Robinson+Cole

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Also admitted in Massachusetts

March 4, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
49 South Road, Bolton, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 107-foot level on the existing 120-foot tower at 49 South Road in Bolton, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2012. Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model BXA-70063-6CF, 700 MHz antennas; three (3) model BXA-70063-4CF, 850 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 107-foot level on the tower. Cellco also intends to install six (6) remote radio heads ("RRHs") behind its 1900 MHz and 2100 MHz antennas and one (1) HYBRIFLEX™ antenna cable inside the monopole tower.[1] Included in Attachment 1 are specifications for Cellco's replacement antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent Robert R. Morra, First Selectman of the Town of Bolton. A copy of this letter is also being sent to Leonard and Cheryl Giglio, the owners of the Property.

[1] The Structural Analysis Report assumes, consistent with its lease, that Cellco will install eight (8) new antenna cables, five (5) attached to the outside of the monopole and three (3) inside the monopole. The HYBRIFLEX™ fiber optic cable is one (1) of the eight (8) new lines to be installed.

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 its existing antenna platform at the 107-foot level of the 120-foot tower.

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

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

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

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
Robert R. Morra, Bolton First Selectman
Leonard and Cheryl Giglio
Timothy Parks

ATTACHMENT 1

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

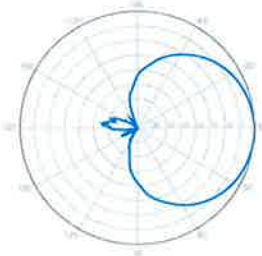
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	13°	11°
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
IM3 (2x20W carriers)	< -153 dBc	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in
Depth with z-brackets	172 mm	6.8 in
Weight without mounting brackets	7.9 kg	17 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.51 m² Side: 0.24 m²	Front: 5.5 ft² Side: 2.6 ft²
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf

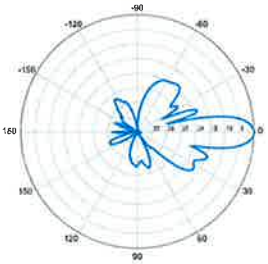
Mounting Options	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



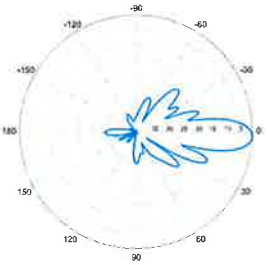
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

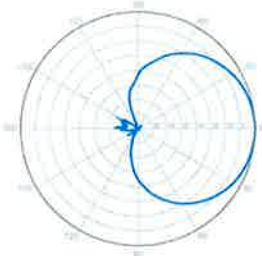


0° | Vertical | 750 MHz

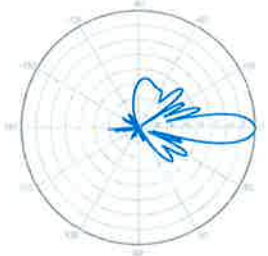
BXA-70063-6CF-EDIN-2



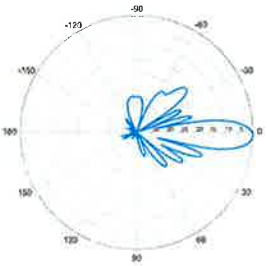
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

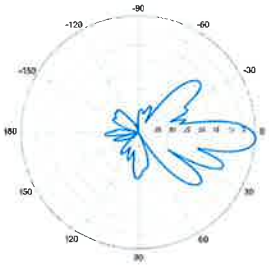


2° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-X

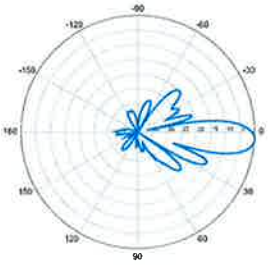
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



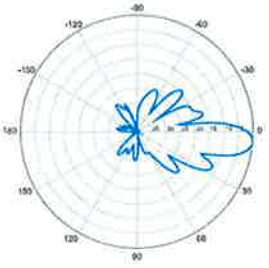
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

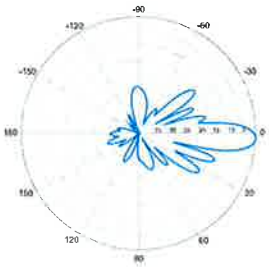


4° | Vertical | 750 MHz

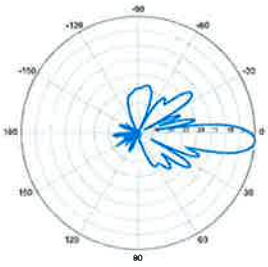
BXA-70063-6CF-EDIN-5



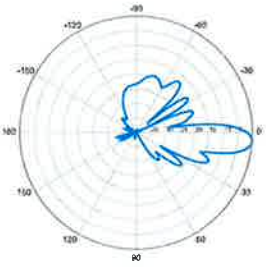
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

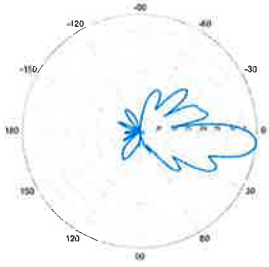


4° | Vertical | 850 MHz



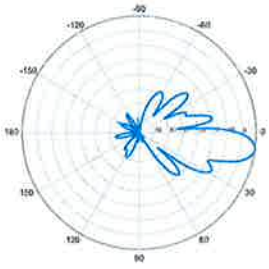
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



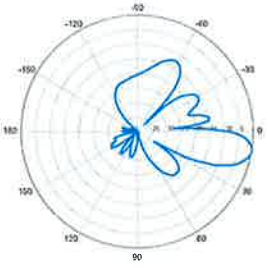
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

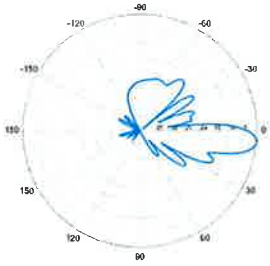


8° | Vertical | 750 MHz

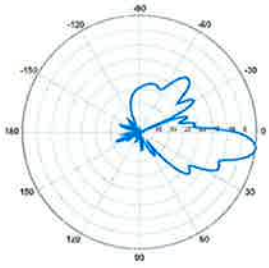
BXA-70063-6CF-EDIN-10



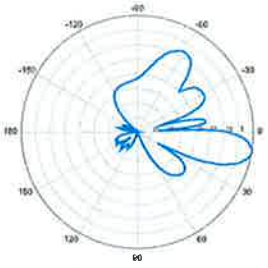
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-70063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

Replace "X" with desired electrical downtilt.

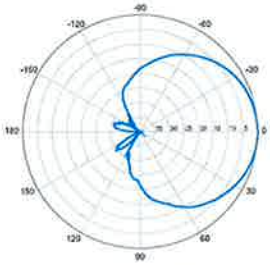
Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	696-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz
Polarization	±45°	
Horizontal beamwidth	65°	63°
Vertical beamwidth	17°	15°
Gain	12.5 dBd (14.6 dBi)	13.0 dBd (15.1 dBi)
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-16.3 dB	-22.1 dB
Front-to-back ratio (+/-30°)	-36.1 dB	-34.9 dB
Null fill	5% (-26.02 dB)	
Isolation between ports	< -25 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	

Mechanical Characteristics				
Dimensions Length x Width x Depth	1205 x 285 x 133 mm		47.4 x 11.2 x 5.2 in	
Depth with z-brackets	173 mm		6.8 in	
Weight without mounting brackets	4.5 kg		9.9 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.34 m²	Side: 0.16 m²	Front: 3.7 ft²	Side: 1.7 ft²
Wind load @ 161 km/hr (100 mph)	Front: 498 N	Side: 260 N	Front: 111 lbf	Side: 55 lbf

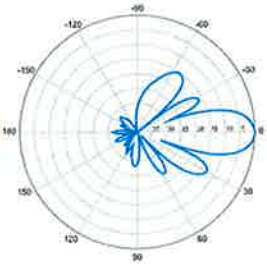
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-4CF-EDIN-X-FP		

BXA-70063-4CF-EDIN-X



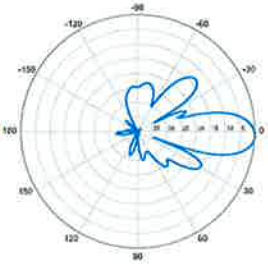
Horizontal | 750 MHz

BXA-70063-4CF-EDIN-0



0° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-2

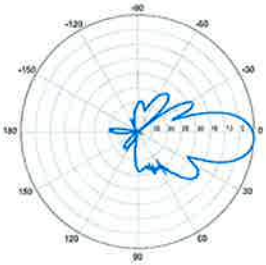


2° | Vertical | 750 MHz

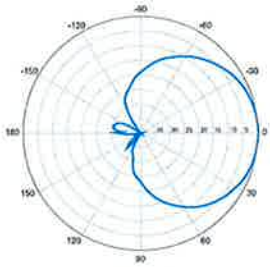
BXA-70063-4CF-EDIN-3

3° | Vertical | 750 MHz

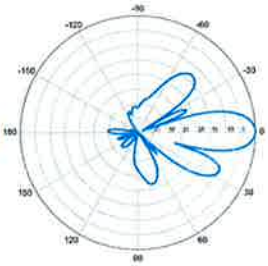
BXA-70063-4CF-EDIN-4



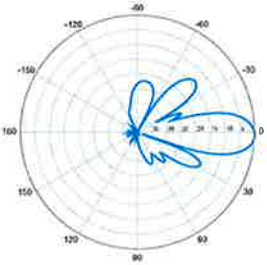
4° | Vertical | 750 MHz



Horizontal | 850 MHz

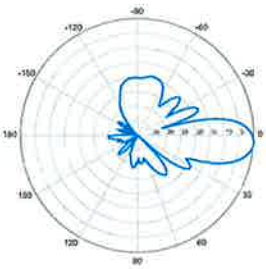


0° | Vertical | 850 MHz



2° | Vertical | 850 MHz

3° | Vertical | 850 MHz



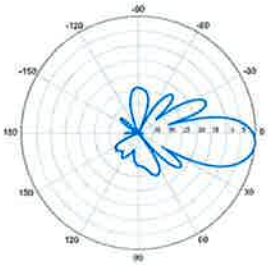
4° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-70063-4CF-EDIN-X

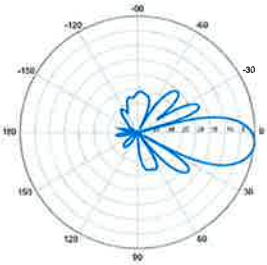
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-70063-4CF-EDIN-5



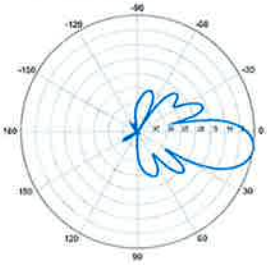
5° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-6



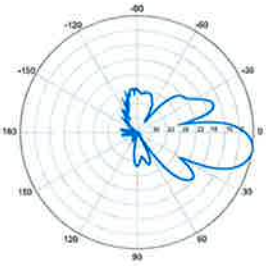
6° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-8



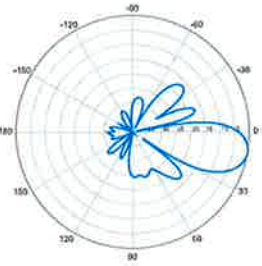
8° | Vertical | 750 MHz

BXA-70063-4CF-EDIN-9

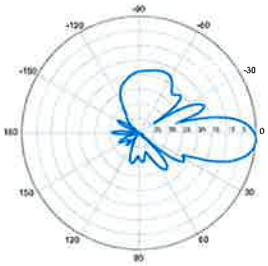


9° | Vertical | 750 MHz

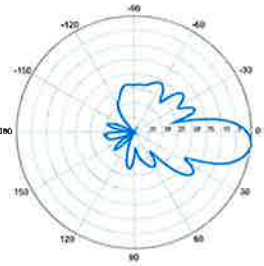
BXA-70063-4CF-EDIN-10



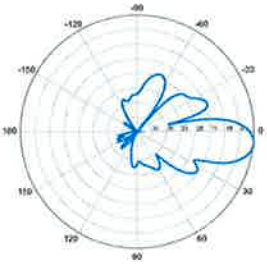
10° | Vertical | 750 MHz



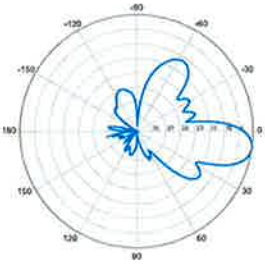
5° | Vertical | 850 MHz



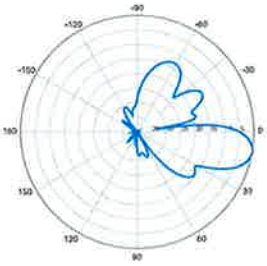
6° | Vertical | 850 MHz



8° | Vertical | 850 MHz

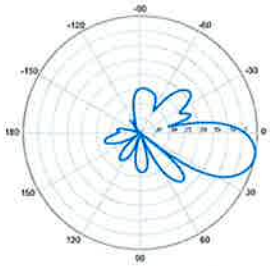


9° | Vertical | 850 MHz



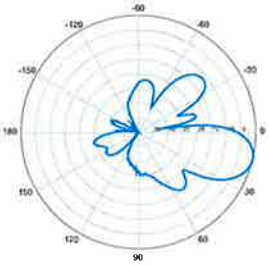
10° | Vertical | 850 MHz

BXA-70063-4CF-EDIN-12

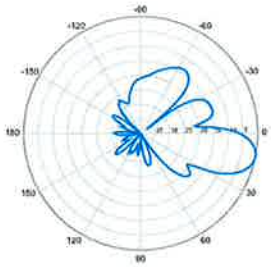


12° | Vertical | 750 MHz

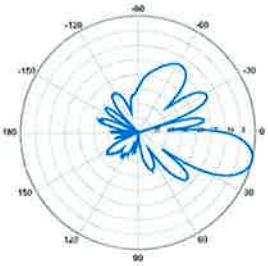
BXA-70063-4CF-EDIN-14



14° | Vertical | 750 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

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

POWERED BY ANDREW

Electrical Specifications

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

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

Mechanical Specifications

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

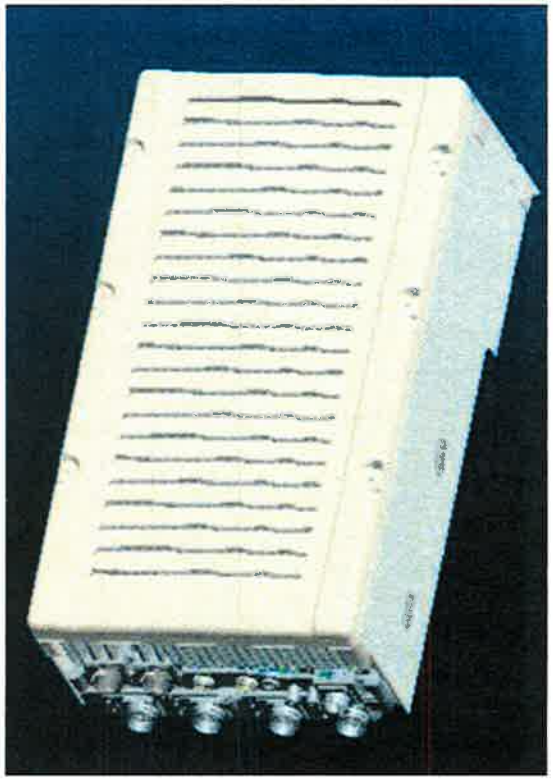
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms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

** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW
RRH2X60 - HW CHARACTERISTICS

LR14.3

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



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

Alcatel·Lucent

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

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

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

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

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

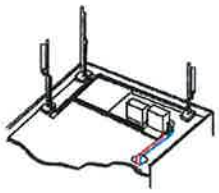
EASY INSTALLATION

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

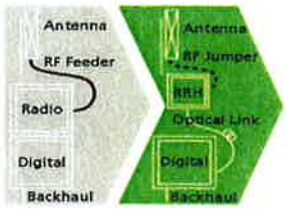
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

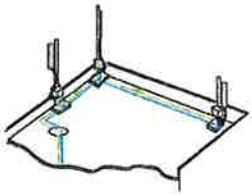
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

Environmental specifications

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

Safety and Regulatory Data

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

* This data is provisional and subject to change

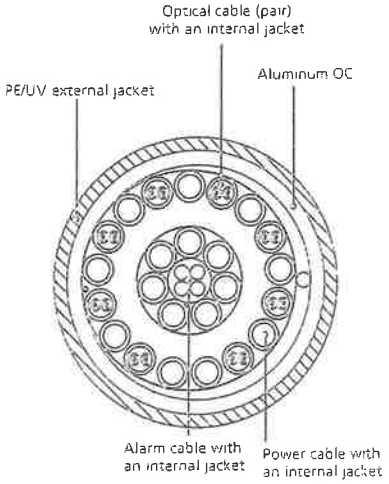


Figure 2: Construction Detail

ATTACHMENT 2

	General	Power	Density					
Site Name: Bolton E								
Tower Height: 120Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	118	0.0292	880	0.5867	4.97%	
*AT&T UMTS	2	875	118	0.0452	1900	1.0000	4.52%	
*AT&T GSM	1	283	118	0.0073	880	0.5867	1.25%	
*AT&T GSM	4	525	118	0.0542	1900	1.0000	5.42%	
*AT&T LTE	1	1313	118	0.0339	734	0.4893	6.93%	
*Pocket (now MetroPCS)	3	631	99	0.0694	2130	1.0000	6.94%	
Verizon PCS	**11**	**452**	**107**	**0.1562**	**1970**	**1.0000**	**15.62%**	
Verizon Cellular	**9**	**411**	**107**	**0.1162**	**869**	**0.5793**	**20.05%**	
Verizon AWS	**1**	**1750**	**107**	**0.0550**	**2145**	**1.0000**	**5.50%**	
Verizon 700	**1**	**1050**	**107**	**0.0330**	**698**	**0.4973**	**6.63%**	
								77.83%
* Source: Siting Council								

ATTACHMENT 3

Date: **February 05, 2015**

TECTONIC
Practical Solutions, Exceptional Service

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

TECTONIC
1279 Route 300
Newburgh, NY 12550
(845) 567-6656

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Bolton East, CT
Crown Castle Designation:	**Crown Castle BU Number:**	842858
	Crown Castle Site Name:	BOLTON
	Crown Castle JDE Job Number:	268229
	Crown Castle Work Order Number:	1001961
	Crown Castle Application Number:	214795 Rev. 6
Engineering Firm Designation:	**TECTONIC Project Number:**	6500.842858
Site Data:	**49 SOUTH ROAD, BOLTON, Tolland County, CT** **Latitude *41° 47' 20.55"*, Longitude *-72° 25' 45.1"*** **120 Foot - Monopole Tower**	

Dear Charles McGuirt,

TECTONIC is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 751641, in accordance with application 214795, revision 6.

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:

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

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

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

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

Structural analysis prepared by: Ian Marinaccio / VE

Respectfully submitted by:

2/5/15

Antonio A. Gualtieri, P.E.
Sr. Vice President

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by PENNSUMMIT TUBULAR, LLC in August of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

This tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 1 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
108.0	107.0	3	alcatel lucent	RRH2X60-AWS	8	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		3	antel	BXA-70063/4CF w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116.0	118.0	6	ericsson	RAU 1	1 1 2 12	3/8 1/2 7/8 1-1/4	1
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		6	powerwave technologies	LGP21903			
		1	raycap	DC6-48-60-18-8F			
	116.0	1	crown mounts	LP 303-1			
108.0	110.0	6	antel	LPA-185063/8CFx2 w/ Mount Pipe	1	1-5/8	2
		6	antel	LPD-6513 w/ Mount Pipe			
	108.0	1	crown mounts	LP 303-1	11	1-5/8	1
99.0	99.0	3	kathrein	742 213 w/ Mount Pipe	6	1-5/8	1

Notes:
1) Existing Equipment
2) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
119.5	119.5	6	allgon	7920 PANEL	-	-
110.0	110.0	6	generic	48" X 12" X 3" PANEL ANTENNA		
100.0	100.0	6	generic	48" X 12" X 3" PANEL ANTENNA		
90.0	90.0	6	generic	48" X 12" X 3" PANEL ANTENNA		
80.0	80.0	3	generic	48" X 12" X 3" PANEL ANTENNA		
70.0	70.0	3	generic	48" X 12" X 3" PANEL ANTENNA		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	TEP	5337356	CCISITES
4-POST-MODIFICATION INSPECTION	GPD	4497609	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PennSummit Tubular, LLC	4291646	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PennSummit Tubular, LLC	4291644	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD	4492167	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD	5096968	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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L1	120 - 115	Pole	TP19.75x19x0.1875	Pole	4.8%	Pass
L2	115 - 110	Pole	TP20.501x19.75x0.1875	Pole	12.9%	Pass
L3	110 - 105	Pole	TP21.251x20.501x0.1875	Pole	24.8%	Pass
L4	105 - 100	Pole	TP22.001x21.251x0.1875	Pole	40.4%	Pass
L5	100 - 95	Pole	TP22.751x22.001x0.1875	Pole	55.2%	Pass
L6	95 - 90	Pole	TP23.502x22.751x0.1875	Pole	68.7%	Pass
L7	90 - 86.25	Pole	TP24.552x23.502x0.1875	Pole	77.9%	Pass
L8	86.25 - 81.25	Pole	TP24.44x23.689x0.25	Pole	69.6%	Pass
L9	81.25 - 76.25	Pole	TP25.19x24.44x0.25	Pole	77.5%	Pass
L10	76.25 - 71.25	Pole	TP25.94x25.19x0.25	Pole	84.7%	Pass
L11	71.25 - 66.25	Pole	TP26.69x25.94x0.25	Pole	91.2%	Pass
L12	66.25 - 61.25	Pole	TP27.44x26.69x0.25	Pole	97.1%	Pass
L13	61.25 - 61	Pole	TP27.478x27.44x0.25	Pole	97.3%	Pass
L14	61 - 60.75	Pole + Reinf.	TP27.515x27.478x0.45	Reinf. 5 Tension Rupture	80.1%	Pass
L15	60.75 - 58.13	Pole + Reinf.	TP27.909x27.515x0.45	Reinf. 5 Tension Rupture	83.3%	Pass
L16	58.13 - 57.88	Pole + Reinf.	TP27.947x27.909x0.425	Reinf. 4 Tension Rupture	83.0%	Pass
L17	57.88 - 52.88	Pole + Reinf.	TP28.697x27.947x0.4188	Reinf. 4 Tension Rupture	87.9%	Pass
L18	52.88 - 47.88	Pole + Reinf.	TP29.447x28.697x0.4125	Reinf. 4 Tension Rupture	92.7%	Pass
L19	47.88 - 45	Pole + Reinf.	TP30.441x29.447x0.4125	Reinf. 4 Tension Rupture	95.4%	Pass
L20	45 - 40.25	Pole + Reinf.	TP30.091x29.378x0.55	Reinf. 3 Tension Rupture	76.3%	Pass
L21	40.25 - 35.25	Pole + Reinf.	TP30.841x30.091x0.5375	Reinf. 3 Tension Rupture	79.2%	Pass
L22	35.25 - 31.75	Pole + Reinf.	TP31.366x30.841x0.5375	Reinf. 3 Tension Rupture	81.4%	Pass
L23	31.75 - 31.5	Pole + Reinf.	TP31.404x31.366x0.4875	Reinf. 2 Tension Rupture	88.8%	Pass
L24	31.5 - 26.5	Pole + Reinf.	TP32.154x31.404x0.4813	Reinf. 2 Tension Rupture	91.5%	Pass
L25	26.5 - 21.5	Pole + Reinf.	TP32.904x32.154x0.475	Reinf. 2 Tension Rupture	94.7%	Pass
L26	21.5 - 19.25	Pole + Reinf.	TP33.242x32.904x0.475	Reinf. 2 Tension Rupture	96.0%	Pass
L27	19.25 - 19	Pole + Reinf.	TP33.279x33.242x0.5	Reinf. 1 Tension Rupture	89.2%	Pass
L28	19 - 14	Pole + Reinf.	TP34.029x33.279x0.4938	Reinf. 1 Tension Rupture	91.7%	Pass
L29	14 - 9	Pole + Reinf.	TP34.78x34.029x0.4875	Reinf. 1 Tension Rupture	94.1%	Pass
L30	9 - 4	Pole + Reinf.	TP35.53x34.78x0.4875	Reinf. 1 Tension Rupture	96.4%	Pass
L31	4 - 0	Pole + Reinf.	TP36.13x35.53x0.4875	Reinf. 1 Tension Rupture	98.1%	Pass
					Summary	
				Pole	97.3%	Pass
				Reinforcement	98.1%	Pass
				Overall	98.1%	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	93.6	Pass
1	Base Plate	0	73.7	Pass
1	Base Foundation Soil Interaction	0	72.4	Pass

Structure Rating (max from all components) =	98.1%

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

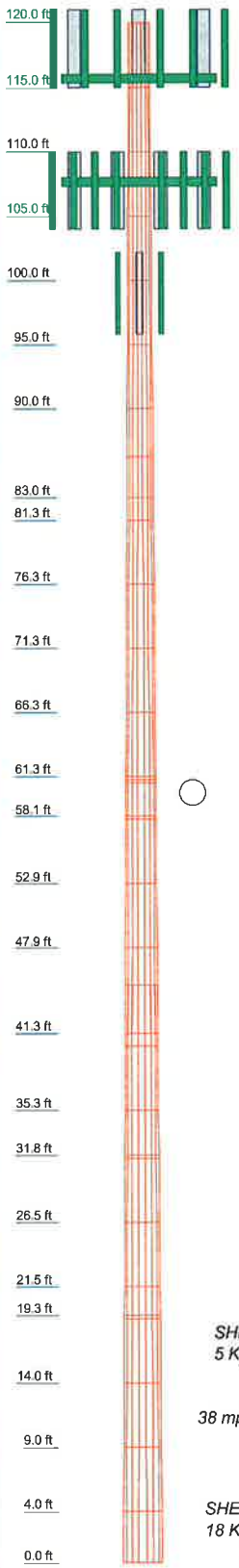
4.1) Recommendations

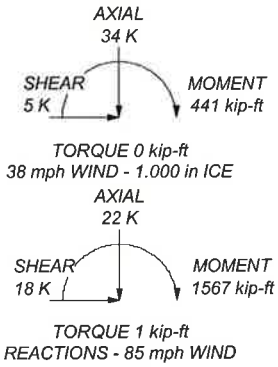
The tower and its foundation have sufficient capacity to carry the existing and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Length (ft)	5.00	5.00	5.00	5.00	5.00	5.00	7.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.75	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.250	0.250	0.250	0.250	0.250	0.313	0.313	0.313	0.313	0.419	0.412	0.412	0.550	0.537	0.537	0.537	0.481	0.475	0.475	0.475	0.494	0.487	0.487	0.487
Socket Length (ft)							3.25												3.75												
Top Dia (in)	19.000	19.750	20.501	21.251	22.001	22.751	23.502	24.252	25.190	25.940	26.690	27.440	28.189	28.939	29.689	30.439	31.189	31.939	32.689	33.439	34.189	34.939	35.689	36.439	37.189	37.939	38.689	39.439	40.189	40.939	41.689
Bot Dia (in)	19.750	20.501	21.251	22.001	22.751	23.502	24.552	24.440	25.190	25.940	26.690	27.440	28.189	28.939	29.689	30.439	31.189	31.939	32.689	33.439	34.189	34.939	35.689	36.439	37.189	37.939	38.689	39.439	40.189	40.939	41.689
Grade	A607-65																														
Weight (K)	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	0.6	0.0	0.8	0.8	0.4	0.0	0.9	0.9	0.9	0.7





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00 w/ Mount Pipe	116	BXA-70063-6CF-2 w/ Mount Pipe	108
(2) 7770.00 w/ Mount Pipe	116	BXA-70063-6CF-2 w/ Mount Pipe	108
(2) 7770.00 w/ Mount Pipe	116	BXA-70063-6CF-2 w/ Mount Pipe	108
(2) LGP21401	116	(2) HBXX-6517DS-A2M w/ Mount Pipe	108
(2) LGP21401	116	(2) HBXX-6517DS-A2M w/ Mount Pipe	108
(2) LGP21401	116	(2) HBXX-6517DS-A2M w/ Mount Pipe	108
(2) LGP21903	116	BXA-70063/4CF w/ Mount Pipe	108
(2) LGP21903	116	BXA-70063/4CF w/ Mount Pipe	108
(2) LGP21903	116	BXA-70063/4CF w/ Mount Pipe	108
AM-X-CD-16-65-00T-RET w/ Mount Pipe	116	RRH2X60-AWS	108
		RRH2X60-AWS	108
AM-X-CD-16-65-00T-RET w/ Mount Pipe	116	RRH2X60-AWS	108
		RRH2X60-PCS	108
AM-X-CD-16-65-00T-RET w/ Mount Pipe	116	RRH2X60-PCS	108
		RRH2X60-PCS	108
(2) RAU 1	116	DB-T1-6Z-8AB-0Z	108
(2) RAU 1	116	LP 303-1	108
(2) RAU 1	116	742 213 w/ Mount Pipe	99
DC6-48-60-18-8F	116	742 213 w/ Mount Pipe	99
LP 303-1	116	742 213 w/ Mount Pipe	99

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.1%

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Job: 6500.842858			
Project: BU 842858 - BOLTON			
Client: Crown Castle	Drawn by: Ian Marinaccio	App'd:	
Code: TIA/EIA-222-F	Date: 02/04/15	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

3) Tower is located in Tolland County, Connecticut.
4) Basic wind speed of 85 mph.
5) Nominal ice thickness of 1.000 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Temperature drop of 50 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) 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	120.00-115.00	5.00	0.000	18	19.000	19.750	0.188	0.750	A607-65 (65 ksi)
L2	115.00-110.00	5.00	0.000	18	19.750	20.501	0.188	0.750	A607-65 (65 ksi)
L3	110.00-105.00	5.00	0.000	18	20.501	21.251	0.188	0.750	A607-65 (65 ksi)
L4	105.00-100.00	5.00	0.000	18	21.251	22.001	0.188	0.750	A607-65 (65 ksi)
L5	100.00-95.00	5.00	0.000	18	22.001	22.751	0.188	0.750	A607-65 (65 ksi)
L6	95.00-90.00	5.00	0.000	18	22.751	23.502	0.188	0.750	A607-65 (65 ksi)
L7	90.00-83.00	7.00	3.250	18	23.502	24.552	0.188	0.750	A607-65 (65 ksi)
L8	83.00-81.25	5.00	0.000	18	23.689	24.440	0.250	1.000	A607-65 (65 ksi)
L9	81.25-76.25	5.00	0.000	18	24.440	25.190	0.250	1.000	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L10	76.25-71.25	5.00	0.000	18	25.190	25.940	0.250	1.000	A607-65 (65 ksi)
L11	71.25-66.25	5.00	0.000	18	25.940	26.690	0.250	1.000	A607-65 (65 ksi)
L12	66.25-61.25	5.00	0.000	18	26.690	27.440	0.250	1.000	A607-65 (65 ksi)
L13	61.25-61.00	0.25	0.000	18	27.440	27.478	0.250	1.000	A607-65 (65 ksi)
L14	61.00-60.75	0.25	0.000	18	27.478	27.515	0.450	1.800	A607-65 (65 ksi)
L15	60.75-58.13	2.63	0.000	18	27.515	27.909	0.450	1.800	A607-65 (65 ksi)
L16	58.13-57.88	0.25	0.000	18	27.909	27.947	0.425	1.700	A607-65 (65 ksi)
L17	57.88-52.88	5.00	0.000	18	27.947	28.697	0.419	1.675	A607-65 (65 ksi)
L18	52.88-47.88	5.00	0.000	18	28.697	29.447	0.412	1.650	A607-65 (65 ksi)
L19	47.88-41.25	6.63	3.750	18	29.447	30.441	0.412	1.650	A607-65 (65 ksi)
L20	41.25-40.25	4.75	0.000	18	29.378	30.091	0.550	2.200	A607-65 (65 ksi)
L21	40.25-35.25	5.00	0.000	18	30.091	30.841	0.537	2.150	A607-65 (65 ksi)
L22	35.25-31.75	3.50	0.000	18	30.841	31.366	0.537	2.150	A607-65 (65 ksi)
L23	31.75-31.50	0.25	0.000	18	31.366	31.404	0.487	1.950	A607-65 (65 ksi)
L24	31.50-26.50	5.00	0.000	18	31.404	32.154	0.481	1.925	A607-65 (65 ksi)
L25	26.50-21.50	5.00	0.000	18	32.154	32.904	0.475	1.900	A607-65 (65 ksi)
L26	21.50-19.25	2.25	0.000	18	32.904	33.242	0.475	1.900	A607-65 (65 ksi)
L27	19.25-19.00	0.25	0.000	18	33.242	33.279	0.500	2.000	A607-65 (65 ksi)
L28	19.00-14.00	5.00	0.000	18	33.279	34.029	0.494	1.975	A607-65 (65 ksi)
L29	14.00-9.00	5.00	0.000	18	34.029	34.780	0.487	1.950	A607-65 (65 ksi)
L30	9.00-4.00	5.00	0.000	18	34.780	35.530	0.487	1.950	A607-65 (65 ksi)
L31	4.00-0.00	4.00		18	35.530	36.130	0.487	1.950	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	19.293	11.196	500.593	6.678	9.652	51.864	1001.846	5.599	3.014	16.075
	20.055	11.642	562.907	6.945	10.033	56.105	1126.555	5.822	3.146	16.779
L2	20.055	11.642	562.907	6.945	10.033	56.105	1126.555	5.822	3.146	16.779
	20.817	12.089	630.188	7.211	10.414	60.512	1261.206	6.046	3.278	17.483
L3	20.817	12.089	630.188	7.211	10.414	60.512	1261.206	6.046	3.278	17.483
	21.579	12.535	702.628	7.477	10.795	65.086	1406.181	6.269	3.410	18.187
L4	21.579	12.535	702.628	7.477	10.795	65.086	1406.181	6.269	3.410	18.187
	22.340	12.982	780.417	7.744	11.177	69.826	1561.860	6.492	3.542	18.892
L5	22.340	12.982	780.417	7.744	11.177	69.826	1561.860	6.492	3.542	18.892
	23.102	13.428	863.745	8.010	11.558	74.733	1728.626	6.715	3.674	19.596
L6	23.102	13.428	863.745	8.010	11.558	74.733	1728.626	6.715	3.674	19.596
	23.864	13.875	952.802	8.277	11.939	79.807	1906.858	6.939	3.806	20.3
L7	23.864	13.875	952.802	8.277	11.939	79.807	1906.858	6.939	3.806	20.3
	24.931	14.500	1087.472	8.649	12.472	87.190	2176.375	7.251	3.991	21.286
L8	24.550	18.599	1290.980	8.321	12.034	107.276	2583.659	9.301	3.729	14.917
	24.817	19.194	1418.945	8.587	12.415	114.290	2839.757	9.599	3.861	15.445

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
L9	24.817	19.194	1418.945	8.587	12.415	114.290	2839.757	9.599	3.861	15.445
	25.578	19.790	1555.098	8.854	12.796	121.527	3112.243	9.897	3.993	15.974
L10	25.578	19.790	1555.098	8.854	12.796	121.527	3112.243	9.897	3.993	15.974
	26.340	20.385	1699.694	9.120	13.177	128.985	3401.625	10.194	4.125	16.502
L11	26.340	20.385	1699.694	9.120	13.177	128.985	3401.625	10.194	4.125	16.502
	27.102	20.980	1852.986	9.386	13.559	136.665	3708.410	10.492	4.257	17.03
L12	27.102	20.980	1852.986	9.386	13.559	136.665	3708.410	10.492	4.257	17.03
	27.864	21.575	2015.228	9.653	13.940	144.568	4033.108	10.790	4.389	17.558
L13	27.864	21.575	2015.228	9.653	13.940	144.568	4033.108	10.790	4.389	17.558
	27.902	21.605	2023.580	9.666	13.959	144.969	4049.822	10.805	4.396	17.584
L14	27.902	38.604	3562.766	9.595	13.959	255.236	7130.219	19.306	4.044	8.987
	27.940	38.657	3577.620	9.608	13.978	255.951	7159.947	19.332	4.051	9.002
L15	27.940	38.657	3577.620	9.608	13.978	255.951	7159.947	19.332	4.051	9.002
	28.340	39.220	3736.086	9.748	14.178	263.516	7477.087	19.614	4.120	9.156
L16	28.340	37.075	3538.172	9.757	14.178	249.557	7080.999	18.541	4.164	9.798
	28.378	37.125	3552.678	9.770	14.197	250.243	7110.030	18.566	4.171	9.813
L17	28.378	36.588	3502.818	9.772	14.197	246.731	7010.245	18.297	4.182	9.986
	29.140	37.585	3797.068	10.039	14.578	260.466	7599.132	18.796	4.314	10.301
L18	29.140	37.032	3742.876	10.041	14.578	256.749	7490.677	18.519	4.325	10.484
	29.901	38.014	4048.662	10.307	14.959	270.649	8102.651	19.011	4.457	10.804
L19	29.901	38.014	4048.662	10.307	14.959	270.649	8102.651	19.011	4.457	10.804
	30.911	39.316	4478.878	10.660	15.464	289.632	8963.650	19.662	4.632	11.228
L20	30.403	50.326	5284.050	10.234	14.924	354.059	10575.052	25.168	4.203	7.641
	30.555	51.570	5685.702	10.487	15.286	371.949	11378.886	25.790	4.328	7.869
L21	30.555	50.419	5563.538	10.492	15.286	363.957	11134.397	25.214	4.350	8.093
	31.317	51.699	5998.056	10.758	15.667	382.838	12004.004	25.854	4.482	8.339
L22	31.317	51.699	5998.056	10.758	15.667	382.838	12004.004	25.854	4.482	8.339
	31.850	52.595	6315.308	10.944	15.934	396.339	12638.926	26.302	4.574	8.511
L23	31.850	47.780	5755.752	10.962	15.934	361.222	11519.077	23.894	4.662	9.564
	31.888	47.838	5776.752	10.975	15.953	362.107	11561.105	23.923	4.669	9.578
L24	31.888	47.234	5706.150	10.978	15.953	357.682	11419.809	23.621	4.680	9.725
	32.650	48.380	6131.600	11.244	16.334	375.383	12271.269	24.194	4.812	9.999
L25	32.650	47.761	6055.553	11.246	16.334	370.727	12119.074	23.885	4.823	10.154
	33.412	48.892	6496.020	11.512	16.715	388.626	13000.588	24.451	4.955	10.432
L26	33.412	48.892	6496.020	11.512	16.715	388.626	13000.588	24.451	4.955	10.432
	33.755	49.401	6701.006	11.632	16.887	396.818	13410.830	24.705	5.015	10.557
L27	33.755	51.961	7037.558	11.623	16.887	416.748	14084.376	25.986	4.971	9.941
	33.793	52.021	7061.772	11.637	16.906	417.711	14132.837	26.015	4.977	9.954
L28	33.793	51.380	6977.490	11.639	16.906	412.725	13964.161	25.695	4.988	10.103
	34.554	52.556	7467.499	11.905	17.287	431.972	14944.823	26.283	5.120	10.37
L29	34.554	51.900	7377.096	11.907	17.287	426.743	14763.900	25.955	5.131	10.526
	35.316	53.061	7883.226	12.174	17.668	446.185	15776.825	26.536	5.263	10.796
L30	35.316	53.061	7883.226	12.174	17.668	446.185	15776.825	26.536	5.263	10.796
	36.078	54.222	8411.991	12.440	18.049	466.060	16835.052	27.116	5.395	11.067
L31	36.078	54.222	8411.991	12.440	18.049	466.060	16835.052	27.116	5.395	11.067
	36.687	55.151	8851.634	12.653	18.354	482.272	17714.916	27.581	5.501	11.284

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 120.00-115.00				1	1	1		
L2 115.00-110.00				1	1	1		
L3 110.00-105.00				1	1	1		
L4 105.00-100.00				1	1	1		
L5 100.00-95.00				1	1	1		
L6 95.00-90.00				1	1	1		
L7 90.00-83.00				1	1	1		
L8 83.00-81.25				1	1	1		
L9 81.25-				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft²	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
76.25								
L10 76.25-71.25				1	1	1		
L11 71.25-66.25				1	1	1		
L12 66.25-61.25				1	1	1		
L13 61.25-61.00				1	1	1		
L14 61.00-60.75				1	1	0.9477		
L15 60.75-58.13				1	1	0.942075		
L16 58.13-57.88				1	1	0.955622		
L17 57.88-52.88				1	1	0.959779		
L18 52.88-47.88				1	1	0.964596		
L19 47.88-41.25				1	1	0.959348		
L20 41.25-40.25				1	1	0.936348		
L21 40.25-35.25				1	1	0.948402		
L22 35.25-31.75				1	1	0.942151		
L23 31.75-31.50				1	1	0.958226		
L24 31.50-26.50				1	1	0.962868		
L25 26.50-21.50				1	1	0.968002		
L26 21.50-19.25				1	1	0.964807		
L27 19.25-19.00				1	1	1.01305		
L28 19.00-14.00				1	1	1.01689		
L29 14.00-9.00				1	1	1.02123		
L30 9.00-4.00				1	1	1.01309		
L31 4.00-0.00				1	1	1.00683		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
Step Pegs (3/4" SR) 7-in. w/30" step	C	No	CaAa (Out Of Face)	120.00 - 0.00	1	No Ice	0.03	0.167
						1/2" Ice	0.14	0.853
						1" Ice	0.23	1.983
						2" Ice	0.43	6.076

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.83	21.592
Safety Line 3/8	C	No	CaAa (Out Of Face)	120.00 - 0.00	1	No Ice	0.04	0.220
						1/2" Ice	0.14	0.750
						1" Ice	0.24	1.280
						2" Ice	0.44	2.340
						4" Ice	0.84	4.460
*								
LDF6-50A(1-1/4")	B	No	Inside Pole	116.00 - 0.00	12	No Ice	0.00	0.660
						1/2" Ice	0.00	0.660
						1" Ice	0.00	0.660
						2" Ice	0.00	0.660
						4" Ice	0.00	0.660
NTM 203 98(3/8)	B	No	Inside Pole	116.00 - 0.00	1	No Ice	0.00	0.077
						1/2" Ice	0.00	0.077
						1" Ice	0.00	0.077
						2" Ice	0.00	0.077
						4" Ice	0.00	0.077
TSZ 999 066/xxxM-10AWG(7/8")	B	No	Inside Pole	116.00 - 0.00	2	No Ice	0.00	0.510
						1/2" Ice	0.00	0.510
						1" Ice	0.00	0.510
						2" Ice	0.00	0.510
						4" Ice	0.00	0.510
LMR-500(1/2")	B	No	Inside Pole	116.00 - 0.00	1	No Ice	0.00	0.100
						1/2" Ice	0.00	0.100
						1" Ice	0.00	0.100
						2" Ice	0.00	0.100
						4" Ice	0.00	0.100
*								
HJ7-50A(1-5/8")	A	No	Inside Pole	108.00 - 0.00	11	No Ice	0.00	1.040
						1/2" Ice	0.00	1.040
						1" Ice	0.00	1.040
						2" Ice	0.00	1.040
						4" Ice	0.00	1.040
HJ7-50A(1-5/8")	A	No	Inside Pole	108.00 - 0.00	3	No Ice	0.00	1.040
						1/2" Ice	0.00	1.040
						1" Ice	0.00	1.040
						2" Ice	0.00	1.040
						4" Ice	0.00	1.040
HJ7-50A(1-5/8")	A	No	CaAa (Out Of Face)	108.00 - 0.00	4	No Ice	0.00	1.040
						1/2" Ice	0.00	2.555
						1" Ice	0.00	4.681
						2" Ice	0.00	10.765
						4" Ice	0.00	30.264
HB158-1-08U8-S8J18(1-5/8)	A	No	CaAa (Out Of Face)	108.00 - 0.00	1	No Ice	0.20	1.300
						1/2" Ice	0.30	2.815
						1" Ice	0.40	4.941
						2" Ice	0.60	11.025
						4" Ice	1.00	30.524
*								
LDF7-50A(1-5/8")	C	No	Inside Pole	99.00 - 0.00	6	No Ice	0.00	0.820
						1/2" Ice	0.00	0.820
						1" Ice	0.00	0.820
						2" Ice	0.00	0.820
						4" Ice	0.00	0.820
*								
PL 1x5	B	No	CaAa (Out Of Face)	20.50 - 0.50	1	No Ice	0.17	0.000
						1/2" Ice	0.28	0.000
						1" Ice	0.39	0.000
						2" Ice	0.61	0.000
						4" Ice	1.06	0.000
PL 1x5	B	No	CaAa (Out Of Face)	30.50 - 20.50	1	No Ice	0.17	0.000
						1/2" Ice	0.28	0.000
						1" Ice	0.39	0.000
						2" Ice	0.61	0.000
						4" Ice	1.06	0.000
PL 1.25x5	B	No	CaAa (Out Of Face)	41.25 - 30.50	1	No Ice	0.21	0.000
						1/2" Ice	0.32	0.000
						1" Ice	0.43	0.000
						2" Ice	0.65	0.000

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	1.10	0.000
PL 1.25x5	B	No	CaAa (Out Of Face)	43.75 - 41.25	1	No Ice	0.21	0.000
						1/2" Ice	0.32	0.000
						1" Ice	0.43	0.000
						2" Ice	0.65	0.000
						4" Ice	1.10	0.000
PL 1x4.5	B	No	CaAa (Out Of Face)	57.25 - 43.75	1	No Ice	0.17	0.000
						1/2" Ice	0.28	0.000
						1" Ice	0.39	0.000
						2" Ice	0.61	0.000
						4" Ice	1.06	0.000
PL 1.25x4	B	No	CaAa (Out Of Face)	62.50 - 57.25	1	No Ice	0.21	0.000
						1/2" Ice	0.32	0.000
						1" Ice	0.43	0.000
						2" Ice	0.65	0.000
						4" Ice	1.10	0.000
**								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.00-115.00	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.009
		C	0.000	0.000	0.000	0.362	0.002
L2	115.00-110.00	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.002
L3	110.00-105.00	A	0.000	0.000	0.000	0.594	0.060
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.002
L4	105.00-100.00	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.002
L5	100.00-95.00	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.022
L6	95.00-90.00	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.027
L7	90.00-83.00	A	0.000	0.000	0.000	1.386	0.140
		B	0.000	0.000	0.000	0.000	0.064
		C	0.000	0.000	0.000	0.507	0.037
L8	83.00-81.25	A	0.000	0.000	0.000	0.346	0.035
		B	0.000	0.000	0.000	0.000	0.016
		C	0.000	0.000	0.000	0.127	0.009
L9	81.25-76.25	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.027
L10	76.25-71.25	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.027
L11	71.25-66.25	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.000	0.046
		C	0.000	0.000	0.000	0.362	0.027
L12	66.25-61.25	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.260	0.046
		C	0.000	0.000	0.000	0.362	0.027
L13	61.25-61.00	A	0.000	0.000	0.000	0.050	0.005
		B	0.000	0.000	0.000	0.052	0.002
		C	0.000	0.000	0.000	0.018	0.001
L14	61.00-60.75	A	0.000	0.000	0.000	0.050	0.005
		B	0.000	0.000	0.000	0.052	0.002
		C	0.000	0.000	0.000	0.018	0.001
L15	60.75-58.13	A	0.000	0.000	0.000	0.520	0.053

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.547	0.024
		C	0.000	0.000	0.000	0.190	0.014
L16	58.13-57.88	A	0.000	0.000	0.000	0.050	0.005
		B	0.000	0.000	0.000	0.052	0.002
		C	0.000	0.000	0.000	0.018	0.001
L17	57.88-52.88	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.859	0.046
		C	0.000	0.000	0.000	0.362	0.027
L18	52.88-47.88	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.833	0.046
		C	0.000	0.000	0.000	0.362	0.027
L19	47.88-41.25	A	0.000	0.000	0.000	1.312	0.133
		B	0.000	0.000	0.000	1.208	0.060
		C	0.000	0.000	0.000	0.480	0.035
L20	41.25-40.25	A	0.000	0.000	0.000	0.198	0.020
		B	0.000	0.000	0.000	0.208	0.009
		C	0.000	0.000	0.000	0.072	0.005
L21	40.25-35.25	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	1.042	0.046
		C	0.000	0.000	0.000	0.362	0.027
L22	35.25-31.75	A	0.000	0.000	0.000	0.693	0.070
		B	0.000	0.000	0.000	0.729	0.032
		C	0.000	0.000	0.000	0.254	0.019
L23	31.75-31.50	A	0.000	0.000	0.000	0.050	0.005
		B	0.000	0.000	0.000	0.052	0.002
		C	0.000	0.000	0.000	0.018	0.001
L24	31.50-26.50	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.875	0.046
		C	0.000	0.000	0.000	0.362	0.027
L25	26.50-21.50	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.833	0.046
		C	0.000	0.000	0.000	0.362	0.027
L26	21.50-19.25	A	0.000	0.000	0.000	0.446	0.045
		B	0.000	0.000	0.000	0.375	0.021
		C	0.000	0.000	0.000	0.163	0.012
L27	19.25-19.00	A	0.000	0.000	0.000	0.050	0.005
		B	0.000	0.000	0.000	0.042	0.002
		C	0.000	0.000	0.000	0.018	0.001
L28	19.00-14.00	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.833	0.046
		C	0.000	0.000	0.000	0.362	0.027
L29	14.00-9.00	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.833	0.046
		C	0.000	0.000	0.000	0.362	0.027
L30	9.00-4.00	A	0.000	0.000	0.000	0.990	0.100
		B	0.000	0.000	0.000	0.833	0.046
		C	0.000	0.000	0.000	0.362	0.027
L31	4.00-0.00	A	0.000	0.000	0.000	0.792	0.080
		B	0.000	0.000	0.000	0.583	0.036
		C	0.000	0.000	0.000	0.290	0.021

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	120.00-115.00	A	1.165	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.009
		C		0.000	0.000	0.000	2.692	0.021
L2	115.00-110.00	A	1.159	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.680	0.020
L3	110.00-105.00	A	1.152	0.000	0.000	0.000	1.285	0.129
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.667	0.020
L4	105.00-100.00	A	1.146	0.000	0.000	0.000	2.136	0.213

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.654	0.020
L5	100.00-95.00	A	1.139	0.000	0.000	0.000	2.129	0.212
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.640	0.040
L6	95.00-90.00	A	1.132	0.000	0.000	0.000	2.122	0.211
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.626	0.044
L7	90.00-83.00	A	1.123	0.000	0.000	0.000	2.958	0.294
		B		0.000	0.000	0.000	0.000	0.064
		C		0.000	0.000	0.000	3.651	0.062
L8	83.00-81.25	A	1.116	0.000	0.000	0.000	0.739	0.073
		B		0.000	0.000	0.000	0.000	0.016
		C		0.000	0.000	0.000	0.913	0.015
L9	81.25-76.25	A	1.110	0.000	0.000	0.000	2.100	0.208
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.582	0.044
L10	76.25-71.25	A	1.101	0.000	0.000	0.000	2.091	0.207
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.565	0.044
L11	71.25-66.25	A	1.092	0.000	0.000	0.000	2.082	0.205
		B		0.000	0.000	0.000	0.000	0.046
		C		0.000	0.000	0.000	2.547	0.043
L12	66.25-61.25	A	1.082	0.000	0.000	0.000	2.072	0.204
		B		0.000	0.000	0.000	0.561	0.046
		C		0.000	0.000	0.000	2.527	0.043
L13	61.25-61.00	A	1.077	0.000	0.000	0.000	0.103	0.010
		B		0.000	0.000	0.000	0.112	0.002
		C		0.000	0.000	0.000	0.126	0.002
L14	61.00-60.75	A	1.076	0.000	0.000	0.000	0.103	0.010
		B		0.000	0.000	0.000	0.112	0.002
		C		0.000	0.000	0.000	0.126	0.002
L15	60.75-58.13	A	1.073	0.000	0.000	0.000	1.083	0.106
		B		0.000	0.000	0.000	1.173	0.024
		C		0.000	0.000	0.000	1.317	0.022
L16	58.13-57.88	A	1.070	0.000	0.000	0.000	0.103	0.010
		B		0.000	0.000	0.000	0.112	0.002
		C		0.000	0.000	0.000	0.125	0.002
L17	57.88-52.88	A	1.064	0.000	0.000	0.000	2.054	0.201
		B		0.000	0.000	0.000	2.042	0.046
		C		0.000	0.000	0.000	2.491	0.043
L18	52.88-47.88	A	1.052	0.000	0.000	0.000	2.042	0.199
		B		0.000	0.000	0.000	2.002	0.046
		C		0.000	0.000	0.000	2.467	0.042
L19	47.88-41.25	A	1.037	0.000	0.000	0.000	2.685	0.261
		B		0.000	0.000	0.000	2.735	0.060
		C		0.000	0.000	0.000	3.227	0.055
L20	41.25-40.25	A	1.026	0.000	0.000	0.000	0.405	0.039
		B		0.000	0.000	0.000	0.439	0.009
		C		0.000	0.000	0.000	0.487	0.008
L21	40.25-35.25	A	1.016	0.000	0.000	0.000	2.006	0.194
		B		0.000	0.000	0.000	2.171	0.046
		C		0.000	0.000	0.000	2.395	0.041
L22	35.25-31.75	A	1.002	0.000	0.000	0.000	1.394	0.134
		B		0.000	0.000	0.000	1.508	0.032
		C		0.000	0.000	0.000	1.656	0.029
L23	31.75-31.50	A	1.000	0.000	0.000	0.000	0.100	0.010
		B		0.000	0.000	0.000	0.108	0.002
		C		0.000	0.000	0.000	0.118	0.002
L24	31.50-26.50	A	1.000	0.000	0.000	0.000	1.990	0.191
		B		0.000	0.000	0.000	1.986	0.046
		C		0.000	0.000	0.000	2.363	0.041
L25	26.50-21.50	A	1.000	0.000	0.000	0.000	1.990	0.191
		B		0.000	0.000	0.000	1.944	0.046
		C		0.000	0.000	0.000	2.363	0.041
L26	21.50-19.25	A	1.000	0.000	0.000	0.000	0.896	0.086
		B		0.000	0.000	0.000	0.875	0.021
		C		0.000	0.000	0.000	1.063	0.018
L27	19.25-19.00	A	1.000	0.000	0.000	0.000	0.100	0.010

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
		B		0.000	0.000	0.000	0.097	0.002
		C		0.000	0.000	0.000	0.118	0.002
L28	19.00-14.00	A	1.000	0.000	0.000	0.000	1.990	0.191
		B		0.000	0.000	0.000	1.944	0.046
		C		0.000	0.000	0.000	2.363	0.041
L29	14.00-9.00	A	1.000	0.000	0.000	0.000	1.990	0.191
		B		0.000	0.000	0.000	1.944	0.046
		C		0.000	0.000	0.000	2.363	0.041
L30	9.00-4.00	A	1.000	0.000	0.000	0.000	1.990	0.191
		B		0.000	0.000	0.000	1.944	0.046
		C		0.000	0.000	0.000	2.363	0.041
L31	4.00-0.00	A	1.000	0.000	0.000	0.000	1.592	0.153
		B		0.000	0.000	0.000	1.361	0.036
		C		0.000	0.000	0.000	1.890	0.033

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.00-115.00	-0.090	0.052	-0.481	0.278
L2	115.00-110.00	-0.090	0.052	-0.485	0.280
L3	110.00-105.00	-0.085	-0.113	-0.443	0.007
L4	105.00-100.00	-0.082	-0.211	-0.421	-0.148
L5	100.00-95.00	-0.082	-0.212	-0.425	-0.150
L6	95.00-90.00	-0.083	-0.213	-0.429	-0.153
L7	90.00-83.00	-0.083	-0.214	-0.433	-0.155
L8	83.00-81.25	-0.083	-0.214	-0.435	-0.156
L9	81.25-76.25	-0.083	-0.215	-0.435	-0.157
L10	76.25-71.25	-0.084	-0.215	-0.437	-0.159
L11	71.25-66.25	-0.084	-0.216	-0.440	-0.161
L12	66.25-61.25	-0.023	-0.178	-0.331	-0.103
L13	61.25-61.00	0.146	-0.071	-0.043	0.056
L14	61.00-60.75	0.146	-0.071	-0.043	0.056
L15	60.75-58.13	0.146	-0.072	-0.043	0.055
L16	58.13-57.88	0.146	-0.072	-0.043	0.055
L17	57.88-52.88	0.109	-0.096	-0.071	0.039
L18	52.88-47.88	0.104	-0.100	-0.075	0.036
L19	47.88-41.25	0.121	-0.089	-0.061	0.042
L20	41.25-40.25	0.148	-0.072	-0.039	0.054
L21	40.25-35.25	0.148	-0.073	-0.037	0.052
L22	35.25-31.75	0.149	-0.073	-0.035	0.051
L23	31.75-31.50	0.149	-0.073	-0.035	0.051
L24	31.50-26.50	0.114	-0.095	-0.064	0.036
L25	26.50-21.50	0.105	-0.101	-0.071	0.032
L26	21.50-19.25	0.106	-0.102	-0.072	0.032
L27	19.25-19.00	0.106	-0.102	-0.072	0.032
L28	19.00-14.00	0.106	-0.102	-0.072	0.033
L29	14.00-9.00	0.106	-0.102	-0.073	0.033
L30	9.00-4.00	0.106	-0.102	-0.073	0.033
L31	4.00-0.00	0.083	-0.117	-0.118	0.008

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 ft²	C_AA_A Side ft²	Weight K

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) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.055 0.103 0.157 0.287 0.665
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.055 0.103 0.157 0.287 0.665
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.12 6.63 7.13 8.16 10.36	4.25 5.01 5.71 7.16 10.41	0.055 0.103 0.157 0.287 0.665
(2) LGP21401	A	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	B	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.014 0.021 0.030 0.055 0.135
(2) LGP21401	C	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.29 1.45 1.61 1.97 2.79	0.23 0.31 0.40 0.61 1.12	0.014 0.021 0.030 0.055 0.135
(2) LGP21903	A	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.011 0.013 0.017 0.028 0.072
(2) LGP21903	B	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.011 0.013 0.017 0.028 0.072
(2) LGP21903	C	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.27 0.34 0.43 0.62 1.10	0.18 0.25 0.32 0.49 0.94	0.011 0.013 0.017 0.028 0.072
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.074 0.139 0.212 0.385 0.874
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.074 0.139 0.212 0.385 0.874

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.30 7.48 8.37 10.18 14.02	0.074 0.139 0.212 0.385 0.874
(2) RAU 1	A	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.05 2.24 2.44 2.87 3.84	0.92 1.07 1.23 1.57 2.35	0.015 0.029 0.045 0.085 0.203
(2) RAU 1	B	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.05 2.24 2.44 2.87 3.84	0.92 1.07 1.23 1.57 2.35	0.015 0.029 0.045 0.085 0.203
(2) RAU 1	C	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.05 2.24 2.44 2.87 3.84	0.92 1.07 1.23 1.57 2.35	0.015 0.029 0.045 0.085 0.203
DC6-48-60-18-8F	A	From Leg	4.00 0.000 2.000	0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.019 0.037 0.057 0.105 0.239
LP 303-1	C	None		0.000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.250 1.481 1.713 2.175 3.101
***									
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.042 0.103 0.171 0.335 0.804
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.042 0.103 0.171 0.335 0.804
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.067 0.137 0.215 0.398 0.914
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice 1/2" Ice	8.98 9.65 10.29	6.96 8.18 9.14	0.067 0.137 0.215

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	11.59	11.02	0.398
						2" Ice	14.32	15.03	0.914
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	8.98	6.96	0.067
						1/2" Ice	9.65	8.18	0.137
						1" Ice	10.29	9.14	0.215
						2" Ice	11.59	11.02	0.398
						4" Ice	14.32	15.03	0.914
BXA-70063/4CF w/ Mount Pipe	A	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	5.40	3.62	0.028
						1/2" Ice	5.84	4.22	0.070
						1" Ice	6.30	4.83	0.118
						2" Ice	7.24	6.16	0.233
						4" Ice	9.26	9.18	0.573
BXA-70063/4CF w/ Mount Pipe	B	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	5.40	3.62	0.028
						1/2" Ice	5.84	4.22	0.070
						1" Ice	6.30	4.83	0.118
						2" Ice	7.24	6.16	0.233
						4" Ice	9.26	9.18	0.573
BXA-70063/4CF w/ Mount Pipe	C	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	5.40	3.62	0.028
						1/2" Ice	5.84	4.22	0.070
						1" Ice	6.30	4.83	0.118
						2" Ice	7.24	6.16	0.233
						4" Ice	9.26	9.18	0.573
RRH2X60-AWS	A	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	3.96	2.05	0.060
						1/2" Ice	4.27	2.33	0.084
						1" Ice	4.60	2.62	0.111
						2" Ice	5.27	3.23	0.178
						4" Ice	6.72	4.54	0.364
RRH2X60-AWS	B	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	3.96	2.05	0.060
						1/2" Ice	4.27	2.33	0.084
						1" Ice	4.60	2.62	0.111
						2" Ice	5.27	3.23	0.178
						4" Ice	6.72	4.54	0.364
RRH2X60-AWS	C	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	3.96	2.05	0.060
						1/2" Ice	4.27	2.33	0.084
						1" Ice	4.60	2.62	0.111
						2" Ice	5.27	3.23	0.178
						4" Ice	6.72	4.54	0.364
RRH2X60-PCS	A	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	2.57	2.01	0.055
						1/2" Ice	2.79	2.22	0.075
						1" Ice	3.02	2.43	0.099
						2" Ice	3.52	2.89	0.155
						4" Ice	4.61	3.92	0.313
RRH2X60-PCS	B	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	2.57	2.01	0.055
						1/2" Ice	2.79	2.22	0.075
						1" Ice	3.02	2.43	0.099
						2" Ice	3.52	2.89	0.155
						4" Ice	4.61	3.92	0.313
RRH2X60-PCS	C	From Leg	4.00 0.000 -1.000	0.000	108.00	No Ice	2.57	2.01	0.055
						1/2" Ice	2.79	2.22	0.075
						1" Ice	3.02	2.43	0.099
						2" Ice	3.52	2.89	0.155
						4" Ice	4.61	3.92	0.313
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.000	0.000	108.00	No Ice	5.60	2.33	0.044
						1/2"	5.92	2.56	0.080

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-1.000			Ice	6.24	2.79	0.120
						1" Ice	6.91	3.28	0.213
						2" Ice	8.37	4.37	0.455
						4" Ice			
LP 303-1	C	None		0.000	108.00	No Ice	14.66	14.66	1.250
						1/2" Ice	18.87	18.87	1.481
						1" Ice	23.08	23.08	1.713
						2" Ice	31.50	31.50	2.175
						4" Ice	48.34	48.34	3.101
***									
742 213 w/ Mount Pipe	A	From Leg	1.00 / 0.000 / 0.000	0.000	99.00	No Ice	5.37	4.62	0.049
						1/2" Ice	5.95	6.00	0.094
						1" Ice	6.50	6.98	0.146
						2" Ice	7.61	8.85	0.277
						4" Ice	9.93	12.79	0.683
742 213 w/ Mount Pipe	B	From Leg	1.00 / 0.000 / 0.000	0.000	99.00	No Ice	5.37	4.62	0.049
						1/2" Ice	5.95	6.00	0.094
						1" Ice	6.50	6.98	0.146
						2" Ice	7.61	8.85	0.277
						4" Ice	9.93	12.79	0.683
742 213 w/ Mount Pipe	C	From Leg	1.00 / 0.000 / 0.000	0.000	99.00	No Ice	5.37	4.62	0.049
						1/2" Ice	5.95	6.00	0.094
						1" Ice	6.50	6.98	0.146
						2" Ice	7.61	8.85	0.277
						4" Ice	9.93	12.79	0.683
***									

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 lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
L1	120 - 115 (1)	TP19.75x19x0.188	5.00	0.00	0.0	39.000	11.642	-1834.820	454049.000	0.004
L2	115 - 110 (2)	TP20.501x19.75x0.188	5.00	0.00	0.0	39.000	12.089	-2059.470	471463.000	0.004
L3	110 - 105 (3)	TP21.251x20.501x0.188	5.00	0.00	0.0	39.000	12.535	-4063.270	488877.000	0.008
L4	105 - 100 (4)	TP22.001x21.251x0.188	5.00	0.00	0.0	39.000	12.982	-4425.760	506291.000	0.009
L5	100 - 95 (5)	TP22.751x22.001x0.188	5.00	0.00	0.0	39.000	13.428	-4916.570	523704.000	0.009
L6	95 - 90 (6)	TP23.502x22.751x0.188	5.00	0.00	0.0	39.000	13.875	-5354.260	541118.000	0.010
L7	90 - 83 (7)	TP24.552x23.502x0.188	7.00	0.00	0.0	39.000	14.210	-5695.770	554178.000	0.010
L8	83 - 81.25 (8)	TP24.44x23.689x0.25	5.00	0.00	0.0	39.000	19.194	-6366.680	748581.000	0.009
L9	81.25 - 76.25 (9)	TP25.19x24.44x0.25	5.00	0.00	0.0	39.000	19.790	-6927.370	771796.000	0.009
L10	76.25 - 71.25	TP25.94x25.19x0.25	5.00	0.00	0.0	39.000	20.385	-7502.560	795012.00	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P lb	Allow. P_a lb	Ratio $\frac{P}{P_a}$
	(10)								0	
L11	71.25 - 66.25 (11)	TP26.69x25.94x0.25	5.00	0.00	0.0	39.000	20.980	-8097.090	818228.000	0.010
L12	66.25 - 61.25 (12)	TP27.44x26.69x0.25	5.00	0.00	0.0	39.000	21.576	-8709.820	841443.000	0.010
L13	61.25 - 61 (13)	TP27.478x27.44x0.25	0.25	0.00	0.0	39.000	21.605	-8748.530	842604.000	0.010
L14	61 - 60.75 (14)	TP27.515x27.478x0.45	0.25	0.00	0.0	39.000	38.657	-8791.260	1507640.000	0.006
L15	60.75 - 58.125 (15)	TP27.909x27.515x0.45	2.63	0.00	0.0	39.000	39.220	-9223.480	1529570.000	0.006
L16	58.125 - 57.875 (16)	TP27.947x27.909x0.425	0.25	0.00	0.0	39.000	37.125	-9270.730	1447890.000	0.006
L17	57.875 - 52.875 (17)	TP28.697x27.947x0.419	5.00	0.00	0.0	39.000	37.585	-10091.300	1465800.000	0.007
L18	52.875 - 47.875 (18)	TP29.447x28.697x0.413	5.00	0.00	0.0	39.000	38.014	-10932.700	1482550.000	0.007
L19	47.875 - 41.25 (19)	TP30.441x29.447x0.413	6.63	0.00	0.0	39.000	38.579	-11421.000	1504580.000	0.008
L20	41.25 - 40.25 (20)	TP30.091x29.378x0.55	4.75	0.00	0.0	39.000	51.570	-12860.100	2011220.000	0.006
L21	40.25 - 35.25 (21)	TP30.841x30.091x0.538	5.00	0.00	0.0	39.000	51.699	-13906.200	2016260.000	0.007
L22	35.25 - 31.75 (22)	TP31.366x30.841x0.538	3.50	0.00	0.0	39.000	52.595	-14647.800	2051200.000	0.007
L23	31.75 - 31.5 (23)	TP31.404x31.366x0.488	0.25	0.00	0.0	39.000	47.838	-14704.200	1865670.000	0.008
L24	31.5 - 26.5 (24)	TP32.154x31.404x0.481	5.00	0.00	0.0	39.000	48.380	-15717.100	1886810.000	0.008
L25	26.5 - 21.5 (25)	TP32.904x32.154x0.475	5.00	0.00	0.0	39.000	48.892	-16751.801	1906780.000	0.009
L26	21.5 - 19.25 (26)	TP33.242x32.904x0.475	2.25	0.00	0.0	39.000	49.401	-17222.301	1926630.000	0.009
L27	19.25 - 19 (27)	TP33.279x33.242x0.5	0.25	0.00	0.0	39.000	52.021	-17285.801	2028810.000	0.009
L28	19 - 14 (28)	TP34.029x33.279x0.494	5.00	0.00	0.0	39.000	52.556	-18419.699	2049680.000	0.009
L29	14 - 9 (29)	TP34.78x34.029x0.488	5.00	0.00	0.0	39.000	53.061	-19575.199	2069380.000	0.009
L30	9 - 4 (30)	TP35.53x34.78x0.488	5.00	0.00	0.0	39.000	54.222	-20746.000	2114650.000	0.010
L31	4 - 0 (31)	TP36.13x35.53x0.488	4.00	0.00	0.0	39.000	55.151	-21694.100	2150870.000	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	120 - 115 (1)	TP19.75x19x0.188	11013.750	2.356	39.000	0.060	0.000	0.000	39.000	0.000
L2	115 - 110 (2)	TP20.501x19.75x0.188	32992.500	6.543	39.000	0.168	0.000	0.000	39.000	0.000
L3	110 - 105 (3)	TP21.251x20.501x0.188	68289.500	12.591	39.000	0.323	0.000	0.000	39.000	0.000
L4	105 - 100 (4)	TP22.001x21.251x0.188	120278.333	20.671	39.000	0.530	0.000	0.000	39.000	0.000
L5	100 - 95 (5)	TP22.751x22.001x0.188	176541.667	28.347	39.000	0.727	0.000	0.000	39.000	0.000
L6	95 - 90 (6)	TP23.502x22.751x0.188	235102.500	35.351	39.000	0.906	0.000	0.000	39.000	0.000
L7	90 - 83 (7)	TP24.552x23.502x0.188	280085.833	40.145	39.000	1.029	0.000	0.000	39.000	0.000
L8	83 - 81.25 (8)	TP24.44x23.689x0.25	341570.000	35.863	39.000	0.920	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x lb-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y lb-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L9	81.25 - 76.25 (9)	TP25.19x24.44x0.25	404712.500	39.963	39.000	1.025	0.000	0.000	39.000	0.000
L10	76.25 - 71.25 (10)	TP25.94x25.19x0.25	469438.333	43.674	39.000	1.120	0.000	0.000	39.000	0.000
L11	71.25 - 66.25 (11)	TP26.69x25.94x0.25	535710.000	47.038	39.000	1.206	0.000	0.000	39.000	0.000
L12	66.25 - 61.25 (12)	TP27.44x26.69x0.25	603508.333	50.095	39.000	1.284	0.000	0.000	39.000	0.000
L13	61.25 - 61 (13)	TP27.478x27.44x0.25	606939.167	50.240	39.000	1.288	0.000	0.000	39.000	0.000
L14	61 - 60.75 (14)	TP27.515x27.478x0.45	610373.333	28.617	39.000	0.734	0.000	0.000	39.000	0.000
L15	60.75 - 58.125 (15)	TP27.909x27.515x0.45	646715.000	29.450	39.000	0.755	0.000	0.000	39.000	0.000
L16	58.125 - 57.875 (16)	TP27.947x27.909x0.425	650202.500	31.179	39.000	0.799	0.000	0.000	39.000	0.000
L17	57.875 - 52.875 (17)	TP28.697x27.947x0.419	720872.500	33.212	39.000	0.852	0.000	0.000	39.000	0.000
L18	52.875 - 47.875 (18)	TP29.447x28.697x0.413	793261.667	35.172	39.000	0.902	0.000	0.000	39.000	0.000
L19	47.875 - 41.25 (19)	TP30.441x29.447x0.413	835641.667	35.966	39.000	0.922	0.000	0.000	39.000	0.000
L20	41.25 - 40.25 (20)	TP30.091x29.378x0.55	906975.000	29.261	39.000	0.750	0.000	0.000	39.000	0.000
L21	40.25 - 35.25 (21)	TP30.841x30.091x0.538	983758.333	30.836	39.000	0.791	0.000	0.000	39.000	0.000
L22	35.25 - 31.75 (22)	TP31.366x30.841x0.538	1038450.000	31.441	39.000	0.806	0.000	0.000	39.000	0.000
L23	31.75 - 31.5 (23)	TP31.404x31.366x0.488	1042383.333	34.544	39.000	0.886	0.000	0.000	39.000	0.000
L24	31.5 - 26.5 (24)	TP32.154x31.404x0.481	1121875.000	35.864	39.000	0.920	0.000	0.000	39.000	0.000
L25	26.5 - 21.5 (25)	TP32.904x32.154x0.475	1202833.333	37.141	39.000	0.952	0.000	0.000	39.000	0.000
L26	21.5 - 19.25 (26)	TP33.242x32.904x0.475	1239733.333	37.490	39.000	0.961	0.000	0.000	39.000	0.000
L27	19.25 - 19 (27)	TP33.279x33.242x0.5	1243850.000	35.733	39.000	0.916	0.000	0.000	39.000	0.000
L28	19 - 14 (28)	TP34.029x33.279x0.494	1326975.000	36.863	39.000	0.945	0.000	0.000	39.000	0.000
L29	14 - 9 (29)	TP34.78x34.029x0.488	1411541.667	37.963	39.000	0.973	0.000	0.000	39.000	0.000
L30	9 - 4 (30)	TP35.53x34.78x0.488	1497525.000	38.558	39.000	0.989	0.000	0.000	39.000	0.000
L31	4 - 0 (31)	TP36.13x35.53x0.488	1567325.000	38.999	39.000	1.000	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	120 - 115 (1)	TP19.75x19x0.188	4256.290	0.366	26.000	0.028	1.862	0.000	26.000	0.000
L2	115 - 110 (2)	TP20.501x19.75x0.188	4537.340	0.375	26.000	0.029	3.792	0.000	26.000	0.000
L3	110 - 105 (3)	TP21.251x20.501x0.188	10227.700	0.816	26.000	0.063	5.841	0.001	26.000	0.000
L4	105 - 100 (4)	TP22.001x21.251x0.188	10561.800	0.814	26.000	0.063	7.953	0.001	26.000	0.000
L5	100 - 95 (5)	TP22.751x22.001x0.188	11546.600	0.860	26.000	0.066	10.102	0.001	26.000	0.000
L6	95 - 90 (6)	TP23.502x22.751x0.188	11874.000	0.856	26.000	0.066	12.284	0.001	26.000	0.000
L7	90 - 83 (7)	TP24.552x23.502x0.188	12114.	0.853	26.000	0.066	13.931	0.001	26.000	0.000

Section No.	Elevation ft	Size	Actual V lb	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T lb-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
			700							
L8	83 - 81.25 (8)	TP24.44x23.689x0.25	12469.800	0.650	26.000	0.050	16.168	0.001	26.000	0.000
L9	81.25 - 76.25 (9)	TP25.19x24.44x0.25	12787.800	0.646	26.000	0.050	18.395	0.001	26.000	0.000
L10	76.25 - 71.25 (10)	TP25.94x25.19x0.25	13101.400	0.643	26.000	0.049	20.644	0.001	26.000	0.000
L11	71.25 - 66.25 (11)	TP26.69x25.94x0.25	13406.900	0.639	26.000	0.049	22.912	0.001	26.000	0.000
L12	66.25 - 61.25 (12)	TP27.44x26.69x0.25	13713.300	0.636	26.000	0.049	23.536	0.001	26.000	0.000
L13	61.25 - 61 (13)	TP27.478x27.44x0.25	13727.600	0.635	26.000	0.049	23.535	0.001	26.000	0.000
L14	61 - 60.75 (14)	TP27.515x27.478x0.45	13745.400	0.356	26.000	0.027	23.312	0.001	26.000	0.000
L15	60.75 - 58.125 (15)	TP27.909x27.515x0.45	13940.200	0.355	26.000	0.027	21.923	0.000	26.000	0.000
L16	58.125 - 57.875 (16)	TP27.947x27.909x0.425	13957.000	0.376	26.000	0.029	20.750	0.000	26.000	0.000
L17	57.875 - 52.875 (17)	TP28.697x27.947x0.419	14307.700	0.381	26.000	0.029	17.940	0.000	26.000	0.000
L18	52.875 - 47.875 (18)	TP29.447x28.697x0.413	14645.900	0.385	26.000	0.030	14.840	0.000	26.000	0.000
L19	47.875 - 41.25 (19)	TP30.441x29.447x0.413	14836.200	0.385	26.000	0.030	13.211	0.000	26.000	0.000
L20	41.25 - 40.25 (20)	TP30.091x29.378x0.55	15192.000	0.295	26.000	0.023	9.504	0.000	26.000	0.000
L21	40.25 - 35.25 (21)	TP30.841x30.091x0.538	15517.000	0.300	26.000	0.023	5.231	0.000	26.000	0.000
L22	35.25 - 31.75 (22)	TP31.366x30.841x0.538	15736.200	0.299	26.000	0.023	2.408	0.000	26.000	0.000
L23	31.75 - 31.5 (23)	TP31.404x31.366x0.488	15748.900	0.329	26.000	0.025	1.419	0.000	26.000	0.000
L24	31.5 - 26.5 (24)	TP32.154x31.404x0.481	16045.800	0.332	26.000	0.026	2.004	0.000	26.000	0.000
L25	26.5 - 21.5 (25)	TP32.904x32.154x0.475	16336.000	0.334	26.000	0.026	5.018	0.000	26.000	0.000
L26	21.5 - 19.25 (26)	TP33.242x32.904x0.475	16466.699	0.333	26.000	0.026	6.396	0.000	26.000	0.000
L27	19.25 - 19 (27)	TP33.279x33.242x0.5	16476.500	0.317	26.000	0.024	6.550	0.000	26.000	0.000
L28	19 - 14 (28)	TP34.029x33.279x0.494	16770.500	0.319	26.000	0.025	9.663	0.000	26.000	0.000
L29	14 - 9 (29)	TP34.78x34.029x0.488	17057.000	0.321	26.000	0.025	12.842	0.000	26.000	0.000
L30	9 - 4 (30)	TP35.53x34.78x0.488	17340.199	0.320	26.000	0.025	16.087	0.000	26.000	0.000
L31	4 - 0 (31)	TP36.13x35.53x0.488	17562.000	0.318	26.000	0.024	18.136	0.000	26.000	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	120 - 115 (1)	0.004	0.060	0.000	0.028	0.000	0.065	1.333	H1-3+VT
L2	115 - 110 (2)	0.004	0.168	0.000	0.029	0.000	0.172	1.333	H1-3+VT
L3	110 - 105 (3)	0.008	0.323	0.000	0.063	0.000	0.332	1.333	H1-3+VT
L4	105 - 100 (4)	0.009	0.530	0.000	0.063	0.000	0.540	1.333	H1-3+VT
L5	100 - 95 (5)	0.009	0.727	0.000	0.066	0.000	0.737	1.333	H1-3+VT
L6	95 - 90 (6)	0.010	0.906	0.000	0.066	0.000	0.917	1.333	H1-3+VT
L7	90 - 83 (7)	0.010	1.029	0.000	0.066	0.000	1.041	1.333	H1-3+VT
L8	83 - 81.25 (8)	0.009	0.920	0.000	0.050	0.000	0.929	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L9	81.25 - 76.25 (9)	0.009	1.025	0.000	0.050	0.000	1.034	1.333	H1-3+VT
L10	76.25 - 71.25 (10)	0.009	1.120	0.000	0.049	0.000	1.130	1.333	H1-3+VT
L11	71.25 - 66.25 (11)	0.010	1.206	0.000	0.049	0.000	1.217	1.333	H1-3+VT
L12	66.25 - 61.25 (12)	0.010	1.284	0.000	0.049	0.000	1.295	1.333	H1-3+VT
L13	61.25 - 61 (13)	0.010	1.288	0.000	0.049	0.000	1.299	1.333	H1-3+VT
L14	61 - 60.75 (14)	0.006	0.734	0.000	0.027	0.000	0.740	1.333	H1-3+VT
L15	60.75 - 58.125 (15)	0.006	0.755	0.000	0.027	0.000	0.761	1.333	H1-3+VT
L16	58.125 - 57.875 (16)	0.006	0.799	0.000	0.029	0.000	0.806	1.333	H1-3+VT
L17	57.875 - 52.875 (17)	0.007	0.852	0.000	0.029	0.000	0.859	1.333	H1-3+VT
L18	52.875 - 47.875 (18)	0.007	0.902	0.000	0.030	0.000	0.909	1.333	H1-3+VT
L19	47.875 - 41.25 (19)	0.008	0.922	0.000	0.030	0.000	0.930	1.333	H1-3+VT
L20	41.25 - 40.25 (20)	0.006	0.750	0.000	0.023	0.000	0.757	1.333	H1-3+VT
L21	40.25 - 35.25 (21)	0.007	0.791	0.000	0.023	0.000	0.798	1.333	H1-3+VT
L22	35.25 - 31.75 (22)	0.007	0.806	0.000	0.023	0.000	0.813	1.333	H1-3+VT
L23	31.75 - 31.5 (23)	0.008	0.886	0.000	0.025	0.000	0.894	1.333	H1-3+VT
L24	31.5 - 26.5 (24)	0.008	0.920	0.000	0.026	0.000	0.928	1.333	H1-3+VT
L25	26.5 - 21.5 (25)	0.009	0.952	0.000	0.026	0.000	0.961	1.333	H1-3+VT
L26	21.5 - 19.25 (26)	0.009	0.961	0.000	0.026	0.000	0.970	1.333	H1-3+VT
L27	19.25 - 19 (27)	0.009	0.916	0.000	0.024	0.000	0.925	1.333	H1-3+VT
L28	19 - 14 (28)	0.009	0.945	0.000	0.025	0.000	0.954	1.333	H1-3+VT
L29	14 - 9 (29)	0.009	0.973	0.000	0.025	0.000	0.983	1.333	H1-3+VT
L30	9 - 4 (30)	0.010	0.989	0.000	0.025	0.000	0.999	1.333	H1-3+VT
L31	4 - 0 (31)	0.010	1.000	0.000	0.024	0.000	1.010	1.333	H1-3+VT

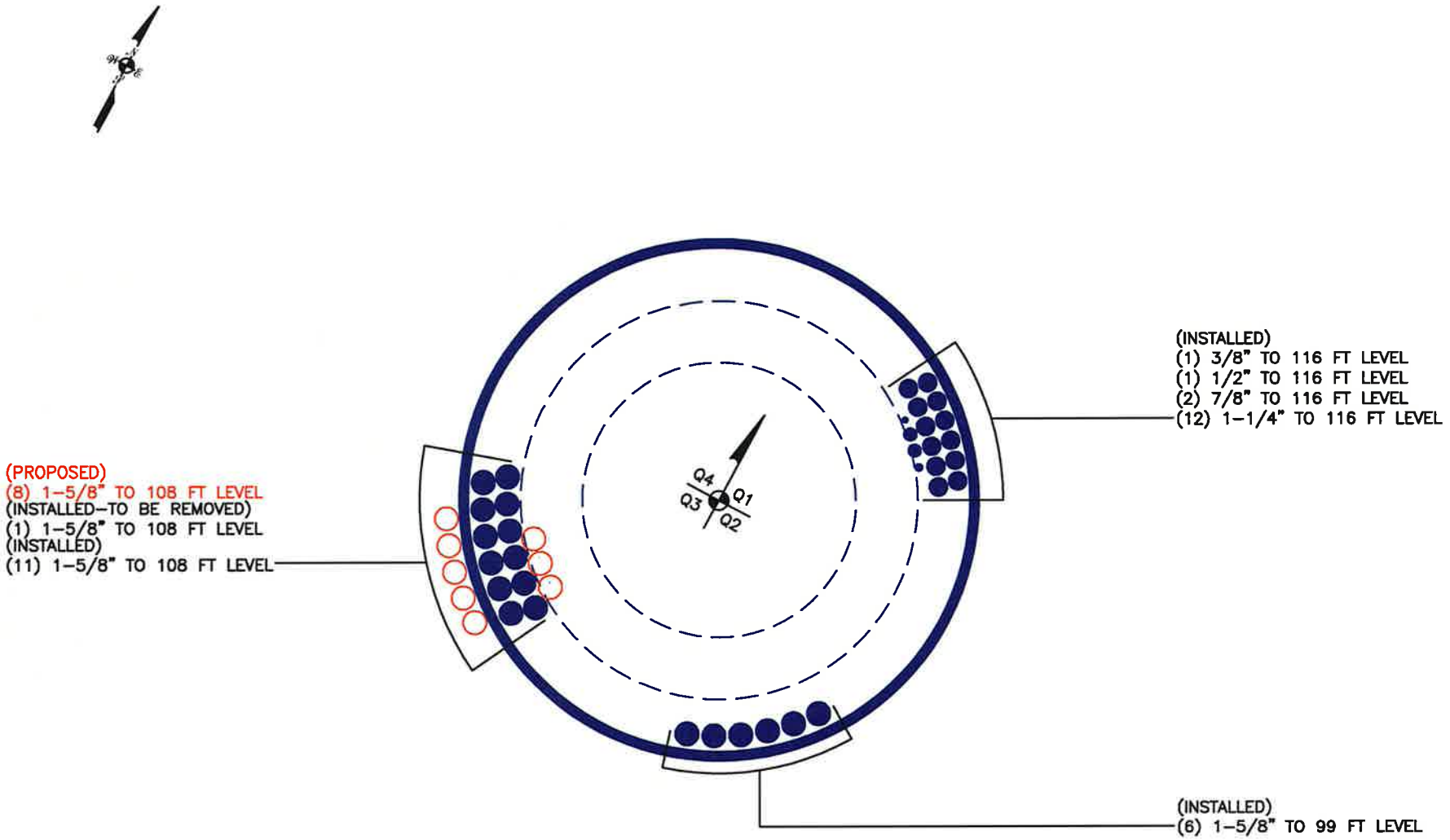
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L1	120 - 115	Pole	TP19.75x19x0.188	1	-1834.820	605247.292	4.8	Pass
L2	115 - 110	Pole	TP20.501x19.75x0.188	2	-2059.470	628460.153	12.9	Pass
L3	110 - 105	Pole	TP21.251x20.501x0.188	3	-4063.270	651673.014	24.9	Pass
L4	105 - 100	Pole	TP22.001x21.251x0.188	4	-4425.760	674885.875	40.5	Pass
L5	100 - 95	Pole	TP22.751x22.001x0.188	5	-4916.570	698097.403	55.3	Pass
L6	95 - 90	Pole	TP23.502x22.751x0.188	6	-5354.260	721310.264	68.8	Pass
L7	90 - 83	Pole	TP24.552x23.502x0.188	7	-5695.770	738719.243	78.1	Pass
L8	83 - 81.25	Pole	TP24.44x23.689x0.25	8	-6366.680	997858.432	69.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	$SF*P_{allow}$ lb	% Capacity	Pass Fail
L9	81.25 - 76.25	Pole	TP25.19x24.44x0.25	9	-6927.370	1028804.025	77.6	Pass
L10	76.25 - 71.25	Pole	TP25.94x25.19x0.25	10	-7502.560	1059750.952	84.8	Pass
L11	71.25 - 66.25	Pole	TP26.69x25.94x0.25	11	-8097.090	1090697.879	91.3	Pass
L12	66.25 - 61.25	Pole	TP27.44x26.69x0.25	12	-8709.820	1121643.472	97.2	Pass
L13	61.25 - 61	Pole	TP27.478x27.44x0.25	13	-8748.530	1123191.085	97.5	Pass
L14	61 - 60.75	Pole	TP27.515x27.478x0.45	14	-8791.260	2009684.037	55.5	Pass
L15	60.75 - 58.125	Pole	TP27.909x27.515x0.45	15	-9223.480	2038916.725	57.1	Pass
L16	58.125 - 57.875	Pole	TP27.947x27.909x0.425	16	-9270.730	1930037.290	60.5	Pass
L17	57.875 - 52.875	Pole	TP28.697x27.947x0.419	17	-10091.300	1953911.319	64.4	Pass
L18	52.875 - 47.875	Pole	TP29.447x28.697x0.413	18	-10932.700	1976239.068	68.2	Pass
L19	47.875 - 41.25	Pole	TP30.441x29.447x0.413	19	-11421.000	2005605.057	69.8	Pass
L20	41.25 - 40.25	Pole	TP30.091x29.378x0.55	20	-12860.100	2680956.149	56.8	Pass
L21	40.25 - 35.25	Pole	TP30.841x30.091x0.538	21	-13906.200	2687674.468	59.8	Pass
L22	35.25 - 31.75	Pole	TP31.366x30.841x0.538	22	-14647.800	2734249.487	61.0	Pass
L23	31.75 - 31.5	Pole	TP31.404x31.366x0.488	23	-14704.200	2486938.007	67.1	Pass
L24	31.5 - 26.5	Pole	TP32.154x31.404x0.481	24	-15717.100	2515117.626	69.6	Pass
L25	26.5 - 21.5	Pole	TP32.904x32.154x0.475	25	-16751.801	2541737.635	72.1	Pass
L26	21.5 - 19.25	Pole	TP33.242x32.904x0.475	26	-17222.301	2568197.683	72.8	Pass
L27	19.25 - 19	Pole	TP33.279x33.242x0.5	27	-17285.801	2704403.618	69.4	Pass
L28	19 - 14	Pole	TP34.029x33.279x0.494	28	-18419.699	2732223.327	71.6	Pass
L29	14 - 9	Pole	TP34.78x34.029x0.488	29	-19575.199	2758483.426	73.7	Pass
L30	9 - 4	Pole	TP35.53x34.78x0.488	30	-20746.000	2818828.333	74.9	Pass
L31	4 - 0	Pole	TP36.13x35.53x0.488	31	-21694.100	2867109.591	75.8	Pass
							Summary	
						Pole (L13)	97.5	Pass
						RATING =	**97.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 842858 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- F

Site BU: 842858

Work Order: 1001961

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	120	37	3.25	18	19	24.552	0.1875	0.75	A607-65
2	86.25	45	3.75	18	23.69	30.441	0.25	1	A607-65
3	45	45	0	18	29.38	36.13	0.3125	1.25	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	19.25	plate	5"x1"(weld btm)	4				x					x			x						x
2	19.25	31.75	plate	5"x1"	3	x						x						x					
3	31.75	41.25	plate	5"x1.25"	3						x						x						x
4	41.25	58.125	plate	4.5"x1"	3						x						x						x
5	58.125	61	plate	4"x1.25"	3		x						x						x				
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	5	1	5	0.5	n/a	21.000	18.000	3.750	1.1875	A572-65
2	5	1	5	0.5	21.000	21.000	18.000	3.750	1.1875	A572-65
3	5	1.25	6.25	0.625	27.000	27.000	15.000	4.688	1.1875	A572-65
4	4.5	1	4.5	0.5	18.000	18.000	18.000	3.250	1.1875	A572-65
5	4	1.25	5	0.625	18.000	18.000	13.500	3.438	1.1875	A572-65

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	120 - 115	5		18	19.000	19.750	0.1875	A607-65	1.000
2	115 - 110	5		18	19.750	20.501	0.1875	A607-65	1.000
3	110 - 105	5		18	20.501	21.251	0.1875	A607-65	1.000
4	105 - 100	5		18	21.251	22.001	0.1875	A607-65	1.000
5	100 - 95	5		18	22.001	22.751	0.1875	A607-65	1.000
6	95 - 90	5		18	22.751	23.502	0.1875	A607-65	1.000
7	90 - 86.25	7	3.25	18	23.502	24.552	0.1875	A607-65	1.000
8	86.25 - 81.25	5		18	23.689	24.440	0.25	A607-65	1.000
9	81.25 - 76.25	5		18	24.440	25.190	0.25	A607-65	1.000
10	76.25 - 71.25	5		18	25.190	25.940	0.25	A607-65	1.000
11	71.25 - 66.25	5		18	25.940	26.690	0.25	A607-65	1.000
12	66.25 - 61.25	5		18	26.690	27.440	0.25	A607-65	1.000
13	61.25 - 61	0.25		18	27.440	27.478	0.25	A607-65	1.000
14	61 - 60.75	0.25		18	27.478	27.515	0.45	A607-65	0.948
15	60.75 - 58.125	2.625		18	27.515	27.909	0.45	A607-65	0.942
16	58.125 - 57.875	0.25		18	27.909	27.947	0.425	A607-65	0.956
17	57.875 - 52.875	5		18	27.947	28.697	0.41875	A607-65	0.960
18	52.875 - 47.875	5		18	28.697	29.447	0.4125	A607-65	0.965
19	47.875 - 45	6.625	3.75	18	29.447	30.441	0.4125	A607-65	0.959
20	45 - 40.25	4.75		18	29.378	30.091	0.55	A607-65	0.936
21	40.25 - 35.25	5		18	30.091	30.841	0.5375	A607-65	0.948
22	35.25 - 31.75	3.5		18	30.841	31.366	0.5375	A607-65	0.942
23	31.75 - 31.5	0.25		18	31.366	31.404	0.4875	A607-65	0.958
24	31.5 - 26.5	5		18	31.404	32.154	0.48125	A607-65	0.963
25	26.5 - 21.5	5		18	32.154	32.904	0.475	A607-65	0.968
26	21.5 - 19.25	2.25		18	32.904	33.242	0.475	A607-65	0.965
27	19.25 - 19	0.25		18	33.242	33.279	0.5	A607-65	1.013
28	19 - 14	5		18	33.279	34.029	0.49375	A607-65	1.017
29	14 - 9	5		18	34.029	34.780	0.4875	A607-65	1.021
30	9 - 4	5		18	34.780	35.530	0.4875	A607-65	1.013
31	4 - 0	4		18	35.530	36.130	0.4875	A607-65	1.007

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	120 - 115	1.8348	11.014	4.2563
2	115 - 110	2.0595	32.992	4.5373
3	110 - 105	4.0633	68.29	10.228
4	105 - 100	4.4258	120.28	10.562
5	100 - 95	4.9166	176.54	11.547
6	95 - 90	5.3543	235.1	11.874
7	90 - 86.25	5.6958	280.09	12.115
8	86.25 - 81.25	6.3667	341.57	12.47
9	81.25 - 76.25	6.9274	404.71	12.788
10	76.25 - 71.25	7.5026	469.44	13.101
11	71.25 - 66.25	8.0971	535.71	13.407
12	66.25 - 61.25	8.7098	603.51	13.713
13	61.25 - 61	8.7485	606.94	13.728
14	61 - 60.75	8.7913	610.37	13.745
15	60.75 - 58.125	9.2235	646.71	13.94
16	58.125 - 57.875	9.2707	650.2	13.957
17	57.875 - 52.875	10.091	720.87	14.308
18	52.875 - 47.875	10.933	793.26	14.646
19	47.875 - 45	11.421	835.64	14.836
20	45 - 40.25	12.86	906.98	15.192
21	40.25 - 35.25	13.906	983.76	15.517
22	35.25 - 31.75	14.648	1038.5	15.736
23	31.75 - 31.5	14.704	1042.4	15.749
24	31.5 - 26.5	15.717	1121.9	16.046
25	26.5 - 21.5	16.752	1202.8	16.336
26	21.5 - 19.25	17.222	1239.7	16.467
27	19.25 - 19	17.286	1243.8	16.476
28	19 - 14	18.42	1327	16.771
29	14 - 9	19.575	1411.5	17.057
30	9 - 4	20.746	1497.5	17.34
31	4 - 0	21.694	1567.3	17.562

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
120 - 115	Pole	TP19.75x19x0.1875	Pole	4.8%	Pass
115 - 110	Pole	TP20.501x19.75x0.1875	Pole	12.9%	Pass
110 - 105	Pole	TP21.251x20.501x0.1875	Pole	24.8%	Pass
105 - 100	Pole	TP22.001x21.251x0.1875	Pole	40.4%	Pass
100 - 95	Pole	TP22.751x22.001x0.1875	Pole	55.2%	Pass
95 - 90	Pole	TP23.502x22.751x0.1875	Pole	68.7%	Pass
90 - 86.25	Pole	TP24.552x23.502x0.1875	Pole	77.9%	Pass
86.25 - 81.25	Pole	TP24.44x23.689x0.25	Pole	69.6%	Pass
81.25 - 76.25	Pole	TP25.19x24.44x0.25	Pole	77.5%	Pass
76.25 - 71.25	Pole	TP25.94x25.19x0.25	Pole	84.7%	Pass
71.25 - 66.25	Pole	TP26.69x25.94x0.25	Pole	91.2%	Pass
66.25 - 61.25	Pole	TP27.44x26.69x0.25	Pole	97.1%	Pass
61.25 - 61	Pole	TP27.478x27.44x0.25	Pole	97.3%	Pass
61 - 60.75	Pole + Reinf.	TP27.515x27.478x0.45	Reinf. 5 Tension Rupture	80.1%	Pass
60.75 - 58.13	Pole + Reinf.	TP27.909x27.515x0.45	Reinf. 5 Tension Rupture	83.3%	Pass
58.13 - 57.88	Pole + Reinf.	TP27.947x27.909x0.425	Reinf. 4 Tension Rupture	83.0%	Pass
57.88 - 52.88	Pole + Reinf.	TP28.697x27.947x0.4188	Reinf. 4 Tension Rupture	87.9%	Pass
52.88 - 47.88	Pole + Reinf.	TP29.447x28.697x0.4125	Reinf. 4 Tension Rupture	92.7%	Pass
47.88 - 45	Pole + Reinf.	TP30.441x29.447x0.4125	Reinf. 4 Tension Rupture	95.4%	Pass
45 - 40.25	Pole + Reinf.	TP30.091x29.378x0.55	Reinf. 3 Tension Rupture	76.3%	Pass
40.25 - 35.25	Pole + Reinf.	TP30.841x30.091x0.5375	Reinf. 3 Tension Rupture	79.2%	Pass
35.25 - 31.75	Pole + Reinf.	TP31.366x30.841x0.5375	Reinf. 3 Tension Rupture	81.4%	Pass
31.75 - 31.5	Pole + Reinf.	TP31.404x31.366x0.4875	Reinf. 2 Tension Rupture	88.8%	Pass
31.5 - 26.5	Pole + Reinf.	TP32.154x31.404x0.4813	Reinf. 2 Tension Rupture	91.5%	Pass
26.5 - 21.5	Pole + Reinf.	TP32.904x32.154x0.475	Reinf. 2 Tension Rupture	94.7%	Pass
21.5 - 19.25	Pole + Reinf.	TP33.242x32.904x0.475	Reinf. 2 Tension Rupture	96.0%	Pass
19.25 - 19	Pole + Reinf.	TP33.279x33.242x0.5	Reinf. 1 Tension Rupture	89.2%	Pass
19 - 14	Pole + Reinf.	TP34.029x33.279x0.4938	Reinf. 1 Tension Rupture	91.7%	Pass
14 - 9	Pole + Reinf.	TP34.78x34.029x0.4875	Reinf. 1 Tension Rupture	94.1%	Pass
9 - 4	Pole + Reinf.	TP35.53x34.78x0.4875	Reinf. 1 Tension Rupture	96.4%	Pass
4 - 0	Pole + Reinf.	TP36.13x35.53x0.4875	Reinf. 1 Tension Rupture	98.1%	Pass
				Summary	
			Pole	97.3%	Pass
			Reinforcement	98.1%	Pass
			Overall	98.1%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity					
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5
120 - 115	563	n/a	563	11.64	n/a	11.64	4.8%					
115 - 110	630	n/a	630	12.09	n/a	12.09	12.9%					
110 - 105	702	n/a	702	12.53	n/a	12.53	24.8%					
105 - 100	780	n/a	780	12.98	n/a	12.98	40.4%					
100 - 95	863	n/a	863	13.43	n/a	13.43	55.2%					
95 - 90	952	n/a	952	13.87	n/a	13.87	68.7%					
90 - 86.25	1023	n/a	1023	14.21	n/a	14.21	77.9%					
86.25 - 81.25	1418	n/a	1418	19.19	n/a	19.19	69.6%					
81.25 - 76.25	1555	n/a	1555	19.79	n/a	19.79	77.5%					
76.25 - 71.25	1699	n/a	1699	20.38	n/a	20.38	84.7%					
71.25 - 66.25	1852	n/a	1852	20.98	n/a	20.98	91.2%					
66.25 - 61.25	2015	n/a	2015	21.57	n/a	21.57	97.1%					
61.25 - 61	2023	n/a	2023	21.60	n/a	21.60	97.3%					
61 - 60.75	2031	1562	3594	21.63	15.00	36.63	55.0%					80.4%
60.75 - 58.13	2121	1605	3726	21.95	15.00	36.95	56.4%					83.3%
58.13 - 57.88	2129	1426	3555	21.98	13.50	35.48	59.5%				83.0%	
57.88 - 52.88	2307	1500	3807	22.57	13.50	36.07	64.0%				88.2%	
52.88 - 47.88	2494	1576	4071	23.17	13.50	36.67	67.6%				93.0%	
47.88 - 45	2606	1621	4227	23.51	13.50	37.01	69.6%				95.7%	
45 - 40.25	3308	2323	5631	29.54	18.75	48.29	56.5%			76.3%		
40.25 - 35.25	3564	2434	5999	30.28	18.75	49.03	59.6%			79.5%		
35.25 - 31.75	3751	2514	6265	30.80	18.75	49.55	61.3%			81.7%		
31.75 - 31.5	3765	1985	5750	30.84	15.00	45.84	66.4%		88.8%			
31.5 - 26.5	4044	2077	6121	31.58	15.00	46.58	69.5%		91.8%			
26.5 - 21.5	4337	2172	6508	32.33	15.00	47.33	70.9%		94.7%			
21.5 - 19.25	4473	2215	6688	32.66	15.00	47.66	71.9%		96.0%			
19.25 - 19	4489	2547	7037	32.70	20.00	52.70	70.4%	89.2%				
19 - 14	4803	2659	7462	33.44	20.00	53.44	72.4%	91.7%				
14 - 9	5131	2773	7904	34.19	20.00	54.19	74.3%	94.1%				
9 - 4	5473	2890	8363	34.93	20.00	54.93	76.1%	96.4%				
4 - 0	5757	3173	8930	35.53	20.00	55.53	75.4%	98.1%				

Note: Section capacity checked in 5 degree increments.

TECTONIC ENGINEERING
& SURVEYING CONSULTANTS P.C.

W.O. 6500.842858
BOLTON
By: IM
2/4/2015

ANCHOR BOLTS - Distribution of Base Reactions

Base Reactions:		
Moment	1567	k-ft
Axial	22	k
Shear	18	k

Combined MOI 9137.06 in^4

Original Anchor Rods		
Quantity	8	
Diameter	2.25	in
Material	A615 Gr 75	
Fy	75	ksi
Fu	100	ksi
Bolt Circle	42	in
Bolt Group MOI	6880.73	in^4

Reactions Taken by Bolt Group

Moment	1180	k-ft
Axial	22	k
Shear	18	k

Reinforcement Anchor Rods		
Quantity	3	
Diameter	1.75	in
Material	F1554-105	
Fy	105	ksi
Fu	125	ksi
Bolt Circle	50	in
Bolt Group MOI	2256.33	in^4

Reactions Taken by Bolt Group

Moment	387	k-ft
Axial	0	k
Shear	0	k

Moment of Inertia Values from AutoCAD

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#: *842858*
Site Name: *BOLTON*
App #: *214795 Rev 6*

Original Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	42	in
Anchor Spacing:	6	in (estimated)

Plate Data		
W=Side:	41	in
Thick:	2.5	in
Grade:	55	ksi
Clip Distance:	2.5	in

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

Pole Data		
Diam:	36.13	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1180	ft-kips
Unfactored Axial, P:	22	kips
Unfactored Shear, V:	18	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	165.8 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	85.1% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	40.5 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	73.7% **Pass**

PL Ref. Data	
Yield Line (in):	21.85
Max PL Length:	21.85

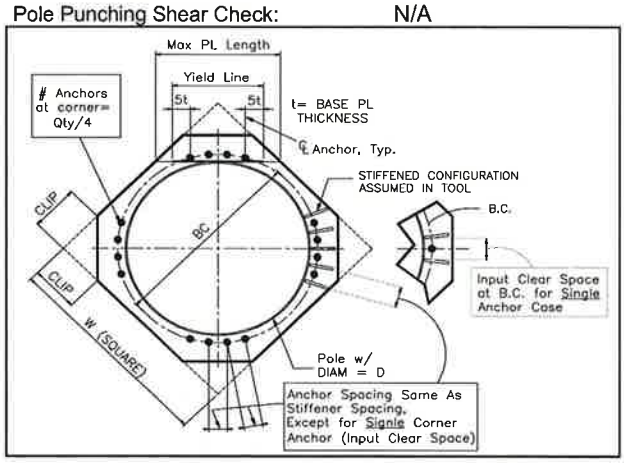
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

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

TIA Rev F

Site Data

BU#: *842858*
Site Name: *BOLTON*
App#: *214795 Rev 6*

Pole Manufacturer:	*Other*

Reactions		
Moment:	387	ft-kips
Axial:	0	kips
Shear:	0	kips

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

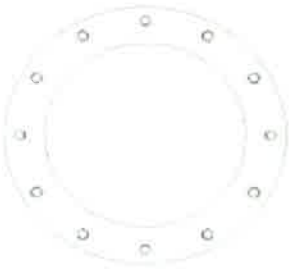
Reinforced Anchor Rod Data		
Qty:	3	
Diam:	1.75	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	105	ksi
Bolt Circle:	50	in

Anchor Rod Results

		Non-Rigid
Maximum Rod Tension:	123.8 Kips	Service, ASD
Allowable Tension:	132.3 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	93.6% **Pass**	

Pole Data		
Diam:	36.13	in
Thick:	0.3125	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



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

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

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 2/4/2015

BU:	842858
Site Name:	BOLTON
App Number:	214795 Rev 6
Work Order:	1001961

Monopole Drilled Pier

Input

Criteria

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

Forces

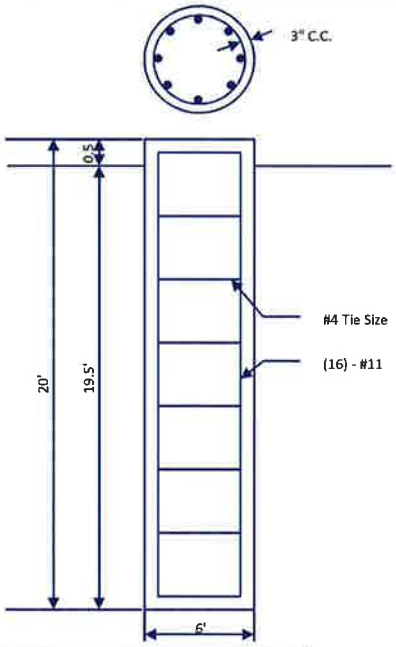
Compression	22 kips
Shear	18 kips
Moment	1567 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	6 ft
Ext. above grade:	0.5 ft
Depth below grade:	19.5 ft

Material Properties

Number of Rebar:	16
Rebar Size:	11
Tie Size	4
Rebar tensile strength:	60 ksi
Concrete Strength:	3000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	3 in



Soil Profile: 842858

Layer	Thickness (ft)	From (ft)	To (ft)	Unit Weight (pcf)	Cohesion (psf)	Friction Angle (deg)	Ultimate Uplift Skin Friction (ksf)	Ultimate Comp. Skin Friction (ksf)	Ultimate Bearing Capacity (ksf)	SPT 'N' Counts
1	0.5	0	0.5	100	0	0				0
2	1.5	0.5	2	102	0	0				0
3	1.33	2	3.33	115	0	0				0
4	0.67	3.33	4	115	0	40	0.12	0.12		0
5	1.5	4	5.5	115	0	37	0.2	0.2		0
6	0.5	5.5	6	53	0	37	0.24	0.24		0
7	2	6	8	53	0	37	0.26	0.26		0
8	2	8	10	53	0	41	0.34	0.34		0
9	2	10	12	55	0	45	0.44	0.44		0
10	2	12	14	58	0	45	0.5	0.5		0
11	6	14	20	58	0	45	0.62	0.62	50	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	4.80 ft
Max Moment, Mu:	1671.37 k-ft
Soil Safety Factor:	2.76
Safety Factor Req'd:	2
RATING:	72.4%

Soil Axial Capacity

Skin Friction (k):	65.88 kips
End Bearing (k):	706.86 kips
Comp. Capacity (k), ϕCn:	772.74 kips
Comp. (k), Cu:	28.60 kips
RATING:	3.7%

Concrete/Steel Check

Mu (from soil analysis)	2172.78 k-ft
ϕMn	3358.74 k-ft
RATING:	64.7%

rho provided	0.61
rho required	0.33 OK
Rebar Spacing	11.08
Spacing required	22.56 OK
Dev. Length required	14.45
Dev. Length provided	61.78 OK

Overall Foundation Rating: 72.4%