Robinson+Cole

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Also admitted in Massachusetts

August 27, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
1455 Forbes Street, East Hartford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 111-foot level of the existing 131-foot tower at 1455 Forbes Street in East Hartford, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). The Council approved Cellco's use of this tower in 1991. Cellco now intends to replace six (6) of its existing antennas with three (3) model SBNHH-1D65B, 700/2100 MHz antennas and three (3) model SBNHH-1D65B, 1900 MHz antennas, all at the same level on the tower. Cellco also intends to replace six (6) existing remote radio heads ("RRHs") with six (6) newer model RRHs and install three (3) additional RRHs and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Marcia A. Leclerc, Mayor of the Town of East Hartford. A copy of this letter is also being sent to Jessie Handel, the owner of the Property and Crown, the owner of the tower.

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 located on its existing platform at the 111-foot level on 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 worst-case General Power Density table for Cellco's modified facility is included in Attachment 2.

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Marcia A. Leclerc, East Hartford Mayor
Jessie Handel
Crown Castle
Tim Parks

ATTACHMENT 1

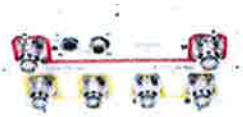
Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.



- Interleaved dipole technology providing for attractive, low wind load mechanical package

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS, dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2180	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

* 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® multiband with internal RET
Band	Multiband
Brand	DualPol® | Teletilt®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
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

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

Supporting 2Tx/4Tx MIMO and 4-way Rx diversity, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

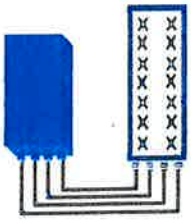
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R
or
2x60W with 2T4R

Can be switched between modes via SW w/o site visit

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Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) IP65 Frontal:<200N / Lateral :<150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485). Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

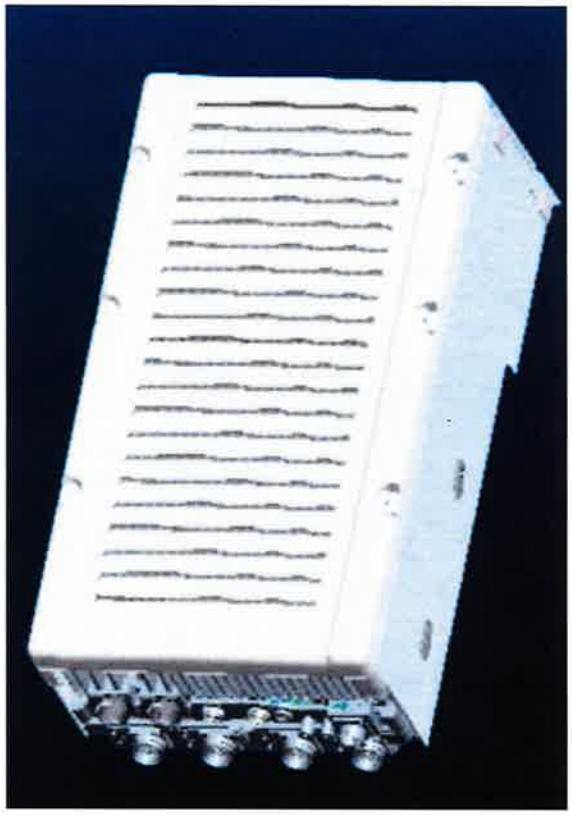
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version	2 Branch RX – LA6.0.1
	1900A HW version	4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms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

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

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

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

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

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

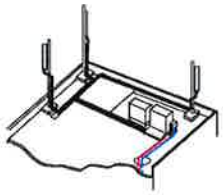
EASY INSTALLATION

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

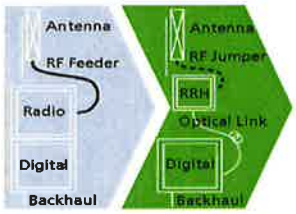
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

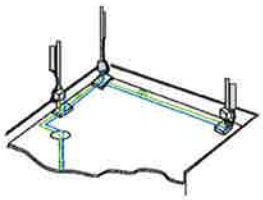
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

Environmental specifications

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

Safety and Regulatory Data

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm² (8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-99-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

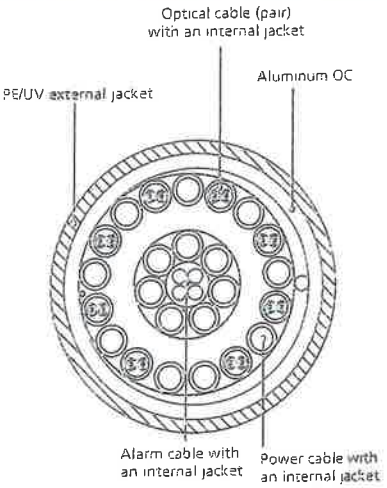


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Forbes St (East Hartford)								
Tower Height: 131Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Sprint CDMA/LTE	6	693	97	0.1589	1900	1.0000	1.59%	
*Sprint CDMA/LTE	1	390	97	0.0149	850	0.5667	0.26%	
*Sprint CDMA/LTE	2	693	97	0.0530	2500	1.0000	0.53%	
*Clearwire	2	153	97	0.0117	2496	1.0000	1.17%	
*Clearwire	1	211	101	0.0074	18 GHz	1.0000	0.74%	
*MetroPCS CDMA	3	727	128	0.0479	2135	1.0000	4.79%	
*MetroPCS LTE	1	1200	128	0.0263	2130	1.0000	2.63%	
*AT&T UMTS	2	565	120	0.0282	880	0.5867	4.81%	
*AT&T UMTS	2	1077	120	0.0538	1900	1.0000	5.38%	
*AT&T GSM	1	283	120	0.0071	880	0.5867	1.20%	
*AT&T GSM	4	646	120	0.0645	1900	1.0000	6.45%	
*AT&T LTE	1	1313	120	0.0328	734	0.4893	6.70%	
*T-Mobile GSM/UMTS	2	12	87	0.0011	1950	1.0000	0.11%	
*T-Mobile UMTS	2	12	87	0.0011	2100	1.0000	0.11%	
*T-Mobile LTE	2	24	87	0.0023	2100	1.0000	0.23%	
Verizon PCS	**11**	**420**	**111**	**0.1348**	**1970**	**1.0000**	**13.48%**	
Verizon Cellular	**9**	**289**	**111**	**0.0759**	**869**	**0.5793**	**13.10%**	
Verizon AWS	**1**	**2306**	**111**	**0.0673**	**2145**	**1.0000**	**6.73%**	
Verizon 700	**1**	**1050**	**111**	**0.0306**	**746**	**0.4973**	**6.16%**	
								76.19%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Date: **May 12, 2015**

Timothy Howell
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
jwoolley@pjfweb.com

Subject: **Structural Modification Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Forbes St, CT
Crown Castle Designation:	**Crown Castle BU Number:**	806376
	Crown Castle Site Name:	HRT 100 943239
	Crown Castle JDE Job Number:	331940
	Crown Castle Work Order Number:	1057339
	Crown Castle Application Number:	293789 Rev. 0
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-1502.004.7700
Site Data:	**1455 FORBES STREET, EAST HARTFORD, Hartford County, CT**	
	Latitude *41° 43' 53.3"*, Longitude *-72° 36' 28"*	
	131 Foot - Monopole Tower	

Dear Timothy Howell,

Paul J Ford and Company is pleased to submit this **"Structural Modification Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 784894, in accordance with application 293789, revision 0.

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

LC4.7: Modified Structure w/ Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 inch ice thickness and 50 mph under service loads.

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

We at *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:

John J. Woolley, E.I.
Structural Designer

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

tnxTower Report - version 6.1.4.1

MAY 19 2015

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 131 ft Monopole tower designed by VALMONT in January of 1999. 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 and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1.25 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
107.0	111.0	3	alcatel lucent	RRH2X60-AWS	2	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	SBNHH-1D65B			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
	107.0	3	alcatel lucent	RRH2x60-700			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	128.0	3	rfs	APX18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
121.0	121.0	3	ericsson	RRUS 11 B2	-	-	2
		3	ericsson	RRUS-11	1* 2* 6	3/8 3/4 1-1/4	1
		3	kathrein	800 10121 w/ Mount Pipe			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	T-Arm Mount [TA 601-3]			
107.0	111.0	2	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD	1 1	1/2 1-1/4	3
		6	alcatel lucent	RRH2X40-AWS			
		3	antel	BXA-171085-8CF-EDIN-2			
		1	antel	BXA-185060/8CFx2			
		2	antel	BXA-185090/8CF			
		3	antel	BXA-70063/6CFx4	12	1-5/8	1
		3	antel	BXA-80063/4CF			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
	107.0	6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount (LP 101-1)			
99.0	100.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
	99.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 101-3]			
	98.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
97.0	101.0	2	andrew	VHLP2.5-11	1 3 2 3	1/2 1-1/4 1/2 5-16	1
		2	dragonwave	HORIZON COMPACT			
	97.0	3	kathrein	840 10054			
		1	motorola	TIMING 2000			
		3	rfs celwave	APXVSPP18-C-A20			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Platform Mount (LP 101-1)			
87.0	87.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	12 1	1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		1	tower mounts	T-Arm Mount [TA 702-3]			

*Installed inside a 2" conduit.
Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Welti, 11/11/91	262381	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont, 10613-91 & 10614-91, 11/30/91	262389	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 1/22/91	262386	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 127151, 2/26/2013	3675451	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25676, 6/4/2014	5099148	CCISITES
4-TOWER EXTENSION DESIGN	Valmont, 10888-91, 8/8/2001	645113	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 attached 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	131 - 110	Pole	TP15.525x10.525x0.1875	1	-1.99	481.40	40.1	Pass
L2	110 - 90	Pole	TP20.528x15.525x0.25	2	-8.00	848.63	94.1	Pass
L3	90 - 84.5833	Pole	TP21.883x20.528x0.4767	3	-9.75	1248.87	79.7	Pass
L4	84.5833 - 83	Pole	TP22.2791x21.883x0.6243	4	-10.06	1655.17	64.1	Pass
L5	83 - 81	Pole	TP22.7794x22.2791x0.3895	5	-10.36	1401.50	78.7	Pass
L6	81 - 70	Pole	TP25.531x22.7794x0.5101	6	-11.66	1423.83	93.0	Pass
L7	70 - 67.0833	Pole	TP25.7604x23.5102x0.4353	7	-13.37	1778.28	86.3	Pass
L8	67.0833 - 64.0833	Pole	TP26.5107x25.7604x0.4313	8	-13.93	1816.65	88.7	Pass
L9	64.0833 - 61.0833	Pole	TP27.2611x26.5107x0.4752	9	-14.52	1940.17	87.2	Pass
L10	61.0833 - 59.5	Pole	TP27.6571x27.2611x0.6039	10	-14.89	2019.29	86.4	Pass
L11	59.5 - 53.5	Pole	TP29.1578x27.6571x0.699	11	-16.49	2320.75	81.8	Pass
L12	53.5 - 44.5833	Pole	TP31.388x29.1578x0.6831	12	-18.96	2431.66	86.0	Pass
L13	44.5833 - 40.5	Pole	TP32.4093x31.388x0.6692	13	-20.12	2465.96	88.2	Pass
L14	40.5 - 39	Pole	TP32.7844x32.4093x0.6987	14	-20.56	2623.92	84.2	Pass
L15	39 - 31.5	Pole	TP34.0326x32.7844x0.7154	15	-22.91	2791.17	86.1	Pass
L16	31.5 - 25.5	Pole	TP35.5312x34.0326x0.6073	16	-24.62	2889.82	86.5	Pass
L17	25.5 - 23.5	Pole	TP36.0307x35.5312x0.6534	17	-25.24	3054.93	83.2	Pass
L18	23.5 - 18.75	Pole	TP37.217x36.0307x0.5424	18	-25.59	2875.45	88.6	Pass
L19	18.75 - 17.0833	Pole	TP37.6333x37.217x0.6846	19	-26.58	3496.62	75.2	Pass
L20	17.0833 - 13	Pole	TP38.6531x37.6333x0.5929	20	-27.13	3081.84	85.9	Pass
L21	13 - 10.5	Pole	TP39.2775x38.6531x0.7508	21	-28.37	3857.89	71.0	Pass
L22	10.5 - 0	Pole	TP41.9x39.2775x0.5542	22	-29.30	2934.09	93.9	Pass
							Summary	
						Pole (L2)	94.1	Pass
						RATING =	**94.1**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	98.3	Pass
1	Base Plate	0	70.7	Pass
1	Base Foundation Structural Steel	0	57.8	Pass
1	Base Foundation Soil Interaction	0	68.0	Pass
1	Flange Connection	110	31.3	Pass

Structure Rating (max from all components) =	98.3%

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

4.1) Recommendations

See attached modification 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 Hartford County, Connecticut.
2) Basic wind speed of 80 mph.
3) Nominal ice thickness of 1.2500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) 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	131.0000-110.0000	21.0000	0.00	12	10.5250	15.5250	0.1875	0.7500	A572-65 (65 ksi)
L2	110.0000-90.0000	20.0000	0.00	12	15.5250	20.5280	0.2500	1.0000	A572-65 (65 ksi)
L3	90.0000-84.5833	5.4167	0.00	12	20.5280	21.8830	0.4767	1.9069	Reinf 47.52 ksi (48 ksi)
L4	84.5833-83.0000	1.5833	0.00	12	21.8830	22.2791	0.6243	2.4972	Reinf 47.54 ksi (48 ksi)
L5	83.0000-81.0000	2.0000	0.00	12	22.2791	22.7794	0.3895	1.5578	Reinf 62.41 ksi (62 ksi)
L6	81.0000-70.0000	11.0000	4.00	12	22.7794	25.5310	0.5101	2.0405	Reinf 45.12 ksi (45 ksi)
L7	70.0000-67.0833	6.9167	0.00	12	23.5101	25.7604	0.4353	1.7411	Reinf 62.64 ksi (63 ksi)
L8	67.0833-64.0833	3.0000	0.00	12	25.7604	26.5107	0.4313	1.7250	Reinf 62.72 ksi (63 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L9	64.0833-61.0833	3.0000	0.00	12	26.5107	27.2611	0.4752	1.9007	Reinf 59.19 ksi (59 ksi)
L10	61.0833-59.5000	1.5833	0.00	12	27.2611	27.6571	0.6039	2.4158	Reinf 47.99 ksi (48 ksi)
L11	59.5000-53.5000	6.0000	0.00	12	27.6571	29.1578	0.6990	2.7960	Reinf 45.30 ksi (45 ksi)
L12	53.5000-44.5833	8.9167	0.00	12	29.1578	31.3880	0.6831	2.7322	Reinf 45.02 ksi (45 ksi)
L13	44.5833-40.5000	4.0833	0.00	12	31.3880	32.4093	0.6692	2.6768	Reinf 45.08 ksi (45 ksi)
L14	40.5000-39.0000	1.5000	0.00	12	32.4093	32.7844	0.6987	2.7946	Reinf 45.45 ksi (45 ksi)
L15	39.0000-31.5000	7.5000	0.00	12	32.7844	34.0326	0.7154	2.8616	Reinf 45.47 ksi (45 ksi)
L16	31.5000-25.5000	6.0000	0.00	12	34.0326	35.5311	0.6073	2.4290	Reinf 52.91 ksi (53 ksi)
L17	25.5000-23.5000	2.0000	0.00	12	35.5311	36.0307	0.6534	2.6134	Reinf 51.32 ksi (51 ksi)
L18	23.5000-18.7500	4.7500	0.00	12	36.0307	37.2170	0.5424	2.1698	Reinf 57.52 ksi (58 ksi)
L19	18.7500-17.0833	1.6667	0.00	12	37.2170	37.6333	0.6846	2.7382	Reinf 54.29 ksi (54 ksi)
L20	17.0833-13.0000	4.0833	0.00	12	37.6333	38.6531	0.5929	2.3716	Reinf 54.49 ksi (54 ksi)
L21	13.0000-10.5000	2.5000	0.00	12	38.6531	39.2775	0.7508	3.0032	Reinf 52.64 ksi (53 ksi)
L22	10.5000-0.0000	10.5000		12	39.2775	41.9000	0.5542	2.2167	Reinf 53.09 ksi (53 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	10.8963	6.2413	85.1314	3.7008	5.4520	15.6148	172.4993	3.0718	2.3182	12.364
	16.0727	9.2600	278.0397	5.4908	8.0419	34.5737	563.3838	4.5575	3.6582	19.51
L2	16.0727	12.2964	366.2060	5.4684	8.0419	45.5370	742.0327	6.0519	3.4907	13.963
	21.2521	16.3238	856.7561	7.2595	10.6335	80.5714	1736.0201	8.0341	4.8315	19.326
L3	21.2521	30.7795	1579.5432	7.1784	10.6335	148.5440	3200.5827	15.1487	4.2239	8.86
	22.6549	32.8594	1921.8885	7.6634	11.3354	169.5476	3894.2672	16.1724	4.5870	9.622
L4	22.6549	42.7352	2465.1574	7.6106	11.3354	217.4744	4995.0772	21.0330	4.1915	6.714
	23.0650	43.5314	2605.5216	7.7524	11.5405	225.7710	5279.4932	21.4248	4.2977	6.884
L5	23.0650	27.4502	1678.8311	7.8365	11.5405	145.4724	3401.7670	13.5102	4.9271	12.651
	23.5829	28.0776	1796.5942	8.0156	11.7997	152.2576	3640.3869	13.8189	5.0611	12.996
L6	23.5829	36.5791	2315.4200	7.9724	11.7997	196.2270	4691.6686	18.0031	4.7377	9.288
	26.4316	41.0990	3284.1419	8.9575	13.2251	248.3272	6654.5619	20.2277	5.4752	10.733
L7	25.6867	32.3410	2197.9556	8.2608	12.1783	180.4819	4453.6539	15.9173	5.1342	11.795
	26.6691	35.4949	2905.7220	9.0664	13.3439	217.7570	5887.7806	17.4695	5.7373	13.181
L8	26.6691	35.1726	2880.2570	9.0678	13.3439	215.8487	5836.1815	17.3109	5.7480	13.329
	27.4459	36.2146	3143.8891	9.3365	13.7326	228.9370	6370.3716	17.8237	5.9491	13.795
L9	27.4459	39.8356	3446.6018	9.3207	13.7326	250.9804	6983.7496	19.6059	5.8314	12.272
	28.2227	40.9837	3753.2637	9.5893	14.1212	265.7887	7605.1298	20.1709	6.0325	12.695
L10	28.2227	51.8397	4701.9207	9.5432	14.1212	332.9682	9527.3660	25.5139	5.6874	9.417
	28.6327	52.6099	4914.6000	9.6850	14.3264	343.0459	9958.3120	25.8930	5.7935	9.593
L11	28.6327	60.6767	5628.4056	9.6510	14.3264	392.8705	11404.6757	29.8632	5.5388	7.924
	30.1863	64.0544	6621.6606	10.1882	15.1037	438.4126	13417.2796	31.5256	5.9410	8.499
L12	30.1863	62.6279	6481.4511	10.1939	15.1037	429.1295	13133.1771	30.8235	5.9837	8.76
	32.4952	67.5330	8126.7669	10.9924	16.2590	499.8330	16467.0330	33.2377	6.5814	9.635
L13	32.4952	66.1935	7972.7619	10.9973	16.2590	490.3610	16154.9772	32.5784	6.6185	9.89
	33.5525	68.3942	8794.6991	11.3629	16.7880	523.8683	17820.4447	33.6616	6.8922	10.299

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
L14	33.5525	71.3389	9156.3225	11.3524	16.7880	545.4089	18553.1917	35.1108	6.8133	9.752
	33.9409	72.1829	9485.1696	11.4867	16.9823	558.5315	19219.5251	35.5262	6.9138	9.896
L15	33.9409	73.8748	9697.3684	11.4807	16.9823	571.0268	19649.4974	36.3590	6.8689	9.601
	35.2331	76.7501	10874.3056	11.9276	17.6289	616.8460	22034.2913	37.7741	7.2034	10.069
L16	35.2331	65.3591	9320.5944	11.9663	17.6289	528.7116	18886.0511	32.1678	7.4933	12.339
	36.7846	68.2894	10631.2500	12.5028	18.4051	577.6241	21541.7948	33.6100	7.8949	13.001
L17	36.7846	73.3766	11393.0824	12.4862	18.4051	619.0165	23085.4738	36.1137	7.7713	11.894
	37.3017	74.4274	11889.6321	12.6651	18.6639	637.0396	24091.6181	36.6309	7.9052	12.099
L18	37.3017	61.9857	9964.2859	12.7048	18.6639	533.8807	20190.3447	30.5075	8.2025	15.121
	38.5299	64.0579	10997.3735	13.1295	19.2784	570.4500	22283.6603	31.5274	8.5204	15.708
L19	38.5299	80.5279	13717.9777	13.0786	19.2784	711.5718	27796.3420	39.6334	8.1395	11.89
	38.9608	81.4455	14192.2707	13.2276	19.4940	728.0311	28757.3882	40.0850	8.2511	12.053
L20	38.9608	70.7152	12383.6858	13.2605	19.4940	635.2548	25092.7048	34.8039	8.4967	14.331
	40.0167	72.6622	13434.9946	13.6256	20.0223	671.0009	27222.9415	35.7621	8.7701	14.792
L21	40.0167	91.6330	16802.3200	13.5690	20.0223	839.1794	34046.0557	45.0990	8.3469	11.117
	40.6631	93.1425	17646.4756	13.7926	20.3458	867.3294	35756.5438	45.8419	8.5142	11.34
L22	40.6631	69.1003	13225.4797	13.8630	20.3458	650.0361	26798.4076	34.0090	9.0412	16.315
	43.3781	73.7799	16098.5774	14.8018	21.7042	741.7264	32620.0823	36.3122	9.7440	17.583

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 131.0000-110.0000				1	1	1		
L2 110.0000-90.0000				1	1	1		
L3 90.0000-84.5833				1	1	1		
L4 84.5833-83.0000				1	1	1		
L5 83.0000-81.0000				1	1	1		
L6 81.0000-70.0000				1	1	1		
L7 70.0000-67.0833				1	1	1		
L8 67.0833-64.0833				1	1	1		
L9 64.0833-61.0833				1	1	1		
L10 61.0833-59.5000				1	1	1		
L11 59.5000-53.5000				1	1	1		
L12 53.5000-44.5833				1	1	1		
L13 44.5833-40.5000				1	1	1		
L14 40.5000-				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
39.0000								
L15 39.0000-31.5000				1	1	1		
L16 31.5000-25.5000				1	1	1		
L17 25.5000-23.5000				1	1	1		
L18 23.5000-18.7500				1	1	1		
L19 18.7500-17.0833				1	1	1		
L20 17.0833-13.0000				1	1	1		
L21 13.0000-10.5000				1	1	1		
L22 10.5000-0.0000				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
***								
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	128.0000 - 0.0000	2	No Ice	0.1980	0.83
						1/2" Ice	0.2980	2.34
						1" Ice	0.3980	4.47
						2" Ice	0.5980	10.55
						4" Ice	0.9980	30.05
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	128.0000 - 0.0000	4	No Ice	0.0000	0.83
						1/2" Ice	0.0000	2.34
						1" Ice	0.0000	4.47
						2" Ice	0.0000	10.55
						4" Ice	0.0000	30.05
***								
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	121.0000 - 0.0000	6	No Ice	0.0000	0.66
						1/2" Ice	0.0000	1.91
						1" Ice	0.0000	3.78
						2" Ice	0.0000	9.33
						4" Ice	0.0000	27.78
FB-L98B-002-75000(3/8")	C	No	CaAa (Out Of Face)	121.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.60
						1" Ice	0.0000	1.76
						2" Ice	0.0000	5.91
						4" Ice	0.0000	21.53
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	121.0000 - 0.0000	2	No Ice	0.0000	0.59
						1/2" Ice	0.0000	1.37
						1" Ice	0.0000	2.76
						2" Ice	0.0000	7.37
						4" Ice	0.0000	23.92
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	121.0000 - 0.0000	1	No Ice	0.2375	0.72
						1/2" Ice	0.3375	2.48
						1" Ice	0.4375	4.84
						2" Ice	0.6375	11.41
						4" Ice	1.0375	31.87
***								
HJ7-50A(1-5/8")	C	No	Inside Pole	107.0000 - 0.0000	12	No Ice	0.0000	1.04
						1/2" Ice	0.0000	1.04
						1" Ice	0.0000	1.04
						2" Ice	0.0000	1.04
						4" Ice	0.0000	1.04
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	107.0000 - 0.0000	2	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.0000	1.30
						2" Ice	0.0000	1.30
						4" Ice	0.0000	1.30
***								
ATCB-B01-005(5/16)	C	No	CaAa (Out Of Face)	97.0000 - 0.0000	3	No Ice	0.0000	0.07
						1/2" Ice	0.0000	0.57
						1" Ice	0.0000	1.68
						2" Ice	0.0000	5.73
						4" Ice	0.0000	21.16
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	97.0000 - 0.0000	2	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.76
						1" Ice	0.0000	2.00
						2" Ice	0.0000	6.30
						4" Ice	0.0000	22.23
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	97.0000 - 0.0000	1	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.76
						1" Ice	0.0000	2.00
						2" Ice	0.0000	6.30
						4" Ice	0.0000	22.23
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	97.0000 - 0.0000	3	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
2" (Nominal) Conduit	C	No	CaAa (Out Of Face)	97.0000 - 0.0000	2	No Ice	0.0000	0.72
						1/2" Ice	0.0000	2.48
						1" Ice	0.0000	4.84
						2" Ice	0.0000	11.41
						4" Ice	0.0000	31.87
***								
LCF114-50J(1-1/4")	C	No	CaAa (Out Of Face)	87.0000 - 0.0000	12	No Ice	0.0000	0.70
						1/2" Ice	0.0000	1.97
						1" Ice	0.0000	3.85
						2" Ice	0.0000	9.45
						4" Ice	0.0000	27.97
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	87.0000 - 0.0000	1	No Ice	0.0000	1.07
						1/2" Ice	0.0000	2.37
						1" Ice	0.0000	4.28
						2" Ice	0.0000	9.93
						4" Ice	0.0000	28.56
****								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	20.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	45.8333 - 15.8333	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	68.3333 - 43.3333	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	85.8333 - 65.8333	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
						2" Ice	0.5694	0.00
						4" Ice	1.0139	0.00
****								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	66.0000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	91.5000 - 81.5000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.3889	0.00
						2" Ice	0.6111	0.00
						4" Ice	1.0556	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	131.0000-110.0000	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	9.741	0.15
L2	110.0000-90.0000	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	12.920	0.51
L3	90.0000-84.5833	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	4.491	0.19
L4	84.5833-83.0000	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	1.465	0.06
L5	83.0000-81.0000	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	1.767	0.08
L6	81.0000-70.0000	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	8.344	0.45
L7	70.0000-67.0833	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	2.369	0.12
L8	67.0833-64.0833	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	2.751	0.12
L9	64.0833-61.0833	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	2.776	0.12
L10	61.0833-59.5000	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	1.465	0.06
L11	59.5000-53.5000	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	5.551	0.24
L12	53.5000-44.5833	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	8.406	0.36
L13	44.5833-40.5000	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	3.934	0.17
L14	40.5000-39.0000	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	1.388	0.06
L15	39.0000-31.5000	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	6.939	0.31
L16	31.5000-25.5000	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	5.551	0.24
L17	25.5000-23.5000	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	1.850	0.08
L18	23.5000-18.7500	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	4.686	0.19
L19	18.7500-17.0833	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	1.820	0.07

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
L20	17.0833-13.0000	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	4.104	0.17
L21	13.0000-10.5000	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	2.417	0.10
L22	10.5000-0.0000	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	10.152	0.43

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	131.0000-110.0000	A	1.459	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	23.457	1.44
L2	110.0000-90.0000	A	1.427	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	30.521	2.65
L3	90.0000-84.5833	A	1.405	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	11.137	1.11
L4	84.5833-83.0000	A	1.398	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	3.776	0.39
L5	83.0000-81.0000	A	1.394	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	4.525	0.49
L6	81.0000-70.0000	A	1.380	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	20.827	2.67
L7	70.0000-67.0833	A	1.365	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	6.062	0.71
L8	67.0833-64.0833	A	1.357	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	7.055	0.71
L9	64.0833-61.0833	A	1.350	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	7.005	0.71
L10	61.0833-59.5000	A	1.344	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	3.687	0.37
L11	59.5000-53.5000	A	1.333	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	13.906	1.40
L12	53.5000-44.5833	A	1.311	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	20.976	2.03
L13	44.5833-40.5000	A	1.289	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	9.788	0.91
L14	40.5000-39.0000	A	1.278	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	3.390	0.33
L15	39.0000-31.5000	A	1.260	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	16.807	1.63
L16	31.5000-25.5000	A	1.250	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	13.384	1.29
L17	25.5000-23.5000	A	1.250	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	4.461	0.43

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
L18	23.5000-18.7500	A	1.250	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	11.374	1.02
L19	18.7500-17.0833	A	1.250	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	4.459	0.36
L20	17.0833-13.0000	A	1.250	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	9.782	0.88
L21	13.0000-10.5000	A	1.250	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	5.681	0.54
L22	10.5000-0.0000	A	1.250	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	23.860	2.26

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	131.0000-110.0000	-0.4410	0.2546	-0.6719	0.3879
L2	110.0000-90.0000	-0.5883	0.3396	-0.9146	0.5280
L3	90.0000-84.5833	-0.7337	0.4236	-1.1647	0.6724
L4	84.5833-83.0000	-0.7997	0.4617	-1.2788	0.7383
L5	83.0000-81.0000	-0.7801	0.4504	-1.2614	0.7283
L6	81.0000-70.0000	-0.7157	0.4132	-1.1969	0.6911
L7	70.0000-67.0833	-0.7620	0.4399	-1.2897	0.7446
L8	67.0833-64.0833	-0.8384	0.4841	-1.3990	0.8077
L9	64.0833-61.0833	-0.8506	0.4911	-1.4157	0.8173
L10	61.0833-59.5000	-0.8558	0.4941	-1.4299	0.8256
L11	59.5000-53.5000	-0.8641	0.4989	-1.4524	0.8386
L12	53.5000-44.5833	-0.8920	0.5150	-1.5147	0.8745
L13	44.5833-40.5000	-0.9182	0.5301	-1.5697	0.9063
L14	40.5000-39.0000	-0.8965	0.5176	-1.5368	0.8873
L15	39.0000-31.5000	-0.9021	0.5208	-1.5482	0.8938
L16	31.5000-25.5000	-0.9110	0.5260	-1.5736	0.9085
L17	25.5000-23.5000	-0.9172	0.5296	-1.5939	0.9203
L18	23.5000-18.7500	-0.9691	0.5595	-1.6800	0.9699
L19	18.7500-17.0833	-1.0506	0.6065	-1.8057	1.0425
L20	17.0833-13.0000	-0.9916	0.5725	-1.7098	0.9872
L21	13.0000-10.5000	-0.9678	0.5588	-1.6734	0.9662
L22	10.5000-0.0000	-0.9768	0.5639	-1.7029	0.9832

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APX18-206517S-C w/ Mount Pipe	A	From Face	1.0000 0.00 0.00	0.00	128.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.1667 5.6182 6.0772 7.0173 9.1225	3.1653 3.6631 4.1794 5.2676 7.6662	0.03 0.06 0.09 0.18 0.46
APX18-206517S-C w/	B	From Face	1.0000	0.00	128.0000	No Ice	5.1667	3.1653	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00				1/2"	5.6182	3.6631	0.06
			0.00				Ice	6.0772	4.1794	0.09
							1" Ice	7.0173	5.2676	0.18
							2" Ice	9.1225	7.6662	0.46
							4" Ice			
APX18-206517S-C w/ Mount Pipe	C	From Face	1.0000		0.00	128.0000	No Ice	5.1667	3.1653	0.03
			0.00				1/2"	5.6182	3.6631	0.06
			0.00				Ice	6.0772	4.1794	0.09
							1" Ice	7.0173	5.2676	0.18
							2" Ice	9.1225	7.6662	0.46
							4" Ice			
Pipe Mount [PM 601-3]	C	None			0.00	128.0000	No Ice	4.3900	4.3900	0.20
							1/2"	5.4800	5.4800	0.24
							Ice	6.5700	6.5700	0.28
							1" Ice	8.7500	8.7500	0.36
							2" Ice	13.1100	13.1100	0.53
							4" Ice			
***										
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.0000		0.00	121.0000	No Ice	8.4975	6.3042	0.07
			0.00				1/2"	9.1490	7.4790	0.14
			0.00				Ice	9.7672	8.3676	0.21
							1" Ice	11.0311	10.1785	0.38
							2" Ice	13.6786	14.0237	0.87
							4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.0000		0.00	121.0000	No Ice	8.4975	6.3042	0.07
			0.00				1/2"	9.1490	7.4790	0.14
			0.00				Ice	9.7672	8.3676	0.21
							1" Ice	11.0311	10.1785	0.38
							2" Ice	13.6786	14.0237	0.87
							4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.0000		0.00	121.0000	No Ice	8.4975	6.3042	0.07
			0.00				1/2"	9.1490	7.4790	0.14
			0.00				Ice	9.7672	8.3676	0.21
							1" Ice	11.0311	10.1785	0.38
							2" Ice	13.6786	14.0237	0.87
							4" Ice			
800 10121 w/ Mount Pipe	A	From Leg	4.0000		0.00	121.0000	No Ice	6.0334	4.9479	0.07
			0.00				1/2"	6.7136	6.0222	0.12
			0.00				Ice	7.2991	6.8104	0.18
							1" Ice	8.4999	8.4586	0.32
							2" Ice	11.0444	12.1015	0.73
							4" Ice			
800 10121 w/ Mount Pipe	B	From Leg	4.0000		0.00	121.0000	No Ice	6.0334	4.9479	0.07
			0.00				1/2"	6.7136	6.0222	0.12
			0.00				Ice	7.2991	6.8104	0.18
							1" Ice	8.4999	8.4586	0.32
							2" Ice	11.0444	12.1015	0.73
							4" Ice			
800 10121 w/ Mount Pipe	C	From Leg	4.0000		0.00	121.0000	No Ice	6.0334	4.9479	0.07
			0.00				1/2"	6.7136	6.0222	0.12
			0.00				Ice	7.2991	6.8104	0.18
							1" Ice	8.4999	8.4586	0.32
							2" Ice	11.0444	12.1015	0.73
							4" Ice			
RRUS-11	A	From Leg	4.0000		0.00	121.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2"	3.4905	1.5510	0.07
			0.00				Ice	3.7411	1.7380	0.09
							1" Ice	4.2682	2.1381	0.15
							2" Ice	5.4260	3.0418	0.31
							4" Ice			
RRUS-11	B	From Leg	4.0000		0.00	121.0000	No Ice	3.2486	1.3726	0.05
			0.00				1/2"	3.4905	1.5510	0.07
			0.00				Ice	3.7411	1.7380	0.09
							1" Ice	4.2682	2.1381	0.15
							2" Ice	5.4260	3.0418	0.31

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
RRUS-11	C	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
(2) LGP21401	A	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	B	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
(2) LGP21401	C	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.2880 1.4453 1.6112 1.9690 2.7882	0.3640 0.4785 0.6017 0.8739 1.5220	0.01 0.02 0.03 0.05 0.14
DC6-48-60-18-8F	A	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4667 1.6667 1.8778 2.3333 3.3778	1.4667 1.6667 1.8778 2.3333 3.3778	0.02 0.04 0.06 0.11 0.24
RRUS 11 B2	A	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3056 3.5497 3.8025 4.3340 5.5006	1.3611 1.5404 1.7284 2.1302 3.0377	0.05 0.07 0.10 0.15 0.31
RRUS 11 B2	B	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3056 3.5497 3.8025 4.3340 5.5006	1.3611 1.5404 1.7284 2.1302 3.0377	0.05 0.07 0.10 0.15 0.31
RRUS 11 B2	C	From Leg	4.0000 0.00 0.00	0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.3056 3.5497 3.8025 4.3340 5.5006	1.3611 1.5404 1.7284 2.1302 3.0377	0.05 0.07 0.10 0.15 0.31
T-Arm Mount [TA 601-3]	C	None		0.00	121.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.9000 14.6500 18.4000 25.9000 40.9000	10.9000 14.6500 18.4000 25.9000 40.9000	0.73 0.93 1.13 1.52 2.32
***									
BXA-80063/4CF	A	From Leg	4.0000 0.00 4.00	0.00	107.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.1613 5.5455 5.9382 6.7497 8.4764	2.2482 2.5469 2.8529 3.4884 5.0414	0.01 0.04 0.07 0.15 0.36
BXA-80063/4CF	B	From Leg	4.0000 0.00 4.00	0.00	107.0000	No Ice 1/2" Ice	5.1613 5.5455 5.9382	2.2482 2.5469 2.8529	0.01 0.04 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	6.7497	3.4884	0.15
						2" Ice	8.4764	5.0414	0.36
						4" Ice			
BXA-80063/4CF	C	From Leg	4.0000	0.00	107.0000	No Ice	5.1613	2.2482	0.01
			0.00			1/2"	5.5455	2.5469	0.04
			4.00			Ice	5.9382	2.8529	0.07
						1" Ice	6.7497	3.4884	0.15
						2" Ice	8.4764	5.0414	0.36
						4" Ice			
BXA-70063/6CFx4	A	From Leg	4.0000	0.00	107.0000	No Ice	7.7311	3.7554	0.02
			0.00			1/2"	8.2682	4.1889	0.06
			4.00			Ice	8.8140	4.6297	0.10
						1" Ice	9.9314	5.5335	0.22
						2" Ice	12.2699	7.4301	0.52
						4" Ice			
BXA-70063/6CFx4	B	From Leg	4.0000	0.00	107.0000	No Ice	7.7311	3.7554	0.02
			0.00			1/2"	8.2682	4.1889	0.06
			4.00			Ice	8.8140	4.6297	0.10
						1" Ice	9.9314	5.5335	0.22
						2" Ice	12.2699	7.4301	0.52
						4" Ice			
BXA-70063/6CFx4	C	From Leg	4.0000	0.00	107.0000	No Ice	7.7311	3.7554	0.02
			0.00			1/2"	8.2682	4.1889	0.06
			4.00			Ice	8.8140	4.6297	0.10
						1" Ice	9.9314	5.5335	0.22
						2" Ice	12.2699	7.4301	0.52
						4" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.0000	0.00	107.0000	No Ice	5.6000	2.3333	0.04
			0.00			1/2"	5.9154	2.5580	0.08
			4.00			Ice	6.2395	2.7914	0.12
						1" Ice	6.9136	3.2840	0.21
						2" Ice	8.3654	4.3728	0.45
						4" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.0000	0.00	107.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.0000	0.00	107.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000	0.00	107.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			0.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) SBNHH-1D65B	A	From Leg	4.0000	0.00	107.0000	No Ice	8.3994	5.3963	0.04
			0.00			1/2"	8.9514	5.8529	0.09
			4.00			Ice	9.5121	6.3169	0.15
						1" Ice	10.6593	7.2671	0.28
						2" Ice	13.0574	9.4206	0.63
						4" Ice			
(2) SBNHH-1D65B	B	From Leg	4.0000	0.00	107.0000	No Ice	8.3994	5.3963	0.04
			0.00			1/2"	8.9514	5.8529	0.09
			4.00			Ice	9.5121	6.3169	0.15
						1" Ice	10.6593	7.2671	0.28
						2" Ice	13.0574	9.4206	0.63
						4" Ice			
(2) SBNHH-1D65B	C	From Leg	4.0000	0.00	107.0000	No Ice	8.3994	5.3963	0.04
			0.00			1/2"	8.9514	5.8529	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
				4.00			Ice	9.5121	6.3169	0.15
							1" Ice	10.6593	7.2671	0.28
							2" Ice	13.0574	9.4206	0.63
							4" Ice			
RRH2X60-AWS	A	From Leg	4.0000		0.00	107.0000	No Ice	2.1904	1.4290	0.04
			0.00				1/2"	2.3976	1.6109	0.06
			4.00				Ice	2.6134	1.8015	0.08
							1" Ice	3.0710	2.2085	0.13
							2" Ice	4.0899	3.1263	0.26
							4" Ice			
RRH2X60-AWS	B	From Leg	4.0000		0.00	107.0000	No Ice	2.1904	1.4290	0.04
			0.00				1/2"	2.3976	1.6109	0.06
			4.00				Ice	2.6134	1.8015	0.08
							1" Ice	3.0710	2.2085	0.13
							2" Ice	4.0899	3.1263	0.26
							4" Ice			
RRH2X60-AWS	C	From Leg	4.0000		0.00	107.0000	No Ice	2.1904	1.4290	0.04
			0.00				1/2"	2.3976	1.6109	0.06
			4.00				Ice	2.6134	1.8015	0.08
							1" Ice	3.0710	2.2085	0.13
							2" Ice	4.0899	3.1263	0.26
							4" Ice			
RRH2x60-700	A	From Leg	4.0000		0.00	107.0000	No Ice	3.9569	1.8157	0.06
			0.00				1/2"	4.2724	2.0752	0.08
			0.00				Ice	4.5965	2.3603	0.11
							1" Ice	5.2705	2.9566	0.17
							2" Ice	6.7224	4.2529	0.35
							4" Ice			
RRH2x60-700	B	From Leg	4.0000		0.00	107.0000	No Ice	3.9569	1.8157	0.06
			0.00				1/2"	4.2724	2.0752	0.08
			0.00				Ice	4.5965	2.3603	0.11
							1" Ice	5.2705	2.9566	0.17
							2" Ice	6.7224	4.2529	0.35
							4" Ice			
RRH2x60-700	C	From Leg	4.0000		0.00	107.0000	No Ice	3.9569	1.8157	0.06
			0.00				1/2"	4.2724	2.0752	0.08
			0.00				Ice	4.5965	2.3603	0.11
							1" Ice	5.2705	2.9566	0.17
							2" Ice	6.7224	4.2529	0.35
							4" Ice			
RRH2X60-PCS	A	From Leg	4.0000		0.00	107.0000	No Ice	2.5667	2.0106	0.06
			0.00				1/2"	2.7914	2.2184	0.08
			4.00				Ice	3.0247	2.4349	0.10
							1" Ice	3.5173	2.8938	0.16
							2" Ice	4.6062	3.9152	0.31
							4" Ice			
RRH2X60-PCS	B	From Leg	4.0000		0.00	107.0000	No Ice	2.5667	2.0106	0.06
			0.00				1/2"	2.7914	2.2184	0.08
			4.00				Ice	3.0247	2.4349	0.10
							1" Ice	3.5173	2.8938	0.16
							2" Ice	4.6062	3.9152	0.31
							4" Ice			
RRH2X60-PCS	C	From Leg	4.0000		0.00	107.0000	No Ice	2.5667	2.0106	0.06
			0.00				1/2"	2.7914	2.2184	0.08
			4.00				Ice	3.0247	2.4349	0.10
							1" Ice	3.5173	2.8938	0.16
							2" Ice	4.6062	3.9152	0.31
							4" Ice			
DB-T1-6Z-8AB-0Z	B	From Leg	4.0000		0.00	107.0000	No Ice	5.6000	2.3333	0.04
			0.00				1/2"	5.9154	2.5580	0.08
			4.00				Ice	6.2395	2.7914	0.12
							1" Ice	6.9136	3.2840	0.21
							2" Ice	8.3654	4.3728	0.45
							4" Ice			
Platform Mount (LP 101-1)	C	None			0.00	107.0000	No Ice	36.2100	36.2100	1.50

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1/2" Ice	42.8200	42.8200	2.30
						1" Ice	49.4300	49.4300	3.10
						2" Ice	62.6500	62.6500	4.70
						4" Ice	89.0900	89.0900	7.89
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	4.0000 0.00 1.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	4.0000 0.00 1.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	4.0000 0.00 1.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.0000 0.00 0.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.0000 0.00 -1.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	4.0000 0.00 -1.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.0000 0.00 -1.00	0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
Side Arm Mount [SO 101-3]	C	None		0.00	99.0000	No Ice 1/2" Ice 1" Ice 2" Ice	7.5000 8.9000 10.3000 13.1000 18.7000	7.5000 8.9000 10.3000 13.1000 18.7000	0.25 0.33 0.41 0.58 0.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
Clearwire TIMING 2000	A	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	0.1258	0.1258	0.00
						1/2" Ice	0.1771	0.1771	0.00
						1" Ice	0.2370	0.2370	0.01
						2" Ice	0.3827	0.3827	0.01
						4" Ice	0.7778	0.7778	0.05
840 10054	A	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	5.1858	1.3611	0.04
						1/2" Ice	5.5447	1.6198	0.06
						1" Ice	5.9122	1.8858	0.09
						2" Ice	6.6731	2.4401	0.16
						4" Ice	8.2987	3.7428	0.35
840 10054	B	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	5.1858	1.3611	0.04
						1/2" Ice	5.5447	1.6198	0.06
						1" Ice	5.9122	1.8858	0.09
						2" Ice	6.6731	2.4401	0.16
						4" Ice	8.2987	3.7428	0.35
840 10054	C	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	5.1858	1.3611	0.04
						1/2" Ice	5.5447	1.6198	0.06
						1" Ice	5.9122	1.8858	0.09
						2" Ice	6.6731	2.4401	0.16
						4" Ice	8.2987	3.7428	0.35
WIMAX DAP HEAD	A	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	1.8044	0.7778	0.03
						1/2" Ice	1.9877	0.9182	0.04
						1" Ice	2.1795	1.0673	0.06
						2" Ice	2.5891	1.3914	0.09
						4" Ice	3.5121	2.1432	0.20
WIMAX DAP HEAD	B	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	1.8044	0.7778	0.03
						1/2" Ice	1.9877	0.9182	0.04
						1" Ice	2.1795	1.0673	0.06
						2" Ice	2.5891	1.3914	0.09
						4" Ice	3.5121	2.1432	0.20
WIMAX DAP HEAD	C	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	1.8044	0.7778	0.03
						1/2" Ice	1.9877	0.9182	0.04
						1" Ice	2.1795	1.0673	0.06
						2" Ice	2.5891	1.3914	0.09
						4" Ice	3.5121	2.1432	0.20
HORIZON COMPACT	B	From Face	4.0000 0.00 4.00	0.00	97.0000	No Ice	0.8409	0.4295	0.01
						1/2" Ice	0.9658	0.5249	0.02
						1" Ice	1.0993	0.6289	0.03
						2" Ice	1.3922	0.8629	0.05
						4" Ice	2.0819	1.4345	0.12
HORIZON COMPACT	C	From Face	4.0000 0.00 4.00	0.00	97.0000	No Ice	0.8409	0.4295	0.01
						1/2" Ice	0.9658	0.5249	0.02
						1" Ice	1.0993	0.6289	0.03
						2" Ice	1.3922	0.8629	0.05
						4" Ice	2.0819	1.4345	0.12
Sprint APXVSPP18-C-A20	A	From Face	4.0000 0.00 0.00	0.00	97.0000	No Ice	8.2600	5.2833	0.06
						1/2" Ice	8.8075	5.7360	0.11
						1" Ice	9.3636	6.1960	0.16
						2" Ice	10.5017	7.1383	0.29
						4" Ice	12.8817	9.2728	0.63
APXVSPP18-C-A20	B	From Face	4.0000 0.00	0.00	97.0000	No Ice	8.2600	5.2833	0.06
						1/2"	8.8075	5.7360	0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00					Ice	9.3636	6.1960	0.16
								1" Ice	10.5017	7.1383	0.29
								2" Ice	12.8817	9.2728	0.63
								4" Ice			
APXVSPP18-C-A20	C	From Face	4.0000			0.00	97.0000	No Ice	8.2600	5.2833	0.06
			0.00					1/2"	8.8075	5.7360	0.11
			0.00					Ice	9.3636	6.1960	0.16
								1" Ice	10.5017	7.1383	0.29
								2" Ice	12.8817	9.2728	0.63
								4" Ice			
IBC1900HG-2A	A	From Face	4.0000			0.00	97.0000	No Ice	1.1270	0.5329	0.02
			0.00					1/2"	1.2726	0.6471	0.03
			0.00					Ice	1.4269	0.7699	0.04
								1" Ice	1.7613	1.0415	0.06
								2" Ice	2.5339	1.6883	0.15
								4" Ice			
IBC1900HG-2A	B	From Face	4.0000			0.00	97.0000	No Ice	1.1270	0.5329	0.02
			0.00					1/2"	1.2726	0.6471	0.03
			0.00					Ice	1.4269	0.7699	0.04
								1" Ice	1.7613	1.0415	0.06
								2" Ice	2.5339	1.6883	0.15
								4" Ice			
IBC1900HG-2A	C	From Face	4.0000			0.00	97.0000	No Ice	1.1270	0.5329	0.02
			0.00					1/2"	1.2726	0.6471	0.03
			0.00					Ice	1.4269	0.7699	0.04
								1" Ice	1.7613	1.0415	0.06
								2" Ice	2.5339	1.6883	0.15
								4" Ice			
IBC1900BB-1	A	From Face	4.0000			0.00	97.0000	No Ice	1.1270	0.5329	0.02
			0.00					1/2"	1.2726	0.6471	0.03
			0.00					Ice	1.4269	0.7699	0.04
								1" Ice	1.7613	1.0415	0.06
								2" Ice	2.5339	1.6883	0.15
								4" Ice			
IBC1900BB-1	B	From Face	4.0000			0.00	97.0000	No Ice	1.1270	0.5329	0.02
			0.00					1/2"	1.2726	0.6471	0.03
			0.00					Ice	1.4269	0.7699	0.04
								1" Ice	1.7613	1.0415	0.06
								2" Ice	2.5339	1.6883	0.15
								4" Ice			
IBC1900BB-1	C	From Face	4.0000			0.00	97.0000	No Ice	1.1270	0.5329	0.02
			0.00					1/2"	1.2726	0.6471	0.03
			0.00					Ice	1.4269	0.7699	0.04
								1" Ice	1.7613	1.0415	0.06
								2" Ice	2.5339	1.6883	0.15
								4" Ice			
Platform Mount (LP 101-1)	C	None				0.00	97.0000	No Ice	36.2100	36.2100	1.50
								1/2"	42.8200	42.8200	2.30
								Ice	49.4300	49.4300	3.10
								1" Ice	62.6500	62.6500	4.70
								2" Ice	89.0900	89.0900	7.89
								4" Ice			
***											
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.0000			0.00	87.0000	No Ice	6.8253	5.6424	0.11
			0.00					1/2"	7.3471	6.4800	0.17
			0.00					Ice	7.8631	7.2567	0.23
								1" Ice	8.9261	8.8640	0.38
								2" Ice	11.1755	12.2932	0.81
								4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.0000			0.00	87.0000	No Ice	6.8253	5.6424	0.11
			0.00					1/2"	7.3471	6.4800	0.17
			0.00					Ice	7.8631	7.2567	0.23
								1" Ice	8.9261	8.8640	0.38
								2" Ice	11.1755	12.2932	0.81
								4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8253 7.3471 7.8631 8.9261 11.1755	5.6424 6.4800 7.2567 8.8640 12.2932	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8155 7.3373 7.8532 8.9160 11.1650	5.6334 6.4717 7.2478 8.8537 12.2804	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8155 7.3373 7.8532 8.9160 11.1650	5.6334 6.4717 7.2478 8.8537 12.2804	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.8155 7.3373 7.8532 8.9160 11.1650	5.6334 6.4717 7.2478 8.8537 12.2804	0.11 0.17 0.23 0.38 0.81
KRY 112 144/1	A	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	B	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
KRY 112 144/1	C	From Face	4.0000 0.00 0.00	0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4083 0.4969 0.5941 0.8145 1.3590	0.2042 0.2733 0.3511 0.5326 0.9992	0.01 0.01 0.02 0.03 0.08
T-Arm Mount [TA 702-3]	C	None		0.00	87.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6400 6.5500 7.4600 9.2800 12.9200	5.6400 6.5500 7.4600 9.2800 12.9200	0.34 0.43 0.52 0.70 1.06

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Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	1.0000 0.00	0.00		97.0000	2.9167	No Ice 1/2" Ice	6.6800 7.0700	0.05 0.08

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
				4.00					1" Ice	7.4600	0.12
									2" Ice	8.2300	0.19
									4" Ice	9.7800	0.34
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	1.0000 0.00 4.00	0.00		97.0000	2.9167	No Ice	6.6800	0.05
									1/2" Ice	7.0700	0.08
									1" Ice	7.4600	0.12
									2" Ice	8.2300	0.19
									4" Ice	9.7800	0.34

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 131.0000-110.0000	119.8282	1.445	23.683	22.794	A	0.000	22.794	22.794	100.00	0.000	0.000
					B	0.000	22.794		100.00	0.000	0.000
					C	0.000	22.794		100.00	0.000	9.741
L2 110.0000-90.0000	99.5374	1.371	22.460	30.044	A	0.000	30.044	30.044	100.00	0.000	0.000
					B	0.000	30.044		100.00	0.000	0.000
					C	0.000	30.044		100.00	0.000	12.920
L3 90.0000-84.5833	87.2628	1.32	21.631	9.572	A	0.000	9.572	9.572	100.00	0.000	0.000
					B	0.000	9.572		100.00	0.000	0.000
					C	0.000	9.572		100.00	0.000	4.491
L4 84.5833-83.0000	83.7893	1.305	21.382	2.913	A	0.000	2.913	2.913	100.00	0.000	0.000
					B	0.000	2.913		100.00	0.000	0.000
					C	0.000	2.913		100.00	0.000	1.465
L5 83.0000-81.0000	81.9963	1.297	21.250	3.755	A	0.000	3.755	3.755	100.00	0.000	0.000
					B	0.000	3.755		100.00	0.000	0.000
					C	0.000	3.755		100.00	0.000	1.767
L6 81.0000-70.0000	75.3956	1.266	20.746	22.142	A	0.000	22.142	22.142	100.00	0.000	0.000
					B	0.000	22.142		100.00	0.000	0.000
					C	0.000	22.142		100.00	0.000	8.344
L7 70.0000-67.0833	68.5325	1.232	20.188	6.146	A	0.000	6.146	6.146	100.00	0.000	0.000
					B	0.000	6.146		100.00	0.000	0.000
					C	0.000	6.146		100.00	0.000	2.369
L8 67.0833-64.0833	65.5761	1.217	19.936	6.534	A	0.000	6.534	6.534	100.00	0.000	0.000
					B	0.000	6.534		100.00	0.000	0.000
					C	0.000	6.534		100.00	0.000	2.751
L9 64.0833-61.0833	62.5763	1.201	19.671	6.721	A	0.000	6.721	6.721	100.00	0.000	0.000
					B	0.000	6.721		100.00	0.000	0.000
					C	0.000	6.721		100.00	0.000	2.776
L10 61.0833-59.5000	60.2897	1.188	19.463	3.623	A	0.000	3.623	3.623	100.00	0.000	0.000
					B	0.000	3.623		100.00	0.000	0.000
					C	0.000	3.623		100.00	0.000	1.465
L11 59.5000-53.5000	56.4736	1.166	19.102	14.204	A	0.000	14.204	14.204	100.00	0.000	0.000
					B	0.000	14.204		100.00	0.000	0.000
					C	0.000	14.204		100.00	0.000	5.551
L12 53.5000-44.5833	48.9869	1.119	18.342	22.495	A	0.000	22.495	22.495	100.00	0.000	0.000
					B	0.000	22.495		100.00	0.000	0.000
					C	0.000	22.495		100.00	0.000	8.406
L13 44.5833-40.5000	42.5308	1.075	17.616	10.854	A	0.000	10.854	10.854	100.00	0.000	0.000
					B	0.000	10.854		100.00	0.000	0.000
					C	0.000	10.854		100.00	0.000	3.934
L14 40.5000-39.0000	39.7486	1.055	17.279	4.075	A	0.000	4.075	4.075	100.00	0.000	0.000
					B	0.000	4.075		100.00	0.000	0.000
					C	0.000	4.075		100.00	0.000	1.388
L15 39.0000-31.5000	35.2266	1.019	16.693	20.880	A	0.000	20.880	20.880	100.00	0.000	0.000
					B	0.000	20.880		100.00	0.000	0.000
					C	0.000	20.880		100.00	0.000	6.939
L16 31.5000-	28.4785	1	16.38	17.391	A	0.000	17.391	17.391	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
25.5000			4		B	0.000	17.391		100.00	0.000	0.000
					C	0.000	17.391		100.00	0.000	5.551
L17 25.5000-23.5000	24.4977	1	16.384	5.963	A	0.000	5.963	5.963	100.00	0.000	0.000
					B	0.000	5.963		100.00	0.000	0.000
					C	0.000	5.963		100.00	0.000	1.850
L18 23.5000-18.7500	21.1122	1	16.384	14.497	A	0.000	14.497	14.497	100.00	0.000	0.000
					B	0.000	14.497		100.00	0.000	0.000
					C	0.000	14.497		100.00	0.000	4.686
L19 18.7500-17.0833	17.9151	1	16.384	5.198	A	0.000	5.198	5.198	100.00	0.000	0.000
					B	0.000	5.198		100.00	0.000	0.000
					C	0.000	5.198		100.00	0.000	1.820
L20 17.0833-13.0000	15.0326	1	16.384	12.979	A	0.000	12.979	12.979	100.00	0.000	0.000
					B	0.000	12.979		100.00	0.000	0.000
					C	0.000	12.979		100.00	0.000	4.104
L21 13.0000-10.5000	11.7467	1	16.384	8.118	A	0.000	8.118	8.118	100.00	0.000	0.000
					B	0.000	8.118		100.00	0.000	0.000
					C	0.000	8.118		100.00	0.000	2.417
L22 10.5000-0.0000	5.1935	1	16.384	35.515	A	0.000	35.515	35.515	100.00	0.000	0.000
					B	0.000	35.515		100.00	0.000	0.000
					C	0.000	35.515		100.00	0.000	10.152

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 131.0000-110.0000	119.8282	1.445	5.232	1.4592	27.901	A	0.000	27.901	27.901	100.00	0.000	0.000
						B	0.000	27.901		100.00	0.000	0.000
						C	0.000	27.901		100.00	0.000	23.457
L2 110.0000-90.0000	99.5374	1.371	4.961	1.4271	34.801	A	0.000	34.801	34.801	100.00	0.000	0.000
						B	0.000	34.801		100.00	0.000	0.000
						C	0.000	34.801		100.00	0.000	30.521
L3 90.0000-84.5833	87.2628	1.32	4.778	1.4047	10.840	A	0.000	10.840	10.840	100.00	0.000	0.000
						B	0.000	10.840		100.00	0.000	0.000
						C	0.000	10.840		100.00	0.000	11.137
L4 84.5833-83.0000	83.7893	1.305	4.723	1.3979	3.282	A	0.000	3.282	3.282	100.00	0.000	0.000
						B	0.000	3.282		100.00	0.000	0.000
						C	0.000	3.282		100.00	0.000	3.776
L5 83.0000-81.0000	81.9963	1.297	4.694	1.3943	4.220	A	0.000	4.220	4.220	100.00	0.000	0.000
						B	0.000	4.220		100.00	0.000	0.000
						C	0.000	4.220		100.00	0.000	4.525
L6 81.0000-70.0000	75.3956	1.266	4.583	1.3803	24.673	A	0.000	24.673	24.673	100.00	0.000	0.000
						B	0.000	24.673		100.00	0.000	0.000
						C	0.000	24.673		100.00	0.000	20.827
L7 70.0000-67.0833	68.5325	1.232	4.460	1.3646	6.817	A	0.000	6.817	6.817	100.00	0.000	0.000
						B	0.000	6.817		100.00	0.000	0.000
						C	0.000	6.817		100.00	0.000	6.062
L8 67.0833-64.0833	65.5761	1.217	4.404	1.3574	7.213	A	0.000	7.213	7.213	100.00	0.000	0.000
						B	0.000	7.213		100.00	0.000	0.000
						C	0.000	7.213		100.00	0.000	7.055
L9 64.0833-61.0833	62.5763	1.201	4.345	1.3498	7.396	A	0.000	7.396	7.396	100.00	0.000	0.000
						B	0.000	7.396		100.00	0.000	0.000
						C	0.000	7.396		100.00	0.000	7.005
L10 61.0833-59.5000	60.2897	1.188	4.299	1.3437	3.978	A	0.000	3.978	3.978	100.00	0.000	0.000
						B	0.000	3.978		100.00	0.000	0.000
						C	0.000	3.978		100.00	0.000	3.687
L11 59.5000-53.5000	56.4736	1.166	4.220	1.3332	15.537	A	0.000	15.537	15.537	100.00	0.000	0.000
						B	0.000	15.537		100.00	0.000	0.000
						C	0.000	15.537		100.00	0.000	13.906
L12 53.5000-44.5833	48.9869	1.119	4.052	1.3107	24.442	A	0.000	24.442	24.442	100.00	0.000	0.000
						B	0.000	24.442		100.00	0.000	0.000
						C	0.000	24.442		100.00	0.000	20.976

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
L13 44.5833-40.5000	42.5308	1.075	3.891	1.2886	11.731	A	0.000	11.731	11.731	100.00	0.000	0.000
						B	0.000	11.731		100.00	0.000	0.000
						C	0.000	11.731		100.00	0.000	9.788
L14 40.5000-39.0000	39.7486	1.055	3.817	1.2782	4.394	A	0.000	4.394	4.394	100.00	0.000	0.000
						B	0.000	4.394		100.00	0.000	0.000
						C	0.000	4.394		100.00	0.000	3.390
L15 39.0000-31.5000	35.2266	1.019	3.687	1.2598	22.455	A	0.000	22.455	22.455	100.00	0.000	0.000
						B	0.000	22.455		100.00	0.000	0.000
						C	0.000	22.455		100.00	0.000	16.807
L16 31.5000-25.5000	28.4785	1	3.619	1.2500	18.641	A	0.000	18.641	18.641	100.00	0.000	0.000
						B	0.000	18.641		100.00	0.000	0.000
						C	0.000	18.641		100.00	0.000	13.384
L17 25.5000-23.5000	24.4977	1	3.619	1.2500	6.380	A	0.000	6.380	6.380	100.00	0.000	0.000
						B	0.000	6.380		100.00	0.000	0.000
						C	0.000	6.380		100.00	0.000	4.461
L18 23.5000-18.7500	21.1122	1	3.619	1.2500	15.487	A	0.000	15.487	15.487	100.00	0.000	0.000
						B	0.000	15.487		100.00	0.000	0.000
						C	0.000	15.487		100.00	0.000	11.374
L19 18.7500-17.0833	17.9151	1	3.619	1.2500	5.545	A	0.000	5.545	5.545	100.00	0.000	0.000
						B	0.000	5.545		100.00	0.000	0.000
						C	0.000	5.545		100.00	0.000	4.459
L20 17.0833-13.0000	15.0326	1	3.619	1.2500	13.830	A	0.000	13.830	13.830	100.00	0.000	0.000
						B	0.000	13.830		100.00	0.000	0.000
						C	0.000	13.830		100.00	0.000	9.782
L21 13.0000-10.5000	11.7467	1	3.619	1.2500	8.639	A	0.000	8.639	8.639	100.00	0.000	0.000
						B	0.000	8.639		100.00	0.000	0.000
						C	0.000	8.639		100.00	0.000	5.681
L22 10.5000-0.0000	5.1935	1	3.619	1.2500	37.703	A	0.000	37.703	37.703	100.00	0.000	0.000
						B	0.000	37.703		100.00	0.000	0.000
						C	0.000	37.703		100.00	0.000	23.860

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 131.0000-110.0000	119.8282	1.445	9.251	22.794	A	0.000	22.794	22.794	100.00	0.000	0.000
					B	0.000	22.794		100.00	0.000	0.000
					C	0.000	22.794		100.00	0.000	9.741
L2 110.0000-90.0000	99.5374	1.371	8.773	30.044	A	0.000	30.044	30.044	100.00	0.000	0.000
					B	0.000	30.044		100.00	0.000	0.000
					C	0.000	30.044		100.00	0.000	12.920
L3 90.0000-84.5833	87.2628	1.32	8.450	9.572	A	0.000	9.572	9.572	100.00	0.000	0.000
					B	0.000	9.572		100.00	0.000	0.000
					C	0.000	9.572		100.00	0.000	4.491
L4 84.5833-83.0000	83.7893	1.305	8.352	2.913	A	0.000	2.913	2.913	100.00	0.000	0.000
					B	0.000	2.913		100.00	0.000	0.000
					C	0.000	2.913		100.00	0.000	1.465
L5 83.0000-81.0000	81.9963	1.297	8.301	3.755	A	0.000	3.755	3.755	100.00	0.000	0.000
					B	0.000	3.755		100.00	0.000	0.000
					C	0.000	3.755		100.00	0.000	1.767
L6 81.0000-70.0000	75.3956	1.266	8.104	22.142	A	0.000	22.142	22.142	100.00	0.000	0.000
					B	0.000	22.142		100.00	0.000	0.000
					C	0.000	22.142		100.00	0.000	8.344
L7 70.0000-67.0833	68.5325	1.232	7.886	6.146	A	0.000	6.146	6.146	100.00	0.000	0.000
					B	0.000	6.146		100.00	0.000	0.000
					C	0.000	6.146		100.00	0.000	2.369
L8 67.0833-64.0833	65.5761	1.217	7.787	6.534	A	0.000	6.534	6.534	100.00	0.000	0.000
					B	0.000	6.534		100.00	0.000	0.000
					C	0.000	6.534		100.00	0.000	2.751

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
L9 64.0833-61.0833	62.5763	1.201	7.684	6.721	A	0.000	6.721	6.721	100.00	0.000	0.000
					B	0.000	6.721		100.00	0.000	0.000
					C	0.000	6.721		100.00	0.000	2.776
L10 61.0833-59.5000	60.2897	1.188	7.603	3.623	A	0.000	3.623	3.623	100.00	0.000	0.000
					B	0.000	3.623		100.00	0.000	0.000
					C	0.000	3.623		100.00	0.000	1.465
L11 59.5000-53.5000	56.4736	1.166	7.462	14.204	A	0.000	14.204	14.204	100.00	0.000	0.000
					B	0.000	14.204		100.00	0.000	0.000
					C	0.000	14.204		100.00	0.000	5.551
L12 53.5000-44.5833	48.9869	1.119	7.165	22.495	A	0.000	22.495	22.495	100.00	0.000	0.000
					B	0.000	22.495		100.00	0.000	0.000
					C	0.000	22.495		100.00	0.000	8.406
L13 44.5833-40.5000	42.5308	1.075	6.881	10.854	A	0.000	10.854	10.854	100.00	0.000	0.000
					B	0.000	10.854		100.00	0.000	0.000
					C	0.000	10.854		100.00	0.000	3.934
L14 40.5000-39.0000	39.7486	1.055	6.749	4.075	A	0.000	4.075	4.075	100.00	0.000	0.000
					B	0.000	4.075		100.00	0.000	0.000
					C	0.000	4.075		100.00	0.000	1.388
L15 39.0000-31.5000	35.2266	1.019	6.521	20.880	A	0.000	20.880	20.880	100.00	0.000	0.000
					B	0.000	20.880		100.00	0.000	0.000
					C	0.000	20.880		100.00	0.000	6.939
L16 31.5000-25.5000	28.4785	1	6.400	17.391	A	0.000	17.391	17.391	100.00	0.000	0.000
					B	0.000	17.391		100.00	0.000	0.000
					C	0.000	17.391		100.00	0.000	5.551
L17 25.5000-23.5000	24.4977	1	6.400	5.963	A	0.000	5.963	5.963	100.00	0.000	0.000
					B	0.000	5.963		100.00	0.000	0.000
					C	0.000	5.963		100.00	0.000	1.850
L18 23.5000-18.7500	21.1122	1	6.400	14.497	A	0.000	14.497	14.497	100.00	0.000	0.000
					B	0.000	14.497		100.00	0.000	0.000
					C	0.000	14.497		100.00	0.000	4.686
L19 18.7500-17.0833	17.9151	1	6.400	5.198	A	0.000	5.198	5.198	100.00	0.000	0.000
					B	0.000	5.198		100.00	0.000	0.000
					C	0.000	5.198		100.00	0.000	1.820
L20 17.0833-13.0000	15.0326	1	6.400	12.979	A	0.000	12.979	12.979	100.00	0.000	0.000
					B	0.000	12.979		100.00	0.000	0.000
					C	0.000	12.979		100.00	0.000	4.104
L21 13.0000-10.5000	11.7467	1	6.400	8.118	A	0.000	8.118	8.118	100.00	0.000	0.000
					B	0.000	8.118		100.00	0.000	0.000
					C	0.000	8.118		100.00	0.000	2.417
L22 10.5000-0.0000	5.1935	1	6.400	35.515	A	0.000	35.515	35.515	100.00	0.000	0.000
					B	0.000	35.515		100.00	0.000	0.000
					C	0.000	35.515		100.00	0.000	10.152

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

Comb. No.	Description
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	131 - 110	Pole	Max Tension	2	0.00	-0.00	-0.00
			Max. Compression	14	-7.25	0.80	-0.11
			Max. Mx	11	-1.99	59.30	0.01
			Max. My	2	-1.99	0.08	59.22
			Max. Vy	11	-5.07	59.30	0.01
			Max. Vx	8	5.06	0.08	-59.13
			Max. Torque	5			0.25
L2	110 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.24	2.59	-2.33
			Max. Mx	11	-8.00	324.86	-0.20
			Max. My	8	-8.04	0.30	-320.49
			Max. Vy	11	-17.13	324.86	-0.20
			Max. Vx	2	-16.87	0.14	320.10
			Max. Torque	12			0.58
L3	90 - 84.5833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.57	3.49	-2.86
			Max. Mx	11	-9.75	423.16	-0.18
			Max. My	8	-9.79	0.43	-417.21
			Max. Vy	11	-19.34	423.16	-0.18
			Max. Vx	2	-19.08	0.20	416.87
			Max. Torque	12			0.61
L4	84.5833 - 83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.26	3.81	-3.05
			Max. Mx	11	-10.06	453.94	-0.18
			Max. My	8	-10.09	0.47	-447.51
			Max. Vy	11	-19.51	453.94	-0.18
			Max. Vx	2	-19.25	0.22	447.18
			Max. Torque	12			0.62
L5	83 - 81	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-32.03	4.23	-3.29
			Max. Mx	11	-10.36	493.17	-0.18
			Max. My	8	-10.40	0.53	-486.15
			Max. Vy	11	-19.70	493.17	-0.18
			Max. Vx	2	-19.44	0.25	485.83
			Max. Torque	12			0.63
L6	81 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.94	5.77	-4.19
			Max. Mx	11	-11.66	633.51	-0.19
			Max. My	8	-11.69	0.74	-624.40
			Max. Vy	11	-20.37	633.51	-0.19
			Max. Vx	2	-20.11	0.36	624.11

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	12			0.67
L7	70 - 67.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.46	7.32	-5.10
			Max. Mx	11	-13.37	777.14	-0.20
			Max. My	8	-13.40	0.96	-765.98
			Max. Vy	11	-21.10	777.14	-0.20
			Max. Vx	2	-20.84	0.48	765.69
			Max. Torque	12			0.71
L8	67.0833 - 64.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-39.68	8.01	-5.50
			Max. Mx	11	-13.93	840.92	-0.20
			Max. My	8	-13.96	1.05	-828.86
			Max. Vy	11	-21.39	840.92	-0.20
			Max. Vx	2	-21.13	0.53	828.57
			Max. Torque	12			0.74
L9	64.0833 - 61.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-40.95	8.72	-5.91
			Max. Mx	11	-14.52	905.57	-0.21
			Max. My	8	-14.55	1.15	-892.62
			Max. Vy	11	-21.69	905.57	-0.21
			Max. Vx	2	-21.43	0.59	892.33
			Max. Torque	12			0.76
L10	61.0833 - 59.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.68	9.09	-6.13
			Max. Mx	11	-14.89	940.06	-0.21
			Max. My	8	-14.92	1.20	-926.63
			Max. Vy	11	-21.85	940.06	-0.21
			Max. Vx	2	-21.59	0.62	926.35
			Max. Torque	12			0.77
L11	59.5 - 53.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.65	10.54	-6.97
			Max. Mx	11	-16.49	1073.18	-0.23
			Max. My	8	-16.52	1.41	-1057.96
			Max. Vy	11	-22.49	1073.18	-0.23
			Max. Vx	2	-22.23	0.74	1057.66
			Max. Torque	12			0.82
L12	53.5 - 44.5833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-49.12	12.77	-8.27
			Max. Mx	11	-18.96	1278.05	-0.27
			Max. My	8	-18.98	1.73	-1260.16
			Max. Vy	11	-23.43	1278.05	-0.27
			Max. Vx	2	-23.17	0.93	1259.83
			Max. Torque	12			0.89
L13	44.5833 - 40.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.18	13.82	-8.87
			Max. Mx	11	-20.12	1374.67	-0.29
			Max. My	8	-20.14	1.88	-1355.55
			Max. Vy	11	-23.85	1374.67	-0.29
			Max. Vx	2	-23.60	1.03	1355.20
			Max. Torque	12			0.92
L14	40.5 - 39	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-51.96	14.20	-9.10
			Max. Mx	11	-20.56	1410.60	-0.29
			Max. My	8	-20.58	1.93	-1391.03
			Max. Vy	11	-24.01	1410.60	-0.29
			Max. Vx	2	-23.75	1.06	1390.67
			Max. Torque	12			0.94
L15	39 - 31.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.92	16.13	-10.22
			Max. Mx	11	-22.91	1593.61	-0.33
			Max. My	8	-22.92	2.22	-1571.80
			Max. Vy	11	-24.75	1593.61	-0.33
			Max. Vx	2	-24.50	1.25	1571.38
			Max. Torque	12			1.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L16	31.5 - 25.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-58.91	17.71	-11.13
			Max. Mx	11	-24.62	1743.96	-0.37
			Max. My	8	-24.64	2.46	-1720.34
			Max. Vy	11	-25.32	1743.96	-0.37
			Max. Vx	2	-25.06	1.40	1719.87
			Max. Torque	13			1.05
L17	25.5 - 23.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-59.96	18.25	-11.44
			Max. Mx	11	-25.24	1794.84	-0.38
			Max. My	8	-25.25	2.54	-1770.63
			Max. Vy	11	-25.51	1794.84	-0.38
			Max. Vx	2	-25.26	1.45	1770.14
			Max. Torque	13			1.07
L18	23.5 - 18.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-62.28	19.55	-12.19
			Max. Mx	11	-26.55	1917.22	-0.42
			Max. My	8	-26.56	2.74	-1891.59
			Max. Vy	11	-25.97	1917.22	-0.42
			Max. Vx	2	-25.72	1.58	1891.05
			Max. Torque	13			1.12
L19	18.75 - 17.0833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-63.20	20.01	-12.46
			Max. Mx	11	-27.10	1960.69	-0.43
			Max. My	8	-27.11	2.81	-1934.56
			Max. Vy	11	-26.15	1960.69	-0.43
			Max. Vx	2	-25.90	1.63	1934.00
			Max. Torque	13			1.14
L20	17.0833 - 13	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-65.32	21.16	-13.13
			Max. Mx	11	-28.35	2068.38	-0.46
			Max. My	8	-28.35	2.98	-2041.04
			Max. Vy	11	-26.55	2068.38	-0.46
			Max. Vx	2	-26.30	1.75	2040.43
			Max. Torque	13			1.18
L21	13 - 10.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.80	21.87	-13.54
			Max. Mx	11	-29.27	2135.16	-0.48
			Max. My	8	-29.28	3.09	-2107.07
			Max. Vy	11	-26.82	2135.16	-0.48
			Max. Vx	2	-26.56	1.82	2106.43
			Max. Torque	13			1.21
L22	10.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-72.30	24.94	-15.31
			Max. Mx	11	-32.47	2422.51	-0.58
			Max. My	8	-32.47	3.56	-2391.31
			Max. Vy	11	-27.87	2422.51	-0.58
			Max. Vx	2	-27.62	2.15	2390.51
			Max. Torque	13			1.33

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	72.30	-0.00	0.00
	Max. H_x	11	32.48	27.86	0.01
	Max. H_z	2	32.48	-0.01	27.61
	Max. M_x	2	2390.51	-0.01	27.61
	Max. M_z	5	2416.82	-27.86	0.03
	Max. Torsion	13	1.33	14.00	23.89
	Min. Vert	8	32.48	0.01	-27.58
	Min. H_x	5	32.48	-27.86	0.03
	Min. H_z	8	32.48	0.01	-27.58

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Min. M_x	8	-2391.31	0.01	-27.58
	Min. M_z	11	-2422.51	27.86	0.01
	Min. Torsion	7	-1.25	-13.90	-23.88

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	32.48	0.00	-0.00	1.83	2.78	-0.00
Dead+Wind 0 deg - No Ice	32.48	0.01	-27.61	-2390.51	2.15	-0.79
Dead+Wind 30 deg - No Ice	32.48	14.01	-23.90	-2068.81	-1215.61	-0.04
Dead+Wind 60 deg - No Ice	32.48	24.17	-13.78	-1191.55	-2096.50	0.49
Dead+Wind 90 deg - No Ice	32.48	27.86	-0.03	-0.83	-2416.82	0.89
Dead+Wind 120 deg - No Ice	32.48	24.15	13.69	1186.15	-2094.61	1.16
Dead+Wind 150 deg - No Ice	32.48	13.90	23.88	2070.08	-1204.35	1.25
Dead+Wind 180 deg - No Ice	32.48	-0.01	27.58	2391.31	3.56	0.80
Dead+Wind 210 deg - No Ice	32.48	-13.92	23.88	2070.78	1211.27	0.13
Dead+Wind 240 deg - No Ice	32.48	-24.15	13.70	1187.36	2101.01	-0.36
Dead+Wind 270 deg - No Ice	32.48	-27.86	-0.01	0.58	2422.51	-0.90
Dead+Wind 300 deg - No Ice	32.48	-24.16	-13.77	-1190.33	2101.49	-1.29
Dead+Wind 330 deg - No Ice	32.48	-14.00	-23.89	-2068.10	1220.09	-1.33
Dead+Ice+Temp	72.30	0.00	-0.00	15.31	24.94	-0.00
Dead+Wind 0 deg+Ice+Temp	72.30	0.00	-8.65	-776.55	24.84	-0.44
Dead+Wind 30 deg+Ice+Temp	72.30	4.38	-7.49	-670.02	-376.76	-0.13
Dead+Wind 60 deg+Ice+Temp	72.30	7.56	-4.32	-379.78	-667.89	0.16
Dead+Wind 90 deg+Ice+Temp	72.30	8.72	-0.01	14.63	-773.95	0.40
Dead+Wind 120 deg+Ice+Temp	72.30	7.55	4.30	408.02	-667.36	0.56
Dead+Wind 150 deg+Ice+Temp	72.30	4.35	7.48	700.07	-373.69	0.61
Dead+Wind 180 deg+Ice+Temp	72.30	-0.00	8.65	806.48	25.23	0.43
Dead+Wind 210 deg+Ice+Temp	72.30	-4.35	7.49	700.26	424.10	0.14
Dead+Wind 240 deg+Ice+Temp	72.30	-7.55	4.30	408.36	717.62	-0.13
Dead+Wind 270 deg+Ice+Temp	72.30	-8.72	-0.00	15.02	824.00	-0.40
Dead+Wind 300 deg+Ice+Temp	72.30	-7.56	-4.32	-379.43	717.75	-0.60
Dead+Wind 330 deg+Ice+Temp	72.30	-4.38	-7.49	-669.81	426.49	-0.63
Dead+Wind 0 deg - Service	32.48	0.00	-10.79	-933.67	2.58	-0.31
Dead+Wind 30 deg - Service	32.48	5.47	-9.34	-807.79	-473.59	-0.02
Dead+Wind 60 deg - Service	32.48	9.44	-5.38	-464.77	-818.04	0.19
Dead+Wind 90 deg - Service	32.48	10.88	-0.01	0.83	-943.28	0.35
Dead+Wind 120 deg - Service	32.48	9.43	5.35	464.96	-817.29	0.46
Dead+Wind 150 deg - Service	32.48	5.43	9.33	810.58	-469.18	0.50
Dead+Wind 180 deg - Service	32.48	-0.00	10.77	936.28	3.13	0.31
Dead+Wind 210 deg - Service	32.48	-5.44	9.33	810.86	475.37	0.04
Dead+Wind 240 deg - Service	32.48	-9.43	5.35	465.44	823.28	-0.15
Dead+Wind 270 deg - Service	32.48	-10.88	-0.00	1.38	948.99	-0.35
Dead+Wind 300 deg - Service	32.48	-9.44	-5.38	-464.29	823.47	-0.50

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+Wind 330 deg - Service	32.48	-5.47	-9.33	-807.51	478.82	-0.52

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	-32.48	0.00	-0.00	32.48	0.00	0.001%
2	0.01	-32.48	-27.62	-0.01	32.48	27.61	0.012%
3	14.01	-32.48	-23.90	-14.01	32.48	23.90	0.000%
4	24.17	-32.48	-13.78	-24.17	32.48	13.78	0.000%
5	27.86	-32.48	-0.03	-27.86	32.48	0.03	0.006%
6	24.15	-32.48	13.69	-24.15	32.48	-13.69	0.000%
7	13.90	-32.48	23.88	-13.90	32.48	-23.88	0.000%
8	-0.01	-32.48	27.59	0.01	32.48	-27.58	0.012%
9	-13.92	-32.48	23.88	13.92	32.48	-23.88	0.000%
10	-24.15	-32.48	13.70	24.15	32.48	-13.70	0.000%
11	-27.86	-32.48	-0.01	27.86	32.48	0.01	0.006%
12	-24.16	-32.48	-13.77	24.16	32.48	13.77	0.000%
13	-14.00	-32.48	-23.89	14.00	32.48	23.89	0.000%
14	0.00	-72.30	0.00	-0.00	72.30	0.00	0.001%
15	0.00	-72.30	-8.66	-0.00	72.30	8.65	0.001%
16	4.38	-72.30	-7.49	-4.38	72.30	7.49	0.001%
17	7.56	-72.30	-4.32	-7.56	72.30	4.32	0.001%
18	8.72	-72.30	-0.01	-8.72	72.30	0.01	0.001%
19	7.55	-72.30	4.30	-7.55	72.30	-4.30	0.001%
20	4.35	-72.30	7.49	-4.35	72.30	-7.48	0.001%
21	-0.00	-72.30	8.65	0.00	72.30	-8.65	0.001%
22	-4.35	-72.30	7.49	4.35	72.30	-7.49	0.001%
23	-7.55	-72.30	4.30	7.55	72.30	-4.30	0.001%
24	-8.72	-72.30	-0.00	8.72	72.30	0.00	0.001%
25	-7.56	-72.30	-4.32	7.56	72.30	4.32	0.001%
26	-4.38	-72.30	-7.49	4.38	72.30	7.49	0.001%
27	0.00	-32.48	-10.79	-0.00	32.48	10.79	0.006%
28	5.47	-32.48	-9.34	-5.47	32.48	9.34	0.003%
29	9.44	-32.48	-5.38	-9.44	32.48	5.38	0.003%
30	10.88	-32.48	-0.01	-10.88	32.48	0.01	0.006%
31	9.43	-32.48	5.35	-9.43	32.48	-5.35	0.003%
32	5.43	-32.48	9.33	-5.43	32.48	-9.33	0.003%
33	-0.00	-32.48	10.78	0.00	32.48	-10.77	0.006%
34	-5.44	-32.48	9.33	5.44	32.48	-9.33	0.003%
35	-9.44	-32.48	5.35	9.43	32.48	-5.35	0.003%
36	-10.88	-32.48	-0.00	10.88	32.48	0.00	0.006%
37	-9.44	-32.48	-5.38	9.44	32.48	5.38	0.003%
38	-5.47	-32.48	-9.33	5.47	32.48	9.33	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	0.00012404	0.00013962
3	Yes	20	0.00000001	0.00011313
4	Yes	20	0.00000001	0.00011080
5	Yes	16	0.00006336	0.00008052
6	Yes	20	0.00000001	0.00011347
7	Yes	20	0.00000001	0.00010981
8	Yes	15	0.00012405	0.00014143
9	Yes	20	0.00000001	0.00011198
10	Yes	20	0.00000001	0.00011314
11	Yes	16	0.00006334	0.00008211

12	Yes	20	0.00000001	0.00011019
13	Yes	20	0.00000001	0.00011503
14	Yes	13	0.00000001	0.00004653
15	Yes	18	0.00008112	0.00009992
16	Yes	18	0.00008095	0.00012635
17	Yes	18	0.00008097	0.00012614
18	Yes	18	0.00008116	0.00009979
19	Yes	18	0.00008094	0.00013279
20	Yes	18	0.00008094	0.00013023
21	Yes	18	0.00008110	0.00010382
22	Yes	18	0.00008085	0.00014057
23	Yes	18	0.00008084	0.00014099
24	Yes	18	0.00008106	0.00010575
25	Yes	18	0.00008087	0.00013370
26	Yes	18	0.00008087	0.00013624
27	Yes	15	0.00013015	0.00007202
28	Yes	16	0.00006653	0.00012280
29	Yes	16	0.00006654	0.00011659
30	Yes	15	0.00013015	0.00007416
31	Yes	16	0.00006654	0.00012764
32	Yes	16	0.00006654	0.00011425
33	Yes	15	0.00013015	0.00007231
34	Yes	16	0.00006653	0.00012085
35	Yes	16	0.00006653	0.00012607
36	Yes	15	0.00013013	0.00007465
37	Yes	16	0.00006653	0.00011497
38	Yes	16	0.00006652	0.00012951

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	131 - 110	35.68	36	2.61	0.00
L2	110 - 90	24.42	36	2.41	0.00
L3	90 - 84.5833	15.47	36	1.78	0.00
L4	84.5833 - 83	13.53	36	1.65	0.00
L5	83 - 81	12.99	36	1.62	0.00
L6	81 - 70	12.32	36	1.56	0.00
L7	74 - 67.0833	10.16	36	1.39	0.00
L8	67.0833 - 64.0833	8.23	36	1.25	0.00
L9	64.0833 - 61.0833	7.47	36	1.16	0.00
L10	61.0833 - 59.5	6.77	36	1.08	0.00
L11	59.5 - 53.5	6.42	36	1.04	0.00
L12	53.5 - 44.5833	5.18	36	0.93	0.00
L13	44.5833 - 40.5	3.59	36	0.77	0.00
L14	40.5 - 39	2.96	36	0.70	0.00
L15	39 - 31.5	2.75	36	0.67	0.00
L16	31.5 - 25.5	1.78	36	0.55	0.00
L17	25.5 - 23.5	1.16	36	0.44	0.00
L18	23.5 - 18.75	0.98	36	0.41	0.00
L19	18.75 - 17.0833	0.62	36	0.31	0.00
L20	17.0833 - 13	0.52	36	0.29	0.00
L21	13 - 10.5	0.30	36	0.22	0.00
L22	10.5 - 0	0.20	36	0.18	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128.0000	APX18-206517S-C w/ Mount	36	34.03	2.61	0.00	11272

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
	Pipe					
121.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	36	30.20	2.57	0.00	5636
107.0000	BXA-80063/4CF	36	22.93	2.33	0.00	2379
101.0000	VHLP2.5-11	36	20.08	2.14	0.00	1939
99.0000	800MHz 2X50W RRH W/FILTER	36	19.18	2.07	0.00	1826
97.0000	TIMING 2000	36	18.30	2.01	0.00	1726
87.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	36	14.37	1.70	0.00	2090

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	131 - 110	90.90	11	6.66	0.01
L2	110 - 90	62.25	11	6.15	0.01
L3	90 - 84.5833	39.46	11	4.54	0.00
L4	84.5833 - 83	34.50	11	4.21	0.00
L5	83 - 81	33.12	11	4.13	0.00
L6	81 - 70	31.43	11	3.98	0.00
L7	74 - 67.0833	25.91	11	3.55	0.00
L8	67.0833 - 64.0833	20.99	11	3.18	0.00
L9	64.0833 - 61.0833	19.07	11	2.95	0.00
L10	61.0833 - 59.5	17.28	11	2.74	0.00
L11	59.5 - 53.5	16.38	11	2.66	0.00
L12	53.5 - 44.5833	13.22	11	2.38	0.00
L13	44.5833 - 40.5	9.16	11	1.97	0.00
L14	40.5 - 39	7.56	11	1.78	0.00
L15	39 - 31.5	7.01	11	1.72	0.00
L16	31.5 - 25.5	4.55	11	1.41	0.00
L17	25.5 - 23.5	2.96	11	1.12	0.00
L18	23.5 - 18.75	2.50	11	1.04	0.00
L19	18.75 - 17.0833	1.59	11	0.80	0.00
L20	17.0833 - 13	1.32	11	0.73	0.00
L21	13 - 10.5	0.77	11	0.55	0.00
L22	10.5 - 0	0.51	11	0.47	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128.0000	APX18-206517S-C w/ Mount Pipe	11	86.69	6.64	0.01	4538
121.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	11	76.95	6.55	0.01	2268
107.0000	BXA-80063/4CF	11	58.44	5.95	0.01	953
101.0000	VHLP2.5-11	11	51.20	5.47	0.01	774
99.0000	800MHz 2X50W RRH W/FILTER	11	48.90	5.29	0.01	728
97.0000	TIMING 2000	11	46.68	5.11	0.01	687
87.0000	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	11	36.66	4.33	0.00	828

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	131 - 110 (1)	TP15.525x10.525x0.1875	21.0000	0.0000	0.0	39.00	9.2600	-1.99	361.14	0.006
L2	110 - 90 (2)	TP20.528x15.525x0.25	20.0000	0.0000	0.0	39.00	16.3238	-8.00	636.63	0.013
L3	90 - 84.5833 (3)	TP21.883x20.528x0.4767	5.4167	0.0000	0.0	28.51	32.8594	-9.75	936.89	0.010
L4	84.5833 - 83 (4)	TP22.2791x21.883x0.6243	1.5833	0.0000	0.0	28.52	43.5314	-10.06	1241.69	0.008
L5	83 - 81 (5)	TP22.7794x22.2791x0.3895	2.0000	0.0000	0.0	37.45	28.0776	-10.36	1051.39	0.010
L6	81 - 70 (6)	TP25.531x22.7794x0.5101	11.0000	0.0000	0.0	27.07	39.4554	-11.66	1068.14	0.011
L7	70 - 67.0833 (7)	TP25.7604x23.5102x0.4353	6.9167	0.0000	0.0	37.58	35.4949	-13.37	1334.04	0.010
L8	67.0833 - 64.0833 (8)	TP26.5107x25.7604x0.4313	3.0000	0.0000	0.0	37.63	36.2146	-13.93	1362.83	0.010
L9	64.0833 - 61.0833 (9)	TP27.2611x26.5107x0.4752	3.0000	0.0000	0.0	35.51	40.9837	-14.52	1455.49	0.010
L10	61.0833 - 59.5 (10)	TP27.6571x27.2611x0.6039	1.5833	0.0000	0.0	28.79	52.6099	-14.89	1514.85	0.010
L11	59.5 - 53.5 (11)	TP29.1578x27.6571x0.6991	6.0000	0.0000	0.0	27.18	64.0544	-16.49	1741.00	0.009
L12	53.5 - 44.5833 (12)	TP31.388x29.1578x0.6831	8.9167	0.0000	0.0	27.01	67.5330	-18.96	1824.20	0.010
L13	44.5833 - 40.5 (13)	TP32.4093x31.388x0.6692	4.0833	0.0000	0.0	27.05	68.3942	-20.12	1849.93	0.011
L14	40.5 - 39 (14)	TP32.7844x32.4093x0.6987	1.5000	0.0000	0.0	27.27	72.1829	-20.56	1968.43	0.010
L15	39 - 31.5 (15)	TP34.0326x32.7844x0.7154	7.5000	0.0000	0.0	27.28	76.7501	-22.91	2093.90	0.011
L16	31.5 - 25.5 (16)	TP35.5312x34.0326x0.6073	6.0000	0.0000	0.0	31.75	68.2894	-24.62	2167.91	0.011
L17	25.5 - 23.5 (17)	TP36.0307x35.5312x0.6534	2.0000	0.0000	0.0	30.79	74.4274	-25.24	2291.77	0.011
L18	23.5 - 18.75 (18)	TP37.217x36.0307x0.5424	4.7500	0.0000	0.0	34.51	62.5038	-25.59	2157.13	0.012
L19	18.75 - 17.0833 (19)	TP37.6333x37.217x0.6846	1.6667	0.0000	0.0	32.57	80.5279	-26.58	2623.12	0.010
L20	17.0833 - 13 (20)	TP38.6531x37.6333x0.5929	4.0833	0.0000	0.0	32.69	70.7152	-27.13	2311.96	0.012
L21	13 - 10.5 (21)	TP39.2775x38.6531x0.7508	2.5000	0.0000	0.0	31.58	91.6330	-28.37	2894.14	0.010
L22	10.5 - 0 (22)	TP41.9x39.2775x0.5542	10.5000	0.0000	0.0	31.85	69.1003	-29.30	2201.12	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	131 - 110 (1)	TP15.525x10.525x0.1875	59.31	20.59	39.00	0.528	0.00	0.00	39.00	0.000
L2	110 - 90 (2)	TP20.528x15.525x0.25	324.86	48.38	39.00	1.241	0.00	0.00	39.00	0.000
L3	90 - 84.5833 (3)	TP21.883x20.528x0.4767	423.17	29.95	28.51	1.050	0.00	0.00	28.51	0.000
L4	84.5833 - 83 (4)	TP22.2791x21.883x0.6243	453.94	24.13	28.52	0.846	0.00	0.00	28.52	0.000
L5	83 - 81 (5)	TP22.7794x22.2791x0.3895	493.17	38.87	37.45	1.038	0.00	0.00	37.45	0.000
L6	81 - 70 (6)	TP25.531x22.7794x0.5101	633.51	33.24	27.07	1.228	0.00	0.00	27.07	0.000
L7	70 - 67.0833 (7)	TP25.7604x23.5102x0.4353	777.14	42.83	37.58	1.139	0.00	0.00	37.58	0.000
L8	67.0833 - 64.0833 (8)	TP26.5107x25.7604x0.4313	840.92	44.08	37.63	1.171	0.00	0.00	37.63	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L9	64.0833 - 61.0833 (9)	TP27.2611x26.5107x0.4752	905.58	40.89	35.51	1.151	0.00	0.00	35.51	0.000
L10	61.0833 - 59.5 (10)	TP27.6571x27.2611x0.6039	940.07	32.88	28.79	1.142	0.00	0.00	28.79	0.000
L11	59.5 - 53.5 (11)	TP29.1578x27.6571x0.699	1073.18	29.37	27.18	1.081	0.00	0.00	27.18	0.000
L12	53.5 - 44.5833 (12)	TP31.388x29.1578x0.6831	1278.05	30.68	27.01	1.136	0.00	0.00	27.01	0.000
L13	44.5833 - 40.5 (13)	TP32.4093x31.388x0.6692	1374.67	31.49	27.05	1.164	0.00	0.00	27.05	0.000
L14	40.5 - 39 (14)	TP32.7844x32.4093x0.6987	1410.60	30.31	27.27	1.111	0.00	0.00	27.27	0.000
L15	39 - 31.5 (15)	TP34.0326x32.7844x0.7154	1593.61	31.00	27.28	1.136	0.00	0.00	27.28	0.000
L16	31.5 - 25.5 (16)	TP35.5312x34.0326x0.6073	1743.96	36.23	31.75	1.141	0.00	0.00	31.75	0.000
L17	25.5 - 23.5 (17)	TP36.0307x35.5312x0.6534	1794.84	33.81	30.79	1.098	0.00	0.00	30.79	0.000
L18	23.5 - 18.75 (18)	TP37.217x36.0307x0.5424	1825.23	40.34	34.51	1.169	0.00	0.00	34.51	0.000
L19	18.75 - 17.0833 (19)	TP37.6333x37.217x0.6846	1917.22	32.33	32.57	0.993	0.00	0.00	32.57	0.000
L20	17.0833 - 13 (20)	TP38.6531x37.6333x0.5929	1960.69	37.04	32.69	1.133	0.00	0.00	32.69	0.000
L21	13 - 10.5 (21)	TP39.2775x38.6531x0.7508	2068.38	29.58	31.58	0.936	0.00	0.00	31.58	0.000
L22	10.5 - 0 (22)	TP41.9x39.2775x0.5542	2135.16	39.42	31.85	1.237	0.00	0.00	31.85	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	131 - 110 (1)	TP15.525x10.525x0.1875	5.07	0.55	26.00	0.043	0.18	0.03	26.00	0.001
L2	110 - 90 (2)	TP20.528x15.525x0.25	17.13	1.05	26.00	0.082	0.49	0.03	26.00	0.001
L3	90 - 84.5833 (3)	TP21.883x20.528x0.4767	19.34	0.59	19.01	0.063	0.50	0.02	19.01	0.001
L4	84.5833 - 83 (4)	TP22.2791x21.883x0.6243	19.51	0.45	19.02	0.048	0.51	0.01	19.02	0.001
L5	83 - 81 (5)	TP22.7794x22.2791x0.3895	19.70	0.70	24.96	0.057	0.52	0.02	24.96	0.001
L6	81 - 70 (6)	TP25.531x22.7794x0.5101	20.37	0.52	18.05	0.058	0.54	0.01	18.05	0.001
L7	70 - 67.0833 (7)	TP25.7604x23.5102x0.4353	21.10	0.59	25.06	0.048	0.57	0.01	25.06	0.001
L8	67.0833 - 64.0833 (8)	TP26.5107x25.7604x0.4313	21.39	0.59	25.09	0.048	0.58	0.01	25.09	0.001
L9	64.0833 - 61.0833 (9)	TP27.2611x26.5107x0.4752	21.69	0.53	23.68	0.045	0.59	0.01	23.68	0.001
L10	61.0833 - 59.5 (10)	TP27.6571x27.2611x0.6039	21.85	0.42	19.20	0.044	0.60	0.01	19.20	0.001
L11	59.5 - 53.5 (11)	TP29.1578x27.6571x0.699	22.49	0.35	18.12	0.039	0.63	0.01	18.12	0.000
L12	53.5 - 44.5833 (12)	TP31.388x29.1578x0.6831	23.43	0.35	18.01	0.039	0.67	0.01	18.01	0.000
L13	44.5833 - 40.5 (13)	TP32.4093x31.388x0.6692	23.85	0.35	18.03	0.039	0.69	0.01	18.03	0.000
L14	40.5 - 39 (14)	TP32.7844x32.4093x0.6987	24.01	0.33	18.18	0.037	0.69	0.01	18.18	0.000
L15	39 - 31.5 (15)	TP34.0326x32.7844x0.7154	24.75	0.32	18.19	0.036	0.73	0.01	18.19	0.000
L16	31.5 - 25.5 (16)	TP35.5312x34.0326x0.6073	25.32	0.37	21.16	0.036	0.76	0.01	21.16	0.000
L17	25.5 - 23.5	TP36.0307x35.5312x0.65	25.51	0.34	20.53	0.034	0.77	0.01	20.53	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 $\frac{f_{vt}}{F_{vt}}$
	(17)	34								
L18	23.5 - 18.75 (18)	TP37.217x36.0307x0.542 4	25.74	0.41	23.01	0.036	0.78	0.01	23.01	0.000
L19	18.75 - 17.0833 (19)	TP37.6333x37.217x0.684 6	26.15	0.32	21.72	0.030	0.80	0.01	21.72	0.000
L20	17.0833 - 13 (20)	TP38.6531x37.6333x0.59 29	26.25	0.37	21.80	0.034	0.81	0.01	21.80	0.000
L21	13 - 10.5 (21)	TP39.2775x38.6531x0.75 08	26.69	0.29	21.06	0.028	0.83	0.01	21.06	0.000
L22	10.5 - 0 (22)	TP41.9x39.2775x0.5542	26.92	0.39	21.24	0.037	0.84	0.01	21.24	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	131 - 110 (1)	0.006	0.528	0.000	0.043	0.001	0.534 ✔	1.333	H1-3+VT ✔
L2	110 - 90 (2)	0.013	1.241	0.000	0.082	0.001	1.255 ✔	1.333	H1-3+VT ✔
L3	90 - 84.5833 (3)	0.010	1.050	0.000	0.063	0.001	1.062 ✔	1.333	H1-3+VT ✔
L4	84.5833 - 83 (4)	0.008	0.846	0.000	0.048	0.001	0.855 ✔	1.333	H1-3+VT ✔
L5	83 - 81 (5)	0.010	1.038	0.000	0.057	0.001	1.049 ✔	1.333	H1-3+VT ✔
L6	81 - 70 (6)	0.011	1.228	0.000	0.058	0.001	1.240 ✔	1.333	H1-3+VT ✔
L7	70 - 67.0833 (7)	0.010	1.139	0.000	0.048	0.001	1.150 ✔	1.333	H1-3+VT ✔
L8	67.0833 - 64.0833 (8)	0.010	1.171	0.000	0.048	0.001	1.182 ✔	1.333	H1-3+VT ✔
L9	64.0833 - 61.0833 (9)	0.010	1.151	0.000	0.045	0.001	1.162 ✔	1.333	H1-3+VT ✔
L10	61.0833 - 59.5 (10)	0.010	1.142	0.000	0.044	0.001	1.152 ✔	1.333	H1-3+VT ✔
L11	59.5 - 53.5 (11)	0.009	1.081	0.000	0.039	0.000	1.091 ✔	1.333	H1-3+VT ✔
L12	53.5 - 44.5833 (12)	0.010	1.136	0.000	0.039	0.000	1.147 ✔	1.333	H1-3+VT ✔
L13	44.5833 - 40.5 (13)	0.011	1.164	0.000	0.039	0.000	1.175 ✔	1.333	H1-3+VT ✔
L14	40.5 - 39 (14)	0.010	1.111	0.000	0.037	0.000	1.122 ✔	1.333	H1-3+VT ✔
L15	39 - 31.5 (15)	0.011	1.136	0.000	0.036	0.000	1.148 ✔	1.333	H1-3+VT ✔
L16	31.5 - 25.5 (16)	0.011	1.141	0.000	0.036	0.000	1.153 ✔	1.333	H1-3+VT ✔
L17	25.5 - 23.5 (17)	0.011	1.098	0.000	0.034	0.000	1.109 ✔	1.333	H1-3+VT ✔
L18	23.5 - 18.75 (18)	0.012	1.169	0.000	0.036	0.000	1.181 ✔	1.333	H1-3+VT ✔
L19	18.75 - 17.0833 (19)	0.010	0.993	0.000	0.030	0.000	1.003 ✔	1.333	H1-3+VT ✔
L20	17.0833 - 13 (20)	0.012	1.133	0.000	0.034	0.000	1.145 ✔	1.333	H1-3+VT ✔
L21	13 - 10.5 (21)	0.010	0.936	0.000	0.028	0.000	0.946 ✔	1.333	H1-3+VT ✔

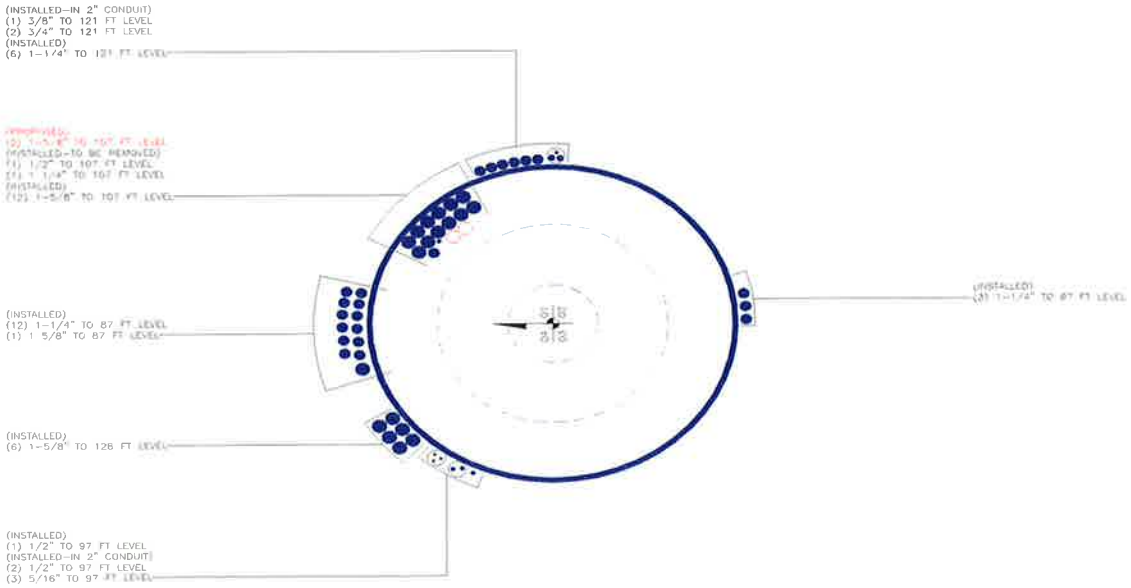
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L22	10.5 - 0 (22)	0.013	1.237	0.000	0.037	0.000	1.251 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	131 - 110	Pole	TP15.525x10.525x0.1875	1	-1.99	481.40	40.1	Pass
L2	110 - 90	Pole	TP20.528x15.525x0.25	2	-8.00	848.63	94.1	Pass
L3	90 - 84.5833	Pole	TP21.883x20.528x0.4767	3	-9.75	1248.87	79.7	Pass
L4	84.5833 - 83	Pole	TP22.2791x21.883x0.6243	4	-10.06	1655.17	64.1	Pass
L5	83 - 81	Pole	TP22.7794x22.2791x0.3895	5	-10.36	1401.50	78.7	Pass
L6	81 - 70	Pole	TP25.531x22.7794x0.5101	6	-11.66	1423.83	93.0	Pass
L7	70 - 67.0833	Pole	TP25.7604x23.5102x0.4353	7	-13.37	1778.28	86.3	Pass
L8	67.0833 - 64.0833	Pole	TP26.5107x25.7604x0.4313	8	-13.93	1816.65	88.7	Pass
L9	64.0833 - 61.0833	Pole	TP27.2611x26.5107x0.4752	9	-14.52	1940.17	87.2	Pass
L10	61.0833 - 59.5	Pole	TP27.6571x27.2611x0.6039	10	-14.89	2019.29	86.4	Pass
L11	59.5 - 53.5	Pole	TP29.1578x27.6571x0.699	11	-16.49	2320.75	81.8	Pass
L12	53.5 - 44.5833	Pole	TP31.388x29.1578x0.6831	12	-18.96	2431.66	86.0	Pass
L13	44.5833 - 40.5	Pole	TP32.4093x31.388x0.6692	13	-20.12	2465.96	88.2	Pass
L14	40.5 - 39	Pole	TP32.7844x32.4093x0.6987	14	-20.56	2623.92	84.2	Pass
L15	39 - 31.5	Pole	TP34.0326x32.7844x0.7154	15	-22.91	2791.17	86.1	Pass
L16	31.5 - 25.5	Pole	TP35.5312x34.0326x0.6073	16	-24.62	2889.82	86.5	Pass
L17	25.5 - 23.5	Pole	TP36.0307x35.5312x0.6534	17	-25.24	3054.93	83.2	Pass
L18	23.5 - 18.75	Pole	TP37.217x36.0307x0.5424	18	-25.59	2875.45	88.6	Pass
L19	18.75 - 17.0833	Pole	TP37.6333x37.217x0.6846	19	-26.58	3496.62	75.2	Pass
L20	17.0833 - 13	Pole	TP38.6531x37.6333x0.5929	20	-27.13	3081.84	85.9	Pass
L21	13 - 10.5	Pole	TP39.2775x38.6531x0.7508	21	-28.37	3857.89	71.0	Pass
L22	10.5 - 0	Pole	TP41.9x39.2775x0.5542	22	-29.30	2934.09	93.9	Pass
							Summary	
						Pole (L2)	94.1	Pass
						RATING =	**94.1**	**Pass**

APPENDIX B

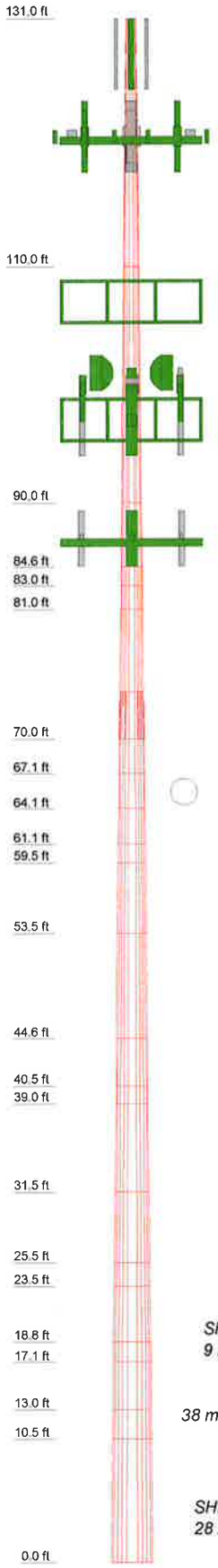
BASE LEVEL DRAWING

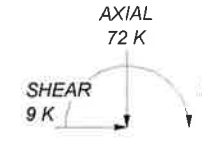

(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 121 FT LEVEL
(2) 3/4" TO 121 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 121 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 107 FT LEVEL
(INSTALLED-TO BE REMOVED)
(1) 1/2" TO 107 FT LEVEL
(1) 1 1/4" TO 107 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 107 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 87 FT LEVEL
(1) 1 5/8" TO 87 FT LEVEL
(INSTALLED)
(6) 1-5/8" TO 126 FT LEVEL
(INSTALLED)
(1) 1/2" TO 97 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(2) 1/2" TO 97 FT LEVEL
(3) 5/16" TO 97 FT LEVEL
(INSTALLED)
(3) 1-1/4" TO 87 FT LEVEL

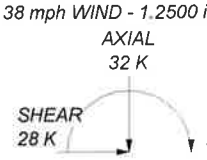
APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Length (ft)	21.0000	20.0000	5.4167	2.0000	3.0000	11.0000	6.9167	3.0000	3.0000	1.5833	6.0000	8.9167	3.0833	1.5000	4.0833	7.5000	6.0000	2.0000	4.7500	2.5000	4.0833	10.5000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.2500	0.4767	0.3125	0.4767	0.5101	0.4353	0.4310	0.4310	0.3750	0.6990	0.6831	0.6992	0.6992	0.6992	0.7154	0.6073	0.6534	0.5424	0.7500	0.6992	0.5542
Socket Length (ft)						4.0000																
Top Dia (in)	10.5250	15.5250	20.5280	22.2759	20.5280	22.7794	25.5101	25.5105	25.5105	25.7605	27.6572	29.1578	32.4093	32.4093	32.4093	32.7844	34.0326	34.0326	34.0326	35.5311	35.5311	39.2775
Bot Dia (in)	15.5250	20.5280	21.8830	22.7759	21.8830	25.5310	27.1578	27.6572	27.6572	27.6572	29.1578	31.3880	32.7844	32.7844	32.7844	34.0326	35.5311	35.5311	36.5337	38.6533	38.6533	41.9000
Grade	A572-65																					
Weight (K)	0.6	1.0	0.6	0.2	0.2	1.5	0.8	0.4	0.4	0.3	1.3	2.0	0.9	0.4	0.9	1.9	1.4	0.5	1.0	0.5	1.0	0.8	2.6







DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APX18-206517S-C w/ Mount Pipe	128	800MHz 2X50W RRH W/FILTER	99
APX18-206517S-C w/ Mount Pipe	128	800MHz 2X50W RRH W/FILTER	99
APX18-206517S-C w/ Mount Pipe	128	800MHz 2X50W RRH W/FILTER	99
Pipe Mount [PM 601-3]	128	PCS 1900MHz 4x45W-65MHz	99
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	PCS 1900MHz 4x45W-65MHz	99
		PCS 1900MHz 4x45W-65MHz	99
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	PCS 1900MHz 4x45W-65MHz	99
		PCS 1900MHz 4x45W-65MHz	99
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	PCS 1900MHz 4x45W-65MHz	99
		Side Arm Mount [SO 101-3]	99
800 10121 w/ Mount Pipe	121	TIMING 2000	97
800 10121 w/ Mount Pipe	121	840 10054	97
800 10121 w/ Mount Pipe	121	840 10054	97
RRUS-11	121	840 10054	97
RRUS-11	121	WIMAX DAP HEAD	97
RRUS-11	121	WIMAX DAP HEAD	97
(2) LGP21401	121	WIMAX DAP HEAD	97
(2) LGP21401	121	HORIZON COMPACT	97
(2) LGP21401	121	HORIZON COMPACT	97
DC6-48-60-18-8F	121	APXVSPP18-C-A20	97
RRUS 11 B2	121	APXVSPP18-C-A20	97
RRUS 11 B2	121	APXVSPP18-C-A20	97
RRUS 11 B2	121	IBC1900HG-2A	97
T-Arm Mount [TA 601-3]	121	IBC1900HG-2A	97
BXA-80063/4CF	107	IBC1900HG-2A	97
BXA-80063/4CF	107	IBC1900BB-1	97
BXA-80063/4CF	107	IBC1900BB-1	97
BXA-70063/6CFx4	107	IBC1900BB-1	97
BXA-70063/6CFx4	107	Platform Mount (LP 101-1)	97
BXA-70063/6CFx4	107	VHLP2.5-11	97
DB-T1-6Z-8AB-0Z	107	VHLP2.5-11	97
(2) FD9R6004/2C-3L	107	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	87
(2) FD9R6004/2C-3L	107	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	87
(2) FD9R6004/2C-3L	107	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	87
(2) SBNHH-1D65B	107	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	87
(2) SBNHH-1D65B	107	KRY 112 144/1	87
(2) SBNHH-1D65B	107	KRY 112 144/1	87
RRH2X60-AWS	107	KRY 112 144/1	87
RRH2X60-AWS	107	T-Arm Mount [TA 702-3]	87
RRH2X60-AWS	107	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	87
RRH2x60-700	107	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	87
RRH2x60-700	107		
RRH2x60-700	107		
RRH2X60-PCS	107		
RRH2X60-PCS	107		
RRH2X60-PCS	107		
DB-T1-6Z-8AB-0Z	107		
Platform Mount (LP 101-1)	107		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 45.08 ksi	45 ksi	57 ksi
Reinf 47.52 ksi	48 ksi	60 ksi	Reinf 45.45 ksi	45 ksi	57 ksi
Reinf 47.54 ksi	48 ksi	60 ksi	Reinf 45.47 ksi	45 ksi	57 ksi
Reinf 62.41 ksi	62 ksi	79 ksi	Reinf 52.91 ksi	53 ksi	67 ksi
Reinf 45.12 ksi	45 ksi	57 ksi	Reinf 51.32 ksi	51 ksi	65 ksi
Reinf 62.64 ksi	63 ksi	79 ksi	Reinf 57.52 ksi	58 ksi	72 ksi
Reinf 62.72 ksi	63 ksi	79 ksi	Reinf 54.29 ksi	54 ksi	68 ksi
Reinf 59.19 ksi	59 ksi	74 ksi	Reinf 54.49 ksi	54 ksi	69 ksi
Reinf 47.99 ksi	48 ksi	60 ksi	Reinf 52.64 ksi	53 ksi	66 ksi
Reinf 45.30 ksi	45 ksi	57 ksi	Reinf 53.09 ksi	53 ksi	67 ksi
Reinf 45.02 ksi	45 ksi	57 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.25 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 94.1%

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

Job:	131' Monopole / HRT 100 943239
Project:	PJF# 37515-1502.004.7700 / BU# 806376
Client: Crown Castle International	Drawn by: John J Woolley App'd:
Code: TIA/EIA-222-F	Date: 05/15/15 Scale: N
Path:	Dwg No.

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

TIA Rev F

Site Data

BU#: *806376*
Site Name: *HRT 100 943239*
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	2423	ft-kips
Axial:	32	kips
Shear:	28	kips

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:	49.88	in

Anchor Rod Results

Maximum Rod Tension:	191.6 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	98.3% Pass	Fty*ASIF

Plate Data		
Diam:	55.88	in
Thick:	2.5	in
Grade:	60	ksi
Single-Rod B-eff:	11.23	in

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	42.4 ksi	Service ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	70.7% Pass	Y.L. Length: 27.06

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

n/a

Stiffener Results

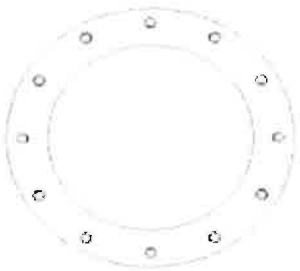
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Data		
Diam:	41.9	in
Thick:	0.344	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Pole Results

Pole Punching Shear Check:	n/a

Stress Increase Factor		
ASIF:	1.333	



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

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

Foundation Loads:

Pole weight or tower leg compression =	**32**	(kips)
Horizontal load at top of pier =	**28**	(kips)
Overturning moment at top of pier=	**2423**	(ft-kips)

Design criteria:

Safety factor against overturning =	**1.5**	

Soil Properties:

Soil density =	**115**	(pcf)
Allowable soil bearing =	**5**	(ksf)
Depth to water table =	**12**	(ft)

Dimensions:

Pier shape (round or square) =	**R**	("R" or "S")
Pier width =	**6**	(ft)
Pier height above grade =	**0.5**	(ft)
depth to bottom of footing =	**8**	(ft)
Footing thickness =	**3**	(ft)
Footing width =	**22**	(ft)
Footing length =	**22**	(ft)

Concrete:

Concrete strength =	**3**	(ksi)
Rebar strength =	**60**	(ksi)
ultimate load factor =	**1.3**	

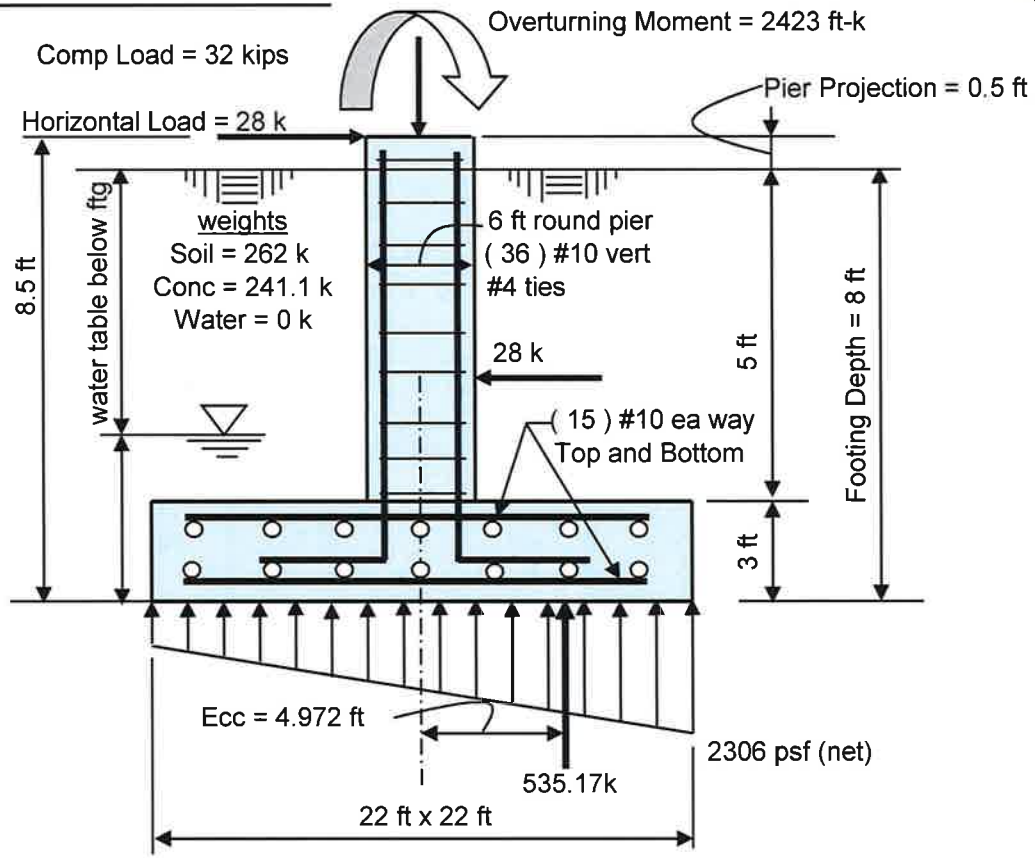
Reinforcing Steel:

	Pad	
minimum cover over rebar =	**3**	inches
size of pad rebar =	**#10**	bar
quantity of pad rebar =	**15**	(ea direction)

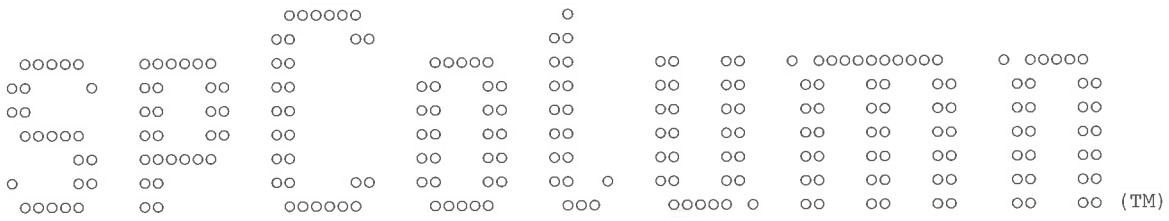
Reinforcing Steel:

	Pier	
size of vert rebar in pier=	**#10**	bar
vertical rebar quantity =	**36**	
size of pier ties =	**#4**	bar
minimum cover over rebar =	**3**	inches

Total volume of concrete = 59.5 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 2.306 ksf Allowable Net Soil Bearing = 5 ksf **Soil Bearing Stress Ratio = 0.46 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 32 psi **Bending Shear Stress Ratio = 0.29 Okay**
Ftg Overturning Resistance = 5887 ft-kips Overturning Moment = 2661 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 2.212 **Ratio = 0.68 Okay**	Pad Bending Moment Capacity= 2595 ft-k Pad Bending Moment = 1161 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\3751...\37515-1502.003.7805 - foundation reinforcement.col
Project: 37512-1659
Column: Engineer: DSK
Code: ACI 318-08 Units: English

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

Material Properties:
==========
f'c = 3 ksi fy = 60 ksi
Ec = 3122.02 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:
==========
Circular: Diameter = 72 in

Gross section area, Ag = 4071.5 in^2
Ix = 1.31917e+006 in^4 Iy = 1.31917e+006 in^4
rx = 18 in ry = 18 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; #3 ties with #10 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 = 45.72 in^2 at rho = 1.12%
Minimum clear spacing = 4.37 in

36 #10 Cover = 3 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	32.00	3350.10	5795.45	1.730	15.59	68.37	0.01016	0.900

*** End of output ***

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

Site Data

BU#: *806376*
Site Name: *HRT 100 943239*
App #:

Pole Manufacturer:	Other

Bolt Data			
Qty:	10		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	75	<-- Disregard	Bolt Fty: 44.00
N/A:	55	<-- Disregard	
Circle (in.):	19.45		

Plate Data		
Diam:	21.95	in
Thick, t:	1.375	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	4.99	in

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

Pole Data		
Diam:	15.53	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	59.31	ft-kips
Axial:	1.99	kips
Shear:	5.07	kips
Elevation:	110	feet

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

Flange Bolt Results

		Rigid
Bolt Tension Capacity, B:	46.07 kips	Service, ASD
Max Bolt directly applied T:	14.44 Kips	Fty*ASIF
Min. PL "tc" for B cap. w/o Pry:	1.286 in	
Min PL "treq" for actual T w/ Pry:	0.539 in	
Min PL "t1" for actual T w/o Pry:	0.720 in	
T allowable w/o Prying:	46.07 kips	α'<0 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	14.44 kips	
Non-Prying Bolt Stress Ratio, T/B:	31.3% Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	11.4 ksi	Service ASD
Allowable Plate Stress:	50.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	22.7% Pass	Comp. Y.L. Length:
No Prying		11.71
Tension Side Stress Ratio, (treq/t)^2:	15.4% Pass	

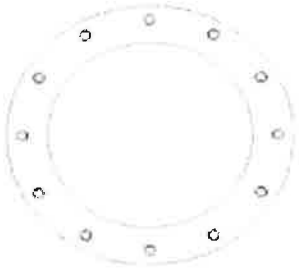
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

37515-1502.004.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #806376; HRY 100 943239

APP: 293789 REV. 0; WO: 1057339

SITE ADDRESS

1455 FORBES STREET
EAST HARTFORD, CONNECTICUT 06118
HARTFORD 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 FORGBOLTS™ SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL FORGBOLTS™ 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-2A FOR REQUIREMENTS ON THE USE OF DTI WASHERS WITH THE BOLTS.
5. ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

PROJECT CONTACT:

MONOPOLE OWNER:
CROWN CASTLE
MOD PM: JOHN MCGEE AT JOHN.MCGEE@CROWNCASTLE.COM
PH: (704) 877-8397
MOD CM: JASON D'AMICO AT JASON.D'AMICO.VENDOR@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

DESIGN STANDARD

THIS DESIGN WAS PERFORMED FOR THIS MONOPOLE IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2005 CONNECTICUT BUILDING CODE AND THE TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING A FASTEST MILE WIND SPEED IF 80 MPH WITH NO ICE, 37.6 MPH WITH 1 1/4 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#37515-1502.004.7700), DATED 05/12/2015.

THIS PROJECT INCLUDES THE FOLLOWING ITEMS:

- SHAFT REINFORCING
- FIELD WELDED STIFFENERS
- STIFFENER REMOVAL

SHEET INDEX

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250 E Broad St, Ste 600· Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE,NC 28277
PH: (724) 416-2000

BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	TITLE SHEET
CHECKED BY: J.J.W.	
APPROVED BY:	T-1
DATE: 05/12/2015	

CROWN CASTLE PROJECT: BU #806376; HRY 100 943239; EAST HARTFORD, 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.
   1.11. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.
   1.12. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG. CONTACT DETAILS:
   TUF-TUG PRODUCTS
   3434 ENCRETE LANE
   MORAINE, OHIO 45439
   PHONE: 937-299-1213
   EMAIL: TUFTUG@AOL.COM

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"
      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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PH: (724) 416-2000

BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	GENERAL NOTES
CHECKED BY: J.J.W.	
APPROVED BY:	
DATE: 05/12/2015	S-1

37515-1502.004.DWG

FORGBolt™ NOTE SHEET: A325/PC8.8 PORTRAIT VERSION DATE 04/24/2015

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.

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)					
GROUP A		FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8	1	135	5.31	1.3	3/8" to 1"	--	RED
	2	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
	3	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
	4	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
	5	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
	6	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note		Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

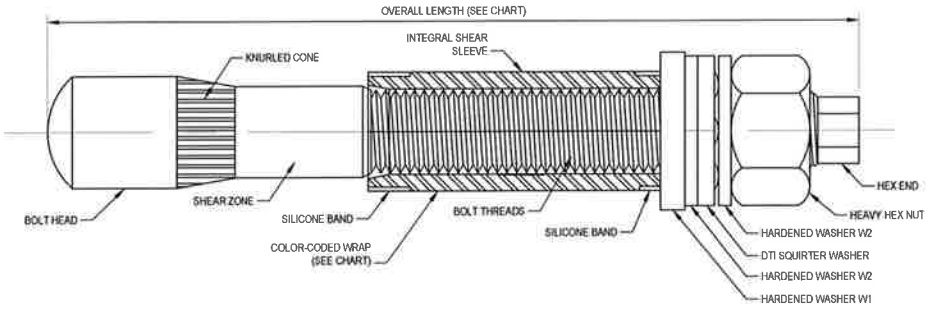
FORGBolt™ Installation

Follow all Manufacturer / Distributor Recommendations for Installation, Tightening, and Inspection.

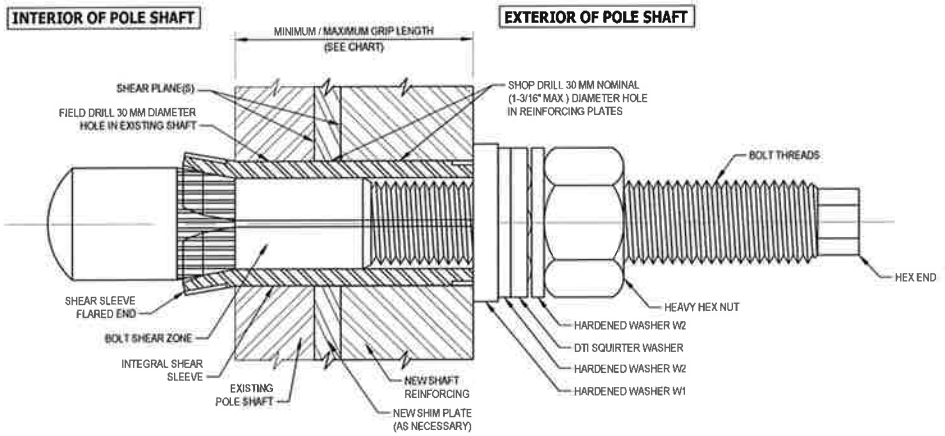
1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

BOLT HOLE NOTES:

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



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL (1 / S-2A)



INSTALLED FORGBolt™ ASSEMBLY DETAIL (2 / S-2A)

AISC GROUP A MATERIAL: ASTM A325 AND PC8.8 (Fu = 120 KSI MIN. TENSILE STRESS)

CONTAINS PROPRIETARY INFORMATION
PATENT PENDING

FORGBolt™ DETAILS

DISTRIBUTOR CONTACT:
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PHONE: 888-926-4857
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

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PROJECT: 37515-1502.004.7700

DRAWN BY:	C.A.W.	FORGBolt™ DETAILS
CHECKED BY:	J.J.W.	
APPROVED BY:		S-2A
DATE:	05/12/2015	

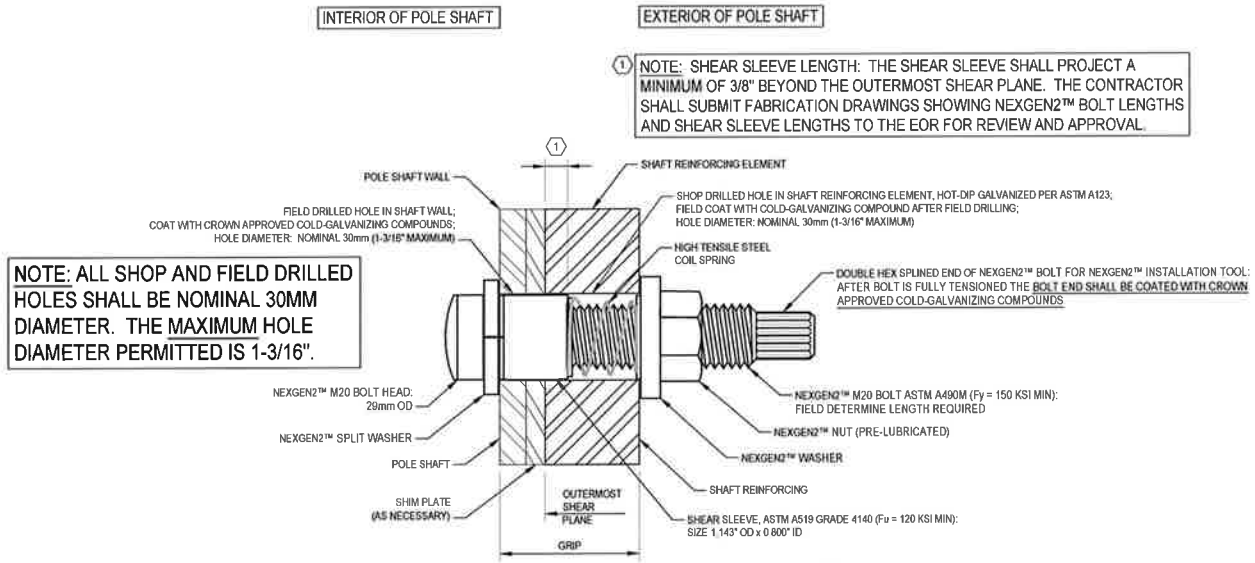
NEXGEN2™ BOLT NOTE SHEET: REV. 1.01, 04-15-2015

NOTES:
1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.

NOTES FOR NEXGEN2™ M20 BLIND BOLTS:

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

INSPECTION REQUIRED: ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND.



TYPICAL NEXGEN2™ BOLT DETAIL 1 S-2B

CROWN APPROVED ALTERNATE BLIND BOLT

NOTE: NEXGEN2™ BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2™ BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

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PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	NEXGEN2™ BOLT DETAIL
CHECKED BY: J.J.W.	
APPROVED BY:	S-2B
DATE: 05/12/2015	

37515-1502.004.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.249795 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	21.00	0.1875	48.00 59.00	10.525	15.525
2	40.00	0.2500		15.525	25.531
3	39.92	0.3125		24.030	34.015
4	39.00	0.3438		32.158	41.900
NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES					

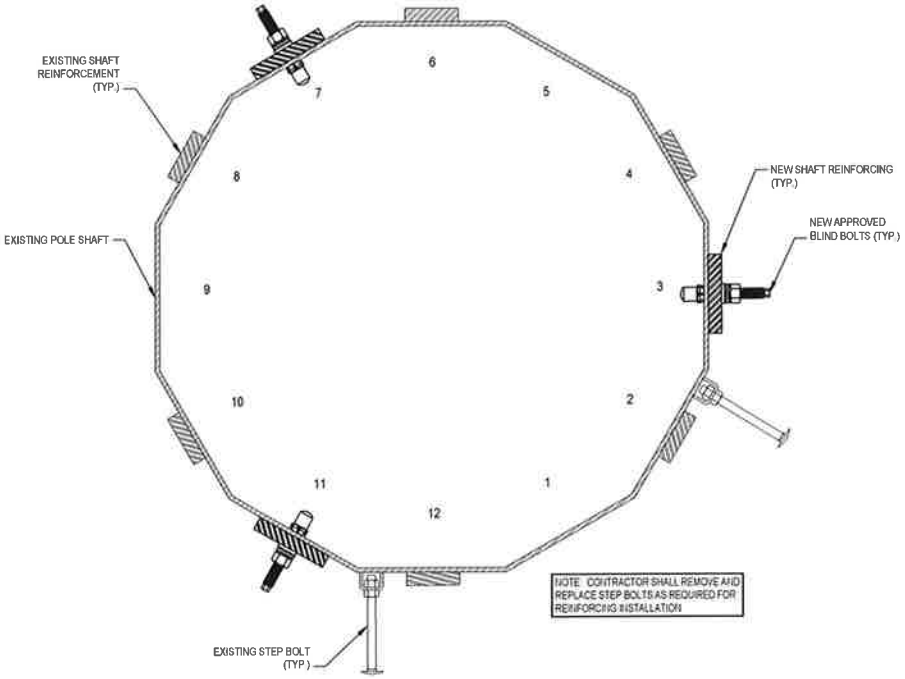
ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

MODIFICATIONS:

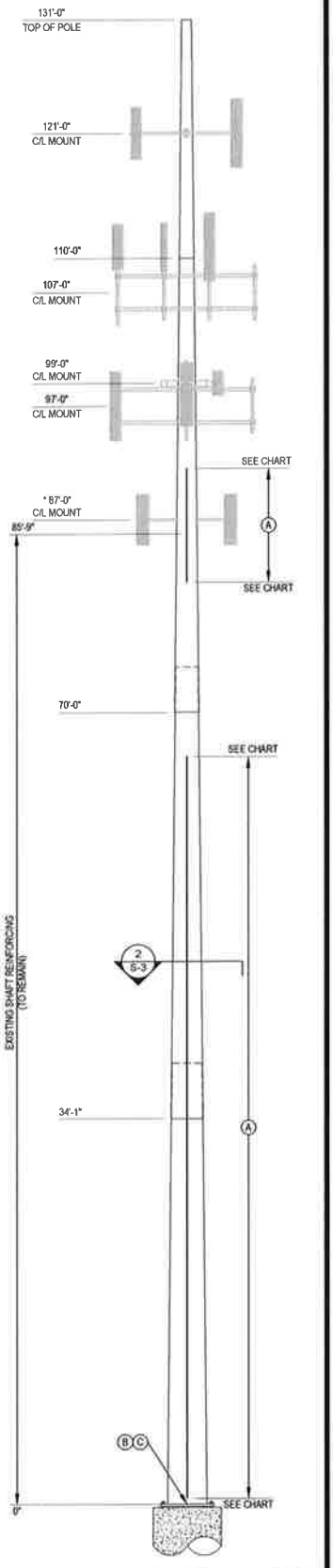
(A) INSTALL NEW SHAFT REINFORCING. SEE CHART ON SHEET S-4.

(B) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-5.

(C) REMOVAL OF TRANSITION STIFFENER. SEE SHEET S-5



SECTION 2 / S-3



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

POLE ELEVATION 1 / S-3

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MONOPOLE PROFILE

S-3

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
0'-6"	15'-8"	F1, F5 & F9	CCI-AFP-06010015	15'-0"	3	27	81	10	10	16"	919 LBS
8'-0"	28'-0"	F6 & F12	CCI-AFP-06010020	20'-0"	2	31	62	10	10	16"	817 LBS
8'-0"	43'-0"	F3	CCI-AFP-06010035	35'-0"	1	42	42	10	10	16"	715 LBS
21'-0"	56'-0"	F7 & F11	CCI-AFP-06010035	35'-0"	2	42	84	10	10	16"	1429 LBS
43'-1"	63'-1"	F3	CCI-AFP-04510020	20'-0"	1	25	25	8	8	20"	306 LBS
56'-1"	66'-1"	F7 & F11	CCI-AFP-04510010	10'-0"	2	19	38	8	8	20"	306 LBS
81'-6"	91'-6"	F3, F7 & F11	CCI-SFP-04510010	10'-0"	3	16	48	6	6	20"	459 LBS
							380				4951 LBS

NOTES:

1.) 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.

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

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

4.) HOLES FOR BOLTS ARE 30mm UNLESS NOTED OTHERWISE.

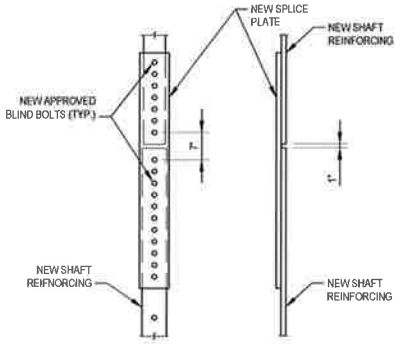
5.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART								
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
43'-1"	1"	4-1/2"	5'-1"	1	0"	0"	18	78 LBS
56'-1"	1"	4-1/2"	5'-1"	2	0"	0"	18	156 LBS
						0"		234 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
0	0	4-1/2"	4"	1-1/4"
17	3	6"	4"	1-1/4"

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



DETAIL 1 / S-4

SCALE: NTS

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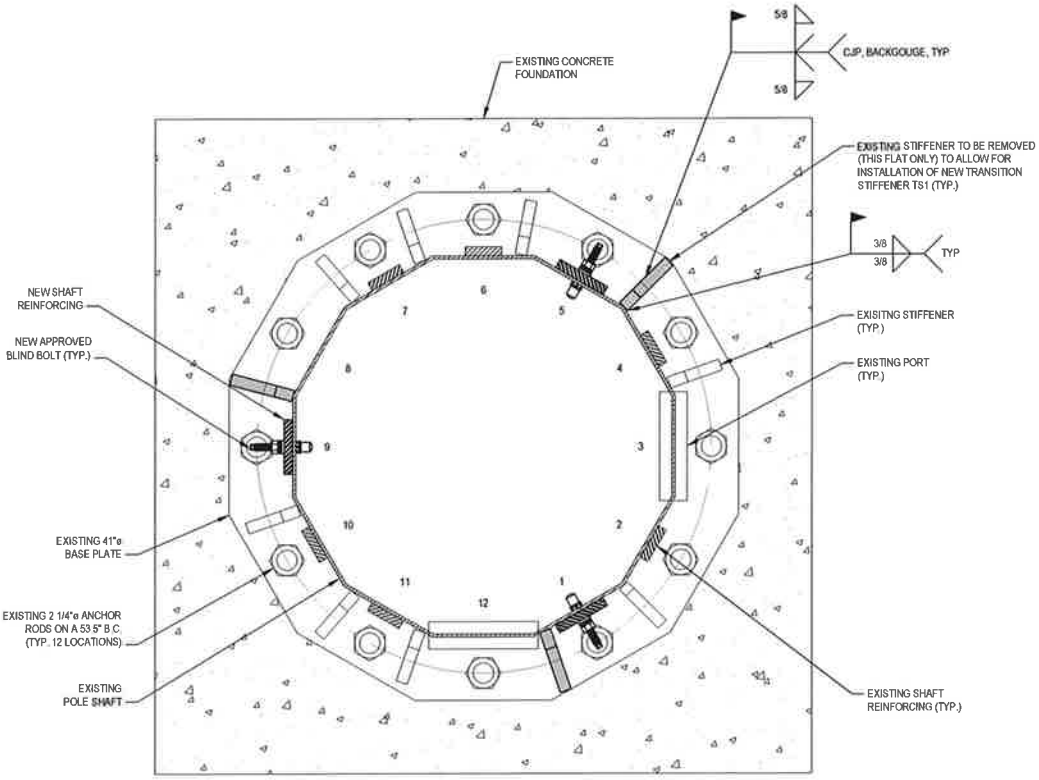
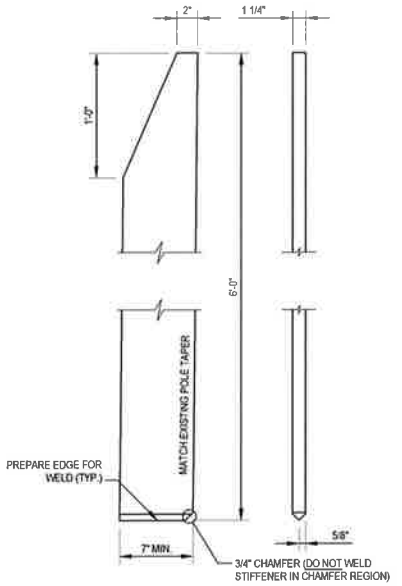
SHAFT REINF. CHART AND DETAILS

S-4



BASE PLATE 1/S-5



TRANSITION STIFFENER MK~TS1

(3 REQUIRED) (Fy = 65 KSI)

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CHECKED BY: J.J.W.	
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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.
       - 9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
       - 9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   - 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
N/A	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
N/A	FABRICATOR NDE INSPECTION
N/A	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS
N/A	POST INSTALLED ANCHOR ROD VERIFICATION
N/A	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
N/A	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
N/A	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)
N/A	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
N/A	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

PAUL J. FORD & COMPANY
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CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE,NC 28277
PH: (724) 416-2000

BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	MI CHECKLIST
CHECKED BY: J.J.W.	
APPROVED BY:	
DATE: 05/12/2015	S-6

37515-1502.004.DWG

MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

BU NUMBER; SITE NAME

BU #806376; HRY 100 943239

APP: 293789 REV. 0; WO: 1057339

SITE ADDRESS

1455 FORBES STREET
EAST HARTFORD, CONNECTICUT 06118
HARTFORD 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 FORGBOLTS™ SHALL BE INSTALLED USING DIRECT TENSION INDICATORS (DTI'S) AND HARDENED WASHERS. ALL FORGBOLTS™ 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-2A FOR REQUIREMENTS ON THE USE OF DTI WASHERS WITH THE BOLTS.
5. ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

PROJECT CONTACT:

MONOPOLE OWNER:
CROWN CASTLE
MOD PM: JOHN MCGEE AT JOHN.MCGEE@CROWNCASTLE.COM
PH: (704) 877-8397
MOD CM: JASON D'AMICO AT JASON.D'AMICO.VENDOR@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

DESIGN STANDARD

THIS DESIGN WAS PERFORMED FOR THIS MONOPOLE IN ACCORDANCE WITH THE REQUIREMENTS OF THE 2005 CONNECTICUT BUILDING CODE AND THE TIA/EIA-222-F STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES USING A FASTEST MILE WIND SPEED IF 80 MPH WITH NO ICE, 37.6 MPH WITH 1 1/4-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#37515-1502.004.7700), DATED 05/12/2015.

THIS PROJECT INCLUDES THE FOLLOWING ITEMS:

SHAFT REINFORCING
FIELD WELDED STIFFENERS
STIFFENER REMOVAL

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STATE OF CONNECTICUT
JOSEPH PACHICARAN JACOBS
No. PEN 22731
LICENSED
PROFESSIONAL ENGINEER

MAY 19 2015

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CROWN CASTLE
3530 TORINGDON WAY SUITE 300 CHARLOTTE,NC 28277
PH: (724) 416-2000

BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	TITLE SHEET
CHECKED BY: J.J.W.	
APPROVED BY: KAJ	T-1
DATE: 05/12/2015	

CROWN CASTLE PROJECT: BU #806376; HRY 100 943239; EAST HARTFORD, 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.
   - 1.11. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.
   - 1.12. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG. CONTACT DETAILS:
     TUF-TUG PRODUCTS
     3434 ENCRETE LANE
     MORAINE, OHIO 45439
     PHONE: 937-299-1213
     EMAIL: TUFTUG@AOL.COM

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"
     - 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 ON 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".

MAY 19 2015

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BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	GENERAL NOTES
CHECKED BY: J.J.W.	
APPROVED BY: [illegible]	S-1
DATE: 05/12/2015	

37515-1502.004.DWG

FORGBolt™ NOTE SHEET: A325/PC8.8 PORTRAIT VERSION DATE 04/24/2015

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.

FORGBolt™		AISC Group A Material: ASTM A325 and PC8.8 (Tensile Stress, Fu = 120 ksi minimum)				
GROUP A	FORGBolt™ Size (mm)	Overall Length (inches)	Estimated Weight Each (lbs)	Grip Range (inch)	Comment	Color Code
FORGBolt™ A325 - PC8.8 1	135	5.31	1.3	3/8" to 1"	--	RED
2	160	6.30	1.6	3/4" to 1-1/2"	--	GREEN
3	195	7.68	1.9	1-1/4" to 2-1/4"	--	BLUE
4	260	10.24	2.6	2" to 3-1/2"	Splice Bolt	YELLOW
5	365	14.37	3.6	3-1/2" to 5-1/2"	Flange Jump Bolt	ORANGE
6	440	17.32	4.3	5-1/2" to 8-1/2"	Flange Jump Bolt	BLACK
DTI Note	Each Group A (A325/PC8.8) FORGBolt™ assembly shall have a 'Squirter' DTI that is compatible with a M20-PC8.8 bolt.					

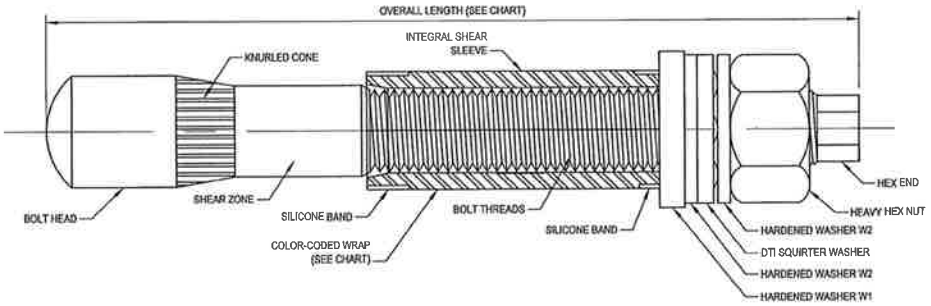
FORGBolt™ Installation

Follow all Manufacturer / Distributor Recommendations for Installation, Tightening, and Inspection.

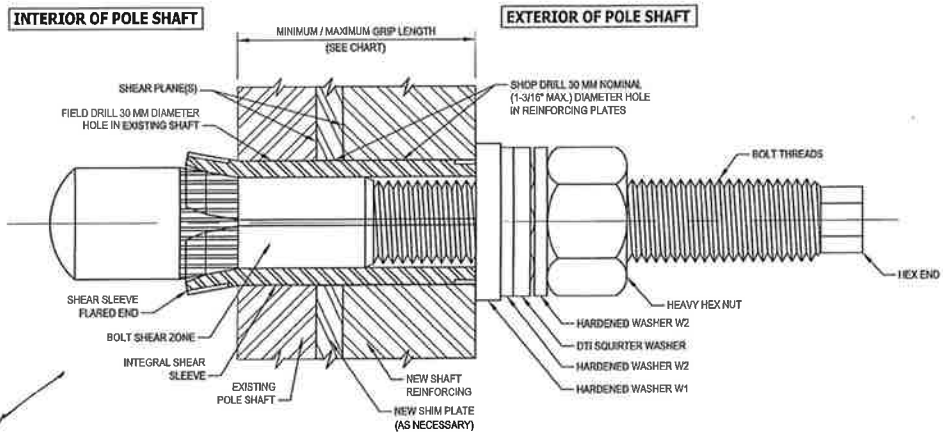
1. FIELD DRILL HOLES TO 30 MM DIAMETER.
2. SELECT CORRECT BOLT SIZE FOR INSTALLATION GRIP (REFER TO PLANS).
3. INSERT BOLT ASSEMBLY THROUGH HOLES IN SHAFT REINFORCING PLATES AND SEAT THE HARDENED WASHER W1 FLUSH AGAINST OUTSIDE OF PLATE.
4. HAND TIGHTEN NUT TO FINGER TIGHT.
5. TIGHTEN NUT TO PRETENSIONED CONDITION AND UNTIL DTI SHOWS PROPER INDICATION.
6. PROPERLY DOCUMENT AND INSPECT BOLT TIGHTENING PER PLAN REQUIREMENTS.

BOLT HOLE NOTES:

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



PRE-INSTALLED FORGBolt™ ASSEMBLY DETAIL 1 S-2A



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 S-2A

STATE OF CONNECTICUT
JOSEPH PACHICARAH JACOBS
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

MAY 19 2015

AISC GROUP A MATERIAL: ASTM A325 AND PC8.8 (Fu = 120 KSI MIN. TENSILE STRESS)

CONTAINS PROPRIETARY INFORMATION
PATENT PENDING

FORGBolt™ DETAILS

DISTRIBUTOR CONTACT:
PRECISION TOWER PRODUCTS
PHONE: 888-926-4857
EMAIL: info@precisiontowerproducts.com
WEB: www.precisiontowerproducts.com

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BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	FORGBolt™ DETAILS
CHECKED BY: J.J.W.	
APPROVED BY: PAF	S-2A
DATE: 05/12/2015	

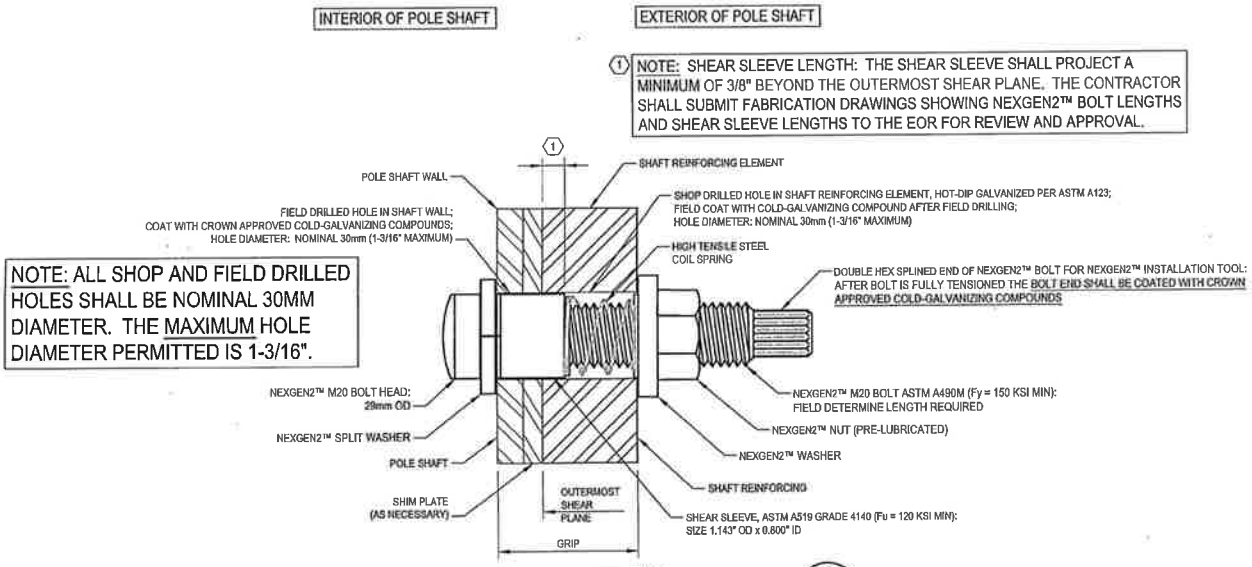
NEXGEN2™ BOLT NOTE SHEET: REV. 1.01, 04-15-2015

NOTES:
1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.

NOTES FOR NEXGEN2™ M20 BLIND BOLTS:

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

INSPECTION REQUIRED: ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND.



TYPICAL NEXGEN2™ BOLT DETAIL 1 S-2B

CROWN APPROVED ALTERNATE BLIND BOLT

NOTE: NEXGEN2™ BOLT ASSEMBLY SHALL BE MAGNI 565 COATED PER ASTM F2833 AND MANUFACTURER SPECIFICATIONS.

NOTE: INSTALL NEXGEN2™ BOLT ASSEMBLY PER MANUFACTURER'S INSTRUCTIONS.

MAY 19 2015

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EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	NEXGEN2™ BOLT DETAIL
CHECKED BY: J.J.W.	
APPROVED BY: KAF	S-2B
DATE: 05/12/2015	

37515-1502.004.DWG

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.249795 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	21.00	0.1875		10.525	15.525
2	40.00	0.2500	48.00	15.525	25.531
3	39.92	0.3125	59.00	24.030	34.015
4	39.00	0.3438		32.158	41.900

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

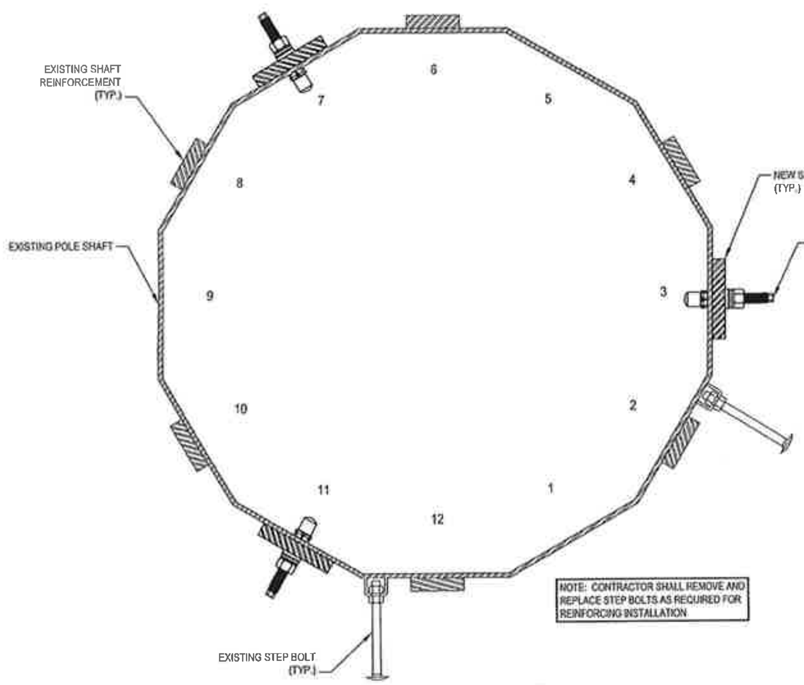
ASTM A36 SHIMS FOR MONOPOLE REINFORCEMENT MEMBERS SHALL BE REQUIRED WHERE GAPS BETWEEN THE POLE SHAFT AND REINFORCING MEMBER EXIST AT FASTENER LOCATIONS. FOR INTERMEDIATE CONNECTIONS, THE MINIMUM SHIM LENGTH AND WIDTH SHALL BE THE WIDTH OF THE REINFORCING MEMBER. FOR TERMINATION CONNECTIONS, A CONTINUOUS SHIM PLATE (PREFERRED) OR EQUIVALENT INDIVIDUAL SHIM PLATES THE WIDTH OF THE REINFORCING MEMBER MAY BE USED. SHIM THICKNESSES SHALL BE NO LESS THAN 1/16". STACKING OF SHIMS IS PERMITTED.

MODIFICATIONS:

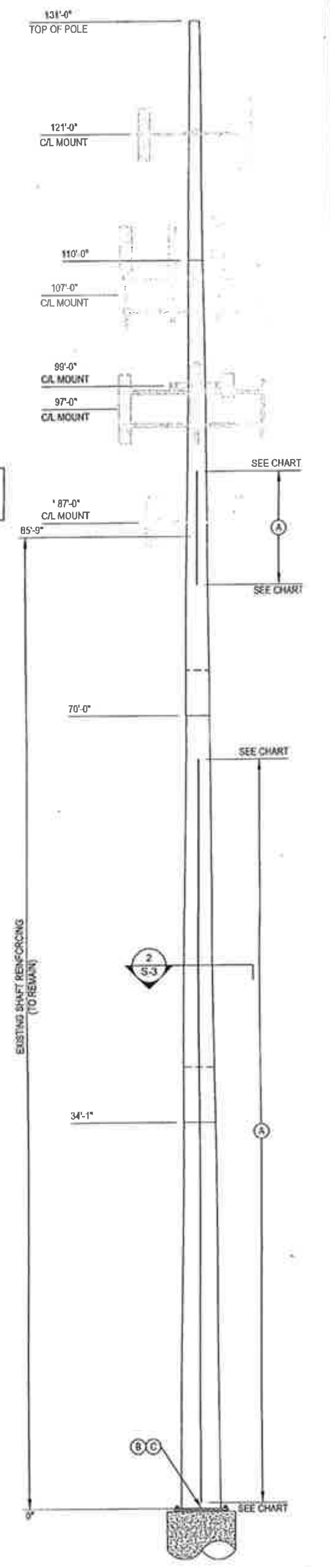
(A) INSTALL NEW SHAFT REINFORCING. SEE CHART ON SHEET S-4.

(B) INSTALL NEW TRANSITION STIFFENERS AT BASE PLATE. SEE SHEET S-5.

(C) REMOVAL OF TRANSITION STIFFENER. SEE SHEET S-5.



SECTION 2 / S-3



POLE ELEVATION 1 / S-3

STATE OF CONNECTICUT
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No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

MAY 1 9 2015

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

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EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	MONOPOLE PROFILE
CHECKED BY: J.J.W.	
APPROVED BY: KAT	S-3
DATE: 05/12/2015	

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE

BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
0' - 6"	15' - 6"	F1, F5 & F9	CCI-AFP-06010015	15' - 0"	3	27	81	10	10	16"	919 LBS.
6' - 0"	26' - 0"	F8 & F12	CCI-AFP-06010020	20' - 0"	2	31	62	10	10	16"	617 LBS.
8' - 0"	43' - 0"	F3	CCI-AFP-06010035	35' - 0"	1	42	42	10	10	16"	715 LBS.
21' - 0"	56' - 0"	F7 & F11	CCI-AFP-06010035	35' - 0"	2	42	84	10	10	16"	1429 LBS.
43' - 1"	63' - 1"	F3	CCI-AFP-04510020	20' - 0"	1	25	25	8	8	20"	306 LBS.
56' - 1"	66' - 1"	F7 & F11	CCI-AFP-04510010	10' - 0"	2	19	38	8	8	20"	306 LBS.
81' - 6"	91' - 6"	F3, F7 & F11	CCI-SFP-04510010	10' - 0"	3	16	48	6	6	20"	459 LBS.
							380				4951 LBS.

NOTES:

1.) 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.
2.) ALL REINFORCING SHALL BE ASTM A572 GR. 65.
3.) WELDS SHALL BE E80XX OR GREATER. TERMINATION WELDS SHALL BE 3/8" FILLET WELDS.
4.) HOLES FOR BOLTS ARE 30mm UNLESS NOTED OTHERWISE.
5.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART

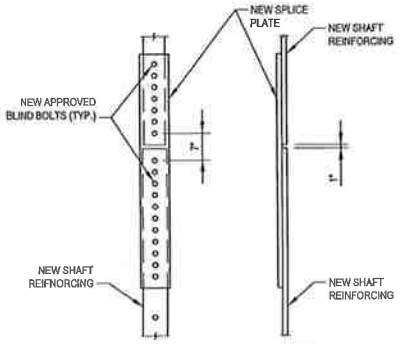
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
43' - 1"	1"	4-1/2"	5' - 1"	1	0"	0"	18	78 LBS.
56' - 1"	1"	4-1/2"	5' - 1"	2	0"	0"	18	156 LBS.
						0"		234 LBS.

* 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
0	0	4-1/2"	4"	1-1/4"
17	3	6"	4"	1-1/4"

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



DETAIL 1 / S-4
SCALE: NTS

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MAY 19 2015

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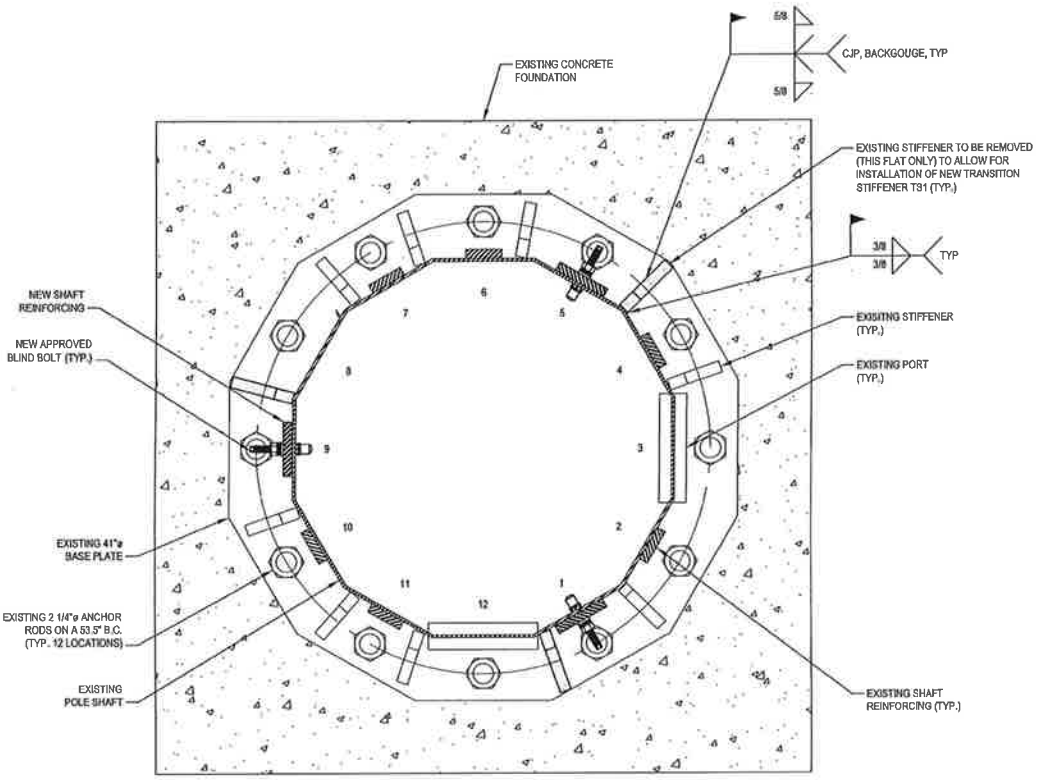
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

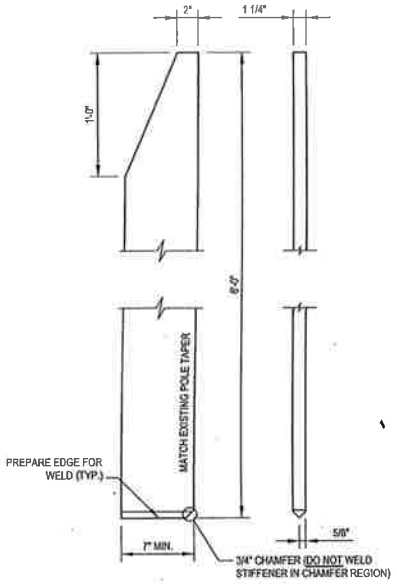
PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	SHAFT REINF. CHART AND DETAILS
CHECKED BY: J.J.W.	
APPROVED BY: KM	S-4
DATE: 05/12/2015	

37515-1502.004.DWG



BASE PLATE 1 / S-5



TRANSITION STIFFENER MK~TS1

(3 REQUIRED) (Fy = 65 KSI)

STATE OF CONNECTICUT
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MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	BASE PLATE DETAILS
CHECKED BY: J.J.W.	
APPROVED BY: [illegible]	S-5
DATE: 05/12/2015	

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.
       - 9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
       - 9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   - 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.

STATE OF CONNECTICUT
JOSEPH PACHICARAH JOHN
No. PEN 22731
LICENSED PROFESSIONAL ENGINEER

MAY 19 2015

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
N/A	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
N/A	FABRICATOR NDE INSPECTION
N/A	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH AND SLUMP TESTS
N/A	POST INSTALLED ANCHOR ROD VERIFICATION
N/A	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
N/A	EARTHWORK PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
N/A	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)
N/A	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
N/A	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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BU #806376; HRY 100 943239
EAST HARTFORD, CONNECTICUT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT: 37515-1502.004.7700

DRAWN BY: C.A.W.	MI CHECKLIST
CHECKED BY: J.J.W.	
APPROVED BY: KAH	S-6
DATE: 05/12/2015	