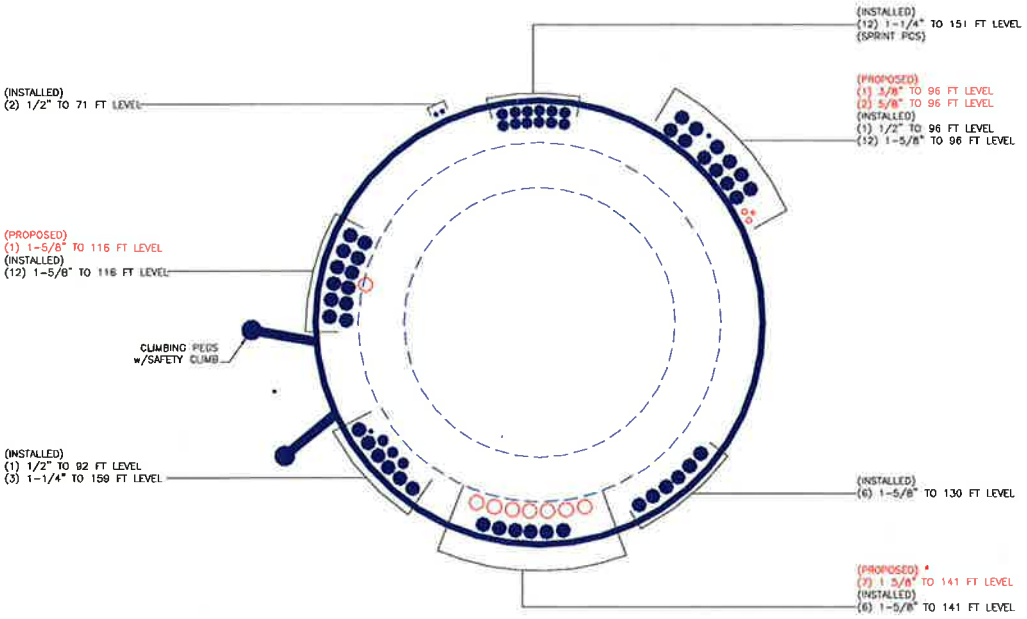
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 117.33 (1)	0.009	0.955	0.000	0.064	0.000	0.965 ✔	1.333	H1-3+VT ✔
L2	117.33 - 94 (2)	0.012	1.291	0.000	0.072	0.000	1.304 ✔	1.333	H1-3+VT ✔
L3	94 - 82.5 (3)	0.011	1.184	0.000	0.060	0.000	1.195 ✔	1.333	H1-3+VT ✔
L4	82.5 - 72.75 (4)	0.011	1.270	0.000	0.054	0.000	1.282 ✔	1.333	H1-3+VT ✔
L5	72.75 - 56 (5)	0.011	1.229	0.000	0.047	0.000	1.240 ✔	1.333	H1-3+VT ✔
L6	56 - 40.583 (6)	0.011	1.206	0.000	0.043	0.000	1.217 ✔	1.333	H1-3+VT ✔
L7	40.583 - 31.5 (7)	0.012	1.237	0.000	0.040	0.000	1.250 ✔	1.333	H1-3+VT ✔
L8	31.5 - 28.75 (8)	0.012	1.176	0.000	0.038	0.000	1.188 ✔	1.333	H1-3+VT ✔
L9	28.75 - 11 (9)	0.014	1.276	0.000	0.039	0.000	1.290 ✔	1.333	H1-3+VT ✔
L10	11 - 8.5 (10)	0.012	1.141	0.000	0.034	0.000	1.154 ✔	1.333	H1-3+VT ✔
L11	8.5 - 0 (11)	0.015	1.314	0.000	0.039	0.000	1.329 ✔	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	160 - 117.33	Pole	TP30.46x22.35x0.2188	1	-7.02	1015.10	72.4	Pass
L2	117.33 - 94	Pole	TP34.4549x29.1348x0.281	2	-14.30	1599.24	97.9	Pass
L3	94 - 82.5	Pole	TP36.64x34.4549x0.3817	3	-15.60	1970.09	89.7	Pass
L4	82.5 - 72.75	Pole	TP37.9427x34.8315x0.375	4	-19.63	2358.28	96.2	Pass
L5	72.75 - 56	Pole	TP41.1385x37.9427x0.4482	5	-24.11	2974.47	93.0	Pass
L6	56 - 40.583	Pole	TP44.08x41.1385x0.6042	6	-27.16	3331.82	91.3	Pass
L7	40.583 - 31.5	Pole	TP45.0389x41.6473x0.6915	7	-34.93	3778.19	93.8	Pass
L8	31.5 - 28.75	Pole	TP45.5593x45.0389x0.7353	8	-36.09	4065.20	89.1	Pass
L9	28.75 - 11	Pole	TP48.9184x45.5593x0.6172	9	-42.95	4203.64	96.8	Pass
L10	11 - 8.5	Pole	TP49.3915x48.9184x0.698	10	-44.05	4789.58	86.6	Pass
L11	8.5 - 0	Pole	TP51x49.3915x0.5706	11	-47.32	4349.94	99.7	Pass
							Summary	
						Pole (L11)	99.7	Pass
						RATING =	**99.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

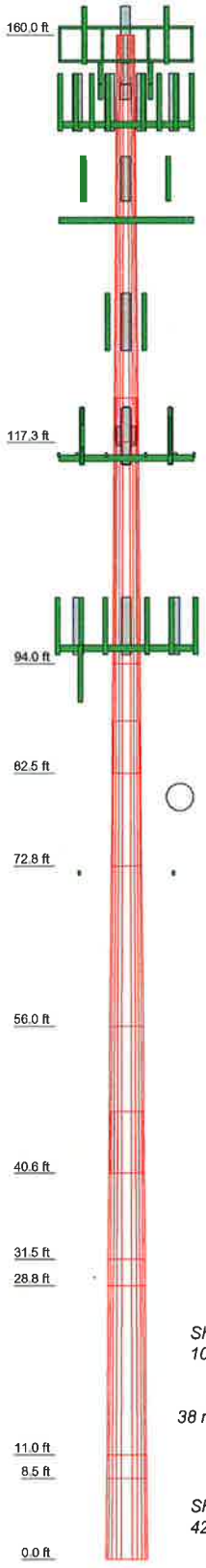


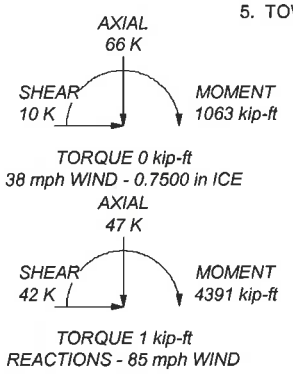
* To be installed internally

APPENDIX C

ADDITIONAL CALCULATIONS

Section	11	10	9	8	7	6	5	4	3	2	1
Length (ft)	8.50	2.50	17.75	2.75	15.50	15.42	16.75	15.25	11.50	28.00	42.67
Number of Sides	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.5706	0.6680	0.6172	0.7353	0.6915	0.6042	0.4482	0.3750	0.3817	0.2810	0.2188
Socket Length (ft)						6.42			5.50		4.67
Top Dia (in)	49.3915	48.9184	45.5593	45.0399	41.6473	41.1385	37.9427	34.8315	34.4549	29.1348	22.3500
Bot Dia (in)	51.0000	49.3915	48.9184	45.5593	45.0389	44.0800	41.1385	37.9427	36.6400	34.4549	30.4600
Grade	Reinf 47.84 ksi	Reinf 47.84 ksi	Reinf 54.75 ksi	Reinf 47.89 ksi	Reinf 47.84 ksi	Reinf 50.68 ksi	Reinf 63.33 ksi	A572-65	Reinf 56.91 ksi	A572-65	
Weight (K)	32.0	2.6	0.9	5.6	1.0	5.0	4.3	3.2	2.3	1.7	2.7





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	159	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	116
APXV9ERR18-C-A20 w/ Mount Pipe	159	BXA-171063-8BF-EDIN-2 w/ Mount Pipe	116
APXVSPP18-C-A20 w/ Mount Pipe	159	(2) FD9R6004/2C-3L	116
Platform Mount [LP 602-1]	159	(2) FD9R6004/2C-3L	116
PCS 1900MHz 4x45W-65MHz	155	(2) FD9R6004/2C-3L	116
PCS 1900MHz 4x45W-65MHz	155	LNX-6514DS-VTM w/ Mount Pipe	116
PCS 1900MHz 4x45W-65MHz	155	LNX-6514DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	LNX-6514DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	HBX-6517DS-VTM w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	155	HBX-6517DS-VTM w/ Mount Pipe	116
Side Arm Mount [SO 102-3]	155	HBX-6517DS-VTM w/ Mount Pipe	116
(4) 7130.16 w/ Mount Pipe	151	DB-T1-6Z-8AB-0Z	116
(4) 7130.16 w/ Mount Pipe	151	RRH2X40-AWS	116
(4) 7130.16 w/ Mount Pipe	151	RRH2X40-AWS	116
T-Arm Mount [TA 602-3]	151	RRH2X40-AWS	116
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	Platform Mount [LP 303-1]	116
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	GPS_A	96
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	141	(2) 7770.00 w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	(2) 7770.00 w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	(2) 7770.00 w/ Mount Pipe	96
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
KRY 112 144/1	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
KRY 112 144/1	141	AM-X-CD-14-65-00T-RET w/ Mount Pipe	96
KRY 112 144/1	141	(2) RRUS-11	96
Platform Mount [LP 602-1]	141	(2) RRUS-11	96
APXV18-206517S-ACU w/ Mount Pipe	130	(2) RRUS-11	96
APXV18-206517S-ACU w/ Mount Pipe	130	(2) TT19-08BP111-001	96
APXV18-206517S-ACU w/ Mount Pipe	130	(2) TT19-08BP111-001	96
Pipe Mount [PM 601-3]	130	(2) TT19-08BP111-001	96
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	DC6-48-60-18-8F	96
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	T-Arm Mount [TA 602-3]	96
BXA-70063-6CF-EDIN-2 w/ Mount Pipe	116	KS24019-L112A	92
SPXW 8515 w/ Mount Pipe	116	Side Arm Mount [SO 701-1]	92
		GPS_A	71
		GPS_A	71
		Side Arm Mount [SO 701-1]	71
		Side Arm Mount [SO 701-1]	71

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 47.89 ksi	48 ksi	60 ksi
Reinf 56.91 ksi	57 ksi	72 ksi	Reinf 54.75 ksi	55 ksi	65 ksi
Reinf 63.33 ksi	63 ksi	80 ksi	Reinf 54.72 ksi	55 ksi	69 ksi
Reinf 50.68 ksi	51 ksi	64 ksi	Reinf 58.70 ksi	59 ksi	74 ksi
Reinf 47.84 ksi	48 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.7%

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250 East Broad Street, Suite 600
Columbus, Ohio 43215
Phone: 614.221.6679
FAX: 614.448.4118

Job: *160-Ft Monopole / Pond Meadow*			
Project: *37511-0419 / BU# 876339*			
Client: Crown Castle	Drawn by: Kevin Mahlum	App'd:	
Code: TIA/EIA-222-F	Date: 03/19/14	Scale: NTS	
Path:		Dwg No. E-1	

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v4.0 - Effective 1-12-12

Date: 3/19/2014
PJF Project: 37513-0634
Client Ref. # BU 876339
Site Name: Pond Meadow
Description: 160 Ft Monopole
Owner: CCI
Engineer: KMM

Asymmetric Anchor Rod Analysis

Moment =	4391	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	47.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	42.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	25							

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

Item	Nominal Anchor Dia, in	Anchor 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	0.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
2	2.250	#18J A615 Gr 75	75	100	22.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
3	2.250	#18J A615 Gr 75	75	100	45.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
4	2.250	#18J A615 Gr 75	75	100	67.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
5	2.250	#18J A615 Gr 75	75	100	90.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
6	2.250	#18J A615 Gr 75	75	100	112.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
7	2.250	#18J A615 Gr 75	75	100	135.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
8	2.250	#18J A615 Gr 75	75	100	157.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
9	2.250	#18J A615 Gr 75	75	100	180.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
10	2.250	#18J A615 Gr 75	75	100	202.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
11	2.250	#18J A615 Gr 75	75	100	225.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
12	2.250	#18J A615 Gr 75	75	100	247.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
13	2.250	#18J A615 Gr 75	75	100	270.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
14	2.250	#18J A615 Gr 75	75	100	292.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
15	2.250	#18J A615 Gr 75	75	100	315.0	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
16	2.250	#18J A615 Gr 75	75	100	337.5	59.30	0.00	3.98	148.95	144.78	144.78	0.00	195.00	74.2%
17	2.000	A193 Gr B7	105	125	15.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
18	2.000	A193 Gr B7	105	125	45.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
19	2.000	A193 Gr B7	105	125	135.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
20	2.000	A193 Gr B7	105	125	165.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
21	2.000	A193 Gr B7	105	125	255.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
22	2.000	A193 Gr B7	105	125	285.0	65.80	0.00	3.14	130.28	126.99	126.99	0.00	172.79	73.5%
23	1.750	F1554 Gr 105	105	125	105.0	67.80	0.00	2.41	102.74	100.22	100.22	0.00	132.29	75.8%
24	1.750	F1554 Gr 105	105	125	225.0	67.80	0.00	2.41	102.74	100.22	100.22	0.00	132.29	75.8%
25	1.750	F1554 Gr 105	105	125	345.0	67.80	0.00	2.41	102.74	100.22	100.22	0.00	132.29	75.8%
								89.75						

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

TIA Rev F

Site Data

BU#: *876339*
Site Name:
App #:
Pole Manufacturer: *Other*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59.3	in

Plate Data		
Diam:	65.3	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.25	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	51	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	2903	ft-kips
Axial:	33.3	kips
Shear:	29.8	kips

Reactions adjusted to account for additional anchor rods.

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

Anchor Rod Results

Maximum Rod Tension:	144.8 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	74.3% Pass	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	29.9 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	49.8% Pass	0.75*Fy*ASIF
		Y.L. Length: 30.26

n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a

* 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

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v4.1 - Effective 7-3-12

Date: 3/20/2014
PJF Project: 37513-0634
Client Ref. # 876339
Site Name: Pond Meadow Rd. Stable
Description: 160' Pole
Owner: CCI
Engineer: KMM

Asymmetric Anchor Rod Analysis

Moment =	5562	k-ft	TIA Ref.	F	Location =	Base Plate	
Axial =	0.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	0.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	4						

** 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	1.750	Williams R71	127.7	150	45.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
2	1.750	Williams R71	127.7	150	135.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
3	1.750	Williams R71	127.7	150	225.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
4	1.750	Williams R71	127.7	150	315.0	322.44	0.00	2.66	207.00	207.00	207.00	207.00	207.00	100.0%
								10.65						

Capacity of Rock Anchors to add to resisting overturning moment

PJF job no. **37512-1874** Project name **160 Ft Monopole**

Foundation Loads:

Pole weight or tower leg compression =	47	(kips)
Horizontal load at top of pier =	42	(kips)
Overturning moment at top of pier=	4391	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	

Soil Properties:

Soil density =	110	(pcf)
Allowable soil bearing =	15	(ksf)
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	R	("R" or "S")
Pier width =	7	(ft)
Pier height above grade =	0.5	(ft)
depth to bottom of footing =	7.5	(ft)
Footing thickness =	3.5	(ft)
Footing width =	23	(ft)
Footing length =	23	(ft)

Concrete:

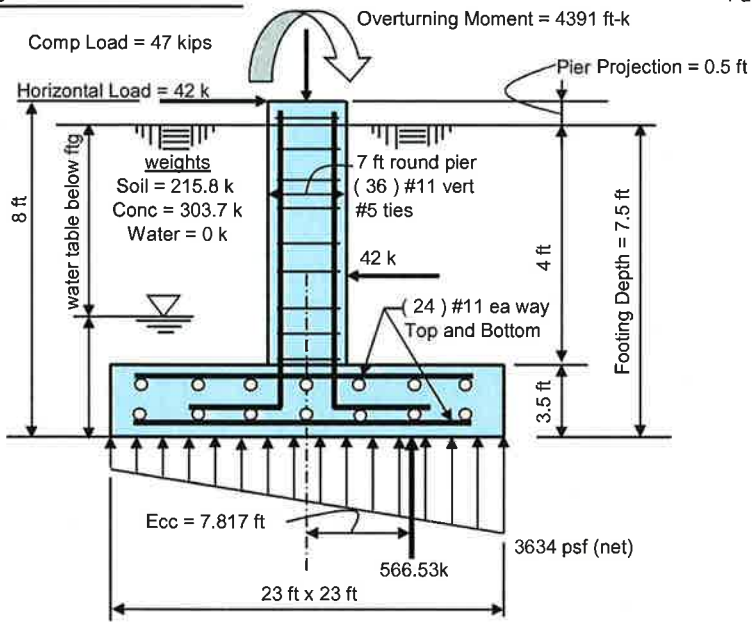
Concrete strength =	4	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

Reinforcing Steel:

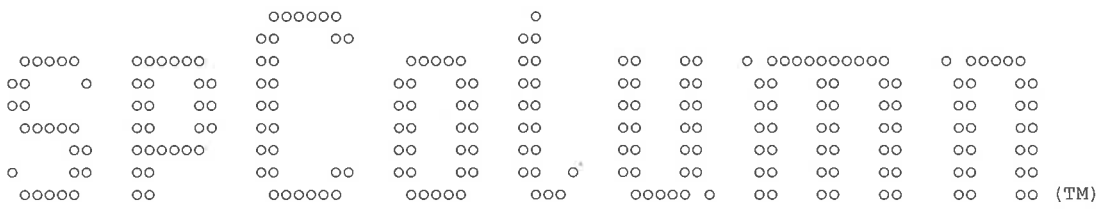
	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#11	bar
quantity of pad rebar =	24	(ea direction)

Reinforcing Steel:

	Pier	
size of vert rebar in pier=	#11	bar
vertical rebar quantity =	36	
size of pier ties =	#5	bar
minimum cover over rebar =	3	inches
Total volume of concrete =	75.0	cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 3.634 ksf	Ult Bending Shear Capacity = 126 psi
Allowable Net Soil Bearing = 15 ksf	Ult Bending Shear Stress = 49 psi
Soil Bearing Stress Ratio = 0.24 Okay	**Bending Shear Stress Ratio = 0.39 Okay**
Ftg Overturning Resistance ** = 12077 ft-kips	Pad Bending Moment Capacity= 6022 ft-k
Overturning Moment = 4429 ft-kips	Pad Bending Moment = 2313 ft-k
Required Overturning Safety Factor = 1.5	**Bending Moment Stress Ratio = 0.38 OK**
Overturning Safety Factor = 2.727	
Ratio = 0.55 Okay	
** Includes Resistance from Rock Anchors	



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

General Information:

File Name: G:\TOWER\375_Crown_Castle\2013\37513-0634 BU 876339\WO 726148 BU 876339...\37513-0634.col
Project:
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:

Circular: Diameter = 84 in

Gross section area, Ag = 5541.77 in^2
Ix = 2.44392e+006 in^4 Iy = 2.44392e+006 in^4
rx = 21 in ry = 21 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; #3 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 56.16 in^2 at rho = 1.01%
Minimum clear spacing = 5.18 in

36 #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	47.00	5897.30	8428.59	1.429	17.44	79.79	0.01073	0.900

*** End of output ***