Robinson+Cole

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Also admitted in Massachusetts

August 23, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
280 Ross Road, Killingly, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 100-foot level on an existing 119-foot monopole tower at 280 Ross Road in Killingly, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). Cellco's use of the tower was approved by the Council in 2009. Cellco now intends to modify its facility by replacing all of its existing antennas with six (6) model LPA-80080-6CF, 850 MHz antennas; three (3) model SBNHH-1D65B, 700/1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 100-foot level on the tower. Cellco also intends to add nine (9) remote radio heads ("RRHs") behind its antennas and one (1) HYBRIFLEX™ fiber optic antenna cable. 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 Sean Hendricks, Town Manager for the Town of Killingly. A copy of this letter is also being sent to Snake Meadow Club Inc., the owner of the Property and Crown, the tower owner.

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

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be installed on Cellco's existing antenna platform at the 100-foot level on the tower.

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

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

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table with 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:
Sean Hendricks, Killingly Town Manager
Snake Meadow Club Inc.
Crown Castle
Tim Parks

ATTACHMENT 1

Vertically Polarized, Log-Periodic 80° / 14 dBd
806-960 MHz

LPA-80080/6CF ___
When ordering replace "__" with connector type.

Mechanical specifications

Length	1800	mm	70.9	in
Width	140	mm	5.5	in
Depth	335	mm	13.2	in
Depth with z-bracket	375	mm	14.8	in
Weight [4]	9.5	kg	21.0	lbs
Wind Area Fore/Aft [6]	0.25	m^2	2.7	ft^2
Wind Area Side [6]	0.61	m^2	6.6	ft^2
Max Wind Survivability [6]	>201	km/hr	>125	mph
Wind Load @ 100 mph (161 km/hr) [6]				
Fore/Aft	415	N	93	lbf
Side	878	N	198	lbf

Antenna consisting of aluminum alloy with brass feedlines covered by a gray, UV safe fiberglass radome. RoHS compliant.

Mounting & Downtilting

Mounting hardware attaches to pipe diameter Ø50-102 mm; Ø2.0-4.0 in. If the lock-down brace is used, the maximum diameter is Ø88.9 mm (3.5 in).

Mechanical downtilt angle 0-22°
Mounting & Downtilt Bracket Kit 21700000

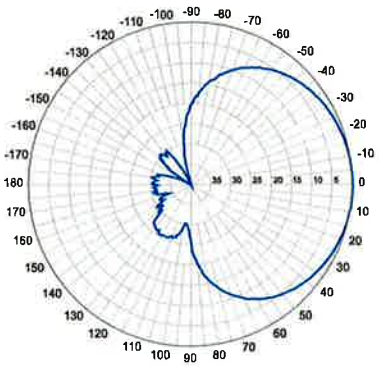
Electrical specifications

Frequency Range	806-960 MHz
Impedance	50Ω
Connector [3]	NE or E-DIN Female 1 port / Center
VSWR [1]	≤ 1.4:1
Polarization	Vertical
Gain [1]	14 dBd
Power Rating [2]	500 W
Half Power Angle [1]	
Horizontal Beamwidth	80°
Vertical Beamwidth	10°
Electrical downtilt [5]	0°
Null fill [1]	10%
Lightning protection	Direct ground

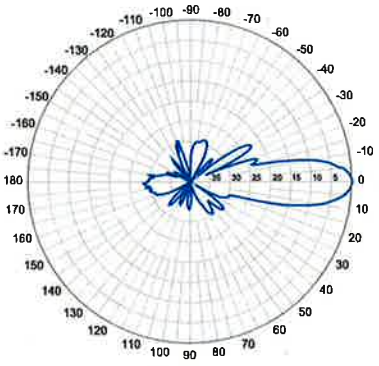
1) Typical values.
2) Power rating limited by connector only.
3) NE indicates an elongated N connector. E-DIN indicates an elongated DIN connector.
4) Antenna weight does not include brackets.
5) Add'l downtilts may be available. Check website for details.
6) Values reflect installation with all three brackets utilized.

Improvements to mechanical and/or electrical performance of the antenna may be made without notice.

Radiation-pattern[1]



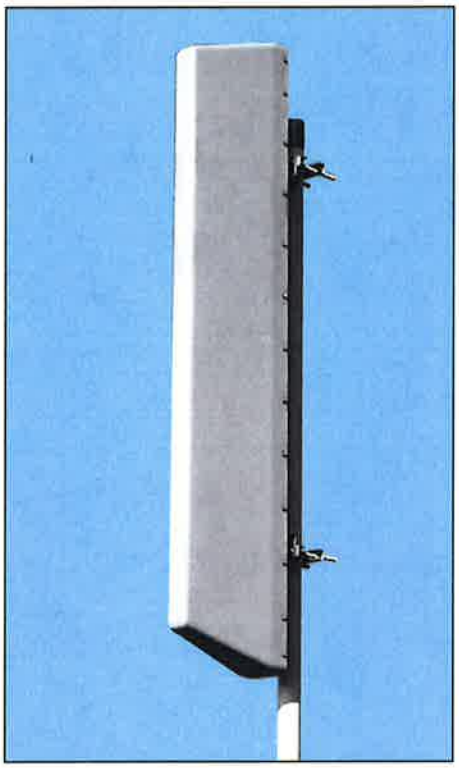
Horizontal



Vertical

Radiation patterns for all antennas are measured with the antenna mounted on a fiberglass pole.

Mounting on a metal pole will typically improve the front-to-back ratio.



Featuring our Exclusive 3T Technology™ Antenna Design:

- True log-periodic design allows for superior front-to-side characteristics to minimize sector overlap.
- Unique feedline design eliminates the need for conventional solder joints in the signal path.
- A non-collinear system with access to every radiating element for broad bandwidth and superior performance.
- Air as insulation for virtually no internal signal loss.

Warranty:
This antenna is under a five-year limited warranty for repair or replacement.

Revision Date: 08/18/08

806-960 MHz

815.399.0001 • antel@antelinc.com • www.antelinc.com

Amphenol Antel, Inc. The Antenna Technology Company

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.

SBNHH-1D65B

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

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

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
CPR at Boresight, dB	20	23	20	20	17	21
CPR at Sector, dB	14	10	12	10	9	1
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

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

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

General Specifications

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

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	617.7 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 in
Net Weight	18.4 kg | 40.6 lb

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

Depth	299.0 mm | 11.8 in
Length	1970.0 mm | 77.6 in
Width	409.0 mm | 16.1 in
Shipping Weight	31.0 kg | 68.3 lb

Regulatory Compliance/Certifications

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

Included Products

Product Specifications

SBNHH-1D65B

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

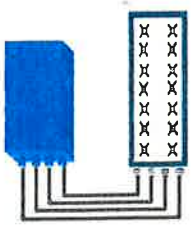
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

Alcatel·Lucent

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

PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

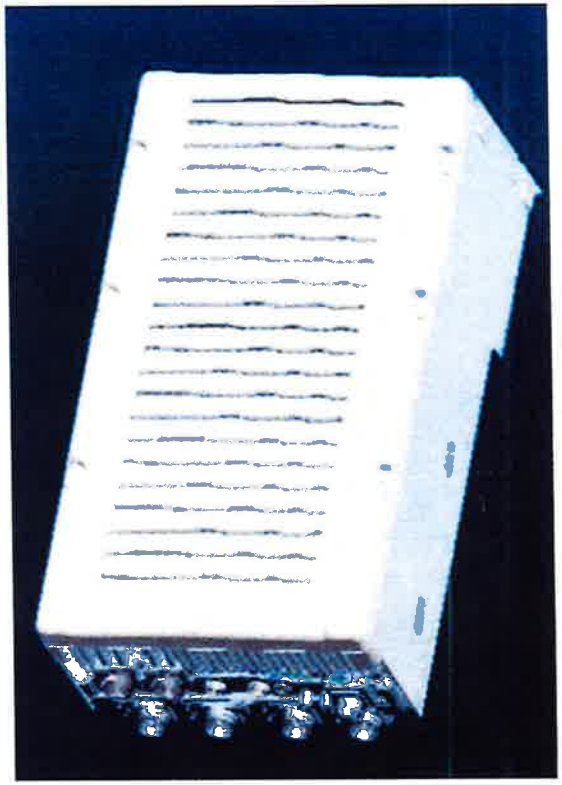
		RRH2x60
RF Output Power		2x60W
Instantaneous Bandwidth		20MHz
Transmitter		2 TX
Receiver	1900 HW version 1900A HW version	2 Branch RX – LA6.0.1 4 Branch RX – LR13.3
Features		AISG 2.0 for RET/TMA
		Internal Smart Bias-T
Power		-48VDC
CPRI Ports		2 CPRI Rate 3 Ports
External Alarms		4 External User Alarms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

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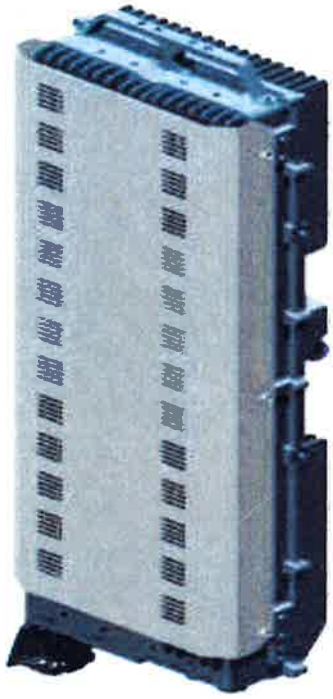
ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
RRH2X60-AWS FOR BAND 4 APPLICATIONS

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



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

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

SUPERIOR RF PERFORMANCE

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

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

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

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

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

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

OPTIMIZED TCO

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

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

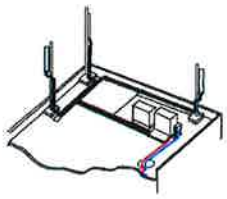
EASY INSTALLATION

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

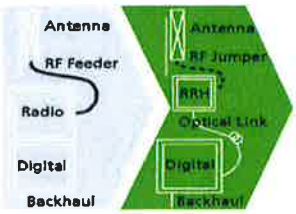
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

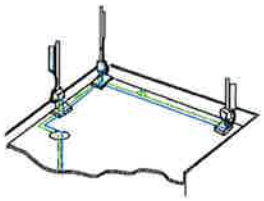
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

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

Environmental specifications

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

Safety and Regulatory Data

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

Alcatel·Lucent

AT THE SPEED OF IDEAS™

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

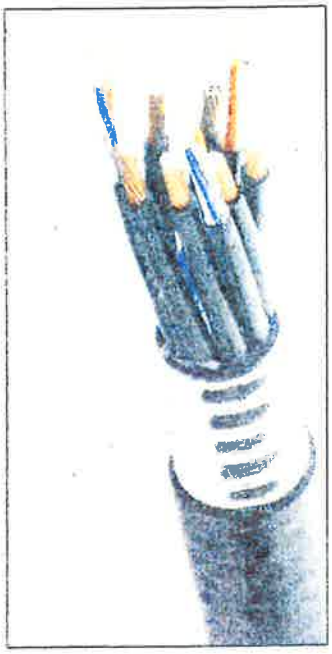


Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

Outer Conductor Armor	Corrugated Aluminum	[mm (in)]	46.5 (1.83)
Jacket	Polyethylene, PE	[mm (in)]	50.3 (1.98)
UV-Protection	Individual and External Jacket		Yes
Weight, Approximate		[kg/m (lb/ft)]	1.9 (1.30)
Minimum Bending Radius, Single Bending		[mm (in)]	200 (8)
Minimum Bending Radius, Repeated Bending		[mm (in)]	500 (20)
Recommended/Maximum Clamp Spacing		[m (ft)]	1.0 / 1.2 (3.25 / 4.0)
DC-Resistance Outer Conductor Armor		[Ω/km (Ω/1000ft)]	068 (0.205)
DC-Resistance Power Cable, 8.4mm²(8AWG)		[Ω/km (Ω/1000ft)]	2.1 (0.307)
Version			Single-mode OM3
Quantity, Fiber Count			16 (8 pairs)
Core/Clad		[µm]	50/125
Primary Coating (Acrylate)		[µm]	245
Buffer Diameter, Nominal		[µm]	900
Secondary Protection, Jacket, Nominal		[mm (in)]	2.0 (0.08)
Minimum Bending Radius		[mm (in)]	104 (4.1)
Insertion Loss @ wavelength 850nm		dB/km	3.0
Insertion Loss @ wavelength 1310nm		dB/km	1.0
Standards (Meets or exceeds)			UL94-V0, UL1666 RoHS Compliant
Size (Power)		[mm² (AWG)]	8.4 (8)
Quantity, Wire Count (Power)			16 (8 pairs)
Size (Alarm)		[mm² (AWG)]	0.8 (18)
Quantity, Wire Count (Alarm)			4 (2 pairs)
Type			UV protected
Strands			19
Primary Jacket Diameter, Nominal		[mm (in)]	6.8 (0.27)
Standards (Meets or exceeds)			NFPA 130, ICEA S-93-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant
Installation Temperature		[°C (°F)]	-40 to +65 (-40 to149)
Operation Temperature		[°C (°F)]	-40 to +65 (-40 to149)

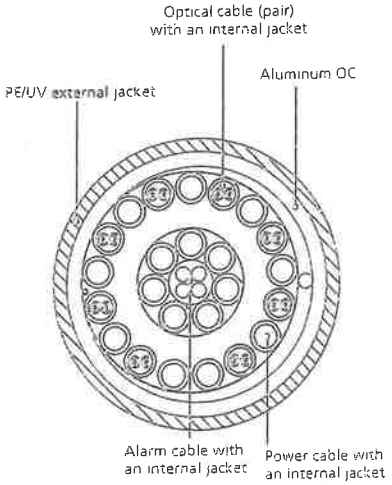


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Danielson S								
Tower Height: 119'								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	2	565	121	0.0307	880	0.5867	0.52%	
*AT&T	2	875	121	0.0476	1900	1.0000	0.48%	
*AT&T	1	283	121	0.0077	880	0.5867	0.13%	
*AT&T	4	525	121	0.0571	1900	1.0000	0.57%	
*AT&T	1	1771	121	0.0482	734	0.4893	0.98%	
*MetroPCS	3	444	90	0.0678	2140	1.0000	0.68%	
*T-Mobile	6	1706	109	0.3470	1900/2100	1.0000	3.47%	
*T-Mobile	1	865	109	0.0293	700	0.4667	0.63%	
Verizon	**11**	**435**	**100**	**0.1721**	**1970**	**1.0000**	**17.21%**	
Verizon	**9**	**393**	**100**	**0.1272**	**869**	**0.5793**	**21.95%**	
Verizon	**1**	**4877**	**100**	**0.1754**	**2145**	**1.0000**	**17.54%**	
Verizon	**1**	**1759**	**100**	**0.0632**	**746**	**0.4973**	**12.72%**	
								76.9%
* Source: Siting Council								

ATTACHMENT 3

November 13th, 2015

Rebecca Klein
Crown Castle
525 Alderman Lane
Fort Mill, SC 29715
(704) 405-6525

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Verizon Wireless* Co-Locate** **Carrier Site Name:**	 Danielson South CT
Crown Castle Designation:	**Crown Castle BU Number:** **Crown Castle Site Name:** **Crown Castle JDE Job Number:** **Crown Castle Work Order Number:** **Crown Castle Application Number:**	857013 Killingly Ross Road 355060 1152311 320011 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	102936.001.01
Site Data:	**280 Ross Road, Killingly, Windham County, CT** **Latitude *41° 46' 17.59"*, Longitude *-71° 51' 20.39"*** **119 Foot - Monopole**	

Dear Rebecca Klein,

B+T Group 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 845484, in accordance with application 320011, revision 0.

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

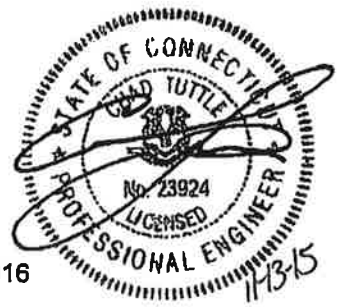
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table 1 and Table 2 for the proposed and existing/reserved loading, respectively.

This 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 85 mph fastest mile.

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

Respectfully submitted by:
B+T Engineering, Inc.



Tharun Cheriyan, E.I.T.
Project Engineer

Chad E. Tuttle, P.E.
Engineer of Record
COA: PEC.0001564 Expires: 02/10/2016

tnxTower Report - version 6.1.4.1

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 119 ft. Monopole tower mapped by GPD in January of 2009. The original design standard and wind speed are not available.

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 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
100.0	100.0	3	Alcatel Lucent	RRH2X60-AWS	1	1-5/8	--
		3	Alcatel Lucent	RRH2X60-PCS			
		3	Alcatel Lucent	RRH2x60-700			
		6	Andrew	SBNHH-1D65B			
		6	Antel	LPA-80080/6CF			
		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
119.0	121.0	6	Andrew	E15S08P77	12 2 1	1-5/8 7/8 1/2	1
		6	Ericsson	RBS 6601			
		3	KMW Comm.	AM-X-CD-17-65-00T-RET			
		6	Nextnet Wireless	BTS-2500			
		6	Powerwave Tech.	7770.00			
		6	Powerwave Tech.	LGP21401			
		1	Raycap	DC6-48-60-18-8F			
	119.0	1	--	Platform Mount [LP 1202-1]			
107.0	109.0	3	Commscope	ATBT-BOTTOM-24V	6	1-5/8	2
		3	Commscope	LNX-6515DS-VTM			
		3	Allgon	LGP 13903	6	1-5/8	1
		3	Rfs Celwave	APX16PV-16PVL			
	107.0	1	--	Platform Mount [LP 304-1]			
100.0	100.0	**6**	**Antel**	**BXA-185085/12CF**	--	--	**3**
		3	**Antel**	**BXA-70063-6CF-EDIN-0**			
		3	**Antel**	**LPA-80080/6CF**			
		1	--	Platform Mount [LP 303-1]	18	1-5/8	1

Notes:
1) Existing Equipment
2) Reserved Equipment
3) 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)
Information Not Available						

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Online Application	Verizon Wireless Co-Locate Rev# 0	320011	CCI Sites
Tower Mapping	GPD Associates, Date: 01/19/2009	4908008	CCI Sites
Foundation Drawing	WEI, Project No. 2009-872	4908012	CCI Sites
Geotech Report	WEI, Project No. 2009-872	4908007	CCI Sites
Antenna Configuration	Crown CAD Package	Date: 11/11/2015	CCI Sites

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.
5) Mount areas and weights are assumed based on photographs provided.

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group 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	119 - 84.33	Pole	TP29.03x19.1x0.5	1	-13.058	1744.644	36.8	Pass
L2	84.33 - 45.5	Pole	TP39.15x26.99x0.625	2	-23.309	2945.103	46.9	Pass
L3	45.5 - 0	Pole	TP50.93x36.5x0.688	3	-35.352	3905.570	47.5	Pass
							Summary	
						Pole (L3)	47.5	Pass
						Rating =	47.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component		Elevation	% Capacity	Pass / Fail
1	Anchor Rods		Base	55.7	Pass
1	Base Plate		Base	59.5	Pass
1	Base Foundation	Structural	Base	64.5	Pass
		Soil	Base	38.1	Pass

Structure Rating (max from all components) =	64.5%

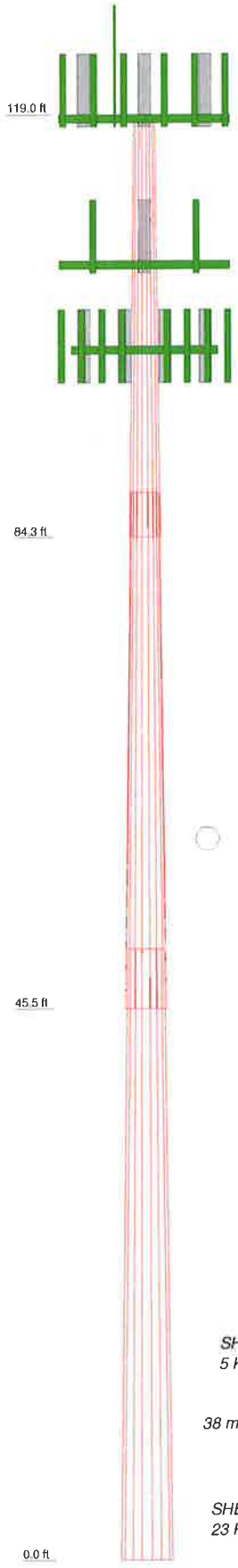
Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT



Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	34.670	18	0.500	3.630	19.100	29.030		4.4
2	42.460	18	0.625	4.890	26.990	39.150	A572-50	9.3
3	50.390	18	0.688		36.500	50.930		16.1
								29.8

AXIAL 54 K
SHEAR 5 K
MOMENT 503 kip-ft
TORQUE 0 kip-ft
38 mph WIND - 0.750 in ICE

AXIAL 43 K
SHEAR 23 K
MOMENT 2083 kip-ft
TORQUE 1 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8" x 8' (E)	119	LGP 13903 (E)	107
(2) 7770.00 w/ Mount Pipe (E)	119	LGP 13903 (E)	107
(2) 7770.00 w/ Mount Pipe (E)	119	LGP 13903 (E)	107
(2) 7770.00 w/ Mount Pipe (E)	119	LNX-6515DS-VTM w/ Mount Pipe (R)	107
AM-X-CD-17-65-00T-RET w/ Mount Pipe (E)	119	LNX-6515DS-VTM w/ Mount Pipe (R)	107
		LNX-6515DS-VTM w/ Mount Pipe (R)	107
AM-X-CD-17-65-00T-RET w/ Mount Pipe (E)	119	ATBT-BOTTOM-24V (R)	107
		ATBT-BOTTOM-24V (R)	107
AM-X-CD-17-65-00T-RET w/ Mount Pipe (E)	119	ATBT-BOTTOM-24V (R)	107
(3) LGP21401 (E)	119	Platform Mount [LP 304-1] (E)	107
(3) LGP21401 (E)	119	(2) LPA-80080/6CF w/ Mount Pipe (P)	100
(3) E15S08P77 (E)	119	(2) LPA-80080/6CF w/ Mount Pipe (P)	100
(3) E15S08P77 (E)	119	(2) LPA-80080/6CF w/ Mount Pipe (P)	100
(2) RBS 6601 (E)	119	(2) SBNHH-1D65B w/ Mount Pipe (P)	100
(2) RBS 6601 (E)	119	(2) SBNHH-1D65B w/ Mount Pipe (P)	100
(2) RBS 6601 (E)	119	(2) SBNHH-1D65B w/ Mount Pipe (P)	100
(3) BTS-2500 (E)	119	RRH2x60-700 (P)	100
(3) BTS-2500 (E)	119	RRH2x60-700 (P)	100
DC6-48-60-18-8F (E)	119	RRH2x60-700 (P)	100
7' x 2" Pipe Mount (E)	119	RRH2X60-AWS (P)	100
7' x 2" Pipe Mount (E)	119	RRH2X60-AWS (P)	100
7' x 2" Pipe Mount (E)	119	RRH2X60-AWS (P)	100
Platform Mount [LP 1202-1] (E)	119	RRH2X60-PCS (P)	100
APX16PV-16PVL w/ Mount Pipe (E)	107	RRH2X60-PCS (P)	100
APX16PV-16PVL w/ Mount Pipe (E)	107	RRH2X60-PCS (P)	100
APX16PV-16PVL w/ Mount Pipe (E)	107	DB-T1-6Z-8AB-0Z (P)	100
		Platform Mount [LP 303-1] (E)	100

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi			

TOWER DESIGN NOTES

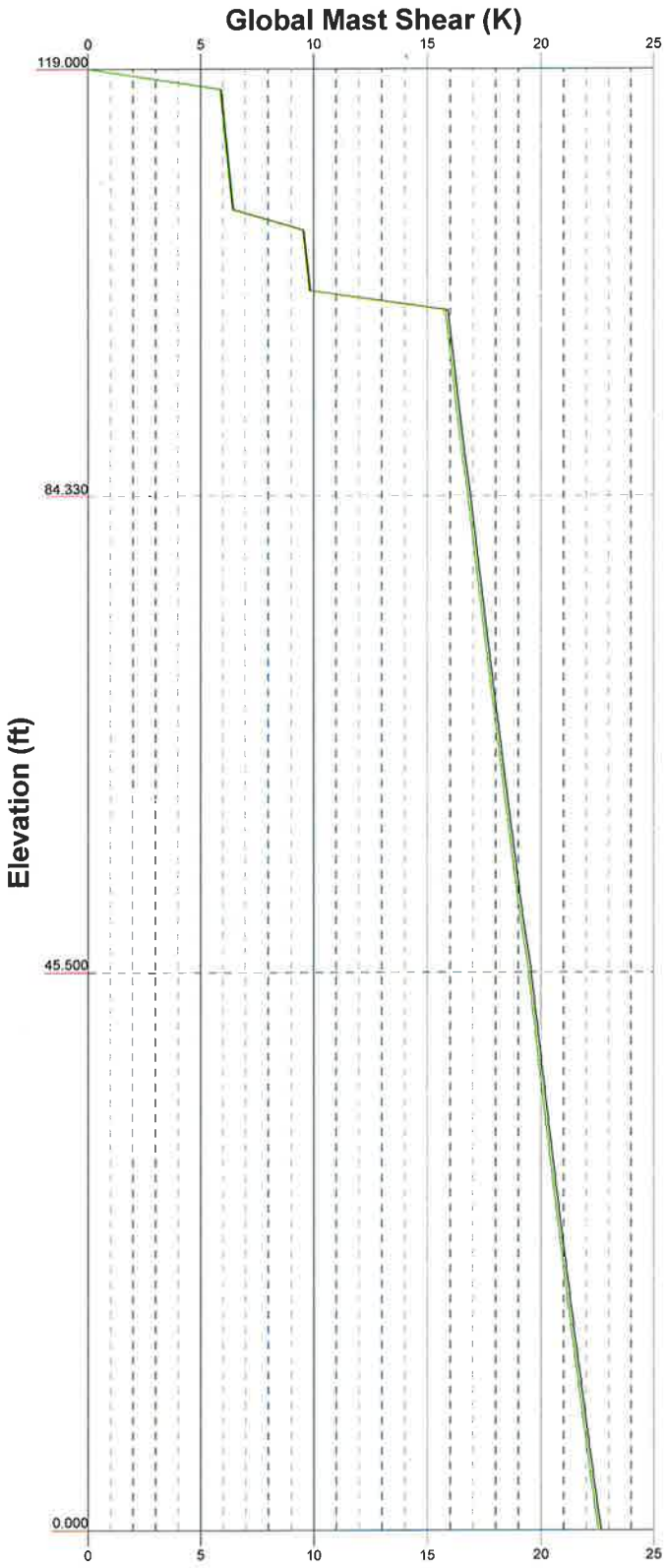
1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 47.5%

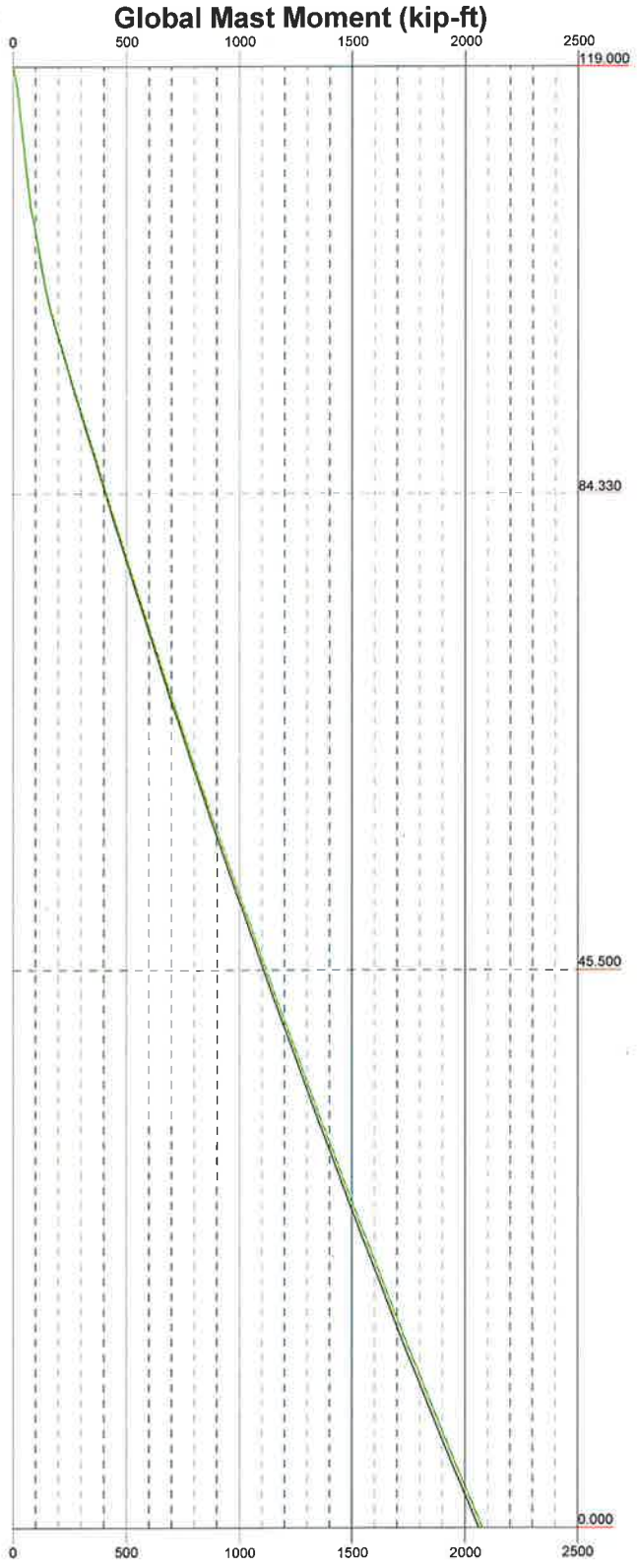
B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 102936.001.01- KILLINGLY ROSS ROAD, CT (BU# 857013)			
Project:			
Client: Crown Castle	Drawn by: Akshay Kumar	App'd:	
Code: TIA/EIA-222-F	Date: 11/13/15	Scale: NTS	
Path:		Dwg No. E-1	

Vx Vz

Mx Mz





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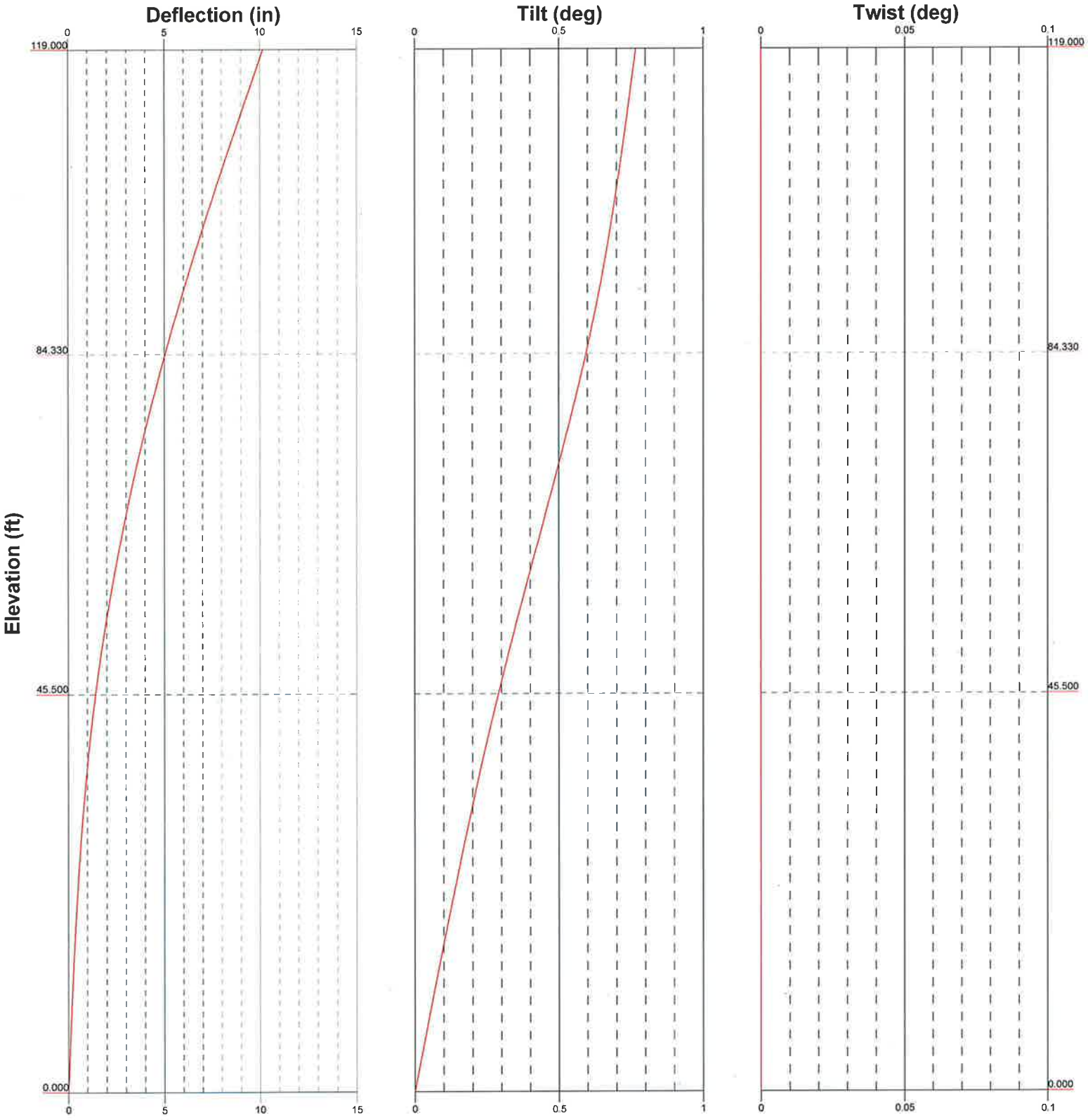
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: *102936.001.01- KILLINGLY ROSS ROAD, CT (BU# 857*			
Project:			
Client: Crown Castle	Drawn by: Akshay Kumar	App'd:	
Code: TIA/EIA-222-F	Date: 11/13/15	Scale: NTS	
Path:		Dwg No. E-4	

TIA/EIA-222-F - Service - 50 mph

Maximum Values



B+T Group
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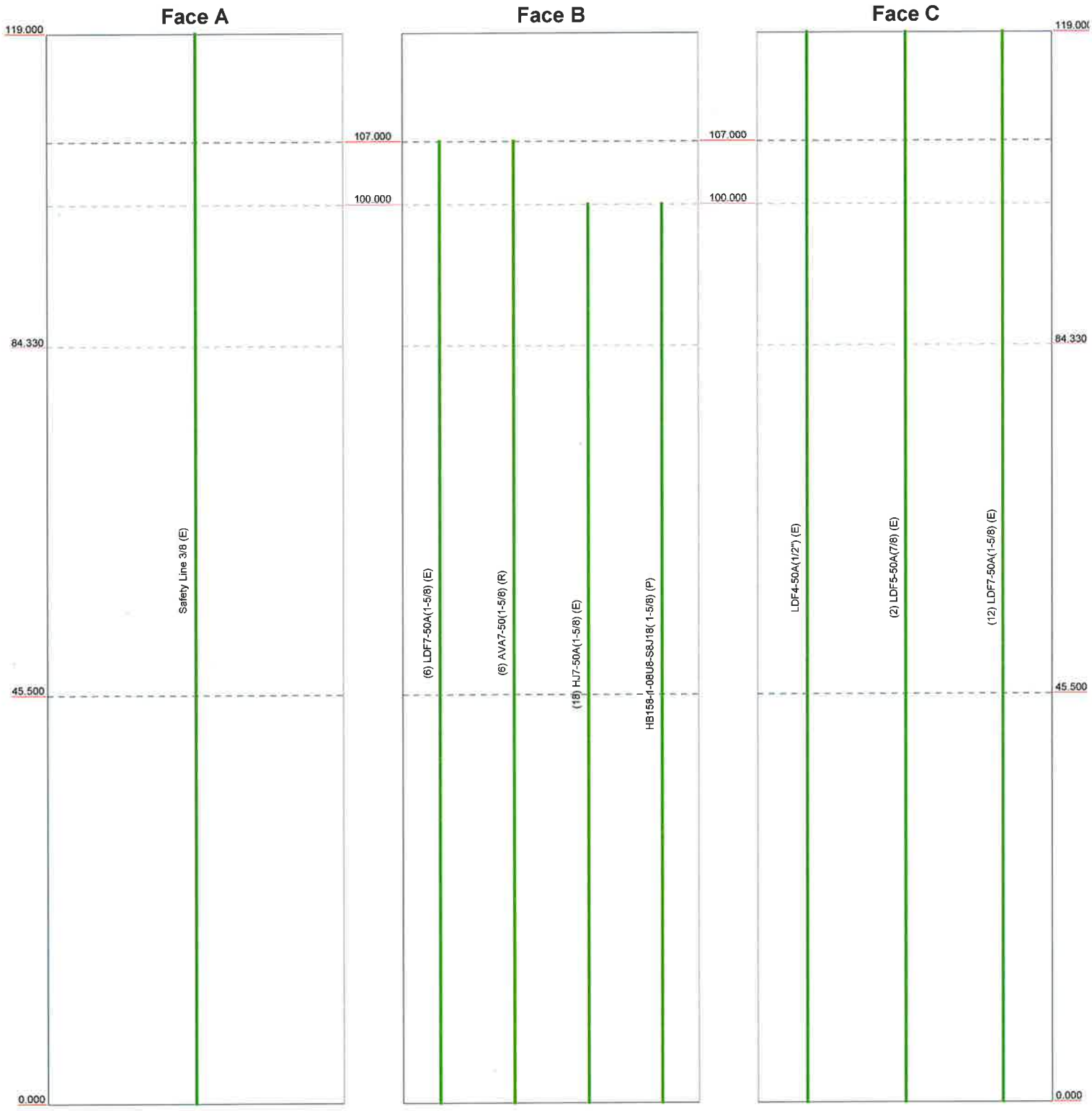
Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 102936.001.01- KILLINGLY ROSS ROAD, CT (BU# 857			
Project:			
Client: Crown Castle	Drawn by: Akshay Kumar	App'd:	
Code: TIA/EIA-222-F	Date: 11/13/15	Scale: NTS	
Path:		Dwg No. E-5	

0' - 119'

Round | Flat | App In Face | App Out Face | Truss Leg



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Phone: (918) 587-4630
FAX: (918) 295-0265

Job: 102936.001.01- KILLINGLY ROSS ROAD, CT (BU# 857			
Project:			
Client: Crown Castle	Drawn by: Akshay Kumar	App'd:	
Code: TIA/EIA-222-F	Date: 11/13/15	Scale: NTS	
Path:		Dwg No. E-7	

Tower Input Data

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

Tower is located in Windham County, Connecticut.
Basic wind speed of 85 mph.
Nominal ice thickness of 0.750 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 38 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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	119.000-84.330	34.670	3.630	18	19.100	29.030	0.500	2.000	A572-50 (50 ksi)
L2	84.330-45.500	42.460	4.890	18	26.990	39.150	0.625	2.500	A572-50 (50 ksi)
L3	45.500-0.000	50.390		18	36.500	50.930	0.688	2.750	A572-50 (50 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	19.395	29.518	1290.189	6.603	9.703	132.971	2582.075	14.762	2.482	4.963
	29.478	45.277	4656.072	10.128	14.747	315.725	9318.271	22.643	4.229	8.459
L2	28.462	52.302	4593.283	9.360	13.711	335.005	9192.611	26.156	3.650	5.84
	39.754	76.424	14330.203	13.676	19.888	720.538	28679.261	38.219	5.790	9.265
L3	38.485	78.146	12662.124	12.713	18.542	682.896	25340.908	39.081	5.214	7.584
	51.716	109.635	34964.780	17.836	25.872	1351.430	69975.567	54.828	7.754	11.278

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 119.000-84.330				1	1	1		
L2 84.330-45.500				1	1	1		
L3 45.500-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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 klf
LDF4-50A(1/2") (E)	C	No	Inside Pole	119.000 - 0.000	1	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF5-50A(7/8) (E)	C	No	Inside Pole	119.000 - 0.000	2	No Ice	0.000	0.000
						1/2" Ice	0.000	0.000
						1" Ice	0.000	0.000
						2" Ice	0.000	0.000
						4" Ice	0.000	0.000
LDF7-50A(1-5/8) (E)	C	No	Inside Pole	119.000 - 0.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
@								
LDF7-50A(1-5/8) (E)	B	No	Inside Pole	107.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
AVA7-50(1-5/8) (R)	B	No	Inside Pole	107.000 - 0.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
@								
HJ7-50A(1-5/8) (E)	B	No	Inside Pole	100.000 - 0.000	18	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
HB158-1-08U8-S8J18(1-5/8) (P)	B	No	Inside Pole	100.000 - 0.000	1	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
						1" Ice	0.000	0.001
						2" Ice	0.000	0.001
						4" Ice	0.000	0.001
@								
Safety Line 3/8 (E)	A	No	CaAa (Out Of Face)	119.000 - 0.000	1	No Ice	0.037	0.000
						1/2" Ice	0.137	0.001
						1" Ice	0.238	0.001
						2" Ice	0.437	0.002
						4" Ice	0.838	0.004
@								

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	119.000-84.330	A	0.000	0.000	0.000	1.300	0.008
		B	0.000	0.000	0.000	0.000	0.520
		C	0.000	0.000	0.000	0.000	0.369
L2	84.330-45.500	A	0.000	0.000	0.000	1.456	0.009
		B	0.000	0.000	0.000	0.000	1.132
		C	0.000	0.000	0.000	0.000	0.414
L3	45.500-0.000	A	0.000	0.000	0.000	1.706	0.010
		B	0.000	0.000	0.000	0.000	1.326
		C	0.000	0.000	0.000	0.000	0.485

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	119.000-84.330	A	0.857	0.000	0.000	0.000	7.245	0.039
		B		0.000	0.000	0.000	0.000	0.520
		C		0.000	0.000	0.000	0.000	0.369
L2	84.330-45.500	A	0.812	0.000	0.000	0.000	8.115	0.044
		B		0.000	0.000	0.000	0.000	1.132
		C		0.000	0.000	0.000	0.000	0.414
L3	45.500-0.000	A	0.750	0.000	0.000	0.000	9.099	0.049
		B		0.000	0.000	0.000	0.000	1.326

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.485

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	119.000-84.330	0.000	-0.055	0.000	-0.267
L2	84.330-45.500	0.000	-0.056	0.000	-0.278
L3	45.500-0.000	0.000	-0.056	0.000	-0.275

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8" x 8' (E)	C	From Leg	2.000 0.000 4.000		0.000	119.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.500 1.314 2.144 3.613 5.683	0.500 1.314 2.144 3.613 5.683	0.031 0.037 0.047 0.084 0.227
@ (2) 7770.00 w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000		0.000	119.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
(2) 7770.00 w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000		0.000	119.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
(2) 7770.00 w/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000		0.000	119.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.119 6.626 7.128 8.164 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.103 0.157 0.287 0.665
AM-X-CD-17-65-00T-RET w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000		0.000	119.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.549 12.267 12.995 14.447 17.709	8.938 10.450 11.986 14.313 19.144	0.092 0.177 0.272 0.496 1.120
AM-X-CD-17-65-00T-RET w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000		0.000	119.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.549 12.267 12.995 14.447 17.709	8.938 10.450 11.986 14.313 19.144	0.092 0.177 0.272 0.496 1.120
AM-X-CD-17-65-00T-RET	C	From Leg	4.000		0.000	119.000	No Ice	11.549	8.938	0.092

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
w/ Mount Pipe			0.000			1/2" Ice	12.267	10.450	0.177
(E)			2.000			1" Ice	12.995	11.986	0.272
						2" Ice	14.447	14.313	0.496
						4" Ice	17.709	19.144	1.120
(3) LGP21401	A	From Leg	4.000	0.000	119.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			2.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(3) LGP21401	B	From Leg	4.000	0.000	119.000	No Ice	1.288	0.233	0.014
(E)			0.000			1/2" Ice	1.445	0.313	0.021
			2.000			1" Ice	1.611	0.403	0.030
						2" Ice	1.969	0.608	0.055
						4" Ice	2.788	1.121	0.135
(3) E15S08P77	A	From Leg	4.000	0.000	119.000	No Ice	0.538	0.236	0.008
(E)			0.000			1/2" Ice	0.639	0.310	0.012
			2.000			1" Ice	0.748	0.393	0.017
						2" Ice	0.993	0.584	0.033
						4" Ice	1.586	1.071	0.089
(3) E15S08P77	C	From Leg	4.000	0.000	119.000	No Ice	0.538	0.236	0.008
(E)			0.000			1/2" Ice	0.639	0.310	0.012
			2.000			1" Ice	0.748	0.393	0.017
						2" Ice	0.993	0.584	0.033
						4" Ice	1.586	1.071	0.089
(2) RBS 6601	A	From Leg	4.000	0.000	119.000	No Ice	0.480	0.348	0.022
(E)			0.000			1/2" Ice	0.625	0.459	0.034
			2.000			1" Ice	0.778	0.578	0.049
						2" Ice	1.110	0.842	0.087
						4" Ice	1.878	1.474	0.202
(2) RBS 6601	B	From Leg	4.000	0.000	119.000	No Ice	0.480	0.348	0.022
(E)			0.000			1/2" Ice	0.625	0.459	0.034
			2.000			1" Ice	0.778	0.578	0.049
						2" Ice	1.110	0.842	0.087
						4" Ice	1.878	1.474	0.202
(2) RBS 6601	C	From Leg	4.000	0.000	119.000	No Ice	0.480	0.348	0.022
(E)			0.000			1/2" Ice	0.625	0.459	0.034
			2.000			1" Ice	0.778	0.578	0.049
						2" Ice	1.110	0.842	0.087
						4" Ice	1.878	1.474	0.202
(3) BTS-2500	B	From Leg	4.000	0.000	119.000	No Ice	2.120	0.957	0.035
(E)			0.000			1/2" Ice	2.323	1.119	0.048
			2.000			1" Ice	2.534	1.291	0.064
						2" Ice	2.983	1.659	0.104
						4" Ice	3.984	2.499	0.223
(3) BTS-2500	C	From Leg	4.000	0.000	119.000	No Ice	2.120	0.957	0.035
(E)			0.000			1/2" Ice	2.323	1.119	0.048
			2.000			1" Ice	2.534	1.291	0.064
						2" Ice	2.983	1.659	0.104
						4" Ice	3.984	2.499	0.223
DC6-48-60-18-8F	C	From Leg	3.000	0.000	119.000	No Ice	1.467	1.467	0.019
(E)			0.000			1/2" Ice	1.667	1.667	0.037
			2.000			1" Ice	1.878	1.878	0.057
						2" Ice	2.333	2.333	0.105
						4" Ice	3.378	3.378	0.239
7' x 2" Pipe Mount	A	From Leg	4.000	0.000	119.000	No Ice	1.663	1.663	0.026
(E)			0.000			1/2" Ice	2.391	2.391	0.038
			0.000			1" Ice	2.825	2.825	0.055

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	3.706	3.706	0.105
						4" Ice	5.578	5.578	0.266
7' x 2" Pipe Mount (E)	B	From Leg	4.000 0.000 0.000	0.000	119.000	No Ice	1.663	1.663	0.026
						1/2" Ice	2.391	2.391	0.038
						1" Ice	2.825	2.825	0.055
						2" Ice	3.706	3.706	0.105
						4" Ice	5.578	5.578	0.266
7' x 2" Pipe Mount (E)	C	From Leg	4.000 0.000 0.000	0.000	119.000	No Ice	1.663	1.663	0.026
						1/2" Ice	2.391	2.391	0.038
						1" Ice	2.825	2.825	0.055
						2" Ice	3.706	3.706	0.105
						4" Ice	5.578	5.578	0.266
Platform Mount [LP 1202-1] (E)	C	None		0.000	119.000	No Ice	37.400	37.400	3.400
						1/2" Ice	42.200	42.200	3.940
						1" Ice	47.000	47.000	4.480
						2" Ice	56.600	56.600	5.560
						4" Ice	75.800	75.800	7.720
@ APX16PV-16PVL w/ Mount Pipe (E)	A	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	6.885	3.268	0.059
						1/2" Ice	7.387	3.974	0.105
						1" Ice	7.889	4.639	0.156
						2" Ice	8.924	6.021	0.281
						4" Ice	11.118	8.995	0.647
APX16PV-16PVL w/ Mount Pipe (E)	B	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	6.885	3.268	0.059
						1/2" Ice	7.387	3.974	0.105
						1" Ice	7.889	4.639	0.156
						2" Ice	8.924	6.021	0.281
						4" Ice	11.118	8.995	0.647
APX16PV-16PVL w/ Mount Pipe (E)	C	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	6.885	3.268	0.059
						1/2" Ice	7.387	3.974	0.105
						1" Ice	7.889	4.639	0.156
						2" Ice	8.924	6.021	0.281
						4" Ice	11.118	8.995	0.647
LGP 13903 (E)	A	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	0.586	0.280	0.010
						1/2" Ice	0.692	0.363	0.015
						1" Ice	0.807	0.455	0.020
						2" Ice	1.062	0.665	0.037
						4" Ice	1.677	1.189	0.095
LGP 13903 (E)	B	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	0.586	0.280	0.010
						1/2" Ice	0.692	0.363	0.015
						1" Ice	0.807	0.455	0.020
						2" Ice	1.062	0.665	0.037
						4" Ice	1.677	1.189	0.095
LGP 13903 (E)	C	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	0.586	0.280	0.010
						1/2" Ice	0.692	0.363	0.015
						1" Ice	0.807	0.455	0.020
						2" Ice	1.062	0.665	0.037
						4" Ice	1.677	1.189	0.095
LNX-6515DS-VTM w/ Mount Pipe (R)	A	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506
						4" Ice	17.875	20.139	1.151
LNX-6515DS-VTM w/ Mount Pipe (R)	B	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice	11.683	9.842	0.083
						1/2" Ice	12.404	11.366	0.173
						1" Ice	13.135	12.914	0.273
						2" Ice	14.601	15.267	0.506

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	17.875	20.139	1.151
LNX-6515DS-VTM w/ Mount Pipe (R)	C	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.683 12.404 13.135 14.601 17.875	9.842 11.366 12.914 15.267 20.139	0.083 0.173 0.273 0.506 1.151
ATBT-BOTTOM-24V (R)	A	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.121 0.172 0.232 0.377 0.771	0.075 0.119 0.172 0.303 0.668	0.003 0.004 0.006 0.013 0.045
ATBT-BOTTOM-24V (R)	B	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.121 0.172 0.232 0.377 0.771	0.075 0.119 0.172 0.303 0.668	0.003 0.004 0.006 0.013 0.045
ATBT-BOTTOM-24V (R)	C	From Leg	4.000 0.000 2.000	0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.121 0.172 0.232 0.377 0.771	0.075 0.119 0.172 0.303 0.668	0.003 0.004 0.006 0.013 0.045
Platform Mount [LP 304-1] (E)	C	None		0.000	107.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.460 22.440 27.420 37.380 57.300	17.460 22.440 27.420 37.380 57.300	1.349 1.625 1.900 2.451 3.554
@ (2) LPA-80080/6CF w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
(2) LPA-80080/6CF w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
(2) LPA-80080/6CF w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.564 5.105 5.612 6.651 8.834	10.728 11.990 12.968 14.980 19.217	0.046 0.113 0.187 0.363 0.857
(2) SBNHH-1D65B w/ Mount Pipe (P)	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.293 9.917 11.190 13.855	7.071 8.260 9.170 11.006 15.043	0.066 0.135 0.212 0.394 0.903
(2) SBNHH-1D65B w/ Mount Pipe (P)	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.293 9.917 11.190 13.855	7.071 8.260 9.170 11.006 15.043	0.066 0.135 0.212 0.394 0.903
(2) SBNHH-1D65B w/ Mount Pipe (P)	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.637 9.293 9.917 11.190 13.855	7.071 8.260 9.170 11.006 15.043	0.066 0.135 0.212 0.394 0.903

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
RRH2x60-700 (P)	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-700 (P)	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2x60-700 (P)	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-AWS (P)	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.957 4.272 4.596 5.271 6.722	1.816 2.075 2.360 2.957 4.253	0.060 0.083 0.109 0.173 0.354
RRH2X60-PCS (P)	A	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS (P)	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
RRH2X60-PCS (P)	C	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.567 2.791 3.025 3.517 4.606	2.011 2.218 2.435 2.894 3.915	0.055 0.075 0.099 0.155 0.313
DB-T1-6Z-8AB-0Z (P)	B	From Leg	4.000 0.000 0.000	0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.600 5.915 6.240 6.914 8.365	2.333 2.558 2.791 3.284 4.373	0.044 0.080 0.120 0.213 0.455
Platform Mount [LP 303-1] (E)	C	None		0.000	100.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.660 18.870 23.080 31.500 48.340	14.660 18.870 23.080 31.500 48.340	1.250 1.481 1.713 2.175 3.101

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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	119 - 84.33	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-20.447	-0.344	-0.947
			Max. Mx	5	-13.062	-349.858	-2.775
			Max. My	8	-13.070	-2.381	-347.170
			Max. Vy	5	16.639	-349.858	-2.775
			Max. Vx	8	16.500	-2.381	-347.170

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	5			-0.892
L2	84.33 - 45.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-31.924	-0.344	-0.889
			Max. Mx	5	-23.311	-1022.626	-6.826
			Max. My	8	-23.315	-6.428	-1014.699
			Max. Vy	5	19.199	-1022.626	-6.826
			Max. Vx	8	19.060	-6.428	-1014.699
			Max. Torque	5			-0.887
L3	45.5 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-53.607	-0.344	-0.790
			Max. Mx	5	-42.987	-2076.052	-12.176
			Max. My	8	-42.987	-11.794	-2061.164
			Max. Vy	5	22.678	-2076.052	-12.176
			Max. Vx	8	22.542	-11.794	-2061.164
			Max. Torque	5			-0.874

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	53.607	0.000	0.000
	Max. H_x	11	42.995	22.662	0.105
	Max. H_z	2	42.995	0.105	22.526
	Max. M_x	2	2060.132	0.105	22.526
	Max. M_z	5	2076.052	-22.662	-0.105
	Max. Torsion	11	0.853	22.662	0.105
	Min. Vert	1	42.995	0.000	0.000
	Min. H_x	5	42.995	-22.662	-0.105
	Min. H_z	8	42.995	-0.105	-22.526
	Min. M_x	8	-2061.164	-0.105	-22.526
	Min. M_z	11	-2075.787	22.662	0.105
	Min. Torsion	5	-0.858	-22.662	-0.105

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	42.995	0.000	0.000	0.497	-0.129	0.000
Dead+Wind 0 deg - No Ice	42.995	-0.105	-22.526	-2060.132	11.529	0.152
Dead+Wind 30 deg - No Ice	42.995	11.240	-19.456	-1778.230	-1027.998	0.562
Dead+Wind 60 deg - No Ice	42.995	19.574	-11.172	-1019.710	-1792.106	0.821
Dead+Wind 90 deg - No Ice	42.995	22.662	0.105	12.176	-2076.052	0.858
Dead+Wind 120 deg - No Ice	42.995	19.679	11.354	1040.933	-1803.760	0.663
Dead+Wind 150 deg - No Ice	42.995	11.422	19.561	1790.914	-1048.192	0.291
Dead+Wind 180 deg - No Ice	42.995	0.105	22.526	2061.164	-11.794	-0.157
Dead+Wind 210 deg - No Ice	42.995	-11.240	19.456	1779.261	1027.733	-0.561
Dead+Wind 240 deg - No Ice	42.995	-19.574	11.172	1020.739	1791.842	-0.816
Dead+Wind 270 deg - No Ice	42.995	-22.662	-0.105	-11.147	2075.787	-0.853
Dead+Wind 300 deg - No Ice	42.995	-19.679	-11.354	-1039.903	1803.494	-0.664
Dead+Wind 330 deg - No Ice	42.995	-11.422	-19.561	-1789.883	1047.926	-0.296
Dead+Ice+Temp	53.607	0.000	0.000	0.790	-0.344	0.000

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 0 deg+Ice+Temp	53.607	-0.022	-5.310	-497.114	2.124	0.003
Dead+Wind 30 deg+Ice+Temp	53.607	2.649	-4.588	-429.159	-248.693	0.096
Dead+Wind 60 deg+Ice+Temp	53.607	4.611	-2.636	-245.986	-432.969	0.164
Dead+Wind 90 deg+Ice+Temp	53.607	5.337	0.022	3.322	-501.329	0.187
Dead+Wind 120 deg+Ice+Temp	53.607	4.633	2.674	251.965	-435.454	0.161
Dead+Wind 150 deg+Ice+Temp	53.607	2.688	4.610	433.318	-252.997	0.091
Dead+Wind 180 deg+Ice+Temp	53.607	0.022	5.310	498.789	-2.846	-0.003
Dead+Wind 210 deg+Ice+Temp	53.607	-2.649	4.588	430.834	247.971	-0.096
Dead+Wind 240 deg+Ice+Temp	53.607	-4.611	2.636	247.662	432.248	-0.163
Dead+Wind 270 deg+Ice+Temp	53.607	-5.337	-0.022	-1.647	500.607	-0.187
Dead+Wind 300 deg+Ice+Temp	53.607	-4.633	-2.674	-250.290	434.732	-0.161
Dead+Wind 330 deg+Ice+Temp	53.607	-2.688	-4.610	-431.643	252.275	-0.092
Dead+Wind 0 deg - Service	42.995	-0.036	-7.795	-712.648	3.903	0.053
Dead+Wind 30 deg - Service	42.995	3.889	-6.732	-615.085	-355.864	0.195
Dead+Wind 60 deg - Service	42.995	6.773	-3.866	-352.571	-620.313	0.284
Dead+Wind 90 deg - Service	42.995	7.842	0.036	4.552	-718.585	0.297
Dead+Wind 120 deg - Service	42.995	6.809	3.929	360.594	-624.349	0.230
Dead+Wind 150 deg - Service	42.995	3.952	6.768	620.153	-362.854	0.102
Dead+Wind 180 deg - Service	42.995	0.036	7.795	713.681	-4.169	-0.054
Dead+Wind 210 deg - Service	42.995	-3.889	6.732	616.117	355.598	-0.195
Dead+Wind 240 deg - Service	42.995	-6.773	3.866	353.603	620.047	-0.283
Dead+Wind 270 deg - Service	42.995	-7.842	-0.036	-3.520	718.319	-0.296
Dead+Wind 300 deg - Service	42.995	-6.809	-3.929	-359.561	624.083	-0.230
Dead+Wind 330 deg - Service	42.995	-3.952	-6.768	-619.120	362.588	-0.102

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.000	-42.995	0.000	0.000	42.995	0.000	0.000%
2	-0.105	-42.995	-22.526	0.105	42.995	22.526	0.000%
3	11.240	-42.995	-19.456	-11.240	42.995	19.456	0.000%
4	19.574	-42.995	-11.172	-19.574	42.995	11.172	0.000%
5	22.662	-42.995	0.105	-22.662	42.995	-0.105	0.000%
6	19.679	-42.995	11.354	-19.679	42.995	-11.354	0.000%
7	11.422	-42.995	19.561	-11.422	42.995	-19.561	0.000%
8	0.105	-42.995	22.526	-0.105	42.995	-22.526	0.000%
9	-11.240	-42.995	19.456	11.240	42.995	-19.456	0.000%
10	-19.574	-42.995	11.172	19.574	42.995	-11.172	0.000%
11	-22.662	-42.995	-0.105	22.662	42.995	0.105	0.000%
12	-19.679	-42.995	-11.354	19.679	42.995	11.354	0.000%
13	-11.422	-42.995	-19.561	11.422	42.995	19.561	0.000%
14	0.000	-53.607	0.000	0.000	53.607	0.000	0.000%
15	-0.022	-53.607	-5.310	0.022	53.607	5.310	0.000%
16	2.649	-53.607	-4.588	-2.649	53.607	4.588	0.000%
17	4.611	-53.607	-2.636	-4.611	53.607	2.636	0.000%
18	5.337	-53.607	0.022	-5.337	53.607	-0.022	0.000%
19	4.633	-53.607	2.674	-4.633	53.607	-2.674	0.000%
20	2.688	-53.607	4.610	-2.688	53.607	-4.610	0.000%
21	0.022	-53.607	5.310	-0.022	53.607	-5.310	0.000%
22	-2.649	-53.607	4.588	2.649	53.607	-4.588	0.000%
23	-4.611	-53.607	2.636	4.611	53.607	-2.636	0.000%
24	-5.337	-53.607	-0.022	5.337	53.607	0.022	0.000%
25	-4.633	-53.607	-2.674	4.633	53.607	2.674	0.000%
26	-2.688	-53.607	-4.610	2.688	53.607	4.610	0.000%
27	-0.036	-42.995	-7.795	0.036	42.995	7.795	0.000%
28	3.889	-42.995	-6.732	-3.889	42.995	6.732	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
29	6.773	-42.995	-3.866	-6.773	42.995	3.866	0.000%
30	7.842	-42.995	0.036	-7.842	42.995	-0.036	0.000%
31	6.809	-42.995	3.929	-6.809	42.995	-3.929	0.000%
32	3.952	-42.995	6.768	-3.952	42.995	-6.768	0.000%
33	0.036	-42.995	7.795	-0.036	42.995	-7.795	0.000%
34	-3.889	-42.995	6.732	3.889	42.995	-6.732	0.000%
35	-6.773	-42.995	3.866	6.773	42.995	-3.866	0.000%
36	-7.842	-42.995	-0.036	7.842	42.995	0.036	0.000%
37	-6.809	-42.995	-3.929	6.809	42.995	3.929	0.000%
38	-3.952	-42.995	-6.768	3.952	42.995	6.768	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	4	0.00000001	0.00001235
3	Yes	4	0.00000001	0.00059131
4	Yes	4	0.00000001	0.00054553
5	Yes	4	0.00000001	0.00007296
6	Yes	4	0.00000001	0.00062120
7	Yes	4	0.00000001	0.00058107
8	Yes	4	0.00000001	0.00002038
9	Yes	4	0.00000001	0.00055468
10	Yes	4	0.00000001	0.00060609
11	Yes	4	0.00000001	0.00005677
12	Yes	4	0.00000001	0.00056868
13	Yes	4	0.00000001	0.00060303
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00026876
16	Yes	4	0.00000001	0.00028065
17	Yes	4	0.00000001	0.00028169
18	Yes	4	0.00000001	0.00027218
19	Yes	4	0.00000001	0.00028656
20	Yes	4	0.00000001	0.00028560
21	Yes	4	0.00000001	0.00027110
22	Yes	4	0.00000001	0.00028212
23	Yes	4	0.00000001	0.00028283
24	Yes	4	0.00000001	0.00027136
25	Yes	4	0.00000001	0.00028389
26	Yes	4	0.00000001	0.00028310
27	Yes	4	0.00000001	0.00000501
28	Yes	4	0.00000001	0.00003546
29	Yes	4	0.00000001	0.00002975
30	Yes	4	0.00000001	0.00001106
31	Yes	4	0.00000001	0.00003814
32	Yes	4	0.00000001	0.00003263
33	Yes	4	0.00000001	0.00000522
34	Yes	4	0.00000001	0.00003069
35	Yes	4	0.00000001	0.00003762
36	Yes	4	0.00000001	0.00001030
37	Yes	4	0.00000001	0.00003121
38	Yes	4	0.00000001	0.00003549

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119 - 84.33	10.156	31	0.769	0.002
L2	87.96 - 45.5	5.510	31	0.620	0.001
L3	50.39 - 0	1.729	31	0.328	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.000	Lightning Rod 5/8" x 8'	31	10.156	0.769	0.002	46064
107.000	APX16PV-16PVL w/ Mount Pipe	31	8.274	0.720	0.001	19193
100.000	(2) LPA-80080/6CF w/ Mount Pipe	31	7.213	0.687	0.001	12122

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	119 - 84.33	29.310	6	2.220	0.006
L2	87.96 - 45.5	15.910	6	1.790	0.002
L3	50.39 - 0	4.993	6	0.947	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
119.000	Lightning Rod 5/8" x 8'	6	29.310	2.220	0.006	16032
107.000	APX16PV-16PVL w/ Mount Pipe	6	23.884	2.077	0.004	6679
100.000	(2) LPA-80080/6CF w/ Mount Pipe	6	20.821	1.984	0.003	4218

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 $\frac{P}{P_a}$

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	119 - 84.33 (1)	TP29.03x19.1x0.5	34.670	0.000	0.0	30.000	43.627	-13.058	1308.810	0.010
L2	84.33 - 45.5 (2)	TP39.15x26.99x0.625	42.460	0.000	0.0	30.000	73.646	-23.309	2209.380	0.011
L3	45.5 - 0 (3)	TP50.93x36.5x0.688	50.390	0.000	0.0	30.000	97.664	-35.352	2929.910	0.012

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	119 - 84.33 (1)	TP29.03x19.1x0.5	351.285	14.390	30.000	0.480	0.000	0.000	30.000	0.000
L2	84.33 - 45.5 (2)	TP39.15x26.99x0.625	1026.242	18.416	30.000	0.614	0.000	0.000	30.000	0.000
L3	45.5 - 0 (3)	TP50.93x36.5x0.688	1660.667	18.613	30.000	0.620	0.000	0.000	30.000	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	119 - 84.33 (1)	TP29.03x19.1x0.5	16.698	0.383	20.000	0.038	0.690	0.014	20.000	0.001
L2	84.33 - 45.5 (2)	TP39.15x26.99x0.625	19.258	0.261	20.000	0.026	0.680	0.006	20.000	0.000
L3	45.5 - 0 (3)	TP50.93x36.5x0.688	21.524	0.220	20.000	0.022	0.670	0.004	20.000	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	119 - 84.33 (1)	0.010	0.480	0.000	0.038	0.001	0.490 ✔	1.333	H1-3+VT ✔
L2	84.33 - 45.5 (2)	0.011	0.614	0.000	0.026	0.000	0.625 ✔	1.333	H1-3+VT ✔
L3	45.5 - 0 (3)	0.012	0.620	0.000	0.022	0.000	0.633 ✔	1.333	H1-3+VT ✔

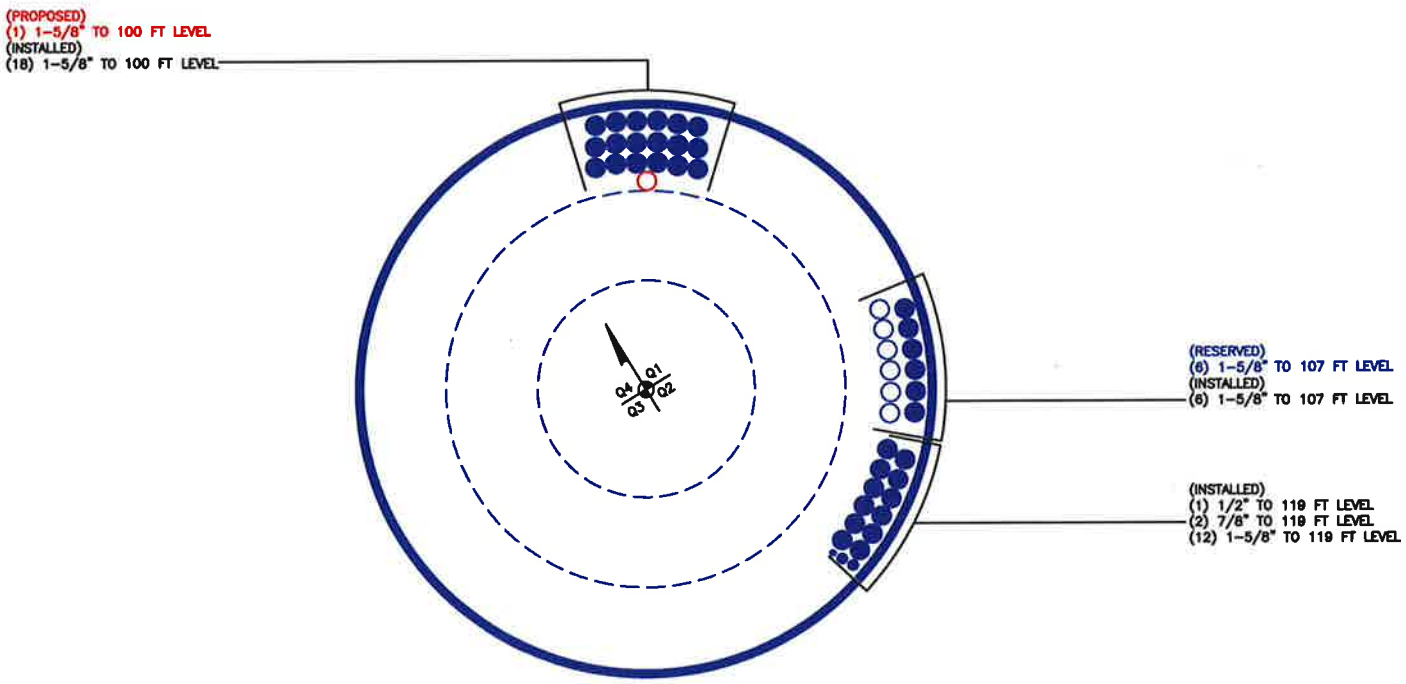
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	119 - 84.33	Pole	TP29.03x19.1x0.5	1	-13.058	1744.644	36.8	Pass
L2	84.33 - 45.5	Pole	TP39.15x26.99x0.625	2	-23.309	2945.103	46.9	Pass
L3	45.5 - 0	Pole	TP50.93x36.5x0.688	3	-35.352	3905.570	47.5	Pass
							Summary	
						Pole (L3)	47.5	Pass
						RATING =	**47.5**	**Pass**

Program Version 6.1.4.1

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 857013

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *857013*
Site Name: *KILLINGLY ROSS ROAD, CT*
App #: *320011 Rev # 0*

Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	16	
Diam:	2	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	59	in

Plate Data		
Diam:	65	in
Thick:	2	in
Grade:	50	ksi
Single-Rod B-eff:	10.10	in

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

Pole Data		
Diam:	50.93	in
Thick:	0.6875	in
Grade:	50	ksi
# of Sides:	18	"0" IF Round
Fu	65	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	2083	ft-kips
Axial, Pu:	43	kips
Shear, Vu:	23	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	111.4 Kips	
Allowable Axial, Φ*Fu*Anet:	200.0 Kips	
Anchor Rod Stress Ratio:	55.7% Pass	

Rigid
AISC LRFD
φ*Tn

Base Plate Results Flexural Check

Base Plate Stress:	26.8 ksi	
Allowable Plate Stress:	45.0 ksi	
Base Plate Stress Ratio:	59.5% Pass	

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 29.78

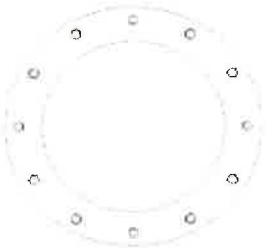
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a



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

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

PROJECT	**857013 - KILLINGLY ROSS ROAD, CT**				
SUBJECT	**Foundation Analysis**				
DATE	**11-13-15**	PAGE	1	OF	1

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Monopole Pad & Pier Foundation Analysis

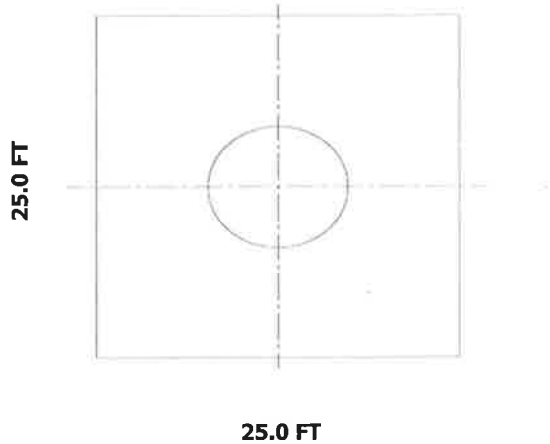
Rev. Type: F

Design Loads:

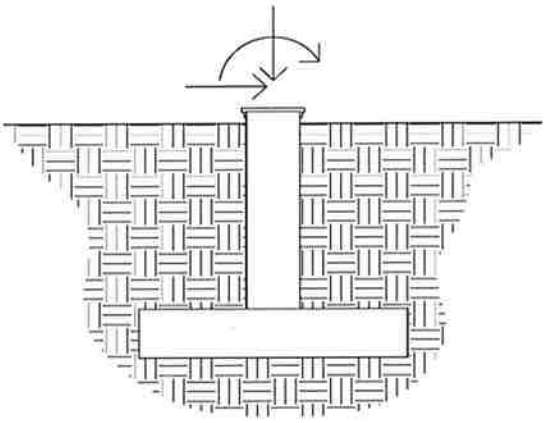
	Input unfactored loads	
Shear:	23.0	kips
Moment:	2,083.0	ft-kips
Tower Height:	119.0	ft
Tower Weight:	43.0	kips

Pad & Pier Dimensions / Properties:

Pole Diameter at Base:	50.93	in
Bearing Depth:	7.0	ft
Pad Width:	25.0	ft
Neglected Depth:	3.3	ft
Thickness:	3.0	ft
Pier Diameter:	7.0	ft
Pier Height Above Grade:	0.5	ft
BP Dist. Above Pier:	3.0	in
Clear Cover:	3.0	in
Pier Rebar Size:	10	
Pier Rebar Quanity:	39	
Pad Rebar Size:	8	
Pad Rebar Quanity:	13	
Pier Tie Size:	3	
Tie Quanity:	5	
Rebar Yield Strength:	60000	psi
Concrete Strength:	3000	psi
Concrete Unit Weight:	0.15	kcf



Elevation Overview



Soil Data:

	Allowable Values	
Soil Unit Weight:	0.128	kcf
Ult. Bearing Capacity:	15.000	ksf
Angle of Friction:	38.000	deg
Cohesion:	0.000	ksf
Passive Pressure:	0.000	ksf
Base Friction:	0.450	

Summary of Results

Req'd Pier Diam.	OK
Overturning	38.1%
Shear Capacity	13.9%
Bearing	18.2%
Pad Shear - 1-way	46.6%
Pad Shear - 2-way	5.7%
Pad Moment Capacity	64.5%
Pier Moment Capacity	37.3%

** Notes:

Pad rebar details assumed.