STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

October 5, 2013

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **EM-VER-043-130916** – Cellco Partnership d/b/a Verizon Wireless notice of intent to modify an existing telecommunications facility located at 1455 Forbes Street, East Hartford, Connecticut.

Dear Attorney Baldwin:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Prior to antenna installation, the tower modifications depicted in the modification drawings attached to the Structural Modification Report prepared by Paul J. Ford and Company dated May 16, 2013, and stamped by Joseph Jacobs, shall be implemented;
- Within 45 days following completion of the antenna installation, Verizon shall provide documentation certified by a professional engineer that its installation complied with the requirements of the structural analysis;
- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated September 13, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

CSC
CONNECTICUT SITING COUNCIL

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/jb

c: The Honorable Marcia A. Leclerc, Mayor, Town of East Hartford
Michael J. Dayton, Town Planner, Town of East Hartford
Crown Castle

Robinson+Cole

KENNETH C. BALDWIN

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kbaldwin@rc.com
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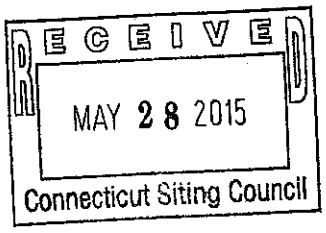
Also admitted in Massachusetts



May 26, 2015

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

Re: **EM-VER-043-130916 – Cellco Partnership d/b/a Verizon Wireless**
1455 Forbes Street, East Hartford, Connecticut

ORIGINAL

Dear Ms. Bachman:

On October 5, 2013, the Siting Council acknowledged receipt of Cellco's notice of intent to modify its telecommunications facility at 1455 Forbes Street in East Hartford in East Hartford, Connecticut. The modifications involved the replacement of its antennas, the installation of remote radio heads and the installation of a new fiber optic antenna cable.

As a condition of the acknowledgement, Cellco was required to provide the Council with a letter stating that Cellco's modifications were consistent with those referenced in the Structural Analysis Report. Attached is a Professional Engineer's Tower Modification Certification letter verifying that the modifications were completed as required.

If you have any questions please do not hesitate to contact me.

Sincerely,

Kenneth C. Baldwin

Attachment
Copy to:
Tim Parks
Rachel A. Mayo

13824646-v1

CENTEK engineering

Centered on Solutions℠

May 22, 2015

Mr. Tim Parks
Verizon Wireless
99 East River Drive
East Hartford, Connecticut 06108

Re: Tower Modification Certification

Project:	**Verizon Forbes Street** 1455 Forbes Street, East Hartford, CT
Tower Owner:	**Crown Castle USA** 220 Lathrop Road, Candor, NY
Engineer:	**Paul J. Ford and Company** 250 East Broad Street, Columbus, OH

Centek Project No.: 14055.002 Rev-1

CSC Exempt Mod Reference No.: EM-VER-043-130916

Dear Mr. Parks,

We are providing this "Tower Modification Certification" with regard to the structural components at the above referenced project.

The following are the basis for substantiating compliance with the tower modification documents prepared by Paul J. Ford and Company (PJF Project Number: 37513-0342 BP R3):

- Review of the Paul J. Ford and Company Structural Analysis dated 05/13/2013.
- Review of the Paul J. Ford and Company Modification Drawings S-1 thru S-6 dated 02/26/2013.
- Review of the Tower Engineering Professionals Modification Inspection Report dated 06/04/2014.
- Field observations by Centek Engineering personnel on 04/14/2015 of the completed modifications which determined all modifications were installed in general compliance with the recommendations of the structural analysis report prepared by Paul J. Ford and Company on 05/16/2013.

The modification design prepared by Paul J. Ford and Company demonstrates the tower will not exceed 100 percent of the post construction structural rating. The work under this Contract has been reviewed and found, to the Engineer's best knowledge, information and belief, to be completed in general compliance with the documents referenced above. This certification is not a review of the adequacy or effectiveness of the modification/reinforcement solution.

Sincerely,

Carlo F. Centore, PE
Principal - Structural

STATE OF CONNECTICUT
CARLO F. CENTORE
No. 16694
LICENSED
PROFESSIONAL ENGINEER

ROBINSON & COLE LLP

KENNETH C. BALDWIN

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Also admitted in Massachusetts

September 13, 2013

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

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

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 109-foot level of the existing 131-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco's shared use of this tower in 1991. Cellco now intends to replace six (6) of its antennas with three (3) model BXA-80063-4CF cellular antennas and three (3) model BXA-171085-8CF AWS antennas, at the same 109-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its antennas and one (1) HYBRIFLEX™ antenna cable, attached to the outside of the monopole tower. Included in Attachment 1 are specifications for the replacement antennas, RRHs and HYBRIFLEX™ cable.

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

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be located at the 109-foot level of the 131-foot tower.

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

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

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the site 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 Analysis 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
Sandy Carter

ATTACHMENT 1

BXA-80063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

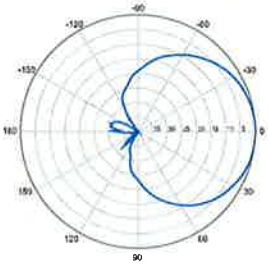
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics				
Frequency bands	806-900 MHz*			
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)			
Polarization	±45°			
Horizontal beamwidth	63°			
Vertical beamwidth	15°			
Gain	13.0 dBd (15.1 dBi)			
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-22.1 dB			
Front-to-back ratio (+/-30°)	-34.9 dB			
Null fill	5% (-26.02 dB)			
Isolation between ports	< -30 dB			
Input power with EDIN connectors	500 W			
Input power with NE connectors	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1205 x 285 x 133 mm		47.4 x 11.2 x 5.2 in	
Depth with z-brackets	173 mm		6.8 in	
Weight without mounting brackets	4.5 kg		9.9 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.34 m²	Side: 0.16 m²	Front: 3.7 ft²	Side: 1.7 ft²
Wind load @ 161 km/hr (100 mph)	Front: 498 N	Side: 260 N	Front: 111 lbf	Side: 55 lbf

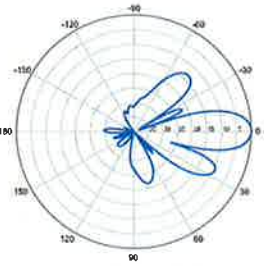
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-4CF-EDIN-X-FP		

BXA-80063-4CF-EDIN-X



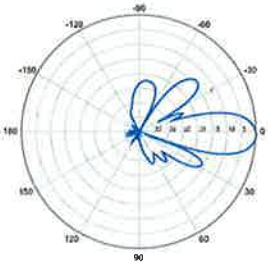
Horizontal

BXA-80063-4CF-EDIN-0



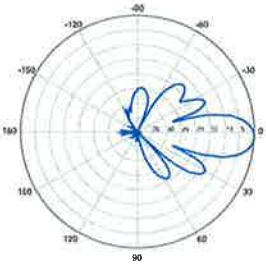
0° | Vertical

BXA-80063-4CF-EDIN-2



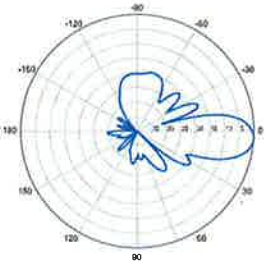
2° | Vertical

BXA-80063-4CF-EDIN-3



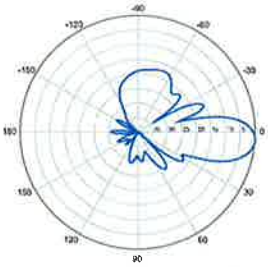
3° | Vertical

BXA-80063-4CF-EDIN-4



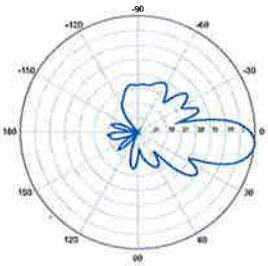
4° | Vertical

BXA-80063-4CF-EDIN-5



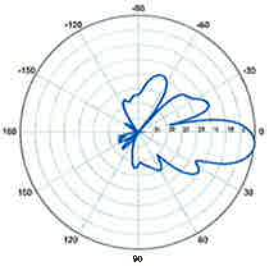
5° | Vertical

BXA-80063-4CF-EDIN-6



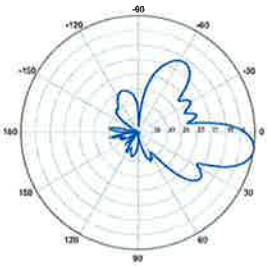
6° | Vertical

BXA-80063-4CF-EDIN-8



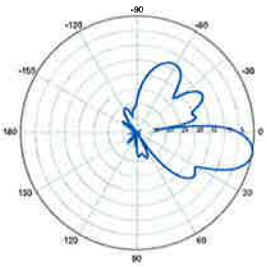
8° | Vertical

BXA-80063-4CF-EDIN-9



9° | Vertical

BXA-80063-4CF-EDIN-10

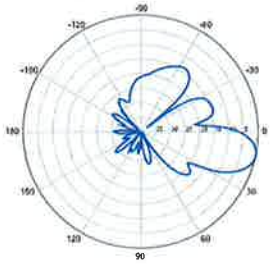


10° | Vertical

BXA-80063-4CF-EDIN-X

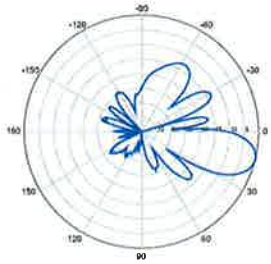
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-80063-4CF-EDIN-12



12° | Vertical

BXA-80063-4CF-EDIN-14



14° | Vertical

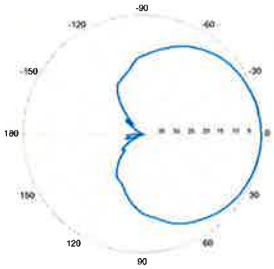
BXA-171085-8CF-EDIN-X

Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 85° | 16.4 dBi

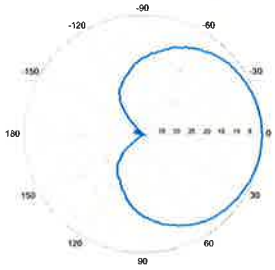
Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	88°	85°	80°
Vertical beamwidth	7°	7°	7°
Gain	13.5 dBd / 15.6 dBi	13.9 dBd / 16.0 dBi	14.3 dBd / 16.4 dBi
Electrical downtilt (X)	0, 2, 4		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Center (Back)		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm		48.5 x 6.1 x 4.1 in
Depth with t-brackets	133 mm		5.2 in
Weight without mounting brackets	4.8 kg		10.5 lbs
Survival wind speed	296 km/hr		184 mph
Wind area	Front: 0.19 m² Side: 0.14 m²		Front: 2.0 ft² Side: 1.5 ft²
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N		Front: 63 lbf Side: 50 lbf
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171085-8CF-EDIN-X-FP		

BXA-171085-8CF-EDIN-X



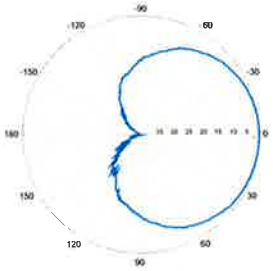
Horizontal | 1710-1880 MHz

BXA-171085-8CF-EDIN-X



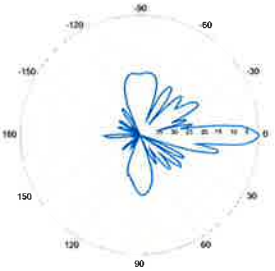
Horizontal | 1850-1990 MHz

BXA-171085-8CF-EDIN-X



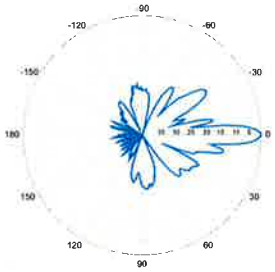
Horizontal | 1920-2170 MHz

BXA-171085-8CF-EDIN-0



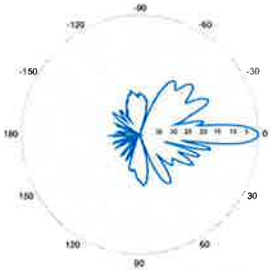
0° | Vertical | 1710-1880 MHz

BXA-171085-8CF-EDIN-0



0° | Vertical | 1850-1990 MHz

BXA-171085-8CF-EDIN-0

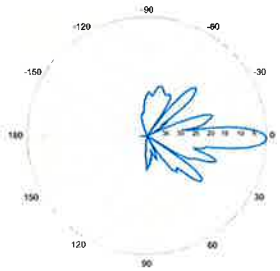


0° | Vertical | 1920-2170 MHz

BXA-171085-8CF-EDIN-X

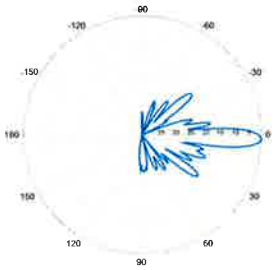
X-Pol | FET Panel | 85° | 16.4 dBi

BXA-171085-8CF-EDIN-2



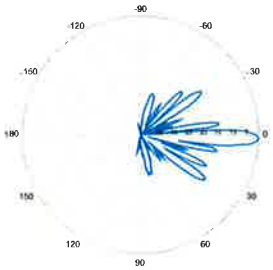
2° | Vertical | 1710-1880 MHz

BXA-171085-8CF-EDIN-2



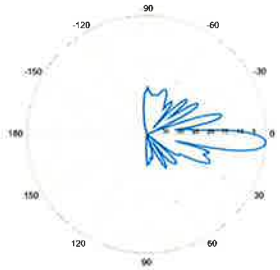
2° | Vertical | 1850-1990 MHz

BXA-171085-8CF-EDIN-2



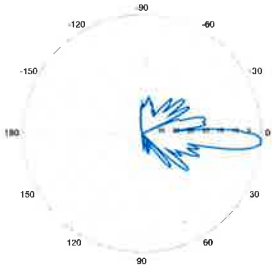
2° | Vertical | 1920-2170 MHz

BXA-171085-8CF-EDIN-4



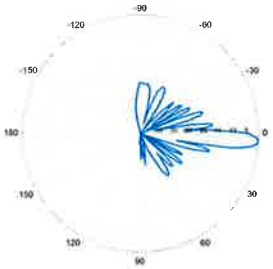
4° | Vertical | 1710-1880 MHz

BXA-171085-8CF-EDIN-4



4° | Vertical | 1850-1990 MHz

BXA-171085-8CF-EDIN-4

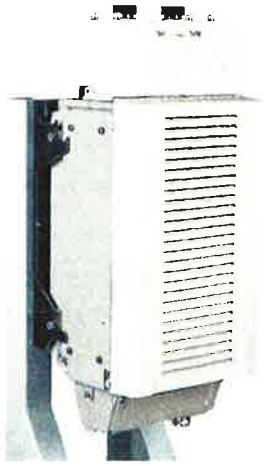


4° | Vertical | 1920-2170 MHz

Alcatel-Lucent RRH2x40-AWS

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-AWS is a high-power, small form-factor Remote Radio Head (RRH) operating in the AWS frequency band (1700/2100MHz - 3GPP Band 4). The Alcatel-Lucent RRH2x40-AWS is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.



A distributed eNodeB expands 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 an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-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. The Alcatel-Lucent RRH2x40-AWS has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to four-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 20 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-AWS is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-AWS is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-AWS is compact and weighs less than 20 kg (44 lb), 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 — a fraction of the time required for a traditional BTS.

Excellent RF performance

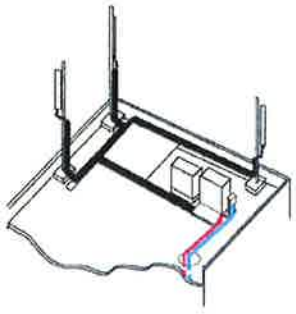
Because of its small size and weight, the Alcatel-Lucent RRH2x40-AWS can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-AWS where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-AWS provides more RF power while at the same time consuming less electricity.

Features

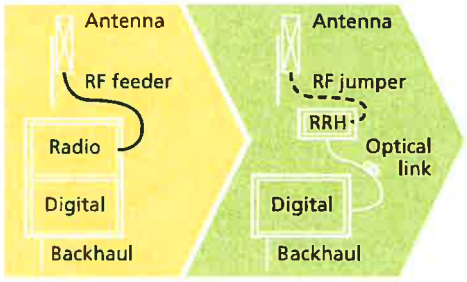
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless)
- Noise-free
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

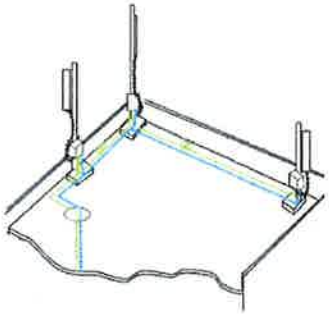
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 620 mm (24.4 in.)
- Width: 270 mm (10.63 in.)
- Depth: 170m (6.7 in.)
- Weight (without mounting kit): less than 20 kg (44 lb)

Power

- Power supply: -48VDC

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 1700/2100 MHz (AWS); 3GPP Band 4
- Bandwidth: up to 20 MHz
- RF output power at antenna port: 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way with optional Rx Diversity module
- Noise figure: below 2.0 dB typical
- Antenna Line Device features
  - ¬ TMA and Remote electrical tilt (RET) support via AISG v2.0

Optical characteristics

Type/number of fibers

- Single-mode variant
  - ¬ One Single Mode Single Fiber per RRH2x, carrying UL and DL using CWDM
  - ¬ Single mode dual fiber (SM/DF)
- Multi-mode variant
  - ¬ Two Multi-mode fibers per RRH2x: one carrying UL, the other carrying DL

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Digital Ports and Alarms

- Two optical ports to support daisy-chaining
- Six external alarms

CPG2809100912 (09)

Alcatel·Lucent

Alcatel-Lucent RRH2x40-07-U

REMOTE RADIO HEAD

The Alcatel-Lucent RRH2x40-07-U is a high-power, small form-factor Remote Radio Head (RRH) operating in the North American Digital Dividend / 700MHz frequency band (3GPP Band 13). The Alcatel-Lucent RRH2x40-07-U is designed with an eco-efficient approach, providing operators with the means to achieve high quality and capacity coverage with minimum site requirements.

A distributed eNodeB expands 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 an eNodeB to be installed separately, within the same site or several kilometres apart.

The Alcatel-Lucent RRH2x40-07-U 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. The Alcatel-Lucent RRH2x40-07-U has two transmit RF paths, 40 W RF output power per transmit path, and is designed to manage up to two-way receive diversity. The device is ideally suited to support macro coverage, with multiple-input multiple-output (MIMO) 2x2 operation in up to 10 MHz of bandwidth.

The Alcatel-Lucent RRH2x40-07-U is designed to make available all the benefits of a distributed eNodeB, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX). The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment or require costly cranes to be employed, leaving coverage holes. However, many of these sites can host an Alcatel-Lucent RRH2x40-07-U installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

Fast, low-cost installation and deployment

The Alcatel-Lucent RRH2x40-07-U is a zero-footprint solution and operates noise-free, simplifying negotiations with site property owners and minimizing environmental impacts. Installation can easily be done by a single person because the Alcatel-Lucent RRH2x40-07-U is compact and weights less than 23 kg (50 lb), 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 — a fraction of the time required for a traditional BTS.

Excellent RF performance

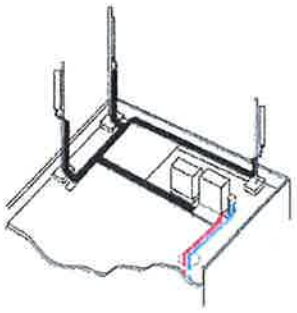
Because of its small size and weight, the Alcatel-Lucent RRH2x40-07-U can be installed close to the antenna. Operators can therefore locate the Alcatel-Lucent RRH2x40-07-U where RF engineering is deemed ideal, minimizing trade-offs between available sites and RF optimum sites. The RF feeder cost and installation costs are reduced or eliminated, and there is no need for a Tower Mounted Amplifier (TMA) because losses introduced by the RF feeder are greatly reduced. The Alcatel-Lucent RRH2x40-07-U provides more RF power while at the same time consuming less electricity.

Features

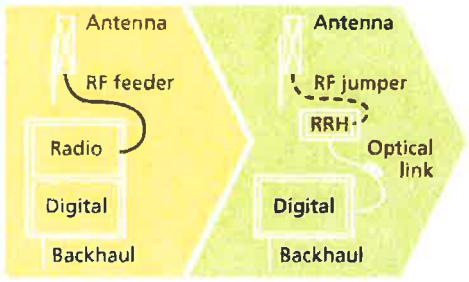
- Zero-footprint deployment
- Easy installation, with a lightweight unit can be carried and set up by one person
- Optimized RF power, with flexible site selection and elimination of a TMA
- Convection-cooled (fanless), noise-free, and heaterless unit
- Best-in-class power efficiency, with significantly reduced energy consumption

Benefits

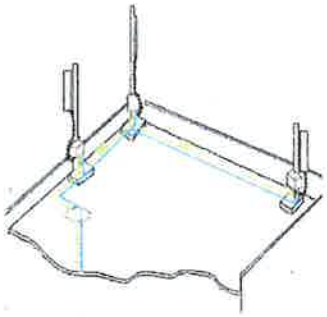
- Leverages existing real estate with lower site costs
- Reduces installation costs, with fewer installation materials and simplified logistics
- Decreases power costs and minimizes environmental impacts, with the potential for eco-sustainable power options
- Improves RF performance and adds flexibility to network planning



Macro



RRH for space-constrained cell sites



Distributed

Technical specifications

Physical dimensions

- Height: 390 mm (15.4 in.)
- Width: 380 mm (15 in.)
- Depth: 210 mm (8.2 in.)
- Weight (without mounting kit): less than 23 kg (50 lb)

Power

- Power supply: -48V

Operating environment

- Outdoor temperature range:
  - ¬ With solar load: -40°C to +50°C (-40°F to +122°F)
  - ¬ Without solar load: -40°C to +55°C (-40°F to +131°F)
- Passive convection cooling (no fans)
- Enclosure protection
  - ¬ IP65 (International Protection rating)

RF characteristics

- Frequency band: 700 MHz; 3GPP Band 13
- Bandwidth: up to 10 MHz
- RF output power at antenna port:
  - ¬ 40 W nominal RF power for each Tx port
- Rx diversity: 2-way or 4-way
- Noise figure: below 2.5 dB typical
- ALD features
  - ¬ TMA
  - ¬ Remote electrical tilt (RET) support (AISG v2.0)

Optical characteristics

Type/number of fibers

- Up to 3.12 Gb/s line bit rate
- Single-mode variant
  - ¬ One SM fiber (9/125 µm) per RRH2x, carrying UL and DL using CWDM (at 1550/1310 nm)
- Multi-mode variant
  - ¬ Two MM fibers (50/125 µm) per RRH2x: one carrying UL, the other carrying DL (at 850 nm)

Optical fiber length

- Up to 500 m (0.31 mi), using MM fiber
- Up to 20 km (12.43 mi), using SM fiber

Alarms and ports

- Six external alarms
- Two optical ports to support daisy-chaining

Alcatel·Lucent

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

Structure			
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
Mechanical Properties			
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
Electrical Properties			
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	.068 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Fiber Optic Properties			
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
DC Power Cable Properties			
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-93-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Environment			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

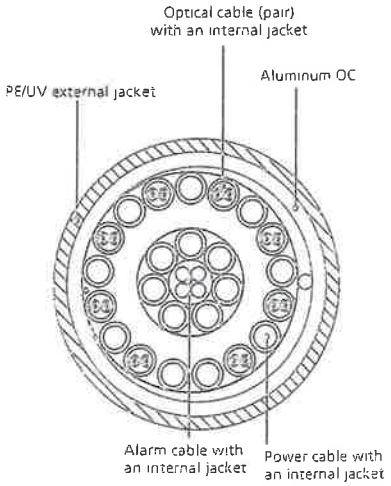


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: East Hartford (Forbes)								
Tower Height: Verizon @ 109ft								
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	15.89%	
*Sprint CDMA/LTE	1	390	97	0.0149	850	0.5667	2.63%	
*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**	**448**	**109**	**0.1491**	**1970**	**1.0000**	**14.91%**	
Verizon Cellular	**9**	**409**	**109**	**0.1114**	**869**	**0.5793**	**19.23%**	
Verizon AWS	**1**	**1750**	**109**	**0.0530**	**2145**	**1.0000**	**5.30%**	
Verizon 700	**1**	**1050**	**109**	**0.0318**	**698**	**0.4653**	**6.83%**	
								99.12%
* Source: Siting Council								

ATTACHMENT 3

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **May 16, 2013**

Andrew Bazinet
Crown Castle USA Inc.
46 Broadway
Albany, NY 12204
585.899.3442

Paul J Ford and Company
250 E. Broad Street, Suite 1500
Columbus, OH 43215
614.221.6679
rkoors@pjfweb.com

Subject: **Structural Analysis 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:	212900
	Crown Castle Work Order Number:	611817
	Crown Castle Application Number:	172360 Rev. 4
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37513-0342 BP R3
Site Data:	**1455 FORBES STREET, EAST HARTFORD, Hartford County, CT** **Latitude *41° 43' 53.3"*, Longitude *-72° 36' 28"*** **131 Foot - Monopole Tower**	

Dear Andrew Bazinet,

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 547069, in accordance with application 172360, revision 4.

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

LC4.7: 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 0.75 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Bob Koors, E.I.
Structural Designer

tnxTower Report - version 6.0.4.0

MAY 2 0 2013

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 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
107.0	107.0	3	alcatel lucent	RRH2x40-AWS	1	1-5/8	-
	109.0	3	alcatel lucent	RRH2X40-AWS			
		3	antel	BXA-171085-8CF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-80063/4CF w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
128.0	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	1	tower mounts	T-Arm Mount [TA 601-3]	1 2 6	3/8 3/4 1-1/4	1
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		6	powerwave technologies	LGP21401			
		3	kathrein	800 10121 w/ Mount Pipe			
		6	ericsson	RRUS-11			

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	109.0	6	decibel	DB844G65ZAXY w/ Mount Pipe	-	-	3
		1	antel	BXA-185060/8CFx2 w/ Mount Pipe	12	1-5/8	1
		2	antel	BXA-185090/8CF w/ Mount Pipe			
		3	antel	BXA-70063/6CFx4 w/ Mount Pipe			
		4	rfs celwave	FD9R6004/1C-3L			
	107.0	2	rfs celwave	FD9R6004/1C-3L			
		2	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD			
		1	tower mounts	Platform Mount (LP 101-1)			
97.0	101.0	2	andrew	VHLP2.5-11	3 3	5/16 1/2	1
		2	dragonwave	HORIZON COMPACT			
	97.0	3	kathrein	840 10054 w/ Mount Pipe			
		1	motorola	TIMING 2000			
		1	tower mounts	Platform Mount [LP 602-1]			
		3	samsung telecommunications	WIMAX DAP HEAD			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3	1-1/4	2
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
95.0	95.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	2
		6	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 101-3]			
87.0	87.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1	1-5/8	2
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		1	tower mounts	Side Arm Mount [SO 702-3]	12	1-1/4	1

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	262381	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont	262389	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont	262386	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF	3249954	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Valmont	645113	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.4.0), 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) Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2) Monopole has been properly maintained in accordance with manufacturer's specifications.
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 will be reinforced in conformance with the referenced proposed modification drawings.
5) Monopole was 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	TP15.525x10.525x0.188	1	-2	483	39.9	Pass
L2	110 - 84.5833	Pole	TP21.883x15.525x0.25	2	-9	905	98.1	Pass
L3	84.5833 - 70	Pole	TP25.531x21.883x0.378	3	-10	1471	81.9	Pass
L4	70 - 67.0833	Pole	TP25.76x23.775x0.436	4	-12	1781	79.7	Pass
L5	67.0833 - 44.5833	Pole	TP31.388x25.76x0.411	5	-16	2066	92.9	Pass
L6	44.5833 - 34.08	Pole	TP34.015x31.388x0.406	6	-17	2135	95.0	Pass
L7	34.08 - 18.75	Pole	TP37.216x31.972x0.425	7	-21	2401	95.8	Pass
L8	18.75 - 0	Pole	TP41.9x37.216x0.408	8	-24	2515	99.6	Pass
							Summary	
						Pole (L8)	99.6	Pass
						Rating =	99.6	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	92.9	Pass
1	Base Plate	0	66.6	Pass
1	Base Foundation Steel	0	56.1	Pass
1	Base Foundation Soil Interaction	0	65.0	Pass
1	Flange Connection	110	31.2	Pass

Structure Rating (max from all components) =	99.6%

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

4.1) Recommendations

Reinforce monopole in conformance with the attached proposed 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:

4) Tower is located in Hartford County, Connecticut.
5) Basic wind speed of 80 mph.
6) Nominal ice thickness of 1.250 in.
7) Ice thickness is considered to increase with height.
8) Ice density of 56 pcf.
9) A wind speed of 38 mph is used in combination with ice.
10) Temperature drop of 50 °F.
11) Deflections calculated using a wind speed of 50 mph.
12) A non-linear (P-delta) analysis was used.
13) Pressures are calculated at each section.
14) Stress ratio used in pole design is 1.333.
15) Local bending stresses due to climbing loads, feedline 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		

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	131.00-110.00	21.00	0.00	12	10.525	15.525	0.188	0.752	A572-65 (65 ksi)
L2	110.00-84.58	25.42	0.00	12	15.525	21.883	0.250	1.000	A572-65 (65 ksi)
L3	84.58-70.00	14.58	4.00	12	21.883	25.531	0.378	1.512	Reinf 62.57 ksi (63 ksi)
L4	70.00-67.08	6.92	0.00	12	23.775	25.760	0.436	1.743	Reinf 62.66 ksi (63 ksi)
L5	67.08-44.58	22.50	0.00	12	25.760	31.388	0.411	1.644	Reinf 63.01 ksi (63 ksi)
L6	44.58-34.08	10.50	4.92	12	31.388	34.015	0.406	1.625	Reinf 63.04 ksi (63 ksi)
L7	34.08-18.75	20.25	0.00	12	31.972	37.216	0.425	1.702	Reinf 63.22 ksi (63 ksi)
L8	18.75-0.00	18.75		12	37.216	41.900	0.408	1.630	Reinf 63.30 ksi (63 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	10.896	6.258	85.346	3.701	5.452	15.654	172.934	3.080	2.317	12.324
	16.073	9.284	278.754	5.491	8.042	34.662	564.831	4.570	3.657	19.451
L2	16.073	12.296	366.206	5.468	8.042	45.537	742.033	6.052	3.491	13.963
	22.655	17.415	1040.235	7.745	11.335	91.769	2107.798	8.571	5.195	20.779
L3	22.655	26.170	1544.810	7.699	11.335	136.282	3130.205	12.880	4.852	12.838
	26.432	30.610	2471.873	9.005	13.225	186.908	5008.685	15.065	5.829	15.425
L4	25.802	32.749	2276.892	8.355	12.315	184.885	4613.601	16.118	5.204	11.941
	26.669	35.535	2908.837	9.066	13.344	217.993	5894.093	17.489	5.736	13.162
L5	26.669	33.541	2750.982	9.075	13.344	206.163	5574.236	16.508	5.802	14.121
	32.495	40.988	5020.126	11.090	16.259	308.762	10172.137	20.173	7.311	17.791
L6	32.495	40.527	4965.201	11.091	16.259	305.383	10060.844	19.946	7.323	18.027
	35.215	43.963	6338.434	12.032	17.620	359.734	12843.386	21.637	8.027	19.76
L7	34.419	43.210	5488.750	11.294	16.561	331.417	11121.695	21.267	7.428	17.463
	38.529	50.393	8706.480	13.171	19.278	451.626	17641.689	24.802	8.834	20.767
L8	38.529	48.309	8354.470	13.178	19.278	433.367	16928.421	23.776	8.882	21.791
	43.378	54.456	11966.615	14.854	21.704	551.350	24247.607	26.802	10.137	24.87

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 131.00-110.00				1	1	1		
L2 110.00-84.58				1	1	1		
L3 84.58-70.00				1	1	1		
L4 70.00-67.08				1	1	1		
L5 67.08-44.58				1	1	1		
L6 44.58-34.08				1	1	1		
L7 34.08-18.75				1	1	1		
L8 18.75-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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)	128.00 - 0.00	4	No Ice	0.00	0.83
						1/2" Ice	0.00	2.34
						1" Ice	0.00	4.47
						2" Ice	0.00	10.55
						4" Ice	0.00	30.05
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	128.00 - 0.00	2	No Ice	0.20	0.83
						1/2" Ice	0.30	2.34

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.40	4.47
						2" Ice	0.60	10.55
						4" Ice	1.00	30.05
**								
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	87.00 - 0.00	6	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	121.00 - 87.00	5	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	121.00 - 87.00	1	No Ice	0.16	0.66
						1/2" Ice	0.25	1.91
						1" Ice	0.35	3.78
						2" Ice	0.55	9.33
						4" Ice	0.95	27.78
FB-L98B-002-75000(3/8")	C	No	CaAa (Out Of Face)	121.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.60
						1" Ice	0.00	1.76
						2" Ice	0.00	5.91
						4" Ice	0.00	21.53
WR-VG86ST-BRD(3/4)	C	No	CaAa (Out Of Face)	121.00 - 0.00	2	No Ice	0.00	0.59
						1/2" Ice	0.00	1.37
						1" Ice	0.00	2.76
						2" Ice	0.00	7.37
						4" Ice	0.00	23.92
**								
HJ7-50A(1-5/8")	C	No	Inside Pole	107.00 - 0.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
						2" Ice	0.00	1.04
						4" Ice	0.00	1.04
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	107.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	2.81
						1" Ice	0.00	4.94
						2" Ice	0.00	11.02
						4" Ice	0.00	30.52
**								
ATCB-B01-005(5/16)	C	No	Inside Pole	97.00 - 0.00	3	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
						2" Ice	0.00	0.07
						4" Ice	0.00	0.07
FSJ4-50B(1/2")	C	No	Inside Pole	97.00 - 0.00	2	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
						2" Ice	0.00	0.14
						4" Ice	0.00	0.14
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	97.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.18
						2" Ice	0.00	9.73
						4" Ice	0.00	28.15
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	97.00 - 0.00	1	No Ice	0.00	0.14
						1/2" Ice	0.00	0.76
						1" Ice	0.00	2.00
						2" Ice	0.00	6.30
						4" Ice	0.00	22.23
2" Rigid Conduit	C	No	CaAa (Out Of Face)	97.00 - 0.00	2	No Ice	0.00	0.95
						1/2" Ice	0.00	2.48
						1" Ice	0.00	4.62
						2" Ice	0.00	10.72
						4" Ice	0.00	30.27
**								
LCF114-50J(1-1/4")	C	No	CaAa (Out Of Face)	87.00 - 0.00	10	No Ice	0.00	0.70
						1/2" Ice	0.00	1.97

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	3.85
						2" Ice	0.00	9.45
						4" Ice	0.00	27.97
LCF114-50J(1-1/4")	C	No	CaAa (Out Of Face)	87.00 - 0.00	2	No Ice	0.16	0.70
						1/2" Ice	0.26	1.97
						1" Ice	0.36	3.85
						2" Ice	0.56	9.45
						4" Ice	0.96	27.97
MLE Hybrid 9Power/18Fiber RL 2(1 5/8)	C	No	CaAa (Out Of Face)	87.00 - 0.00	1	No Ice	0.16	1.07
						1/2" Ice	0.26	2.37
						1" Ice	0.36	4.28
						2" Ice	0.56	9.93
						4" Ice	0.96	28.56
**								
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	60.50 - 0.00	1	No Ice	0.13	6.00
						1/2" Ice	0.24	6.56
						1" Ice	0.35	7.47
						2" Ice	0.57	10.32
						4" Ice	1.01	20.17
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	82.00 - 72.00	1	No Ice	0.13	6.00
						1/2" Ice	0.24	6.56
						1" Ice	0.35	7.47
						2" Ice	0.57	10.32
						4" Ice	1.01	20.17
**								

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	131.00-110.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	8.833	0
L2	110.00-84.58	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	14.787	1
L3	84.58-70.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	14.003	1
L4	70.00-67.08	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	2.551	0
L5	67.08-44.58	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	21.666	1
L6	44.58-34.08	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	10.498	0
L7	34.08-18.75	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	15.323	1
L8	18.75-0.00	A	0.000	0.000	0.000	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	18.741	1

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	131.00-110.00	A	1.459	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	22.549	1
L2	110.00-84.58	A	1.422	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	37.845	3
L3	84.58-70.00	A	1.384	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	37.262	3
L4	70.00-67.08	A	1.365	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	6.587	1
L5	67.08-44.58	A	1.330	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	56.304	5
L6	44.58-34.08	A	1.276	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	26.883	2
L7	34.08-18.75	A	1.250	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	39.236	3
L8	18.75-0.00	A	1.250	0.000	0.000	0.000	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	47.386	4

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	131.00-110.00	-0.409	0.236	-0.656	0.379
L2	110.00-84.58	-0.555	0.320	-0.926	0.535
L3	84.58-70.00	-0.840	0.485	-1.378	0.795
L4	70.00-67.08	-0.803	0.464	-1.347	0.777
L5	67.08-44.58	-0.893	0.516	-1.521	0.878
L6	44.58-34.08	-0.950	0.548	-1.648	0.952
L7	34.08-18.75	-0.969	0.559	-1.710	0.987
L8	18.75-0.00	-0.996	0.575	-1.794	1.036

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	1.00 0 0	0.000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.17 5.62 6.08 7.02 9.12	3.17 3.66 4.18 5.27 7.67	0 0 0 0 0
APX18-206517S-C w/ Mount Pipe	B	From Face	1.00 0 0	0.000	128.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.17 5.62 6.08 7.02 9.12	3.17 3.66 4.18 5.27 7.67	0 0 0 0 0
APX18-206517S-C w/ Mount Pipe	C	From Face	1.00 0 0	0.000	128.00	No Ice 1/2" Ice	5.17 5.62 6.08	3.17 3.66 4.18	0 0 0

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
							1" Ice	7.02	5.27	0
							2" Ice	9.12	7.67	0
							4" Ice			
Pipe Mount [PM 601-3]	C	None			0.000	128.00	No Ice	4.39	4.39	0
							1/2" Ice	5.48	5.48	0
							1" Ice	6.57	6.57	0
							2" Ice	8.75	8.75	0
							4" Ice	13.11	13.11	1
**										
800 10121 w/ Mount Pipe	A	From Face	4.00	0	0.000	121.00	No Ice	6.03	4.95	0
			0				1/2" Ice	6.71	6.02	0
							1" Ice	7.30	6.81	0
							2" Ice	8.50	8.46	0
							4" Ice	11.04	12.10	1
800 10121 w/ Mount Pipe	B	From Face	4.00	0	0.000	121.00	No Ice	6.03	4.95	0
			0				1/2" Ice	6.71	6.02	0
							1" Ice	7.30	6.81	0
							2" Ice	8.50	8.46	0
							4" Ice	11.04	12.10	1
800 10121 w/ Mount Pipe	C	From Face	4.00	0	0.000	121.00	No Ice	6.03	4.95	0
			0				1/2" Ice	6.71	6.02	0
							1" Ice	7.30	6.81	0
							2" Ice	8.50	8.46	0
							4" Ice	11.04	12.10	1
(2) LGP21401	A	From Face	4.00	0	0.000	121.00	No Ice	1.29	0.23	0
			0				1/2" Ice	1.45	0.31	0
							1" Ice	1.61	0.40	0
							2" Ice	1.97	0.61	0
							4" Ice	2.79	1.12	0
(2) LGP21401	B	From Face	4.00	0	0.000	121.00	No Ice	1.29	0.23	0
			0				1/2" Ice	1.45	0.31	0
							1" Ice	1.61	0.40	0
							2" Ice	1.97	0.61	0
							4" Ice	2.79	1.12	0
(2) LGP21401	C	From Face	4.00	0	0.000	121.00	No Ice	1.29	0.23	0
			0				1/2" Ice	1.45	0.31	0
							1" Ice	1.61	0.40	0
							2" Ice	1.97	0.61	0
							4" Ice	2.79	1.12	0
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.00	0	0.000	121.00	No Ice	8.50	6.30	0
			0				1/2" Ice	9.15	7.48	0
							1" Ice	9.77	8.37	0
							2" Ice	11.03	10.18	0
							4" Ice	13.68	14.02	1
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.00	0	0.000	121.00	No Ice	8.50	6.30	0
			0				1/2" Ice	9.15	7.48	0
							1" Ice	9.77	8.37	0
							2" Ice	11.03	10.18	0
							4" Ice	13.68	14.02	1
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.00	0	0.000	121.00	No Ice	8.50	6.30	0
			0				1/2" Ice	9.15	7.48	0
							1" Ice	9.77	8.37	0
							2" Ice	11.03	10.18	0
							4" Ice	13.68	14.02	1
DC6-48-60-18-8F	A	From Face	4.00		0.000	121.00	No Ice	1.47	1.47	0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0 0			1/2" Ice	1.67	1.67	0
						1" Ice	1.88	1.88	0
						2" Ice	2.33	2.33	0
						4" Ice	3.38	3.38	0
(2) RRUS-11	A	From Face	4.00 0 0	0.000	121.00	No Ice	3.25	1.37	0
						1/2" Ice	3.49	1.55	0
						1" Ice	3.74	1.74	0
						2" Ice	4.27	2.14	0
						4" Ice	5.43	3.04	0
(2) RRUS-11	B	From Face	4.00 0 0	0.000	121.00	No Ice	3.25	1.37	0
						1/2" Ice	3.49	1.55	0
						1" Ice	3.74	1.74	0
						2" Ice	4.27	2.14	0
						4" Ice	5.43	3.04	0
(2) RRUS-11	C	From Face	4.00 0 0	0.000	121.00	No Ice	3.25	1.37	0
						1/2" Ice	3.49	1.55	0
						1" Ice	3.74	1.74	0
						2" Ice	4.27	2.14	0
						4" Ice	5.43	3.04	0
T-Arm Mount [TA 601-3]	C	None		0.000	121.00	No Ice	10.90	10.90	1
						1/2" Ice	14.65	14.65	1
						1" Ice	18.40	18.40	1
						2" Ice	25.90	25.90	2
						4" Ice	40.90	40.90	2
**									
BXA-70063/6CFx4 w/ Mount Pipe	A	From Face	4.00 0 2	0.000	107.00	No Ice	7.97	5.40	0
						1/2" Ice	8.61	6.55	0
						1" Ice	9.22	7.41	0
						2" Ice	10.46	9.18	0
						4" Ice	13.07	12.93	1
BXA-70063/6CFx4 w/ Mount Pipe	B	From Face	4.00 0 2	0.000	107.00	No Ice	7.97	5.40	0
						1/2" Ice	8.61	6.55	0
						1" Ice	9.22	7.41	0
						2" Ice	10.46	9.18	0
						4" Ice	13.07	12.93	1
BXA-70063/6CFx4 w/ Mount Pipe	C	From Face	4.00 0 2	0.000	107.00	No Ice	7.97	5.40	0
						1/2" Ice	8.61	6.55	0
						1" Ice	9.22	7.41	0
						2" Ice	10.46	9.18	0
						4" Ice	13.07	12.93	1
BXA-185090/8CF w/ Mount Pipe	A	From Face	4.00 0 2	0.000	107.00	No Ice	3.16	3.33	0
						1/2" Ice	3.53	3.94	0
						1" Ice	3.94	4.56	0
						2" Ice	4.83	5.86	0
						4" Ice	6.73	8.84	0
BXA-185090/8CF w/ Mount Pipe	B	From Face	4.00 0 2	0.000	107.00	No Ice	3.16	3.33	0
						1/2" Ice	3.53	3.94	0
						1" Ice	3.94	4.56	0
						2" Ice	4.83	5.86	0
						4" Ice	6.73	8.84	0
BXA-185060/8CFx2 w/ Mount Pipe	C	From Face	4.00 0 2	0.000	107.00	No Ice	3.20	3.02	0
						1/2" Ice	3.58	3.64	0
						1" Ice	3.99	4.26	0
						2" Ice	4.88	5.56	0
							6.80	8.46	0

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			
FD9R6004/1C-3L	A	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0 0 0 0 0
(2) FD9R6004/1C-3L	B	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0 0 0 0 0
(3) FD9R6004/1C-3L	C	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0 0 0 0 0
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	A	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.55 1.72 1.90 2.28 3.14	0.81 0.94 1.09 1.40 2.12	0 0 0 0 0
BXA-80063/4CF w/ Mount Pipe	A	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.42 4.02 4.64 5.92 8.93	0 0 0 0 1
BXA-80063/4CF w/ Mount Pipe	B	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.42 4.02 4.64 5.92 8.93	0 0 0 0 1
BXA-80063/4CF w/ Mount Pipe	C	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.40 5.84 6.30 7.24 9.26	3.42 4.02 4.64 5.92 8.93	0 0 0 0 1
BXA-171085-8CF-EDIN-2 w/ Mount Pipe	A	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0 0 0 0 0
BXA-171085-8CF-EDIN-2 w/ Mount Pipe	B	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0 0 0 0 0
BXA-171085-8CF-EDIN-2 w/ Mount Pipe	C	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.18 3.56 3.96 4.85 6.77	3.35 3.97 4.60 5.89 8.89	0 0 0 0 0
RRH2X40-AWS	A	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice	2.52 2.75 2.99 3.50	1.59 1.80 2.01 2.46	0 0 0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice 4" Ice	4.61	3.48	0
RRH2X40-AWS	B	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0 0 0 0 0
RRH2X40-AWS	C	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0 0 0 0 0
RRH2x40-AWS	A	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0 0 0 0 0
RRH2x40-AWS	B	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0 0 0 0 0
RRH2x40-AWS	C	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.52 2.75 2.99 3.50 4.61	1.59 1.80 2.01 2.46 3.48	0 0 0 0 0
DB-T1-6Z-8AB-0Z	C	From Face	4.00 0 2	0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0 0 0 0 0
Platform Mount (LP 101-1)	C	None		0.000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	36.21 42.82 49.43 62.65 89.09	36.21 42.82 49.43 62.65 89.09	2 2 3 5 8
Clearwire TIMING 2000	A	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.13 0.18 0.24 0.38 0.78	0.13 0.18 0.24 0.38 0.78	0 0 0 0 0
840 10054 w/ Mount Pipe	A	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.41 5.83 6.26 7.16 9.09	2.39 2.92 3.47 4.61 7.32	0 0 0 0 1
840 10054 w/ Mount Pipe	B	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.41 5.83 6.26 7.16 9.09	2.39 2.92 3.47 4.61 7.32	0 0 0 0 1
840 10054 w/ Mount Pipe	C	From Face	4.00 0	0.000	97.00	No Ice 1/2"	5.41 5.83	2.39 2.92	0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0			Ice	6.26	3.47	0
						1" Ice	7.16	4.61	0
						2" Ice	9.09	7.32	1
						4" Ice			
WIMAX DAP HEAD	A	From Face	4.00	0.000	97.00	No Ice	1.80	0.78	0
			0			1/2"	1.99	0.92	0
			0			Ice	2.18	1.07	0
						1" Ice	2.59	1.39	0
						2" Ice	3.51	2.14	0
						4" Ice			
WIMAX DAP HEAD	B	From Face	4.00	0.000	97.00	No Ice	1.80	0.78	0
			0			1/2"	1.99	0.92	0
			0			Ice	2.18	1.07	0
						1" Ice	2.59	1.39	0
						2" Ice	3.51	2.14	0
						4" Ice			
WIMAX DAP HEAD	C	From Face	4.00	0.000	97.00	No Ice	1.80	0.78	0
			0			1/2"	1.99	0.92	0
			0			Ice	2.18	1.07	0
						1" Ice	2.59	1.39	0
						2" Ice	3.51	2.14	0
						4" Ice			
HORIZON COMPACT	B	From Face	4.00	0.000	97.00	No Ice	0.84	0.43	0
			0			1/2"	0.97	0.52	0
			4			Ice	1.10	0.63	0
						1" Ice	1.39	0.86	0
						2" Ice	2.08	1.43	0
						4" Ice			
HORIZON COMPACT	C	From Face	4.00	0.000	97.00	No Ice	0.84	0.43	0
			0			1/2"	0.97	0.52	0
			4			Ice	1.10	0.63	0
						1" Ice	1.39	0.86	0
						2" Ice	2.08	1.43	0
						4" Ice			
Sprint APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.00	0.000	97.00	No Ice	8.50	6.95	0
			0			1/2"	9.15	8.13	0
			0			Ice	9.77	9.02	0
						1" Ice	11.03	10.84	0
						2" Ice	13.68	14.85	1
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.00	0.000	97.00	No Ice	8.50	6.95	0
			0			1/2"	9.15	8.13	0
			0			Ice	9.77	9.02	0
						1" Ice	11.03	10.84	0
						2" Ice	13.68	14.85	1
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.00	0.000	97.00	No Ice	8.50	6.95	0
			0			1/2"	9.15	8.13	0
			0			Ice	9.77	9.02	0
						1" Ice	11.03	10.84	0
						2" Ice	13.68	14.85	1
						4" Ice			
IBC1900HG-2A	A	From Face	4.00	0.000	97.00	No Ice	1.13	0.53	0
			0			1/2"	1.27	0.65	0
			0			Ice	1.43	0.77	0
						1" Ice	1.76	1.04	0
						2" Ice	2.53	1.69	0
						4" Ice			
IBC1900HG-2A	B	From Face	4.00	0.000	97.00	No Ice	1.13	0.53	0
			0			1/2"	1.27	0.65	0
			0			Ice	1.43	0.77	0
						1" Ice	1.76	1.04	0
						2" Ice	2.53	1.69	0
						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
IBC1900HG-2A	C	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	0 0 0 0 0
IBC1900BB-1	A	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	0 0 0 0 0
IBC1900BB-1	B	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	0 0 0 0 0
IBC1900BB-1	C	From Face	4.00 0 0	0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.13 1.27 1.43 1.76 2.53	0.53 0.65 0.77 1.04 1.69	0 0 0 0 0
Platform Mount [LP 602-1]	C	None		0.000	97.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	32.03 38.71 45.39 58.75 85.47	32.03 38.71 45.39 58.75 85.47	1 2 2 3 5
**									
(2) PCS 1900MHz 4x45W-65MHz	A	From Face	4.00 0 0	0.000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0 0 0 0 0
(2) PCS 1900MHz 4x45W-65MHz	B	From Face	4.00 0 0	0.000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0 0 0 0 0
(2) PCS 1900MHz 4x45W-65MHz	B	From Face	4.00 0 0	0.000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.85 3.09 3.61 4.74	0 0 0 0 0
800MHz 2X50W RRH W/FILTER	A	From Face	4.00 0 0	0.000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0 0 0 0 0
800MHz 2X50W RRH W/FILTER	B	From Face	4.00 0 0	0.000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.40 2.61 2.83 3.30 4.34	2.25 2.46 2.68 3.13 4.15	0 0 0 0 0
800MHz 2X50W RRH W/FILTER	C	From Face	4.00 0 0	0.000	95.00	No Ice 1/2" Ice 1" Ice	2.40 2.61 2.83 3.30	2.25 2.46 2.68 3.13	0 0 0 0

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	4.34	4.15	0
						4" Ice			
Side Arm Mount [SO 101-3]	C	None		0.000	95.00	No Ice	7.50	7.50	0
						1/2" Ice	8.90	8.90	0
							10.30	10.30	0
						1" Ice	13.10	13.10	1
						2" Ice	18.70	18.70	1
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Face	4.00 0 0	0.000	87.00	No Ice	6.83	5.64	0
						1/2" Ice	7.35	6.48	0
							7.86	7.26	0
						1" Ice	8.93	8.86	0
						2" Ice	11.18	12.29	1
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Face	4.00 0 0	0.000	87.00	No Ice	6.83	5.64	0
						1/2" Ice	7.35	6.48	0
							7.86	7.26	0
						1" Ice	8.93	8.86	0
						2" Ice	11.18	12.29	1
						4" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Face	4.00 0 0	0.000	87.00	No Ice	6.83	5.64	0
						1/2" Ice	7.35	6.48	0
							7.86	7.26	0
						1" Ice	8.93	8.86	0
						2" Ice	11.18	12.29	1
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Face	4.00 0 0	0.000	87.00	No Ice	6.83	5.64	0
						1/2" Ice	7.35	6.48	0
							7.86	7.26	0
						1" Ice	8.93	8.86	0
						2" Ice	11.18	12.29	1
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Face	4.00 0 0	0.000	87.00	No Ice	6.83	5.64	0
						1/2" Ice	7.35	6.48	0
							7.86	7.26	0
						1" Ice	8.93	8.86	0
						2" Ice	11.18	12.29	1
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Face	4.00 0 0	0.000	87.00	No Ice	6.83	5.64	0
						1/2" Ice	7.35	6.48	0
							7.86	7.26	0
						1" Ice	8.93	8.86	0
						2" Ice	11.18	12.29	1
						4" Ice			
KRY 112 144/1	A	From Face	4.00 0 0	0.000	87.00	No Ice	0.41	0.20	0
						1/2" Ice	0.50	0.27	0
							0.59	0.35	0
						1" Ice	0.81	0.53	0
						2" Ice	1.36	1.00	0
						4" Ice			
KRY 112 144/1	B	From Face	4.00 0 0	0.000	87.00	No Ice	0.41	0.20	0
						1/2" Ice	0.50	0.27	0
							0.59	0.35	0
						1" Ice	0.81	0.53	0
						2" Ice	1.36	1.00	0
						4" Ice			
KRY 112 144/1	C	From Face	4.00 0 0	0.000	87.00	No Ice	0.41	0.20	0
						1/2" Ice	0.50	0.27	0
							0.59	0.35	0
						1" Ice	0.81	0.53	0
						2" Ice	1.36	1.00	0
						4" Ice			
Side Arm Mount [SO 702-3]	C	None		0.000	87.00	No Ice	3.22	3.22	0
						1/2" Ice	4.15	4.15	0

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
						Ice	5.08	5.08	0
						1" Ice	6.94	6.94	0
						2" Ice	10.66	10.66	0
						4" Ice			
**									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-11	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0 4	0.000		97.00	2.92	No Ice	6.68	0
									1/2" Ice	7.07	0
									1" Ice	7.46	0
									2" Ice	8.23	0
									4" Ice	9.78	0
VHLP2.5-11	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0 4	0.000		97.00	2.92	No Ice	6.68	0
									1/2" Ice	7.07	0
									1" Ice	7.46	0
									2" Ice	8.23	0
									4" Ice	9.78	0
**											

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 131.00-110.00	119.83	1.445	23.68	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	8.833
L2 110.00-84.58	96.57	1.359	22.27	39.616	A	0.000	39.616	39.616	100.00	0.000	0.000
					B	0.000	39.616		100.00	0.000	0.000
					C	0.000	39.616		100.00	0.000	14.787
L3 84.58-70.00	77.10	1.274	20.88	28.811	A	0.000	28.811	28.811	100.00	0.000	0.000
					B	0.000	28.811		100.00	0.000	0.000
					C	0.000	28.811		100.00	0.000	14.003
L4 70.00-67.08	68.53	1.232	20.19	6.159	A	0.000	6.159	6.159	100.00	0.000	0.000
					B	0.000	6.159		100.00	0.000	0.000
					C	0.000	6.159		100.00	0.000	2.551
L5 67.08-44.58	55.46	1.16	19.00	53.576	A	0.000	53.576	53.576	100.00	0.000	0.000
					B	0.000	53.576		100.00	0.000	0.000
					C	0.000	53.576		100.00	0.000	21.666
L6 44.58-34.08	39.26	1.051	17.22	28.623	A	0.000	28.623	28.623	100.00	0.000	0.000
					B	0.000	28.623		100.00	0.000	0.000
					C	0.000	28.623		100.00	0.000	10.498
L7 34.08-18.75	26.27	1	16.38	45.008	A	0.000	45.008	45.008	100.00	0.000	0.000
					B	0.000	45.008		100.00	0.000	0.000
					C	0.000	45.008		100.00	0.000	15.323
L8 18.75-0.00	9.19	1	16.38	61.810	A	0.000	61.810	61.810	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
					B	0.000	61.810		100.00	0.000	0.000
					C	0.000	61.810		100.00	0.000	18.741

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 131.00-110.00	119.83	1.445	5.23	1.459	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	22.549
L2 110.00-84.58	96.57	1.359	4.92	1.422	45.640	A	0.000	45.640	45.640	100.00	0.000	0.000
						B	0.000	45.640		100.00	0.000	0.000
						C	0.000	45.640		100.00	0.000	37.845
L3 84.58-70.00	77.10	1.274	4.61	1.384	32.174	A	0.000	32.174	32.174	100.00	0.000	0.000
						B	0.000	32.174		100.00	0.000	0.000
						C	0.000	32.174		100.00	0.000	37.262
L4 70.00-67.08	68.53	1.232	4.46	1.365	6.832	A	0.000	6.832	6.832	100.00	0.000	0.000
						B	0.000	6.832		100.00	0.000	0.000
						C	0.000	6.832		100.00	0.000	6.587
L5 67.08-44.58	55.46	1.16	4.20	1.330	58.565	A	0.000	58.565	58.565	100.00	0.000	0.000
						B	0.000	58.565		100.00	0.000	0.000
						C	0.000	58.565		100.00	0.000	56.304
L6 44.58-34.08	39.26	1.051	3.80	1.276	30.857	A	0.000	30.857	30.857	100.00	0.000	0.000
						B	0.000	30.857		100.00	0.000	0.000
						C	0.000	30.857		100.00	0.000	26.883
L7 34.08-18.75	26.27	1	3.62	1.250	48.269	A	0.000	48.269	48.269	100.00	0.000	0.000
						B	0.000	48.269		100.00	0.000	0.000
						C	0.000	48.269		100.00	0.000	39.236
L8 18.75-0.00	9.19	1	3.62	1.250	65.716	A	0.000	65.716	65.716	100.00	0.000	0.000
						B	0.000	65.716		100.00	0.000	0.000
						C	0.000	65.716		100.00	0.000	47.386

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 131.00-110.00	119.83	1.445	9.25	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	8.833
L2 110.00-84.58	96.57	1.359	8.70	39.616	A	0.000	39.616	39.616	100.00	0.000	0.000
					B	0.000	39.616		100.00	0.000	0.000
					C	0.000	39.616		100.00	0.000	14.787
L3 84.58-70.00	77.10	1.274	8.16	28.811	A	0.000	28.811	28.811	100.00	0.000	0.000
					B	0.000	28.811		100.00	0.000	0.000
					C	0.000	28.811		100.00	0.000	14.003
L4 70.00-67.08	68.53	1.232	7.89	6.159	A	0.000	6.159	6.159	100.00	0.000	0.000
					B	0.000	6.159		100.00	0.000	0.000
					C	0.000	6.159		100.00	0.000	2.551
L5 67.08-44.58	55.46	1.16	7.42	53.576	A	0.000	53.576	53.576	100.00	0.000	0.000
					B	0.000	53.576		100.00	0.000	0.000
					C	0.000	53.576		100.00	0.000	21.666
L6 44.58-	39.26	1.051	6.73	28.623	A	0.000	28.623	28.623	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
34.08					B	0.000	28.623		100.00	0.000	0.000
					C	0.000	28.623		100.00	0.000	10.498
L7 34.08-18.75	26.27	1	6.40	45.008	A	0.000	45.008	45.008	100.00	0.000	0.000
					B	0.000	45.008		100.00	0.000	0.000
					C	0.000	45.008		100.00	0.000	15.323
L8 18.75-0.00	9.19	1	6.40	61.810	A	0.000	61.810	61.810	100.00	0.000	0.000
					B	0.000	61.810		100.00	0.000	0.000
					C	0.000	61.810		100.00	0.000	18.741

Load Combinations

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

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	8	0	0	0
			Max. Compression	14	-7	1	0
			Max. Mx	11	-2	59	0
			Max. My	8	-2	0	-59
			Max. Vy	11	-5	59	0

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	8	5	0	-59
			Max. Torque	9			0
L2	110 - 84.5833	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-28	3	0
			Max. Mx	11	-9	381	3
			Max. My	2	-9	3	385
			Max. Vy	11	-18	381	3
			Max. Vx	8	18	-2	-384
			Max. Torque	11			-1
L3	84.5833 - 70	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-32	5	-1
			Max. Mx	11	-10	577	5
			Max. My	8	-10	-3	-582
			Max. Vy	11	-19	577	5
			Max. Vx	8	19	-3	-582
			Max. Torque	11			-1
L4	70 - 67.0833	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-35	7	-2
			Max. Mx	11	-12	711	6
			Max. My	8	-12	-4	-718
			Max. Vy	11	-20	711	6
			Max. Vx	8	20	-4	-718
			Max. Torque	11			-1
L5	67.0833 - 44.5833	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-44	12	-5
			Max. Mx	11	-16	1183	8
			Max. My	8	-16	-6	-1193
			Max. Vy	11	-22	1183	8
			Max. Vx	8	22	-6	-1193
			Max. Torque	11			-1
L6	44.5833 - 34.08	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-47	13	-6
			Max. Mx	11	-17	1308	9
			Max. My	8	-17	-6	-1320
			Max. Vy	11	-23	1308	9
			Max. Vx	8	23	-6	-1320
			Max. Torque	11			-1
L7	34.08 - 18.75	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-56	19	-9
			Max. Mx	11	-23	1789	12
			Max. My	8	-23	-7	-1803
			Max. Vy	11	-25	1789	12
			Max. Vx	8	25	-7	-1803
			Max. Torque	11			-1
L8	18.75 - 0	Pole	Max Tension	1	0	0	0
			Max. Compression	14	-65	24	-12
			Max. Mx	11	-27	2269	14
			Max. My	8	-27	-9	-2287
			Max. Vy	11	-27	2269	14
			Max. Vx	8	27	-9	-2287
			Max. Torque	11			-1

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	65	0	0
	Max. H_x	11	27	27	0
	Max. H_z	2	27	0	27
	Max. M_x	2	2279	0	27

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_z	5	2256	-26	0
	Max. Torsion	5	1	-26	0
	Min. Vert	8	27	0	-27
	Min. H_x	5	27	-26	0
	Min. H_z	8	27	0	-27
	Min. M_x	8	-2287	0	-27
	Min. M_z	11	-2269	27	0
	Min. Torsion	11	-1	27	0

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	27	0	0	1	3	0
Dead+Wind 0 deg - No Ice	27	0	-27	-2279	21	0
Dead+Wind 30 deg - No Ice	27	13	-23	-1971	-1121	-1
Dead+Wind 60 deg - No Ice	27	23	-13	-1134	-1952	-1
Dead+Wind 90 deg - No Ice	27	26	0	8	-2256	-1
Dead+Wind 120 deg - No Ice	27	23	13	1157	-1952	-1
Dead+Wind 150 deg - No Ice	27	13	23	1985	-1133	0
Dead+Wind 180 deg - No Ice	27	0	27	2287	-9	0
Dead+Wind 210 deg - No Ice	27	-13	23	1982	1123	1
Dead+Wind 240 deg - No Ice	27	-23	13	1138	1960	1
Dead+Wind 270 deg - No Ice	27	-27	0	-14	2269	1
Dead+Wind 300 deg - No Ice	27	-23	-13	-1152	1966	1
Dead+Wind 330 deg - No Ice	27	-13	-23	-1980	1143	0
Dead+Ice+Temp	65	0	0	12	24	0
Dead+Wind 0 deg+Ice+Temp	65	0	-9	-778	29	0
Dead+Wind 30 deg+Ice+Temp	65	4	-7	-671	-367	0
Dead+Wind 60 deg+Ice+Temp	65	7	-4	-381	-655	0
Dead+Wind 90 deg+Ice+Temp	65	9	0	14	-761	0
Dead+Wind 120 deg+Ice+Temp	65	7	4	412	-655	0
Dead+Wind 150 deg+Ice+Temp	65	4	7	699	-370	0
Dead+Wind 180 deg+Ice+Temp	65	0	9	804	21	0
Dead+Wind 210 deg+Ice+Temp	65	-4	7	698	414	0
Dead+Wind 240 deg+Ice+Temp	65	-7	4	406	703	0
Dead+Wind 270 deg+Ice+Temp	65	-9	0	8	810	0
Dead+Wind 300 deg+Ice+Temp	65	-7	-4	-386	705	0
Dead+Wind 330 deg+Ice+Temp	65	-4	-7	-674	419	0
Dead+Wind 0 deg - Service	27	0	-10	-891	10	0
Dead+Wind 30 deg - Service	27	5	-9	-770	-437	0
Dead+Wind 60 deg - Service	27	9	-5	-443	-762	0
Dead+Wind 90 deg - Service	27	10	0	4	-881	0
Dead+Wind 120 deg - Service	27	9	5	454	-762	0
Dead+Wind 150 deg - Service	27	5	9	777	-442	0
Dead+Wind 180 deg - Service	27	0	10	896	-1	0
Dead+Wind 210 deg - Service	27	-5	9	776	442	0
Dead+Wind 240 deg -	27	-9	5	446	769	0

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 270 deg - Service	27	-10	0	-5	890	0
Dead+Wind 300 deg - Service	27	-9	-5	-450	771	0
Dead+Wind 330 deg - Service	27	-5	-9	-774	449	0

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0	-27	0	0	27	0	0.001%
2	0	-27	-27	0	27	27	0.012%
3	13	-27	-23	-13	27	23	0.000%
4	23	-27	-13	-23	27	13	0.000%
5	26	-27	0	-26	27	0	0.012%
6	23	-27	13	-23	27	-13	0.000%
7	13	-27	23	-13	27	-23	0.000%
8	0	-27	27	0	27	-27	0.012%
9	-13	-27	23	13	27	-23	0.000%
10	-23	-27	13	23	27	-13	0.000%
11	-27	-27	0	27	27	0	0.007%
12	-23	-27	-13	23	27	13	0.000%
13	-13	-27	-23	13	27	23	0.000%
14	0	-65	0	0	65	0	0.001%
15	0	-65	-9	0	65	9	0.002%
16	4	-65	-7	-4	65	7	0.002%
17	7	-65	-4	-7	65	4	0.002%
18	9	-65	0	-9	65	0	0.002%
19	7	-65	4	-7	65	-4	0.002%
20	4	-65	7	-4	65	-7	0.002%
21	0	-65	9	0	65	-9	0.002%
22	-4	-65	7	4	65	-7	0.001%
23	-7	-65	4	7	65	-4	0.001%
24	-9	-65	0	9	65	0	0.002%
25	-7	-65	-4	7	65	4	0.002%
26	-4	-65	-7	4	65	7	0.001%
27	0	-27	-10	0	27	10	0.007%
28	5	-27	-9	-5	27	9	0.004%
29	9	-27	-5	-9	27	5	0.004%
30	10	-27	0	-10	27	0	0.006%
31	9	-27	5	-9	27	-5	0.004%
32	5	-27	9	-5	27	-9	0.004%
33	0	-27	10	0	27	-10	0.007%
34	-5	-27	9	5	27	-9	0.004%
35	-9	-27	5	9	27	-5	0.004%
36	-10	-27	0	10	27	0	0.006%
37	-9	-27	-5	9	27	5	0.002%
38	-5	-27	-9	5	27	9	0.004%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	17	0.00010883	0.00012417
3	Yes	23	0.00000001	0.00009268
4	Yes	23	0.00000001	0.00009491
5	Yes	17	0.00010905	0.00014825
6	Yes	23	0.00000001	0.00009350

7	Yes	23	0.00000001	0.00009624
8	Yes	17	0.00010881	0.00011997
9	Yes	23	0.00000001	0.00009453
10	Yes	23	0.00000001	0.00009229
11	Yes	18	0.00006098	0.00012204
12	Yes	23	0.00000001	0.00009766
13	Yes	23	0.00000001	0.00009468
14	Yes	15	0.00000001	0.00002670
15	Yes	20	0.00010867	0.00008819
16	Yes	20	0.00010836	0.00013491
17	Yes	20	0.00010836	0.00013744
18	Yes	20	0.00010872	0.00008550
19	Yes	20	0.00010825	0.00014257
20	Yes	20	0.00010823	0.00014179
21	Yes	20	0.00010854	0.00009005
22	Yes	21	0.00006374	0.00009308
23	Yes	21	0.00006374	0.00009121
24	Yes	20	0.00010851	0.00009061
25	Yes	20	0.00010815	0.00014933
26	Yes	21	0.00006380	0.00009076
27	Yes	17	0.00011686	0.00006216
28	Yes	18	0.00006538	0.00013637
29	Yes	18	0.00006538	0.00014603
30	Yes	17	0.00011689	0.00006675
31	Yes	18	0.00006536	0.00013508
32	Yes	18	0.00006535	0.00014773
33	Yes	17	0.00011683	0.00006240
34	Yes	18	0.00006535	0.00014400
35	Yes	18	0.00006535	0.00013395
36	Yes	17	0.00011684	0.00007073
37	Yes	19	0.00000001	0.00008893
38	Yes	18	0.00006534	0.00014038

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	131 - 110	44.55	38	3.085	0.007
L2	110 - 84.5833	31.23	38	2.882	0.006
L3	84.5833 - 70	17.73	38	2.089	0.004
L4	74 - 67.0833	13.44	38	1.781	0.002
L5	67.0833 - 44.5833	10.94	38	1.641	0.002
L6	44.5833 - 34.08	4.72	33	1.010	0.001
L7	39 - 18.75	3.63	33	0.863	0.001
L8	18.75 - 0	0.82	33	0.425	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128.00	APX18-206517S-C w/ Mount Pipe	38	42.60	3.071	0.007	11412
121.00	800 10121 w/ Mount Pipe	38	38.09	3.030	0.007	5706
107.00	BXA-70063/6CFx4 w/ Mount Pipe	38	29.44	2.815	0.006	2470
101.00	VHLP2.5-11	38	25.99	2.647	0.006	2078
97.00	TIMING 2000	38	23.81	2.518	0.005	1878
95.00	(2) PCS 1900MHz 4x45W-65MHz	38	22.75	2.450	0.005	1791
87.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	38	18.82	2.171	0.004	1525

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	131 - 110	113.29	8	7.851	0.019
L2	110 - 84.5833	79.49	8	7.339	0.016
L3	84.5833 - 70	45.20	8	5.324	0.009
L4	74 - 67.0833	34.28	8	4.541	0.006
L5	67.0833 - 44.5833	27.92	8	4.186	0.005
L6	44.5833 - 34.08	12.05	8	2.579	0.002
L7	39 - 18.75	9.26	8	2.203	0.002
L8	18.75 - 0	2.09	8	1.084	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
128.00	APX18-206517S-C w/ Mount Pipe	8	108.35	7.818	0.018	4662
121.00	800 10121 w/ Mount Pipe	8	96.90	7.712	0.018	2329
107.00	BXA-70063/6CFx4 w/ Mount Pipe	8	74.94	7.168	0.016	1002
101.00	VHLP2.5-11	8	66.20	6.743	0.014	839
97.00	TIMING 2000	8	60.65	6.415	0.013	756
95.00	(2) PCS 1900MHz 4x45W-65MHz	8	57.98	6.243	0.012	721
87.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	8	47.98	5.534	0.010	611

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)	TP15.525x10.525x0.188	21.00	0.00	0.0	39.00	9.284	-2	362	0.005
L2	110 - 84.5833 (2)	TP21.883x15.525x0.25	25.42	0.00	0.0	39.00	17.415	-9	679	0.013
L3	84.5833 - 70 (3)	TP25.531x21.883x0.378	14.58	0.00	0.0	37.54	29.392	-10	1103	0.009
L4	70 - 67.0833 (4)	TP25.76x23.775x0.436	6.92	0.00	0.0	37.60	35.535	-12	1336	0.009
L5	67.0833 - 44.5833 (5)	TP31.388x25.76x0.411	22.50	0.00	0.0	37.81	40.987	-16	1550	0.010
L6	44.5833 - 34.08 (6)	TP34.015x31.388x0.406	10.50	0.00	0.0	37.82	42.354	-17	1602	0.011
L7	34.08 - 18.75 (7)	TP37.216x31.972x0.425	20.25	0.00	0.0	37.93	47.493	-21	1802	0.012
L8	18.75 - 0 (8)	TP41.9x37.216x0.408	18.75	0.00	0.0	37.98	49.675	-24	1887	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)	TP15.525x10.525x0.188	59	20.52	39.00	0.526	0	0.00	39.00	0.000
L2	110 - 84.5833 (2)	TP21.883x15.525x0.25	386	50.42	39.00	1.293	0	0.00	39.00	0.000
L3	84.5833 - 70 (3)	TP25.531x21.883x0.378	583	40.63	37.54	1.082	0	0.00	37.54	0.000
L4	70 - 67.0833 (4)	TP25.76x23.775x0.436	719	39.57	37.60	1.052	0	0.00	37.60	0.000
L5	67.0833 - 44.5833 (5)	TP31.388x25.76x0.411	1194	46.41	37.81	1.228	0	0.00	37.81	0.000
L6	44.5833 - 34.08 (6)	TP34.015x31.388x0.406	1320	47.47	37.82	1.255	0	0.00	37.82	0.000
L7	34.08 - 18.75 (7)	TP37.216x31.972x0.425	1604	48.01	37.93	1.266	0	0.00	37.93	0.000
L8	18.75 - 0 (8)	TP41.9x37.216x0.408	1908	49.95	37.98	1.315	0	0.00	37.98	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)	TP15.525x10.525x0.188	5	0.54	26.00	0.043	0	0.01	26.00	0.000
L2	110 - 84.5833 (2)	TP21.883x15.525x0.25	18	1.04	26.00	0.081	1	0.06	26.00	0.002
L3	84.5833 - 70 (3)	TP25.531x21.883x0.378	19	0.65	25.03	0.053	1	0.03	25.03	0.001
L4	70 - 67.0833 (4)	TP25.76x23.775x0.436	20	0.56	25.06	0.046	1	0.02	25.06	0.001
L5	67.0833 - 44.5833 (5)	TP31.388x25.76x0.411	22	0.54	25.20	0.044	1	0.01	25.20	0.000
L6	44.5833 - 34.08 (6)	TP34.015x31.388x0.406	23	0.54	25.22	0.043	1	0.01	25.22	0.000
L7	34.08 - 18.75 (7)	TP37.216x31.972x0.425	24	0.51	25.29	0.041	0	0.01	25.29	0.000
L8	18.75 - 0 (8)	TP41.9x37.216x0.408	25	0.51	25.32	0.041	0	0.00	25.32	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)	0.005	0.526	0.000	0.043	0.000	0.532 ✔	1.333	H1-3+VT ✔
L2	110 - 84.5833 (2)	0.013	1.293	0.000	0.081	0.002	1.307 ✔	1.333	H1-3+VT ✔
L3	84.5833 - 70 (3)	0.009	1.082	0.000	0.053	0.001	1.092 ✔	1.333	H1-3+VT ✔
L4	70 - 67.0833 (4)	0.009	1.052	0.000	0.046	0.001	1.062 ✔	1.333	H1-3+VT ✔
L5	67.0833 - 44.5833 (5)	0.010	1.228	0.000	0.044	0.000	1.239 ✔	1.333	H1-3+VT ✔
L6	44.5833 - 34.08 (6)	0.011	1.255	0.000	0.043	0.000	1.266 ✔	1.333	H1-3+VT ✔
L7	34.08 - 18.75 (7)	0.012	1.266	0.000	0.041	0.000	1.278 ✔	1.333	H1-3+VT ✔

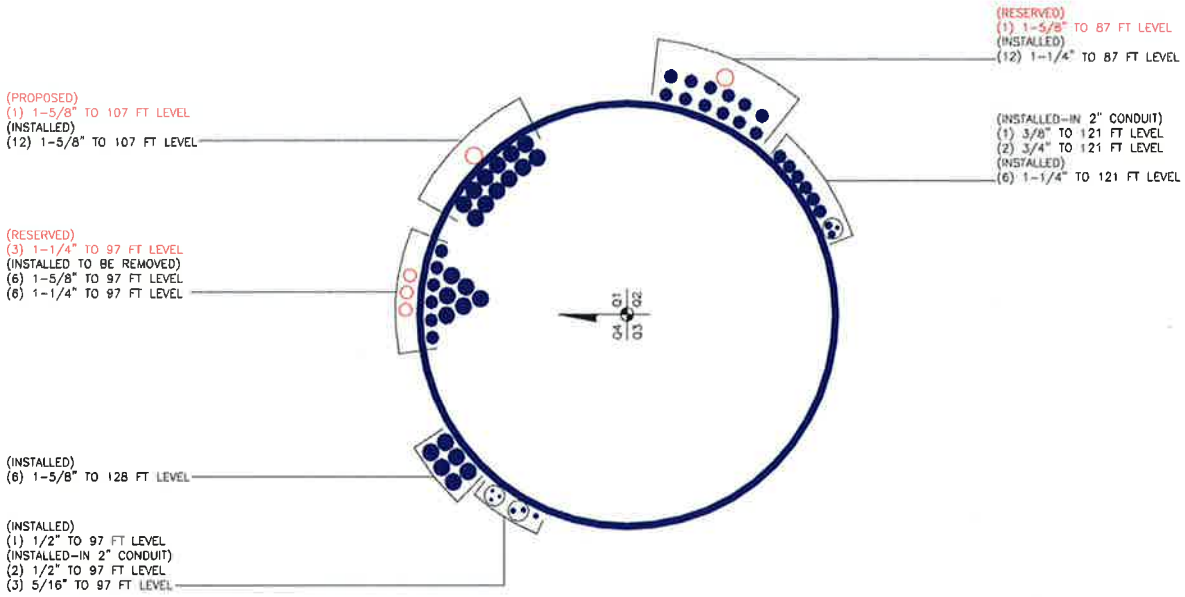
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L8	18.75 - 0 (8)	0.013	1.315	0.000	0.041	0.000	1.328 ✔	1.333	H1-3+VT ✔

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	TP15.525x10.525x0.188	1	-2	483	39.9	Pass
L2	110 - 84.5833	Pole	TP21.883x15.525x0.25	2	-9	905	98.1	Pass
L3	84.5833 - 70	Pole	TP25.531x21.883x0.378	3	-10	1471	81.9	Pass
L4	70 - 67.0833	Pole	TP25.76x23.775x0.436	4	-12	1781	79.7	Pass
L5	67.0833 - 44.5833	Pole	TP31.388x25.76x0.411	5	-16	2066	92.9	Pass
L6	44.5833 - 34.08	Pole	TP34.015x31.388x0.406	6	-17	2135	95.0	Pass
L7	34.08 - 18.75	Pole	TP37.216x31.972x0.425	7	-21	2401	95.8	Pass
L8	18.75 - 0	Pole	TP41.9x37.216x0.408	8	-24	2515	99.6	Pass
							Summary	
						Pole (L8)	99.6	Pass
						RATING =	**99.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

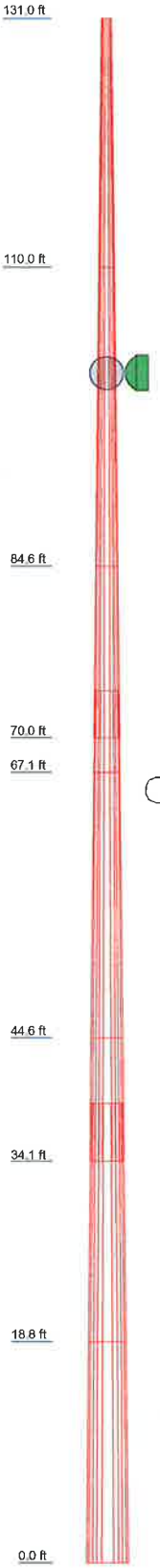

(RESERVED)
(1) 1-5/8" TO 87 FT LEVEL
(INSTALLED)
(12) 1-1/4" TO 87 FT LEVEL
(PROPOSED)
(1) 1-5/8" TO 107 FT LEVEL
(INSTALLED)
(12) 1-5/8" TO 107 FT LEVEL
(INSTALLED-IN 2" CONDUIT)
(1) 3/8" TO 121 FT LEVEL
(2) 3/4" TO 121 FT LEVEL
(INSTALLED)
(6) 1-1/4" TO 121 FT LEVEL
(RESERVED)
(3) 1-1/4" TO 97 FT LEVEL
(INSTALLED TO BE REMOVED)
(6) 1-5/8" TO 97 FT LEVEL
(6) 1-1/4" TO 97 FT LEVEL
01
02
04
03
(INSTALLED)
(6) 1-5/8" TO 128 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

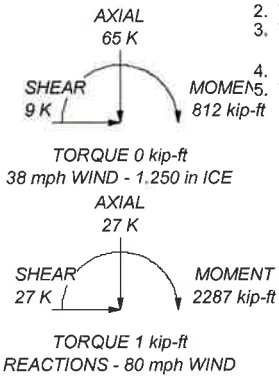
APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8
Length (ft)	21.00	25.42	14.58	6.92	22.50	10.50	20.25	18.75
Number of Sides	12	12	12	12	12	12	12	12
Thickness (in)	0.188	0.250	0.378	0.436	0.411	0.406	0.425	0.408
Socket Length (ft)			4.00			4.92		
Top Dia (in)	10.525	15.525	21.883	23.775	25.760	31.388	31.972	37.216
Bot Dia (in)	15.525	21.883	25.531	25.760	31.388	34.015	37.216	41.900
Grade	A572-65			Reinf 62.57 ksi	Reinf 62.66 ksi	Reinf 63.01 ksi	Reinf 63.04 ksi	Reinf 63.22 ksi / Reinf 63.30 ksi
Weight (K)	0.6	1.3	1.4	0.8	2.9	1.5	3.2	3.3

14.9





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APX18-206517S-C w/ Mount Pipe	128	DB-T1-6Z-8AB-0Z	107
APX18-206517S-C w/ Mount Pipe	128	Platform Mount (LP 101-1)	107
APX18-206517S-C w/ Mount Pipe	128	TIMING 2000	97
Pipe Mount [PM 601-3]	128	840 10054 w/ Mount Pipe	97
800 10121 w/ Mount Pipe	121	840 10054 w/ Mount Pipe	97
800 10121 w/ Mount Pipe	121	840 10054 w/ Mount Pipe	97
800 10121 w/ Mount Pipe	121	WIMAX DAP HEAD	97
(2) LGP21401	121	WIMAX DAP HEAD	97
(2) LGP21401	121	WIMAX DAP HEAD	97
(2) LGP21401	121	HORIZON COMPACT	97
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	HORIZON COMPACT	97
		APXVSPP18-C-A20 w/ Mount Pipe	97
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	APXVSPP18-C-A20 w/ Mount Pipe	97
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	APXVSPP18-C-A20 w/ Mount Pipe	97
		IBC1900HG-2A	97
DC6-48-60-18-8F	121	IBC1900HG-2A	97
(2) RRUS-11	121	IBC1900HG-2A	97
(2) RRUS-11	121	IBC1900BB-1	97
(2) RRUS-11	121	IBC1900BB-1	97
T-Arm Mount [TA 601-3]	121	IBC1900BB-1	97
BXA-70063/6CFx4 w/ Mount Pipe	107	Platform Mount [LP 602-1]	97
BXA-70063/6CFx4 w/ Mount Pipe	107	VHLP2.5-11	97
BXA-70063/6CFx4 w/ Mount Pipe	107	VHLP2.5-11	97
BXA-185090/8CF w/ Mount Pipe	107	(2) PCS 1900MHz 4x45W-65MHz	95
BXA-185090/8CF w/ Mount Pipe	107	800MHz 2X50W RRH W/FILTER	95
BXA-185060/8CFx2 w/ Mount Pipe	107	800MHz 2X50W RRH W/FILTER	95
FD9R6004/1C-3L	107	800MHz 2X50W RRH W/FILTER	95
(2) FD9R6004/1C-3L	107	Side Arm Mount [SO 101-3]	95
(3) FD9R6004/1C-3L	107	(2) PCS 1900MHz 4x45W-65MHz	95
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	107	(2) PCS 1900MHz 4x45W-65MHz	95
		ERICSSON AIR 21 B2A B4P w/ Mount Pipe	87
BXA-80063/4CF w/ Mount Pipe	107		
BXA-80063/4CF w/ Mount Pipe	107	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	87
BXA-80063/4CF w/ Mount Pipe	107	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	87
BXA-171085-8CF-EDIN-2 w/ Mount Pipe	107	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	87
BXA-171085-8CF-EDIN-2 w/ Mount Pipe	107	KRY 112 144/1	87
BXA-171085-8CF-EDIN-2 w/ Mount Pipe	107	KRY 112 144/1	87
		KRY 112 144/1	87
RRH2X40-AWS	107	Side Arm Mount [SO 702-3]	87
RRH2X40-AWS	107	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	87
RRH2X40-AWS	107		
RRH2x40-AWS	107	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	87
RRH2x40-AWS	107		
RRH2x40-AWS	107		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	Reinf 63.04 ksi	63 ksi	79 ksi
Reinf 62.57 ksi	63 ksi	79 ksi	Reinf 63.22 ksi	63 ksi	80 ksi
Reinf 62.66 ksi	63 ksi	79 ksi	Reinf 63.30 ksi	63 ksi	80 ksi
Reinf 63.01 ksi	63 ksi	79 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: 99.6%

Paul J Ford and Company
250 E. Broad Street Suite 1500
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.44105

Job: 131-Ft Monopole / HRT 100 943239			
Project: PJF 37513-0342 BP R3 / BU 806376			
Client: Crown Castle	Drawn by: Robert Koors	App'd:	
Code: TIA/EIA-222-F	Date: 05/20/13	Scale: NTS	
Path:		Dwg No. E-1	

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

TIA Rev F

Site Data

BU#: *806376*
Site Name:
App #:

Pole Manufacturer:	*Other*

Reactions		
Moment:	2287	ft-kips
Axial:	27	kips
Shear:	27	kips

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

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

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

Maximum Rod Tension:	181.2 Kips	Rigid
Allowable Tension:	195.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	92.9% Pass	Fty*ASIF

Base Plate Results Flexural Check

Base Plate Stress:	40.0 ksi	Rigid
Allowable Plate Stress:	60.0 ksi	Service ASD
Base Plate Stress Ratio:	66.6% Pass	0.75*Fy*ASIF
		Y.L. Length: 27.06

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

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

Site Data

BU#: *806376*
Site Name:
App #:

Pole Manufacturer:	Other

Reactions		
Moment:	59	ft-kips
Axial:	2	kips
Shear:	5	kips
Elevation:	110	feet

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

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	

Flange Bolt Results

Bolt Tension Capacity, **B**:	46.07	kips	Rigid
Max Bolt directly applied T:	14.36	Kips	Service, ASD
Min. PL "tc" for **B** cap. **w/o Pry:**	1.286	in	Fty*ASIF
Min PL "treq" for actual **T w/ Pry:**	0.538	in	
Min PL "t1" for actual **T w/o Pry:**	0.718	in	
T allowable w/o Prying:	46.07	kips	**α'<0 case**
Prying Force, Q:	0.00	kips	
Total Bolt Tension=T+Q:	14.36	kips	
Non-Prying Bolt Stress Ratio, T/B:	31.2%	Pass	

Exterior Flange Plate Results	Flexural Check		Rigid
Compression Side Plate Stress:	11.3	ksi	Service ASD
Allowable Plate Stress:	50.0	ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	22.6%	Pass	Comp. Y.L. Length:
No Prying			11.71
Tension Side Stress Ratio, (treq/t)^2:	15.3%	Pass	

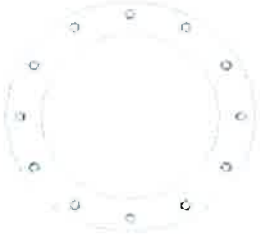
n/a

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

PJF job no. **37513-0342 BP R3** Project name **131' Monopole**

Foundation Loads:

Pole weight or tower leg compression =	27	(kips)
Horizontal load at top of pier =	27	(kips)
Overturning moment at top of pier=	2287	(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	

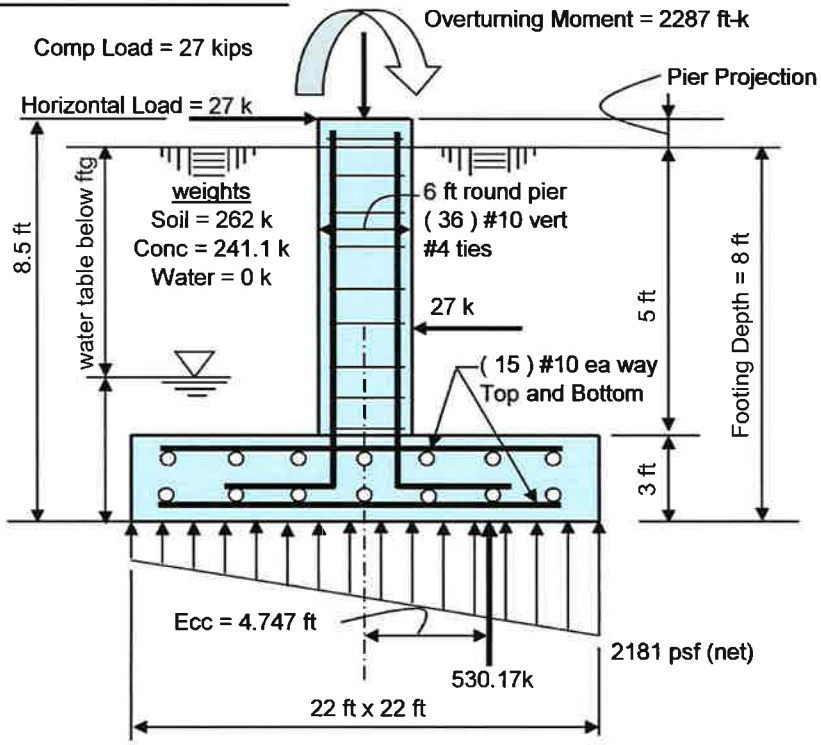
Reinforcing Steel:

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

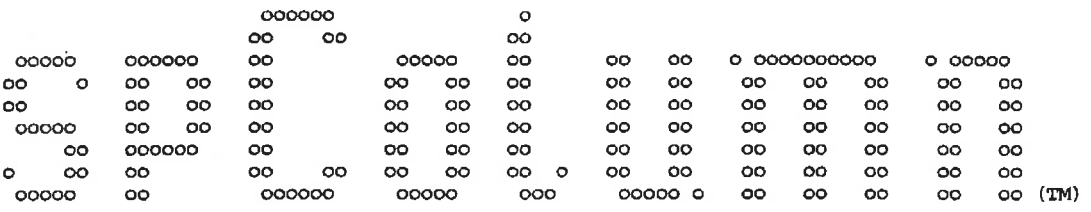
Reinforcing Steel:

	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 = 2.181 ksf Allowable Net Soil Bearing = 5 ksf **Soil Bearing Stress Ratio = 0.44 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 30 psi **Bending Shear Stress Ratio = 0.27 Okay**
Ftg Overturning Resistance = 5832 ft-kips Overturning Moment = 2517 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 2.317 **Ratio = 0.65 Okay**	Pad Bending Moment Capacity= 2595 ft-k Pad Bending Moment = 1079 ft-k **Bending Moment Stress Ratio = 0.42 OK**



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

General Information:

File Name: T:\375_Crown_Castle\2013\37513-0342 BU 806376\WO 611817 BU 806376...\37513-0342 BP R3.col
Project: 37512-1659
Column:
Code: ACI 318-08
Engineer: DSK
Units: English

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

Material Properties:

f'c = 3 ksi
Ec = 3122.02 ksi
fy = 60 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
rx = 18 in
Xo = 0 in
Iy = 1.31917e+006 in^4
ry = 18 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	27.00	3246.50	5786.61	1.782	15.56	68.37	0.01018	0.900

*** End of output ***

37513-0342 PERMIT.DWG

CROWN CASTLE PROJECT: BU #806376; HRT 100 943239; EAST HARTFORD, CT
MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 2, 1/22/2009)

UPON THE SUCCESSFUL AND COMPLETE INSTALLATION OF THE REINFORCING SYSTEM SPECIFIED IN THESE PLANS, THE REINFORCED POLE MEETS THE WIND DESIGN RECOMMENDATIONS OF THE TIA/EIA-222-F-1996 STANDARD FOR WIND SPEEDS OF 80 MPH AND 38 MPH + 1/4" RADIAL ICE

A. GENERAL NOTES

1. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO FABRICATION AND CONSTRUCTION. THESE DRAWINGS WERE PREPARED FROM INFORMATION AND DOCUMENTS PROVIDED TO PAUL J. FORD & COMPANY BY CROWN CASTLE. THIS INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY PAUL J. FORD & COMPANY FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. ANY DISCREPANCIES AND/OR CHANGES BETWEEN THE INFORMATION CONTAINED IN THESE DRAWINGS AND THE ACTUAL VERIFIED SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF CROWN CASTLE AND PAUL J. FORD & COMPANY SO THAT ANY CHANGES AND/OR ADJUSTMENTS, IF NECESSARY, CAN BE MADE TO THE DESIGN AND DRAWINGS.
2. THE EXISTING UNREINFORCED MONOPOLE STRUCTURE DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE ANTENNA AND PLATFORM LOADS SHOWN ON THESE DRAWINGS AT THE REQUIRED MINIMUM TIA/EIA-222-F-1996 BASIC WIND SPEEDS. DO NOT INSTALL ANY ADDITIONAL OR NEW ANTENNA AND PLATFORM LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
3. 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.
4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN PROPERLY AND ADEQUATELY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO INSURE 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. IMPORTANT CUTTING, WELDING AND SAFETY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFETY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES FROM CROWN CASTLE. 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 PLAN" (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT.
5. 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 THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES.
6. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY THE INSPECTION/TESTING AGENCY. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
7. ALL MATERIALS AND EQUIPMENT FURNISHED WILL 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 THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
8. 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 INSURE 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.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
10. 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/OR RELOCATED, AND/OR REPLACED AND RE-INSTALLED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH THE OWNER, TESTING AGENCY, AND ENGINEER.
11. 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. IN NO CASE SHALL ANY NEW AND/OR ADDITIONAL PLATFORMS AND/OR ANTENNAS AND/OR COAX CABLES AND/OR OTHER EQUIPMENT BE INSTALLED ON THE MONOPOLE UNTIL THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF ALL OF THE REQUIRED STRUCTURAL REINFORCING SYSTEM COMPONENTS.

B. "LOW HEAT" WELDING PROCEDURES - (NOT REQUIRED)

C. SPECIAL INSPECTION AND TESTING

1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY THE OWNER'S REPRESENTATIVE AND THE OWNER'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY. REFER TO CROWN CASTLE DOCUMENT ENG-SOW-10066 FOR SPECIFICATION.
2. ANY SUPPORT SERVICES PERFORMED BY THE ENGINEER DURING CONSTRUCTION SHALL BE DISTINGUISHED FROM CONTINUOUS AND DETAILED INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS. THESE SUPPORT SERVICES PERFORMED BY THE ENGINEER ARE PERFORMED SOLELY FOR THE PURPOSE OF ASSISTING IN QUALITY CONTROL AND IN ACHIEVING CONFORMANCE WITH CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY THE OWNER FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
   (A.) ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
   (B.) 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.
5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES FOR THE OWNER. THE TESTING AGENCY SHALL 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.
   A. GENERAL:
      (1.) PERFORM CONTINUOUS ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY OWNER IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   B. FOUNDATIONS, CONCRETE, AND SOIL PREPARATION - (NOT REQUIRED)
   C. CONCRETE TESTING PER ACI - (NOT REQUIRED)
   D. STRUCTURAL STEEL
      (1.) CHECK THE STEEL ON THE JOB WITH THE PLANS.
      (2.) CHECK MILL CERTIFICATIONS.
      (3.) CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
      (4.) INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
      (5.) CALL FOR LABORATORY TEST REPORTS WHEN IN DOUBT.
      (6.) CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
      (7.) CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
      (8.) CHECK BOLT TIGHTENING ACCORDING TO AISC "TURN OF THE NUT" METHOD.
   E. WELDING
      (1.) VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
      (2.) INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND IN ACCORDANCE WITH AWS D1.1.
      (3.) APPROVE FIELD WELDING SEQUENCE.
         (A.) A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO THE OWNER BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM THE OWNER.
      (4.) INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
         (A.) INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE AND WORKING CONDITIONS.
         (B.) VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
         (C.) INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
         (D.) VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1.
         (E.) SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE OR DYE PENETRANT.
         (F.) INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED PLANS.
         (G.) VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
         (H.) REVIEW THE REPORTS BY TESTING LABS.
         (I.) CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
         (J.) INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
         (K.) CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
   F. SPECIAL INSPECTION OF EXISTING SHAFT-TO-FLANGE WELD CONNECTIONS - (NOT REQUIRED)
   G. REPORTS:
      (1.) COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO THE OWNER.
6. 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 AND PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO THE OWNER'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT THE OWNER'S REVIEW AND SPECIFIC WRITTEN CONSENT. THE OWNER RESERVES THE RIGHT TO DETERMINE WHAT IS AN ACCEPTABLE RESOLUTION OF DISCREPANCIES AND PROBLEMS.
7. 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 THE OWNER. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
8. RESPONSIBILITY: 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.

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BU #806376; HRT 100 943239
EAST HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-0342	ISSUE DATE OF PERMIT: 2-26-2013
DRAWN BY: B.M.S.	
CHECKED BY: R.M.K.	
APPROVED BY:	S-1
DATE: 2-26-2013	

D. **STRUCTURAL STEEL**

1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:

A. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
   (A.) "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
   (B.) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS OF THE ENGINEERING FOUNDATION.
   (C.) "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" (PARAGRAPH 4.2.1 SPECIFICALLY EXCLUDED).

B. BY THE AMERICAN WELDING SOCIETY (AWS):
   (A.) "STRUCTURAL WELDING CODE - STEEL D1.1."
   (B.) "SYMBOLS FOR WELDING AND NON-DESTRUCTIVE TESTING"

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.
3. TIGHTEN ALL STRUCTURAL BOLTS, INCLUDING THE AJAX M20 BOLTS WITH SHEAR SLEEVES, ACCORDING TO THE REQUIREMENTS OF THE AISC "TURN OF THE NUT" METHOD. TIGHTEN BOLTS 1/3 TURN PAST THE SNUG TIGHT CONDITION AS DEFINED BY AISC.
4. 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.
5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO THE OWNER'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65 (FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
7. 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.
8. UNLESS OTHERWISE NOTED, ALL STEEL MEMBERS SHALL BE HOT-DIP GALVANIZED, AFTER FABRICATION, IN ACCORDANCE WITH ASTM A123. SEE SECTION J FOR FURTHER NOTES AND FOR EXCEPTIONS (IF ANY).
9. ALL WELDS SHALL BE VISUALLY INSPECTED BY THE OWNER'S APPROVED TESTING AGENCY. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT. THE CONTRACTOR SHALL COOPERATE WITH THE TESTING AGENCY IN THEIR TESTING EFFORTS.
10. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
11. FIELD CUTTING OF STEEL:
   (A.) PRIOR TO ANY FIELD CUTTING, THE CONTRACTOR SHALL MARK THE CUT OUTLINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS.
   (B.) ANY REQUIRED CUTS IN THE STEEL SHALL BE CAREFULLY CUT BY MECHANICAL METHODS SUCH AS DRILLING, SAW CUTTING, AND GRINDING. THE CONTRACTOR IS RESPONSIBLE TO PREVENT ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, DURING THE CUTTING WORK. 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.
   (C.) 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. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

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

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

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

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

I. **TOUCH UP OF GALVANIZING**

1. THE CONTRACTOR SHALL TOUCH UP ANY AND/OR 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-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. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. THE OWNER'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.
3. THE OWNER'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 INADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

J. **HOT DIP GALVANIZING**

1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.
2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING.
3. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES AS REQUIRED.
4. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

K. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**

1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY THE OWNER, THE OWNER WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
2. THE MONOPOLE REINFORCING SYSTEM INDICATED IN THESE DOCUMENTS USES REINFORCING COMPONENTS THAT INVOLVE FIELD WELDING STEEL MEMBERS TO THE EXISTING GALVANIZED STEEL POLE STRUCTURE. THESE 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 CONNECTED 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 THE OWNER REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.**
3. THE OWNER 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 THE OWNER BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. **PAUL J. FORD & COMPANY 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 SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

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PROJECT No: 37513-0342	ISSUE DATE OF PERMIT: 2-26-2013
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AJAX BOLT NOTE SHEET: REV. 1.3, 11-07-2012

NOTES:

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

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

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

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

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

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

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

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

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

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

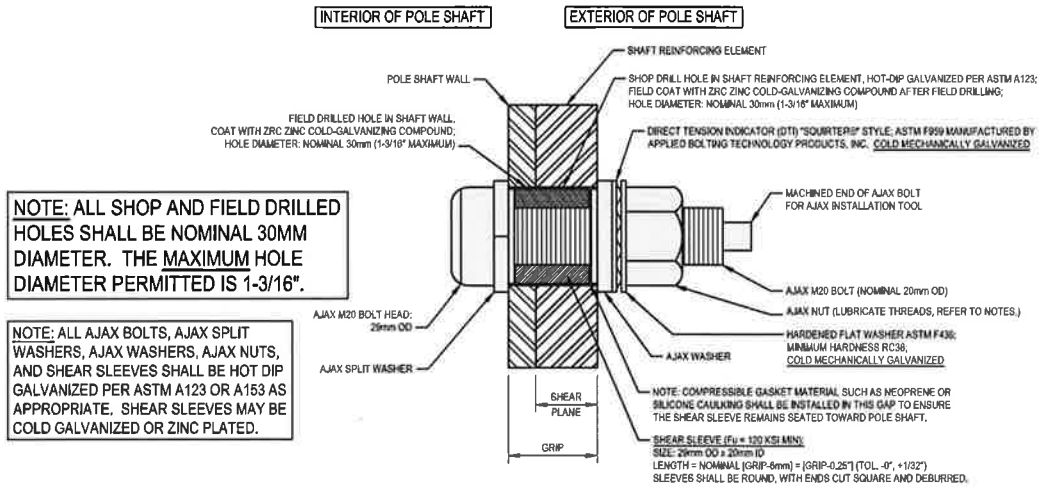
HARDENED WASHERS REQUIRED: USE A HARDENED WASHER FOR A 20 MM (M20) NOMINAL BOLT BETWEEN THE TOP OF THE DIRECT TENSION INDICATOR (DTI) WASHER AND THE NUT OF THE AJAX M20 BOLTS. HARDENED WASHERS SHALL CONFORM TO ASTM F436 AND HAVE A MINIMUM HARDNESS OF RC 38 OR HIGHER. THE HARDENED WASHERS SHALL BE MECHANICALLY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

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

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

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

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



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

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

TYPICAL AJAX BOLT DETAIL 1/S-3

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BU #806376; HRT 100 943239
EAST HARTFORD, CT
MONOPOLE REINFORCEMENT AND RETROFIT PROJECT

PROJECT No: 37513-0342	ISSUE DATE OF PERMIT: 2-26-2013
DRAWN BY: B.M.S.	
CHECKED BY: R.M.K.	
APPROVED BY:	S-3
DATE: 2-26-2013	

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NOTE: NO DETAILED INFORMATION REGARDING INTERFERENCES WAS PROVIDED. THEREFORE, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. REPORT ANY AND ALL DISCREPANCIES TO PAUL J. FORD AND COMPANY AND CROWN CASTLE FIELD PERSONNEL IMMEDIATELY.

THIS POLE REINFORCEMENT DRAWING IS FOR THE POLE DESIGN AND ANTENNA LOADING DOCUMENTED IN THE PJF CO-LOCATION ANALYSIS FOR THIS SITE (PJF#37513-0342), DATED 2-26-2013.

POLE SPECIFICATIONS	
POLE SHAPE TYPE:	12-SIDED POLYGON
TAPER:	0.249795 IN/FT
SHAFT STEEL:	ASTM A572 GRADE 65
BASE PL STEEL:	ASTM A633 GR. E (60 KSI)
ANCHOR RODS:	2 1/4"Ø #16J ASTM A615 GRADE 75

SHAFT SECTION DATA					
SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM
1	21.00	0.1875		10.525	15.525
2	40.00	0.2500	48.00	15.525	25.531
3	38.92	0.3125	56.00	24.030	34.015
4	39.00	0.3438		32.156	41.900

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

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

NOTES:

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

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

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

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

5. NUT LUBRICATION REQUIRED: * PROPERLY LUBRICATE THE THREADS OF THE NUT OF THE AJAX BOLT SO THAT IT CAN BE PROPERLY TIGHTENED WITHOUT GALLING AND/OR LOCKING UP ON THE BOLT THREADS. CONTRACTOR SHALL FOLLOW DTI MANUFACTURER INSTRUCTIONS FOR PROPER LUBRICATION AND TIGHTENING. REFER TO SHEET S-3.

6. AJAX BOLT HOLE SIZE: ALL SHOP- AND FIELD-DRILLED HOLES SHALL BE NOMINAL 30MM DIAMETER. THE MAXIMUM HOLE DIAMETER PERMITTED IS 1-3/16". REFER TO SHEET S-3.

* AS OF 5/30/2012, UNTIL FURTHER NOTICE, CROWN CASTLE WILL ACCEPT AJAX BOLTS TIGHTENED USING AISC "TURN-OF-THE-NUT" METHODOLOGY. INSTALLERS SHALL FOLLOW CROWN GUIDELINES FOR AISC "TURN-OF-THE-NUT" METHOD AND ALSO PROVIDE COMPLETE INSPECTION DOCUMENTATION IN THE PMI.

NEW AEROSOLUTIONS MP3 REINFORCING (OPTION #1)

ELEVATION	FLAT #	REINFORCING ELEMENT
0'-6" TO 20'-6"	3, 8 & 11	MP305
15'-3" TO 45'-3"	1, 5 & 9	MP304
42'-5" TO 72'-5"	4, 8 & 12	MP304
70'-1" TO 85'-1"	1, 5 & 9	MP303

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

NEW SABRE FLAT PLATE REINFORCING (OPTION #2)

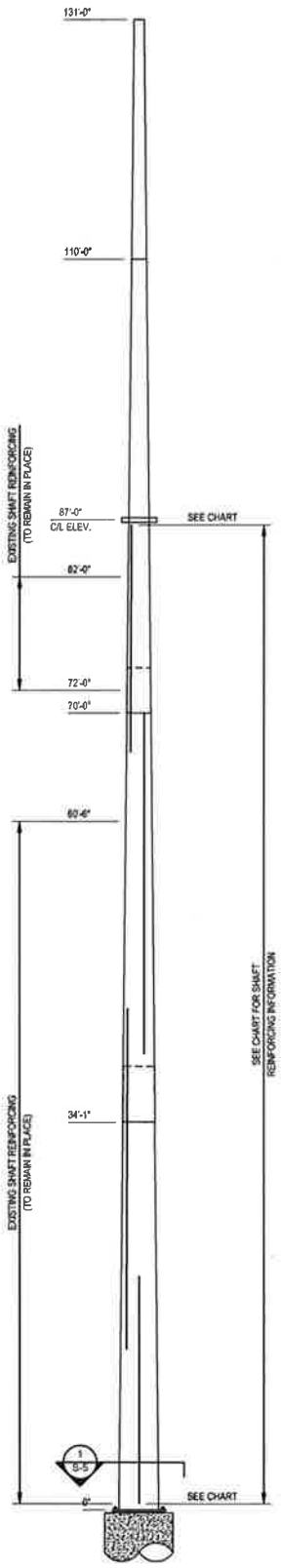
ELEVATION	FLAT #	REINFORCING ELEMENT
0'-6" TO 20'-6"	3, 8 & 11	MS-650
14'-1" TO 44'-1"	1, 5 & 9	MS-600
40'-1" TO 70'-1"	4, 8 & 12	MS-600
66'-7" TO 86'-7"	1, 5 & 9	MS-450

ALL BOLTS SHALL BE AJAX M20 BOLTS WITH HIGH STRENGTH SHEAR SLEEVES (ASTM A519 WITH MIN. Fu=105 KSI). CONTACT SUPPLIER FOR MATERIAL (PLATE & BOLTS) AND INSTALLATION PROCEDURES.

NEW CCI FLAT PLATE (100 KSI) REINFORCING (OPTION #3)

ELEVATION	FLAT #	REINFORCING ELEMENT
0'-6" TO 20'-6"	3, 8 & 11	ISP-UR-1004
15'-10" TO 45'-10"	1, 5 & 9	ISP-UR-0754
43'-4" TO 68'-4"	4, 8 & 12	ISP-UR-0754
68'-10" TO 85'-10"	1, 5 & 9	ISP-UR-0754

NOTES FOR CROWN REINFORCING OPTION (100 KSI) MATERIAL:
1. DO NOT FIELD WELD DIRECTLY TO THE 100 KSI MATERIAL.
2. THE 100 KSI MATERIAL SHALL CONFORM TO THE FOLLOWING:
A. MATERIAL SHALL BE ASTM A514, GRADE A, GRADE E, or GRADE P, HAVING A MINIMUM TENSILE STRENGTH (F_u) OF 110 KSI AND A MINIMUM YIELD STRENGTH (F_y) OF 100 KSI.
B. MATERIAL SHALL BE HEAT TREATED, QUENCHED AND TEMPERED PER ASTM A514.
C. MATERIAL SHALL HAVE CHARPY V-NOTCH (CVN) IMPACT VALUES OF NOT LESS THAN 15 FT-LB AT -20 DEGREES F, IN ACCORDANCE WITH ASTM A370.
D. MINIMUM INSIDE BEND RADIUS FOR COLD BENDING, PER ASTM A6 TABLE X 4.2, SHALL BE 4.5t MINIMUM.
E. ANY AND ALL WELDING TO THE MATERIAL SHALL BE PERFORMED ACCORDING TO AN APPROVED WELDING PROCEDURE SPECIFICATION (WPS) SUITABLE FOR THE GRADE AND INTENDED USE AND SERVICE. THE WPS SHALL BE DEVELOPED BY A QUALIFIED CWI AND IN ACCORDANCE WITH AWS D1.1. PRIOR TO ANY WORK, FABRICATION OR WELDING, THE WPS SHALL BE SUBMITTED TO CROWN CASTLE AND PAUL J. FORD AND COMPANY FOR REVIEW.



POLE ELEVATION 1 S-4

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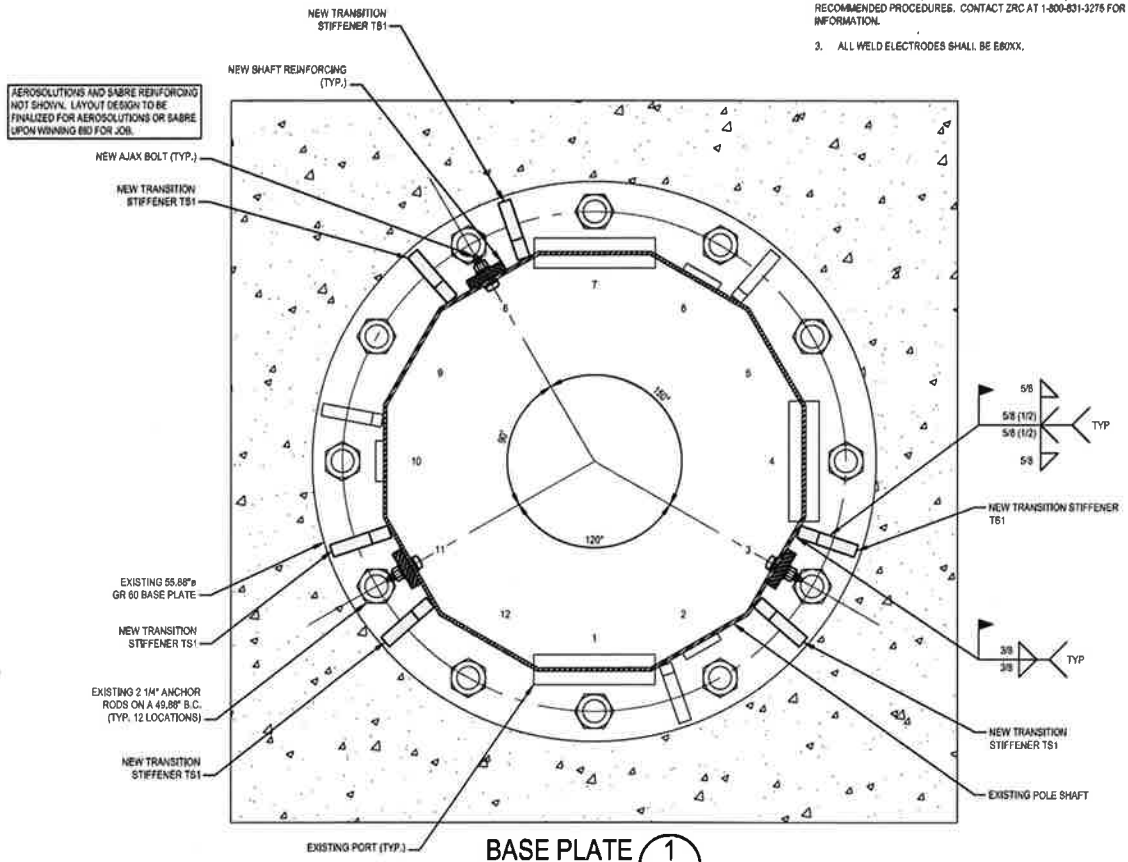
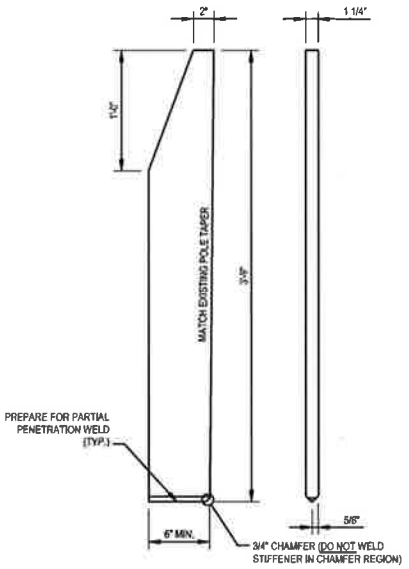
GENERAL NOTES:
1. AJAX BOLTS ARE TO BE 20 mm Ø WITH CORRESPONDING 29 mm Ø SHEAR SLEEVE WITH MATCHING STEEL GRADE. DRILLED HOLE DIAMETERS IN REINFORCING STEEL AND EXISTING SHAFT SHALL BE 1 3/16"ø MAX.

2. ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC -RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-631-3276 FOR PRODUCT INFORMATION.

3. ALL WELD ELECTRODES SHALL BE E80XX.



BASE PLATE 1 / S-5



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

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MODIFICATION INSPECTION NOTES:

GENERAL

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

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

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

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

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

MI INSPECTOR

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

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

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

GENERAL CONTRACTOR

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

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

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

RECOMMENDATIONS

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

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

CANCELLATION OR DELAYS IN SCHEDULED MI

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

CORRECTION OF FAILING MI'S

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

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

MI VERIFICATION INSPECTIONS

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

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

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

PHOTOGRAPHS

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

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

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

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

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWINGS
X	EOR APPROVED SHOP DRAWINGS
X	FABRICATION INSPECTION
NA	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
NA	FABRICATOR NDE INSPECTION
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
NA	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: LIFT AND DENSITY
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
X	INSPECTION OF BOLT PRETENSION PER AISC BOLT SPEC.
X	INSPECTION OF AJAX BOLTS AND DTI'S PER REQUIREMENTS ON SHEET S-3
ADDITIONAL TESTING AND INSPECTIONS:	
POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
NA	POST INSTALLED ANCHOR ROD PULL-OUT TESTING
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

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