Robinson+Cole

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Also admitted in Massachusetts

January 21, 2015

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

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

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 105-foot level on the existing 125-foot tower at 201 Main Street in Cromwell (the "Property"). The tower is owned by Crown Castle. Cellco's shared use of this tower was approved by the Council in 2001. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with 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 level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable, inside the monopole tower. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ 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 Jonathan Sistare, Town Manager of the Town of Cromwell. A copy of this letter is also being sent to S&S Partners, 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).

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 105-foot level of the 125-foot tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site 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. Far Field Approximation tables for the RF emissions at each of Cellco's operating frequencies for the modified facility are included in Attachment 2. These tables indicate that Cellco's modified facility will operate well within the FCC standards.

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:
Jonathan Sistare, Cromwell Town Manager
S&S Partners, Inc.
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

LNX-6514DS-VTM

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

POWERED BY ANDREW.

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°

Mechanical Specifications

Color | Radome Material	Light gray | Fiberglass, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 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
Antenna Dimensions, L x W x D	1847.0 mm x 301.0 mm x 181.0 mm | 72.7 in x 11.9 in x 7.1 in
Net Weight	17.6 kg | 38.8 lb
Model with factory installed AISG 2.0 RET	LNX-6514DS-A1M

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

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

POWERED BY ANDREW

Electrical Specifications

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 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
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
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°

**Values calculated using NGMN Alliance N-P-BASTA v9.6*

Mechanical Specifications

Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 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
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm | 74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg | 43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

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	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-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)

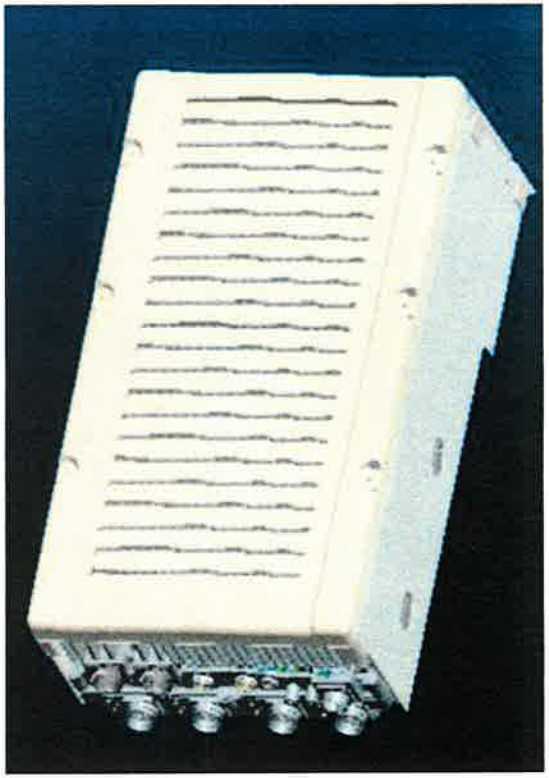
** Not a Verizon Wireless deployed product

Alcatel·Lucent

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

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.

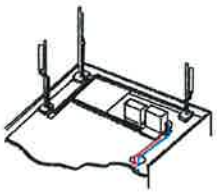
EASY INSTALLATION

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.

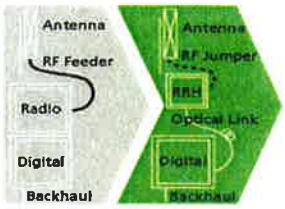
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

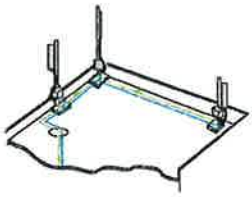
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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 daisychaining 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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

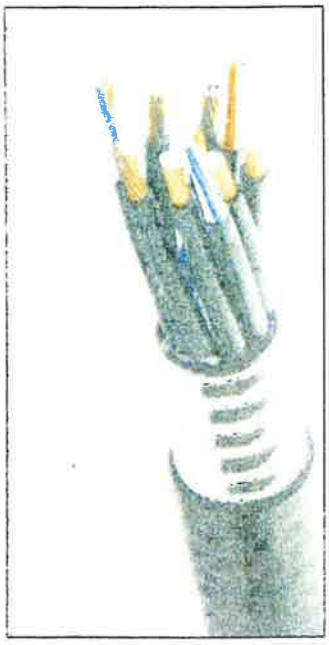


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

* This data is provisional and subject to change

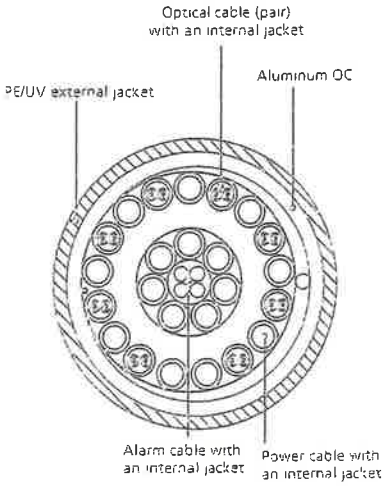


Figure 2: Construction Detail

ATTACHMENT 2

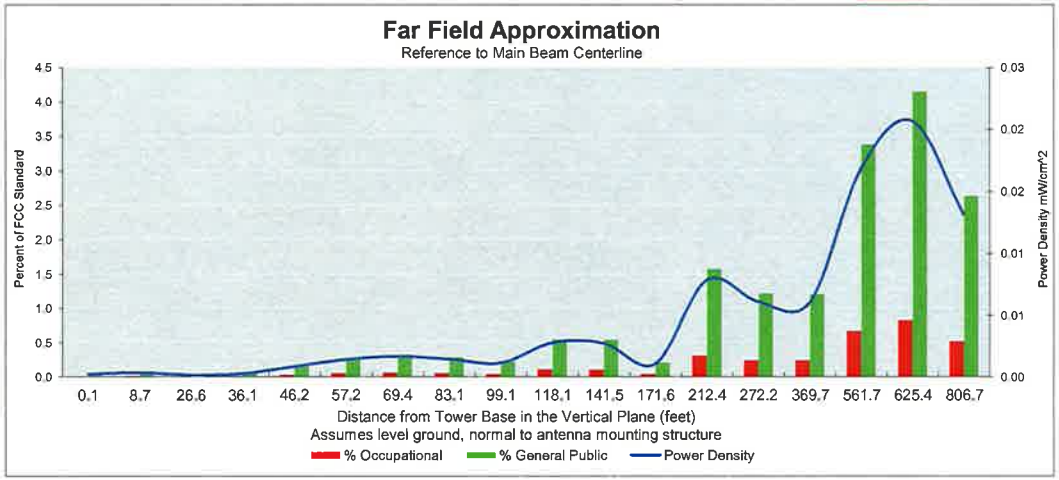
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**CROMWELL SE CT**
Site #:	2-0612
Date:	01/14/15
Name:	Jaime Laredo
File Name:	CROMWELL SE CT - FF POWER (LTE-700).xlsx

Operating Freq. (MHz):	**746.0**
Antenna Height (ft):	**102.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**71.0**
Downtilt (degrees):	**5.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**851.1**



Calc Angle	90.0	85.0	75.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	9.0	7.0
Solve for r, dx to antenna	99.0	99.4	102.5	105.4	109.3	114.4	120.9	129.3	140.1	154.1	172.7	198.1	234.4	289.6	382.7	570.4	633.2	812.8
Distance from Antenna Structure Base in Horizontal plane	0.1	8.7	26.6	36.1	46.2	57.2	69.4	83.1	99.1	118.1	141.5	171.6	212.4	272.2	369.7	561.7	625.4	806.7
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	0.02	0.01
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.3	0.2	0.2	0.7	0.8	0.5
Percent of General Population Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.6	0.5	0.2	1.6	1.2	1.2	3.4	4.2	2.6

Antenna Type: **BXA-70063-6CF**

Max%: **4.15%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

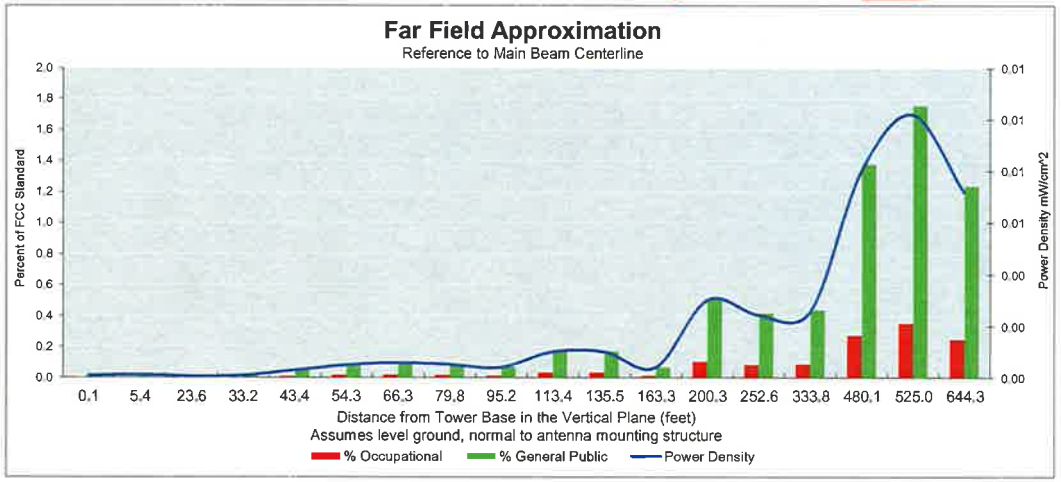
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**CROMWELL SE CT**
Site #:	2-0612
Date:	01/14/15
Name:	Jaime Laredo
File Name:	CROMWELL SE CT - FF POWER (Cellular).xlsx

Operating Freq. (MHz):	**869.0**
Antenna Height (ft):	**105.0**
Antenna Gain (dBi):	**16.0**
Antenna Size (in.):	**72.7**
Downtilt (degrees):	**7.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**348.6**



Calc Angle	90.0	87.0	77.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	11.0	9.0
Solve for r, dx to antenna	102.0	102.1	104.7	107.3	110.8	115.6	121.7	129.5	139.5	152.5	169.6	192.6	224.8	272.4	349.0	490.8	534.8	652.4
Distance from Antenna Structure Base in Horizontal plane	0.1	5.4	23.6	33.2	43.4	54.3	66.3	79.8	95.2	113.4	135.5	163.3	200.3	252.6	333.8	480.1	525.0	644.3
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.4	0.2
Percent of General Population Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.4	0.4	1.4	1.8	1.2

Antenna Type: **LNX-6514DS**

Max%: **1.76%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

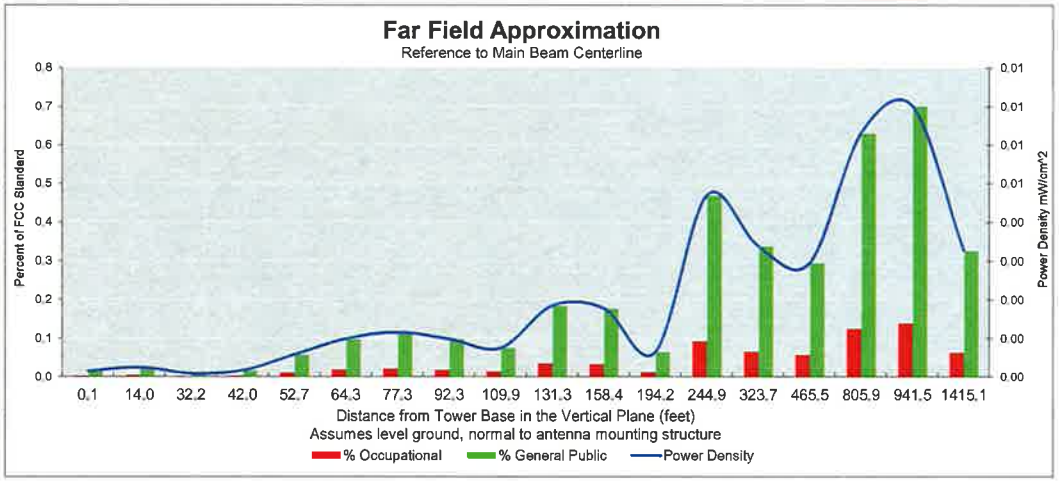
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**CROMWELL SE CT**
Site #:	2-0612
Date:	01/14/15
Name:	Jaime Laredo
File Name:	CROMWELL SE CT - FF POWER (PCS).xlsx

Operating Freq. (MHz):	**1970.0**
Antenna Height (ft):	**101.9**
Antenna Gain (dBi):	**18.5**
Antenna Size (in.):	**74.9**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**423.7**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0
Solve for r, dx to antenna	98.9	99.9	104.0	107.5	112.0	118.0	125.6	135.3	147.9	164.4	186.7	217.9	264.1	338.4	475.9	811.9	946.6	1418.5
Distance from Antenna Structure Base in Horizontal plane	0.1	14.0	32.2	42.0	52.7	64.3	77.3	92.3	109.9	131.3	158.4	194.2	244.9	323.7	465.5	805.9	941.5	1415.1
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Percent of General Population Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.5	0.3	0.3	0.6	0.7	0.3

Antenna Type: **HBXX-6517DS**

Max%: **0.70%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

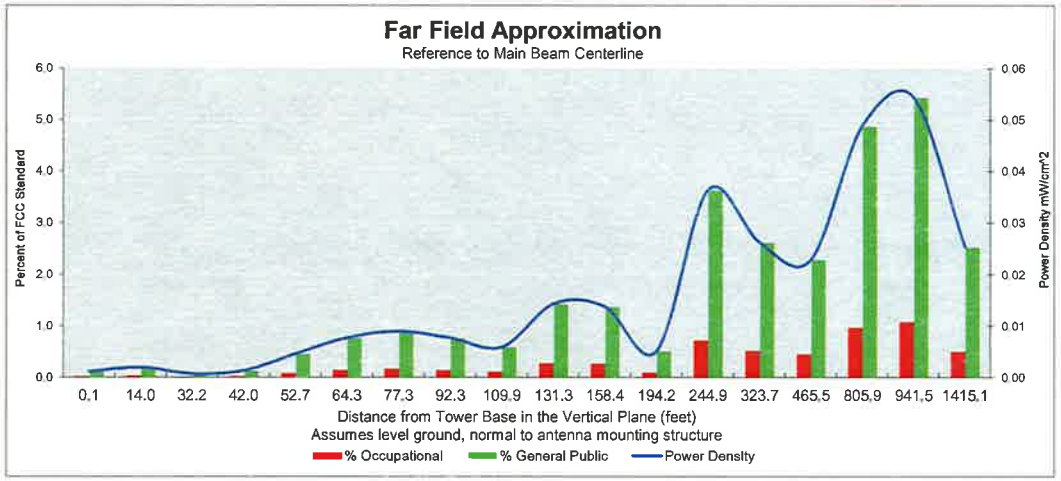
Far Field Approximation
with downtilt variation

Estimated Radiated Emission
Single Emitter Far Field Model
Dipole/Wire/Yagi Antenna Types

verizonwireless

Location:	**CROMWELL SE CT**
Site #:	2-0612
Date:	01/14/15
Name:	Jaime Laredo
File Name:	CROMWELL SE CT - FF POWER (LTE-AWS).xlsx

Operating Freq. (MHz):	**2145.0**
Antenna Height (ft):	**101.9**
Antenna Gain (dBi):	**19.2**
Antenna Size (in.):	**74.9**
Downtilt (degrees):	**2.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**2811.6**



Calc Angle	90.0	82.0	72.0	67.0	62.0	57.0	52.0	47.0	42.0	37.0	32.0	27.0	22.0	17.0	12.0	7.0	6.0	4.0
Solve for r, dx to antenna	98.9	99.9	104.0	107.5	112.0	118.0	125.6	135.3	147.9	164.4	186.7	217.9	264.1	338.4	475.9	811.9	946.6	1418.5
Distance from Antenna Structure Base in Horizontal plane	0.1	14.0	32.2	42.0	52.7	64.3	77.3	92.3	109.9	131.3	158.4	194.2	244.9	323.7	465.5	805.9	941.5	1415.1
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Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.04	0.03	0.02	0.05	0.05	0.03
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.3	0.3	0.1	0.7	0.5	0.5	1.0	1.1	0.5
Percent of General Population Standard	0.1	0.2	0.1	0.1	0.5	0.8	0.9	0.8	0.6	1.4	1.4	0.5	3.6	2.6	2.3	4.9	5.4	2.5

Antenna Type: **HBXX-6517DS**

Max%: **5.43%**

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Power (in watts).
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

November 17, 2014

Holly Haas
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6535

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:	119617
	Carrier Site Name:	Cromwell SE CT
Crown Castle Designation:	**Crown Castle BU Number:**	876364
	Crown Castle Site Name:	Cromwell / First Line Emergenc
	Crown Castle JDE Job Number:	265157
	Crown Castle Work Order Number:	965717
	Crown Castle Application Number:	218644 Rev. 6
Engineering Firm Designation:	**B+T Group Project Number:**	84470.011.01
Site Data:	**201 Main St., Cromwell, Middlesex County, CT** **Latitude *41° 35' 0.11"*, Longitude *-72° 38' 59.14"*** **125 Foot - Monopole Tower**	

Dear Holly Haas,

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 729322, in accordance with application 218644, revision 6.

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.

Jennifer Tillson, E.I.
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 125 ft. Monopole designed by Engineered Endeavors, Inc. in February of 2002. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower has been modified multiple times in the past to accommodate additional loading.

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	105.0	3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Andrew	LNX-6514DS-A1M			
		6	Commscope	HBXX-6517DS-A2M			
		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
125.0	129.0	3	Argus Tech.	LLPX310R-V1	--	--	1
	127.0	3	Alcatel Lucent	TD-RRH8x20-25	1	1-1/4	2
		3	RFS Celwave	APXVTM14-C-120			
		3	RFS Celwave	APXVSPP18-C-A20	3 3 2 3	1/4 5/16 1/2 1-1/4	1
	125.0	2	Dragonwave	HORIZON COMPACT			
		3	Samsung Telecomm.	WIMAX DAP HEAD			
		1	--	Platform Mount [LP 712-1]			
	124.0	1	Andrew	VHLP2-11			
		1	Andrew	VHLP2-18			
123.0	123.0	3	Alcatel Lucent	800MHZ 2X50W RRH W/FILTER	--	--	1
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		1	--	Side Arm Mount [SO 102-3]			
115.0	117.0	6	Communication Components Inc.	DTMABP7819VG12A	1 2 12	3/8 3/4 1-1/4	1
		3	Ericsson	RRUS-11			
		9	KMW Comm.	AM-X-CD-16-65-00T-RET			
		1	Raycap	DC6-48-60-18-8F			
	115.0	1	--	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
105.0	105.0	**6**	**Andrew**	**DB846F65ZAXY**	--	--	**3**
		3	**Antel**	**BXA-171063-8BF-EDIN-2**			
		3	Antel	BXA-70063-6CF-EDIN-0	12	1-5/8	1
		6	RFS Celwave	FD9R6004/2C-3L			
		1	--	Platform Mount [LP 712-1]			
85.0	85.0	--	--	--	6	1-5/8	1
		3	Ericsson	ERICSSON AIR 21 B2A B4P	1	1-3/16	2
		3	Ericsson	ERICSSON AIR 21 B4A B2P			
		1	--	T-Arm Mount [TA 601-3]			

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

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate, Rev# 6	218644	CCI Sites
Tower Manufacturer Drawing	EEI, Job No. 10554	2068958	CCI Sites
Tower Modification Drawing	Semaan Engineering Solutions, Job No. CT23XC558	2055765	CCI Sites
Post Modification Inspection	VSI, Job No. 2007-004-138	2182292	CCI Sites
Tower Modification Drawing	B+T Group, Project No. 84890.001	3373019	CCI Sites
Post Modification Inspection	B+T Group, Project No. 84890.002	3394680	CCI Sites
Tower Modification Drawing	B+T Group, Project No. 84470.006.01	3669962	CCI Sites
Post-Modification Inspection	TEP, Project No. 131001.876364	4009982	CCI Sites
Foundation Drawing	EEI, Project No. 6464	1613909	CCI Sites
Base Plate Details	Crown, Project No. 320820	2608627	CCI Sites
Geotech Report	Dr. Clarence Welti, P.E., Date: 08/02/1999	1532312	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 11/12/2014	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	125 - 94.45	Pole	TP25.067x18.5x0.188	1	-7.898	769.746	99.9	Pass
L2	94.45 - 85.04	Pole	TP27.09x25.067x0.439	2	-8.727	1485.762	64.0	Pass
L3	85.04 - 73.5	Pole	TP29.158x25.873x0.475	3	-13.153	1790.126	79.9	Pass
L4	73.5 - 73	Pole	TP29.264x29.158x0.609	4	-13.284	2294.599	63.5	Pass
L5	73 - 60.5	Pole	TP31.921x29.264x0.367	5	-15.780	1905.897	92.7	Pass
L6	60.5 - 40.457	Pole	TP36.18x31.921x0.436	6	-19.682	2481.659	85.9	Pass
L7	40.457 - 30.5	Pole	TP37.787x34.6x0.485	7	-24.837	2975.016	84.2	Pass
L8	30.5 - 0	Pole	TP44.25x37.787x0.456	8	-34.326	3287.951	94.0	Pass
							Summary	
						Pole (L1)	99.9	Pass
						Rating =	99.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	89.6	Pass
1	Base Plate	Base	86.6	Pass
1	Base Foundation (Soil Interaction)	Base	84.6	Pass

Structure Rating (max from all components) =	99.9%

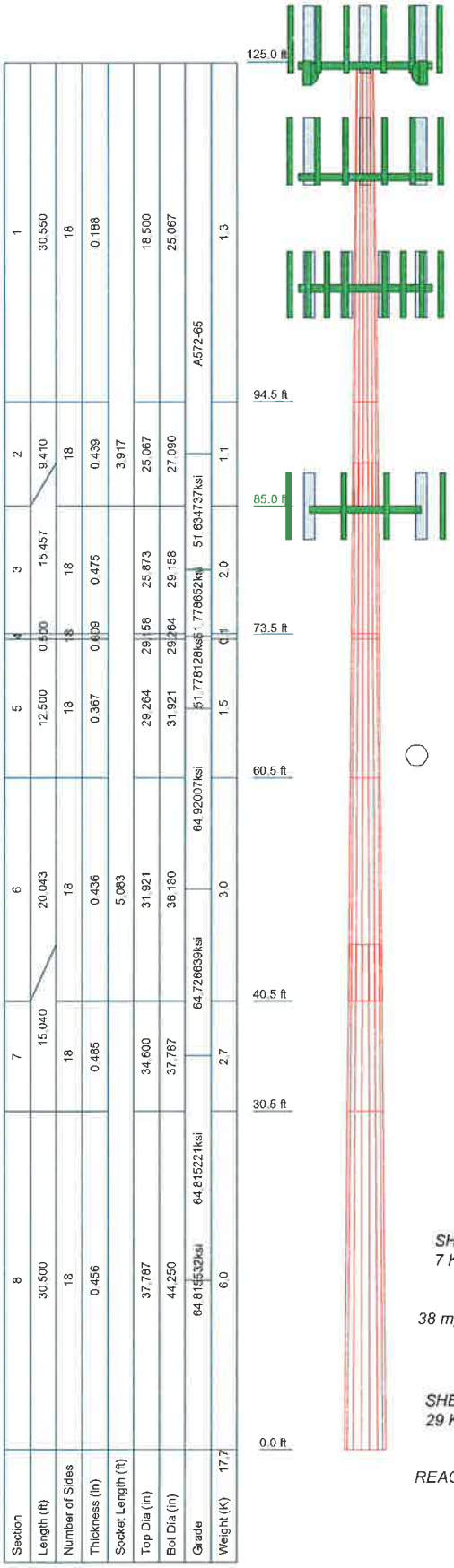
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

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	5	6	7	8
Length (ft)	30.500	9.410	15.457	0.500	12.500	20.043	15.040	30.500
Number of Sides	18	18	18	18	18	18	18	18
Thickness (in)	0.188	0.439	0.475	0.609	0.367	0.436	0.485	0.456
Socket Length (ft)		3.917			5.083			
Top Dia (in)	18.500	25.067	25.873	29.158	29.264	31.921	34.600	37.787
Bot Dia (in)	25.067	27.090	29.158	29.264	31.921	36.180	37.787	44.250
Grade	A572-65	51.634737ksi	51.778652ksi	51.778128ksi	64.92007ksi	64.726639ksi	64.815221ksi	64.815532ksi
Weight (K)	1.3	1.1	2.0	0.1	1.5	3.0	2.7	6.0

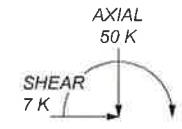
17.7

DESIGNED APPURTENANCE LOADING

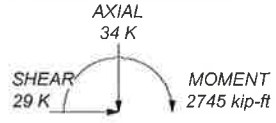
TYPE	ELEVATION	TYPE	ELEVATION
APXVTM14-C-120 w/ Mount Pipe (R)	125	RRUS-11 (E)	115
APXVTM14-C-120 w/ Mount Pipe (R)	125	RRUS-11 (E)	115
APXVTM14-C-120 w/ Mount Pipe (R)	125	DC6-48-60-18-8F (E)	115
TD-RRH8x20-25 (R)	125	6' x 2" Mount Pipe (E-For Surge)	115
TD-RRH8x20-25 (R)	125	Platform Mount [LP 303-1] (E)	115
TD-RRH8x20-25 (R)	125	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115
LLPX310R-V1 w/ Mount Pipe (E)	125	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115
LLPX310R-V1 w/ Mount Pipe (E)	125	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
LLPX310R-V1 w/ Mount Pipe (E)	125	(2) FD9R6004/2C-3L (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (E)	125	(2) FD9R6004/2C-3L (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (E)	125	(2) FD9R6004/2C-3L (E)	105
APXVSPP18-C-A20 w/ Mount Pipe (E)	125	LNX-6514DS-A1M w/ Mount Pipe (P)	105
WIMAX DAP HEAD (E)	125	LNX-6514DS-A1M w/ Mount Pipe (P)	105
WIMAX DAP HEAD (E)	125	LNX-6514DS-A1M w/ Mount Pipe (P)	105
WIMAX DAP HEAD (E)	125	(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105
HORIZON COMPACT (E)	125	(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105
HORIZON COMPACT (E)	125	(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	105
(2) 6' x 2" Mount Pipe (E)	125	RRH2X60-AWS (P)	105
(2) 6' x 2" Mount Pipe (E)	125	RRH2X60-AWS (P)	105
(2) 6' x 2" Mount Pipe (E)	125	RRH2X60-AWS (P)	105
Platform Mount [LP 712-1] (E)	125	RRH2X60-PCS (P)	105
VHLP2-18 (E)	125	RRH2X60-PCS (P)	105
VHLP2-11 (E)	125	RRH2X60-PCS (P)	105
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (E)	123	DB-T1-6Z-8AB-0Z (P)	105
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (E)	123	Platform Mount [LP 712-1] (E)	105
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (E)	123	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
800MHZ 2X50W RRH W/FILTER w / Mount Pipe (E)	123	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	105
Side Arm Mount [SO 102-3] (E)	123	(2) ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	85
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (E)	123	(2) ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	85
PCS 1900MHz 4x45W-65MHz w / Mount Pipe (E)	123	T-Arm Mount [TA 601-3] (R)	85
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	115	ERICSSON AIR 21 B2A B4P w/ Mount Pipe (R)	85
(2) DTMABP7819VG12A (E)	115	ERICSSON AIR 21 B4A B2P w/ Mount Pipe (R)	85
(2) DTMABP7819VG12A (E)	115		
(2) DTMABP7819VG12A (E)	115		
RRUS-11 (E)	115		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	64.92007ksi	65 ksi	80 ksi
51.634737ksi	52 ksi	67 ksi	64.726639ksi	65 ksi	80 ksi
51.778652ksi	52 ksi	67 ksi	64.815221ksi	65 ksi	80 ksi
51.778128ksi	52 ksi	67 ksi	64.815532ksi	65 ksi	80 ksi



TORQUE 0 kip-ft
38 mph WIND - 0.750 in ICE



TORQUE 0 kip-ft
REACTIONS - 85 mph WIND

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 MC to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.9%

B+T Group
1717 South Boulder Ave, Suite 300
Tulsa, OK - 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

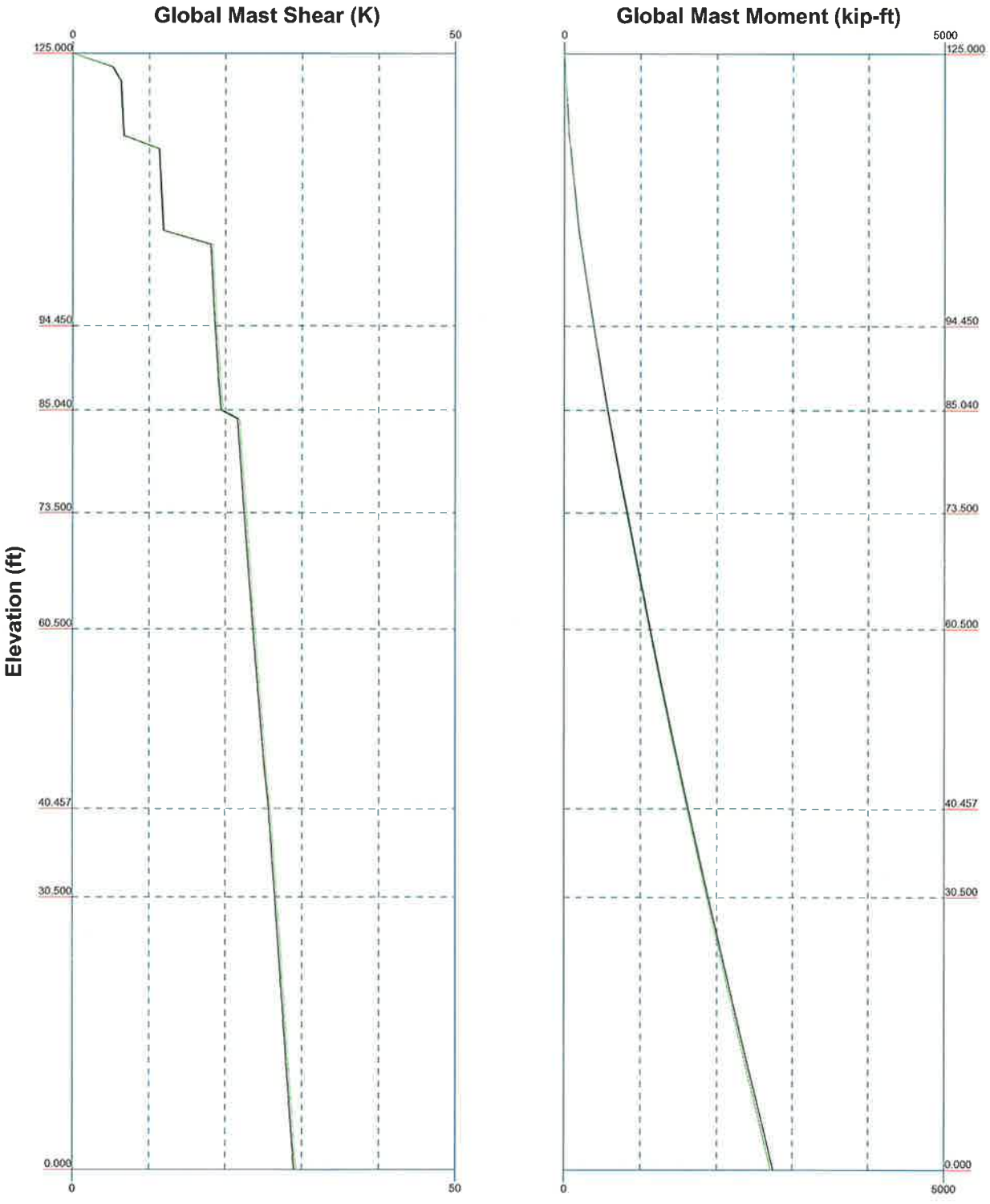
Job: 84470.011.01 - CROMWELL / FIRST LINE EMERGENC, CT (BU# 87636		
Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 11/17/14	Scale: NTS
Path:		Dwg No. E-1

TIA/EIA-222-F - 85 mph/38 mph 0.750 in Ice

Vx Vz

Maximum Values

Mx Mz



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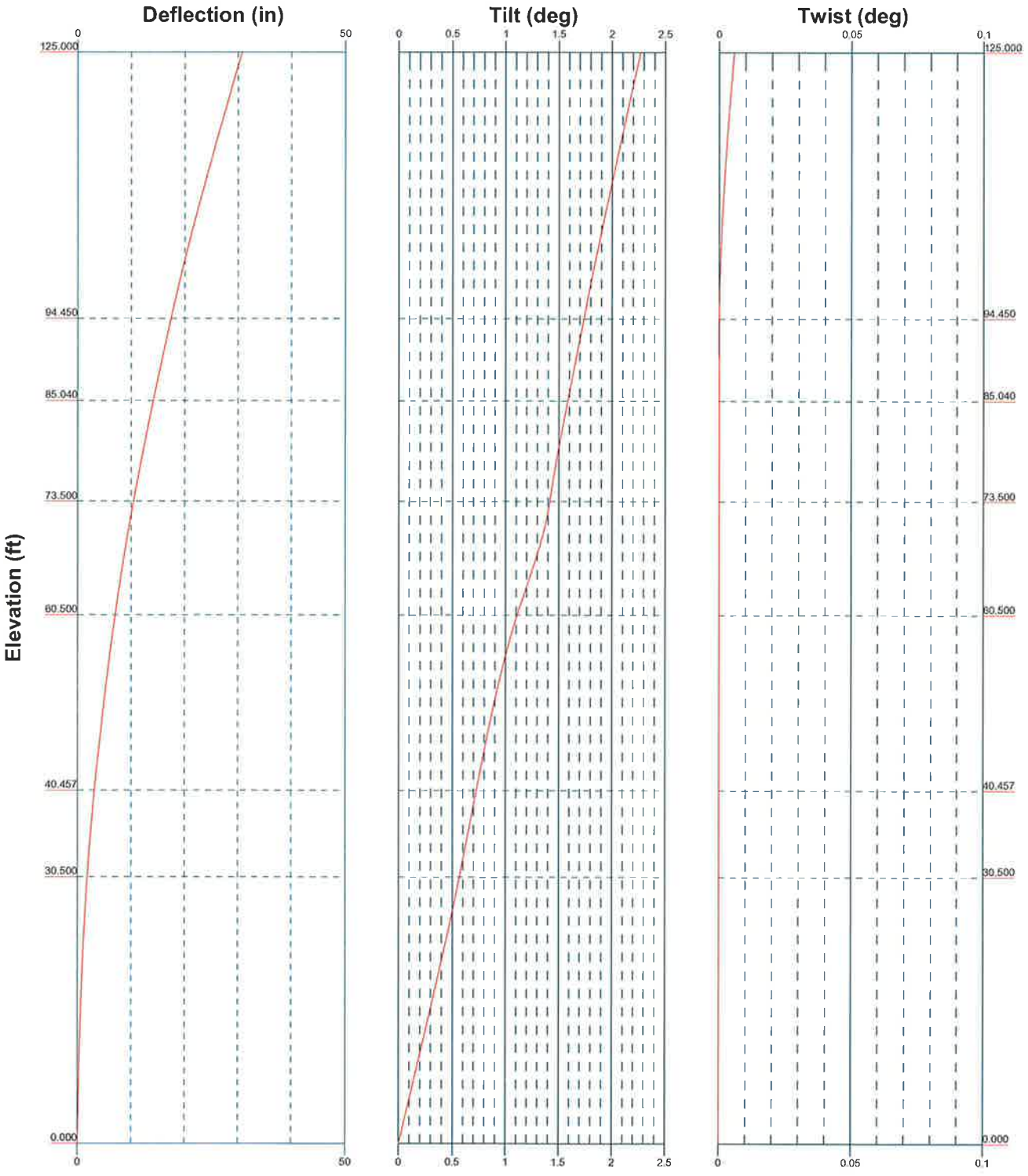
Job: 84470.011.01 - CROMWELL / FIRST LINE EMERGENC, CT (BU# 87636		
Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 11/17/14	Scale: NTS
Path:		Dwg No. E-4

TIA/EIA-222-F - Service - 50 mph **Maximum Values**



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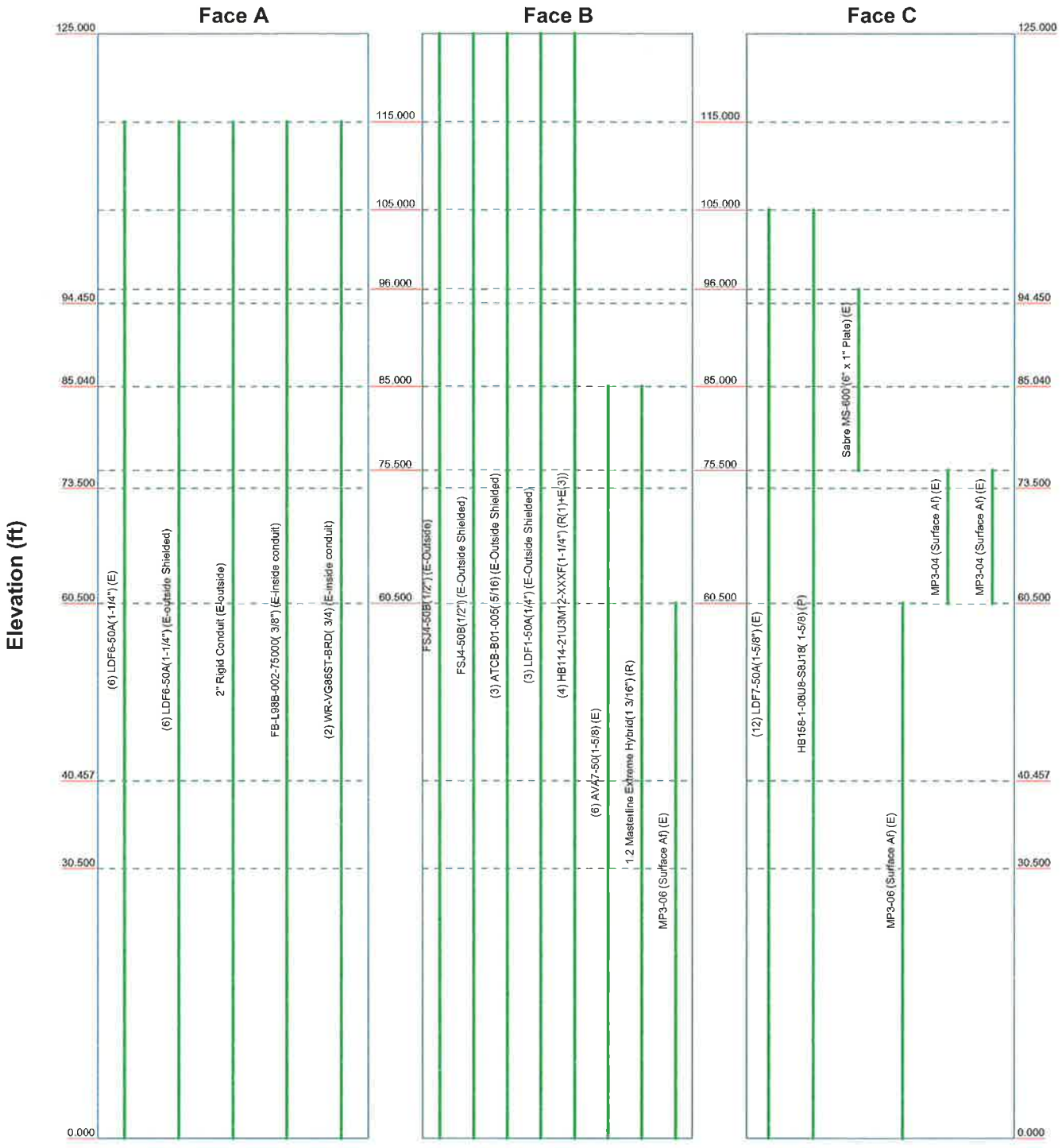
FAX: (918) 295-0265

Job: 84470.011.01 - CROMWELL / FIRST LINE EMERGENC, CT (BU# 87636		
Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 11/17/14	Scale: NTS
Path:		Dwg No. E-5

Feed Line Distribution Chart
0' - 125'

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



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Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 84470.011.01 - CROMWELL / FIRST LINE EMERGENC, CT (BU# 87636		
Project:		
Client: Crown Castle	Drawn by: JTillson	App'd:
Code: TIA/EIA-222-F	Date: 11/17/14	Scale: NTS
Path:		Dwg No. E-7

tnxTower	Job	Page
	84470.011.01 - CROMWELL / FIRST LINE EMERGENC, CT (BU# 876364)	1 of 20
B+T Group 1717 South Boulder Ave, Suite 300 Tulsa, OK - 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project	Date 11:54:27 11/17/14
	Client Crown Castle	Designed by JTillson

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.
TOWER RATING: 99.9%.
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

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification	√	Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
√	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination		Use TIA-222-G Tension Splice Capacity Exemption		

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	125.000-94.450	30.550	0.000	18	18.500	25.067	0.188	0.750	A572-65 (65 ksi)
L2	94.450-85.040	9.410	3.917	18	25.067	27.090	0.439	1.757	51.634737ksi (52 ksi)
L3	85.040-73.500	15.457	0.000	18	25.873	29.158	0.475	1.899	51.778652ksi (52 ksi)
L4	73.500-73.000	0.500	0.000	18	29.158	29.264	0.609	2.437	51.778128ksi

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
L5	73.000-60.500	12.500	0.000	18	29.264	31.921	0.367	1.466	(52 ksi) 64.92007ksi
L6	60.500-40.457	20.043	5.083	18	31.921	36.180	0.436	1.743	(65 ksi) 64.726639ksi
L7	40.457-30.500	15.040	0.000	18	34.600	37.787	0.485	1.939	(65 ksi) 64.815221ksi
L8	30.500-0.000	30.500		18	37.787	44.250	0.456	1.825	(65 ksi) 64.815532ksi

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.785	10.898	461.730	6.501	9.398	49.131	924.069	5.450	2.926	15.605
	25.454	14.807	1157.924	8.832	12.734	90.931	2317.371	7.405	4.082	21.77
L2	25.454	34.331	2630.769	8.743	12.734	206.592	5265.000	17.169	3.639	8.285
	27.508	37.151	3333.705	9.461	13.762	242.245	6671.796	18.579	3.995	9.096
L3	27.117	38.276	3119.391	9.016	13.143	237.334	6242.888	19.142	3.718	7.83
	29.608	43.226	4493.011	10.182	14.812	303.332	8991.935	21.617	4.296	9.048
L4	29.608	55.204	5684.267	10.135	14.812	383.756	11376.014	27.607	4.060	6.664
	29.716	55.409	5747.975	10.172	14.866	386.648	11503.512	27.710	4.078	6.694
L5	29.716	33.616	3546.548	10.259	14.866	238.565	7097.762	16.811	4.505	12.293
	32.413	36.706	4617.275	11.202	16.216	284.742	9240.626	18.357	4.973	13.569
L6	32.413	43.541	5453.050	11.177	16.216	336.283	10913.275	21.775	4.851	11.134
	36.738	49.432	7979.124	12.689	18.379	434.133	15968.747	24.720	5.601	12.855
L7	36.227	52.486	7717.450	12.111	17.577	439.073	15445.054	26.248	5.236	10.803
	38.370	57.389	10088.726	13.242	19.196	525.572	20190.728	28.700	5.797	11.96
L8	38.370	54.065	9518.850	13.252	19.196	495.884	19050.225	27.038	5.847	12.815
	44.933	63.426	15368.309	15.547	22.479	683.674	30756.839	31.719	6.985	15.308

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 125.000-94.450				1	1	1		
L2 94.450-85.040				1	1	0.93228		
L3 85.040-73.500				1	1	0.947822		
L4 73.500-73.000				1	1	0.93408		
L5 73.000-60.500				1	1	0.976519		
L6 60.500-40.457				1	1	0.959022		
L7 40.457-30.500				1	1	0.966927		
L8 30.500-0.000				1	1	0.9761		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
FSJ4-50B(1/2") (E-Outside)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice	0.052	0.000
						1/2" Ice	0.152	0.001
						1" Ice	0.252	0.002
						2" Ice	0.452	0.006
						4" Ice	0.852	0.022
FSJ4-50B(1/2") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
ATCB-B01-005(5/16) (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
LDF1-50A(1/4") (E-Outside Shielded)	B	No	CaAa (Out Of Face)	125.000 - 0.000	3	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.021
HB114-21U3M12-XXX F(1-1/4") (R(1)+E(3))	B	No	Inside Pole	125.000 - 0.000	4	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)	A	No	Inside Pole	115.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF6-50A(1-1/4") (E-outside Shielded)	A	No	CaAa (Out Of Face)	115.000 - 0.000	6	No Ice	0.000	0.001
						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
2" Rigid Conduit (E-outside)	A	No	CaAa (Out Of Face)	115.000 - 0.000	1	No Ice	0.200	0.003
						1/2" Ice	0.300	0.004
						1" Ice	0.400	0.006
						2" Ice	0.600	0.013
						4" Ice	1.000	0.032
FB-L98B-002-75000(3/8") (E-inside conduit)	A	No	CaAa (Out Of Face)	115.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
WR-VG86ST-BRD(3/4)	A	No	CaAa (Out Of	115.000 - 0.000	2	No Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(E-inside conduit)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.007
						4" Ice	0.000	0.024
##								
LDF7-50A(1-5/8")	C	No	Inside Pole	105.000 - 0.000	12	No Ice	0.000	0.001
(E)						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
HB158-1-08U8-S8J18(	C	No	Inside Pole	105.000 - 0.000	1	No Ice	0.000	0.001
1-5/8)						1/2" Ice	0.000	0.001
(P)						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
##								
##								
AVA7-50(1-5/8)	B	No	Inside Pole	85.000 - 0.000	6	No Ice	0.000	0.001
(E)						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
1.2 Masterline Extreme	B	No	Inside Pole	85.000 - 0.000	1	No Ice	0.000	0.001
Hybrid(1 3/16")						1/2" Ice	0.000	0.001
(R)						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
##								
##								
Sabre MS-600 (6" x 1"	C	No	CaAa (Out Of	96.000 - 75.500	1	No Ice	0.167	0.000
Plate)			Face)			1/2" Ice	0.250	0.000
(E)						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
##								
##								
MP3-06 (Surface Af)	C	No	CaAa (Out Of	60.500 - 0.000	1	No Ice	0.434	0.029
(E)			Face)			1/2" Ice	0.518	0.031
						1" Ice	0.601	0.034
						2" Ice	0.768	0.040
						4" Ice	1.101	0.057
MP3-06 (Surface Af)	B	No	CaAa (Out Of	60.500 - 0.000	1	No Ice	0.434	0.029
(E)			Face)			1/2" Ice	0.518	0.031
						1" Ice	0.601	0.034
						2" Ice	0.768	0.040
						4" Ice	1.101	0.057
##								
MP3-04 (Surface Af)	C	No	CaAa (Out Of	75.500 - 60.500	1	No Ice	0.268	0.014
(E)			Face)			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)	C	No	CaAa (Out Of	75.500 - 60.500	1	No Ice	0.268	0.014
(E)			Face)			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_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	125.000-94.450	A	0.000	0.000	0.000	4.110	0.246
		B	0.000	0.000	0.000	1.589	0.170
		C	0.000	0.000	0.000	0.258	0.118
L2	94.450-85.040	A	0.000	0.000	0.000	1.882	0.113
		B	0.000	0.000	0.000	0.489	0.052
		C	0.000	0.000	0.000	1.568	0.105
L3	85.040-73.500	A	0.000	0.000	0.000	2.308	0.138
		B	0.000	0.000	0.000	0.600	0.123
		C	0.000	0.000	0.000	2.663	0.185
L4	73.500-73.000	A	0.000	0.000	0.000	0.100	0.006
		B	0.000	0.000	0.000	0.026	0.005
		C	0.000	0.000	0.000	0.268	0.020
L5	73.000-60.500	A	0.000	0.000	0.000	2.500	0.149
		B	0.000	0.000	0.000	0.650	0.134
		C	0.000	0.000	0.000	6.708	0.492
L6	60.500-40.457	A	0.000	0.000	0.000	4.009	0.240
		B	0.000	0.000	0.000	9.748	0.792
		C	0.000	0.000	0.000	8.705	0.801
L7	40.457-30.500	A	0.000	0.000	0.000	1.991	0.119
		B	0.000	0.000	0.000	4.842	0.394
		C	0.000	0.000	0.000	4.325	0.398
L8	30.500-0.000	A	0.000	0.000	0.000	6.100	0.365
		B	0.000	0.000	0.000	14.833	1.206
		C	0.000	0.000	0.000	13.247	1.219

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	125.000-94.450	A	0.866	0.000	0.000	0.000	7.668	0.734
		B		0.000	0.000	0.000	6.878	0.506
		C		0.000	0.000	0.000	0.482	0.118
L2	94.450-85.040	A	0.846	0.000	0.000	0.000	3.473	0.330
		B		0.000	0.000	0.000	2.081	0.152
		C		0.000	0.000	0.000	2.895	0.105
L3	85.040-73.500	A	0.833	0.000	0.000	0.000	4.260	0.404
		B		0.000	0.000	0.000	2.552	0.246
		C		0.000	0.000	0.000	4.572	0.197
L4	73.500-73.000	A	0.825	0.000	0.000	0.000	0.183	0.017
		B		0.000	0.000	0.000	0.109	0.010
		C		0.000	0.000	0.000	0.406	0.022
L5	73.000-60.500	A	0.816	0.000	0.000	0.000	4.540	0.425
		B		0.000	0.000	0.000	2.690	0.260
		C		0.000	0.000	0.000	10.108	0.561
L6	60.500-40.457	A	0.789	0.000	0.000	0.000	7.171	0.663
		B		0.000	0.000	0.000	15.545	1.063
		C		0.000	0.000	0.000	11.341	0.879
L7	40.457-30.500	A	0.756	0.000	0.000	0.000	3.562	0.329
		B		0.000	0.000	0.000	7.722	0.528
		C		0.000	0.000	0.000	5.634	0.437
L8	30.500-0.000	A	0.750	0.000	0.000	0.000	10.675	0.968
		B		0.000	0.000	0.000	23.221	1.589
		C		0.000	0.000	0.000	17.060	1.331

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	125.000-94.450	0.050	-0.149	0.199	-0.157
L2	94.450-85.040	-0.125	-0.114	-0.076	-0.106
L3	85.040-73.500	-0.195	-0.071	-0.156	-0.059
L4	73.500-73.000	-0.476	0.107	-0.474	0.138
L5	73.000-60.500	-0.481	0.108	-0.483	0.140
L6	60.500-40.457	0.048	0.280	0.166	0.285
L7	40.457-30.500	0.049	0.286	0.171	0.294
L8	30.500-0.000	0.051	0.294	0.172	0.305

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVTM14-C-120 w/ Mount Pipe (R)	A	From Leg	4.000 0.000 2.000		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe (R)	B	From Leg	4.000 0.000 2.000		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
APXVTM14-C-120 w/ Mount Pipe (R)	C	From Leg	4.000 0.000 2.000		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.134 7.662 8.183 9.256 11.526	4.959 5.754 6.472 8.010 11.412	0.077 0.131 0.193 0.338 0.752
TD-RRH8x20-25 (R)	A	From Leg	4.000 0.000 2.000		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25 (R)	B	From Leg	4.000 0.000 2.000		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
TD-RRH8x20-25 (R)	C	From Leg	4.000 0.000 2.000		0.000	125.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.720 5.014 5.316 5.948 7.314	1.703 1.920 2.145 2.622 3.680	0.070 0.097 0.128 0.201 0.397
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.000 0.000		0.000	125.000	No Ice 1/2" Ice	5.065 5.480	2.983 3.526	0.045 0.083

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
(E)			4.000			1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	5.065	2.983	0.045
			0.000			1/2" Ice	5.480	3.526	0.083
(E)			4.000			1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	5.065	2.983	0.045
			0.000			1/2" Ice	5.480	3.526	0.083
(E)			4.000			1" Ice	5.905	4.086	0.126
						2" Ice	6.788	5.313	0.232
						4" Ice	8.704	8.131	0.544
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
			0.000			1/2" Ice	9.149	8.127	0.151
(E)			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	B	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
			0.000			1/2" Ice	9.149	8.127	0.151
(E)			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	C	From Leg	4.000	0.000	125.000	No Ice	8.498	6.946	0.083
			0.000			1/2" Ice	9.149	8.127	0.151
(E)			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
WIMAX DAP HEAD	A	From Leg	4.000	0.000	125.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	B	From Leg	4.000	0.000	125.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
WIMAX DAP HEAD	C	From Leg	4.000	0.000	125.000	No Ice	1.804	0.778	0.033
(E)			0.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.180	1.067	0.058
						2" Ice	2.589	1.391	0.094
						4" Ice	3.512	2.143	0.201
HORIZON COMPACT	B	From Leg	4.000	0.000	125.000	No Ice	0.841	0.429	0.012
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			0.000			1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
HORIZON COMPACT	C	From Leg	4.000	0.000	125.000	No Ice	0.841	0.429	0.012
(E)			0.000			1/2" Ice	0.966	0.525	0.018
			0.000			1" Ice	1.099	0.629	0.026
						2" Ice	1.392	0.863	0.048
						4" Ice	2.082	1.435	0.122
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090

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" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	125.000	No Ice	1.425	1.425	0.022
(E)			0.000			1/2" Ice	1.925	1.925	0.033
			0.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 712-1]	C	None		0.000	125.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
##									
PCS 1900MHz	A	From Leg	1.000	0.000	123.000	No Ice	2.905	3.218	0.071
4x45W-65MHz w / Mount			0.000			1/2" Ice	3.206	3.647	0.101
Pipe			0.000			1" Ice	3.519	4.094	0.138
(E)						2" Ice	4.187	5.064	0.225
						4" Ice	5.703	7.343	0.480
PCS 1900MHz	B	From Leg	1.000	0.000	123.000	No Ice	2.905	3.218	0.071
4x45W-65MHz w / Mount			0.000			1/2" Ice	3.206	3.647	0.101
Pipe			0.000			1" Ice	3.519	4.094	0.138
(E)						2" Ice	4.187	5.064	0.225
						4" Ice	5.703	7.343	0.480
PCS 1900MHz	C	From Leg	1.000	0.000	123.000	No Ice	2.905	3.218	0.071
4x45W-65MHz w / Mount			0.000			1/2" Ice	3.206	3.647	0.101
Pipe			0.000			1" Ice	3.519	4.094	0.138
(E)						2" Ice	4.187	5.064	0.225
						4" Ice	5.703	7.343	0.480
800MHZ 2X50W RRH	A	From Leg	1.000	0.000	123.000	No Ice	2.586	2.731	0.073
W/FILTER w / Mount Pipe			0.000			1/2" Ice	2.861	3.102	0.101
(E)			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216
						4" Ice	5.207	6.396	0.453
800MHZ 2X50W RRH	B	From Leg	1.000	0.000	123.000	No Ice	2.586	2.731	0.073
W/FILTER w / Mount Pipe			0.000			1/2" Ice	2.861	3.102	0.101
(E)			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216
						4" Ice	5.207	6.396	0.453
800MHZ 2X50W RRH	C	From Leg	1.000	0.000	123.000	No Ice	2.586	2.731	0.073
W/FILTER w / Mount Pipe			0.000			1/2" Ice	2.861	3.102	0.101
(E)			0.000			1" Ice	3.149	3.490	0.135
						2" Ice	3.780	4.371	0.216
						4" Ice	5.207	6.396	0.453
Side Arm Mount [SO 102-3]	C	None		0.000	123.000	No Ice	3.000	3.000	0.081
(E)						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
##									
(3)	A	From Leg	4.000	0.000	115.000	No Ice	8.498	6.304	0.074
AM-X-CD-16-65-00T-RET			0.000			1/2" Ice	9.149	7.479	0.139
w/ Mount Pipe			2.000			1" Ice	9.767	8.368	0.212
(E)						2" Ice	11.031	10.179	0.385

tnxTower	Job: 84470.011.01 - CROMWELL / FIRST LINE EMERGENC, CT (BU# 876364)	Page: 9 of 20
B+T Group 1717 South Boulder Ave, Suite 300 Tulsa, OK - 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project	Date: 11:54:27 11/17/14
	Client: Crown Castle	Designed by: JTillson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: Horz ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
								4" Ice	13.679	14.024	0.874
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000	0.000	2.000	0.000	115.000	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
(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000	0.000	2.000	0.000	115.000	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
(2) DTMABP7819VG12A (E)	A	From Leg	4.000	0.000	2.000	0.000	115.000	No Ice	1.139	0.391	0.019
								1/2" Ice	1.284	0.488	0.026
								1" Ice	1.437	0.595	0.036
								2" Ice	1.769	0.833	0.060
								4" Ice	2.538	1.414	0.140
(2) DTMABP7819VG12A (E)	B	From Leg	4.000	0.000	2.000	0.000	115.000	No Ice	1.139	0.391	0.019
								1/2" Ice	1.284	0.488	0.026
								1" Ice	1.437	0.595	0.036
								2" Ice	1.769	0.833	0.060
								4" Ice	2.538	1.414	0.140
(2) DTMABP7819VG12A (E)	C	From Leg	4.000	0.000	2.000	0.000	115.000	No Ice	1.139	0.391	0.019
								1/2" Ice	1.284	0.488	0.026
								1" Ice	1.437	0.595	0.036
								2" Ice	1.769	0.833	0.060
								4" Ice	2.538	1.414	0.140
RRUS-11 (E)	A	From Leg	4.000	0.000	2.000	0.000	115.000	No Ice	3.249	1.373	0.048
								1/2" Ice	3.491	1.551	0.068
								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	2.000	0.000	115.000	No Ice	3.249	1.373	0.048
								1/2" Ice	3.491	1.551	0.068
								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	2.000	0.000	115.000	No Ice	3.249	1.373	0.048
								1/2" Ice	3.491	1.551	0.068
								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	2.000	0.000	115.000	No Ice	1.467	1.467	0.019
								1/2" Ice	1.667	1.667	0.037
								1" Ice	1.878	1.878	0.057
								2" Ice	2.333	2.333	0.105
								4" Ice	3.378	3.378	0.239
6' x 2" Mount Pipe (E-For Surge)	A	From Leg	4.000	0.000	0.000	0.000	115.000	No Ice	1.425	1.425	0.022
								1/2" Ice	1.925	1.925	0.033
								1" Ice	2.294	2.294	0.048
								2" Ice	3.060	3.060	0.090
								4" Ice	4.702	4.702	0.231
Platform Mount [LP 303-1] (E)	C	None				0.000	115.000	No Ice	14.660	14.660	1.250
								1/2" Ice	18.870	18.870	1.481
								1" Ice	23.080	23.080	1.713
								2" Ice	31.500	31.500	2.175
								4" Ice	48.340	48.340	3.101

##

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
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
(2) FD9R6004/2C-3L (E)	A	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/2C-3L (E)	C	From Leg	4.000 0.000 0.000	0.000	105.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
LNX-6514DS-A1M w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	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
LNX-6514DS-A1M w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	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
LNX-6514DS-A1M w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	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 0.000	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 0.000	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	C	From Leg	4.000 0.000	0.000	105.000	No Ice 1/2" Ice	8.976 9.647	6.963 8.182	0.067 0.137

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
(P)			0.000			1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
RRH2X60-AWS	A	From Leg	4.000	0.000	105.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			0.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS	B	From Leg	4.000	0.000	105.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			0.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-AWS	C	From Leg	4.000	0.000	105.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			0.000			1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354
RRH2X60-PCS	A	From Leg	4.000	0.000	105.000	No Ice	2.567	2.032	0.055
(P)			0.000			1/2" Ice	2.791	2.240	0.075
			0.000			1" Ice	3.025	2.458	0.099
						2" Ice	3.517	2.918	0.156
						4" Ice	4.606	3.942	0.314
RRH2X60-PCS	B	From Leg	4.000	0.000	105.000	No Ice	2.567	2.032	0.055
(P)			0.000			1/2" Ice	2.791	2.240	0.075
			0.000			1" Ice	3.025	2.458	0.099
						2" Ice	3.517	2.918	0.156
						4" Ice	4.606	3.942	0.314
RRH2X60-PCS	C	From Leg	4.000	0.000	105.000	No Ice	2.567	2.032	0.055
(P)			0.000			1/2" Ice	2.791	2.240	0.075
			0.000			1" Ice	3.025	2.458	0.099
						2" Ice	3.517	2.918	0.156
						4" Ice	4.606	3.942	0.314
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	105.000	No Ice	5.600	2.333	0.044
(P)			0.000			1/2" Ice	5.915	2.558	0.080
			0.000			1" Ice	6.240	2.791	0.120
						2" Ice	6.914	3.284	0.213
						4" Ice	8.365	4.373	0.455
Platform Mount [LP 712-1]	C	None		0.000	105.000	No Ice	24.530	24.530	1.335
(E)						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
###									
###									
ERICSSON AIR 21 B2A	A	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B4P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(R)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A	A	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B2P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169
(R)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
(2) ERICSSON AIR 21 B2A	B	From Leg	4.000	0.000	85.000	No Ice	6.825	5.642	0.112
B4P w/ Mount Pipe			0.000			1/2" Ice	7.347	6.480	0.169

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
(R)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
(2) ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0.000	0.000	85.000	No Ice 1/2" Ice	6.825 7.347	5.642 6.480	0.112 0.169
(R)			0.000			1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
T-Arm Mount [TA 601-3] (R)	C	None		0.000	85.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.900 14.650 18.400 25.900 40.900	10.900 14.650 18.400 25.900 40.900	0.726 0.926 1.125 1.524 2.322
##									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-18 (E)	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 -1.000	62.000		125.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.720 4.010 4.300 4.880 6.040	0.031 0.050 0.070 0.110 0.200
VHLP2-11 (E)	C	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 -1.000	90.000		125.000	2.175	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.720 4.010 4.300 4.880 6.040	0.027 0.050 0.070 0.110 0.190
##											

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

Comb. No.	Description
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	125 - 94.45	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-17.432	-0.295	1.089
			Max. Mx	5	-7.941	-384.253	-3.212
			Max. My	2	-7.898	1.544	389.552
			Max. Vy	5	18.622	-384.253	-3.212
			Max. Vx	2	-18.884	1.544	389.552
			Max. Torque	5			-1.098
L2	94.45 - 85.04	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-18.542	-0.356	1.251
			Max. Mx	5	-8.767	-487.692	-3.838
			Max. My	2	-8.727	1.834	494.474
			Max. Vy	5	19.055	-487.692	-3.838
			Max. Vx	2	-19.318	1.834	494.474
			Max. Torque	12			-0.652
L3	85.04 - 73.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.021	-0.459	1.659
			Max. Mx	5	-13.191	-816.598	-5.640
			Max. My	2	-13.153	2.715	827.615
			Max. Vy	5	22.468	-816.598	-5.640
			Max. Vx	8	22.733	-3.439	-826.577
			Max. Torque	12			-0.653
L4	73.5 - 73	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.174	-0.447	1.664
			Max. Mx	5	-13.321	-827.827	-5.706
			Max. My	2	-13.284	2.757	838.986

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	22.515	-827.827	-5.706
			Max. Vx	8	22.780	-3.459	-837.957
			Max. Torque	12			-0.650
L5	73 - 60.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-28.277	-0.129	1.788
			Max. Mx	11	-15.810	1115.932	3.356
			Max. My	2	-15.780	3.809	1130.362
			Max. Vy	5	23.612	-1115.616	-7.347
			Max. Vx	8	23.876	-3.939	-1129.539
			Max. Torque	12			-0.649
L6	60.5 - 40.457	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-32.961	-0.318	1.603
			Max. Mx	11	-19.705	1479.583	3.601
			Max. My	8	-19.682	-4.973	-1497.721
			Max. Vy	5	25.051	-1479.408	-9.627
			Max. Vx	8	25.315	-4.973	-1497.721
			Max. Torque	12			-0.615
L7	40.457 - 30.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-39.140	-0.518	1.407
			Max. Mx	11	-24.854	1867.676	3.819
			Max. My	8	-24.837	-6.009	-1890.383
			Max. Vy	5	26.501	-1867.645	-11.937
			Max. Vx	8	26.764	-6.009	-1890.383
			Max. Torque	12			-0.576
L8	30.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-50.157	-0.950	0.911
			Max. Mx	5	-34.327	-2713.062	-16.682
			Max. My	8	-34.326	-8.079	-2744.770
			Max. Vy	5	28.985	-2713.062	-16.682
			Max. Vx	2	-29.239	6.953	2741.517
			Max. Torque	12			-0.558

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	50.157	0.011	7.111
	Max. H_x	11	34.346	28.954	0.045
	Max. H_z	2	34.346	0.051	29.216
	Max. M_x	2	2741.517	0.051	29.216
	Max. M_z	5	2713.062	-28.962	-0.117
	Max. Torsion	3	0.160	-14.411	25.329
	Min. Vert	1	34.346	0.000	0.000
	Min. H_x	5	34.346	-28.962	-0.117
	Min. H_z	8	34.346	-0.066	-29.216
	Min. M_x	8	-2744.770	-0.066	-29.216
	Min. M_z	11	-2712.794	28.954	0.045
	Min. Torsion	12	-0.496	25.043	14.702

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	34.346	0.000	0.000	1.619	0.349	0.000
Dead+Wind 0 deg - No Ice	34.346	-0.051	-29.216	-2741.517	6.953	0.060
Dead+Wind 30 deg - No Ice	34.346	14.411	-25.329	-2377.492	-1347.268	-0.160
Dead+Wind 60 deg - No Ice	34.346	25.023	-14.655	-1376.075	-2342.054	-0.102
Dead+Wind 90 deg - No Ice	34.346	28.962	0.117	16.682	-2713.062	0.102
Dead+Wind 120 deg - No Ice	34.346	25.086	14.699	1384.908	-2350.002	-0.041
Dead+Wind 150 deg - No Ice	34.346	14.495	25.330	2380.877	-1358.077	0.012
Dead+Wind 180 deg - No Ice	34.346	0.066	29.216	2744.770	-8.079	0.282
Dead+Wind 210 deg - No Ice	34.346	-14.370	25.314	2378.839	1342.775	0.473
Dead+Wind 240 deg - No Ice	34.346	-25.050	14.583	1370.087	2346.258	0.031
Dead+Wind 270 deg - No Ice	34.346	-28.954	-0.045	-4.095	2712.794	-0.013
Dead+Wind 300 deg - No Ice	34.346	-25.043	-14.702	-1382.103	2345.241	0.496
Dead+Wind 330 deg - No Ice	34.346	-14.482	-25.336	-2378.401	1357.179	0.376
Dead+Ice+Temp	50.157	0.000	-0.000	-0.911	-0.950	-0.000
Dead+Wind 0 deg+Ice+Temp	50.157	-0.011	-7.111	-689.315	0.527	0.034
Dead+Wind 30 deg+Ice+Temp	50.157	3.513	-6.164	-597.890	-339.790	-0.032
Dead+Wind 60 deg+Ice+Temp	50.157	6.098	-3.566	-346.552	-589.693	-0.036
Dead+Wind 90 deg+Ice+Temp	50.157	7.057	0.026	2.449	-682.745	-0.004
Dead+Wind 120 deg+Ice+Temp	50.157	6.112	3.576	345.831	-591.524	-0.043
Dead+Wind 150 deg+Ice+Temp	50.157	3.531	6.164	595.920	-342.271	-0.028
Dead+Wind 180 deg+Ice+Temp	50.157	0.015	7.111	687.310	-2.918	0.043
Dead+Wind 210 deg+Ice+Temp	50.157	-3.504	6.161	595.445	336.626	0.102
Dead+Wind 240 deg+Ice+Temp	50.157	-6.104	3.550	342.428	588.524	0.020
Dead+Wind 270 deg+Ice+Temp	50.157	-7.055	-0.010	-2.314	680.550	0.024
Dead+Wind 300 deg+Ice+Temp	50.157	-6.103	-3.576	-347.938	588.295	0.146
Dead+Wind 330 deg+Ice+Temp	50.157	-3.529	-6.166	-598.103	339.931	0.117
Dead+Wind 0 deg - Service	34.346	-0.018	-10.109	-949.055	2.650	0.021
Dead+Wind 30 deg - Service	34.346	4.986	-8.764	-822.887	-466.672	-0.057
Dead+Wind 60 deg - Service	34.346	8.659	-5.071	-475.822	-811.411	-0.036
Dead+Wind 90 deg - Service	34.346	10.021	0.040	6.850	-939.983	0.036
Dead+Wind 120 deg - Service	34.346	8.680	5.086	481.023	-814.178	-0.014
Dead+Wind 150 deg - Service	34.346	5.015	8.765	826.198	-470.424	0.005
Dead+Wind 180 deg - Service	34.346	0.023	10.109	952.314	-2.562	0.099
Dead+Wind 210 deg - Service	34.346	-4.972	8.759	825.480	465.591	0.166
Dead+Wind 240 deg - Service	34.346	-8.668	5.046	475.877	813.346	0.011
Dead+Wind 270 deg - Service	34.346	-10.019	-0.015	-0.354	940.367	-0.004
Dead+Wind 300 deg - Service	34.346	-8.665	-5.087	-477.917	813.000	0.175
Dead+Wind 330 deg - Service	34.346	-5.011	-8.767	-823.209	470.590	0.132

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-34.346	0.000	0.000	34.346	0.000	0.000%
2	-0.051	-34.346	-29.216	0.051	34.346	29.216	0.000%
3	14.411	-34.346	-25.329	-14.411	34.346	25.329	0.000%
4	25.023	-34.346	-14.655	-25.023	34.346	14.655	0.000%
5	28.962	-34.346	0.117	-28.962	34.346	-0.117	0.000%
6	25.086	-34.346	14.699	-25.086	34.346	-14.699	0.000%
7	14.495	-34.346	25.330	-14.495	34.346	-25.330	0.000%
8	0.066	-34.346	29.216	-0.066	34.346	-29.216	0.000%
9	-14.370	-34.346	25.314	14.370	34.346	-25.314	0.000%
10	-25.050	-34.346	14.583	25.050	34.346	-14.583	0.000%
11	-28.954	-34.346	-0.045	28.954	34.346	0.045	0.000%
12	-25.043	-34.346	-14.702	25.043	34.346	14.702	0.000%
13	-14.482	-34.346	-25.336	14.482	34.346	25.336	0.000%
14	0.000	-50.157	0.000	-0.000	50.157	0.000	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
15	-0.011	-50.157	-7.111	0.011	50.157	7.111	0.000%
16	3.513	-50.157	-6.164	-3.513	50.157	6.164	0.000%
17	6.098	-50.157	-3.566	-6.098	50.157	3.566	0.000%
18	7.057	-50.157	0.026	-7.057	50.157	-0.026	0.000%
19	6.112	-50.157	3.576	-6.112	50.157	-3.576	0.000%
20	3.531	-50.157	6.164	-3.531	50.157	-6.164	0.000%
21	0.015	-50.157	7.111	-0.015	50.157	-7.111	0.000%
22	-3.504	-50.157	6.161	3.504	50.157	-6.161	0.000%
23	-6.104	-50.157	3.550	6.104	50.157	-3.550	0.000%
24	-7.055	-50.157	-0.010	7.055	50.157	0.010	0.000%
25	-6.103	-50.157	-3.576	6.103	50.157	3.576	0.000%
26	-3.529	-50.157	-6.166	3.529	50.157	6.166	0.000%
27	-0.018	-34.346	-10.109	0.018	34.346	10.109	0.000%
28	4.986	-34.346	-8.764	-4.986	34.346	8.764	0.000%
29	8.659	-34.346	-5.071	-8.659	34.346	5.071	0.000%
30	10.021	-34.346	0.040	-10.021	34.346	-0.040	0.000%
31	8.680	-34.346	5.086	-8.680	34.346	-5.086	0.000%
32	5.015	-34.346	8.765	-5.015	34.346	-8.765	0.000%
33	0.023	-34.346	10.109	-0.023	34.346	-10.109	0.000%
34	-4.972	-34.346	8.759	4.972	34.346	-8.759	0.000%
35	-8.668	-34.346	5.046	8.668	34.346	-5.046	0.000%
36	-10.019	-34.346	-0.015	10.019	34.346	0.015	0.000%
37	-8.665	-34.346	-5.087	8.665	34.346	5.087	0.000%
38	-5.011	-34.346	-8.767	5.011	34.346	8.767	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00042250
3	Yes	6	0.00000001	0.00006441
4	Yes	6	0.00000001	0.00006515
5	Yes	4	0.00000001	0.00088644
6	Yes	6	0.00000001	0.00006510
7	Yes	6	0.00000001	0.00006509
8	Yes	4	0.00000001	0.00031319
9	Yes	6	0.00000001	0.00006536
10	Yes	6	0.00000001	0.00006465
11	Yes	4	0.00000001	0.00052302
12	Yes	6	0.00000001	0.00006593
13	Yes	6	0.00000001	0.00006444
14	Yes	4	0.00000001	0.00001914
15	Yes	5	0.00000001	0.00055605
16	Yes	5	0.00000001	0.00072998
17	Yes	5	0.00000001	0.00073119
18	Yes	5	0.00000001	0.00054880
19	Yes	5	0.00000001	0.00072635
20	Yes	5	0.00000001	0.00072781
21	Yes	5	0.00000001	0.00055103
22	Yes	5	0.00000001	0.00072108
23	Yes	5	0.00000001	0.00071828
24	Yes	5	0.00000001	0.00054717
25	Yes	5	0.00000001	0.00073322
26	Yes	5	0.00000001	0.00073030
27	Yes	4	0.00000001	0.00017452

28	Yes	5	0.00000001	0.00016220
29	Yes	5	0.00000001	0.00016504
30	Yes	4	0.00000001	0.00018357
31	Yes	5	0.00000001	0.00016522
32	Yes	5	0.00000001	0.00016566
33	Yes	4	0.00000001	0.00018736
34	Yes	5	0.00000001	0.00016682
35	Yes	5	0.00000001	0.00016264
36	Yes	4	0.00000001	0.00017811
37	Yes	5	0.00000001	0.00016930
38	Yes	5	0.00000001	0.00016295

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 94.45	30.726	33	2.271	0.003
L2	94.45 - 85.04	17.398	33	1.734	0.001
L3	88.957 - 73.5	15.452	33	1.649	0.001
L4	73.5 - 73	10.444	33	1.416	0.001
L5	73 - 60.5	10.296	33	1.409	0.001
L6	60.5 - 40.457	6.996	33	1.111	0.000
L7	45.54 - 30.5	3.995	33	0.805	0.000
L8	30.5 - 0	1.784	33	0.569	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	APXVTM14-C-120 w/ Mount Pipe	33	30.726	2.271	0.003	10929
124.000	VHLP2-18	33	30.256	2.252	0.003	10929
123.000	PCS 1900MHz 4x45W-65MHz w / Mount Pipe	33	29.786	2.234	0.003	10929
115.000	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	33	26.059	2.087	0.002	5464
105.000	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	33	21.611	1.909	0.001	2731
85.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	33	14.105	1.588	0.001	4796

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	125 - 94.45	88.466	8	6.539	0.008
L2	94.45 - 85.04	50.116	8	4.996	0.003
L3	88.957 - 73.5	44.514	8	4.752	0.003
L4	73.5 - 73	30.092	8	4.081	0.002

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L5	73 - 60.5	29.666	8	4.061	0.002
L6	60.5 - 40.457	20.159	8	3.202	0.001
L7	45.54 - 30.5	11.512	8	2.321	0.001
L8	30.5 - 0	5.142	8	1.639	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
125.000	APXVTM14-C-120 w/ Mount Pipe	8	88.466	6.539	0.008	3885
124.000	VHLP2-18	8	87.113	6.486	0.008	3885
123.000	PCS 1900MHz 4x45W-65MHz w / Mount Pipe	8	85.760	6.433	0.007	3885
115.000	(3) AM-X-CD-16-65-00T-RET w/ Mount Pipe	8	75.040	6.010	0.005	1941
105.000	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	8	62.242	5.499	0.004	968
85.000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	40.633	4.576	0.002	1687

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	125 - 94.45 (1)	TP25.067x18.5x0.188 H1-3+VT (1.33 CR) - 1	30.550	0.000	0.0	39.000	14.807	-7.898	577.454	0.014
L2	94.45 - 85.04 (2)	TP27.09x25.067x0.439	9.410	0.000	0.0	30.981	35.977	-8.727	1114.600	0.008
L3	85.04 - 73.5 (3)	TP29.158x25.873x0.475	15.457	0.000	0.0	31.067	43.227	-13.153	1342.930	0.010
L4	73.5 - 73 (4)	TP29.264x29.158x0.609	0.500	0.000	0.0	31.067	55.409	-13.284	1721.380	0.008
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	12.500	0.000	0.0	38.952	36.706	-15.780	1429.780	0.011
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	20.043	0.000	0.0	38.836	47.938	-19.682	1861.710	0.011
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	15.040	0.000	0.0	38.889	57.389	-24.837	2231.820	0.011
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	30.500	0.000	0.0	38.889	63.426	-34.326	2466.580	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	125 - 94.45 (1)	TP25.067x18.5x0.188	389.555	51.409	39.000	1.318	0.000	0.000	39.000	0.000
L2	94.45 - 85.04 (2)	TP27.09x25.067x0.439	494.478	26.133	30.981	0.844	0.000	0.000	30.981	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L3	85.04 - 73.5 (3)	TP29.158x25.873x0.475	827.619	32.741	31.067	1.054	0.000	0.000	31.067	0.000
L4	73.5 - 73 (4)	TP29.264x29.158x0.609	838.992	26.039	31.067	0.838	0.000	0.000	31.067	0.000
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	1130.367	47.638	38.952	1.223	0.000	0.000	38.952	0.000
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	1497.725	44.036	38.836	1.134	0.000	0.000	38.836	0.000
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	1890.392	43.162	38.889	1.110	0.000	0.000	38.889	0.000
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	2744.783	48.177	38.889	1.239	0.000	0.000	38.889	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	125 - 94.45 (1)	TP25.067x18.5x0.188	18.884	1.275	26.000	0.098	0.106	0.007	26.000	0.000
L2	94.45 - 85.04 (2)	TP27.09x25.067x0.439	19.318	0.537	20.654	0.052	0.102	0.003	20.654	0.000
L3	85.04 - 73.5 (3)	TP29.158x25.873x0.475	22.733	0.526	20.712	0.051	0.085	0.002	20.712	0.000
L4	73.5 - 73 (4)	TP29.264x29.158x0.609	22.780	0.411	20.711	0.040	0.083	0.001	20.711	0.000
L5	73 - 60.5 (5)	TP31.921x29.264x0.367	23.876	0.650	25.968	0.050	0.039	0.001	25.968	0.000
L6	60.5 - 40.457 (6)	TP36.18x31.921x0.436	25.315	0.528	25.891	0.041	0.303	0.004	25.891	0.000
L7	40.457 - 30.5 (7)	TP37.787x34.6x0.485	26.764	0.466	25.926	0.036	0.296	0.003	25.926	0.000
L8	30.5 - 0 (8)	TP44.25x37.787x0.456	29.239	0.461	25.926	0.036	0.283	0.002	25.926	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	125 - 94.45 (1)	0.014	1.318	0.000	0.098	0.000	1.332	1.333	H1-3+VT
L2	94.45 - 85.04 (2)	0.008	0.844	0.000	0.052	0.000	0.852 ✔	1.333	H1-3+VT ✔
L3	85.04 - 73.5 (3)	0.010	1.054	0.000	0.051	0.000	1.064 ✔	1.333	H1-3+VT ✔
L4	73.5 - 73 (4)	0.008	0.838	0.000	0.040	0.000	0.846 ✔	1.333	H1-3+VT ✔
L5	73 - 60.5 (5)	0.011	1.223	0.000	0.050	0.000	1.235 ✔	1.333	H1-3+VT ✔
L6	60.5 - 40.457 (6)	0.011	1.134	0.000	0.041	0.000	1.145 ✔	1.333	H1-3+VT ✔
L7	40.457 - 30.5 (7)	0.011	1.110	0.000	0.036	0.000	1.121 ✔	1.333	H1-3+VT ✔
L8	30.5 - 0 (8)	0.014	1.239	0.000	0.036	0.000	1.253 ✔	1.333	H1-3+VT ✔

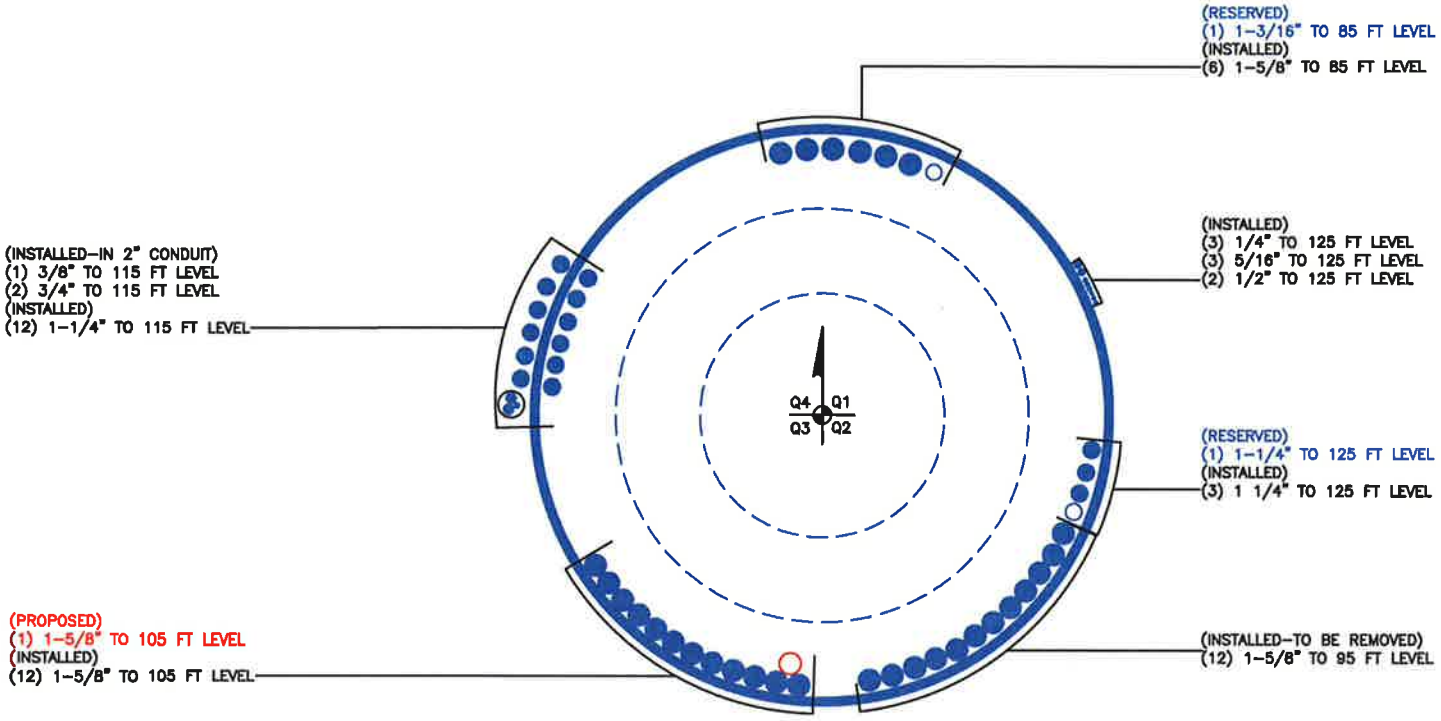
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	125 - 94.45	Pole	TP25.067x18.5x0.188	1	-7.898	769.746	**	**
L2	94.45 - 85.04	Pole	TP27.09x25.067x0.439	2	-8.727	1485.762	**	**
L3	85.04 - 73.5	Pole	TP29.158x25.873x0.475	3	-13.153	1790.126	**	**
L4	73.5 - 73	Pole	TP29.264x29.158x0.609	4	-13.284	2294.599	**	**
L5	73 - 60.5	Pole	TP31.921x29.264x0.367	5	-15.780	1905.897	**	**
L6	60.5 - 40.457	Pole	TP36.18x31.921x0.436	6	-19.682	2481.659	**	**
L7	40.457 - 30.5	Pole	TP37.787x34.6x0.485	7	-24.837	2975.016	**	**
L8	30.5 - 0	Pole	TP44.25x37.787x0.456	8	-34.326	3287.951	**	**
							Summary	
						Pole (L1)	99.9	Pass
						RATING =	**99.9**	**Pass**

**See additional calculations

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876364 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Reinforcement Capacity

AeroSolutions LLC
Optimizing Your Tower Infrastructure
5500 Flatirons Parkway, Suite 100
Boulder, CO 80301
720-304-6882

Dimensions and Properties														Compression				Axial				
																		ASD-9			LRFD	
Model	Weight (lb/ft)	Area (in^2)	Moment of Inertia (in^4)	Moment of Inertia (in^4)	Centroid from Mating Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (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	Design Axial Strength (kip)	Governing Axial
Model	*Wt*	*A*	*Ix*	*Iy*	*Y*	*X*	*Tw*	*W*	*Wf*	*Tf*	*Dh*	*Fy*	*Fu*	*Kx*	*Lx*	*Ky*	*Ly*	*Pall*	*Pall inc*	*Ptype ASD*	*phiPn*	*Ptype LRFD*
MP404	12.1	3.56	0.17	6.70	0.375	0	0.75	4.75	0	0	1.21875	100	110	0.80	14	1.00	14	145.1	190.4	Rupture	214.6	Rupture
MP406	20.7	6.09	0.79	12.07	0.625	0	1.25	4.875	0	0	1.21875	100	110	0.80	23	1.00	23	247.1	323.4	Rupture	370.6	Rupture
MS-600	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	0.80	16.375	1.00	16.375	187.6	250.4	Compress.	283.1	Rupture

Rein1

Bottom	Top	Qty	Model	Position	T or T&C
0	30.5	3	MP406	F	T&C
30.5	60.5	3	MP406	F	T&C
60.5	73.5	3	MP404	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

Flats (Used for relative orientation only. Actual flat numbers may vary.)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
		1						1						1			
			1						1						1		
		1						1						1			

Rein2

Bottom	Top	Qty	Model	Position	T or T&C
73	87.45	3	MS-600	F	T&C
87.45	94.45	3	MS-600	F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1						1						1					
	1						1						1				

Rein3

Bottom	Top	Qty	Model	Position	T or T&C
0				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C
				F	T&C

AeroSolutions LLC

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

TIA Rev F

Site Data

BU#: *876364*
Site Name: *CROMWELL - FIRST LINE*
App #: *218644 Revision # 6*

Pole Manufacturer:	*Other*

Reactions		
Moment:	2302.2646	ft-kips
Axial:	34.3263	kips
Shear:	29.239474	kips

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

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

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

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

Pole Data		
Diam:	44.25	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	170.9 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	87.7% Pass	

Base Plate Results

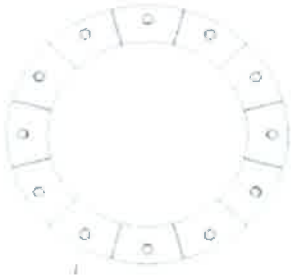
	Flexural Check	Stiffened
Base Plate Stress:	52.0 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	86.6% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	76.8% Pass
Vertical Weld:	40.9% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	16.5% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	67.2% Pass
Plate Comp. (AISC Bracket):	67.5% Pass

Pole Results

Pole Punching Shear Check:	12.7% Pass



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

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

Anchor Rod Information for TIA/EIA-222-F and TIA-222-G-2

Site Information	
ID:	876364
Name:	CROMWELL - FIRST LINE EMERGENC
App. #:	218644 Revision # 6

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Base Reactions		
Moment:	2745	ft-kip
Axial:	34	kip
Shear:	29	kip
Base Plate Type:	Circular	

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	100%
eta Factor:	0.50

Original Anchor Rod Data		
Quantity:	12	
Diameter:	2.25	in
Material:	#18J	
Bolt Circle:	53.0	in
Bolt Spacing:		in
Bolt Group Area:	47.71	in^2
Bolt Group MOIx:	16753	in^4

Reactions Seen by Original AR Group		
Moment:	2302.3	kip-ft
Axial:	34.3	kip
Shear:	29.2	kip

Original AR Capacity Check		
Tension Load:	165.0	kip
Allowable load:	194.8	kip
AR Capacity:	84.7%	Pass

First Added Anchor Rod Data		
Quantity:	3	
Diameter:	1.75	in
Material:	A193 B7	
Bolt Circle:	59.8	in
Bolt Group Area:	7.22	in^2
Bolt Group MOIx:	3220	in^4

Reactions Seen by First Added AR Group		
Moment:	442.5	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

First Added AR Capacity Check		
Tension Load:	118.5	kip
Allowable load:	132.3	kip
AR Capacity:	89.6%	Pass

Second Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

Third Added Anchor Rod Data		
Quantity:		
Diameter:		in
Material:		
Bolt Circle:		in
Bolt Group Area:	0.00	in^2
Bolt Group MOIx:	0	in^4

Reactions Seen by Second Added AR Group		
Moment:	0.0	kip-ft
Axial:	0.0	kip
Shear:	0.0	kip

Second Added AR Capacity Check		
Tension Load:	0.0	kip
Allowable load:	0.0	kip
AR Capacity:	0.0%	

PROJECT	**876364 - CROMWELL / FIRST LINE EMERGENC, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**11/17/14**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

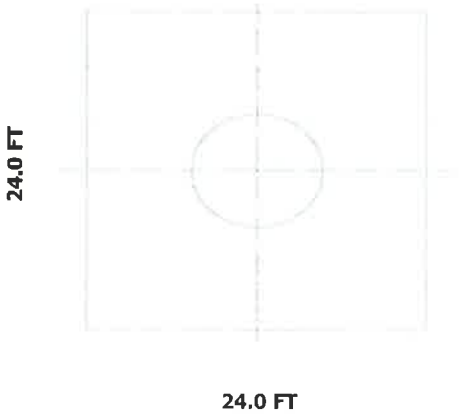
Rev. Type: F

Design Loads:

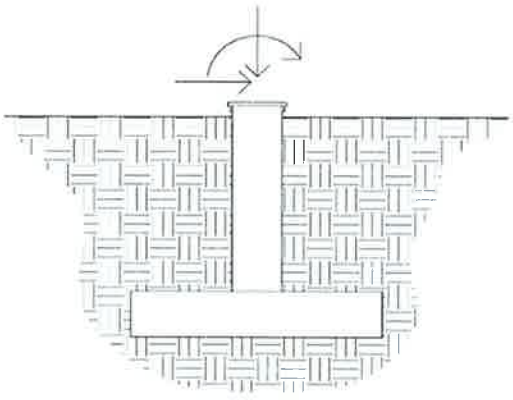
	Input unfactored loads	
Shear:	29.0	kips
Moment:	2,745.0	ft-kips
Tower Height:	125.0	ft
Tower Weight:	34.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	44.25	in
Bearing Depth:	5.0	ft
Pad Width:	24.0	ft
Neglected Depth:	3.3	ft
Thickness:	3.0	ft
Pier Diameter:	14.0	ft
Pier Height Above Grade:	1.0	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	8	
Pier Rebar Quanity:	24	
Pad Rebar Size:	8	
Pad Rebar Quanity:	30	
Pier Tie Size:	4	
Tie Quanity:	7	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.125	kcf
Ult. Bearing Capacity:	8.000	ksf
Angle of Friction:	30.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.300	

Summary of Results

Req'd Pier Diam.	OK
Overturning	84.6%
Shear Capacity	40.1%
Bearing	46.4%
Pad Shear - 1-way	19.6%
Pad Shear - 2-way	6.7%
Pad Moment Capacity	14.7%
Pier Moment Capacity	52.3%

** Notes: