

April 13, 2015

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

Re: **Notice of Exempt Modification – Facility Modification
94 East High Street, East Hampton, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 108-foot level of an existing 117.5-foot tower at 94 East High Street in East Hampton (the “Property”). The tower is owned Crown Castle. Cellco’s use of the tower was approved by the Council in 2000. Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas; three (3) model LNX-6514DS-VTM, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 108-foot level on the tower. Cellco also intends to install six (6) remote radio heads (“RRHs”) behind its 1900 MHz and 2100 MHz antennas and two (2) HYBRIFLEX™ antenna cables inside the monopole tower. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Michael Maniscalco, Town Manager of the Town of East Hampton. A copy of this letter is also being sent to Pauls & Sandys Too, Inc., 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).

13582553-v1

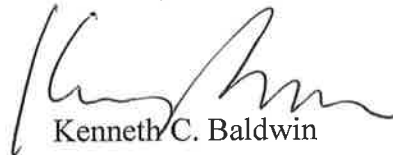
Robinson + Cole

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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 108-foot level of the tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the 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 behind 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:

Michael Maniscalco, East Hampton Town Manger
Pauls & Sandys Too, Inc.
Tim Parks

ATTACHMENT 1



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	15.8	15.9
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	12.4	11.2
Beam Tilt, degrees	0–10	0–10
USLS, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	23	23
CPR at Sector, dB	12	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

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896
Gain by all Beam Tilts, average, dBi	15.6	15.7
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5
	0 ° 15.7	0 ° 15.9
Gain by Beam Tilt, average, dBi	5 ° 15.7	5 ° 15.8
	10 ° 15.3	10 ° 15.3
Beamwidth, Horizontal Tolerance, degrees	±0.9	±1.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6
USLS, dB	18	20
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	25	24
CPR at Sector, dB	15	12

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, [download the whitepaper Time to Raise the Bar on BSAs.](#)

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® Teletilt®

Product Specifications

COMMSCOPE®

LNX-6514DS-VTM

POWERED BY



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

Dimensions

Depth	181.0 mm 7.1 in
Length	1847.0 mm 72.7 in
Width	301.0 mm 11.9 in
Net Weight	14.2 kg 31.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator LNX-6514DS-A1M

RET System Teletilt®

Regulatory Compliance/Certifications

Agency

RoHS 2011/65/EU
China RoHS SJ/T 11364-2006
ISO 9001:2008

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)
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



HBXX-6517DS-VTM

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

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	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

Electrical Specifications, BASTA*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0° 18.4	0° 18.4	0° 18.7
	3° 18.7	3° 18.7	3° 18.9
	6° 18.4	6° 18.5	6° 18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, [download the whitepaper Time to Raise the Bar on BSAs.](#)

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® quad
Band	Single band
Brand	DualPol® Teletilt®
Operating Frequency Band	1710 – 2180 MHz

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

POWERED BY



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
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h 149.8 mph

Dimensions

Depth	166.0 mm 6.5 in
Length	1903.0 mm 74.9 in
Width	305.0 mm 12.0 in
Net Weight	19.5 kg 43.0 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator HBXX-6517DS-A2M
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

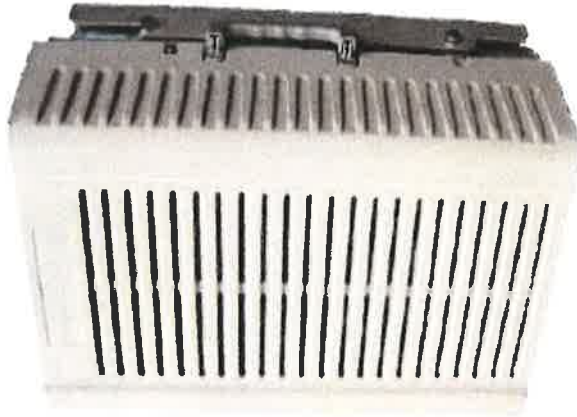
600899A-2 — Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

RRH2x60	
RF Output Power	2X60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver	1900 HW version 1900A HW version
Features	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3 AISG 2.0 for RET/TMA
Power	Internal Smart Bias-T -48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (top mounted)

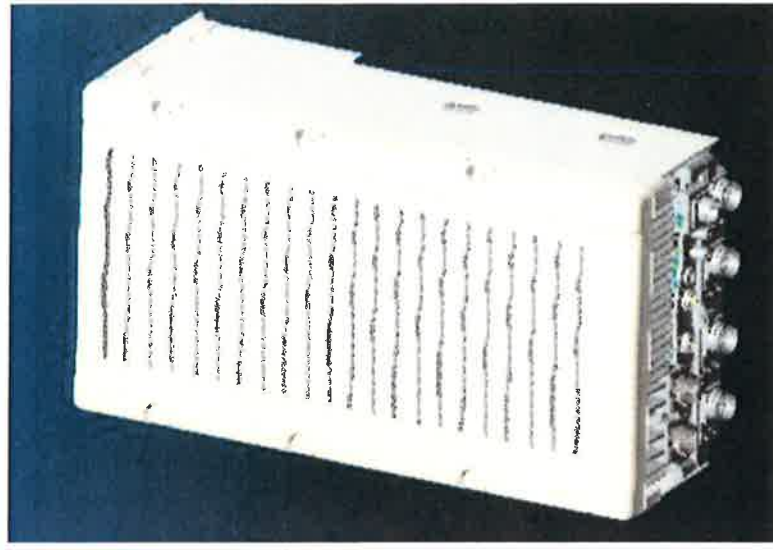


** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW RRH2X60 - HW CHARACTERISTICS

LR14.3

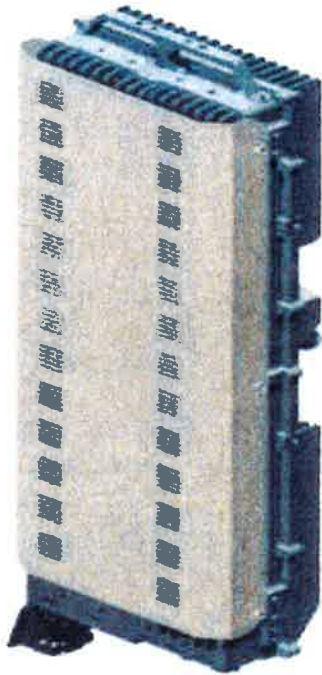
	RRH2x60
RF Output Power	2x60W (4x30W HW Ready)
Instantaneous Bandwidth	60MHz
Target Reliability (Annual Return Rate)	<2%
Receiver	4 Branch Rx
Features	AISG 2.0 for RET/TMA
Power	-48VDC Internal Smart Bias-T
CPRI Ports	2 CPRI Rate 5 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX, RX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (downward facing)
Dimensions	22"(h) x 12"(w) x 9.4" (d)**
Weight	55lb**



** - Includes solar shield but not mounting brackets (8 lbs.)

ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2X60-AWS FOR BAND 4 APPLICATIONS

The Alcatel-Lucent RRH2x60-AWS is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the 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 a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent RRH2x60-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.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-AWS is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

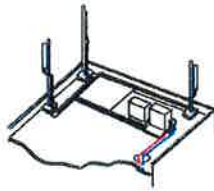
EASY INSTALLATION

The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

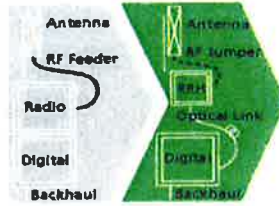
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

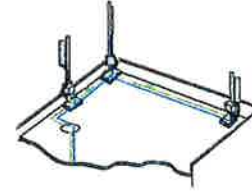
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-AWS integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- RRH2x60-AWS is optimized for LTE operation
- RRH2x60-AWS is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

- silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

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.....Alcatel-Lucent

AT THE SPEED OF IDEAS™

.....Alcatel-Lucent 



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.

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



Figure 1: HYBRIFLEX Series

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
Physical 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, 8.4mm (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Optical 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
DC Power Cable Properties			
Size (Power)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environmental			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

* This data is provisional and subject to change

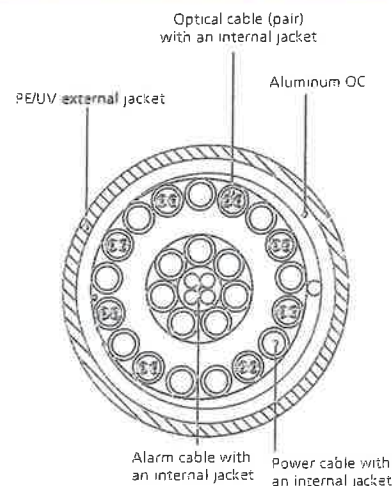


Figure 2: Construction Detail

All information contained in the present datasheet is subject to confirmation at time of ordering.

ATTACHMENT 2

ATTACHMENT 3

February 17, 2015

Marianne Dunst
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6580



B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject: **Structural Analysis Report**

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Number: 119663
Carrier Site Name: East Hampton CT

Crown Castle Designation: **Crown Castle BU Number:** 876352
Crown Castle Site Name: Richard Wall
Crown Castle JDE Job Number: 321658
Crown Castle Work Order Number: 1003571
Crown Castle Application Number: 281620 Rev. 1

Engineering Firm Designation: **B+T Group Project Number:** 92595.002.01

Site Data: **94 East Hight Street, East Hampton, Middlesex County, CT**
Latitude 41° 35' 14.2", Longitude -72° 29' 19.6"
117.5 Foot - Monopole Tower

Dear Marianne Dunst,

B+T Group 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 753082, in accordance with application 281620, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

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

We at B+T Group 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:
B+T Engineering, Inc.

Jacob Johnson, E.I.T.
Project Engineer

Chad E. Tuttle, P.E.
President



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7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 117.5 ft. Monopole tower designed by Engineered Endeavors, Inc. in May of 1999. The tower was originally designed for a wind speed of 89.25 mph per TIA/EIA-222-F. This tower has been modified by B+T Group in September 2012 and those modifications are incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 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
105.0	108.0	3	Alcatel Lucent	RRH2X60-AWS	2	1-5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		6	Andrew	HBXX-6517DS-A2M			
		6	Andrew	LNX-6514DS-A1M			
		1	RFS Celwave	DB-B1-6C-12AB-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
118.0	118.0	3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz	--	--	2
		3	Alcatel Lucent	800MHz 2X50W RRH W/FILTER			
		1	--	Side Arm Mount [SO 102-3]			
117.0	119.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	2
		3	RFS Celwave	APXVTM14-C-120			
		3	RFS Celwave	APXVSP18-C-A20			
	117.0	1	--	Platform Mount [LP 712-1]	3	1-1/4	1
105.0	108.0	2	Antel	BXA-171063-12BF	--	--	3
		1	Antel	BXA-171063-8BF-2			
		1	Antel	BXA-70063/6CF-2			
		2	Antel	BXA-70063/6CFx4			
		4	Decibel	DB846F65ZAXY			
		2	RFS Celwave	APL866513-42T0			
	105.0	6	RFS Celwave	FD9R6004/2C-3L	12	1-1/4	1
		1	--	Platform Mount [LP 1201-1]			
91.0	93.0	3	Ericsson	RRUS-11	12	1-5/8	1
		3	KMW Comm.	AM-X-CD-16-65-00T-RET			
		6	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP 17201			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
91.0	93.0	6	Powerwave Tech.	LGP21903	--	--	1
		1	Raycap	DC6-48-60-18-8F			
	1	--	Platform Mount [LP 1201-1]				
75.0	76.0	1	Lucent	KS24019-L112A	1	1/2	1
	75.0	1	--	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) Equipment To Be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
117.5	117.5	12	Decibel	DB 980	--	--
		1	Generic	Low Profile Platform		
105	105	12	Swedcom	ALP 9212	--	--
		1	Generic	Low Profile Platform		
95	95	12	Swedcom	ALP 9212	--	--
		1	Generic	Low Profile Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co Locate, Rev. 1	281620	CCI Sites
Tower Manufacturer Drawing	EEl, Job No. 5069	2122777	CCI Sites
Tower Modification Drawing	B+T Group, Date: 09/18/2012	3250765	CCI Sites
Post Modification Inspection	B+T Group, Date: 11/02/2012	3404046	CCI Sites
Foundation Drawings	EEl, Job No. 5069	2122776	CCI Sites
Geotech Report	Clough, Harbour & Associates LLP, Project. 7472.07.03	1532964	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 02/13/2015	CCI Sites

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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) Mount areas and weights are assumed based on photographs provided.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	117.5 - 86.29	Pole	TP22.9x15x0.188	1	-8.857	675.914	95.1	Pass
L2	86.29 - 42.63	Pole	TP33.46x21.659x0.313	2	-15.150	1647.841	100.0	Pass
L3	42.63 - 28.167	Pole	TP36.452x31.644x0.397	3	-19.744	1989.036	100.0	Pass
L4	28.167 - 0	Pole	TP43.5x36.452x0.411	4	-23.605	2308.543	97.0	Pass
							Summary	Pass
							Pole (L3)	100.0
							RATING =	100.0

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	81.2	Pass
1	Base Plate, Stiffeners	Base	93.3	Pass
1	Base Foundation	Base	98.7	Pass

Structure Rating (max from all components) =	100.0%
---	---------------

Notes:

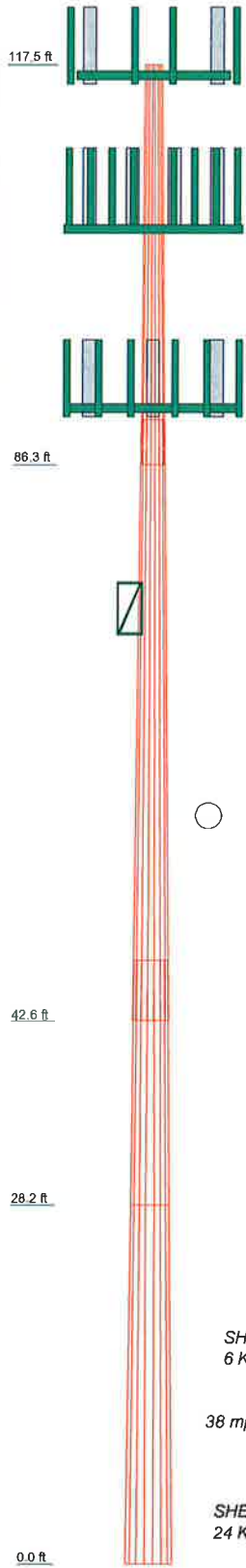
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	31.210	47.080	19.213	28.167
Number of Sides	18	18	18	18
Thickness (in)	0.188	0.313	0.397	0.411
Socket Length (ft)	3.420	4.750		36.452
Top Dia (in)	15.000	21.659	31.644	43.500
Bot Dia (in)	22.900	33.460	36.452	55.36672ksi
Grade		A572-65	54.680649ksi	
Weight (K)	1.2	4.3	2.7	4.9



DESIGNED APPURTENANCE LOADING

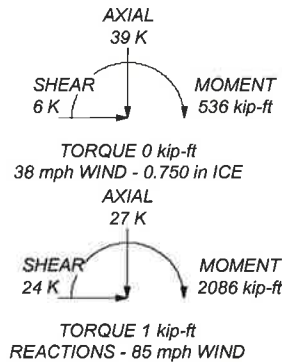
TYPE	ELEVATION	TYPE	ELEVATION
PCS 1900MHz 4x45W-65MHz	118	RRH2X60-PCS (P)	105
PCS 1900MHz 4x45W-65MHz	118	RRH2X60-AWS (P)	105
PCS 1900MHz 4x45W-65MHz	118	RRH2X60-AWS (P)	105
800MHz 2X50W RRH W/FILTER	118	RRH2X60-AWS (P)	105
800MHz 2X50W RRH W/FILTER	118	DB-B1-6C-12AB-0Z (P)	105
800MHz 2X50W RRH W/FILTER	118	(2) FD9R6004/2C-3L (E)	105
Side Arm Mount [SO 102-3]	118	(2) FD9R6004/2C-3L (E)	105
APXVSP18-C-A20 w/ Mount Pipe (E)	117	(2) FD9R6004/2C-3L (E)	105
APXVSP18-C-A20 w/ Mount Pipe (E)	117	Platform Mount [LP 1201-1] (E)	105
APXVSP18-C-A20 w/ Mount Pipe (E)	117	(2) 7770.00 w/ Mount Pipe (E)	91
APXVTM14-C-120 w/ Mount Pipe (R)	117	(2) 7770.00 w/ Mount Pipe (E)	91
APXVTM14-C-120 w/ Mount Pipe (R)	117	(2) 7770.00 w/ Mount Pipe (E)	91
APXVTM14-C-120 w/ Mount Pipe (R)	117	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	91
TD-RRH8x20-25 (R)	117	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	91
TD-RRH8x20-25 (R)	117	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	91
TD-RRH8x20-25 (R)	117	AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	91
(2) 7' x 2" Pipe Mount (E)	117	(2) LGP21903 (E)	91
(2) 7' x 2" Pipe Mount (E)	117	(2) LGP21903 (E)	91
Platform Mount [LP 712-1] (E)	117	(2) LGP21903 (E)	91
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	105	RRUS-11 (E)	91
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	105	RRUS-11 (E)	91
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	105	RRUS-11 (E)	91
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	105	DC6-48-60-18-8F (E)	91
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105	(2) LGP 17201 (E)	91
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105	(2) LGP 17201 (E)	91
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105	8' x 2" Pipe Mount (E)	91
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105	8' x 2" Pipe Mount (E)	91
RRH2X60-PCS (P)	105	Platform Mount [LP 1201-1] (E)	91
RRH2X60-PCS (P)	105	KS24019-1.112A (E)	75
		Side Arm Mount [SO 701-1] (E)	75

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	55.36672ksi	55 ksi	70 ksi
54.680649ksi	55 ksi	70 ksi			

TOWER DESIGN NOTES

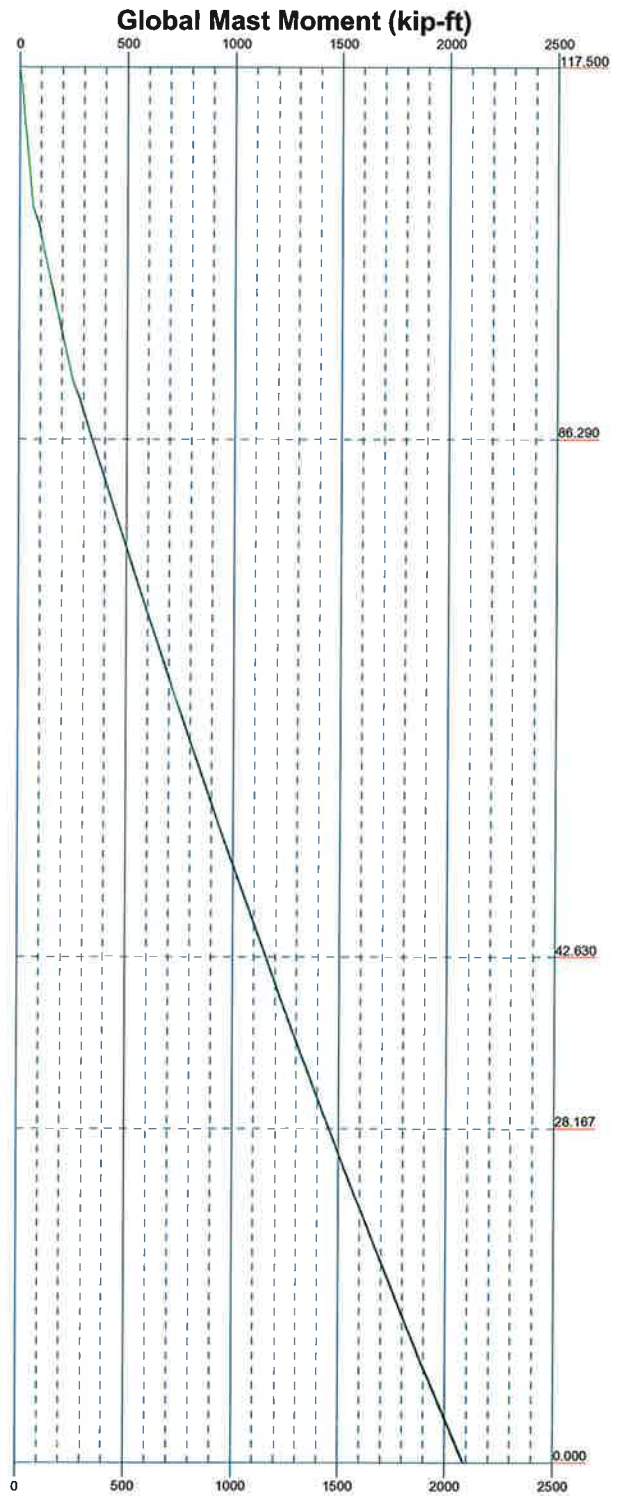
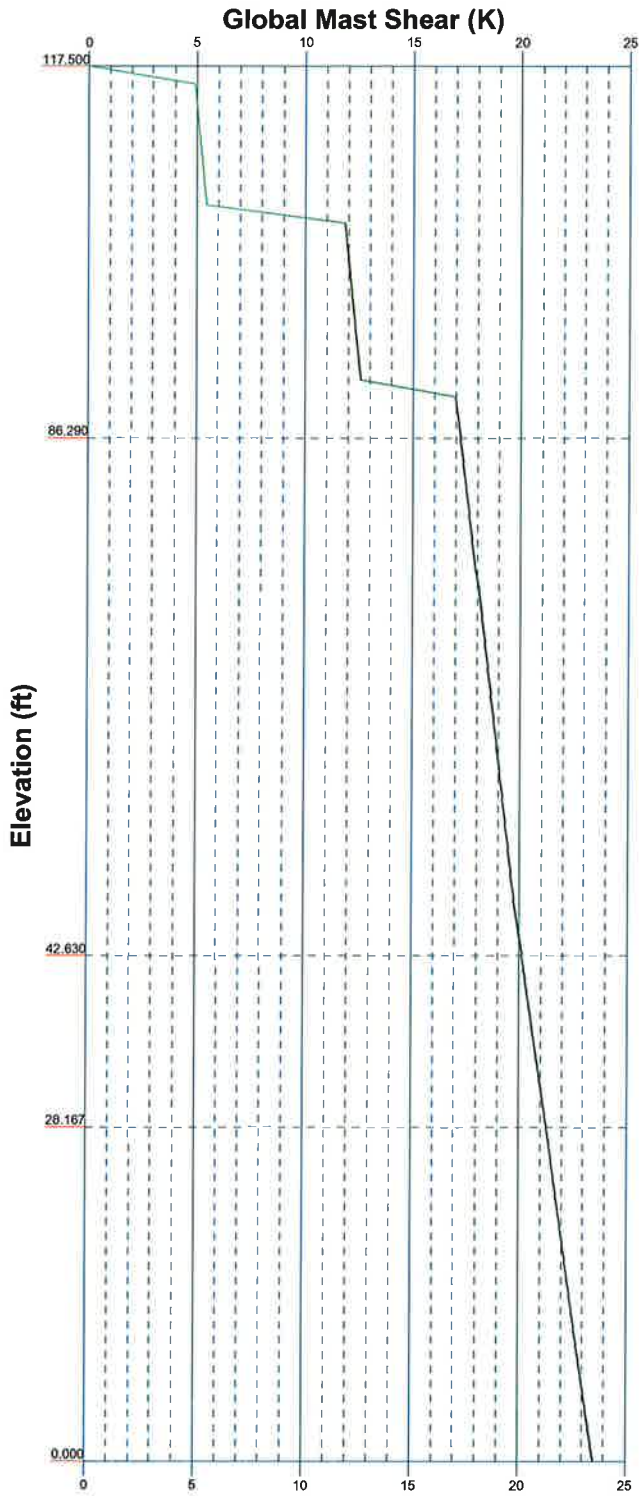
1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 100%




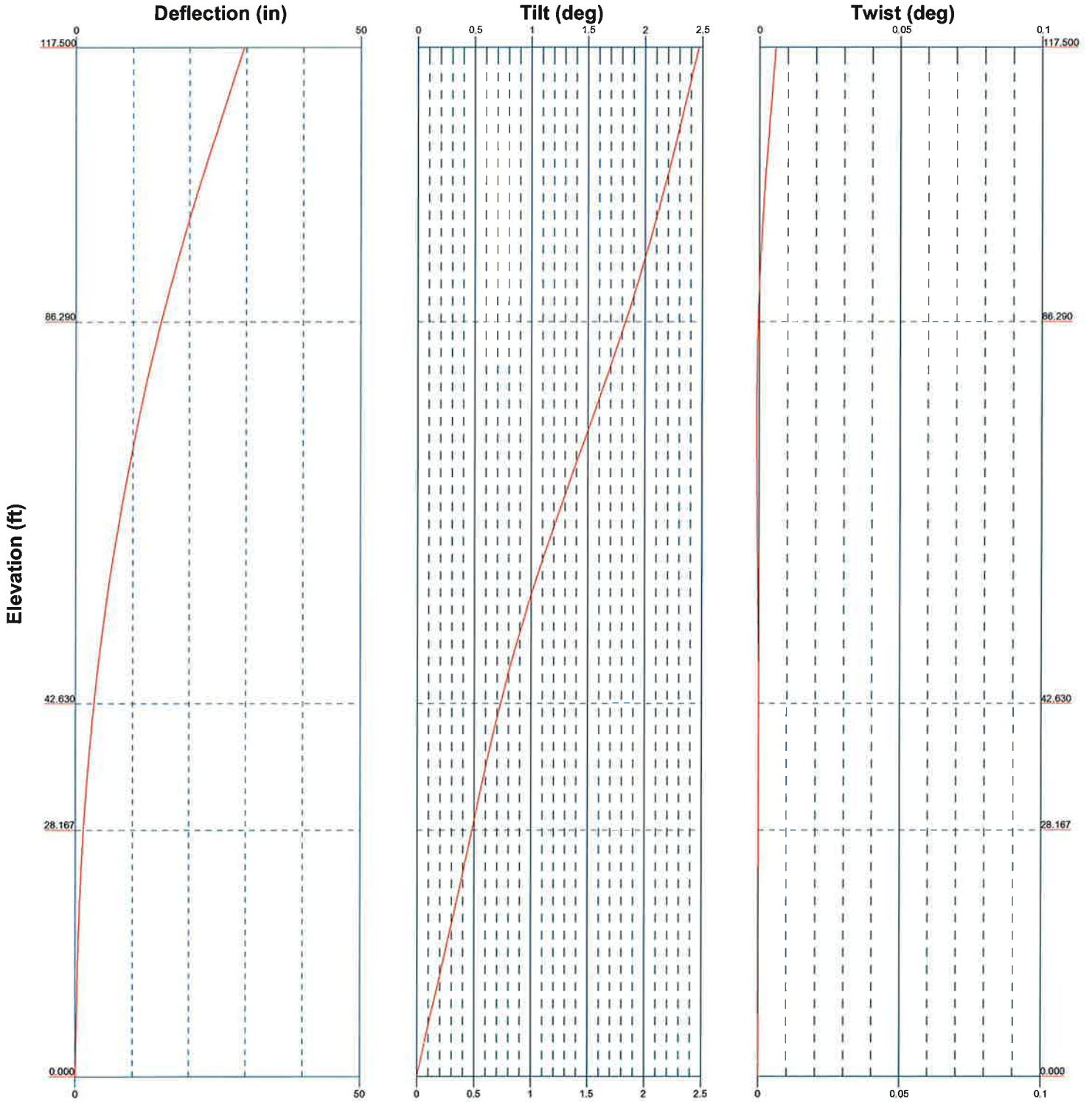
	B+T Group		
	1717 S. Boulder, Suite 300		
	Tulsa, OK, 74119		
	Phone: (918) 587-4630		
	FAX: (918) 295-0265		
Job:	92595.002.01 - Richard Wall, CT (BU #876352)		
Project:	Crown Castle		
Client:	Drawn by:	J. Johnson	App'd:
Code:	TIA/EIA-222-F	Date:	02/17/15
Path:	Scale: NTS		
			Dwg No. E-1


Vx Vz

Mx Mz



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	<p>Project: Crown Castle</p>			
	<p>Client: Crown Castle</p>		<p>Drawn by: J. Johnson</p>	<p>App'd:</p>
	<p>Code: TIA/EIA-222-F</p>		<p>Date: 02/17/15</p>	<p>Scale: NTS</p>
	<p>Path:</p>			<p>Dwg No. E-4</p>

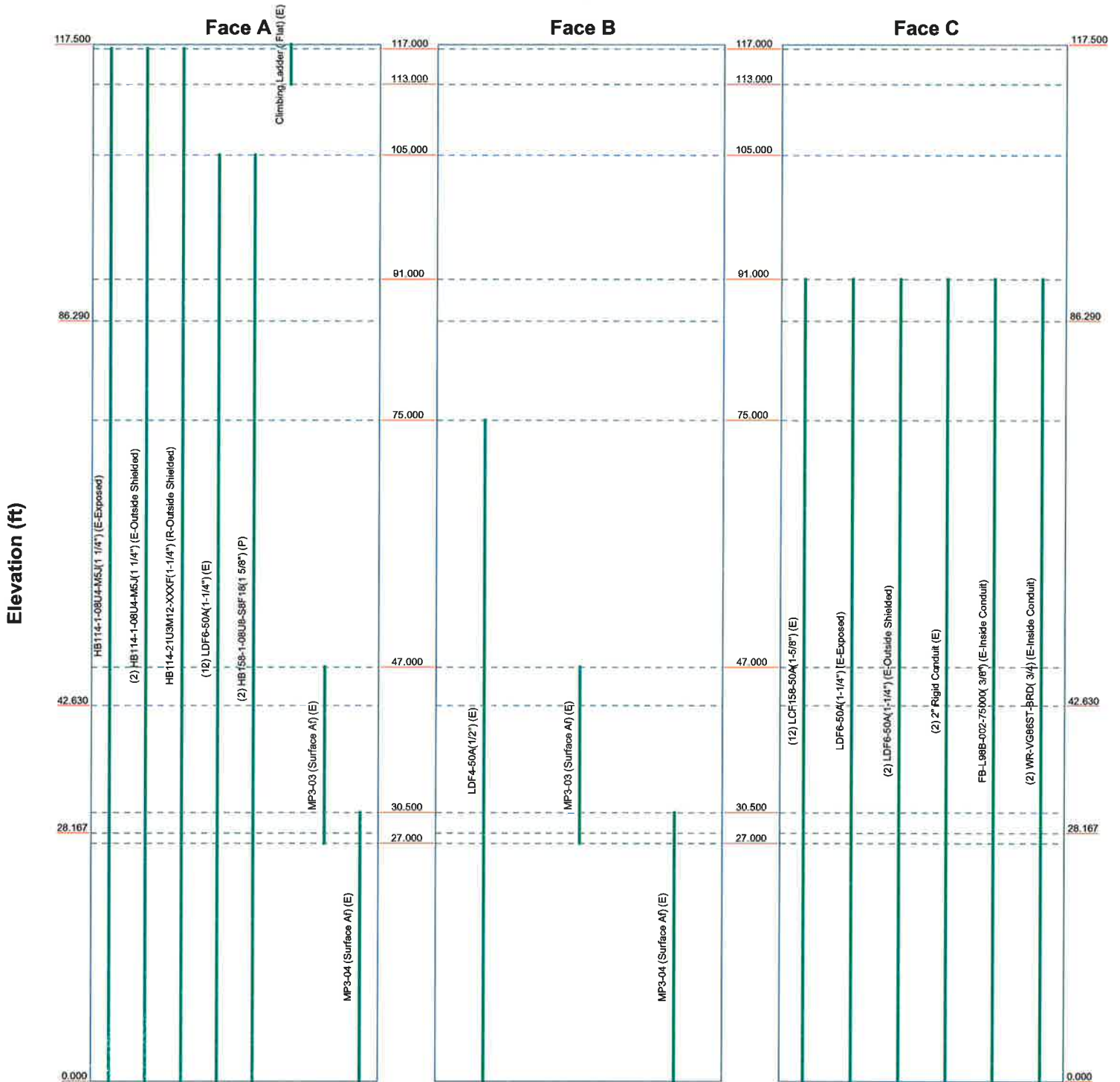


 <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK, 74119 Phone: (918) 587-4630 FAX: (918) 295-0265</p>	<p>Job: 92595.002.01 - Richard Wall, CT (BU #876352)</p>			
	Project:	Client: Crown Castle	Drawn by: J. Johnson	App'd:
	Code: TIA/EIA-222-F	Date: 02/17/15	Scale: NTS	
	Path:	Dwg No: E-5		

Feed Line Distribution Chart

0' - 117'6"

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



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	Project: Crown Castle		
	Client: TIA/EIA-222-F	Drawn by: J. Johnson	App'd:
	Code: TIA/EIA-222-F	Date: 02/17/15	Scale: NTS
	Path:		Dwg No. E-7

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	Client Crown Castle	Designed by J. Johnson

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 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

<ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination 	<ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption 	<ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque Include Angle Block Shear Check <li style="text-align: center;">Poles √ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets
--	---	---

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	117.500-86.290	31.210	3.420	18	15.000	22.900	0.188	0.750	A572-65 (65 ksi)
L2	86.290-42.630	47.080	4.750	18	21.659	33.460	0.313	1.250	A572-65 (65 ksi)
L3	42.630-28.167	19.213	0.000	18	31.644	36.452	0.397	1.590	54.680649ksi (55 ksi)
L4	28.167-0.000	28.167		18	36.452	43.500	0.411	1.646	55.36672ksi (55 ksi)

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	Client Crown Castle	Designed by J. Johnson

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	15.231	8.815	244.360	5.258	7.620	32.068	489.042	4.408	2.310	12.32
	23.253	13.517	880.928	8.063	11.633	75.725	1763.015	6.760	3.700	19.735
L2	22.864	21.173	1218.972	7.578	11.003	110.786	2439.548	10.589	3.262	10.439
	33.976	32.878	4564.012	11.767	16.998	268.508	9134.028	16.442	5.339	17.085
L3	33.339	39.416	4862.156	11.093	16.075	302.460	9730.710	19.712	4.870	12.254
	37.014	45.481	7469.374	12.799	18.518	403.366	14948.577	22.745	5.716	14.383
L4	37.014	47.070	7724.323	12.794	18.518	417.134	15458.809	23.539	5.691	13.832
	44.171	56.275	13199.994	15.296	22.098	597.339	26417.357	28.143	6.932	16.846

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1 117,500-86.290				1	1	1		
L2 86,290-42.630				1	1	1		
L3 42,630-28.167				1	1	0.981348		
L4 28,167-0.000				1	1	0.98208		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	Number Per Row	Clear Spacing	Width or Diameter	Perimeter	Weight
				ft			in	in	in	klf
\$\$\$										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _{AA}	Weight	
				ft		ft ² /ft	klf	
HB114-1-08U4-M5J(1-1/4") (E-Exposed)	A	No	CaAa (Out Of Face)	117.000 - 0.000	1	No Ice	0.154	0.001
						1/2" Ice	0.254	0.002
						1" Ice	0.354	0.004
						2" Ice	0.554	0.010
						4" Ice	0.954	0.028
HB114-1-08U4-M5J(1-1/4") (E-Outside Shielded)	A	No	CaAa (Out Of Face)	117.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
HB114-21U3M12-XXX F(1-1/4") (R-Outside Shielded)	A	No	CaAa (Out Of Face)	117.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.010
						4" Ice	0.000	0.028
LDF6-50A(1-1/4") (E)	A	No	Inside Pole	105.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001

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	Client Crown Castle	Designed by J. Johnson

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight klf
							ft ² /ft	
HB158-1-08U8-S8F18(1 5/8") (P)	A	No	Inside Pole	105.000 - 0.000	2	2" Ice	0.000	0.001
						4" Ice	0.000	0.001
						No Ice	0.000	0.002
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.002
						2" Ice	0.000	0.002
\$\$\$	C	No	Inside Pole	91.000 - 0.000	12	4" Ice	0.000	0.002
						No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF6-50A(1-1/4") (E-Exposed)	C	No	CaAa (Out Of Face)	91.000 - 0.000	1	No Ice	0.155	0.001
						1/2" Ice	0.255	0.002
						1" Ice	0.355	0.004
						2" Ice	0.555	0.009
						4" Ice	0.955	0.028
						No Ice	0.000	0.001
LDF6-50A(1-1/4") (E-Outside Shielded)	C	No	CaAa (Out Of Face)	91.000 - 0.000	2	1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.009
						4" Ice	0.000	0.028
						No Ice	0.000	0.001
						1" Ice	0.000	0.004
2" Rigid Conduit (E)	C	No	Inside Pole	91.000 - 0.000	2	2" Ice	0.000	0.009
						4" Ice	0.000	0.028
						No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
						2" Ice	0.000	0.003
FB-L98B-002-75000(3/8") (E-Inside Conduit)	C	No	Inside Pole	91.000 - 0.000	1	4" Ice	0.000	0.003
						No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (E-Inside Conduit)	C	No	Inside Pole	91.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
						No Ice	0.000	0.001
\$\$\$	B	No	CaAa (Out Of Face)	75.000 - 0.000	1	No Ice	0.063	0.000
						1/2" Ice	0.163	0.001
						1" Ice	0.263	0.002
						2" Ice	0.463	0.007
						4" Ice	0.863	0.023
						No Ice	0.000	0.000
\$\$\$	B	No	CaAa (Out Of Face)	117.500 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
						No Ice	0.000	0.000
\$\$\$	A	No	CaAa (Out Of Face)	117.500 - 113.000	1	No Ice	0.584	0.005
						1/2" Ice	1.030	0.007
						1" Ice	1.476	0.010
						2" Ice	2.368	0.020
						4" Ice	4.151	0.049
						No Ice	0.000	0.000
\$\$\$	A	No	CaAa (Out Of Face)	47.000 - 27.000	1	No Ice	0.262	0.010
						1/2" Ice	0.345	0.015
						1" Ice	0.428	0.020
						2" Ice	0.595	0.040

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	Client Crown Castle	Designed by J. Johnson

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _{AA}		Weight klf
						In Face ft ²	Out Face ft ²	
MP3-03 (Surface Af) (E)	B	No	CaAa (Out Of Face)	47,000 - 27,000	1	4" Ice	0.928	0.080
						No Ice	0.262	0.010
						1/2" Ice	0.345	0.015
						1" Ice	0.428	0.020
						2" Ice	0.595	0.040
						4" Ice	0.928	0.080
\$\$\$								
MP3-04 (Surface Af) (E)	A	No	CaAa (Out Of Face)	30,500 - 0,000	1	No Ice	0.268	0.014
						1/2" Ice	0.352	0.016
						1" Ice	0.435	0.018
						2" Ice	0.602	0.022
						4" Ice	0.935	0.036
MP3-04 (Surface Af) (E)	B	No	CaAa (Out Of Face)	30,500 - 0,000	1	No Ice	0.268	0.014
						1/2" Ice	0.352	0.016
						1" Ice	0.435	0.018
						2" Ice	0.602	0.022
						4" Ice	0.935	0.036
\$\$\$								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	117,500-86,290	A	0.000	0.000	0.000	7.359	0.370
		B	0.000	0.000	0.000	1.170	0.007
		C	0.000	0.000	0.000	0.730	0.087
L2	86,290-42,630	A	0.000	0.000	0.000	7.867	0.732
		B	0.000	0.000	0.000	4.820	0.058
		C	0.000	0.000	0.000	6.767	0.804
L3	42,630-28,167	A	0.000	0.000	0.000	6.638	0.404
		B	0.000	0.000	0.000	5.864	0.181
		C	0.000	0.000	0.000	2.242	0.266
L4	28,167-0,000	A	0.000	0.000	0.000	12.201	0.853
		B	0.000	0.000	0.000	10.694	0.419
		C	0.000	0.000	0.000	4.366	0.519

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} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	117,500-86,290	A	0.858	0.000	0.000	0.000	16.068	0.707
		B		0.000	0.000	0.000	6.524	0.035
		C		0.000	0.000	0.000	1.538	0.123
L2	86,290-42,630	A	0.811	0.000	0.000	0.000	15.982	1.220
		B		0.000	0.000	0.000	18.487	0.188
		C		0.000	0.000	0.000	14.257	1.143
L3	42,630-28,167	A	0.756	0.000	0.000	0.000	11.256	0.669
		B		0.000	0.000	0.000	12.829	0.341
		C		0.000	0.000	0.000	4.589	0.371
L4	28,167-0,000	A	0.750	0.000	0.000	0.000	20.093	1.178
		B		0.000	0.000	0.000	22.811	0.559
		C		0.000	0.000	0.000	8.591	0.703

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Feed Line Center of Pressure

Section	Elevation	CP _X	CP _Z	CP _X Ice	CP _Z Ice
	ft	in	in	in	in
L1	117.500-86.290	0.011	-0.238	0.124	-0.330
L2	86.290-42.630	-0.041	-0.061	0.095	0.010
L3	42.630-28.167	0.242	-0.199	0.429	-0.154
L4	28.167-0.000	0.225	-0.192	0.412	-0.147

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement ft	C _{AA} Front	C _{AA} Side	Weight K	
			Horz Lateral ft	Vert ft			ft ²	ft ²		
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.000	0.000	0.000	118.000	No Ice	2.400	2.611	0.060
							1/2" Ice	2.948	2.847	0.083
							1" Ice	3.195	3.092	0.110
							2" Ice	3.716	3.608	0.173
							4" Ice	4.862	4.744	0.347
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.000	0.000	0.000	118.000	No Ice	2.400	2.611	0.060
							1/2" Ice	2.948	2.847	0.083
							1" Ice	3.195	3.092	0.110
							2" Ice	3.716	3.608	0.173
							4" Ice	4.862	4.744	0.347
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.000	0.000	0.000	118.000	No Ice	2.400	2.611	0.060
							1/2" Ice	2.948	2.847	0.083
							1" Ice	3.195	3.092	0.110
							2" Ice	3.716	3.608	0.173
							4" Ice	4.862	4.744	0.347
800MHz 2X50W RRH W/FILTER	A	From Leg	2.000	0.000	0.000	118.000	No Ice	2.100	2.254	0.064
							1/2" Ice	2.613	2.460	0.086
							1" Ice	2.833	2.675	0.111
							2" Ice	3.300	3.132	0.172
							4" Ice	4.337	4.148	0.338
800MHz 2X50W RRH W/FILTER	B	From Leg	2.000	0.000	0.000	118.000	No Ice	2.100	2.254	0.064
							1/2" Ice	2.613	2.460	0.086
							1" Ice	2.833	2.675	0.111
							2" Ice	3.300	3.132	0.172
							4" Ice	4.337	4.148	0.338
800MHz 2X50W RRH W/FILTER	C	From Leg	2.000	0.000	0.000	118.000	No Ice	2.100	2.254	0.064
							1/2" Ice	2.613	2.460	0.086
							1" Ice	2.833	2.675	0.111
							2" Ice	3.300	3.132	0.172
							4" Ice	4.337	4.148	0.338
Side Arm Mount [SO 102-3]	C	None			0.000	118.000	No Ice	3.000	3.000	0.081
							1/2" Ice	3.480	3.480	0.111
							1" Ice	3.960	3.960	0.141
							2" Ice	4.920	4.920	0.201
							4" Ice	6.840	6.840	0.321
\$\$\$ APXVSPP18-C-A20 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	117.000	No Ice	8.498	6.946	0.083
							1/2" Ice	9.149	8.127	0.151
							1" Ice	9.767	9.021	0.227
							2" Ice	11.031	10.844	0.406
							4" Ice	13.679	14.851	0.909
APXVSPP18-C-A20 w/	B	From Leg	4.000	0.000	0.000	117.000	No Ice	8.498	6.946	0.083

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight						
			Horz Lateral	Vert						ft	ft	ft	ft	ft ²	ft ²
Mount Pipe (E)										0.000	1/2" Ice	9.149	8.127	0.151	
										2.000	1" Ice	9.767	9.021	0.227	
											2" Ice	11.031	10.844	0.406	
											4" Ice	13.679	14.851	0.909	
APXVSPP18-C-A20 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	117.000					No Ice	8.498	6.946	0.083	
											0.000	1/2" Ice	9.149	8.127	0.151
											2.000	1" Ice	9.767	9.021	0.227
												2" Ice	11.031	10.844	0.406
												4" Ice	13.679	14.851	0.909
												No Ice	7.134	4.959	0.074
APXVTM14-C-120 w/ Mount Pipe (R)	A	From Leg	4.000	0.000	0.000	117.000					1/2" Ice	7.662	5.754	0.128	
											0.000	1" Ice	8.183	6.472	0.190
											2.000	2" Ice	9.256	8.010	0.335
												4" Ice	11.526	11.412	0.749
												No Ice	7.134	4.959	0.074
												1/2" Ice	7.662	5.754	0.128
APXVTM14-C-120 w/ Mount Pipe (R)	B	From Leg	4.000	0.000	0.000	117.000					1" Ice	8.183	6.472	0.190	
											0.000	2" Ice	9.256	8.010	0.335
											2.000	4" Ice	11.526	11.412	0.749
												No Ice	7.134	4.959	0.074
												1/2" Ice	7.662	5.754	0.128
												1" Ice	8.183	6.472	0.190
APXVTM14-C-120 w/ Mount Pipe (R)	C	From Leg	4.000	0.000	0.000	117.000					2" Ice	9.256	8.010	0.335	
											0.000	4" Ice	11.526	11.412	0.749
											2.000	No Ice	7.134	4.959	0.074
												1/2" Ice	7.662	5.754	0.128
												1" Ice	8.183	6.472	0.190
												2" Ice	9.256	8.010	0.335
TD-RRH8x20-25 (R)	A	From Leg	4.000	0.000	0.000	117.000					4" Ice	11.526	11.412	0.749	
											0.000	No Ice	4.100	1.703	0.070
											2.000	1/2" Ice	5.014	1.920	0.097
												1" Ice	5.316	2.145	0.128
												2" Ice	5.948	2.622	0.201
												4" Ice	7.314	3.680	0.397
TD-RRH8x20-25 (R)	B	From Leg	4.000	0.000	0.000	117.000					No Ice	4.100	1.703	0.070	
											0.000	1/2" Ice	5.014	1.920	0.097
											2.000	1" Ice	5.316	2.145	0.128
												2" Ice	5.948	2.622	0.201
												4" Ice	7.314	3.680	0.397
												No Ice	4.100	1.703	0.070
TD-RRH8x20-25 (R)	C	From Leg	4.000	0.000	0.000	117.000					1/2" Ice	5.014	1.920	0.097	
											0.000	1" Ice	5.316	2.145	0.128
											2.000	2" Ice	5.948	2.622	0.201
												4" Ice	7.314	3.680	0.397
												No Ice	4.100	1.703	0.070
												1/2" Ice	5.014	1.920	0.097
(2) 7' x 2" Pipe Mount (E)	A	From Leg	4.000	0.000	0.000	117.000					1" Ice	5.316	2.145	0.128	
											0.000	2" Ice	5.948	2.622	0.201
											2.000	4" Ice	7.314	3.680	0.397
												No Ice	1.663	1.663	0.026
												1/2" Ice	2.391	2.391	0.038
												1" Ice	2.825	2.825	0.055
(2) 7' x 2" Pipe Mount (E)	B	From Leg	4.000	0.000	0.000	117.000					2" Ice	3.706	3.706	0.105	
											0.000	4" Ice	5.578	5.578	0.266
											2.000	No Ice	1.663	1.663	0.026
												1/2" Ice	2.391	2.391	0.038
												1" Ice	2.825	2.825	0.055
												2" Ice	3.706	3.706	0.105
(2) 7' x 2" Pipe Mount (E)	C	From Leg	4.000	0.000	0.000	117.000					4" Ice	5.578	5.578	0.266	
											0.000	No Ice	1.663	1.663	0.026
											2.000	1/2" Ice	2.391	2.391	0.038
												1" Ice	2.825	2.825	0.055
												2" Ice	3.706	3.706	0.105
												4" Ice	5.578	5.578	0.266
Platform Mount [LP 712-1] (E)	C	None			0.000	117.000					No Ice	24.530	24.530	1.335	
												1/2" Ice	29.940	29.940	1.646
												1" Ice	35.350	35.350	1.956

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
\$\$\$									
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	A	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.648 9.305 9.930 11.204 13.872	7.082 8.273 9.185 11.023 15.063	0.065 0.134 0.211 0.393 0.902
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	B	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.648 9.305 9.930 11.204 13.872	7.082 8.273 9.185 11.023 15.063	0.065 0.134 0.211 0.393 0.902
(2) LNX-6514DS-A1M w/ Mount Pipe (P)	C	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.648 9.305 9.930 11.204 13.872	7.082 8.273 9.185 11.023 15.063	0.065 0.134 0.211 0.393 0.902
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	A	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	B	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	C	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
RRH2X60-PCS (P)	A	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.240 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS (P)	B	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.240 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS (P)	C	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.240 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-AWS (P)	A	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.500 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	B	From Leg	4.000 0.000 3.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.500 4.272 4.596 5.271	1.816 2.075 2.360 2.957	0.060 0.083 0.109 0.173

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz Lateral	Vert					
RRH2X60-AWS (P)	C	From Leg	4.000	0.000	105.000	4" Ice	6.722	4.253	0.354
						No Ice	3.500	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
DB-B1-6C-12AB-0Z (P)	A	From Leg	4.000	0.000	105.000	4" Ice	6.722	4.253	0.354
						No Ice	3.500	2.557	0.021
						1/2" Ice	4.197	2.794	0.050
						1" Ice	4.478	3.040	0.082
						2" Ice	5.066	3.557	0.158
(2) FD9R6004/2C-3L (E)	A	From Leg	4.000	0.000	105.000	4" Ice	6.347	4.696	0.360
						No Ice	0.320	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
(2) FD9R6004/2C-3L (E)	B	From Leg	4.000	0.000	105.000	4" Ice	1.281	0.740	0.063
						No Ice	0.320	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
(2) FD9R6004/2C-3L (E)	C	From Leg	4.000	0.000	105.000	4" Ice	1.281	0.740	0.063
						No Ice	0.320	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
Platform Mount [LP 1201-1] (E)	C	None		0.000	105.000	4" Ice	1.281	0.740	0.063
						No Ice	23.100	23.100	2.100
						1/2" Ice	26.800	26.800	2.500
						1" Ice	30.500	30.500	2.900
						2" Ice	37.900	37.900	3.700
\$\$\$						4" Ice	52.700	52.700	5.300
						No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
(2) 7770.00 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	91.000	4" Ice	10.360	10.412	0.665
						No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
(2) 7770.00 w/ Mount Pipe (E)	B	From Leg	4.000	0.000	91.000	4" Ice	10.360	10.412	0.665
						No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
(2) 7770.00 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	91.000	4" Ice	10.360	10.412	0.665
						No Ice	6.119	4.254	0.055
						1/2" Ice	6.626	5.014	0.103
						1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000	0.000	91.000	4" Ice	10.360	10.412	0.665
						No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000	0.000	91.000	4" Ice	13.679	14.024	0.874
						No Ice	8.498	6.304	0.074
						1/2" Ice	9.149	7.479	0.139
						1" Ice	9.767	8.368	0.212
						2" Ice	11.031	10.179	0.385
						4" Ice	13.679	14.024	0.874

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz Lateral	Vert						°
AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	91.000	No Ice	8.498	6.304	0.074
			0.000				1/2" Ice	9.149	7.479	0.139
			2.000				1" Ice	9.767	8.368	0.212
							2" Ice	11.031	10.179	0.385
							4" Ice	13.679	14.024	0.874
(2) LGP21903 (E)	A	From Leg	4.000	0.000	0.000	91.000	No Ice	0.270	0.184	0.011
			0.000				1/2" Ice	0.343	0.248	0.013
			2.000				1" Ice	0.425	0.322	0.017
							2" Ice	0.616	0.494	0.028
							4" Ice	1.101	0.943	0.072
(2) LGP21903 (E)	B	From Leg	4.000	0.000	0.000	91.000	No Ice	0.270	0.184	0.011
			0.000				1/2" Ice	0.343	0.248	0.013
			2.000				1" Ice	0.425	0.322	0.017
							2" Ice	0.616	0.494	0.028
							4" Ice	1.101	0.943	0.072
(2) LGP21903 (E)	C	From Leg	4.000	0.000	0.000	91.000	No Ice	0.270	0.184	0.011
			0.000				1/2" Ice	0.343	0.248	0.013
			2.000				1" Ice	0.425	0.322	0.017
							2" Ice	0.616	0.494	0.028
							4" Ice	1.101	0.943	0.072
RRUS-11 (E)	A	From Leg	4.000	0.000	0.000	91.000	No Ice	2.835	1.373	0.048
			0.000				1/2" Ice	3.491	1.551	0.068
			2.000				1" Ice	3.741	1.738	0.092
							2" Ice	4.268	2.138	0.150
							4" Ice	5.426	3.042	0.310
RRUS-11 (E)	B	From Leg	4.000	0.000	0.000	91.000	No Ice	2.835	1.373	0.048
			0.000				1/2" Ice	3.491	1.551	0.068
			2.000				1" Ice	3.741	1.738	0.092
							2" Ice	4.268	2.138	0.150
							4" Ice	5.426	3.042	0.310
RRUS-11 (E)	C	From Leg	4.000	0.000	0.000	91.000	No Ice	2.935	1.373	0.048
			0.000				1/2" Ice	3.491	1.551	0.068
			2.000				1" Ice	3.741	1.738	0.092
							2" Ice	4.268	2.138	0.150
							4" Ice	5.426	3.042	0.310
DC6-48-60-18-8F (E)	A	From Leg	4.000	0.000	0.000	91.000	No Ice	1.266	1.266	0.020
			0.000				1/2" Ice	1.456	1.456	0.035
			2.000				1" Ice	1.658	1.658	0.053
							2" Ice	2.093	2.093	0.095
							4" Ice	3.098	3.098	0.215
(2) LGP 17201 (E)	A	From Leg	4.000	0.000	0.000	91.000	No Ice	1.700	0.518	0.031
			0.000				1/2" Ice	2.134	0.640	0.042
			2.000				1" Ice	2.330	0.770	0.055
							2" Ice	2.749	1.056	0.089
							4" Ice	3.690	1.733	0.193
(2) LGP 17201 (E)	B	From Leg	4.000	0.000	0.000	91.000	No Ice	1.700	0.518	0.031
			0.000				1/2" Ice	2.134	0.640	0.042
			2.000				1" Ice	2.330	0.770	0.055
							2" Ice	2.749	1.056	0.089
							4" Ice	3.690	1.733	0.193
(2) LGP 17201 (E)	C	From Leg	4.000	0.000	0.000	91.000	No Ice	1.700	0.518	0.031
			0.000				1/2" Ice	2.134	0.640	0.042
			2.000				1" Ice	2.330	0.770	0.055
							2" Ice	2.749	1.056	0.089
							4" Ice	3.690	1.733	0.193
8' x 2" Pipe Mount (E)	A	From Leg	4.000	0.000	0.000	91.000	No Ice	1.900	1.900	0.029
			0.000				1/2" Ice	2.728	2.728	0.044

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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			0.000			1" Ice 3.401	3.401	0.063
						2" Ice 4.396	4.396	0.119
						4" Ice 6.498	6.498	0.300
8' x 2" Pipe Mount (E)	B	From Leg	4.000	0.000	91.000	No Ice 1.900	1.900	0.029
			0.000			1/2" Ice 2.728	2.728	0.044
			0.000			1" Ice 3.401	3.401	0.063
						2" Ice 4.396	4.396	0.119
						4" Ice 6.498	6.498	0.300
8' x 2" Pipe Mount (E)	C	From Leg	4.000	0.000	91.000	No Ice 1.900	1.900	0.029
			0.000			1/2" Ice 2.728	2.728	0.044
			0.000			1" Ice 3.401	3.401	0.063
						2" Ice 4.396	4.396	0.119
						4" Ice 6.498	6.498	0.300
Platform Mount [LP 1201-1] (E)	C	None		0.000	91.000	No Ice 23.100	23.100	2.100
						1/2" Ice 26.800	26.800	2.500
						1" Ice 30.500	30.500	2.900
						2" Ice 37.900	37.900	3.700
						4" Ice 52.700	52.700	5.300
\$\$\$								
KS24019-L112A (E)	C	From Leg	2.000	0.000	75.000	No Ice 0.875	0.100	0.005
			0.000			1/2" Ice 0.180	0.180	0.006
			1.000			1" Ice 0.260	0.260	0.008
						2" Ice 0.420	0.420	0.011
						4" Ice 0.740	0.740	0.017
Side Arm Mount [SO 701-1] (E)	C	From Leg	1.000	0.000	75.000	No Ice 0.850	1.670	0.065
			0.000			1/2" Ice 1.140	2.340	0.079
			0.000			1" Ice 1.430	3.010	0.093
						2" Ice 2.010	4.350	0.121
						4" Ice 3.170	7.030	0.177
\$\$\$								

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
\$\$\$										

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

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Comb. No.	Description
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	117.5 - 86.29	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-17.681	0.017	0.943
			Max. Mx	11	-8.866	282.805	0.254
			Max. My	2	-8.857	-0.001	283.883
			Max. Vy	11	-17.141	282.805	0.254
			Max. Vx	2	-17.183	-0.001	283.883
			Max. Torque	5			0.817
			Max Tension	1	0.000	0.000	0.000
L2	86.29 - 42.63	Pole	Max. Compression	14	-25.399	0.400	1.366
			Max. Mx	11	-15.154	1068.481	0.352
			Max. My	2	-15.150	0.069	1071.285
			Max. Vy	5	19.983	-1068.178	0.512
			Max. Vx	2	-20.025	0.069	1071.285
			Max. Torque	5			0.823
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-31.074	0.163	1.808
L3	42.63 - 28.167	Pole	Max. Mx	5	-19.746	-1466.873	0.761
			Max. My	2	-19.744	-0.143	1470.806
			Max. Vy	5	21.529	-1466.873	0.761
			Max. Vx	2	-21.570	-0.143	1470.806
			Max. Torque	5			0.780
			Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.441	-0.295	2.572
			Max. Mx	5	-26.917	-2104.878	1.288
L4	28.167 - 0	Pole	Max. My	2	-26.917	-0.698	2109.930

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	23,804	-2104.878	1.288
			Max. Vx	2	-23.845	-0.698	2109.930
			Max. Torque	5			0.824

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	39.441	0.005	6.054
	Max. H _x	11	26.930	23.789	-0.001
	Max. H _z	2	26.930	-0.001	23.829
	Max. M _x	2	2109.930	-0.001	23.829
	Max. M _z	5	2104.878	-23.789	0.001
	Max. Torsion	5	0.824	-23.789	0.001
	Min. Vert	1	26.930	0.000	0.000
	Min. H _x	5	26.930	-23.789	0.001
	Min. H _z	8	26.930	0.001	-23.829
	Min. M _x	8	-2107.614	0.001	-23.829
	Min. M _z	11	-2103.749	23.789	-0.001
	Min. Torsion	11	-0.823	23.789	-0.001

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	26.930	0.000	0.000	-1.127	-0.563	0.000
Dead+Wind 0 deg - No Ice	26.930	0.001	-23.829	-2109.930	-0.698	-0.057
Dead+Wind 30 deg - No Ice	26.930	11.896	-20.637	-1827.482	-1052.834	-0.459
Dead+Wind 60 deg - No Ice	26.930	20.603	-11.916	-1055.666	-1823.022	-0.740
Dead+Wind 90 deg - No Ice	26.930	23.789	-0.001	-1.288	-2104.878	-0.824
Dead+Wind 120 deg - No Ice	26.930	20.602	11.914	1053.126	-1822.886	-0.687
Dead+Wind 150 deg - No Ice	26.930	11.894	20.636	1825.036	-1052.600	-0.364
Dead+Wind 180 deg - No Ice	26.930	-0.001	23.829	2107.614	-0.432	0.057
Dead+Wind 210 deg - No Ice	26.930	-11.896	20.637	1825.169	1051.700	0.463
Dead+Wind 240 deg - No Ice	26.930	-20.603	11.916	1053.357	1821.889	0.744
Dead+Wind 270 deg - No Ice	26.930	-23.789	0.001	-1.021	2103.749	0.823
Dead+Wind 300 deg - No Ice	26.930	-20.602	-11.914	-1055.436	1821.760	0.682
Dead+Wind 330 deg - No Ice	26.930	-11.894	-20.636	-1827.350	1051.473	0.360
Dead+Ice+Temp	39.441	-0.000	-0.000	-2.572	-0.295	0.000
Dead+Wind 0 deg+Ice+Temp	39.441	-0.005	-6.054	-547.894	0.091	0.006
Dead+Wind 30 deg+Ice+Temp	39.441	3.014	-5.241	-474.655	-271.656	-0.087
Dead+Wind 60 deg+Ice+Temp	39.441	5.225	-3.023	-274.944	-470.691	-0.156
Dead+Wind 90 deg+Ice+Temp	39.441	6.036	0.005	-2.271	-543.682	-0.184
Dead+Wind 120 deg+Ice+Temp	39.441	5.230	3.031	270.299	-471.071	-0.163
Dead+Wind 150 deg+Ice+Temp	39.441	3.022	5.246	469.733	-272.314	-0.097
Dead+Wind 180 deg+Ice+Temp	39.441	0.005	6.054	542.592	-0.669	-0.006
Dead+Wind 210 deg+Ice+Temp	39.441	-3.014	5.241	469.353	271.078	0.087
Dead+Wind 240 deg+Ice+Temp	39.441	-5.225	3.023	269.641	470.112	0.157
Dead+Wind 270 deg+Ice+Temp	39.441	-6.036	-0.005	-3.031	543.103	0.184
Dead+Wind 300 deg+Ice+Temp	39.441	-5.230	-3.031	-275.602	470.492	0.162
Dead+Wind 330 deg+Ice+Temp	39.441	-3.022	-5.246	-475.035	271.736	0.097
Dead+Wind 0 deg - Service	26.930	0.000	-8.245	-732.148	-0.610	-0.020
Dead+Wind 30 deg - Service	26.930	4.116	-7.141	-634.240	-365.321	-0.162

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Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead+Wind 60 deg - Service	26.930	7.129	-4.123	-366.697	-632.296	-0.260
Dead+Wind 90 deg - Service	26.930	8.232	-0.000	-1.210	-729.996	-0.289
Dead+Wind 120 deg - Service	26.930	7.129	4.122	364.289	-632.249	-0.241
Dead+Wind 150 deg - Service	26.930	4.115	7.141	631.866	-365.241	-0.127
Dead+Wind 180 deg - Service	26.930	-0.000	8.245	729.819	-0.518	0.020
Dead+Wind 210 deg - Service	26.930	-4.116	7.141	631.912	364.193	0.162
Dead+Wind 240 deg - Service	26.930	-7.129	4.123	364.370	631.167	0.261
Dead+Wind 270 deg - Service	26.930	-8.232	0.000	-1.118	728.868	0.289
Dead+Wind 300 deg - Service	26.930	-7.129	-4.122	-366.617	631.121	0.240
Dead+Wind 330 deg - Service	26.930	-4.115	-7.141	-634.194	364.113	0.127

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-26.930	0.000	0.000	26.930	0.000	0.000%
2	0.001	-26.930	-23.829	-0.001	26.930	23.829	0.000%
3	11.896	-26.930	-20.637	-11.896	26.930	20.637	0.000%
4	20.603	-26.930	-11.916	-20.603	26.930	11.916	0.000%
5	23.789	-26.930	-0.001	-23.789	26.930	0.001	0.000%
6	20.602	-26.930	11.914	-20.602	26.930	-11.914	0.000%
7	11.894	-26.930	20.636	-11.894	26.930	-20.636	0.000%
8	-0.001	-26.930	23.829	0.001	26.930	-23.829	0.000%
9	-11.896	-26.930	20.637	11.896	26.930	-20.637	0.000%
10	-20.603	-26.930	11.916	20.603	26.930	-11.916	0.000%
11	-23.789	-26.930	0.001	23.789	26.930	-0.001	0.000%
12	-20.602	-26.930	-11.914	20.602	26.930	11.914	0.000%
13	-11.894	-26.930	-20.636	11.894	26.930	20.636	0.000%
14	0.000	-39.441	0.000	0.000	39.441	0.000	0.000%
15	-0.005	-39.441	-6.054	0.005	39.441	6.054	0.000%
16	3.014	-39.441	-5.241	-3.014	39.441	5.241	0.000%
17	5.225	-39.441	-3.023	-5.225	39.441	3.023	0.000%
18	6.036	-39.441	0.005	-6.036	39.441	-0.005	0.000%
19	5.230	-39.441	3.031	-5.230	39.441	-3.031	0.000%
20	3.022	-39.441	5.246	-3.022	39.441	-5.246	0.000%
21	0.005	-39.441	6.054	-0.005	39.441	-6.054	0.000%
22	-3.014	-39.441	5.241	3.014	39.441	-5.241	0.000%
23	-5.225	-39.441	3.023	5.225	39.441	-3.023	0.000%
24	-6.036	-39.441	-0.005	6.036	39.441	0.005	0.000%
25	-5.230	-39.441	-3.031	5.230	39.441	3.031	0.000%
26	-3.022	-39.441	-5.246	3.022	39.441	5.246	0.000%
27	0.000	-26.930	-8.245	-0.000	26.930	8.245	0.000%
28	4.116	-26.930	-7.141	-4.116	26.930	7.141	0.000%
29	7.129	-26.930	-4.123	-7.129	26.930	4.123	0.000%
30	8.232	-26.930	-0.000	-8.232	26.930	0.000	0.000%
31	7.129	-26.930	4.122	-7.129	26.930	-4.122	0.000%
32	4.115	-26.930	7.141	-4.115	26.930	-7.141	0.000%
33	-0.000	-26.930	8.245	0.000	26.930	-8.245	0.000%
34	-4.116	-26.930	7.141	4.116	26.930	-7.141	0.000%
35	-7.129	-26.930	4.123	7.129	26.930	-4.123	0.000%
36	-8.232	-26.930	0.000	8.232	26.930	-0.000	0.000%
37	-7.129	-26.930	-4.122	7.129	26.930	4.122	0.000%
38	-4.115	-26.930	-7.141	4.115	26.930	7.141	0.000%

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Non-Linear Convergence Results

<i>Load Combination</i>	<i>Converged?</i>	<i>Number of Cycles</i>	<i>Displacement Tolerance</i>	<i>Force</i>
1	Yes	4	0.0000001	0.0000001
2	Yes	4	0.0000001	0.00024480
3	Yes	5	0.0000001	0.00056478
4	Yes	5	0.0000001	0.00058478
5	Yes	4	0.0000001	0.00061453
6	Yes	5	0.0000001	0.00056046
7	Yes	5	0.0000001	0.00057737
8	Yes	4	0.0000001	0.00024564
9	Yes	5	0.0000001	0.00057954
10	Yes	5	0.0000001	0.00055951
11	Yes	4	0.0000001	0.00060967
12	Yes	5	0.0000001	0.00058343
13	Yes	5	0.0000001	0.00056656
14	Yes	4	0.0000001	0.00001755
15	Yes	5	0.0000001	0.00027648
16	Yes	5	0.0000001	0.00031180
17	Yes	5	0.0000001	0.00031232
18	Yes	5	0.0000001	0.00027390
19	Yes	5	0.0000001	0.00030820
20	Yes	5	0.0000001	0.00030936
21	Yes	5	0.0000001	0.00027324
22	Yes	5	0.0000001	0.00030946
23	Yes	5	0.0000001	0.00030824
24	Yes	5	0.0000001	0.00027431
25	Yes	5	0.0000001	0.00031302
26	Yes	5	0.0000001	0.00031257
27	Yes	4	0.0000001	0.00010796
28	Yes	5	0.0000001	0.00005254
29	Yes	5	0.0000001	0.00005628
30	Yes	4	0.0000001	0.00015401
31	Yes	5	0.0000001	0.00005156
32	Yes	5	0.0000001	0.00005466
33	Yes	4	0.0000001	0.00010764
34	Yes	5	0.0000001	0.00005508
35	Yes	5	0.0000001	0.00005142
36	Yes	4	0.0000001	0.00015376
37	Yes	5	0.0000001	0.00005604
38	Yes	5	0.0000001	0.00005287

Maximum Tower Deflections - Service Wind

<i>Section No.</i>	<i>Elevation</i>	<i>Horz. Deflection</i>	<i>Gov. Load Comb.</i>	<i>Tilt</i>	<i>Twist</i>
	<i>ft</i>	<i>in</i>		<i>°</i>	<i>°</i>
L1	117.5 - 86.29	29.904	27	2.493	0.004
L2	89.71 - 42.63	16.550	27	1.932	0.002
L3	47.38 - 28.167	4.105	27	0.835	0.001
L4	28.167 - 0	1.391	27	0.486	0.000

tnxTower B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK, 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job 92595.002.01 - Richard Wall, CT (BU #876352)	Page 15 of 17
	Project	Date 13:55:15 02/17/15
	Client Crown Castle	Designed by J. Johnson

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.000	PCS 1900MHz 4x45W-65MHz	27	29.904	2.493	0.004	10046
117.000	APXVSPPI8-C-A20 w/ Mount Pipe	27	29.649	2.484	0.004	10046
105.000	(2) LNX-6514DS-A1M w/ Mount Pipe	27	23.590	2.259	0.003	4018
91.000	(2) 7770.00 w/ Mount Pipe	27	17.096	1.962	0.002	1924
75.000	KS24019-L112A	27	11.080	1.548	0.002	2047

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	117.5 - 86.29	85.939	2	7.167	0.012
L2	89.71 - 42.63	47.618	2	5.558	0.007
L3	47.38 - 28.167	11.825	2	2.406	0.002
L4	28.167 - 0	4.008	2	1.400	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.000	PCS 1900MHz 4x45W-65MHz	2	85.939	7.167	0.012	3587
117.000	APXVSPPI8-C-A20 w/ Mount Pipe	2	85.205	7.141	0.012	3587
105.000	(2) LNX-6514DS-A1M w/ Mount Pipe	2	67.824	6.497	0.010	1433
91.000	(2) 7770.00 w/ Mount Pipe	2	49.185	5.645	0.007	683
75.000	KS24019-L112A	2	31.900	4.456	0.004	721

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 P P _a
L1	117.5 - 86.29 (1)	TP22.9x15x0.188	31.210	0.000	0.0	39.000	13.002	-8.857	507.062	0.017
L2	86.29 - 42.63 (2)	TP33.46x21.659x0.313 H1-3+VT (1.33 CR) - 2	47.080	0.000	0.0	39.000	31.697	-15.150	1236.190	0.012
L3	42.63 - 28.167 (3)	TP36.452x31.644x0.397 H1-3+VT (1.35 CR) - 3	19.213	0.000	0.0	32.808	45.481	-19.744	1492.150	0.013
L4	28.167 - 0 (4)	TP43.5x36.452x0.411	28.167	0.000	0.0	33.220	52.132	-23.605	1731.840	0.014

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Pole Bending Design Data

Section No.	Elevation ft	Size	Actual	Actual	Allow.	Ratio	Actual	Actual	Allow.	Ratio
			M_x kip-ft	f_{bx} ksi	F_{bx} ksi	$\frac{f_{bx}}{F_{bx}}$	M_y kip-ft	f_{by} ksi	F_{by} ksi	$\frac{f_{by}}{F_{by}}$
L1	117.5 - 86.29 (1)	TP22.9x15x0.188	283.883	48.638	39.000	1.247	0.000	0.000	39.000	0.000
L2	86.29 - 42.63 (2)	TP33.46x21.659x0.313	1071.28 3	51.529	39.000	1.321	0.000	0.000	39.000	0.000
L3	42.63 - 28.167 (3)	TP36.452x31.644x0.397	1470.80 8	43.756	32.808	1.334	0.000	0.000	32.808	0.000
L4	28.167 - 0 (4)	TP43.5x36.452x0.411	1814.40 0	42.504	33.220	1.279	0.000	0.000	33.220	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual	Actual	Allow.	Ratio	Actual	Actual	Allow.	Ratio
			V K	f_v ksi	F_v ksi	$\frac{f_v}{F_v}$	T kip-ft	f_{vt} ksi	F_{vt} ksi	$\frac{f_{vt}}{F_{vt}}$
L1	117.5 - 86.29 (1)	TP22.9x15x0.188	17.183	1.322	26.000	0.102	0.002	0.000	26.000	0.000
L2	86.29 - 42.63 (2)	TP33.46x21.659x0.313	20.025	0.632	26.000	0.049	0.135	0.003	26.000	0.000
L3	42.63 - 28.167 (3)	TP36.452x31.644x0.397	21.570	0.474	21.872	0.043	0.111	0.002	21.872	0.000
L4	28.167 - 0 (4)	TP43.5x36.452x0.411	22.905	0.439	22.147	0.039	0.081	0.001	22.147	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio	Ratio	Ratio	Ratio	Ratio	Comb. Stress Ratio	Allow.	Criteria
		$\frac{P}{P_a}$	$\frac{f_{bx}}{F_{bx}}$	$\frac{f_{by}}{F_{by}}$	$\frac{f_v}{F_v}$	$\frac{f_{vt}}{F_{vt}}$		Stress Ratio	
L1	117.5 - 86.29 (1)	0.017	1.247	0.000	0.102	0.000	1.267 ✓	1.333	H1-3+VT ✓
L2	86.29 - 42.63 (2)	0.012	1.321	0.000	0.049	0.000	1.334 ✓	1.333	H1-3+VT ✓
L3	42.63 - 28.167 (3)	0.013	1.334	0.000	0.043	0.000	1.347 ✓	1.333	H1-3+VT ✓
L4	28.167 - 0 (4)	0.014	1.279	0.000	0.039	0.000	1.293 ✓	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	117.5 - 86.29	Pole	TP22.9x15x0.188	1	-8.857	675.914	95.1	Pass
L2	86.29 - 42.63	Pole	TP33.46x21.659x0.313	2	-15.150	1647.841	100.0	Pass
L3	42.63 - 28.167	Pole	TP36.452x31.644x0.397	3	-19.744	1989.036	100.0	Pass
L4	28.167 - 0	Pole	TP43.5x36.452x0.411	4	-23.605	2308.543	97.0	Pass
Summary								
Pole (L3)							100.0	Pass
RATING =							100.0	Pass

APPENDIX B
BASE LEVEL DRAWING

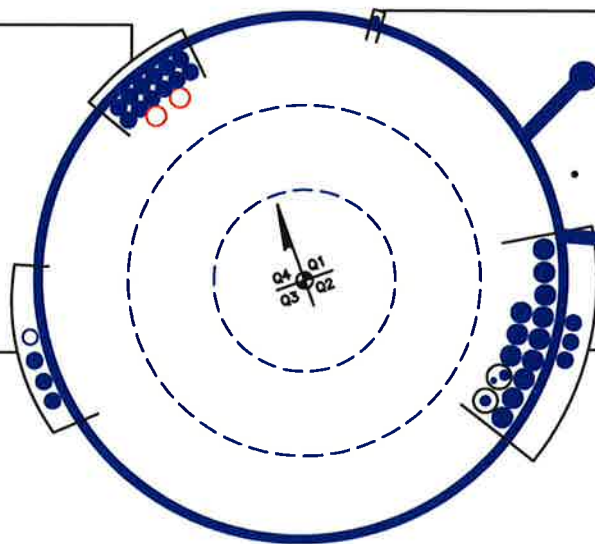
(PROPOSED)
(2) 1-5/8" TO 105 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 105 FT LEVEL

(INSTALLED)
(1) 1/2" TO 75 FT LEVEL

(RESERVED)
(1) 1-1/4" TO 117 FT LEVEL
(INSTALLED)
(3) 1-1/4" TO 117 FT LEVEL

CLIMBING PEGS
W/ SAFETY CLIMB

(INSTALLED-BUNDLED IN (2) 2" CONDUIT)
(1) 3/8" TO 91 FT LEVEL
(2) 3/4" TO 91 FT LEVEL
(INSTALLED)
(3) 1-1/4" TO 91 FT LEVEL
(12) 1-5/8" TO 91 FT LEVEL



BUSINESS UNIT: 876352

APPENDIX C
ADDITIONAL CALCULATIONS

Reinforcement 1													
Bottom	Top	QTY	Type	Position	Gap	Top Cont.	Bottom	Top	QTY	Type	Position	Gap	Top Cont.
0	28.167	3	MP304	F	0	T&C	0	28.167	3	MP304	F	0	T&C
28.167	45.833	3	MP303	F	0	T&C	28.167	45.833	3	MP303	F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C

Reinforcement 2													
Bottom	Top	QTY	Type	Position	Gap	Top Cont.	Bottom	Top	QTY	Type	Position	Gap	Top Cont.
0	28.167	3	MP304	F	0	T&C	0	28.167	3	MP304	F	0	T&C
28.167	45.833	3	MP303	F	0	T&C	28.167	45.833	3	MP303	F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C

Reinforcement 3													
Bottom	Top	QTY	Type	Position	Gap	Top Cont.	Bottom	Top	QTY	Type	Position	Gap	Top Cont.
0	28.167	3	MP304	F	0	T&C	0	28.167	3	MP304	F	0	T&C
28.167	45.833	3	MP303	F	0	T&C	28.167	45.833	3	MP303	F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C
				F	0	T&C					F	0	T&C

Bottom Elevation	Top Elevation	Original Thickness	Original Yield Stress	Original Ultimate Stress	Reinforced Capacity	Stress Ratio
46.2000	117.5000	0.1875	65	80	94.0%	94.0%
47.6300	89.7100	0.3125	65	80	98.9%	98.9%
28.1670	47.3800	0.3125	65	80	83.0%	83.0%
0.0000	28.1670	0.3125	65	80	80.6%	80.6%

Bottom Elevation	Top Elevation	Section Length	Lap Splice	# of Sides	Top Diameter	Bottom Diameter	Equivalent Shaft Thk	Equivalent Shaft Fy	Equivalent Weight Mult.
117.5000	31.7100	34.2000	0.0000	18	15.0000	22.9000	0.1875	65.0	1.00
47.6300	29.0800	4.7500	0.0000	18	21.6991	34.4600	0.3125	85.0	1.00
47.3800	29.0800	4.7500	0.0000	18	21.6991	34.4600	0.3125	85.0	1.00
28.1670	28.1670	28.1670	0.0000	18	34.6300	43.5000	0.4115	33.9	0.98

Bottom Elevation	Top Elevation	Failure	Bottom Elevation	Top Elevation	Failure
1	89.5	92	107.500	92	107.500
2	47	68	110.0%	47	68
3	0	43	110.6%	0	43
4					
5					
6					
7					
8					
9					
10					
11					
12					
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28					
29					
30					

Reinforced Pole Stress and Effective Thickness Check

Section	Member	Span	Effective Thickness		Stress		Effective Thickness		Stress		Effective Thickness		Stress		Effective Thickness		Stress	
			Actual	Required	Actual	Required	Actual	Required	Actual	Required	Actual	Required	Actual	Required	Actual	Required	Actual	Required
1	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
2	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
3	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
4	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
5	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
6	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
7	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
8	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
9	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000
10	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000

Reinforcement Capacity



Dimensions and Properties										Compression			Axial			AGD-9			LFRD			
Model	Weight (lb/ft)	Area (in ²)	Moment of Inertia (in ⁴)	Centroid from Mating Edge (in)	Centroid from Both Holes (in)	Web Thickness (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender Ratio Coefficient	Unbraced Length (in)	Slender Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ Increase (kip)	Governing Axial Rupture	Design Strength (kip)	Governing Axial Rupture	Design Strength (kip)	Governing Axial Rupture
MP303	9.9	2.92	6.57	0.59	0	0.30	1.57	0.64	1.21875	65	80	0.80	18	1.00	18	96.4	128.8	144.7	144.7	206.0	144.7	206.0
MP304	14.1	4.13	11.86	0.61	0	0.43	1.61	0.84	1.21875	65	80	0.80	18	1.00	18	137.3	183.1	206.0	206.0	206.0	206.0	206.0

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

TIA Rev F

Site Data

BU#: 876352
Site Name: RICHARD WALL
App #: 281620 Revision # 1
Pole Manufacturer: Other

Reactions	
Moment:	2086.3402 ft-kips
Axial:	26.8911 kips
Shear:	23.5573 kips

Anchor Rod Data

Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	52	in

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

Anchor Rod Results

Maximum Rod Tension:	158.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	81.2% Pass

Stiffened
Service, ASD
Fty*ASIF

Plate Data

Diam:	58	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	11.51	in

Base Plate Results

Base Plate Stress:	48.1 ksi	Flexural Check
Allowable Plate Stress:	60.0 ksi	
Base Plate Stress Ratio:	80.2% Pass	

Stiffened
Service, ASD
0.75*Fy*ASIF
Y.L. Length:
N/A, Roark

Stiffener Data (Welding at both sides)

Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0.625	<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.625	in
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	20	in
Thick:	0.75	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Stiffener Results

Horizontal Weld :	69.6% Pass
Vertical Weld:	42.5% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	28.8% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	87.3% Pass
Plate Comp. (AISC Bracket):	93.3% Pass

Pole Results

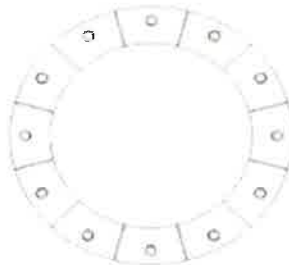
Pole Punching Shear Check:	14.0% Pass
----------------------------	------------

Pole Data

Diam:	43.5	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

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



* 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

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2

Date: 2/17/2015

BU: 876352
 Site Name: Richard Wall, CT
 App Number: 281620 Rev. 1
 Work Order: 1003571



Monopole Drilled Pier

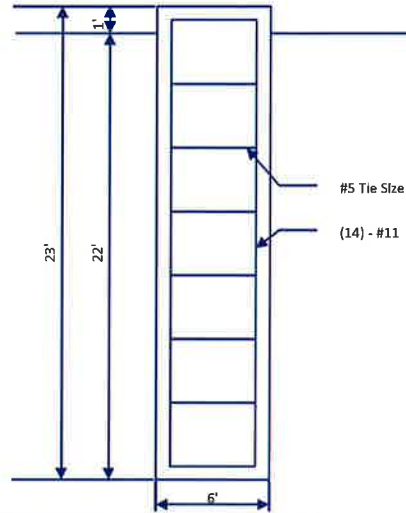
Input

Criteria
 TIA Revision: F
 ACI 318 Revision: 2002
 Seismic Category: B

Forces
 Compression: 27 kips
 Shear: 24 kips
 Moment: 2086 k-ft
 Swelling Force: 0 kips

Foundation Dimensions
 Pier Diameter: 6 ft
 Ext. above grade: 1 ft
 Depth below grade: 22 ft

Material Properties
 Number of Rebar: 14
 Rebar Size: 11
 Tie Size: 5
 Rebar tensile strength: 60 ksi
 Concrete Strength: 3000 psi
 Ultimate Concrete Strain: 0.003 in/in
 Clear Cover to Ties: 4 in



Soil Profile: Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3.3	0	3.3	120	0	0	0	0	0	
2	3.2	3.3	6.5	120		33			0	
3	4.5	6.5	11	120		33			0	
4	11	11	22	120		33			12	

Analysis Results

Soil Lateral Capacity
 Depth to Zero Shear: 5.42 ft
 Max Moment, Mu: 2238.57 k-ft
 Soil Safety Factor: 2.82
 Safety Factor Req'd: 2
RATING: 71.0%

Soil Axial Capacity
 Skin Friction (k): 121.62 kips
 End Bearing (k): 169.65 kips
 Comp. Capacity (k), ϕC_n : 291.26 kips
 Comp. (k), Cu: 35.10 kips
RATING: 12.1%

Concrete/Steel Check

Mu (from soil analysis) 2910.15 k-ft
 ϕM_n 2949.60 k-ft
RATING: 98.7%

rho provided 0.54
 rho required 0.33 OK

Rebar Spacing 12.35
 Spacing required 22.56 OK

Dev. Length required 16.25
 Dev. Length provided 61.78 OK

Overall Foundation Rating: 98.7%