ROBINSON & COLE LLP

KENNETH C. BALDWIN

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Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
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Also admitted in Massachusetts

May 7, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
2715 Mountain Road, Suffield, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 160-foot level of the existing 190.5 foot tower at 2715 Mountain Road in Suffield, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 2008. Cellco now intends to replace six (6) of its existing antennas with three (3) model 742 213V01, 1900 MHz antennas and three (3) model 742 213V01, 2100 MHz antennas, all at the same 160-foot level on the tower. Cellco also intends to install three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable attached to the outside of the monopole. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Edward McAnaney, First Selectman of the Town of Suffield. The Town of Suffield is 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 RRH's will be located at the 160-foot level on the 190.5 tower.

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

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

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

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

6. The tower and its foundation can support Cellco's proposed modifications. (*See* Structural Analysis Report included in Attachment 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Edward McAnaney, Suffield First Selectman
Sandy M. Carter

ATTACHMENT 1

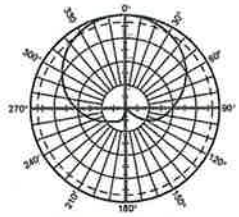
KATHREIN
SCALA DIVISION

742 213V01

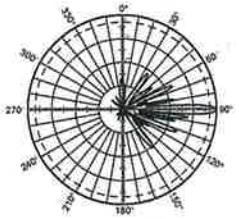
65° Panel Antenna

Kathrein's X-polarized adjustable electrical downtilt antennas offer the wireless carrier the ability to tailor polarization diversity sites for optimum performance. Using variable downtilt, only a few models need be procured to accommodate the needs of widely varying conditions. Remotely controlled downtilt is available as a retrofitable option.

- 0-6° downtilt range.
- UV resistant pulltruded fiberglass radome.
- DC Grounded metallic parts for impulse suppression.
- No moving electrical connections.
- Wideband vector dipole technology.
- Optional remote downtilt Control.
- Will accomodate future 3G / UMTS applications.



Horizontal pattern
±45°- polarization



Vertical pattern
±45°- polarization
0°–6° electrical downtilt

General specifications:

Frequency range	1710–2200 MHz
VSWR	< 1.5:1
Impedance	50 ohms
Intermodulation (2x20w)	IM3: <-150 dBc
Polarization	+45° and -45°
Front-to-back ratio (180°±30°)	>30 dB (co-polar) >25 dB (total power)
Maximum input power	300 watts per input (at 50°C)
Electrical downtilt continuously adjustable	0–6 degrees
Connector	2 x 7-16 DIN female
Isolation	>30 dB
Cross polar ratio Main direction 0° Sector ±60°	 25 dB (typical) >10 dB
Tracking, average	0.5 dB
Squint	±2.0°
Weight	19.8 lb (9 kg) 24.3 lb (11 kg) clamps included
Dimensions	76.9 x 6.1 x 2.8 inches (1954 x 155 x 70 mm)
Wind load Front/Side/Rear Mounting category	at 93 mph (150kph) 115 lbf / 32 lbf / 115 lbf (510 N) / (140 N) / (510 N) M (Medium)
Wind survival rating*	120 mph (200 kph)
Shipping dimensions	88 x 6.8 x 3.6 inches (2235 x 172 x 92 mm)
Shipping weight	28.7 lb (13 kg)
Mounting	Fixed mounts for 2 to 4.6 inch (50 to 115 mm) OD masts are included and tilt options are available.
See reverse for order information.	

Specifications:	**1710–1880 MHz**	**1850–1990 MHz**	**1920–2200 MHz**
Gain	19 dBi	19.2 dBi	19.5 dBi
+45° and -45° polarization horizontal beamwidth	67° (half-power)	65° (half-power)	63° (half-power)
+45° and -45° polarization vertical beamwidth	4.7° (half-power)	4.5° (half-power)	4.3° (half-power)
Sidelobe suppression for first sidelobe above main beam	0° 2° 4° 6° T 18 18 16 15 dB	0° 2° 4° 6° T 18 18 17 16 dB	0° 2° 4° 6° T 18 18 18 18 dB

RoHS
Lead-Free

11271-B
936.3740/b

*Mechanical design is based on environmental conditions as stipulated in TIA-222-G-2 (December 2009) and/or ETS 300 019-1-4 which include the static mechanical load imposed on an antenna by wind at maximum velocity. See the Engineering Section of the catalog for further details.

Kathrein Inc., Scala Division Post Office Box 4580 Medford, OR 97501 (USA) Phone: (541) 779-6500 Fax: (541) 779-3991
Email: communications@kathrein.com Internet: www.kathrein-scala.com

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

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

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

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

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

Fast, low-cost installation and deployment

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

Excellent RF performance

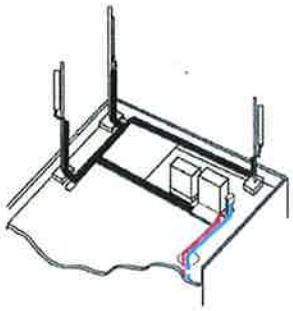
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation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

Features

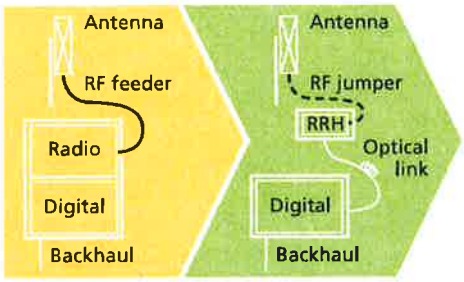
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

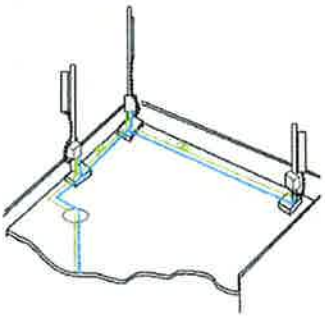
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility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



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

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

Power

- Power supply: -48VDC

Operating environment

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

RF characteristics

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

Optical characteristics

Type/number of fibers

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

Optical fiber length

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

Digital Ports and Alarms

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

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

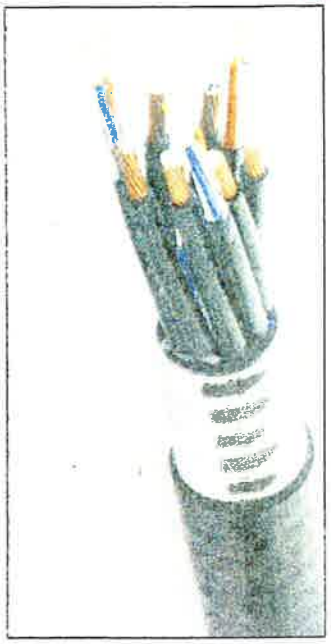


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

* This data is provisional and subject to change

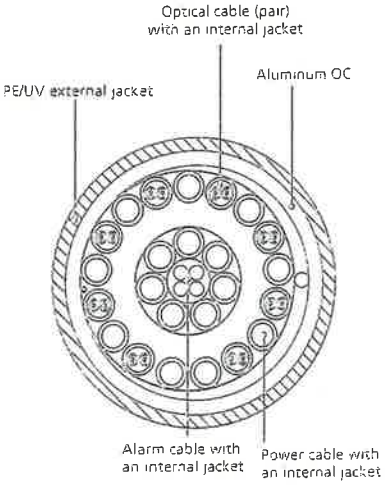


Figure 2: Construction Detail

ATTACHMENT 2

	General	Power	Density					
Site Name: Suffield W								
Tower Height: 190.5Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	170	0.0141	880	0.5867	2.40%	
*AT&T UMTS	2	875	170	0.0218	1900	1.0000	2.18%	
*AT&T GSM	1	283	170	0.0035	880	0.5867	0.60%	
*AT&T GSM	4	525	170	0.0261	1900	1.0000	2.61%	
*AT&T LTE	1	1615	170	0.0201	734	0.4893	4.11%	
*Nextel	9	100	192	0.0088	851	0.5673	1.55%	
*T-Mobile	8	193	182	0.0168	1930	1.0000	1.68%	
Verizon	**11**	**399**	**160**	**0.0616**	**1970**	**1.0000**	**6.16%**	
Verizon	**9**	**380**	**160**	**0.0480**	**869**	**0.5793**	**8.29%**	
Verizon	**1**	**1750**	**160**	**0.0246**	**2145**	**1.0000**	**2.46%**	
Verizon	**1**	**1050**	**160**	**0.0147**	**698**	**0.4653**	**3.17%**	
								35.20%
* Source: Siting Council								

ATTACHMENT 3

March 21, 2014

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

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Suffield West
Crown Castle Designation:	**Crown Castle BU Number:**	801485
	Crown Castle Site Name:	CT SUFFIELD 1 CAC 801485
	Crown Castle JDE Job Number:	264261
	Crown Castle Work Order Number:	727321
	Crown Castle Application Number:	213751 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	84855.002.01
Site Data:	**2715 Mountain Rd., Suffield, Hartford County, CT** **Latitude *42° 0' 41.8"*, Longitude *-72° 43' 43.6"*** **190.5 Foot - Monopole Tower**	

Dear Marianne Dunst,

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 627479, in accordance with application 213751, revision 0.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing 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 80 mph fastest mile.

All modifications and 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.

Jyoti Ojha
Project Engineer

Chad E. Tuttle, P.E.
President

CONNECTICUT No. 23924 LICENSED PROFESSIONAL ENGINEER 3/21/14

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 190.5 ft. Monopole tower designed by FWT Inc. in May of 2000. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	160.0	3	Alcatel Lucent	RRH2x40-AWS	1	1 5/8	--
		6	Kathrein	742 213			
		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
191.0	192.0	12	Decibel	DB844H90-XY	12	1 5/8	1
	191.0	1	--	Platform Mount [LP 714-1]			
180.0	182.0	6	Decibel	PCS 1900 TMA Dual DUP	6	1 5/8	1
		3	Ems Wireless	RR90-17-02DP			
	180.0	1	--	T-Arm Mount [TA 701-3]			
168.0	171.0	3	Ericsson	RRUS-11	12 2 1	1 5/8 3/4 3/8	1
		2	Powerwave	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
	170.0	1	Kmw	AM-X-CD-14-65-00T-RET			
		6	Powerwave	7770.00			
		4	Powerwave	LGP21401			
		6	Powerwave	LGP21901			
		2	Powerwave	P65-17-XLH-RR			
	168.0	1	--	Platform Mount [LP 303-1]			
160.0	160.0	2	Antel	BXA-70063-6CF-EDIN-0	18	1 5/8	1
		1	Antel	BXA-70063-6CF-2			
		4	Antel	LPA-80063-6CF-EDIN			
		2	Antel	LPA-80063-6CF-EDIN-5			
		6	**Antel**	**LPA-171080-12CF-EDIN-2**	**--**	**--**	**2**
		1	--	Platform Mount [LP 601-1]	--	--	1

Notes:
1) Existing Equipment
2) 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)
192	192	1	--	12' LPS Mount w/service grating	--	--
		12	swedcom	ALP-9011-E-DIN		
182	182	1	--	12' LPS Mount w/service grating	--	--
		12	swedcom	ALP-9212-N		
172	172	1	--	12' LPS Mount w/service grating	--	--
		12	swedcom	ALP-9212-N		
162	162	1	--	12' LPS Mount w/service grating	--	--
		12	swedcom	ALP-9212-N		
152	152	1	--	12' LPS Mount w/service grating	--	--
		12	swedcom	ALP-9212-N		
142	142	1	--	12' LPS Mount w/service grating	--	--
		12	swedcom	ALP-9212-N		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Revision # 0	213751	CCI Sites
Tower Manufacturer Drawings	FWT Inc. Job No. 21281000	942443	CCI Sites
Tower Modification Drawings	B+T Group Project No. 84855.001	3268394	CCI Sites
Post Modification Inspection	TEP Project No. 127143	3770639	CCI Sites
Tower Foundation Drawing	FWT Inc. Job No. 21281000	1118796	CCI Sites
Geotechnical Reports	Clough, Harbour & Associates LLP,CHA Project No. 8961.07.06	2240855	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 03/13/2014	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	190.5 - 143.17	Pole	TP27.778x14.75x0.25	1	-8.815	1094.926	87.8	Pass
L2	143.17 - 93.75	Pole	TP40.88x26.293x0.375	2	-17.976	2415.569	83.4	Pass
L3	93.75 - 46.08	Pole	TP53.251x38.663x0.375	3	-24.171	2768.401	87.7	Pass
L4	46.08 - 0	Pole	TP65.185x50.596x0.375	4	-46.879	3748.329	91.5	Pass
							Summary	
						Pole (L4)	91.5	Pass
						RATING =	**91.5**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	76.0	Pass
1	Base Plate	Base	43.3	Pass
1	Base Foundation	Base	74.9	Pass

Structure Rating (max from all components) =	**91.5%**

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

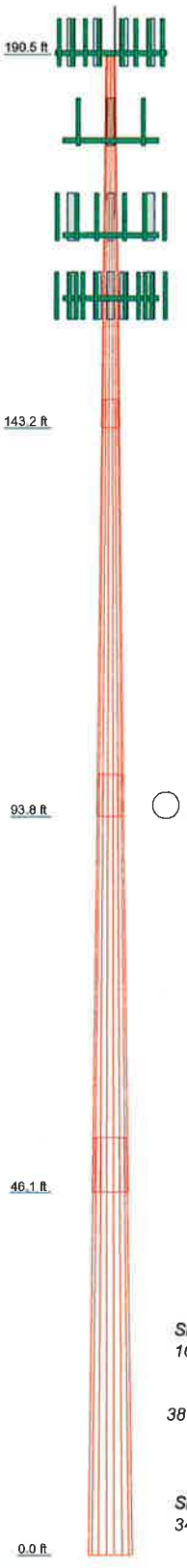
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	47.330	18	0.250	3.580	14.750	27.778	A572-65	2.7
2	53.000	18	0.375	5.330	26.293	40.880		7.1
3	53.000	18	0.375	6.920	38.663	53.251		9.8
4	53.000	18	0.375		50.596	65.185		12.3
								31.9



AXIAL
80 K

SHEAR
10 K

MOMENT
1454 kip-ft

TORQUE 0 kip-ft
38 mph WIND - 1.000 in ICE

AXIAL
47 K

SHEAR
34 K

MOMENT
4517 kip-ft

TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(4) DB844H90-XY w/ Mount Pipe (E)	191	P65-17-XLH-RR w/ Mount Pipe (E)	168
(4) DB844H90-XY w/ Mount Pipe (E)	191	P65-17-XLH-RR w/ Mount Pipe (E)	168
(4) DB844H90-XY w/ Mount Pipe (E)	191	RRUS-11 (E)	168
Platform Mount [LP 714-1] (E)	191	RRUS-11 (E)	168
Lightning Rod 5/8" x 6' (E)	190.5	RRUS-11 (E)	168
RR90-17-02DP w/ Mount Pipe (E)	180	DC6-48-60-18-8F (E)	168
RR90-17-02DP w/ Mount Pipe (E)	180	Platform Mount [LP 303-1] (E)	168
RR90-17-02DP w/ Mount Pipe (E)	180	(2) LPA-80063-6CF-EDIN-5 w/ Mount Pipe (E)	160
(2) PCS 1900 TMA DUAL DUP (E)	180		
(2) PCS 1900 TMA DUAL DUP (E)	180	(2) LPA-80063-6CF-EDIN w/ Mount Pipe (E)	160
(2) PCS 1900 TMA DUAL DUP (E)	180		
(2) 6' x 2" Mount Pipe (E)	180	(2) LPA-80063-6CF-EDIN w/ Mount Pipe (E)	160
(2) 6' x 2" Mount Pipe (E)	180		
(2) 6' x 2" Mount Pipe (E)	180	BXA-70063-6CF-2 w/ Mount Pipe (E)	160
T-Arm Mount [TA 701-3] (E)	180	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	160
(2) 7770.00 w/ Mount Pipe (E)	168		
(2) 7770.00 w/ Mount Pipe (E)	168	BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	160
(2) 7770.00 w/ Mount Pipe (E)	168	(2) 742 213 w/ Mount Pipe (P)	160
(2) LGP21901 (E)	168	(2) 742 213 w/ Mount Pipe (P)	160
(2) LGP21901 (E)	168	(2) 742 213 w/ Mount Pipe (P)	160
(2) LGP21901 (E)	168	RRH2x40-AWS (P)	160
(2) LGP21401 (E)	168	RRH2x40-AWS (P)	160
(2) LGP21401 (E)	168	RRH2x40-AWS (P)	160
(2) LGP21401 (E)	168	DB-T1-6Z-8AB-0Z (P)	160
AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	168	Platform Mount [LP 601-1] (E)	160

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 91.5%

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

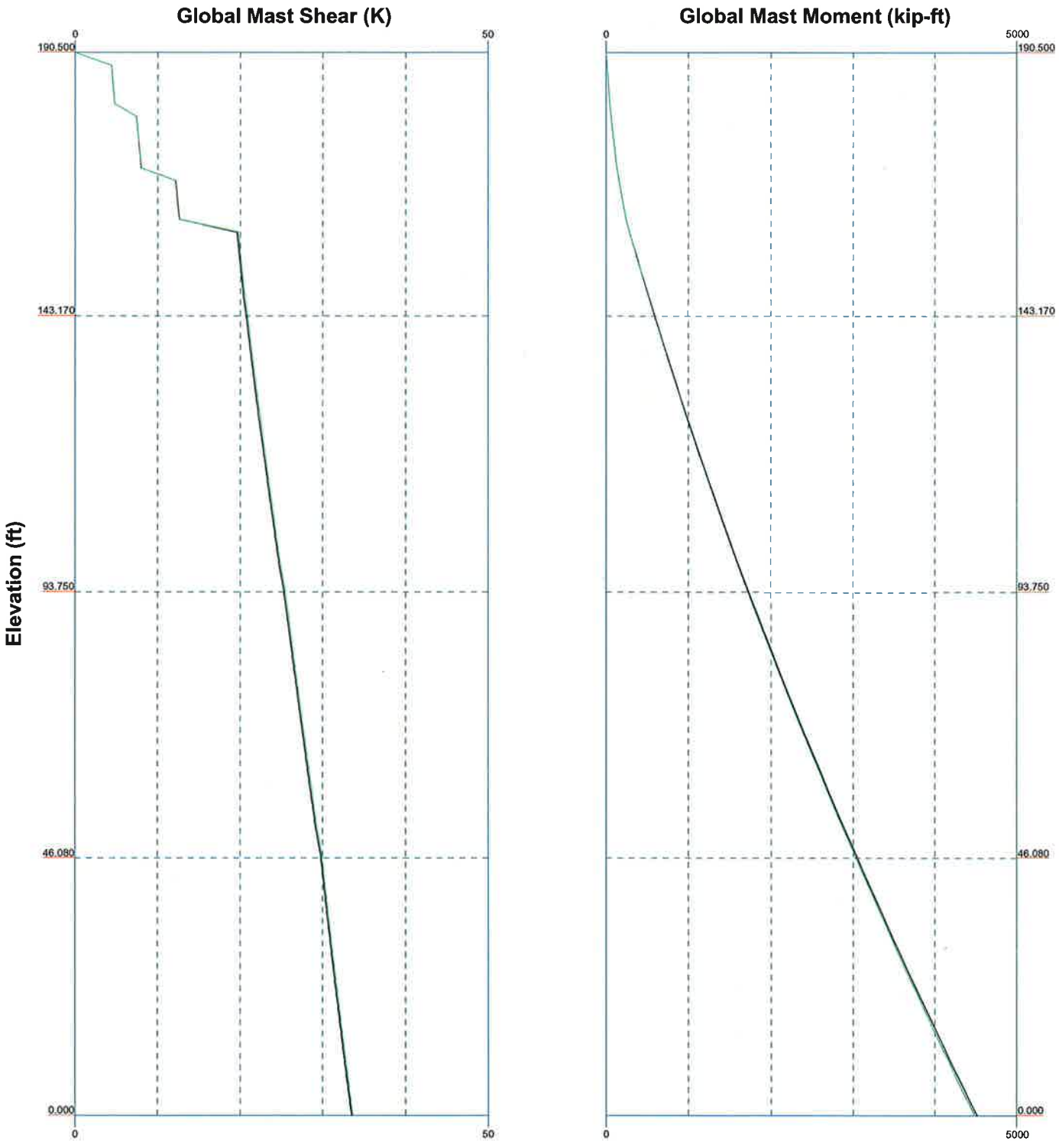
Job: 84855.002.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148		
Project:		
Client: Crown Castle	Drawn by: jojha	App'd:
Code: TIA/EIA-222-F	Date: 03/21/14	Scale: NTS
Path: C:\Users\Job\Desktop\84855.002\Tnx\84855_002_01_CT SUFFIELD 1 CAC 801485_CT.e		Dwg No. E-1

TIA/EIA-222-F - 80 mph/38 mph 1.000 in Ice

Vx Vz

Maximum Values

Mx Mz



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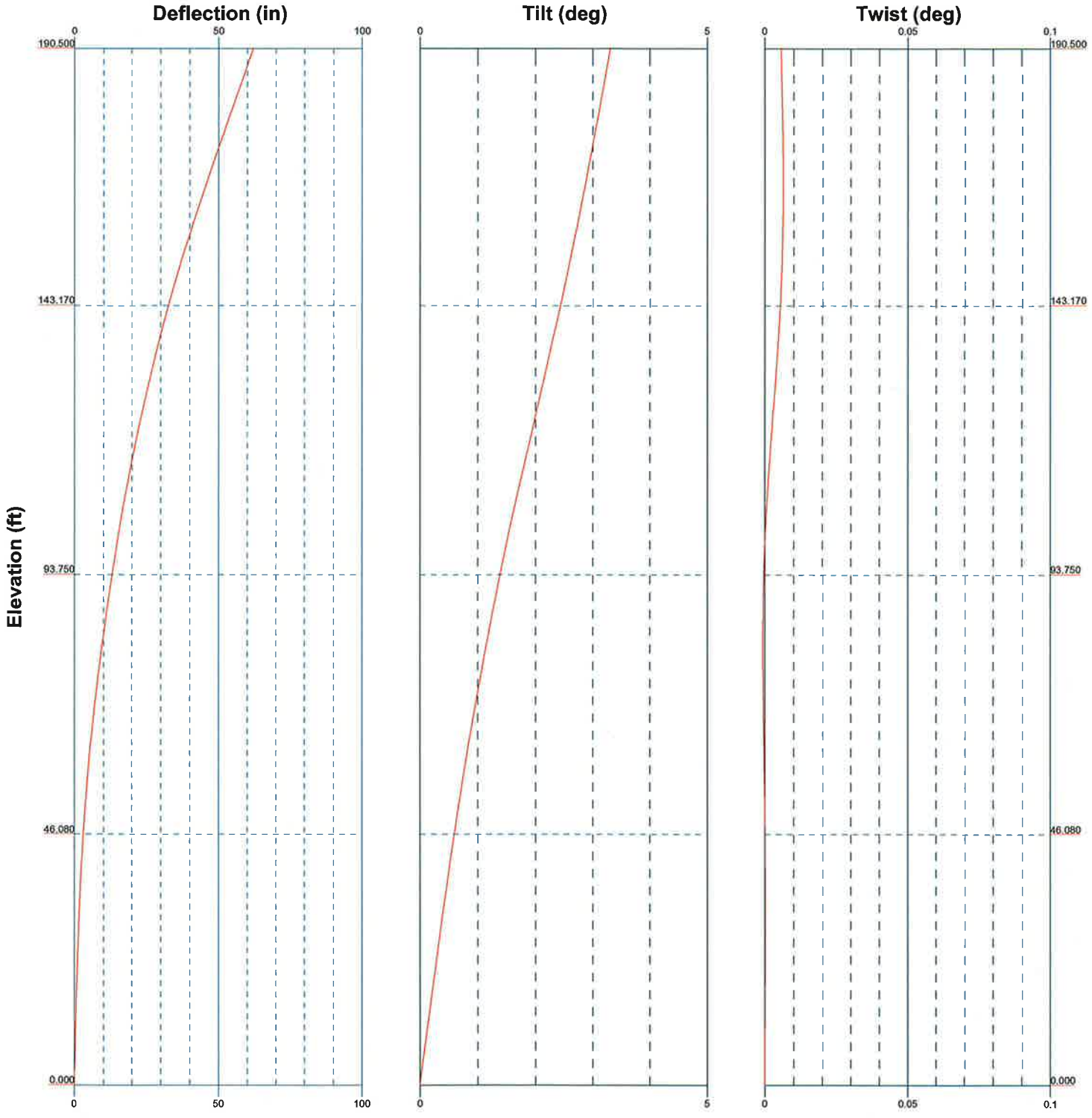
FAX: (918) 295-0265

Job: 84855.002.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148			
Project:			
Client: Crown Castle	Drawn by: jojha	App'd:	
Code: TIA/EIA-222-F	Date: 03/21/14	Scale: NTS	
Path: C:\Users\jojha\Desktop\84855.002\Tnx\84855_002_01_CT_SUFFIELD_1_CAC_801485_CT.e		Dwg No. E-4	

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

Maximum Values

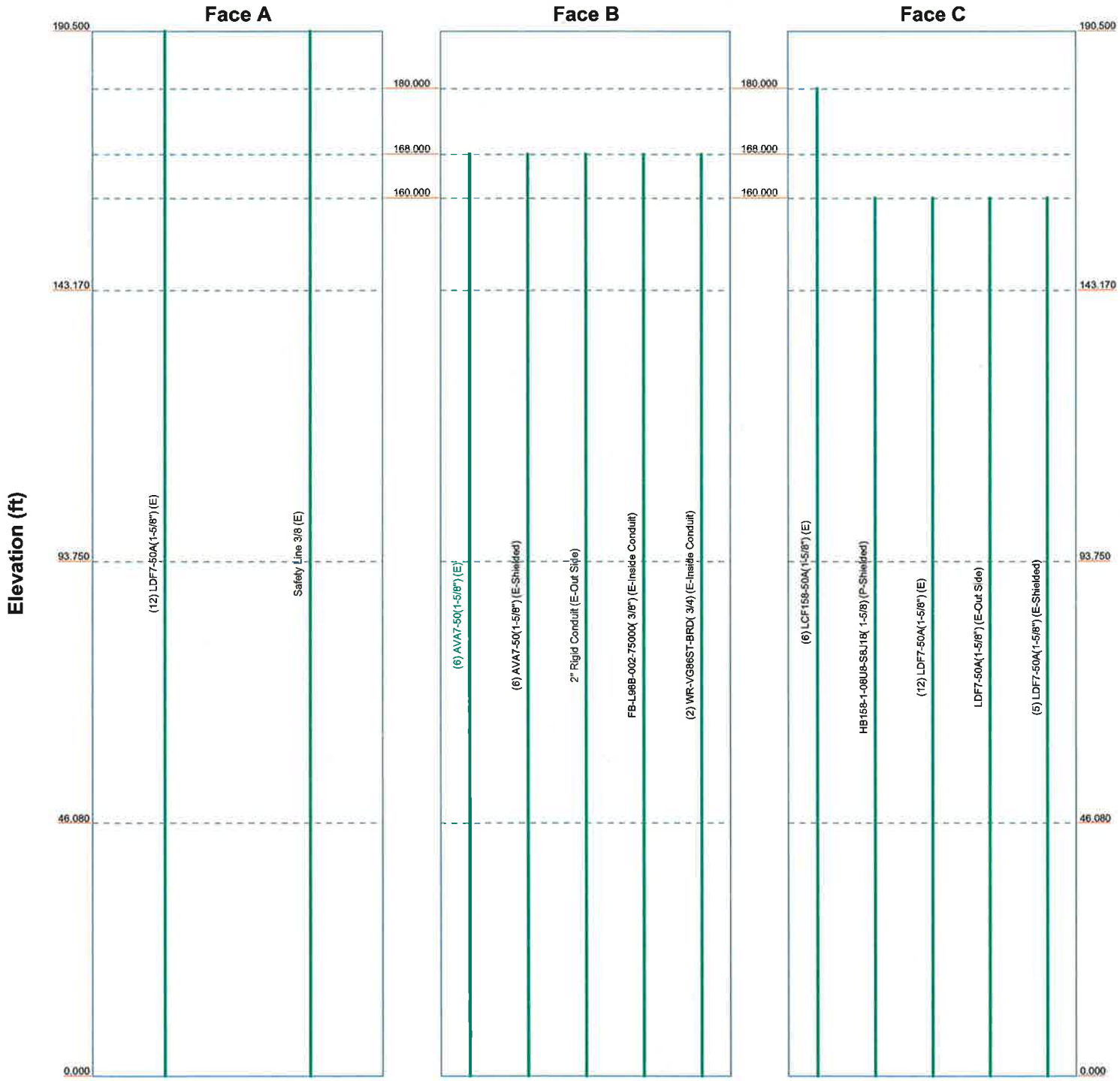


B+T Group
1717 S Boulder Ave, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: *84855.002.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148*			
Project:			
Client: Crown Castle	Drawn by: jojha	App'd:	
Code: TIA/EIA-222-F	Date: 03/21/14	Scale: NTS	
Path: C:\Users\JoJha\Desktop\84855.002\Tnx\84855_002_01_CT_SUFFIELD_1_CAC_801485_CT.e		Dwg No. E-5	

Feed Line Distribution Chart
0' - 190'6"

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



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

Job: 84855.002.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 80148		
Project:		
Client: Crown Castle	Drawn by: jojha	App'd:
Code: TIA/EIA-222-F	Date: 03/21/14	Scale: NTS
Path: C:\Users\jojha\Desktop\84855.002\Tnx\84855_002_01_CT SUFFIELD 1 CAC 801485_CT.e		Dwg No. E-7

tnxTower	Job	Page
	84855.002.01 - CT SUFFIELD 1 CAC 801485, CT (BU# 801485)	1 of 15
B+T Group 1717 S Boulder Ave, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project	Date 11:07:49 03/21/14
	Client Crown Castle	Designed by jojha

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 Hartford County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 1.000 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	190.500-143.170	47.330	3.580	18	14.750	27.778	0.250	1.000	A572-65 (65 ksi)
L2	143.170-93.750	53.000	5.330	18	26.293	40.880	0.375	1.500	A572-65 (65 ksi)
L3	93.750-46.080	53.000	6.920	18	38.663	53.251	0.375	1.500	A572-65 (65 ksi)
L4	46.080-0.000	53.000		18	50.596	65.185	0.375	1.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.978	11.506	305.625	5.148	7.493	40.788	611.651	5.754	2.156	8.624
	28.207	21.843	2091.262	9.772	14.111	148.198	4185.275	10.924	4.449	17.796
L2	27.699	30.848	2617.934	9.201	13.357	196.003	5239.312	15.427	3.967	10.58
	41.511	48.211	9993.130	14.379	20.767	481.201	19999.410	24.110	6.535	17.426
L3	40.749	45.572	8440.413	13.592	19.641	429.739	16891.932	22.790	6.145	16.386
	54.072	62.936	22230.612	18.771	27.052	821.788	44490.476	31.474	8.712	23.232
L4	53.311	59.776	19047.570	17.829	25.703	741.066	38120.203	29.894	8.245	21.987
	66.191	77.140	40935.651	23.008	33.114	1236.205	81925.167	38.577	10.813	28.833

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 190.500-143.170				1	1	1		
L2 143.170-93.750				1	1	1		
L3 93.750-46.080				1	1	1		
L4 46.080-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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
LDF7-50A(1-5/8") (E)	A	No	Inside Pole	190.500 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
&								
LCF158-50A(1-5/8") (E)	C	No	Inside Pole	180.000 - 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
&								

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
AVA7-50(1-5/8") (E)	B	No	Inside Pole	168.000 - 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
AVA7-50(1-5/8") (E-Shielded)	B	No	CaAa (Out Of Face)	168.000 - 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	0.010
						4" Ice	0.000	0.030
2" Rigid Conduit (E-Out Side)	B	No	CaAa (Out Of Face)	168.000 - 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)	B	No	CaAa (Out Of Face)	168.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (E-Inside Conduit)	B	No	CaAa (Out Of Face)	168.000 - 0.000	2	No Ice	0.000	0.001
						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
&								
HB158-1-08U8-S8J18(1-5/8) (P-Shielded)	C	No	CaAa (Out Of Face)	160.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.031
LDF7-50A(1-5/8") (E)	C	No	Inside Pole	160.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
LDF7-50A(1-5/8") (E-Out Side)	C	No	CaAa (Out Of Face)	160.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.002
						1" Ice	0.398	0.004
						2" Ice	0.598	0.011
						4" Ice	0.998	0.030
LDF7-50A(1-5/8") (E-Shielded)	C	No	CaAa (Out Of Face)	160.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002
						1" Ice	0.000	0.004
						2" Ice	0.000	0.011
						4" Ice	0.000	0.030
&								
Safety Line 3/8 (E)	A	No	CaAa (Out Of Face)	190.500 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
&								

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	190.500-143.170	A	0.000	0.000	0.000	1.775	0.476
		B	0.000	0.000	0.000	4.966	0.309
		C	0.000	0.000	0.000	3.332	0.447
L2	143.170-93.750	A	0.000	0.000	0.000	1.853	0.497
		B	0.000	0.000	0.000	9.884	0.615
		C	0.000	0.000	0.000	9.785	1.031
L3	93.750-46.080	A	0.000	0.000	0.000	1.788	0.480
		B	0.000	0.000	0.000	9.534	0.593
		C	0.000	0.000	0.000	9.439	0.994
L4	46.080-0.000	A	0.000	0.000	0.000	1.728	0.464
		B	0.000	0.000	0.000	9.216	0.573
		C	0.000	0.000	0.000	9.124	0.961

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	190.500-143.170	A	1.213	0.000	0.000	0.000	13.255	0.537
		B		0.000	0.000	0.000	10.988	1.329
		C		0.000	0.000	0.000	7.414	1.028
L2	143.170-93.750	A	1.164	0.000	0.000	0.000	13.840	0.561
		B		0.000	0.000	0.000	21.871	2.645
		C		0.000	0.000	0.000	21.772	2.738
L3	93.750-46.080	A	1.093	0.000	0.000	0.000	12.887	0.538
		B		0.000	0.000	0.000	20.634	2.431
		C		0.000	0.000	0.000	20.539	2.543
L4	46.080-0.000	A	1.000	0.000	0.000	0.000	11.804	0.517
		B		0.000	0.000	0.000	19.292	2.179
		C		0.000	0.000	0.000	19.200	2.319

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	190.500-143.170	0.042	0.087	0.068	-0.054
L2	143.170-93.750	0.002	0.210	0.002	0.164
L3	93.750-46.080	0.002	0.218	0.002	0.181
L4	46.080-0.000	0.002	0.222	0.002	0.192

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8" x 6'	B	From Leg	0.000	0.000	190.500	No Ice	0.375	0.375	0.033
(E)			0.000			1/2" Ice	0.989	0.989	0.037
			3.000			1" Ice	1.619	1.619	0.045
						2" Ice	2.464	2.464	0.074
						4" Ice	4.076	4.076	0.184
&									
(4) DB844H90-XY w/ Mount Pipe	C	From Leg	4.000	0.000	191.000	No Ice	3.104	5.154	0.028
(E)			0.000			1/2" Ice	3.476	5.833	0.068
			1.000			1" Ice	3.879	6.523	0.113
						2" Ice	4.761	7.959	0.224
						4" Ice	6.660	11.092	0.552
(4) DB844H90-XY w/ Mount Pipe	B	From Leg	4.000	0.000	191.000	No Ice	3.104	5.154	0.028
(E)			0.000			1/2" Ice	3.476	5.833	0.068
			1.000			1" Ice	3.879	6.523	0.113
						2" Ice	4.761	7.959	0.224
						4" Ice	6.660	11.092	0.552
(4) DB844H90-XY w/ Mount Pipe	A	From Leg	4.000	0.000	191.000	No Ice	3.104	5.154	0.028
(E)			0.000			1/2" Ice	3.476	5.833	0.068
			1.000			1" Ice	3.879	6.523	0.113
						2" Ice	4.761	7.959	0.224
						4" Ice	6.660	11.092	0.552
Platform Mount [LP 714-1]	C	None		0.000	191.000	No Ice	37.470	37.470	1.600
(E)						1/2" Ice	44.230	44.230	2.040
						1" Ice	50.990	50.990	2.480
						2" Ice	64.510	64.510	3.360
						4" Ice	91.550	91.550	5.119
&									
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.000	0.000	180.000	No Ice	4.593	3.319	0.034
(E)			0.000			1/2" Ice	5.088	4.089	0.072
			2.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.000	0.000	180.000	No Ice	4.593	3.319	0.034
(E)			0.000			1/2" Ice	5.088	4.089	0.072
			2.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.000	0.000	180.000	No Ice	4.593	3.319	0.034
(E)			0.000			1/2" Ice	5.088	4.089	0.072
			2.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
(2) PCS 1900 TMA DUAL DUP	C	From Leg	4.000	0.000	180.000	No Ice	0.628	0.617	0.018
(E)			0.000			1/2" Ice	0.744	0.732	0.023
			2.000			1" Ice	0.869	0.856	0.031
						2" Ice	1.145	1.131	0.052
						4" Ice	1.799	1.783	0.122
(2) PCS 1900 TMA DUAL DUP	B	From Leg	4.000	0.000	180.000	No Ice	0.628	0.617	0.018
(E)			0.000			1/2" Ice	0.744	0.732	0.023
			2.000			1" Ice	0.869	0.856	0.031
						2" Ice	1.145	1.131	0.052
						4" Ice	1.799	1.783	0.122
(2) PCS 1900 TMA DUAL DUP	A	From Leg	4.000	0.000	180.000	No Ice	0.628	0.617	0.018
(E)			0.000			1/2" Ice	0.744	0.732	0.023
			2.000			1" Ice	0.869	0.856	0.031
						2" Ice	1.145	1.131	0.052
						4" Ice	1.799	1.783	0.122

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.000	180.000	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	B	From Leg	4.000	0.000	180.000	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	A	From Leg	4.000	0.000	180.000	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
T-Arm Mount [TA 701-3]	C	None		0.000	180.000	No Ice	27.950	27.950	1.092
(E)						1/2" Ice	37.260	37.260	1.407
						1" Ice	46.570	46.570	1.722
						2" Ice	65.190	65.190	2.352
						4" Ice	102.430	102.430	3.612
&									
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	168.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			2.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	168.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			2.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	168.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			2.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
(2) LGP21901	C	From Leg	4.000	0.000	168.000	No Ice	0.270	0.184	0.006
(E)			0.000			1/2" Ice	0.343	0.248	0.008
			2.000			1" Ice	0.425	0.322	0.011
						2" Ice	0.616	0.494	0.022
						4" Ice	1.101	0.943	0.066
(2) LGP21901	B	From Leg	4.000	0.000	168.000	No Ice	0.270	0.184	0.006
(E)			0.000			1/2" Ice	0.343	0.248	0.008
			2.000			1" Ice	0.425	0.322	0.011
						2" Ice	0.616	0.494	0.022
						4" Ice	1.101	0.943	0.066
(2) LGP21901	A	From Leg	4.000	0.000	168.000	No Ice	0.270	0.184	0.006
(E)			0.000			1/2" Ice	0.343	0.248	0.008
			2.000			1" Ice	0.425	0.322	0.011
						2" Ice	0.616	0.494	0.022
						4" Ice	1.101	0.943	0.066
(2) LGP21401	C	From Leg	4.000	0.000	168.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			2.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(2) LGP21401	B	From Leg	4.000	0.000	168.000	No Ice	1.288	0.233	0.014

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)			0.000 3.000			1/2" Ice 1" Ice 2" Ice 4" Ice	1.445 1.611 1.969 2.788	0.313 0.403 0.608 1.121	0.021 0.030 0.055 0.135
(2) LGP21401 (E)	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.288 1.445 1.611 1.969 2.788	0.233 0.313 0.403 0.608 1.121	0.014 0.021 0.030 0.055 0.135
AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.744 6.198 6.661 7.618 9.668	4.015 4.633 5.276 6.678 9.744	0.035 0.080 0.131 0.254 0.610
P65-17-XLH-RR w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126
P65-17-XLH-RR w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.704 12.424 13.153 14.639 17.906	8.938 10.450 11.986 14.313 19.144	0.092 0.178 0.273 0.498 1.126
RRUS-11 (E)	C	From Leg	4.000 0.000 3.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS-11 (E)	B	From Leg	4.000 0.000 3.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
RRUS-11 (E)	A	From Leg	4.000 0.000 3.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.249 3.491 3.741 4.268 5.426	1.373 1.551 1.738 2.138 3.042	0.048 0.068 0.092 0.150 0.310
DC6-48-60-18-8F (E)	A	From Leg	4.000 0.000 3.000	0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.266 1.456 1.658 2.093 3.098	1.266 1.456 1.658 2.093 3.098	0.020 0.035 0.053 0.095 0.215
Platform Mount [LP 303-1] (E)	C	None		0.000	168.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101
& (2) LPA-80063-6CF-EDIN-5 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	160.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.745 11.412 12.045 13.341 16.054	10.700 11.967 12.948 14.963 19.208	0.052 0.145 0.247 0.480 1.095
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	160.000	No Ice 1/2" Ice	10.745 11.412	10.700 11.967	0.052 0.145

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)			0.000			1" Ice	12.045	12.948	0.247
						2" Ice	13.341	14.963	0.480
						4" Ice	16.054	19.208	1.095
(2) LPA-80063-6CF-EDIN w/ Mount Pipe	A	From Leg	4.000	0.000	160.000	No Ice	10.745	10.700	0.052
			0.000			1/2" Ice	11.412	11.967	0.145
(E)			0.000			1" Ice	12.045	12.948	0.247
						2" Ice	13.341	14.963	0.480
						4" Ice	16.054	19.208	1.095
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.000	0.000	160.000	No Ice	7.969	5.801	0.042
			0.000			1/2" Ice	8.609	6.953	0.103
(E)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000	0.000	160.000	No Ice	7.969	5.801	0.042
			0.000			1/2" Ice	8.609	6.953	0.103
(E)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000	0.000	160.000	No Ice	7.969	5.801	0.042
			0.000			1/2" Ice	8.609	6.953	0.103
(E)			0.000			1" Ice	9.216	7.819	0.171
						2" Ice	10.459	9.601	0.335
						4" Ice	13.066	13.366	0.804
(2) 742 213 w/ Mount Pipe	C	From Leg	4.000	0.000	160.000	No Ice	5.373	4.620	0.049
(P)			0.000			1/2" Ice	5.950	6.000	0.094
			0.000			1" Ice	6.501	6.982	0.146
						2" Ice	7.611	8.852	0.277
						4" Ice	9.933	12.794	0.683
(2) 742 213 w/ Mount Pipe	B	From Leg	4.000	0.000	160.000	No Ice	5.373	4.620	0.049
(P)			0.000			1/2" Ice	5.950	6.000	0.094
			0.000			1" Ice	6.501	6.982	0.146
						2" Ice	7.611	8.852	0.277
						4" Ice	9.933	12.794	0.683
(2) 742 213 w/ Mount Pipe	A	From Leg	4.000	0.000	160.000	No Ice	5.373	4.620	0.049
(P)			0.000			1/2" Ice	5.950	6.000	0.094
			0.000			1" Ice	6.501	6.982	0.146
						2" Ice	7.611	8.852	0.277
						4" Ice	9.933	12.794	0.683
RRH2x40-AWS	C	From Leg	4.000	0.000	160.000	No Ice	2.522	1.589	0.044
(P)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2x40-AWS	B	From Leg	4.000	0.000	160.000	No Ice	2.522	1.589	0.044
(P)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
RRH2x40-AWS	A	From Leg	4.000	0.000	160.000	No Ice	2.522	1.589	0.044
(P)			0.000			1/2" Ice	2.753	1.795	0.061
			0.000			1" Ice	2.993	2.010	0.082
						2" Ice	3.499	2.465	0.132
						4" Ice	4.615	3.479	0.275
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	160.000	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

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
Platform Mount [LP 601-1] (E)	C	None		0.000	160.000	4" Ice	8.365	4.373	0.455
						No Ice	28.470	28.470	1.122
						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
						2" Ice	48.950	48.950	2.689
						4" Ice	69.430	69.430	4.255
&									

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190.5 - 143.17	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.129	-1.245	0.425
			Max. Mx	5	-8.847	-515.841	-0.319
			Max. My	2	-8.815	0.250	518.313
			Max. Vy	5	20.395	-515.841	-0.319
			Max. Vx	8	20.565	-0.816	-517.707
			Max. Torque	6			1.565
L2	143.17 - 93.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-38.717	-1.877	-2.626
			Max. Mx	5	-17.998	-1588.264	-1.730
			Max. My	8	-17.976	-1.991	-1598.644
			Max. Vy	5	24.731	-1588.264	-1.730
			Max. Vx	8	24.904	-1.991	-1598.644
			Max. Torque	6			1.556
L3	93.75 - 46.08	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-56.499	-2.563	-6.421
			Max. Mx	5	-29.892	-2829.188	-3.303
			Max. My	8	-29.881	-3.133	-2847.956
			Max. Vy	5	29.058	-2829.188	-3.303
			Max. Vx	8	29.229	-3.133	-2847.956
			Max. Torque	6			1.480
L4	46.08 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-80.477	-3.383	-11.270
			Max. Mx	5	-46.879	-4488.741	-5.282
			Max. My	8	-46.879	-4.441	-4517.105
			Max. Vy	5	33.509	-4488.741	-5.282
			Max. Vx	8	33.674	-4.441	-4517.105
			Max. Torque	6			1.400

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	80.477	0.001	-10.023
	Max. H_x	11	46.901	33.478	0.020
	Max. H_z	2	46.901	0.020	33.642
	Max. M_x	2	4513.752	0.020	33.642
	Max. M_z	5	4488.741	-33.478	-0.020
	Max. Torsion	6	1.325	-29.002	-16.838
	Min. Vert	1	46.901	0.000	0.000
	Min. H_x	5	46.901	-33.478	-0.020
	Min. H_z	8	46.901	-0.020	-33.642
	Min. M_x	8	-4517.105	-0.020	-33.642
	Min. M_z	11	-4487.015	33.478	0.020
	Min. Torsion	12	-1.320	29.002	16.838

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	46.901	0.000	0.000	1.639	-0.824	0.000
Dead+Wind 0 deg - No Ice	46.901	-0.020	-33.642	-4513.752	2.730	0.920
Dead+Wind 30 deg - No Ice	46.901	16.721	-29.125	-3907.065	-2241.669	0.301
Dead+Wind 60 deg - No Ice	46.901	28.982	-16.804	-2252.989	-3885.696	-0.401
Dead+Wind 90 deg - No Ice	46.901	33.478	0.020	5.282	-4488.741	-0.997
Dead+Wind 120 deg - No Ice	46.901	29.002	16.838	2262.566	-3889.235	-1.325
Dead+Wind 150 deg - No Ice	46.901	16.756	29.145	3913.984	-2247.844	-1.296
Dead+Wind 180 deg - No Ice	46.901	0.020	33.642	4517.105	-4.441	-0.919
Dead+Wind 210 deg - No Ice	46.901	-16.721	29.125	3910.422	2239.936	-0.295
Dead+Wind 240 deg - No Ice	46.901	-28.982	16.804	2256.366	3883.956	0.406
Dead+Wind 270 deg - No Ice	46.901	-33.478	-0.020	-1.889	4487.015	0.996
Dead+Wind 300 deg - No Ice	46.901	-29.002	-16.838	-2259.176	3887.530	1.320
Dead+Wind 330 deg - No Ice	46.901	-16.756	-29.145	-3910.615	2246.147	1.292
Dead+Ice+Temp	80.477	0.000	0.000	11.270	-3.383	0.000
Dead+Wind 0 deg+Ice+Temp	80.477	0.001	-10.023	-1431.571	-3.666	0.299
Dead+Wind 30 deg+Ice+Temp	80.477	4.997	-8.681	-1238.352	-722.375	0.100
Dead+Wind 60 deg+Ice+Temp	80.477	8.654	-5.013	-710.245	-1248.446	-0.126
Dead+Wind 90 deg+Ice+Temp	80.477	9.991	-0.001	11.244	-1440.916	-0.319
Dead+Wind 120 deg+Ice+Temp	80.477	8.652	5.011	732.788	-1248.215	-0.426
Dead+Wind 150 deg+Ice+Temp	80.477	4.995	8.680	1261.051	-721.981	-0.418
Dead+Wind 180 deg+Ice+Temp	80.477	-0.001	10.023	1454.489	-3.219	-0.299
Dead+Wind 210 deg+Ice+Temp	80.477	-4.997	8.681	1261.274	715.483	-0.099
Dead+Wind 240 deg+Ice+Temp	80.477	-8.654	5.013	733.175	1241.553	0.127
Dead+Wind 270 deg+Ice+Temp	80.477	-9.991	0.001	11.691	1434.031	0.319
Dead+Wind 300 deg+Ice+Temp	80.477	-8.652	-5.011	-709.857	1241.337	0.425
Dead+Wind 330 deg+Ice+Temp	80.477	-4.995	-8.680	-1238.128	715.103	0.418
Dead+Wind 0 deg - Service	46.901	-0.008	-13.142	-1765.727	0.533	0.366
Dead+Wind 30 deg - Service	46.901	6.532	-11.377	-1528.250	-877.949	0.119
Dead+Wind 60 deg - Service	46.901	11.321	-6.564	-880.816	-1521.421	-0.161
Dead+Wind 90 deg - Service	46.901	13.077	0.008	3.085	-1757.450	-0.398
Dead+Wind 120 deg - Service	46.901	11.329	6.578	886.608	-1522.821	-0.528
Dead+Wind 150 deg - Service	46.901	6.545	11.385	1533.011	-880.377	-0.517
Dead+Wind 180 deg - Service	46.901	0.008	13.142	1769.085	-2.275	-0.366
Dead+Wind 210 deg - Service	46.901	-6.532	11.377	1531.608	876.204	-0.118
Dead+Wind 240 deg - Service	46.901	-11.321	6.564	884.177	1519.675	0.162
Dead+Wind 270 deg - Service	46.901	-13.077	-0.008	0.278	1755.706	0.398
Dead+Wind 300 deg - Service	46.901	-11.329	-6.578	-883.245	1521.080	0.527
Dead+Wind 330 deg - Service	46.901	-6.545	-11.385	-1529.651	878.637	0.516

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-46.901	0.000	0.000	46.901	0.000	0.000%
2	-0.020	-46.901	-33.642	0.020	46.901	33.642	0.000%
3	16.721	-46.901	-29.125	-16.721	46.901	29.125	0.000%
4	28.982	-46.901	-16.804	-28.982	46.901	16.804	0.000%
5	33.477	-46.901	0.020	-33.478	46.901	-0.020	0.000%
6	29.002	-46.901	16.838	-29.002	46.901	-16.838	0.000%
7	16.756	-46.901	29.145	-16.756	46.901	-29.145	0.000%
8	0.020	-46.901	33.642	-0.020	46.901	-33.642	0.000%
9	-16.721	-46.901	29.125	16.721	46.901	-29.125	0.000%
10	-28.982	-46.901	16.804	28.982	46.901	-16.804	0.000%
11	-33.477	-46.901	-0.020	33.478	46.901	0.020	0.000%
12	-29.002	-46.901	-16.838	29.002	46.901	16.838	0.000%
13	-16.756	-46.901	-29.145	16.756	46.901	29.145	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
14	0.000	-80.477	0.000	-0.000	80.477	-0.000	0.000%
15	0.001	-80.477	-10.023	-0.001	80.477	10.023	0.000%
16	4.997	-80.477	-8.681	-4.997	80.477	8.681	0.000%
17	8.653	-80.477	-5.013	-8.654	80.477	5.013	0.000%
18	9.991	-80.477	-0.001	-9.991	80.477	0.001	0.000%
19	8.652	-80.477	5.011	-8.652	80.477	-5.011	0.000%
20	4.995	-80.477	8.680	-4.995	80.477	-8.680	0.000%
21	-0.001	-80.477	10.023	0.001	80.477	-10.023	0.000%
22	-4.997	-80.477	8.681	4.997	80.477	-8.681	0.000%
23	-8.653	-80.477	5.013	8.654	80.477	-5.013	0.000%
24	-9.991	-80.477	0.001	9.991	80.477	-0.001	0.000%
25	-8.652	-80.477	-5.011	8.652	80.477	5.011	0.000%
26	-4.995	-80.477	-8.680	4.995	80.477	8.680	0.000%
27	-0.008	-46.901	-13.142	0.008	46.901	13.142	0.000%
28	6.532	-46.901	-11.377	-6.532	46.901	11.377	0.000%
29	11.321	-46.901	-6.564	-11.321	46.901	6.564	0.000%
30	13.077	-46.901	0.008	-13.077	46.901	-0.008	0.000%
31	11.329	-46.901	6.578	-11.329	46.901	-6.578	0.000%
32	6.545	-46.901	11.385	-6.545	46.901	-11.385	0.000%
33	0.008	-46.901	13.142	-0.008	46.901	-13.142	0.000%
34	-6.532	-46.901	11.377	6.532	46.901	-11.377	0.000%
35	-11.321	-46.901	6.564	11.321	46.901	-6.564	0.000%
36	-13.077	-46.901	-0.008	13.077	46.901	0.008	0.000%
37	-11.329	-46.901	-6.578	11.329	46.901	6.578	0.000%
38	-6.545	-46.901	-11.385	6.545	46.901	11.385	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	0.00068252
3	Yes	6	0.00000001	0.00004969
4	Yes	6	0.00000001	0.00004988
5	Yes	4	0.00000001	0.00073498
6	Yes	6	0.00000001	0.00004859
7	Yes	6	0.00000001	0.00005070
8	Yes	4	0.00000001	0.00075495
9	Yes	6	0.00000001	0.00004936
10	Yes	6	0.00000001	0.00004913
11	Yes	4	0.00000001	0.00081248
12	Yes	6	0.00000001	0.00005066
13	Yes	6	0.00000001	0.00004860
14	Yes	4	0.00000001	0.00003095
15	Yes	5	0.00000001	0.00049363
16	Yes	5	0.00000001	0.00077512
17	Yes	5	0.00000001	0.00077330
18	Yes	5	0.00000001	0.00049601
19	Yes	5	0.00000001	0.00077763
20	Yes	5	0.00000001	0.00079048
21	Yes	5	0.00000001	0.00049887
22	Yes	5	0.00000001	0.00077505
23	Yes	5	0.00000001	0.00077541
24	Yes	5	0.00000001	0.00049259
25	Yes	5	0.00000001	0.00077098
26	Yes	5	0.00000001	0.00075992

27	Yes	4	0.00000001	0.00019800
28	Yes	5	0.00000001	0.00013388
29	Yes	5	0.00000001	0.00013445
30	Yes	4	0.00000001	0.00020768
31	Yes	5	0.00000001	0.00012936
32	Yes	5	0.00000001	0.00013868
33	Yes	4	0.00000001	0.00020368
34	Yes	5	0.00000001	0.00013213
35	Yes	5	0.00000001	0.00013096
36	Yes	4	0.00000001	0.00021322
37	Yes	5	0.00000001	0.00013789
38	Yes	5	0.00000001	0.00012917

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190.5 - 143.17	62.195	33	3.313	0.006
L2	146.75 - 93.75	34.605	33	2.507	0.003
L3	99.08 - 46.08	14.596	33	1.493	0.001
L4	53 - 0	3.958	33	0.701	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.000	(4) DB844H90-XY w/ Mount Pipe	33	62.195	3.313	0.006	17559
190.500	Lightning Rod 5/8" x 6'	33	62.195	3.313	0.006	17559
180.000	RR90-17-02DP w/ Mount Pipe	33	55.141	3.129	0.006	8361
168.000	(2) 7770.00 w/ Mount Pipe	33	47.283	2.914	0.005	3900
160.000	(2) LPA-80063-6CF-EDIN-5 w/ Mount Pipe	33	42.276	2.766	0.004	2876

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190.5 - 143.17	158.303	8	8.437	0.016
L2	146.75 - 93.75	88.189	8	6.391	0.008
L3	99.08 - 46.08	37.234	8	3.808	0.003
L4	53 - 0	10.102	8	1.789	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.000	(4) DB844H90-XY w/ Mount Pipe	8	158.303	8.437	0.016	7135
190.500	Lightning Rod 5/8" x 6'	8	158.303	8.437	0.016	7135
180.000	RR90-17-02DP w/ Mount Pipe	8	140.383	7.970	0.014	3396
168.000	(2) 7770.00 w/ Mount Pipe	8	120.416	7.425	0.012	1581
160.000	(2) LPA-80063-6CF-EDIN-5 w/ Mount Pipe	8	107.692	7.049	0.010	1164

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	190.5 - 143.17 (1)	TP27.778x14.75x0.25	47.330	0.000	0.0	39.000	21.062	-8.815	821.400	0.011
L2	143.17 - 93.75 (2)	TP40.88x26.293x0.375	53.000	0.000	0.0	39.000	46.465	-17.976	1812.130	0.010
L3	93.75 - 46.08 (3)	TP53.251x38.663x0.375	53.000	0.000	0.0	39.000	53.252	-24.171	2076.820	0.012
L4	46.08 - 0 (4)	TP65.185x50.596x0.375	53.000	0.000	0.0	36.453	77.140	-46.879	2811.950	0.017

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	190.5 - 143.17 (1)	TP27.778x14.75x0.25	518.313	45.158	39.000	1.158	0.000	0.000	39.000	0.000
L2	143.17 - 93.75 (2)	TP40.88x26.293x0.375	1598.642	42.934	39.000	1.101	0.000	0.000	39.000	0.000
L3	93.75 - 46.08 (3)	TP53.251x38.663x0.375	2209.975	45.132	39.000	1.157	0.000	0.000	39.000	0.000
L4	46.08 - 0 (4)	TP65.185x50.596x0.375	4517.108	43.848	36.453	1.203	0.000	0.000	36.453	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	190.5 - 143.17 (1)	TP27.778x14.75x0.25	20.565	0.976	26.000	0.075	0.926	0.039	26.000	0.002
L2	143.17 - 93.75 (2)	TP40.88x26.293x0.375	24.904	0.536	26.000	0.041	0.921	0.012	26.000	0.000
L3	93.75 - 46.08 (3)	TP53.251x38.663x0.375	27.365	0.514	26.000	0.039	0.920	0.009	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L4	46.08 - 0 (4)	TP65.185x50.596x0.375	33.674	0.437	26.000	0.034	0.919	0.004	26.000	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	190.5 - 143.17 (1)	0.011	1.158	0.000	0.075	0.002	1.170 ✔	1.333	H1-3+VT ✔
L2	143.17 - 93.75 (2)	0.010	1.101	0.000	0.041	0.000	1.111 ✔	1.333	H1-3+VT ✔
L3	93.75 - 46.08 (3)	0.012	1.157	0.000	0.039	0.000	1.169 ✔	1.333	H1-3+VT ✔
L4	46.08 - 0 (4)	0.017	1.203	0.000	0.034	0.000	1.220 ✔	1.333	H1-3+VT ✔

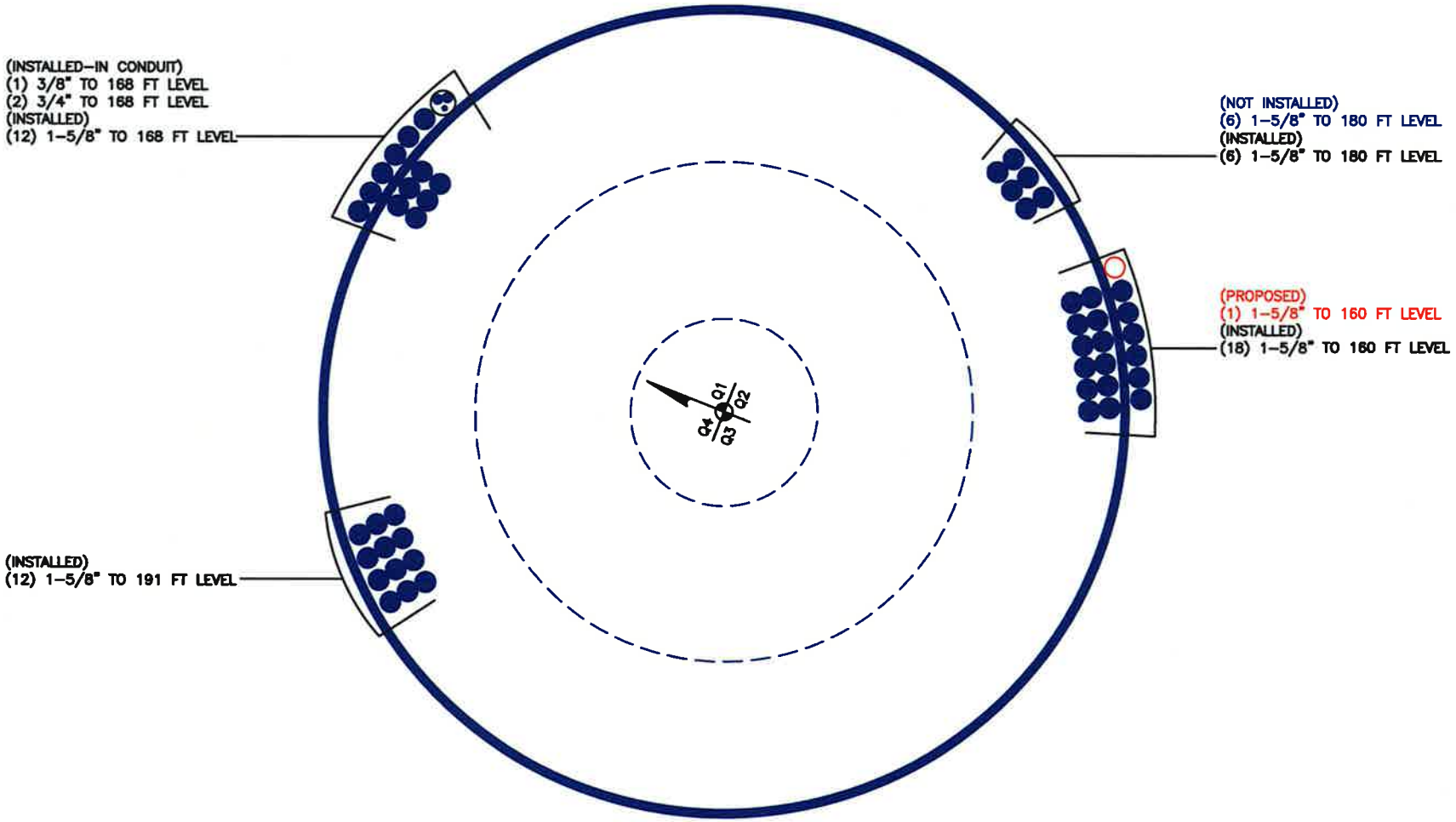
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	190.5 - 143.17	Pole	TP27.778x14.75x0.25	1	-8.815	1094.926	87.8	Pass
L2	143.17 - 93.75	Pole	TP40.88x26.293x0.375	2	-17.976	2415.569	83.4	Pass
L3	93.75 - 46.08	Pole	TP53.251x38.663x0.375	3	-24.171	2768.401	87.7	Pass
L4	46.08 - 0	Pole	TP65.185x50.596x0.375	4	-46.879	3748.329	91.5	Pass
							Summary	
						Pole (L4)	91.5	Pass
						RATING =	91.5	Pass

Program Version 6.1.4.1

APPENDIX B

BASE LEVEL DRAWING


(INSTALLED–IN CONDUIT)
(1) 3/8" TO 168 FT LEVEL
(2) 3/4" TO 168 FT LEVEL
(INSTALLED)
(12) 1–5/8" TO 168 FT LEVEL
(NOT INSTALLED)
(6) 1–5/8" TO 180 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 180 FT LEVEL
(PROPOSED)
(1) 1–5/8" TO 160 FT LEVEL
(INSTALLED)
(18) 1–5/8" TO 160 FT LEVEL
(INSTALLED)
(12) 1–5/8" TO 191 FT LEVEL
Q1
Q2
Q3
Q4

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#: *801485*
Site Name: *CT SUFFIELD 1 CAC 8014*
App #: *213751, Rev:0*

Pole Manufacturer:	*Other*

Reactions		
Moment:	4517	ft-kips
Axial:	47	kips
Shear:	34	kips

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

Anchor Rod Data		
Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	72	in

Plate Data		
Diam:	78	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.34	in

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

Pole Data		
Diam:	65.185	in
Thick:	0.375	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

Maximum Rod Tension:	148.2 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	76.0% **Pass**	Fty*ASIF

Base Plate Results

	Flexural Check	
Base Plate Stress:	25.9 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	43.3% **Pass**	0.75*Fy*ASIF
		Y.L. Length: 30.58

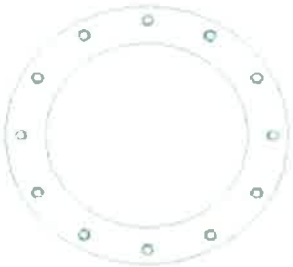
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

PROJECT	**801485 - CT SUFFIELD 1 CAC 801485, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**03/21/14**	PAGE	1	OF	1

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

Monopole Pad & Pier Foundation Analysis

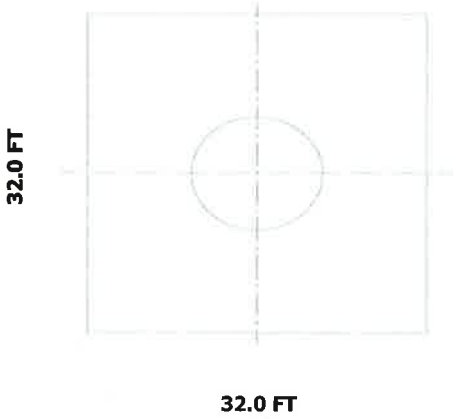
Rev. Type: F

Design Loads:

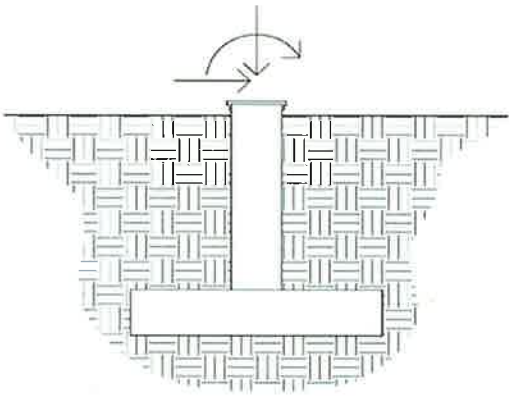
	Input unfactored loads	
Shear:	34.0	kips
Moment:	4,517.0	ft-kips
Tower Height:	190.5	ft
Tower Weight:	47.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	65.19	in
Bearing Depth:	6.5	ft
Pad Width:	32.0	ft
Neglected Depth:	2.0	ft
Thickness:	5.0	ft
Pier Diameter:	8.0	ft
Pier Height Above Grade:	0.5	ft
BP Dist. Above Pier:	3.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	9	
Pier Rebar Quanity:	43	
Pad Rebar Size:	9	
Pad Rebar Quanity:	34	
Pier Tie Size:	5	
Tie Quanity:	9	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.120	kcf
Ult. Bearing Capacity:	6.000	ksf
Angle of Friction:	30.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.300	

** Notes:

Summary of Results

Req'd Pier Diam.	OK
Overturning	54.2%
Shear Capacity	22.3%
Bearing	44.4%
Pad Shear - 1-way	28.4%
Pad Shear - 2-way	2.9%
Pad Moment Capacity	24.7%
Pier Moment Capacity	74.9%