

June 24, 2015

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

Re: **Notice of Exempt Modification – Facility Modification
1969 Saybrook Road, Middletown, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 142-foot level of the existing 150-foot tower at 1969 Saybrook Road in Middletown (the “Property”). The tower is owned by Crown Castle. The Council approved Cellco’s use of this tower in 2002. Cellco now intends to modify its facility by replacing three (3) of its existing antennas with three (3) model HBXX-6517DS-VTM, 1900 MHz antennas and adding three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, for a total of fifteen (15) antennas, all at the same 142-foot level. Cellco also intends to add six (6) remote radio heads (“RRHs”) and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cable attached to the outside of the tower.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Daniel T. Drew, Mayor for the City of Middletown. A copy of this letter is also being sent to Regowset Ridge LLC, the owner of the Property.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

Melanie A. Bachman

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1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be located at the 142-foot level on the 150-foot tower.

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

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

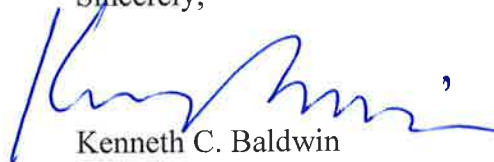
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table is included behind Attachment 2.

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

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (See Structural Modification Report included in Attachment 3).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Daniel T. Drew, Middletown Mayor
Regowset Ridge LLC
Tim Parks

ATTACHMENT 1



HBXX-6517DS-VTM

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

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

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR Return Loss, dB	1.4 15.6	1.4 15.6	1.4 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

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

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

General Specifications

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

HBXX-6517DS-VTM



Performance Note

Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h 149.8 mph

Dimensions

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

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M
RET System	Teletilt®

Regulatory Compliance/Certifications

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



Included Products

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

* Footnotes

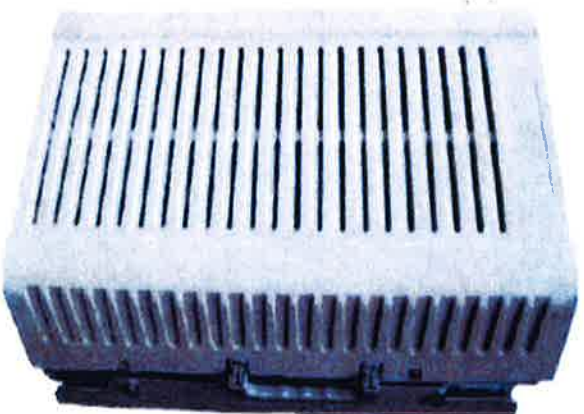
Performance Note	Severe environmental conditions may degrade optimum performance
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PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

RRH2X60	
RF Output Power	2X60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver	1900 HW version 1900A HW version
Features	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3 AISG 2.0 for RET/TMA
Power	Internal Smart Bias-T -48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor Ports	TX
Environmental	GR487 Compliance
RF Connectors	7/16 DIN (top mounted)



** Not a Verizon Wireless deployed product

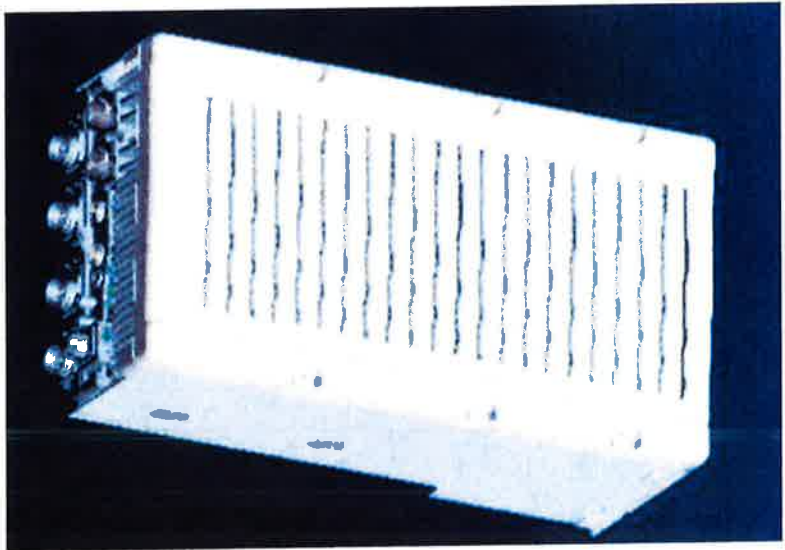
ALCATEL-LUCENT – CONFIDENTIAL – SOLELY FOR AUTHORIZED PERSONS HAVING A NEED TO KNOW – PROPRIETARY – USE PURSUANT TO COMPANY INSTRUCTION

NEW PCS RF MODULES FOR VZW RRH2X60 - HW CHARACTERISTICS

LR14.3

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

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



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

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



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

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals

along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

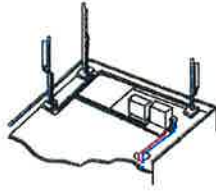
EASY INSTALLATION

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

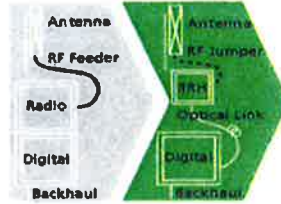
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

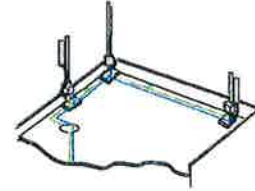
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

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

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

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

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)

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.....Alcatel-Lucent

AT THE SPEED OF IDEAS™

.....Alcatel-Lucent 



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

Product Description

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

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

Features/Benefits

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



Figure 1: HYBRIFLEX Series

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight and Dimensions			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	0.68 (0.205)
DC-Resistance Power Cable, 8.4mm ² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Optical Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[μm]	50/125
Primary Coating (Acrylate)		[μm]	245
Buffer Diameter, Nominal		[μm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Power and Alarm Cable Properties			
Size (Power)		[mm (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Operating Temperature			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to 149)

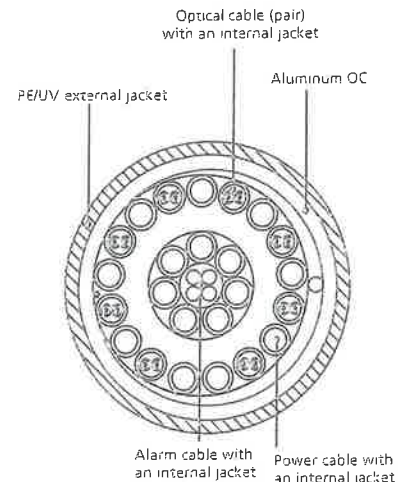


Figure 2: Construction Detail

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

* This data is provisional and subject to change

ATTACHMENT 2

Site Name: Middletown SE Tower Height: 150Ft.		General		Power		Density							
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total					
*AT&T 850/1900 MHz	8	396.5	132	0.0655	850	0.5667	1.18%						
*AT&T 700/850/1900/2300 MHz	4	881	132	0.0727	700	0.4667	2.14%						
*AT&T 700/1900 MHz	2	1767	132	0.0729	700	0.4667	2.12%						
*Pocket (now MetroPCS)	3	631	122	0.0457	2130	1.0000	4.57%						
*VoiceStream	8	234	110	0.0556	1930	1.0000	5.56%						
*Sprint	11	122	150	0.0214	1900	1.0000	2.14%						
Verizon PCS	11	388	142	0.0761	1970	1.0000	7.61%						
Verizon Cellular	9	266	142	0.0427	869	0.5793	7.37%						
Verizon AWS	1	2812	142	0.0501	2145	1.0000	5.01%						
Verizon 700	1	811	142	0.0145	746	0.4973	2.91%						
								40.62%					
* Source: Siting Council													

ATTACHMENT 3



June 17, 2015

Mr. Timothy Howell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(980) 209-8242

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

Subject: Structural Modification Report

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Number: 39390
Carrier Site Name: Middletown SE, CT

Crown Castle Designation: **Crown Castle BU Number:** 876341
Crown Castle Site Name: Middletown 2 - Marino Property
Crown Castle JDE Job Number: 321324
Crown Castle Work Order Number: 1008755
Crown Castle Application Number: 280690 Rev. 2

Engineering Firm Designation: **B+T Group Project Number:** 79732.003.01

Site Data: **1969 Saybrook Road, Middletown, CT, Middlesex County**
Latitude 41° 30' 38.3", Longitude -72° 35' 36.1"
150 Foot - Monopole

Dear Mr. Howell,

B+T Group is pleased to submit this "**Structural Modification 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 757182, in accordance with application 280690, revision 2.

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:

LC4.7: TSA specified load case with proposed modifications

Sufficient Capacity

Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and International Building Code 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.

Robbie Frazier, E.I.
Project Engineer

Chad E. Tuttle, P.E.
President

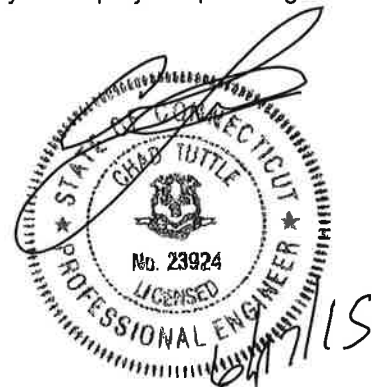


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Tower Modification Drawings

1) INTRODUCTION

This is a 150 ft. monopole designed by Summit in March of 1997. The monopole was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. This monopole has been modified by IETS in 2008 and FDH in 2014 and those modifications were incorporated in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this monopole 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
141.0	142.0	3	Alcatel Lucent	RRH-2x60-PCS	1	1 5/8	--
		3	Alcatel Lucent	RRH2X60-AWS BAND 4			
		6	Andrew	HBXX-6517DS-A2M			
		1	RFS Celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note	
150.0	150.0	6	Decibel	DB980H90E-M	6	1 5/8	1	
		1	--	Platform Mount [LP 712-1]				
141.0	145.0	1	Lucent	KS24019-L112A	--	--	1	
		3	Antel	BXA-171085-8BF-EDIN-2	--	--	3	
	2	Antel	BXA-70063/4CF					
	1	Antel	BXA-70063/4CFx4					
	142.0	142.0	6	RFS Celwave	APL868013-42T0	12	1 5/8	1
			3	Antel	BXA-70063-6CF-EDIN-0			
			6	RFS Celwave	FD9R6004/2C-3L			
			1	--	Platform Mount [LP 712-1]			
141.0	141.0	6	RFS Celwave	FD9R6004/2C-3L	1	1/2		
		1	--	Platform Mount [LP 712-1]				
129.0	132.0	6	CCI Antennas	OPA-65R-LCUU-H6	2	3/4	2	
		3	Ericsson	RRUS A2 MODULE				
		3	Ericsson	RRUS-11 1900MHz				
		1	Raycap	DC6-48-60-18-8F				
	129.0	129.0	3	Powerwave	7770.00	12	1 5/8	1
			3	Ericsson	RRU-11			
			6	Powerwave	LGP21401			
			1	Raycap	DC6-48-60-18-8F			
122.0	122.0	1	--	Platform Mount [LP 712-1]	1	3/8		
		3	RFS Celwave	APXV18-206517S-C	6	1 5/8	1	
1	--	Pipe Mount [PM 601-3]						

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
111.0	111.0	4	Remec	S20057A1	8	1 5/8	1
		2	--	T-Arm Mount [TA 602-1]			
	110.0	4	EMS Wireless	RR65-18-02DP			
104.0	104.0	1	Lucent	KS24019-L112A	1	1/2	1
		1	--	Side Arm Mount [SO 701-1]			
100.0	100.0	12	decibel	DB844H90E-XY	12	1 1/4	3
		1	--	Platform Mount [LP 303-1]			

Notes:

- 1) Existing Equipment
- 2) Reserved Equipment
- 3) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
150	150	1	Generic	14'Low Profile Platform	--	--
		12	Generic	DB980H90		
130	130	1	Generic	14'Low Profile Platform	--	--
		12	Generic	DB980H90		
110	110	1	Generic	14'Low Profile Platform	--	--
		12	Generic	DB980H90		
100	100	1	Generic	GPS Antenna w/ Mount	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate, Revision # 2	280690	CCI Sites
Tower Manufacturer Drawings	Summit Manufacturing, Inc. Job No. A29297-081	1614554	CCI Sites
Tower Modification Drawings	IETS, Project No. 2008-70608-04	Date: 09/10/08	CCI Sites
	FDH, Project No. 1462WS1400	5069317	CCI Sites
Post Modification Inspection	IETS, Project No. 2009-70565	1595639	CCI Sites
	SGS, Project No. 145061	5311239	CCI Sites
Foundation Drawings	Summit Manufacturing, Inc. Job No. A29297-081	1613596	CCI Sites
Geotech Report	CHA Project No. 5835.07.34	1532967	CCI Sites
Antenna Configuration	Previous SA by FDH, Project No. 15BDJF1400	5551772	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) - LC4.7

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 108	Pole	TP30.401x22x0.25	1	-8.722	-	77.6	Pass ¹
L2	108 - 89.5	Pole	TP33.602x29.151x0.313	2	-13.009	-	97.5	Pass ¹
L3	89.5 - 69.75	Pole	TP37.553x33.602x0.482	3	-16.345	-	83.8	Pass ¹
L4	69.75 - 68	Pole	TP37.278x35.978x0.375	4	-18.465	-	94.9	Pass ¹
L5	68 - 57.5	Pole	TP39.378x37.278x0.557	5	-21.243	-	88.9	Pass ¹
L6	57.5 - 32.5	Pole	TP44.379x39.378x0.565	6	-27.029	-	90.1	Pass ¹
L7	32.5 - 26.5	Pole	TP44.829x42.529x0.621	7	-32.300	-	88.1	Pass ¹
L8	26.5 - 0	Pole	TP50.13x44.829x0.66	8	-42.461	-	86.5	Pass ¹
							Summary	
						Pole (L2)	97.5	Pass ¹
						RATING =	97.5	Pass¹

Table 6 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	Base	86.0	Pass
1	Base Plate	Base	87.3	Pass
1	Base Foundation (Soil Interaction)	Base	75.0	Pass

Structure Rating (max from all components) =	97.5%
---	--------------

Notes:

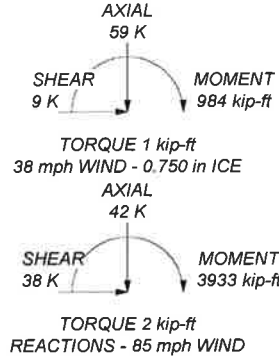
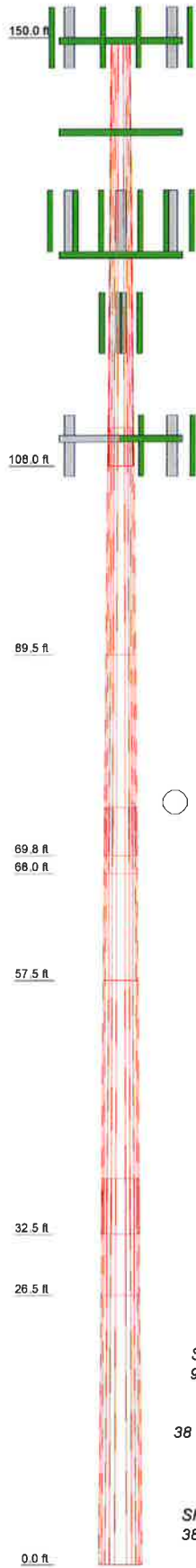
- 1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.
- 2) The percent capacities shown above (excluding foundations) include the 1/3 increase in allowable stresses as allowed by TIA/EIA-222-F.

4.1) Recommendations

- 1) All modifications proposed in this report shall be installed in accordance with the attached drawings (Appendix D) for the determined available structural capacity to be effective.

APPENDIX A
tnxTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	30.4
Length (ft)	42.000	22.250	19.750	6.500	10.500	25.000	11.500	26.500	
Number of Sides	12	12	12	12	12	12	12	12	
Thickness (in)	0.250	0.313	0.482	0.375	0.557	0.565	0.621	0.660	
Socket Length (ft)	3.750		4.750		5.500	5.500		44.829	
Top Dia (in)	22.000	29.151	33.602	35.978	37.278	39.376	42.529	50.130	
Bot Dia (in)	30.401	33.602	37.553	37.278	39.378	44.379	44.829	51.286	
Grade		A607-60		51.036228ksi	A607-65	53.554342ksi	51.246456ksi	52.119532ksi	51.286513ksi
Weight (K)	3.0	2.4	3.6	1.0	2.3	6.2	3.3	8.7	



DESIGNED APPURTENANCE LOADING


TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H90E-M w/ Mount Pipe (E)	150	7770.00 w/ Mount Pipe (E)	129
(2) DB980H90E-M w/ Mount Pipe (E)	150	7770.00 w/ Mount Pipe (E)	129
(2) DB980H90E-M w/ Mount Pipe (E)	150	(2) LGP21401 (E)	129
(3) 6' x 2" Mount Pipe (E)	150	(2) LGP21401 (E)	129
(3) 6' x 2" Mount Pipe (E)	150	(2) LGP21401 (E)	129
(3) 6' x 2" Mount Pipe (E)	150	RRU-11 (E)	129
Platform Mount [LP 712-1] (E)	150	RRU-11 (E)	129
(2) APL868013-42T0 w/ Mount Pipe (E)	141	RRU-11 (E)	129
(2) APL868013-42T0 w/ Mount Pipe (E)	141	DC6-48-60-18-8F (E)	129
(2) APL868013-42T0 w/ Mount Pipe (E)	141	(2) OPA-65R-LCUU-H6 w/ Mount Pipe (R)	129
(2) APL868013-42T0 w/ Mount Pipe (E)	141	(2) OPA-65R-LCUU-H6 w/ Mount Pipe (R)	129
KS24019-L112A (E)	141	(2) OPA-65R-LCUU-H6 w/ Mount Pipe (R)	129
(2) FD9R6004/2C-3L (E)	141	RRUS A2 MODULE (R)	129
(2) FD9R6004/2C-3L (E)	141	RRUS A2 MODULE (R)	129
(2) FD9R6004/2C-3L (E)	141	RRUS A2 MODULE (R)	129
RRH2X60-AWS BAND 4 (P)	141	RRUS A2 MODULE (R)	129
RRH2X60-AWS BAND 4 (P)	141	RRUS-11 1900MHz (R)	129
RRH2X60-AWS BAND 4 (P)	141	RRUS-11 1900MHz (R)	129
RRH-2x60-PCS (P)	141	RRUS-11 1900MHz (R)	129
RRH-2x60-PCS (P)	141	DC6-48-60-18-8F (R)	129
RRH-2x60-PCS (P)	141	6' x 2" Mount Pipe (E)	129
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	141	6' x 2" Mount Pipe (E)	129
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	141	Platform Mount [LP 712-1] (E)	129
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	141	APXV18-206517S-C (E)	122
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	141	APXV18-206517S-C (E)	122
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	141	APXV18-206517S-C (E)	122
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	141	Pipe Mount [PM 601-3] (E)	122
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	141	(2) RR65-18-02DP w/ Mount Pipe (E)	111
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	141	(2) RR65-18-02DP w/ Mount Pipe (E)	111
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	141	(2) S20057A1 (E)	111
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (E)	141	(2) S20057A1 (E)	111
DB-T1-8Z-8AB-0Z (P)	141	T-Arm Mount [TA 602-1] (E)	111
Platform Mount [LP 712-1] (E)	141	T-Arm Mount [TA 602-1] (E)	111
7770.00 w/ Mount Pipe (E)	129	KS24019-L112A (E)	104
		Side Arm Mount [SO 701-1] (E)	104

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	51.246456ksi	51 ksi	66 ksi
51.036228ksi	51 ksi	66 ksi	51.286513ksi	51 ksi	66 ksi
A607-65	65 ksi	80 ksi	52.119532ksi	52 ksi	67 ksi
53.554342ksi	54 ksi	69 ksi			

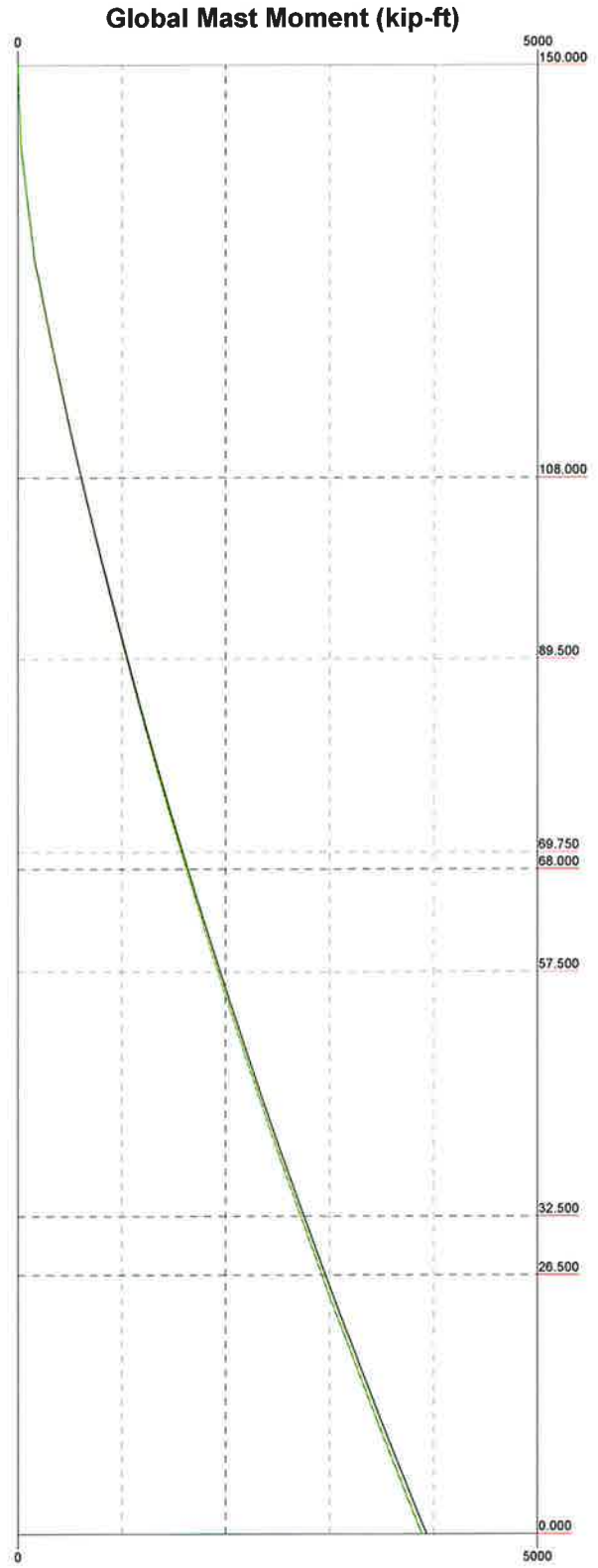
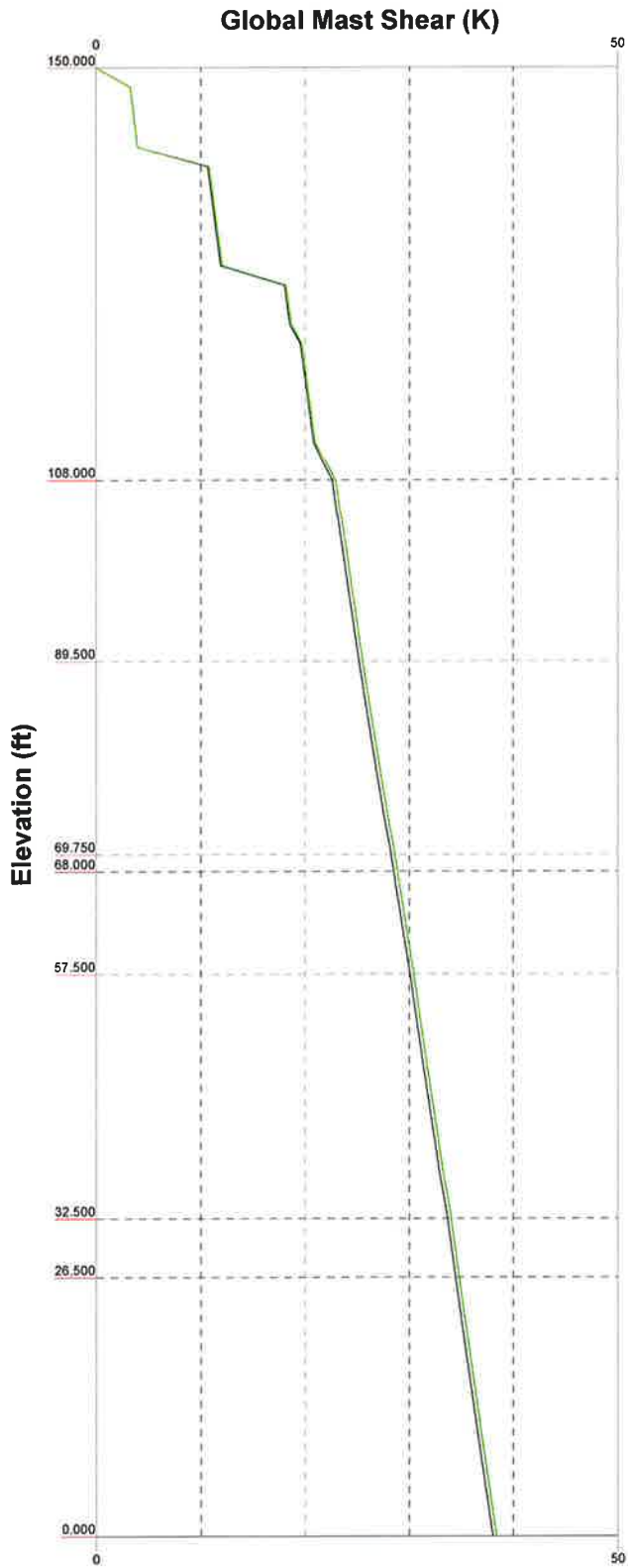
TOWER DESIGN NOTES


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: 97.5%

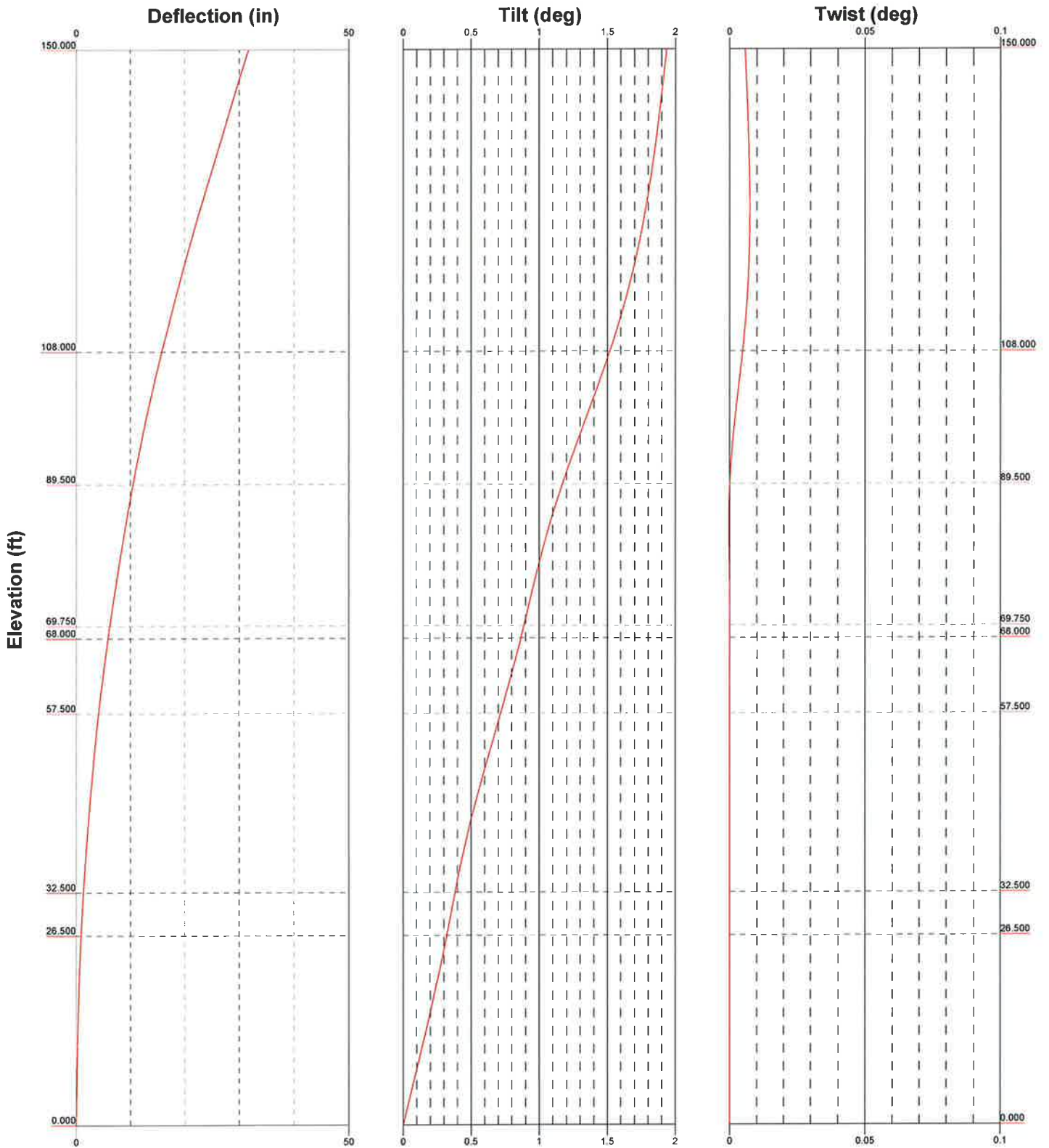
 B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630	Job: 79732.003.01 - Middletown 2 - Marino Property, CT (BU# 876341)
	Project:
	Client: Crown Castle
	Code: TIA/EIA-222-F
Path:	Drawn by: APatil
Date: 02/24/15	App'd:
Scale: NTS	Dwg No. E-1


— Vx — Vz

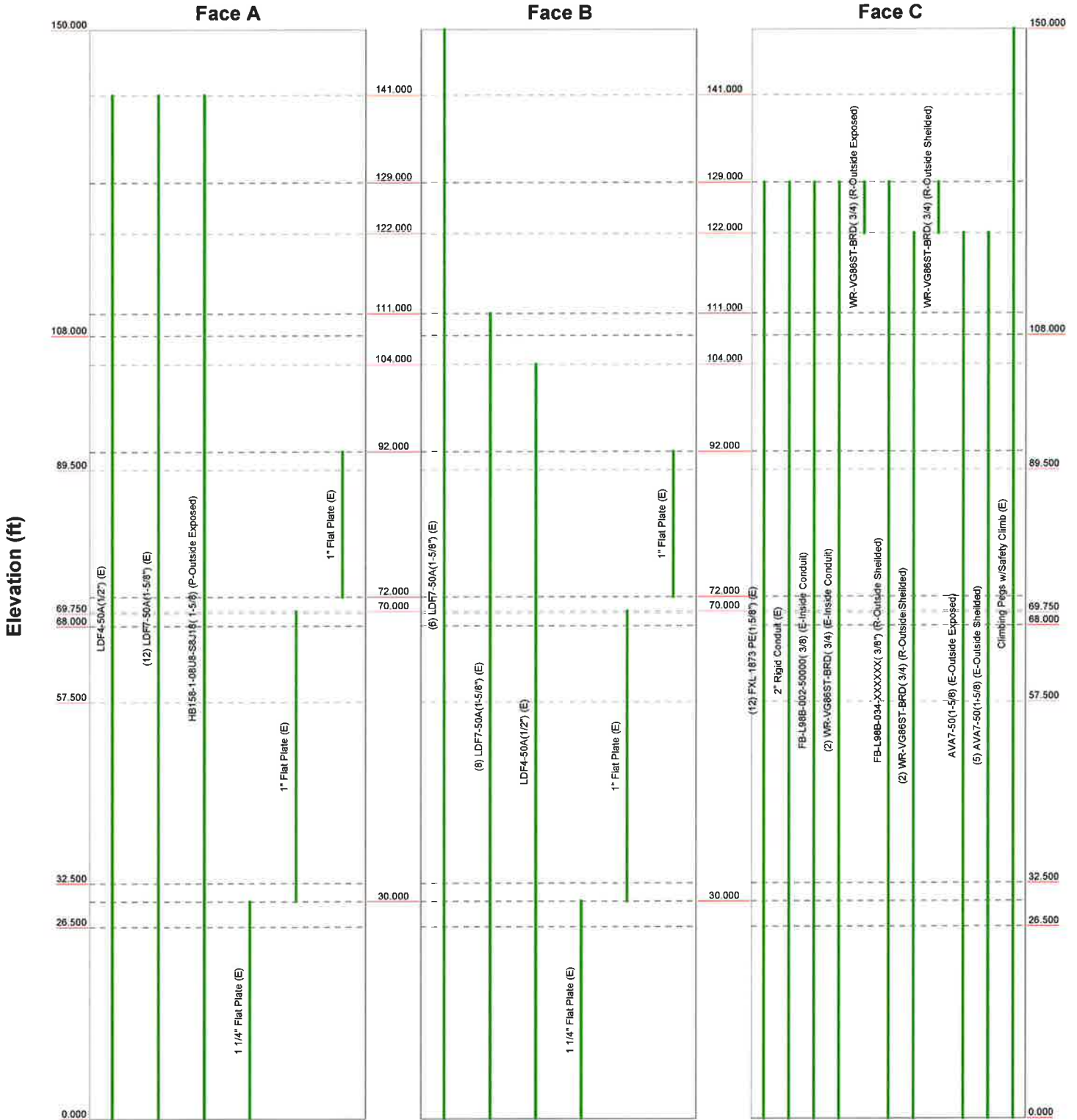
— Mx — Mz




	B+T Group		
	1717 S. Boulder, Suite 300		
	Tulsa, OK 74119		
	Phone: (918) 587-4630		
	FAX: (918) 587-4630		
Job: 79732.003.01 - Middletown 2 - Marino Property, CT (BU# 876341)			
Project:			
Client: Crown Castle	Drawn by: APatil	App'd:	
Code: TIA/EIA-222-F	Date: 02/24/15	Scale: NTS	
Path:	Dwg No		E-4



 <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630</p>	Job: 79732.003.01 - Middletown 2 - Marino Property, CT (BU# 876341)		
	Project:		
	Client: Crown Castle	Drawn by: APatil	App'd:
	Code: TIA/EIA-222-F	Date: 02/24/15	Scale: NTS
	Path:		Dwg No. E-5



 <p>B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 587-4630</p>	<p>Job: 79732.003.01 - Middletown 2 - Marino Property, CT (BU# 876341)</p>		
	<p>Project:</p>		
	<p>Client: Crown Castle</p>	<p>Drawn by: APatil</p>	<p>App'd:</p>
	<p>Code: TIA/EIA-222-F</p>	<p>Date: 02/24/15</p>	<p>Scale: NTS</p>
	<p>Path:</p>	<p>Dwg No E-7</p>	

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	Project	Date 19:55:41 02/24/15
	Client Crown Castle	Designed by APatil

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Middlesex County, Connecticut.

Basic wind speed of 85 mph.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

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

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 50 mph.

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

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

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

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	150.000-108.000	42.000	3.750	12	22.000	30.401	0.250	1.000	A607-60 (60 ksi)
L2	108.000-89.500	22.250	0.000	12	29.151	33.602	0.313	1.250	A607-60 (60 ksi)
L3	89.500-69.750	19.750	4.750	12	33.602	37.553	0.482	1.930	51.036228ksi (51 ksi)
L4	69.750-68.000	6.500	0.000	12	35.978	37.278	0.375	1.500	A607-65 (65 ksi)
L5	68.000-57.500	10.500	0.000	12	37.278	39.378	0.557	2.226	53.554342ksi (54 ksi)
L6	57.500-32.500	25.000	5.500	12	39.378	44.379	0.565	2.258	51.246456ksi (51 ksi)
L7	32.500-26.500	11.500	0.000	12	42.529	44.829	0.621	2.484	51.286513ksi (51 ksi)
L8	26.500-0.000	26.500		12	44.829	50.130	0.660	2.639	52.119532ksi (52 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	I/Q in ²	w in	w/t
L1	22.776	17.509	1057.206	7.786	11.396	92.770	2142.186	8.617	5.226	20.904
	31.473	24.272	2816.352	10.794	15.748	178.842	5706.693	11.946	7.477	29.91
L2	30.956	29.019	3080.391	10.324	15.100	203.997	6241.707	14.282	6.975	22.32
	34.787	33.498	4738.211	11.918	17.406	272.220	9600.899	16.486	8.168	26.137
L3	34.787	51.449	7203.276	11.857	17.406	413.842	14595.790	25.321	7.712	15.987
	38.878	57.586	10100.969	13.271	19.452	519.265	20467.302	28.342	8.771	18.182
L4	38.231	42.990	6955.434	12.746	18.636	373.216	14093.595	21.159	8.637	23.032
	38.593	44.560	7745.626	13.211	19.310	401.120	15694.738	21.931	8.985	23.961

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	Project	Date 19:55:41 02/24/15
	Client Crown Castle	Designed by APatil

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L5	38.593	65.810	11326.984	13.146	19.310	586.587	22951.541	32.390	8.499	15.27
	40.767	69.574	13383.835	13.898	20.398	656.137	27119.279	34.242	9.062	16.282
L6	40.767	70.559	13567.776	13.895	20.398	665.154	27491.993	34.727	9.040	16.013
	45.945	79.650	19516.647	15.686	22.988	848.981	39546.018	39.201	10.381	18.387
L7	45.168	83.808	18787.080	15.003	22.030	852.798	38067.718	41.248	9.733	15.672
	46.411	88.408	22053.718	15.827	23.222	949.710	44686.812	43.512	10.350	16.665
L8	46.411	93.849	23369.891	15.813	23.222	1006.389	47353.735	46.190	10.246	15.527
	51.898	105.112	32833.991	17.710	25.967	1264.434	66530.567	51.733	11.666	17.68

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals
ft	ft ²	in					in	in
L1				1	1	1		
150.000-108.000								
L2				1	1	1		
108.000-89.500								
L3				1	1	0.969522		
89.500-69.750								
L4				1	1	1		
69.750-68.000								
L5				1	1	0.933334		
68.000-57.500								
L6				1	1	0.974102		
57.500-32.500								
L7				1	1	0.976384		
32.500-26.500								
L8				1	1	0.973031		
26.500-0.000								

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number	C _A A _A	Weight
				ft		ft ² /ft	klf
LDF7-50A(1-5/8") (E)	B	No	Inside Pole	150.000 - 0.000	6	No Ice	0.000
						1/2" Ice	0.000
						1" Ice	0.000
						2" Ice	0.000
						4" Ice	0.000
__**							
LDF4-50A(1/2") (E)	A	No	Inside Pole	141.000 - 0.000	1	No Ice	0.000
						1/2" Ice	0.000
						1" Ice	0.000

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	Project	Date 19:55:41 02/24/15
	Client Crown Castle	Designed by APatil

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	CAAs		Weight klf
							ft ² /ft	
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF7-50A(1-5/8") (E)	A	No	Inside Pole	141.000 - 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
HB158-1-08U8-S8J18(1-5/8) (P-Outside Exposed)	A	No	CaAa (Out Of Face)	141.000 - 0.000	1	No Ice	0.198	0.001
						1/2" Ice	0.298	0.003
						1" Ice	0.398	0.005
						2" Ice	0.598	0.011
						4" Ice	0.998	0.031
__**								
FXL 1873 PE(1 5/8") (E)	C	No	Inside Pole	129.000 - 0.000	12	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
2" Rigid Conduit (E)	C	No	Inside Pole	129.000 - 0.000	1	No Ice	0.000	0.003
						1/2" Ice	0.000	0.003
						1" Ice	0.000	0.003
						2" Ice	0.000	0.003
						4" Ice	0.000	0.003
FB-L98B-002-50000(3/8) (E-Inside Conduit)	C	No	Inside Pole	129.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
WR-VG86ST-BRD(3/4) (E-Inside Conduit)	C	No	Inside Pole	129.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
WR-VG86ST-BRD(3/4) (R-Outside Exposed)	C	No	CaAa (Out Of Face)	129.000 - 122.000	1	No Ice	0.077	0.001
						1/2" Ice	0.177	0.001
						1" Ice	0.277	0.003
						2" Ice	0.477	0.007
						4" Ice	0.877	0.024
FB-L98B-034-XXXXXX (3/8") (R-Outside Sheilded)	C	No	CaAa (Out Of Face)	129.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.002
						2" Ice	0.000	0.006
						4" Ice	0.000	0.022
WR-VG86ST-BRD(3/4) (R-Outside Sheilded)	C	No	CaAa (Out Of Face)	122.000 - 0.000	2	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.007
						4" Ice	0.000	0.024
WR-VG86ST-BRD(3/4) (R-Outside Sheilded)	C	No	CaAa (Out Of Face)	129.000 - 122.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.003
						2" Ice	0.000	0.007
						4" Ice	0.000	0.024
__**								
AVA7-50(1-5/8) (E-Outside Exposed)	C	No	CaAa (Out Of Face)	122.000 - 0.000	1	No Ice	0.201	0.001
						1/2" Ice	0.301	0.002
						1" Ice	0.401	0.004
						2" Ice	0.601	0.010
						4" Ice	1.001	0.030
AVA7-50(1-5/8) (E-Outside Sheilded)	C	No	CaAa (Out Of Face)	122.000 - 0.000	5	No Ice	0.000	0.001
						1/2" Ice	0.000	0.002

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Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	150.000-108.000	A	0.000	0.000	0.000	6.534	0.373
		B	0.000	0.000	0.000	0.000	0.226
		C	0.000	0.000	0.000	7.031	0.194
L2	108.000-89.500	A	0.000	0.000	0.000	4.080	0.209
		B	0.000	0.000	0.000	0.417	0.215
		C	0.000	0.000	0.000	5.337	0.187
L3	89.500-69.750	A	0.000	0.000	0.000	6.869	0.223
		B	0.000	0.000	0.000	2.958	0.230
		C	0.000	0.000	0.000	5.698	0.199
L4	69.750-68.000	A	0.000	0.000	0.000	0.638	0.020
		B	0.000	0.000	0.000	0.292	0.020
		C	0.000	0.000	0.000	0.505	0.018
L5	68.000-57.500	A	0.000	0.000	0.000	3.829	0.119
		B	0.000	0.000	0.000	1.750	0.122
		C	0.000	0.000	0.000	3.029	0.106
L6	57.500-32.500	A	0.000	0.000	0.000	9.117	0.282
		B	0.000	0.000	0.000	4.167	0.291
		C	0.000	0.000	0.000	7.213	0.252
L7	32.500-26.500	A	0.000	0.000	0.000	2.334	0.068
		B	0.000	0.000	0.000	1.146	0.070
		C	0.000	0.000	0.000	1.731	0.061
L8	26.500-0.000	A	0.000	0.000	0.000	10.768	0.299
		B	0.000	0.000	0.000	5.521	0.308
		C	0.000	0.000	0.000	7.645	0.267

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	150.000-108.000	A	0.883	0.000	0.000	0.000	12.359	0.476
		B		0.000	0.000	0.000	0.000	0.226
		C		0.000	0.000	0.000	18.151	0.651
L2	108.000-89.500	A	0.855	0.000	0.000	0.000	7.713	0.267
		B		0.000	0.000	0.000	0.784	0.215
		C		0.000	0.000	0.000	11.868	0.670
L3	89.500-69.750	A	0.833	0.000	0.000	0.000	12.626	0.281
		B		0.000	0.000	0.000	5.424	0.230
		C		0.000	0.000	0.000	12.282	0.680
L4	69.750-68.000	A	0.819	0.000	0.000	0.000	1.173	0.025
		B		0.000	0.000	0.000	0.535	0.020
		C		0.000	0.000	0.000	1.088	0.060
L5	68.000-57.500	A	0.810	0.000	0.000	0.000	6.948	0.148
		B		0.000	0.000	0.000	3.168	0.122
		C		0.000	0.000	0.000	6.431	0.353
L6	57.500-32.500	A	0.778	0.000	0.000	0.000	16.248	0.350
		B		0.000	0.000	0.000	7.408	0.291
		C		0.000	0.000	0.000	14.992	0.811
L7	32.500-26.500	A	0.750	0.000	0.000	0.000	4.045	0.084
		B		0.000	0.000	0.000	1.924	0.070
		C		0.000	0.000	0.000	3.598	0.195
L8	26.500-0.000	A	0.750	0.000	0.000	0.000	18.055	0.367
		B		0.000	0.000	0.000	8.833	0.308
		C		0.000	0.000	0.000	15.595	0.833

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Feed Line Center of Pressure

Section	Elevation	CP _X	CP _Z	CP _X Ice	CP _Z Ice
	ft	in	in	in	in
L1	150.000-108.000	-0.198	-0.096	-0.415	-0.087
L2	108.000-89.500	-0.286	-0.082	-0.527	-0.077
L3	89.500-69.750	-0.143	-0.152	-0.289	-0.182
L4	69.750-68.000	-0.125	-0.163	-0.263	-0.198
L5	68.000-57.500	-0.126	-0.164	-0.263	-0.200
L6	57.500-32.500	-0.128	-0.167	-0.266	-0.205
L7	32.500-26.500	-0.102	-0.181	-0.247	-0.219
L8	26.500-0.000	-0.085	-0.193	-0.231	-0.230

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			ft ft ft	°	ft	ft ²	ft ²	K
__**								
(2) DB980H90E-M w/ Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 4.036 1/2" Ice 4.499 1" Ice 4.947 2" Ice 5.870 4" Ice 8.046	3.619 4.481 5.219 6.744 9.995	0.030 0.066 0.109 0.216 0.549
(2) DB980H90E-M w/ Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 4.036 1/2" Ice 4.499 1" Ice 4.947 2" Ice 5.870 4" Ice 8.046	3.619 4.481 5.219 6.744 9.995	0.030 0.066 0.109 0.216 0.549
(2) DB980H90E-M w/ Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 4.036 1/2" Ice 4.499 1" Ice 4.947 2" Ice 5.870 4" Ice 8.046	3.619 4.481 5.219 6.744 9.995	0.030 0.066 0.109 0.216 0.549
(3) 6' x 2" Mount Pipe (E)	A	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1.425 1/2" Ice 1.925 1" Ice 2.294 2" Ice 3.060 4" Ice 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(3) 6' x 2" Mount Pipe (E)	B	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1.425 1/2" Ice 1.925 1" Ice 2.294 2" Ice 3.060 4" Ice 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
(3) 6' x 2" Mount Pipe (E)	C	From Leg	4.000 0.000 0.000	0.000	150.000	No Ice 1.425 1/2" Ice 1.925 1" Ice 2.294 2" Ice 3.060 4" Ice 4.702	1.425 1.925 2.294 3.060 4.702	0.022 0.033 0.048 0.090 0.231
Platform Mount [LP 712-1] (E)	C	None		0.000	150.000	No Ice 24.530 1/2" Ice 29.940 1" Ice 35.350 2" Ice 46.170 4" Ice 67.810	24.530 29.940 35.350 46.170 67.810	1.335 1.646 1.956 2.577 3.820

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft ²	ft ²	K	
(2) APL868013-42T0 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	141.000	No Ice	3.104	4.921	0.025
			0.000				1/2" Ice	3.476	5.596	0.063
			1.000				1" Ice	3.879	6.284	0.108
							2" Ice	4.761	7.712	0.216
							4" Ice	6.660	10.833	0.541
(2) APL868013-42T0 w/ Mount Pipe (E)	B	From Leg	4.000	0.000	0.000	141.000	No Ice	3.104	4.921	0.025
			0.000				1/2" Ice	3.476	5.596	0.063
			1.000				1" Ice	3.879	6.284	0.108
							2" Ice	4.761	7.712	0.216
							4" Ice	6.660	10.833	0.541
(2) APL868013-42T0 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	0.000	141.000	No Ice	3.104	4.921	0.025
			0.000				1/2" Ice	3.476	5.596	0.063
			1.000				1" Ice	3.879	6.284	0.108
							2" Ice	4.761	7.712	0.216
							4" Ice	6.660	10.833	0.541
KS24019-L112A (E)	A	From Leg	4.000	0.000	0.000	141.000	No Ice	0.156	0.156	0.005
			0.000				1/2" Ice	0.225	0.225	0.007
			4.000				1" Ice	0.302	0.302	0.009
							2" Ice	0.484	0.484	0.018
							4" Ice	0.951	0.951	0.056
(2) FD9R6004/2C-3L (E)	A	From Leg	4.000	0.000	0.000	141.000	No Ice	0.367	0.085	0.003
			0.000				1/2" Ice	0.451	0.136	0.005
			0.000				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	0.000	141.000	No Ice	0.367	0.085	0.003
			0.000				1/2" Ice	0.451	0.136	0.005
			0.000				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	0.000	141.000	No Ice	0.367	0.085	0.003
			0.000				1/2" Ice	0.451	0.136	0.005
			0.000				1" Ice	0.543	0.196	0.009
							2" Ice	0.755	0.343	0.020
							4" Ice	1.281	0.740	0.063
RRH2X60-AWS BAND 4 (P)	A	From Leg	4.000	0.000	0.000	141.000	No Ice	2.189	1.485	0.040
			0.000				1/2" Ice	2.396	1.669	0.060
			1.000				1" Ice	2.612	1.862	0.079
							2" Ice	3.069	2.272	0.126
							4" Ice	4.088	3.198	0.261
RRH2X60-AWS BAND 4 (P)	B	From Leg	4.000	0.000	0.000	141.000	No Ice	2.189	1.485	0.040
			0.000				1/2" Ice	2.396	1.669	0.060
			1.000				1" Ice	2.612	1.862	0.079
							2" Ice	3.069	2.272	0.126
							4" Ice	4.088	3.198	0.261
RRH2X60-AWS BAND 4 (P)	C	From Leg	4.000	0.000	0.000	141.000	No Ice	2.189	1.485	0.040
			0.000				1/2" Ice	2.396	1.669	0.060
			1.000				1" Ice	2.612	1.862	0.079
							2" Ice	3.069	2.272	0.126
							4" Ice	4.088	3.198	0.261
RRH-2x60-PCS (P)	A	From Leg	4.000	0.000	0.000	141.000	No Ice	2.450	1.429	0.060
			0.000				1/2" Ice	2.668	1.615	0.072
			1.000				1" Ice	2.895	1.809	0.092
							2" Ice	3.375	2.224	0.140
							4" Ice	4.438	3.158	0.280
RRH-2x60-PCS (P)	B	From Leg	4.000	0.000	0.000	141.000	No Ice	2.450	1.429	0.060
			0.000				1/2" Ice	2.668	1.615	0.072

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A _A Front	C _A A _A Side	Weight
			Horz	Vert					
			ft	ft	°	ft	ft ²	ft ²	K
				1.000			1" Ice 2.895	1.809	0.092
							2" Ice 3.375	2.224	0.140
							4" Ice 4.438	3.158	0.280
RRH-2x60-PCS (P)	C	From Leg	4.000	0.000	0.000	141.000	No Ice 2.450	1.429	0.060
			0.000				1/2" Ice 2.668	1.615	0.072
			1.000				1" Ice 2.895	1.809	0.092
							2" Ice 3.375	2.224	0.140
							4" Ice 4.438	3.158	0.280
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	A	From Leg	4.000	0.000	0.000	141.000	No Ice 8.976	6.963	0.067
			0.000				1/2" Ice 9.647	8.182	0.137
			1.000				1" Ice 10.291	9.144	0.215
							2" Ice 11.595	11.022	0.398
							4" Ice 14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	B	From Leg	4.000	0.000	0.000	141.000	No Ice 8.976	6.963	0.067
			0.000				1/2" Ice 9.647	8.182	0.137
			1.000				1" Ice 10.291	9.144	0.215
							2" Ice 11.595	11.022	0.398
							4" Ice 14.321	15.027	0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe (P)	C	From Leg	4.000	0.000	0.000	141.000	No Ice 8.976	6.963	0.067
			0.000				1/2" Ice 9.647	8.182	0.137
			1.000				1" Ice 10.291	9.144	0.215
							2" Ice 11.595	11.022	0.398
							4" Ice 14.321	15.027	0.914
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	A	From Leg	4.000	0.000	0.000	141.000	No Ice 7.969	5.801	0.042
			0.000				1/2" Ice 8.609	6.953	0.103
			1.000				1" Ice 9.216	7.819	0.171
							2" Ice 10.459	9.601	0.335
							4" Ice 13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	B	From Leg	4.000	0.000	0.000	141.000	No Ice 7.969	5.801	0.042
			0.000				1/2" Ice 8.609	6.953	0.103
			1.000				1" Ice 9.216	7.819	0.171
							2" Ice 10.459	9.601	0.335
							4" Ice 13.066	13.366	0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe (P)	C	From Leg	4.000	0.000	0.000	141.000	No Ice 7.969	5.801	0.042
			0.000				1/2" Ice 8.609	6.953	0.103
			1.000				1" Ice 9.216	7.819	0.171
							2" Ice 10.459	9.601	0.335
							4" Ice 13.066	13.366	0.804
DB-T1-6Z-8AB-0Z (P)	A	From Leg	4.000	0.000	0.000	141.000	No Ice 5.600	2.333	0.044
			0.000				1/2" Ice 5.915	2.558	0.080
			1.000				1" Ice 6.240	2.791	0.120
							2" Ice 6.914	3.284	0.213
							4" Ice 8.365	4.373	0.455
Platform Mount [LP 712-1] (E)	C	None			0.000	141.000	No Ice 24.530	24.530	1.335
							1/2" Ice 29.940	29.940	1.646
							1" Ice 35.350	35.350	1.956
							2" Ice 46.170	46.170	2.577
							4" Ice 67.810	67.810	3.820
***_**_**									
7770.00 w/ Mount Pipe (E)	A	From Leg	4.000	0.000	0.000	129.000	No Ice 6.119	4.254	0.055
			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 (E)	B	From Leg	4.000	0.000	0.000	129.000	No Ice 6.119	4.254	0.055
			0.000				1/2" Ice 6.626	5.014	0.103
			3.000				1" Ice 7.128	5.711	0.157

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Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz ft	Lateral ft	Vert ft					
							2" Ice	8.164	7.155	0.287
							4" Ice	10.360	10.412	0.665
7770.00 w/ Mount Pipe (E)	C	From Leg	4.000	0.000	129.000		No Ice	6.119	4.254	0.055
			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) LGP21401 (E)	A	From Leg	4.000	0.000	129.000		No Ice	1.288	0.233	0.014
			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) LGP21401 (E)	B	From Leg	4.000	0.000	129.000		No Ice	1.288	0.233	0.014
			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
(2) LGP21401 (E)	C	From Leg	4.000	0.000	129.000		No Ice	1.288	0.233	0.014
			0.000				1/2" Ice	1.445	0.313	0.021
			0.000				1" Ice	1.611	0.403	0.030
							2" Ice	1.969	0.608	0.055
							4" Ice	2.788	1.121	0.135
RRU-11 (E)	A	From Leg	4.000	0.000	129.000		No Ice	1.912	1.472	0.044
			0.000				1/2" Ice	2.102	1.645	0.060
			0.000				1" Ice	2.301	1.827	0.078
							2" Ice	2.725	2.218	0.123
							4" Ice	3.676	3.102	0.254
RRU-11 (E)	B	From Leg	4.000	0.000	129.000		No Ice	1.912	1.472	0.044
			0.000				1/2" Ice	2.102	1.645	0.060
			0.000				1" Ice	2.301	1.827	0.078
							2" Ice	2.725	2.218	0.123
							4" Ice	3.676	3.102	0.254
RRU-11 (E)	C	From Leg	4.000	0.000	129.000		No Ice	1.912	1.472	0.044
			0.000				1/2" Ice	2.102	1.645	0.060
			0.000				1" Ice	2.301	1.827	0.078
							2" Ice	2.725	2.218	0.123
							4" Ice	3.676	3.102	0.254
DC6-48-60-18-8F (E)	C	From Leg	4.000	0.000	129.000		No Ice	2.567	2.567	0.019
			0.000				1/2" Ice	2.798	2.798	0.041
			0.000				1" Ice	3.038	3.038	0.067
							2" Ice	3.543	3.543	0.129
							4" Ice	4.658	4.658	0.299
(2) OPA-65R-LCUU-H6 w/ Mount Pipe (R)	A	From Leg	4.000	0.000	129.000		No Ice	10.598	7.179	0.100
			0.000				1/2" Ice	11.268	8.362	0.175
			3.000				1" Ice	11.906	9.259	0.261
							2" Ice	13.209	11.086	0.459
							4" Ice	15.934	15.151	1.002
(2) OPA-65R-LCUU-H6 w/ Mount Pipe (R)	B	From Leg	4.000	0.000	129.000		No Ice	10.598	7.179	0.100
			0.000				1/2" Ice	11.268	8.362	0.175
			3.000				1" Ice	11.906	9.259	0.261
							2" Ice	13.209	11.086	0.459
							4" Ice	15.934	15.151	1.002
(2) OPA-65R-LCUU-H6 w/ Mount Pipe (R)	C	From Leg	4.000	0.000	129.000		No Ice	10.598	7.179	0.100
			0.000				1/2" Ice	11.268	8.362	0.175
			3.000				1" Ice	11.906	9.259	0.261
							2" Ice	13.209	11.086	0.459
							4" Ice	15.934	15.151	1.002

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA}		Weight
			Horz	Lateral			Front	Side	
			ft	ft	°	ft	ft ²	ft ²	K
RRUS A2 MODULE (R)	A	From Leg	4.000	0.000	129.000	No Ice	1.867	0.423	0.021
			0.000			1/2" Ice	2.051	0.532	0.031
			3.000			1" Ice	2.244	0.650	0.044
						2" Ice	2.657	0.912	0.077
						4" Ice	3.585	1.540	0.177
RRUS A2 MODULE (R)	B	From Leg	4.000	0.000	129.000	No Ice	1.867	0.423	0.021
			0.000			1/2" Ice	2.051	0.532	0.031
			3.000			1" Ice	2.244	0.650	0.044
						2" Ice	2.657	0.912	0.077
						4" Ice	3.585	1.540	0.177
RRUS A2 MODULE (R)	C	From Leg	4.000	0.000	129.000	No Ice	1.867	0.423	0.021
			0.000			1/2" Ice	2.051	0.532	0.031
			3.000			1" Ice	2.244	0.650	0.044
						2" Ice	2.657	0.912	0.077
						4" Ice	3.585	1.540	0.177
RRUS-11 1900MHz (R)	A	From Leg	4.000	0.000	129.000	No Ice	2.942	1.190	0.044
			0.000			1/2" Ice	3.172	1.351	0.063
			3.000			1" Ice	3.410	1.521	0.086
						2" Ice	3.913	1.887	0.140
						4" Ice	5.023	2.721	0.291
RRUS-11 1900MHz (R)	B	From Leg	4.000	0.000	129.000	No Ice	2.942	1.190	0.044
			0.000			1/2" Ice	3.172	1.351	0.063
			3.000			1" Ice	3.410	1.521	0.086
						2" Ice	3.913	1.887	0.140
						4" Ice	5.023	2.721	0.291
RRUS-11 1900MHz (R)	C	From Leg	4.000	0.000	129.000	No Ice	2.942	1.190	0.044
			0.000			1/2" Ice	3.172	1.351	0.063
			3.000			1" Ice	3.410	1.521	0.086
						2" Ice	3.913	1.887	0.140
						4" Ice	5.023	2.721	0.291
DC6-48-60-18-8F (R)	A	From Leg	4.000	0.000	129.000	No Ice	2.567	2.567	0.019
			0.000			1/2" Ice	2.798	2.798	0.041
			3.000			1" Ice	3.038	3.038	0.067
						2" Ice	3.543	3.543	0.129
						4" Ice	4.658	4.658	0.299
6' x 2" Mount Pipe (E)	A	From Leg	4.000	0.000	129.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			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 (E)	B	From Leg	4.000	0.000	129.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			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 (E)	C	From Leg	4.000	0.000	129.000	No Ice	1.425	1.425	0.022
			0.000			1/2" Ice	1.925	1.925	0.033
			3.000			1" Ice	2.294	2.294	0.048
						2" Ice	3.060	3.060	0.090
						4" Ice	4.702	4.702	0.231
Platform Mount [LP 712-1] (E)	C	None		0.000	129.000	No Ice	24.530	24.530	1.335
						1/2" Ice	29.940	29.940	1.646
						1" Ice	35.350	35.350	1.956
						2" Ice	46.170	46.170	2.577
						4" Ice	67.810	67.810	3.820
__** APXV18-206517S-C	A	From Leg	1.000	0.000	122.000	No Ice	5.167	3.038	0.026

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight
			Horz	Vert					
			ft	ft					
(E)			0.000			1/2" Ice	5.618	3.469	0.053
			0.000			1" Ice	6.077	3.909	0.085
						2" Ice	7.017	4.809	0.167
						4" Ice	9.122	6.700	0.404
APXV18-206517S-C	B	From Leg	1.000	0.000	122.000	No Ice	5.167	3.038	0.026
(E)			0.000			1/2" Ice	5.618	3.469	0.053
			0.000			1" Ice	6.077	3.909	0.085
						2" Ice	7.017	4.809	0.167
						4" Ice	9.122	6.700	0.404
APXV18-206517S-C	C	From Leg	1.000	0.000	122.000	No Ice	5.167	3.038	0.026
(E)			0.000			1/2" Ice	5.618	3.469	0.053
			0.000			1" Ice	6.077	3.909	0.085
						2" Ice	7.017	4.809	0.167
						4" Ice	9.122	6.700	0.404
Pipe Mount [PM 601-3]	C	None		0.000	122.000	No Ice	4.390	4.390	0.195
(E)						1/2" Ice	5.480	5.480	0.237
						1" Ice	6.570	6.570	0.280
						2" Ice	8.750	8.750	0.365
						4" Ice	13.110	13.110	0.534
__***									
(2) RR65-18-02DP w/ Mount	A	From Leg	4.000	0.000	111.000	No Ice	4.593	3.319	0.034
Pipe			0.000			1/2" Ice	5.088	4.089	0.072
(E)			-1.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
(2) RR65-18-02DP w/ Mount	B	From Leg	4.000	0.000	111.000	No Ice	4.593	3.319	0.034
Pipe			0.000			1/2" Ice	5.088	4.089	0.072
(E)			-1.000			1" Ice	5.578	4.784	0.115
						2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
(2) S20057A1	A	From Leg	4.000	0.000	111.000	No Ice	0.821	0.385	0.011
(E)			0.000			1/2" Ice	0.953	0.494	0.016
			0.000			1" Ice	1.093	0.612	0.023
						2" Ice	1.399	0.874	0.043
						4" Ice	2.114	1.502	0.112
(2) S20057A1	B	From Leg	4.000	0.000	111.000	No Ice	0.821	0.385	0.011
(E)			0.000			1/2" Ice	0.953	0.494	0.016
			0.000			1" Ice	1.093	0.612	0.023
						2" Ice	1.399	0.874	0.043
						4" Ice	2.114	1.502	0.112
T-Arm Mount [TA 602-1]	A	From Leg	2.000	0.000	111.000	No Ice	7.280	3.020	0.258
(E)			0.000			1/2" Ice	9.520	4.200	0.330
			0.000			1" Ice	11.760	5.380	0.402
						2" Ice	16.240	7.740	0.546
						4" Ice	25.200	12.460	0.834
T-Arm Mount [TA 602-1]	B	From Leg	2.000	0.000	111.000	No Ice	7.280	3.020	0.258
(E)			0.000			1/2" Ice	9.520	4.200	0.330
			0.000			1" Ice	11.760	5.380	0.402
						2" Ice	16.240	7.740	0.546
						4" Ice	25.200	12.460	0.834
__***									
KS24019-L112A	B	From Leg	3.000	0.000	104.000	No Ice	0.156	0.156	0.005
(E)			0.000			1/2" Ice	0.225	0.225	0.007
			0.000			1" Ice	0.302	0.302	0.009
						2" Ice	0.484	0.484	0.018
						4" Ice	0.951	0.951	0.056
Side Arm Mount [SO 701-1]	B	From Leg	1.500	0.000	104.000	No Ice	0.850	1.670	0.065

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz Lateral ft	Vert ft					
(E)			0.000			1/2" Ice	1.140	2.340	0.079
			0.000			1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121
						4" Ice	3.170	7.030	0.177
__**									
__**									

Load Combinations

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

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Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 108	31.669	27	1.939	0.004
L2	111.75 - 89.5	17.007	27	1.582	0.003
L3	89.5 - 69.75	10.493	27	1.170	0.002
L4	74.5 - 68	7.168	38	0.945	0.001
L5	68 - 57.5	5.925	38	0.866	0.001
L6	57.5 - 32.5	4.185	38	0.716	0.001
L7	38 - 26.5	1.827	38	0.440	0.000
L8	26.5 - 0	0.886	38	0.322	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	(2) DB980H90E-M w/ Mount Pipe	27	31.669	1.939	0.004	24657
141.000	(2) APL868013-42T0 w/ Mount Pipe	27	28.017	1.884	0.004	13698
129.000	7770.00 w/ Mount Pipe	27	23.270	1.792	0.004	5870
122.000	APXV18-206517S-C	27	20.627	1.721	0.004	4402
111.000	(2) RR65-18-02DP w/ Mount Pipe	27	16.756	1.570	0.003	3245
104.000	KS24019-L112A	27	14.518	1.445	0.003	3102

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 108	91.177	2	5.583	0.012
L2	111.75 - 89.5	49.011	2	4.556	0.009
L3	89.5 - 69.75	30.256	13	3.373	0.005
L4	74.5 - 68	20.675	13	2.725	0.003
L5	68 - 57.5	17.091	13	2.499	0.003
L6	57.5 - 32.5	12.075	13	2.064	0.002
L7	38 - 26.5	5.271	13	1.270	0.001
L8	26.5 - 0	2.557	13	0.930	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.000	(2) DB980H90E-M w/ Mount Pipe	2	91.177	5.583	0.012	8718
141.000	(2) APL868013-42T0 w/ Mount Pipe	2	80.677	5.423	0.012	4842
129.000	7770.00 w/ Mount Pipe	2	67.028	5.160	0.011	2073
122.000	APXV18-206517S-C	2	59.426	4.956	0.011	1553
111.000	(2) RR65-18-02DP w/ Mount Pipe	2	48.289	4.521	0.009	1142
104.000	KS24019-L112A	2	41.847	4.164	0.008	1090

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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 _o K	Ratio P P _o
L1	150 - 108 (1)	TP30.401x22x0.25	42.000	0.000	0.0	36.000	23.668	-8.722	852.038	0.010
L2	108 - 89.5 (2)	TP33.602x29.151x0.313	22.250	0.000	0.0	36.000	33.498	-13.009	1205.910	0.011
L3	89.5 - 69.75 (3)	TP37.553x33.602x0.482	19.750	0.000	0.0	30.622	56.110	-16.345	1718.190	0.010
L4	69.75 - 68 (4)	TP37.278x35.978x0.375	6.500	0.000	0.0	39.000	44.560	-18.465	1737.850	0.011
L5	68 - 57.5 (5)	TP39.378x37.278x0.557	10.500	0.000	0.0	32.133	69.574	-21.243	2235.590	0.010
L6	57.5 - 32.5 (6)	TP44.379x39.378x0.565	25.000	0.000	0.0	30.748	77.650	-27.029	2387.570	0.011
L7	32.5 - 26.5 (7)	TP44.829x42.529x0.621	11.500	0.000	0.0	30.772	88.408	-32.300	2720.480	0.012
L8	26.5 - 0 (8)	TP50.13x44.829x0.66	26.500	0.000	0.0	31.272	105.112	-42.461	3287.030	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio f _{bx} F _{bx}	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio f _{by} F _{by}
L1	150 - 108 (1)	TP30.401x22x0.25	524.092	36.991	36.000	1.028	0.000	0.000	36.000	0.000
L2	108 - 89.5 (2)	TP33.602x29.151x0.313	1055.89	46.546	36.000	1.293	0.000	0.000	36.000	0.000
L3	89.5 - 69.75 (3)	TP37.553x33.602x0.482	1455.59	35.443	30.622	1.157	0.000	0.000	30.622	0.000
L4	69.75 - 68 (4)	TP37.278x35.978x0.375	1639.81	49.057	39.000	1.258	0.000	0.000	39.000	0.000
L5	68 - 57.5 (5)	TP39.378x37.278x0.557	1951.01	35.682	32.133	1.110	0.000	0.000	32.133	0.000
L6	57.5 - 32.5 (6)	TP44.379x39.378x0.565	2571.23	38.252	30.748	1.244	0.000	0.000	30.748	0.000
L7	32.5 - 26.5 (7)	TP44.829x42.529x0.621	2962.84	37.437	30.772	1.217	0.000	0.000	30.772	0.000
L8	26.5 - 0 (8)	TP50.13x44.829x0.66	3933.41	37.330	31.272	1.194	0.000	0.000	31.272	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio f _v F _v	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio f _{vt} F _{vt}
L1	150 - 108 (1)	TP30.401x22x0.25	20.993	0.887	24.000	0.076	0.592	0.020	24.000	0.001
L2	108 - 89.5 (2)	TP33.602x29.151x0.313	25.526	0.762	24.000	0.065	1.405	0.029	24.000	0.001
L3	89.5 - 69.75 (3)	TP37.553x33.602x0.482	27.807	0.496	20.415	0.049	1.374	0.016	20.415	0.001
L4	69.75 - 68 (4)	TP37.278x35.978x0.375	28.876	0.648	26.000	0.051	1.363	0.019	26.000	0.001
L5	68 - 57.5 (5)	TP39.378x37.278x0.557	30.439	0.438	21.422	0.041	1.344	0.012	21.422	0.001
L6	57.5 - 32.5 (6)	TP44.379x39.378x0.565	33.188	0.427	20.499	0.042	2.124	0.015	20.499	0.001
L7	32.5 - 26.5 (7)	TP44.829x42.529x0.621	34.852	0.394	20.515	0.039	2.121	0.013	20.515	0.001
L8	26.5 - 0 (8)	TP50.13x44.829x0.66	38.453	0.366	20.848	0.036	2.128	0.009	20.848	0.000

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Pole Interaction Design Data

Section No.	Elevation ft	Ratio P	Ratio f_{bc}	Ratio f_{by}	Ratio f_v	Ratio f_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		P_a	F_{bx}	F_{by}	F_v	F_{vt}			
L1	150 - 108 (1)	0.010	1.028	0.000	0.076	0.001	1.039	1.333	H1-3+VT ✓
L2	108 - 89.5 (2)	0.011	1.293	0.000	0.065	0.001	1.305	1.333	H1-3+VT ✓
L3	89.5 - 69.75 (3)	0.010	1.157	0.000	0.049	0.001	1.168	1.333	H1-3+VT ✓
L4	69.75 - 68 (4)	0.011	1.258	0.000	0.051	0.001	1.269	1.333	H1-3+VT ✓
L5	68 - 57.5 (5)	0.010	1.110	0.000	0.041	0.001	1.120	1.333	H1-3+VT ✓
L6	57.5 - 32.5 (6)	0.011	1.244	0.000	0.042	0.001	1.256	1.333	H1-3+VT ✓
L7	32.5 - 26.5 (7)	0.012	1.217	0.000	0.039	0.001	1.229	1.333	H1-3+VT ✓
L8	26.5 - 0 (8)	0.013	1.194	0.000	0.036	0.000	1.207	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 - 108	Pole	TP30.401x22x0.25	1	-8.722	1135.767	77.6	Pass	
L2	108 - 89.5	Pole	TP33.602x29.151x0.313	2	-13.009	1607.478	97.5	Pass	
L3	89.5 - 69.75	Pole	TP37.553x33.602x0.482	3	-16.345	2290.347	83.8	Pass	
L4	69.75 - 68	Pole	TP37.278x35.978x0.375	4	-18.465	2316.554	94.9	Pass	
L5	68 - 57.5	Pole	TP39.378x37.278x0.557	5	-21.243	2980.041	88.9	Pass	
L6	57.5 - 32.5	Pole	TP44.379x39.378x0.565	6	-27.029	3182.631	90.1	Pass	
L7	32.5 - 26.5	Pole	TP44.829x42.529x0.621	7	-32.300	3626.400	88.1	Pass	
L8	26.5 - 0	Pole	TP50.13x44.829x0.66	8	-42.461	4381.611	86.5	Pass	
							Summary		
							Pole (L2)	97.5	Pass
							RATING =	97.5	Pass

APPENDIX B
BASE LEVEL DRAWING

(PROPOSED)
 (1) 1-5/8" TO 141 FT LEVEL
 (INSTALLED)
 (1) 1/2" TO 141 FT LEVEL
 (12) 1-5/8" TO 141 FT LEVEL

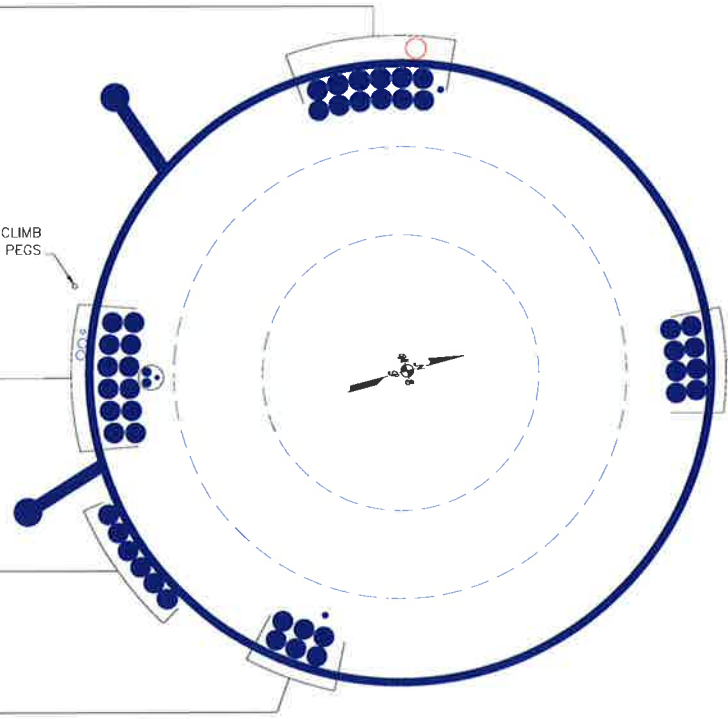
(RESERVED)
 (1) 3/8" TO 129 FT LEVEL
 (2) 3/4" TO 129 FT LEVEL
 (INSTALLED-IN CONDUIT)
 (1) 3/8" TO 129 FT LEVEL
 (2) 3/4" TO 129 FT LEVEL
 (INSTALLED)
 (12) 1-5/8" TO 129 FT LEVEL

(INSTALLED)
 (6) 1-5/8" TO 122 FT LEVEL

(INSTALLED)
 (1) 1/2" TO 104 FT LEVEL
 (6) 1-5/8" TO 150 FT LEVEL

(INSTALLED)
 (8) 1-5/8" TO 111 FT LEVEL

3/8" SAFETY CLIMB
 W/ CLIMBING PEGS



APPENDIX C
ADDITIONAL CALCULATIONS

Reinforcement Capacity

Dimensions and Properties										Compression			Axial			LRFD						
Model	Weight (lb/ft)	Area (in ²)	Moment of Inertia (in ⁴)	Moment of Inertia (in ⁴)	Centroid from Maching Edge (in)	Centroid from Bolt Hole Center (in)	Web Thickness (in)	Width (in)	Flange Width (in)	Flange Thickness (in)	Hole Diameter (in)	Yield Stress (ksi)	Ultimate Stress (ksi)	Slender. Ratio Coefficient	Unbraced Length (in)	Slender. Ratio Coefficient	Unbraced Length (in)	Allowable Axial (kip)	Allowable Axial w/ Increase (kip)	Governing Axial	Design Axial Strength (kip)	Governing Axial
CC-136	20.4	6.00	0.50	18.00	0.5	0	1	6	0	0	1.21875	65	80	1.00	16	1.00	16	188.8	251.7	Rupture	283.1	Rupture
CC-1.25x6.5	27.6	8.13	1.06	28.61	0.625	0	1.25	6.5	0	0	1.21875	65	80	0.80	19	0.80	19	260.6	347.2	Compress.	391.4	Rupture

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

Site Information	
ID:	876341
Name:	MIDDLETOWN 2 - MARINO PROPERTY
App. #:	280690; Revision # 2

Base Reactions	
Moment:	3933 ft-kip
Axial:	42 kip
Shear:	38 kip
Base Plate Type:	Square

Design Information	
TIA Code:	F
ASIF:	1.333
Failure:	99%
eta Factor:	0.50



Original Anchor Rod Data	
Quantity:	16
Diameter:	2.25 in
Material:	A615 GR 75
Bolt Circle:	58.0 in
Bolt Spacing:	6 in
Bolt Group Area:	63.62 in ²
Bolt Group MOIx:	26751 in ⁴

Reactions Seen by Original AR Group

Moment:	3081.3 kip-ft
Axial:	42.5 kip
Shear:	38.5 kip

Original AR Capacity Check

Tension Load:	155.9 kip
Allowable load:	194.8 kip
AR Capacity:	80.0% Pass

First Added Anchor Rod Data	
Quantity:	4
Diameter:	2.25 in
Material:	A615 GR 75
Bolt Circle:	61.0 in
Bolt Group Area:	15.90 in ²
Bolt Group MOIx:	7397 in ⁴

Reactions Seen by First Added AR Group

Moment:	852.1 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

First Added AR Capacity Check

Tension Load:	167.6 kip
Allowable load:	194.8 kip
AR Capacity:	86.0% Pass

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

Reactions Seen by Second Added AR Group

Moment:	0.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Second Added AR Capacity Check

Tension Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

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

Reactions Seen by Second Added AR Group

Moment:	0.0 kip-ft
Axial:	0.0 kip
Shear:	0.0 kip

Second Added AR Capacity Check

Tension Load:	0.0 kip
Allowable load:	0.0 kip
AR Capacity:	0.0%

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

- 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 $(1) \times (\text{Rod Diameter})$

Site Data

BU#:	876341
Site Name:	MIDDLETOWN 2 - MARIN
App #:	280690; Revision # 2

Anchor Rod Data

Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	58	in
Anchor Spacing:	6	in

Plate Data

W=Side:	57	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	6	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:	50.13	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor

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

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

Base Reactions

TIA Revision:	F	
Unfactored Moment, M:	3066	ft-kips
Unfactored Axial, P:	42.4614	kips
Unfactored Shear, V:	38.452544	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	155.9 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	80.0% Pass

Base Plate Results

Base Plate Stress:	43.6 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	87.3% Pass

Flexural Check

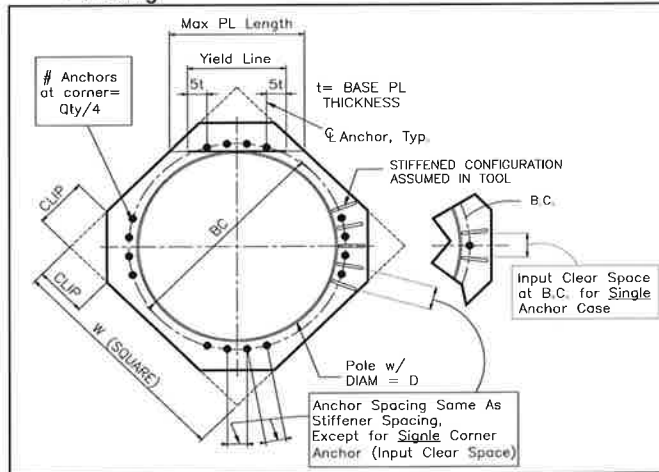
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, $f_b/F_b + (f_v/F_v)^2$:	N/A
Plate Tension+Shear, $f_t/F_t + (f_v/F_v)^2$:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A
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BU: 876341
 Site Name: MIDDLETOWN 2 - MARINO PROPERTY
 App Number: 280690 Rev. 2
 Work Order: 1008755

Monopole Drilled Pier

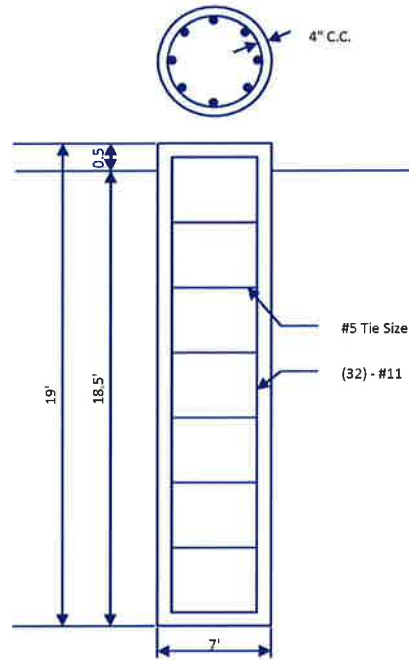
Input

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

Forces
 Compression: 54.6 kips
 Shear: 49.4 kips
 Moment: 5112.9 k-ft
 Swelling Force: 0 kips

Foundation Dimensions
 Pier Diameter: 7 ft
 Ext. above grade: 0.5 ft
 Depth below grade: 18.5 ft

Material Properties
 Number of Rebar: 32
 Rebar Size: 11
 Tie Size: 5
 Rebar tensile strength: 60 ksi
 Concrete Strength: 3000 psi
 Ultimate Concrete Strain: 0.003 in/in
 Clear Cover to Ties: 4 in



Soil Profile: Soil

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	3.333	0	3.333	120	0	0	0	0	0	
2	0.667	3.333	4	120		32			0	
3	14.5	4	18.5	125	4000				4	

Analysis Results

Soil Lateral Capacity
 Depth to Zero Shear: 4.36 ft
 Max Moment, Mu: 4079.11 k-ft
 Soil Safety Factor: 2.67
 Safety Factor Req'd: 2
RATING: 75.0%

Soil Axial Capacity
 Skin Friction (k): 253.32 kips
 End Bearing (k): 76.97 kips
 Comp. Capacity (k), φCn: 330.29 kips
 Comp. (k), Cu: 54.60 kips
RATING: 16.5%

Concrete/Steel Check

Mu (from soil analysis) 5302.85 k-ft
 φMn 7483.82 k-ft
RATING: 70.9%

rho provided 0.90
 rho required 0.33 OK

Rebar Spacing 5.79
 Spacing required 22.56 OK

Dev. Length required 13.80
 Dev. Length provided 61.78 OK

Overall Foundation Rating: 75.0%

APPENDIX D
TOWER MODIFICATION DRAWINGS

TOWER MODIFICATION DRAWINGS PREPARED FOR: CROWN CASTLE

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST

TIMOTHY HOWELL
(980) 209-8242
TIMOTHY.HOWELL@CROWNCastle.COM
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

SITE NAME: MIDDLETOWN 2 - MARINO
PROPERTY

BU NUMBER: 876341

2. CROWN PROJECT MANAGER

JERRY BRUNO
(781) 970-0069
JERRY.BRUNO.CONTRACTOR@CROWNCastle.COM

SITE ADDRESS:
1969 SAYBROOK ROAD,
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY, USA

3. CROWN CONSTRUCTION MANAGER

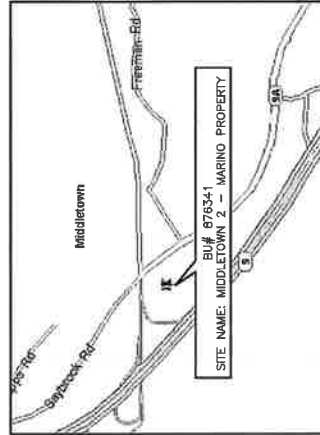
N/A

4. B+T GROUP PROJECT ENGINEER

ROBBIE FRAZIER
(918) 587-4630
RFRAZIER@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



MAP

DIRECTIONS

I-91 TO ROUTE 9 SOUTH (EXIT 10). TAKE 154
SOUTHEAST ACCESS ROAD. MONOPOLE IS ON RIGHT
ACROSS FROM COYOTE BLUE RESTAURANT. THE ACCESS
ROAD ON THE LEFT OF THE WHITE HOUSE.

TOWER INFORMATION

TOWER MANUFACTURER / JOB #: SUMMITT MANUFACTURING, INC. / 2249
TOWER HEIGHT / TYPE: 150' MONOPOLE
TOWER LOCATION: LAT. 41° 30' 38.3"
DATUM: (NAD 1983) LONG. -72° 35' 36.1"
ELEV. 379 FT AMSL
STRUCTURAL DESIGN DRAWING REPORT: B+T GROUP / WO. # 1008755
STRUCTURAL ANALYSIS REPORT: FDH ENGINEERING, INC. / WO. # 1005211
APPLICATION ID / REVISION #: 260690 / 2
CCSITES DOCUMENT ID: 5551772

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 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.

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., SCHEDULE AND TX LINE DIST. DIAGRAM
S5	TOWER SECTION (55'-70')



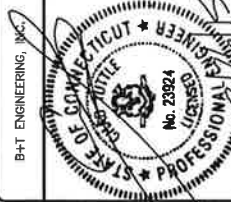
B+T GRP
1717 S BOULDER AVE
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

CROWN
CASTLE

REV	DATE	DESCRIPTION
0	02/26/13	ISSUED FOR CONSTRUCTION

PROJECT NO.: 19132.000.01
PROJECT ENG: ROBBIE FRAZIER
DRAWN BY: JUUJ/OLS
CHECKED BY: SSC

B+T ENGINEERING, INC.



IT IS A LAW HEREIN TO SEAL AND SIGN ANY DRAWING OR SPECIFICATION OF A LICENSED PROFESSIONAL ENGINEER, TO BE VALID AND LEGAL UNLESS THE SIGNATURE, TOGETHER WITH THIS DOCUMENT, IS ATTACHED TO THE DRAWING.

MIDDLETOWN 2 - MARINO
PROPERTY
876341
1969 SAYBROOK ROAD,
MIDDLETOWN, CT
EXISTING 150' MONOPOLE

SHEET TITLE
TITLE SHEET

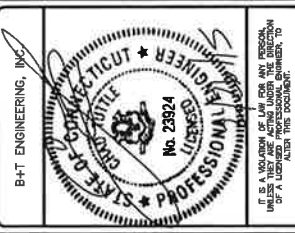
SHEET NUMBER: S1
REVISION: 0



CROWN CASTLE

REV	DATE	DESCRIPTION
0	02/25/10	ISSUED FOR CONSTRUCTION

PROJECT NO: 79732.003.01
 PROJECT ENG: ROBBIE FRAZIER
 DRAWN BY: UJUL/GSL
 CHECKED BY: SSC



B+T ENGINEERING, INC.
 MIDDLETOWN 2 - MARINO
 PROPERTY
 876341
 1668 SAYBROOK ROAD,
 MIDDLETOWN, CT
 EXISTING 150' MONOPOLE

SHEET TITLE
 MODIFICATION INSPECTION
 NOTES AND CHECKLIST

SHEET NUMBER: **S2**
 REVISION: **0**

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 TURKEY 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.
- WHILE THE MI INSPECTOR IS PRESENT, THE GC SHOULD CONSIDER THE FOLLOWING:
 - 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 FOUNDATION INSPECTIONS TO CAREFULLY 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, ALL COSTS WILL BE THE RESPONSIBILITY OF THE PARTY WHO CANCELS OR DELAYS. THE COSTS OF 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 MIs
 THE MODIFICATION INSTALLATION SHOULD FAIL THE MI (FEILED 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 A/EV/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 AND TORQUE
- FINAL INSTALLED CONDITION
- SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
- FINAL INFELD 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.

REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
	MI CHECKLIST	
	PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT. 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, MOLINTS, 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.
N/A	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.
N/A	FABRICATOR CERTIFIED WELD INSPECTION	A VISUAL OBSERVATION BY A CWI OF A PORTION OF 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-SOW-10069) 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.
N/A	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.
N/A	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-PROC-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 FIELDS WELDS. CWI SHALL FOLLOW ALL THE PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS ENG-SOW-10066, ENG-SOW-10069 AND SRAV-STD-10159. A WRITTEN 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.
N/A	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.
N/A	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-PROC-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:	
	<p>GENERAL THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).</p> <p>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.</p> <p>ALL MIs 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.</p> <p>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).</p> <p>REFER TO ENG-SOW-10007 : MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.</p>	



1775 BOULDER AVE
TULSA, OK 74119
PH: (918) 587-4630
www.btgpr.com

CROWN CASTLE

REV	DATE	DESCRIPTION
0	02/26/13	ISSUED FOR CONSTRUCTION

ISSUED FOR:
PROJECT NO.: 79732.003.01
PROJECT ENG: ROBBIE FRAZIER
DRAWN BY: UJUL/GLS
CHECKED BY: SSC



MIDDLETOWN 2 - MARINO
PROPERTY
876341
1668 S WYBROOK ROAD,
MIDDLETOWN, CT
EXISTING 150' MONOPOLE

SHEET TITLE
GENERAL NOTES
AJAX BOLT NOTES
AND DETAIL

SHEET NUMBER: **S3**
REVISION: **0**

GENERAL NOTES

- 1.1 ALL WORK SHALL COMPLY WITH THE TIA/EIA-222-F STANDARD AS WELL AS ANY OTHER GOVERNING BUILDING CODES. 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 STRUCTURE.
- 1.2 A MINIMUM OF TWO COATS OF ZINC COLD GALVANIZING COMPOUND (OR APPROVED EQUIVALENT) SHALL BE APPLIED TO ANY FIELD CUTS OR FIELD DRILLED HOLES.
- 1.3 THE USE OF A GAS TORCH OR WELDER WILL NOT BE PERMITTED ON THE DOWNPOLE OF THE WINKER.
- 1.4 THE USE OF TEMPORARY BRACING SHALL BE LIMITED TO THE 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:
 - A. STEEL SHAPES AND PLATES: U.S.N.O. YIELD 65ksi/6572

- 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 ALL STRUCTURAL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH AISC 3.08. THE CONTRACTOR SHALL PROVIDE SHOP FABRICATION DRAWINGS TO B+T GROUP 5 DAYS PRIOR TO FABRICATION.

KEY NOTES

Ⓔ TOWER MODIFICATION I.D.

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 (DTIS) AND HARDENED WASHERS. DTIS SHALL BE USED IN THE BEST 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 PRE-TENSIONED PER AISC TURN-OF-NUT METHOD.

NOTES FOR AJAX M20 "ONE-SIDE" BOLTS WITH DIRECT TENSION INDICATORS (DTIS):

DTIS REQUIRED. DTIS SHALL BE "SELF-INDICATING" SQUIRTER® STYLE DTIS MADE WITH SILICONE EMBEDDED IN THEM, INSPECTED BY MEANS OF THE VISUAL EJECTION OF SILICONE AS THE DTI PROTRUSIONS COMPRESS. SQUIRTER® DTIS SHALL BE CALIBRATED PER MANUFACTURER'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
BELLWILLS FALLS, VERMONT 05101, USA
PHONE 1-800-552-1999
WEBSITE: WWW.APPLIEDBOLTING.COM

DISTRIBUTORS OF SQUIRTER® DTIS:
HTTP://WWW.APPLIEDBOLTING.COM/APPLIED-BOLTING-DISTRIBUTORS.HTML

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

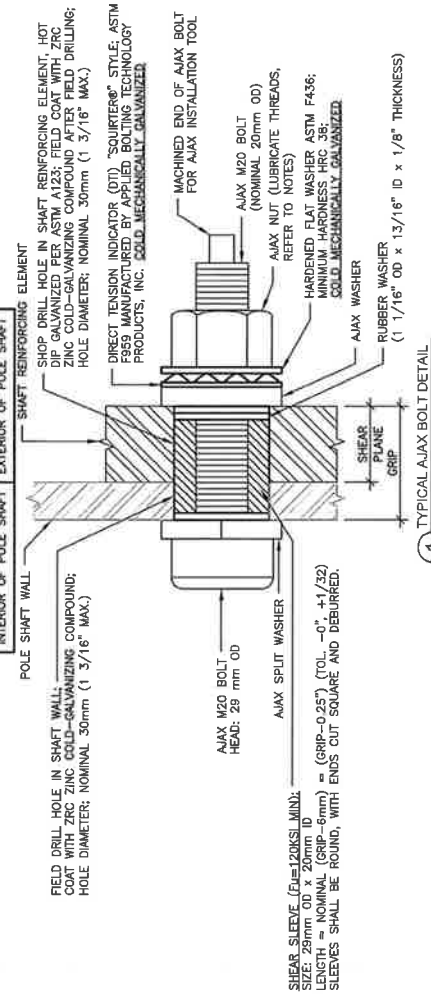
HARDENED WASHERS REQUIRED. USE A HARDENED WASHER FOR A 3/4" NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLT. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF HRC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY 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 DTIS 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. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT THE SHOP-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 DTIS 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 DTIS.



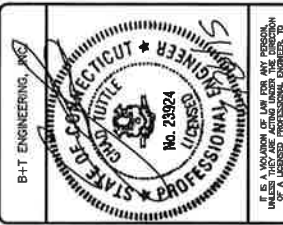


1777 S BOULDER AVE
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CROWN CASTLE

REV	DATE	DESCRIPTION
0	02/26/13	ISSUED FOR CONSTRUCTION

PROJECT NO: 79732.003.01
PROJECT ENG: ROBBIE FRAZIER
DRAWN BY: UJJ/CLS
CHECKED BY: SSC



MIDDLETOWN 2 - MARINO
PROPERTY
876341
1989 SAYBROOK ROAD,
MIDDLETOWN, CT
EXISTING 150 MONOPOLE

SHEET TITLE
TOWER ELEV. SCHEDULE
AND TX LINE DIST. DIAGRAM

SHEET NUMBER: **S4**
REVISION: **0**

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

TERMINATION BOLTS (TOP)	TERMINATION BOLTS (BOTTOM)	TOTAL AJAX BOLTS PER PLATE	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	FLAT PLATE DESIGNATION	CCI-SFP-08010015	15'-0"	3	24	72	8	8	16"	MAXIMUM INTERMEDIATE BOLT SPACING	TOTAL STEEL WEIGHT
B	B	B	15'-0"	3	CCI-SFP-08010015	CCI-SFP-08010015	15'-0"	3	24	72	8	8	16"	16"	918

NEW CCI FLAT PLATE (65KSI) REINFORCING ELEMENTS

START ELEVATION	END ELEVATION	QTY	FLAT #	FLAT PLATE *
55'	70'	3	3, 7 & 10	CCI-SFP-06010015

* SEE CRRP 65 KSI PARTS CATALOG EDITION 2 REV. 1 FOR PART DETAILS

ALL BOLTS SHALL BE AJAX W20 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 SPICE
1	12	0.4375	50.1300	52.5928	66"
2	12	0.4125	44.5713	55.9728	57"
3	12	0.3750	38.4011	42.0000	54"

EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY LETS DATED 06/10/08

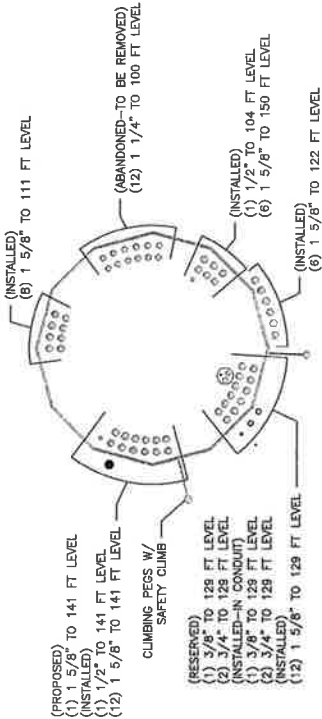
EXISTING TOWER HAS BEEN PREVIOUSLY MODIFIED. REFERENCE DRAWINGS BY FDH ENGINEERING, INC. DATED 04/18/14

NOTES:
1. AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 28mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATOR IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL FABRICATED STEEL SHALL BE HOT-DIP GALVANIZED AS FOLLOWS: A) ALL FABRICATED STEEL SHALL BE GALVANIZED WITH A ZINC-BRAND ZINC-RICH GOLD GALVANIZING COMPOUND. FILM THICKNESS: 1-800-851-3279 FOR PRODUCT INFORMATION.
2. ALL HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
3. SHOP WELDS ARE ASSUMED EBOX OR GREATER, PER STANDARD SPICE DETAIL.
4. 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.
5. 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 MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHIM LENGTH AND WIDTH SHALL BE THE EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE 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.

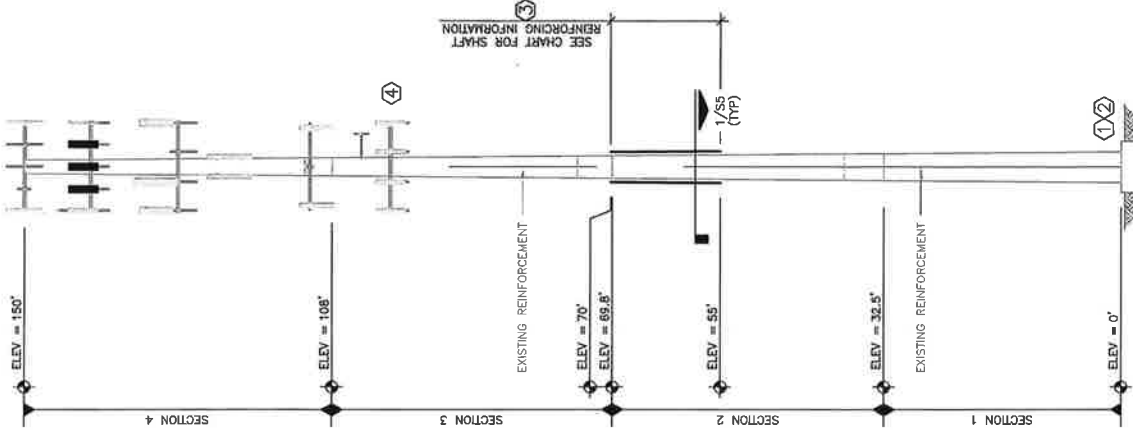
TOWER MODIFICATIONS:

- CONTRACTOR SHALL BUDGET A SITE VISIT TO CHECK CRITICAL DIMENSIONS AND VERIFY UNKNOWN CONDITIONS PRIOR TO STEEL FABRICATION.
- THE NEW AND EXISTING TRANSMISSION MUST BE DISTRIBUTED AS SHOWN IN THE TX LINE DIST. DIAGRAM RE: DETAIL 2/S4.
- INSTALL NEW REINFORCING ELEMENTS RE: SHEET 55.
- REMOVE EQUIPMENT, MOUNT AND TRANSMISSION LINES FROM 100' LEVEL.

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



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





B+T GRP
 7772 S BOULDER AVE
 TULSA, OK 74119
 PH: (918) 587-4600
 www.btgrp.com

CROWN CASTLE

REV	DATE	DESCRIPTION
0	02/28/13	ISSUED FOR CONSTRUCTION

PROJECT NO: 70732.000.01
 PROJECT ENG: ROBBIE FRAZIER
 DRAWN BY: UJU/7/LS
 CHECKED BY: SSC

B+T ENGINEERING, INC.

STATE OF OKLAHOMA
 PROFESSIONAL ENGINEER
 LICENSE No. 23824

IF I, THE SIGNER, HAVE NOT ACTED AS AN ENGINEER OR ARCHITECT UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER OR ARCHITECT, I HEREBY RESIGN MY LICENSE TO PRACTICE IN THIS JURISDICTION.

MIDDLETOWN 2 - MARINO
 PROPERTY
 876341
 1660 S BIRCH ROAD,
 MIDDLETOWN, CT
 EXISTING 150' MONOPOLE

SHEET TITLE
 TOWER SECTION
 (55-70)

SHEET NUMBER	55
REVISION	0

