Robinson+Cole

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Also admitted in Massachusetts

March 11, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
1000 Old County Circle, Windsor Locks, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 85-foot level on the existing 101-foot tower at 1000 Old County Circle in Windsor Locks, Connecticut (the "Property"). The tower is owned by Crown Castle. The Council approved Cellco's shared use of this tower in 2004. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with two (2) model BXA-70080-4CF, 850 MHz antennas; one (1) model BXA-80063-4CF, 850 MHz antenna; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same 85-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 tower. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Steven N. Wawruck, Jr., First Selectman of the Town of Windsor Locks. A copy of this letter is also being sent to Maria Rafalowski, the owner of the Property.

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

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 85-foot level on the tower.

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

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

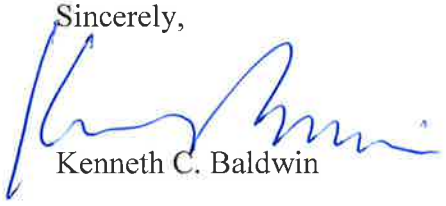
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions safety limits established by the FCC.

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:
Steven N. Wawruck, Jr., Windsor Locks First Selectman
Maria Rafalowski
Timothy Parks

ATTACHMENT 1

Amphenol ANTENNA SOLUTIONS

BXA-70080-4CF-EDIN-X

X-Pol | FET Panel | 80° | 12.0 dBd

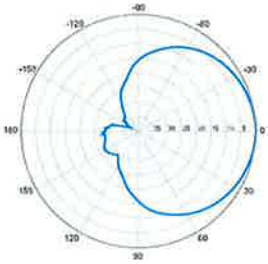
Replace "X" with desired electrical downtilt.

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	82°	80°
Vertical beamwidth	17°	15°
Gain	11.5 dBd (13.6 dBi)	12.0 dBd (14.1 dBi)
Electrical downtilt (X)	0, 2, 4, 6, 8, 10, 12, 14	
Impedance	**50Ω**	
VSWR	≤1.35:1	
Upper sidelobe suppression (0°)	-11.8 dB	-13.1 dB
Front-to-back ratio (+/-30°)	-30.3 dB	-36.7 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	1206 x 204 x 151 mm	47.5 x 8.0 x 5.9 in
Depth with z-brackets	196 mm	7.7 in
Weight without mounting brackets	5.4 kg	12 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.25 m^2 Side: 0.18 m^2	Front: 2.6 ft^2 Side: 1.9 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 351 N Side: 280 N	Front: 79 lbf Side: 61 lbf

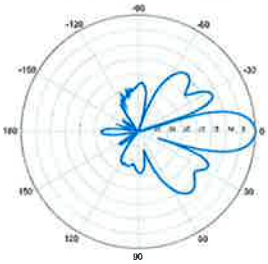
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-70080-4CF-EDIN-X-FP		

BXA-70080-4CF-EDIN-X



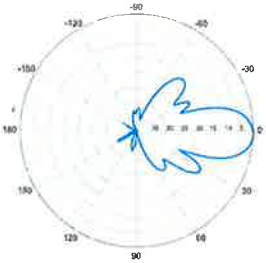
Horizontal | 750 MHz

BXA-70080-4CF-EDIN-0

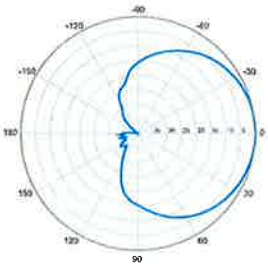


0° | Vertical | 750 MHz

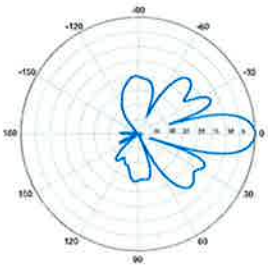
BXA-70080-4CF-EDIN-2



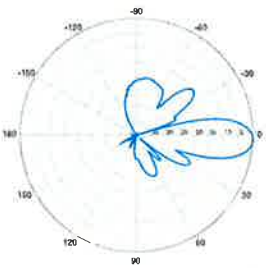
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz

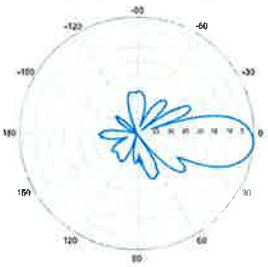


2° | Vertical | 850 MHz

BXA-70080-4CF-EDIN-X

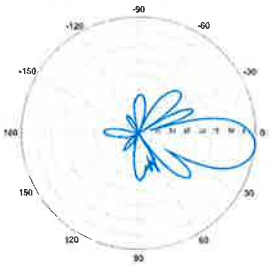
X-Pol | FET Panel | 80° | 12.0 dBd

BXA-70080-4CF-EDIN-4



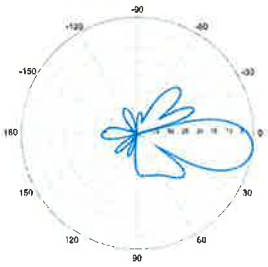
4° | Vertical | 750 MHz

BXA-70080-4CF-EDIN-6

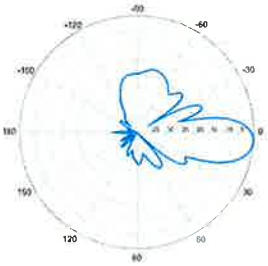


6° | Vertical | 750 MHz

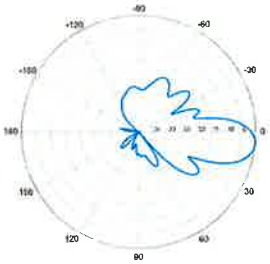
BXA-70080-4CF-EDIN-8



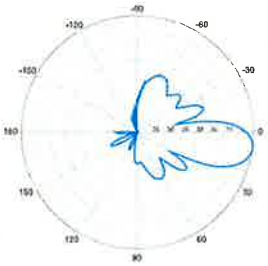
8° | Vertical | 750 MHz



4° | Vertical | 850 MHz

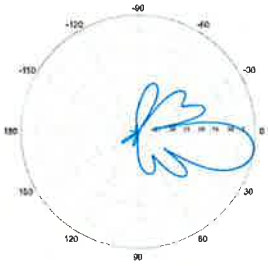


6° | Vertical | 850 MHz



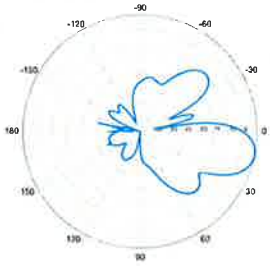
8° | Vertical | 850 MHz

BXA-70080-4CF-EDIN-10



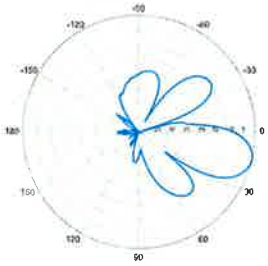
10° | Vertical | 750 MHz

BXA-70080-4CF-EDIN-12

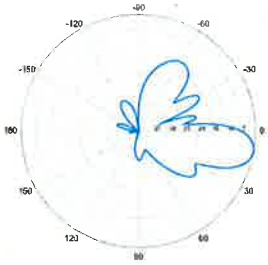


12° | Vertical | 750 MHz

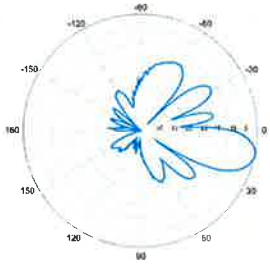
BXA-70080-4CF-EDIN-14



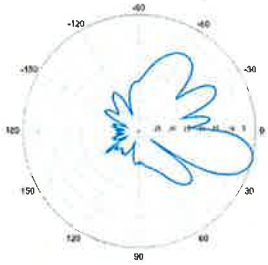
14° | Vertical | 750 MHz



10° | Vertical | 850 MHz



12° | Vertical | 850 MHz



14° | Vertical | 850 MHz

Amphenol ANTENNA SOLUTIONS

BXA-80063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

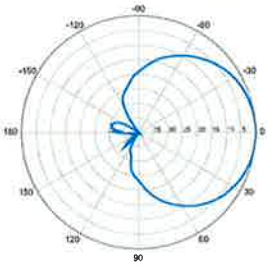
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics				
Frequency bands	806-900 MHz*			
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)			
Polarization	±45°			
Horizontal beamwidth	63°			
Vertical beamwidth	15°			
Gain	13.0 dBd (15.1 dBi)			
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-22.1 dB			
Front-to-back ratio (+/-30°)	-34.9 dB			
Null fill	5% (-26.02 dB)			
Isolation between ports	< -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

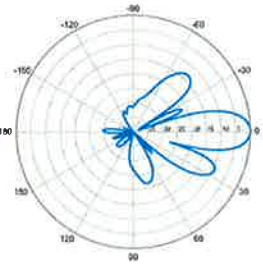
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-4CF-EDIN-X-FP		

BXA-80063-4CF-EDIN-X



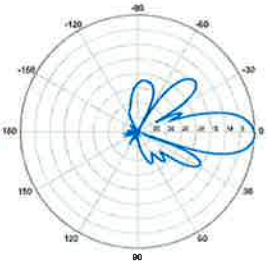
Horizontal

BXA-80063-4CF-EDIN-0



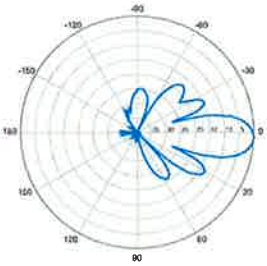
0° | Vertical

BXA-80063-4CF-EDIN-2



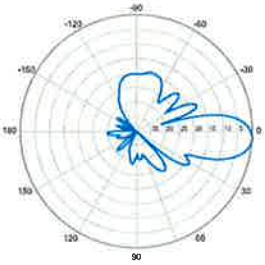
2° | Vertical

BXA-80063-4CF-EDIN-3



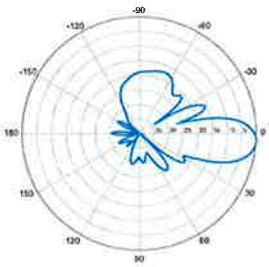
3° | Vertical

BXA-80063-4CF-EDIN-4



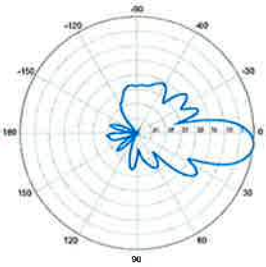
4° | Vertical

BXA-80063-4CF-EDIN-5



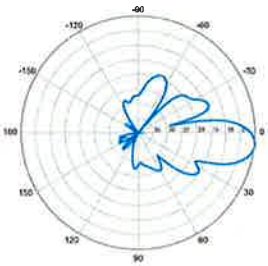
5° | Vertical

BXA-80063-4CF-EDIN-6



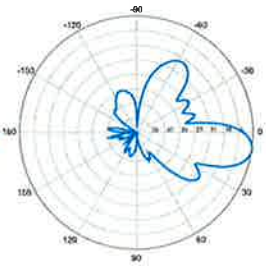
6° | Vertical

BXA-80063-4CF-EDIN-8



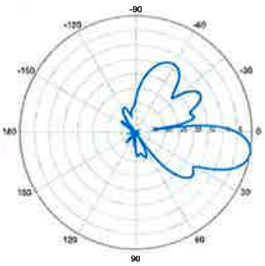
8° | Vertical

BXA-80063-4CF-EDIN-9



9° | Vertical

BXA-80063-4CF-EDIN-10



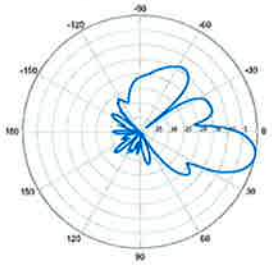
10° | Vertical

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-80063-4CF-EDIN-X

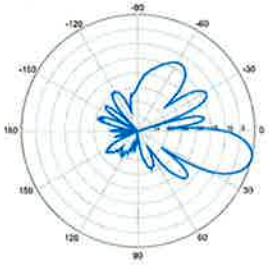
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-80063-4CF-EDIN-12



12° | Vertical

BXA-80063-4CF-EDIN-14



14° | Vertical

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

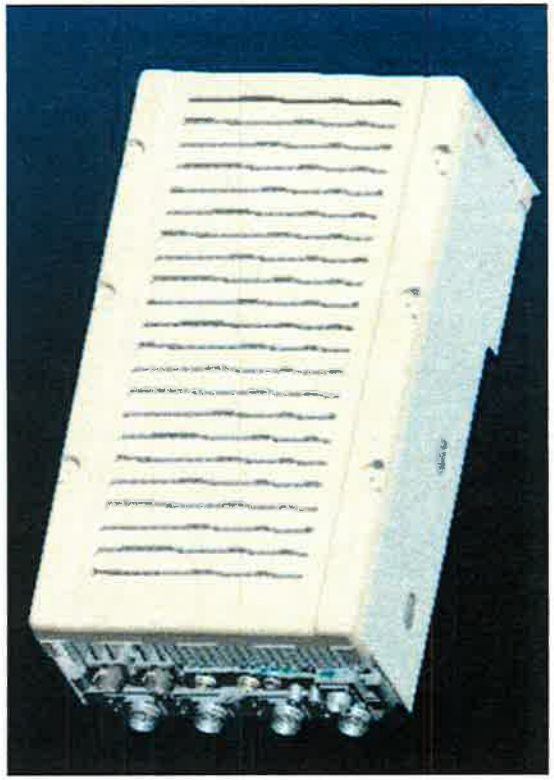
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms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

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.

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).

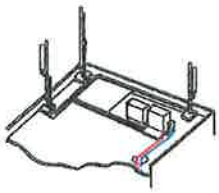
The Alcatel-Lucent RRH2x60-AWS is a very cost-effective solution to deploy LTE MIMO.

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.

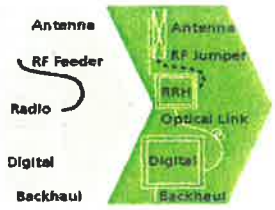
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

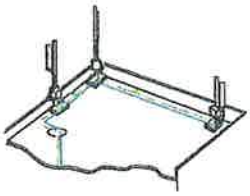
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

- 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

- 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.

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

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

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

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

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

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

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket:	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight and Bending Radius			
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
Temperature			
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

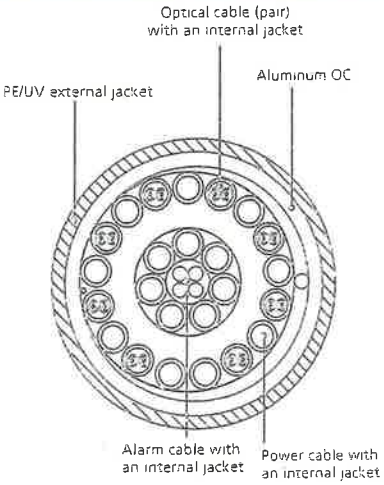


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

Far Field Approximation
with downtilt variation

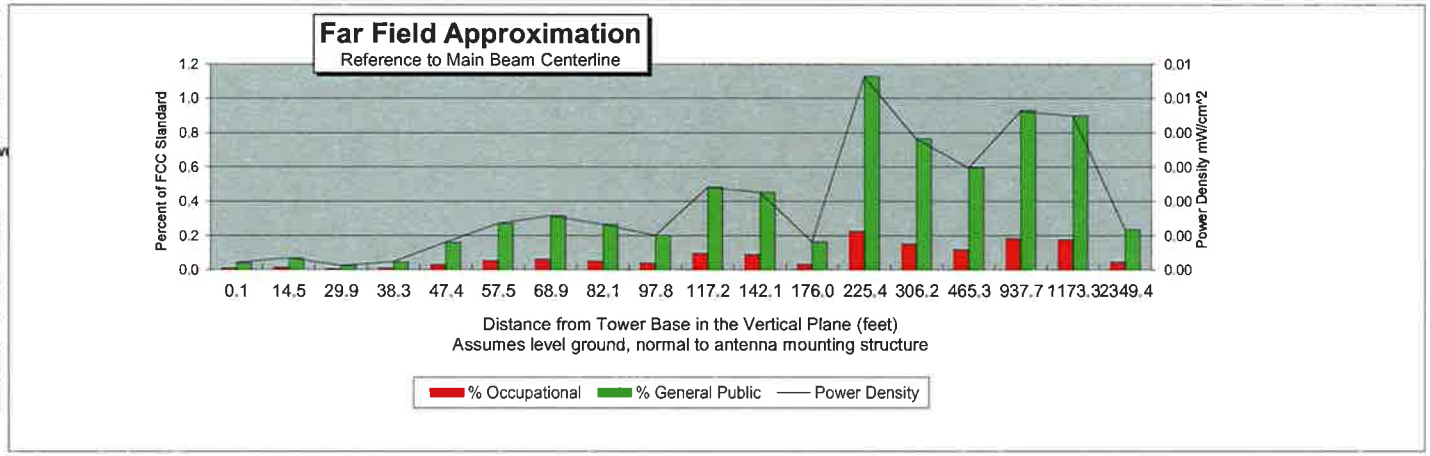
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	WINDSOR LOCKS 2, CT
Site #:	
Date:	03/10/15
Name:	Mark Brauer
File Name:	Windsor Locks 2, CT - FF Pow

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**85.0**
Antenna Gain (dBi):	**14.5**
Antenna Size (in.):	**71.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1050.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	82.0	83.3	87.3	90.5	94.7	100.1	107.1	116.0	127.6	143.0	164.1	194.1	239.9	317.0	472.5	941.3	1176.1	2350.8
Distance from Antenna Structure Base in Horizontal plane	0.1	14.5	29.9	38.3	47.4	57.5	68.9	82.1	97.8	117.2	142.1	176.0	225.4	306.2	465.3	937.7	1173.3	2349.4
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.2	0.1	0.2	0.2	0.0
Percent of General Population Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.1	0.8	0.6	0.9	0.9	0.2

Antenna Type BXA-70063-6CF
Max% 1.13%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pow
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

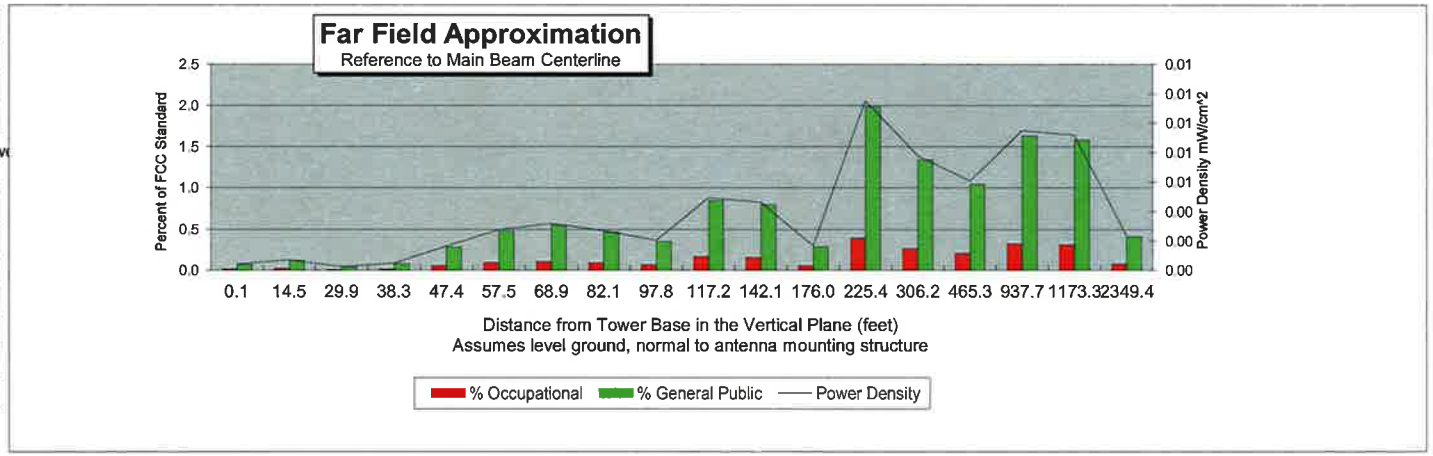
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	WINDSOR LOCKS 2, CT
Site #:	
Date:	03/10/15
Name:	Mark Brauer
File Name:	Windsor Locks 2, CT - FF Pow

Operating Freq. (MHz)	869.0
Antenna Height (ft):	85.0
Antenna Gain (dBi):	12.0
Antenna Size (in.):	44.3
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
Power @ J4 (w):	3824.0



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	82.0	83.3	87.3	90.5	94.7	100.1	107.1	116.0	127.6	143.0	164.1	194.1	239.9	317.0	472.5	941.3	1176.1	2350.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.5	29.9	38.3	47.4	57.5	68.9	82.1	97.8	117.2	142.1	176.0	225.4	306.2	465.3	937.7	1173.3	2349.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.2	0.3	0.3	0.1	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.3	0.5	0.6	0.5	0.4	0.8	0.8	0.3	2.0	1.3	1.0	1.6	1.6	0.4	

Antenna Type BXA-70080-4BF
Max% 1.99%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pov
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

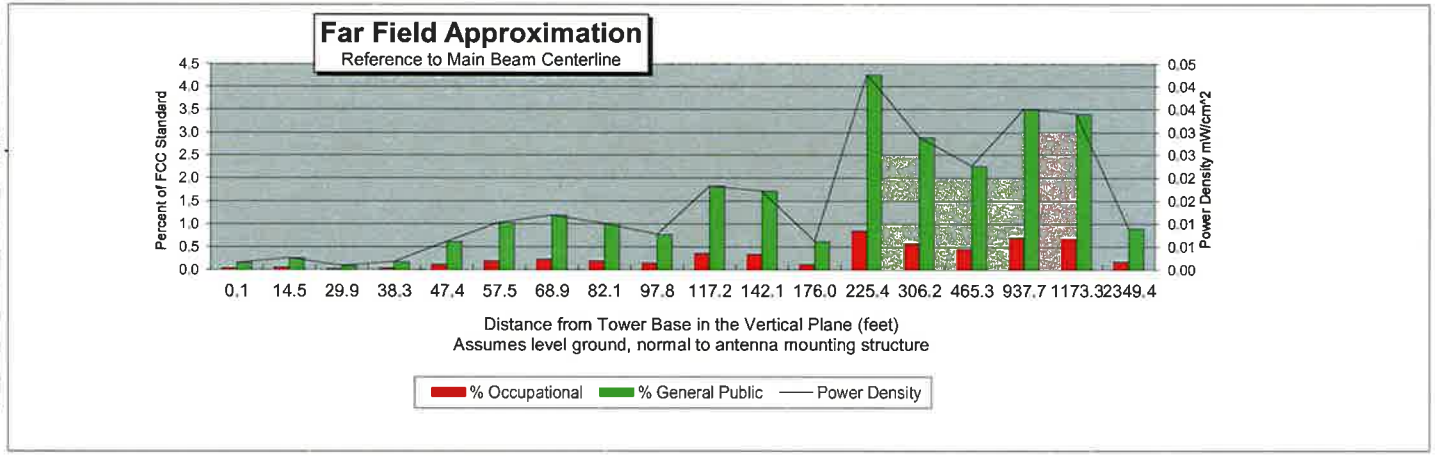
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	WINDSOR LOCKS 2, CT
Site #:	
Date:	03/10/15
Name:	Mark Brauer
File Name:	East Haven Cosey Beach, CT

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**85.0**
Antenna Gain (dBi):	**16.3**
Antenna Size (in.):	**74.9**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**5234.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	82.0	83.3	87.3	90.5	94.7	100.1	107.1	116.0	127.6	143.0	164.1	194.1	239.9	317.0	472.5	941.3	1176.1	2350.8	
Distance from Antenna Structure Base in Horizontal plane	0.1	14.5	29.9	38.3	47.4	57.5	68.9	82.1	97.8	117.2	142.1	176.0	225.4	306.2	465.3	937.7	1173.3	2349.4	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.04	0.03	0.02	0.04	0.03	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.1	0.9	0.6	0.5	0.7	0.7	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.6	1.0	1.2	1.0	0.8	1.8	1.7	0.6	4.3	2.9	2.3	3.5	3.4	0.9	

Antenna Type HBXX-6517DS-A2M
Max% 4.27%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
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Far Field Approximation
with downtilt variation

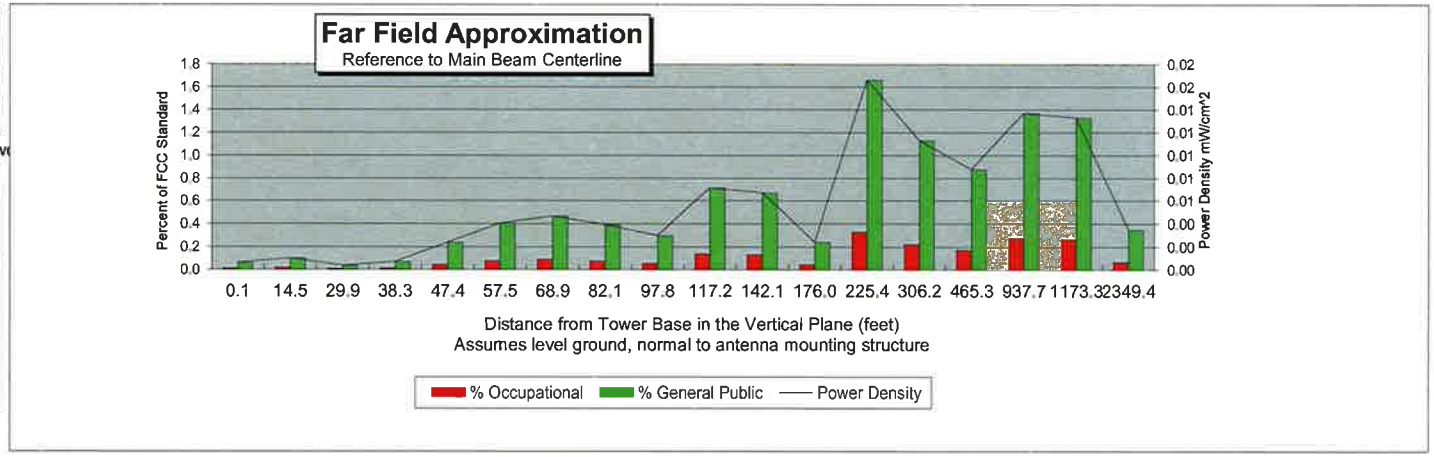
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	WINDSOR LOCKS 2, CT
Site #:	
Date:	03/10/15
Name:	Mark Brauer
File Name:	Windsor Locks 2, CT - FF Pow

Operating Freq. (MHz)	**2145.0**
Antenna Height (ft):	**85.0**
Antenna Gain (dBi):	**17.0**
Antenna Size (in.):	**74.9**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
Power @ J4 (w):	**1750.0**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
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Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.01	0.01	0.00	
Percent of Occupational Standard	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.2	0.2	0.3	0.3	0.1	
Percent of General Population Standard	0.1	0.1	0.0	0.1	0.2	0.4	0.5	0.4	0.3	0.7	0.7	0.2	1.7	1.1	0.9	1.4	1.3	0.3	

Antenna Type HBXX-6517DS-A2M
Max% 1.66%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Pov
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

Date: **February 05, 2015**

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

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	NA
	Carrier Site Name:	Windsor Locks 2, CT
Crown Castle Designation:	**Crown Castle BU Number:**	842876
	Crown Castle Site Name:	WINDSOR LOCKS
	Crown Castle JDE Job Number:	275903
	Crown Castle Work Order Number:	1001967
	Crown Castle Application Number:	215954 Rev. 12
Engineering Firm Designation:	**TECTONIC Project Number:**	6500.842876
Site Data:	**1000 OLD COUNTY CIRCLE, WINDSOR LOCKS, Hartford County, CT** **Latitude *41° 54' 36.9"*, Longitude *-72° 39' 42.4"*** **101 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 751644, in accordance with application 215954, revision 12.

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 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 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: Garrett Miller / DG

Respectfully submitted by:

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

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 101 ft Monopole tower designed by Engineered Endeavors, Inc. in July of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 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
86.0	85.0	3	alcatel lucent	RRH2X60-AWS	1	1-5/8	-
		3	alcatel lucent	RRH2X60-PCS			
		6	andrew	HBXX-6517DS-A2M w/ Mount Pipe			
		2	antel	BXA-70080-4CF-2 w/ Mount Pipe			
		1	antel	BXA-80063-4CF-EDIN-2 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
95.0	95.0	1	andrew	SBNH-1D6565C w/ Mount Pipe	1 1 2 12	3/8 2 1/2 7/8	1
		1	crown mounts	LP 601-1			
		6	ericsson	RRUS 11			
		1	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		12	powerwave technologies	LGP21401			
		1	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
86.0	86.0	1	crown mounts	LP 601-1	12	1-5/8	1
	85.0	3	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	antel	BXA-171063-8BF-2 w/ Mount Pipe	-	-	2
		6	antel	LPA-80080-4CF-EDIN-0 w/ Mount Pipe			
		2	swedcom	SPX 8515 w/ Mount Pipe			
63.0	65.0	6	andrew	E15S09P80	18	7/8	1
		3	andrew	ETD819G-12UB			
		3	rfs celwave	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe			
		6	rfs celwave	APXV18-206516S-C-ACU w/ Mount Pipe			
	63.0	1	crown mounts	LP 303-1			

Notes:
1) Existing Equipment
2) Equipment To Be Removed; Not Considered in this Analysis

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)
98.0	98.0	12	Swedcom	ALP 11011-N	-	-
88.0	88.0	12	Swedcom	ALP 11011-N	-	-
78.0	78.0	12	Swedcom	ALP 11011-N	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Engineered Endeavors, Inc.	4529468	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors, Inc.	4713155	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Clarence Welti Associates, Inc.	4713154	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B&T Engineering, Inc.	4964607	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) The existing base plate grout has not been considered in this analysis.
5) The base plate stiffeners have been installed in accordance with to the reinforcement drawings, referenced above.

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	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	101 - 83.62	Pole	TP17.41x13x0.1875	1	-2.32	511.25	25.4	Pass
L2	83.62 - 45.58	Pole	TP26.56x16.3372x0.25	2	-9.18	1045.63	87.2	Pass
L3	45.58 - 0	Pole	TP37.5x25.0976x0.3125	3	-15.79	1855.47	82.8	Pass
							Summary	
						Pole (L2)	87.2	Pass
						Rating =	87.2	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	63.3%	Pass
1	Base Plate	0	82.9%	Pass
1	Base Foundation	0	52.4%	Pass

Structure Rating (max from all components) =	87.2%

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

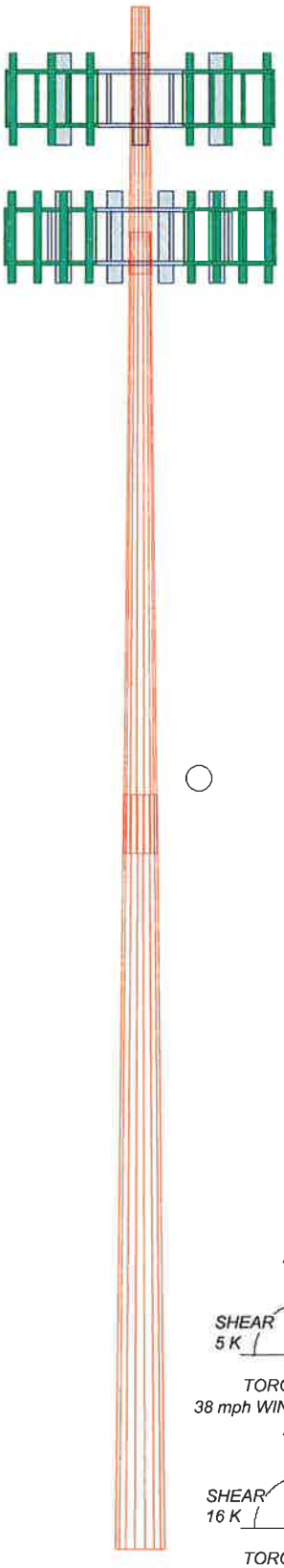
Section	1	2	3		
Length (ft)	17.38	40.79	49.42		
Number of Sides	18	18	18		
Thickness (in)	0.1875	0.2500	0.3125		
Socket Length (ft)	2.75	3.84			
Top Dia (in)	13.0000	16.3372	25.0976		
Bot Dia (in)	17.4100	26.5600	37.5000		
Grade				A572-65	
Weight (K)	0.5	2.3	5.2		8.0

101.0 ft

83.6 ft

45.6 ft

0.0 ft



DESIGNED APPURTENANCE LOADING

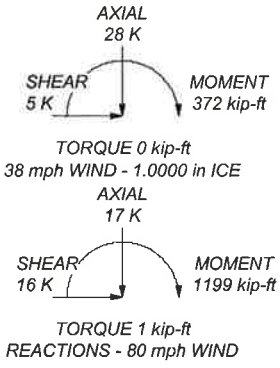
TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00 w/ Mount Pipe	95	RRH2X60-AWS	86
(2) 7770.00 w/ Mount Pipe	95	RRH2X60-AWS	86
(2) 7770.00 w/ Mount Pipe	95	RRH2X60-AWS	86
SBNH-1D6565C w/ Mount Pipe	95	RRH2X60-PCS	86
AM-X-CD-16-65-00T-RET w/ Mount Pipe	95	RRH2X60-PCS	86
		RRH2X60-PCS	86
P65-17-XLH-RR w/ Mount Pipe	95	DB-T1-6Z-8AB-0Z	86
(4) LGP21401	95	LP 601-1	86
(4) LGP21401	95	(2) APXV18-206516S-C-ACU w/ Mount Pipe	63
(4) LGP21401	95		
(2) RRUS 11	95	(2) APXV18-206516S-C-ACU w/ Mount Pipe	63
(2) RRUS 11	95		
(2) RRUS 11	95	(2) APXV18-206516S-C-ACU w/ Mount Pipe	63
DC6-48-60-18-8F	95		
6' x 2" STD Pipe	95	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	63
6' x 2" STD Pipe	95	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	63
6' x 2" STD Pipe	95		
LP 601-1	95	APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	63
BXA-70063-6CF-2 w/ Mount Pipe	86		
BXA-70063-6CF-2 w/ Mount Pipe	86	(2) E15S09P80	63
BXA-70063-6CF-2 w/ Mount Pipe	86	(2) E15S09P80	63
(2) FD9R6004/2C-3L	86	(2) E15S09P80	63
(2) FD9R6004/2C-3L	86	ETD819G-12UB	63
(2) FD9R6004/2C-3L	86	ETD819G-12UB	63
BXA-80063-4CF-EDIN-2 w/ Mount Pipe	86	ETD819G-12UB	63
		6' x 2" STD Pipe	63
BXA-70080-4CF-2 w/ Mount Pipe	86	6' x 2" STD Pipe	63
BXA-70080-4CF-2 w/ Mount Pipe	86	6' x 2" STD Pipe	63
(2) HBXX-6517DS-A2M w/ Mount Pipe	86	LP 303-1	63
(2) HBXX-6517DS-A2M w/ Mount Pipe	86		
(2) HBXX-6517DS-A2M w/ Mount Pipe	86		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 87.2%



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FAX: (845) 567-8703

Job: 6500.842876			
Project: BU 842876- WINDSOR LOCKS			
Client: Crown Castle	Drawn by: Garrett Miller		App'd:
Code: TIA/EIA-222-F	Date: 02/04/15		Scale: NTS
Path: G:\Newburgh\Projects\6500 Crown SA\842876\Structural\6500 842876 - Structural Analysis.eri			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 Hartford County, Connecticut.
4) Basic wind speed of 80 mph.
5) Nominal ice thickness of 1.0000 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	101.00-83.62	17.38	2.75	18	13.0000	17.4100	0.1875	0.7500	A572-65 (65 ksi)
L2	83.62-45.58	40.79	3.84	18	16.3372	26.5600	0.2500	1.0000	A572-65 (65 ksi)
L3	45.58-0.00	49.42		18	25.0976	37.5000	0.3125	1.2500	A572-65 (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	13.2005	7.6250	158.1420	4.5484	6.6040	23.9464	316.4921	3.8132	1.9580	10.443
	17.6786	10.2495	384.0911	6.1140	8.8443	43.4282	768.6876	5.1257	2.7342	14.582

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
L2	17.2891	12.7652	417.3755	5.7110	8.2993	50.2904	835.3002	6.3838	2.4353	9.741
	26.9697	20.8770	1825.7736	9.3400	13.4925	135.3179	3653.9496	10.4405	4.2346	16.938
L3	26.4633	24.5837	1907.9521	8.7987	12.7496	149.6481	3818.4148	12.2942	3.8672	12.375
	38.0785	36.8854	6444.4424	13.2016	19.0500	338.2909	12897.3645	18.4462	6.0500	19.36

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 101.00-83.62				1	1	1		
L2 83.62-45.58				1	1	1		
L3 45.58-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
95								
AL5-50(7/8)	C	No	Inside Pole	95.00 - 8.00	12	No Ice	0.00	0.26
						1/2" Ice	0.00	0.26
						1" Ice	0.00	0.26
						2" Ice	0.00	0.26
						4" Ice	0.00	0.26
FSJ2-50(3/8")	C	No	Inside Pole	95.00 - 8.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
						2" Ice	0.00	0.08
						4" Ice	0.00	0.08
LDF4-50A(1/2")	C	No	Inside Pole	95.00 - 8.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
WC166(2")	C	No	Inside Pole	95.00 - 8.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
2" Rigid Conduit	C	No	Inside Pole	95.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
86								
HJ7-50A(1-5/8")	B	No	Inside Pole	86.00 - 8.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
						2" Ice	0.00	1.04
						4" Ice	0.00	1.04
HB158-1-08U8-S8J18(1-5/8)	B	No	Inside Pole	86.00 - 8.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30
63								
LDF5-50A(7/8")	A	No	CaAa (Out Of Face)	63.00 - 8.00	2	No Ice	0.11	0.33
						1/2" Ice	0.21	1.30
						1" Ice	0.31	2.88
						2" Ice	0.51	7.88
						4" Ice	0.91	25.20
LDF5-50A(7/8")	A	No	CaAa (Out Of	63.00 - 8.00	16	No Ice	0.00	0.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
			Face)			1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
						2" Ice	0.00	0.33
						4" Ice	0.00	0.33
misc Climbing Pegs	B	No	CaAa (Out Of Face)	101.00 - 8.00	1	No Ice	0.01	0.31
						1/2" Ice	0.12	0.71
						1" Ice	0.22	1.71
						2" Ice	0.41	5.56
						4" Ice	0.82	20.59

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	101.00-83.62	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.261	0.04
		C	0.000	0.000	0.000	0.000	0.10
L2	83.62-45.58	A	0.000	0.000	0.000	3.798	0.10
		B	0.000	0.000	0.000	0.571	0.54
		C	0.000	0.000	0.000	0.000	0.35
L3	45.58-0.00	A	0.000	0.000	0.000	8.192	0.22
		B	0.000	0.000	0.000	0.564	0.53
		C	0.000	0.000	0.000	0.000	0.36

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	101.00-83.62	A	1.131	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	4.191	0.07
		C		0.000	0.000	0.000	0.000	0.10
L2	83.62-45.58	A	1.082	0.000	0.000	0.000	11.677	0.22
		B		0.000	0.000	0.000	9.174	0.61
		C		0.000	0.000	0.000	0.000	0.35
L3	45.58-0.00	A	1.000	0.000	0.000	0.000	24.456	0.45
		B		0.000	0.000	0.000	8.696	0.59
		C		0.000	0.000	0.000	0.000	0.36

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	101.00-83.62	0.0193	0.0111	0.2339	0.1351
L2	83.62-45.58	0.0183	-0.1470	0.2229	-0.2377
L3	45.58-0.00	0.0145	-0.2351	0.1787	-0.4773

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
95									
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.06 0.10 0.16 0.29 0.66
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.06 0.10 0.16 0.29 0.66
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.68 12.40 13.14 14.60 17.87	9.84 11.37 12.91 15.27 20.14	0.09 0.18 0.28 0.52 1.16
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.07 0.14 0.21 0.38 0.87
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.70 12.42 13.15 14.64 17.91	8.94 10.45 11.99 14.31 19.14	0.09 0.18 0.27 0.50 1.13
(4) LGP21401	A	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.01 0.02 0.03 0.05 0.14
(4) LGP21401	B	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.01 0.02 0.03 0.05 0.14
(4) LGP21401	C	From Leg	4.00 0.00 0.00	0.0000	95.00	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	0.01 0.02 0.03 0.05 0.14
(2) RRUS 11	A	From Leg	4.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.10 0.15 0.31
(2) RRUS 11	B	From Leg	4.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice 1" Ice	3.25 3.49 3.74 4.27	1.37 1.55 1.74 2.14	0.05 0.07 0.10 0.15

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
						2" Ice	5.43	3.04	0.31
						4" Ice			
(2) RRUS 11	C	From Leg	4.00	0.0000	95.00	No Ice	3.25	1.37	0.05
			0.00			1/2"	3.49	1.55	0.07
			0.00			Ice	3.74	1.74	0.10
						1" Ice	4.27	2.14	0.15
						2" Ice	5.43	3.04	0.31
						4" Ice			
DC6-48-60-18-8F	C	From Leg	2.00	0.0000	95.00	No Ice	1.47	1.47	0.02
			0.00			1/2"	1.67	1.67	0.04
			0.00			Ice	1.88	1.88	0.06
						1" Ice	2.33	2.33	0.11
						2" Ice	3.38	3.38	0.24
						4" Ice			
6' x 2" STD Pipe	A	From Leg	4.00	0.0000	95.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
6' x 2" STD Pipe	B	From Leg	4.00	0.0000	95.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
6' x 2" STD Pipe	C	From Leg	4.00	0.0000	95.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						4" Ice			
LP 601-1	C	None		0.0000	95.00	No Ice	28.47	28.47	1.12
						1/2"	33.59	33.59	1.51
						Ice	38.71	38.71	1.91
						1" Ice	48.95	48.95	2.69
						2" Ice	69.43	69.43	4.26
						4" Ice			
86									
BXA-70063-6CF-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	86.00	No Ice	7.97	5.80	0.04
			0.00			1/2"	8.61	6.95	0.10
			-1.00			Ice	9.22	7.82	0.17
						1" Ice	10.46	9.60	0.34
						2" Ice	13.07	13.37	0.80
						4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	86.00	No Ice	7.97	5.80	0.04
			0.00			1/2"	8.61	6.95	0.10
			-1.00			Ice	9.22	7.82	0.17
						1" Ice	10.46	9.60	0.34
						2" Ice	13.07	13.37	0.80
						4" Ice			
BXA-70063-6CF-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	86.00	No Ice	7.97	5.80	0.04
			0.00			1/2"	8.61	6.95	0.10
			-1.00			Ice	9.22	7.82	0.17
						1" Ice	10.46	9.60	0.34
						2" Ice	13.07	13.37	0.80
						4" Ice			
(2) FD9R6004/2C-3L	A	From Leg	4.00	0.0000	86.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			-1.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.00	0.0000	86.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01

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
			-1.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Leg	4.00	0.0000	86.00	No Ice	0.37	0.08	0.00
			0.00			1/2"	0.45	0.14	0.01
			-1.00			Ice	0.54	0.20	0.01
						1" Ice	0.75	0.34	0.02
						2" Ice	1.28	0.74	0.06
						4" Ice			
BXA-80063-4CF-EDIN-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	86.00	No Ice	5.40	3.69	0.03
			0.00			1/2"	5.84	4.29	0.07
			-1.00			Ice	6.30	4.91	0.12
						1" Ice	7.24	6.26	0.23
						2" Ice	9.26	9.29	0.58
						4" Ice			
BXA-70080-4CF-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	86.00	No Ice	3.93	3.97	0.03
			0.00			1/2"	4.36	4.58	0.07
			-1.00			Ice	4.79	5.22	0.11
						1" Ice	5.69	6.61	0.22
						2" Ice	7.63	9.66	0.54
						4" Ice			
BXA-70080-4CF-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	86.00	No Ice	3.93	3.97	0.03
			0.00			1/2"	4.36	4.58	0.07
			-1.00			Ice	4.79	5.22	0.11
						1" Ice	5.69	6.61	0.22
						2" Ice	7.63	9.66	0.54
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00	0.0000	86.00	No Ice	8.98	6.96	0.07
			0.00			1/2"	9.65	8.18	0.14
			-1.00			Ice	10.29	9.14	0.21
						1" Ice	11.59	11.02	0.40
						2" Ice	14.32	15.03	0.91
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00	0.0000	86.00	No Ice	8.98	6.96	0.07
			0.00			1/2"	9.65	8.18	0.14
			-1.00			Ice	10.29	9.14	0.21
						1" Ice	11.59	11.02	0.40
						2" Ice	14.32	15.03	0.91
						4" Ice			
(2) HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00	0.0000	86.00	No Ice	8.98	6.96	0.07
			0.00			1/2"	9.65	8.18	0.14
			-1.00			Ice	10.29	9.14	0.21
						1" Ice	11.59	11.02	0.40
						2" Ice	14.32	15.03	0.91
						4" Ice			
RRH2X60-AWS	A	From Leg	4.00	0.0000	86.00	No Ice	3.96	2.05	0.06
			0.00			1/2"	4.27	2.33	0.08
			-1.00			Ice	4.60	2.62	0.11
						1" Ice	5.27	3.23	0.18
						2" Ice	6.72	4.54	0.36
						4" Ice			
RRH2X60-AWS	B	From Leg	4.00	0.0000	86.00	No Ice	3.96	2.05	0.06
			0.00			1/2"	4.27	2.33	0.08
			-1.00			Ice	4.60	2.62	0.11
						1" Ice	5.27	3.23	0.18
						2" Ice	6.72	4.54	0.36
						4" Ice			
RRH2X60-AWS	C	From Leg	4.00	0.0000	86.00	No Ice	3.96	2.05	0.06
			0.00			1/2"	4.27	2.33	0.08
			-1.00			Ice	4.60	2.62	0.11
						1" Ice	5.27	3.23	0.18
						2" Ice	6.72	4.54	0.36
						4" Ice			
RRH2X60-PCS	A	From Leg	4.00	0.0000	86.00	No Ice	2.57	2.01	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 -1.00			1/2" Ice 1" Ice 2" Ice 4" Ice	2.79 3.02 3.52 4.61	2.22 2.43 2.89 3.92	0.08 0.10 0.16 0.31
RRH2X60-PCS	B	From Leg	4.00 0.00 -1.00	0.0000	86.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
RRH2X60-PCS	C	From Leg	4.00 0.00 -1.00	0.0000	86.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
DB-T1-6Z-8AB-0Z	A	From Leg	4.00 0.00 -1.00	0.0000	86.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
LP 601-1	C	None		0.0000	86.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	28.47 33.59 38.71 48.95 69.43	28.47 33.59 38.71 48.95 69.43	1.12 1.51 1.91 2.69 4.26
63									
(2) APXV18-206516S-C-ACU w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.81 4.22 4.67 5.62 7.66	3.29 4.00 4.66 6.04 9.02	0.04 0.07 0.11 0.21 0.53
(2) APXV18-206516S-C-ACU w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.81 4.22 4.67 5.62 7.66	3.29 4.00 4.66 6.04 9.02	0.04 0.07 0.11 0.21 0.53
(2) APXV18-206516S-C-ACU w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.81 4.22 4.67 5.62 7.66	3.29 4.00 4.66 6.04 9.02	0.04 0.07 0.11 0.21 0.53
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.11 0.16 0.28 0.65
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.11 0.16 0.28 0.65
APX16DWV-16DWV-S-E-ACU w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.94 7.44 7.94 8.98 11.17	3.29 4.00 4.66 6.04 9.02	0.06 0.11 0.16 0.28 0.65

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			
(2) E15S09P80	A	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.66 0.78 0.90 1.17 1.82	0.24 0.32 0.42 0.63 1.17	0.01 0.01 0.02 0.03 0.09
(2) E15S09P80	B	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.66 0.78 0.90 1.17 1.82	0.24 0.32 0.42 0.63 1.17	0.01 0.01 0.02 0.03 0.09
(2) E15S09P80	C	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.66 0.78 0.90 1.17 1.82	0.24 0.32 0.42 0.63 1.17	0.01 0.01 0.02 0.03 0.09
ETD819G-12UB	A	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.15 2.35 2.55 2.99 3.97	0.48 0.60 0.74 1.04 1.73	0.03 0.04 0.06 0.09 0.20
ETD819G-12UB	B	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.15 2.35 2.55 2.99 3.97	0.48 0.60 0.74 1.04 1.73	0.03 0.04 0.06 0.09 0.20
ETD819G-12UB	C	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.15 2.35 2.55 2.99 3.97	0.48 0.60 0.74 1.04 1.73	0.03 0.04 0.06 0.09 0.20
6' x 2" STD Pipe	A	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" STD Pipe	B	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
6' x 2" STD Pipe	C	From Leg	4.00 0.00 2.00	0.0000	63.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
LP 303-1	C	None		0.0000	63.00	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	1.25 1.48 1.71 2.18 3.10
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Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	101 - 83.62	Pole	Max Tension	11	0.00	-0.00	0.00
			Max. Compression	14	-6.07	0.41	0.11
			Max. Mx	11	-2.32	43.14	-0.10
			Max. My	2	-2.32	0.00	42.83
			Max. Vy	5	5.21	-29.63	0.09
			Max. Vx	2	-5.24	-0.01	29.67
			Max. Torque	9			-0.60
L2	83.62 - 45.58	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.18	0.95	-0.00
			Max. Mx	11	-9.19	466.36	-1.34
			Max. My	2	-9.19	-1.21	468.35
			Max. Vy	11	-13.66	466.36	-1.34
			Max. Vx	2	-13.73	-1.21	468.35
			Max. Torque	13			1.06
L3	45.58 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.25	0.85	0.54
			Max. Mx	11	-16.53	1192.54	-2.88

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-16.53	-3.03	1198.12
			Max. Vy	11	-15.79	1192.54	-2.88
			Max. Vx	2	-15.86	-3.03	1198.12
			Max. Torque	2			1.05

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	15	28.25	-0.00	4.76
	Max. H_x	11	16.55	15.77	-0.04
	Max. H_z	2	16.55	-0.04	15.84
	Max. M_x	2	1198.12	-0.04	15.84
	Max. M_z	5	1192.08	-15.77	0.04
	Max. Torsion	2	1.05	-0.04	15.84
	Min. Vert	1	16.55	0.00	0.00
	Min. H_x	5	16.55	-15.77	0.04
	Min. H_z	8	16.55	0.04	-15.84
	Min. M_x	8	-1197.36	0.04	-15.84
	Min. M_z	11	-1192.54	15.77	-0.04
	Min. Torsion	8	-1.04	0.04	-15.84

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	16.55	0.00	0.00	-0.37	0.22	0.00
Dead+Wind 0 deg - No Ice	16.55	0.04	-15.84	-1198.12	-3.04	-1.05
Dead+Wind 30 deg - No Ice	16.55	7.92	-13.73	-1039.28	-598.74	-0.80
Dead+Wind 60 deg - No Ice	16.55	13.68	-7.95	-602.08	-1033.96	-0.34
Dead+Wind 90 deg - No Ice	16.55	15.77	-0.04	-3.65	-1192.08	0.21
Dead+Wind 120 deg - No Ice	16.55	13.64	7.89	595.67	-1030.71	0.71
Dead+Wind 150 deg - No Ice	16.55	7.86	13.70	1035.27	-593.10	1.01
Dead+Wind 180 deg - No Ice	16.55	-0.04	15.84	1197.36	3.49	1.04
Dead+Wind 210 deg - No Ice	16.55	-7.92	13.73	1038.52	599.20	0.80
Dead+Wind 240 deg - No Ice	16.55	-13.68	7.95	601.32	1034.43	0.34
Dead+Wind 270 deg - No Ice	16.55	-15.77	0.04	2.88	1192.54	-0.21
Dead+Wind 300 deg - No Ice	16.55	-13.64	-7.89	-596.44	1031.18	-0.71
Dead+Wind 330 deg - No Ice	16.55	-7.86	-13.70	-1036.04	593.56	-1.01
Dead+Ice+Temp	28.25	-0.00	-0.00	-0.54	0.85	-0.00
Dead+Wind 0 deg+Ice+Temp	28.25	0.00	-4.76	-372.22	0.58	-0.30
Dead+Wind 30 deg+Ice+Temp	28.25	2.37	-4.12	-322.59	-184.48	-0.22
Dead+Wind 60 deg+Ice+Temp	28.25	4.11	-2.38	-186.66	-319.86	-0.09
Dead+Wind 90 deg+Ice+Temp	28.25	4.74	-0.00	-0.87	-369.29	0.07
Dead+Wind 120 deg+Ice+Temp	28.25	4.10	2.37	185.01	-319.54	0.21
Dead+Wind 150 deg+Ice+Temp	28.25	2.37	4.12	321.16	-183.92	0.30
Dead+Wind 180 deg+Ice+Temp	28.25	-0.00	4.76	371.12	1.22	0.30
Dead+Wind 210 deg+Ice+Temp	28.25	-2.37	4.12	321.49	186.28	0.22
Dead+Wind 240 deg+Ice+Temp	28.25	-4.11	2.38	185.56	321.66	0.09
Dead+Wind 270	28.25	-4.74	0.00	-0.23	371.10	-0.07

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
deg+Ice+Temp						
Dead+Wind 300 deg+Ice+Temp	28.25	-4.10	-2.37	-186.11	321.34	-0.21
Dead+Wind 330 deg+Ice+Temp	28.25	-2.37	-4.12	-322.27	185.72	-0.30
Dead+Wind 0 deg - Service	16.55	0.01	-6.19	-468.83	-1.04	-0.41
Dead+Wind 30 deg - Service	16.55	3.09	-5.36	-406.71	-234.03	-0.31
Dead+Wind 60 deg - Service	16.55	5.34	-3.11	-235.71	-404.25	-0.13
Dead+Wind 90 deg - Service	16.55	6.16	-0.01	-1.66	-466.08	0.08
Dead+Wind 120 deg - Service	16.55	5.33	3.08	232.74	-402.97	0.28
Dead+Wind 150 deg - Service	16.55	3.07	5.35	404.67	-231.82	0.40
Dead+Wind 180 deg - Service	16.55	-0.01	6.19	468.07	1.51	0.41
Dead+Wind 210 deg - Service	16.55	-3.09	5.36	405.94	234.50	0.32
Dead+Wind 240 deg - Service	16.55	-5.34	3.11	234.95	404.72	0.13
Dead+Wind 270 deg - Service	16.55	-6.16	0.01	0.89	466.56	-0.08
Dead+Wind 300 deg - Service	16.55	-5.33	-3.08	-233.50	403.44	-0.28
Dead+Wind 330 deg - Service	16.55	-3.07	-5.35	-405.43	232.29	-0.40

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-16.55	0.00	0.00	16.55	0.00	0.000%
2	0.04	-16.55	-15.84	-0.04	16.55	15.84	0.000%
3	7.92	-16.55	-13.73	-7.92	16.55	13.73	0.000%
4	13.68	-16.55	-7.95	-13.68	16.55	7.95	0.000%
5	15.77	-16.55	-0.04	-15.77	16.55	0.04	0.000%
6	13.64	-16.55	7.89	-13.64	16.55	-7.89	0.000%
7	7.86	-16.55	13.70	-7.86	16.55	-13.70	0.000%
8	-0.04	-16.55	15.84	0.04	16.55	-15.84	0.000%
9	-7.92	-16.55	13.73	7.92	16.55	-13.73	0.000%
10	-13.68	-16.55	7.95	13.68	16.55	-7.95	0.000%
11	-15.77	-16.55	0.04	15.77	16.55	-0.04	0.000%
12	-13.64	-16.55	-7.89	13.64	16.55	7.89	0.000%
13	-7.86	-16.55	-13.70	7.86	16.55	13.70	0.000%
14	0.00	-28.25	0.00	0.00	28.25	0.00	0.000%
15	0.00	-28.25	-4.76	-0.00	28.25	4.76	0.000%
16	2.37	-28.25	-4.12	-2.37	28.25	4.12	0.000%
17	4.11	-28.25	-2.38	-4.11	28.25	2.38	0.000%
18	4.74	-28.25	-0.00	-4.74	28.25	0.00	0.000%
19	4.10	-28.25	2.37	-4.10	28.25	-2.37	0.000%
20	2.37	-28.25	4.12	-2.37	28.25	-4.12	0.000%
21	-0.00	-28.25	4.76	0.00	28.25	-4.76	0.000%
22	-2.37	-28.25	4.12	2.37	28.25	-4.12	0.000%
23	-4.11	-28.25	2.38	4.11	28.25	-2.38	0.000%
24	-4.74	-28.25	0.00	4.74	28.25	-0.00	0.000%
25	-4.10	-28.25	-2.37	4.10	28.25	2.37	0.000%
26	-2.37	-28.25	-4.12	2.37	28.25	4.12	0.000%
27	0.01	-16.55	-6.19	-0.01	16.55	6.19	0.000%
28	3.09	-16.55	-5.36	-3.09	16.55	5.36	0.000%
29	5.34	-16.55	-3.11	-5.34	16.55	3.11	0.000%
30	6.16	-16.55	-0.01	-6.16	16.55	0.01	0.000%
31	5.33	-16.55	3.08	-5.33	16.55	-3.08	0.000%
32	3.07	-16.55	5.35	-3.07	16.55	-5.35	0.000%
33	-0.01	-16.55	6.19	0.01	16.55	-6.19	0.000%
34	-3.09	-16.55	5.36	3.09	16.55	-5.36	0.000%
35	-5.34	-16.55	3.11	5.34	16.55	-3.11	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
36	-6.16	-16.55	0.01	6.16	16.55	-0.01	0.000%
37	-5.33	-16.55	-3.08	5.33	16.55	3.08	0.000%
38	-3.07	-16.55	-5.35	3.07	16.55	5.35	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00004340
3	Yes	5	0.00000001	0.00036485
4	Yes	5	0.00000001	0.00039446
5	Yes	4	0.00000001	0.00017167
6	Yes	5	0.00000001	0.00039864
7	Yes	5	0.00000001	0.00035707
8	Yes	5	0.00000001	0.00004928
9	Yes	5	0.00000001	0.00040762
10	Yes	5	0.00000001	0.00037554
11	Yes	4	0.00000001	0.00030520
12	Yes	5	0.00000001	0.00036527
13	Yes	5	0.00000001	0.00040932
14	Yes	4	0.00000001	0.00000935
15	Yes	5	0.00000001	0.00013843
16	Yes	5	0.00000001	0.00023191
17	Yes	5	0.00000001	0.00024103
18	Yes	5	0.00000001	0.00013151
19	Yes	5	0.00000001	0.00024483
20	Yes	5	0.00000001	0.00022984
21	Yes	5	0.00000001	0.00013846
22	Yes	5	0.00000001	0.00025191
23	Yes	5	0.00000001	0.00023972
24	Yes	5	0.00000001	0.00013313
25	Yes	5	0.00000001	0.00023636
26	Yes	5	0.00000001	0.00025457
27	Yes	4	0.00000001	0.00031237
28	Yes	5	0.00000001	0.00004328
29	Yes	5	0.00000001	0.00004984
30	Yes	4	0.00000001	0.00005482
31	Yes	5	0.00000001	0.00005099
32	Yes	5	0.00000001	0.00004176
33	Yes	4	0.00000001	0.00032762
34	Yes	5	0.00000001	0.00005342
35	Yes	5	0.00000001	0.00004546
36	Yes	4	0.00000001	0.00006727
37	Yes	5	0.00000001	0.00004343
38	Yes	5	0.00000001	0.00005409

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	101 - 83.62 (1)	TP17.41x13x0.1875	17.38	0.00	0.0	39.000	9.8343	-2.32	383.54	0.006
L2	83.62 - 45.58 (2)	TP26.56x16.3372x0.25	40.79	0.00	0.0	39.000	20.1133	-9.18	784.42	0.012
L3	45.58 - 0 (3)	TP37.5x25.0976x0.3125	49.42	0.00	0.0	39.000	35.6911	-15.79	1391.95	0.011

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	101 - 83.62 (1)	TP17.41x13x0.1875	43.13	12.952	39.000	0.332	0.00	0.000	39.000	0.000
L2	83.62 - 45.58 (2)	TP26.56x16.3372x0.25	469.01	44.826	39.000	1.149	0.00	0.000	39.000	0.000
L3	45.58 - 0 (3)	TP37.5x25.0976x0.3125	1123.87	42.591	39.000	1.092	0.00	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	101 - 83.62 (1)	TP17.41x13x0.1875	5.08	0.516	26.000	0.040	0.52	0.077	26.000	0.003
L2	83.62 - 45.58 (2)	TP26.56x16.3372x0.25	13.75	0.683	26.000	0.053	0.78	0.036	26.000	0.001
L3	45.58 - 0 (3)	TP37.5x25.0976x0.3125	15.76	0.442	26.000	0.033	0.80	0.015	26.000	0.001

Pole Interaction Design Data

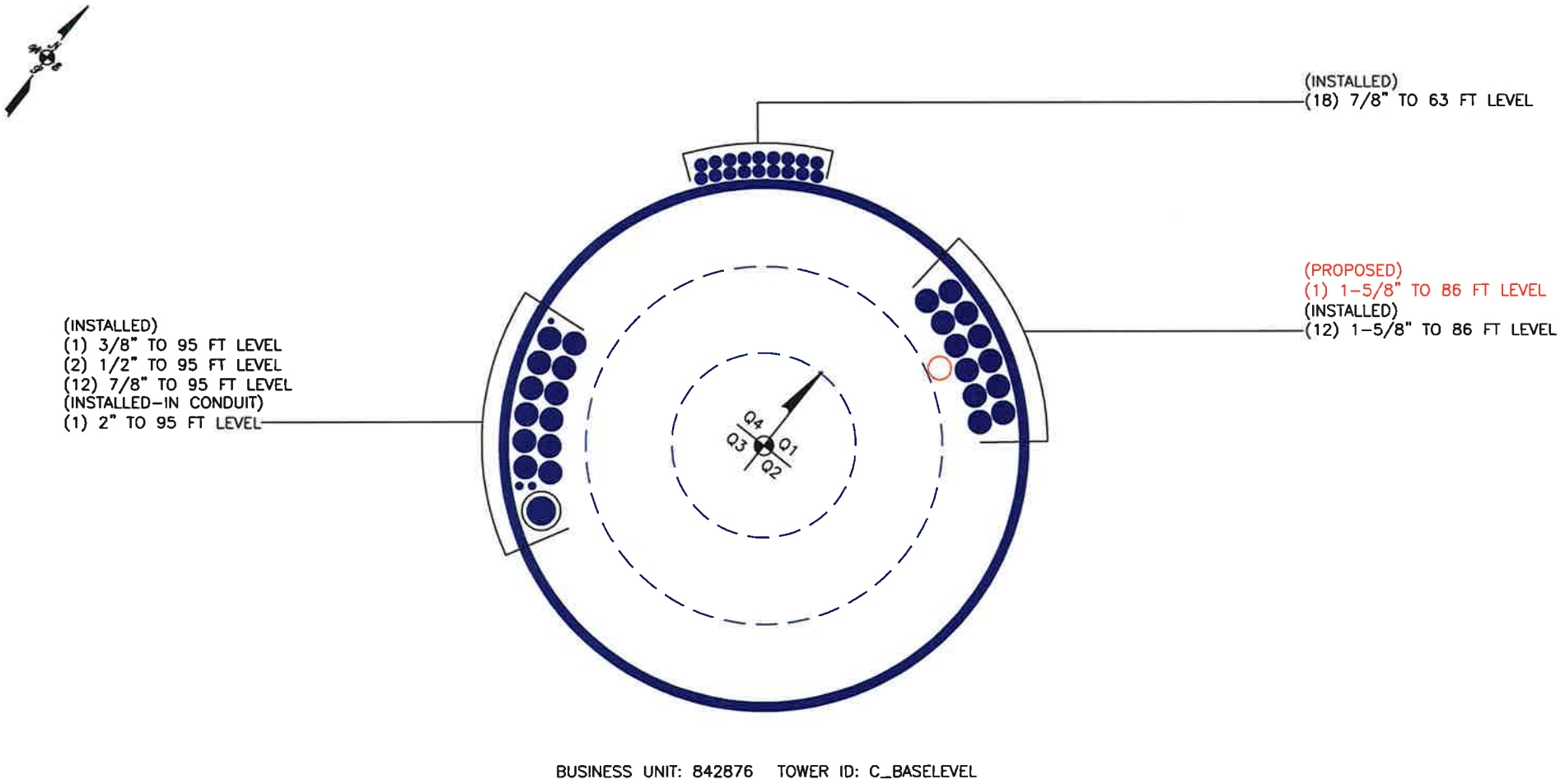
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	101 - 83.62 (1)	0.006	0.332	0.000	0.040	0.003	0.339 ✔	1.333	H1-3+VT ✔
L2	83.62 - 45.58 (2)	0.012	1.149	0.000	0.053	0.001	1.162 ✔	1.333	H1-3+VT ✔
L3	45.58 - 0 (3)	0.011	1.092	0.000	0.033	0.001	1.104 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	101 - 83.62	Pole	TP17.41x13x0.1875	1	-2.32	511.25	25.4	Pass
L2	83.62 - 45.58	Pole	TP26.56x16.3372x0.25	2	-9.18	1045.63	87.2	Pass
L3	45.58 - 0	Pole	TP37.5x25.0976x0.3125	3	-15.79	1855.47	82.8	Pass
						Summary		
						Pole (L2)	87.2	Pass
						RATING =	**87.2**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 842876 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

BU#:	842876
Site Name:	WINDSOR LOCKS
App#:	215954 Rev. 12
Pole Manufacturer:	*Other*

Reactions		
Moment:	1199	ft-kips
Axial:	17	kips
Shear:	16	kips

Anchor Rod Data		
Qty:	10	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	46	in

Plate Data		
Diam:	52	in
Thick:	1.5	in
Grade:	60	ksi
Single-Rod B-eff:	11.90	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Fillet	
Groove Depth:	0.25	<-- Disregard
Groove Angle:	45	<-- Disregard
Fillet H. Weld:	0.5	in
Fillet V. Weld:	0.31	in
Width:	6	in
Height:	12	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	37.5	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	

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	123.4 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	63.3% **Pass**	

Base Plate Results

	Flexural Check	Stiffened
Base Plate Stress:	49.7 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	82.9% **Pass**	Y.L. Length: N/A, Roark

Stiffener To Toe Plate/Pole Results

Horizontal Weld :	82.1% **Pass**
Vertical Weld:	72.6% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	30.6% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	59.8% **Pass**
Plate Comp. (AISC Bracket):	75.8% **Pass**

Pole Results

Pole Punching Shear Check:	25.5% **Pass**

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

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

CCI Foundation Tool Suite - Monopole Pier

CCIFTS 1.2.108.14286 - Phase 1-2 Date: 2/5/2015

BU:	842876
Site Name:	WINDSOR LOCKS
App Number:	215954 Rev. 12
Work Order:	1001967

CROWN CASTLE

Monopole Drilled Pier

Input

Criteria

TIA Revision:	F
ACI 318 Revision:	2005
Seismic Category:	B

Forces

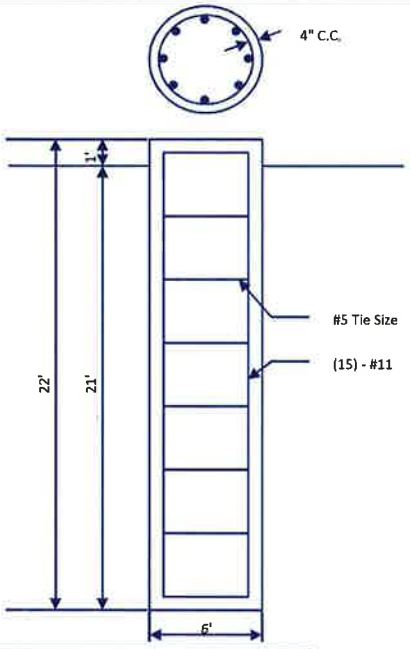
Compression	17 kips
Shear	16 kips
Moment	1199 k-ft
Swelling Force	0 kips

Foundation Dimensions

Pier Diameter:	6 ft
Ext. above grade:	1 ft
Depth below grade:	21 ft

Material Properties

Number of Rebar:	15
Rebar Size:	11
Tie Size	5
Rebar tensile strength:	60 ksi
Concrete Strength:	4000 psi
Ultimate Concrete Strain	0.003 in/in
Clear Cover to Ties:	4 in



Soil Profile: PROFILE 1_842876

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	3.333	0	3.333	125		0			0	
2	1.667	3.333	5	125		34	0	0	0	
3	10	5	15	125		34	0.8	0.8	0	
4	6	15	21	125		34	1.6	1.6	0	

Analysis Results

Soil Lateral Capacity

Depth to Zero Shear:	5.42 ft
Max Moment, Mu:	1287.90 k-ft
Soil Safety Factor:	4.55
Safety Factor Req'd:	2
RATING:	44.0%

Soil Axial Capacity

Skin Friction (k):	165.88 kips
End Bearing (k):	0.00 kips
Comp. Capacity (k), ϕCn:	165.88 kips
Comp. (k), Cu:	22.10 kips
RATING:	13.3%

Concrete/Steel Check

Mu (from soil analysis)	1674.27 k-ft
ϕMn	3197.83 k-ft
RATING:	52.4%

rho provided	0.57
rho required	0.33 OK
Rebar Spacing	11.44
Spacing required	22.56 OK
Dev. Length required	15.25
Dev. Length provided	53.51 OK

Overall Foundation Rating: 52.4%