Robinson+Cole

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August 26, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
111 Schoolhouse Road, Milford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 104-foot level of the existing 140-foot tower at 111 Schoolhouse Road in Milford, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). The Council approved Cellco's use of the existing tower in 2000. Cellco now intends to modify its facility by replacing nine (9) its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model SBNHH-1D65B, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 104-foot level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") with three (3) newer model RRHs and install six (6) new RRHs and two (2) HYBRIFLEX™ fiber optic antenna cables. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Benjamin G. Blake, Mayor of the City of Milford. A copy of this letter is also being sent to Milford Enterprises, LLC, the owner of the Property and Crown, the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on Cellco's existing antenna platform at a height of 104 feet on the existing tower.

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

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

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

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

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

A copy of the Milford Assessor's Parcel Map and property owner information is included in Attachment 4.

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:
Benjamin G. Blake, Milford Mayor
Milford Enterprises, LLC
Crown
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

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

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

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 14.6	0 ° | 14.5	0 ° | 17.4	0 ° | 17.8	0 ° | 18.1	0 ° | 18.2
	7 ° | 14.6	7 ° | 14.4	3 ° | 17.5	3 ° | 17.9	3 ° | 18.3	3 ° | 18.4
	14 ° | 14.2	14 ° | 13.6	7 ° | 17.4	7 ° | 17.9	7 ° | 18.2	7 ° | 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	4

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

General Specifications

Antenna Type	Sector with internal RET
Band	Multiband
Brand	DualPol®
Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

Product Specifications

SBNHH-1D65B

Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight, without mounting kit	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

Depth	296.0 mm | 11.7 in
Length	2025.0 mm | 79.7 in
Width	390.0 mm | 15.4 in
Shipping Weight	31.0 kg | 68.3 lb

Regulatory Compliance/Certifications

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

Product Specifications

SBNHH-1D65B

Included Products

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

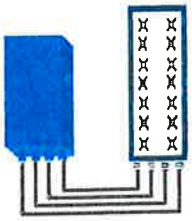
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

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

Alcatel·Lucent

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.

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

The Alcatel-Lucent RRH2x60-1900A-4R is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-1900A-4R integrates all the latest technologies. This allows operators to offer best-in-class characteristics.

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

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

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

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

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-1900A-4R is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

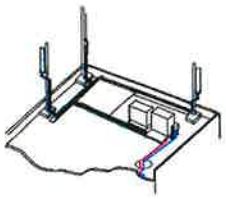
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

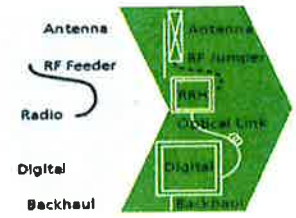
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

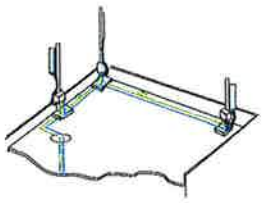
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)
- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 15km using SM fiber
- TMA/RETA: AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions: ETS300-019-1-4 class4.1E
- Ingress Protection: IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

B66A RRH 4X45 - PHYSICAL CHARACTERISTICS- TARGET 15.1

B4 RRH4x45-4R (AWS-Extension Band)	
Frequency Band	LR15.1 – B4 / LR16.1 B66 (AWS 1 and 3 only)
RF Output Power	2x90W/4x45W (SW configurable)
Operational range	2110-2180 MHz, DL/ 1710-1780 MHz UL
Instantaneous Bandwidth	70MHz
Configuration (HW readiness)	LTE: 2T2R, 2T4R, 4T4R
Carrier Bandwidths	5, 10, 15 and 20 MHz
Interfaces	2x CPRI Rate 7 Ports Antenna Connectors 4.3-10
AISG Support	AISG 2.0 for RET Internal Smart Bias T
Monitor Ports	NA (Spec An to replace ports)
Environmental	GR487 Compliance / GR3178 Compliance (with exceptions)
Mounting options	Pole/Wall
Connectors location	All bottom
External Alarms	4
Annual Return Rate (Target)	<2%
Operating Temperature	-40 C to +55 C (without solar load)

- Commercial Product Will include B66 support of AWS 1 and 3.
- Lower AWS 3 UL Not in 3GPP Band 66 Definition

Physical Dimensions – Not to Exceed		
	W/O Solar Shield	With Solar Shield
Dimensions HxWxD	H = 26in (H=660mm) W = 11.4in (W=290mm) D = 5.9in (D=150mm)	H = 26.6in (H=675mm) W = 12in (W=304mm) D = 6.8n (D=173mm)
Volume	29l	35.5l
Weight		64lbs / 29kg

Product Data Sheet **HB158-1-08U8-S8J18**

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

Product Description

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

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

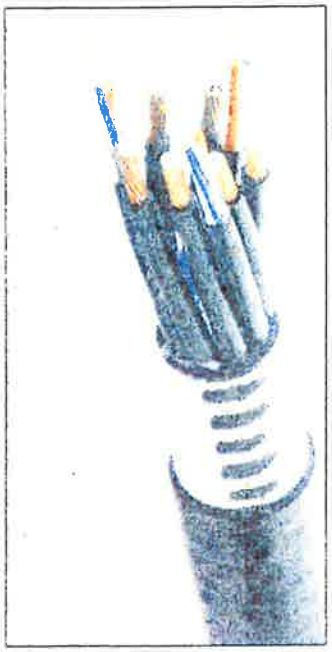


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

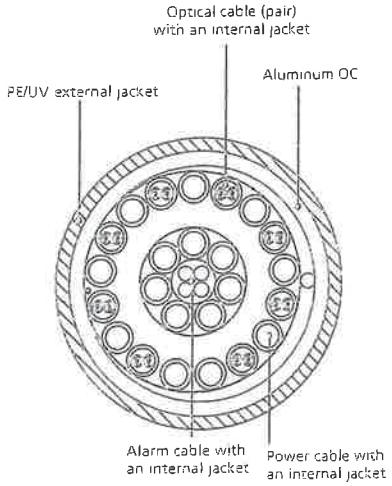


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Milford 2								
Tower Height: 140 ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Pocket (now MetroPCS)	3	631	95	2130	0.0859	1.0000	0.86%	
*Sprint	4	348	140	1900	0.0278	1.0000	0.28%	
*Sprint	1	195	140	850	0.0039	0.5667	0.07%	
*Sprint	2	195	140	2500	0.0078	1.0000	0.08%	
*AT&T	2	656	125	1900	0.0333	1.0000	0.33%	
*AT&T	4	414	125	850	0.0421	0.5667	0.74%	
*AT&T	2	1791	125	1900	0.0910	1.0000	0.91%	
*AT&T	2	940	125	734	0.0477	0.4893	0.98%	
*T-Mobile	8	122	115	1945	0.0295	1.0000	0.30%	
*T-Mobile	2	770	115	2100	0.0466	1.0000	0.47%	
Verizon	**1**	**2224**	**104**	**0.0739**	**1970**	**1.0000**	**7.39%**	
Verizon	**9**	**342**	**104**	**0.1023**	**869**	**0.5793**	**17.66%**	
Verizon	**1**	**2229**	**104**	**0.0741**	**2145**	**1.0000**	**7.41%**	
Verizon	**1**	**806**	**104**	**0.0268**	**698**	**0.4653**	**5.76%**	
								43.23%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Date: **October 20, 2015**

Timothy Howell
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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

Subject: Structural Modification Report

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	117577
	Carrier Site Name:	Milford 2 CT
Crown Castle Designation:	**Crown Castle BU Number:**	876342
	Crown Castle Site Name:	BIC DRIVE (SSUSA)
	Crown Castle JDE Job Number:	348546
	Crown Castle Work Order Number:	1133853
	Crown Castle Application Number:	312913 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-2876.002.7700
Site Data:	**111 School House Road, a/k/a Bic Drive, MILFORD, New Haven County, CT**	
	Latitude *41° 12' 46.06"*, Longitude *-73° 5' 7.1"*	
	140 Foot - Monopole Tower	

Dear Timothy Howell,

Paul J Ford and Company is pleased to submit this **"Structural Modification Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 834035, in accordance with application 312913, revision 1.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 90 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

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

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

Respectfully submitted by:

Jared Smith, E.I.
Structural Designer

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

10.21.15

tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 140 ft Monopole tower designed by SUMMIT in October of 1993. The tower was originally designed for a wind speed of 85 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 90 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
104.0	104.0	3	alcatel lucent	RRH2X60-PCS	2 1	1-5/8 1/2	-
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		9	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
140.0	140.0	3	alcatel lucent	TD-RRH8x20-25	3 1 1	1-1/4 1-5/8 1/2	1
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
137.0	137.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	TME-1900MHz RRH (65 MHz)			
		3	alcatel lucent	TME-800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 101-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
121.0	125.0	3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe	12 2 1	1-5/8 7/16 3/8	1
		1	raycap	DC6-48-60-18-8F			
	123.0	6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21901			
	121.0	1	tower mounts	Platform Mount [LP 1201-1]			
115.0	116.0	3	andrew	ETW200VS12UB	11 6	1-1/4 1-5/8	1
		6	ems wireless	RR90-17-02DP w/ Mount Pipe			
		6	remec	S20070A1			
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe			
	115.0	1	tower mounts	Platform Mount [LP 1201-1]			
104.0	107.0	1	trimble	ACUTIME 2000	-	-	1
	105.0	3	rymsa wireless	MG D3-800Tx w/ Mount Pipe	7	1-5/8	2
	104.0	3	alcatel lucent	RRH2X40-AWS			
		3	antel	BXA-171063-8BF-EDIN-0 w/ Mount Pipe			
		2	antel	BXA-70063/6CF w/ Mount Pipe			
		1	powerwave technologies	P65.16.XL.2 w/ Mount Pipe			
		3	andrew	LNX-6514DS-VTM w/ Mount Pipe	6	1-5/8	1
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		6	rfs celwave	FD9R6004/2C-3L			
		1	tower mounts	Platform Mount [LP 1201-1]			
95.0	95.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
80.0	82.0	1	kathrein	OG-860/1920/GPS-A	1	1/2	1
	80.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 08-12040E G1, 12/05/08	1531894	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41709-0132, 12/04/09	2547672	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit, 5403, 9/29/99	1631615	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit, 5403, 10/29/99	1630877	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The monopole was modified in conformance with the referenced modification drawings.
5) The monopole will be modified 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	140 - 104	Pole	TP23.3091x16x0.25	1	-9.94	965.01	92.5	Pass
L2	104 - 98.5	Pole	TP24.4257x23.3091x0.3787	2	-13.63	1264.74	91.7	Pass
L3	98.5 - 97	Pole	TP24.7303x24.4257x0.6428	3	-13.95	2068.70	60.6	Pass
L4	97 - 88.5	Pole	TP26.456x24.7303x0.4933	4	-15.23	1794.42	81.9	Pass
L5	88.5 - 88	Pole	TP26.0576x24.8095x0.5565	5	-16.43	2043.02	81.9	Pass
L6	88 - 71.75	Pole	TP29.3572x26.0576x0.6716	6	-20.70	2782.32	84.1	Pass
L7	71.75 - 70.5833	Pole	TP29.5941x29.3572x0.7851	7	-21.06	3306.97	72.7	Pass
L8	70.5833 - 47.25	Pole	TP34.332x29.5941x0.7176	8	-26.92	3436.22	89.0	Pass
L9	47.25 - 41.75	Pole	TP34.8235x32.0338x0.7655	9	-29.42	3618.99	91.5	Pass
L10	41.75 - 32.5	Pole	TP36.7016x34.8235x0.8008	10	-34.78	4166.01	89.5	Pass
L11	32.5 - 23.5	Pole	TP38.5288x36.7016x0.8175	11	-38.37	4578.91	87.2	Pass
L12	23.5 - 20.75	Pole	TP39.0872x38.5288x0.9506	12	-39.63	4989.34	82.1	Pass
L13	20.75 - 3	Pole	TP42.6909x39.0872x0.8077	13	-47.19	5053.88	89.8	Pass
L14	3 - 0	Pole	TP43.3x42.6909x0.8586	14	-48.59	5489.96	84.3	Pass
							Summary	
						Pole (L1)	92.5	Pass
						Rating =	92.5	Pass

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

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	95.0	Pass
1	Base Plate	0	73.9	Pass
1	Base Foundation Steel	0	63.0	Pass
1	Base Foundation Soil Interaction	0	92.0	Pass

Structure Rating (max from all components) =	95%

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

4.1) Recommendations

- See 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:

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 90 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	140.0000-104.0000	36.0000	0.00	12	16.0000	23.3090	0.2500	1.0000	A572-65 (65 ksi)
L2	104.0000-98.5000	5.5000	0.00	12	23.3090	24.4257	0.3787	1.5147	Reinf 53.93 ksi (54 ksi)
L3	98.5000-97.0000	1.5000	0.00	12	24.4257	24.7303	0.6428	2.5712	Reinf 51.88 ksi (52 ksi)
L4	97.0000-88.5000	8.5000	3.25	12	24.7303	26.4560	0.4933	1.9733	Reinf 55.82 ksi (56 ksi)
L5	88.5000-88.0000	3.7500	0.00	12	24.8095	26.0576	0.5565	2.2260	Reinf 55.90 ksi (56 ksi)
L6	88.0000-71.7500	16.2500	0.00	12	26.0576	29.3572	0.6716	2.6863	Reinf 56.08 ksi (56 ksi)
L7	71.7500-70.5833	1.1667	0.00	12	29.3572	29.5941	0.7851	3.1406	Reinf 56.77 ksi (57 ksi)
L8	70.5833-47.2500	23.3333	4.25	12	29.5941	34.3320	0.7176	2.8705	Reinf 56.77 ksi (57 ksi)
L9	47.2500-41.7500	9.7500	0.00	12	32.0338	34.8235	0.7655	3.0620	Reinf 56.51 ksi (57 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L10	41.7500-32.5000	9.2500	0.00	12	34.8235	36.7015	0.8008	3.2030	Reinf 56.27 ksi (56 ksi)
L11	32.5000-23.5000	9.0000	0.00	12	36.7015	38.5288	0.8175	3.2701	Reinf 57.67 ksi (58 ksi)
L12	23.5000-20.7500	2.7500	0.00	12	38.5288	39.0872	0.9506	3.8024	Reinf 53.44 ksi (53 ksi)
L13	20.7500-3.0000	17.7500	0.00	12	39.0872	42.6909	0.8077	3.2308	Reinf 58.01 ksi (58 ksi)
L14	3.0000-0.0000	3.0000		12	42.6909	43.3000	0.8586	3.4344	Reinf 58.50 ksi (59 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	16.5644	12.6788	401.4426	5.6385	8.2880	48.4366	813.4316	6.2401	3.6180	14.472
	24.1313	18.5625	1259.8129	8.2551	12.0741	104.3402	2552.7226	9.1359	5.5768	22.307
L2	24.1313	27.9601	1876.4949	8.2091	12.0741	155.4150	3802.2873	13.7611	5.2320	13.816
	25.2874	29.3217	2164.2056	8.6088	12.6525	171.0494	4385.2674	14.4313	5.5312	14.607
L3	25.2874	49.2255	3553.9103	8.5143	12.6525	280.8856	7201.1857	24.2273	4.8234	7.504
	25.6026	49.8558	3692.1892	8.6233	12.8103	288.2210	7481.3764	24.5375	4.9050	7.631
L4	25.6026	38.5001	2886.7114	8.6768	12.8103	225.3435	5849.2600	18.9486	5.3056	10.755
	27.3893	41.2415	3548.2900	9.2946	13.7042	258.9197	7189.7975	20.2978	5.7681	11.692
L5	26.8046	43.4597	3262.9030	8.6826	12.8513	253.8962	6611.5261	21.3895	5.1575	9.268
	26.9769	45.6963	3793.0256	9.1294	13.4979	281.0095	7685.6983	22.4903	5.4920	9.869
L6	26.9769	54.8970	4515.7042	9.0882	13.4979	334.5497	9150.0409	27.0187	5.1836	7.719
	30.3928	62.0324	6515.2887	10.2695	15.2070	428.4388	13201.7412	30.5304	6.0679	9.035
L7	30.3928	72.2346	7526.8793	10.2288	15.2070	494.9600	15251.4982	35.5516	5.7636	7.341
	30.6381	72.8335	7715.6590	10.3136	15.3298	503.3125	15634.0169	35.8464	5.8271	7.422
L8	30.6381	66.7260	7101.8332	10.3378	15.3298	463.2710	14390.2394	32.8405	6.0080	8.372
	35.5431	77.6740	11202.4154	12.0339	17.7840	629.9162	22699.1307	38.2288	7.2778	10.142
L9	34.4228	77.0745	9618.4402	11.1940	16.5935	579.6510	19489.5676	37.9337	6.5335	8.535
	36.0520	83.9511	12429.4204	12.1928	18.0386	689.0462	25185.3756	41.3182	7.2811	9.511
L10	36.0520	87.7259	12961.4384	12.1802	18.0386	718.5395	26263.3882	43.1760	7.1867	8.975
	37.9962	92.5683	15228.4678	12.8525	19.0114	801.0176	30857.0044	45.5593	7.6900	9.603
L11	37.9962	94.4628	15525.6142	12.8465	19.0114	816.6475	31459.1036	46.4917	7.6450	9.351
	39.8880	99.2730	18020.2033	13.5006	19.9579	902.9095	36513.8174	48.8591	8.1347	9.95
L12	39.8880	115.0244	20732.3363	13.4530	19.9579	1038.8020	42009.3342	56.6115	7.7781	8.182
	40.4660	116.7334	21670.2459	13.6529	20.2471	1070.2866	43909.7932	57.4526	7.9277	8.34
L13	40.4660	99.5558	18620.1826	13.7040	20.2471	919.6449	37729.5381	48.9983	8.3107	10.29
	44.1969	108.9283	24389.7145	14.9942	22.1139	1102.9137	49420.1740	53.6112	9.2766	11.485
L14	44.1969	115.6521	25832.3253	14.9760	22.1139	1168.1492	52343.2945	56.9205	9.1401	10.646
	44.8275	117.3361	26977.2116	15.1940	22.4294	1202.7612	54663.1447	57.7492	9.3034	10.836

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 140.0000-104.0000				1	1	1		
L2 104.0000-98.5000				1	1	1		
L3 98.5000-97.0000				1	1	1		
L4 97.0000-88.5000				1	1	1		
L5 88.5000-88.0000				1	1	1		
L6 88.0000-71.7500				1	1	1		
L7 71.7500-70.5833				1	1	1		
L8 70.5833-47.2500				1	1	1		
L9 47.2500-41.7500				1	1	1		
L10 41.7500-32.5000				1	1	1		
L11 32.5000-23.5000				1	1	1		
L12 23.5000-20.7500				1	1	1		
L13 20.7500-3.0000				1	1	1		
L14 3.0000-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Aero MP3-08	C	No	CaAa (Out Of Face)	41.7500 - 0.0000	1	No Ice	0.4667	0.00
						1/2" Ice	0.5778	0.00
						1" Ice	0.6889	0.00
						2" Ice	0.9111	0.00
						4" Ice	1.3556	0.00
Aero MP3-06	C	No	CaAa (Out Of Face)	71.7500 - 41.7500	1	No Ice	0.4343	0.00
						1/2" Ice	0.5454	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
Aero MP3-05	C	No	CaAa (Out Of Face)	100.7500 - 71.7500	1	No Ice	0.3478	0.00
						1/2" Ice	0.4001	0.00
						1" Ice	0.6566	0.00
						2" Ice	0.8788	0.00
						4" Ice	1.3232	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	105.5000 - 100.7500	1	No Ice	0.1667	0.11
						1/2" Ice	0.2778	0.80
						1" Ice	0.3889	1.84
						2" Ice	0.6111	4.95
						4" Ice	1.0556	15.32
***								
LDF4-50A(1/2")	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
LDF7-50A(1-5/8")	C	No	Inside Pole	140.0000 - 0.0000	1	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	140.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
						2" Ice	0.0000	1.20
						4" Ice	0.0000	1.20
LDF7-50A(1-5/8")	C	No	Inside Pole	121.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
FB-L98B-002-75000(3/8")	C	No	Inside Pole	121.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG122ST-BRDA(7/16)	C	No	Inside Pole	121.0000 - 0.0000	2	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.14
						1" Ice	0.0000	0.14
						2" Ice	0.0000	0.14
						4" Ice	0.0000	0.14
561(1-5/8")	C	No	CaAa (Out Of Face)	115.0000 - 0.0000	1	No Ice	0.1625	1.35
						1/2" Ice	0.2625	2.65
						1" Ice	0.3625	4.56
						2" Ice	0.5625	10.21
						4" Ice	0.9625	28.84
HJ7-50A(1-5/8")	C	No	CaAa (Out Of Face)	115.0000 - 0.0000	5	No Ice	0.0000	1.04
						1/2" Ice	0.0000	2.55
						1" Ice	0.0000	4.68
						2" Ice	0.0000	10.76
						4" Ice	0.0000	30.26
LDF6-50A(1-1/4")	C	No	Inside Pole	115.0000 - 0.0000	11	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
LDF7-50A(1-5/8")	C	No	Inside Pole	104.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	104.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
						2" Ice	0.0000	6.58
						4" Ice	0.0000	22.78
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	104.0000 - 0.0000	1	No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
						2" Ice	0.5980	11.02
						4" Ice	0.9980	30.52
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	104.0000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	2.81
						1" Ice	0.0000	4.94
						2" Ice	0.0000	11.02
						4" Ice	0.0000	30.52
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	95.0000 - 0.0000	6	No Ice	0.0000	0.83
						1/2" Ice	0.0000	2.34
						1" Ice	0.0000	4.47
						2" Ice	0.0000	10.55
						4" Ice	0.0000	30.05
LDF4-50A(1/2")	C	No	Inside Pole	80.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15

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	140.0000-104.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.038	0.49
L2	104.0000-98.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.307	0.20
L3	98.5000-97.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.062	0.05
L4	97.0000-88.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	6.021	0.34
L5	88.5000-88.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.354	0.02
L6	88.0000-71.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.510	0.67
L7	71.7500-70.5833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.927	0.05
L8	70.5833-47.2500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	18.546	0.97
L9	47.2500-41.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.372	0.23
L10	41.7500-32.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.651	0.38
L11	32.5000-23.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	7.445	0.37
L12	23.5000-20.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.275	0.11
L13	20.7500-3.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	14.682	0.73
L14	3.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.482	0.12

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	140.0000-104.0000	A	0.877	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.258	0.69
L2	104.0000-98.5000	A	0.858	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.345	0.34
L3	98.5000-97.0000	A	0.854	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.926	0.09
L4	97.0000-88.5000	A	0.849	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.873	0.67
L5	88.5000-88.0000	A	0.844	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

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	0.640	0.04
L6	88.0000-71.7500	A	0.834	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	20.560	1.36
L7	71.7500-70.5833	A	0.822	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.524	0.10
L8	70.5833-47.2500	A	0.804	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	30.212	1.91
L9	47.2500-41.7500	A	0.777	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	7.122	0.45
L10	41.7500-32.5000	A	0.761	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	12.029	0.73
L11	32.5000-23.5000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	11.644	0.71
L12	23.5000-20.7500	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.558	0.22
L13	20.7500-3.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	22.965	1.39
L14	3.0000-0.0000	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.881	0.24

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140.0000-104.0000	-0.0807	0.0466	-0.1502	0.0867
L2	104.0000-98.5000	-0.6008	0.3469	-0.9082	0.5243
L3	98.5000-97.0000	-0.6837	0.3947	-0.9833	0.5677
L4	97.0000-88.5000	-0.6907	0.3988	-0.9973	0.5758
L5	88.5000-88.0000	-0.6933	0.4003	-1.0032	0.5792
L6	88.0000-71.7500	-0.7041	0.4065	-1.0220	0.5901
L7	71.7500-70.5833	-0.7801	0.4504	-1.0690	0.6172
L8	70.5833-47.2500	-0.7952	0.4591	-1.0948	0.6321
L9	47.2500-41.7500	-0.8065	0.4656	-1.1186	0.6458
L10	41.7500-32.5000	-0.8411	0.4856	-1.1423	0.6595
L11	32.5000-23.5000	-0.8502	0.4909	-1.1570	0.6680
L12	23.5000-20.7500	-0.8557	0.4940	-1.1682	0.6745
L13	20.7500-3.0000	-0.8646	0.4992	-1.1866	0.6851
L14	3.0000-0.0000	-0.8730	0.5040	-1.2040	0.6951

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
TD-RRH8x20-25	A	From Leg	4.0000 0.00	0.00	140.0000	No Ice 1/2"	4.7198 5.0138	1.7027 1.9196	0.07 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
						2" Ice	7.3141	3.6805	0.40
						4" Ice			
(3) ACU-A20-N	A	From Leg	4.0000	0.00	140.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2"	0.1210	0.1890	0.00
			0.00			Ice	0.1728	0.2506	0.00
						1" Ice	0.3025	0.3997	0.01
						2" Ice	0.6654	0.8015	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000	0.00	140.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2"	9.1490	8.1266	0.15
			0.00			Ice	9.7672	9.0212	0.23
						1" Ice	11.0311	10.8440	0.41
						2" Ice	13.6786	14.8507	0.91
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000	0.00	140.0000	No Ice	7.1342	4.9591	0.08
			0.00			1/2"	7.6618	5.7544	0.13
			0.00			Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
TD-RRH8x20-25	B	From Leg	4.0000	0.00	140.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2"	5.0138	1.9196	0.10
			0.00			Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
						2" Ice	7.3141	3.6805	0.40
						4" Ice			
(3) ACU-A20-N	B	From Leg	4.0000	0.00	140.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2"	0.1210	0.1890	0.00
			0.00			Ice	0.1728	0.2506	0.00
						1" Ice	0.3025	0.3997	0.01
						2" Ice	0.6654	0.8015	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000	0.00	140.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2"	9.1490	8.1266	0.15
			0.00			Ice	9.7672	9.0212	0.23
						1" Ice	11.0311	10.8440	0.41
						2" Ice	13.6786	14.8507	0.91
						4" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000	0.00	140.0000	No Ice	7.1342	4.9591	0.08
			0.00			1/2"	7.6618	5.7544	0.13
			0.00			Ice	8.1830	6.4723	0.19
						1" Ice	9.2563	8.0099	0.34
						2" Ice	11.5262	11.4120	0.75
						4" Ice			
TD-RRH8x20-25	C	From Leg	4.0000	0.00	140.0000	No Ice	4.7198	1.7027	0.07
			0.00			1/2"	5.0138	1.9196	0.10
			0.00			Ice	5.3165	2.1453	0.13
						1" Ice	5.9478	2.6224	0.20
						2" Ice	7.3141	3.6805	0.40
						4" Ice			
(3) ACU-A20-N	C	From Leg	4.0000	0.00	140.0000	No Ice	0.0778	0.1361	0.00
			0.00			1/2"	0.1210	0.1890	0.00
			0.00			Ice	0.1728	0.2506	0.00
						1" Ice	0.3025	0.3997	0.01
						2" Ice	0.6654	0.8015	0.04
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	0.00	140.0000	No Ice	8.4975	6.9458	0.08
			0.00			1/2"	9.1490	8.1266	0.15
			0.00			Ice	9.7672	9.0212	0.23
						1" Ice	11.0311	10.8440	0.41
						2" Ice	13.6786	14.8507	0.91
						4" Ice			
APXVTM14-C-120 w/	C	From Leg	4.0000	0.00	140.0000	No Ice	7.1342	4.9591	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	7.6618 8.1830 9.2563 11.5262	5.7544 6.4723 8.0099 11.4120	0.13 0.19 0.34 0.75
Platform Mount [LP 1201-1]	C	None		0.00	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.1000 26.8000 30.5000 37.9000 52.7000	23.1000 26.8000 30.5000 37.9000 52.7000	2.10 2.50 2.90 3.70 5.30
(2) 6' x 2" Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
(2) 6' x 2" Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	140.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4250 1.9250 2.2939 3.0596 4.7022	1.4250 1.9250 2.2939 3.0596 4.7022	0.02 0.03 0.05 0.09 0.23
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
TME-800MHZ RRH	A	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
800MHz 2X50W RRH W/FILTER	B	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
TME-800MHZ RRH	B	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32
800MHz 2X50W RRH W/FILTER	C	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
TME-800MHZ RRH	C	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice 1/2" Ice 1" Ice 2" Ice	2.4899 2.7061 2.9310 3.4068 4.4620	2.0685 2.2705 2.4812 2.9284 3.9265	0.05 0.07 0.10 0.16 0.32

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			
Side Arm Mount [SO 101-3]	C	None		0.00	137.0000	No Ice	7.5000	7.5000	0.25
						1/2" Ice	8.9000	8.9000	0.33
						1" Ice	10.3000	10.3000	0.41
						2" Ice	13.1000	13.1000	0.58
						4" Ice	18.7000	18.7000	0.90
TME-1900MHz RRH (65 MHz)	A	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice	2.6979	2.7708	0.06
						1/2" Ice	2.9362	3.0111	0.08
						1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
TME-1900MHz RRH (65 MHz)	B	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice	2.6979	2.7708	0.06
						1/2" Ice	2.9362	3.0111	0.08
						1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
TME-1900MHz RRH (65 MHz)	C	From Leg	4.0000 0.00 0.00	0.00	137.0000	No Ice	2.6979	2.7708	0.06
						1/2" Ice	2.9362	3.0111	0.08
						1" Ice	3.1832	3.2600	0.11
						2" Ice	3.7030	3.7837	0.18
						4" Ice	4.8463	4.9348	0.35
***									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.0000 0.00 4.00	0.00	121.0000	No Ice	8.4975	6.3042	0.07
						1/2" Ice	9.1490	7.4790	0.14
						1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.00	121.0000	No Ice	6.2208	4.8204	0.09
						1/2" Ice	6.7144	5.5082	0.14
						1" Ice	7.2182	6.2127	0.21
						2" Ice	8.2568	7.6716	0.36
						4" Ice	10.4762	11.0613	0.76
(2) LGP21401	A	From Leg	4.0000 0.00 2.00	0.00	121.0000	No Ice	1.2880	0.3640	0.01
						1/2" Ice	1.4453	0.4785	0.02
						1" Ice	1.6112	0.6017	0.03
						2" Ice	1.9690	0.8739	0.05
						4" Ice	2.7882	1.5220	0.14
(2) LGP21901	A	From Leg	4.0000 0.00 2.00	0.00	121.0000	No Ice	0.2695	0.1838	0.01
						1/2" Ice	0.3432	0.2483	0.01
						1" Ice	0.4255	0.3216	0.01
						2" Ice	0.6160	0.4940	0.02
						4" Ice	1.1009	0.9425	0.07
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.0000 0.00 4.00	0.00	121.0000	No Ice	8.4975	6.3042	0.07
						1/2" Ice	9.1490	7.4790	0.14
						1" Ice	9.7672	8.3676	0.21
						2" Ice	11.0311	10.1785	0.38
						4" Ice	13.6786	14.0237	0.87
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.00	121.0000	No Ice	6.2208	4.8204	0.09
						1/2" Ice	6.7144	5.5082	0.14
						1" Ice	7.2182	6.2127	0.21
						2" Ice	8.2568	7.6716	0.36
						4" Ice	10.4762	11.0613	0.76
(2) LGP21401	B	From Leg	4.0000 0.00 2.00	0.00	121.0000	No Ice	1.2880	0.3640	0.01
						1/2" Ice	1.4453	0.4785	0.02
						1" Ice	1.6112	0.6017	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	1.9690	0.8739	0.05
						2" Ice	2.7882	1.5220	0.14
						4" Ice			
(2) LGP21901	B	From Leg	4.0000	0.00	121.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2"	0.3432	0.2483	0.01
			2.00			Ice	0.4255	0.3216	0.01
						1" Ice	0.6160	0.4940	0.02
						2" Ice	1.1009	0.9425	0.07
						4" Ice			
DC6-48-60-18-8F	B	From Leg	4.0000	0.00	121.0000	No Ice	1.4667	1.4667	0.02
			0.00			1/2"	1.6667	1.6667	0.04
			4.00			Ice	1.8778	1.8778	0.06
						1" Ice	2.3333	2.3333	0.11
						2" Ice	3.3778	3.3778	0.24
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.0000	0.00	121.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2"	9.1490	7.4790	0.14
			4.00			Ice	9.7672	8.3676	0.21
						1" Ice	11.0311	10.1785	0.38
						2" Ice	13.6786	14.0237	0.87
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000	0.00	121.0000	No Ice	6.2208	4.8204	0.09
			0.00			1/2"	6.7144	5.5082	0.14
			2.00			Ice	7.2182	6.2127	0.21
						1" Ice	8.2568	7.6716	0.36
						2" Ice	10.4762	11.0613	0.76
						4" Ice			
(2) LGP21401	C	From Leg	4.0000	0.00	121.0000	No Ice	1.2880	0.3640	0.01
			0.00			1/2"	1.4453	0.4785	0.02
			2.00			Ice	1.6112	0.6017	0.03
						1" Ice	1.9690	0.8739	0.05
						2" Ice	2.7882	1.5220	0.14
						4" Ice			
(2) LGP21901	C	From Leg	4.0000	0.00	121.0000	No Ice	0.2695	0.1838	0.01
			0.00			1/2"	0.3432	0.2483	0.01
			2.00			Ice	0.4255	0.3216	0.01
						1" Ice	0.6160	0.4940	0.02
						2" Ice	1.1009	0.9425	0.07
						4" Ice			
Platform Mount [LP 1201-1]	C	None		0.00	121.0000	No Ice	23.1000	23.1000	2.10
						1/2"	26.8000	26.8000	2.50
						Ice	30.5000	30.5000	2.90
						1" Ice	37.9000	37.9000	3.70
						2" Ice	52.7000	52.7000	5.30
						4" Ice			
***									
ETW200VS12UB	A	From Leg	4.0000	0.00	115.0000	No Ice	0.4716	0.1899	0.01
			0.00			1/2"	0.5667	0.2551	0.01
			1.00			Ice	0.6704	0.3290	0.02
						1" Ice	0.9037	0.5027	0.03
						2" Ice	1.4741	0.9538	0.09
						4" Ice			
(2) RR90-17-02DP w/ Mount Pipe	A	From Leg	4.0000	0.00	115.0000	No Ice	4.5931	3.3194	0.03
			0.00			1/2"	5.0883	4.0888	0.07
			1.00			Ice	5.5778	4.7844	0.12
						1" Ice	6.5876	6.2255	0.22
						2" Ice	8.7306	9.3076	0.56
						4" Ice			
(2) S20070A1	A	From Leg	4.0000	0.00	115.0000	No Ice	0.7653	0.3588	0.01
			0.00			1/2"	0.8909	0.4622	0.01
			1.00			Ice	1.0250	0.5744	0.02
						1" Ice	1.3193	0.8246	0.04
						2" Ice	2.0115	1.4286	0.10
						4" Ice			
APX16DWV-16DWV-S-E-	A	From Leg	4.0000	0.00	115.0000	No Ice	7.4657	3.4938	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
A20 w/ Mount Pipe			0.00 1.00			1/2" Ice 1" Ice 2" Ice 4" Ice	7.9944 8.5176 9.5949 11.8728	4.2631 4.9598 6.4031 9.4897	0.11 0.16 0.30 0.68
ETW200VS12UB	B	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4716 0.5667 0.6704 0.9037 1.4741	0.1899 0.2551 0.3290 0.5027 0.9538	0.01 0.01 0.02 0.03 0.09
(2) RR90-17-02DP w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.12 0.22 0.56
(2) S20070A1	B	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7653 0.8909 1.0250 1.3193 2.0115	0.3588 0.4622 0.5744 0.8246 1.4286	0.01 0.01 0.02 0.04 0.10
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.4657 7.9944 8.5176 9.5949 11.8728	3.4938 4.2631 4.9598 6.4031 9.4897	0.06 0.11 0.16 0.30 0.68
ETW200VS12UB	C	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.4716 0.5667 0.6704 0.9037 1.4741	0.1899 0.2551 0.3290 0.5027 0.9538	0.01 0.01 0.02 0.03 0.09
(2) RR90-17-02DP w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.12 0.22 0.56
(2) S20070A1	C	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.7653 0.8909 1.0250 1.3193 2.0115	0.3588 0.4622 0.5744 0.8246 1.4286	0.01 0.01 0.02 0.04 0.10
APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	C	From Leg	4.0000 0.00 1.00	0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.4657 7.9944 8.5176 9.5949 11.8728	3.4938 4.2631 4.9598 6.4031 9.4897	0.06 0.11 0.16 0.30 0.68
Platform Mount [LP 1201-1]	C	None		0.00	115.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.1000 26.8000 30.5000 37.9000 52.7000	23.1000 26.8000 30.5000 37.9000 52.7000	2.10 2.50 2.90 3.70 5.30
***									
LNX-6514DS-VTM w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice	8.6346 9.2852 9.9050 11.1720 13.8246	7.0679 8.2532 9.1523 10.9842 15.0105	0.06 0.13 0.21 0.39 0.90

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6000 5.9154 6.2395 6.9136 8.3654	2.3333 2.5580 2.7914 3.2840 4.3728	0.04 0.08 0.12 0.21 0.45
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
RRH2x60-700	A	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.9569 4.2724 4.5965 5.2705 6.7224	1.8157 2.0752 2.3603 2.9566 4.2529	0.06 0.08 0.11 0.17 0.35
RRH2X60-PCS	A	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.5667 2.7914 3.0247 3.5173 4.6062	2.0106 2.2184 2.4349 2.8938 3.9152	0.06 0.08 0.10 0.16 0.31
RRH4X45-AWS4 B66	A	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.1033 3.3578 3.6210 4.1732 5.3814	1.7586 1.9794 2.2088 2.6936 3.7670	0.06 0.08 0.11 0.17 0.33
(3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6393 9.2963 9.9210 11.1952 13.8631	7.0730 8.2637 9.1753 11.0130 15.0524	0.07 0.14 0.21 0.39 0.90
LNX-6514DS-VTM w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.6346 9.2852 9.9050 11.1720 13.8246	7.0679 8.2532 9.1523 10.9842 15.0105	0.06 0.13 0.21 0.39 0.90
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.3665 0.4506 0.5433 0.7546 1.2808	0.0846 0.1362 0.1965 0.3430 0.7396	0.00 0.01 0.01 0.02 0.06
ACUTIME 2000	B	From Leg	4.0000 0.00 3.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.2975 0.3739 0.4589 0.6549 1.1506	0.2975 0.3739 0.4589 0.6549 1.1506	0.00 0.00 0.01 0.02 0.08
RRH2x60-700	B	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.9569 4.2724 4.5965 5.2705 6.7224	1.8157 2.0752 2.3603 2.9566 4.2529	0.06 0.08 0.11 0.17 0.35
RRH2X60-PCS	B	From Leg	4.0000 0.00 0.00	0.00	104.0000	No Ice 1/2" Ice 1" Ice	2.5667 2.7914 3.0247 3.5173	2.0106 2.2184 2.4349 2.8938	0.06 0.08 0.10 0.16

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	4.6062	3.9152	0.31
						4" Ice			
RRH4X45-AWS4 B66	B	From Leg	4.0000	0.00	104.0000	No Ice	3.1033	1.7586	0.06
			0.00			1/2" Ice	3.3578	1.9794	0.08
			0.00				3.6210	2.2088	0.11
						1" Ice	4.1732	2.6936	0.17
						2" Ice	5.3814	3.7670	0.33
						4" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000	0.00	104.0000	No Ice	8.6393	7.0730	0.07
			0.00			1/2" Ice	9.2963	8.2637	0.14
			0.00				9.9210	9.1753	0.21
						1" Ice	11.1952	11.0130	0.39
						2" Ice	13.8631	15.0524	0.90
						4" Ice			
LNX-6514DS-VTM w/ Mount Pipe	C	From Leg	4.0000	0.00	104.0000	No Ice	8.6346	7.0679	0.06
			0.00			1/2" Ice	9.2852	8.2532	0.13
			0.00				9.9050	9.1523	0.21
						1" Ice	11.1720	10.9842	0.39
						2" Ice	13.8246	15.0105	0.90
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.0000	0.00	104.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2" Ice	0.4506	0.1362	0.01
			0.00				0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
RRH2x60-700	C	From Leg	4.0000	0.00	104.0000	No Ice	3.9569	1.8157	0.06
			0.00			1/2" Ice	4.2724	2.0752	0.08
			0.00				4.5965	2.3603	0.11
						1" Ice	5.2705	2.9566	0.17
						2" Ice	6.7224	4.2529	0.35
						4" Ice			
RRH2X60-PCS	C	From Leg	4.0000	0.00	104.0000	No Ice	2.5667	2.0106	0.06
			0.00			1/2" Ice	2.7914	2.2184	0.08
			0.00				3.0247	2.4349	0.10
						1" Ice	3.5173	2.8938	0.16
						2" Ice	4.6062	3.9152	0.31
						4" Ice			
RRH4X45-AWS4 B66	C	From Leg	4.0000	0.00	104.0000	No Ice	3.1033	1.7586	0.06
			0.00			1/2" Ice	3.3578	1.9794	0.08
			0.00				3.6210	2.2088	0.11
						1" Ice	4.1732	2.6936	0.17
						2" Ice	5.3814	3.7670	0.33
						4" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000	0.00	104.0000	No Ice	8.6393	7.0730	0.07
			0.00			1/2" Ice	9.2963	8.2637	0.14
			0.00				9.9210	9.1753	0.21
						1" Ice	11.1952	11.0130	0.39
						2" Ice	13.8631	15.0524	0.90
						4" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.0000	0.00	104.0000	No Ice	5.6000	2.3333	0.04
			0.00			1/2" Ice	5.9154	2.5580	0.08
			0.00				6.2395	2.7914	0.12
						1" Ice	6.9136	3.2840	0.21
						2" Ice	8.3654	4.3728	0.45
						4" Ice			
Platform Mount [LP 1201-1]	C	None		0.00	104.0000	No Ice	23.1000	23.1000	2.10
						1/2" Ice	26.8000	26.8000	2.50
							30.5000	30.5000	2.90
						1" Ice	37.9000	37.9000	3.70
						2" Ice	52.7000	52.7000	5.30
						4" Ice			
***									
APXV18-206517S-C w/ Mount Pipe	A	From Leg	1.0000	0.00	95.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Leg	1.0000	0.00	95.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.10
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	C	From Leg	1.0000	0.00	95.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.10
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
Pipe Mount [PM 601-3]	C	None		0.00	95.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice	13.1100	13.1100	0.53
						4" Ice			
***									
OG-860/1920/GPS-A	A	From Leg	4.0000	0.00	80.0000	No Ice	0.3286	0.4044	0.00
			0.00			1/2"	0.4340	0.5138	0.01
			2.00			Ice	0.5481	0.6317	0.01
						1" Ice	0.8022	0.8936	0.02
						2" Ice	1.4140	1.5210	0.08
						4" Ice			
Side Arm Mount [SO 701-1]	A	From Leg	2.0000	0.00	80.0000	No Ice	0.8500	1.6700	0.07
			0.00			1/2"	1.1400	2.3400	0.08
			0.00			Ice	1.4300	3.0100	0.09
						1" Ice	2.0100	4.3500	0.12
						2" Ice	3.1700	7.0300	0.18
						4" Ice			

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 140.0000-104.0000	121.0724	1.45	30.03	58.964	A	0.000	58.964	58.964	100.00	0.000	0.000
					B	0.000	58.964		100.00	0.000	0.000
					C	0.000	58.964		100.00	0.000	2.038
L2 104.0000-98.5000	101.2286	1.377	28.56	10.939	A	0.000	10.939	10.939	100.00	0.000	0.000
					B	0.000	10.939		100.00	0.000	0.000
					C	0.000	10.939		100.00	0.000	3.307
L3 98.5000-97.0000	97.7485	1.364	28.28	3.072	A	0.000	3.072	3.072	100.00	0.000	0.000
					B	0.000	3.072		100.00	0.000	0.000
					C	0.000	3.072		100.00	0.000	1.062
L4 97.0000-88.5000	92.7022	1.343	27.85	18.128	A	0.000	18.128	18.128	100.00	0.000	0.000
					B	0.000	18.128		100.00	0.000	0.000
					C	0.000	18.128		100.00	0.000	6.021
L5 88.5000-88.0000	88.2497	1.325	27.47	1.082	A	0.000	1.082	1.082	100.00	0.000	0.000
					B	0.000	1.082		100.00	0.000	0.000
					C	0.000	1.082		100.00	0.000	0.354

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
L6 88.0000-71.7500	79.7137	1.287	26.68	37.520	A	0.000	37.520	37.520	100.00	0.000	0.000
					B	0.000	37.520		100.00	0.000	0.000
					C	0.000	37.520		100.00	0.000	11.510
L7 71.7500-70.5833	71.1659	1.246	25.83	2.866	A	0.000	2.866	2.866	100.00	0.000	0.000
					B	0.000	2.866		100.00	0.000	0.000
					C	0.000	2.866		100.00	0.000	0.927
L8 70.5833-47.2500	58.6284	1.178	24.44	62.150	A	0.000	62.150	62.150	100.00	0.000	0.000
					B	0.000	62.150		100.00	0.000	0.000
					C	0.000	62.150		100.00	0.000	18.546
L9 47.2500-41.7500	44.4788	1.089	22.58	15.600	A	0.000	15.600	15.600	100.00	0.000	0.000
					B	0.000	15.600		100.00	0.000	0.000
					C	0.000	15.600		100.00	0.000	4.372
L10 41.7500-32.5000	37.0845	1.034	21.44	27.567	A	0.000	27.567	27.567	100.00	0.000	0.000
					B	0.000	27.567		100.00	0.000	0.000
					C	0.000	27.567		100.00	0.000	7.651
L11 32.5000-23.5000	27.9636	1	20.74	28.211	A	0.000	28.211	28.211	100.00	0.000	0.000
					B	0.000	28.211		100.00	0.000	0.000
					C	0.000	28.211		100.00	0.000	7.445
L12 23.5000-20.7500	22.1217	1	20.74	8.893	A	0.000	8.893	8.893	100.00	0.000	0.000
					B	0.000	8.893		100.00	0.000	0.000
					C	0.000	8.893		100.00	0.000	2.275
L13 20.7500-3.0000	11.7446	1	20.74	60.482	A	0.000	60.482	60.482	100.00	0.000	0.000
					B	0.000	60.482		100.00	0.000	0.000
					C	0.000	60.482		100.00	0.000	14.682
L14 3.0000-0.0000	1.4965	1	20.74	10.749	A	0.000	10.749	10.749	100.00	0.000	0.000
					B	0.000	10.749		100.00	0.000	0.000
					C	0.000	10.749		100.00	0.000	2.482

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 140.0000-104.0000	121.0724	1.45	5.24	0.8766	64.223	A	0.000	64.223	64.223	100.00	0.000	0.000
						B	0.000	64.223		100.00	0.000	0.000
						C	0.000	64.223		100.00	0.000	4.258
L2 104.0000-98.5000	101.2286	1.377	4.99	0.8580	11.726	A	0.000	11.726	11.726	100.00	0.000	0.000
						B	0.000	11.726		100.00	0.000	0.000
						C	0.000	11.726		100.00	0.000	6.345
L3 98.5000-97.0000	97.7485	1.364	4.94	0.8544	3.286	A	0.000	3.286	3.286	100.00	0.000	0.000
						B	0.000	3.286		100.00	0.000	0.000
						C	0.000	3.286		100.00	0.000	1.926
L4 97.0000-88.5000	92.7022	1.343	4.86	0.8490	19.331	A	0.000	19.331	19.331	100.00	0.000	0.000
						B	0.000	19.331		100.00	0.000	0.000
						C	0.000	19.331		100.00	0.000	10.873
L5 88.5000-88.0000	88.2497	1.325	4.79	0.8440	1.153	A	0.000	1.153	1.153	100.00	0.000	0.000
						B	0.000	1.153		100.00	0.000	0.000
						C	0.000	1.153		100.00	0.000	0.640
L6 88.0000-71.7500	79.7137	1.287	4.66	0.8337	39.778	A	0.000	39.778	39.778	100.00	0.000	0.000
						B	0.000	39.778		100.00	0.000	0.000
						C	0.000	39.778		100.00	0.000	20.560
L7 71.7500-70.5833	71.1659	1.246	4.51	0.8225	3.026	A	0.000	3.026	3.026	100.00	0.000	0.000
						B	0.000	3.026		100.00	0.000	0.000
						C	0.000	3.026		100.00	0.000	1.524
L8 70.5833-47.2500	58.6284	1.178	4.27	0.8035	65.275	A	0.000	65.275	65.275	100.00	0.000	0.000
						B	0.000	65.275		100.00	0.000	0.000
						C	0.000	65.275		100.00	0.000	30.212
L9 47.2500-41.7500	44.4788	1.089	3.94	0.7774	16.337	A	0.000	16.337	16.337	100.00	0.000	0.000
						B	0.000	16.337		100.00	0.000	0.000
						C	0.000	16.337		100.00	0.000	7.122
L10 41.7500-32.5000	37.0845	1.034	3.74	0.7606	28.740	A	0.000	28.740	28.740	100.00	0.000	0.000
						B	0.000	28.740		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						C	0.000	28.740		100.00	0.000	12.029
L11 32.5000-23.5000	27.9636	1	3.62	0.7500	29.336	A	0.000	29.336	29.336	100.00	0.000	0.000
						B	0.000	29.336		100.00	0.000	0.000
						C	0.000	29.336		100.00	0.000	11.644
L12 23.5000-20.7500	22.1217	1	3.62	0.7500	9.237	A	0.000	9.237	9.237	100.00	0.000	0.000
						B	0.000	9.237		100.00	0.000	0.000
						C	0.000	9.237		100.00	0.000	3.558
L13 20.7500-3.0000	11.7446	1	3.62	0.7500	62.700	A	0.000	62.700	62.700	100.00	0.000	0.000
						B	0.000	62.700		100.00	0.000	0.000
						C	0.000	62.700		100.00	0.000	22.965
L14 3.0000-0.0000	1.4965	1	3.62	0.7500	11.124	A	0.000	11.124	11.124	100.00	0.000	0.000
						B	0.000	11.124		100.00	0.000	0.000
						C	0.000	11.124		100.00	0.000	3.881

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 140.0000-104.0000	121.0724	1.45	9.27	58.964	A	0.000	58.964	58.964	100.00	0.000	0.000
					B	0.000	58.964		100.00	0.000	0.000
					C	0.000	58.964		100.00	0.000	2.038
L2 104.0000-98.5000	101.2286	1.377	8.82	10.939	A	0.000	10.939	10.939	100.00	0.000	0.000
					B	0.000	10.939		100.00	0.000	0.000
					C	0.000	10.939		100.00	0.000	3.307
L3 98.5000-97.0000	97.7485	1.364	8.73	3.072	A	0.000	3.072	3.072	100.00	0.000	0.000
					B	0.000	3.072		100.00	0.000	0.000
					C	0.000	3.072		100.00	0.000	1.062
L4 97.0000-88.5000	92.7022	1.343	8.60	18.128	A	0.000	18.128	18.128	100.00	0.000	0.000
					B	0.000	18.128		100.00	0.000	0.000
					C	0.000	18.128		100.00	0.000	6.021
L5 88.5000-88.0000	88.2497	1.325	8.48	1.082	A	0.000	1.082	1.082	100.00	0.000	0.000
					B	0.000	1.082		100.00	0.000	0.000
					C	0.000	1.082		100.00	0.000	0.354
L6 88.0000-71.7500	79.7137	1.287	8.23	37.520	A	0.000	37.520	37.520	100.00	0.000	0.000
					B	0.000	37.520		100.00	0.000	0.000
					C	0.000	37.520		100.00	0.000	11.510
L7 71.7500-70.5833	71.1659	1.246	7.97	2.866	A	0.000	2.866	2.866	100.00	0.000	0.000
					B	0.000	2.866		100.00	0.000	0.000
					C	0.000	2.866		100.00	0.000	0.927
L8 70.5833-47.2500	58.6284	1.178	7.54	62.150	A	0.000	62.150	62.150	100.00	0.000	0.000
					B	0.000	62.150		100.00	0.000	0.000
					C	0.000	62.150		100.00	0.000	18.546
L9 47.2500-41.7500	44.4788	1.089	6.97	15.600	A	0.000	15.600	15.600	100.00	0.000	0.000
					B	0.000	15.600		100.00	0.000	0.000
					C	0.000	15.600		100.00	0.000	4.372
L10 41.7500-32.5000	37.0845	1.034	6.62	27.567	A	0.000	27.567	27.567	100.00	0.000	0.000
					B	0.000	27.567		100.00	0.000	0.000
					C	0.000	27.567		100.00	0.000	7.651
L11 32.5000-23.5000	27.9636	1	6.40	28.211	A	0.000	28.211	28.211	100.00	0.000	0.000
					B	0.000	28.211		100.00	0.000	0.000
					C	0.000	28.211		100.00	0.000	7.445
L12 23.5000-20.7500	22.1217	1	6.40	8.893	A	0.000	8.893	8.893	100.00	0.000	0.000
					B	0.000	8.893		100.00	0.000	0.000
					C	0.000	8.893		100.00	0.000	2.275
L13 20.7500-3.0000	11.7446	1	6.40	60.482	A	0.000	60.482	60.482	100.00	0.000	0.000
					B	0.000	60.482		100.00	0.000	0.000
					C	0.000	60.482		100.00	0.000	14.682
L14 3.0000-0.0000	1.4965	1	6.40	10.749	A	0.000	10.749	10.749	100.00	0.000	0.000
					B	0.000	10.749		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
					C	0.000	10.749		100.00	0.000	2.482

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	140 - 104	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-18.22	0.06	-0.30
			Max. Mx	11	-9.94	412.86	-0.17
			Max. My	8	-9.95	0.12	-412.88
			Max. Vy	11	-17.96	412.86	-0.17
			Max. Vx	8	17.96	0.12	-412.88
			Max. Torque	3			-0.35
L2	104 - 98.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.48	1.16	-0.97
			Max. Mx	11	-13.64	556.01	-1.13
			Max. My	8	-13.67	1.21	-554.98
			Max. Vy	11	-26.30	556.01	-1.13

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	26.14	1.21	-554.98
			Max. Torque	12			1.06
L3	98.5 - 97	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.87	1.21	-1.00
			Max. Mx	11	-13.97	595.62	-1.35
			Max. My	8	-13.99	1.44	-594.33
			Max. Vy	11	-26.51	595.62	-1.35
			Max. Vx	8	26.35	1.44	-594.33
			Max. Torque	12			1.07
L4	97 - 88.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.80	1.48	-1.16
			Max. Mx	11	-15.24	739.74	-2.14
			Max. My	8	-15.26	2.25	-737.56
			Max. Vy	11	-28.16	739.74	-2.14
			Max. Vx	8	28.00	2.25	-737.56
			Max. Torque	12			1.11
L5	88.5 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.32	1.68	-1.27
			Max. Mx	11	-16.44	846.44	-2.71
			Max. My	8	-16.47	2.84	-843.63
			Max. Vy	5	28.73	-845.38	1.99
			Max. Vx	8	28.57	2.84	-843.63
			Max. Torque	12			1.14
L6	88 - 71.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.49	2.65	-1.51
			Max. Mx	11	-20.71	1332.20	-4.98
			Max. My	8	-20.73	5.41	-1326.05
			Max. Vy	11	-31.06	1332.20	-4.98
			Max. Vx	8	30.86	5.41	-1326.05
			Max. Torque	12			1.20
L7	71.75 - 70.5833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-34.91	2.72	-1.55
			Max. Mx	11	-21.07	1368.54	-5.16
			Max. My	8	-21.09	5.60	-1362.14
			Max. Vy	11	-31.23	1368.54	-5.16
			Max. Vx	8	31.02	5.60	-1362.14
			Max. Torque	13			1.10
L8	70.5833 - 47.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.72	3.96	-2.26
			Max. Mx	11	-26.93	1988.94	-8.06
			Max. My	8	-26.95	8.64	-1978.49
			Max. Vy	11	-33.81	1988.94	-8.06
			Max. Vx	8	33.61	8.64	-1978.49
			Max. Torque	13			1.31
L9	47.25 - 41.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-46.77	4.58	-2.62
			Max. Mx	11	-31.31	2325.82	-9.55
			Max. My	8	-31.32	10.20	-2313.29
			Max. Vy	11	-35.20	2325.82	-9.55
			Max. Vx	8	34.99	10.20	-2313.29
			Max. Torque	13			1.42
L10	41.75 - 32.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-50.66	5.19	-2.97
			Max. Mx	11	-34.78	2656.61	-10.96
			Max. My	8	-34.79	11.68	-2642.12
			Max. Vy	11	-36.33	2656.61	-10.96
			Max. Vx	8	36.12	11.68	-2642.12
			Max. Torque	13			1.52
L11	32.5 - 23.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-54.66	5.80	-3.33
			Max. Mx	11	-38.37	2988.43	-12.32
			Max. My	8	-38.38	13.13	-2972.03
			Max. Vy	11	-37.41	2988.43	-12.32
			Max. Vx	8	37.20	13.13	-2972.03
			Max. Torque	13			1.63
L12	23.5 - 20.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-56.06	6.00	-3.44
			Max. Mx	11	-39.63	3091.77	-12.74
			Max. My	8	-39.64	13.57	-3074.80
			Max. Vy	11	-37.75	3091.77	-12.74
			Max. Vx	8	37.55	13.57	-3074.80
			Max. Torque	13			1.66
L13	20.75 - 3	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-64.45	7.32	-4.20
			Max. Mx	11	-47.19	3780.87	-15.43
			Max. My	8	-47.19	16.41	-3760.16
			Max. Vy	11	-39.90	3780.87	-15.43
			Max. Vx	8	39.70	16.41	-3760.16
			Max. Torque	13			1.88
L14	3 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-65.99	7.55	-4.33
			Max. Mx	11	-48.59	3901.14	-15.88
			Max. My	8	-48.59	16.89	-3879.80
			Max. Vy	11	-40.27	3901.14	-15.88
			Max. Vx	8	40.07	16.89	-3879.80
			Max. Torque	13			1.92

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	65.99	-0.00	0.00
	Max. H_x	11	48.60	40.25	-0.14
	Max. H_z	2	48.60	-0.14	40.06
	Max. M_x	2	3877.59	-0.14	40.06
	Max. M_z	5	3896.63	-40.25	0.14
	Max. Torsion	13	1.92	20.01	34.62
	Min. Vert	5	48.60	-40.25	0.14
	Min. H_x	5	48.60	-40.25	0.14
	Min. H_z	8	48.60	0.14	-40.06
	Min. M_x	8	-3879.80	0.14	-40.06
	Min. M_z	11	-3901.14	40.25	-0.14
	Min. Torsion	7	-1.92	-20.01	-34.62

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	48.60	-0.00	0.00	1.07	2.05	0.00
Dead+Wind 0 deg - No Ice	48.60	0.14	-40.06	-3877.59	-12.66	-1.63
Dead+Wind 30 deg - No Ice	48.60	20.25	-34.76	-3365.43	-1960.28	-0.89
Dead+Wind 60 deg - No Ice	48.60	34.93	-20.15	-1951.08	-3382.04	0.08
Dead+Wind 90 deg - No Ice	48.60	40.25	-0.14	-13.67	-3896.63	1.03
Dead+Wind 120 deg - No Ice	48.60	34.79	19.91	1927.73	-3367.34	1.70
Dead+Wind 150 deg - No Ice	48.60	20.01	34.62	3352.93	-1934.72	1.92
Dead+Wind 180 deg - No Ice	48.60	-0.14	40.06	3879.80	16.89	1.63
Dead+Wind 210 deg - No Ice	48.60	-20.25	34.76	3367.64	1964.51	0.89
Dead+Wind 240 deg - No Ice	48.60	-34.93	20.15	1953.29	3386.28	-0.08
Dead+Wind 270 deg - No Ice	48.60	-40.25	0.14	15.88	3901.14	-1.03
Dead+Wind 300 deg - No Ice	48.60	-34.79	-19.91	-1925.53	3371.57	-1.70
Dead+Wind 330 deg - No Ice	48.60	-20.01	-34.62	-3350.72	1938.95	-1.92
Dead+Ice+Temp	65.99	0.00	-0.00	4.33	7.55	0.00
Dead+Wind 0 deg+Ice+Temp	65.99	0.03	-8.43	-836.81	5.07	-0.42
Dead+Wind 30	65.99	4.26	-7.31	-725.47	-417.31	-0.24

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
deg+Ice+Temp Dead+Wind 60	65.99	7.35	-4.24	-418.54	-725.77	0.00
deg+Ice+Temp Dead+Wind 90	65.99	8.47	-0.03	1.74	-837.67	0.25
deg+Ice+Temp Dead+Wind 120	65.99	7.32	4.19	422.77	-723.02	0.42
deg+Ice+Temp Dead+Wind 150	65.99	4.21	7.29	731.71	-412.54	0.49
deg+Ice+Temp Dead+Wind 180	65.99	-0.03	8.43	845.80	10.58	0.42
deg+Ice+Temp Dead+Wind 210	65.99	-4.26	7.31	734.47	432.96	0.25
deg+Ice+Temp Dead+Wind 240	65.99	-7.35	4.24	427.54	741.42	0.00
deg+Ice+Temp Dead+Wind 270	65.99	-8.47	0.03	7.25	853.32	-0.25
deg+Ice+Temp Dead+Wind 300	65.99	-7.32	-4.19	-413.77	738.67	-0.42
deg+Ice+Temp Dead+Wind 330	65.99	-4.21	-7.29	-722.72	428.19	-0.49
Dead+Wind 0 deg - Service	48.60	0.04	-12.36	-1197.77	-2.44	-0.50
Dead+Wind 30 deg - Service	48.60	6.25	-10.73	-1039.51	-604.47	-0.28
Dead+Wind 60 deg - Service	48.60	10.78	-6.22	-602.33	-1043.95	0.02
Dead+Wind 90 deg - Service	48.60	12.42	-0.04	-3.46	-1203.05	0.32
Dead+Wind 120 deg - Service	48.60	10.74	6.14	596.64	-1039.39	0.53
Dead+Wind 150 deg - Service	48.60	6.18	10.69	1037.17	-596.56	0.60
Dead+Wind 180 deg - Service	48.60	-0.04	12.36	1199.99	6.69	0.50
Dead+Wind 210 deg - Service	48.60	-6.25	10.73	1041.73	608.71	0.28
Dead+Wind 240 deg - Service	48.60	-10.78	6.22	604.55	1048.20	-0.02
Dead+Wind 270 deg - Service	48.60	-12.42	0.04	5.68	1207.30	-0.32
Dead+Wind 300 deg - Service	48.60	-10.74	-6.14	-594.42	1043.64	-0.53
Dead+Wind 330 deg - Service	48.60	-6.18	-10.69	-1034.95	600.81	-0.60

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	0.00	-48.60	0.00	0.00	48.60	-0.00	0.000%
2	0.14	-48.60	-40.06	-0.14	48.60	40.06	0.002%
3	20.25	-48.60	-34.76	-20.25	48.60	34.76	0.000%
4	34.93	-48.60	-20.15	-34.93	48.60	20.15	0.000%
5	40.26	-48.60	-0.14	-40.25	48.60	0.14	0.006%
6	34.79	-48.60	19.91	-34.79	48.60	-19.91	0.000%
7	20.01	-48.60	34.62	-20.01	48.60	-34.62	0.000%
8	-0.14	-48.60	40.06	0.14	48.60	-40.06	0.002%
9	-20.25	-48.60	34.76	20.25	48.60	-34.76	0.000%
10	-34.93	-48.60	20.15	34.93	48.60	-20.15	0.000%
11	-40.26	-48.60	0.14	40.25	48.60	-0.14	0.002%
12	-34.79	-48.60	-19.91	34.79	48.60	19.91	0.000%
13	-20.01	-48.60	-34.62	20.01	48.60	34.62	0.000%
14	0.00	-65.99	0.00	-0.00	65.99	0.00	0.002%
15	0.03	-65.99	-8.43	-0.03	65.99	8.43	0.000%
16	4.26	-65.99	-7.31	-4.26	65.99	7.31	0.000%
17	7.35	-65.99	-4.24	-7.35	65.99	4.24	0.000%
18	8.47	-65.99	-0.03	-8.47	65.99	0.03	0.000%
19	7.32	-65.99	4.19	-7.32	65.99	-4.19	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
20	4.21	-65.99	7.29	-4.21	65.99	-7.29	0.000%
21	-0.03	-65.99	8.43	0.03	65.99	-8.43	0.000%
22	-4.26	-65.99	7.31	4.26	65.99	-7.31	0.000%
23	-7.35	-65.99	4.24	7.35	65.99	-4.24	0.000%
24	-8.47	-65.99	0.03	8.47	65.99	-0.03	0.000%
25	-7.32	-65.99	-4.19	7.32	65.99	4.19	0.000%
26	-4.21	-65.99	-7.29	4.21	65.99	7.29	0.000%
27	0.04	-48.60	-12.36	-0.04	48.60	12.36	0.003%
28	6.25	-48.60	-10.73	-6.25	48.60	10.73	0.001%
29	10.78	-48.60	-6.22	-10.78	48.60	6.22	0.001%
30	12.42	-48.60	-0.04	-12.42	48.60	0.04	0.003%
31	10.74	-48.60	6.14	-10.74	48.60	-6.14	0.001%
32	6.18	-48.60	10.69	-6.18	48.60	-10.69	0.001%
33	-0.04	-48.60	12.36	0.04	48.60	-12.36	0.003%
34	-6.25	-48.60	10.73	6.25	48.60	-10.73	0.001%
35	-10.78	-48.60	6.22	10.78	48.60	-6.22	0.001%
36	-12.42	-48.60	0.04	12.42	48.60	-0.04	0.003%
37	-10.74	-48.60	-6.14	10.74	48.60	6.14	0.001%
38	-6.18	-48.60	-10.69	6.18	48.60	10.69	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00002703	0.00006124
3	Yes	18	0.00000001	0.00006091
4	Yes	18	0.00000001	0.00006124
5	Yes	13	0.00007186	0.00010857
6	Yes	18	0.00000001	0.00006123
7	Yes	18	0.00000001	0.00005937
8	Yes	14	0.00002703	0.00011056
9	Yes	18	0.00000001	0.00006192
10	Yes	18	0.00000001	0.00006162
11	Yes	14	0.00002701	0.00008798
12	Yes	18	0.00000001	0.00005952
13	Yes	18	0.00000001	0.00006136
14	Yes	7	0.00000001	0.00001824
15	Yes	15	0.00000001	0.00011308
16	Yes	15	0.00000001	0.00013205
17	Yes	15	0.00000001	0.00013238
18	Yes	15	0.00000001	0.00011312
19	Yes	15	0.00000001	0.00013308
20	Yes	15	0.00000001	0.00013230
21	Yes	15	0.00000001	0.00011435
22	Yes	15	0.00000001	0.00013604
23	Yes	15	0.00000001	0.00013608
24	Yes	15	0.00000001	0.00011513
25	Yes	15	0.00000001	0.00013340
26	Yes	15	0.00000001	0.00013382
27	Yes	13	0.00007734	0.00004499
28	Yes	14	0.00000001	0.00012828
29	Yes	14	0.00000001	0.00013062
30	Yes	13	0.00007732	0.00004162
31	Yes	14	0.00000001	0.00013519
32	Yes	14	0.00000001	0.00012243
33	Yes	13	0.00007734	0.00004809
34	Yes	14	0.00000001	0.00013536
35	Yes	14	0.00000001	0.00013337
36	Yes	13	0.00007732	0.00004407
37	Yes	14	0.00000001	0.00012356
38	Yes	14	0.00000001	0.00013601

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 104	32.07	35	2.20	0.00
L2	104 - 98.5	16.94	35	1.64	0.00
L3	98.5 - 97	15.11	35	1.53	0.00
L4	97 - 88.5	14.64	35	1.51	0.00
L5	91.75 - 88	13.04	35	1.40	0.00
L6	88 - 71.75	11.95	35	1.36	0.00
L7	71.75 - 70.5833	7.79	35	1.08	0.00
L8	70.5833 - 47.25	7.53	35	1.06	0.00
L9	51.5 - 41.75	3.95	35	0.73	0.00
L10	41.75 - 32.5	2.56	35	0.60	0.00
L11	32.5 - 23.5	1.53	35	0.46	0.00
L12	23.5 - 20.75	0.79	35	0.32	0.00
L13	20.75 - 3	0.62	35	0.29	0.00
L14	3 - 0	0.01	35	0.04	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.0000	TD-RRH8x20-25	35	32.07	2.20	0.00	14098
137.0000	800MHz 2X50W RRH W/FILTER	35	30.70	2.16	0.00	14098
121.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	35	23.58	1.96	0.00	3709
115.0000	ETW200VS12UB	35	21.09	1.86	0.00	2818
104.0000	LNX-6514DS-VTM w/ Mount Pipe	35	16.94	1.64	0.00	2150
95.0000	APXV18-206517S-C w/ Mount Pipe	35	14.02	1.47	0.00	3372
80.0000	OG-860/1920/GPS-A	35	9.78	1.23	0.00	3361

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 104	103.22	10	7.09	0.01
L2	104 - 98.5	54.62	10	5.30	0.01
L3	98.5 - 97	48.74	10	4.92	0.00
L4	97 - 88.5	47.21	10	4.86	0.00
L5	91.75 - 88	42.05	10	4.53	0.00
L6	88 - 71.75	38.55	10	4.40	0.00
L7	71.75 - 70.5833	25.14	10	3.48	0.00
L8	70.5833 - 47.25	24.30	10	3.42	0.00
L9	51.5 - 41.75	12.74	10	2.37	0.00
L10	41.75 - 32.5	8.27	10	1.95	0.00
L11	32.5 - 23.5	4.95	10	1.48	0.00
L12	23.5 - 20.75	2.57	10	1.05	0.00
L13	20.75 - 3	1.99	10	0.94	0.00
L14	3 - 0	0.04	10	0.12	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
140.0000	TD-RRH8x20-25	10	103.22	7.09	0.01	4489
137.0000	800MHz 2X50W RRH W/FILTER	10	98.82	6.98	0.01	4489
121.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	10	75.96	6.32	0.01	1178
115.0000	ETW200VS12UB	10	67.95	6.01	0.01	894
104.0000	LNX-6514DS-VTM w/ Mount Pipe	10	54.62	5.30	0.01	679
95.0000	APXV18-206517S-C w/ Mount Pipe	10	45.21	4.74	0.00	1062
80.0000	OG-860/1920/GPS-A	10	31.57	3.98	0.00	1054

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	140 - 104 (1)	TP23.3091x16x0.25	36.0000	0.0000	0.0	39.00	18.5625	-9.94	723.94	0.014
L2	104 - 98.5 (2)	TP24.4257x23.3091x0.3787	5.5000	0.0000	0.0	32.36	29.3217	-13.63	948.79	0.014
L3	98.5 - 97 (3)	TP24.7303x24.4257x0.6428	1.5000	0.0000	0.0	31.13	49.8558	-13.95	1551.91	0.009
L4	97 - 88.5 (4)	TP26.456x24.7303x0.4933	8.5000	0.0000	0.0	33.49	40.1933	-15.23	1346.15	0.011
L5	88.5 - 88 (5)	TP26.0576x24.8095x0.5565	3.7500	0.0000	0.0	33.54	45.6963	-16.43	1532.65	0.011
L6	88 - 71.75 (6)	TP29.3572x26.0576x0.6716	16.2500	0.0000	0.0	33.65	62.0324	-20.70	2087.26	0.010
L7	71.75 - 70.5833 (7)	TP29.5941x29.3572x0.7851	1.1667	0.0000	0.0	34.06	72.8335	-21.06	2480.85	0.008
L8	70.5833 - 47.25 (8)	TP34.332x29.5941x0.7176	23.3333	0.0000	0.0	34.06	75.6799	-26.92	2577.81	0.010
L9	47.25 - 41.75 (9)	TP34.8235x32.0338x0.7655	9.7500	0.0000	0.0	33.91	80.0720	-29.42	2714.92	0.011
L10	41.75 - 32.5 (10)	TP36.7016x34.8235x0.8008	9.2500	0.0000	0.0	33.76	92.5683	-34.78	3125.29	0.011
L11	32.5 - 23.5 (11)	TP38.5288x36.7016x0.8175	9.0000	0.0000	0.0	34.60	99.2730	-38.37	3435.04	0.011
L12	23.5 - 20.75 (12)	TP39.0872x38.5288x0.9506	2.7500	0.0000	0.0	32.06	116.7330	-39.63	3742.94	0.011
L13	20.75 - 3 (13)	TP42.6909x39.0872x0.8077	17.7500	0.0000	0.0	34.81	108.9280	-47.19	3791.36	0.012
L14	3 - 0 (14)	TP43.3x42.6909x0.8586	3.0000	0.0000	0.0	35.10	117.3360	-48.59	4118.50	0.012

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	140 - 104 (1)	TP23.3091x16x0.25	412.96	47.49	39.00	1.218	0.00	0.00	39.00	0.000
L2	104 - 98.5 (2)	TP24.4257x23.3091x0.3787	556.63	39.05	32.36	1.207	0.00	0.00	32.36	0.000
L3	98.5 - 97 (3)	TP24.7303x24.4257x0.6428	596.36	24.83	31.13	0.798	0.00	0.00	31.13	0.000
L4	97 - 88.5 (4)	TP26.456x24.7303x0.4933	740.92	36.17	33.49	1.080	0.00	0.00	33.49	0.000
L5	88.5 - 88 (5)	TP26.0576x24.8095x0.55	847.94	36.21	33.54	1.080	0.00	0.00	33.54	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
		65								
L6	88 - 71.75 (6)	TP29.3572x26.0576x0.67 16	1334.8 9	37.39	33.65	1.111	0.00	0.00	33.65	0.000
L7	71.75 - 70.5833 (7)	TP29.5941x29.3572x0.78 51	1371.3 2	32.70	34.06	0.960	0.00	0.00	34.06	0.000
L8	70.5833 - 47.25 (8)	TP34.332x29.5941x0.717 6	1993.1 7	40.02	34.06	1.175	0.00	0.00	34.06	0.000
L9	47.25 - 41.75 (9)	TP34.8235x32.0338x0.76 55	2138.6 8	40.99	33.91	1.209	0.00	0.00	33.91	0.000
L10	41.75 - 32.5 (10)	TP36.7016x34.8235x0.80 08	2662.2 8	39.88	33.76	1.181	0.00	0.00	33.76	0.000
L11	32.5 - 23.5 (11)	TP38.5288x36.7016x0.81 75	2994.7 8	39.80	34.60	1.150	0.00	0.00	34.60	0.000
L12	23.5 - 20.75 (12)	TP39.0872x38.5288x0.95 06	3098.3 2	34.74	32.06	1.083	0.00	0.00	32.06	0.000
L13	20.75 - 3 (13)	TP42.6909x39.0872x0.80 77	3788.7 6	41.22	34.81	1.184	0.00	0.00	34.81	0.000
L14	3 - 0 (14)	TP43.3x42.6909x0.8586	3909.2 5	39.00	35.10	1.111	0.00	0.00	35.10	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	140 - 104 (1)	TP23.3091x16x0.25	17.97	0.97	26.00	0.076	0.34	0.02	26.00	0.001
L2	104 - 98.5 (2)	TP24.4257x23.3091x0.37 87	26.38	0.90	21.57	0.085	0.37	0.01	21.57	0.001
L3	98.5 - 97 (3)	TP24.7303x24.4257x0.64 28	26.59	0.53	20.75	0.052	0.37	0.01	20.75	0.000
L4	97 - 88.5 (4)	TP26.456x24.7303x0.493 3	28.24	0.70	22.33	0.064	0.37	0.01	22.33	0.000
L5	88.5 - 88 (5)	TP26.0576x24.8095x0.55 65	28.82	0.63	22.36	0.057	0.37	0.01	22.36	0.000
L6	88 - 71.75 (6)	TP29.3572x26.0576x0.67 16	31.13	0.50	22.43	0.045	0.08	0.00	22.43	0.000
L7	71.75 - 70.5833 (7)	TP29.5941x29.3572x0.78 51	31.30	0.43	22.71	0.038	0.08	0.00	22.71	0.000
L8	70.5833 - 47.25 (8)	TP34.332x29.5941x0.717 6	33.88	0.45	22.71	0.040	0.08	0.00	22.71	0.000
L9	47.25 - 41.75 (9)	TP34.8235x32.0338x0.76 55	34.72	0.43	22.60	0.039	0.08	0.00	22.60	0.000
L10	41.75 - 32.5 (10)	TP36.7016x34.8235x0.80 08	36.40	0.39	22.51	0.035	0.08	0.00	22.51	0.000
L11	32.5 - 23.5 (11)	TP38.5288x36.7016x0.81 75	37.48	0.38	23.07	0.033	0.08	0.00	23.07	0.000
L12	23.5 - 20.75 (12)	TP39.0872x38.5288x0.95 06	37.83	0.32	21.38	0.031	0.08	0.00	21.38	0.000
L13	20.75 - 3 (13)	TP42.6909x39.0872x0.80 77	39.97	0.37	23.20	0.032	0.08	0.00	23.20	0.000
L14	3 - 0 (14)	TP43.3x42.6909x0.8586	40.34	0.34	23.40	0.030	0.08	0.00	23.40	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	140 - 104 (1)	0.014	1.218	0.000	0.076	0.001	1.233 ✔	1.333	H1-3+VT ✔

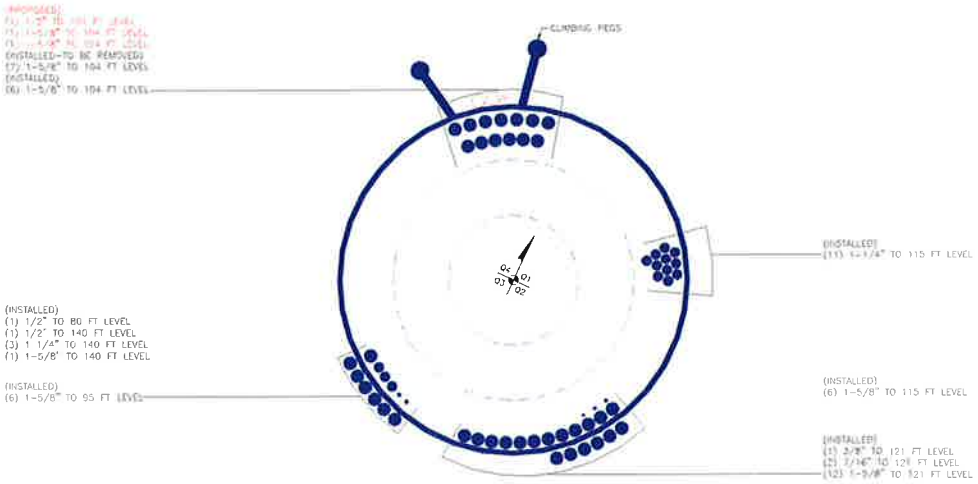
Section No.	Elevation ft	Ratio P / P_a	Ratio f_{bx} / F_{bx}	Ratio f_{by} / F_{by}	Ratio f_v / F_v	Ratio f_{vt} / F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	104 - 98.5 (2)	0.014	1.207	0.000	0.085	0.001	1.223 ✔	1.333	H1-3+VT ✔
L3	98.5 - 97 (3)	0.009	0.798	0.000	0.052	0.000	0.807 ✔	1.333	H1-3+VT ✔
L4	97 - 88.5 (4)	0.011	1.080	0.000	0.064	0.000	1.092 ✔	1.333	H1-3+VT ✔
L5	88.5 - 88 (5)	0.011	1.080	0.000	0.057	0.000	1.091 ✔	1.333	H1-3+VT ✔
L6	88 - 71.75 (6)	0.010	1.111	0.000	0.045	0.000	1.122 ✔	1.333	H1-3+VT ✔
L7	71.75 - 70.5833 (7)	0.008	0.960	0.000	0.038	0.000	0.969 ✔	1.333	H1-3+VT ✔
L8	70.5833 - 47.25 (8)	0.010	1.175	0.000	0.040	0.000	1.186 ✔	1.333	H1-3+VT ✔
L9	47.25 - 41.75 (9)	0.011	1.209	0.000	0.039	0.000	1.220 ✔	1.333	H1-3+VT ✔
L10	41.75 - 32.5 (10)	0.011	1.181	0.000	0.035	0.000	1.193 ✔	1.333	H1-3+VT ✔
L11	32.5 - 23.5 (11)	0.011	1.150	0.000	0.033	0.000	1.162 ✔	1.333	H1-3+VT ✔
L12	23.5 - 20.75 (12)	0.011	1.083	0.000	0.031	0.000	1.094 ✔	1.333	H1-3+VT ✔
L13	20.75 - 3 (13)	0.012	1.184	0.000	0.032	0.000	1.197 ✔	1.333	H1-3+VT ✔
L14	3 - 0 (14)	0.012	1.111	0.000	0.030	0.000	1.123 ✔	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	140 - 104	Pole	TP23.3091x16x0.25	1	-9.94	965.01	92.5	Pass
L2	104 - 98.5	Pole	TP24.4257x23.3091x0.3787	2	-13.63	1264.74	91.7	Pass
L3	98.5 - 97	Pole	TP24.7303x24.4257x0.6428	3	-13.95	2068.70	60.6	Pass
L4	97 - 88.5	Pole	TP26.456x24.7303x0.4933	4	-15.23	1794.42	81.9	Pass
L5	88.5 - 88	Pole	TP26.0576x24.8095x0.5565	5	-16.43	2043.02	81.9	Pass
L6	88 - 71.75	Pole	TP29.3572x26.0576x0.6716	6	-20.70	2782.32	84.1	Pass
L7	71.75 - 70.5833	Pole	TP29.5941x29.3572x0.7851	7	-21.06	3306.97	72.7	Pass
L8	70.5833 - 47.25	Pole	TP34.332x29.5941x0.7176	8	-26.92	3436.22	89.0	Pass
L9	47.25 - 41.75	Pole	TP34.8235x32.0338x0.7655	9	-29.42	3618.99	91.5	Pass
L10	41.75 - 32.5	Pole	TP36.7016x34.8235x0.8008	10	-34.78	4166.01	89.5	Pass
L11	32.5 - 23.5	Pole	TP38.5288x36.7016x0.8175	11	-38.37	4578.91	87.2	Pass
L12	23.5 - 20.75	Pole	TP39.0872x38.5288x0.9506	12	-39.63	4989.34	82.1	Pass
L13	20.75 - 3	Pole	TP42.6909x39.0872x0.8077	13	-47.19	5053.88	89.8	Pass
L14	3 - 0	Pole	TP43.3x42.6909x0.8586	14	-48.59	5489.96	84.3	Pass
							Summary	
						Pole (L1)	92.5	Pass
						RATING =	**92.5**	**Pass**

APPENDIX B

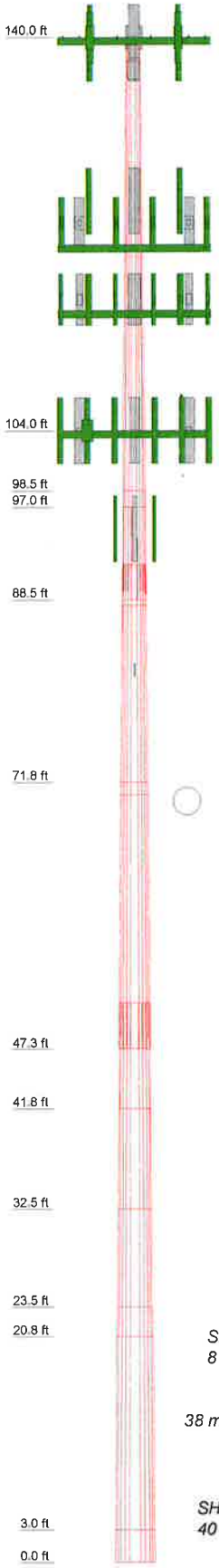
BASE LEVEL DRAWING

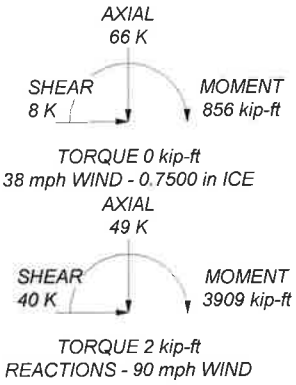


APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Length (ft)	36.0000	5.5000	1.5000	3.7500	8.0000	16.2500	1.1667	23.3333	9.7500	9.2500	9.0000	2.7500	17.7500	3.0000
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.3787	0.6420	0.4933	0.5565	0.6716	0.7851	0.7176	0.7655	0.8008	0.8175	0.9506	0.8077	0.8586
Socket Length (ft)				3.2500				4.2500						
Top Dia (in)	16.0000	23.3090	24.4257	24.7303	24.8095	26.0576	29.3572	29.5941	32.0338	34.8235	36.7015	38.5288	39.0872	42.6909
Bot Dia (in)	23.3090	24.4257	24.7303	26.0576	26.4560	29.3572	29.5941	34.3320	34.8235	36.7015	38.5288	39.0872	42.6909	43.3000
Grade	A572-65							Reinf 56.77 ksi		Reinf 56.51 ksi	Reinf 56.27 ksi	Reinf 57.67 ksi	Reinf 53.44 ksi	Reinf 58.01 ksi
Weight (K)	1.9	0.5	0.3	1.2	0.6	3.2	0.3	5.7	2.7	2.8	3.0	1.1	6.3	1.2





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
TD-RRH8x20-25	140	(2) RR90-17-02DP w/ Mount Pipe	115
(3) ACU-A20-N	140	(2) S20070A1	115
APXVSPP18-C-A20 w/ Mount Pipe	140	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	140	ETW200VS12UB	115
TD-RRH8x20-25	140	(2) RR90-17-02DP w/ Mount Pipe	115
(3) ACU-A20-N	140	(2) S20070A1	115
APXVSPP18-C-A20 w/ Mount Pipe	140	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	140	ETW200VS12UB	115
TD-RRH8x20-25	140	(2) RR90-17-02DP w/ Mount Pipe	115
(3) ACU-A20-N	140	(2) S20070A1	115
APXVSPP18-C-A20 w/ Mount Pipe	140	APX16DWV-16DWV-S-E-A20 w/ Mount Pipe	115
APXVTM14-C-120 w/ Mount Pipe	140	Platform Mount [LP 1201-1]	115
Platform Mount [LP 1201-1]	140	LNX-6514DS-VTM w/ Mount Pipe	104
(2) 6' x 2" Mount Pipe	140	DB-T1-6Z-8AB-0Z	104
(2) 6' x 2" Mount Pipe	140	(2) FD9R6004/2C-3L	104
(2) 6' x 2" Mount Pipe	140	RRH2x60-700	104
800MHz 2X50W RRH W/FILTER	137	RRH2X60-PCS	104
TME-800MHZ RRH	137	RRH4X45-AWS4 B66	104
800MHz 2X50W RRH W/FILTER	137	(3) SBNHH-1D65B w/ Mount Pipe	104
TME-800MHZ RRH	137	LNX-6514DS-VTM w/ Mount Pipe	104
800MHz 2X50W RRH W/FILTER	137	(2) FD9R6004/2C-3L	104
TME-800MHZ RRH	137	ACUTIME 2000	104
Side Arm Mount [SO 101-3]	137	RRH2x60-700	104
TME-1900MHz RRH (65 MHz)	137	RRH2X60-PCS	104
TME-1900MHz RRH (65 MHz)	137	RRH4X45-AWS4 B66	104
TME-1900MHz RRH (65 MHz)	137	(3) SBNHH-1D65B w/ Mount Pipe	104
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	LNX-6514DS-VTM w/ Mount Pipe	104
(2) 7770.00 w/ Mount Pipe	121	(2) FD9R6004/2C-3L	104
(2) LGP21401	121	RRH2x60-700	104
(2) LGP21901	121	RRH2X60-PCS	104
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	RRH4X45-AWS4 B66	104
(2) 7770.00 w/ Mount Pipe	121	(3) SBNHH-1D65B w/ Mount Pipe	104
(2) LGP21401	121	DB-T1-6Z-8AB-0Z	104
(2) LGP21901	121	Platform Mount [LP 1201-1]	104
DC6-48-60-18-8F	121	APXV18-206517S-C w/ Mount Pipe	95
AM-X-CD-16-65-00T-RET w/ Mount Pipe	121	APXV18-206517S-C w/ Mount Pipe	95
(2) 7770.00 w/ Mount Pipe	121	APXV18-206517S-C w/ Mount Pipe	95
(2) LGP21401	121	Pipe Mount [PM 601-3]	95
(2) LGP21901	121	OG-860/1920/GPS-A	80
Platform Mount [LP 1201-1]	121	Side Arm Mount [SO 701-1]	80
ETW200VS12UB	115		

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 92.5%

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

Job: 140' MP; BIC Drive (SSUSA); Milford, CT			
Project: PJF# 37515-2876 (BU# 876342)			
Client: CCI	Drawn by: Jared Smith	App'd:	
Code: TIA/EIA-222-F	Date: 10/21/15	Scale: N	
Path:		Dwg No.	

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

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

Site Data

BU#:
Site Name:
App #:

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	54	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	56	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	6	in

Stiffener Data (Welding at both sides)		
Configuration:	Stiffened	
Weld Type:	Both	**
Groove Depth:	0.5	in **
Groove Angle:	45	degrees
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.3125	in
Width:	7.75	in
Height:	18	in
Thick:	1.25	in
Notch:	0.75	in
Grade:	65	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	43.3	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3379.7	ft-kips
Unfactored Axial, P:	41	kips
Unfactored Shear, V:	33.5	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	185.2 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	95.0% Pass

Base Plate Results — Shear Check Only

Base Plate Stress:	4.1 ksi
Allowable PL Bending Stress:	26.7 ksi
Base Plate Stress Ratio:	15.4% Pass

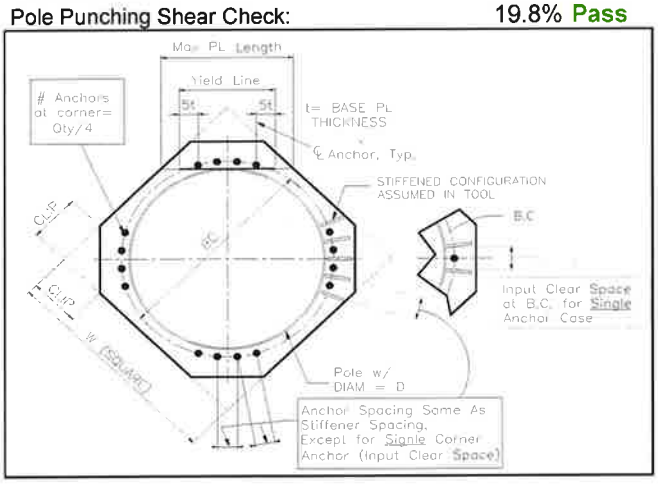
PL Ref. Data
Yield Line (in):
N/A, Roark
Max PL Length:
35.90

Stiffener Results

Horizontal Weld :	66.6% Pass
Vertical Weld:	73.9% Pass
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	11.0% Pass
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	31.0% Pass
Plate Comp. (AISC Bracket):	39.4% Pass

Pole Results

Pole Punching Shear Check:	19.8% Pass



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

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

v4.4 - Effective 7-12-13

Date: 10/21/2015
PJF Project: 37515-2876.002.7700
Client Ref. # 876342
Site Name: Site Name
Description: Description
Owner: Owner
Engineer: JWS

Asymmetric Anchor Rod Analysis

Moment =	3909	k-ft	TIA Ref.	F	Location =	Base Plate		
Axial =	49.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9	
Shear =	40.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	19							

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	25.5	54.00	0.00	3.98	162.94	157.81	157.81	0.00	195.00	80.9%
2	2.250	#18J A615 Gr 75	75	100	38.5	54.00	0.00	3.98	161.71	156.59	156.59	0.00	195.00	80.3%
3	2.250	#18J A615 Gr 75	75	100	51.5	54.00	0.00	3.98	163.03	157.91	157.91	0.00	195.00	81.0%
4	2.250	#18J A615 Gr 75	75	100	64.5	54.00	0.00	3.98	166.32	161.20	161.20	0.00	195.00	82.7%
5	2.250	#18J A615 Gr 75	75	100	115.5	54.00	0.00	3.98	178.71	173.58	173.58	0.00	195.00	89.0%
6	2.250	#18J A615 Gr 75	75	100	128.5	54.00	0.00	3.98	177.77	172.64	172.64	0.00	195.00	88.5%
7	2.250	#18J A615 Gr 75	75	100	141.5	54.00	0.00	3.98	174.71	169.58	169.58	0.00	195.00	87.0%
8	2.250	#18J A615 Gr 75	75	100	154.5	54.00	0.00	3.98	170.00	164.88	164.88	0.00	195.00	84.6%
9	2.250	#18J A615 Gr 75	75	100	205.5	54.00	0.00	3.98	155.00	149.87	149.87	0.00	195.00	76.9%
10	2.250	#18J A615 Gr 75	75	100	218.5	54.00	0.00	3.98	156.94	151.82	151.82	0.00	195.00	77.9%
11	2.250	#18J A615 Gr 75	75	100	231.5	54.00	0.00	3.98	161.68	156.56	156.56	0.00	195.00	80.3%
12	2.250	#18J A615 Gr 75	75	100	244.5	54.00	0.00	3.98	168.31	163.18	163.18	0.00	195.00	83.7%
13	2.250	#18J A615 Gr 75	75	100	295.5	54.00	0.00	3.98	190.00	184.87	184.87	0.00	195.00	94.8%
14	2.250	#18J A615 Gr 75	75	100	308.5	54.00	0.00	3.98	190.33	185.20	185.20	0.00	195.00	95.0%
15	2.250	#18J A615 Gr 75	75	100	321.5	54.00	0.00	3.98	188.07	182.94	182.94	0.00	195.00	93.8%
16	2.250	#18J A615 Gr 75	75	100	334.5	54.00	0.00	3.98	183.64	178.52	178.52	0.00	195.00	91.5%
17	2.250	Williams R71	127.7	150	30.0	66.30	0.00	4.14	205.90	200.56	200.56	0.00	273.50	73.3%
18	2.250	Williams R71	127.7	150	145.0	66.30	0.00	4.14	222.88	217.55	217.55	0.00	273.50	79.5%
19	2.250	Williams R71	127.7	150	235.0	66.30	0.00	4.14	208.17	202.84	202.84	0.00	273.50	74.2%
								76.11						

Foundation Loads:

Pole weight or tower leg compression =	49	(kips)
Horizontal load at top of pier =	40	(kips)
Overturning moment at top of pier=	3909	(ft-kips)

Design criteria:

Safety factor against overturning =	2	

Soil Properties:

Soil density =	130	(pcf)
Allowable soil bearing =	10	(ksf)
Depth to water table =	99	(ft)

Dimensions:

Pier shape (round or square)	S	("R" or "S")
Pier width =	7	(ft)
Pier height above grade =	0.5	(ft)
depth to bottom of footing =	10	(ft)
Footing thickness =	4	(ft)
Footing width =	22.5	(ft)
Footing length =	22.5	(ft)

Concrete:

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

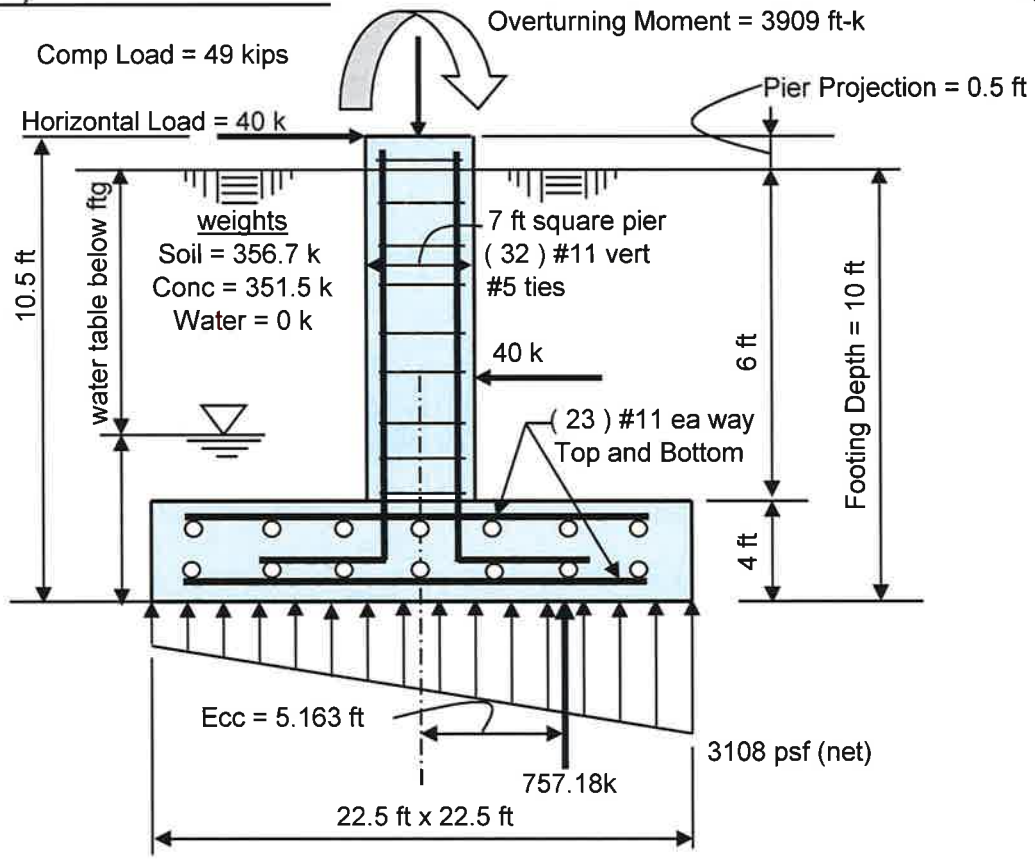
Reinforcing Steel:

	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#11	bar
quantity of pad rebar =	23	(ea direction)

Reinforcing Steel:

	Pier	
size of vert rebar in pier=	#11	bar
vertical rebar quantity =	32	
size of pier ties =	#5	bar
minimum cover over rebar =	3	inches

Total volume of concrete = 86.8 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 3.108 ksf Allowable Net Soil Bearing = 10 ksf **Soil Bearing Stress Ratio = 0.31 Okay**	Ult Bending Shear Capacity = 110 psi Ult Bending Shear Stress = 30 psi **Bending Shear Stress Ratio = 0.28 Okay**
Ftg Overturning Resistance = 8518 ft-kips Overturning Moment = 3909 ft-kips Required Overturning Safety Factor = 2 Overturning Safety Factor = 2.179 **Ratio = 0.92 Okay**	Pad Bending Moment Capacity= 6680 ft-k Pad Bending Moment = 1567 ft-k **Bending Moment Stress Ratio = 0.23 OK**

General Information:
==========
File Name: g:\tower\375_crown_castle\2015\37515-2876_876342_bic drive (ss...\37515-2876.002.7700.col
Project: 37515-2876.001.7805
Column: Engineer: CMM
Code: ACI 318-05 Units: English

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

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

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

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

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

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

Confinement: Tied; #5 ties with #11 bars, #5 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Rectangular
Pattern: All Sides Equal (Cover to longitudinal reinforcement)
Total steel area: As = 49.92 in^2 at rho = 0.71% (Note: rho < 1.0%)
Minimum clear spacing = 8.16 in

32 #11 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	49.00	5419.70	8608.63	1.588	10.37	80.29	0.02022	0.900

*** End of output ***

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

BU #876342; BIC DRIVE (SSUSA)

111 SCHOOL HOUSE ROAD, A/K/A BIC DRIVE
MILFORD, CONNECTICUT 06460
NEW HAVEN COUNTY
LAT: 41° 12' 46.06"; LONG: -73° 5' 7.1"
APP: 312913 REV. 1; WO: 1133853

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT
JASON.D'AMICO.VENDOR@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

WIND DESIGN DATA	
REFERENCE STANDARD	TIA/EIA-222-F
LOCAL CODE	2005 C.B.C.
BASIC WIND SPEED (FASTEST-MILE)	90 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	37.6 MPH
SERVICE WIND SPEED	50 MPH

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
SHAFT REINFORCING
FIELD WELDED ANCHOR BRACKETS
POST INSTALLED ANCHOR RODS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	SHAFT REINF. CHART AND DETAILS
S-5	BASE PLATE DETAILS
S-6	MISC DETAILS
S-7	MI CHECKLIST

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1127325

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600- Columbus, OH 43215
Phone 614.221.6679 www.paulJford.com

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

MODIFICATION OF AN EXISTING
140'-0" MONOPOLE
BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2876 002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

TITLE SHEET

T-1

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. **GENERAL NOTES**

1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.

1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK.

1.3. 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.

1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.

1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.

1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.

1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

1.8. 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 ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.

1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.

1.10. 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 RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.

1.11. 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.

1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.

1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "COI APPROVED REINFORCEMENT COMPONENTS" CATALOG.

1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
3434 ENCRETE LANE, MORAINE, OHIO 45439
PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. **STRUCTURAL STEEL**

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

2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):

2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."

2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.

2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"

2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):

2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."

2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"

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

2.3. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.

2.4. 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.

2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.

2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.

2.7. 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.

2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.

2.9. FIELD CUTTING OF STEEL:

2.9.1. IMPORTANT CUTTING AND WELDING SAFTEY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFTEY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE, "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.

2.9.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

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

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

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

6. **EPOXY GROUTED REINFORCING ANCHOR RODS**

6.1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BARS CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BARS ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL.

6.2. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A123.

6.3. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS, PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY. CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.

6.4. HILTI HIT RE-500 SD OR ITW RED HEAD EPCON G5 EPOXY SHALL BE USED TO ANCHOR THE BAR IN THE DRILL HOLES. IF THE DESIGNED EMBEDMENT IS GREATER THAN 12 FT, CONTRACTOR HAS THE OPTION TO USE PILE ANCHOR GROUT BY E-CHEM AS AN ALTERNATE. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO THE EOR FOR REVIEW PRIOR TO CONSTRUCTION.

6.5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHORS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING SHEETS FOR SPECIFIED ANCHOR ROD TARGET TENSION LOAD.

6.6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED THE CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

7. **TOUCH UP OF GALVANIZING**

7.1. THE CONTRACTOR SHALL TOUCH UP ANY AND ALL AREAS OF GALVANIZING ON THE EXISTING STRUCTURE OR NEW COMPONENTS THAT ARE DAMAGED OR ABRADED DURING CONSTRUCTION. GALVANIZED SURFACES DAMAGED DURING TRANSPORTATION OR ERECTION AND ASSEMBLY AS WELL AS ANY AND ALL ABRASIONS, CUTS, FIELD DRILLING, AND ALL FIELD WELDING SHALL BE TOUCHED UP WITH TWO (2) COATS OF ZRC COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS, DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.

7.2. CONTRACTOR SHALL CLEAN AND PREPARE ALL FIELD WELDS ON GALVANIZED AND PRIME PAINTED SURFACES FOR TOUCH-UP COATING IN ACCORDANCE WITH AWS D1.1. CROWN CASTLE'S TESTING AGENCY SHALL VERIFY THE PREPARED SURFACE PRIOR TO APPLICATION OF THE TOUCH-UP COATING.

7.3. CROWN CASTLE'S TESTING AGENCY SHALL TEST AND VERIFY THE COATING THICKNESS AFTER THE CONTRACTOR HAS APPLIED THE ZRC COLD GALVANIZING COMPOUND AND IT HAS SUFFICIENTLY DRIED. AREAS FOUND TO BE ADEQUATELY COATED, SHALL BE RE-COATED BY THE CONTRACTOR AND RE-TESTED BY THE TESTING AGENCY.

8. **HOT-DIP GALVANIZING**

8.1. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL MEMBERS AND ALL STEEL ACCESSORIES, BOLTS, WASHERS, ETC. PER ASTM A123 OR PER ASTM A153, AS APPROPRIATE.

8.2. PROPERLY PREPARE STEEL ITEMS FOR GALVANIZING. DRILL OR PUNCH WEEP AND/OR DRAINAGE HOLES WITH EOR APPROVAL OF LOCATIONS.

8.3. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION IS COMPLETED AND PRIOR TO FIELD INSTALLATION.

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

9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.

9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.

9.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT. ACCORDING TO ANSI/TIA-222-G-2-2009 SECTION 14.2, "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

PJF PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

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

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

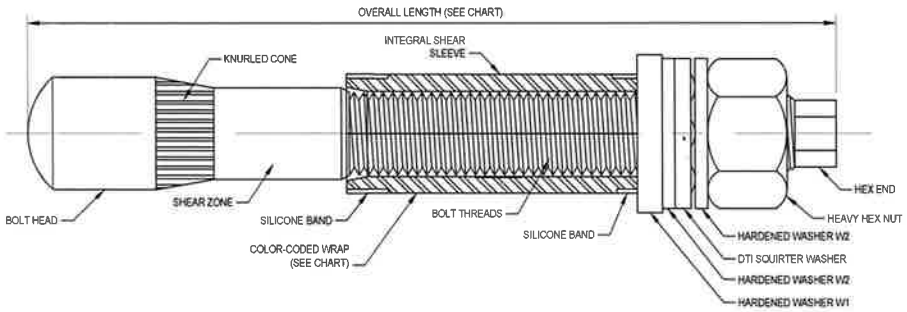
BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2876.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

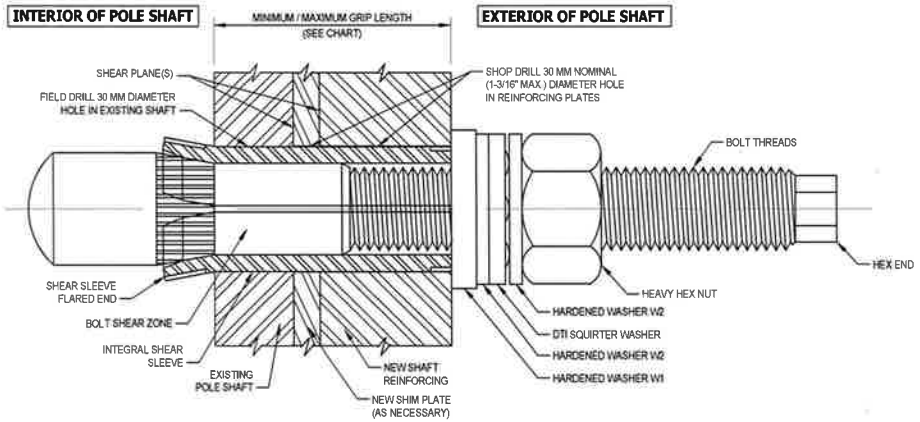
GENERAL NOTES

S-1

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



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



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 / S-2A

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

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

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

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

BOLT TIGHTENING AND INSPECTION 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.

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

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

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

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MODIFICATION OF AN EXISTING
140'-0" MONOPOLE
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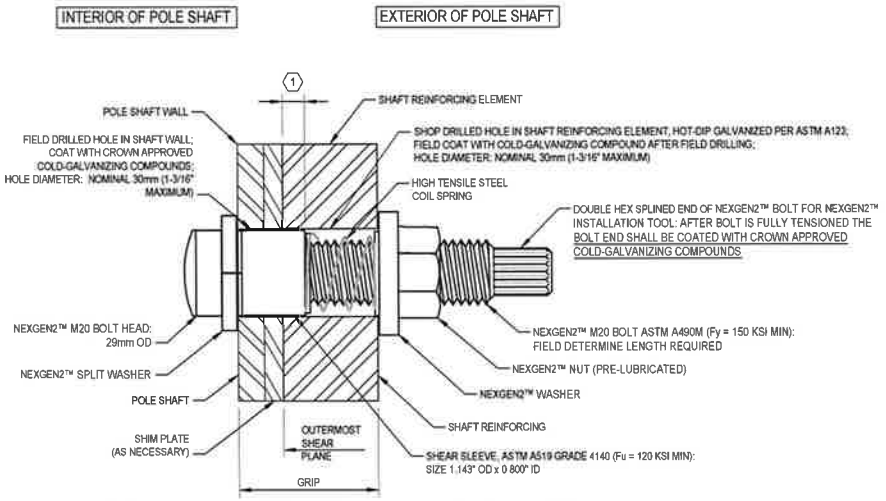
FORGBolt™ DETAILS

S-2A

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

① NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL ① S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

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

BOLT TIGHTENING AND INSPECTION NOTES:
1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND.

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

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

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

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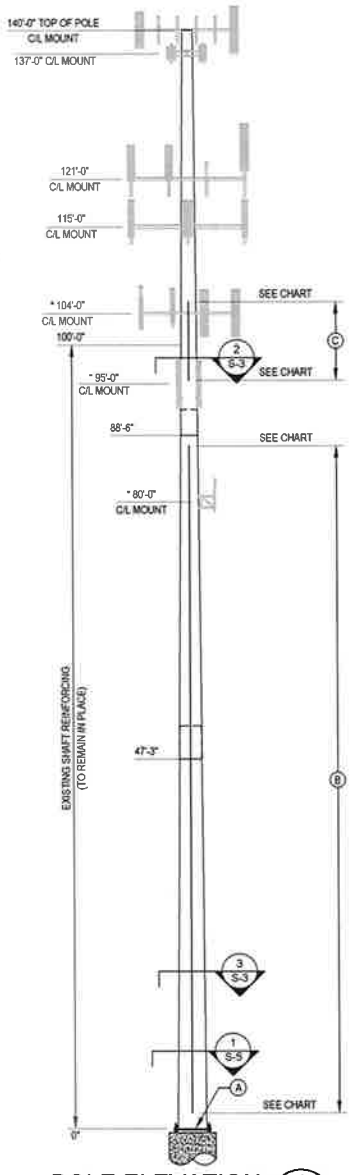
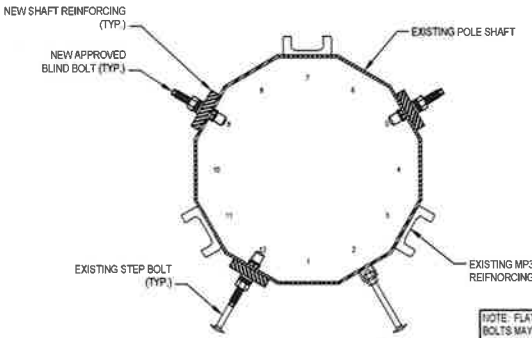
NEXGEN2™ BOLT DETAIL

S-2B



POLE ELEVATION 1 / S-3

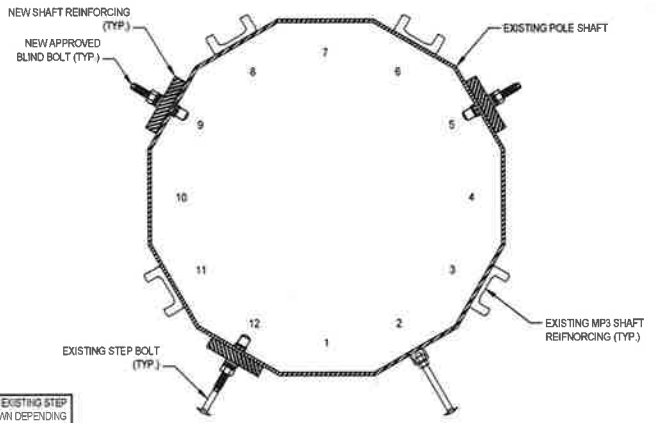
* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING



SECTION 2 / S-3
EL. 98'-0"

NOTE: FLAT LOCATION OF THE EXISTING STEP BOLTS MAY DIFFER FROM SHOWN DEPENDING ON ELEVATION. CONTRACTOR SHALL REMOVE AND REPLACE STEP BOLTS AS REQUIRED FOR REINFORCING INSTALLATION

NOTE: SHAFT REINFORCING MAY NEED TO BE INSTALLED OFF-CENTER OF THE FLAT FOR FIT-UP.



SECTION 3 / S-3
EL. 20'-0"

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (ksi)	POLE SHAPE
1	51.50	0.2500	39.00	16.000	26.456	A572-65	12-SIDED
2	44.50	0.3125	51.00	25.296	34.332	A572-65	12-SIDED
3	51.50	0.3750		32.844	43.300	A572-65	12-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

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

MODIFICATIONS:

(A) INSTALL NEW ANCHOR RODS AND BRACKETS AT BASE PLATE. SEE SHEET S-4.

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

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PH: (724) 416-2000

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2876.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

MONOPOLE PROFILE

S-3

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
2'-0"	35'-6"	F12, F5 & F9	1-1/4" x 6-1/2" WCFP #1	33'-6"	3	29	87	0	12	19"	2779 LBS.
35'-7"	70'-7"	F12, F5 & F9	CCI-AFP-06010035	35'-0"	3	42	126	10	10	16"	2144 LBS.
70'-8"	90'-8"	F12, F5 & F9	CCI-AFP-06010020	20'-0"	3	31	93	10	10	16"	1225 LBS.
95'-6"	125'-6"	F12, F5 & F9	CCI-SFP-04510010	10'-0"	3	16	48	6	6	20"	459 LBS.
							354				6607 LBS.

NOTES:

1.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.

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

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

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

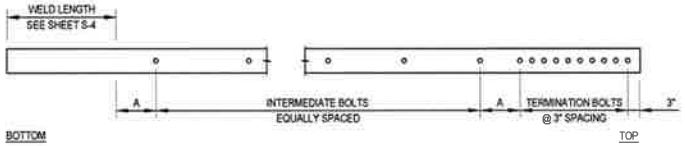
5.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART								
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
35'-7"	1"	6"	6'-1"	3	0"	0"	22	373 LBS.
70'-8"	1"	6"	5'-7"	3	0"	0"	20	342 LBS.
						0"		715 LBS.

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

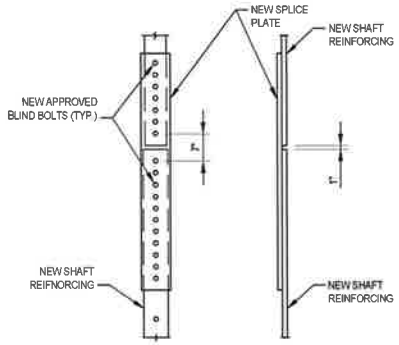
NEW SHIM CHART				
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
27	12	6"	6"	1-1/4"

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



CUSTOM WELDED BAR DETAIL

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



DETAIL 1 / S-4

SCALE: NTS

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

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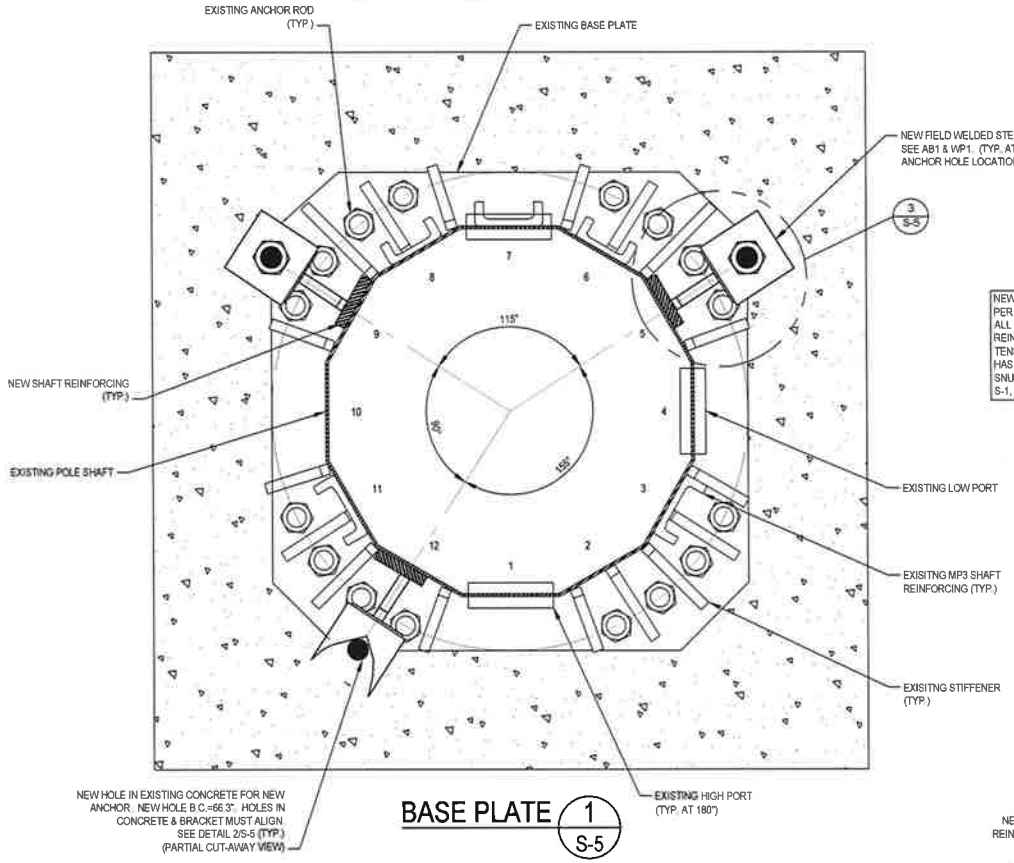
SHAFT REINFORCING CHART & DETAILS

S-4

BASE SPECIFICATIONS	
BASE PLATE:	56" SQUARE; 3" THK.; Fy=50 KSI
ANCHOR RODS:	(16) 2 1/4"ø; A615 GRADE 75; 54" B.C.

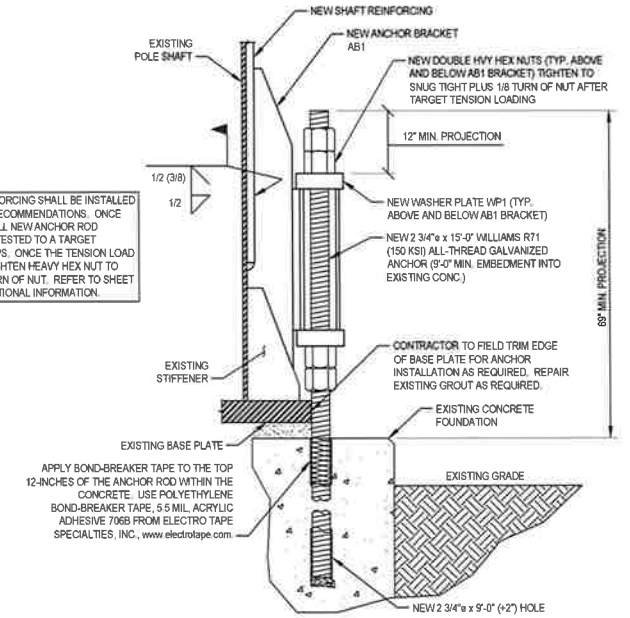
NOTE: SHAFT REINFORCING MAY NEED TO BE INSTALLED OFF-CENTER OF THE FLAT FOR FIT-UP



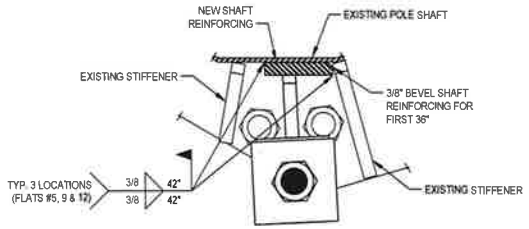
BASE PLATE 1 S-5

NEW ANCHOR RODS				
PART #	DIAMETER (IN)	LENGTH (IN)	MATERIAL	EMBEDMENT DEPTH (IN)
CUSTOM	2 1/4	180	WILLIAMS R71	72

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE TESTED TO A TARGET TENSION LOAD OF 310 KIPS. ONCE THE TENSION LOAD HAS BEEN RELEASED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-1, SECTION 6 FOR ADDITIONAL INFORMATION.



NEW ANCHOR & BRACKET DETAIL 2 S-5



DETAIL 3 S-5

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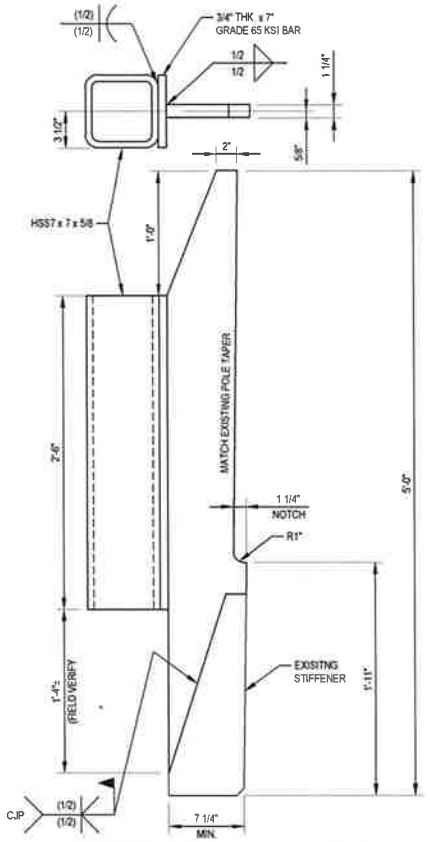
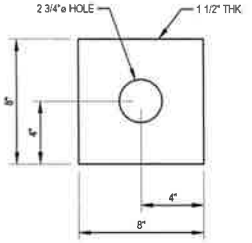
BASE PLATE DETAILS

S-5



ANCHOR BRACKET MK~AB1

(3 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 65 KSI)



WASHER PLATE MK~WP1

(6 REQUIRED) (Fy = 50 KSI)

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MISC DETAILS

S-6

MODIFICATION INSPECTION NOTES:

1. GENERAL
   - 1.1. THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE EOR.
   - 1.2. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.
2. MI INSPECTOR
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN CASTLE.
3. GENERAL CONTRACTOR
   - 3.1. THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.
4. RECOMMENDATIONS
   - 4.1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
     - 4.1.1. IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
     - 4.1.2. THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
     - 4.1.3. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS.
     - 4.1.4. IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
     - 4.1.5. WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.
5. CANCELLATION OR DELAYS IN SCHEDULED MI
   - 5.1. IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, CROWN CASTLE SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF CROWN CASTLE CONTRACTS DIRECTLY FOR A THIRD PARTY MI. EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.
6. CORRECTION OF FAILING MI'S
   - 6.1. IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH CROWN CASTLE TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:
     - 6.1.1. CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
     - 6.1.2. OR, WITH CROWN CASTLE'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION.
7. MI VERIFICATION INSPECTIONS
   - 7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.
8. PHOTOGRAPHS
   - 8.1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
     - 8.1.1. PRECONSTRUCTION GENERAL SITE CONDITION
     - 8.1.2. PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - 8.1.3. RAW MATERIALS
     - 8.1.4. PHOTOS OF ALL CRITICAL DETAILS
     - 8.1.5. FOUNDATION MODIFICATIONS
     - 8.1.6. WELD PREPARATION
     - 8.1.7. BOLT INSTALLATION AND TORQUE
     - 8.1.8. FINAL INSTALLED CONDITION
     - 8.1.9. SURFACE COATING REPAIR
     - 8.1.10. POST CONSTRUCTION PHOTOGRAPHS
     - 8.1.11. FINAL INFIELD CONDITION
     - 8.1.12. PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
     - 8.1.13. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE REFER TO ENG-SOW-10007.
9. INSPECTION AND TESTING
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   - 9.6. GENERAL
     - 9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. FOUNDATIONS AND SOIL PREPARATION- (NOT REQUIRED)
   - 9.8. CONCRETE TESTING PER ACI- (NOT REQUIRED)
   - 9.9. STRUCTURAL STEEL
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009.
     - 9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.8. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. WELDING:
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
       - 9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
       - 9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   - 9.11. REPORTS:
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
N/A	FABRICATOR NDE INSPECTION
N/A	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

PJF PAUL J. FORD & COMPANY
250 E Broad St. Ste 600 Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

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

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2876.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

MI CHECKLIST

S-7

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

BU #876342; BIC DRIVE (SSUSA)

111 SCHOOL HOUSE ROAD, A/K/A BIC DRIVE
MILFORD, CONNECTICUT 06460
NEW HAVEN COUNTY
LAT: 41° 12' 46.06"; LONG: -73° 5' 7.1"
APP: 312913 REV. 1; WO: 1133853

PROJECT CONTACTS

STRUCTURE OWNER:
CROWN CASTLE
MOD PM: DAN VADNEY AT DAN.VADNEY@CROWNCASTLE.COM
PH: (518) 373-3510
MOD CM: JASON D'AMICO AT
JASON.D'AMICO.VENDOR@CROWNCASTLE.COM
PH: (860) 209-0104

ENGINEER OF RECORD:
PJFMOD@PJFWEB.COM

WIND DESIGN DATA	
REFERENCE STANDARD	TIA/EIA-222-F
LOCAL CODE	2005 C.B.C.
BASIC WIND SPEED (FASTEST-MILE)	90 MPH
ICE THICKNESS	0.75 IN
ICE WIND SPEED	37.6 MPH
SERVICE WIND SPEED	50 MPH

THIS PROJECT INCLUDES THE FOLLOWING ITEMS
SHAFT REINFORCING
FIELD WELDED ANCHOR BRACKETS
POST INSTALLED ANCHOR RODS

SHEET INDEX	
SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET
S-1	GENERAL NOTES
S-2A	FORGBOLT™ DETAILS
S-2B	NEXGEN2™ BOLT DETAIL
S-3	MONOPOLE PROFILE
S-4	SHAFT REINF. CHART AND DETAILS
S-5	BASE PLATE DETAILS
S-6	MISC DETAILS
S-7	MI CHECKLIST

THE ASSOCIATED FAILING SA WO NUMBER FOR THIS PROJECT IS 1127325

ATTENTION ALL CONTRACTORS, ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT (800) 788-7011.

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30930
LICENSED
PROFESSIONAL ENGINEER
10.21.15

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

MODIFICATION OF AN EXISTING
140'-0" MONOPOLE
BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2878.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	KAS
DATE:	10/20/2015

TITLE SHEET

T-1

37515-2878.002.DWG

MONOPOLE RETROFIT PROJECT MASTER NOTES DOCUMENT (REV. 3, 02/05/2015)

1. **GENERAL NOTES**
   - 1.1. THE MONOPOLE STRUCTURE IN ITS EXISTING CONDITION DOES NOT HAVE THE STRUCTURAL CAPACITY TO CARRY ALL OF THE PROPOSED AND EXISTING LOADS FROM THE ATTACHED STRUCTURAL MODIFICATION REPORT AT THE REQUIRED MINIMUM WIND SPEEDS. DO NOT INSTALL ANY NEW LOADS UNTIL THE MONOPOLE REINFORCING SYSTEM IS COMPLETELY AND SUCCESSFULLY INSTALLED.
   - 1.2. THESE DRAWINGS WERE PREPARED FROM INFORMATION PROVIDED BY CROWN CASTLE. THE INFORMATION PROVIDED HAS NOT BEEN FIELD VERIFIED BY THE ENGINEER OF RECORD (EOR) FOR ACCURACY AND THEREFORE DISCREPANCIES BETWEEN THESE DRAWINGS AND ACTUAL SITE CONDITIONS SHOULD BE ANTICIPATED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS. THE CONTRACTOR SHALL COORDINATE WITH THE PROJECT DRAWINGS AND THEIR FIELD VERIFIED CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL IMMEDIATELY REPORT ANY AND ALL DISCREPANCIES TO THE EOR AND CROWN CASTLE BEFORE PROCEEDING WITH THE WORK.
   - 1.3. 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.
   - 1.4. THIS STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE INSTALLATION OF THE REINFORCING REPAIR SYSTEM HAS BEEN SUCCESSFULLY COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO ENSURE THE SAFETY AND STABILITY OF THE MONOPOLE AND ITS COMPONENT PARTS DURING FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF WHATEVER TEMPORARY BRACING, GUYS OR TIE DOWNS THAT MAY BE NECESSARY. SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.
   - 1.5. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/TIA-1019 (LATEST EDITION), OSHA AND GENERAL INDUSTRY STANDARDS. ALL RIGGING PLANS SHALL ADHERE TO ANSI/TIA-1019 (LATEST EDITION) INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION.
   - 1.6. OBSERVATION VISITS TO THE SITE BY CROWN CASTLE AND/OR THE EOR SHALL NOT INCLUDE INSPECTIONS OF THE PROTECTIVE MEASURES OR THE CONSTRUCTION PROCEDURES. ANY SUPPORT SERVICES PERFORMED BY THE EOR DURING CONSTRUCTION ARE SOLELY FOR THE PURPOSE OF ACHIEVING GENERAL CONFORMANCE WITH THE CONTRACT DOCUMENTS. THEY DO NOT GUARANTEE THE CONTRACTOR'S PERFORMANCE AND SHALL NOT BE CONSTRUED AS SUPERVISION OF CONSTRUCTION.
   - 1.7. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY CROWN CASTLE AND EOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF MATERIALS AND EQUIPMENT BEING SUBSTITUTED.
   - 1.8. 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 ENSURE THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK AS WELL AS CROWN CASTLE SAFETY GUIDELINES.
   - 1.9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING AND NEW COAXIAL CABLES AND OTHER EQUIPMENT DURING CONSTRUCTION.
   - 1.10. 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 RELOCATED, REPLACED, OR RE-INSTALLED AS REQUIRED AFTER THE REINFORCING IS SUCCESSFULLY COMPLETED. THE CONTRACTOR SHALL IDENTIFY AND COORDINATE THESE ITEMS PRIOR TO CONSTRUCTION WITH CROWN CASTLE, TESTING AGENCY, AND EOR.
   - 1.11. 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.
   - 1.12. THE CLIMBING FACILITIES, SAFETY CLIMB AND ALL PARTS THEREOF SHALL NOT BE IMPEDED, MODIFIED OR ALTERED WITHOUT THE EXPRESS APPROVAL OF THE EOR.
   - 1.13. FOR STANDARD CROWN PARTS SEE THE MOST RECENT VERSION OF THE "CCI APPROVED REINFORCEMENT COMPONENTS" CATALOG.
   - 1.14. ALL SOLUTIONS FOR THE REPLACEMENT, RELOCATION OR MODIFICATION OF THE SAFETY CLIMB AND/OR ANY OF THE MONOPOLE CLIMBING FACILITIES SHALL BE COORDINATED WITH TUF-TUG PRODUCTS. CONTACT DETAILS:
     3434 ENCRETE LANE, MORAINE, OHIO 45439
     PHONE: 937-299-1213 EMAIL: TUFTUG@AOL.COM

2. **STRUCTURAL STEEL**
   - 2.1. STRUCTURAL STEEL MATERIALS, FABRICATION, DETAILING, AND WORKMANSHIP SHALL CONFORM TO THE LATEST EDITION OF THE FOLLOWING REFERENCE STANDARDS:
     - 2.1.1. BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC):
       - 2.1.1.1. "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
       - 2.1.1.2. "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS," AS APPROVED BY THE RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS.
       - 2.1.1.3. "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"
     - 2.1.2. BY THE AMERICAN WELDING SOCIETY (AWS):
       - 2.1.2.1. "STRUCTURAL WELDING CODE – STEEL D1.1."
       - 2.1.2.2. "STANDARD SYMBOLS FOR WELDING, BRAZING, AND NONDESTRUCTIVE EXAMINATION"
   - 2.2. ALL STRUCTURAL BOLTS SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM HIGH STRENGTH BOLTS', DEC. 31, 2009.
   - 2.3. ANY MATERIAL OR WORKMANSHIP WHICH IS OBSERVED TO BE DEFECTIVE OR INCONSISTENT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED, MODIFIED, OR REPLACED AT THE CONTRACTOR'S EXPENSE.
   - 2.4. 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.
   - 2.5. ALL WELDED CONNECTIONS SHALL BE MADE BY WELDERS CERTIFIED BY AWS. CONTRACTOR SHALL SUBMIT WELDERS' CERTIFICATION AND QUALIFICATION DOCUMENTATION TO CROWN CASTLE'S TESTING AGENCY FOR REVIEW AND APPROVAL PRIOR TO CONSTRUCTION.
   - 2.6. STRUCTURAL STEEL PLATES SHALL CONFORM TO ASTM A572 GRADE 65(FY = 65 KSI MIN.) UNLESS NOTED OTHERWISE ON THE DRAWINGS.
   - 2.7. 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.
   - 2.8. NO WELDING SHALL BE DONE TO THE EXISTING STRUCTURE WITHOUT THE PRIOR APPROVAL AND SUPERVISION OF THE TESTING AGENCY.
   - 2.9. FIELD CUTTING OF STEEL:
     - 2.9.1. IMPORTANT CUTTING AND WELDING SAFTEY GUIDELINES: THE CONTRACTOR SHALL FOLLOW ALL CROWN CASTLE CUTTING, WELDING, FIRE PREVENTION AND SAFTEY GUIDELINES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL OBTAIN A COPY OF THE CURRENT CROWN CASTLE GUIDELINES. PER THE 12-01-2005 CROWN CASTLE DIRECTIVE: "ALL CUTTING AND WELDING ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH CROWN CASTLE POLICY 'CUTTING AND WELDING SAFETY PLAN' (DOC # ENG-PLN-10015) ON AN ONGOING BASIS THROUGHOUT THE ENTIRE LIFE OF THE PROJECT". ANY DAMAGE TO THE COAX CABLES, AND/OR OTHER EQUIPMENT AND/OR THE STRUCTURE, RESULTING FROM THE CONTRACTOR'S ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
     - 2.9.2. ALL REQUIRED CUTS SHALL BE CUT WITHIN THE DIMENSIONS SHOWN ON THE DRAWINGS. NO CUTS SHALL EXTEND BEYOND THE OUTLINE OF THE DIMENSIONS SHOWN ON THE DRAWINGS. ALL CUT EDGES SHALL BE GROUND SMOOTH AND DE-BURRED. CUT EDGES THAT ARE TO BE FIELD WELDED SHALL BE PREPARED FOR FIELD WELDING PER AWS D1.1 AND AS SHOWN ON THE DRAWINGS. CONTRACTOR TO AVOID 90 DEGREE CORNERS. IT MAY BE NECESSARY TO DRILL STARTER HOLES AS REQUIRED TO MAKE THE CUTS.

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

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

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

6. **EPOXY GROUTED REINFORCING ANCHOR RODS**
   - 6.1. UNLESS OTHERWISE NOTED, REINFORCING ANCHOR RODS SHALL BE 150 KSI ALL-THREAD BARS CONFORMING TO ASTM A722. RECOMMENDED MANUFACTURERS/SUPPLIERS OF 150 KSI ALL-THREAD BARS ARE WILLIAMS FORM ENGINEERING CORPORATION AND DYWIDAG SYSTEMS INTERNATIONAL.
   - 6.2. ALL REINFORCING ANCHOR RODS SHALL BE HOT DIP GALVANIZED PER ASTM A123.
   - 6.3. THE CORE-DRILLED HOLES IN THE CONCRETE FOR THE ANCHOR RODS SHALL BE CLEAN AND DRY, AND OTHERWISE PROPERLY PREPARED ACCORDING TO THE ANCHOR ROD AND EPOXY MANUFACTURERS' INSTRUCTIONS, PRIOR TO PLACEMENT OF ANCHOR RODS AND EPOXY. CONTRACTOR SHALL FOLLOW ALL ANCHOR ROD AND EPOXY MANUFACTURER RECOMMENDATIONS REGARDING HANDLING OF RODS, EPOXY, ACCEPTABLE AMBIENT TEMPERATURE RANGE DURING INSTALLATION AND POST-INSTALLATION CURING, THE EFFECT OF TEMPERATURE ON EPOXY CURING TIME, PREPARATION OF HOLE, ETC.
   - 6.4. HILTI HIT RE-500 SD OR ITW RED HEAD EPCON G5 EPOXY SHALL BE USED TO ANCHOR THE BAR IN THE DRILL HOLES. IF THE DESIGNED EMBEDMENT IS GREATER THAN 12 FT, CONTRACTOR HAS THE OPTION TO USE PILE ANCHOR GROUT BY E-CHEM AS AN ALTERNATE. IF CONTRACTOR WISHES TO USE A DIFFERENT EPOXY, A REQUEST INCLUDING THE EPOXY TECHNICAL DATA SHEET(S) SHALL BE SUBMITTED TO THE EOR FOR REVIEW PRIOR TO CONSTRUCTION.
   - 6.5. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN INSTALLED AND ALL EPOXY AND GROUT HAVE CURED (IF BASE PLATE AND/OR BEARING PLATES HAVE BEEN GROUTED PRIOR TO TESTING), ALL REINFORCING ANCHORS SHALL BE LOAD TESTED PER CROWN CASTLE ENGINEERING DOCUMENT #ENG-PRC-10119. REFER TO THE NEW ANCHOR & BRACKET DETAIL ON FOLLOWING SHEETS FOR SPECIFIED ANCHOR ROD TARGET TENSION LOAD.
   - 6.6. ONCE THE REINFORCING ANCHOR RODS HAVE BEEN SUCCESSFULLY LOAD TESTED AND APPROVED THE CONTRACTOR SHALL TIGHTEN ALL HEAVY HEX ANCHOR NUTS TO SNUG TIGHT PLUS 1/8 TURN OF NUT.

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

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

9. **PERPETUAL INSPECTION AND MAINTENANCE BY THE OWNER**
   - 9.1. AFTER THE CONTRACTOR HAS SUCCESSFULLY COMPLETED THE INSTALLATION OF THE MONOPOLE REINFORCING SYSTEM AND THE WORK HAS BEEN ACCEPTED BY CROWN CASTLE, CROWN CASTLE WILL BE RESPONSIBLE FOR THE LONG TERM AND PERPETUAL INSPECTION AND MAINTENANCE OF THE POLE AND REINFORCING SYSTEM.
   - 9.2. ANY FIELD WELDED CONNECTIONS ARE SUBJECT TO CORROSION DAMAGE AND DETERIORATION IF THEY ARE NOT PROPERLY MAINTAINED AND COVERED WITH CORROSION PREVENTIVE COATING SUCH AS THE ZRC GALVANIZING COMPOUND SPECIFIED PREVIOUSLY. THE STRUCTURAL LOAD CARRYING CAPACITY OF THE REINFORCED POLE SYSTEM IS DEPENDENT UPON THE INSTALLED SIZE AND QUALITY, MAINTAINED SOUND CONDITION AND STRENGTH OF THESE FIELD WELDED CONNECTIONS. ANY CORROSION OF, DAMAGE TO, FATIGUE, FRACTURE, AND/OR DETERIORATION OF THESE WELDS AND/OR THE EXISTING GALVANIZED STEEL POLE STRUCTURE AND THE WELDED COMPONENTS WILL RESULT IN THE LOSS OF STRUCTURAL LOAD CARRYING CAPACITY AND MAY LEAD TO FAILURE OF THE STRUCTURAL SYSTEM. THEREFORE, IT IS IMPERATIVE THAT CROWN CASTLE REGULARLY INSPECTS, MAINTAINS, AND REPAIRS AS NECESSARY, ALL OF THESE WELDS, CONNECTIONS, AND COMPONENTS FOR THE LIFE OF THE STRUCTURE.
   - 9.3. CROWN CASTLE SHALL REFER TO ANSI/TIA-222-G-2-2009, SECTION 14 AND ANNEX J FOR RECOMMENDATIONS FOR MAINTENANCE AND INSPECTION. THE FREQUENCY OF THE INSPECTION AND MAINTENANCE INTERVALS IS TO BE DETERMINED BY CROWN CASTLE BASED UPON ACTUAL SITE AND ENVIRONMENTAL CONDITIONS. THE EOR RECOMMENDS THAT A COMPLETE AND THOROUGH INSPECTION OF THE ENTIRE REINFORCED MONOPOLE STRUCTURAL SYSTEM BE PERFORMED YEARLY AND/OR AS FREQUENTLY AS CONDITIONS WARRANT, ACCORDING TO ANSI/TIA-222-G-2-2009 SECTION 14.2: "IT IS RECOMMENDED THAT THE STRUCTURE BE INSPECTED AFTER SEVERE WIND AND/OR ICE STORMS OR OTHER EXTREME LOADING CONDITIONS".

10-2015

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MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

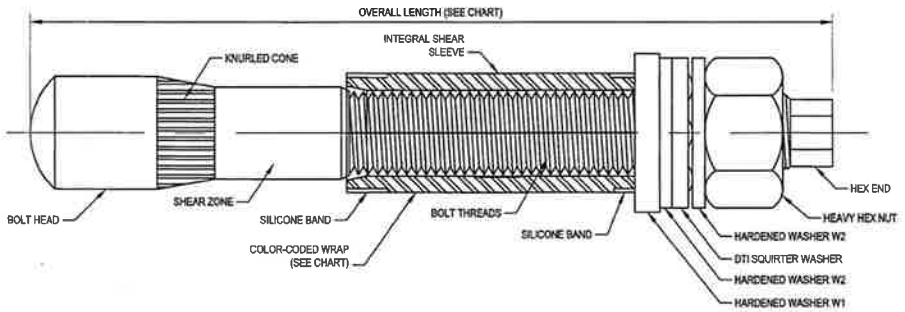
PROJECT No:	37515-2876.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	JWK
DATE:	10/20/2015

GENERAL NOTES

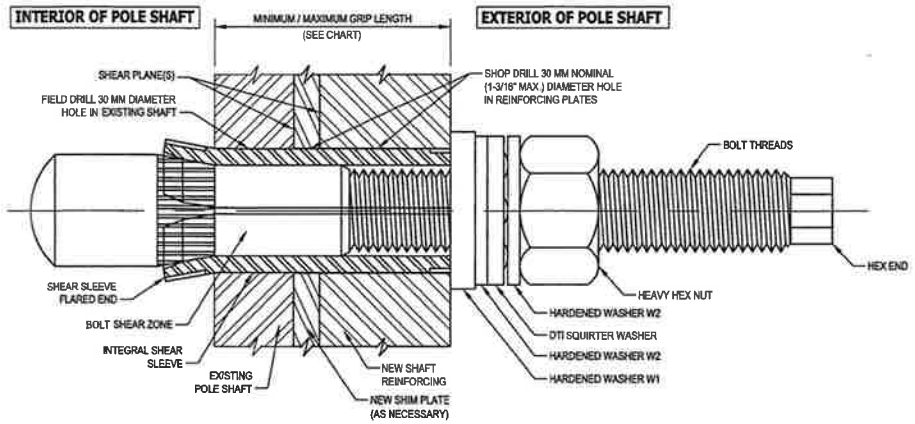
S-1

37515-2876.002.DWG

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



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



INSTALLED FORGBolt™ ASSEMBLY DETAIL 2 / S-2A

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

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

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

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

BOLT TIGHTENING AND INSPECTION 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.

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

CONTAINS PROPRIETARY INFORMATION PATENT PENDING

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

STATE OF CONNECTICUT JUSTIN T. KLINE No. 30301 LICENSED PROFESSIONAL ENGINEER 10.21.15

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

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE
BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2876.002.7706
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

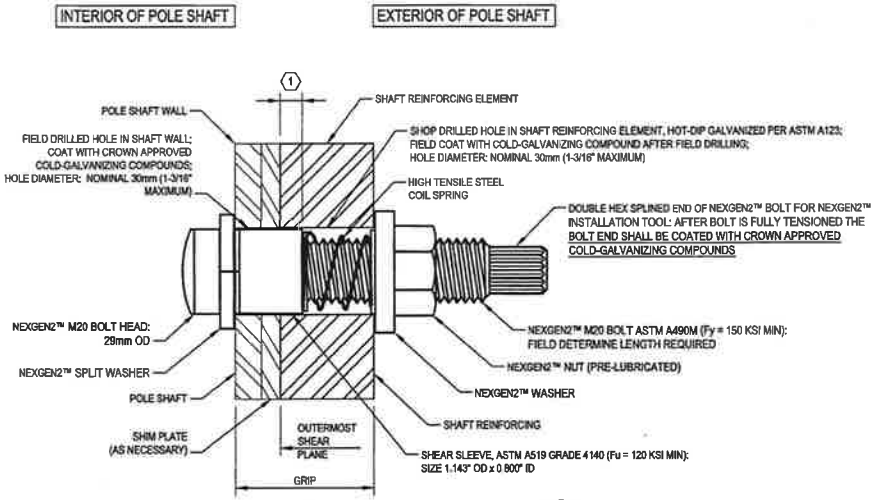
FORGBolt™ DETAILS

S-2A

37515-2876.002.DWG

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

① NOTE: SHEAR SLEEVE LENGTH: THE SHEAR SLEEVE SHALL PROJECT A MINIMUM OF 3/8" BEYOND THE OUTERMOST SHEAR PLANE. THE CONTRACTOR SHALL SUBMIT FABRICATION DRAWINGS SHOWING NEXGEN2™ BOLT LENGTHS AND SHEAR SLEEVE LENGTHS TO THE EOR FOR REVIEW AND APPROVAL.



TYPICAL NEXGEN2™ BOLT DETAIL ① S-2B

FOLLOW ALL MANUFACTURER / DISTRIBUTOR RECOMMENDATIONS FOR INSTALLATION, TIGHTENING, AND INSPECTION

BOLT HOLE NOTES:

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

BOLT TIGHTENING AND INSPECTION NOTES:

1. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSTALLED AND TIGHTENED TO THE PRETENSIONED CONDITION ACCORDING TO THE REQUIREMENTS OF SECTION 8.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. PER SECTION 8.2.3: ALL FASTENER ASSEMBLIES SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS IN AISC SECTION 8.1 WITHOUT SEVERING THE SPLINED END AND WITH WASHERS POSITIONED AS REQUIRED IN AISC SECTION 6.2. PER REQUIREMENTS IN SECTION 8.1: PRIOR TO BOLT PRETENSIONING, THE JOINT SHALL FIRST BE COMPACTED TO THE SNUG-TIGHT CONDITION. SNUG TIGHT IS THE CONDITION THAT EXISTS WHEN ALL OF THE PLIES IN THE CONNECTION HAVE BEEN PULLED INTO FIRM CONTACT BY THE BOLTS AND THE BOLTS HAVE BEEN TIGHTENED SUFFICIENTLY TO PREVENT THE REMOVAL OF THE NUTS WITHOUT THE USE OF A WRENCH. ONCE THE SNUG TIGHT CONDITION IS ACHIEVED, THEN THE BOLT ASSEMBLY CAN BE TIGHTENED TO THE PRETENSIONED CONDITION.
2. ALL NEXGEN2™ BOLT ASSEMBLIES SHALL BE INSPECTED ACCORDING TO THE REQUIREMENTS OF SECTION 9.2.3 OF THE AISC 'SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS', DEC. 31, 2009. NOTE THAT COMPLETE INSPECTION OF ALL NEXGEN2™ BOLT ASSEMBLIES IS REQUIRED IN ADDITION TO ROUTINE OBSERVATION.
3. ALL NEXGEN2™ BOLTS SHALL BE INSPECTED BY A QUALIFIED BOLT INSPECTOR PER NOTES 1 AND 2, ABOVE. DURING INSTALLATION, THE BOLT INSPECTOR SHALL VERIFY AND DOCUMENT: THE SHOP-DRILLED AND FIELD-DRILLED HOLE SIZES; THE INSTALLATION OF THE NEXGEN2™ BOLT ASSEMBLY, INCLUDING THE SHEAR SLEEVE PLACEMENT AND NUT LUBRICATION; AND THE CONTRACTOR'S TENSIONING PROCEDURE. THE BOLT INSPECTOR SHALL PROVIDE COMPLETE DOCUMENTATION OF ALL BOLTS AFTER TIGHTENING CLEARLY SHOWING THAT THE DOUBLE HEX SPLINED END OF THE BOLTS HAVE BEEN TWISTED OFF AND COATED WITH CROWN APPROVED COLD-GALVANIZING COMPOUND..

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

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

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

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

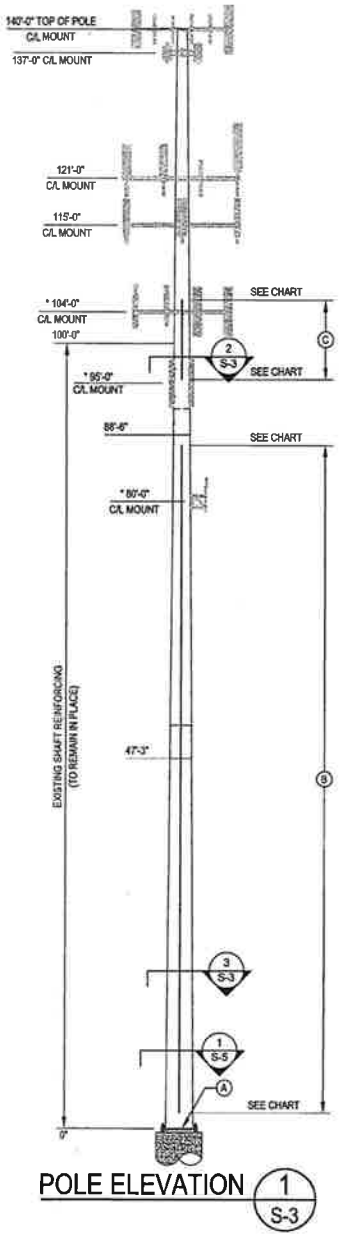
MODIFICATION OF AN EXISTING 140'-0" MONOPOLE
BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2878.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

NEXGEN2™ BOLT DETAIL

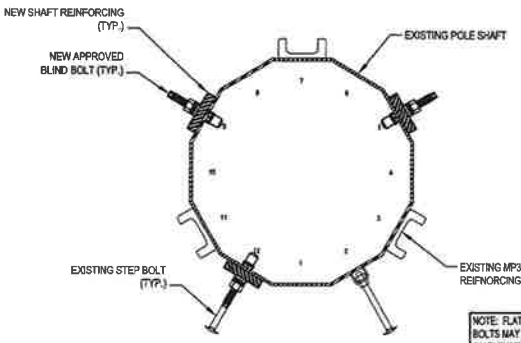
S-2B

37515-2878.002.DWG



POLE ELEVATION 1 / S-3

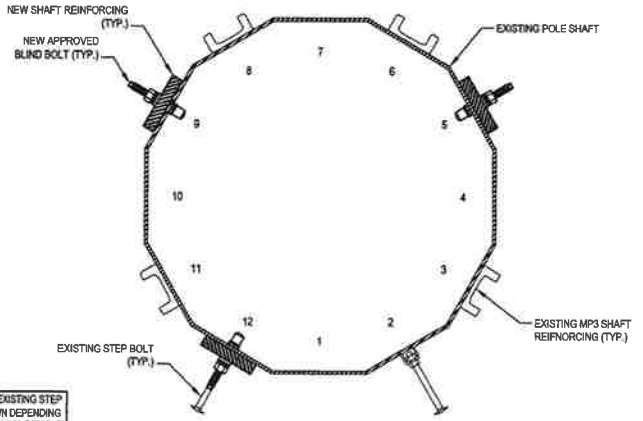
* EXISTING MOUNTS MAY NEED TO BE ADJUSTED, MOVED AND/OR TEMPORARILY SUPPORTED DURING THE INSTALLATION OF SHAFT REINFORCING



SECTION 2 / S-3
EL. 98'-0"

NOTE: FLAT LOCATION OF THE EXISTING STEP BOLTS MAY DIFFER FROM SHOWN DEPENDING ON ELEVATION. CONTRACTOR SHALL REMOVE AND REPLACE STEP BOLTS AS REQUIRED FOR REINFORCING INSTALLATION

NOTE: SHAFT REINFORCING MAY NEED TO BE INSTALLED OFF-CENTER OF THE FLAT FOR FIT-UP.



SECTION 3 / S-3
EL. 20'-0"

SHAFT SECTION DATA

SHAFT SECTION	SECTION LENGTH (FT)	PLATE THICKNESS (IN)	LAP SPLICE (IN)	DIAMETER ACROSS FLATS (IN) @ TOP	DIAMETER ACROSS FLATS (IN) @ BOTTOM	POLE GRADE (ksi)	POLE SHAPE
1	51.50	0.2500	39.00	16.000	26.456	A572-65	12-SIDED
2	44.50	0.3125	51.00	25.296	34.332	A572-65	12-SIDED
3	51.50	0.3750		32.844	43.300	A572-65	12-SIDED

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES

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

MODIFICATIONS:

(A) INSTALL NEW ANCHOR RODS AND BRACKETS AT BASE PLATE. SEE SHEET S-4.

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

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MONOPOLE PROFILE

S-3

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED PROFESSIONAL ENGINEER
10.21.15

37515-2878.002.DWG

NEW CCI FLAT PLATE (65 KSI) REINFORCING SCHEDULE											
BOTTOM ELEVATION	TOP ELEVATION	FLAT # / DEGREE SEPARATION	ELEMENT	ELEMENT LENGTH	ELEMENT QUANTITY	APPROXIMATE BOLTS PER ELEMENT	APPROXIMATE TOTAL BOLT QUANTITY	TERMINATION BOLTS (BOTTOM)	TERMINATION BOLTS (TOP)	MAXIMUM INTERMEDIATE BOLT SPACING	ESTIMATED TOTAL STEEL WEIGHT
2' - 0"	35' - 6"	F12, F5 & F9	1-1/4" x 6-1/2" WCFP #1	33' - 6"	3	29	87	0	12	19"	2779 LBS.
35' - 7"	70' - 7"	F12, F5 & F9	CCI-AFP-06010035	35' - 0"	3	42	126	10	10	16"	2144 LBS.
70' - 8"	90' - 6"	F12, F5 & F9	CCI-AFP-06010020	20' - 0"	3	31	93	10	10	16"	1225 LBS.
95' - 6"	105' - 6"	F12, F5 & F9	CCI-SFP-04510010	10' - 0"	3	16	48	6	6	20"	459 LBS.
							354				6607 LBS.

NOTES:

1.) ALL STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALTERNATIVELY, ALL NEW STIFFENER PLATE STEEL REINFORCING MAY BE COLD GALVANIZED AS FOLLOWS: APPLY A MINIMUM OF TWO COATS OF ZRC-BRAND ZINC-RICH COLD GALVANIZING COMPOUND. FILM THICKNESS PER COAT SHALL BE: WET 3.0 MILS; DRY 1.5 MILS. APPLY PER ZRC (MANUFACTURER) RECOMMENDED PROCEDURES. CONTACT ZRC AT 1-800-831-3275 FOR PRODUCT INFORMATION.

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

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

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

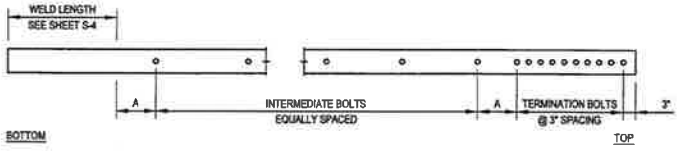
5.) ALL SHIMS SHALL BE ASTM A-36.

SPLICE PLATE INSTALLATION CHART								
ELEVATION	FLAT PLATE THICKNESS	FLAT PLATE WIDTH	FLAT PLATE LENGTH	FLAT PLATE QUANTITY	WELD LENGTH PER SIDE	TOTAL WELD LENGTH	BOLTS PER SPLICE*	TOTAL STEEL WEIGHT
35' - 7"	1"	6"	5' - 1"	3	0"	0"	22	373 LBS.
70' - 8"	1"	6"	5' - 7"	3	0"	0"	20	342 LBS.
						0"		715 LBS.

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

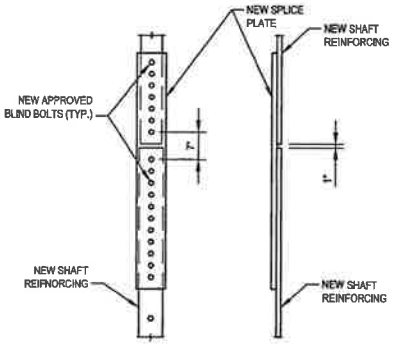
NEW SHIM CHART				
1/16" SHIM QUANTITY	1/4" SHIM QUANTITY	SHIM WIDTH	SHIM LENGTH	HOLE DIAMETER
27	12	6"	6"	1-1/4"

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



CUSTOM WELDED BAR DETAIL

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



DETAIL 1 / S-4

SCALE: NTS

10-21-15

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

37515-2878.002.DWG

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MODIFICATION OF AN EXISTING 140'-0" MONOPOLE

BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

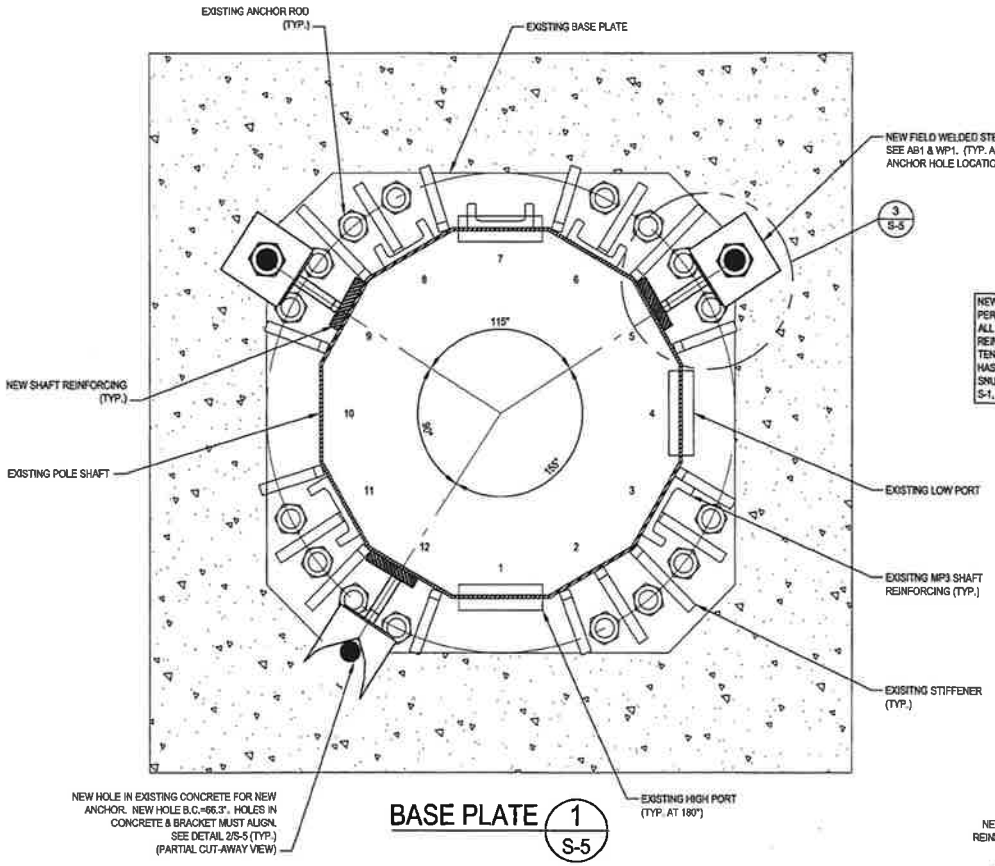
PROJECT No:	37515-2878.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

SHAFT REINFORCING CHART & DETAILS

S-4

BASE SPECIFICATIONS	
BASE PLATE:	56" SQUARE; 3" THK.; Fy=50 KSI
ANCHOR RODS:	(16) 2 1/4"ø; A615 GRADE 75; 54" B.C.

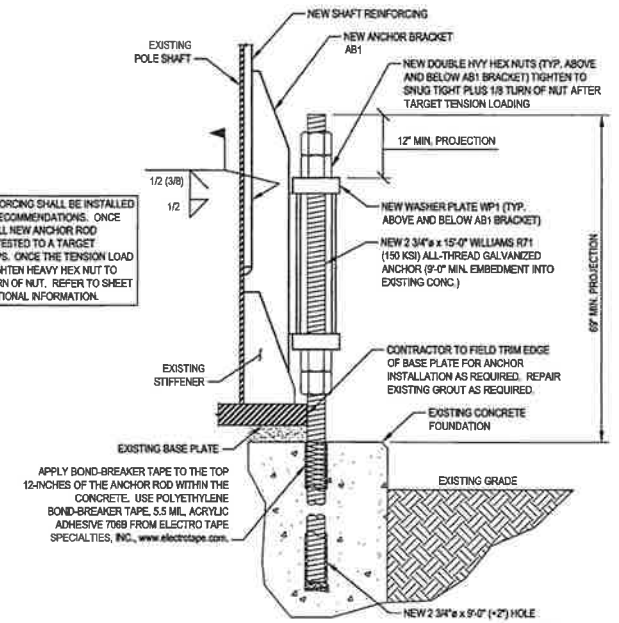
NOTE: SHAFT REINFORCING MAY NEED TO BE INSTALLED OFF-CENTER OF THE FLAT FOR FIT-UP.



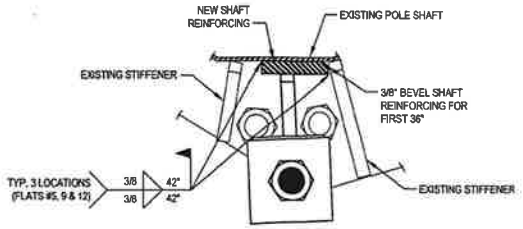
BASE PLATE 1 S-5

NEW ANCHOR RODS				
PART #	DIAMETER (IN)	LENGTH (IN)	MATERIAL	EMBEDMENT DEPTH (IN)
CUSTOM	2 1/4	180	WILLIAMS R71	72

NEW ANCHOR ROD REINFORCING SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. ONCE ALL RESIN HAS CURED, ALL NEW ANCHOR ROD REINFORCING SHALL BE TESTED TO A TARGET TENSION LOAD OF 310 KIPS. ONCE THE TENSION LOAD HAS BEEN RELEASED, TIGHTEN HEAVY HEX NUT TO SNUG TIGHT PLUS 1/8 TURN OF NUT. REFER TO SHEET S-1, SECTION 6 FOR ADDITIONAL INFORMATION.



NEW ANCHOR & BRACKET DETAIL 2 S-5



DETAIL 3 S-5

10-21-15

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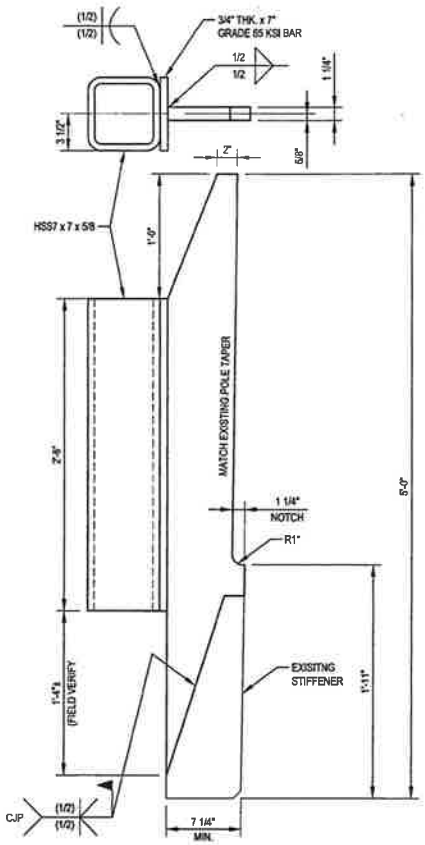
DESIGNED BY:	J.W.S
CHECKED BY:	KAT
DATE:	10/20/2015

BASE PLATE DETAILS

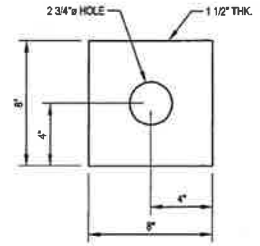
S-5

37515-2876.002.DWG



ANCHOR BRACKET MK~AB1

(3 REQUIRED) (TUBE Fy = 46 KSI) (STIFFENER Fy = 65 KSI)



WASHER PLATE MK~WP1

(6 REQUIRED) (Fy = 50 KSI)

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CHECKED BY:	KMT
DATE:	10/20/2015

MISC DETAILS

S-6

37515-2876.002.DWG

MODIFICATION INSPECTION NOTES:

1. **GENERAL**
   - 1.1. THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE EOR.
   - 1.2. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES
   - 1.3. ALL MI'S SHALL BE CONDUCTED BY A CROWN CASTLE ENGINEERING VENDOR (AEV) OR ENGINEERING SERVICE VENDOR (AESV) THAT IS APPROVED TO PERFORM ELEVATED WORK FOR CROWN CASTLE.
   - 1.4. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN, CONTACT YOUR CROWN CASTLE POINT OF CONTACT (POC).
   - 1.5. REFER TO ENG-SOW-10007: MODIFICATION INSPECTION SOW FOR FURTHER DETAILS AND REQUIREMENTS.

2. **MI INSPECTOR**
   - 2.1. THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:
     - 2.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 2.1.2. WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 2.1.3. THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GC INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO CROWN CASTLE.

3. **GENERAL CONTRACTOR**
   - 3.1. THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:
     - 3.1.1. REVIEW THE REQUIREMENTS OF THE MI CHECKLIST.
     - 3.1.2. WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS.
     - 3.1.3. BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS.
     - 3.1.4. THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH THE REQUIREMENTS OF THE MI CHECKLIST AND ENG-SOW-10007.

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

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

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

7. **MI VERIFICATION INSPECTIONS**
   - 7.1. CROWN CASTLE RESERVES THE RIGHT TO CONDUCT A MI VERIFICATION INSPECTION TO VERIFY THE ACCURACY AND COMPLETENESS OF PREVIOUSLY COMPLETED MI INSPECTION(S) ON TOWER MODIFICATION PROJECTS.
   - 7.2. ALL VERIFICATION INSPECTIONS SHALL BE HELD TO THE SAME SPECIFICATIONS AND REQUIREMENTS IN THE CONTRACT DOCUMENTS AND IN ACCORDANCE WITH ENG-SOW-10007.
   - 7.3. VERIFICATION INSPECTION MAY BE CONDUCTED BY AN INDEPENDENT AEV/AESV FIRM AFTER A MODIFICATION PROJECT IS COMPLETED, AS MARKED BY THE DATE OF AN ACCEPTED "PASSING MI" OR "PASS AS NOTED MI" REPORT FOR THE ORIGINAL PROJECT.

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

9. **INSPECTION AND TESTING**
   - 9.1. ALL WORK SHALL BE SUBJECT TO REVIEW AND OBSERVATION BY CROWN CASTLE'S REPRESENTATIVE AND CROWN CASTLE'S AUTHORIZED INDEPENDENT INSPECTION AND TESTING AGENCY.
   - 9.2. INSPECTION SERVICES WHICH ARE FURNISHED BY OTHERS ARE STILL REQUIRED WHEN THE EOR PERFORMS SUPPORT SERVICES DURING CONSTRUCTION.
   - 9.3. OBSERVED DISCREPANCIES BETWEEN THE WORK AND THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST.
   - 9.4. AN INDEPENDENT QUALIFIED INSPECTION/TESTING AGENCY SHALL BE SELECTED, RETAINED AND PAID FOR BY CROWN CASTLE FOR THE SOLE PURPOSE OF INSPECTING, TESTING, DOCUMENTING, AND APPROVING ALL WELDING AND FIELD WORK PERFORMED BY THE CONTRACTOR.
     - 9.4.1. ACCESS TO ANY PLACE WHERE WORK IS BEING DONE SHALL BE PERMITTED AT ALL TIMES.
     - 9.4.2. THE INSPECTION AGENCY SHALL SO SCHEDULE THIS WORK AS TO CAUSE A MINIMUM OF INTERRUPTION TO, AND COORDINATE WITH, THE WORK IN PROGRESS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE THE WORK SCHEDULE WITH THE TESTING AGENCY. THE CONTRACTOR SHALL ALLOW FOR ADEQUATE TIME AND ACCESS FOR THE TESTING AGENCY TO PERFORM THEIR DUTIES.
   - 9.5. THE INSPECTION AND TESTING AGENCY SHALL BE RESPONSIBLE TO PERFORM THE FOLLOWING SERVICES AND INSPECT THE FOLLOWING ITEMS IN ACCORDANCE WITH THE CONSTRUCTION DRAWINGS. THE TESTING AGENCY SHALL INSPECT ITEMS ON THIS LIST AND OTHER ITEMS AS NECESSARY TO FULFILL THEIR RESPONSIBILITY. THE TESTING AGENCY SHALL UTILIZE EXPERIENCED, TRAINED INSPECTORS INCLUDING AWS CERTIFIED WELDING INSPECTORS (CWI). INSPECTORS SHALL HAVE THE TRAINING, CREDENTIALS, AND EXPERIENCE APPROPRIATE FOR AND COMMENSURATE WITH THE SCOPE AND TYPE OF INSPECTION WORK TO BE PERFORMED.
   - 9.6. GENERAL
     - 9.6.1. PERFORM PERIODIC ON-SITE OBSERVATION, INSPECTION, VERIFICATION, AND TESTING DURING THE TIME THE CONTRACTOR IS WORKING ON-SITE. AGENCY SHALL NOTIFY CROWN CASTLE AND THE EOR IMMEDIATELY WHEN FIELD PROBLEMS OR DISCREPANCIES OCCUR.
   - 9.7. FOUNDATIONS AND SOIL PREPARATION- (NOT REQUIRED)
   - 9.8. CONCRETE TESTING PER ACI- (NOT REQUIRED)
   - 9.9. STRUCTURAL STEEL
     - 9.9.1. CHECK STEEL ON THE JOB WITH THE PLANS.
     - 9.9.2. CHECK MILL CERTIFICATIONS. CALL FOR LABORATORY TEST REPORTS WHEN MILL CERTIFICATION IS IN QUESTION.
     - 9.9.3. CHECK GRADE OF STEEL MEMBERS, AND BOLTS FOR CONFORMANCE WITH DRAWINGS.
     - 9.9.4. INSPECT ALL STRUCTURAL BOLTS SHALL BE FIELD INSPECTED ACCORDING TO THE REQUIREMENTS OF THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS", DEC. 31, 2009.
     - 9.9.5. INSPECT STEEL MEMBERS FOR DISTORTION, EXCESSIVE RUST, FLAWS AND BURNED HOLES.
     - 9.9.6. CHECK STEEL MEMBERS FOR SIZES, SWEEP AND DIMENSIONAL TOLERANCES.
     - 9.9.7. CHECK FOR SURFACE FINISH SPECIFIED, GALVANIZED.
     - 9.9.8. CHECK THAT BOLTS HAVE BEEN TIGHTENED PROPERLY.
     - 9.9.9. PRIOR TO ANY FIELD CUTTING THE CONTRACTOR SHALL MARK THE CUTOUT LINES ON THE STEEL AND THE INSPECTION/TESTING AGENCY SHALL VERIFY PROPOSED LAYOUT, LOCATION, AND DIMENSIONS. THE INSPECTION/TESTING AGENCY SHALL CLOSELY AND CONTINUOUSLY MONITOR THIS ACTIVITY.
   - 9.10. WELDING:
     - 9.10.1. VERIFY FIELD WELDING PROCEDURES, WELDERS, AND WELDING OPERATORS, NOT DEEMED PREQUALIFIED, IN ACCORDANCE WITH AWS D1.1.
     - 9.10.2. INSPECT FIELD WELDED CONNECTIONS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED AND WITH AWS D1.1.
     - 9.10.3. APPROVE FIELD WELDING SEQUENCE.
     - 9.10.4. A PROGRAM OF THE APPROVED SEQUENCES SHALL BE SUBMITTED TO CROWN CASTLE BEFORE WELDING BEGINS. NO CHANGE IN APPROVED SEQUENCES MAY BE MADE WITHOUT PERMISSION FROM CROWN CASTLE.
     - 9.10.5. INSPECT WELDED CONNECTIONS AS FOLLOWS AND IN ACCORDANCE WITH AWS D1.1:
       - 9.10.5.1. INSPECT WELDING EQUIPMENT FOR CAPACITY, MAINTENANCE, AND WORKING CONDITIONS.
       - 9.10.5.2. VERIFY SPECIFIED ELECTRODES AND HANDLING AND STORAGE OF ELECTRODES FOR CONFORMANCE TO SPECIFICATIONS.
       - 9.10.5.3. INSPECT PREHEATING AND INTERPASS TEMPERATURES FOR CONFORMANCE WITH AWS D1.1.
       - 9.10.5.4. VISUALLY INSPECT ALL WELDS AND VERIFY THAT QUALITY OF WELDS MEETS THE REQUIREMENTS OF AWS D1.1. OTHER TESTS MAY ALSO BE PERFORMED ON THE WELDS BY THE TESTING AGENCY IN ORDER FOR THEM TO PERFORM THEIR DUTIES FOR THIS PROJECT.
       - 9.10.5.5. SPOT TEST AT LEAST ONE FILLET WELD OF EACH MEMBER USING MAGNETIC PARTICLE.
       - 9.10.5.6. INSPECT FOR SIZE, SPACING, TYPE AND LOCATION AS PER APPROVED DRAWINGS.
       - 9.10.5.7. VERIFY THAT THE BASE METAL CONFORMS TO THE DRAWINGS.
       - 9.10.5.8. REVIEW THE REPORTS BY TESTING LABS.
       - 9.10.5.9. CHECK TO SEE THAT WELDS ARE CLEAN AND FREE FROM SLAG.
       - 9.10.5.10. INSPECT RUST PROTECTION OF WELDS AS PER SPECIFICATIONS.
       - 9.10.5.11. CHECK THAT DEFECTIVE WELDS ARE CLEARLY MARKED AND HAVE BEEN ADEQUATELY REPAIRED.
       - 9.10.5.12. FULL PENETRATION WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 100% NDE INSPECTED BY UT IN ACCORDANCE WITH AWS D1.1.
       - 9.10.5.13. PARTIAL PENETRATION AND FILLET WELDS IN THE VICINITY OF THE BASE OF THE TOWER ARE REQUIRED TO BE 50% NDE INSPECTED BY MP IN ACCORDANCE WITH AWS D1.1.
   - 9.11. REPORTS:
     - 9.11.1. COMPILE AND PERIODICALLY SUBMIT DAILY INSPECTION REPORTS TO CROWN CASTLE.
     - 9.11.2. THE INSPECTION PLAN OUTLINED HEREIN IS INTENDED AS A DESCRIPTION OF GENERAL AND SPECIFIC ITEMS OF CONCERN. IT IS NOT INTENDED TO BE ALL-INCLUSIVE. IT DOES NOT LIMIT THE TESTING AND INSPECTION AGENCY TO THE ITEMS LISTED. ADDITIONAL TESTING, INSPECTION, AND CHECKING MAY BE REQUIRED AND SHOULD BE ANTICIPATED. THE TESTING AGENCY SHALL USE THEIR PROFESSIONAL JUDGMENT AND KNOWLEDGE OF THE JOB SITE CONDITIONS AND THE CONTRACTOR'S PERFORMANCE TO DECIDE WHAT OTHER ITEMS REQUIRE ADDITIONAL ATTENTION. THE TESTING AGENCY'S JUDGMENT MUST PREVAIL ON ITEMS NOT SPECIFICALLY COVERED. ANY DISCREPANCIES OR PROBLEMS SHALL BE BROUGHT IMMEDIATELY TO CROWN CASTLE'S ATTENTION. RESOLUTIONS ARE NOT TO BE MADE WITHOUT CROWN CASTLE'S REVIEW AND SPECIFIC WRITTEN CONSENT. CROWN CASTLE RESERVES THE RIGHT TO DETERMINE WHETHER OR NOT A RESOLUTION IS ACCEPTABLE.
     - 9.11.3. AFTER EACH INSPECTION, THE TESTING AGENCY WILL PREPARE A WRITTEN ACCEPTANCE OR REJECTION WHICH WILL BE GIVEN TO THE CONTRACTOR AND FILED AS DAILY REPORTS TO CROWN CASTLE. THIS WRITTEN ACTION WILL GIVE THE CONTRACTOR A LIST OF ITEMS TO BE CORRECTED, PRIOR TO CONTINUING CONSTRUCTION, AND/OR LOADING OF STRUCTURAL ITEMS.
     - 9.11.4. THE TESTING AGENCY DOES NOT RELIEVE THE CONTRACTOR'S CONTRACTUAL OR STATUTORY OBLIGATIONS. THE CONTRACTOR HAS THE SOLE RESPONSIBILITY FOR ANY DEVIATIONS FROM THE OFFICIAL CONTRACT DOCUMENTS. THE TESTING AGENCY WILL NOT REPLACE THE CONTRACTOR'S QUALITY CONTROL PERSONNEL.

MI CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY EOR)	REPORT ITEM
	PRE-CONSTRUCTION
X	MI CHECKLIST DRAWINGS
X	EOR REVIEW
X	FABRICATION INSPECTION
X	FABRICATOR CERTIFIED WELD INSPECTION
X	MATERIAL TEST REPORT (MTR)
N/A	FABRICATOR NDE INSPECTION
N/A	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)
X	PACKING SLIPS
ADDITIONAL TESTING AND INSPECTIONS:	
	CONSTRUCTION
X	CONSTRUCTION INSPECTIONS
NA	FOUNDATION INSPECTIONS
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS
X	POST INSTALLED ANCHOR ROD VERIFICATION
NA	BASE PLATE GROUT VERIFICATION
X	CONTRACTOR'S CERTIFIED WELD INSPECTION
NA	EARTHWORK: PROVIDE PHOTO DOCUMENTATION OF EXCAVATION QUALITY AND COMPACTION
X	ON SITE COLD GALVANIZING VERIFICATION
NA	GUY WIRE TENSION REPORT
X	GC AS-BUILT DOCUMENTS
NA	MICROPILE/ROCK ANCHOR INSTALLERS DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTS
ADDITIONAL TESTING AND INSPECTIONS:	
	POST-CONSTRUCTION
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)
X	POST INSTALLED ANCHOR ROD TARGET TENSION LOAD TESTING
NA	REFER TO MICROPILE/ROCK ANCHOR NOTES FOR SPECIAL INSPECTION AND TESTING REQUIREMENTS.
X	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

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

PJF PAUL J. FORD & COMPANY
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Phone 614.221.6679 www.pauljford.com

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

MODIFICATION OF AN EXISTING 140'-0" MONOPOLE
BU #876342; BIC DRIVE (SSUSA)
MILFORD, CONNECTICUT

PROJECT No:	37515-2876.002.7700
DRAWN BY:	B.M.S.
DESIGNED BY:	J.W.S.
CHECKED BY:	
DATE:	10/20/2015

MI CHECKLIST

S-7

37515-2876.002.DWG

ATTACHMENT 4

City of Milford

Geographic Information System (GIS)

Date Printed: 8/25/2016

MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The City of Milford and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 100 feet

0 100 Feet

N W E S

111 SCHOOLHOUSE RD

Location	111 SCHOOLHOUSE RD	**Mblu**	33/ 335/ 5/A /
Acct#	023043	**Owner**	MILFORD ENTERPRISES LLC
Assessment	$315,000	**Appraisal**	$450,000
PID	100242	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$450,000	$0	$450,000
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$315,000	$0	$315,000

Owner of Record

Owner	MILFORD ENTERPRISES LLC
Other	C/O JAYESH PATEL
Address	7871 BELLE POINT DR GREENBELT, MD 20770

Sale Price	$3,675,000
Certificate	
Book & Page	03622/0230
Sale Date	03/27/2015
Instrument	18

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
MILFORD ENTERPRISES LLC	$3,675,000		03622/0230	18	03/27/2015
CSMC 2007 C5 FFI HOTEL PORTFOLIO LLC	$6,930,207		03602/0294	22	10/06/2014
MILFORD FFI LLC	$4,800,000		03168/0407	00	05/10/2007
OLY REALTY ONE LLC	$3,800,000		02396/0375		02/28/2000
TELAHC PROPERTIES L P	$0		02040/0184		03/11/1994

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0

Building Percent Good:

Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Description:	
Kitchen Descrip:	
Int Condition:	
Solar Panels	
House Generator	

Building Photo

(http://images.vgsi.com/photos/MilfordCTPhotos//default.jpg)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 434V

Land Line Valuation

Size (Acres) 0

Description	CELL TOWER MDL-00	**Frontage**	
Zone		**Depth**	
Neighborhood	C	**Assessed Value**	$0
Alt Land Appr	No	**Appraised Value**	$0
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
CEL1	CEL TWR SITE			1 UNITS	$450,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$450,000	$0	$450,000
2013	$450,000	$0	$450,000
2012	$450,000	$0	$450,000

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$315,000	$0	$315,000
2013	$315,000	$0	$315,000
2012	$315,000	$0	$315,000