Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

January 7, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
170 Ingham Hill Road, Old Saybrook, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains nine (9) antennas at the 133-foot level of the existing 150-foot tower at 170 Ingham Hill Road in Old Saybrook (the "Property"). The tower is owned by Crown Castle. Cellco's shared use of this tower was approved by the Council in 1992. Cellco now intends to replace three (3) of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas and add three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, for a total of twelve (12) antennas, all at the same 133-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable, attached to the outside of the monopole. Included in Attachment 1 are specifications for the 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 Carl P. Fortuna, First Selectman of the Town of Old Saybrook. A copy of this letter is also being sent to Robert A. and Carol J. Lorenz, the owners 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 133-foot level.

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

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

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

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

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Analysis Report and Modification Drawings 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:
Carl Fortuna, Old Saybrook First Selectman
Robert A. and Carol J. Lorenz
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

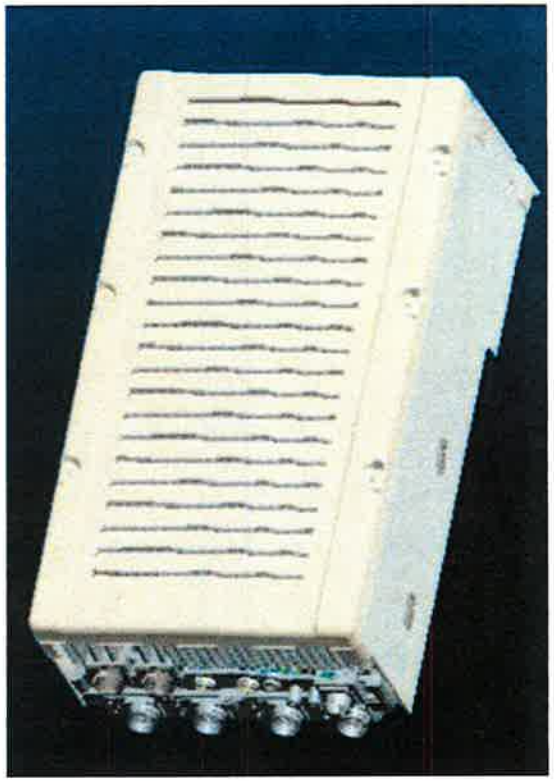
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms
Monitor Ports		TX
Environmental		GR487 Compliance
RF Connectors		7/16 DIN (top mounted)

** Not a Verizon Wireless deployed product

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.

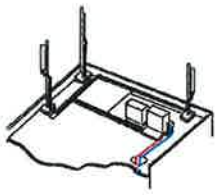
EASY INSTALLATION

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.

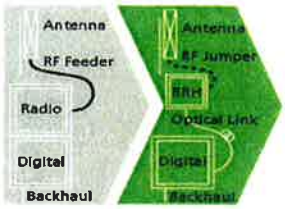
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

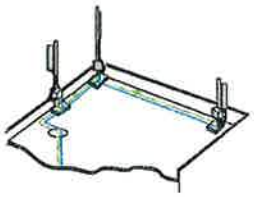
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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.

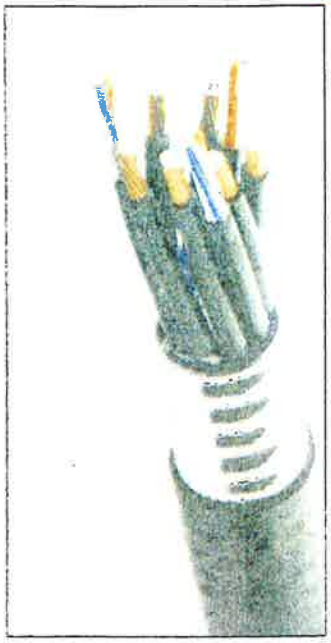


Figure 1: HYBRIFLEX Series

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)

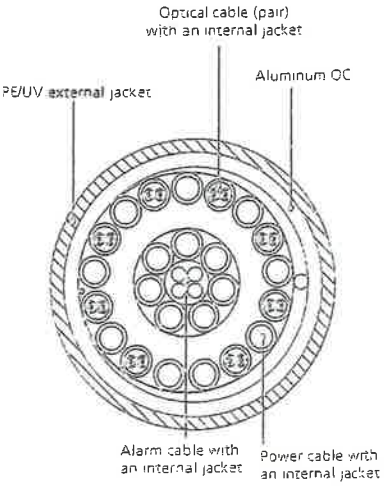


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Old Saybrook								
Tower Height: 150ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	1	500	154	0.0076	880	0.5867	1.29%	
*AT&T UMTS	1	500	154	0.0076	1900	1.0000	0.76%	
*AT&T GSM	8	427	154	0.0518	1900	1.0000	5.18%	
*AT&T GSM	8	296	154	0.0359	880	0.5867	6.12%	
*AT&T LTE	1	500	154	0.0076	740	0.4933	1.54%	
*Paging	1	1000	158	0.0144	931.1875	0.6208	2.32%	
*Omni/V'Stream			161	0.0073	1930	1.0000	0.73%	
Verizon PCS	**11**	**227**	**133**	**0.0508**	**1970**	**1.0000**	**5.08%**	
Verizon Cellular	**9**	**219**	**133**	**0.0401**	**869**	**0.5793**	**6.92%**	
Verizon AWS	**1**	**2805**	**133**	**0.0570**	**2145**	**1.0000**	**5.70%**	
Verizon 700	**1**	**673**	**133**	**0.0137**	**746**	**0.4973**	**2.75%**	
								38.38%
* Source: Siting Council								

ATTACHMENT 3

October 22, 2014

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6565

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:	119689
	Carrier Site Name:	Old Saybrook CT
Crown Castle Designation:	**Crown Castle BU Number:**	841289
	Crown Castle Site Name:	Old Saybrook
	Crown Castle JDE Job Number:	276027
	Crown Castle Work Order Number:	943465
	Crown Castle Application Number:	225459 Rev. 11
Engineering Firm Designation:	**B+T Group Project Number:**	93496.003.01
Site Data:	**170 Ingham Hill Road, Old Saybrook, Middlesex County, CT** **Latitude *41° 18' 35.55"*, Longitude *-72° 23' 51.13"*** **150 Foot - Monopole Tower**	

Dear Sean Dempsey,

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 715677, in accordance with application 225459, revision 11.

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:

LC4.5: Modified Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and IBC 2006 based upon a wind speed of 85 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.

Venu Ambati
Project Engineer

Chad E. Tuttle, P.E.
President

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Engineered Endeavors, Inc. in June of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-E. The tower has been modified in the past and Those modifications are incorporated in this analysis.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
130.0	133.0	3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Commscope	HBXX-6517DS-A2M			
		3	Commscope	LNX-6514DS-A1M			
		1	Rfs Celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
163.0	163.0	1	Andrew	CSHAX-6516-R2	6	1-1/4	1
160.0	160.0	1	--	Pipe Mount (PM 701-1)			
149.0	156.0	1	Andrew	KP4F-23A	1 12	7/8 1-1/4	1
	152.0	4	Kmw Comm.	AM-X-CD-14-65-00T-RET			
		2	Kmw Comm.	AM-X-CW-14-65-00T-RET			
		3	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	TT19-08BP111-001			
	149.0	1	--	Platform Mount [LP 403-1]			
148.0	152.0	6	Ericsson	RRUS 11	1 2	5/8 7/8	1
	148.0	1	--	Side Arm Mount [SO 102-3]			
	147.0	1	Raycap	DC6-48-60-18-8F			
130.0	133.0	**3**	**Antel**	**BXA-70063-6CF-2**	--	--	**2**
		3	Antel	BXA-171085-8BF-EDIN-0	12	1-1/4	1
		3	Antel	BXA-80080/4CF			
		6	Rfs Celwave	FD9R6004/2C-3L			
	130.0	1	--	Platform Mount [LP 403-1]			
71.0	72.0	1	Kathrein	FMO	1	1/2	1
	71.0	1	--	Side Arm Mount [SO 301-1]			
22.0	22.0	1	Maxrad	MYA-43012N	1	1/2	1
		1	--	Side Arm Mount [SO 301-1]			

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)
158	158	1	Ems Wireless	TRR90-17	--	--
150	150	12	Allgon	7120.16	--	--
140	140	12	Allgon	7120.16	--	--
130	130	12	Allgon	7184.05	--	--
120	120	12	Allgon	7184.05	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless, Co-Locate Revision # 11	225459	CCI Sites
Tower Manufacturer Drawings	EEI, Job No. 3503	4287398	CCI Sites
Tower Mapping	ReliaPOLE, Project No. 14-0703NEd	5204147	CCI Sites
Tower Modification Drawings	GPD, Project No. 2011007.20	4945054	CCI Sites
Post Modification Inspection	HDG, Date: 03/19/2012	4468635	CCI Sites
Tower Modification Drawings	GPD, Project No. 2008263.44	4489382	CCI Sites
Post Modification Inspection	GPD, Project No. 2008534.00	4489415	CCI Sites
Tower Modification Drawings	GPD, Project No. 2011716.17	4478711	CCI Sites
Tower Modification Drawings	B+T Group, Project No. 93496.001.01	5293057	CCI Sites
Foundation Drawings	FDH Project No. 08-04159E N1	4591935	CCI Sites
Geotech Report	FDH Project No. 08-04159E G1	4468634	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 10/07/2014	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	150 - 123.75	Pole	TP19.625x15.53x0.25	1	-5.948	810.835	80.0	Pass
L2	123.75 - 110.25	Pole	TP21.731x19.625x0.482	2	-7.669	1211.204	86.8	Pass
L3	110.25 - 83.25	Pole	TP26.134x21.731x0.559	3	-205.224	1968.934	83.6	Pass
		Guy A@91.35	1 5/8	10	147.059	162.000	90.8	Pass
		Guy B@91.35	1 3/8	9	73.314	116.000	63.2	Pass
		Guy C@91.35	1 3/8	8	87.150	116.000	75.1	Pass
L4	83.25 - 67.75	Pole	TP28.64x26.134x0.545	4	-215.122	1823.704	89.3	Pass
L5	67.75 - 52.25	Pole	TP30.555x26.984x0.588	5	-218.386	2083.799	82.2	Pass
L6	52.25 - 33.25	Pole	TP33.66x30.555x0.375	6	-221.446	1894.500	88.6	Pass
L7	33.25 - 0	Pole	TP38.29x32.256x0.438	7	-224.975	2377.752	71.1	Pass
							Summary	
						Pole (L4)	89.3	Pass
						Guy A (L3)	90.8	Pass
						Guy B (L3)	63.2	Pass
						Guy C (L3)	75.1	Pass
						RATING =	**90.8**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC4.5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Bridge Stiffener	110	54.3	Pass
1	Flange Connections	110	56.6	Pass
1	Anchor Rods	Base	58.3	Pass
1	Base Plate	Base	55.8	Pass
1	Base Foundation (Soil Interaction)	Base	68.7	Pass
1	Inner Guy Anchor Foundation	Base	84.2	Pass
1	Outer Guy Anchor Foundation	Base	60.4	Pass

Structure Rating (max from all components) =	**90.8%**

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

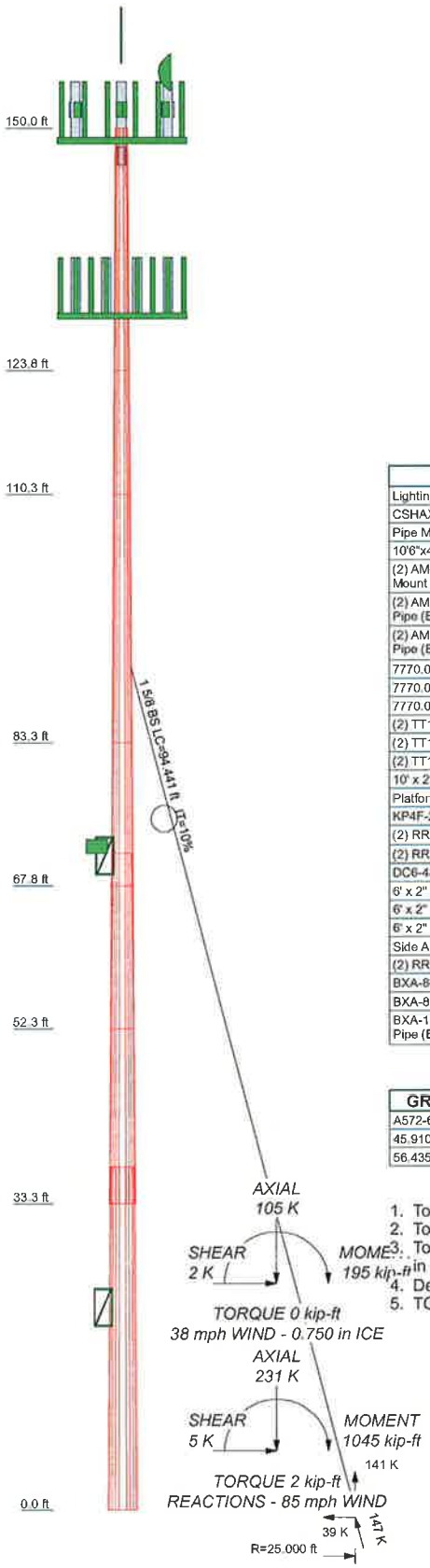
4.1) Recommendations

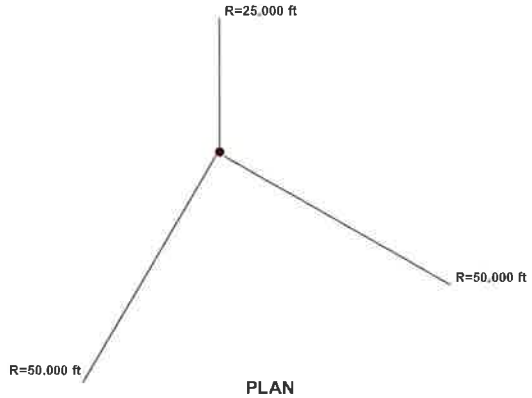
The modification designed by (B+T Group, Project No. 93496.001.01) document number 5293057 were incorporated in this analysis and must be properly installed for the provided capacity to be effective. Considering all the modification listed in table 4, the tower and its foundation have sufficient capacity to carry the existing and proposed loads.

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	26.250	12	0.250		15.530	19.625	A572-65	1.2
2	13.500	12	0.482		19.625	21.731		1.3
3	27.000	12	0.559		21.731	26.134	45.910808ksi	4.2
4	15.500	12	0.545	3.500	26.134	28.640	56.435684ksi	2.4
5	19.000	12	0.588		26.984	30.555	50.76328ksi	3.3
6	19.000	12	0.375	4.000	30.555	33.660	50.905414ksi	2.5
7	37.250	12	0.438		32.256	38.290	A572-65	6.2
								21.2





PLAN

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lighting Rod 5/8" x 5' (E)	168	BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	130
CSHAX-6516-R2 (E)	163	BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	130
Pipe Mount (PM 701-1) (E)	160	(2) FD9R6004/2C-3L (E)	130
10'6"x4" Pipe Mount (E)	155.5	(2) FD9R6004/2C-3L (E)	130
(2) AM-X-CW-14-65-00T-RET w/ Mount Pipe (E)	149	(2) FD9R6004/2C-3L (E)	130
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	149	LNX-6514DS-A1M w/ Mount Pipe (P)	130
(2) AM-X-CD-14-65-00T-RET w/ Mount Pipe (E)	149	LNX-6514DS-A1M w/ Mount Pipe (P)	130
7770.00 w/ Mount Pipe (E)	149	LNX-6514DS-A1M w/ Mount Pipe (P)	130
7770.00 w/ Mount Pipe (E)	149	HBXX-6517DS-A2M w/ Mount Pipe (P)	130
7770.00 w/ Mount Pipe (E)	149	HBXX-6517DS-A2M w/ Mount Pipe (P)	130
(2) TT19-08BP111-001 (E)	149	HBXX-6517DS-A2M w/ Mount Pipe (P)	130
(2) TT19-08BP111-001 (E)	149	RRH2X60-AWS (P)	130
(2) TT19-08BP111-001 (E)	149	RRH2X60-AWS (P)	130
10' x 2" Mount Pipe (E)	149	RRH2X60-AWS (P)	130
Platform Mount [LP 403-1] (E)	149	RRH2X60-PCS (P)	130
KP4F-23A (E)	149	RRH2X60-PCS (P)	130
(2) RRUS 11 (E)	148	RRH2X60-PCS (P)	130
(2) RRUS 11 (E)	148	DB-T1-6Z-8AB-0Z (P)	130
DC6-48-60-18-8F (E)	148	Platform Mount [LP 403-1] (E)	130
6' x 2" Mount Pipe (E)	148	BXA-80080/4CF w/ Mount Pipe (E)	130
6' x 2" Mount Pipe (E)	148	Side Arm Mount [SO 301-1] (E)	71
6' x 2" Mount Pipe (E)	148	FMO (E)	71
Side Arm Mount [SO 102-3] (E)	148	Side Arm Mount [SO 301-1] (E)	22
(2) RRUS 11 (E)	148	MYA-43012N (E)	22
BXA-80080/4CF w/ Mount Pipe (E)	130		
BXA-80080/4CF w/ Mount Pipe (E)	130		
BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	130		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	50.76328ksi	51 ksi	66 ksi
45.910808ksi	46 ksi	61 ksi	50.905414ksi	51 ksi	66 ksi
56.435684ksi	56 ksi	71 ksi			

TOWER DESIGN NOTES

1. Tower is located in Middlesex County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 90.8%

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

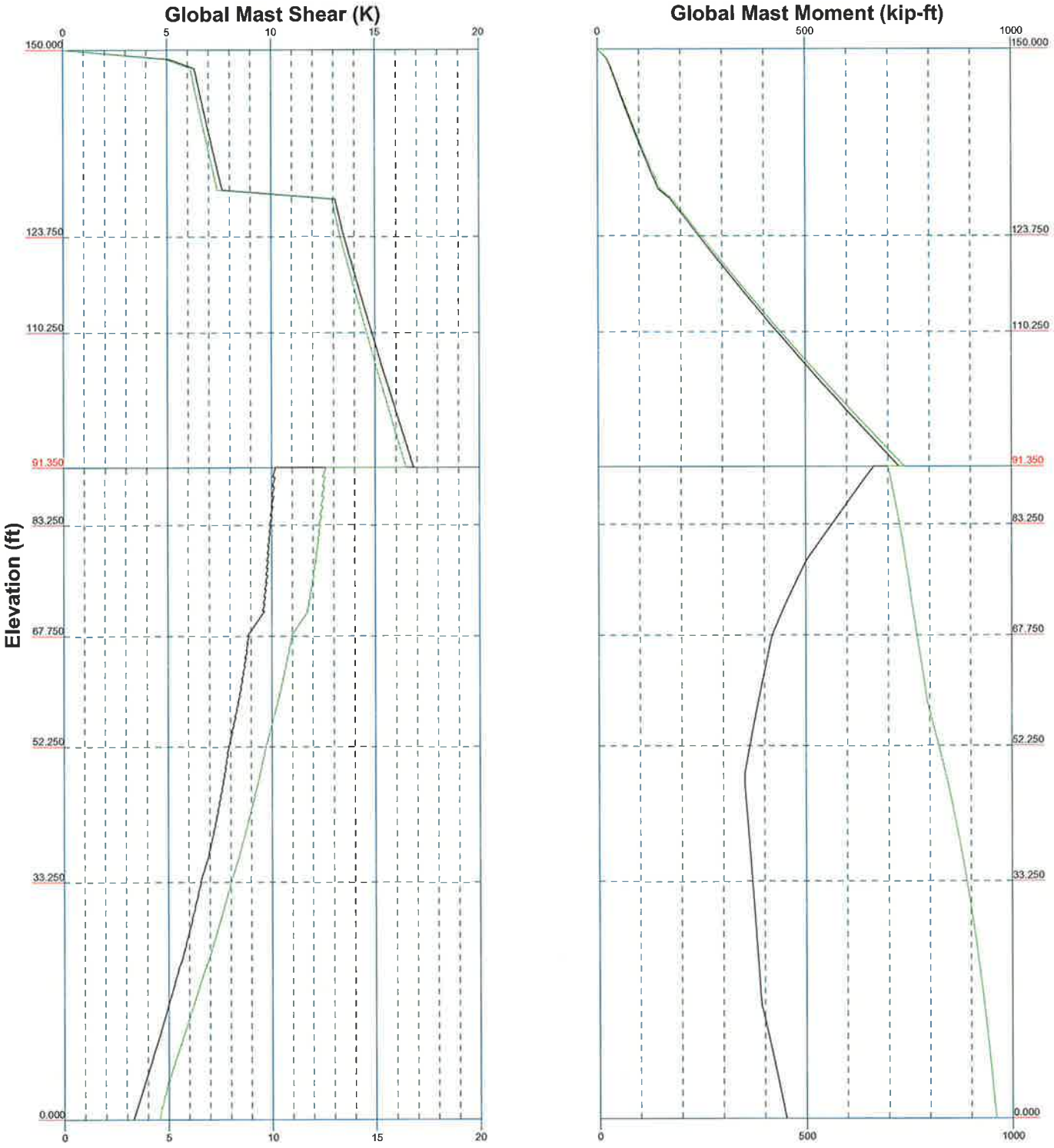
Job: 93496.003.01 - OLD SAYBROOK, CT (BU # 84128			
Project:			
Client: Crown Castle	Drawn by: VenuAmbati	App'd:	
Code: TIA/EIA-222-F	Date: 10/22/14	Scale: NTS	
Path:		Dwg No. E-1	

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

Vx Vz

Maximum Values

Mx Mz



B+T Group
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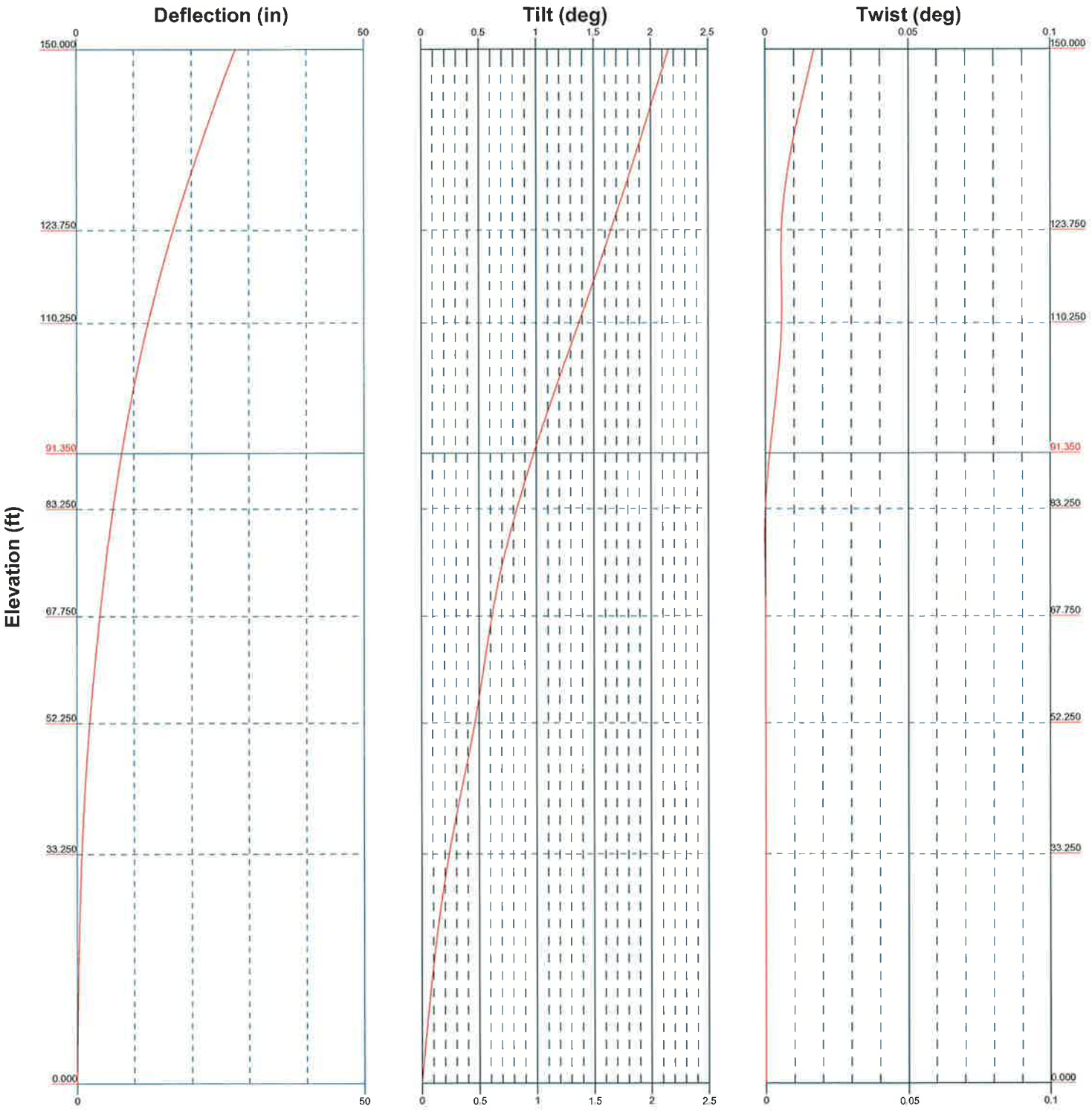
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 93496.003.01 - OLD SAYBROOK, CT (BU # 841289			
Project:			
Client: Crown Castle	Drawn by: VenuAmbati	App'd:	
Code: TIA/EIA-222-F	Date: 10/22/14	Scale: NTS	
Path:		Dwg No. E-4	

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

Maximum Values



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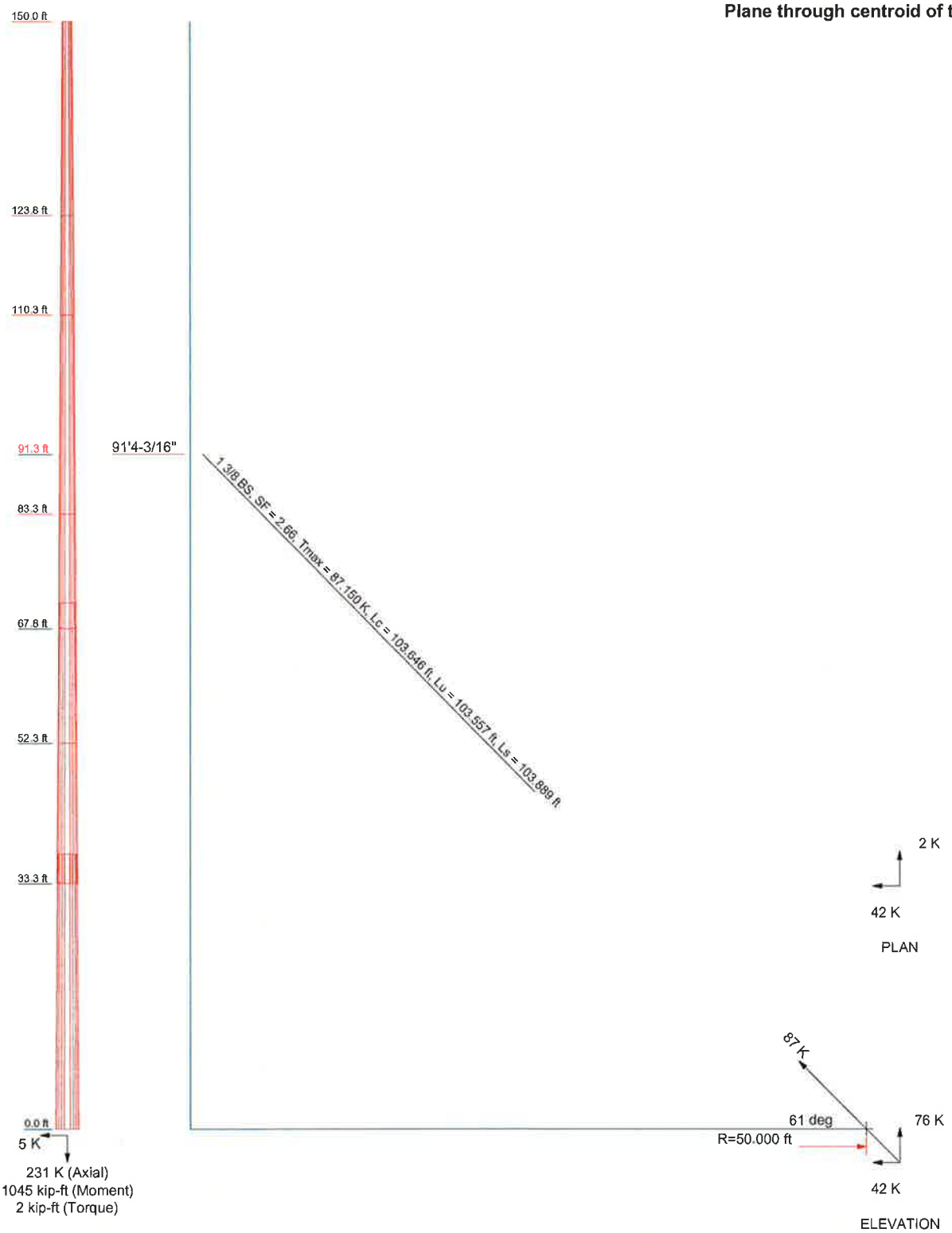
FAX: (918) 295-0265

Job: 93496.003.01 - OLD SAYBROOK, CT (BU # 841289			
Project:			
Client: Crown Castle	Drawn by: VenuAmbati	App'd:	
Code: TIA/EIA-222-F	Date: 10/22/14	Scale: NTS	
Path:		Dwg No. E-5	

Guy Tensions and Tower Reactions

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

Maximum Values
Anchor 'C'@50 ft Azimuth 211 deg Elev 0 ft
Plane through centroid of tower



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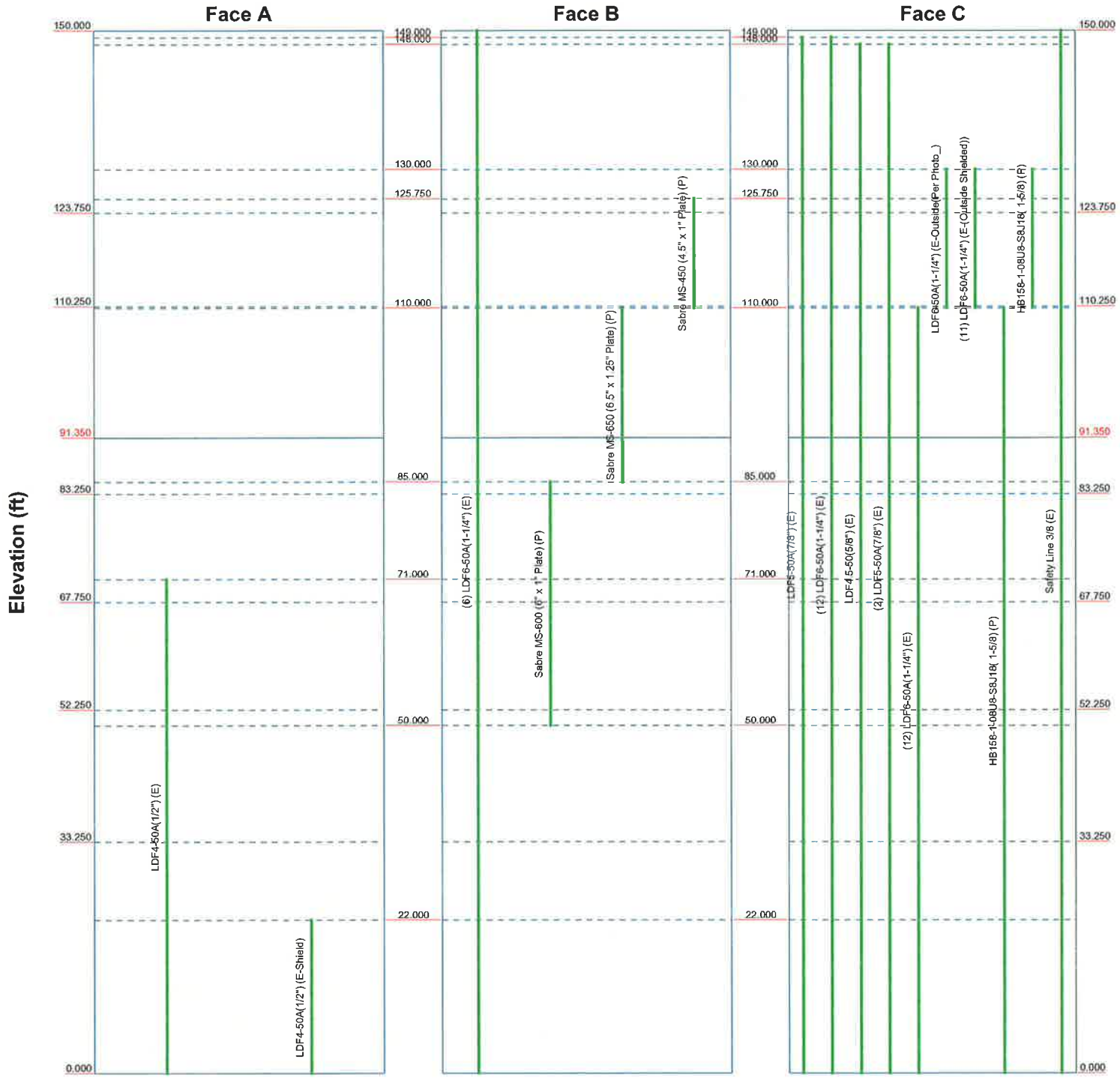
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 93496.003.01 - OLD SAYBROOK, CT (BU # 841289			
Project:			
Client: Crown Castle	Drawn by: VenuAmbati	App'd:	
Code: TIA/EIA-222-F	Date: 10/22/14	Scale: NTS	
Path:		Dwg No. E-6	

Feed Line Distribution Chart
0' - 150'

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



B+T Group
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Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 93496.003.01 - OLD SAYBROOK, CT (BU # 841289			
Project:			
Client: Crown Castle	Drawn by: VenuAmbati	App'd:	
Code: TIA/EIA-222-F	Date: 10/22/14	Scale: NTS	
Path:		Dwg No. E-7	

tnxTower	Job	Page
	93496.003.01 - OLD SAYBROOK, CT (BU # 841289)	1 of 21
B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project	Date 13:20:00 10/22/14
	Client Crown Castle	Designed by VenuAmbati

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.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Safety factor used in guy design is 2.
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	150.000-123.750	26.250	0.000	12	15.530	19.625	0.250	1.000	A572-65 (65 ksi)
L2	123.750-110.250	13.500	0.000	12	19.625	21.731	0.482	1.928	45.910808ksi (46 ksi)
L3	110.250-83.250	27.000	0.000	12	21.731	26.134	0.559	2.234	56.435684ksi (56 ksi)
L4	83.250-67.750	15.500	3.500	12	26.134	28.640	0.545	2.181	50.76328ksi (51 ksi)
L5	67.750-52.250	19.000	0.000	12	26.984	30.555	0.588	2.350	50.905414ksi

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
L6	52.250-33.250	19.000	4.000	12	30.555	33.660	0.375	1.500	(51 ksi) A572-65 (65 ksi)
L7	33.250-0.000	37.250		12	32.256	38.290	0.438	1.750	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	16.078	12.300	366.566	5.470	8.045	45.567	742.762	6.054	3.492	13.968
	20.317	15.597	747.321	6.936	10.166	73.514	1514.274	7.676	4.590	18.358
L2	20.317	29.716	1389.933	6.853	10.166	136.727	2816.381	14.625	3.967	8.23
	22.498	32.985	1900.990	7.607	11.257	168.877	3851.922	16.234	4.532	9.401
L3	22.498	38.078	2178.702	7.580	11.257	193.548	4414.642	18.741	4.327	7.747
	27.056	45.997	3840.415	9.156	13.538	283.684	7781.721	22.638	5.507	9.86
L4	27.056	44.918	3754.287	9.161	13.538	277.322	7607.202	22.107	5.543	10.168
	29.650	49.316	4968.568	10.058	14.836	334.910	10067.666	24.272	6.215	11.4
L5	28.617	49.937	4441.178	9.450	13.978	317.733	8999.030	24.577	5.657	9.629
	31.632	56.692	6498.251	10.728	15.827	410.572	13167.217	27.902	6.614	11.258
L6	31.632	36.442	4236.569	10.804	15.827	267.675	8584.438	17.936	7.184	19.156
	34.847	40.192	5683.538	11.916	17.436	325.968	11516.389	19.781	8.016	21.376
L7	34.065	44.825	5792.534	11.391	16.709	346.677	11737.245	22.061	7.472	17.079
	39.641	53.325	9752.222	13.551	19.834	491.687	19760.646	26.245	9.089	20.775

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_l	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 150.000-123.750				1	1	1		
L2 123.750-110.250				1	1	0.931504		
L3 110.250-83.250				1	1	1.0926		
L4 83.250-67.750				1	1	0.948412		
L5 67.750-52.250				1	1	0.957744		
L6 52.250-33.250				1	1	1		
L7 33.250-0.000				1	1	1		

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension K	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
91.35	BS	A	1 5/8	32.400	10%	24000.000	5.550	94.361	25.000	0.000	0.000	100%
		B	1 3/8	23.200	10%	24000.000	3.970	103.557	50.000	0.000	0.000	100%
		C	1 3/8	23.200	10%	24000.000	3.970	103.557	50.000	-30.000	0.000	100%

Guy Data(cont'd)

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
91.35	Corner						

Guy Data (cont'd)

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
91.350	A572-50 (50 ksi)	Solid Round				A572-50 (50 ksi)	Solid Round	

Guy Data (cont'd)

Guy Elevation ft	Cable Weight A K	Cable Weight B K	Cable Weight C K	Cable Weight D K	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
91.35	0.524	0.411	0.411		0.757 1.5 sec/pulse	0.911 1.6 sec/pulse	0.911 1.6 sec/pulse	

Guy Data (cont'd)

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
91.35	No	No			1	1	1	1

Guy Data (cont'd)

Guy Elevation ft	Torque-Arm				Pull Off				Diagonal			
	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U	Bolt Size in	Number	Net Width Deduct in	U
91.35	0.625 A325N	0	0.000	0.75	0.625 A325N	0	0.000	0.75	0.625 A325N	0	0.000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z ksf	q_z Ice ksf	Ice Thickness in
91.35	A	45.675	0.020	0.004	0.780
	B	45.675	0.020	0.004	0.780
	C	45.675	0.020	0.004	0.780

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
R										

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
R								
LDF6-50A(1-1/4") (E)	B	No	Inside Pole	150.000 - 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
R								
LDF5-50A(7/8") (E)	C	No	Inside Pole	149.000 - 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
LDF6-50A(1-1/4") (E)	C	No	Inside Pole	149.000 - 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
R								
LDF4.5-50(5/8") (E)	C	No	Inside Pole	148.000 - 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
LDF5-50A(7/8") (E)	C	No	Inside Pole	148.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
R								
LDF6-50A(1-1/4")	C	No	Inside Pole	110.000 - 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
LDF6-50A(1-1/4")	C	No	CaAa (Out Of	130.000 - 110.000	1	No Ice	0.155	0.001
(E-Outside(Per Photo_)			Face)			1/2" Ice	0.255	0.002
						1" Ice	0.355	0.004
						2" Ice	0.555	0.009
						4" Ice	0.955	0.028
LDF6-50A(1-1/4")	C	No	CaAa (Out Of	130.000 - 110.000	11	No Ice	0.000	0.001
(E-(Outside Shielded))			Face)			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
HB158-1-08U8-S8J18(	C	No	CaAa (Out Of	110.000 - 0.000	1	No Ice	0.198	0.001
1-5/8)			Face)			1/2" Ice	0.298	0.003
(P)						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.031
HB158-1-08U8-S8J18(	C	No	CaAa (Out Of	130.000 - 110.000	1	No Ice	0.000	0.001
1-5/8)			Face)			1/2" Ice	0.000	0.003
(P)						1" Ice	0.000	0.005
						2" Ice	0.000	0.011
						4" Ice	0.000	0.031
R								
LDF4-50A(1/2")	A	No	CaAa (Out Of	71.000 - 0.000	1	No Ice	0.063	0.000
(E)			Face)			1/2" Ice	0.163	0.001
						1" Ice	0.263	0.002
						2" Ice	0.463	0.007
						4" Ice	0.863	0.023
LDF4-50A(1/2")	A	No	CaAa (Out Of	22.000 - 0.000	1	No Ice	0.000	0.000
(E-Shield)			Face)			1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.007
						4" Ice	0.000	0.023
R								
Safety Line 3/8	C	No	CaAa (Out Of	150.000 - 0.000	1	No Ice	0.037	0.000
(E)			Face)			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
R								
Sabre MS-600 (6" x 1"	B	No	CaAa (Out Of	85.000 - 50.000	1	No Ice	0.167	0.000
Plate)			Face)			1/2" Ice	0.250	0.000
(P)						1" Ice	0.333	0.000
						2" Ice	0.500	0.000
						4" Ice	0.833	0.000
Sabre MS-650 (6.5" x	B	No	CaAa (Out Of	110.000 - 85.000	1	No Ice	0.208	0.000
1.25" Plate)			Face)			1/2" Ice	0.292	0.000
(P)						1" Ice	0.375	0.000
						2" Ice	0.542	0.000
						4" Ice	0.875	0.000
Sabre MS-450 (4.5" x 1"	B	No	CaAa (Out Of	125.750 - 110.000	1	No Ice	0.167	0.000
Plate)			Face)			1/2" Ice	0.250	0.000
(P)						1" Ice	0.333	0.000
						2" Ice	0.500	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						4" Ice	0.833	0.000
R								

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	150.000-123.750	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.333	0.104
		C	0.000	0.000	0.000	1.953	0.291
L2	123.750-110.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	2.250	0.053
		C	0.000	0.000	0.000	2.599	0.250
L3	110.250-83.250	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	5.542	0.107
		C	0.000	0.000	0.000	6.348	0.500
L4	83.250-67.750	A	0.000	0.000	0.000	0.205	0.000
		B	0.000	0.000	0.000	2.583	0.061
		C	0.000	0.000	0.000	3.650	0.287
L5	67.750-52.250	A	0.000	0.000	0.000	0.976	0.002
		B	0.000	0.000	0.000	2.583	0.061
		C	0.000	0.000	0.000	3.650	0.287
L6	52.250-33.250	A	0.000	0.000	0.000	1.197	0.003
		B	0.000	0.000	0.000	0.375	0.075
		C	0.000	0.000	0.000	4.474	0.351
L7	33.250-0.000	A	0.000	0.000	0.000	2.095	0.008
		B	0.000	0.000	0.000	0.000	0.132
		C	0.000	0.000	0.000	7.830	0.615

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	150.000-123.750	A	0.889	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.630	0.104
		C		0.000	0.000	0.000	7.733	0.539
L2	123.750-110.250	A	0.873	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	4.214	0.053
		C		0.000	0.000	0.000	7.312	0.732
L3	110.250-83.250	A	0.853	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	9.380	0.107
		C		0.000	0.000	0.000	15.559	0.613
L4	83.250-67.750	A	0.828	0.000	0.000	0.000	0.743	0.006
		B		0.000	0.000	0.000	4.723	0.061
		C		0.000	0.000	0.000	8.785	0.345
L5	67.750-52.250	A	0.806	0.000	0.000	0.000	3.544	0.026
		B		0.000	0.000	0.000	4.723	0.061
		C		0.000	0.000	0.000	8.785	0.345
L6	52.250-33.250	A	0.773	0.000	0.000	0.000	4.136	0.029
		B		0.000	0.000	0.000	0.665	0.075
		C		0.000	0.000	0.000	10.352	0.418
L7	33.250-0.000	A	0.750	0.000	0.000	0.000	7.237	0.086
		B		0.000	0.000	0.000	0.000	0.132

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
		C		0.000	0.000	0.000	18.116	0.731

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.000-123.750	-0.078	0.065	-0.271	0.187
L2	123.750-110.250	-0.028	0.223	-0.189	0.405
L3	110.250-83.250	-0.032	0.270	-0.194	0.451
L4	83.250-67.750	-0.076	0.238	-0.233	0.396
L5	67.750-52.250	-0.075	0.174	-0.225	0.206
L6	52.250-33.250	-0.251	0.086	-0.493	0.080
L7	33.250-0.000	-0.278	0.075	-0.544	0.063

Discrete Tower Loads

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
Lighting Rod 5/8" x 5' (E)	C	None		0.000	168.000	No Ice	0.313	0.313	0.031
						1/2" Ice	0.826	0.826	0.035
						1" Ice	1.322	1.322	0.041
						2" Ice	1.957	1.957	0.065
						4" Ice	3.338	3.338	0.159
R CSHAX-6516-R2 (E)	C	None		0.000	163.000	No Ice	5.818	5.818	0.184
						1/2" Ice	6.300	6.300	0.245
						1" Ice	6.793	6.793	0.312
						2" Ice	7.813	7.813	0.462
						4" Ice	9.985	9.985	0.832
10'6"x4" Pipe Mount (E)	C	None		0.000	155.500	No Ice	4.725	4.725	0.114
						1/2" Ice	5.615	5.615	0.147
						1" Ice	6.252	6.252	0.187
						2" Ice	7.553	7.553	0.288
						4" Ice	10.267	10.267	0.582
Pipe Mount (PM 701-1) (E)	C	None		0.000	160.000	No Ice	10.610	10.610	0.278
						1/2" Ice	12.540	12.540	0.370
						1" Ice	14.470	14.470	0.462
						2" Ice	18.330	18.330	0.646
						4" Ice	26.050	26.050	1.014
R (2) AM-X-CW-14-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000 0.000 3.000	0.000	149.000	No Ice	5.744	4.015	0.049
						1/2" Ice	6.198	4.633	0.094
						1" Ice	6.661	5.276	0.145
						2" Ice	7.618	6.678	0.268
						4" Ice	9.668	9.744	0.624
(2)	B	From Leg	4.000	0.000	149.000	No Ice	5.744	4.015	0.035

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
AM-X-CD-14-65-00T-RET			0.000			1/2" Ice	6.198	4.633	0.080
w/ Mount Pipe			3.000			1" Ice	6.661	5.276	0.131
(E)						2" Ice	7.618	6.678	0.254
						4" Ice	9.668	9.744	0.610
(2)	C	From Leg	4.000	0.000	149.000	No Ice	5.744	4.015	0.035
AM-X-CD-14-65-00T-RET			0.000			1/2" Ice	6.198	4.633	0.080
w/ Mount Pipe			3.000			1" Ice	6.661	5.276	0.131
(E)						2" Ice	7.618	6.678	0.254
						4" Ice	9.668	9.744	0.610
7770.00 w/ Mount Pipe	A	From Leg	4.000	0.000	149.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			3.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	B	From Leg	4.000	0.000	149.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			3.000			1" Ice	7.128	5.711	0.157
						2" Ice	8.164	7.155	0.287
						4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe	C	From Leg	4.000	0.000	149.000	No Ice	6.119	4.254	0.055
(E)			0.000			1/2" Ice	6.626	5.014	0.103
			3.000			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) TT19-08BP111-001	A	From Leg	4.000	0.000	149.000	No Ice	0.636	0.516	0.016
(E)			0.000			1/2" Ice	0.747	0.619	0.022
			3.000			1" Ice	0.867	0.730	0.029
						2" Ice	1.133	0.980	0.049
						4" Ice	1.768	1.582	0.118
(2) TT19-08BP111-001	B	From Leg	4.000	0.000	149.000	No Ice	0.636	0.516	0.016
(E)			0.000			1/2" Ice	0.747	0.619	0.022
			3.000			1" Ice	0.867	0.730	0.029
						2" Ice	1.133	0.980	0.049
						4" Ice	1.768	1.582	0.118
(2) TT19-08BP111-001	C	From Leg	4.000	0.000	149.000	No Ice	0.636	0.516	0.016
(E)			0.000			1/2" Ice	0.747	0.619	0.022
			3.000			1" Ice	0.867	0.730	0.029
						2" Ice	1.133	0.980	0.049
						4" Ice	1.768	1.582	0.118
10' x 2" Mount Pipe	B	From Leg	4.000	0.000	149.000	No Ice	2.000	2.000	0.080
(E)			0.000			1/2" Ice	3.025	3.025	0.096
			0.000			1" Ice	4.067	4.067	0.117
						2" Ice	5.702	5.702	0.181
						4" Ice	8.257	8.257	0.394
Platform Mount [LP 403-1]	C	None		0.000	149.000	No Ice	18.850	18.850	1.500
(E)						1/2" Ice	24.300	24.300	1.797
						1" Ice	29.750	29.750	2.093
						2" Ice	40.650	40.650	2.686
						4" Ice	62.450	62.450	3.872
R									
(2) RRUS 11	A	From Leg	2.000	0.000	148.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			4.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS 11	B	From Leg	2.000	0.000	148.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068

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
			4.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
(2) RRUS 11	C	From Leg	2.000	0.000	148.000	No Ice	3.249	1.373	0.048
(E)			0.000			1/2" Ice	3.491	1.551	0.068
			4.000			1" Ice	3.741	1.738	0.092
						2" Ice	4.268	2.138	0.150
						4" Ice	5.426	3.042	0.310
DC6-48-60-18-8F	A	From Leg	2.000	0.000	148.000	No Ice	1.266	1.266	0.020
(E)			0.000			1/2" Ice	1.456	1.456	0.035
			-1.000			1" Ice	1.658	1.658	0.053
						2" Ice	2.093	2.093	0.095
						4" Ice	3.098	3.098	0.215
6' x 2" Mount Pipe	A	From Leg	2.000	0.000	148.000	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
6' x 2" Mount Pipe	B	From Leg	2.000	0.000	148.000	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
6' x 2" Mount Pipe	C	From Leg	2.000	0.000	148.000	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
Side Arm Mount [SO 102-3]	C	None		0.000	148.000	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
R									
BXA-80080/4CF w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	5.486	4.033	0.033
			0.000			1/2" Ice	5.937	4.655	0.077
(E)			3.000			1" Ice	6.397	5.298	0.127
						2" Ice	7.349	6.704	0.248
						4" Ice	9.389	9.778	0.600
BXA-80080/4CF w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	5.486	4.033	0.033
			0.000			1/2" Ice	5.937	4.655	0.077
(E)			3.000			1" Ice	6.397	5.298	0.127
						2" Ice	7.349	6.704	0.248
						4" Ice	9.389	9.778	0.600
BXA-80080/4CF w/ Mount Pipe	C	From Leg	4.000	0.000	130.000	No Ice	5.486	4.033	0.033
			0.000			1/2" Ice	5.937	4.655	0.077
(E)			3.000			1" Ice	6.397	5.298	0.127
						2" Ice	7.349	6.704	0.248
						4" Ice	9.389	9.778	0.600
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000	0.000	130.000	No Ice	3.179	3.353	0.029
			0.000			1/2" Ice	3.555	3.971	0.061
(E)			3.000			1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000	0.000	130.000	No Ice	3.179	3.353	0.029
			0.000			1/2" Ice	3.555	3.971	0.061
(E)			3.000			1" Ice	3.964	4.595	0.099

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
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
BXA-171085-8BF-EDIN-0 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	3.179	3.353	0.029
						1/2" Ice	3.555	3.971	0.061
						1" Ice	3.964	4.595	0.099
						2" Ice	4.853	5.893	0.193
						4" Ice	6.767	8.885	0.488
(2) FD9R6004/2C-3L (E)	A	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (E)	B	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
(2) FD9R6004/2C-3L (E)	C	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	0.367	0.085	0.003
						1/2" Ice	0.451	0.136	0.005
						1" Ice	0.543	0.196	0.009
						2" Ice	0.755	0.343	0.020
						4" Ice	1.281	0.740	0.063
LNX-6514DS-A1M w/ Mount Pipe (P)	A	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	8.648	7.082	0.065
						1/2" Ice	9.305	8.273	0.134
						1" Ice	9.930	9.185	0.211
						2" Ice	11.204	11.023	0.393
						4" Ice	13.872	15.063	0.902
LNX-6514DS-A1M w/ Mount Pipe (P)	B	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	8.648	7.082	0.065
						1/2" Ice	9.305	8.273	0.134
						1" Ice	9.930	9.185	0.211
						2" Ice	11.204	11.023	0.393
						4" Ice	13.872	15.063	0.902
LNX-6514DS-A1M w/ Mount Pipe (P)	C	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	8.648	7.082	0.065
						1/2" Ice	9.305	8.273	0.134
						1" Ice	9.930	9.185	0.211
						2" Ice	11.204	11.023	0.393
						4" Ice	13.872	15.063	0.902
HBXX-6517DS-A2M w/ Mount Pipe (P)	A	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	8.976	6.963	0.067
						1/2" Ice	9.647	8.182	0.137
						1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
HBXX-6517DS-A2M w/ Mount Pipe (P)	B	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	8.976	6.963	0.067
						1/2" Ice	9.647	8.182	0.137
						1" Ice	10.291	9.144	0.215
						2" Ice	11.595	11.022	0.398
						4" Ice	14.321	15.027	0.914
HBXX-6517DS-A2M w/ Mount Pipe (P)	C	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	8.976	6.963	0.067
						1/2" Ice	9.647	8.182	0.137
						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 (P)	A	From Leg	4.000 0.000 3.000	0.000	130.000	No Ice	3.957	1.816	0.060
						1/2" Ice	4.272	2.075	0.083
						1" Ice	4.596	2.360	0.109
						2" Ice	5.271	2.957	0.173
						4" Ice	6.722	4.253	0.354

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
RRH2X60-AWS	B	From Leg	4.000	0.000	130.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			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	130.000	No Ice	3.957	1.816	0.060
(P)			0.000			1/2" Ice	4.272	2.075	0.083
			3.000			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	130.000	No Ice	2.567	2.011	0.055
(P)			0.000			1/2" Ice	2.791	2.218	0.075
			3.000			1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
RRH2X60-PCS	B	From Leg	4.000	0.000	130.000	No Ice	2.567	2.011	0.055
(P)			0.000			1/2" Ice	2.791	2.218	0.075
			3.000			1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
RRH2X60-PCS	C	From Leg	4.000	0.000	130.000	No Ice	2.567	2.011	0.055
(P)			0.000			1/2" Ice	2.791	2.218	0.075
			3.000			1" Ice	3.025	2.435	0.099
						2" Ice	3.517	2.894	0.155
						4" Ice	4.606	3.915	0.313
DB-T1-6Z-8AB-0Z	A	From Leg	4.000	0.000	130.000	No Ice	5.600	2.333	0.044
(P)			0.000			1/2" Ice	5.915	2.558	0.080
			3.000			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 403-1]	C	None		0.000	130.000	No Ice	18.850	18.850	1.500
(E)						1/2" Ice	24.300	24.300	1.797
						1" Ice	29.750	29.750	2.093
						2" Ice	40.650	40.650	2.686
						4" Ice	62.450	62.450	3.872
R									
FMO	C	From Leg	2.000	0.000	71.000	No Ice	9.800	9.800	0.010
(E)			0.000			1/2" Ice	10.284	10.284	0.181
			1.000			1" Ice	10.777	10.777	0.361
						2" Ice	11.788	11.788	0.747
						4" Ice	13.914	13.914	1.632
Side Arm Mount [SO 301-1]	C	From Leg	1.000	0.000	71.000	No Ice	1.000	0.900	0.023
(E)			0.000			1/2" Ice	1.390	1.420	0.033
			0.000			1" Ice	1.780	1.940	0.042
						2" Ice	2.560	2.980	0.061
						4" Ice	4.120	5.060	0.100
R									
MYA-43012N	C	From Leg	2.000	0.000	22.000	No Ice	0.620	0.620	0.005
(E)			0.000			1/2" Ice	1.116	1.116	0.006
			0.000			1" Ice	1.612	1.612	0.008
						2" Ice	2.604	2.604	0.011
						4" Ice	4.588	4.588	0.017
Side Arm Mount [SO 301-1]	C	From Leg	1.000	0.000	22.000	No Ice	1.000	0.900	0.023
(E)			0.000			1/2" Ice	1.390	1.420	0.033
			0.000			1" Ice	1.780	1.940	0.042
						2" Ice	2.560	2.980	0.061
						4" Ice	4.120	5.060	0.100

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
R								

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
KP4F-23A (E)	B	Grid	From Leg	4.000 0.000 7.000	0.000		149.000	4.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	12.570 13.090 16.130 22.210 34.360	0.070 0.140 0.200 0.340 0.610
R											

Load Combinations

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

Comb. No.	Description
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

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	150 - 123.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-12.482	-1.213	-0.201
			Max. Mx	5	-6.033	-249.906	-3.100
			Max. My	8	-6.527	-2.706	-244.348
			Max. Vy	5	13.513	-249.906	-3.100
			Max. Vx	8	13.341	-2.706	-244.348
			Max. Torque	8			1.312
L2	123.75 - 110.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-14.927	-0.930	-0.615
			Max. Mx	5	-7.757	-441.096	-5.382
			Max. My	8	-8.297	-3.708	-432.998
			Max. Vy	5	14.857	-441.096	-5.382
			Max. Vx	8	14.613	-3.708	-432.998
			Max. Torque	8			1.298
L3	110.25 - 83.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-215.115	-665.637	-292.599
			Max. Mx	5	-11.218	-740.255	-9.106
			Max. My	8	-11.824	-5.295	-726.687
			Max. Vy	5	16.851	-740.255	-9.106
			Max. Vx	8	16.487	-5.295	-726.687
			Max. Torque	7			3.306
		Guy A	Bottom Tension	6	146.570		
			Top Tension	6	147.059		
			Top Cable Vert	6	141.798		
			Top Cable Norm	6	38.780		
			Top Cable Tan	6	3.950		
			Bot Cable Vert	6	-141.211		
			Bot Cable Norm	6	39.024		
			Bot Cable Tan	6	4.402		
		Guy B	Bottom Tension	11	72.954		
			Top Tension	11	73.314		
			Top Cable Vert	11	64.630		
			Top Cable Norm	11	34.609		
			Top Cable Tan	11	0.303		
			Bot Cable Vert	11	-64.058		
			Bot Cable Norm	11	34.909		
			Bot Cable Tan	11	0.526		
		Guy C	Bottom Tension	5	86.800		
			Top Tension	5	87.150		
			Top Cable Vert	5	76.690		
			Top Cable Norm	5	41.348		
			Top Cable Tan	5	2.036		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Bot Cable Vert	5	-76.178		
			Bot Cable Norm	5	41.535		
			Bot Cable Tan	5	2.445		
L4	83.25 - 67.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-217.176	-728.755	-311.497
			Max. Mx	5	-208.641	-759.644	-89.254
			Max. My	2	-101.599	-1.761	563.817
			Max. Vy	12	9.971	494.474	287.939
			Max. Vx	2	12.356	-1.761	563.817
			Max. Torque	7			3.286
L5	67.75 - 52.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-221.442	-822.557	-344.008
			Max. Mx	6	-221.442	-822.557	-344.008
			Max. My	7	-179.868	-482.347	-419.488
			Max. Vy	11	8.912	439.485	-30.213
			Max. Vx	2	10.995	-7.019	380.368
			Max. Torque	6			2.049
L6	52.25 - 33.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-223.727	-877.732	-365.457
			Max. Mx	6	-223.727	-877.732	-365.457
			Max. My	6	-223.727	-877.732	-365.457
			Max. Vy	11	7.935	308.541	-66.887
			Max. Vx	2	9.720	-12.254	219.404
			Max. Torque	6			2.020
L7	33.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	6	-231.377	-960.745	-410.243
			Max. Mx	6	-231.377	-960.745	-410.243
			Max. My	5	-222.832	-874.279	-451.428
			Max. Vy	11	6.589	169.390	-108.887
			Max. Vx	2	8.020	-18.283	49.948
			Max. Torque	6			1.985

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Mast	Max. Vert	6	231.378	-1.602	-1.206
	Max. H_x	3	103.563	1.156	-3.885
	Max. H_z	8	143.873	-0.431	1.787
	Max. M_x	33	-6.441	-0.276	0.612
	Max. M_z	6	960.745	-1.602	-1.206
	Max. Torsion	6	1.808	-1.602	-1.206
	Min. Vert	14	84.407	-0.214	-0.472
	Min. H_x	11	157.163	-3.304	-1.666
	Min. H_z	4	170.489	-0.602	-4.530
	Min. M_x	5	-451.428	-0.940	-3.307
	Min. M_z	9	-131.278	-0.775	1.003
	Min. Torsion	4	-0.562	-0.602	-4.530
Guy C @ 50 ft Elev 0 ft Azimuth 211 deg	Max. Vert	9	-0.421	-0.065	0.107
	Max. H_x	10	-0.641	-0.042	0.275
	Max. H_z	4	-75.411	-22.176	34.683
	Min. Vert	5	-76.178	-23.243	34.510
	Min. H_x	5	-76.178	-23.243	34.510
	Min. H_z	9	-0.421	-0.065	0.107

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Guy B @ 50 ft Elev 0 ft Azimuth 120 deg	Max. Vert	31	-0.098	0.068	0.039
	Max. H_x	11	-64.058	30.495	16.999
	Max. H_z	11	-64.058	30.495	16.999
	Min. Vert	11	-64.058	30.495	16.999
	Min. H_x	6	-0.209	0.012	0.008
	Min. H_z	7	-0.381	0.153	-0.027
Guy A @ 25 ft Elev 0 ft Azimuth 0 deg	Max. Vert	2	-3.888	-0.002	-0.826
	Max. H_x	10	-101.111	1.053	-27.491
	Max. H_z	2	-3.888	-0.002	-0.826
	Min. Vert	6	-141.211	-4.402	-39.024
	Min. H_x	6	-141.211	-4.402	-39.024
	Min. H_z	6	-141.211	-4.402	-39.024

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	93.890	0.244	0.630	45.760	-28.337	-0.008
Dead+Wind 0 deg - No Ice+Guy	117.732	0.255	4.348	158.142	-27.507	0.023
Dead+Wind 30 deg - No Ice+Guy	103.563	-1.156	3.885	160.397	-31.045	0.343
Dead+Wind 60 deg - No Ice+Guy	170.489	0.602	4.530	352.422	-514.361	0.562
Dead+Wind 90 deg - No Ice+Guy	222.833	0.940	3.307	451.428	-874.279	-0.600
Dead+Wind 120 deg - No Ice+Guy	231.378	1.602	1.206	410.243	-960.745	-1.808
Dead+Wind 150 deg - No Ice+Guy	192.830	2.833	-0.623	251.504	-742.720	-1.676
Dead+Wind 180 deg - No Ice+Guy	143.873	0.431	-1.787	92.338	-63.787	-0.143
Dead+Wind 210 deg - No Ice+Guy	178.251	0.775	-1.003	171.434	131.278	0.519
Dead+Wind 240 deg - No Ice+Guy	186.151	2.432	0.321	208.384	91.655	0.044
Dead+Wind 270 deg - No Ice+Guy	157.163	3.304	1.666	171.873	2.333	-0.736
Dead+Wind 300 deg - No Ice+Guy	118.960	3.266	2.600	113.741	-77.552	-0.822
Dead+Wind 330 deg - No Ice+Guy	120.669	2.011	3.944	148.830	-58.780	-0.323
Dead+Ice+Temp+Guy	84.407	0.214	0.472	36.827	-23.009	-0.004
Dead+Wind 0 deg+Ice+Temp+Guy	87.424	0.393	1.612	72.128	-26.336	-0.093
Dead+Wind 30 deg+Ice+Temp+Guy	85.617	-0.198	1.402	68.128	-21.848	0.244
Dead+Wind 60 deg+Ice+Temp+Guy	92.527	-0.061	1.290	83.411	-77.100	0.440
Dead+Wind 90 deg+Ice+Temp+Guy	102.962	0.419	1.082	101.525	-154.094	0.425
Dead+Wind 120	104.691	0.670	0.569	90.649	-173.126	0.123

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
deg+Ice+Temp+Guy Dead+Wind 150	95.844	0.599	-0.061	52.088	-119.922	-0.169
deg+Ice+Temp+Guy Dead+Wind 180	85.086	0.328	-0.504	13.489	-38.004	-0.228
deg+Ice+Temp+Guy Dead+Wind 210	88.157	0.596	-0.322	19.713	-20.944	-0.219
deg+Ice+Temp+Guy Dead+Wind 240	91.589	1.109	0.180	35.708	-28.796	-0.115
deg+Ice+Temp+Guy Dead+Wind 270	90.997	1.247	0.628	44.261	-35.793	-0.096
deg+Ice+Temp+Guy Dead+Wind 300	90.503	1.153	1.083	55.974	-36.814	-0.250
deg+Ice+Temp+Guy Dead+Wind 330	89.410	0.837	1.434	66.423	-32.578	-0.322
deg+Ice+Temp+Guy Dead+Wind 0 deg - Service+Guy	98.175	0.251	1.911	88.364	-28.188	0.012
Dead+Wind 30 deg - Service+Guy	94.576	-0.310	1.719	82.679	-20.114	0.069
Dead+Wind 60 deg - Service+Guy	98.605	-0.316	1.482	89.854	-63.167	0.228
Dead+Wind 90 deg - Service+Guy	113.582	0.383	1.294	118.193	-172.856	0.197
Dead+Wind 120 deg - Service+Guy	115.936	0.707	0.713	106.050	-198.611	0.029
Dead+Wind 150 deg - Service+Guy	103.757	0.544	-0.063	55.055	-125.433	-0.059
Dead+Wind 180 deg - Service+Guy	90.448	0.276	-0.612	6.441	-33.386	-0.033
Dead+Wind 210 deg - Service+Guy	93.900	0.785	-0.446	11.042	-36.708	-0.036
Dead+Wind 240 deg - Service+Guy	98.342	1.223	0.018	27.205	-43.232	-0.207
Dead+Wind 270 deg - Service+Guy	100.757	1.418	0.634	46.305	-47.984	-0.329
Dead+Wind 300 deg - Service+Guy	101.798	1.268	1.285	67.396	-45.756	-0.244
Dead+Wind 330 deg - Service+Guy	100.899	0.834	1.764	83.239	-38.180	-0.073

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	-31.459	0.000	-0.000	31.459	0.000	0.000%
2	-0.033	-31.593	-27.671	0.033	31.593	27.670	0.000%
3	13.773	-31.529	-23.892	-13.773	31.529	23.892	0.000%
4	23.906	-31.457	-13.801	-23.906	31.457	13.801	0.000%
5	27.663	-31.399	0.038	-27.663	31.399	-0.039	0.000%
6	23.998	-31.346	13.912	-23.998	31.346	-13.912	0.000%
7	13.859	-31.310	24.027	-13.859	31.310	-24.026	0.001%
8	0.051	-31.325	27.678	-0.052	31.325	-27.678	0.002%
9	-13.719	-31.389	23.924	13.719	31.389	-23.924	0.000%
10	-23.891	-31.460	13.812	23.891	31.460	-13.812	0.000%
11	-27.663	-31.519	-0.019	27.663	31.519	0.019	0.000%
12	-23.967	-31.572	-13.894	23.967	31.572	13.894	0.000%
13	-13.842	-31.608	-24.036	13.842	31.608	24.036	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	0.000	-42.526	0.000	0.000	42.526	0.000	0.000%
15	-0.194	-42.586	-7.076	0.194	42.586	7.076	0.000%
16	3.480	-42.559	-6.041	-3.480	42.559	6.041	0.000%
17	6.074	-42.527	-3.489	-6.074	42.527	3.489	0.000%
18	7.038	-42.501	0.009	-7.038	42.501	-0.009	0.000%
19	6.120	-42.476	3.544	-6.120	42.476	-3.544	0.000%
20	3.525	-42.460	6.105	-3.525	42.460	-6.105	0.000%
21	0.024	-42.466	7.016	-0.024	42.466	-7.016	0.000%
22	-3.477	-42.493	6.043	3.477	42.493	-6.043	0.000%
23	-6.211	-42.524	3.373	6.211	42.524	-3.373	0.000%
24	-7.107	-42.551	-0.121	7.107	42.551	0.121	0.000%
25	-6.184	-42.575	-3.581	6.184	42.575	3.581	0.000%
26	-3.656	-42.592	-6.109	3.656	42.592	6.109	0.000%
27	-0.011	-31.505	-9.575	0.011	31.505	9.575	0.000%
28	4.766	-31.483	-8.267	-4.766	31.483	8.267	0.000%
29	8.272	-31.458	-4.775	-8.272	31.458	4.775	0.001%
30	9.572	-31.438	0.013	-9.572	31.438	-0.013	0.000%
31	8.304	-31.420	4.814	-8.304	31.420	-4.814	0.000%
32	4.796	-31.407	8.314	-4.796	31.407	-8.314	0.000%
33	0.018	-31.413	9.577	-0.018	31.413	-9.577	0.000%
34	-4.747	-31.435	8.278	4.747	31.435	-8.278	0.000%
35	-8.267	-31.459	4.779	8.267	31.459	-4.779	0.000%
36	-9.572	-31.480	-0.007	9.572	31.480	0.007	0.000%
37	-8.293	-31.498	-4.808	8.293	31.498	4.808	0.000%
38	-4.790	-31.510	-8.317	4.790	31.510	8.317	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00020276
2	Yes	5	0.00000001	0.00054238
3	Yes	6	0.00000001	0.00056628
4	Yes	8	0.00000001	0.00024927
5	Yes	9	0.00002433	0.00065429
6	Yes	10	0.00000001	0.00028341
7	Yes	8	0.00000001	0.00090825
8	Yes	6	0.00007546	0.00081428
9	Yes	7	0.00000001	0.00032861
10	Yes	7	0.00000001	0.00039071
11	Yes	6	0.00000001	0.00082518
12	Yes	6	0.00000001	0.00005079
13	Yes	6	0.00000001	0.00006823
14	Yes	5	0.00000001	0.00027321
15	Yes	5	0.00000001	0.00029580
16	Yes	6	0.00000001	0.00010458
17	Yes	7	0.00000001	0.00049508
18	Yes	7	0.00000001	0.00086177
19	Yes	7	0.00000001	0.00083624
20	Yes	7	0.00000001	0.00061054
21	Yes	6	0.00000001	0.00086401
22	Yes	6	0.00000001	0.00036339
23	Yes	6	0.00000001	0.00037977
24	Yes	6	0.00000001	0.00006451
25	Yes	5	0.00000001	0.00041400
26	Yes	5	0.00000001	0.00034859

27	Yes	5	0.00000001	0.00004236
28	Yes	5	0.00000001	0.00007987
29	Yes	6	0.00000001	0.00075238
30	Yes	7	0.00000001	0.00019364
31	Yes	7	0.00000001	0.00019557
32	Yes	7	0.00000001	0.00010733
33	Yes	5	0.00000001	0.00019642
34	Yes	5	0.00000001	0.00013165
35	Yes	5	0.00000001	0.00021301
36	Yes	5	0.00000001	0.00004980
37	Yes	5	0.00000001	0.00005669
38	Yes	5	0.00000001	0.00004809

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.75	27.623	31	2.160	0.015
L2	123.75 - 110.25	16.814	31	1.656	0.006
L3	110.25 - 83.25	12.511	31	1.377	0.005
L4	83.25 - 67.75	6.322	31	0.828	0.002
L5	71.25 - 52.25	4.472	31	0.652	0.001
L6	52.25 - 33.25	2.240	31	0.465	0.001
L7	37.25 - 0	1.079	31	0.281	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
168.000	Lighting Rod 5/8" x 5'	31	27.623	2.160	0.015	10022
163.000	CSHAX-6516-R2	31	27.623	2.160	0.015	10022
160.000	Pipe Mount (PM 701-1)	31	27.623	2.160	0.015	10022
156.000	KP4F-23A	31	27.623	2.160	0.015	10022
155.500	10'6"x4" Pipe Mount	31	27.623	2.160	0.015	10022
149.000	(2) AM-X-CW-14-65-00T-RET w/ Mount Pipe	31	27.184	2.142	0.015	10022
148.000	(2) RRUS 11	31	26.745	2.123	0.014	10022
130.000	BXA-80080/4CF w/ Mount Pipe	31	19.157	1.780	0.009	2505
91.350	Guy	31	7.864	0.979	0.003	1761
71.000	FMO	31	4.438	0.649	0.001	4577
22.000	MYA-43012N	31	0.421	0.136	0.000	8350

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 123.75	106.399	6	7.404	0.113
L2	123.75 - 110.25	68.884	6	5.961	0.069

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	110.25 - 83.25	53.169	6	5.154	0.052
L4	83.25 - 67.75	28.710	6	3.530	0.018
L5	71.25 - 52.25	20.642	6	2.910	0.010
L6	52.25 - 33.25	10.505	6	2.152	0.004
L7	37.25 - 0	5.083	6	1.325	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
168.000	Lighting Rod 5/8" x 5'	6	106.399	7.404	0.125	3587
163.000	CSHAX-6516-R2	6	106.399	7.404	0.125	3587
160.000	Pipe Mount (PM 701-1)	6	106.399	7.404	0.125	3587
156.000	KP4F-23A	6	106.399	7.404	0.125	3587
155.500	10'6"x4" Pipe Mount	6	106.399	7.404	0.125	3587
149.000	(2) AM-X-CW-14-65-00T-RET w/ Mount Pipe	6	104.891	7.350	0.123	3587
148.000	(2) RRUS 11	6	103.384	7.297	0.121	3587
130.000	BXA-80080/4CF w/ Mount Pipe	6	77.156	6.317	0.090	893
91.350	Guy	6	35.104	4.002	0.032	973
71.000	FMO	6	20.488	2.899	0.013	1411
22.000	MYA-43012N	6	1.987	0.656	0.001	1780

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension K	Breaking Load K	Actual T K	Allowable T_a K	Required S.F.	Actual S.F.
L3	91.350 (A) (10)	1 5/8 BS	32.400	324.001	147.059	162.000	2.000	2.203 ✔
	91.350 (B) (9)	1 3/8 BS	23.200	232.000	73.314	116.000	2.000	3.164 ✔
	91.350 (C) (8)	1 3/8 BS	23.200	232.000	87.150	116.000	2.000	2.662 ✔

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	150 - 123.75 (1)	TP19.625x15.53x0.25	26.250	0.000	0.0	39.000	15.597	-5.948	608.278	0.010
L2	123.75 - 110.25 (2)	TP21.731x19.625x0.482	13.500	0.000	0.0	27.547	32.985	-7.669	908.630	0.008
L3	110.25 - 83.25	TP26.134x21.731x0.559	27.000	0.000	0.0	33.861	43.621	-205.224	1477.070	0.139

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 $\frac{P}{P_a}$
L4	83.25 - 67.75 (4)	TP28.64x26.134x0.545	15.500	0.000	0.0	30.458	44.918	-215.122	1368.120	0.157
L5	67.75 - 52.25 (5)	TP30.555x26.984x0.588	19.000	0.000	0.0	30.543	51.181	-218.386	1563.240	0.140
L6	52.25 - 33.25 (6)	TP33.66x30.555x0.375	19.000	0.000	0.0	39.000	36.442	-221.446	1421.230	0.156
L7	33.25 - 0 (7)	TP38.29x32.256x0.438	37.250	0.000	0.0	39.000	45.737	-224.975	1783.760	0.126

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	150 - 123.75 (1)	TP19.625x15.53x0.25	252.271	41.179	39.000	1.056	0.000	0.000	39.000	0.000
L2	123.75 - 110.25 (2)	TP21.731x19.625x0.482	445.191	31.634	27.547	1.148	0.000	0.000	27.547	0.000
L3	110.25 - 83.25 (3)	TP26.134x21.731x0.559	701.196	33.018	33.861	0.975	0.000	0.000	33.861	0.000
L4	83.25 - 67.75 (4)	TP28.64x26.134x0.545	727.087	31.462	30.458	1.033	0.000	0.000	30.458	0.000
L5	67.75 - 52.25 (5)	TP30.555x26.984x0.588	812.009	29.179	30.543	0.955	0.000	0.000	30.543	0.000
L6	52.25 - 33.25 (6)	TP33.66x30.555x0.375	891.583	39.970	39.000	1.025	0.000	0.000	39.000	0.000
L7	33.25 - 0 (7)	TP38.29x32.256x0.438	963.675	32.030	39.000	0.821	0.000	0.000	39.000	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	150 - 123.75 (1)	TP19.625x15.53x0.25	13.641	0.875	26.000	0.068	0.479	0.037	26.000	0.001
L2	123.75 - 110.25 (2)	TP21.731x19.625x0.482	15.004	0.455	18.364	0.050	0.450	0.015	18.364	0.001
L3	110.25 - 83.25 (3)	TP26.134x21.731x0.559	7.550	0.173	22.574	0.015	1.411	0.031	22.574	0.001
L4	83.25 - 67.75 (4)	TP28.64x26.134x0.545	6.024	0.134	20.305	0.013	3.206	0.065	20.305	0.003
L5	67.75 - 52.25 (5)	TP30.555x26.984x0.588	5.626	0.110	20.362	0.011	2.049	0.034	20.362	0.002
L6	52.25 - 33.25 (6)	TP33.66x30.555x0.375	4.808	0.132	26.000	0.010	2.020	0.043	26.000	0.002
L7	33.25 - 0 (7)	TP38.29x32.256x0.438	3.295	0.072	26.000	0.006	1.985	0.031	26.000	0.001

Pole Interaction Design Data

tnxTower	Job: 93496.003.01 - OLD SAYBROOK, CT (BU # 841289)	Page: 21 of 21
B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Project:	Date: 13:20:00 10/22/14
	Client: Crown Castle	Designed by: VenuAmbati

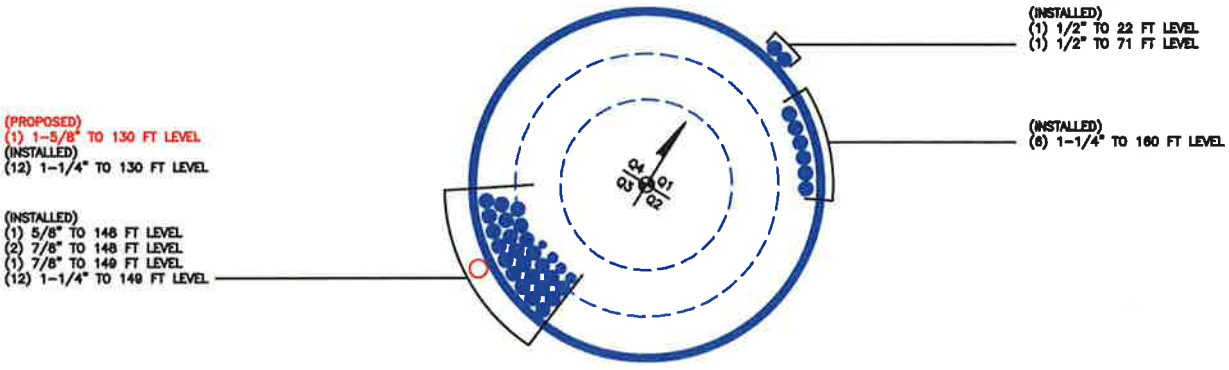
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 123.75 (1)	0.010	1.056	0.000	0.068	0.001	1.067 ✔	1.333	H1-3+VT ✔
L2	123.75 - 110.25 (2)	0.008	1.148	0.000	0.050	0.001	1.157 ✔	1.333	H1-3+VT ✔
L3	110.25 - 83.25 (3)	0.139	0.975	0.000	0.015	0.001	1.114 ✔	1.333	H1-3+VT ✔
L4	83.25 - 67.75 (4)	0.157	1.033	0.000	0.013	0.003	1.190 ✔	1.333	H1-3+VT ✔
L5	67.75 - 52.25 (5)	0.140	0.955	0.000	0.011	0.002	1.095 ✔	1.333	H1-3+VT ✔
L6	52.25 - 33.25 (6)	0.156	1.025	0.000	0.010	0.002	1.181 ✔	1.333	H1-3+VT ✔
L7	33.25 - 0 (7)	0.126	0.821	0.000	0.006	0.001	0.947 ✔	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	150 - 123.75	Pole	TP19.625x15.53x0.25	1	-5.948	810.835	80.0	Pass
L2	123.75 - 110.25	Pole	TP21.731x19.625x0.482	2	-7.669	1211.204	86.8	Pass
L3	110.25 - 83.25	Pole	TP26.134x21.731x0.559	3	-205.224	1968.934	83.6	Pass
		Guy A@91.35	1 5/8	10	147.059	162.000	90.8	Pass
		Guy B@91.35	1 3/8	9	73.314	116.000	63.2	Pass
		Guy C@91.35	1 3/8	8	87.150	116.000	75.1	Pass
L4	83.25 - 67.75	Pole	TP28.64x26.134x0.545	4	-215.122	1823.704	89.3	Pass
L5	67.75 - 52.25	Pole	TP30.555x26.984x0.588	5	-218.386	2083.799	82.2	Pass
L6	52.25 - 33.25	Pole	TP33.66x30.555x0.375	6	-221.446	1894.500	88.6	Pass
L7	33.25 - 0	Pole	TP38.29x32.256x0.438	7	-224.975	2377.752	71.1	Pass
							Summary	
						Pole (L4)	89.3	Pass
						Guy A (L3)	90.8	Pass
						Guy B (L3)	63.2	Pass
						Guy C (L3)	75.1	Pass
						RATING =	**90.8**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 841289 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

PROJECT	**93496.003.01 - Old Saybrook, CT - Crown Castle**				
SUBJECT	**Bridge Stiffeners @ 110 ft**				
DATE	**10/22/14**	PAGE	1	OF	1

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

BMT

Global Section Properties:

Step Width	3.00 in		Axial Load	7.60 k
Pole Thickness	0.22 in		Number of BS	3
Pole Grade	65.00 ksi		Bolt Circle	25.5
BS Material Grade	65.00 ksi		Number of Bolts	12
BS Ultimate Stress	80.00 ksi		Bolt Size	1
BS Width	6.50 in			
BS Thickness	1.25 in			
BS Height	128.00 in			
Gap	6.00 in		Distance Between BS Welded Sections	
I	3417.94 in^4		Global MOI, Taken from AutoCAD	
Moment	445.10 k-ft		Moment at Flange Under Consideration	
Ybar	14.63 in		Dist. CL Pole to CL BS	
S	233.63 in^3		Global Section Modulus; I/Ybar	
fb	22.86 ksi		M/S	
Area	8.13 in^2		BS Cross Sectional Area Below Flange	
P	185.76 k		Load to BS	

Check Bridge Stiffener Span:

Lu	16.00 in	
Iy	1.06 in^4	
A	8.13 in^2	
ry	0.3608 in	
Cc	93.84414701	
kl/r	44.34050067	
Fa	31.54 ksi	
Fa w/ 1/3 Increase	42.06 ksi	**54.36%**

Plate Tension Analysis:

Hole Size	1.25 in	
Ag	8.13 in^2	
An	6.56 in^2	
U	1	
Ae	6.56 in^2	
Ta (Yielding)	422.50 k	
Ta (Rupture)	350.00 k	
Ft (Equiv)	43.08 ksi	**53.07%**

Moment to Existing Bolt Group:

S_{BG} =	268.07 in^3	# Bolts Acting	3
ft =	19.92 ksi		
Ab =	.785 in^2		
T =	46.95 k		
Arm =	25.50 in		
M_{EQ} =	99.8 k-ft	**<-------Insert into Crown Spreadsheet**	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *841289*
Site Name: *OLD SAYBROOK,CT*
App #: *225459 Revision # 11*

Pole Manufacturer:	Other

Reactions		
Moment:	99.8	ft-kips
Axial:	7.6	kips
Shear:	15.004	kips
Elevation:	110	feet

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

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	25.5		

Plate Data		
Diam:	28	in
Thick, t:	1	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	5.83	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:	21.77	in
Thick:	0.22	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

		Rigid
Bolt Tension Capacity, **B**:	46.07 kips	Service, ASD
Max Bolt directly applied T:	15.02 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.356 in	
Min PL "treq" for actual **T w/ Pry**:	0.575 in	
Min PL "t1" for actual **T w/o Pry**:	0.774 in	
T allowable with Prying:	36.85 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	15.02 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	32.6% **Pass**	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	20.4 ksi	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	56.6% **Pass**	Comp. Y.L. Length:
No Prying		13.28
Tension Side Stress Ratio, (treq/t)^2:	33.1% **Pass**	

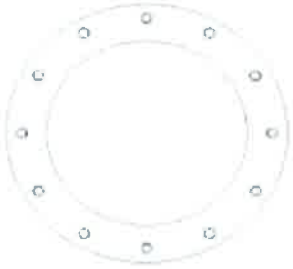
n/a

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

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

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

Site Data

BU#: *841289*
Site Name: *OLD SAYBROOK,CT*
App #: *225459, Revision # 11*

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	44	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	49	in
Thick:	2.5	in
Grade:	50	ksi
Clip Distance:	0	in

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

Pole Data		
Diam:	38.29	in
Thick:	0.4375	in
Grade:	60	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1045	ft-kips
Unfactored Axial, P:	231	kips
Unfactored Shear, V:	5	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	113.6 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	58.3% **Pass**

Base Plate Results — Flexural Check

Base Plate Stress:	27.9 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	55.8% **Pass**

PL Ref. Data	
Yield Line (in):	31.00
Max PL Length:	31.01

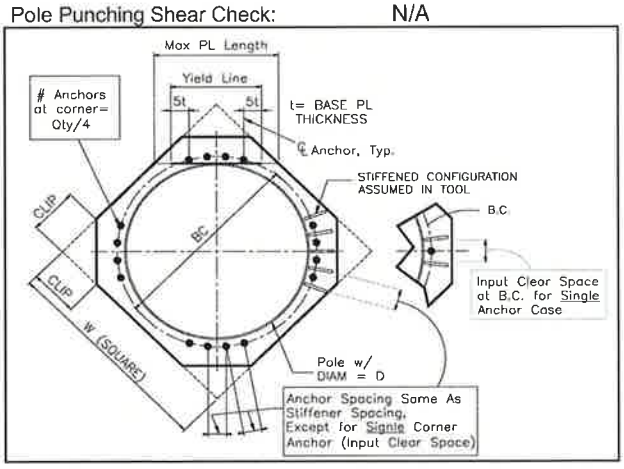
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

PROJECT	**841289 - OLD SAYBROOK,CT**			
SUBJECT	**Foundation Analysis**			
DATE	**10/22/14**	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

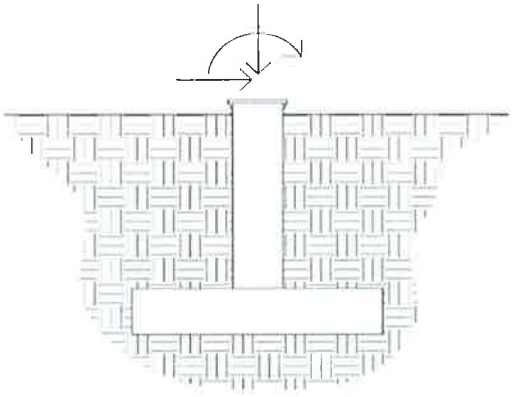
Design Loads:

	Input unfactored loads	
Shear:	5.0	kips
Moment:	1,045.0	ft-kips
Tower Height:	150.0	ft
Tower Weight:	231.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	38.29	in
Bearing Depth:	8.7	ft
Pad Width:	12.0	ft
Neglected Depth:	3.3	ft
Thickness:	2.5	ft
Pier Diameter:	8.0	ft
Pier Height Above Grade:	0.3	ft
BP Dist. Above Pier:	0.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	11	
Pier Rebar Quanity:	44	
Pier Tie Size:	4	
Tie Quanity:	7	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.1084	kcf

Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.073	kcf
Ult. Bearing Capacity:	30.000	ksf
Angle of Friction:	42.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.400	

** Notes:

Pad reinforcement has not been analyzed.

Summary of Results

Req'd Pier Diam.	OK
Overturning	68.7%
Shear Capacity	5.9%
Bearing	37.4%
Pad Shear - 1-way	-7.2%
Pad Shear - 2-way	21.7%
Pier Moment Capacity	11.1%

PROJECT	**841289 - OLD SAYBROOK,CT**
SUBJECT	**Guy Anchor Analysis**
DATE	**10/22/14**

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

Inner Deadman Guy Anchor Analysis Rev F

Design Loads:

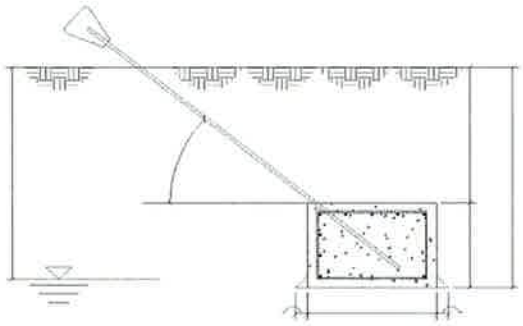
Uplift (Pv)	=	141.00	k
Shear (Ph)	=	39.00	k

Saftey Factors:

Uplift S.F. (Conc. Wt.)	=	1.25
Uplift S.F. (Soil Wt.)	=	2.00
Shear S.F.	=	2.00

Anchor Dims / Properties:

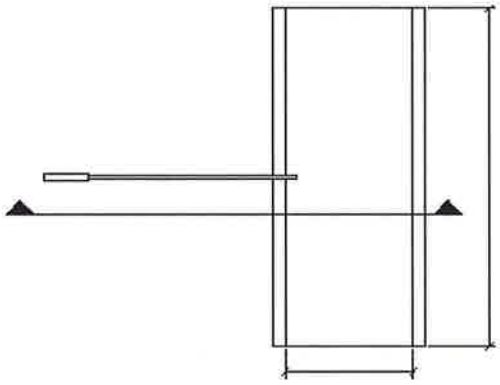
Anchor Radius	=	25.00	ft
Deadman Block Width (W)	=	5.00	ft
Deadman Block Thickness (H)	=	2.00	ft
Deadman Block Length (L)	=	39.00	ft
Depth to BOC (D)	=	8.00	ft
Concrete Density	=	0.09	kcf
Concrete Strength	=	4000	psi



Soil Data:

Frost Depth	=	3.33	ft
Allowable Soil Friction		0.00	ksf

	Unit Wt. (pcf)	Angle (deg)	Cohesion (kcf)
Berm: 3'	0.12	0.00	0.00
Layer 1: 2.7'	0.11	0.00	0.00
Layer 2: 3.33'	0.05	0.00	0.00
Layer 3: 4'	0.05	31.00	0.00
Layer 4: 8'	0.07	42.00	0.00



Steel Reinforcement:

Bar Size	=	9	
No. of Bars in Top of Block	=	13	
No. of Bars in Front of Block	=	4	
Rebar Tensile Strength	=	60000	psi
Clear Cover	=	3.00	in
Strength Reduction Factor	=	0.90	

Anchor Shaft:

Shaft Diameter	=	1.75	in
Shaft Grade	=	50	ksi

Summary of Results

Uplift	84.2%
Lateral	32.7%
Anchor Rod	76.4%
Rebar	Acceptable

PROJECT	**841289 - OLD SAYBROOK,CT**
SUBJECT	**Guy Anchor Analysis**
DATE	**10/22/14**

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

A Deadman Guy Anchor Analysis Rev F

Design Loads:

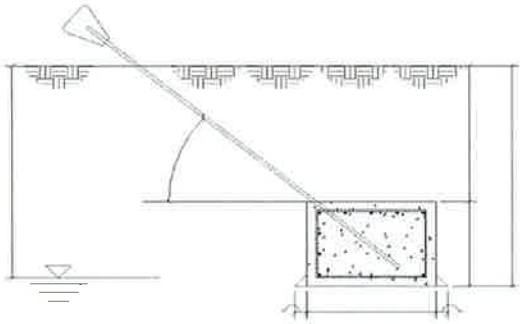
Uplift (Pv)	=	76.00	k
Shear (Ph)	=	42.00	k

Saftey Factors:

Uplift S.F. (Conc. Wt.)	=	1.25
Uplift S.F. (Soil Wt.)	=	2.00
Shear S.F.	=	2.00

Anchor Dims / Properties:

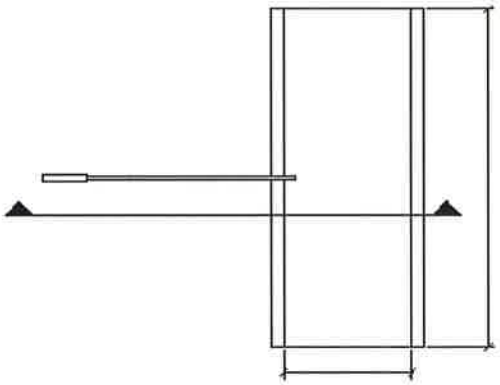
Anchor Radius	=	50.00	ft
Deadman Block Width (W)	=	5.00	ft
Deadman Block Thickness (H)	=	2.00	ft
Deadman Block Length (L)	=	30.00	ft
Depth to BOC (D)	=	8.00	ft
Concrete Density	=	0.09	kcf
Concrete Strength	=	4000	psi



Soil Data:

Frost Depth	=	3.33	ft
Allowable Soil Friction		0.00	ksf

	Unit Wt. (pcf)	Angle (deg)	Cohesion (kcf)
Layer 1: 2.7'	0.11	0.00	0.00
Layer 2: 3.33'	0.05	0.00	0.00
Layer 3: 4'	0.05	31.00	0.00
Layer 4: 8'	0.07	42.00	0.00



Steel Reinforcement:

Bar Size	=	9	
No. of Bars in Top of Block	=	13	
No. of Bars in Front of Block	=	4	
Rebar Tensile Strength	=	60000	psi
Clear Cover	=	3.00	in
Strength Reduction Factor	=	0.90	

Anchor Shaft:

Shaft Diameter	=	1.75	in
Shaft Grade	=	50	ksi

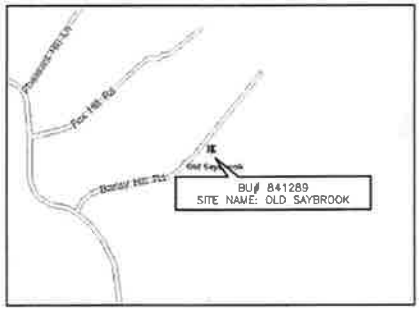
Summary of Results

Uplift	80.4%
Lateral	48.1%
Anchor Rod	45.2%
Rebar	Acceptable

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

SITE NAME: OLD SAYBROOK
BU NUMBER: 841289

SITE ADDRESS:
170 INGHAM HILL ROAD
OLD SAYBROOK, CT 06475
MIDDLESEX, USA



MAP

DIRECTIONS

UPDATED 2 07 CT 2019 OLD SAYBROOK I 95 SOUTH TO EXIT 67. RIGHT ON ELM STREET. APPROX. .8 MILES. GO PAST 170 INGHAM HILL ROAD MAILBOX TO BARLEY HILL ROAD. TURN RIGHT ONTO BARLEY HILL ROAD.CONTINUE UP HILL. ACCESS ROAD AND GATE IS ON THE RIGHT. CLOSE TO TOP OF STREET. ACCESS 24/7 COMBO:0043

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   ANDREW BAZINET
   (585) 899-3442
   ANDREW.BAZINET @CROWNCASTLE.COM
   46 BROADWAY
   ALBANY, NY 12204

2. CROWN PROJECT MANAGER
   ROY PYPTIUK
   (518) 433-6245
   ROY.PYPTIUK@CROWNCASTLE.COM

3. CROWN CONSTRUCTION MANAGER
   ELIZABETH MASTERS
   (518) 433-6264
   ELIZABETH.MASTERS@CROWNCASTLE.COM

4. B+T GROUP PROJECT ENGINEER
   BRADEN TABB, E.I.
   (918) 587-4630
   BTABB@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

5. B+T GROUP ENGINEER (EOR)
   CHAD E TUTTLE, P.E.
   (918) 587-4630
   CTUTTLE@BTGRP.COM
   1717 S BOULDER AVENUE, SUITE 300
   TULSA, OK 74119

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	ENGINEERED ENDEAVORS, INC. / 3503
TOWER HEIGHT / TYPE:	151' MONOPOLE
TOWER LOCATION:	LAT. 41° 18' 35.55"
DATUM: (NAD 1983)	LONG. -72° 23' 51.13"
	ELEV. 175 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT:	B+T GROUP / WO. # 758096
STRUCTURAL ANALYSIS REPORT:	GPD / WO. # 738761
STRUCTURAL ANALYSIS DATE:	04/18/14
APPLICATION ID / REVISION #:	225459 / 8
CCISITES DOCUMENT ID:	4856496

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE REQUIREMENTS OF TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING FASTEST MILE WIND SPEED OF 85 MPH WITH NO ICE, 38 MPH WITH 0.75 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S1	TITLE SHEET
S2	MODIFICATION INSPECTION NOTES AND CHECKLIST
S3	GENERAL NOTES, AJAX BOLT NOTES AND DETAIL
S4	TOWER ELEV., SCHEDULES & TX LINE DIST. DIAG.
S5	GUY ANCHOR PLATE DETAILS AND HARDWARE SCH.
S6	SOIL BERM DETAIL
S7	GUY ANCHOR MODIFICATION (25' RADIUS)
S8	GUY ANCHOR MODIFICATION (50' RADIUS)
S9	TOWER SECTIONS (50'-85', 80'-110' AND 110.75'-125.75')
S10	IN-LINE SPLICE DETAIL
S11	FLAT PLATE BRIDGE STIFFENER DETAIL
D1	PART DETAILS

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV.	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93496.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, LLC

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

OLD SAYBROOK
841289
170 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 151' MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER:	REVISION:
S1	0

MI CHECKLIST

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
		PRE-CONSTRUCTION
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT.
X	EOR APPROVAL	ONCE THE PRE-MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS AS NECESSARY FOR NON-STANDARD PARTS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. APPROVED ASSEMBLY/SHOP DRAWINGS SHALL BE SUBMITTED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF WELDING ON THE PROPOSED STRUCTURAL MEMBERS IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL AS SPECIFIED IN THE MODIFICATION DRAWINGS AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING (PER ENG-STD-10009) ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE REPORT OF MONOPOLE BASE PLATE	A NDE (PER ENG-SOW-10033) OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
		CONSTRUCTION (PERFORMED BY CONTRACTOR)
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS.
X	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	POST INSTALLED ANCHOR ROD VERIFICATION	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	BASE PLATE GROUT VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH CROWN ENG-PRC-10012 FOR INCLUSION IN THE MI REPORT.
N/A	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-STD-10069 AND SRV-STD-10139. A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. FULL PENETRATION WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
X	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED IN ACCORDANCE WITH ENG-BUL-10149.
X	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE AS PART OF PLUMB AND TENSION PROCEDURE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD.
		POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
N/A	POST INSTALLED ANCHOR ROD PULL-OUT TESTING	POST-INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH ENG-PRC-10119 AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
ADDITIONAL TESTING AND INSPECTIONS:		
NOTE: X DENOTES A DOCUMENT NEEDED FOR THE MI REPORT AND N/A DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT		

MODIFICATION INSPECTION NOTES:

GENERAL

THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

ALL MI'S SHALL BE CONDUCTED BY A CROWN ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN. SEE ENG-BUL-10173 LIST OF APPROVED MI VENDORS.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN POINT OF CONTACT (POC).

REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN.

GENERAL CONTRACTOR

THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE MI INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"). THE GC SHALL WORK WITH CROWN TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH CROWN'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.

ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.

VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

REQUIRED PHOTOS

BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93490.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/12/14

OLD SAYBROOK
841289

170 INGHAM HILL ROAD
OLD SAYBROOK, CT

EXISTING 151' MONOPOLE

SHEET TITLE
MODIFICATION INSPECTION NOTES AND CHECKLIST

SHEET NUMBER:	REVISION:
S2	0

NOTES:

1. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRE-TENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

2. ALL STRUCTURAL BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.

3. ALL AJAX M20 BOLTS WITH SHEAR SLEEVES SHALL BE PRE-TENSIONED AND TIGHTENED UNTIL THE DIRECT TENSION INDICATOR (DTI) WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAIL BELOW FOR THE USE OF DIRECT TENSION INDICATOR (DTI) WASHERS WITH THE AJAX M20 BOLTS.

4. ALL AJAX BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. DTI'S SHALL BE THE SQUIRTER® STYLE, MADE TO ASTM F959 LATEST REVISION; AND HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A HARDNESS OF HRC 38 OR HIGHER.

5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER AISC TURN-OF-NUT METHOD.

NOTES FOR AJAX M20 'ONE-SIDE' BOLTS WITH DIRECT TENSION INDICATORS (DTI'S):

DTI'S REQUIRED: DTI'S SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTI'S MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTI'S SHALL BE CALIBRATED PER MANUFACTURES'S INSTRUCTIONS PRIOR TO USE.

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY:

APPLIED BOLTING TECHNOLOGY PRODUCTS, INC.
1413 ROCKINGHAM ROAD
BELLOWS FALLS, VERMONT 05101, USA
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTI'S:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRUBUTORS.HTML

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 3/4" NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

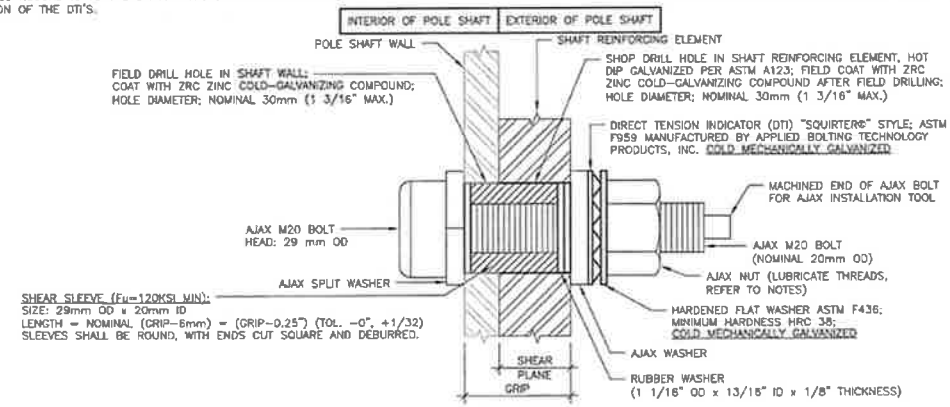
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLT. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF HRC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF HRC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

NUT LUBRICATION REQUIRED: PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING.

NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

CONTRACTOR SHALL FOLLOW DTI MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION, LUBRICATION, TIGHTENING AND INSPECTION.

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 32, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



1 TYPICAL AJAX BOLT DETAIL
SCALE: N.T.S.

GENERAL NOTES

1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES.
1.2 FIELD WORK WILL BE DONE AROUND EXISTING COAXIAL CABLE AND EQUIPMENT. ALL WORK SHALL BE DONE IN A MANNER SUCH THAT NO DAMAGE OCCURS TO THE EXISTING EQUIPMENT OR THE STRUCTURE.
1.3 A MINIMUM OF TWO COATS OF ZINGA COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
1.4 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE TOWER WITHOUT THE CONSENT OF THE OWNER.
1.5 IN LIEU OF TEMPORARY BRACING CONTRACTOR MAY HAVE A STABILITY ANALYSIS PERFORMED BY AN ENGINEER LICENSED IN THE STATE THE TOWER IS LOCATED. THE ANALYSIS SHALL USE A MINIMUM WIND SPEED OF 45 mph (3-SEC) PER TIA-1019.

FABRICATION

2.1 ALL WORK SHALL BE DONE IN ACCORDANCE WITH A.I.S.C. "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2.2 STRUCTURAL STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS:

	YIELD	ASTM SPECS
A. STEEL SHAPES AND PLATES, U.N.O.	65ksi	A572

2.3 ALL NEW MATERIAL INCLUDING STRUCTURAL STEEL AND FASTENERS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 AND A153.
2.4 WELDING SHALL MEET ANSI/AWS D1.1 STRUCTURAL WELDING CODE (LATEST REVISION). ELECTRODES SHALL BE E80 SERIES.
2.5 CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

KEY NOTES

(1) TOWER MODIFICATION I.D.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93486.301.01
PROJECT ENG:	BRADEN TAIBI
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

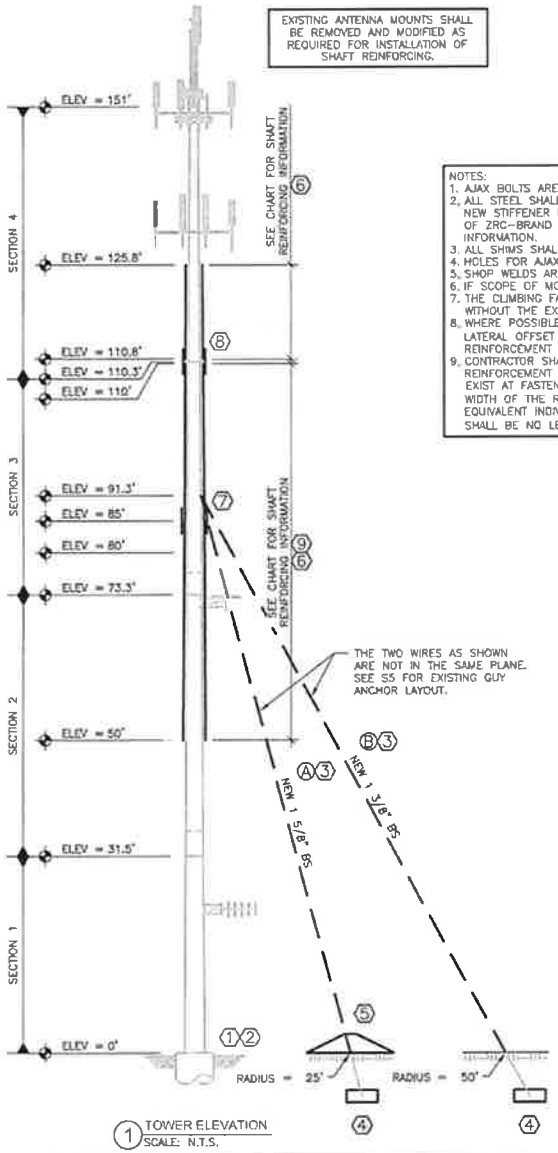
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

OLD SAYBROOK
841289
170 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 151' MONOPOLE

SHEET TITLE
GENERAL NOTES, AJAX BOLT NOTES AND DETAIL

SHEET NUMBER: S3
REVISION: 0

EXISTING ANTENNA MOUNTS SHALL BE REMOVED AND MODIFIED AS REQUIRED FOR INSTALLATION OF SHAFT REINFORCING.



1 TOWER ELEVATION
SCALE: N.T.S.

CCI: FLAT PLATE-BILL OF MATERIALS (65KSI)

BOTTOM ELEVATION	TOP ELEVATION	FLAT PLATE DESIGNATION	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	AJAX BOLTS PER PLATE	TOTAL AJAX BOLT QTY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT	
50'-0"	85'-0"	CCI-SFP-06010035	35'-0"	3	39	117	8	8	16"	2144	LBS.
85'-0"	110'-0"	CCI-SFP-06512525	25'-0"	2	34	68	11	11	18"	1382	LBS.
80'-0"	110'-0"	FP1 **	30'-0"	1	38	38	11	11	18"	829	LBS.
110'-9"	125'-9"	CCI-AFP-04510015	15'-0"	3	22	66	8	8	20"	689	LBS.
						289				5044	LBS.

* EXISTING FLAT PLATE TO BE REMOVED FOR INSTALLATION OF NEW FLAT PLATE.
** UNIQUE PART. SEE PART DETAIL D1.

NOTES:
1. AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS: 1-800-831-3275 FOR PRODUCT INFORMATION.
3. ALL SHIMS SHALL BE ASTM A36.
4. HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
5. SHOP WELDS ARE ASSUMED E80XX OR GREATER, PER STANDARD SPLICE DETAIL.
6. IF SCOPE OF MODIFICATION REQUIRES REMOVAL OF TOWER ID TAG, IT MUST BE REPLACED.
7. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE ENGINEER OF RECORD OR TOWER OWNER.
8. WHERE POSSIBLE, CLIMBING HARDWARE SHOULD REMAIN IN-LINE ALONG THE POLE. IF AN OBSTRUCTION CAUSES A LATERAL OFFSET OF 2'-0" OR MORE, CLIMBING ANCHORS SHALL BE PROVIDED AT EACH CHANGE IN ALIGNMENT. IF NEW REINFORCEMENT REQUIRES STEP BOLT BRACKETS, INSTALL PRIOR TO GALVANIZATION OF STEEL.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER FITTING OF REINFORCEMENT ON MONOPOLES. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

NEW CCI FLAT PLATE (65KSI) REINFORCING ELEMENTS

START ELEVATION	END ELEVATION	QTY	FLAT #	FLAT PLATE *
50'	85'	3	4, 8 & 12	CCI-SFP-06010035
85'	110'	2	4 & 12	CCI-SFP-06512525
80'	110'	1	7	FP1 **
110.75'	125.75'	3	4, 8 & 12	CCI-AFP-04510015

* SEE CMRP 65 KSI PARTS CATALOG EDITION 2 REV. 1 FOR PART DETAILS
** UNIQUE PART. SEE PART DETAIL D1.

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=120 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE AND BOLTS) AND INSTALLATION PROCEDURES.

EXISTING MEMBER SCHEDULE

SECTION	NUMBER OF SIDES	THICKNESS	BOTTOM DIAMETER	TOP DIAMETER	LAP SPLICE
1	12	0.395"	38.280"	32.412"	48"
2	12	0.350"	33.660"	27.449"	42"
3	12	0.270"	28.640"	21.770"	---
4	12	0.220"	21.770"	16.530"	---

TOWER MODIFICATIONS:

1. CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
2. THE NEW AND EXISTING TRANSMISSION LINES MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S4.
3. INSTALL NEW GUY WIRES AT THE ELEVATIONS INDICATED WITH BRIDGE STRAND GUY WIRES. REFER TO THE GUY WIRE SCHEDULE ON SHEET S1 FOR INFORMATION. NEW GUY ACCESSORIES SHALL ALSO BE PROVIDED (RE: SHEET S5 FOR DETAILS). THESE ACCESSORIES SHALL INCLUDE TURNBUCKLES, SHACKLES, PREFORMS AND THIMBLES AT A MINIMUM. PRETENSION THE NEW GUY WIRES TO THE INITIAL VALUE SHOWN IN THE GUY WIRE SCHEDULE.

   GUY WIRE INSTALLATION OR REPLACEMENT SHALL BE PERFORMED BY A CONTRACTOR WITH EXPERIENCE IN THIS TYPE OF CONSTRUCTION. THE CONTRACTOR SHALL REPLACE ONLY (1) GUY WIRE AT A TIME AND THE TOWER MUST REMAIN FULLY BRACED AT ALL TIMES.
4. EXTEND EXISTING GUY ANCHOR FOUNDATIONS RE: SHEETS S7 AND S8.
5. EXTEND EXISTING SOIL BERM RE: SHEET S6.
6. INSTALL NEW REINFORCING ELEMENTS RE: SHEET S9.
7. INSTALL NEW IN-LINE SPLICE RE: SHEET S10.
8. INSTALL NEW BRIDGE STIFFENERS RE: SHEET S11.
9. REMOVE EXISTING BOLTED 4"x1" FLAT PLATE REINFORCEMENT FROM 71.75' TO 96.75' ON FLAT 7.

* CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR ALL REMOVE AND REPLACE PROCEDURES.
** MODIFICATIONS SHALL BE COMPLETED PRIOR TO ADDING THE PROPOSED APPURTENANCES.

GUY WIRE SCHEDULE

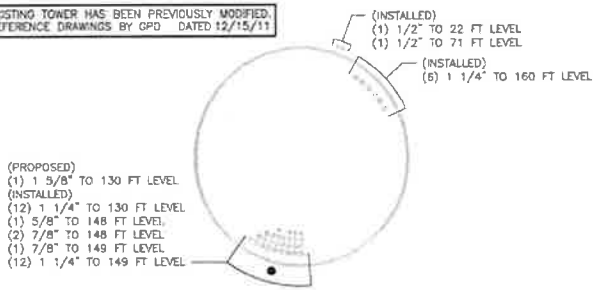
MARK	ELEV. (FT.)	QTY.	SIZE (IN.)	TYPE	GUY RADIUS (FT.)	BREAKING STRENGTH (KIPS)	INITIAL TENSION (KIPS) 40° (F)	60° (F)	80° (F)	100° (F)	COMMENTS
A	91.3	1	1 5/8	BS	25	324	32.84	32.4	32.26	32.13	REPLACE
B	91.3	2	1 3/8	BS	50	232	23.64	23.5	22.76	22.51	REPLACE

* GUY TENSIONS MAY BE INTERPOLATED BETWEEN TEMPERATURES.

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY GPD DATED 10/02/08

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY GPD DATED 04/18/11

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY GPD DATED 12/15/11



2 TX LINE DISTRIBUTION DIAGRAM
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH. (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV.	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO: 93406.001.01
PROJECT ENG: BRADEN TABB
DRAWN BY: CWR
CHECKED BY: AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
9/12/14

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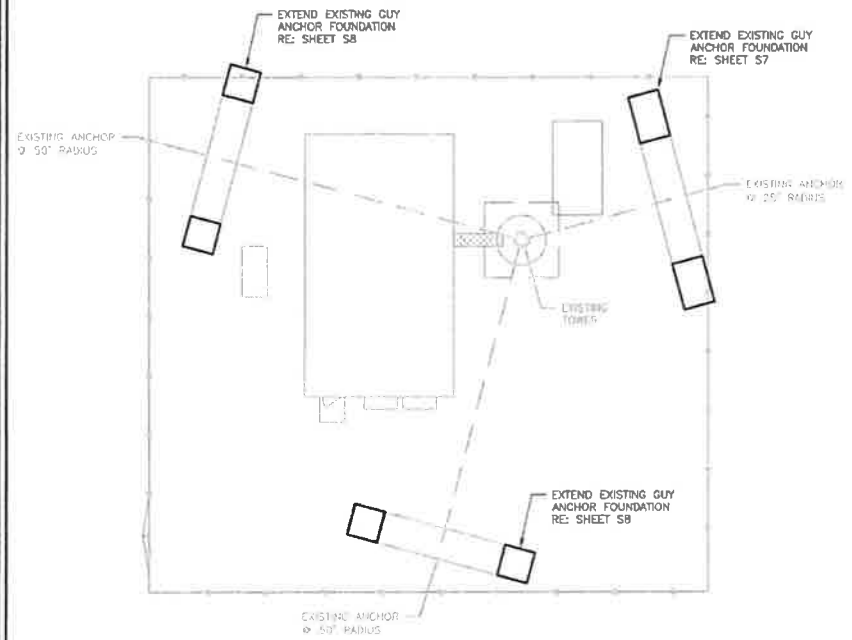
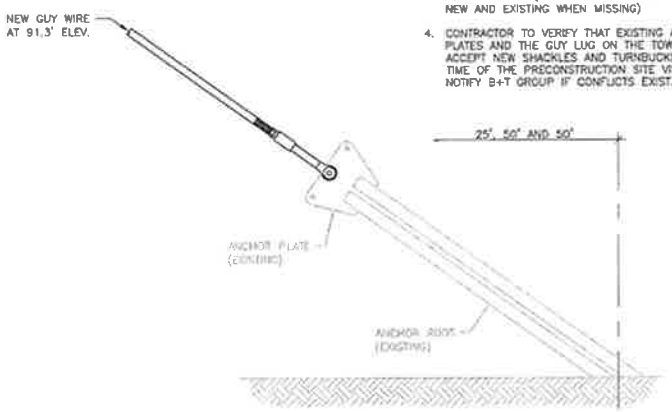
OLD SAYBROOK
841289
170 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 151' MONOPOLE

SHEET TITLE:
TOWER ELEV., SCHEDULES, TX LINE DIST. DIAGRAM AND GUY WIRE SCHEDULE

SHEET NUMBER: S4
REVISION: 0



1 SITE PLAN
SCALE: N.T.S.



2 ANCHOR PLATE DETAIL
SCALE N.T.S.

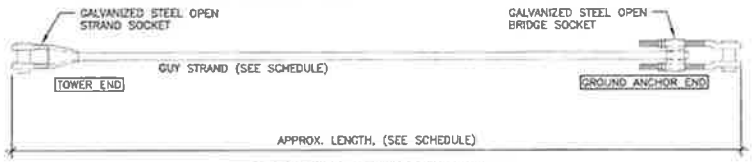
NOTES:

1. NEW GUY WIRE SHALL BE INSTALLED AS INDICATED.
2. NEW GUY WIRE SHALL BE GROUNDED PER OWNERS REQUIREMENTS.
3. CONTRACTOR TO PROVIDE WIRE SERVINGS AT ENDS OF GUY WIRES (WRAP GUY WIRE MIN. 4 TIMES ON NEW AND EXISTING WHEN MISSING)
4. CONTRACTOR TO VERIFY THAT EXISTING ANCHOR PLATES AND THE GUY LUG ON THE TOWER WILL ACCEPT NEW SHACKLES AND TURNBUCKLES AT THE TIME OF THE PRECONSTRUCTION SITE VISIT AND NOTIFY B+T GROUP IF CONFLICTS EXIST.

GUY WIRE HARDWARE (NEW GUY WIRES)

ELEVATION	QTY	GUY WIRE SIZE	LENGTH *	OPEN STRAND SOCKET	OPEN BRIDGE SOCKET
91.3'	1	1 5/8" BS	106'	PART# 2409	PART# 2610
91.3'	2	1 3/8" BS	117'	PART# 2408	PART# 2608

* INCLUDES 15% EXTRA LENGTH
** USE CBSI OR EQUIVALENT ON ALL GUY HARDWARE



3 GUY WIRE HARDWARE SCHEDULE
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93406.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/11/14

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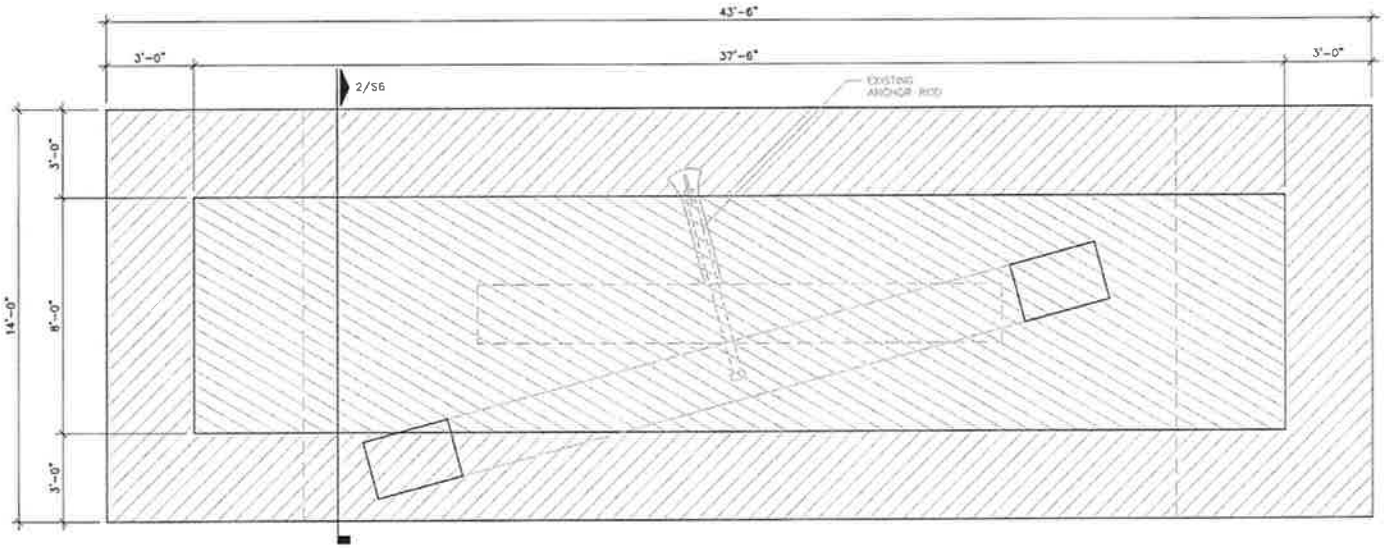
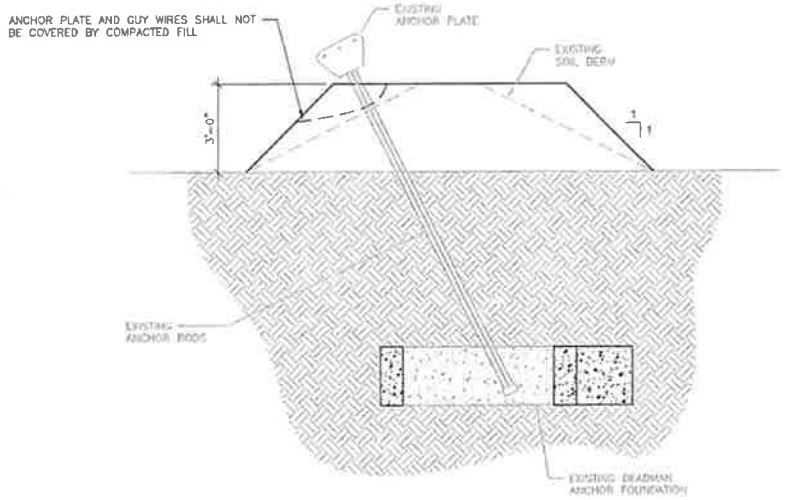
OLD SAYBROOK
841289
170 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 151' MONOPOLE

SHEET TITLE
SITE PLAN, GUY ANCHOR DETAIL AND HARDWARE SCHEDULE

SHEET NUMBER: S5
REVISION: 0



1 SOIL BERM MODIFICATION (25' RADIUS)
SCALE: N.T.S.



2 SOIL BERM SECTION
SCALE: N.T.S.

NOTES:

1. SOIL BERMS SHALL BE CONSTRUCTED WITH STRUCTURAL FILL WITH A MINIMUM SOIL UNIT WEIGHT OF 120 PCF. THE SOIL SHALL BE INSTALLED IN 6" LIFTS AND BE COMPACTED THOROUGHLY TO ACHIEVE THE APPROPRIATE UNIT WEIGHT. STANDARD PENETRATION TEST RESULTS (SPT-N VALUES) SHALL BE SUBMITTED TO THE MI INSPECTOR TO ENSURE DESIRED DENSITIES HAVE BEEN ACHIEVED. (ASTM D1586-11)
2. EROSION PROTECTION MEASURES SHALL BE TAKEN FOR ALL NEW BERMS.

B+T GRP
1717 S. BOULDER AVE.
SUITE 500
TULSA, OK 74119
PH (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93496.001.01
PROJECT ENG:	BRADEN TABBI
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CRAIG TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

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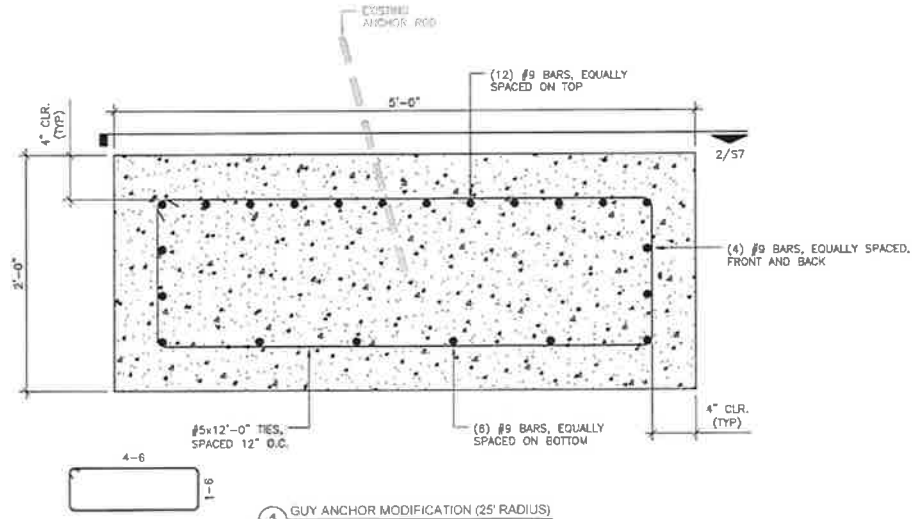
OLD SAYBROOK
841289

170 INGHAM HILL ROAD
OLD SAYBROOK, CT

EXISTING 151' MONOPOLE

SHEET TITLE
SOIL BERM DETAILS

SHEET NUMBER:	REVISION:
S6	0



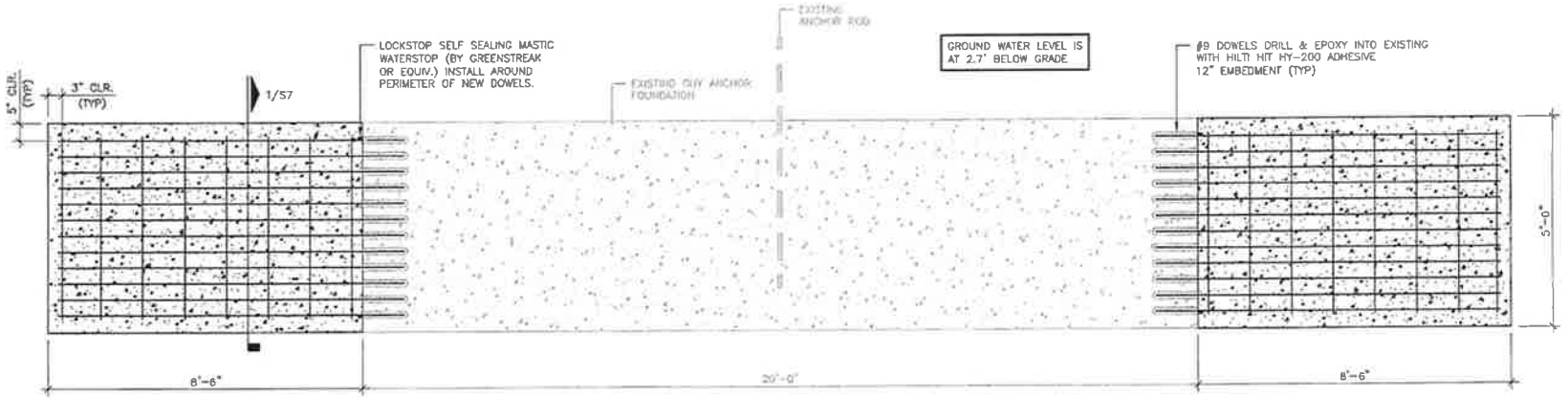
1 GUY ANCHOR MODIFICATION (25' RADIUS)
SCALE: N.T.S.

CONTRACTOR NOTES:

1. B+T GROUP RECOMMENDS THAT THE CONTRACTOR WALK THIS SITE PRIOR TO BIDDING.
2. EXISTING FOUNDATION AND FENCING MAY BE DAMAGED DURING INSTALLATION OF FOUNDATION MODIFICATIONS, CONSTRUCTION PRICE SHALL INCLUDE REPLACEMENT OR REPAIR OF THE DAMAGED ITEMS.

CONCRETE NOTES:

1. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL SP-66 (LATEST REVISION).
2. REINFORCING BARS SHALL BE GRADE 60 DEFORMED BARS CONFORMING TO ASTM SPECIFICATION A615, EXCEPT TIES WHICH MAY BE ASTM A615 (GRADE 40) USE CLASS B LAP SPLICES.
3. ALL REINFORCING BARS SHALL BE TIED WITH TIE WIRE AT ALL REINFORCING BAR INTERSECTIONS. THE CONTRACTOR SHALL SUPPORT THE REINFORCING BAR MAT WITH CONTINUOUS STEEL CHAIRS SPACED NO MORE THAN FOUR FEET O.C.
4. ALL WATER SHALL BE REMOVED FROM THE BOTTOM OF THE EXCAVATION BEFORE COMPACTING FILL AND PLACING CONCRETE.
5. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
6. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL WHERE POSSIBLE. FORMS, WHEN REQUIRED SHALL BE REMOVED PRIOR TO BACKFILLING.
7. BACKFILL MATERIAL SHALL BE COMPACTED TO A MINIMUM UNIT WEIGHT OF 120 PCF OR THE UNIT WEIGHT SPECIFIED IN THE GEOTECH REPORT. THE SOIL SHALL BE INSTALLED IN 6" LIFTS AND COMPACTED THOROUGHLY TO ACHIEVE THE APPROPRIATE UNIT WEIGHT. STANDARD PENETRATION TEST RESULTS (SPT-N VALUES) SHALL BE SUBMITTED TO THE MI INSPECTOR TO ENSURE DESIRED DENSITIES HAVE BEEN ACHIEVED. (ASTM D1586-11)
8. FOR THE LESSER OF 25 C.Y. OR ONE DAY'S PLACEMENT, A MINIMUM OF 4 CONCRETE CYLINDERS SHALL BE TAKEN. CONCRETE SHALL BE TESTED AS REQUIRED BY OWNER'S PROJECT MANAGER.
9. CONTRACTOR SHALL NOT UNDERCUT EXISTING FOUNDATION.



2 GUY ANCHOR SECTION (25' RADIUS)
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93496.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	MA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
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OLD SAYBROOK
841289

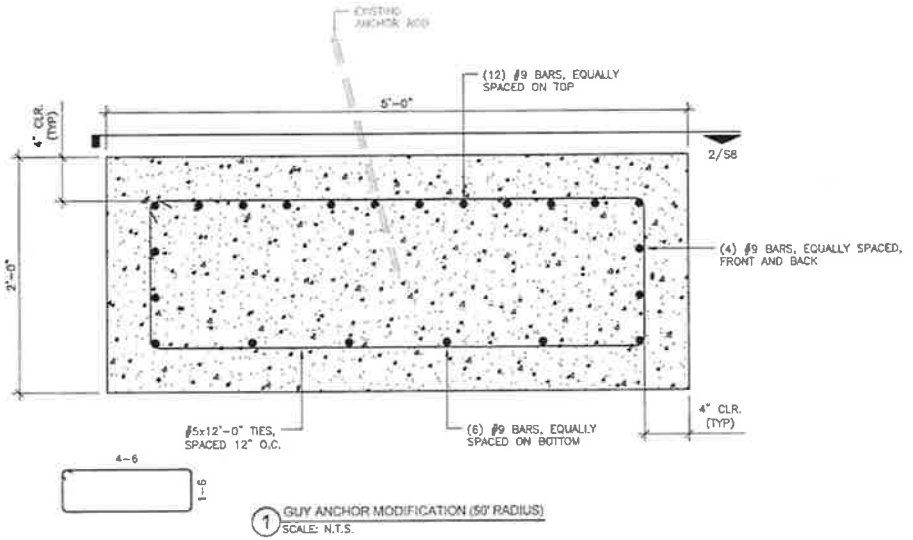
170 INGHAM HILL ROAD
OLD SAYBROOK, CT

EXISTING 151' MONOPOLE

SHEET TITLE
GUY ANCHOR MODIFICATION (25' RADIUS)

SHEET NUMBER: S7

REVISION: 0



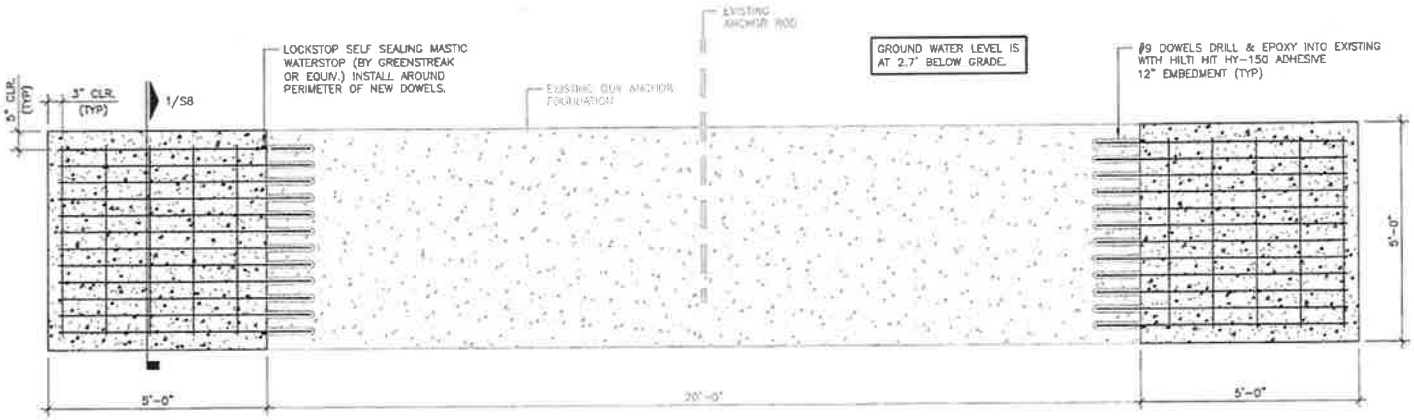
1 GUY ANCHOR MODIFICATION (50' RADIUS)
SCALE: N.T.S.

CONTRACTOR NOTES:

1. B+T GROUP RECOMMENDS THAT THE CONTRACTOR WALK THIS SITE PRIOR TO BIDDING.
2. EXISTING FOUNDATION AND FENCING MAY BE DAMAGED DURING INSTALLATION OF FOUNDATION MODIFICATIONS. CONSTRUCTION PRICE SHALL INCLUDE REPLACEMENT OR REPAIR OF THE DAMAGED ITEMS.

CONCRETE NOTES:

1. ALL DETAILING, FABRICATION AND PLACING OF REINFORCING BARS SHALL BE IN ACCORDANCE WITH THE ACI DETAILING MANUAL SP-66 (LATEST REVISION).
2. REINFORCING BARS SHALL BE GRADE 60 DEFORMED BARS CONFORMING TO ASTM SPECIFICATION A615, EXCEPT TIES WHICH MAY BE ASTM A615 (GRADE 40). USE CLASS B LAP SPLICES.
3. ALL REINFORCING BARS SHALL BE TIED WITH TIE WIRE AT ALL REINFORCING BAR INTERSECTIONS. THE CONTRACTOR SHALL SUPPORT THE REINFORCING BAR MAT WITH CONTINUOUS STEEL CHAIRS SPACED NO MORE THAN FOUR FEET O.C.
4. ALL WATER SHALL BE REMOVED FROM THE BOTTOM OF THE EXCAVATION BEFORE COMPACTING FILL AND PLACING CONCRETE.
5. CONCRETE SHALL BE NORMAL WEIGHT AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS.
6. CONCRETE SHALL BE PLACED AGAINST UNDISTURBED SOIL WHERE POSSIBLE. FORMS, WHEN REQUIRED SHALL BE REMOVED PRIOR TO BACKFILLING.
7. BACKFILL MATERIAL SHALL BE COMPACTED TO A MINIMUM UNIT WEIGHT OF 120 PCF OR THE UNIT WEIGHT SPECIFIED IN THE GEOTECH REPORT. THE SOIL SHALL BE INSTALLED IN 6" LIFTS AND COMPACTED THOROUGHLY TO ACHIEVE THE APPROPRIATE UNIT WEIGHT. STANDARD PENETRATION TEST RESULTS (SPT-N VALUES) SHALL BE SUBMITTED TO THE MI INSPECTOR TO ENSURE DESIRED DENSITIES HAVE BEEN ACHIEVED. (ASTM D1586-11)
8. FOR THE LESSER OF 26 C.Y. OR ONE DAY'S PLACEMENT, A MINIMUM OF 4 CONCRETE CYLINDERS SHALL BE TAKEN. CONCRETE SHALL BE TESTED AS REQUIRED BY OWNER'S PROJECT MANAGER.
9. CONTRACTOR SHALL NOT UNDERCUT EXISTING FOUNDATION.



2 GUY ANCHOR SECTION (50' RADIUS)
SCALE: N.T.S.

B+T GRP
1717 S. BOULDER AVE.
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93466.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

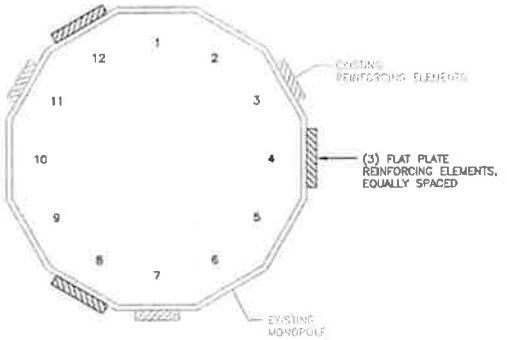
STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/12/14

OLD SAYBROOK
841289
670 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 151' MONOPOLE

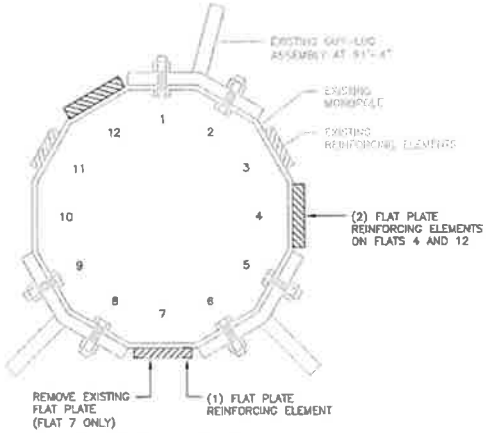
SHEET TITLE
GUY ANCHOR MODIFICATION (50' RADIUS)

SHEET NUMBER: S8
REVISION: 0

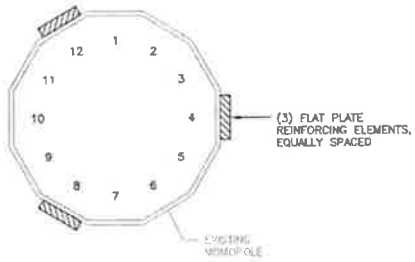
CONTRACTOR NOTE:
THE BOLT PATTERN AND SPACING SHOULD MATCH THE EXISTING PLATES THAT ARE BEING REMOVED. NO ADDITIONAL HOLES SHOULD BE REQUIRED ON THE TOWER EXCEPT AT THE TERMINATIONS. RECOMMENDED BOLT LAYOUT IS GIVEN ON D1. IT IS RECOMMENDED THAT HOLE LOCATIONS BE FIELD VERIFIED IN THE CASE THAT ADDITIONAL BOLTS ARE NEEDED, MAINTAIN A SPACING OF 3" MINIMUM AND 15" MAXIMUM CENTER TO CENTER BETWEEN EXISTING AND NEW HOLES.



1 TOWER SECTION (50'-85')
SCALE: N.T.S.



2 TOWER SECTION (80'-110')
SCALE: N.T.S.



3 TOWER SECTION (110.75'-125.75')
SCALE: N.T.S.

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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93496.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER

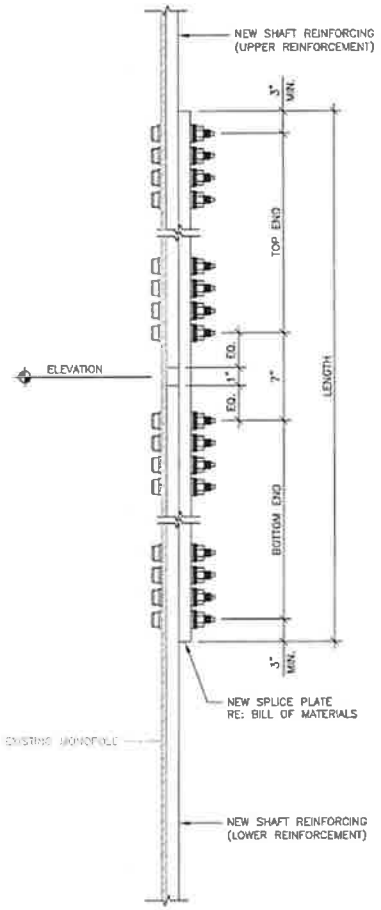
OLD SAYBROOK
841289

170 INGHAM HILL ROAD
OLD SAYBROOK, CT

EXISTING 151' MONOPOLE

SHEET TITLE:
TOWER SECTIONS
50'-80', 80'-110' AND
110.75'-125.75'

SHEET NUMBER: S9
REVISION: 0



1 FLAT PLATE IN-LINE SPLICE DETAIL
SCALE: N.T.S.

SPLICE PLATE-BILL OF MATERIALS (65KSI)

ELEVATION	WIDTH	THICKNESS	LENGTH	QTY	QTY OF BOLTS (TOP END)	QTY OF BOLTS (BOTTOM END)	AJAX BOLTS PER SPLICE	TOTAL AJAX BOLTS	TOTAL STEEL WEIGHT	
85'	6 1/2"	1 1/4"	5'-4"	2	8	11	19	38	294	LBS.
							TOTAL:	38	294	LBS.

* O.C. DISTANCE ON TERMINATION BOLTS TO BE 3 IN. U.N.O.
* USE SHIM PLATES AS REQUIRED.
**BOLT QTY INCLUDED IN S4 BILL OF MATERIALS
***STEEL WEIGHT NOT INCLUDED IN S4 BILL OF MATERIALS.

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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	03496.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

OLD SAYBROOK
841289

170 INGHAM HILL ROAD
OLD SAYBROOK, CT

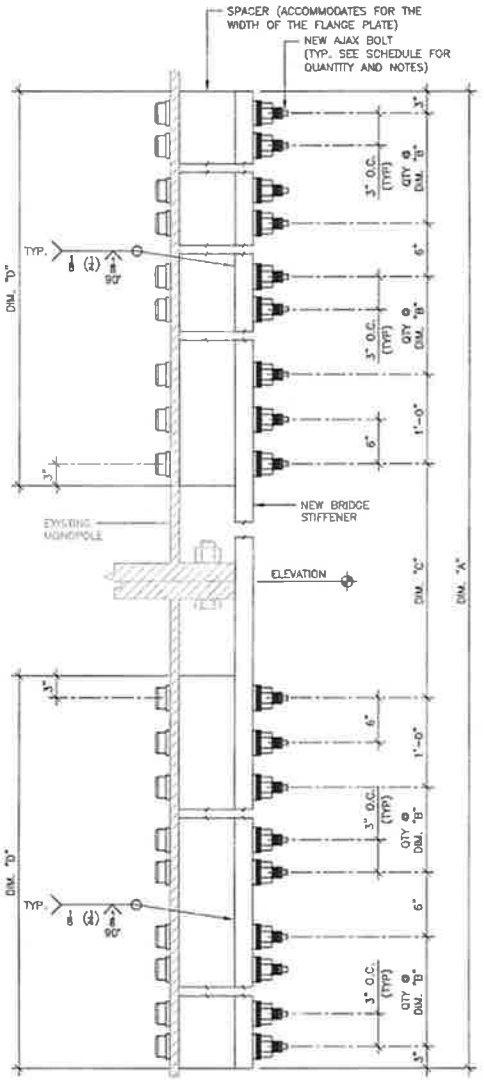
EXISTING 151' MONOPOLE

SHEET TITLE:
IN-LINE SPLICE DETAIL

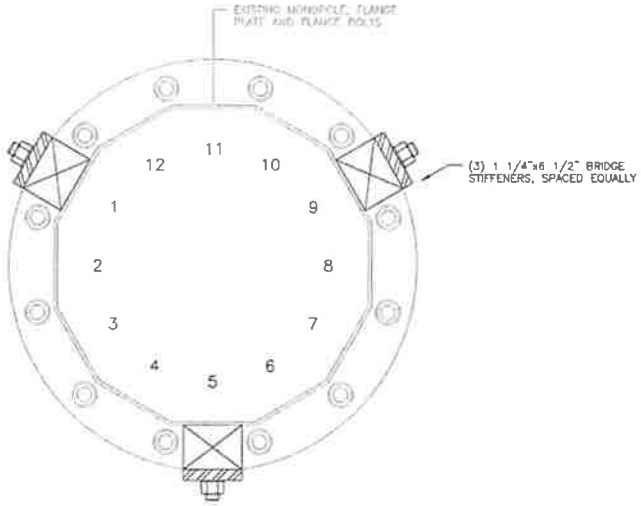
SHEET NUMBER: S10

REVISION: 0

FLAT PLATE BRIDGE STIFFENER-SCHEDULE (65 ksi)								
ELEVATION	NO. OF BRIDGE STIFFENERS	FLAT PLATE SIZE	DIM. "A"	QTY @ DIM. "B"	DIM. "C"	DIM. "D"	AJAX BOLT QTY PER STIFFENER	TOTAL AJAX BOLT QTY
110'-3"	3	1 1/4"x6 1/2"	13'-10"	10 HOLES @ 2'-3"	1'-4"	6'-6"	44	132



1 FLAT PLATE BRIDGE STIFFENER DETAIL
SCALE: N.T.S.



2 TOWER SECTION (110'-3")
SCALE: N.T.S.

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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93499.001.07
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23824
LICENSED
PROFESSIONAL ENGINEER

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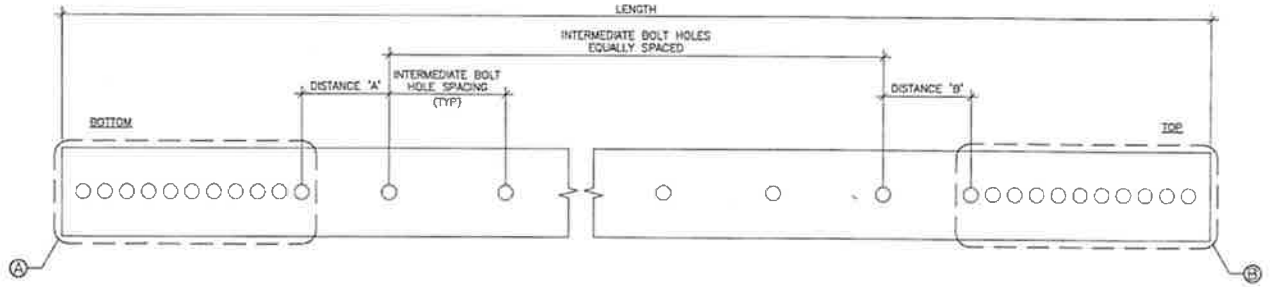
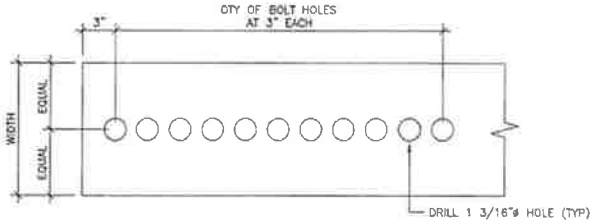
OLD SAYBROOK
841289
170 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 155' MONOPOLE

SHEET TITLE:
FLAT PLATE
BRIDGE STIFFENER DETAIL,
SCHEDULE AND NOTES

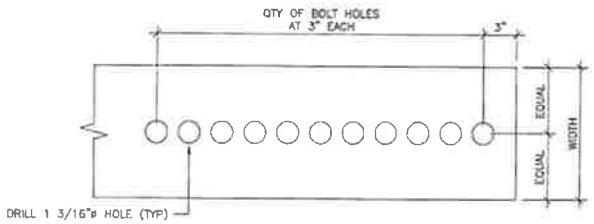
SHEET NUMBER: S11
REVISION: 0



1 UNIQUE PART
SCALE: N.T.S.



2 DETAIL A (BOTTOM)
SCALE: N.T.S.



3 DETAIL B (TOP)
SCALE: N.T.S.

PART NUMBER	BLACK WEIGHT (LBS)	WIDTH	THICKNESS	LENGTH	DISTANCE 'A'	DISTANCE 'B'	TOTAL QTY OF 1 3/16"ø BOLT HOLES	QTY OF BOLT HOLES (BOTTOM END)	QTY OF BOLT HOLES (TOP END)	INTERMEDIATE BOLT HOLE SPACING
FP1	829	6 1/2"	1 1/4"	30'-0"	FIELD VERIFY 1'-6" MAX.	FIELD VERIFY 1'-6" MAX.	38	11	11	1'-6"

CONTRACTOR NOTE:
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CROWN CASTLE

ISSUED FOR:

REV	DATE	DESCRIPTION
0	09/12/14	ISSUED FOR CONSTRUCTION

PROJECT NO:	93490.001.01
PROJECT ENG:	BRADEN TABB
DRAWN BY:	CWR
CHECKED BY:	AA

B+T ENGINEERING, INC.

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
9/12/14

OLD SAYBROOK
841289
170 INGHAM HILL ROAD
OLD SAYBROOK, CT
EXISTING 151' MONOPOLE

SHEET TITLE
PART DETAILS

SHEET NUMBER: D1
REVISION: 0