Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

June 3, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
389 Route 2, Preston, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 138-foot level of an existing 147-foot tower at 389 Route 2 in Preston, Connecticut (the "Property"). The tower is owned Crown Castle. Cellco's use of the tower was approved by the Council in 2000. Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas; three (3) model LNX-6514DS-VTM, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 138-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas. Included in Attachment 1 are specifications for Cellco's replacement antennas and RRHs.

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 Robert Congdon, First Selectman for the Town of Preston. The Town of Preston is the owner of the Property.

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

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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on its existing antenna platform at the 138-foot level of the 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 behind Attachment 2.

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

6. The tower and its foundation, with certain modifications, can support Cellco's proposed modifications. (*See* Structural Analysis Report and Reinforcement Plans 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:
Robert Congdon, Preston First Selectman
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

LNX-6514DS-VTM

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

- Great solution to maximize network coverage and capacity
- Excellent gain, VSWR, front-to-back ratio, and PIM specifications for robust network performance
- Ideal choice for site collocations and tough zoning restrictions
- Excellent solution for site sharing and maximizing capacity
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- The RF connectors are designed for IP67 rating and the radome for IP56 rating

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain, dBi	15.8	15.9
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Vertical, degrees	12.4	11.2
Beam Tilt, degrees	0–10	0–10
USLS, dB	17	18
Front-to-Back Ratio at 180°, dB	32	30
CPR at Boresight, dB	23	23
CPR at Sector, dB	12	10
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	15.6	15.7
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.5
Gain by Beam Tilt, average, dBi	0 ° | 15.7	0 ° | 15.9
	5 ° | 15.7	5 ° | 15.8
	10 ° | 15.3	10 ° | 15.3
Beamwidth, Horizontal Tolerance, degrees	±0.9	±1.4
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6
USLS, dB	18	20
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	25	24
CPR at Sector, dB	15	12

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

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®

Product Specifications

LNX-6514DS-VTM

Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1847.0 mm | 72.7 in
Width	301.0 mm | 11.9 in
Net Weight	14.2 kg | 31.3 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	LNX-6514DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

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

Included Products

DB380 — Pipe Mounting Kit for 2.4"-4.5" (60-115mm) OD round members on wide panel antennas. Includes 2 clamp sets and double nuts.

DB5083 — Downtilt Mounting Kit for 2.4"-4.5" (60 - 115 mm) OD round members. Includes a heavy-duty, galvanized steel downtilt mounting bracket assembly and associated hardware. This kit is compatible with the DB380 pipe mount kit for panel antennas that are equipped with two mounting brackets.

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

HBXX-6517DS-VTM

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

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

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

Product Specifications

HBXX-6517DS-VTM

Mechanical Specifications

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

Dimensions

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

Remote Electrical Tilt (RET) Information

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

Regulatory Compliance/Certifications

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

Included Products

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

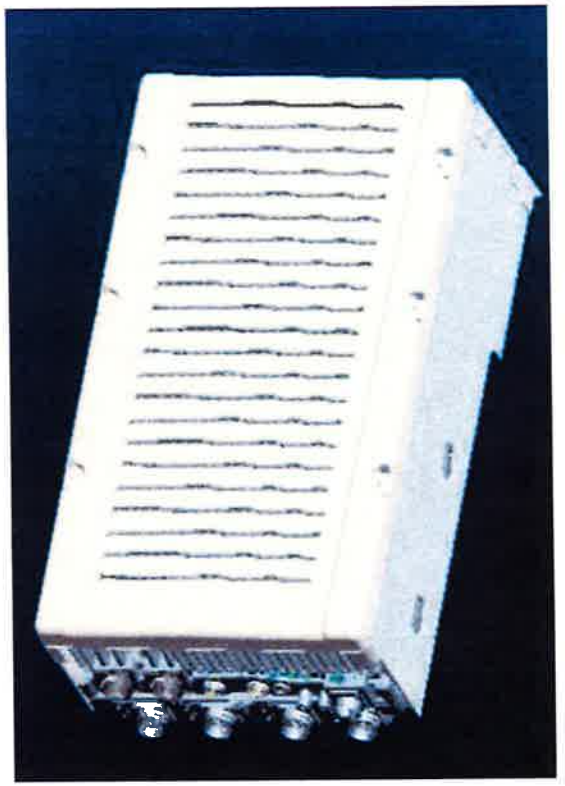
	RRH2x60
RF Output Power	2x60W
Instantaneous Bandwidth	20MHz
Transmitter	2 TX
Receiver 1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features	AISG 2.0 for RET/TMA
	Internal Smart Bias-T
Power	-48VDC
CPRI Ports	2 CPRI Rate 3 Ports
External Alarms	4 External User Alarms
Monitor 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**

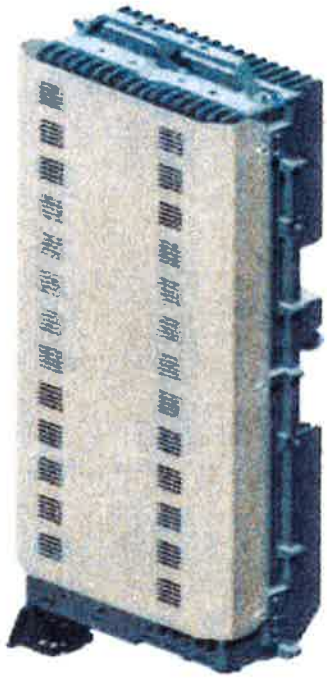


**- Includes solar shield but not mounting brackets (8 lbs.)

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.

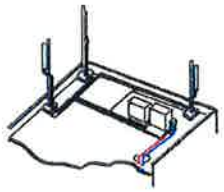
EASY INSTALLATION

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.

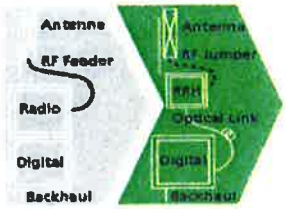
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

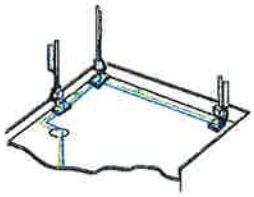
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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™

ATTACHMENT 2

	General	Power	Density					
Site Name: Preston								
Tower Height: 147Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	118	0.0292	880	0.5867	4.97%	
*AT&T UMTS	2	875	118	0.0452	1900	1.0000	4.52%	
*AT&T GSM	1	283	118	0.0073	880	0.5867	1.25%	
*AT&T GSM	4	525	118	0.0542	1900	1.0000	5.42%	
*AT&T LTE	1	1615	118	0.0417	734	0.4893	8.52%	
*MetroPCS	3	443.61	110	0.0395	2140	1.0000	3.95%	
*T-Mobile LTE	2	24	129	0.0010	2100	1.0000	0.10%	
*T-Mobile GSM/UMTS	2	12	129	0.0005	1950	1.0000	0.05%	
*T-Mobile UMTS	2	12	129	0.0005	2100	1.0000	0.05%	
*Sprint	11	122	148	0.0220	1960	1.0000	2.20%	
Verizon PCS	**11**	**448**	**138**	**0.0930**	**1970**	**1.0000**	**9.30%**	
Verizon Cellular	**9**	**388**	**138**	**0.0659**	**869**	**0.5793**	**11.38%**	
Verizon AWS	**1**	**1897**	**138**	**0.0358**	**2145**	**1.0000**	**3.58%**	
Verizon 700	**1**	**696**	**138**	**0.0131**	**746**	**0.4973**	**2.64%**	
								57.96%
* Source: Siting Council								

ATTACHMENT 3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **April 06, 2015**

Sean Dempsey
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117758
	Carrier Site Name:	Preston CT
Crown Castle Designation:	**Crown Castle BU Number:**	876360
	Crown Castle Site Name:	PRESTON / TOWN HALL
	Crown Castle JDE Job Number:	321737
	Crown Castle Work Order Number:	1038257
	Crown Castle Application Number:	281638 Rev. 4
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37515-0448.003.7805
Site Data:	**389 Rt. 2, PRESTON, New London County, CT**	
	Latitude *41° 29' 25.25"*, Longitude *-71° 59' 29.55"*	
	147 Foot - Monopole Tower	

Dear Sean Dempsey,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 773784, in accordance with application 281638, revision 4.

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

LC4.5: Modified Structure w/ Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code with 2009 amendment and the 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.

All modifications and equipment proposed in this report shall be installed in accordance with the referenced drawings for the determined available structural capacity to be effective.

We at *Paul J. Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Joey Meinerding, E.I.
Structural Designer

4/6/15

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 147 ft. monopole tower designed by Engineered Endeavors, Inc. in May of 2000. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code with 2009 amendment and the 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
136.0	138.0	3	alcatel lucent	RRH2X60-PCS	--	--	--
		6	andrew	HBXX-6517DS-VTM w/ Mount Pipe			
		6	andrew	LNX-6514DS-VTM w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147.0	147.0	6	decibel	DB978H90T2E-M w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Platform Mount [LP 601-1]			
136.0	138.0	6	antel	LPA-80080/4CF w/ Mount Pipe	--	--	2
		3	rfs celwave	APX75-866514-CT0 w/ Mount Pipe			
		3	rymsa wireless	MG D5-800Tx w/ Mount Pipe			
	136.0	6	rfs celwave	FD9R6004/2C-3L	12	1-5/8	1
		1	tower mounts	Platform Mount [LP 601-1]			
129.0	129.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		1	tower mounts	Platform Mount [LP 403-1]			
120.0	120.0	6	ericsson	TME-RRUS-11	--	--	1
		1	tower mounts	Side Arm Mount [SO 102-3]			
118.0	118.0	1	andrew	SBNH-1D6565C w/ Mount Pipe	3 6	3/8 1-1/4	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		2	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 303-1]			
110.0	110.0	3	kathrein	800 10504 w/ Mount Pipe	6	1-5/8	1
		3	kathrein	860 10025			
		1	tower mounts	T-Arm Mount [TA 602-3]			
50.0	51.0	1	lucent	KS24019-L112A	1	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 701-1]			
48.0	49.0	1	lucent	KS24019-L112A	1	1/2	1
	48.0	1	tower mounts	Pipe Mount [PM 601-1]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 08-01210G, 01/24/2008	2192501	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Solutions, 080609.05, 09/26/2008	2331610	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 131001.876360, 04/04/2013	3846952	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 6938, 05/03/2000	1615411	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 6938, 05/02/2000	1615372	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37515-0448.002.7700, 02/23/2015	5573224	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.
5) Monopole will be reinforced in conformance with the referenced proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	147 - 120.37	Pole	TP21.98x16.25x0.1875	1	-5.57	652.60	62.4	Pass
L2	120.37 - 105	Pole	TP24.8521x20.9057x0.25	2	-10.39	1014.88	95.6	Pass
L3	105 - 94.1667	Pole	TP27.1481x24.8521x0.4671	3	-12.30	1429.55	90.6	Pass
L4	94.1667 - 84.91	Pole	TP29.11x27.1481x0.5744	4	-13.39	1825.18	78.9	Pass
L5	84.91 - 59.5	Pole	TP33.993x27.0775x0.5966	5	-21.22	2302.21	93.1	Pass
L6	59.5 - 58.5833	Pole	TP34.1872x33.993x0.6049	6	-21.47	2347.87	92.1	Pass
L7	58.5833 - 44.41	Pole	TP37.19x34.1872x0.6337	7	-24.10	2704.40	86.6	Pass
L8	44.41 - 30.5	Pole	TP39.5221x34.8273x0.6669	8	-26.97	2852.90	88.4	Pass
L9	30.5 - 29.75	Pole	TP39.6814x39.5221x0.6655	9	-31.63	3134.35	87.7	Pass
L10	29.75 - 29	Pole	TP39.8407x39.6814x0.744	10	-31.90	3512.73	78.9	Pass
L11	29 - 27.5833	Pole	TP40.1416x39.8407x0.7408	11	-32.41	3557.24	78.6	Pass
L12	27.5833 - 6.75	Pole	TP44.5664x40.1416x0.6557	12	-39.62	3704.81	84.2	Pass
L13	6.75 - 2.5	Pole	TP45.469x44.5664x0.649	13	-40.79	3537.77	89.5	Pass
L14	2.5 - 0	Pole	TP46x45.469x0.669	14	-41.18	3644.97	87.4	Pass
							Summary	
						Pole (L2)	95.6	Pass
						RATING =	95.6	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	81.0	Pass
1	Base Plate	0	85.2	Pass
1	Base Foundation Structural Steel	0	84.0	Pass
1	Base Foundation Soil Interaction	0	75.3	Pass

Structure Rating (max from all components) =	95.6%

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

4.1) Recommendations

Install the proposed modifications per the referenced drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in New London County, Connecticut.
2) Basic wind speed of 85.00 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice density of 56.00 pcf.
5) A wind speed of 37.60 mph is used in combination with ice.
6) Temperature drop of 50.00 °F.
7) Deflections calculated using a wind speed of 50.00 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) 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	147.0000-120.3700	26.6300	3.25	18	16.2500	21.9800	0.1875	0.7500	A572-65 (65 ksi)
L2	120.3700-105.0000	18.6200	0.00	18	20.9057	24.8521	0.2500	1.0000	A572-65 (65 ksi)
L3	105.0000-94.1667	10.8333	0.00	18	24.8521	27.1481	0.4671	1.8682	Reinf 45.19 ksi (45 ksi)
L4	94.1667-84.9100	9.2567	4.17	18	27.1481	29.1100	0.5744	2.2974	Reinf 45.27 ksi (45 ksi)
L5	84.9100-59.5000	29.5800	0.00	18	27.0775	33.9930	0.5966	2.3862	Reinf 45.52 ksi (46 ksi)
L6	59.5000-58.5833	0.9167	0.00	18	33.9930	34.1872	0.6049	2.4196	Reinf 45.53 ksi (46 ksi)
L7	58.5833-44.4100	14.1733	5.17	18	34.1872	37.1900	0.6337	2.5347	Reinf 47.41 ksi (47 ksi)
L8	44.4100-30.5000	19.0800	0.00	18	34.8273	39.5221	0.6669	2.6676	Reinf 47.56 ksi (48 ksi)
L9	30.5000-29.7500	0.7500	0.00	18	39.5221	39.6814	0.6655	2.6621	Reinf 47.55 ksi (48 ksi)
L10	29.7500-	0.7500	0.00	18	39.6814	39.8407	0.7440	2.9761	Reinf 47.57 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
	29.0000								(48 ksi)
L11	29.0000-27.5833	1.4167	0.00	18	39.8407	40.1416	0.7408	2.9631	Reinf 48.01 ksi (48 ksi)
L12	27.5833-6.7500	20.8333	0.00	18	40.1416	44.5664	0.6557	2.6227	Reinf 50.69 ksi (51 ksi)
L13	6.7500-2.5000	4.2500	0.00	18	44.5664	45.4690	0.6490	2.5961	Reinf 48.15 ksi (48 ksi)
L14	2.5000-0.0000	2.5000		18	45.4690	46.0000	0.6690	2.6758	Reinf 47.91 ksi (48 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	16.5007	9.5592	311.5911	5.7022	8.2550	37.7457	623.5922	4.7805	2.5300	13.493
	22.3191	12.9693	778.1562	7.7363	11.1658	69.6908	1557.3364	6.4859	3.5385	18.872
L2	21.9276	16.3903	883.4944	7.3328	10.6201	83.1908	1768.1514	8.1967	3.2394	12.958
	25.2355	19.5217	1492.7921	8.7337	12.6249	118.2423	2987.5485	9.7627	3.9340	15.736
L3	25.2355	36.1488	2715.6706	8.6567	12.6249	215.1052	5434.9146	18.0778	3.5520	7.605
	27.5669	39.5524	3557.2713	9.4718	13.7912	257.9370	7119.2233	19.7800	3.9561	8.47
L4	27.5669	48.4444	4322.0232	9.4337	13.7912	313.3890	8649.7334	24.2268	3.7672	6.559
	29.5591	52.0210	5351.6957	10.1302	14.7879	361.8974	10710.433 3	26.0154	4.1125	7.16
L5	28.4851	50.1411	4442.1954	9.4007	13.7554	322.9429	8890.2360	25.0753	3.7157	6.229
	34.5174	63.2356	8910.4615	11.8557	17.2685	515.9963	17832.647 5	31.6238	4.9328	8.269
L6	34.5174	64.1026	9028.1227	11.8528	17.2685	522.8100	18068.124 9	32.0574	4.9182	8.131
	34.7146	64.4755	9186.5835	11.9217	17.3671	528.9642	18385.255 0	32.2439	4.9523	8.187
L7	34.7146	67.4852	9598.9499	11.9115	17.3671	552.7083	19210.530 3	33.7490	4.9017	7.735
	37.7637	73.5246	12413.529 7	12.9775	18.8925	657.0606	24843.393 4	36.7693	5.4302	8.569
L8	36.6563	72.3077	10660.299 4	12.1270	17.6923	602.5393	21334.626 0	36.1607	4.9559	7.431
	40.1318	82.2452	15687.233 4	13.7936	20.0772	781.3446	31395.108 6	41.1304	5.7822	8.67
L9	40.1318	82.0803	15656.886 1	13.7941	20.0772	779.8331	31334.374 0	41.0480	5.7846	8.692
	40.2935	82.4168	15850.242 0	13.8506	20.1582	786.2944	31721.340 1	41.2162	5.8126	8.734
L10	40.2935	91.9514	17612.830 6	13.8228	20.1582	873.7324	35248.836 7	45.9844	5.6745	7.627
	40.4553	92.3275	17829.874 6	13.8793	20.2391	880.9631	35683.210 2	46.1725	5.7025	7.664
L11	40.4553	91.9331	17756.644 3	13.8805	20.2391	877.3448	35536.653 2	45.9753	5.7082	7.706
	40.7608	92.6406	18169.741 2	13.9873	20.3919	891.0264	36363.390 6	46.3291	5.7611	7.777
L12	40.7608	82.1740	16186.618 8	14.0175	20.3919	793.7760	32394.536 4	41.0948	5.9109	9.015
	45.2539	91.3824	22260.800 0	15.5883	22.6397	983.2632	44550.891 3	45.6999	6.6897	10.203
L13	45.2539	90.4707	22045.361 6	15.5907	22.6397	973.7473	44119.731 1	45.2439	6.7014	10.325
	46.1705	92.3301	23432.812 1	15.9111	23.0983	1014.4838	46896.457 7	46.1738	6.8603	10.57
L14	46.1705	95.1230	24120.167 0	15.9040	23.0983	1044.2416	48272.071 9	47.5706	6.8252	10.203
	46.7096	96.2504	24988.004 3	16.0925	23.3680	1069.3258	50008.888 4	48.1344	6.9186	10.342

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 147.0000-120.3700				1	1	1		
L2 120.3700-105.0000				1	1	1		
L3 105.0000-94.1667				1	1	1		
L4 94.1667-84.9100				1	1	1		
L5 84.9100-59.5000				1	1	1		
L6 59.5000-58.5833				1	1	1		
L7 58.5833-44.4100				1	1	1		
L8 44.4100-30.5000				1	1	1		
L9 30.5000-29.7500				1	1	1		
L10 29.7500-29.0000				1	1	1		
L11 29.0000-27.5833				1	1	1		
L12 27.5833-6.7500				1	1	1		
L13 6.7500-2.5000				1	1	1		
L14 2.5000-0.0000				1	1	1		

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 plf
LDF7-50A(1-5/8")	C	No	Inside Pole	147.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	136.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	129.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	Inside Pole	129.0000 - 0.0000	1	No Ice	0.0000	1.07
						1/2" Ice	0.0000	1.07
						1" Ice	0.0000	1.07
***								
AVA6-50(1-1/4")	C	No	Inside Pole	118.0000 - 0.0000	6	No Ice	0.0000	0.45
						1/2" Ice	0.0000	0.45
						1" Ice	0.0000	0.45
FB-L98B-002-75000(3/8")	C	No	Inside Pole	118.0000 - 0.0000	3	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
2" Conduit	C	No	Inside Pole	118.0000 - 0.0000	1	No Ice	0.0000	1.16
						1/2" Ice	0.0000	1.16
						1" Ice	0.0000	1.16
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	110.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
LDF7-50A(1-5/8")	C	No	CaAa (Out Of	110.0000 - 0.0000	1	No Ice	0.1980	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
***								
LDF4-50A(1/2")	C	No	Inside Pole	50.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
***								
LDF4-50A(1/2")	C	No	Inside Pole	48.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
***								
Aero MP3-03	C	No	CaAa (Out Of Face)	30.7500 - 5.7500	1	No Ice	0.2625	0.00
						1/2" Ice	0.3736	0.00
						1" Ice	0.4847	0.00
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	108.6700 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00

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	147.0000-120.3700	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.38
L2	120.3700-105.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.755	0.47
L3	105.0000-94.1667	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.402	0.38
L4	94.1667-84.9100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.761	0.32
L5	84.9100-59.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.325	0.88
L6	59.5000-58.5833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.372	0.03
L7	58.5833-44.4100	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.759	0.49
L8	44.4100-30.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.718	0.49
L9	30.5000-29.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.502	0.03
L10	29.7500-29.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.502	0.03
L11	29.0000-27.5833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.947	0.05
L12	27.5833-6.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	13.933	0.73
L13	6.7500-2.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.989	0.15
L14	2.5000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.016	0.09

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	147.0000-120.3700	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.38
L2	120.3700-105.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.116	0.55
L3	105.0000-94.1667	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.832	0.54
L4	94.1667-84.9100	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.693	0.46
L5	84.9100-59.5000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	18.371	1.27
L6	59.5000-58.5833	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.663	0.05
L7	58.5833-44.4100	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.247	0.71
L8	44.4100-30.5000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.164	0.70
L9	30.5000-29.7500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.864	0.04
L10	29.7500-29.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.864	0.04
L11	29.0000-27.5833	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.632	0.07
L12	27.5833-6.7500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	24.003	1.05
L13	6.7500-2.5000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.502	0.21
L14	2.5000-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.808	0.13

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	147.0000-120.3700	0.0000	0.0000	0.0000	0.0000
L2	120.3700-105.0000	-0.1470	0.0849	-0.2365	0.1365
L3	105.0000-94.1667	-0.4445	0.2566	-0.6750	0.3897
L4	94.1667-84.9100	-0.4499	0.2597	-0.6897	0.3982
L5	84.9100-59.5000	-0.4561	0.2634	-0.7072	0.4083
L6	59.5000-58.5833	-0.4618	0.2666	-0.7233	0.4176
L7	58.5833-44.4100	-0.4644	0.2681	-0.7308	0.4219
L8	44.4100-30.5000	-0.4726	0.2728	-0.7468	0.4312
L9	30.5000-29.7500	-0.7224	0.4171	-1.0791	0.6230

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L10	29.7500-29.0000	-0.7229	0.4174	-1.0803	0.6237
L11	29.0000-27.5833	-0.7236	0.4178	-1.0820	0.6247
L12	27.5833-6.7500	-0.7304	0.4217	-1.0990	0.6345
L13	6.7500-2.5000	-0.5401	0.3118	-0.8535	0.4928
L14	2.5000-0.0000	-0.4770	0.2754	-0.7683	0.4436

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
(2) DB978H90T2E-M w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice	3.2208 3.5954 4.0226	2.8875 3.4896 4.1025	0.03 0.06 0.09
(2) DB978H90T2E-M w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice	3.2208 3.5954 4.0226	2.8875 3.4896 4.1025	0.03 0.06 0.09
(2) DB978H90T2E-M w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	147.0000	No Ice 1/2" Ice 1" Ice	3.2208 3.5954 4.0226	2.8875 3.4896 4.1025	0.03 0.06 0.09
Platform Mount [LP 601-1]	C	None		0.0000	147.0000	No Ice 1/2" Ice 1" Ice	28.4700 33.5900 38.7100	28.4700 33.5900 38.7100	1.12 1.51 1.91
***									
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
(2) HBXX-6517DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	8.9758 9.6473 10.2909	6.9629 8.1817 9.1436	0.07 0.14 0.21
(2) HBXX-6517DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	8.9758 9.6473 10.2909	6.9629 8.1817 9.1436	0.07 0.14 0.21
(2) HBXX-6517DS-VTM w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	8.9758 9.6473 10.2909	6.9629 8.1817 9.1436	0.07 0.14 0.21
(2) LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	8.6346 9.2852 9.9050	7.0679 8.2532 9.1523	0.06 0.13 0.21
(2) LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	8.6346 9.2852 9.9050	7.0679 8.2532 9.1523	0.06 0.13 0.21
(2) LNX-6514DS-VTM w/	C	From Leg	4.0000	0.0000	136.0000	No Ice	8.6346	7.0679	0.06

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
Mount Pipe			0.00 2.00			1/2" Ice 1" Ice	9.2852 9.9050	8.2532 9.1523	0.13 0.21
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.3665 0.4506 0.5433	0.0846 0.1362 0.1965	0.00 0.01 0.01
RRH2X60-PCS	A	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.5667 2.7914 3.0247	2.0106 2.2184 2.4349	0.06 0.08 0.10
RRH2X60-PCS	B	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.5667 2.7914 3.0247	2.0106 2.2184 2.4349	0.06 0.08 0.10
RRH2X60-PCS	C	From Leg	4.0000 0.00 2.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.5667 2.7914 3.0247	2.0106 2.2184 2.4349	0.06 0.08 0.10
Platform Mount [LP 601-1]	C	None		0.0000	136.0000	No Ice 1/2" Ice 1" Ice	28.4700 33.5900 38.7100	28.4700 33.5900 38.7100	1.12 1.51 1.91
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	6.8253 7.3471 7.8631	5.6424 6.4800 7.2567	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	6.8253 7.3471 7.8631	5.6424 6.4800 7.2567	0.11 0.17 0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	6.8253 7.3471 7.8631	5.6424 6.4800 7.2567	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	6.8155 7.3373 7.8532	5.6334 6.4717 7.2478	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	6.8155 7.3373 7.8532	5.6334 6.4717 7.2478	0.11 0.17 0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	6.8155 7.3373 7.8532	5.6334 6.4717 7.2478	0.11 0.17 0.23
KRY 112 144/1	A	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	0.4083 0.4969 0.5941	0.2042 0.2733 0.3511	0.01 0.01 0.02
KRY 112 144/1	B	From Leg	4.0000 0.00 0.00	0.0000	129.0000	No Ice 1/2" Ice 1" Ice	0.4083 0.4969 0.5941	0.2042 0.2733 0.3511	0.01 0.01 0.02
KRY 112 144/1	C	From Leg	4.0000	0.0000	129.0000	No Ice	0.4083	0.2042	0.01

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
			0.00 0.00			1/2" Ice 1" Ice	0.4969 0.5941	0.2733 0.3511	0.01 0.02
Platform Mount [LP 403-1]	C	None		0.0000	129.0000	No Ice 1/2" Ice 1" Ice	18.8500 24.3000 29.7500	18.8500 24.3000 29.7500	1.50 1.80 2.09
***									
(2) TME-RRUS-11	A	From Leg	2.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.2486 3.4905 3.7411	1.3726 1.5510 1.7380	0.05 0.07 0.09
(2) TME-RRUS-11	B	From Leg	2.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.2486 3.4905 3.7411	1.3726 1.5510 1.7380	0.05 0.07 0.09
(2) TME-RRUS-11	C	From Leg	2.0000 0.00 0.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.2486 3.4905 3.7411	1.3726 1.5510 1.7380	0.05 0.07 0.09
Side Arm Mount [SO 102-3]	C	None		0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
***									
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	11.8229 12.5940 13.3752	9.0563 10.6186 12.2051	0.09 0.18 0.28
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	11.5561 12.2227 12.8929	9.7151 11.1857 12.5942	0.10 0.19 0.28
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	11.8229 12.5940 13.3752	9.0563 10.6186 12.2051	0.09 0.18 0.28
7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	6.2208 6.7144 7.2182	4.8204 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	6.2208 6.7144 7.2182	4.8204 5.5082 6.2127	0.09 0.14 0.21
7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	6.2208 6.7144 7.2182	4.8204 5.5082 6.2127	0.09 0.14 0.21
(2) LGP21401	A	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	1.2880 1.4453 1.6112	0.3640 0.4785 0.6017	0.01 0.02 0.03
(2) LGP21401	B	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	1.2880 1.4453 1.6112	0.3640 0.4785 0.6017	0.01 0.02 0.03
(2) LGP21401	C	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	1.2880 1.4453 1.6112	0.3640 0.4785 0.6017	0.01 0.02 0.03
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice	1.4667 1.6667 1.8778	1.4667 1.6667 1.8778	0.02 0.04 0.06

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
Platform Mount [LP 303-1]	C	None		0.0000	118.0000	No Ice 1/2" Ice 1" Ice	14.6600 18.8700 23.0800	14.6600 18.8700 23.0800	1.25 1.48 1.71
***									
800 10504 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
800 10504 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	3.5887 4.0069 4.4217	3.1779 3.9053 4.5808	0.04 0.07 0.11
860 10025	A	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	0.1565 0.2211 0.2944	0.1293 0.1913 0.2620	0.00 0.00 0.01
860 10025	B	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	0.1565 0.2211 0.2944	0.1293 0.1913 0.2620	0.00 0.00 0.01
860 10025	C	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	0.1565 0.2211 0.2944	0.1293 0.1913 0.2620	0.00 0.00 0.01
2.375" OD x 5' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
2.375" OD x 5' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	110.0000	No Ice 1/2" Ice 1" Ice	1.1875 1.4956 1.8071	1.1875 1.4956 1.8071	0.02 0.03 0.04
T-Arm Mount [TA 602-3]	C	None		0.0000	110.0000	No Ice 1/2" Ice 1" Ice	11.5900 15.4400 19.2900	11.5900 15.4400 19.2900	0.77 0.99 1.21
***									
KS24019-L112A	C	From Leg	3.0000 0.00 1.00	0.0000	50.0000	No Ice 1/2" Ice 1" Ice	0.1556 0.2247 0.3025	0.1556 0.2247 0.3025	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	C	None		0.0000	50.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09
***									
KS24019-L112A	A	From Leg	1.0000 0.00 1.00	0.0000	48.0000	No Ice 1/2" Ice 1" Ice	0.1556 0.2247 0.3025	0.1556 0.2247 0.3025	0.01 0.01 0.01
Pipe Mount [PM 601-1]	A	None		0.0000	48.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.7400 4.4800	0.9000 1.1200 1.3400	0.07 0.08 0.09

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.0000-120.3700	133.0198	1.489	28	42.419	A	0.000	42.419	42.419	100.00	0.000	0.000
					B	0.000	42.419		100.00	0.000	0.000
					C	0.000	42.419		100.00	0.000	0.000
L2 120.3700-105.0000	112.5053	1.42	26	29.745	A	0.000	29.745	29.745	100.00	0.000	0.000
					B	0.000	29.745		100.00	0.000	0.000
					C	0.000	29.745		100.00	0.000	1.755
L3 105.0000-94.1667	99.5036	1.371	25	23.472	A	0.000	23.472	23.472	100.00	0.000	0.000
					B	0.000	23.472		100.00	0.000	0.000
					C	0.000	23.472		100.00	0.000	4.402
L4 94.1667-84.9100	89.4845	1.33	25	21.699	A	0.000	21.699	21.699	100.00	0.000	0.000
					B	0.000	21.699		100.00	0.000	0.000
					C	0.000	21.699		100.00	0.000	3.761
L5 84.9100-59.5000	71.7995	1.249	23	65.691	A	0.000	65.691	65.691	100.00	0.000	0.000
					B	0.000	65.691		100.00	0.000	0.000
					C	0.000	65.691		100.00	0.000	10.325
L6 59.5000-58.5833	59.0412	1.181	22	2.604	A	0.000	2.604	2.604	100.00	0.000	0.000
					B	0.000	2.604		100.00	0.000	0.000
					C	0.000	2.604		100.00	0.000	0.372
L7 58.5833-44.4100	51.3973	1.135	21	42.152	A	0.000	42.152	42.152	100.00	0.000	0.000
					B	0.000	42.152		100.00	0.000	0.000
					C	0.000	42.152		100.00	0.000	5.759
L8 44.4100-30.5000	37.3501	1.036	19	43.829	A	0.000	43.829	43.829	100.00	0.000	0.000
					B	0.000	43.829		100.00	0.000	0.000
					C	0.000	43.829		100.00	0.000	5.718
L9 30.5000-29.7500	30.1247	1	18	2.475	A	0.000	2.475	2.475	100.00	0.000	0.000
					B	0.000	2.475		100.00	0.000	0.000
					C	0.000	2.475		100.00	0.000	0.502
L10 29.7500-29.0000	29.3747	1	18	2.485	A	0.000	2.485	2.485	100.00	0.000	0.000
					B	0.000	2.485		100.00	0.000	0.000
					C	0.000	2.485		100.00	0.000	0.502
L11 29.0000-27.5833	28.2908	1	18	4.721	A	0.000	4.721	4.721	100.00	0.000	0.000
					B	0.000	4.721		100.00	0.000	0.000
					C	0.000	4.721		100.00	0.000	0.947
L12 27.5833-6.7500	16.9853	1	18	73.531	A	0.000	73.531	73.531	100.00	0.000	0.000
					B	0.000	73.531		100.00	0.000	0.000
					C	0.000	73.531		100.00	0.000	13.933
L13 6.7500-2.5000	4.6179	1	18	15.944	A	0.000	15.944	15.944	100.00	0.000	0.000
					B	0.000	15.944		100.00	0.000	0.000
					C	0.000	15.944		100.00	0.000	1.989
L14 2.5000-0.0000	1.2476	1	18	9.528	A	0.000	9.528	9.528	100.00	0.000	0.000
					B	0.000	9.528		100.00	0.000	0.000
					C	0.000	9.528		100.00	0.000	1.016

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.0000-120.3700	133.0198	1.489	5	0.7500	45.748	A	0.000	45.748	45.748	100.00	0.000	0.000
						B	0.000	45.748		100.00	0.000	0.000
						C	0.000	45.748		100.00	0.000	0.000
L2 120.3700-	112.5053	1.42	5	0.7500	31.666	A	0.000	31.666	31.666	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
105.0000						B	0.000	31.666		100.00	0.000	0.000
						C	0.000	31.666		100.00	0.000	3.116
L3 105.0000-94.1667	99.5036	1.371	5	0.7500	24.826	A	0.000	24.826	24.826	100.00	0.000	0.000
						B	0.000	24.826		100.00	0.000	0.000
						C	0.000	24.826		100.00	0.000	7.832
L4 94.1667-84.9100	89.4845	1.33	5	0.7500	22.856	A	0.000	22.856	22.856	100.00	0.000	0.000
						B	0.000	22.856		100.00	0.000	0.000
						C	0.000	22.856		100.00	0.000	6.693
L5 84.9100-59.5000	71.7995	1.249	5	0.7500	68.867	A	0.000	68.867	68.867	100.00	0.000	0.000
						B	0.000	68.867		100.00	0.000	0.000
						C	0.000	68.867		100.00	0.000	18.371
L6 59.5000-58.5833	59.0412	1.181	4	0.7500	2.719	A	0.000	2.719	2.719	100.00	0.000	0.000
						B	0.000	2.719		100.00	0.000	0.000
						C	0.000	2.719		100.00	0.000	0.663
L7 58.5833-44.4100	51.3973	1.135	4	0.7500	43.924	A	0.000	43.924	43.924	100.00	0.000	0.000
						B	0.000	43.924		100.00	0.000	0.000
						C	0.000	43.924		100.00	0.000	10.247
L8 44.4100-30.5000	37.3501	1.036	4	0.7500	45.568	A	0.000	45.568	45.568	100.00	0.000	0.000
						B	0.000	45.568		100.00	0.000	0.000
						C	0.000	45.568		100.00	0.000	10.164
L9 30.5000-29.7500	30.1247	1	4	0.7500	2.569	A	0.000	2.569	2.569	100.00	0.000	0.000
						B	0.000	2.569		100.00	0.000	0.000
						C	0.000	2.569		100.00	0.000	0.864
L10 29.7500-29.0000	29.3747	1	4	0.7500	2.579	A	0.000	2.579	2.579	100.00	0.000	0.000
						B	0.000	2.579		100.00	0.000	0.000
						C	0.000	2.579		100.00	0.000	0.864
L11 29.0000-27.5833	28.2908	1	4	0.7500	4.898	A	0.000	4.898	4.898	100.00	0.000	0.000
						B	0.000	4.898		100.00	0.000	0.000
						C	0.000	4.898		100.00	0.000	1.632
L12 27.5833-6.7500	16.9853	1	4	0.7500	76.135	A	0.000	76.135	76.135	100.00	0.000	0.000
						B	0.000	76.135		100.00	0.000	0.000
						C	0.000	76.135		100.00	0.000	24.003
L13 6.7500-2.5000	4.6179	1	4	0.7500	16.475	A	0.000	16.475	16.475	100.00	0.000	0.000
						B	0.000	16.475		100.00	0.000	0.000
						C	0.000	16.475		100.00	0.000	3.502
L14 2.5000-0.0000	1.2476	1	4	0.7500	9.841	A	0.000	9.841	9.841	100.00	0.000	0.000
						B	0.000	9.841		100.00	0.000	0.000
						C	0.000	9.841		100.00	0.000	1.808

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 147.0000-120.3700	133.0198	1.489	10	42.419	A	0.000	42.419	42.419	100.00	0.000	0.000
					B	0.000	42.419		100.00	0.000	0.000
					C	0.000	42.419		100.00	0.000	0.000
L2 120.3700-105.0000	112.5053	1.42	9	29.745	A	0.000	29.745	29.745	100.00	0.000	0.000
					B	0.000	29.745		100.00	0.000	0.000
					C	0.000	29.745		100.00	0.000	1.755
L3 105.0000-94.1667	99.5036	1.371	9	23.472	A	0.000	23.472	23.472	100.00	0.000	0.000
					B	0.000	23.472		100.00	0.000	0.000
					C	0.000	23.472		100.00	0.000	4.402
L4 94.1667-84.9100	89.4845	1.33	9	21.699	A	0.000	21.699	21.699	100.00	0.000	0.000
					B	0.000	21.699		100.00	0.000	0.000
					C	0.000	21.699		100.00	0.000	3.761
L5 84.9100-59.5000	71.7995	1.249	8	65.691	A	0.000	65.691	65.691	100.00	0.000	0.000
					B	0.000	65.691		100.00	0.000	0.000
					C	0.000	65.691		100.00	0.000	10.325
L6 59.5000-	59.0412	1.181	8	2.604	A	0.000	2.604	2.604	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
58.5833					B	0.000	2.604		100.00	0.000	0.000
					C	0.000	2.604		100.00	0.000	0.372
L7 58.5833-44.4100	51.3973	1.135	7	42.152	A	0.000	42.152	42.152	100.00	0.000	0.000
					B	0.000	42.152		100.00	0.000	0.000
					C	0.000	42.152		100.00	0.000	5.759
L8 44.4100-30.5000	37.3501	1.036	7	43.829	A	0.000	43.829	43.829	100.00	0.000	0.000
					B	0.000	43.829		100.00	0.000	0.000
					C	0.000	43.829		100.00	0.000	5.718
L9 30.5000-29.7500	30.1247	1	6	2.475	A	0.000	2.475	2.475	100.00	0.000	0.000
					B	0.000	2.475		100.00	0.000	0.000
					C	0.000	2.475		100.00	0.000	0.502
L10 29.7500-29.0000	29.3747	1	6	2.485	A	0.000	2.485	2.485	100.00	0.000	0.000
					B	0.000	2.485		100.00	0.000	0.000
					C	0.000	2.485		100.00	0.000	0.502
L11 29.0000-27.5833	28.2908	1	6	4.721	A	0.000	4.721	4.721	100.00	0.000	0.000
					B	0.000	4.721		100.00	0.000	0.000
					C	0.000	4.721		100.00	0.000	0.947
L12 27.5833-6.7500	16.9853	1	6	73.531	A	0.000	73.531	73.531	100.00	0.000	0.000
					B	0.000	73.531		100.00	0.000	0.000
					C	0.000	73.531		100.00	0.000	13.933
L13 6.7500-2.5000	4.6179	1	6	15.944	A	0.000	15.944	15.944	100.00	0.000	0.000
					B	0.000	15.944		100.00	0.000	0.000
					C	0.000	15.944		100.00	0.000	1.989
L14 2.5000-0.0000	1.2476	1	6	9.528	A	0.000	9.528	9.528	100.00	0.000	0.000
					B	0.000	9.528		100.00	0.000	0.000
					C	0.000	9.528		100.00	0.000	1.016

Load Combinations

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

Comb. No.	Description
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	147 - 120.37	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-11.12	0.00	-0.00
			Max. Mx	11	-5.57	173.79	0.00
			Max. My	2	-5.57	-0.01	173.79
			Max. Vy	11	-12.85	173.79	0.00
			Max. Vx	2	-12.85	-0.01	173.79
			Max. Torque	8			0.00
L2	120.37 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.51	0.07	0.17
			Max. Mx	5	-10.39	-483.63	0.30
			Max. My	2	-10.39	-0.26	483.96
			Max. Vy	11	-19.20	483.59	-0.20
			Max. Vx	8	19.22	0.24	-483.83
			Max. Torque	12			-0.28
L3	105 - 94.1667	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.72	0.27	0.05
			Max. Mx	11	-12.30	696.11	-0.43
			Max. My	2	-12.30	-0.41	696.63
			Max. Vy	11	-20.05	696.11	-0.43
			Max. Vx	8	20.07	0.49	-696.56
			Max. Torque	12			-0.27
L4	94.1667 - 84.91	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.96	0.38	-0.01
			Max. Mx	11	-13.39	799.13	-0.54
			Max. My	2	-13.39	-0.48	799.71
			Max. Vy	11	-20.46	799.13	-0.54
			Max. Vx	8	20.48	0.61	-799.68
			Max. Torque	12			-0.23
L5	84.91 - 59.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.74	1.05	-0.40
			Max. Mx	11	-21.22	1440.17	-1.18
			Max. My	8	-21.22	1.33	-1441.28
			Max. Vy	11	-22.84	1440.17	-1.18
			Max. Vx	8	22.87	1.33	-1441.28
			Max. Torque	11			-0.21
L6	59.5 - 58.5833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.01	1.07	-0.41
			Max. Mx	11	-21.47	1461.13	-1.20
			Max. My	8	-21.47	1.35	-1462.27
			Max. Vy	11	-22.91	1461.13	-1.20
			Max. Vx	8	22.93	1.35	-1462.27
			Max. Torque	11			-0.16
L7	58.5833 - 44.41	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-33.99	1.34	-0.57
			Max. Mx	11	-24.11	1670.43	-1.41
			Max. My	8	-24.10	1.60	-1671.72
			Max. Vy	11	-23.65	1670.43	-1.41
			Max. Vx	8	23.67	1.60	-1671.72
			Max. Torque	11			-0.16
L8	44.41 - 30.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.01	1.86	-0.85
			Max. Mx	11	-31.38	2137.64	-1.83
			Max. My	8	-31.38	2.08	-2139.28

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-25.15	2137.64	-1.83
			Max. Vx	8	25.18	2.08	-2139.28
			Max. Torque	9			-0.17
L9	30.5 - 29.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.28	1.88	-0.86
			Max. Mx	11	-31.63	2156.52	-1.85
			Max. My	8	-31.63	2.10	-2158.17
			Max. Vy	11	-25.21	2156.52	-1.85
			Max. Vx	8	25.23	2.10	-2158.17
			Max. Torque	9			-0.18
L10	29.75 - 29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-42.58	1.90	-0.87
			Max. Mx	11	-31.90	2175.45	-1.86
			Max. My	8	-31.90	2.12	-2177.11
			Max. Vy	11	-25.26	2175.45	-1.86
			Max. Vx	8	25.28	2.12	-2177.11
			Max. Torque	9			-0.18
L11	29 - 27.5833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.15	1.94	-0.90
			Max. Mx	11	-32.41	2211.31	-1.89
			Max. My	8	-32.41	2.15	-2213.00
			Max. Vy	11	-25.37	2211.31	-1.89
			Max. Vx	8	25.40	2.15	-2213.00
			Max. Torque	9			-0.18
L12	27.5833 - 6.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.19	2.59	-1.27
			Max. Mx	11	-39.62	2755.51	-2.37
			Max. My	8	-39.62	2.69	-2757.58
			Max. Vy	11	-26.89	2755.51	-2.37
			Max. Vx	8	26.91	2.69	-2757.58
			Max. Torque	2			0.27
L13	6.75 - 2.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.90	2.73	-1.35
			Max. Mx	11	-41.16	2870.39	-2.46
			Max. My	8	-41.16	2.80	-2872.52
			Max. Vy	11	-27.18	2870.39	-2.46
			Max. Vx	8	27.20	2.80	-2872.52
			Max. Torque	2			0.29
L14	2.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.95	2.82	-1.40
			Max. Mx	11	-42.10	2938.52	-2.52
			Max. My	8	-42.10	2.87	-2940.70
			Max. Vy	11	-27.34	2938.52	-2.52
			Max. Vx	8	27.37	2.87	-2940.70
			Max. Torque	2			0.30

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	53.95	0.00	-0.00
	Max. H_x	11	42.11	27.33	-0.02
	Max. H_z	2	42.11	-0.02	27.35
	Max. M_x	2	2940.06	-0.02	27.35
	Max. M_z	5	2937.18	-27.33	0.02
	Max. Torsion	2	0.30	-0.02	27.35
	Min. Vert	8	42.11	0.02	-27.35
	Min. H_x	5	42.11	-27.33	0.02
	Min. H_z	8	42.11	0.02	-27.35
	Min. M_x	8	-2940.70	0.02	-27.35
	Min. M_z	11	-2938.52	27.33	-0.02
	Min. Torsion	8	-0.30	0.02	-27.35

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	42.11	-0.00	0.00	0.32	0.65	0.00
Dead+Wind 0 deg - No Ice	42.11	0.02	-27.35	-2940.06	-1.53	-0.30
Dead+Wind 30 deg - No Ice	42.11	13.68	-23.70	-2547.56	-1470.35	-0.27
Dead+Wind 60 deg - No Ice	42.11	23.68	-13.69	-1471.97	-2545.02	-0.16
Dead+Wind 90 deg - No Ice	42.11	27.33	-0.02	-1.87	-2937.18	-0.02
Dead+Wind 120 deg - No Ice	42.11	23.66	13.66	1468.82	-2542.83	0.13
Dead+Wind 150 deg - No Ice	42.11	13.65	23.68	2546.02	-1466.55	0.25
Dead+Wind 180 deg - No Ice	42.11	-0.02	27.35	2940.70	2.87	0.30
Dead+Wind 210 deg - No Ice	42.11	-13.68	23.70	2548.21	1471.69	0.27
Dead+Wind 240 deg - No Ice	42.11	-23.68	13.69	1472.62	2546.36	0.16
Dead+Wind 270 deg - No Ice	42.11	-27.33	0.02	2.52	2938.52	0.02
Dead+Wind 300 deg - No Ice	42.11	-23.66	-13.66	-1468.17	2544.17	-0.13
Dead+Wind 330 deg - No Ice	42.11	-13.65	-23.68	-2545.37	1467.89	-0.25
Dead+Ice+Temp	53.95	-0.00	0.00	1.40	2.82	0.00
Dead+Wind 0 deg+Ice+Temp	53.95	0.00	-6.46	-708.16	2.51	-0.13
Dead+Wind 30 deg+Ice+Temp	53.95	3.23	-5.60	-613.31	-351.99	-0.11
Dead+Wind 60 deg+Ice+Temp	53.95	5.59	-3.23	-353.73	-611.39	-0.05
Dead+Wind 90 deg+Ice+Temp	53.95	6.46	-0.00	1.02	-706.18	0.02
Dead+Wind 120 deg+Ice+Temp	53.95	5.59	3.23	355.88	-610.97	0.08
Dead+Wind 150 deg+Ice+Temp	53.95	3.23	5.59	615.78	-351.25	0.12
Dead+Wind 180 deg+Ice+Temp	53.95	-0.00	6.46	711.06	3.36	0.13
Dead+Wind 210 deg+Ice+Temp	53.95	-3.23	5.60	616.20	357.86	0.11
Dead+Wind 240 deg+Ice+Temp	53.95	-5.59	3.23	356.62	617.26	0.05
Dead+Wind 270 deg+Ice+Temp	53.95	-6.46	0.00	1.88	712.05	-0.02
Dead+Wind 300 deg+Ice+Temp	53.95	-5.59	-3.23	-352.99	616.84	-0.08
Dead+Wind 330 deg+Ice+Temp	53.95	-3.23	-5.59	-612.88	357.12	-0.12
Dead+Wind 0 deg - Service	42.11	0.01	-9.46	-1018.39	-0.09	-0.10
Dead+Wind 30 deg - Service	42.11	4.73	-8.20	-882.29	-508.90	-0.09
Dead+Wind 60 deg - Service	42.11	8.19	-4.74	-509.69	-881.18	-0.06
Dead+Wind 90 deg - Service	42.11	9.46	-0.01	-0.44	-1017.16	-0.01
Dead+Wind 120 deg - Service	42.11	8.19	4.73	509.02	-880.41	0.05
Dead+Wind 150 deg - Service	42.11	4.72	8.19	882.17	-507.58	0.09
Dead+Wind 180 deg - Service	42.11	-0.01	9.46	1019.03	1.43	0.10
Dead+Wind 210 deg - Service	42.11	-4.73	8.20	882.93	510.25	0.09
Dead+Wind 240 deg - Service	42.11	-8.19	4.74	510.34	882.52	0.06
Dead+Wind 270 deg - Service	42.11	-9.46	0.01	1.08	1018.50	0.01
Dead+Wind 300 deg - Service	42.11	-8.19	-4.73	-508.37	881.76	-0.05
Dead+Wind 330 deg - Service	42.11	-4.72	-8.19	-881.52	508.93	-0.09

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-42.11	0.00	0.00	42.11	-0.00	0.000%
2	0.02	-42.11	-27.35	-0.02	42.11	27.35	0.007%
3	13.68	-42.11	-23.70	-13.68	42.11	23.70	0.000%
4	23.68	-42.11	-13.69	-23.68	42.11	13.69	0.000%
5	27.33	-42.11	-0.02	-27.33	42.11	0.02	0.007%
6	23.66	-42.11	13.66	-23.66	42.11	-13.66	0.000%
7	13.65	-42.11	23.68	-13.65	42.11	-23.68	0.000%
8	-0.02	-42.11	27.35	0.02	42.11	-27.35	0.007%
9	-13.68	-42.11	23.70	13.68	42.11	-23.70	0.000%
10	-23.68	-42.11	13.69	23.68	42.11	-13.69	0.000%
11	-27.33	-42.11	0.02	27.33	42.11	-0.02	0.007%
12	-23.66	-42.11	-13.66	23.66	42.11	13.66	0.000%
13	-13.65	-42.11	-23.68	13.65	42.11	23.68	0.000%
14	0.00	-53.95	0.00	0.00	53.95	-0.00	0.000%
15	0.00	-53.95	-6.46	-0.00	53.95	6.46	0.000%
16	3.23	-53.95	-5.60	-3.23	53.95	5.60	0.000%
17	5.59	-53.95	-3.23	-5.59	53.95	3.23	0.000%
18	6.46	-53.95	-0.00	-6.46	53.95	0.00	0.000%
19	5.59	-53.95	3.23	-5.59	53.95	-3.23	0.000%
20	3.23	-53.95	5.59	-3.23	53.95	-5.59	0.000%
21	-0.00	-53.95	6.46	0.00	53.95	-6.46	0.000%
22	-3.23	-53.95	5.60	3.23	53.95	-5.60	0.000%
23	-5.59	-53.95	3.23	5.59	53.95	-3.23	0.000%
24	-6.46	-53.95	0.00	6.46	53.95	-0.00	0.000%
25	-5.59	-53.95	-3.23	5.59	53.95	3.23	0.000%
26	-3.23	-53.95	-5.59	3.23	53.95	5.59	0.000%
27	0.01	-42.11	-9.46	-0.01	42.11	9.46	0.003%
28	4.73	-42.11	-8.20	-4.73	42.11	8.20	0.003%
29	8.19	-42.11	-4.74	-8.19	42.11	4.74	0.003%
30	9.46	-42.11	-0.01	-9.46	42.11	0.01	0.003%
31	8.19	-42.11	4.73	-8.19	42.11	-4.73	0.003%
32	4.72	-42.11	8.19	-4.72	42.11	-8.19	0.003%
33	-0.01	-42.11	9.46	0.01	42.11	-9.46	0.003%
34	-4.73	-42.11	8.20	4.73	42.11	-8.20	0.003%
35	-8.19	-42.11	4.74	8.19	42.11	-4.74	0.003%
36	-9.46	-42.11	0.01	9.46	42.11	-0.01	0.003%
37	-8.19	-42.11	-4.73	8.19	42.11	4.73	0.003%
38	-4.72	-42.11	-8.19	4.72	42.11	8.19	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00007428	0.00007919
3	Yes	19	0.00000001	0.00014764
4	Yes	19	0.00000001	0.00014832
5	Yes	15	0.00007429	0.00008142
6	Yes	19	0.00000001	0.00014704
7	Yes	19	0.00000001	0.00014755
8	Yes	15	0.00007428	0.00007964
9	Yes	19	0.00000001	0.00014834
10	Yes	19	0.00000001	0.00014761
11	Yes	15	0.00007429	0.00007961
12	Yes	19	0.00000001	0.00014778
13	Yes	19	0.00000001	0.00014731
14	Yes	6	0.00000001	0.00000001
15	Yes	17	0.00000001	0.00008588
16	Yes	17	0.00000001	0.00009681
17	Yes	17	0.00000001	0.00009685
18	Yes	17	0.00000001	0.00008565
19	Yes	17	0.00000001	0.00009685
20	Yes	17	0.00000001	0.00009691
21	Yes	17	0.00000001	0.00008606
22	Yes	17	0.00000001	0.00009762

23	Yes	17	0.00000001	0.00009752
24	Yes	17	0.00000001	0.00008617
25	Yes	17	0.00000001	0.00009726
26	Yes	17	0.00000001	0.00009725
27	Yes	15	0.00007868	0.00003585
28	Yes	15	0.00007845	0.00013858
29	Yes	15	0.00007845	0.00014076
30	Yes	15	0.00007868	0.00003590
31	Yes	15	0.00007845	0.00013776
32	Yes	15	0.00007845	0.00013942
33	Yes	15	0.00007868	0.00003587
34	Yes	15	0.00007844	0.00014076
35	Yes	15	0.00007844	0.00013845
36	Yes	15	0.00007868	0.00003590
37	Yes	15	0.00007845	0.00014016
38	Yes	15	0.00007845	0.00013862

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 120.37	32.988	34	2.2185	0.0006
L2	123.62 - 105	22.480	34	1.9753	0.0006
L3	105 - 94.1667	15.547	34	1.5165	0.0003
L4	94.1667 - 84.91	12.332	34	1.3149	0.0002
L5	89.08 - 59.5	10.974	34	1.2330	0.0002
L6	59.5 - 58.5833	4.703	34	0.7677	0.0001
L7	58.5833 - 44.41	4.557	34	0.7534	0.0001
L8	49.58 - 30.5	3.263	34	0.6200	0.0001
L9	30.5 - 29.75	1.209	34	0.3848	0.0000
L10	29.75 - 29	1.149	34	0.3747	0.0000
L11	29 - 27.5833	1.091	34	0.3657	0.0000
L12	27.5833 - 6.75	0.985	34	0.3488	0.0000
L13	6.75 - 2.5	0.057	34	0.0811	0.0000
L14	2.5 - 0	0.008	34	0.0292	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.0000	(2) DB978H90T2E-M w/ Mount Pipe	34	32.988	2.2185	0.0006	13284
136.0000	(2) FD9R6004/2C-3L	34	27.903	2.1452	0.0007	6038
129.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	34	24.777	2.0665	0.0007	3689
120.0000	(2) TME-RRUS-11	34	21.000	1.8957	0.0006	2653
118.0000	P65-17-XLH-RR w/ Mount Pipe	34	20.208	1.8468	0.0005	2558
110.0000	800 10504 w/ Mount Pipe	34	17.234	1.6382	0.0004	2242
50.0000	KS24019-L112A	34	3.319	0.6258	0.0001	4981
48.0000	KS24019-L112A	34	3.058	0.5991	0.0001	5100

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 120.37	94.961	8	6.3918	0.0017
L2	123.62 - 105	64.743	9	5.6923	0.0017

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	105 - 94.1667	44.802	9	4.3717	0.0008
L4	94.1667 - 84.91	35.545	9	3.7910	0.0005
L5	89.08 - 59.5	31.636	9	3.5553	0.0005
L6	59.5 - 58.5833	13.565	9	2.2142	0.0002
L7	58.5833 - 44.41	13.144	9	2.1729	0.0002
L8	49.58 - 30.5	9.412	9	1.7885	0.0002
L9	30.5 - 29.75	3.488	9	1.1100	0.0001
L10	29.75 - 29	3.316	9	1.0810	0.0001
L11	29 - 27.5833	3.148	9	1.0551	0.0001
L12	27.5833 - 6.75	2.842	9	1.0064	0.0001
L13	6.75 - 2.5	0.164	9	0.2341	0.0000
L14	2.5 - 0	0.022	9	0.0843	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.0000	(2) DB978H90T2E-M w/ Mount Pipe	8	94.961	6.3918	0.0018	4716
136.0000	(2) FD9R6004/2C-3L	8	80.339	6.1812	0.0020	2142
129.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	71.350	5.9547	0.0019	1307
120.0000	(2) TME-RRUS-11	9	60.490	5.4631	0.0016	937
118.0000	P65-17-XLH-RR w/ Mount Pipe	9	58.213	5.3225	0.0015	903
110.0000	800 10504 w/ Mount Pipe	9	49.658	4.7221	0.0011	789
50.0000	KS24019-L112A	9	9.572	1.8050	0.0002	1731
48.0000	KS24019-L112A	9	8.820	1.7282	0.0002	1772

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	147 - 120.37 (1)	TP21.98x16.25x0.1875	26.6300	0.0000	0.0	39.000	12.5531	-5.57	489.57	0.011
L2	120.37 - 105 (2)	TP24.8521x20.9057x0.25	18.6200	0.0000	0.0	39.000	19.5217	-10.39	761.35	0.014
L3	105 - 94.1667 (3)	TP27.1481x24.8521x0.4671	10.8333	0.0000	0.0	27.114	39.5524	-12.30	1072.43	0.011
L4	94.1667 - 84.91 (4)	TP29.11x27.1481x0.5744	9.2567	0.0000	0.0	27.162	50.4098	-13.39	1369.23	0.010
L5	84.91 - 59.5 (5)	TP33.993x27.0775x0.5966	29.5800	0.0000	0.0	27.312	63.2356	-21.22	1727.09	0.012
L6	59.5 - 58.5833 (6)	TP34.1872x33.993x0.6049	0.9167	0.0000	0.0	27.318	64.4755	-21.47	1761.34	0.012
L7	58.5833 - 44.41 (7)	TP37.19x34.1872x0.6337	14.1733	0.0000	0.0	28.446	71.3216	-24.10	2028.81	0.012
L8	44.41 - 30.5 (8)	TP39.5221x34.8273x0.6669	19.0800	0.0000	0.0	28.536	75.0004	-26.97	2140.21	0.013
L9	30.5 - 29.75 (9)	TP39.6814x39.5221x0.6655	0.7500	0.0000	0.0	28.530	82.4168	-31.63	2351.35	0.013
L10	29.75 - 29 (10)	TP39.8407x39.6814x0.744	0.7500	0.0000	0.0	28.542	92.3275	-31.90	2635.21	0.012
L11	29 - 27.5833 (11)	TP40.1416x39.8407x0.7408	1.4167	0.0000	0.0	28.806	92.6406	-32.41	2668.60	0.012
L12	27.5833 - 6.75	TP44.5664x40.1416x0.655	20.8333	0.0000	0.0	30.414	91.3824	-39.62	2779.30	0.014

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 $\frac{P}{P_a}$
	(12)	7								
L13	6.75 - 2.5 (13)	TP45.469x44.5664x0.649	4.2500	0.0000	0.0	28.890	91.8653	-40.79	2653.99	0.015
L14	2.5 - 0 (14)	TP46x45.469x0.669	2.5000	0.0000	0.0	28.746	95.1230	-41.18	2734.41	0.015

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	147 - 120.37 (1)	TP21.98x16.25x0.1875	173.82	31.956	39.000	0.819	0.00	0.000	39.000	0.000
L2	120.37 - 105 (2)	TP24.8521x20.9057x0.25	484.16	49.136	39.000	1.260	0.00	0.000	39.000	0.000
L3	105 - 94.1667 (3)	TP27.1481x24.8521x0.4671	696.95	32.424	27.114	1.196	0.00	0.000	27.114	0.000
L4	94.1667 - 84.91 (4)	TP29.11x27.1481x0.5744	800.13	28.272	27.162	1.041	0.00	0.000	27.162	0.000
L5	84.91 - 59.5 (5)	TP33.993x27.0775x0.5966	1442.21	33.540	27.312	1.228	0.00	0.000	27.312	0.000
L6	59.5 - 58.5833 (6)	TP34.1872x33.993x0.6049	1463.21	33.194	27.318	1.215	0.00	0.000	27.318	0.000
L7	58.5833 - 44.41 (7)	TP37.19x34.1872x0.6337	1672.83	32.485	28.446	1.142	0.00	0.000	28.446	0.000
L8	44.41 - 30.5 (8)	TP39.5221x34.8273x0.6669	1796.86	33.239	28.536	1.165	0.00	0.000	28.536	0.000
L9	30.5 - 29.75 (9)	TP39.6814x39.5221x0.6655	2159.62	32.959	28.530	1.155	0.00	0.000	28.530	0.000
L10	29.75 - 29 (10)	TP39.8407x39.6814x0.744	2178.57	29.675	28.542	1.040	0.00	0.000	28.542	0.000
L11	29 - 27.5833 (11)	TP40.1416x39.8407x0.7408	2214.47	29.824	28.806	1.035	0.00	0.000	28.806	0.000
L12	27.5833 - 6.75 (12)	TP44.5664x40.1416x0.6557	2759.41	33.677	30.414	1.107	0.00	0.000	30.414	0.000
L13	6.75 - 2.5 (13)	TP45.469x44.5664x0.649	2845.57	34.003	28.890	1.177	0.00	0.000	28.890	0.000
L14	2.5 - 0 (14)	TP46x45.469x0.669	2874.43	33.032	28.746	1.149	0.00	0.000	28.746	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	147 - 120.37 (1)	TP21.98x16.25x0.1875	12.86	1.024	26.000	0.079	0.00	0.000	26.000	0.000
L2	120.37 - 105 (2)	TP24.8521x20.9057x0.25	19.24	0.985	26.000	0.076	0.02	0.001	26.000	0.000
L3	105 - 94.1667 (3)	TP27.1481x24.8521x0.4671	20.09	0.508	18.076	0.056	0.04	0.001	18.076	0.000
L4	94.1667 - 84.91 (4)	TP29.11x27.1481x0.5744	20.50	0.407	18.108	0.045	0.05	0.001	18.108	0.000
L5	84.91 - 59.5 (5)	TP33.993x27.0775x0.5966	22.88	0.362	18.208	0.040	0.10	0.001	18.208	0.000
L6	59.5 - 58.5833 (6)	TP34.1872x33.993x0.6049	22.95	0.356	18.212	0.039	0.10	0.001	18.212	0.000
L7	58.5833 - 44.41 (7)	TP37.19x34.1872x0.6337	23.68	0.332	18.964	0.035	0.13	0.001	18.964	0.000
L8	44.41 - 30.5 (8)	TP39.5221x34.8273x0.6669	24.34	0.325	19.024	0.034	0.15	0.001	19.024	0.000
L9	30.5 - 29.75 (9)	TP39.6814x39.5221x0.6655	25.24	0.306	19.020	0.032	0.18	0.001	19.020	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 $\frac{f_{vt}}{F_{vt}}$
L10	29.75 - 29 (10)	TP39.8407x39.6814x0.744	25.30	0.274	19.028	0.029	0.18	0.001	19.028	0.000
L11	29 - 27.5833 (11)	TP40.1416x39.8407x0.7408	25.41	0.274	19.204	0.029	0.18	0.001	19.204	0.000
L12	27.5833 - 6.75 (12)	TP44.5664x40.1416x0.6557	26.93	0.295	20.276	0.029	0.25	0.001	20.276	0.000
L13	6.75 - 2.5 (13)	TP45.469x44.5664x0.649	27.21	0.296	19.260	0.031	0.26	0.002	19.260	0.000
L14	2.5 - 0 (14)	TP46x45.469x0.669	27.30	0.287	19.164	0.030	0.26	0.001	19.164	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	147 - 120.37 (1)	0.011	0.819	0.000	0.079	0.000	0.832 ✔	1.333	H1-3+VT ✔
L2	120.37 - 105 (2)	0.014	1.260	0.000	0.076	0.000	1.275 ✔	1.333	H1-3+VT ✔
L3	105 - 94.1667 (3)	0.011	1.196	0.000	0.056	0.000	1.208 ✔	1.333	H1-3+VT ✔
L4	94.1667 - 84.91 (4)	0.010	1.041	0.000	0.045	0.000	1.051 ✔	1.333	H1-3+VT ✔
L5	84.91 - 59.5 (5)	0.012	1.228	0.000	0.040	0.000	1.241 ✔	1.333	H1-3+VT ✔
L6	59.5 - 58.5833 (6)	0.012	1.215	0.000	0.039	0.000	1.228 ✔	1.333	H1-3+VT ✔
L7	58.5833 - 44.41 (7)	0.012	1.142	0.000	0.035	0.000	1.154 ✔	1.333	H1-3+VT ✔
L8	44.41 - 30.5 (8)	0.013	1.165	0.000	0.034	0.000	1.178 ✔	1.333	H1-3+VT ✔
L9	30.5 - 29.75 (9)	0.013	1.155	0.000	0.032	0.000	1.169 ✔	1.333	H1-3+VT ✔
L10	29.75 - 29 (10)	0.012	1.040	0.000	0.029	0.000	1.052 ✔	1.333	H1-3+VT ✔
L11	29 - 27.5833 (11)	0.012	1.035	0.000	0.029	0.000	1.048 ✔	1.333	H1-3+VT ✔
L12	27.5833 - 6.75 (12)	0.014	1.107	0.000	0.029	0.000	1.122 ✔	1.333	H1-3+VT ✔
L13	6.75 - 2.5 (13)	0.015	1.177	0.000	0.031	0.000	1.193 ✔	1.333	H1-3+VT ✔
L14	2.5 - 0 (14)	0.015	1.149	0.000	0.030	0.000	1.164 ✔	1.333	H1-3+VT ✔

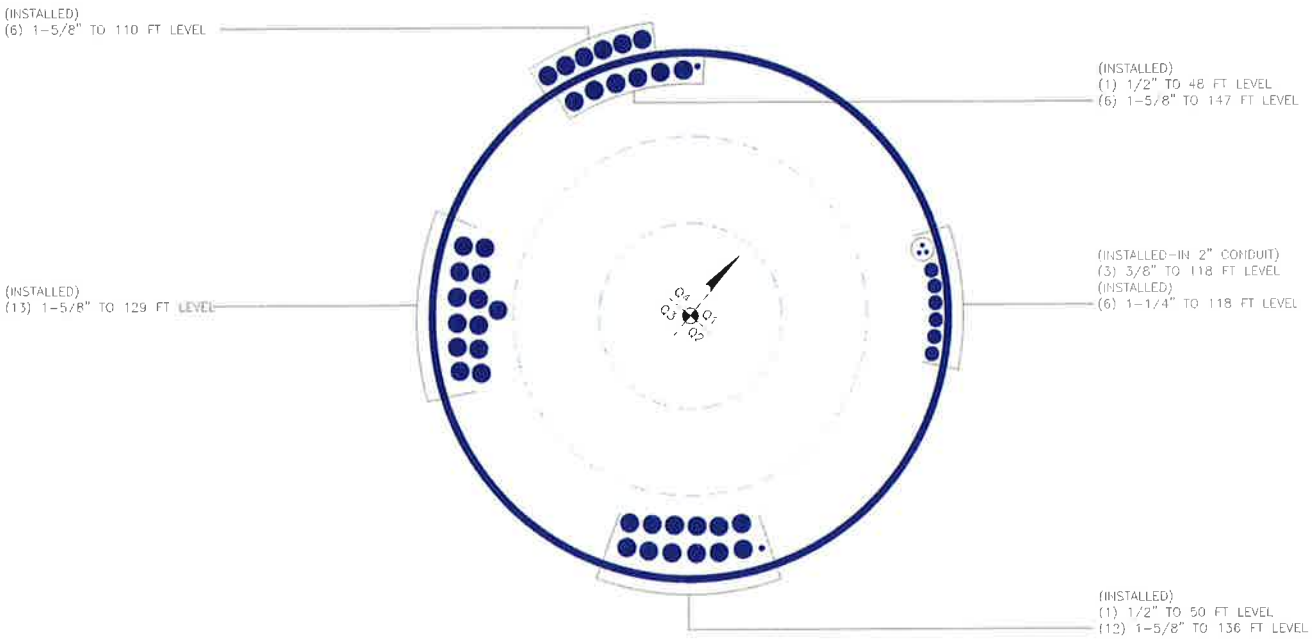
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	147 - 120.37	Pole	TP21.98x16.25x0.1875	1	-5.57	652.60	62.4	Pass
L2	120.37 - 105	Pole	TP24.8521x20.9057x0.25	2	-10.39	1014.88	95.6	Pass
L3	105 - 94.1667	Pole	TP27.1481x24.8521x0.4671	3	-12.30	1429.55	90.6	Pass
L4	94.1667 - 84.91	Pole	TP29.11x27.1481x0.5744	4	-13.39	1825.18	78.9	Pass
L5	84.91 - 59.5	Pole	TP33.993x27.0775x0.5966	5	-21.22	2302.21	93.1	Pass
L6	59.5 - 58.5833	Pole	TP34.1872x33.993x0.6049	6	-21.47	2347.87	92.1	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L7	58.5833 - 44.41	Pole	TP37.19x34.1872x0.6337	7	-24.10	2704.40	86.6	Pass
L8	44.41 - 30.5	Pole	TP39.5221x34.8273x0.6669	8	-26.97	2852.90	88.4	Pass
L9	30.5 - 29.75	Pole	TP39.6814x39.5221x0.6655	9	-31.63	3134.35	87.7	Pass
L10	29.75 - 29	Pole	TP39.8407x39.6814x0.744	10	-31.90	3512.73	78.9	Pass
L11	29 - 27.5833	Pole	TP40.1416x39.8407x0.7408	11	-32.41	3557.24	78.6	Pass
L12	27.5833 - 6.75	Pole	TP44.5664x40.1416x0.6557	12	-39.62	3704.81	84.2	Pass
L13	6.75 - 2.5	Pole	TP45.469x44.5664x0.649	13	-40.79	3537.77	89.5	Pass
L14	2.5 - 0	Pole	TP46x45.469x0.669	14	-41.18	3644.97	87.4	Pass
							Summary	
						Pole (L2)	95.6	Pass
						RATING =	**95.6**	**Pass**

APPENDIX B

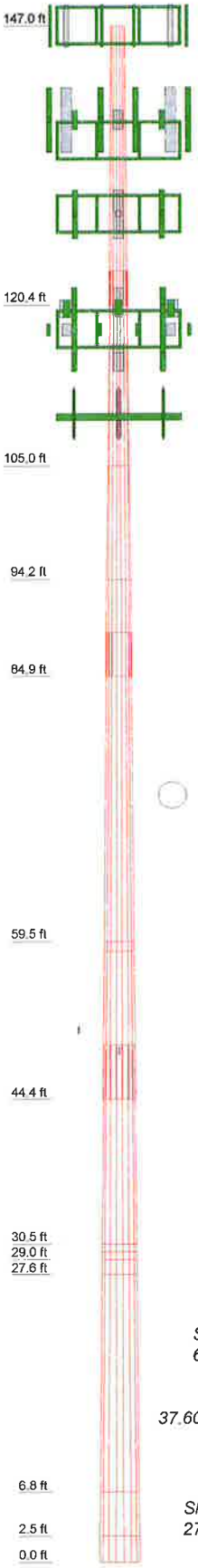
BASE LEVEL DRAWING

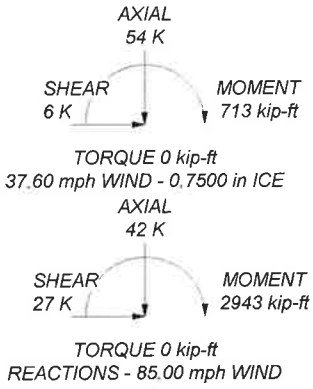

(INSTALLED)
(6) 1-5/8" TO 110 FT LEVEL
(INSTALLED)
(1) 1/2" TO 48 FT LEVEL
(6) 1-5/8" TO 147 FT LEVEL
(INSTALLED)
(13) 1-5/8" TO 129 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(3) 3/8" TO 118 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 118 FT LEVEL
(INSTALLED)
(1) 1/2" TO 50 FT LEVEL
(12) 1-5/8" TO 136 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Length (ft)	26.6300	18.6200	10.8333	9.2567	29.5800	0.9167	14.1733	19.0800				20.8333	2.5000	2.5000
Number of Sides	18	18	18	18	18	18	18	18				18	18	18
Thickness (in)	0.1875	0.2500	0.4671	0.5744	0.5966	0.6049	0.6337	0.6669				0.6557	0.6690	0.6490
Socket Length (ft)				4.1700			5.1700							
Top Dia (in)	16.2500	20.9057	24.8521	27.1481	27.0775	33.9930	34.1872	34.8273				40.1416	45.4963	45.5664
Bot Dia (in)	21.9800	24.8521	27.1481	29.1100	33.9930	34.1872	37.1900	39.5221				44.5664	46.0035	46.4690
Grade	A572-65		Reinf 45.19 ksi		Reinf 45.27 ksi	Reinf 45.52 ksi	Reinf 45.53 ksi	Reinf 47.41 ksi	Reinf 47.56 ksi	Reinf 48.01 ksi	Reinf 48.15 ksi	Reinf 50.69 ksi	Reinf 47.55 ksi	Reinf 47.57 ksi
Weight (K)	1.0	1.1	1.4	1.6	5.7	0.2	3.4	5.0				6.2	1.3	0.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB978H90T2E-M w/ Mount Pipe	147	KRY 112 144/1	129
(2) DB978H90T2E-M w/ Mount Pipe	147	KRY 112 144/1	129
(2) DB978H90T2E-M w/ Mount Pipe	147	Platform Mount [LP 403-1]	129
Platform Mount [LP 601-1]	147	(2) TME-RRUS-11	120
(2) FD9R6004/2C-3L	136	(2) TME-RRUS-11	120
(2) FD9R6004/2C-3L	136	(2) TME-RRUS-11	120
(2) FD9R6004/2C-3L	136	Side Arm Mount [SO 102-3]	120
(2) HBXX-6517DS-VTM w/ Mount Pipe	136	P65-17-XLH-RR w/ Mount Pipe	118
(2) HBXX-6517DS-VTM w/ Mount Pipe	136	SBNH-1D6565C w/ Mount Pipe	118
(2) HBXX-6517DS-VTM w/ Mount Pipe	136	P65-17-XLH-RR w/ Mount Pipe	118
(2) LNX-6514DS-VTM w/ Mount Pipe	136	7770.00 w/ Mount Pipe	118
(2) LNX-6514DS-VTM w/ Mount Pipe	136	7770.00 w/ Mount Pipe	118
(2) LNX-6514DS-VTM w/ Mount Pipe	136	7770.00 w/ Mount Pipe	118
(2) FD9R6004/2C-3L	136	(2) LGP21401	118
(2) FD9R6004/2C-3L	136	(2) LGP21401	118
(2) FD9R6004/2C-3L	136	(2) LGP21401	118
RRH2X60-PCS	136	DC6-48-60-18-8F	118
RRH2X60-PCS	136	Platform Mount [LP 303-1]	118
RRH2X60-PCS	136	800 10504 w/ Mount Pipe	110
Platform Mount [LP 601-1]	136	800 10504 w/ Mount Pipe	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	129	800 10504 w/ Mount Pipe	110
		860 10025	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	129	860 10025	110
		860 10025	110
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	129	2.375" OD x 5' Mount Pipe	110
		2.375" OD x 5' Mount Pipe	110
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	129	2.375" OD x 5' Mount Pipe	110
		T-Arm Mount [TA 602-3]	110
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	129	KS24019-L112A	50
		Side Arm Mount [SO 701-1]	50
KRY 112 144/1	129	KS24019-L112A	48
		Pipe Mount [PM 601-1]	48

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 47.55 ksi	48 ksi	60 ksi
Reinf 45.19 ksi	45 ksi	57 ksi	Reinf 47.57 ksi	48 ksi	60 ksi
Reinf 45.27 ksi	45 ksi	57 ksi	Reinf 48.01 ksi	48 ksi	61 ksi
Reinf 45.52 ksi	46 ksi	57 ksi	Reinf 50.69 ksi	51 ksi	64 ksi
Reinf 45.53 ksi	46 ksi	57 ksi	Reinf 48.15 ksi	48 ksi	61 ksi
Reinf 47.41 ksi	47 ksi	60 ksi	Reinf 47.91 ksi	48 ksi	60 ksi
Reinf 47.56 ksi	48 ksi	60 ksi			

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 0.75 in ice.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 95.6%

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *147 ft Monopole / Preston/Town Hall*			
Project: *PJF 37515-0448 / BU 876360*			
Client: CCI	Drawn by: Joey Meinerding	App'd:	
Code: TIA/EIA-222-F	Date: 04/06/15	Scale: N	
Path:		Dwg No.	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

v4.4 - Effective 7-12-13

Date: 4/6/2015
PJF Project: 37515-0448.003.7805
Client Ref. # 876360
Site Name: Preston/Town Hall
Description: 147' Pole
Owner: CCI
Engineer: JWM

Asymmetric Anchor Rod Analysis

Moment =	2943	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	42.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	27.0	kips	Max Ratio =	105.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	16							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	15.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
2	2.250	#18J A615 Gr 75	75	100	45.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
3	2.250	#18J A615 Gr 75	75	100	75.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
4	2.250	#18J A615 Gr 75	75	100	105.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
5	2.250	#18J A615 Gr 75	75	100	135.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
6	2.250	#18J A615 Gr 75	75	100	165.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
7	2.250	#18J A615 Gr 75	75	100	195.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
8	2.250	#18J A615 Gr 75	75	100	225.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
9	2.250	#18J A615 Gr 75	75	100	255.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
10	2.250	#18J A615 Gr 75	75	100	285.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
11	2.250	#18J A615 Gr 75	75	100	315.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
12	2.250	#18J A615 Gr 75	75	100	345.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
13	2.250	#18J A615 Gr 75	75	100	0.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
14	2.250	#18J A615 Gr 75	75	100	90.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
15	2.250	#18J A615 Gr 75	75	100	180.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
16	2.250	#18J A615 Gr 75	75	100	270.0	55.00	0.00	3.98	163.15	157.90	157.90	0.00	195.00	81.0%
								63.68						

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

TIA Rev F

Site Data

BU#: *876360*
Site Name: *Preston/Town Hall*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	2219.25	ft-kips
Axial:	42	kips
Shear:	27	kips

Moment adjusted to account for additional anchor rods.

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

Anchor Rod Data		
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	55	in

Plate Data		
Diam:	61	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	12.17	in

Stiffener Data (Welding at both sides)		
Config:	3	*
Weld Type:	Groove	
Groove Depth:	0.25	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.4375	in
Width:	6	in
Height:	14	in
Thick:	0.5	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	80	ksi
Clear Space between Stiffeners (b):	7	in

Pole Data		
Diam:	46	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

Maximum Rod Tension:	157.9 Kips	Stiffened Service, ASD Fty*ASIF

Original Stiffener Check

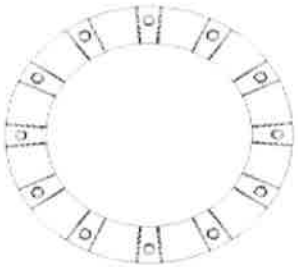
Stiffened
Service, ASD
0.75*Fy*ASIF
Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	54.3% Pass
Vertical Weld:	23.9% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	22.0% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	56.5% Pass
Plate Comp. (AISC Bracket):	65.3% Pass

Pole Results

Pole Punching Shear Check:	10.3% Pass



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

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

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

TIA Rev F

Site Data

BU#: *876360*
Site Name: *Preston/Town Hall*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	4390.375	ft-kips
Axial:	42	kips
Shear:	27	kips

Moment adjusted to account for additional anchor rods.

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

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	55	in

Plate Data		
Diam:	61	in
Thick:	1.75	in
Grade:	60	ksi
Single-Rod B-eff:	6.08	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Both	
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.375	in
Width:	6	in
Height:	14	in
Thick:	1	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	80	ksi

Pole Data		
Diam:	46	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

Maximum Rod Tension:	157.9 Kips	Stiffened, Service, ASD, Fty*ASIF

Base Plate Results

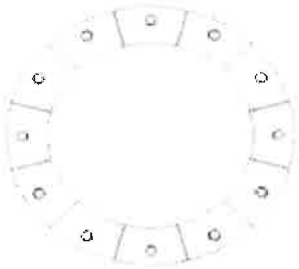
	Flexural Check	
Base Plate Stress:	51.1 ksi	Stiffened, Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	85.2% Pass	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	53.7% Pass
Vertical Weld:	68.2% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	20.2% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	52.6% Pass
Plate Comp. (AISC Bracket):	61.4% Pass

Pole Results

Pole Punching Shear Check:	25.1% Pass



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

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

Foundation Loads:

Pole weight or tower leg compression =	42	(kips)
Horizontal load at top of pier =	27	(kips)
Overturning moment at top of pier=	2943	(ft-kips)

Design criteria:

Safety factor against overturning =	2	

Soil Properties:

Soil density =	120	(pcf)
Allowable soil bearing =	5	(ksf)
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	S	("R" or "S")
Pier width =	7	(ft)
Pier height above grade =	1	(ft)
depth to bottom of footing =	6	(ft)
Footing thickness =	3	(ft)
Footing width =	26	(ft)
Footing length =	26	(ft)

Concrete:

Concrete strength =	4	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

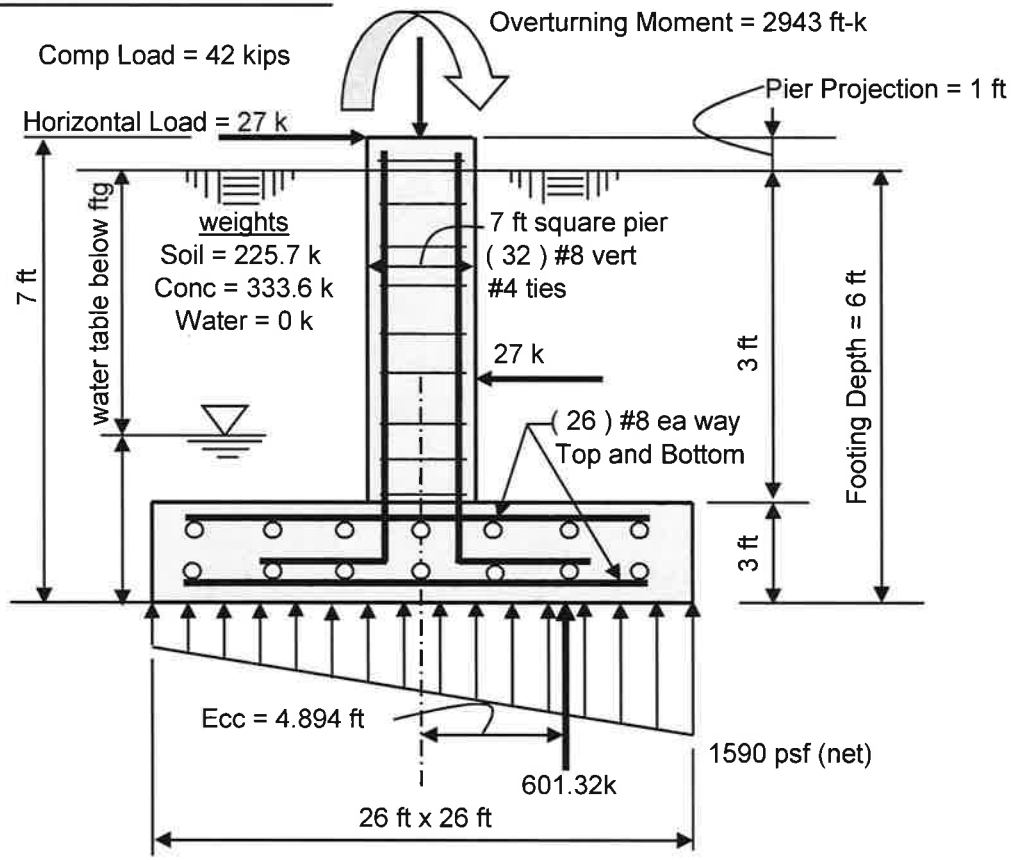
Reinforcing Steel:

	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#8	bar
quantity of pad rebar =	26	(ea direction)

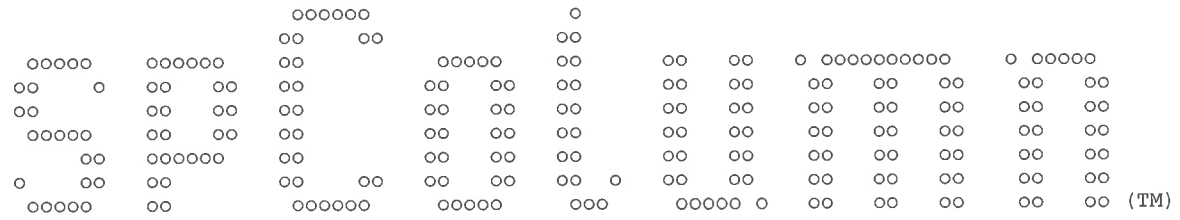
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	#8	bar
vertical rebar quantity =	32	
size of pier ties =	#4	bar
minimum cover over rebar =	4.5	inches

Total volume of concrete = 82.4 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 1.59 ksf Allowable Net Soil Bearing = 5 ksf **Soil Bearing Stress Ratio = 0.32 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 26 psi **Bending Shear Stress Ratio = 0.2 Okay**
Ftg Overturning Resistance = 7817 ft-kips Overturning Moment = 2943 ft-kips Required Overturning Safety Factor = 2 Overturning Safety Factor = 2.656 **Ratio = 0.75 Okay**	Pad Bending Moment Capacity= 2858 ft-k Pad Bending Moment = 1288 ft-k **Bending Moment Stress Ratio = 0.45 OK**



spColumn v4.80 (TM)
Computer program for the Strength Design of Reinforced Concrete Sections

General Information:
==========
File Name: G:\TOWER\375_Crown_Castle\2015\37515-0448_876360_PRESTON-TOWN ...\37515-0448.003.7805.col
Project: 37515-0448.003.7805
Column: Engineer: JWM
Code: ACI 318-02 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Structural

Material Properties:
==========
f'c = 4 ksi fy = 60 ksi
Ec = 3605 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:
==========
Rectangular: Width = 84 in Depth = 84 in

Gross section area, Ag = 7056 in^2
Ix = 4.14893e+006 in^4 Iy = 4.14893e+006 in^4
rx = 24.2487 in ry = 24.2487 in
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #4 ties with #8 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
Pattern: All Sides Equal (Cover to longitudinal reinforcement)
Total steel area: As = 26.07 in^2 at rho = 0.37% (Note: rho < 0.50%)
Minimum clear spacing = 6.03 in

33 #8 Cover = 4.5 in

Factored Loads and Moments with Corresponding Capacities:
==========

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	42.00	3966.30	4722.72	1.191	5.80	78.83	0.03789	0.900

*** End of output ***

37515-0448.002.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #876360; PRESTON / TOWN HALL

APP: 281638 REV. 0; WO: 1011395

SITE ADDRESS

389 RT. 2
PRESTON, CONNECTICUT 06365
NEW LONDON COUNTY

PROJECT NOTES

1. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN CASTLE'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT DRAWINGS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIRMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. DTI'S REQUIRED: ALL ONE SIDED BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL ONE SIDED BOLTS SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DTI WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-2 FOR REQUIREMENTS ON THE USE OF DTI WASHERS WITH THE BOLTS.

PROJECT CONTACT:

MONOPOLE OWNER:
CROWN CASTLE
MOD PM: JOHN MCGEE AT JOHN.MCGEE@CROWNCASTLE.COM
PH: (704) 877-8397

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE 2005 CONNECTICUT BUILDING CODE WITH 2009 AMENDMENT AND THE 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.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37515-0448.002.7700), DATED 02/23/2015.

THIS PROJECT INCLUDES THE FOLLOWING ITEMS:

SHAFT REINFORCING
FIELD WELDED STIFFENERS
REMOVAL OF EXISTING STIFFENERS

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	AJAX BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	BASE PLATE DETAILS
S-5	MI CHECKLIST

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED PROFESSIONAL ENGINEER

2-27-15

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street · Suite 600 · Columbus, Ohio 43215
(614) 221-6679 www.pjfweb.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE,NC 28277
PH: (123) 456-7890

BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	TITLE SHEET
CHECKED BY: JWM	
APPROVED BY: BKK	T-1
DATE: 02/23/2015	

CROWN CASTLE PROJECT: BU #876360; PRESTON / TOWN HALL: PRESTON, CONNECTICUT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. **GENERAL NOTES**
   - 1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
   - 1.2. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
   - 1.3. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
   - 1.4. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
   - 1.5. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING GENERAL CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
   - 1.6. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
   - 1.7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
   - 1.8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
   - 1.9. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED AND RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.
   - 1.10. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS.

2. **STRUCTURAL STEEL**
   - 2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
     - 2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
       - 2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
       - 2.1.1.2. SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
       - 2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).
     - 2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
       - 2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
       - 2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"
   - 2.2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
   - 2.3. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.4. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
   - 2.5. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.6. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
   - 2.7. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
   - 2.8. FIELD CUTTING OF STEEL:
     - 2.8.1. IMPORTANT CUTTING AND WELDING SAFTEY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFTEY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
     - 2.8.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. **BASE PLATE GROUT - (NOT REQUIRED)**

4. **FOUNDATION WORK - (NOT REQUIRED)**

5. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**

6. **EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**

7. **TOUCH UP OF GALVANIZING**
   - 7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3375 FOR PRODUCT INFORMATION.
   - 7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS OR GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
   - 7.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. **HOT-DIP GALVANIZING**
   - 8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
   - 8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
   - 8.3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.
   - 8.4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
   - 9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
   - 9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
   - 9.3. CROWN CASTLE SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT, ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVER WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	GENERAL NOTES
CHECKED BY: JWM	
APPROVED BY: BKK	S-1
DATE: 02/23/2015	

37515-0448.002.DWG

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

NOTES:

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

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

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

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

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

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

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

PART NUMBER: 2DTIM208MGAFSIF

DESCRIPTION: P.C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

DISTRIBUTOR CONTACT DETAILS:
ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

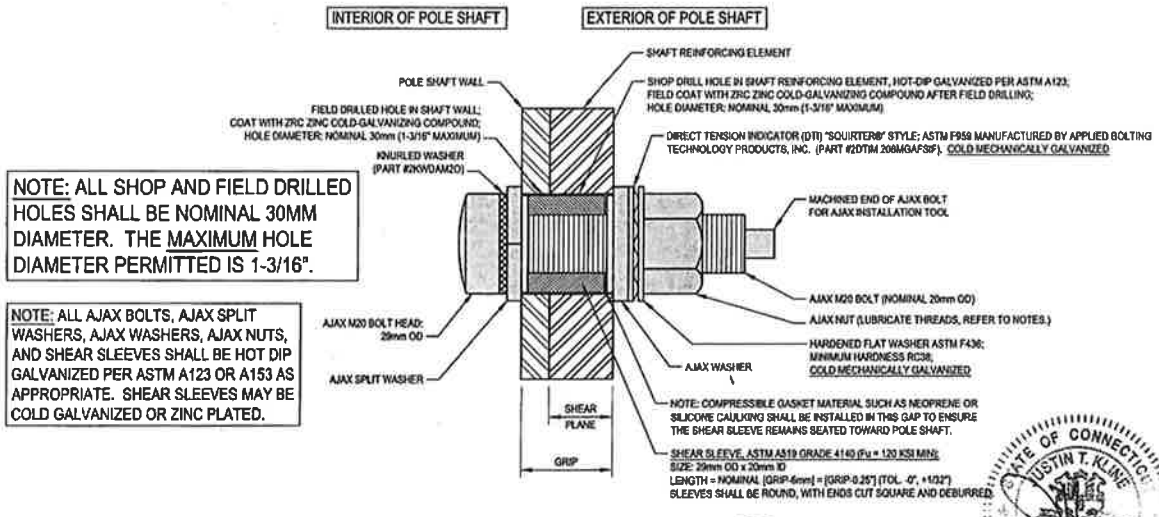
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

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

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

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

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.



NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.

TYPICAL AJAX BOLT DETAIL 1 / S-2

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BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	AJAX BOLT DETAIL
CHECKED BY: JWM	
APPROVED BY: BKK	S-2
DATE: 02/23/2015	

37515-0448.002.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.2123390 IN/FT
SHAFT STEEL:	Fy=65 KSI
BASE PL STEEL:	Fy=60 KSI
ANCHOR RODS:	2 1/4"ø #18J ASTM A615 GRADE 75

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	26.83	0.1875	38.00	16.250	21.980
2	38.71	0.2500	50.00	20.905	29.110
3	44.67	0.3125	62.00	27.726	37.160
4	49.56	0.3750		35.469	46.000

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:

(A) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-4.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART ON THIS SHEET.

(C) REMOVE EXISTING STIFFENERS AT BASE. SEE SHEET S-4.

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE										
BOTTOM ELEVATION	TOP ELEVATION	FLAT B / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
0' - 0"	30' - 6"	F1 & F7	CCI-AFP-04510030	30' - 0"	2	31	62	8	8	20"	919 LBS.
0' - 0"	30' - 6"	F15	1"x 4-1/2" (CUSTOM)	30' - 0"	1	21	21	0	8	20"	459 LBS.
25' - 7"	60' - 7"	F13	CCI-AFP-04510035	35' - 0"	1	34	34	8	8	20"	536 LBS.
30' - 7"	60' - 7"	F1 & F7	CCI-AFP-04510030	30' - 0"	2	31	62	8	8	20"	919 LBS.
60' - 8"	95' - 8"	F1, F7 & F13	CCI-AFP-04007535	35' - 0"	3	35	105	6	6	16"	1072 LBS.
							284				3905 LBS.

NOTES:

1.) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.

2.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-631-3275 FOR PRODUCT INFORMATION.

3.) ALL REINFORCING SHALL BE ASTM A572 GR. 65. .

4.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.

5.) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.

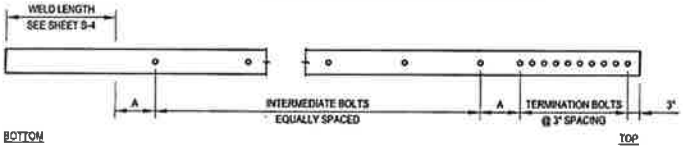
6.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART								
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	AJAX BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
30' - 7"	1"	4-1/2"	4' - 7"	2	0"	0"	16	140 LBS.
60' - 8"	1"	4-1/2"	4' - 1"	3	0"	0"	14	188 LBS.
						0"		328 LBS.

* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

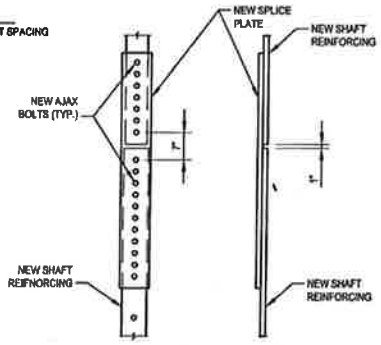
NEW SHIM CHART				
1/16" SHIM QUANTITY	1/8" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
12	3	4"	4"	1-1/4"
15	3	4-1/2"	4"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.

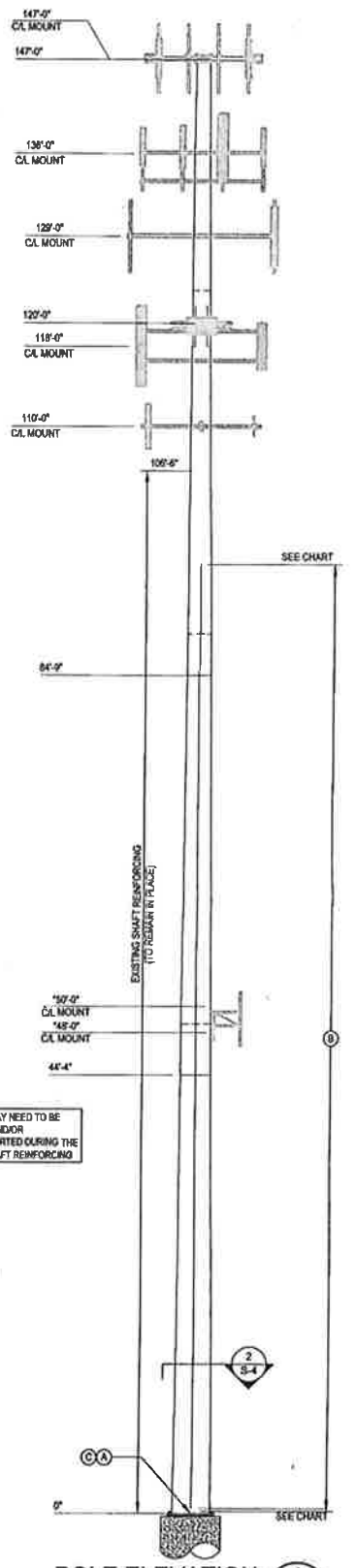


CUSTOM WELDED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING



DETAIL 2 / S-3
SCALE: NTS



POLE ELEVATION 1 / S-3

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING

2-27-15

CROWN CASTLE US PATENT NOS 8,048,972; 8,158,712; 7,649,059; 8,424,269 AND PATENT PENDING

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
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CROWN CASTLE
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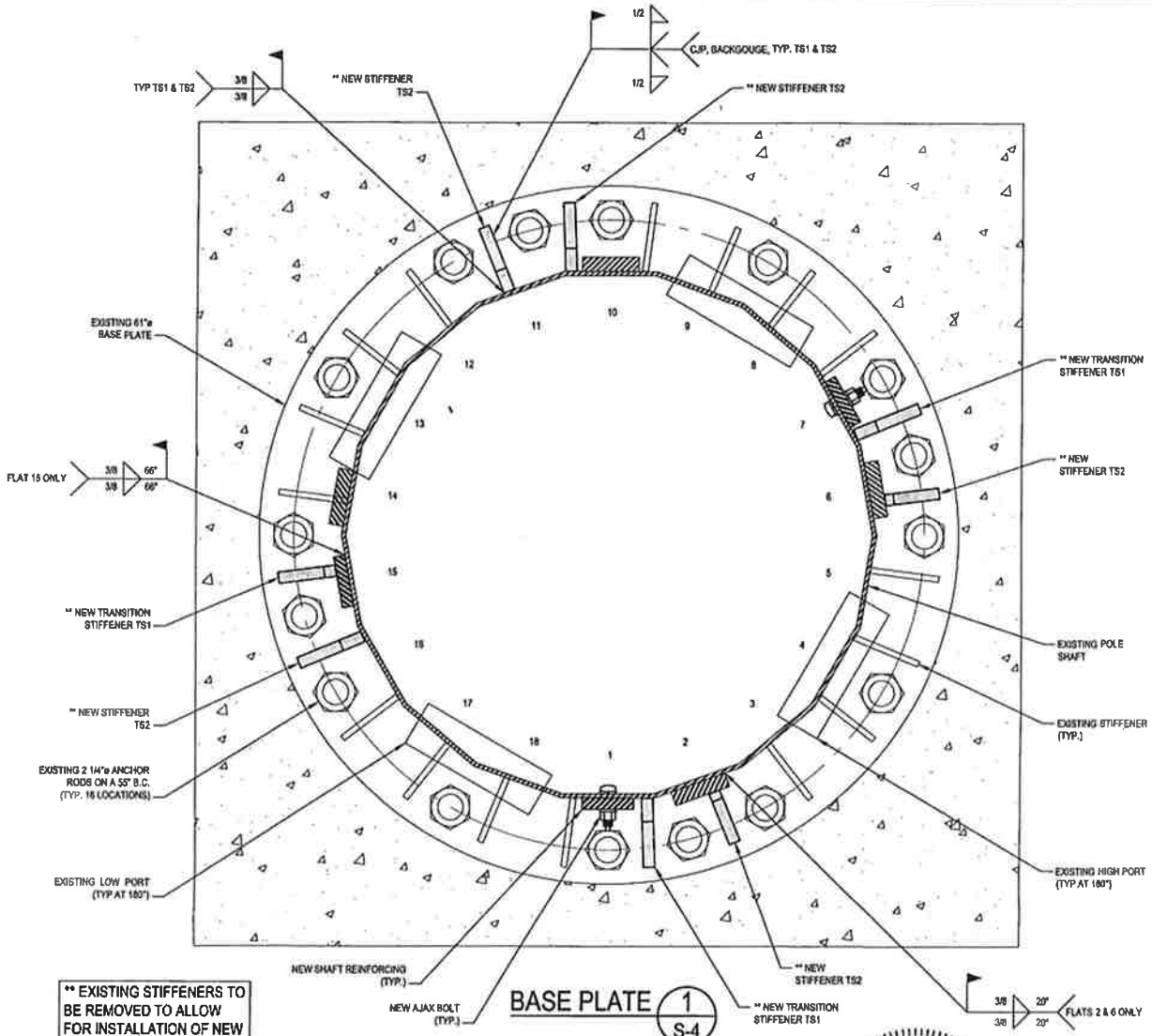
PH: (123) 456-7890

BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	MONOPOLE PROFILE
CHECKED BY: JWM	
APPROVED BY: BKM	S-3
DATE: 02/23/2015	

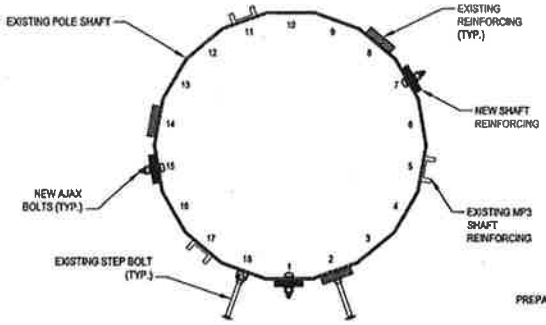
37515-0448.002.DWG



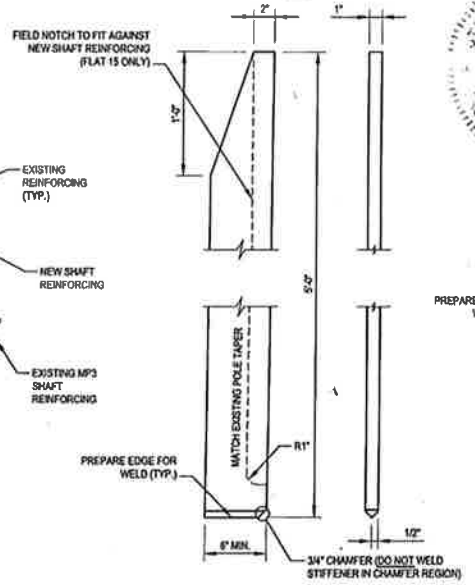
** EXISTING STIFFENERS TO BE REMOVED TO ALLOW FOR INSTALLATION OF NEW STIFFENERS TS1 & TS2

BASE PLATE 1 / S-4

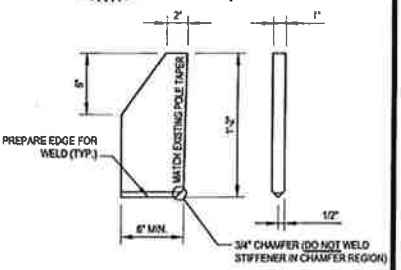
NOTE: CONTRACTOR SHALL REMOVE AND REPLACE STEP BOLTS AS REQUIRED FOR REINFORCING INSTALLATION



DETAIL 2 / S-4
SCALE: NTS



TRANSITION STIFFENER MK~TS1
(3 REQUIRED) (Fy = 65 KSI)



STIFFENER MK~TS2
(5 REQUIRED) (Fy = 65 KSI)

STATE OF CONNECTICUT
JUSTIN T. KNINE
No. 30301
LICENSED PROFESSIONAL ENGINEER

2-27-15

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PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	BASE PLATE DETAILS
CHECKED BY: JWM	
APPROVED BY: BKK	S-4
DATE: 02/23/2015	

37515-0448.002.DWG

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   - 1.1. 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 EOR.
   - 1.2. 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.
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. 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 CASTLE.

3. **GENERAL CONTRACTOR**
   - 3.1. 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:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

4. **RECOMMENDATIONS**
   - 4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
     - 4.1.1. IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
     - 4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
     - 4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
     - 4.1.4. IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
     - 4.1.5. 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.

5. **CANCELLATION OR DELAYS IN SCHEDULED MI**
   - 5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CASTLE 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.

6. **CORRECTION OF FAILING MI'S**
   - 6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
     - 6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
     - 6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. **MI VERIFICATION INSPECTIONS**
   - 7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. 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.

8. **PHOTOGRAPHS**
   - 8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
     - 8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
     - 8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - 8.1.3. RAW MATERIALS
     - 8.1.4. PHOTOS OF ALL CRITICAL DETAILS
     - 8.1.5. FOUNDATION MODIFICATIONS
     - 8.1.6. WELD PREPARATION
     - 8.1.7. BOLT INSTALLATION AND TORQUE
     - 8.1.8. FINAL INSTALLED CONDITION
     - 8.1.9. SURFACE COATING REPAIR
     - 8.1.10. POST CONSTRUCTION PHOTOGRAPHS
     - 8.1.11. FINAL INFIELD CONDITION
     - 8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
     - 8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

9. **INSPECTION AND TESTING**
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   - 9.6. **GENERAL**
     - 9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. **FOUNDATIONS AND SOIL PREPARATION - (NOT REQUIRED)**
   - 9.8. **CONCRETE TESTING PER ACI - (NOT REQUIRED)**
   - 9.9. **STRUCTURAL STEEL**
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.5. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.6. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.7. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.8. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. **WELDING:**
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   - 9.11. **REPORTS:**
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
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
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF ONE SIDED BOLTS AND OTITS PER REQUIREMENTS ON SHEET S-2
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

STATE OF CONNECTICUT — JUSTIN T. KLINE — No. 30030 — LICENSED PROFESSIONAL ENGINEER

2-27-15

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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #876360; PRESTON / TOWN HALL

APP: 281638 REV. 0; WO: 1011395

SITE ADDRESS

389 RT. 2
PRESTON, CONNECTICUT 06365
NEW LONDON COUNTY

PROJECT NOTES

1. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. DETAILED FIELD INFORMATION REGARDING INTERFERENCES AND/OR EXISTING FIELD CONDITIONS MAY BE AVAILABLE ON CROWN CASTLE'S CCISITES AND FROM CONTRACTOR'S PRE-MOD MAPPING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AND COORDINATE WITH THE AVAILABLE SOURCES OF INFORMATION ABOVE AND WITH THE PROJECT DRAWINGS BEFORE PROCEEDING WITH THE WORK. CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE FIELD PERSONNEL BEFORE PROCEEDING WITH THE WORK.
2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIRMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
3. ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
4. DTI'S REQUIRED: ALL ONE SIDED BOLTS SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL ONE SIDED BOLTS SHALL BE PRETENSIONED AND TIGHTENED UNTIL THE DTI WASHERS SHOW THAT THE PROPER BOLT TENSION HAS BEEN REACHED. SEE NOTES AND DETAILS ON SHEET S-2 FOR REQUIREMENTS ON THE USE OF DTI WASHERS WITH THE BOLTS.

PROJECT CONTACT:

MONOPOLE OWNER:
CROWN CASTLE
MOD PM: JOHN MCGEE AT JOHN.MCGEE@CROWNCASTLE.COM
PH: (704) 877-8397

DESIGN STANDARD

THIS REINFORCEMENT DESIGN IS BASED UPON THE REQUIREMENTS OF THE 2005 CONNECTICUT BUILDING CODE WITH 2009 AMENDMENT AND THE 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.

REFER TO THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF STRUCTURAL ANALYSIS FOR THIS SITE (PJF#37515-0448.002.7700), DATED 02/23/2015.

THIS PROJECT INCLUDES THE FOLLOWING ITEMS:
SHAFT REINFORCING
FIELD WELDED STIFFENERS
REMOVAL OF EXISTING STIFFENERS

SHEET INDEX

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2	AJAX BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	BASE PLATE DETAILS
S-5	MI CHECKLIST

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CROWN CASTLE PROJECT: BU #876360; PRESTON / TOWN HALL; PRESTON, CONNECTICUT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. **GENERAL NOTES**
   1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
   1.2. IF MATERIALS, QUANTITIES, STRENGTHS OR SIZES INDICATED BY THE DRAWINGS OR SPECIFICATIONS ARE NOT IN AGREEMENT WITH THESE NOTES, THE BETTER QUALITY AND/OR GREATER QUANTITY, STRENGTH OR SIZE INDICATED, SPECIFIED OR NOTED SHALL BE PROVIDED.
   1.3. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
   1.4. THE STRUCTURAL CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OR MEANS OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
   1.5. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING GENERAL CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
   1.6. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
   1.7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
   1.8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
   1.9. ANY EXISTING ATTACHMENTS AND/OR PROJECTIONS ON THE POLE THAT MAY INTERFERE WITH THE INSTALLATION OF THE REINFORCING SYSTEM WILL HAVE TO BE REMOVED AND RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.
   1.10. ANY AND ALL EXISTING PLATFORMS THAT ARE LOCATED IN AREAS OF THE POLE SHAFT WHERE SHAFT REINFORCING MUST BE APPLIED SHALL BE TEMPORARILY REMOVED OR OTHERWISE SUPPORTED TO PERMIT NEW CONTINUOUS REINFORCEMENT TO BE ATTACHED. AFTER THE CONTRACTOR HAS SUCCESSFULLY INSTALLED THE MONOPOLE REINFORCEMENT SYSTEM, THE CONTRACTOR SHALL RE-INSTALL THE PLATFORMS.

2. **STRUCTURAL STEEL**
   2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
      2.1.1. **BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):**
         2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
         2.1.1.2. SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
         2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED)
      2.1.2. **BY THE AMERICAN WELDING SOCIETY (AWS):**
         2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
         2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"
   2.2. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
   2.3. WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY, AWS D1.1. ALL WELD ELECTRODES SHALL BE E80XX UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   2.4. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
   2.5. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   2.6. SURFACES OF EXISTING STEEL SHALL BE PREPARED AS REQUIRED FOR FIELD WELDING PER AWS. SEE SECTION I NOTES REGARDING TOUCH UP OF GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS FIELD WELDING.
   2.7. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
   2.8. **FIELD CUTTING OF STEEL:**
      2.8.1. **IMPORTANT CUTTING AND WELDING SAFTEY GUIDELINES:** THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFTEY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. **PER THE 12-01-2005 CROWN CASTLE DIRECTIVE "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT".** ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
      2.8.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

3. **BASE PLATE GROUT - (NOT REQUIRED)**

4. **FOUNDATION WORK - (NOT REQUIRED)**

5. **CAST-IN-PLACE CONCRETE - (NOT REQUIRED)**

6. **EPOXY GROUTED REINFORCING ANCHOR RODS - (NOT REQUIRED)**

7. **TOUCH UP OF GALVANIZING**
   7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
   7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
   7.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. **HOT-DIP GALVANIZING**
   8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
   8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
   8.3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.
   8.4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

9. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
   9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
   9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. **ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
   9.3. CROWN CASTLE SHALL REFER TO TIA/EIA-222-F-1996, SECTION 14 AND ANNEX E FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT,** ACCORDING TO TIA/EIA-222-F-1996 SECTION 14.1, NOTE 1: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVER WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	GENERAL NOTES
CHECKED BY: JWM	
APPROVED BY:	S-1
DATE: 02/23/2015	

AJAX BOLT NOTE SHEET: REV. 1.5, 5-12-2014

NOTES:

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

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

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

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

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

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

THE DIRECT TENSION INDICATOR (DTI) WASHERS SHALL BE THE "SQUIRTER® STYLE" AS MANUFACTURED BY APPLIED BOLTING TECHNOLOGY PRODUCTS' INC.:

PART NUMBER: 2DTIM208MGAFSIF

DESCRIPTION: P,C. 8.8 DTI SQUIRTER WASHER WITH RED DURABLE SQUIRT MEDIA DESIGNED SPECIFICALLY FOR THE AJAX M20 ONESIDE BOLT. FINISH SHALL BE ZINC GALVANIZED AS PROVIDED BY THE DTI MANUFACTURER.

DISTRIBUTOR CONTACT DETAILS:
ALLFASTENERS
15401 COMMERCE PARK DR.
BROOKPARK, OHIO 44142
PHONE: 440-232-6060
E-MAIL: SALES@ALLFASTENERS.COM

DTI: USE DIRECT TENSION INDICATOR (DTI) WASHERS COMPATIBLE WITH 20 MM (M20) NOMINAL A325 BOLTS FOR THE AJAX M20 BOLTS. DTI'S SHALL NOT BE HOT-DIP GALVANIZED. DTI'S SHALL BE MECHANICALLY GALVANIZED (MG) BY THE COLD MECHANICAL PROCESS ONLY AS PROVIDED BY THE DTI MANUFACTURER.

HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY GALVANIZED BY THE COLD MECHANICAL PROCESS. ALTERNATIVELY, CORRECTLY MADE HOT DIP GALVANIZED HARDENED FLAT WASHERS HAVING A MINIMUM HARDNESS OF RC 38 CAN BE USED; CONTRACTOR SHALL PROVIDE DOCUMENTATION OF WASHER SPECIFICATION AND HARDNESS.

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

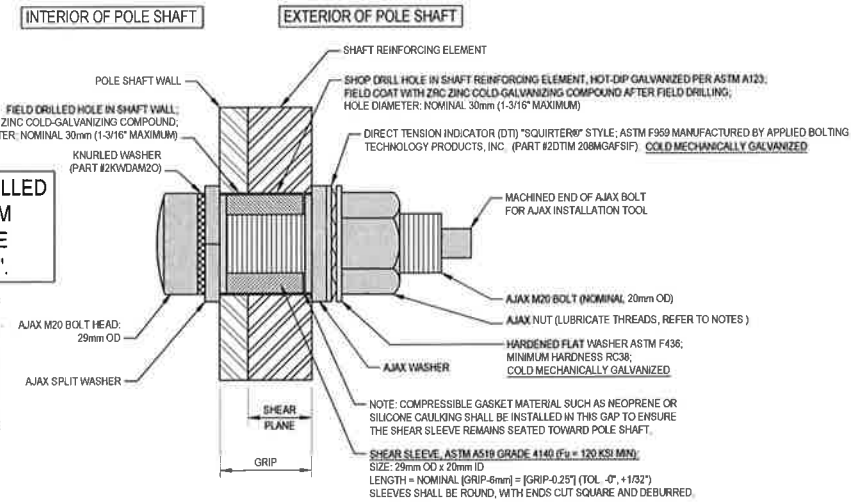
NOTE: COMPLETELY COMPRESSED DTI'S SHOWING NO VISIBLE REMAINING GAP ARE ACCEPTABLE. DTI WASHERS SHALL BE PLACED DIRECTLY AGAINST THE OUTER AJAX WASHER WITH THE DTI BUMPS FACING AWAY FROM THE AJAX WASHER. PLACE A HARDENED WASHER BETWEEN THE DTI AND THE AJAX NUT. THE DTI BUMPS SHALL BEAR AGAINST THE UNDERSIDE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

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

INSPECTION REQUIRED: ALL AJAX BOLTS SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009, BY A QUALIFIED BOLT INSPECTOR. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE AJAX BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. IN ADDITION, ALL AJAX BOLTS AND DTI'S SHALL BE VISUALLY INSPECTED ACCORDING TO THE DTI MANUFACTURER'S INSTRUCTIONS. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE PHOTO DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THE CONDITION OF THE DTI'S.

NOTE: ALL SHOP AND FIELD DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16".

NOTE: ALL AJAX BOLTS, AJAX SPLIT WASHERS, AJAX WASHERS, AJAX NUTS, AND SHEAR SLEEVES SHALL BE HOT DIP GALVANIZED PER ASTM A123 OR A153 AS APPROPRIATE. SHEAR SLEEVES MAY BE COLD GALVANIZED OR ZINC PLATED.



TYPICAL AJAX BOLT DETAIL 1/S-2

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BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	AJAX BOLT DETAIL
CHECKED BY: JWM	
APPROVED BY:	S-2
DATE: 02/23/2015	

37515-0448.002.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	18-SIDED POLYGON
TAPER:	0.212390 IN/FT
SHAFT STEEL:	Fy=65 KSI
BASE PL STEEL:	Fy=60 KSI
ANCHOR RODS:	2 1/4"ø #18J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN)	
				@ TOP	@ BOTTOM
1	26.63	0.1875	39.00	16.250	21.880
2	38.71	0.2500	50.00	20.905	29.110
3	44.67	0.3125	62.00	27.726	37.190
4	49.58	0.3750		35.469	46.000

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

CONTRACTOR SHALL PROVIDE ASTM A36 SHIM PLATES BELOW SLIP JOINTS. THE SHIM PLATES SHALL BE PLACED BETWEEN THE NEW SHAFT REINFORCEMENT AND THE EXISTING POLE SHAFT FROM THE SLIP JOINT TO THE NEW SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND A EXTRA LONG "SPLICE SHIM" SHALL BE PLACED BETWEEN THE NEW UPPER AND LOWER SHAFT REINFORCEMENT PLATES AT THE SHAFT REINFORCEMENT SPLICE PLATE LOCATION AND ALL TERMINATION POINTS, AS REQUIRED.

MODIFICATIONS:

(A) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-4.

(B) INSTALL NEW SHAFT REINFORCING. SEE CHART ON THIS SHEET.

(C) REMOVE EXISTING STIFFENERS AT BASE. SEE SHEET S-4.

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE AJAX BOLTS PER ELEMENT	APPROXIMATE TOTAL AJAX BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
0' - 6"	30' - 6"	F1 & F7	CCI-AFP-04510030	30 - 0"	2	31	62	8	8	20"	919 LBS
0' - 6"	30' - 6"	F15	1"x 4-1/2" (CUSTOM)	30 - 0"	1	21	21	0	8	20"	459 LBS
26' - 7"	60' - 7"	F13	CCI-AFP-04510035	35 - 0"	1	34	34	8	8	20"	536 LBS
30' - 7"	60' - 7"	F1 & F7	CCI-AFP-04510030	30 - 0"	2	31	62	8	8	20"	919 LBS
60' - 6"	95' - 6"	F1, F7 & F13	CCI-AFP-04007535	35 - 0"	3	35	105	6	6	16"	1072 LBS
							284				3905 LBS

NOTES:

1) AJAX BOLTS ARE TO BE 20mm DIAMETER WITH CORRESPONDING 29mm DIAMETER SLEEVE WITH MATCHING STEEL GRADE.
2) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.
3) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
4) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/6" FILLET WELDS.
5) HOLES FOR AJAX BOLTS AND SHEAR SLEEVES ARE 30mm UNLESS NOTED OTHERWISE.
6) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART

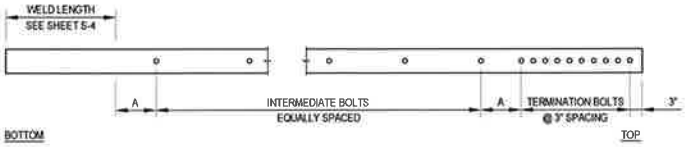
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	AJAX BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
30' - 7"	1"	4-1/2"	4' - 7"	2	0"	0"	16	140 LBS
60' - 6"	1"	4-1/2"	4' - 1"	3	0"	0"	14	168 LBS
						0"		308 LBS

* BOLTS INCLUDED IN THE TOTAL QUANTITY LISTED IN THE FLAT PLATE INSTALLATION CHART.

NEW SHIM CHART

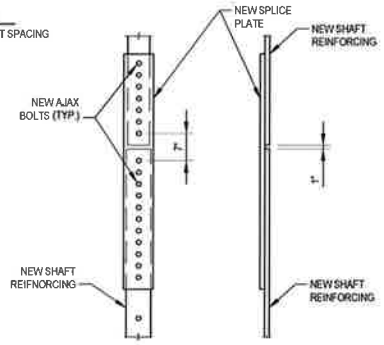
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
12	3	4"	4"	1-1/4"
15	3	4-1/2"	4"	1-1/4"

SHIMS ARE FOR BIDDING PURPOSES ONLY. FINAL SHIM REQUIREMENTS TO BE DETERMINED BY CONTRACTOR DURING FABRICATION.

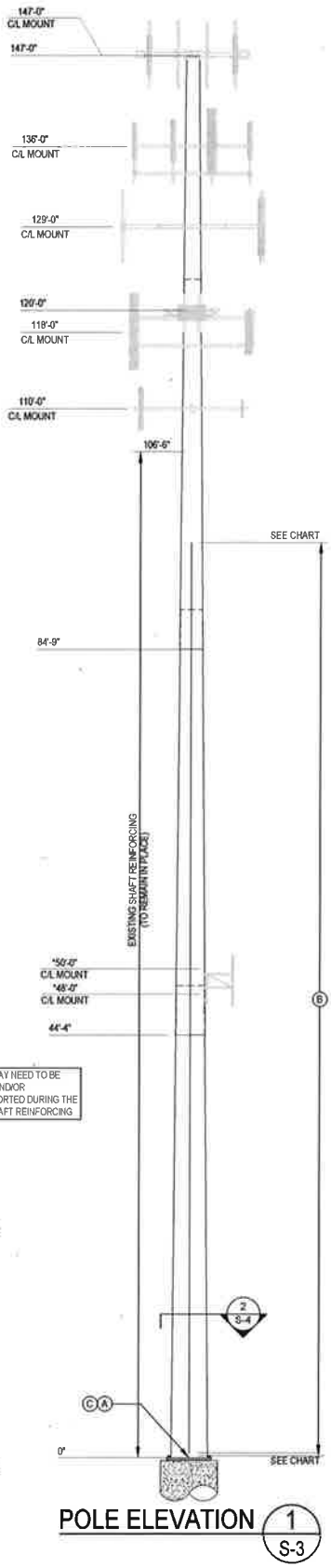


CUSTOM WELDED BAR DETAIL

NOTE: "A" DIMENSION MAY VARY, NOT TO EXCEED MAXIMUM INTERMEDIATE BOLT SPACING



DETAIL 2 / S-3
SCALE: NTS



POLE ELEVATION 1 / S-3

* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING.

CROWN CASTLE US PATENT NOS 8,046,972; 8,156,712; 7,849,659; 8,424,269 AND PATENT PENDING

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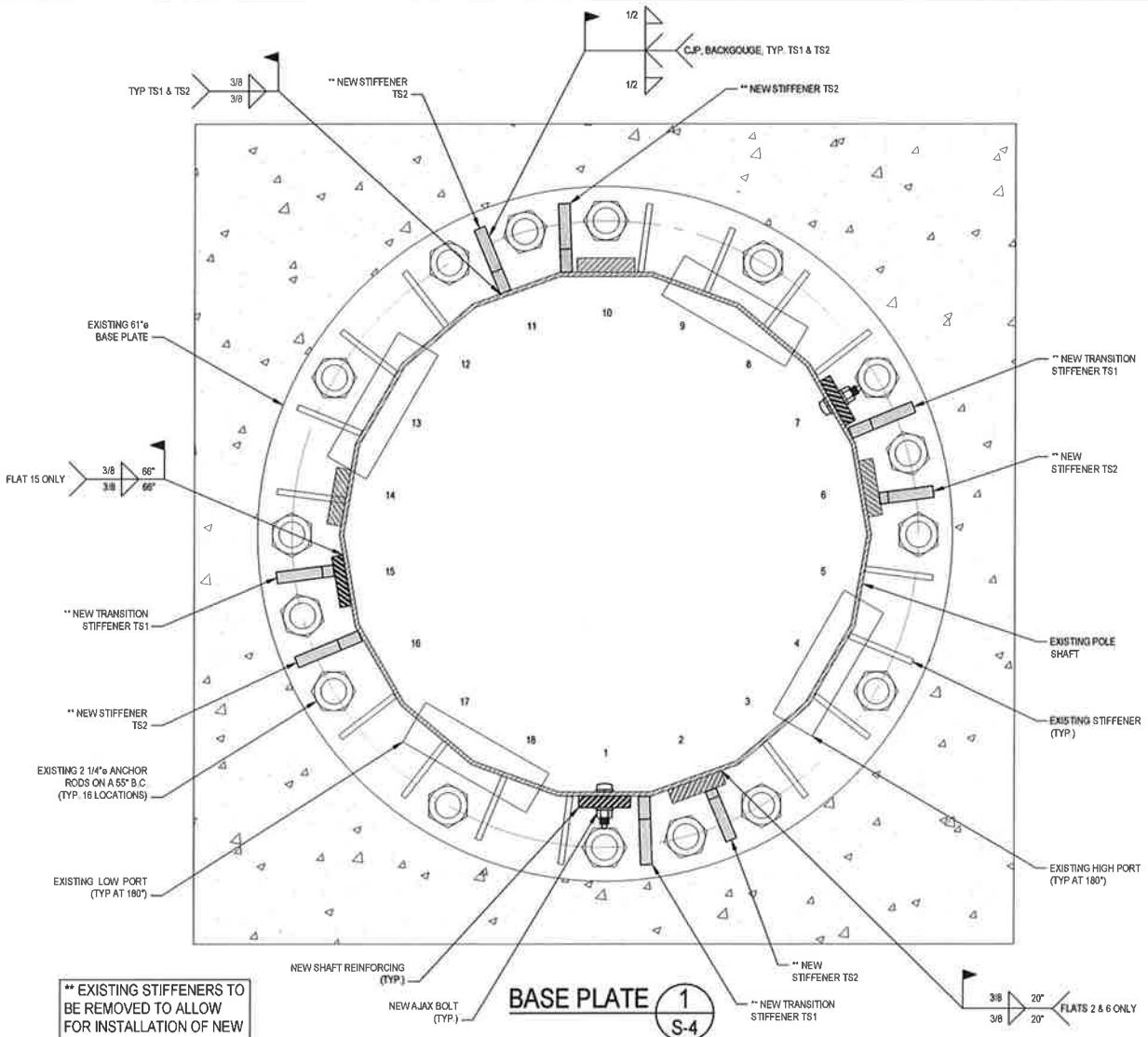
DATE: 02/23/2015	

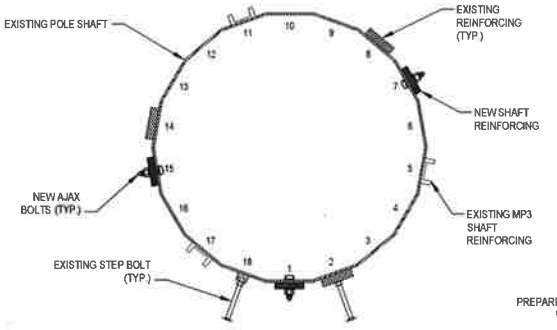
37515-0448.002.DWG



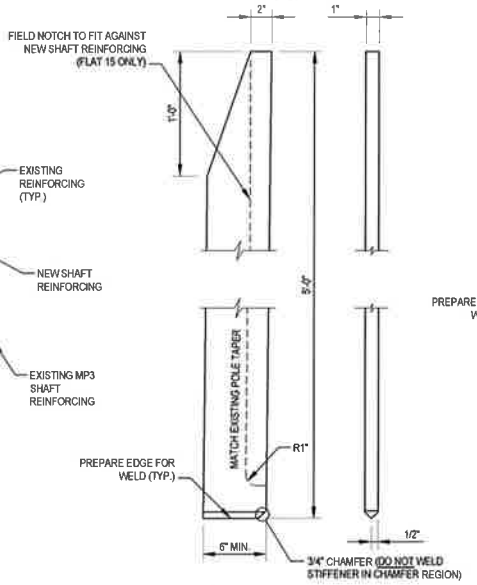
** EXISTING STIFFENERS TO BE REMOVED TO ALLOW FOR INSTALLATION OF NEW STIFFENERS TS1 & TS2

BASE PLATE 1 S-4

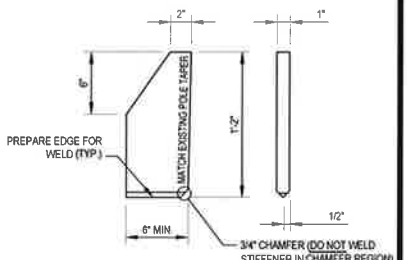
NOTE: CONTRACTOR SHALL REMOVE AND REPLACE STEP BOLTS AS REQUIRED FOR REINFORCING INSTALLATION



DETAIL 2 S-4
SCALE: NTS



TRANSITION STIFFENER MK~TS1
(3 REQUIRED) (Fy = 65 KSI)



STIFFENER MK~TS2
(5 REQUIRED) (Fy = 65 KSI)

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BU #876360; PRESTON / TOWN HALL
PRESTON, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-0448.002.7700

DRAWN BY: CAW	BASE PLATE DETAILS
CHECKED BY: JWM	
APPROVED BY:	S-4
DATE: 02/23/2015	

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   - 1.1. 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 EOR.
   - 1.2. 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.
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. 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 CASTLE.

3. **GENERAL CONTRACTOR**
   - 3.1. 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:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

4. **RECOMMENDATIONS**
   - 4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
     - 4.1.1. IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
     - 4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
     - 4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
     - 4.1.4. IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
     - 4.1.5. 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.

5. **CANCELLATION OR DELAYS IN SCHEDULED MI**
   - 5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CASTLE 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.

6. **CORRECTION OF FAILING MI'S**
   - 6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
     - 6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
     - 6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.

7. **MI VERIFICATION INSPECTIONS**
   - 7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. 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.

8. **PHOTOGRAPHS**
   - 8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
     - 8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
     - 8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - 8.1.3. RAW MATERIALS
     - 8.1.4. PHOTOS OF ALL CRITICAL DETAILS
     - 8.1.5. FOUNDATION MODIFICATIONS
     - 8.1.6. WELD PREPARATION
     - 8.1.7. BOLT INSTALLATION AND TORQUE
     - 8.1.8. FINAL INSTALLED CONDITION
     - 8.1.9. SURFACE COATING REPAIR
     - 8.1.10. POST CONSTRUCTION PHOTOGRAPHS
     - 8.1.11. FINAL INFIELD CONDITION
     - 8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
     - 8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.

9. **INSPECTION AND TESTING**
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   - 9.6. **GENERAL**
     - 9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. **FOUNDATIONS AND SOIL PREPARATION - (NOT REQUIRED)**
   - 9.8. **CONCRETE TESTING PER ACI - (NOT REQUIRED)**
   - 9.9. **STRUCTURAL STEEL**
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.5. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.6. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.7. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.8. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. **WELDING:**
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   - 9.11. **REPORTS:**
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
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
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF ONE SIDED BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-2
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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