Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
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kbaldwin@rc.com
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Also admitted in Massachusetts

November 10, 2014

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

Re: **Notice of Exempt Modification – Facility Modification**
850 West Main Street, Branford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 111-foot level of the existing 130-foot tower at 850 West Main Street in Branford, Connecticut (the Property"). The tower is owned by Crown Castle. The Council approved Cellco's use of this tower in 2000. Cellco now intends to modify its facility by replacing six (6) of its existing antennas with three (3) model BXA-70063-6CF, 700 MHz antennas and three (3) model HBXX-6517DS-A2M, 1900 MHZ antennas, and adding three (3) model HBXX-6517DS-A2M, 2100 MHZ antennas, for a total of fifteen (15) antennas, all at the same level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs"), one each behind its new antennas and one (1) HYBRIFLEX™ antenna cable. Included in Attachment 1 are specifications for Cellco's new antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to James B. Cosgrove, First Selectman of the Town of Branford. A copy of this letter is also being sent to SBC Real Estate Group, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on Cellco's existing antenna platform at the 111-foot level of the 130-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 for Cellco's modified facility is included in Attachment 2.

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

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Modifications 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:
James B. Cosgrove, Branford First Selectman
SBC Real Estate Group
Sandy M. Carter

ATTACHMENT 1

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

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

POWERED BY ANDREW.

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4 3 ° | 18.7 6 ° | 18.4	0 ° | 18.4 3 ° | 18.7 6 ° | 18.5	0 ° | 18.7 3 ° | 18.9 6 ° | 18.6
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
Beam Tilt, degrees	0–6	0–6	0–6
USLS, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°

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

Mechanical Specifications

Color | Radome Material	Light gray | PVC, UV resistant
Connector Interface | Location | Quantity	7-16 DIN Female | Bottom | 4
Wind Loading, maximum	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph
Antenna Dimensions, L x W x D	1903.0 mm x 305.0 mm x 166.0 mm | 74.9 in x 12.0 in x 6.5 in
Net Weight	19.5 kg | 43.0 lb
Model with factory installed AISG 2.0 RET	HBXX-6517DS-A2M

PCS RF MODULES
RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

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

** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

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

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

Alcatel·Lucent

ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET

RRH2X60-AWS FOR BAND 4 APPLICATIONS

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

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

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

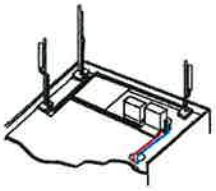
EASY INSTALLATION

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

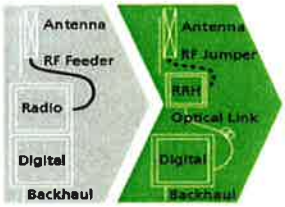
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

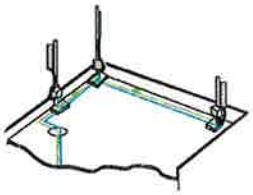
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

Environmental specifications

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

Safety and Regulatory Data

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 3.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	102 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in.)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

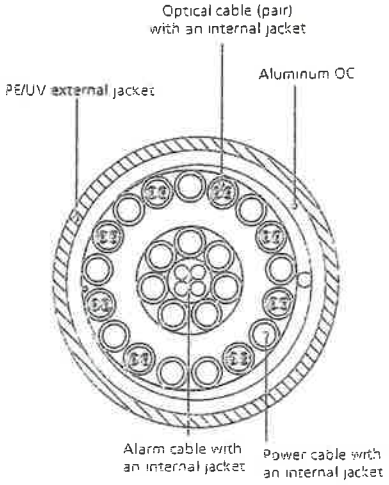


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Branford SW								
Tower Height: 130ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint CDMA/LTE	3	693	120	0.0519	1900	1.0000	5.19%	
*Sprint CDMA/LTE	1	390	120	0.0097	850	0.5667	1.72%	
*Sprint CDMA/LTE	2	390	120	0.0195	2500	1.0000	1.95%	
*Clearwire	2	153	120	0.0076	2496	1.0000	0.76%	
*Clearwire	1	211	124	0.0049	11 GHz	1.0000	0.49%	
*T-Mobile LTE	2	24	130	0.0010	2100	1.0000	0.10%	
*T-Mobile GSM/UMTS	2	12	130	0.0005	1950	1.0000	0.05%	
*T-Mobile UMTS	2	12	130	0.0005	2100	1.0000	0.05%	
Verizon PCS	**7**	**391**	**111**	**0.0799**	**1970**	**1.0000**	**7.99%**	
Verizon Cellular	**9**	**279**	**111**	**0.0733**	**869**	**0.5793**	**12.65%**	
Verizon AWS	**1**	**2812**	**111**	**0.0821**	**2145**	**1.0000**	**8.21%**	
Verizon 700	**1**	**846**	**111**	**0.0247**	**698**	**0.4973**	**4.96%**	
								44.13%
* Source: Siting Council								

ATTACHMENT 3

Date: **October 20, 2014**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate** **Carrier Site Name:**	 Branford SW
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	876322 TARTAGLIA PROPERTY 255193 946748 210217 Rev. 12
Engineering Firm Designation:	**Crown Castle Project Number:**	946748
Site Data:	**850 West Main Street, BRANFORD, New Haven County, CT** **Latitude *41° 16' 40.188"*, Longitude *-72° 50' 12.696"*** **130 Foot - Monopole Tower**	

Dear Steve Tuttle,

Crown Castle 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 946748, in accordance with application 210217, revision 12.

The purpose of the analysis is to determine acceptability of the tower stress level including the proposed modifications as outlined in the attached drawings, "Appendix D". 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: Modified Structure w/ Existing + Reserved + Proposed **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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

All 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 *Crown Castle* 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.

Structural analysis prepared by: Randall Ashworth, Associate Design Engineer / TS

Respectfully submitted by:

Jamal A Huwel, P.E.
Manger Engineering

STATE OF CONNECTICUT
JAMAL A. HUWEL
28893
LICENSED
PROFESSIONAL ENGINEER
DATE
OCT 22 2014
SIGNED

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 130 ft Monopole tower designed by SUMMIT in June of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by Global Signal in December of 2006. Reinforcement consists of the addition of a 10' extension. The modification drawings designed by CCI and attached in Appendix D, have been considered in this analysis.

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
110.0	111.0	3	alcatel lucent	RRH2X60-AWS	1	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		3	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe			
		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
128.0	130.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	11	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
	128.0	1	tower mounts	Platform Mount [LP 305-1]			
		-	-	-	2	1-5/8	4
122.0	122.0	3	alcatel lucent	TME-1900MHz RRH (65MHz) w/ Mount Pipe	-	-	1
		3	alcatel lucent	TME-800MHz RRH w/ mount pipe			
		1	tower mounts	Side Arm Mount [SO 102-3]			
118.0	124.0	1	andrew	VHLP2-11	2	1/2	1
		1	andrew	VHLP2-18			
	120.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	argus technologies	LLPX310R w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		3	samsung telecommunications	FDD_R6_RRH			
		3	alcatel lucent	TD-RRH8x20-25	1	5/8	2
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
	118.0	9	rfs celwave	ACU-A20-N	3	1-1/4	1
		1	tower mounts	Platform Mount [LP 712-1]			
110.0	114.0	1	kathrein	OG-860/1920/GPS-A	1	1/2	1
	111.0	3	antel	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	1	5/16	3
		3	rymsa wireless	MG D3-800Tx w/ Mount Pipe			
		6	rfs celwave	APL868013-42T0 w/ Mount Pipe	12	1-5/8	1
	110.0	6	rfs celwave	FD9R6004/1C-3L			
		1	tower mounts	Platform Mount [LP 712-1]			
50.0	52.0	1	kathrein	OG-860/1920/GPS-A	1	5/16	1
	50.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be removed, not considered in analysis
4) Abandoned Equipment, considered in analysis

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)
120	120	12	Decibel	DB96 PCS	-	-
110	110	12	Generic	Panel Antenna	-	-
100	100	12	Generic	Panel Antenna	-	-
85	85	2	Generic	20'x3" Whip Antenna	-	-
50	50	1	Generic	GPS	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Goodkind & O'Dea, Inc.	1614542	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals	1956410	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing Inc./PJF	1613605	CCISITES
4-TOWER MANUFACTURER	Summit Manufacturing Inc./PJF	1529811	CCISITES

Document	Remarks	Reference	Source
DRAWINGS			
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Global Signal	2483868	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Crown Castle	Appendix D	ON FILE

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.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are included in Appendix C.

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.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP18x18x0.375	Pole	6.0%	Pass
125 - 120	Pole	TP18x18x0.375	Pole	14.8%	Pass
120 - 115	Pole	TP22.9x22x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP23.8x22.9x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP24.701x23.8x0.25	Pole	43.5%	Pass
105 - 100	Pole	TP25.601x24.701x0.25	Pole	56.3%	Pass
100 - 95	Pole	TP26.501x25.601x0.25	Pole	67.8%	Pass
95 - 90	Pole	TP27.401x26.501x0.25	Pole	77.9%	Pass
90 - 85	Pole	TP28.302x27.401x0.25	Pole	87.1%	Pass
85 - 80.75	Pole	TP29.742x28.302x0.25	Pole	94.1%	Pass
80.75 - 75.75	Pole	TP29.467x28.567x0.3125	Pole	84.6%	Pass
75.75 - 70.75	Pole	TP30.367x29.467x0.3125	Pole	90.1%	Pass
70.75 - 65.75	Pole	TP31.267x30.367x0.3125	Pole	95.1%	Pass
65.75 - 63	Pole	TP31.762x31.267x0.3125	Pole	97.6%	Pass
63 - 62.75	Pole + Reinf.	TP31.807x31.762x0.5125	Reinf. 3 Compression	74.6%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
62.75 - 57.75	Pole + Reinf.	TP32.707x31.807x0.5063	Reinf. 3 Compression	79.0%	Pass
57.75 - 52.75	Pole + Reinf.	TP33.608x32.707x0.5	Reinf. 3 Compression	82.8%	Pass
52.75 - 47.75	Pole + Reinf.	TP34.508x33.608x0.4938	Reinf. 3 Compression	86.1%	Pass
47.75 - 42.75	Pole + Reinf.	TP35.408x34.508x0.4875	Reinf. 3 Compression	88.5%	Pass
42.75 - 42.25	Pole + Reinf.	TP36.308x35.408x0.4875	Reinf. 3 Compression	90.2%	Pass
42.25 - 37.25	Pole + Reinf.	TP35.773x34.873x0.55	Reinf. 3 Compression	85.3%	Pass
37.25 - 35	Pole + Reinf.	TP36.178x35.773x0.55	Reinf. 3 Compression	86.2%	Pass
35 - 34.75	Pole + Reinf.	TP36.223x36.178x0.5625	Reinf. 3 Compression	86.3%	Pass
34.75 - 32.25	Pole + Reinf.	TP36.673x36.223x0.5625	Reinf. 3 Compression	87.7%	Pass
32.25 - 32	Pole + Reinf.	TP36.718x36.673x0.6625	Reinf. 2 Compression	74.4%	Pass
32 - 31.75	Pole + Reinf.	TP36.763x36.718x0.5375	Reinf. 1 Compression	80.6%	Pass
31.75 - 26.75	Pole + Reinf.	TP37.664x36.763x0.5375	Reinf. 1 Compression	83.4%	Pass
26.75 - 21.75	Pole + Reinf.	TP38.564x37.664x0.5375	Reinf. 1 Compression	85.7%	Pass
21.75 - 16.75	Pole + Reinf.	TP39.464x38.564x0.5313	Reinf. 1 Compression	88.0%	Pass
16.75 - 11.75	Pole + Reinf.	TP40.364x39.464x0.5375	Reinf. 1 Compression	89.8%	Pass
11.75 - 6.75	Pole + Reinf.	TP41.265x40.364x0.5125	Reinf. 1 Compression	91.9%	Pass
6.75 - 1.75	Pole + Reinf.	TP42.165x41.265x0.525	Reinf. 1 Compression	94.6%	Pass
1.75 - 0	Pole + Reinf.	TP42.48x42.165x0.5125	Reinf. 1 Compression	94.7%	Pass
				Summary	
			Pole	97.7%	Pass
			Reinforcement	95.3%	Pass
			Overall	97.7%	Pass

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	72.0	Pass
1	Base Plate	0	84.8	Pass
1	Base Foundation	0	54.9	Pass
1	Flange Plate	120	16.1	Pass
1	Flange Bolts	120	22.5	Pass

Structure Rating (max from all components) =	97.7%

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

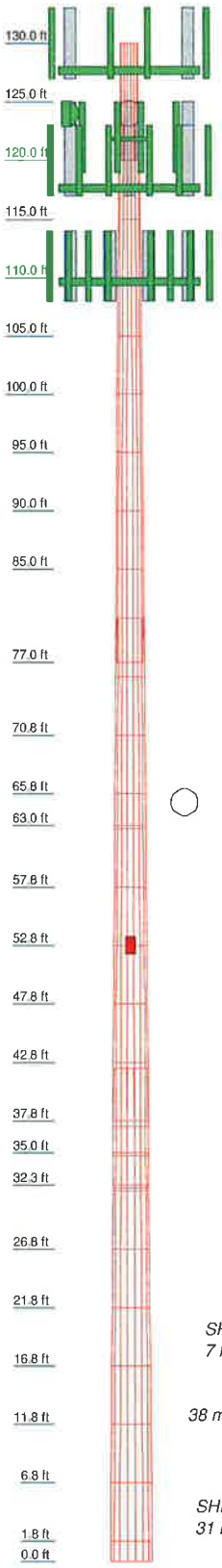
4.1) Recommendations

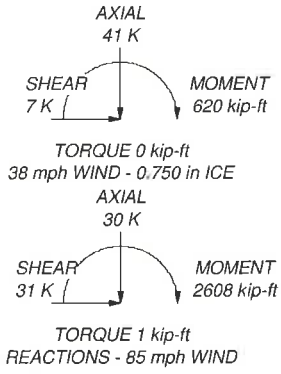
Perform the modifications detailed in "Appendix D" to remedy the deficiencies identified in Crown Castle Work Order No. 936366.

APPENDIX A

TNXTOWER OUTPUT

Section		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Length (ft)		5'	5'	5'	5'	5'	5'	5'	5'	5'	8'	5'	5'	5'	3'2'9"	5'	5'	5'	5'	5'	5'	5'	3'2'9"	3'2'9"	3'2'9"	3'2'9"	3'2'9"	5'	5'	5'	5'	5'	5'	19'
Number of Sides		12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)		0.375	0.375	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.313	0.313	0.313	0.313	0.500	0.500	0.500	0.494	0.487	0.500	0.487	0.500	0.487	0.500	0.487	0.500	0.537	0.537	0.531	0.537	0.512	0.525	0.512
Socket Length (ft)											3'9"										4'6"													
Top Dia (in)		18.000	18.000	22.000	22.900	23.800	24.701	25.601	26.501	27.401	28.302	29.467	30.362	31.267	32.176	31.801	32.707	33.608	34.508	35.408	36.308	37.208	38.108	39.008	39.908	40.808	41.708	36.763	37.664	38.564	39.464	40.364	41.265	42.165
Bot Dia (in)		18.000	18.000	22.900	23.800	24.701	25.601	26.501	27.401	28.302	29.742	30.362	31.267	32.176	33.085	32.707	33.608	34.508	35.408	36.308	37.208	38.108	39.008	39.908	40.808	41.708	42.608	37.664	38.564	39.464	40.364	41.265	42.165	42.480
Grade		A53-B-35														A572-65																		
Weight (K)		0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.6	0.5	0.5	0.5	0.3	0.8	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.3	0.4





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	128	TD-RRH8x20-25	118
		TD-RRH8x20-25	118
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	128	TD-RRH8x20-25	118
		LLPX310R w/ Mount Pipe	118
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	128	LLPX310R w/ Mount Pipe	118
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	128	LLPX310R w/ Mount Pipe	118
		FDD_R6_RRH	118
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	128	FDD_R6_RRH	118
		FDD_R6_RRH	118
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	128	Platform Mount [LP 712-1]	118
		6' x 2" Mount Pipe	118
KRY 112 144/1	128	6' x 2" Mount Pipe	118
KRY 112 144/1	128	6' x 2" Mount Pipe	118
KRY 112 144/1	128	VHLP2-11	118
Platform Mount [LP 305-1]	128	VHLP2-18	118
6' x 2" Mount Pipe	128	(2) APL868013-42T0 w/ Mount Pipe	110
6' x 2" Mount Pipe	128	(2) FD9R6004/1C-3L	110
6' x 2" Mount Pipe	128	(2) FD9R6004/1C-3L	110
TME-1900MHz RRH (65MHz) w/ Mount Pipe	122	(2) FD9R6004/1C-3L	110
		OG-860/1920/GPS-A	110
TME-1900MHz RRH (65MHz) w/ Mount Pipe	122	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	110
TME-1900MHz RRH (65MHz) w/ Mount Pipe	122	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	110
TME-800MHz RRH w/ mount pipe	122	BXA-70063-6CF-EDIN-0 w/ Mount Pipe	110
TME-800MHz RRH w/ mount pipe	122		
TME-800MHz RRH w/ mount pipe	122	(2) HBXX-6517DS-A2M w/ Mount Pipe	110
Side Arm Mount [SO 102-3]	122	(2) HBXX-6517DS-A2M w/ Mount Pipe	110
APXVSPP18-C-A20 w/ Mount Pipe	118	(2) HBXX-6517DS-A2M w/ Mount Pipe	110
APXVSPP18-C-A20 w/ Mount Pipe	118	RRH2X60-AWS	110
APXVSPP18-C-A20 w/ Mount Pipe	118	RRH2X60-AWS	110
800 EXTERNAL NOTCH FILTER	118	RRH2X60-AWS	110
800 EXTERNAL NOTCH FILTER	118	RRH2X60-PCS	110
800 EXTERNAL NOTCH FILTER	118	RRH2X60-PCS	110
(3) ACU-A20-N	118	RRH2X60-PCS	110
(3) ACU-A20-N	118	DB-T1-6Z-8AB-0Z	110
(3) ACU-A20-N	118	Platform Mount [LP 712-1]	110
APXVTM14-C-120 w/ Mount Pipe	118	(2) APL868013-42T0 w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	118	(2) APL868013-42T0 w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	118	OG-860/1920/GPS-A	50
		Side Arm Mount [SO 701-1]	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A572-65	65 ksi	80 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven 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: 97.7%

CROWN CASTLE
The Foundation for a Wireless World

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Job: BU# 876322			
Project:			
Client: Crown Castle	Drawn by: RAshworth	App'd:	
Code: TIA/EIA-222-F	Date: 10/16/14	Scale: NTS	
Path: C:\Users\RAshworth\Desktop\876322\876322 mod.en		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

5) Tower is located in New Haven County, Connecticut.
6) Basic wind speed of 85 mph.
7) Nominal ice thickness of 0.750 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56.000 pcf.
10) A wind speed of 38 mph is used in combination with ice.
11) Temperature drop of 50.000 °F.
12) Deflections calculated using a wind speed of 50 mph.
13) TOWER RATING: 97.7%.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.333.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	130'-125'	5'	0'	Round	18.000	18.000	0.375		A53-B-35 (35 ksi)
L2	125'-120'	5'	0'	Round	18.000	18.000	0.375		A53-B-35 (35 ksi)
L3	120'-115'	5'	0'	12	22.000	22.900	0.250	1.000	A572-65 (65 ksi)
L4	115'-110'	5'	0'	12	22.900	23.800	0.250	1.000	A572-65 (65 ksi)
L5	110'-105'	5'	0'	12	23.800	24.701	0.250	1.000	A572-65 (65 ksi)
L6	105'-100'	5'	0'	12	24.701	25.601	0.250	1.000	A572-65 (65 ksi)
L7	100'-95'	5'	0'	12	25.601	26.501	0.250	1.000	A572-65 (65 ksi)
L8	95'-90'	5'	0'	12	26.501	27.401	0.250	1.000	A572-65 (65 ksi)

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
L9	90'-85'	5'	0'	12	27.401	28.302	0.250	1.000	A572-65 (65 ksi)
L10	85'-77'	8'	3'9"	12	28.302	29.742	0.250	1.000	A572-65 (65 ksi)
L11	77'-75'9"	5'	0'	12	28.567	29.467	0.313	1.250	A572-65 (65 ksi)
L12	75'9"-70'9"	5'	0'	12	29.467	30.367	0.313	1.250	A572-65 (65 ksi)
L13	70'9"-65'9"	5'	0'	12	30.367	31.267	0.313	1.250	A572-65 (65 ksi)
L14	65'9"-63'	2'9"	0'	12	31.267	31.762	0.313	1.250	A572-65 (65 ksi)
L15	63'-62'9"	3"	0'	12	31.762	31.807	0.512	2.050	A572-65 (65 ksi)
L16	62'9"-57'9"	5'	0'	12	31.807	32.707	0.506	2.025	A572-65 (65 ksi)
L17	57'9"-52'9"	5'	0'	12	32.707	33.608	0.500	2.000	A572-65 (65 ksi)
L18	52'9"-47'9"	5'	0'	12	33.608	34.508	0.494	1.975	A572-65 (65 ksi)
L19	47'9"-42'9"	5'	0'	12	34.508	35.408	0.487	1.950	A572-65 (65 ksi)
L20	42'9"-37'9"	5'	4'6"	12	35.408	36.308	0.487	1.950	A572-65 (65 ksi)
L21	37'9"-37'3"	5'	0'	12	34.873	35.773	0.550	2.200	A572-65 (65 ksi)
L22	37'3"-35'	2'3"	0'	12	35.773	36.178	0.550	2.200	A572-65 (65 ksi)
L23	35'-34'9"	3"	0'	12	36.178	36.223	0.563	2.250	A572-65 (65 ksi)
L24	34'9"-32'3"	2'6"	0'	12	36.223	36.673	0.563	2.250	A572-65 (65 ksi)
L25	32'3"-32'	3"	0'	12	36.673	36.718	0.662	2.650	A572-65 (65 ksi)
L26	32'-31'9"	3"	0'	12	36.718	36.763	0.537	2.150	A572-65 (65 ksi)
L27	31'9"-26'9"	5'	0'	12	36.763	37.664	0.537	2.150	A572-65 (65 ksi)
L28	26'9"-21'9"	5'	0'	12	37.664	38.564	0.537	2.150	A572-65 (65 ksi)
L29	21'9"-16'9"	5'	0'	12	38.564	39.464	0.531	2.125	A572-65 (65 ksi)
L30	16'9"-11'9"	5'	0'	12	39.464	40.364	0.537	2.150	A572-65 (65 ksi)
L31	11'9"-6'9"	5'	0'	12	40.364	41.265	0.512	2.050	A572-65 (65 ksi)
L32	6'9"-1'9"	5'	0'	12	41.265	42.165	0.525	2.100	A572-65 (65 ksi)
L33	1'9"-0'	1'9"		12	42.165	42.480	0.512	2.050	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	18.000	20.764	806.631	6.233	9.000	89.626	1613.263	10.376	0.000	0
	18.000	20.764	806.631	6.233	9.000	89.626	1613.263	10.376	0.000	0
L2	18.000	20.764	806.631	6.233	9.000	89.626	1613.263	10.376	0.000	0
	18.000	20.764	806.631	6.233	9.000	89.626	1613.263	10.376	0.000	0
L3	22.776	17.509	1057.206	7.786	11.396	92.770	2142.186	8.617	5.226	20.904
	23.708	18.233	1193.988	8.109	11.862	100.654	2419.343	8.974	5.467	21.869
L4	23.708	18.233	1193.988	8.109	11.862	100.654	2419.343	8.974	5.467	21.869
	24.640	18.958	1342.086	8.431	12.329	108.859	2719.430	9.331	5.709	22.834
L5	24.640	18.958	1342.086	8.431	12.329	108.859	2719.430	9.331	5.709	22.834
	25.572	19.683	1501.950	8.753	12.795	117.386	3043.359	9.687	5.950	23.799

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L6	25.572	19.683	1501.950	8.753	12.795	117.386	3043.359	9.687	5.950	23.799
	26.504	20.407	1674.031	9.076	13.261	126.234	3392.041	10.044	6.191	24.764
L7	26.504	20.407	1674.031	9.076	13.261	126.234	3392.041	10.044	6.191	24.764
	27.436	21.132	1858.778	9.398	13.728	135.404	3766.388	10.401	6.432	25.729
L8	27.436	21.132	1858.778	9.398	13.728	135.404	3766.388	10.401	6.432	25.729
	28.368	21.857	2056.640	9.720	14.194	144.896	4167.310	10.757	6.674	26.694
L9	28.368	21.857	2056.640	9.720	14.194	144.896	4167.310	10.757	6.674	26.694
	29.300	22.582	2268.068	10.042	14.660	154.709	4595.720	11.114	6.915	27.659
L10	29.300	22.582	2268.068	10.042	14.660	154.709	4595.720	11.114	6.915	27.659
	30.791	23.741	2635.691	10.558	15.406	171.078	5340.625	11.685	7.301	29.203
L11	30.273	28.431	2896.988	10.115	14.798	195.774	5870.083	13.993	6.818	21.819
	30.506	29.337	3182.782	10.437	15.264	208.517	6449.180		7.060	22.591
L12	30.506	29.337	3182.782	10.437	15.264	208.517	6449.180	14.439	7.060	22.591
	31.438	30.242	3486.781	10.760	15.730	221.662	7065.163	14.884	7.301	23.363
L13	31.438	30.242	3486.781	10.760	15.730	221.662	7065.163	14.884	7.301	23.363
	32.370	31.148	3809.545	11.082	16.196	235.209	7719.171	15.330	7.542	24.135
L14	32.370	31.148	3809.545	11.082	16.196	235.209	7719.171	15.330	7.542	24.135
	32.883	31.646	3995.268	11.259	16.453	242.831	8095.497	15.575	7.675	24.559
L15	32.883	51.570	6428.029	11.187	16.453	390.693	13024.930	25.381	7.139	13.929
	32.929	51.644	6455.843	11.204	16.476	391.829	13081.288	25.418	7.151	13.953
L16	32.929	51.025	6380.935	11.206	16.476	387.282	12929.503	25.113	7.168	14.158
	33.861	52.492	6947.414	11.528	16.942	410.059	14077.344	25.835	7.409	14.635
L17	33.861	51.854	6865.640	11.530	16.942	405.233	13911.647	25.521	7.426	14.851
	34.793	53.303	7457.522	11.853	17.409	428.378	15110.961	26.234	7.667	15.334
L18	34.793	52.647	7368.474	11.855	17.409	423.263	14930.527	25.911	7.684	15.562
	35.725	54.078	7985.850	12.177	17.875	446.761	16181.498	26.616	7.925	16.05
L19	35.725	53.403	7889.111	12.179	17.875	441.349	15985.477	26.283	7.942	16.29
	36.657	54.816	8532.037	12.501	18.341	465.182	17288.219	26.979	8.183	16.785
L20	36.657	54.816	8532.037	12.501	18.341	465.182	17288.219	26.979	8.183	16.785
	37.589	56.229	9208.977	12.824	18.808	489.643	18659.883	27.674	8.424	17.28
L21	36.942	60.786	9140.197	12.288	18.064	505.985	18520.518	29.917	7.872	14.313
	37.035	62.380	9878.438	12.610	18.530	533.091	20016.394	30.702	8.113	14.751
L22	37.035	62.380	9878.438	12.610	18.530	533.091	20016.394	30.702	8.113	14.751
	37.454	63.098	10223.219	12.755	18.740	545.520	20715.014	31.055	8.222	14.949
L23	37.454	64.509	10444.564	12.750	18.740	557.331	21163.518	31.749	8.188	14.557
	37.501	64.591	10484.215	12.767	18.764	558.751	21243.862	31.789	8.200	14.578
L24	37.501	64.591	10484.215	12.767	18.764	558.751	21243.862	31.789	8.200	14.578
	37.967	65.406	10886.256	12.928	18.997	573.057	22058.506	32.191	8.321	14.793
L25	37.967	76.820	12715.367	12.892	18.997	669.342	25764.780	37.809	8.053	12.155
	38.014	76.916	12763.108	12.908	19.020	671.032	25861.517	37.856	8.065	12.174
L26	38.014	62.620	10463.045	12.953	19.020	550.104	21200.966	30.820	8.400	15.628
	38.060	62.698	10502.145	12.969	19.043	551.484	21280.193	30.858	8.412	15.65
L27	38.060	62.698	10502.145	12.969	19.043	551.484	21280.193	30.858	8.412	15.65
	38.992	64.256	11304.731	13.291	19.510	579.439	22906.450	31.625	8.653	16.099
L28	38.992	64.256	11304.731	13.291	19.510	579.439	22906.450	31.625	8.653	16.099
	39.924	65.814	12147.200	13.613	19.976	608.087	24613.520	32.392	8.895	16.548
L29	39.924	65.060	12011.874	13.616	19.976	601.312	24339.313	32.020	8.911	16.774
	40.856	66.600	12885.204	13.938	20.442	630.317	26108.917	32.778	9.153	17.229
L30	40.856	67.372	13030.517	13.936	20.442	637.425	26403.361	33.159	9.136	16.997
	41.788	68.930	13955.651	14.258	20.909	667.455	28277.933	33.925	9.377	17.446
L31	41.788	65.766	13331.625	14.267	20.909	637.609	27013.487	32.368	9.444	18.428
	42.720	67.251	14255.669	14.589	21.375	666.929	28885.851	33.099	9.685	18.898
L32	42.720	68.870	14589.935	14.585	21.375	682.567	29563.164	33.896	9.652	18.385
	43.652	70.392	15578.676	14.907	21.841	713.263	31566.621	34.645	9.893	18.844
L33	43.652	68.737	15221.455	14.912	21.841	696.908	30842.794	33.830	9.927	19.369
	43.979	69.257	15569.512	15.024	22.005	707.556	31548.052	34.086	10.011	19.534

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 130'-125'				1	1	1		
L2 125'-120'				1	1	1		
L3 120'-115'				1	1	1		
L4 115'-110'				1	1	1		
L5 110'-105'				1	1	1		
L6 105'-100'				1	1	1		
L7 100'-95'				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L8 95'-90'				1	1	1		
L9 90'-85'				1	1	1		
L10 85'-77'				1	1	1		
L11 77'-75'9"				1	1	1		
L12 75'9"-70'9"				1	1	1		
L13 70'9"-65'9"				1	1	1		
L14 65'9"-63'				1	1	1		
L15 63'-62'9"				1	1	0.962691		
L16 62'9"-57'9"				1	1	0.964399		
L17 57'9"-52'9"				1	1	0.966714		
L18 52'9"-47'9"				1	1	0.969614		
L19 47'9"-42'9"				1	1	0.973079		
L20 42'9"-37'9"				1	1	0.972225		
L21 37'9"-37'3"				1	1	0.974173		
L22 37'3"-35'				1	1	0.970848		
L23 35'-34'9"				1	1	0.982197		
L24 34'9"-32'3"				1	1	0.978264		
L25 32'3"-32'				1	1	1.04415		
L26 32'-31'9"				1	1	1.09013		
L27 31'9"-26'9"				1	1	1.08061		
L28 26'9"-21'9"				1	1	1.07155		
L29 21'9"-16'9"				1	1	1.07523		
L30 16'9"-11'9"				1	1	1.05465		
L31 11'9"-6'9"				1	1	1.09714		
L32 6'9"-1'9"				1	1	1.06363		
L33 1'9"-0'				1	1	1.08656		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
***									
CCI-65FP-065125	A	Surface Af (CaAa)	35' - 0'	1	1	-0.100 0.100	6.500	15.500	0.000
CCI-65FP-065125	B	Surface Af (CaAa)	35' - 0'	1	1	-0.100 0.100	6.500	15.500	0.000
CCI-65FP-065125	C	Surface Af (CaAa)	35' - 0'	1	1	0.100 0.300	6.500	15.500	0.000
CCI-65FP-060100	A	Surface Af (CaAa)	35' - 32'	1	1	0.200 0.400	6.000	14.000	0.000
CCI-65FP-060100	B	Surface Af (CaAa)	35' - 32'	1	1	0.200 0.400	6.000	14.000	0.000
CCI-65FP-060100	C	Surface Af (CaAa)	35' - 35'	1	1	0.100 0.300	6.000	14.000	0.000
***									

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8")	A	No	Inside Pole	128' - 0'	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
LDF7-50A(1-5/8")	A	No	Inside Pole	128' - 0'	10	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
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	A	No	Inside Pole	128' - 0'	1	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
***								
AL7-50(1 5/8)	B	No	Inside Pole	110' - 0'	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
LDF4-50A(1/2")	B	No	Inside Pole	110' - 0'	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
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	110' - 0'	1	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
860 10000(5/16)	B	No	Inside Pole	50' - 0'	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
***								
7983A(1/2")	C	No	Inside Pole	118' - 0'	2	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
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	118' - 0'	3	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
HB058-M12-XXXF(5/8")	C	No	Inside Pole	118' - 0'	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
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130'-125'	A	0.000	0.000	0.000	0.000	0.033
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L2	125'-120'	A	0.000	0.000	0.000	0.000	0.055

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.000
L3	120'-115'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.012
L4	115'-110'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.020
L5	110'-105'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L6	105'-100'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L7	100'-95'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L8	95'-90'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L9	90'-85'	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L10	85'-77'	A	0.000	0.000	0.000	0.000	0.087
		B	0.000	0.000	0.000	0.000	0.062
		C	0.000	0.000	0.000	0.000	0.032
L11	77'-75'9"	A	0.000	0.000	0.000	0.000	0.014
		B	0.000	0.000	0.000	0.000	0.010
		C	0.000	0.000	0.000	0.000	0.005
L12	75'9"-70'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L13	70'9"-65'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L14	65'9"-63'	A	0.000	0.000	0.000	0.000	0.030
		B	0.000	0.000	0.000	0.000	0.021
		C	0.000	0.000	0.000	0.000	0.011
L15	63'-62'9"	A	0.000	0.000	0.000	0.000	0.003
		B	0.000	0.000	0.000	0.000	0.002
		C	0.000	0.000	0.000	0.000	0.001
L16	62'9"-57'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L17	57'9"-52'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L18	52'9"-47'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L19	47'9"-42'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L20	42'9"-37'9"	A	0.000	0.000	0.000	0.000	0.055
		B	0.000	0.000	0.000	0.000	0.038
		C	0.000	0.000	0.000	0.000	0.020
L21	37'9"-37'3"	A	0.000	0.000	0.000	0.000	0.005
		B	0.000	0.000	0.000	0.000	0.004
		C	0.000	0.000	0.000	0.000	0.002
L22	37'3"-35'	A	0.000	0.000	0.000	0.000	0.025
		B	0.000	0.000	0.000	0.000	0.017
		C	0.000	0.000	0.000	0.000	0.009
L23	35'-34'9"	A	0.000	0.000	0.521	0.000	0.003
		B	0.000	0.000	0.521	0.000	0.002
		C	0.000	0.000	0.271	0.000	0.001
L24	34'9"-32'3"	A	0.000	0.000	5.208	0.000	0.027
		B	0.000	0.000	5.208	0.000	0.019
		C	0.000	0.000	2.708	0.000	0.010
L25	32'3"-32'	A	0.000	0.000	0.521	0.000	0.003

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.521	0.000	0.002
		C	0.000	0.000	0.271	0.000	0.001
L26	32'-31'9"	A	0.000	0.000	0.271	0.000	0.003
		B	0.000	0.000	0.271	0.000	0.002
		C	0.000	0.000	0.271	0.000	0.001
L27	31'9"-26'9"	A	0.000	0.000	5.417	0.000	0.055
		B	0.000	0.000	5.417	0.000	0.038
		C	0.000	0.000	5.417	0.000	0.020
L28	26'9"-21'9"	A	0.000	0.000	5.417	0.000	0.055
		B	0.000	0.000	5.417	0.000	0.038
		C	0.000	0.000	5.417	0.000	0.020
L29	21'9"-16'9"	A	0.000	0.000	5.417	0.000	0.055
		B	0.000	0.000	5.417	0.000	0.038
		C	0.000	0.000	5.417	0.000	0.020
L30	16'9"-11'9"	A	0.000	0.000	5.417	0.000	0.055
		B	0.000	0.000	5.417	0.000	0.038
		C	0.000	0.000	5.417	0.000	0.020
L31	11'9"-6'9"	A	0.000	0.000	5.417	0.000	0.055
		B	0.000	0.000	5.417	0.000	0.038
		C	0.000	0.000	5.417	0.000	0.020
L32	6'9"-1'9"	A	0.000	0.000	5.417	0.000	0.055
		B	0.000	0.000	5.417	0.000	0.038
		C	0.000	0.000	5.417	0.000	0.020
L33	1'9"-0'	A	0.000	0.000	1.896	0.000	0.019
		B	0.000	0.000	1.896	0.000	0.013
		C	0.000	0.000	1.896	0.000	0.007

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130'-125'	A	0.882	0.000	0.000	0.000	0.000	0.033
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L2	125'-120'	A	0.878	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.000
L3	120'-115'	A	0.873	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.012
L4	115'-110'	A	0.869	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.020
L5	110'-105'	A	0.864	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L6	105'-100'	A	0.859	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L7	100'-95'	A	0.854	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L8	95'-90'	A	0.849	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L9	90'-85'	A	0.843	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L10	85'-77'	A	0.835	0.000	0.000	0.000	0.000	0.087
		B		0.000	0.000	0.000	0.000	0.062
		C		0.000	0.000	0.000	0.000	0.032
L11	77'-75'9"	A	0.829	0.000	0.000	0.000	0.000	0.014
		B		0.000	0.000	0.000	0.000	0.010
		C		0.000	0.000	0.000	0.000	0.005
L12	75'9"-70'9"	A	0.825	0.000	0.000	0.000	0.000	0.055

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L13	70'9"-65'9"	A	0.818	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L14	65'9"-63'	A	0.813	0.000	0.000	0.000	0.000	0.030
		B		0.000	0.000	0.000	0.000	0.021
		C		0.000	0.000	0.000	0.000	0.011
L15	63'-62'9"	A	0.810	0.000	0.000	0.000	0.000	0.003
		B		0.000	0.000	0.000	0.000	0.002
		C		0.000	0.000	0.000	0.000	0.001
L16	62'9"-57'9"	A	0.806	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L17	57'9"-52'9"	A	0.798	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L18	52'9"-47'9"	A	0.789	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L19	47'9"-42'9"	A	0.779	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L20	42'9"-37'9"	A	0.768	0.000	0.000	0.000	0.000	0.055
		B		0.000	0.000	0.000	0.000	0.038
		C		0.000	0.000	0.000	0.000	0.020
L21	37'9"-37'3"	A	0.762	0.000	0.000	0.000	0.000	0.005
		B		0.000	0.000	0.000	0.000	0.004
		C		0.000	0.000	0.000	0.000	0.002
L22	37'3"-35'	A	0.758	0.000	0.000	0.000	0.000	0.025
		B		0.000	0.000	0.000	0.000	0.017
		C		0.000	0.000	0.000	0.000	0.009
L23	35'-34'9"	A	0.755	0.000	0.000	0.647	0.000	0.005
		B		0.000	0.000	0.647	0.000	0.005
		C		0.000	0.000	0.334	0.000	0.002
L24	34'9"-32'3"	A	0.751	0.000	0.000	6.461	0.000	0.053
		B		0.000	0.000	6.461	0.000	0.045
		C		0.000	0.000	3.334	0.000	0.023
L25	32'3"-32'	A	0.750	0.000	0.000	0.646	0.000	0.005
		B		0.000	0.000	0.646	0.000	0.004
		C		0.000	0.000	0.333	0.000	0.002
L26	32'-31'9"	A	0.750	0.000	0.000	0.333	0.000	0.004
		B		0.000	0.000	0.333	0.000	0.003
		C		0.000	0.000	0.333	0.000	0.002
L27	31'9"-26'9"	A	0.750	0.000	0.000	6.667	0.000	0.081
		B		0.000	0.000	6.667	0.000	0.065
		C		0.000	0.000	6.667	0.000	0.047
L28	26'9"-21'9"	A	0.750	0.000	0.000	6.667	0.000	0.081
		B		0.000	0.000	6.667	0.000	0.065
		C		0.000	0.000	6.667	0.000	0.047
L29	21'9"-16'9"	A	0.750	0.000	0.000	6.667	0.000	0.081
		B		0.000	0.000	6.667	0.000	0.065
		C		0.000	0.000	6.667	0.000	0.047
L30	16'9"-11'9"	A	0.750	0.000	0.000	6.667	0.000	0.081
		B		0.000	0.000	6.667	0.000	0.065
		C		0.000	0.000	6.667	0.000	0.047
L31	11'9"-6'9"	A	0.750	0.000	0.000	6.667	0.000	0.081
		B		0.000	0.000	6.667	0.000	0.065
		C		0.000	0.000	6.667	0.000	0.047
L32	6'9"-1'9"	A	0.750	0.000	0.000	6.667	0.000	0.081
		B		0.000	0.000	6.667	0.000	0.065
		C		0.000	0.000	6.667	0.000	0.047
L33	1'9"-0'	A	0.750	0.000	0.000	2.333	0.000	0.028
		B		0.000	0.000	2.333	0.000	0.023
		C		0.000	0.000	2.333	0.000	0.016

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130'-125'	0.000	0.000	0.000	0.000
L2	125'-120'	0.000	0.000	0.000	0.000
L3	120'-115'	0.000	0.000	0.000	0.000
L4	115'-110'	0.000	0.000	0.000	0.000
L5	110'-105'	0.000	0.000	0.000	0.000
L6	105'-100'	0.000	0.000	0.000	0.000
L7	100'-95'	0.000	0.000	0.000	0.000
L8	95'-90'	0.000	0.000	0.000	0.000
L9	90'-85'	0.000	0.000	0.000	0.000
L10	85'-77'	0.000	0.000	0.000	0.000
L11	77'-75'9"	0.000	0.000	0.000	0.000
L12	75'9"-70'9"	0.000	0.000	0.000	0.000
L13	70'9"-65'9"	0.000	0.000	0.000	0.000
L14	65'9"-63'	0.000	0.000	0.000	0.000
L15	63'-62'9"	0.000	0.000	0.000	0.000
L16	62'9"-57'9"	0.000	0.000	0.000	0.000
L17	57'9"-52'9"	0.000	0.000	0.000	0.000
L18	52'9"-47'9"	0.000	0.000	0.000	0.000
L19	47'9"-42'9"	0.000	0.000	0.000	0.000
L20	42'9"-37'9"	0.000	0.000	0.000	0.000
L21	37'9"-37'3"	0.000	0.000	0.000	0.000
L22	37'3"-35'	0.000	0.000	0.000	0.000
L23	35'-34'9"	0.130	-0.412	0.147	-0.439
L24	34'9"-32'3"	0.131	-0.413	0.148	-0.441
L25	32'3"-32'	0.131	-0.415	0.149	-0.443
L26	32'-31'9"	-0.620	-0.199	-0.670	-0.215
L27	31'9"-26'9"	-0.624	-0.200	-0.674	-0.216
L28	26'9"-21'9"	-0.631	-0.202	-0.683	-0.219
L29	21'9"-16'9"	-0.638	-0.205	-0.692	-0.222
L30	16'9"-11'9"	-0.645	-0.207	-0.701	-0.225
L31	11'9"-6'9"	-0.652	-0.209	-0.709	-0.228
L32	6'9"-1'9"	-0.659	-0.211	-0.717	-0.230
L33	1'9"-0'	-0.663	-0.213	-0.723	-0.232

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	128'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	128'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	128'	No Ice	6.825	5.642	0.112
						1/2" Ice	7.347	6.480	0.169
						1" Ice	7.863	7.257	0.233
						2" Ice	8.926	8.864	0.383
						4" Ice	11.175	12.293	0.807
ERICSSON AIR 21 B2A	A	From Leg	4.000	0.000	128'	No Ice	6.825	5.642	0.112

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
B4P w/ Mount Pipe			0'				1/2"	7.347	6.480	0.169
			2'				Ice	7.863	7.257	0.233
							1" Ice	8.926	8.864	0.383
							2" Ice	11.175	12.293	0.807
							4" Ice			
ERICSSON AIR 21 B2A	B	From Leg	4.000		0.000	128'	No Ice	6.825	5.642	0.112
B4P w/ Mount Pipe			0'				1/2"	7.347	6.480	0.169
			2'				Ice	7.863	7.257	0.233
							1" Ice	8.926	8.864	0.383
							2" Ice	11.175	12.293	0.807
							4" Ice			
ERICSSON AIR 21 B2A	C	From Leg	4.000		0.000	128'	No Ice	6.825	5.642	0.112
B4P w/ Mount Pipe			0'				1/2"	7.347	6.480	0.169
			2'				Ice	7.863	7.257	0.233
							1" Ice	8.926	8.864	0.383
							2" Ice	11.175	12.293	0.807
							4" Ice			
KRY 112 144/1	A	From Leg	4.000		0.000	128'	No Ice	0.408	0.204	0.011
			0'				1/2"	0.497	0.273	0.014
			2'				Ice	0.594	0.351	0.019
							1" Ice	0.815	0.533	0.032
							2" Ice	1.359	0.999	0.082
							4" Ice			
KRY 112 144/1	B	From Leg	4.000		0.000	128'	No Ice	0.408	0.204	0.011
			0'				1/2"	0.497	0.273	0.014
			2'				Ice	0.594	0.351	0.019
							1" Ice	0.815	0.533	0.032
							2" Ice	1.359	0.999	0.082
							4" Ice			
KRY 112 144/1	C	From Leg	4.000		0.000	128'	No Ice	0.408	0.204	0.011
			0'				1/2"	0.497	0.273	0.014
			2'				Ice	0.594	0.351	0.019
							1" Ice	0.815	0.533	0.032
							2" Ice	1.359	0.999	0.082
							4" Ice			
Platform Mount [LP 305-1]	C	None			0.000	128'	No Ice	18.010	18.010	1.121
							1/2"	23.330	23.330	1.352
							Ice	28.650	28.650	1.584
							1" Ice	39.290	39.290	2.046
							2" Ice	60.570	60.570	2.972
							4" Ice			
6' x 2" Mount Pipe	A	From Leg	4.000		0.000	128'	No Ice	1.425	1.425	0.022
			0'				1/2"	1.925	1.925	0.033
			0'				Ice	2.294	2.294	0.048
							1" Ice	3.060	3.060	0.090
							2" Ice	4.702	4.702	0.231
							4" Ice			
6' x 2" Mount Pipe	B	From Leg	4.000		0.000	128'	No Ice	1.425	1.425	0.022
			0'				1/2"	1.925	1.925	0.033
			0'				Ice	2.294	2.294	0.048
							1" Ice	3.060	3.060	0.090
							2" Ice	4.702	4.702	0.231
							4" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000		0.000	128'	No Ice	1.425	1.425	0.022
			0'				1/2"	1.925	1.925	0.033
			0'				Ice	2.294	2.294	0.048
							1" Ice	3.060	3.060	0.090
							2" Ice	4.702	4.702	0.231
							4" Ice			
***										
TME-1900MHz RRH	A	From Leg	1.000		0.000	122'	No Ice	2.698	2.771	0.060
(65MHz) w/ Mount Pipe			0'				1/2"	2.936	3.011	0.084
			0'				Ice	3.183	3.260	0.111
							1" Ice	3.703	3.784	0.176
							2" Ice	4.846	4.935	0.354

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
TME-1900MHz RRH (65MHz) w/ Mount Pipe	B	From Leg	1.000 0' 0'	0.000	122'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.698 2.936 3.183 3.703 4.846	2.771 3.011 3.260 3.784 4.935	0.060 0.084 0.111 0.176 0.354
TME-1900MHz RRH (65MHz) w/ Mount Pipe	C	From Leg	1.000 0' 0'	0.000	122'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.698 2.936 3.183 3.703 4.846	2.771 3.011 3.260 3.784 4.935	0.060 0.084 0.111 0.176 0.354
TME-800MHz RRH w/ mount pipe	A	From Leg	1.000 0' 0'	0.000	122'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.676 2.956 3.247 3.885 5.328	2.561 2.929 3.316 4.193 6.215	0.063 0.091 0.123 0.202 0.435
TME-800MHz RRH w/ mount pipe	B	From Leg	1.000 0' 0'	0.000	122'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.676 2.956 3.247 3.885 5.328	2.561 2.929 3.316 4.193 6.215	0.063 0.091 0.123 0.202 0.435
TME-800MHz RRH w/ mount pipe	C	From Leg	1.000 0' 0'	0.000	122'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.676 2.956 3.247 3.885 5.328	2.561 2.929 3.316 4.193 6.215	0.063 0.091 0.123 0.202 0.435
Side Arm Mount [SO 102-3]	C	None		0.000	122'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.000 3.480 3.960 4.920 6.840	3.000 3.480 3.960 4.920 6.840	0.081 0.111 0.141 0.201 0.321
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.498 9.149 9.767 11.031 13.679	6.946 8.127 9.021 10.844 14.851	0.083 0.151 0.227 0.406 0.909
800 EXTERNAL NOTCH FILTER	A	From Leg	4.000 0' 2'	0.000	118'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.770 0.890 1.018 1.301 1.970	0.375 0.465 0.563 0.787 1.337	0.011 0.017 0.024 0.045 0.114
800 EXTERNAL NOTCH FILTER	B	From Leg	4.000 0' 2'	0.000	118'	No Ice 1/2" Ice	0.770 0.890 1.018	0.375 0.465 0.563	0.011 0.017 0.024

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	1.301	0.787	0.045
						2" Ice	1.970	1.337	0.114
						4" Ice			
800 EXTERNAL NOTCH FILTER	C	From Leg	4.000 0' 2'	0.000	118'	No Ice	0.770	0.375	0.011
						1/2" Ice	0.890	0.465	0.017
						1" Ice	1.018	0.563	0.024
						2" Ice	1.301	0.787	0.045
						4" Ice	1.970	1.337	0.114
(3) ACU-A20-N	A	From Leg	4.000 0' 0'	0.000	118'	No Ice	0.078	0.136	0.001
						1/2" Ice	0.121	0.189	0.002
						1" Ice	0.173	0.251	0.004
						2" Ice	0.302	0.400	0.012
						4" Ice	0.665	0.802	0.045
(3) ACU-A20-N	B	From Leg	4.000 0' 0'	0.000	118'	No Ice	0.078	0.136	0.001
						1/2" Ice	0.121	0.189	0.002
						1" Ice	0.173	0.251	0.004
						2" Ice	0.302	0.400	0.012
						4" Ice	0.665	0.802	0.045
(3) ACU-A20-N	C	From Leg	4.000 0' 0'	0.000	118'	No Ice	0.078	0.136	0.001
						1/2" Ice	0.121	0.189	0.002
						1" Ice	0.173	0.251	0.004
						2" Ice	0.302	0.400	0.012
						4" Ice	0.665	0.802	0.045
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0' 2'	0.000	118'	No Ice	7.134	4.959	0.074
						1/2" Ice	7.662	5.754	0.128
						1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	118'	No Ice	7.134	4.959	0.074
						1/2" Ice	7.662	5.754	0.128
						1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	118'	No Ice	7.134	4.959	0.074
						1/2" Ice	7.662	5.754	0.128
						1" Ice	8.183	6.472	0.190
						2" Ice	9.256	8.010	0.335
						4" Ice	11.526	11.412	0.749
TD-RRH8x20-25	A	From Leg	4.000 0' 2'	0.000	118'	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	B	From Leg	4.000 0' 2'	0.000	118'	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
TD-RRH8x20-25	C	From Leg	4.000 0' 2'	0.000	118'	No Ice	4.720	1.703	0.070
						1/2" Ice	5.014	1.920	0.097
						1" Ice	5.316	2.145	0.128
						2" Ice	5.948	2.622	0.201
						4" Ice	7.314	3.680	0.397
LLPX310R w/ Mount Pipe	A	From Leg	4.000 0'	0.000	118'	No Ice	5.065	2.985	0.045
						1/2" Ice	5.480	3.528	0.083

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			2'			Ice	5.905	4.087	0.126
						1" Ice	6.788	5.314	0.232
						2" Ice	8.705	8.133	0.544
						4" Ice			
LLPX310R w/ Mount Pipe	B	From Leg	4.000 0' 2'	0.000	118'	No Ice	5.065	2.985	0.045
						1/2"	5.480	3.528	0.083
						Ice	5.905	4.087	0.126
						1" Ice	6.788	5.314	0.232
						2" Ice	8.705	8.133	0.544
						4" Ice			
LLPX310R w/ Mount Pipe	C	From Leg	4.000 0' 2'	0.000	118'	No Ice	5.065	2.985	0.045
						1/2"	5.480	3.528	0.083
						Ice	5.905	4.087	0.126
						1" Ice	6.788	5.314	0.232
						2" Ice	8.705	8.133	0.544
						4" Ice			
FDD_R6_RRH	A	From Leg	4.000 0' 2'	0.000	118'	No Ice	1.789	0.778	0.033
						1/2"	1.971	0.918	0.045
						Ice	2.163	1.067	0.058
						1" Ice	2.571	1.391	0.094
						2" Ice	3.491	2.143	0.200
						4" Ice			
FDD_R6_RRH	B	From Leg	4.000 0' 2'	0.000	118'	No Ice	1.789	0.778	0.033
						1/2"	1.971	0.918	0.045
						Ice	2.163	1.067	0.058
						1" Ice	2.571	1.391	0.094
						2" Ice	3.491	2.143	0.200
						4" Ice			
FDD_R6_RRH	C	From Leg	4.000 0' 2'	0.000	118'	No Ice	1.789	0.778	0.033
						1/2"	1.971	0.918	0.045
						Ice	2.163	1.067	0.058
						1" Ice	2.571	1.391	0.094
						2" Ice	3.491	2.143	0.200
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.000	118'	No Ice	24.530	24.530	1.335
						1/2"	29.940	29.940	1.646
						Ice	35.350	35.350	1.956
						1" Ice	46.170	46.170	2.577
						2" Ice	67.810	67.810	3.820
						4" Ice			
6' x 2" Mount Pipe	A	From Leg	4.000 0' 0'	0.000	118'	No Ice	1.425	1.425	0.022
						1/2"	1.925	1.925	0.033
						Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
6' x 2" Mount Pipe	B	From Leg	4.000 0' 0'	0.000	118'	No Ice	1.425	1.425	0.022
						1/2"	1.925	1.925	0.033
						Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
6' x 2" Mount Pipe	C	From Leg	4.000 0' 0'	0.000	118'	No Ice	1.425	1.425	0.022
						1/2"	1.925	1.925	0.033
						Ice	2.294	2.294	0.048
						1" Ice	3.060	3.060	0.090
						2" Ice	4.702	4.702	0.231
						4" Ice			
***									
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.000 0' 1'	0.000	110'	No Ice	3.104	4.921	0.025
						1/2"	3.476	5.596	0.063
						Ice	3.879	6.284	0.108
						1" Ice	4.761	7.712	0.216
						2" Ice	6.660	10.833	0.541
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.104 3.476 3.879 4.761 6.660	4.921 5.596 6.284 7.712 10.833	0.025 0.063 0.108 0.216 0.541
(2) APL868013-42T0 w/ Mount Pipe	C	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.104 3.476 3.879 4.761 6.660	4.921 5.596 6.284 7.712 10.833	0.025 0.063 0.108 0.216 0.541
(2) FD9R6004/1C-3L	A	From Leg	4.000 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/1C-3L	B	From Leg	4.000 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) FD9R6004/1C-3L	C	From Leg	4.000 0' 0'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
OG-860/1920/GPS-A	C	From Leg	4.000 0' 4'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.329 0.434 0.548 0.802 1.414	0.404 0.514 0.632 0.894 1.521	0.003 0.007 0.011 0.026 0.080
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-EDIN-0 w/ Mount Pipe	C	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.969 8.609 9.216 10.459 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.103 0.171 0.335 0.804
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.976 9.647 10.291 11.595 14.321	6.963 8.182 9.144 11.022 15.027	0.067 0.137 0.215 0.398 0.914
RRH2X60-AWS	A	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS	B	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS	C	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-PCS	A	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS	B	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS	C	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
DB-T1-6Z-8AB-0Z	B	From Leg	4.000 0' 1'	0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
Platform Mount [LP 712-1]	C	None		0.000	110'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.530 29.940 35.350 46.170 67.810	24.530 29.940 35.350 46.170 67.810	1.335 1.646 1.956 2.577 3.820
***									
OG-860/1920/GPS-A	A	From Leg	3.000 0' 2'	0.000	50'	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.329 0.434 0.548 0.802 1.414	0.404 0.514 0.632 0.894 1.521	0.003 0.007 0.011 0.026 0.080
Side Arm Mount [SO 701-1]	A	From Leg	1.500 0' 0'	0.000	50'	No Ice 1/2" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	2.010	4.350	0.121
						2" Ice	3.170	7.030	0.177
						4" Ice			
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11	A	Paraboloid w/Shroud (HP)	From Leg	4.000 0' 6'	30.000		118'	2.175	No Ice	3.720	0.027
									1/2" Ice	4.010	0.050
									1" Ice	4.300	0.070
									2" Ice	4.880	0.110
									4" Ice	6.040	0.190
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	4.000 0' 6'	77.000		118'	2.175	No Ice	3.720	0.031
									1/2" Ice	4.010	0.050
									1" Ice	4.300	0.070
									2" Ice	4.880	0.110
									4" Ice	6.040	0.200
***											

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	130 - 125	Pole	Max Tension	11	0.000	-0.000	0.000
			Max. Compression	14	-3.508	0.000	0.000
			Max. Mx	5	-1.960	-13.080	-0.005
			Max. My	8	-1.959	0.000	-13.081
			Max. Vy	5	3.219	-13.080	-0.005
			Max. Vx	8	3.219	0.000	-13.081
			Max. Torque	5			0.002
L2	125 - 120	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-4.941	0.268	0.155
			Max. Mx	11	-2.738	32.818	-0.075
			Max. My	8	-2.726	-0.114	-33.040
			Max. Vy	5	4.660	-32.636	-0.081
			Max. Vx	8	4.742	-0.114	-33.040
			Max. Torque	8			-1.280
L3	120 - 115	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-9.567	0.268	0.155
			Max. Mx	11	-4.970	77.341	-0.233
			Max. My	8	-4.957	-0.252	-78.068
			Max. Vy	5	9.778	-77.249	-0.274
			Max. Vx	8	9.861	-0.252	-78.068
			Max. Torque	8			-1.283
L4	115 - 110	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-10.089	0.268	0.155
			Max. Mx	5	-5.331	-127.306	-0.470
			Max. My	8	-5.321	-0.395	-128.540
			Max. Vy	5	10.249	-127.306	-0.470
			Max. Vx	8	10.332	-0.395	-128.540
			Max. Torque	8			-1.283
L5	110 - 105	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-15.488	-0.162	-0.144
			Max. Mx	5	-7.582	-216.725	-1.149
			Max. My	8	-7.578	-1.067	-217.899
			Max. Vy	5	17.078	-216.725	-1.149
			Max. Vx	8	17.092	-1.067	-217.899
			Max. Torque	8			-1.282
L6	105 - 100	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.082	-0.162	-0.144
			Max. Mx	5	-8.059	-303.288	-1.673
			Max. My	8	-8.056	-1.533	-304.527
			Max. Vy	5	17.554	-303.288	-1.673
			Max. Vx	8	17.567	-1.533	-304.527
			Max. Torque	7			-0.943
L7	100 - 95	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-16.693	-0.162	-0.144
			Max. Mx	5	-8.567	-392.226	-2.195
			Max. My	8	-8.563	-2.001	-393.530
			Max. Vy	5	18.030	-392.226	-2.195
			Max. Vx	8	18.043	-2.001	-393.530
			Max. Torque	7			-0.942
L8	95 - 90	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-17.319	-0.162	-0.144

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	5	-9.103	-483.538	-2.717
			Max. My	8	-9.100	-2.470	-484.907
			Max. Vy	5	18.506	-483.538	-2.717
			Max. Vx	8	18.518	-2.470	-484.907
			Max. Torque	7			-0.942
L9	90 - 85	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-17.962	-0.162	-0.144
			Max. Mx	5	-9.667	-577.219	-3.238
			Max. My	8	-9.665	-2.939	-578.652
			Max. Vy	5	18.979	-577.219	-3.238
			Max. Vx	8	18.992	-2.939	-578.652
			Max. Torque	7			-0.941
L10	85 - 77	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-18.521	-0.162	-0.144
			Max. Mx	5	-10.167	-658.700	-3.679
			Max. My	8	-10.165	-3.339	-660.187
			Max. Vy	5	19.378	-658.700	-3.679
			Max. Vx	8	19.391	-3.339	-660.187
			Max. Torque	7			-0.940
L11	77 - 75.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-19.699	-0.162	-0.144
			Max. Mx	5	-11.109	-756.902	-4.198
			Max. My	8	-11.106	-3.808	-758.453
			Max. Vy	5	19.906	-756.902	-4.198
			Max. Vx	8	19.918	-3.808	-758.453
			Max. Torque	7			-0.940
L12	75.75 - 70.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.478	-0.162	-0.144
			Max. Mx	5	-11.819	-857.569	-4.716
			Max. My	8	-11.817	-4.279	-859.183
			Max. Vy	5	20.377	-857.569	-4.716
			Max. Vx	8	20.390	-4.279	-859.183
			Max. Torque	7			-0.940
L13	70.75 - 65.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-21.275	-0.162	-0.144
			Max. Mx	5	-12.552	-960.588	-5.233
			Max. My	8	-12.550	-4.749	-962.265
			Max. Vy	5	20.846	-960.588	-5.233
			Max. Vx	8	20.859	-4.749	-962.265
			Max. Torque	7			-0.939
L14	65.75 - 63	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-21.722	-0.162	-0.144
			Max. Mx	5	-12.960	-1018.244	-5.517
			Max. My	8	-12.958	-5.007	-1019.955
			Max. Vy	5	21.105	-1018.244	-5.517
			Max. Vx	8	21.117	-5.007	-1019.955
			Max. Torque	7			-0.938
L15	63 - 62.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-21.778	-0.162	-0.144
			Max. Mx	5	-13.027	-1023.521	-5.542
			Max. My	8	-13.025	-5.031	-1025.235
			Max. Vy	5	21.120	-1023.521	-5.542
			Max. Vx	8	21.133	-5.031	-1025.235
			Max. Torque	7			-0.938
L16	62.75 - 57.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-22.907	-0.162	-0.144
			Max. Mx	5	-14.043	-1130.375	-6.057
			Max. My	8	-14.042	-5.500	-1132.151
			Max. Vy	5	21.629	-1130.375	-6.057
			Max. Vx	8	21.642	-5.500	-1132.151
			Max. Torque	7			-0.938
L17	57.75 - 52.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-24.055	-0.162	-0.144
			Max. Mx	5	-15.087	-1239.734	-6.571
			Max. My	8	-15.086	-5.969	-1241.572

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	5	22.127	-1239.734	-6.571
			Max. Vx	8	22.140	-5.969	-1241.572
			Max. Torque	7			-0.938
L18	52.75 - 47.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-25.317	-0.162	0.152
			Max. Mx	5	-16.218	-1351.758	-6.891
			Max. My	8	-16.218	-6.438	-1353.378
			Max. Vy	5	22.692	-1351.758	-6.891
			Max. Vx	8	22.673	-6.438	-1353.378
			Max. Torque	7			-0.937
L19	47.75 - 42.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.500	-0.162	0.152
			Max. Mx	5	-17.305	-1466.374	-7.404
			Max. My	8	-17.306	-6.906	-1467.898
			Max. Vy	5	23.169	-1466.374	-7.404
			Max. Vx	8	23.150	-6.906	-1467.898
			Max. Torque	8			-0.888
L20	42.75 - 37.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-26.619	-0.162	0.152
			Max. Mx	5	-17.421	-1477.966	-7.455
			Max. My	8	-17.421	-6.953	-1479.481
			Max. Vy	5	23.212	-1477.966	-7.455
			Max. Vx	8	23.193	-6.953	-1479.481
			Max. Torque	8			-0.888
L21	37.75 - 37.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-28.913	-0.162	0.152
			Max. Mx	5	-19.418	-1595.346	-7.967
			Max. My	8	-19.419	-7.421	-1596.764
			Max. Vy	5	23.740	-1595.346	-7.967
			Max. Vx	8	23.721	-7.421	-1596.764
			Max. Torque	8			-0.888
L22	37.25 - 35	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.509	-0.162	0.152
			Max. Mx	5	-19.966	-1648.980	-8.198
			Max. My	8	-19.966	-7.632	-1650.355
			Max. Vy	5	23.948	-1648.980	-8.198
			Max. Vx	8	23.928	-7.632	-1650.355
			Max. Torque	8			-0.888
L23	35 - 34.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.584	-0.162	0.153
			Max. Mx	5	-20.037	-1654.971	-8.223
			Max. My	8	-20.037	-7.655	-1656.340
			Max. Vy	5	23.987	-1654.971	-8.223
			Max. Vx	8	23.967	-7.655	-1656.340
			Max. Torque	8			-0.888
L24	34.75 - 32.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.334	-0.167	0.167
			Max. Mx	5	-20.659	-1715.497	-8.479
			Max. My	8	-20.659	-7.889	-1716.819
			Max. Vy	5	24.448	-1715.497	-8.479
			Max. Vx	8	24.428	-7.889	-1716.819
			Max. Torque	8			-0.887
L25	32.25 - 32	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.423	-0.167	0.169
			Max. Mx	5	-20.746	-1721.613	-8.505
			Max. My	8	-20.746	-7.913	-1722.929
			Max. Vy	5	24.486	-1721.613	-8.505
			Max. Vx	8	24.466	-7.913	-1722.929
			Max. Torque	8			-0.882
L26	32 - 31.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-30.499	-0.166	0.169
			Max. Mx	5	-20.813	-1727.739	-8.531
			Max. My	8	-20.813	-7.936	-1729.051
			Max. Vy	5	24.531	-1727.739	-8.531

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	8	24.512	-7.936	-1729.051
			Max. Torque	8			-0.884
L27	31.75 - 26.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-32.038	-0.133	0.180
			Max. Mx	5	-22.163	-1852.658	-9.041
			Max. My	8	-22.164	-8.404	-1853.873
			Max. Vy	5	25.450	-1852.658	-9.041
			Max. Vx	8	25.431	-8.404	-1853.873
			Max. Torque	8			-0.934
L28	26.75 - 21.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-33.600	-0.100	0.190
			Max. Mx	5	-23.547	-1982.171	-9.550
			Max. My	8	-23.547	-8.871	-1983.289
			Max. Vy	5	26.376	-1982.171	-9.550
			Max. Vx	8	26.357	-8.871	-1983.289
			Max. Torque	8			-0.986
L29	21.75 - 16.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-35.184	-0.065	0.201
			Max. Mx	5	-24.958	-2116.343	-10.057
			Max. My	8	-24.958	-9.337	-2117.363
			Max. Vy	5	27.314	-2116.343	-10.057
			Max. Vx	8	27.295	-9.337	-2117.363
			Max. Torque	8			-1.040
L30	16.75 - 11.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-36.791	-0.031	0.213
			Max. Mx	5	-26.393	-2255.239	-10.562
			Max. My	8	-26.393	-9.800	-2256.161
			Max. Vy	5	28.267	-2255.239	-10.562
			Max. Vx	8	28.247	-9.800	-2256.161
			Max. Torque	8			-1.096
L31	11.75 - 6.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-38.421	0.005	0.224
			Max. Mx	5	-27.859	-2398.895	-11.065
			Max. My	8	-27.859	-10.262	-2399.719
			Max. Vy	5	29.220	-2398.895	-11.065
			Max. Vx	8	29.200	-10.262	-2399.719
			Max. Torque	8			-1.153
L32	6.75 - 1.75	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-40.074	0.042	0.236
			Max. Mx	5	-29.349	-2547.321	-11.565
			Max. My	8	-29.349	-10.722	-2548.047
			Max. Vy	5	30.176	-2547.321	-11.565
			Max. Vx	8	30.156	-10.722	-2548.047
			Max. Torque	8			-1.212
L33	1.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-40.659	0.055	0.240
			Max. Mx	5	-29.869	-2600.400	-11.740
			Max. My	8	-29.869	-10.883	-2601.092
			Max. Vy	5	30.520	-2600.400	-11.740
			Max. Vx	8	30.500	-10.883	-2601.092
			Max. Torque	8			-1.232

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	40.659	-0.019	-6.856
	Max. H_x	11	29.891	30.481	0.032
	Max. H_z	2	29.891	0.082	30.405
	Max. M_x	2	2591.937	0.082	30.405

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	5	2600.400	-30.498	-0.100
	Max. Torsion	2	0.997	0.082	30.405
	Min. Vert	1	29.891	0.000	0.000
	Min. H_x	5	29.891	-30.498	-0.100
	Min. H_z	8	29.891	-0.091	-30.479
	Min. M_x	8	-2601.092	-0.091	-30.479
	Min. M_z	11	-2598.027	30.481	0.032
	Min. Torsion	8	-1.232	-0.091	-30.479

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	29.891	0.000	0.000	-0.140	-0.050	0.000
Dead+Wind 0 deg - No Ice	29.891	-0.082	-30.405	-2591.937	9.630	-0.997
Dead+Wind 30 deg - No Ice	29.891	15.148	-26.314	-2242.923	-1288.048	-0.924
Dead+Wind 60 deg - No Ice	29.891	26.350	-15.139	-1288.624	-2244.541	-0.377
Dead+Wind 90 deg - No Ice	29.891	30.498	0.100	11.740	-2600.400	0.134
Dead+Wind 120 deg - No Ice	29.891	26.459	15.284	1305.378	-2257.487	0.384
Dead+Wind 150 deg - No Ice	29.891	15.264	26.445	2258.546	-1301.372	1.052
Dead+Wind 180 deg - No Ice	29.891	0.091	30.479	2601.092	-10.883	1.232
Dead+Wind 210 deg - No Ice	29.891	-15.155	26.354	2247.753	1288.834	1.051
Dead+Wind 240 deg - No Ice	29.891	-26.385	15.173	1292.773	2248.900	0.503
Dead+Wind 270 deg - No Ice	29.891	-30.481	-0.032	-3.408	2598.027	0.093
Dead+Wind 300 deg - No Ice	29.891	-26.406	-15.284	-1305.727	2250.652	-0.238
Dead+Wind 330 deg - No Ice	29.891	-15.264	-26.382	-2250.805	1301.280	-0.697
Dead+Ice+Temp	40.659	0.000	0.000	-0.240	0.055	0.000
Dead+Wind 0 deg+Ice+Temp	40.659	-0.017	-6.839	-617.344	2.113	-0.223
Dead+Wind 30 deg+Ice+Temp	40.659	3.410	-5.920	-534.326	-306.833	-0.214
Dead+Wind 60 deg+Ice+Temp	40.659	5.930	-3.406	-307.218	-534.446	-0.096
Dead+Wind 90 deg+Ice+Temp	40.659	6.862	0.021	2.331	-619.029	0.018
Dead+Wind 120 deg+Ice+Temp	40.659	5.953	3.437	310.392	-537.271	0.075
Dead+Wind 150 deg+Ice+Temp	40.659	3.433	5.948	537.345	-309.641	0.231
Dead+Wind 180 deg+Ice+Temp	40.659	0.019	6.856	619.019	-2.288	0.276
Dead+Wind 210 deg+Ice+Temp	40.659	-3.411	5.929	535.012	307.122	0.241
Dead+Wind 240 deg+Ice+Temp	40.659	-5.937	3.414	307.749	535.550	0.123
Dead+Wind 270 deg+Ice+Temp	40.659	-6.858	-0.006	-0.850	618.595	0.033
Dead+Wind 300 deg+Ice+Temp	40.659	-5.941	-3.437	-310.884	535.820	-0.041
Dead+Wind 330 deg+Ice+Temp	40.659	-3.434	-5.934	-535.994	309.726	-0.149
Dead+Wind 0 deg - Service	29.891	-0.029	-10.521	-898.123	3.304	-0.348
Dead+Wind 30 deg - Service	29.891	5.242	-9.105	-777.197	-446.301	-0.323
Dead+Wind 60 deg - Service	29.891	9.118	-5.238	-446.561	-777.697	-0.131
Dead+Wind 90 deg - Service	29.891	10.553	0.034	3.976	-901.003	0.048
Dead+Wind 120 deg - Service	29.891	9.155	5.288	452.191	-782.201	0.135
Dead+Wind 150 deg - Service	29.891	5.282	9.151	782.443	-450.927	0.370
Dead+Wind 180 deg - Service	29.891	0.032	10.546	901.120	-3.804	0.430
Dead+Wind 210 deg - Service	29.891	-5.244	9.119	778.688	446.509	0.365
Dead+Wind 240 deg -	29.891	-9.130	5.250	447.816	779.145	0.174

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 270 deg - Service	29.891	-10.547	-0.011	-1.273	900.110	0.030
Dead+Wind 300 deg - Service	29.891	-9.137	-5.289	-452.494	779.758	-0.083
Dead+Wind 330 deg - Service	29.891	-5.282	-9.129	-779.938	450.825	-0.242

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-29.891	0.000	0.000	29.891	0.000	0.000%
2	-0.082	-29.891	-30.405	0.082	29.891	30.405	0.000%
3	15.148	-29.891	-26.314	-15.148	29.891	26.314	0.000%
4	26.350	-29.891	-15.139	-26.350	29.891	15.139	0.000%
5	30.498	-29.891	0.100	-30.498	29.891	-0.100	0.000%
6	26.459	-29.891	15.284	-26.459	29.891	-15.284	0.000%
7	15.264	-29.891	26.445	-15.264	29.891	-26.445	0.000%
8	0.091	-29.891	30.479	-0.091	29.891	-30.479	0.000%
9	-15.155	-29.891	26.354	15.155	29.891	-26.354	0.000%
10	-26.385	-29.891	15.173	26.385	29.891	-15.173	0.000%
11	-30.481	-29.891	-0.032	30.481	29.891	0.032	0.000%
12	-26.406	-29.891	-15.284	26.406	29.891	15.284	0.000%
13	-15.264	-29.891	-26.382	15.264	29.891	26.382	0.000%
14	0.000	-40.659	0.000	0.000	40.659	0.000	0.000%
15	-0.017	-40.659	-6.839	0.017	40.659	6.839	0.000%
16	3.410	-40.659	-5.920	-3.410	40.659	5.920	0.000%
17	5.930	-40.659	-3.406	-5.930	40.659	3.406	0.000%
18	6.862	-40.659	0.021	-6.862	40.659	-0.021	0.000%
19	5.953	-40.659	3.437	-5.953	40.659	-3.437	0.000%
20	3.433	-40.659	5.948	-3.433	40.659	-5.948	0.000%
21	0.019	-40.659	6.856	-0.019	40.659	-6.856	0.000%
22	-3.411	-40.659	5.929	3.411	40.659	-5.929	0.000%
23	-5.937	-40.659	3.414	5.937	40.659	-3.414	0.000%
24	-6.858	-40.659	-0.006	6.858	40.659	0.006	0.000%
25	-5.941	-40.659	-3.437	5.941	40.659	3.437	0.000%
26	-3.434	-40.659	-5.934	3.434	40.659	5.934	0.000%
27	-0.029	-29.891	-10.521	0.029	29.891	10.521	0.000%
28	5.242	-29.891	-9.105	-5.242	29.891	9.105	0.000%
29	9.118	-29.891	-5.238	-9.118	29.891	5.238	0.000%
30	10.553	-29.891	0.034	-10.553	29.891	-0.034	0.000%
31	9.155	-29.891	5.288	-9.155	29.891	-5.288	0.000%
32	5.282	-29.891	9.151	-5.282	29.891	-9.151	0.000%
33	0.032	-29.891	10.546	-0.032	29.891	-10.546	0.000%
34	-5.244	-29.891	9.119	5.244	29.891	-9.119	0.000%
35	-9.130	-29.891	5.250	9.130	29.891	-5.250	0.000%
36	-10.547	-29.891	-0.011	10.547	29.891	0.011	0.000%
37	-9.137	-29.891	-5.289	9.137	29.891	5.289	0.000%
38	-5.282	-29.891	-9.129	5.282	29.891	9.129	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00010566
3	Yes	6	0.00000001	0.00007913
4	Yes	6	0.00000001	0.00008063
5	Yes	5	0.00000001	0.00007230
6	Yes	6	0.00000001	0.00008241

7	Yes	6	0.00000001	0.00007939
8	Yes	5	0.00000001	0.00008196
9	Yes	6	0.00000001	0.00008227
10	Yes	6	0.00000001	0.00008030
11	Yes	4	0.00000001	0.00096966
12	Yes	6	0.00000001	0.00008070
13	Yes	6	0.00000001	0.00008244
14	Yes	4	0.00000001	0.00000001
15	Yes	6	0.00000001	0.00009679
16	Yes	6	0.00000001	0.00010519
17	Yes	6	0.00000001	0.00010532
18	Yes	6	0.00000001	0.00009709
19	Yes	6	0.00000001	0.00010632
20	Yes	6	0.00000001	0.00010613
21	Yes	6	0.00000001	0.00009721
22	Yes	6	0.00000001	0.00010554
23	Yes	6	0.00000001	0.00010552
24	Yes	6	0.00000001	0.00009689
25	Yes	6	0.00000001	0.00010586
26	Yes	6	0.00000001	0.00010587
27	Yes	4	0.00000001	0.00071874
28	Yes	5	0.00000001	0.00020582
29	Yes	5	0.00000001	0.00021300
30	Yes	4	0.00000001	0.00060234
31	Yes	5	0.00000001	0.00022238
32	Yes	5	0.00000001	0.00020798
33	Yes	4	0.00000001	0.00074887
34	Yes	5	0.00000001	0.00022124
35	Yes	5	0.00000001	0.00021165
36	Yes	4	0.00000001	0.00055152
37	Yes	5	0.00000001	0.00021371
38	Yes	5	0.00000001	0.00022204

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	29.993	31	2.041	0.005
L2	125 - 120	27.858	31	2.038	0.005
L3	120 - 115	25.731	31	2.025	0.004
L4	115 - 110	23.623	31	2.002	0.004
L5	110 - 105	21.547	31	1.962	0.003
L6	105 - 100	19.524	31	1.901	0.003
L7	100 - 95	17.574	31	1.820	0.002
L8	95 - 90	15.719	31	1.722	0.002
L9	90 - 85	13.973	31	1.611	0.002
L10	85 - 77	12.349	31	1.490	0.001
L11	80.75 - 75.75	11.072	31	1.379	0.001
L12	75.75 - 70.75	9.662	31	1.304	0.001
L13	70.75 - 65.75	8.359	31	1.184	0.001
L14	65.75 - 63	7.184	31	1.060	0.001
L15	63 - 62.75	6.593	31	0.991	0.001
L16	62.75 - 57.75	6.542	31	0.987	0.001
L17	57.75 - 52.75	5.550	31	0.907	0.001
L18	52.75 - 47.75	4.643	31	0.825	0.001
L19	47.75 - 42.75	3.823	31	0.741	0.000
L20	42.75 - 37.75	3.091	31	0.657	0.000
L21	42.25 - 37.25	3.022	31	0.648	0.000
L22	37.25 - 35	2.365	31	0.603	0.000
L23	35 - 34.75	2.090	31	0.567	0.000
L24	34.75 - 32.25	2.060	31	0.563	0.000
L25	32.25 - 32	1.776	31	0.524	0.000
L26	32 - 31.75	1.748	31	0.521	0.000
L27	31.75 - 26.75	1.721	31	0.517	0.000
L28	26.75 - 21.75	1.222	31	0.435	0.000
L29	21.75 - 16.75	0.809	31	0.355	0.000
L30	16.75 - 11.75	0.480	31	0.273	0.000

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L31	11.75 - 6.75	0.236	31	0.193	0.000
L32	6.75 - 1.75	0.078	31	0.110	0.000
L33	1.75 - 0	0.005	31	0.029	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128'	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	31	29.139	2.041	0.005	35132
124'	VHLP2-11	31	27.432	2.036	0.005	28996
122'	TME-1900MHz RRH (65MHz) w/ Mount Pipe	31	26.580	2.031	0.005	21085
118'	APXVSPP18-C-A20 w/ Mount Pipe	31	24.885	2.017	0.004	12510
110'	(2) APL868013-42T0 w/ Mount Pipe	31	21.547	1.962	0.003	5760
50'	OG-860/1920/GPS-A	31	4.181	0.779	0.001	3435

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 125	86.333	7	5.883	0.015
L2	125 - 120	80.193	7	5.874	0.015
L3	120 - 115	74.079	6	5.835	0.013
L4	115 - 110	68.019	6	5.769	0.011
L5	110 - 105	62.053	6	5.654	0.009
L6	105 - 100	56.236	6	5.479	0.008
L7	100 - 95	50.631	6	5.245	0.007
L8	95 - 90	45.295	6	4.964	0.006
L9	90 - 85	40.271	6	4.645	0.005
L10	85 - 77	35.596	6	4.295	0.004
L11	80.75 - 75.75	31.919	6	3.977	0.004
L12	75.75 - 70.75	27.857	6	3.759	0.003
L13	70.75 - 65.75	24.105	6	3.413	0.003
L14	65.75 - 63	20.719	6	3.057	0.002
L15	63 - 62.75	19.017	6	2.858	0.002
L16	62.75 - 57.75	18.868	6	2.847	0.002
L17	57.75 - 52.75	16.009	6	2.616	0.002
L18	52.75 - 47.75	13.394	6	2.380	0.002
L19	47.75 - 42.75	11.028	6	2.139	0.001
L20	42.75 - 37.75	8.917	6	1.894	0.001
L21	42.25 - 37.25	8.720	6	1.870	0.001
L22	37.25 - 35	6.825	6	1.740	0.001
L23	35 - 34.75	6.030	6	1.636	0.001
L24	34.75 - 32.25	5.944	6	1.625	0.001
L25	32.25 - 32	5.123	6	1.512	0.001
L26	32 - 31.75	5.044	6	1.503	0.001
L27	31.75 - 26.75	4.966	6	1.491	0.001
L28	26.75 - 21.75	3.528	6	1.257	0.001
L29	21.75 - 16.75	2.334	6	1.023	0.001
L30	16.75 - 11.75	1.386	6	0.788	0.000
L31	11.75 - 6.75	0.681	6	0.557	0.000
L32	6.75 - 1.75	0.224	6	0.316	0.000
L33	1.75 - 0	0.015	6	0.083	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128'	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	7	83.876	5.882	0.015	12498
124'	VHLP2-11	6	78.967	5.869	0.015	10322
122'	TME-1900MHz RRH (65MHz) w/ Mount Pipe	6	76.520	5.854	0.014	7492
118'	APXVSPP18-C-A20 w/ Mount Pipe	6	71.647	5.813	0.012	4419
110'	(2) APL868013-42T0 w/ Mount Pipe	6	62.053	5.654	0.009	2036
50'	OG-860/1920/GPS-A	6	12.062	2.248	0.002	1195

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	130 - 129	TP18x18x0.375	5'	0'	0.0	21.0000	20.764	-0.073	436.043	0.000
	129 - 128					21.0000	20.764	-0.145	436.043	0.000
	128 - 127					21.0000	20.764	-1.813	436.043	0.004
	127 - 126					21.0000	20.764	-1.886	436.043	0.004
	126 - 125					21.0000	20.764	-1.959	436.043	0.004
L2	125 - 124	TP18x18x0.375	5'	0'	0.0	21.0000	20.764	-2.036	436.043	0.005
	124 - 123					21.0000	20.764	-2.142	436.043	0.005
	123 - 122					21.0000	20.764	-2.211	436.043	0.005
	122 - 121					21.0000	20.764	-2.648	436.043	0.006
	121 - 120					21.0000	20.764	-2.726	436.043	0.006
L3	120 - 119	TP22.9x22x0.25	5'	0'	0.0	39.0000	17.654	-2.791	688.494	0.004
	119 - 118					39.0000	17.799	-2.856	694.146	0.004
	118 - 117					39.0000	17.944	-4.820	699.799	0.007
	117 - 116					39.0000	18.088	-4.888	705.452	0.007
	116 - 115					39.0000	18.233	-4.957	711.104	0.007
L4	115 - 114	TP23.8x22.9x0.25	5'	0'	0.0	39.0000	18.378	-5.028	716.757	0.007
	114 - 113					39.0000	18.523	-5.100	722.409	0.007
	113 - 112					39.0000	18.668	-5.173	728.062	0.007
	112 - 111					39.0000	18.813	-5.246	733.714	0.007
	111 - 110					39.0000	18.958	-5.321	739.367	0.007
L5	110 - 109	TP24.701x23.8x0.25	5'	0'	0.0	39.0000	19.103	-7.219	745.019	0.010
	109 - 108					39.0000	19.248	-7.307	750.672	0.010
	108 - 107					39.0000	19.393	-7.396	756.325	0.010
	107 - 106					39.0000	19.538	-7.487	761.977	0.010
	106 - 105					39.0000	19.683	-7.578	767.630	0.010
L6	105 - 104	TP25.601x24.701x0.25	5'	0'	0.0	39.0000	19.828	-7.664	773.282	0.010
	104 - 103					39.0000	19.973	-7.758	778.935	0.010
	103 - 102					39.0000	20.118	-7.853	784.587	0.010
	102 - 101					39.0000	20.263	-7.950	790.240	0.010
	101 - 100					39.0000	20.407	-8.048	795.892	0.010
L7	100 - 99	TP26.501x25.601x0.25	5'	0'	0.0	39.0000	20.552	-8.147	801.545	0.010
	99 - 98					39.0000	20.697	-8.248	807.198	0.010
	98 - 97					39.0000	20.842	-8.350	812.850	0.010
	97 - 96					39.0000	20.987	-8.452	818.503	0.010
	96 - 95					39.0000	21.132	-8.556	824.155	0.010
L8	95 - 94	TP27.401x26.501x0.25	5'	0'	0.0	39.0000	21.277	-8.661	829.808	0.010
	94 - 93					39.0000	21.422	-8.768	835.460	0.010
	93 - 92					39.0000	21.567	-8.875	841.113	0.011
	92 - 91					39.0000	21.712	-8.984	846.766	0.011
	91 - 90					39.0000	21.857	-9.093	852.418	0.011

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L9	90 - 89	TP28.302x27.401x0.25	5'	0'	0.0	39.0000	22.002	-9.204	858.071	0.011
	89 - 88					39.0000	22.147	-9.316	863.723	0.011
	88 - 87					39.0000	22.292	-9.429	869.376	0.011
	87 - 86					39.0000	22.437	-9.543	875.028	0.011
	86 - 85					39.0000	22.582	-9.658	880.681	0.011
L10	85 - 83.9375	TP29.742x28.302x0.25	8'	0'	0.0	39.0000	22.736	-9.781	886.687	0.011
	83.9375 - 82.875					39.0000	22.890	-9.906	892.693	0.011
	82.875 - 81.8125					39.0000	23.044	-10.032	898.698	0.011
	81.8125 - 80.75					39.0000	23.198	-10.159	904.704	0.011
	80.75 - 77					39.0000	23.741	-4.921	925.901	0.005
L11	80.75 - 77	TP29.467x28.567x0.313	5'	0'	0.0	39.0000	29.110	-5.997	1135.300	0.005
	77 - 75.75					39.0000	29.337	-11.100	1144.130	0.010
L12	75.75 - 74.75	TP30.367x29.467x0.313	5'	0'	0.0	39.0000	29.518	-11.243	1151.200	0.010
	74.75 - 73.75					39.0000	29.699	-11.384	1158.260	0.010
	73.75 - 72.75					39.0000	29.880	-11.525	1165.330	0.010
	72.75 - 71.75					39.0000	30.061	-11.668	1172.390	0.010
	71.75 - 70.75					39.0000	30.242	-11.812	1179.460	0.010
L13	70.75 - 69.75	TP31.267x30.367x0.313	5'	0'	0.0	39.0000	30.424	-11.956	1186.520	0.010
	69.75 - 68.75					39.0000	30.605	-12.102	1193.590	0.010
	68.75 - 67.75					39.0000	30.786	-12.249	1200.650	0.010
	67.75 - 66.75					39.0000	30.967	-12.396	1207.720	0.010
	66.75 - 65.75					39.0000	31.148	-12.545	1214.780	0.010
L14	65.75 - 64.375	TP31.762x31.267x0.313	2'9"	0'	0.0	39.0000	31.397	-12.746	1224.490	0.010
	64.375 - 63					39.0000	31.646	-12.954	1234.210	0.010
L15	63 - 62.75 (15)	TP31.807x31.762x0.513	3"	0'	0.0	39.0000	51.644	-13.021	2014.130	0.006
L16	62.75 - 61.75	TP32.707x31.807x0.506	5'	0'	0.0	39.0000	51.318	-13.217	2001.410	0.007
	61.75 - 60.75					39.0000	51.612	-13.420	2012.850	0.007
	60.75 - 59.75					39.0000	51.905	-13.625	2024.300	0.007
	59.75 - 58.75					39.0000	52.199	-13.830	2035.740	0.007
	58.75 - 57.75					39.0000	52.492	-14.037	2047.190	0.007
L17	57.75 - 56.75	TP33.608x32.707x0.5	5'	0'	0.0	39.0000	52.144	-14.244	2033.610	0.007
	56.75 - 55.75					39.0000	52.434	-14.451	2044.910	0.007
	55.75 - 54.75					39.0000	52.723	-14.661	2056.220	0.007
	54.75 - 53.75					39.0000	53.013	-14.871	2067.520	0.007
	53.75 - 52.75					39.0000	53.303	-15.082	2078.830	0.007
L18	52.75 - 51.75	TP34.508x33.608x0.494	5'	0'	0.0	39.0000	52.933	-15.293	2064.390	0.007
	51.75 - 50.75					39.0000	53.219	-15.505	2075.550	0.007
	50.75 - 49.75					39.0000	53.506	-15.783	2086.720	0.008
	49.75 - 48.75					39.0000	53.792	-15.997	2097.880	0.008
	48.75 - 47.75					39.0000	54.078	-16.213	2109.040	0.008
L19	47.75 - 46.75	TP35.408x34.508x0.488	5'	0'	0.0	39.0000	53.686	-16.428	2093.750	0.008
	46.75 - 45.75					39.0000	53.968	-16.645	2104.770	0.008
	45.75 - 44.75					39.0000	54.251	-16.863	2115.790	0.008
	44.75 - 43.75					39.0000	54.534	-17.081	2126.810	0.008
	43.75 - 42.75					39.0000	54.816	-17.301	2137.830	0.008
L20	42.75 - 42.25	TP36.308x35.408x0.488	5'	0'	0.0	39.0000	54.958	-17.416	2143.340	0.008
	42.25 - 37.75					39.0000	56.229	-9.173	2192.940	0.004
L21	42.25 - 37.75	TP35.773x34.873x0.55	5'	0'	0.0	39.0000	62.221	-19.415	2426.610	0.008
	37.75 - 37.25					39.0000	62.380	-19.415	2432.830	0.008
L22	37.25 - 36.125	TP36.178x35.773x0.55	2'3"	0'	0.0	39.0000	62.739	-19.685	2446.820	0.008
	36.125 - 35					39.0000	63.098	-19.962	2460.810	0.008
L23	35 - 34.75 (23)	TP36.223x36.178x0.563	3"	0'	0.0	39.0000	64.590	-20.034	2519.030	0.008
L24	34.75 - 33.5	TP36.673x36.223x0.563	2'6"	0'	0.0	39.0000	64.998	-20.339	2534.930	0.008
	33.5 - 32.25					39.0000	65.406	-20.656	2550.830	0.008
L25	32.25 - 32 (25)	TP36.718x36.673x0.663	3"	0'	0.0	39.0000	76.916	-20.742	2999.730	0.007
L26	32 - 31.75 (26)	TP36.763x36.718x0.538	3"	0'	0.0	39.0000	62.698	-20.810	2445.220	0.009
L27	31.75 - 30.75	TP37.664x36.763x0.538	5'	0'	0.0	39.0000	63.010	-21.071	2457.370	0.009
	30.75 - 29.75					39.0000	63.321	-21.341	2469.530	0.009
	29.75 - 28.75					39.0000	63.633	-21.613	2481.680	0.009
	28.75 - 27.75					39.0000	63.944	-21.886	2493.830	0.009
	27.75 - 26.75					39.0000	64.256	-22.160	2505.990	0.009
L28	26.75 - 25.75	TP38.564x37.664x0.538	5'	0'	0.0	39.0000	64.568	-22.435	2518.140	0.009
	25.75 - 24.75					39.0000	64.879	-22.710	2530.290	0.009
	24.75 - 23.75					39.0000	65.191	-22.987	2542.450	0.009
	23.75 - 22.75					39.0000	65.503	-23.265	2554.600	0.009
	22.75 - 21.75					39.0000	65.814	-23.545	2566.750	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L29	21.75 - 20.75	TP39.464x38.564x0.531	5'	0'	0.0	39.0000	65.368	-23.824	2549.340	0.009
	20.75 - 19.75					39.0000	65.676	-24.105	2561.350	0.009
	19.75 - 18.75					39.0000	65.984	-24.387	2573.360	0.009
	18.75 - 17.75					39.0000	66.292	-24.671	2585.370	0.010
	17.75 - 16.75					39.0000	66.600	-24.956	2597.380	0.010
L30	16.75 - 15.75	TP40.364x39.464x0.538	5'	0'	0.0	39.0000	67.684	-25.240	2639.670	0.010
	15.75 - 14.75					39.0000	67.996	-25.526	2651.830	0.010
	14.75 - 13.75					39.0000	68.307	-25.813	2663.980	0.010
	13.75 - 12.75					39.0000	68.619	-26.101	2676.130	0.010
	12.75 - 11.75					39.0000	68.930	-26.391	2688.290	0.010
L31	11.75 - 10.75	TP41.265x40.364x0.513	5'	0'	0.0	39.0000	66.063	-26.681	2576.450	0.010
	10.75 - 9.75					39.0000	66.360	-26.973	2588.040	0.010
	9.75 - 8.75					39.0000	66.657	-27.267	2599.620	0.010
	8.75 - 7.75					39.0000	66.954	-27.562	2611.210	0.011
	7.75 - 6.75					39.0000	67.251	-27.858	2622.800	0.011
L32	6.75 - 5.75	TP42.165x41.265x0.525	5'	0'	0.0	39.0000	69.175	-28.154	2697.820	0.010
	5.75 - 4.75					39.0000	69.479	-28.450	2709.690	0.010
	4.75 - 3.75					39.0000	69.784	-28.748	2721.560	0.011
	3.75 - 2.75					39.0000	70.088	-29.048	2733.430	0.011
	2.75 - 1.75					39.0000	70.392	-29.349	2745.300	0.011
L33	1.75 - 0 (33)	TP42.48x42.165x0.513	1'9"	0'	0.0	39.0000	69.257	-29.869	2701.020	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	130 - 129	TP18x18x0.375	0.024	0.0032	23.1000	0.000	0.000	0.0000	23.1000	0.000
	129 - 128		0.097	0.0130	23.1000	0.001	0.000	0.0000	23.1000	0.000
	128 - 127		6.740	0.9024	23.1000	0.039	0.000	0.0000	23.1000	0.000
	127 - 126		9.887	1.3237	23.1000	0.057	0.000	0.0000	23.1000	0.000
	126 - 125		13.082	1.7515	23.1000	0.076	0.000	0.0000	23.1000	0.000
L2	125 - 124	TP18x18x0.375	16.325	2.1858	23.1000	0.095	0.000	0.0000	23.1000	0.000
	124 - 123		20.021	2.6806	23.1000	0.116	0.000	0.0000	23.1000	0.000
	123 - 122		23.651	3.1667	23.1000	0.137	0.000	0.0000	23.1000	0.000
	122 - 121		28.322	3.7920	23.1000	0.164	0.000	0.0000	23.1000	0.000
	121 - 120		33.040	4.4237	23.1000	0.192	0.000	0.0000	23.1000	0.000
L3	120 - 119	TP22.9x22x0.25	37.828	4.8127	39.0000	0.123	0.000	0.0000	39.0000	0.000
	119 - 118		42.708	5.3449	39.0000	0.137	0.000	0.0000	39.0000	0.000
	118 - 117		58.535	7.2071	39.0000	0.185	0.000	0.0000	39.0000	0.000
	117 - 116		68.255	8.2690	39.0000	0.212	0.000	0.0000	39.0000	0.000
	116 - 115		78.068	9.3073	39.0000	0.239	0.000	0.0000	39.0000	0.000
L4	115 - 114	TP23.8x22.9x0.25	87.975	10.3227	39.0000	0.265	0.000	0.0000	39.0000	0.000
	114 - 113		97.975	11.3159	39.0000	0.290	0.000	0.0000	39.0000	0.000
	113 - 112		108.068	12.2877	39.0000	0.315	0.000	0.0000	39.0000	0.000
	112 - 111		118.257	13.2387	39.0000	0.339	0.000	0.0000	39.0000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	111 - 110		128.540	14.1695	39.0000	0.363	0.000	0.0000	39.0000	0.000
L5	110 - 109	TP24.701x23.8x0.25	150.306	16.3171	39.0000	0.418	0.000	0.0000	39.0000	0.000
	109 - 108		167.063	17.8627	39.0000	0.458	0.000	0.0000	39.0000	0.000
	108 - 107		183.913	19.3701	39.0000	0.497	0.000	0.0000	39.0000	0.000
	107 - 106		200.860	20.8406	39.0000	0.534	0.000	0.0000	39.0000	0.000
	106 - 105		217.901	22.2753	39.0000	0.571	0.000	0.0000	39.0000	0.000
L6	105 - 104	TP25.601x24.701x0.25	235.082	23.6798	39.0000	0.607	0.000	0.0000	39.0000	0.000
	104 - 103		252.361	25.0510	39.0000	0.642	0.000	0.0000	39.0000	0.000
	103 - 102		269.735	26.3893	39.0000	0.677	0.000	0.0000	39.0000	0.000
	102 - 101		287.204	27.6959	39.0000	0.710	0.000	0.0000	39.0000	0.000
	101 - 100		304.769	28.9717	39.0000	0.743	0.000	0.0000	39.0000	0.000
L7	100 - 99	TP26.501x25.601x0.25	322.429	30.2176	39.0000	0.775	0.000	0.0000	39.0000	0.000
	99 - 98		340.183	31.4345	39.0000	0.806	0.000	0.0000	39.0000	0.000
	98 - 97		358.033	32.6231	39.0000	0.836	0.000	0.0000	39.0000	0.000
	97 - 96		375.978	33.7844	39.0000	0.866	0.000	0.0000	39.0000	0.000
	96 - 95		394.017	34.9192	39.0000	0.895	0.000	0.0000	39.0000	0.000
L8	95 - 94	TP27.401x26.501x0.25	412.152	36.0281	39.0000	0.924	0.000	0.0000	39.0000	0.000
	94 - 93		430.382	37.1119	39.0000	0.952	0.000	0.0000	39.0000	0.000
	93 - 92		448.706	38.1713	39.0000	0.979	0.000	0.0000	39.0000	0.000
	92 - 91		467.125	39.2070	39.0000	1.005	0.000	0.0000	39.0000	0.000
	91 - 90		485.639	40.2198	39.0000	1.031	0.000	0.0000	39.0000	0.000
L9	90 - 89	TP28.302x27.401x0.25	504.249	41.2101	39.0000	1.057	0.000	0.0000	39.0000	0.000
	89 - 88		522.952	42.1786	39.0000	1.082	0.000	0.0000	39.0000	0.000
	88 - 87		541.750	43.1258	39.0000	1.106	0.000	0.0000	39.0000	0.000
	87 - 86		560.643	44.0525	39.0000	1.130	0.000	0.0000	39.0000	0.000
	86 - 85		579.631	44.9591	39.0000	1.153	0.000	0.0000	39.0000	0.000
L10	85 - 83.9375	TP29.742x28.302x0.25	599.908	45.9010	39.0000	1.177	0.000	0.0000	39.0000	0.000
	83.9375 - 82.875		620.291	46.8213	39.0000	1.201	0.000	0.0000	39.0000	0.000
	82.875 - 81.8125		640.779	47.7208	39.0000	1.224	0.000	0.0000	39.0000	0.000
	81.8125 - 80.75		661.374	48.5999	39.0000	1.246	0.000	0.0000	39.0000	0.000
	80.75 - 77		337.373	23.6645	39.0000	0.607	0.000	0.0000	39.0000	0.000
L11	80.75 - 77	TP29.467x28.567x0.313	397.638	23.2431	39.0000	0.596	0.000	0.0000	39.0000	0.000
	77 - 75.75		759.886	43.7308	39.0000	1.121	0.000	0.0000	39.0000	0.000
L12	75.75 - 74.75	TP30.367x29.467x0.313	779.892	44.3301	39.0000	1.137	0.000	0.0000	39.0000	0.000
	74.75 - 73.75		799.99	44.916	39.000	1.152	0.000	0.0000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
			2	7	0				0	
	73.75 - 72.75		820.18 8	45.491 0	39.000 0	1.166	0.000	0.0000	39.000 0	0.000
	72.75 - 71.75		840.47 5	46.053 3	39.000 0	1.181	0.000	0.0000	39.000 0	0.000
	71.75 - 70.75		860.85 8	46.604 0	39.000 0	1.195	0.000	0.0000	39.000 0	0.000
L13	70.75 - 69.75	TP31.267x30.367x0.313	881.34 2	47.143 2	39.000 0	1.209	0.000	0.0000	39.000 0	0.000
	69.75 - 68.75		901.90 8	47.671 3	39.000 0	1.222	0.000	0.0000	39.000 0	0.000
	68.75 - 67.75		922.57 5	48.188 5	39.000 0	1.236	0.000	0.0000	39.000 0	0.000
	67.75 - 66.75		943.33 3	48.695 1	39.000 0	1.249	0.000	0.0000	39.000 0	0.000
	66.75 - 65.75		964.19 2	49.191 4	39.000 0	1.261	0.000	0.0000	39.000 0	0.000
L14	65.75 - 64.375	TP31.762x31.267x0.313	993.01 7	49.857 5	39.000 0	1.278	0.000	0.0000	39.000 0	0.000
	64.375 - 63		1022.0 17	50.505 0	39.000 0	1.295	0.000	0.0000	39.000 0	0.000
L15	63 - 62.75 (15)	TP31.807x31.762x0.513	1027.3 08	31.461 9	39.000 0	0.807	0.000	0.0000	39.000 0	0.000
L16	62.75 - 61.75	TP32.707x31.807x0.506	1048.5 42	32.115 7	39.000 0	0.823	0.000	0.0000	39.000 0	0.000
	61.75 - 60.75		1069.8 67	32.394 5	39.000 0	0.831	0.000	0.0000	39.000 0	0.000
	60.75 - 59.75		1091.3 00	32.667 9	39.000 0	0.838	0.000	0.0000	39.000 0	0.000
	59.75 - 58.75		1112.8 33	32.936 1	39.000 0	0.845	0.000	0.0000	39.000 0	0.000
	58.75 - 57.75		1134.4 67	33.199 1	39.000 0	0.851	0.000	0.0000	39.000 0	0.000
L17	57.75 - 56.75	TP33.608x32.707x0.5	1156.2 00	33.855 7	39.000 0	0.868	0.000	0.0000	39.000 0	0.000
	56.75 - 55.75		1178.0 33	34.111 9	39.000 0	0.875	0.000	0.0000	39.000 0	0.000
	55.75 - 54.75		1199.9 67	34.363 2	39.000 0	0.881	0.000	0.0000	39.000 0	0.000
	54.75 - 53.75		1222.0 00	34.609 7	39.000 0	0.887	0.000	0.0000	39.000 0	0.000
	53.75 - 52.75		1244.1 33	34.851 5	39.000 0	0.894	0.000	0.0000	39.000 0	0.000
L18	52.75 - 51.75	TP34.508x33.608x0.494	1266.3 67	35.512 9	39.000 0	0.911	0.000	0.0000	39.000 0	0.000
	51.75 - 50.75		1288.6 92	35.748 6	39.000 0	0.917	0.000	0.0000	39.000 0	0.000
	50.75 - 49.75		1311.0 08	35.976 6	39.000 0	0.922	0.000	0.0000	39.000 0	0.000
	49.75 - 48.75		1333.6 00	36.205 5	39.000 0	0.928	0.000	0.0000	39.000 0	0.000
	48.75 - 47.75		1356.3 00	36.430 2	39.000 0	0.934	0.000	0.0000	39.000 0	0.000
L19	47.75 - 46.75	TP35.408x34.508x0.488	1379.0 92	37.100 1	39.000 0	0.951	0.000	0.0000	39.000 0	0.000
	46.75 - 45.75		1401.9 75	37.319 1	39.000 0	0.957	0.000	0.0000	39.000 0	0.000
	45.75 - 44.75		1424.9 58	37.534 0	39.000 0	0.962	0.000	0.0000	39.000 0	0.000
	44.75 - 43.75		1448.0 33	37.744 8	39.000 0	0.968	0.000	0.0000	39.000 0	0.000
	43.75 - 42.75		1471.2 08	37.951 8	39.000 0	0.973	0.000	0.0000	39.000 0	0.000
L20	42.75 - 42.25	TP36.308x35.408x0.488	1482.8 33	38.053 8	39.000 0	0.976	0.000	0.0000	39.000 0	0.000
	42.25 - 37.75		769.84 7	18.867 2	39.000 0	0.484	0.000	0.0000	39.000 0	0.000
L21	42.25 - 37.75	TP35.773x34.873x0.55	818.77 3	18.526 0	39.000 0	0.475	0.000	0.0000	39.000 0	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	37.75 - 37.25		1600.508	36.027	39.000	0.924	0.000	0.0000	39.000	0.000
L22	37.25 - 36.125	TP36.178x35.773x0.55	1627.333	36.210	39.000	0.928	0.000	0.0000	39.000	0.000
	36.125 - 35		1654.275	36.389	39.000	0.933	0.000	0.0000	39.000	0.000
L23	35 - 34.75 (23)	TP36.223x36.178x0.563	1660.275	35.656	39.000	0.914	0.000	0.0000	39.000	0.000
L24	34.75 - 33.5	TP36.673x36.223x0.563	1690.475	35.847	39.000	0.919	0.000	0.0000	39.000	0.000
	33.5 - 32.25		1720.950	36.037	39.000	0.924	0.000	0.0000	39.000	0.000
L25	32.25 - 32 (25)	TP36.718x36.673x0.663	1727.083	30.885	39.000	0.792	0.000	0.0000	39.000	0.000
L26	32 - 31.75 (26)	TP36.763x36.718x0.538	1733.225	37.714	39.000	0.967	0.000	0.0000	39.000	0.000
L27	31.75 - 30.75	TP37.664x36.763x0.538	1757.900	37.870	39.000	0.971	0.000	0.0000	39.000	0.000
	30.75 - 29.75		1782.758	38.026	39.000	0.975	0.000	0.0000	39.000	0.000
	29.75 - 28.75		1807.800	38.181	39.000	0.979	0.000	0.0000	39.000	0.000
	28.75 - 27.75		1833.025	38.335	39.000	0.983	0.000	0.0000	39.000	0.000
	27.75 - 26.75		1858.433	38.487	39.000	0.987	0.000	0.0000	39.000	0.000
L28	26.75 - 25.75	TP38.564x37.664x0.538	1884.025	38.639	39.000	0.991	0.000	0.0000	39.000	0.000
	25.75 - 24.75		1909.800	38.789	39.000	0.995	0.000	0.0000	39.000	0.000
	24.75 - 23.75		1935.767	38.939	39.000	0.998	0.000	0.0000	39.000	0.000
	23.75 - 22.75		1961.908	39.088	39.000	1.002	0.000	0.0000	39.000	0.000
	22.75 - 21.75		1988.242	39.236	39.000	1.006	0.000	0.0000	39.000	0.000
L29	21.75 - 20.75	TP39.464x38.564x0.531	2014.758	39.826	39.000	1.021	0.000	0.0000	39.000	0.000
	20.75 - 19.75		2041.467	39.974	39.000	1.025	0.000	0.0000	39.000	0.000
	19.75 - 18.75		2068.358	40.121	39.000	1.029	0.000	0.0000	39.000	0.000
	18.75 - 17.75		2095.433	40.267	39.000	1.032	0.000	0.0000	39.000	0.000
	17.75 - 16.75		2122.708	40.412	39.000	1.036	0.000	0.0000	39.000	0.000
L30	16.75 - 15.75	TP40.364x39.464x0.538	2150.158	40.104	39.000	1.028	0.000	0.0000	39.000	0.000
	15.75 - 14.75		2177.808	40.245	39.000	1.032	0.000	0.0000	39.000	0.000
	14.75 - 13.75		2205.642	40.386	39.000	1.036	0.000	0.0000	39.000	0.000
	13.75 - 12.75		2233.675	40.526	39.000	1.039	0.000	0.0000	39.000	0.000
	12.75 - 11.75		2261.892	40.666	39.000	1.043	0.000	0.0000	39.000	0.000
L31	11.75 - 10.75	TP41.265x40.364x0.513	2290.300	42.714	39.000	1.095	0.000	0.0000	39.000	0.000
	10.75 - 9.75		2318.900	42.859	39.000	1.099	0.000	0.0000	39.000	0.000
	9.75 - 8.75		2347.683	43.003	39.000	1.103	0.000	0.0000	39.000	0.000
	8.75 - 7.75		2376.667	43.145	39.000	1.106	0.000	0.0000	39.000	0.000
	7.75 - 6.75		2405.833	43.288	39.000	1.110	0.000	0.0000	39.000	0.000
L32	6.75 - 5.75	TP42.165x41.265x0.525	2435.200	42.434	39.000	1.088	0.000	0.0000	39.000	0.000
	5.75 - 4.75		2464.7	42.571	39.000	1.092	0.000	0.0000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
			50	3	0				0	
	4.75 - 3.75		2494.492	42.7076	39.0000	1.095	0.000	0.0000	39.0000	0.000
	3.75 - 2.75		2524.425	42.8432	39.0000	1.099	0.000	0.0000	39.0000	0.000
	2.75 - 1.75		2554.550	42.9780	39.0000	1.102	0.000	0.0000	39.0000	0.000
L33	1.75 - 0 (33)	TP42.48x42.165x0.513	2607.733	44.2266	39.0000	1.134	0.000	0.0000	39.0000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	130 - 129	TP18x18x0.375	0.048	0.0023	14.0000	0.000	0.000	0.0000	14.0000	0.000
	129 - 128		0.097	0.0047	14.0000	0.001	0.000	0.0000	14.0000	0.000
	128 - 127		3.123	0.1504	14.0000	0.021	0.001	0.0000	14.0000	0.000
	127 - 126		3.171	0.1527	14.0000	0.022	0.001	0.0000	14.0000	0.000
	126 - 125		3.219	0.1550	14.0000	0.022	0.001	0.0000	14.0000	0.000
L2	125 - 124	TP18x18x0.375	3.268	0.1574	14.0000	0.022	0.001	0.0000	14.0000	0.000
	124 - 123		3.612	0.1740	14.0000	0.025	0.756	0.0495	14.0000	0.004
	123 - 122		3.740	0.1801	14.0000	0.026	1.280	0.0839	14.0000	0.006
	122 - 121		4.695	0.2261	14.0000	0.032	1.280	0.0839	14.0000	0.006
	121 - 120		4.742	0.2284	14.0000	0.033	1.280	0.0839	14.0000	0.006
L3	120 - 119	TP22.9x22x0.25	4.834	0.2738	26.0000	0.021	1.280	0.0767	26.0000	0.003
	119 - 118		4.926	0.2768	26.0000	0.022	1.280	0.0754	26.0000	0.003
	118 - 117		9.674	0.5391	26.0000	0.042	1.283	0.0744	26.0000	0.003
	117 - 116		9.767	0.5400	26.0000	0.042	1.283	0.0732	26.0000	0.003
	116 - 115		9.861	0.5408	26.0000	0.042	1.283	0.0720	26.0000	0.003
L4	115 - 114	TP23.8x22.9x0.25	9.954	0.5416	26.0000	0.042	1.283	0.0709	26.0000	0.003
	114 - 113		10.048	0.5424	26.0000	0.042	1.283	0.0698	26.0000	0.003
	113 - 112		10.142	0.5433	26.0000	0.042	1.282	0.0687	26.0000	0.003
	112 - 111		10.237	0.5441	26.0000	0.043	1.282	0.0677	26.0000	0.003
	111 - 110		10.332	0.5450	26.0000	0.043	1.282	0.0666	26.0000	0.003
L5	110 - 109	TP24.701x23.8x0.25	16.711	0.8748	26.0000	0.068	1.282	0.0656	26.0000	0.003
	109 - 108		16.806	0.8731	26.0000	0.068	0.894	0.0451	26.0000	0.002
	108 - 107		16.901	0.8715	26.0000	0.068	0.894	0.0444	26.0000	0.002
	107 - 106		16.996	0.8699	26.0000	0.068	0.894	0.0438	26.0000	0.002
	106 - 105		17.092	0.8684	26.0000	0.068	0.894	0.0431	26.0000	0.002

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L6	105 - 104	TP25.601x24.701x0.25	17.235	0.8692	26.0000	0.068	0.943	0.0448	26.0000	0.002
	104 - 103		17.330	0.8677	26.0000	0.068	0.943	0.0441	26.0000	0.002
	103 - 102		17.425	0.8662	26.0000	0.068	0.943	0.0435	26.0000	0.002
	102 - 101		17.521	0.8647	26.0000	0.068	0.942	0.0429	26.0000	0.002
	101 - 100		17.616	0.8632	26.0000	0.067	0.942	0.0423	26.0000	0.002
L7	100 - 99	TP26.501x25.601x0.25	17.711	0.8617	26.0000	0.067	0.942	0.0417	26.0000	0.002
	99 - 98		17.806	0.8603	26.0000	0.067	0.942	0.0411	26.0000	0.002
	98 - 97		17.901	0.8589	26.0000	0.067	0.942	0.0405	26.0000	0.002
	97 - 96		17.997	0.8575	26.0000	0.067	0.942	0.0399	26.0000	0.002
	96 - 95		18.092	0.8561	26.0000	0.067	0.942	0.0394	26.0000	0.002
L8	95 - 94	TP27.401x26.501x0.25	18.187	0.8548	26.0000	0.067	0.942	0.0388	26.0000	0.001
	94 - 93		18.282	0.8534	26.0000	0.067	0.942	0.0383	26.0000	0.001
	93 - 92		18.377	0.8521	26.0000	0.067	0.941	0.0378	26.0000	0.001
	92 - 91		18.472	0.8508	26.0000	0.066	0.941	0.0373	26.0000	0.001
	91 - 90		18.568	0.8495	26.0000	0.066	0.941	0.0368	26.0000	0.001
L9	90 - 89	TP28.302x27.401x0.25	18.662	0.8482	26.0000	0.066	0.941	0.0363	26.0000	0.001
	89 - 88		18.756	0.8469	26.0000	0.066	0.941	0.0358	26.0000	0.001
	88 - 87		18.851	0.8457	26.0000	0.066	0.941	0.0354	26.0000	0.001
	87 - 86		18.946	0.8444	26.0000	0.066	0.941	0.0349	26.0000	0.001
	86 - 85		19.041	0.8432	26.0000	0.066	0.941	0.0344	26.0000	0.001
L10	85 - 83.9375	TP29.742x28.302x0.25	19.141	0.8419	26.0000	0.066	0.940	0.0340	26.0000	0.001
	83.9375 - 82.875		19.240	0.8406	26.0000	0.066	0.940	0.0335	26.0000	0.001
	82.875 - 81.8125		19.340	0.8393	26.0000	0.066	0.940	0.0331	26.0000	0.001
	81.8125 - 80.75		19.440	0.8380	26.0000	0.065	0.940	0.0326	26.0000	0.001
	80.75 - 77		9.216	0.3882	26.0000	0.030	0.431	0.0143	26.0000	0.001
L11	80.75 - 77	TP29.467x28.567x0.313	10.637	0.3654	26.0000	0.029	0.509	0.0140	26.0000	0.001
	77 - 75.75		19.968	0.6806	26.0000	0.053	0.940	0.0255	26.0000	0.001
L12	75.75 - 74.75	TP30.367x29.467x0.313	20.060	0.6796	26.0000	0.053	0.940	0.0252	26.0000	0.001
	74.75 - 73.75		20.155	0.6786	26.0000	0.053	0.939	0.0249	26.0000	0.001
	73.75 - 72.75		20.249	0.6777	26.0000	0.053	0.939	0.0246	26.0000	0.001
	72.75 - 71.75		20.344	0.6768	26.0000	0.053	0.939	0.0243	26.0000	0.001
	71.75 - 70.75		20.439	0.6758	26.0000	0.053	0.939	0.0240	26.0000	0.001
L13	70.75 - 69.75	TP31.267x30.367x0.313	20.532	0.6749	26.0000	0.053	0.939	0.0237	26.0000	0.001
	69.75 - 68.75		20.626	0.6740	26.0000	0.053	0.939	0.0234	26.0000	0.001
	68.75 - 67.75		20.720	0.6730	26.000	0.053	0.939	0.0231	26.000	0.001

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
					0				0	
	67.75 - 66.75		20.814	0.6721	26.000 0	0.053	0.939	0.0228	26.000 0	0.001
	66.75 - 65.75		20.908	0.6712	26.000 0	0.052	0.938	0.0226	26.000 0	0.001
L14	65.75 - 64.375	TP31.762x31.267x0.313	21.038	0.6701	26.000 0	0.052	0.938	0.0222	26.000 0	0.001
	64.375 - 63		21.166	0.6688	26.000 0	0.052	0.938	0.0219	26.000 0	0.001
L15	63 - 62.75 (15)	TP31.807x31.762x0.513	21.182	0.4102	26.000 0	0.032	0.938	0.0135	26.000 0	0.001
L16	62.75 - 61.75	TP32.707x31.807x0.506	21.286	0.4148	26.000 0	0.032	0.938	0.0135	26.000 0	0.001
	61.75 - 60.75		21.387	0.4144	26.000 0	0.032	0.938	0.0133	26.000 0	0.001
	60.75 - 59.75		21.488	0.4140	26.000 0	0.032	0.938	0.0132	26.000 0	0.001
	59.75 - 58.75		21.589	0.4136	26.000 0	0.032	0.938	0.0130	26.000 0	0.001
	58.75 - 57.75		21.691	0.4132	26.000 0	0.032	0.938	0.0129	26.000 0	0.000
L17	57.75 - 56.75	TP33.608x32.707x0.5	21.790	0.4179	26.000 0	0.033	0.938	0.0129	26.000 0	0.000
	56.75 - 55.75		21.889	0.4175	26.000 0	0.033	0.938	0.0127	26.000 0	0.000
	55.75 - 54.75		21.989	0.4171	26.000 0	0.033	0.938	0.0126	26.000 0	0.000
	54.75 - 53.75		22.089	0.4167	26.000 0	0.033	0.938	0.0125	26.000 0	0.000
	53.75 - 52.75		22.189	0.4163	26.000 0	0.033	0.938	0.0123	26.000 0	0.000
L18	52.75 - 51.75	TP34.508x33.608x0.494	22.286	0.4210	26.000 0	0.033	0.937	0.0123	26.000 0	0.000
	51.75 - 50.75		22.384	0.4206	26.000 0	0.033	0.937	0.0122	26.000 0	0.000
	50.75 - 49.75		22.555	0.4215	26.000 0	0.033	0.529	0.0068	26.000 0	0.000
	49.75 - 48.75		22.653	0.4211	26.000 0	0.033	0.326	0.0042	26.000 0	0.000
	48.75 - 47.75		22.751	0.4207	26.000 0	0.033	0.326	0.0041	26.000 0	0.000
L19	47.75 - 46.75	TP35.408x34.508x0.488	22.846	0.4256	26.000 0	0.033	0.326	0.0041	26.000 0	0.000
	46.75 - 45.75		22.942	0.4251	26.000 0	0.033	0.326	0.0041	26.000 0	0.000
	45.75 - 44.75		23.037	0.4246	26.000 0	0.033	0.326	0.0040	26.000 0	0.000
	44.75 - 43.75		23.133	0.4242	26.000 0	0.033	0.326	0.0040	26.000 0	0.000
	43.75 - 42.75		23.228	0.4238	26.000 0	0.033	0.326	0.0040	26.000 0	0.000
L20	42.75 - 42.25	TP36.308x35.408x0.488	23.271	0.4234	26.000 0	0.033	0.326	0.0039	26.000 0	0.000
	42.25 - 37.75		11.636	0.2069	26.000 0	0.016	0.158	0.0018	26.000 0	0.000
L21	42.25 - 37.75	TP35.773x34.873x0.55	12.132	0.1950	26.000 0	0.015	0.168	0.0018	26.000 0	0.000
	37.75 - 37.25		23.799	0.3815	26.000 0	0.030	0.326	0.0034	26.000 0	0.000
L22	37.25 - 36.125	TP36.178x35.773x0.55	23.905	0.3810	26.000 0	0.030	0.326	0.0034	26.000 0	0.000
	36.125 - 35		24.007	0.3805	26.000 0	0.030	0.326	0.0034	26.000 0	0.000
L23	35 - 34.75 (23)	TP36.223x36.178x0.563	24.045	0.3723	26.000 0	0.029	0.326	0.0033	26.000 0	0.000
L24	34.75 - 33.5	TP36.673x36.223x0.563	24.279	0.3735	26.000 0	0.029	0.324	0.0032	26.000 0	0.000
	33.5 - 32.25		24.506	0.3747	26.000 0	0.029	0.316	0.0031	26.000 0	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L25	32.25 - 32 (25)	TP36.718x36.673x0.663	24.544	0.3191	26.0000	0.025	0.308	0.0026	26.0000	0.000
L26	32 - 31.75 (26)	TP36.763x36.718x0.538	24.590	0.3922	26.0000	0.031	0.306	0.0031	26.0000	0.000
L27	31.75 - 30.75	TP37.664x36.763x0.538	24.778	0.3932	26.0000	0.031	0.309	0.0031	26.0000	0.000
	30.75 - 29.75		24.960	0.3942	26.0000	0.031	0.311	0.0031	26.0000	0.000
	29.75 - 28.75		25.142	0.3951	26.0000	0.031	0.313	0.0031	26.0000	0.000
	28.75 - 27.75		25.325	0.3960	26.0000	0.031	0.315	0.0031	26.0000	0.000
	27.75 - 26.75		25.509	0.3970	26.0000	0.031	0.318	0.0031	26.0000	0.000
L28	26.75 - 25.75	TP38.564x37.664x0.538	25.693	0.3979	26.0000	0.031	0.320	0.0031	26.0000	0.000
	25.75 - 24.75		25.877	0.3989	26.0000	0.031	0.322	0.0031	26.0000	0.000
	24.75 - 23.75		26.063	0.3998	26.0000	0.031	0.324	0.0031	26.0000	0.000
	23.75 - 22.75		26.248	0.4007	26.0000	0.031	0.327	0.0031	26.0000	0.000
	22.75 - 21.75		26.435	0.4017	26.0000	0.031	0.329	0.0031	26.0000	0.000
L29	21.75 - 20.75	TP39.464x38.564x0.531	26.621	0.4073	26.0000	0.032	0.331	0.0031	26.0000	0.000
	20.75 - 19.75		26.808	0.4082	26.0000	0.032	0.334	0.0031	26.0000	0.000
	19.75 - 18.75		26.996	0.4091	26.0000	0.032	0.336	0.0031	26.0000	0.000
	18.75 - 17.75		27.184	0.4101	26.0000	0.032	0.339	0.0031	26.0000	0.000
	17.75 - 16.75		27.373	0.4110	26.0000	0.032	0.341	0.0031	26.0000	0.000
L30	16.75 - 15.75	TP40.364x39.464x0.538	27.562	0.4072	26.0000	0.032	0.343	0.0030	26.0000	0.000
	15.75 - 14.75		27.752	0.4081	26.0000	0.032	0.346	0.0030	26.0000	0.000
	14.75 - 13.75		27.942	0.4091	26.0000	0.032	0.348	0.0030	26.0000	0.000
	13.75 - 12.75		28.133	0.4100	26.0000	0.032	0.351	0.0030	26.0000	0.000
	12.75 - 11.75		28.325	0.4109	26.0000	0.032	0.353	0.0030	26.0000	0.000
L31	11.75 - 10.75	TP41.265x40.364x0.513	28.515	0.4316	26.0000	0.034	0.356	0.0031	26.0000	0.000
	10.75 - 9.75		28.705	0.4326	26.0000	0.034	0.358	0.0031	26.0000	0.000
	9.75 - 8.75		28.895	0.4335	26.0000	0.034	0.361	0.0031	26.0000	0.000
	8.75 - 7.75		29.086	0.4344	26.0000	0.034	0.364	0.0031	26.0000	0.000
	7.75 - 6.75		29.278	0.4353	26.0000	0.034	0.366	0.0031	26.0000	0.000
L32	6.75 - 5.75	TP42.165x41.265x0.525	29.468	0.4260	26.0000	0.033	0.369	0.0030	26.0000	0.000
	5.75 - 4.75		29.658	0.4269	26.0000	0.033	0.371	0.0030	26.0000	0.000
	4.75 - 3.75		29.850	0.4277	26.0000	0.033	0.374	0.0030	26.0000	0.000
	3.75 - 2.75		30.041	0.4286	26.0000	0.033	0.376	0.0030	26.0000	0.000
	2.75 - 1.75		30.233	0.4295	26.0000	0.034	0.379	0.0030	26.0000	0.000
L33	1.75 - 0 (33)	TP42.48x42.165x0.513	30.577	0.4415	26.0000	0.035	0.384	0.0031	26.0000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 129	0.000	0.000	0.000	0.000	0.000	0.000 ✔	1.333	H1-3+VT ✔
	129 - 128	0.000	0.001	0.000	0.001	0.000	0.001 ✔	1.333	H1-3+VT ✔
	128 - 127	0.004	0.039	0.000	0.021	0.000	0.043 ✔	1.333	H1-3+VT ✔
	127 - 126	0.004	0.057	0.000	0.022	0.000	0.062 ✔	1.333	H1-3+VT ✔
	126 - 125	0.004	0.076	0.000	0.022	0.000	0.080 ✔	1.333	H1-3+VT ✔
L2	125 - 124	0.005	0.095	0.000	0.022	0.000	0.099 ✔	1.333	H1-3+VT ✔
	124 - 123	0.005	0.116	0.000	0.025	0.004	0.121 ✔	1.333	H1-3+VT ✔
	123 - 122	0.005	0.137	0.000	0.026	0.006	0.143 ✔	1.333	H1-3+VT ✔
	122 - 121	0.006	0.164	0.000	0.032	0.006	0.171 ✔	1.333	H1-3+VT ✔
	121 - 120	0.006	0.192	0.000	0.033	0.006	0.198 ✔	1.333	H1-3+VT ✔
L3	120 - 119	0.004	0.123	0.000	0.021	0.003	0.128 ✔	1.333	H1-3+VT ✔
	119 - 118	0.004	0.137	0.000	0.022	0.003	0.141 ✔	1.333	H1-3+VT ✔
	118 - 117	0.007	0.185	0.000	0.042	0.003	0.192 ✔	1.333	H1-3+VT ✔
	117 - 116	0.007	0.212	0.000	0.042	0.003	0.220 ✔	1.333	H1-3+VT ✔
	116 - 115	0.007	0.239	0.000	0.042	0.003	0.246 ✔	1.333	H1-3+VT ✔
L4	115 - 114	0.007	0.265	0.000	0.042	0.003	0.272 ✔	1.333	H1-3+VT ✔
	114 - 113	0.007	0.290	0.000	0.042	0.003	0.298 ✔	1.333	H1-3+VT ✔
	113 - 112	0.007	0.315	0.000	0.042	0.003	0.323 ✔	1.333	H1-3+VT ✔
	112 - 111	0.007	0.339	0.000	0.043	0.003	0.347 ✔	1.333	H1-3+VT ✔
	111 - 110	0.007	0.363	0.000	0.043	0.003	0.371 ✔	1.333	H1-3+VT ✔
L5	110 - 109	0.010	0.418	0.000	0.068	0.003	0.429 ✔	1.333	H1-3+VT ✔
	109 - 108	0.010	0.458	0.000	0.068	0.002	0.469 ✔	1.333	H1-3+VT ✔
	108 - 107	0.010	0.497	0.000	0.068	0.002	0.508 ✔	1.333	H1-3+VT ✔
	107 - 106	0.010	0.534	0.000	0.068	0.002	0.545 ✔	1.333	H1-3+VT ✔
	106 - 105	0.010	0.571	0.000	0.068	0.002	0.582 ✔	1.333	H1-3+VT ✔
L6	105 - 104	0.010	0.607	0.000	0.068	0.002	0.618 ✔	1.333	H1-3+VT ✔
	104 - 103	0.010	0.642	0.000	0.068	0.002	0.654 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	103 - 102	0.010	0.677	0.000	0.068	0.002	0.688 ✔	1.333	H1-3+VT ✔
	102 - 101	0.010	0.710	0.000	0.068	0.002	0.721 ✔	1.333	H1-3+VT ✔
	101 - 100	0.010	0.743	0.000	0.067	0.002	0.754 ✔	1.333	H1-3+VT ✔
L7	100 - 99	0.010	0.775	0.000	0.067	0.002	0.786 ✔	1.333	H1-3+VT ✔
	99 - 98	0.010	0.806	0.000	0.067	0.002	0.817 ✔	1.333	H1-3+VT ✔
	98 - 97	0.010	0.836	0.000	0.067	0.002	0.848 ✔	1.333	H1-3+VT ✔
	97 - 96	0.010	0.866	0.000	0.067	0.002	0.878 ✔	1.333	H1-3+VT ✔
	96 - 95	0.010	0.895	0.000	0.067	0.002	0.907 ✔	1.333	H1-3+VT ✔
L8	95 - 94	0.010	0.924	0.000	0.067	0.001	0.935 ✔	1.333	H1-3+VT ✔
	94 - 93	0.010	0.952	0.000	0.067	0.001	0.963 ✔	1.333	H1-3+VT ✔
	93 - 92	0.011	0.979	0.000	0.067	0.001	0.990 ✔	1.333	H1-3+VT ✔
	92 - 91	0.011	1.005	0.000	0.066	0.001	1.017 ✔	1.333	H1-3+VT ✔
	91 - 90	0.011	1.031	0.000	0.066	0.001	1.043 ✔	1.333	H1-3+VT ✔
L9	90 - 89	0.011	1.057	0.000	0.066	0.001	1.069 ✔	1.333	H1-3+VT ✔
	89 - 88	0.011	1.082	0.000	0.066	0.001	1.093 ✔	1.333	H1-3+VT ✔
	88 - 87	0.011	1.106	0.000	0.066	0.001	1.118 ✔	1.333	H1-3+VT ✔
	87 - 86	0.011	1.130	0.000	0.066	0.001	1.142 ✔	1.333	H1-3+VT ✔
	86 - 85	0.011	1.153	0.000	0.066	0.001	1.165 ✔	1.333	H1-3+VT ✔
L10	85 - 83.9375	0.011	1.177	0.000	0.066	0.001	1.189 ✔	1.333	H1-3+VT ✔
	83.9375 - 82.875	0.011	1.201	0.000	0.066	0.001	1.213 ✔	1.333	H1-3+VT ✔
	82.875 - 81.8125	0.011	1.224	0.000	0.066	0.001	1.236 ✔	1.333	H1-3+VT ✔
	81.8125 - 80.75	0.011	1.246	0.000	0.065	0.001	1.258 ✔	1.333	H1-3+VT ✔
	80.75 - 77	0.005	0.607	0.000	0.030	0.001	0.612 ✔	1.333	H1-3+VT ✔
L11	80.75 - 77	0.005	0.596	0.000	0.029	0.001	0.601 ✔	1.333	H1-3+VT ✔
	77 - 75.75	0.010	1.121	0.000	0.053	0.001	1.132 ✔	1.333	H1-3+VT ✔
L12	75.75 - 74.75	0.010	1.137	0.000	0.053	0.001	1.147 ✔	1.333	H1-3+VT ✔
	74.75 - 73.75	0.010	1.152	0.000	0.053	0.001	1.162 ✔	1.333	H1-3+VT ✔
	73.75 - 72.75	0.010	1.166	0.000	0.053	0.001	1.177 ✔	1.333	H1-3+VT ✔
	72.75 - 71.75	0.010	1.181	0.000	0.053	0.001	1.192 ✔	1.333	H1-3+VT ✔
	71.75 - 70.75	0.010	1.195	0.000	0.053	0.001	1.206 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L13	70.75 - 69.75	0.010	1.209	0.000	0.053	0.001	1.220 ✔	1.333	H1-3+VT ✔
	69.75 - 68.75	0.010	1.222	0.000	0.053	0.001	1.233 ✔	1.333	H1-3+VT ✔
	68.75 - 67.75	0.010	1.236	0.000	0.053	0.001	1.247 ✔	1.333	H1-3+VT ✔
	67.75 - 66.75	0.010	1.249	0.000	0.053	0.001	1.260 ✔	1.333	H1-3+VT ✔
	66.75 - 65.75	0.010	1.261	0.000	0.052	0.001	1.272 ✔	1.333	H1-3+VT ✔
L14	65.75 - 64.375	0.010	1.278	0.000	0.052	0.001	1.290 ✔	1.333	H1-3+VT ✔
	64.375 - 63	0.010	1.295	0.000	0.052	0.001	1.306 ✔	1.333	H1-3+VT ✔
L15	63 - 62.75 (15)	0.006	0.807	0.000	0.032	0.001	0.813 ✔	1.333	H1-3+VT ✔
L16	62.75 - 61.75	0.007	0.823	0.000	0.032	0.001	0.830 ✔	1.333	H1-3+VT ✔
	61.75 - 60.75	0.007	0.831	0.000	0.032	0.001	0.838 ✔	1.333	H1-3+VT ✔
	60.75 - 59.75	0.007	0.838	0.000	0.032	0.001	0.845 ✔	1.333	H1-3+VT ✔
	59.75 - 58.75	0.007	0.845	0.000	0.032	0.001	0.852 ✔	1.333	H1-3+VT ✔
	58.75 - 57.75	0.007	0.851	0.000	0.032	0.000	0.858 ✔	1.333	H1-3+VT ✔
L17	57.75 - 56.75	0.007	0.868	0.000	0.033	0.000	0.875 ✔	1.333	H1-3+VT ✔
	56.75 - 55.75	0.007	0.875	0.000	0.033	0.000	0.882 ✔	1.333	H1-3+VT ✔
	55.75 - 54.75	0.007	0.881	0.000	0.033	0.000	0.889 ✔	1.333	H1-3+VT ✔
	54.75 - 53.75	0.007	0.887	0.000	0.033	0.000	0.895 ✔	1.333	H1-3+VT ✔
	53.75 - 52.75	0.007	0.894	0.000	0.033	0.000	0.901 ✔	1.333	H1-3+VT ✔
L18	52.75 - 51.75	0.007	0.911	0.000	0.033	0.000	0.918 ✔	1.333	H1-3+VT ✔
	51.75 - 50.75	0.007	0.917	0.000	0.033	0.000	0.924 ✔	1.333	H1-3+VT ✔
	50.75 - 49.75	0.008	0.922	0.000	0.033	0.000	0.930 ✔	1.333	H1-3+VT ✔
	49.75 - 48.75	0.008	0.928	0.000	0.033	0.000	0.936 ✔	1.333	H1-3+VT ✔
	48.75 - 47.75	0.008	0.934	0.000	0.033	0.000	0.942 ✔	1.333	H1-3+VT ✔
L19	47.75 - 46.75	0.008	0.951	0.000	0.033	0.000	0.959 ✔	1.333	H1-3+VT ✔
	46.75 - 45.75	0.008	0.957	0.000	0.033	0.000	0.965 ✔	1.333	H1-3+VT ✔
	45.75 - 44.75	0.008	0.962	0.000	0.033	0.000	0.971 ✔	1.333	H1-3+VT ✔
	44.75 - 43.75	0.008	0.968	0.000	0.033	0.000	0.976 ✔	1.333	H1-3+VT ✔
	43.75 - 42.75	0.008	0.973	0.000	0.033	0.000	0.981 ✔	1.333	H1-3+VT ✔
L20	42.75 - 42.25	0.008	0.976	0.000	0.033	0.000	0.984 ✔	1.333	H1-3+VT ✔
	42.25 - 37.75	0.004	0.484	0.000	0.016	0.000	0.488 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L21	42.25 - 37.75	0.008	0.475	0.000	0.015	0.000	0.483	1.333	H1-3+VT
	37.75 - 37.25	0.008	0.924	0.000	0.030	0.000	0.932	1.333	H1-3+VT
L22	37.25 - 36.125	0.008	0.928	0.000	0.030	0.000	0.937	1.333	H1-3+VT
	36.125 - 35	0.008	0.933	0.000	0.030	0.000	0.941	1.333	H1-3+VT
L23	35 - 34.75 (23)	0.008	0.914	0.000	0.029	0.000	0.922	1.333	H1-3+VT
L24	34.75 - 33.5	0.008	0.919	0.000	0.029	0.000	0.927	1.333	H1-3+VT
	33.5 - 32.25	0.008	0.924	0.000	0.029	0.000	0.932	1.333	H1-3+VT
L25	32.25 - 32 (25)	0.007	0.792	0.000	0.025	0.000	0.799	1.333	H1-3+VT
L26	32 - 31.75 (26)	0.009	0.967	0.000	0.031	0.000	0.976	1.333	H1-3+VT
L27	31.75 - 30.75	0.009	0.971	0.000	0.031	0.000	0.980	1.333	H1-3+VT
	30.75 - 29.75	0.009	0.975	0.000	0.031	0.000	0.984	1.333	H1-3+VT
	29.75 - 28.75	0.009	0.979	0.000	0.031	0.000	0.988	1.333	H1-3+VT
	28.75 - 27.75	0.009	0.983	0.000	0.031	0.000	0.992	1.333	H1-3+VT
	27.75 - 26.75	0.009	0.987	0.000	0.031	0.000	0.996	1.333	H1-3+VT
L28	26.75 - 25.75	0.009	0.991	0.000	0.031	0.000	1.000	1.333	H1-3+VT
	25.75 - 24.75	0.009	0.995	0.000	0.031	0.000	1.004	1.333	H1-3+VT
	24.75 - 23.75	0.009	0.998	0.000	0.031	0.000	1.008	1.333	H1-3+VT
	23.75 - 22.75	0.009	1.002	0.000	0.031	0.000	1.012	1.333	H1-3+VT
	22.75 - 21.75	0.009	1.006	0.000	0.031	0.000	1.015	1.333	H1-3+VT
L29	21.75 - 20.75	0.009	1.021	0.000	0.032	0.000	1.031	1.333	H1-3+VT
	20.75 - 19.75	0.009	1.025	0.000	0.032	0.000	1.035	1.333	H1-3+VT
	19.75 - 18.75	0.009	1.029	0.000	0.032	0.000	1.038	1.333	H1-3+VT
	18.75 - 17.75	0.010	1.032	0.000	0.032	0.000	1.042	1.333	H1-3+VT
	17.75 - 16.75	0.010	1.036	0.000	0.032	0.000	1.046	1.333	H1-3+VT
L30	16.75 - 15.75	0.010	1.028	0.000	0.032	0.000	1.038	1.333	H1-3+VT
	15.75 - 14.75	0.010	1.032	0.000	0.032	0.000	1.042	1.333	H1-3+VT
	14.75 - 13.75	0.010	1.036	0.000	0.032	0.000	1.045	1.333	H1-3+VT
	13.75 - 12.75	0.010	1.039	0.000	0.032	0.000	1.049	1.333	H1-3+VT
	12.75 - 11.75	0.010	1.043	0.000	0.032	0.000	1.053	1.333	H1-3+VT
L31	11.75 - 10.75	0.010	1.095	0.000	0.034	0.000	1.106	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	10.75 - 9.75	0.010	1.099	0.000	0.034	0.000	1.110 ✔	1.333	H1-3+VT ✔
	9.75 - 8.75	0.010	1.103	0.000	0.034	0.000	1.113 ✔	1.333	H1-3+VT ✔
	8.75 - 7.75	0.011	1.106	0.000	0.034	0.000	1.117 ✔	1.333	H1-3+VT ✔
	7.75 - 6.75	0.011	1.110	0.000	0.034	0.000	1.121 ✔	1.333	H1-3+VT ✔
L32	6.75 - 5.75	0.010	1.088	0.000	0.033	0.000	1.099 ✔	1.333	H1-3+VT ✔
	5.75 - 4.75	0.010	1.092	0.000	0.033	0.000	1.102 ✔	1.333	H1-3+VT ✔
	4.75 - 3.75	0.011	1.095	0.000	0.033	0.000	1.106 ✔	1.333	H1-3+VT ✔
	3.75 - 2.75	0.011	1.099	0.000	0.033	0.000	1.109 ✔	1.333	H1-3+VT ✔
	2.75 - 1.75	0.011	1.102	0.000	0.034	0.000	1.113 ✔	1.333	H1-3+VT ✔
L33	1.75 - 0 (33)	0.011	1.134	0.000	0.035	0.000	1.145 ✔	1.333	H1-3+VT ✔

Section Capacity Table

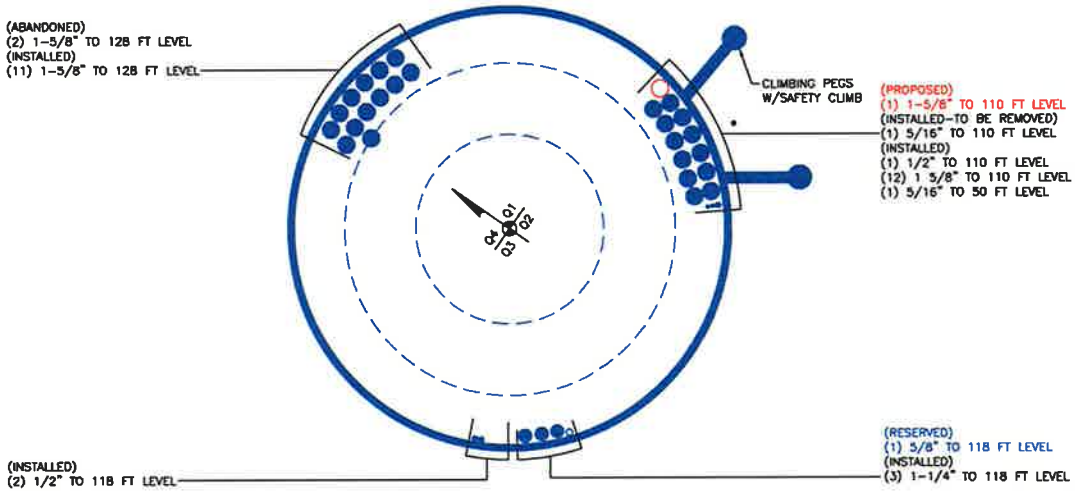
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	130 - 125	Pole	TP18x18x0.375	1	-1.959	581.245	6.0	Pass
L2	125 - 120	Pole	TP18x18x0.375	2	-2.726	581.245	14.9	Pass
L3	120 - 115	Pole	TP22.9x22x0.25	3	-4.957	947.902	18.5	Pass
L4	115 - 110	Pole	TP23.8x22.9x0.25	4	-5.321	985.576	27.8	Pass
L5	110 - 105	Pole	TP24.701x23.8x0.25	5	-7.578	1023.251	43.7	Pass
L6	105 - 100	Pole	TP25.601x24.701x0.25	6	-8.048	1060.924	56.6	Pass
L7	100 - 95	Pole	TP26.501x25.601x0.25	7	-8.556	1098.599	68.0	Pass
L8	95 - 90	Pole	TP27.401x26.501x0.25	8	-9.093	1136.273	78.3	Pass
L9	90 - 85	Pole	TP28.302x27.401x0.25	9	-9.658	1173.948	87.4	Pass
L10	85 - 77	Pole	TP29.742x28.302x0.25	10	-10.159	1205.970	94.4	Pass
L11	77 - 75.75	Pole	TP29.467x28.567x0.313	11	-11.100	1525.125	84.9	Pass
L12	75.75 - 70.75	Pole	TP30.367x29.467x0.313	12	-11.812	1572.220	90.5	Pass
L13	70.75 - 65.75	Pole	TP31.267x30.367x0.313	13	-12.545	1619.302	95.5	Pass
L14	65.75 - 63	Pole	TP31.762x31.267x0.313	14	-12.954	1645.202	98.0	Pass
L15	63 - 62.75	Pole	TP31.807x31.762x0.513	15	-13.021	2684.835	61.0	Pass
L16	62.75 - 57.75	Pole	TP32.707x31.807x0.506	16	-14.037	2728.904	64.4	Pass
L17	57.75 - 52.75	Pole	TP33.608x32.707x0.5	17	-15.082	2771.080	67.6	Pass
L18	52.75 - 47.75	Pole	TP34.508x33.608x0.494	18	-16.213	2811.350	70.7	Pass
L19	47.75 - 42.75	Pole	TP35.408x34.508x0.488	19	-17.301	2849.727	73.6	Pass
L20	42.75 - 37.75	Pole	TP36.308x35.408x0.488	20	-17.416	2857.072	73.8	Pass
L21	37.75 - 37.25	Pole	TP35.773x34.873x0.55	21	-19.415	3242.962	69.9	Pass
L22	37.25 - 35	Pole	TP36.178x35.773x0.55	22	-19.962	3280.260	70.6	Pass
L23	35 - 34.75	Pole	TP36.223x36.178x0.563	23	-20.034	3357.867	69.2	Pass
L24	34.75 - 32.25	Pole	TP36.673x36.223x0.563	24	-20.656	3400.256	69.9	Pass
L25	32.25 - 32	Pole	TP36.718x36.673x0.663	25	-20.742	3998.640	59.9	Pass
L26	32 - 31.75	Pole	TP36.763x36.718x0.538	26	-20.810	3259.478	73.2	Pass
L27	31.75 - 26.75	Pole	TP37.664x36.763x0.538	27	-22.160	3340.485	74.7	Pass
L28	26.75 - 21.75	Pole	TP38.564x37.664x0.538	28	-23.545	3421.478	76.2	Pass
L29	21.75 - 16.75	Pole	TP39.464x38.564x0.531	29	-24.956	3462.307	78.5	Pass
L30	16.75 - 11.75	Pole	TP40.364x39.464x0.538	30	-26.391	3583.490	79.0	Pass
L31	11.75 - 6.75	Pole	TP41.265x40.364x0.513	31	-27.858	3496.192	84.1	Pass
L32	6.75 - 1.75	Pole	TP42.165x41.265x0.525	32	-29.349	3659.485	83.5	Pass
L33	1.75 - 0	Pole	TP42.48x42.165x0.513	33	-29.869	3600.460	85.9	Pass
							Summary	
						Pole (L14)	98.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
						RATING =	**98.0**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876322 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

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

Site Data

BU#: *876322*
Site Name: *TARTAGLIA PROPERTY*
App #: *210217 Rev. 12*

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	55	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	55	in
Thick:	3.5	in
Grade:	50	ksi
Clip Distance:	7	in

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

Pole Data		
Diam:	42.48	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	2608	ft-kips
Unfactored Axial, P:	30	kips
Unfactored Shear, V:	31	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	140.4 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	72.0% **Pass**

Base Plate Results — Flexural Check

Base Plate Stress:	42.4 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	84.8% **Pass**

PL Ref. Data
Yield Line (in): 35.30
Max PL Length: 35.30

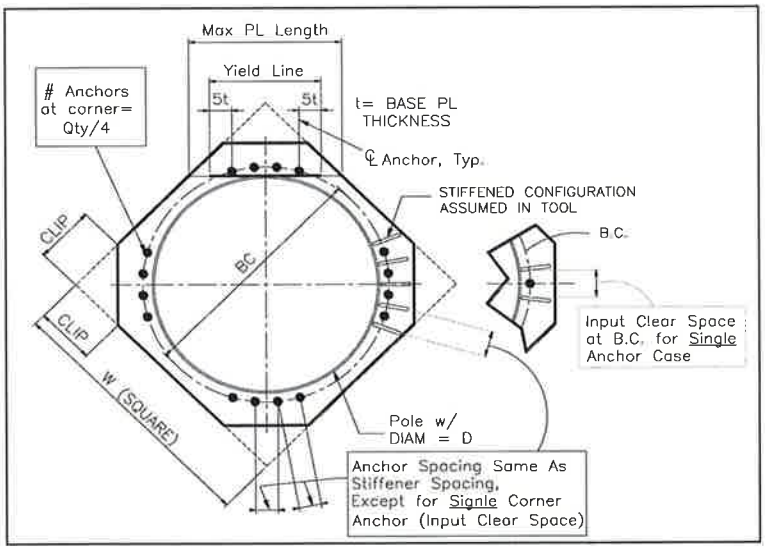
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	N/A



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

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

Site Data

BU#: *876322*
Site Name: *TARTAGLIA PROPERTY*
App #: *210217 Rev. 12*

Pole Manufacturer:	Other

Reactions		
Moment:	33.04	ft-kips
Axial:	2.73	kips
Shear:	4.74	kips
Elevation:	120	feet

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

Bolt Data

Qty:	8		
Diameter (in.):	0.875	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	24		

Flange Bolt Results

			Rigid
Bolt Tension Capacity, **B**:	35.27	kips	Service, ASD
Max Bolt directly applied T:	7.92	Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o Pry**:	1.239	in	
Min PL "treq" for actual **T w/ Pry**:	0.430	in	
Min PL "t1" for actual **T w/o Pry**:	0.587	in	
T allowable w/o Prying:	35.27	kips	α'<0 case
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	7.92	kips	
Non-Prying Bolt Stress Ratio, T/B:	22.5%	**Pass**	

Plate Data

Diam:	26.25	in
Thick, t:	1.25	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	7.07	in

Exterior Flange Plate Results — Flexural Check

			Rigid
Compression Side Plate Stress:	8.0	ksi	Service ASD
Allowable Plate Stress:	50.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	16.1%	**Pass**	Comp. Y.L. Length:
No Prying			15.87
Tension Side Stress Ratio, (treq/t)^2:	11.8%	**Pass**	

Stiffener Data (Welding at Both Sides)

Config:	0	*
Weld Type:		
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

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

Pole Results

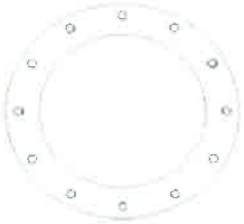
Pole Punching Shear Check: n/a

Pole Data

Diam:	18	in
Thick:	0.375	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	63	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF:	1.333	



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

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

CCI Foundation Tool Suite - Monopole Pier - Beta Release

CCI Foundation Tool Suite - v1.0 Date: 10/16/2014

BU:	876322
Site Name:	TARTAGLIA PROPERTY
App Number:	210217 Rev. 12
Work Order:	946748

CROWN CASTLE

Monopole Drilled Pier

Input

Criteria

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

Forces

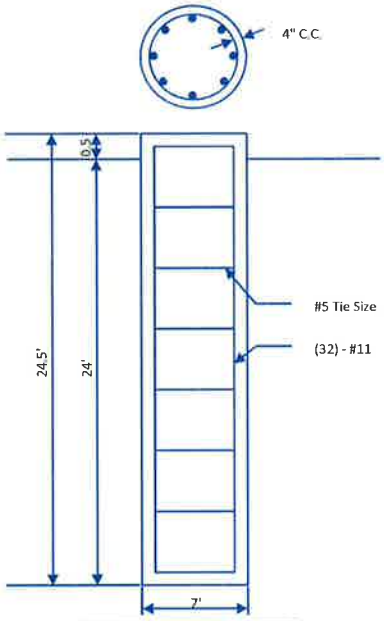
Compression	30 kips
Shear	31 kips
Moment	2608 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	7 ft
Ext. above grade:	0.5 ft
Depth below grade:	24 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	5	0	5	120					0	
2	5	5	10	120		35			0	
3	10	10	20	60		40			0	
4	4	20	24	63		43			40	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	6.95 ft
Max Moment, Mu:	2803.95 k-ft
Soil Safety Factor:	3.64
Safety Factor Req'd:	2
RATING:	54.9%

Soil Axial Capacity

Skin Friction (k):	176.42 kips
End Bearing (k):	769.69 kips
Comp. Capacity (k), ϕCn:	946.11 kips
Comp. (k), Cu:	30.00 kips
RATING:	3.2%

Concrete/Steel Check

Mu (from soil analysis)	3645.14 k-ft
ϕMn	7449.59 k-ft
RATING:	48.9%

rho provided	0.90
rho required	0.33 OK
Rebar Spacing	5.79
Spacing required	22.56 OK
Dev. Length required	16.72
Dev. Length provided	61.78 OK

Overall Foundation Rating: 54.9%

CCIpole

per TIA-222- F

Site BU: 876322

Work Order: 946748

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	130	10	0	0	18	18	0.375	n/a	A53-B-35
2	120	43	3.75	12	22.00	29.742	0.25	1	A572-65
3	80.75	43	4.5	12	28.57	36.308	0.3125	1.25	A572-65
4	42.25	42.25	0	12	34.87	42.48	0.375	1.5	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	32.25	plate	CCI-SFP-065125	2			x								x	
2	0	35	plate	CCI-SFP-065125	1						x						
3	32	63	plate	CCI-SFP-060100	2		x								x		
4	35	63	plate	CCI-SFP-060100	1						x						
5																	
6																	
7																	
8																	
9																	
10																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
2	6.5	1.25	8.125	0.625	33.000	33.000	19.000	6.563	1.1875	A572-65
3	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65
4	6	1	6	0.5	24.000	24.000	16.000	4.750	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	130 - 125	5		0	18.000	18.000	0.375	A53-B-35	1.000
2	125 - 120	5	0	0	18.000	18.000	0.375	A53-B-35	1.000
3	120 - 115	5		12	22.000	22.900	0.25	A572-65	1.000
4	115 - 110	5		12	22.900	23.800	0.25	A572-65	1.000
5	110 - 105	5		12	23.800	24.701	0.25	A572-65	1.000
6	105 - 100	5		12	24.701	25.601	0.25	A572-65	1.000
7	100 - 95	5		12	25.601	26.501	0.25	A572-65	1.000
8	95 - 90	5		12	26.501	27.401	0.25	A572-65	1.000
9	90 - 85	5		12	27.401	28.302	0.25	A572-65	1.000
10	85 - 80.75	8	3.75	12	28.302	29.742	0.25	A572-65	1.000
11	80.75 - 75.75	5		12	28.567	29.467	0.3125	A572-65	1.000
12	75.75 - 70.75	5		12	29.467	30.367	0.3125	A572-65	1.000
13	70.75 - 65.75	5		12	30.367	31.267	0.3125	A572-65	1.000
14	65.75 - 63	2.75		12	31.267	31.762	0.3125	A572-65	1.000
15	63 - 62.75	0.25		12	31.762	31.807	0.5125	A572-65	0.963
16	62.75 - 57.75	5		12	31.807	32.707	0.50625	A572-65	0.964
17	57.75 - 52.75	5		12	32.707	33.608	0.5	A572-65	0.967
18	52.75 - 47.75	5		12	33.608	34.508	0.49375	A572-65	0.970
19	47.75 - 42.75	5		12	34.508	35.408	0.4875	A572-65	0.973
20	42.75 - 42.25	5	4.5	12	35.408	36.308	0.4875	A572-65	0.972
21	42.25 - 37.25	5		12	34.873	35.773	0.55	A572-65	0.974
22	37.25 - 35	2.25		12	35.773	36.178	0.55	A572-65	0.971
23	35 - 34.75	0.25		12	36.178	36.223	0.5625	A572-65	0.982
24	34.75 - 32.25	2.5		12	36.223	36.673	0.5625	A572-65	0.978
25	32.25 - 32	0.25		12	36.673	36.718	0.6625	A572-65	1.044
26	32 - 31.75	0.25		12	36.718	36.763	0.5375	A572-65	1.090
27	31.75 - 26.75	5		12	36.763	37.664	0.5375	A572-65	1.081
28	26.75 - 21.75	5		12	37.664	38.564	0.5375	A572-65	1.072
29	21.75 - 16.75	5		12	38.564	39.464	0.53125	A572-65	1.075
30	16.75 - 11.75	5		12	39.464	40.364	0.5375	A572-65	1.055
31	11.75 - 6.75	5		12	40.364	41.265	0.5125	A572-65	1.097
32	6.75 - 1.75	5		12	41.265	42.165	0.525	A572-65	1.064
33	1.75 - 0	1.75		12	42.165	42.480	0.5125	A572-65	1.087

TNX Section Forces

Increment (ft): 5

	Section Height (ft)	TNX Output P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	130 - 125	1.9587	13.082	3.2194
2	125 - 120	2.7261	33.04	4.7424
3	120 - 115	4.9565	78.068	9.8608
4	115 - 110	5.3209	128.54	10.332
5	110 - 105	7.5781	217.9	17.092
6	105 - 100	8.0481	304.77	17.616
7	100 - 95	8.5563	394.02	18.092
8	95 - 90	9.0935	485.64	18.568
9	90 - 85	9.6583	579.63	19.041
10	85 - 80.75	10.159	661.37	19.44
11	80.75 - 75.75	11.1	759.89	19.968
12	75.75 - 70.75	11.812	860.86	20.439
13	70.75 - 65.75	12.545	964.19	20.908
14	65.75 - 63	12.954	1022	21.166
15	63 - 62.75	13.021	1027.3	21.182
16	62.75 - 57.75	14.037	1134.5	21.691
17	57.75 - 52.75	15.082	1244.1	22.189
18	52.75 - 47.75	16.213	1356.3	22.751
19	47.75 - 42.75	17.301	1471.2	23.228
20	42.75 - 42.25	17.416	1482.8	23.271
21	42.25 - 37.25	19.414	1600.5	23.799
22	37.25 - 35	19.962	1654.3	24.007
23	35 - 34.75	20.034	1660.3	24.045
24	34.75 - 32.25	20.656	1721	24.506
25	32.25 - 32	20.742	1727.1	24.544
26	32 - 31.75	20.809	1733.2	24.59
27	31.75 - 26.75	22.161	1858.4	25.509
28	26.75 - 21.75	23.545	1988.2	26.435
29	21.75 - 16.75	24.956	2122.7	27.373
30	16.75 - 11.75	26.391	2261.9	28.325
31	11.75 - 6.75	27.858	2405.8	29.278
32	6.75 - 1.75	29.349	2554.6	30.233
33	1.75 - 0	29.868	2607.7	30.577

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
130 - 125	Pole	TP18x18x0.375	Pole	6.0%	Pass
125 - 120	Pole	TP18x18x0.375	Pole	14.8%	Pass
120 - 115	Pole	TP22.9x22x0.25	Pole	18.4%	Pass
115 - 110	Pole	TP23.8x22.9x0.25	Pole	27.7%	Pass
110 - 105	Pole	TP24.701x23.8x0.25	Pole	43.5%	Pass
105 - 100	Pole	TP25.601x24.701x0.25	Pole	56.3%	Pass
100 - 95	Pole	TP26.501x25.601x0.25	Pole	67.8%	Pass
95 - 90	Pole	TP27.401x26.501x0.25	Pole	77.9%	Pass
90 - 85	Pole	TP28.302x27.401x0.25	Pole	87.1%	Pass
85 - 80.75	Pole	TP29.742x28.302x0.25	Pole	94.1%	Pass
80.75 - 75.75	Pole	TP29.467x28.567x0.3125	Pole	84.6%	Pass
75.75 - 70.75	Pole	TP30.367x29.467x0.3125	Pole	90.1%	Pass
70.75 - 65.75	Pole	TP31.267x30.367x0.3125	Pole	95.1%	Pass
65.75 - 63	Pole	TP31.762x31.267x0.3125	Pole	97.6%	Pass
63 - 62.75	Pole + Reinf.	TP31.807x31.762x0.5125	Reinf. 3 Compression	74.6%	Pass
62.75 - 57.75	Pole + Reinf.	TP32.707x31.807x0.5063	Reinf. 3 Compression	79.0%	Pass
57.75 - 52.75	Pole + Reinf.	TP33.608x32.707x0.5	Reinf. 3 Compression	82.8%	Pass
52.75 - 47.75	Pole + Reinf.	TP34.508x33.608x0.4938	Reinf. 3 Compression	86.1%	Pass
47.75 - 42.75	Pole + Reinf.	TP35.408x34.508x0.4875	Reinf. 3 Compression	88.5%	Pass
42.75 - 42.25	Pole + Reinf.	TP36.308x35.408x0.4875	Reinf. 3 Compression	90.2%	Pass
42.25 - 37.25	Pole + Reinf.	TP35.773x34.873x0.55	Reinf. 3 Compression	85.3%	Pass
37.25 - 35	Pole + Reinf.	TP36.178x35.773x0.55	Reinf. 3 Compression	86.2%	Pass
35 - 34.75	Pole + Reinf.	TP36.223x36.178x0.5625	Reinf. 3 Compression	86.3%	Pass
34.75 - 32.25	Pole + Reinf.	TP36.673x36.223x0.5625	Reinf. 3 Compression	87.7%	Pass
32.25 - 32	Pole + Reinf.	TP36.718x36.673x0.6625	Reinf. 2 Compression	74.4%	Pass
32 - 31.75	Pole + Reinf.	TP36.763x36.718x0.5375	Reinf. 1 Compression	80.6%	Pass
31.75 - 26.75	Pole + Reinf.	TP37.664x36.763x0.5375	Reinf. 1 Compression	83.4%	Pass
26.75 - 21.75	Pole + Reinf.	TP38.564x37.664x0.5375	Reinf. 1 Compression	85.7%	Pass
21.75 - 16.75	Pole + Reinf.	TP39.464x38.564x0.5313	Reinf. 1 Compression	88.0%	Pass
16.75 - 11.75	Pole + Reinf.	TP40.364x39.464x0.5375	Reinf. 1 Compression	89.8%	Pass
11.75 - 6.75	Pole + Reinf.	TP41.265x40.364x0.5125	Reinf. 1 Compression	91.9%	Pass
6.75 - 1.75	Pole + Reinf.	TP42.165x41.265x0.525	Reinf. 1 Compression	94.6%	Pass
1.75 - 0	Pole + Reinf.	TP42.48x42.165x0.5125	Reinf. 1 Compression	94.7%	Pass
				Summary	
			Pole	97.7%	Pass
			Reinforcement	95.3%	Pass
			Overall	97.7%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity				
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4
130 - 125	807	n/a	807	20.76	n/a	20.76	6.0%				
125 - 120	807	n/a	807	20.76	n/a	20.76	14.8%				
120 - 115	1196	n/a	1196	18.21	n/a	18.21	18.4%				
115 - 110	1344	n/a	1344	18.93	n/a	18.93	27.7%				
110 - 105	1504	n/a	1504	19.65	n/a	19.65	43.5%				
105 - 100	1676	n/a	1676	20.38	n/a	20.38	56.3%				
100 - 95	1861	n/a	1861	21.10	n/a	21.10	67.8%				
95 - 90	2059	n/a	2059	21.83	n/a	21.83	77.9%				
90 - 85	2271	n/a	2271	22.55	n/a	22.55	87.1%				
85 - 80.75	2462	n/a	2462	23.16	n/a	23.16	94.1%				
80.75 - 75.75	3187	n/a	3187	29.29	n/a	29.29	84.6%				
75.75 - 70.75	3492	n/a	3492	30.20	n/a	30.20	90.1%				
70.75 - 65.75	3815	n/a	3815	31.10	n/a	31.10	95.1%				
65.75 - 63	4001	n/a	4001	31.60	n/a	31.60	97.7%				
63 - 62.75	4018	2449	6467	31.65	18.00	49.65	60.0%			74.9%	74.9%
62.75 - 57.75	4372	2584	6956	32.55	18.00	50.55	62.1%			79.0%	79.0%
57.75 - 52.75	4747	2723	7470	33.46	18.00	51.46	65.2%			82.8%	82.8%
52.75 - 47.75	5142	2865	8007	34.36	18.00	52.36	69.4%			86.4%	86.4%
47.75 - 42.75	5559	3010	8570	35.26	18.00	53.26	73.0%			89.8%	89.8%
42.75 - 42.25	5602	3025	8627	35.35	18.00	53.35	71.1%			90.2%	90.2%
42.25 - 37.25	6845	3070	9916	42.68	18.00	60.68	67.3%			85.3%	85.3%
37.25 - 35	7083	3138	10221	43.17	18.00	61.17	69.5%			86.5%	86.5%
35 - 34.75	7113	3285	10398	43.22	20.13	63.35	69.7%		77.3%	86.5%	
34.75 - 32.25	7386	3416	10802	43.77	20.13	63.89	69.3%		78.5%	87.7%	
32.25 - 32	7490	5443	12933	43.82	36.38	80.20	63.3%	62.3%	74.5%	67.5%	
32 - 31.75	7481	3073	10554	43.88	24.38	68.25	76.5%	81.0%	75.8%		
31.75 - 26.75	8053	3360	11413	44.96	24.38	69.34	77.6%	83.4%	78.1%		
26.75 - 21.75	8649	3516	12165	46.05	24.38	70.42	79.7%	85.7%	80.4%		
21.75 - 16.75	9273	3676	12950	47.13	24.38	71.51	81.8%	88.0%	82.6%		
16.75 - 11.75	9931	4044	13976	48.22	24.38	72.59	81.8%	90.2%	84.8%		
11.75 - 6.75	10606	3838	14444	49.30	24.38	73.68	86.9%	92.4%	86.9%		
6.75 - 1.75	11325	4178	15503	50.39	24.38	74.76	87.7%	94.6%	89.0%		
1.75 - 0	11577	4060	15637	50.77	24.38	75.14	89.5%	95.3%	89.7%		

Note: Section capacity checked in 5 degree increments.

APPENDIX D

REQUIRED MODIFICATION DRAWINGS

CROWN CASTLE

TOWER MODIFICATION DRAWINGS

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322

SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

FROM I-95 NORTH: 13. TAKE EXIT 53 FOR BRANFORD CON TOWARD SHORT BEACH 1.1 MI 14. TURN RIGHT ONTO U.S. 1 S 0.5 MI 850 W MAIN ST TOWER WILL BE ON THE RIGHT.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   STEVE TUTTLE
   (585) 899-3445
   STEVE.TUTTLE@CROWNCASTLE.COM
   8 PARKMEADOW DRIVE
   PITTSFORD, NY 14534
2. CROWN PROJECT MANAGER
   JERRY BRUNO
   (781) 970-0069
   JERRY.BRUNO.CONTRACTOR@CROWNCASTLE.COM
   500 WEST CUMMINGS PARK, SUITE 3600
   WOBURN, MA 01801
3. CROWN CONSTRUCTION MANAGER
   JASON D'AMICO
   (860) 209-0104
   JASON.D'AMICO.CONTRACTOR@CROWNCASTLE.COM
   1200 MACARTHUR BLVD, SUITE 200
   MAHWAH, NJ 07430
4. CROWN DESIGN ENGINEER (EOR)
   JAMAL A. HUWEL, P.E.
   (724) 416-2337
   JAMAL.HUWEL@CROWNCASTLE.COM
   2000 CORPORATE DRIVE
   CANONSBURG, PA 15317

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S-1	TITLE PAGE
S-2	MODIFICATION INSPECTION CHECKLIST
S-3	NOTES
S-4	AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S-5	BASE PLATE WELD DETAIL
S-6	POLE MODIFICATION SCHEDULE
S-7	TOWER SECTION

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	SUMMIT / DWG # 3734-D1
TOWER HEIGHT / TYPE:	130 FT MONOPOLE TOWER
TOWER LOCATION:	LAT 41° 16' 40.188"
DATUM: (NAD 1983)	LONG -72° 50' 12.696"
	ELEV 132.25 FT AMSL
STRUCTURAL DESIGN DRAWING:	CCI / WO # 946748
STRUCTURAL ANALYSIS REPORT:	PJF / WO # 936366
STRUCTURAL ANALYSIS DATE:	09/30/14
APPLICATION ID:	210217 REV # 12
CCISITES DOCUMENT ID:	5323351

CODE COMPLIANCE

THIS MODIFICATION DESIGN IS BASED ON THE REQUIREMENTS OF TIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES AND 2005 CT STATE BUILDING CODE WITH 2009 AMENDMENT USING A FASTEST WIND SPEED OF85 MPH WITH NO ICE, 37.6 MPH WITH 0.75 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT · JAMAL A. HUWEL · 28693 · LICENSED PROFESSIONAL ENGINEER · OCT 22 2014

CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 946748
SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS	DATE: 10/20/14		
DFT BY: JJW	DATE: 10/21/14		
DFT/QA BY: SL	DATE: 10/21/14		
APRVD BY: RAD	DATE: 10/21/14		

SCALE: N.T.S

TITLE PAGE

S-1 | REV 0

MODIFICATION INSPECTION NOTES

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR APPROVAL
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT REQUIRED FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

GENERAL

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

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

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

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

REFER TO CROWN ENG-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

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

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

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

GENERAL CONTRACTOR

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

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

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

RECOMMENDATIONS

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

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

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY, NOR FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

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

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

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT AN 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 CROWN ENG-SOW-10007.

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

REQUIRED PHOTOS

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

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

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

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

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT
JAMAL A. HAMEL
28893
LICENSED
PROFESSIONAL ENGINEER
OCT 22 2014

CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 946748
SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRVD BY: RAF DATE: 10/22/14
SCALE: N.T.S

MODIFICATION INSPECTION CHECKLIST

S-2 REV 0

GENERAL NOTES

1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
2. THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
5. ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE CROWN CASTLE ENGINEER OF RECORD (EOR) AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.
7. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
8. USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS, UNO.
9. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
10. STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
11. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
12. ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
14. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
15. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
16. STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
17. DO NOT SCALE DRAWINGS.
18. THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN CASTLE. THEY MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE EXPRESSED WRITTEN CONSENT/PERMISSION OF CROWN CASTLE.
19. FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
20. MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.
21. 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.

STRUCTURAL STEEL NOTES

1. DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO):
   A. TIA-222: STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   B. TIA-1019-A: INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   C. AISC: MANUAL OF STEEL CONSTRUCTION
2. ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO:
   A. STRUCTURAL STEEL: ASTM A572 GRADE 65 (FY = 65KSI).
   B. ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS.
   C. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS.
   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS.
3. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.
4. ALL FASTENERS SHALL NOT BE REUSED.
5. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS.
6. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
7. HOT-DIP GALVANIZE ALL ITEMS, UNO.
   GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.
8. FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".
9. AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN". PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.

WELDING NOTES

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL."
2. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
3. ALL ARC WELDING ON CROWN STRUCTURES SHALL BE DONE IN ACCORDANCE WITH THE CROWN ENG-PLN-10015, "CUTTING AND WELDING SAFETY PLAN" AND AWS D1.1 (LATEST EDITION). THIS SHALL INCLUDE A CERTIFIED WELDING INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE WELDING INSPECTION. THE CERTIFIED WELDING INSPECTION IS THE RESPONSIBILITY OF THE GC.
4. FOR ALL WELDING, USE E70XX ELECTRODES FOR SMAW PROCESS AND E7XT-XX ELECTRODES FOR FCAW PROCESS, UNO.
5. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING.
6. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0° F. WHEN THE TEMPERATURE IS BETWEEN 0° F AND 32° F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70° F DURING THE WELDING PROCESS.
7. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
8. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
9. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.

DETAIL DRAWINGS SHALL GOVERN OVER ANY VARIANCE FROM THIS SHEET

NO.	DATE	DESCRIPTION	BY

REVISIONS

CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 946748
SITE ADDRESS:
880 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRVD BY: RAH DATE: 10/21/14
SCALE: N.T.S.

NOTES

S-3 REV 0

AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

M20 AJAX/DTI BOLT ASSEMBLY COMPONENT SPECIFICATIONS:

BOLT:
AJAX ONESIDE™ BLIND BOLT (M8.8, EQUIVALENT TO A325)
FINISH: HOT DIP GALVANIZED PER ASTM A153.

SPLIT WASHER:
AJAX ONESIDE™ SPLIT WASHER
FINISH: HOT DIP GALVANIZED PER ASTM A153.

SHEAR SLEEVE:
F_u = 120 KSI MIN. (ASTM A519)
29MM O.D. x 20MM I.D.
LENGTH = NOMINAL [GRIP-6MM] = [GRIP-0.25"] (TOL. -0", +1/32")
SLEEVES SHALL BE ROUND, WITH ENDS CUT SQUARE AND DEBURRED.
FINISH: GALVANIZED (COLD GALVANIZED AS PER CROWN ENG-BUL-10149, HOT DIP GALVANIZED PER ASTM A123, MECHANICALLY GALVANIZED AND SPUN) OR CADMIUM PLATED.

SOLID WASHER:
AJAX ONESIDE™ SOLID WASHER
FINISH: HOT DIP GALVANIZED PER ASTM A153.

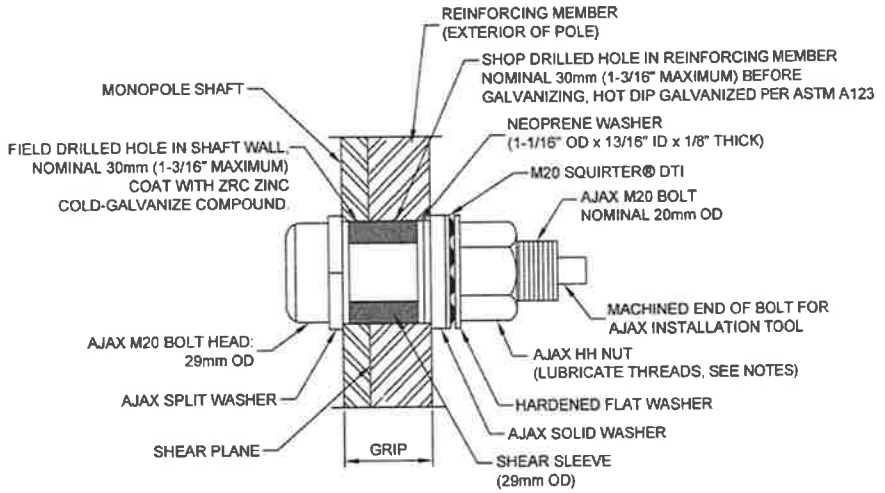
DIRECT TENSION INDICATOR WASHER:
SQUIRTER® DTI, ASTM F959M
FINISH: COLD MECHANICALLY GALVANIZED (TO ASTM B695) AND EPOXY COATED.

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

DISTRIBUTORS OF SQUIRTER® DTI'S:
http://www.appliedbolting.com/applied-bolting-distributors.html

FLAT WASHER:
HARDENED FLAT WASHER, ASTM F436M (MINIMUM HARDNESS RC38)
FINISH: COLD MECHANICALLY GALVANIZED

HEX NUT:
AJAX ONESIDE™ HEAVY HEX NUT
FINISH: HOT DIP GALVANIZED PER ASTM A153.



DETAIL 1: M20 AJAX/DTI BOLT ASSEMBLY

BOLT ASSEMBLY AND INSTALLATION:
BOLT ASSEMBLY SHALL ADHERE TO THE REQUIREMENTS OF DETAIL 1.
NON-PETROLEUM BASED, WATER SOLUBLE, INERT BOLT LUBRICANT SHALL BE USED ON ALL AJAX BOLTS TO ENSURE PROPER TENSIONING OF THE ASSEMBLY. CARE SHOULD BE TAKEN TO ENSURE THE BOLT HEAD AND SPLIT WASHER ARE NOT LUBRICATED AS THIS MAY CAUSE EXCESSIVE BOLT SLIPPAGE UPON APPLYING TORQUE, WHICH MAY LEAD TO DIFFICULTIES IN ENGAGING THE SQUIRTER ® DTI WASHER PROPERLY. **NOTE:** ONLY LUBRICATING THE THREADS OF THE NUT MAY ACHIEVE BETTER RESULTS.
THE TYPICAL RULE OF THUMB WHEN USING AN IMPACT WRENCH IS TO ENGAGE FOR NO MORE THAN 10 SECONDS. IF THE BOLT IS NOT SPINNING AND THE SQUIRTER ® DTI "BUMPS" HAVE NOT ENGAGED AFTER 10 SECONDS USING AN IMPACT WRENCH, REMOVE THE NUT AND REAPPLY LUBRICANT. **NOTE:** PROLONGED USE OF THE IMPACT WRENCH TENDS TO HEAT THE BOLT THREAD/NUT, THEREBY, INCREASING FRICTION ON THE THREADS WHICH WOULD REQUIRE ADDITIONAL TORQUE. HOLDING FOR LONGER THAN 10 SECONDS CAN BE COUNTERPRODUCTIVE.

A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI "BUMPS" SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE END CONNECTION OF REINFORCING MEMBERS. INTERMEDIATE BOLTS SHALL ENGAGE A MINIMUM OF 3 OUT OF 5 SQUIRTER® DTI "BUMPS".

DTI WASHERS MUST BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE "BUMPS" FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI "BUMPS" SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

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

INSPECTION:
VISUALLY INSPECT ALL BOLT ASSEMBLIES TO ENSURE THE MINIMUM "BUMP" ENGAGEMENT AS DEFINED IN THE SECTION "BOLT ASSEMBLY AND INSTALLATION" HAS BEEN ACHIEVED. FOR MORE INFORMATION ON INSPECTION, SEE THE MANUFACTURER'S GUIDELINES.
WHERE FEASIBLE, CHECK A SAMPLE OF THE END CONNECTION DTI WASHERS WITH THE APPROPRIATE FEELER GAGE. IF THE FEELER GAGE CANNOT BE INSERTED TO THE BOLT SHANK HALF WAY AROUND THE BOLT, THE INSTALLATION IS OKAY. IF YOU CAN INSERT THE FEELER GAGE TO THE SHANK ALL THE WAY AROUND THE BOLT, THE INSTALLATION IS NOT OKAY. IF YOU FIND MORE THAN ONE SUCH "NOT OKAY" BOLT IN ANY ONE END CONNECTION, CHECK ALL BOLTS IN THAT END CONNECTION. A MINIMUM OF THREE BOLTS SHALL BE CHECKED IN EACH END CONNECTION. PHOTOS SHALL BE TAKEN TO INDICATE THE BOLTS TESTED.

ALL BOLT ASSEMBLIES AND DTI WASHERS SHALL BE VISUALLY INSPECTED. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI WASHERS.

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT
DANIEL A. HUBNER
28893
LICENSED
PROFESSIONAL ENGINEER
OCT 22 2014

CROWN CASTLE

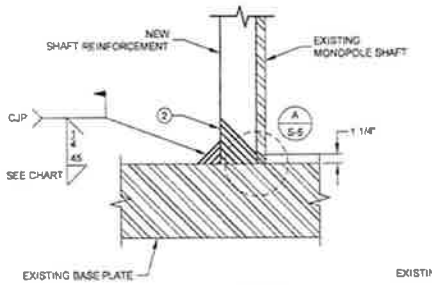
SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 878322
WO NUMBER: 946748
SITE ADDRESS:
860 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRV'D BY: RAP DATE: 10/21/14
SCALE: N.T.S.

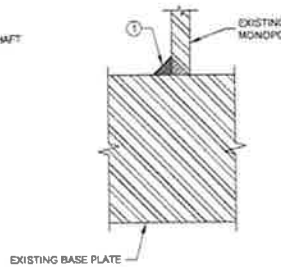
AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

S-4 REV 0

OPTION 1



WELD DETAIL

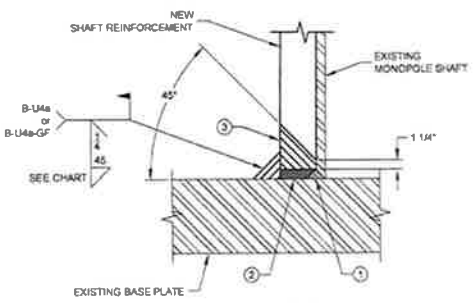


A / S-5 EXISTING WELD

NOTES:
1. GRIND EXISTING FILLET WELD FLUSH TO BASE PLATE & POLE FOR THE WIDTH OF THE REINFORCEMENT PLATE PLUS 1/4" ON EACH SIDE (DO NOT OVER GRIND)
2. PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

PART NUMBER	PLATE SIZE	MINIMUM REINFORCING WELD
CCI-WSFP-040075 CCI-WAFP-040075	3/4" x 4"	1/4"
CCI-WSFP-045100 CCI-WAFP-045100	1" x 4 1/2"	1/4"
CCI-WSFP-060100 CCI-WAFP-060100	1" x 6"	3/8"
CCI-WSFP-065125 CCI-WAFP-065125	1 1/4" x 6 1/2"	1/2"
CCI-WSFP-085125 CCI-WAFP-085125	1 1/4" x 8 1/2"	5/8"

OPTION 2



WELD DETAIL

NOTES:
1. CLEAN EXISTING WELD FROM GALVANIZING
2. BUILD A PLATFORM WITH WELD AT THE SAME HEIGHT OF THE EXISTING FILLET WELD (TO REDUCE THE AMOUNT OF WELD TO BUILD THE PLATFORM, IT IS ALLOWABLE TO PARTIALLY GRIND THE HEIGHT OF THE EXISTING FILLET WELD TO A 1/4" MINIMUM)
3. PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

NO.	DATE	DESCRIPTION	BY

REVISIONS

CROWN CASTLE

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BU NUMBER: 876322
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SCALE: N.T.S

BASE PLATE WELD DETAIL

S-5 REV 0

POLE SPECIFICATIONS

POLE SHAPE TYPE	12-SIDED POLYGON
TAPER	0.180042 IN/FT
SHAFT STEEL	ASTM A607 GRADE 65 (0.0 FT - 120.0 FT) ASTM A53-B GRADE 35 (120.0 FT - 130.0 FT)
BASE PL STEEL	ASTM A572 (50 KSI)
ANCHOR RODS	2 1/4"Ø #18J ASTM A615 GRADE 75

POLE MODIFICATION SCHEDULE

	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	0.0 - 65.0	INSTALL NEW FLAT PLATE REINFORCEMENT	S-7

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	10.00	0.3750	0 45 54	18.000	18.000
1	43.00	0.2500		22.000	29.742
2	43.00	0.3125		28.587	36.308
3	42.25	0.3750		34.573	42.480

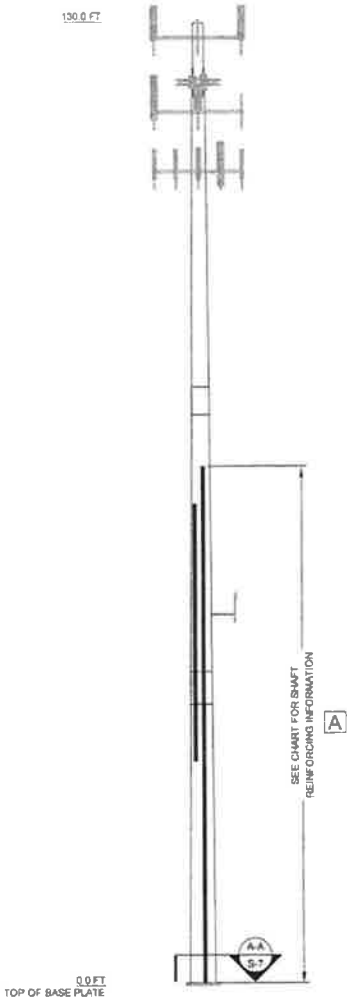
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

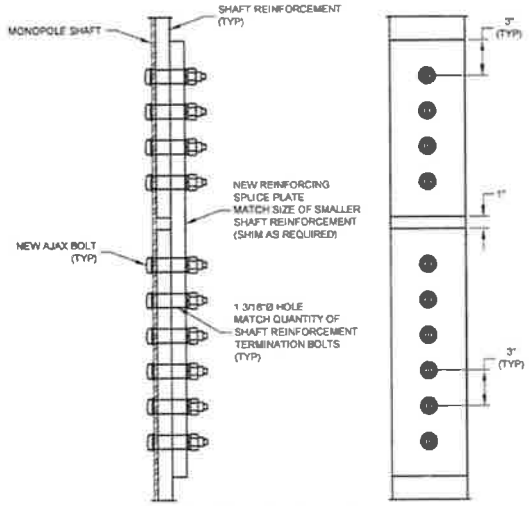
BOTTOM ELEVATION	TOP ELEVATION	PART NUMBER	FLAT / DEGREES (°)	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAX INTERMEDIATE BOLT SPACING	AJAX BOLT QUANTITY PER PLATE	STEEL WEIGHT PER PLATE (BLACK)	TOTAL AJAX BOLT QUANTITY	TOTAL STEEL WEIGHT (BLACK)
0'-0"	35'-0"	CCI-WSFP-08612535	3, 6, 11	N/A	11	1'-7"	31	966.9	93	2900.7
30'-0"	65'-0"	CCI-SFP-08010035	2, 10	8	8	1'-4"	39	714.0	78	1428.0
35'-0"	65'-0"	CCI-SFP-08010030	6	8	8	1'-4"	35	612.0	35	612.0
								TOTAL	206	4940.7

NOTES FOR CROWN REINFORCING (65 KSI) MATERIAL

1. DO NOT WELD WITHOUT APPROVAL FROM THE EOR
2. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESS SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.
3. ALL FLAT PLATE REINFORCEMENT IS TO BE INSTALLED CENTERED ON ITS DESIGNATED FLAT, UNO
4. SEE CMRP 65 KSI PARTS CATALOG 2nd EDITION FOR PART DETAILS
5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER THE AISC TURN-OF-NUT METHOD.
6. ON MULTISIDED POLES, **EXISTING SAFETY CLIMB IS CONSIDERED FLAT 1 THEN FLATS ARE NUMBERED COUNTER CLOCKWISE**
7. CLIMBING PEGS TO BE RELOCATED AS REQUIRED



POLE ELEVATION



REINFORCING SPLICE PLATE DETAIL

(STEEL GRADE A572-65)

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT JOHN J. WINE 20893 LICENSED PROFESSIONAL ENGINEER OCT 22 2014

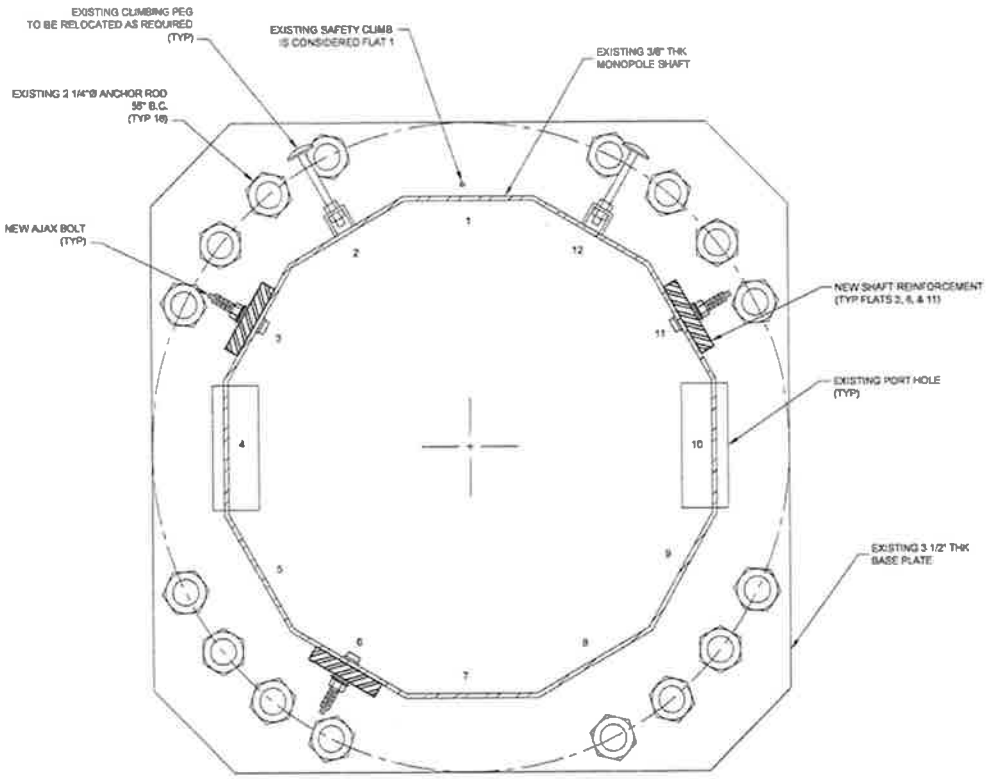
CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 846748
SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TB DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRV'D BY: RAA DATE: 10/21/14
SCALE: N.T.S

POLE MODIFICATION SCHEDULE

S-6 REV 0



AA S-7 TOWER SECTION

NO.	DATE	DESCRIPTION	BY

REVISIONS

STATE OF CONNECTICUT
JAMES A. WIRE
28893
LICENSED
PROFESSIONAL ENGINEER
OCT 22 2014

CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
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860 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS	DATE:	10/20/14
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DFT/QA BY: SC	DATE:	10/21/14
APR'VD BY: RAH	DATE:	10/21/14

SCALE: N.T.S.

TOWER SECTION

S-7

REV 0

CROWN CASTLE

TOWER MODIFICATION DRAWINGS

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322

SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

FROM I-95 NORTH: 13, TAKE EXIT 53 FOR BRANFORD CON TOWARD SHORT BEACH 1.1 MI 14, TURN RIGHT ONTO U.S. 1 S 0.5 MI 850 W MAIN ST TOWER WILL BE ON THE RIGHT.

PROJECT CONTACTS:

1. CROWN TOWER STRUCTURAL ANALYST
   STEVE TUTTLE
   (585) 899-3445
   STEVE.TUTTLE@CROWNCASTLE.COM
   8 PARKMEADOW DRIVE
   PITTSFORD, NY 14534
2. CROWN PROJECT MANAGER
   JERRY BRUNO
   (781) 970-0069
   JERRY.BRUNO.CONTRACTOR@CROWNCASTLE.COM
   500 WEST CUMMINGS PARK, SUITE 3600
   WOBURN, MA 01801
3. CROWN CONSTRUCTION MANAGER
   JASON D'AMICO
   (860) 209-0104
   JASON.D'AMICO.CONTRACTOR@CROWNCASTLE.COM
   1200 MACARTHUR BLVD, SUITE 200
   MAHWAH, NJ 07430
4. CROWN DESIGN ENGINEER (EOR)
   JAMAL A. HUWEL, P.E.
   (724) 416-2337
   JAMAL.HUWEL@CROWNCASTLE.COM
   2000 CORPORATE DRIVE
   CANONSBURG, PA 15317

DRAWINGS INCLUDED

SHEET NUMBER	DESCRIPTION
S-1	TITLE PAGE
S-2	MODIFICATION INSPECTION CHECKLIST
S-3	NOTES
S-4	AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE
S-5	BASE PLATE WELD DETAIL
S-6	POLE MODIFICATION SCHEDULE
S-7	TOWER SECTION

TOWER INFORMATION

TOWER MANUFACTURER / DWG #:	SUMMIT / DWG # 3734-D1
TOWER HEIGHT / TYPE:	130 FT MONOPOLE TOWER
TOWER LOCATION:	LAT 41° 16' 40.188"
DATUM: (NAD 1983)	LONG -72° 50' 12.696"
	ELEV 132.25 FT AMSL
STRUCTURAL DESIGN DRAWING:	CCI / WO # 946748
STRUCTURAL ANALYSIS REPORT:	PJF / WO # 936366
STRUCTURAL ANALYSIS DATE:	09/30/14
APPLICATION ID:	210217 REV # 12
CCISITES DOCUMENT ID:	5323351

CODE COMPLIANCE

THIS MODIFICATION DESIGN IS BASED ON THE REQUIREMENTS OF TIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES AND 2005 CT STATE BUILDING CODE WITH 2009 AMENDMENT USING A FASTEST WIND SPEED OF85 MPH WITH NO ICE, 37.6 MPH WITH 0.75 INCH ICE THICKNESS AND 50 MPH UNDER SERVICE LOADS.

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT · JAMAL A. HUWEL · 28693 · LICENSED PROFESSIONAL ENGINEER · OCT 22 2014

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SCALE: N.T.S.		

TITLE PAGE

S-1 | REV 0

MODIFICATION INSPECTION NOTES

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING
X	EOR APPROVAL
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
X	NDE REPORT OF MONOPOLE BASE PLATE PER ENG-SOW-10033
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION AND NDE REPORTS
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTE: X DENOTES A DOCUMENT REQUIRED FOR THE MI REPORT
NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT

GENERAL

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

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

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

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

REFER TO CROWN ENG-SOW-10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

MI INSPECTOR

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

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

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

GENERAL CONTRACTOR

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

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

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

RECOMMENDATIONS

THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT.

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

CANCELLATION OR DELAYS IN SCHEDULED MI

IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY, NOR FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S

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

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

MI VERIFICATION INSPECTIONS

CROWN RESERVES THE RIGHT TO CONDUCT AN 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 CROWN ENG-SOW-10007.

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

REQUIRED PHOTOS

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

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

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

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

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 875322
WO NUMBER: 946748
SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRVD BY: RAE DATE: 10/22/14
SCALE: N.T.S.

MODIFICATION INSPECTION CHECKLIST

S-2 REV 0

GENERAL NOTES

1. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED, THAT HE IS PROPERLY LICENSED, AND THAT HE IS PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.
2. THE GENERAL NOTES AND TYPICAL DETAILS ARE APPLICABLE TO ALL PARTS OF THE STRUCTURE AND SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL DRAWINGS AND PROJECT SPECIFICATIONS.
3. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING APPROVALS FROM ALL AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT AND SHALL NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY, OR CITY) ENGINEER 24 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
5. ERECT GUARDS AND BARRIERS PER APPLICABLE LABOR AND CONSTRUCTION SAFETY REGULATIONS.
6. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS, POSSIBLE INTERFERENCES, AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO THE CROWN CASTLE ENGINEER OF RECORD (EOR) AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY. ANY AND ALL FIELD CHANGES SHALL BE APPROVED AND DOCUMENTED BY THE EOR PRIOR TO FIELD IMPLEMENTATION.
7. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR TWO (2) YEARS FROM THE DATE OF COMPLETED CONSTRUCTION.
8. USE ONLY THE LATEST ISSUES OF ANY APPLICABLE CODES, STANDARDS, OR REGULATIONS MENTIONED IN THE FOLLOWING NOTES AND SPECIFICATIONS, UNO.
9. ALL WORKMANSHIP SHALL BE IN ACCORDANCE WITH ANSI, ASTM, ACI, TIA, AND AISC STANDARDS AS REFERENCED IN THE APPLICABLE CODE.
10. STRUCTURAL ELEMENTS SHOWN ON THESE DRAWINGS ARE DESIGNED IN ACCORDANCE WITH APPLICABLE BUILDING CODES/STANDARDS. ALL CONSTRUCTION, EXCEPT WHERE NOTED OTHERWISE, SHALL COMPLY WITH THOSE CODES/STANDARDS.
11. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS, AND IN CONFORMANCE WITH THE DRAWINGS. ANY AND ALL SUBSTITUTIONS MUST BE DULY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER OF RECORD PRIOR TO FABRICATION AND INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
12. ALL MANUFACTURER'S HARDWARE ASSEMBLY INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERSEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER, AND ALL OTHER APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY REGULATIONS.
14. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIAL ACCESS, WITH THE RESIDENT LEASING AGENT.
15. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SAFEGUARD ALL EXISTING STRUCTURES OR BURIED SERVICES AFFECTED BY THIS CONSTRUCTION. CONTRACTOR IS ALSO RESPONSIBLE FOR TEMPORARILY RELOCATING ANY LINES OR STRUTS AS NECESSARY TO COMPLETE THE REQUIRED WORK.
16. STRUCTURAL DESIGN IS FOR THE COMPLETE CONDITION ONLY. THE CONTRACTOR MUST BE COGNIZANT THAT THE REMOVAL OF ANY STRUCTURAL COMPONENT OF AN EXISTING TOWER HAS THE POTENTIAL TO CAUSE THE PARTIAL OR COMPLETE COLLAPSE OF THE STRUCTURE. ALL NECESSARY PRECAUTIONS MUST BE TAKEN TO ENSURE STRUCTURAL INTEGRITY, INCLUDING, BUT NOT LIMITED TO, ENGINEERING ASSESSMENT OF CONSTRUCTION STRESSES WITH INSTALLATION MAXIMUM WIND SPEED AND/OR TEMPORARY BRACING AND SHORING.
17. DO NOT SCALE DRAWINGS.
18. THE DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF CROWN CASTLE. THEY MAY NOT BE REPRODUCED IN ANY FORM WITHOUT THE EXPRESSED WRITTEN CONSENT/PERMISSION OF CROWN CASTLE.
19. FOR THIS ANALYSIS AND MODIFICATION, THE TOWER HAS BEEN ASSUMED TO BE IN GOOD CONDITION WITHOUT ANY DEFECTS. IF THE CONTRACTOR DISCOVERS ANY INDICATION OF AN EXISTING STRUCTURAL DEFECT, CONTACT THE ENGINEER OF RECORD IMMEDIATELY.
20. MODIFICATION WORK SHALL BE COMPLETED IN CALM WIND CONDITIONS / OR APPROPRIATE WIND SPEED FOR THE TYPE OF MODIFICATION WORK TO BE INSTALLED.
21. 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.

STRUCTURAL STEEL NOTES

1. DESIGN, FABRICATION, ERECTION, ALTERATION AND MAINTENANCE SHALL CONFORM TO THE FOLLOWING, UNLESS NOTED OTHERWISE (UNO)
   A. TIA-222: STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   B. TIA-1019-A: INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS
   C. AISC: MANUAL OF STEEL CONSTRUCTION
2. ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS, UNO
   A. STRUCTURAL STEEL, ASTM A572 GRADE 65 (FY = 65KSI)
   B. ALL BOLTS, ASTM A325 TYPE 1 GALVANIZED HIGH STRENGTH BOLTS
   C. ALL NUTS, ASTM A563 CARBON AND ALLOY STEEL NUTS
   D. ALL WASHERS, ASTM F436 HARDENED STEEL WASHERS
3. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER OF RECORD.
4. ALL FASTENERS SHALL NOT BE REUSED.
5. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED ASTM A325 BOLTS.
6. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.
7. HOT-DIP GALVANIZE ALL ITEMS, UNO.
   GALVANIZE PER ASTM A123, ASTM A153/A153M OR ASTM A653 G90, AS APPLICABLE.
8. FOR A LIST OF CROWN APPROVED COLD GALVANIZING COMPOUNDS, REFER TO CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN".
9. AFTER FINAL INSPECTION, ALL EXPOSED STRUCTURAL STEEL AS THE RESULT OF THIS SCOPE OF WORK INCLUDING WELDS, FIELD DRILLED HOLES AND SHAFT INTERIORS (WHERE ACCESSIBLE), SHALL BE CLEANED AND COLD GALVANIZING APPLIED BY BRUSH IN ACCORDANCE WITH CROWN ENG-BUL-10149, "TOWER PROTECTIVE COATINGS BULLETIN". PHOTO DOCUMENTATION IS REQUIRED TO BE SUBMITTED TO THE MI INSPECTOR.

WELDING NOTES

1. ALL WELDING SHALL BE IN ACCORDANCE WITH THE AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL."
2. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS.
3. ALL ARC WELDING ON CROWN STRUCTURES SHALL BE DONE IN ACCORDANCE WITH THE CROWN ENG-PLN-10015, "CUTTING AND WELDING SAFETY PLAN" AND AWS D1.1 (LATEST EDITION). THIS SHALL INCLUDE A CERTIFIED WELDING INSPECTOR (CWI) FOR ACCEPTANCE OR REJECTION OF ALL WELDING OPERATIONS, PRE-DURING-POST, USING THE ACCEPTANCE CRITERIA OF AWS D1.1. THE CWI SHALL WORK WITH THE GC ON THE LEVEL OF INTERACTION NEEDED TO CONDUCT THE WELDING INSPECTION. THE CERTIFIED WELDING INSPECTION IS THE RESPONSIBILITY OF THE GC.
4. FOR ALL WELDING, USE E70XX ELECTRODES FOR SMAW PROCESS AND E7XT-XX ELECTRODES FOR FCAW PROCESS, UNO.
5. SURFACES TO BE WELDED SHALL BE FREE FROM SCALE, SLAG, RUST, MOISTURE, GREASE OR ANY OTHER FOREIGN MATERIAL THAT WOULD PREVENT PROPER WELDING. GRIND THE SURFACE ADJACENT TO THE WELD FOR A DISTANCE OF 2" MINIMUM ALL AROUND. ENSURE BOTH AREAS ARE 100% FREE OF ALL GALVANIZING.
6. DO NOT WELD IF THE TEMPERATURE OF THE STEEL IN THE VICINITY OF THE WELD AREA IS BELOW 0° F. WHEN THE TEMPERATURE IS BETWEEN 0° F AND 32° F, PREHEAT AND MAINTAIN THE STEEL IN THE VICINITY OF THE WELD AREA AT 70° F DURING THE WELDING PROCESS.
7. DO NOT WELD ON WET OR FROST-COVERED SURFACES & PROVIDE ADEQUATE PROTECTION FROM HIGH WINDS.
8. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
9. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.

DETAIL DRAWINGS SHALL GOVERN OVER ANY VARIANCE FROM THIS SHEET

NO.	DATE	DESCRIPTION	BY

REVISIONS

CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 946748
SITE ADDRESS:
860 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS	DATE: 10/20/14
DFT BY: JJW	DATE: 10/21/14
DFT/QA BY: SL	DATE: 10/21/14
APRV'D BY: RAA	DATE: 10/21/14
SCALE: N.T.S	

NOTES

S-3 REV 0

AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

M20 AJAX/DTI BOLT ASSEMBLY COMPONENT SPECIFICATIONS:

BOLT:
AJAX ONESIDE™ BLIND BOLT (M8.8, EQUIVALENT TO A325)
FINISH: HOT DIP GALVANIZED PER ASTM A153.

SPLIT WASHER:
AJAX ONESIDE™ SPLIT WASHER
FINISH: HOT DIP GALVANIZED PER ASTM A153.

SHEAR SLEEVE:
F_U = 120 KSI MIN. (ASTM A519)
29MM O.D. x 20MM I.D.
LENGTH = NOMINAL [GRIP-6MM] = [GRIP-0.25"] (TOL. -0", +1/32")
SLEEVES SHALL BE ROUND, WITH ENDS CUT SQUARE AND DEBURRED.
FINISH: GALVANIZED (COLD GALVANIZED AS PER CROWN ENG-BUL-10149, HOT DIP GALVANIZED PER ASTM A123, MECHANICALLY GALVANIZED AND SPUN) OR CADMIUM PLATED.

SOLID WASHER:
AJAX ONESIDE™ SOLID WASHER
FINISH: HOT DIP GALVANIZED PER ASTM A153.

DIRECT TENSION INDICATOR WASHER:
SQUIRTER® DTI, ASTM F959M
FINISH: COLD MECHANICALLY GALVANIZED (TO ASTM B695) AND EPOXY COATED.

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

DISTRIBUTORS OF SQUIRTER® DTI'S:
http://www.appliedbolting.com/applied-bolting-distributors.html

FLAT WASHER:
HARDENED FLAT WASHER, ASTM F436M (MINIMUM HARDNESS RC38)
FINISH: COLD MECHANICALLY GALVANIZED

HEX NUT:
AJAX ONESIDE™ HEAVY HEX NUT
FINISH: HOT DIP GALVANIZED PER ASTM A153.

BOLT ASSEMBLY AND INSTALLATION:
BOLT ASSEMBLY SHALL ADHERE TO THE REQUIREMENTS OF DETAIL 1.
NON-PETROLEUM BASED, WATER SOLUBLE, INERT BOLT LUBRICANT SHALL BE USED ON ALL AJAX BOLTS TO ENSURE PROPER TENSIONING OF THE ASSEMBLY. CARE SHOULD BE TAKEN TO ENSURE THE BOLT HEAD AND SPLIT WASHER ARE NOT LUBRICATED AS THIS MAY CAUSE EXCESSIVE BOLT SLIPPAGE UPON APPLYING TORQUE, WHICH MAY LEAD TO DIFFICULTIES IN ENGAGING THE SQUIRTER® DTI WASHER PROPERLY. **NOTE:** ONLY LUBRICATING THE THREADS OF THE NUT MAY ACHIEVE BETTER RESULTS.
THE TYPICAL RULE OF THUMB WHEN USING AN IMPACT WRENCH IS TO ENGAGE FOR NO MORE THAN 10 SECONDS. IF THE BOLT IS NOT SPINNING AND THE SQUIRTER ® DTI "BUMPS" HAVE NOT ENGAGED AFTER 10 SECONDS USING AN IMPACT WRENCH, REMOVE THE NUT AND REAPPLY LUBRICANT. **NOTE:** PROLONGED USE OF THE IMPACT WRENCH TENDS TO HEAT THE BOLT THREAD/NUT, THEREBY, INCREASING FRICTION ON THE THREADS WHICH WOULD REQUIRE ADDITIONAL TORQUE. HOLDING FOR LONGER THAN 10 SECONDS CAN BE COUNTERPRODUCTIVE.

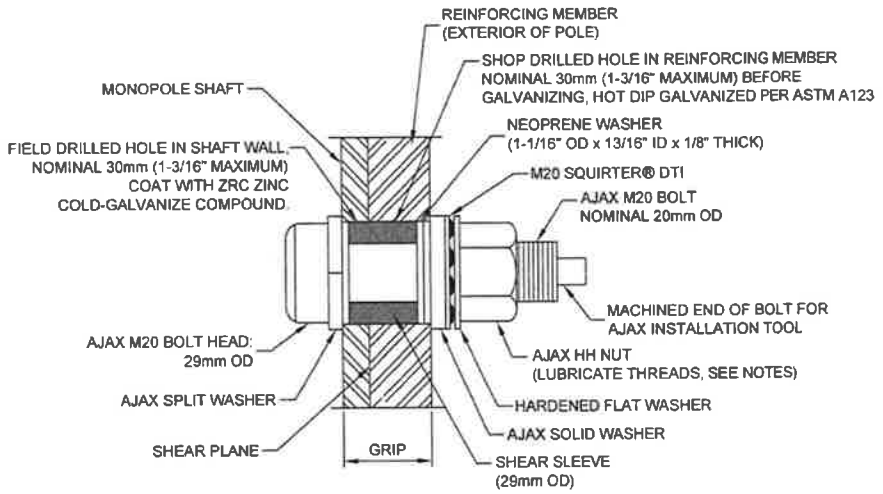
A MINIMUM OF 4 OUT OF 5 SQUIRTER® DTI "BUMPS" SHALL BE ENGAGED IN ANY AJAX/DTI BOLT ASSEMBLY IN THE END CONNECTION OF REINFORCING MEMBERS. INTERMEDIATE BOLTS SHALL ENGAGE A MINIMUM OF 3 OUT OF 5 SQUIRTER® DTI "BUMPS".

DTI WASHERS MUST BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE "BUMPS" FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI "BUMPS" SHALL BEAR AGAINST THE UNDERSIDE OF A HARDENED FLAT WASHER, NEVER DIRECTLY AGAINST THE NUT.

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

INSPECTION:
VISUALLY INSPECT ALL BOLT ASSEMBLIES TO ENSURE THE MINIMUM "BUMP" ENGAGEMENT AS DEFINED IN THE SECTION "BOLT ASSEMBLY AND INSTALLATION" HAS BEEN ACHIEVED. FOR MORE INFORMATION ON INSPECTION, SEE THE MANUFACTURER'S GUIDELINES.
WHERE FEASIBLE, CHECK A SAMPLE OF THE END CONNECTION DTI WASHERS WITH THE APPROPRIATE FEELER GAGE. IF THE FEELER GAGE CANNOT BE INSERTED TO THE BOLT SHANK HALF WAY AROUND THE BOLT, THE INSTALLATION IS OKAY. IF YOU CAN INSERT THE FEELER GAGE TO THE SHANK ALL THE WAY AROUND THE BOLT, THE INSTALLATION IS NOT OKAY. IF YOU FIND MORE THAN ONE SUCH "NOT OKAY" BOLT IN ANY ONE END CONNECTION, CHECK ALL BOLTS IN THAT END CONNECTION. A MINIMUM OF THREE BOLTS SHALL BE CHECKED IN EACH END CONNECTION. PHOTOS SHALL BE TAKEN TO INDICATE THE BOLTS TESTED.

ALL BOLT ASSEMBLIES AND DTI WASHERS SHALL BE VISUALLY INSPECTED. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI WASHERS.



DETAIL 1: M20 AJAX/DTI BOLT ASSEMBLY

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT
DANIEL A. HUNT
28893
LICENSED
PROFESSIONAL ENGINEER
OCT 22 2014

CROWN CASTLE

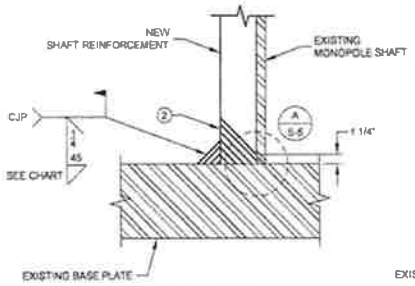
SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 878322
WO NUMBER: 946748
SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: YS DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRVD BY: RAA DATE: 10/21/14
SCALE: N.T.S.

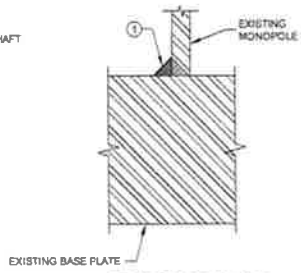
AJAX/DTI BOLT SPECIFICATIONS AND TIGHTENING PROCEDURE

S-4 REV 0

OPTION 1



WELD DETAIL



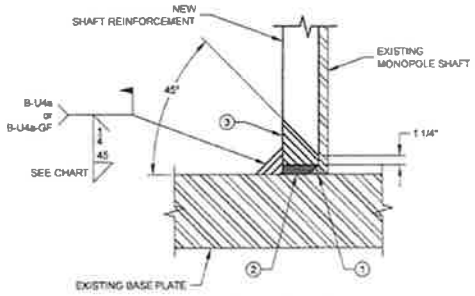
A
S-5 EXISTING WELD

NOTES:
1. GRIND EXISTING FILLET WELD FLUSH TO BASE PLATE & POLE FOR THE WIDTH OF THE REINFORCEMENT PLATE PLUS 1/4" ON EACH SIDE (DO NOT OVER GRIND)

2 PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

PART NUMBER	PLATE SIZE	MINIMUM REINFORCING WELD
CCI-WSFP-040075 CCI-WAFP-040075	3/4" x 4"	1/4"
CCI-WSFP-045100 CCI-WAFP-045100	1" x 4 1/2"	1/4"
CCI-WSFP-060100 CCI-WAFP-060100	1" x 6"	3/8"
CCI-WSFP-065125 CCI-WAFP-065125	1 1/4" x 6 1/2"	1/2"
CCI-WSFP-085125 CCI-WAFP-085125	1 1/4" x 8 1/2"	5/8"

OPTION 2



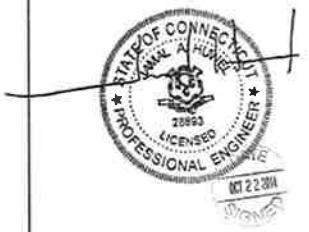
WELD DETAIL

NOTES:
1. CLEAN EXISTING WELD FROM GALVANIZING

2 BUILD A PLATFORM WITH WELD AT THE SAME HEIGHT OF THE EXISTING FILLET WELD (TO REDUCE THE AMOUNT OF WELD TO BUILD THE PLATFORM, IT IS ALLOWABLE TO PARTIALLY GRIND THE HEIGHT OF THE EXISTING FILLET WELD TO A 1/4" MINIMUM)

3 PERFORM CJP WELD WITH REINFORCING FILLET WELD USING POLE AS BACKING BAR

NO.	DATE	DESCRIPTION	BY
		REVISIONS	



CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
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850 WEST MAIN STREET
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BASE PLATE
WELD DETAIL

S-5 REV 0

POLE SPECIFICATIONS

POLE SHAPE TYPE	12-SIDED POLYGON
TAPER	0.180042 IN/FT
SHAFT STEEL	ASTM A607 GRADE 65 (0.0 FT - 120.0 FT) ASTM A53-B GRADE 35 (120.0 FT - 130.0 FT)
BASE PL STEEL	ASTM A572 (50 KSI)
ANCHOR RODS	2 1/4"Ø #18J ASTM A615 GRADE 75

POLE MODIFICATION SCHEDULE

	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	0.0 - 65.0	INSTALL NEW FLAT PLATE REINFORCEMENT	S-7

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	10.00	0.3750	0	18.000	18.000
1	43.00	0.2500	45	22.000	29.742
2	43.00	0.3125	54	28.567	36.308
3	42.25	0.3750		34.673	42.460

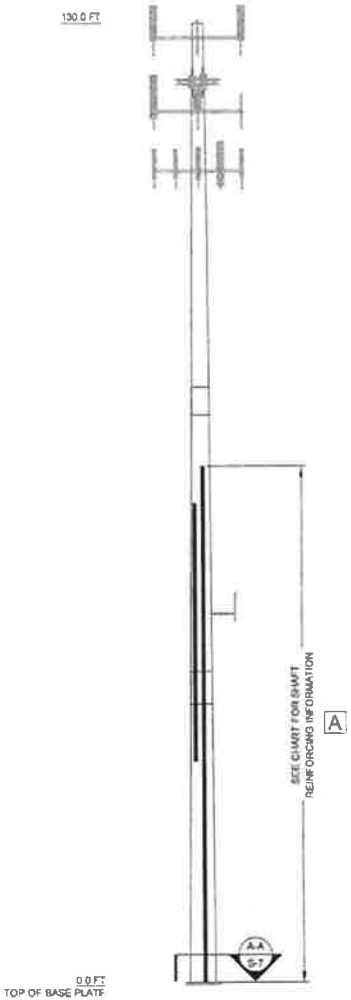
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

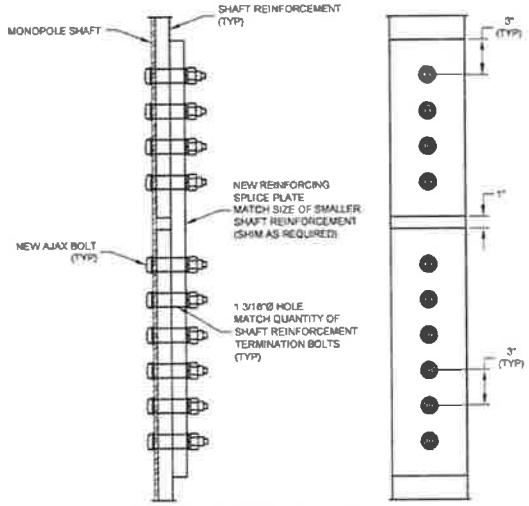
BOTTOM ELEVATION	TOP ELEVATION	PART NUMBER	FLAT / DEGREES (°)	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAX INTERMEDIATE BOLT SPACING	AJAX BOLT QUANTITY PER PLATE	STEEL WEIGHT PER PLATE (BLACK)	TOTAL AJAX BOLT QUANTITY	TOTAL STEEL WEIGHT (BLACK)
0'-0"	35'-0"	CCI-WSFP-08512535	3, 6, 11	N/A	11	1'-7"	31	986.9	93	2900.7
30'-0"	65'-0"	CCI-SFP-08010035	2, 10	8	8	1'-4"	39	714.0	78	1428.0
35'-0"	65'-0"	CCI-SFP-08010030	6	8	8	1'-4"	35	612.0	35	612.0
								TOTAL	206	4940.7

NOTES FOR CROWN REINFORCING (65 KSI) MATERIAL:

1. DO NOT WELD WITHOUT APPROVAL FROM THE EOR.
2. SHIMS FOR MONOPOLE REINFORCEMENT MEMBER SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESS SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.
3. ALL FLAT PLATE REINFORCEMENT IS TO BE INSTALLED CENTERED ON ITS DESIGNATED FLAT, UNO
4. SEE CMRP 65 KSI PARTS CATALOG 2nd EDITION FOR PART DETAILS
5. AS AN ALTERNATIVE TO USING DTI WASHERS, AJAX BOLTS MAY BE PRETENSIONED PER THE AISC TURN-OF-NUT METHOD
6. ON MULTISIDED POLES: EXISTING SAFETY CLIMB IS CONSIDERED FLAT 1 THEN FLATS ARE NUMBERED COUNTER CLOCKWISE
7. CLIMBING PEGS TO BE RELOCATED AS REQUIRED



POLE ELEVATION



REINFORCING SPLICE PLATE DETAIL

(STEEL GRADE A572-65)

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

STATE OF CONNECTICUT · JOHN A. WINE · 28953 · LICENSED PROFESSIONAL ENGINEER · OCT 22 2014

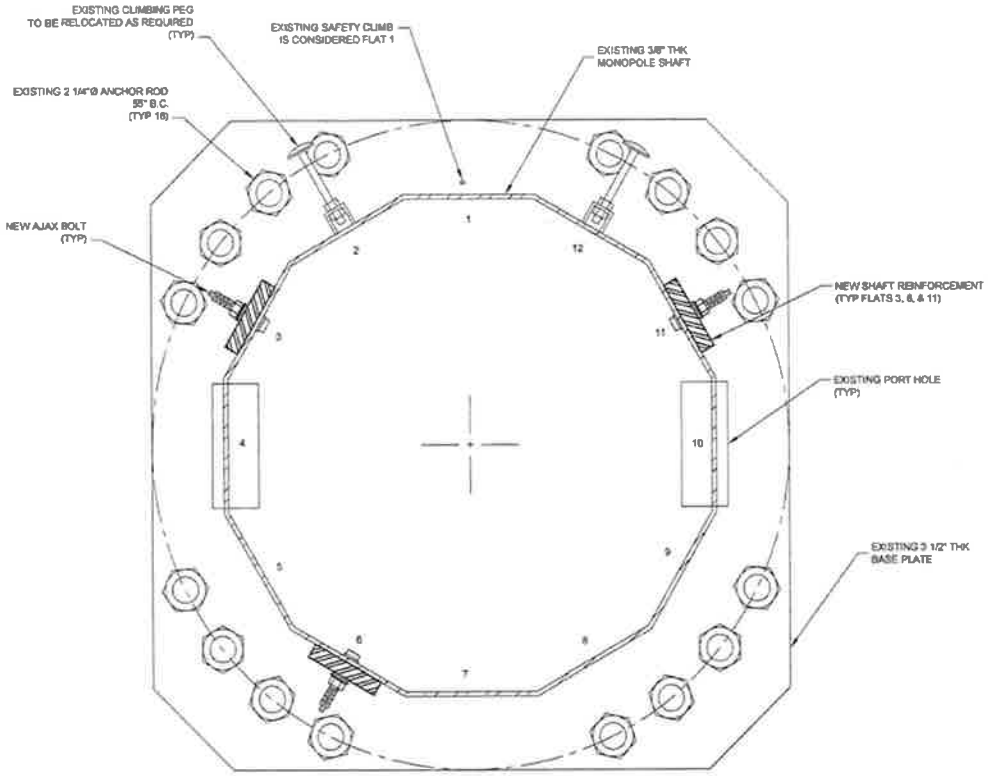
CROWN CASTLE

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 846748
SITE ADDRESS:
689 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS DATE: 10/20/14
DFT BY: JJW DATE: 10/21/14
DFT/QA BY: SL DATE: 10/21/14
APRV'D BY: RAA DATE: 10/24/14
SCALE: N.T.S.

POLE MODIFICATION SCHEDULE

S-6 REV 0



A-A
S-7 TOWER SECTION

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

CROWN CASTLE

STATE OF CONNECTICUT
JAMES A. JUNEK
28893
LICENSED
PROFESSIONAL ENGINEER
OCT 22 2014

SITE NAME: TARTAGLIA PROPERTY
BU NUMBER: 876322
WO NUMBER: 948748
SITE ADDRESS:
850 WEST MAIN STREET
BRANFORD, CT 06405
NEW HAVEN COUNTY, USA

ENG/QA BY: TS	DATE: 10/20/14
DFT BY: JJW	DATE: 10/21/14
DFT/QA BY: SC	DATE: 10/21/14
APRV'D BY: RAH	DATE: 10/22/14
SCALE: N.T.S.	

TOWER SECTION

S-7 REV 0