Robinson+Cole

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Also admitted in Massachusetts

November 16, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
23 Kelleher Court, Wethersfield, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) antennas at the 130-foot level of the existing 180-foot tower at 150 Mattatuck Heights in Waterbury, Connecticut (the "Property"). The tower and underlying property are owned by the Town of Wethersfield ("Town"). The Council approved Cellco's use of this tower in 2003. Cellco now intends to modify its facility by replacing six (6) of its antennas with three (3) model SBNHH-1D65B, 700/1900 MHz antennas and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") and install six (6) new RRHs and one (1) HYBRIFLEX™ fiber optic antenna cable. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable . Included in Attachment 1 are specifications for Cellco's replacement antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Jeff Bridges, Town Manager of the Town of Wethersfield. As noted above, the Town is the owner of the Property and tower.

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 structure. Cellco's new antennas and RRHs will be installed at a centerline height of 130 feet on the 180-foot tower.

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

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

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

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

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

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

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

Sincerely,

Kenneth C. Baldwin

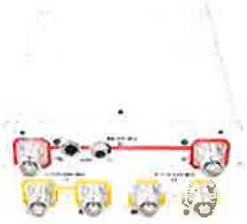
Enclosures
Copy to:
Jeff Bridges, Wethersfield Town Manager
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.



SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 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	1710–1880	1850–1990	1920–2180	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, 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	1710–1880	1850–1990	1920–2180	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, 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	1710 – 2360 MHz | 698 – 896 MHz

Mechanical Specifications

Product Specifications

SBNHH-1D65B

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	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1828.0 mm | 72.0 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®

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

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.

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.

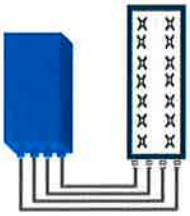
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

ALCATEL-LUCENT B25 RRH4X30

Alcatel-Lucent Band 25 Remote Radio Head 4x30W is the new 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 B25 RRH4x30 allows operators to have a compact radio solution to deploy LTE in the PCS band (1.9 GHz, 3GPP band 25), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B25 RRH4x30 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, LTE carriers from 3 MHz up to 20 MHz and up to 65 MHz instantaneous bandwidth.

The Alcatel-Lucent B25 RRH4x30 is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

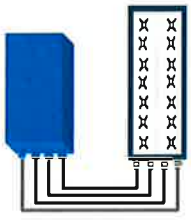
Its compactness and slim design makes the Alcatel-Lucent B25 RRH4x30 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

FEATURES

- Supporting LTE in 1.9 GHz band (PCS, 3GPP band 2 & 25)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- Ready for 3, 5, 10, 15 or 20MHz LTE carrier operation with 4Rx Diversity
- Ready to support up to 4 carriers anywhere in 65MHz instantaneous bandwidth
- Convection-cooled (fan-less)
- Supports AISG 2.0 devices (RET, TMA) through RS485 or RF ports

BENEFITS

- Compact to reduce additional footprint when adding LTE in PCS band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Full flexibility for multiple carriers operation over entire PCS spectrum
- Improves downlink spectral efficiency and cell edge throughput through MIMO4
- Increases LTE coverage thanks to 4-way Rx 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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	3GPP bands 2 & 25 (PCS-G) DL: 1930 - 1995 MHz UL: 1850 - 1915 MHz
Instantaneous bandwidth - #carriers	65MHz – Up to 4 LTE carriers (in 40MHz occupied bandwidth)
LTE carrier bandwidth	3, 5, 10, 15 or 20 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure (3GPP band 2) RX Diversity scheme	2.0 dB typ. (<2.5 dB max) 2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.) Volume (w/ solar shield) in L Weight (w/ solar shield) in kg (lb)	538 x 304 x 182 (21.2" x 12.0" x 7.2") 30 24 (53)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 580W typical @100% RF load
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 (> 14dB)
CPRI ports	2 CPRI ports (HW ready for Rate7 / 9.8 Gbps)
AISG interfaces	1 AISG2.0 output (RS485), +24V/2A DC power Integrated Smart Bias Tees (x2)
Misc. Interfaces	1 external alarms connector (4 alarms) 4 RF Tx & 4 RF Rx monitor ports 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

ALCATEL-LUCENT B66A RRH4X45

The Alcatel-Lucent B66a Remote Radio Head 4x45 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. Its operational range covers beyond that of B4 (AWS) and B10 (AWS+).

Supporting 2Tx/4Tx MIMO and 2-way/4-way Rx diversity, the Alcatel-Lucent B66a RRH4x45 allows operators to have a compact radio solution to deploy LTE in the 2100 band (3GPP band 4, 10, and 66), providing them with the means to achieve high capacity, high quality, high reliability, large instantaneous bandwidth, and high coverage with minimum site requirements.

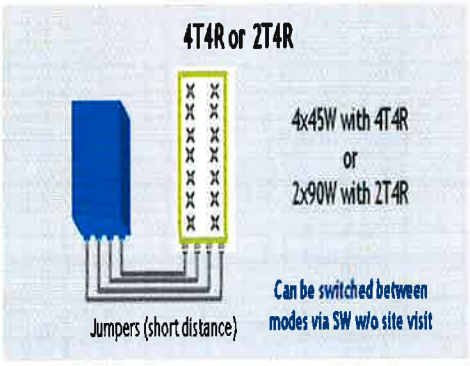
The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.

The Alcatel-Lucent B66a RRH4x45 is a compact (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 B66a RRH4x45 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 2110 - 2180 MHz band/DL, 1710-1780MHz/UL (3GPP band 4, 10, and 66a)
- LTE 2Tx or 4Tx MIMO (SW selectable)
- Configuration: 2T2R/2T4R/4T4R
- Output power: Up to 2x90W or 4x45W (SW configurable)
- 70MHz 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 AWS 1-3 band
- Selection of MIMO configuration (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through 4Tx MIMO
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall

Features & Performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R selectable by SW)
Frequency band	AWS 1-3, B4/B66a DL: 2110-2180 MHz / UL: 1710-1780 MHz
Instantaneous bandwidth - #carriers	70 MHz – 4 LTE MIMO carriers (in 70 MHz occupied bandwidth)
LTE carrier bandwidth	5, 10, 15, 20 MHz
RF output power	2x90W or 4x45W (selectable by SW)
Noise figure – RX Diversity scheme Receiver Sensivity (FRC A1-3)	2 dB typical (<2.5 dB max) – 2 or 4 way Rx diversity -104.5 dBm maximum
Sizes (HxWxD) in mm (in.) Volume in Liters Weight in kg (lb) (w/o mounting HW)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield) 35.5 (with solar shield) 29.7 (without solar shield) 25.8kg (56.8lb) (with solar shield)
DC voltage range DC power consumption	Nominal: -48V, -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 750W typical @100% RF load (in 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) UL50E Type 4 Enclosure 250N (56lb) Frontal/150N (34lb) Lateral
Antenna ports	4 ports 4.3-10 female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate 7, 9.8 Gbps) SFP: SMDF (HW supports also SMSF and MMDF)
AISG interfaces	1 AISG 2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-487 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27 / FCC Part 15 / GR-3178-CORE

Alcatel·Lucent

Product Data Sheet HB158-1-08U8-S8J18

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

Product Description

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

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

Figure 1: HYBRIFLEX Series

Features/Benefits

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

Technical Specifications

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

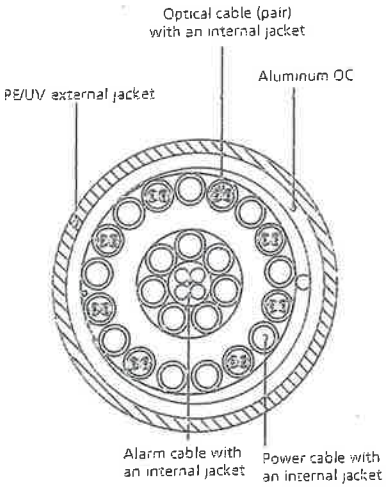


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Wethersfield 3								
Tower Height: 180Ft.								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*Town of Weths	1	64	167	866.01	0.0009	0.5773	0.02%	
*Town of Weths	1	204	187.25	460.25	0.0022	0.3068	0.07%	
*Town of Weths	1	100	190	140	0.0011	0.2000	0.05%	
*Town of Weths	1	100	151.5	18000	0.0017	1.0000	0.02%	
*Town of Weths	1	100	155.5	18000	0.0016	1.0000	0.02%	
*Clearwire	2	153	165	2496	0.0044	1.0000	0.04%	
*Clearwire	1	211	167	11 GHz	0.0029	1.0000	0.03%	
*AT&T	2	664	140	850	0.0266	0.5667	0.47%	
*AT&T	2	1672	140	2300	0.0670	1.0000	0.67%	
*AT&T	2	711	140	1900	0.0285	1.0000	0.28%	
*AT&T	2	414	140	850	0.0166	0.5667	0.29%	
*AT&T	2	656	140	1900	0.0263	1.0000	0.26%	
*AT&T	2	1239	140	700	0.0496	0.4667	1.06%	
*AT&T	2	1876	140	1900	0.0751	1.0000	0.75%	
*Sprint	4	693	123	1900	0.0728	1.0000	0.73%	
*Sprint	1	390	123	850	0.0102	0.5667	0.18%	
*Sprint	2	693	123	2500	0.0364	1.0000	0.36%	
*Nextel	12	100	74	851	0.0933	0.5673	1.65%	
*T-Mobile	2	315	151	1950	0.0108	1.0000	0.11%	
*T-Mobile	4	157	151	2100	0.0107	1.0000	0.11%	
*T-Mobile	1	470	151	700	0.0080	0.4667	0.17%	
Verizon PCS	**1**	**5000**	**130**	**0.1064**	**1970**	**1.0000**	**10.64%**	
Verizon Cellular	**9**	**397**	**130**	**0.0760**	**869**	**0.5793**	**13.12%**	
Verizon AWS	**1**	**7400**	**130**	**0.1574**	**2145**	**1.0000**	**15.74%**	
Verizon 700	**1**	**2200**	**130**	**0.0468**	**746**	**0.4973**	**9.41%**	
								56.26%
* Source: Siting Council								

ATTACHMENT 3

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

180-ft Existing FWT Monopole

Proposed Verizon Wireless
Antenna Upgrade

Verizon Site Ref: Wethersfield 3

23 Kelleher Court
Wethersfield, CT

Centek Project No. 15001.063

~~Date: July 22, 2015~~
~~Rev 1: November 8, 2016~~
~~Rev 2: November 14, 2016~~
Rev 3: November 15, 2016

Prepared for:
Verizon Wireless
99 East River Road, 9th Floor
East Hartford, CT 06108

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by Verizon on the existing monopole (tower) located in Wethersfield, CT.

The host tower is a 180-ft tall, four-section, eighteen sided, tapered monopole, originally designed and manufactured by FWT job no; J060713001, dated July 18, 2006. The tower geometry, structure member sizes and foundation system information were obtained from the aforementioned tower design documents. This analysis takes into account baseplate reinforcements designed by Raymaker for Sprint, job no. 28752, dated October 8, 2014.

Antenna and appurtenance information were obtained from a previous structural report prepared by EBI Consulting job no; 8114000824 dated March 20, 2015, visual verification from grade by Centek personnel on July 21, 2015 and a Verizon RF data sheet.

The tower is made up of four (4) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 23.10-in at the top and 69.23-in at the base.

Verizon proposes the removal of six (6) panel antennas and three (3) RRHs and the installation of six (6) panel antennas, nine (9) RRHs and one (1) main distribution box mounted to the existing low profile platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (Existing):
  Antennas: Three (3) 10' omni-directional whips, two (2) Sinclair SC473-HF1LDF omni-directional whips, one (1) db Spectra DS4C03F36U-D omni-directional whip, one (1) tower top amplifier and one (1) filter box mounted on three (3) T-Arms with an elevation of 179-ft above exiting grade.
  Coax Cables: Four (4) 1/2", one (1) 5/8", one (1) 7/8" and one (1) 1-5/8" ∅ coax cables running on the inside of the existing tower. One (1) 1/2", two (2) 7/8" and one (1) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
- SPRINT (Existing):
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) Powerwave P40-16-XLHPP-RR-A panel antenna, three (3) RFS APXVTM14 panel antennas, three (3) 1900 RRH's, three (3) 800 RRH's and three (3) RRH8x20 mounted on three (3) T-Arms with a RAD center elevation of 173.5-ft above exiting grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing tower and four (4) 1-1/4" ∅ fiber cables running on the exterior of the existing tower.
- TOWN (Existing):
  Antennas: One (1) 2' ∅ dish w/ radome flush mounted with a RAD center elevation of 163.5-ft above exiting grade.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on the inside of the existing tower.

- T-MOBILE (Existing):
  Antennas: Three (3) Andrew SBNHH-1D65C panel antennas, six (6) AIR21 panel antennas, three (3) Ericsson RRUS-11 remote radio heads and three (3) TMA's mounted to three (3) T-Arms with a RAD center elevation of 151-ft above exiting grade.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables (twelve (12) running on the inside of the existing tower and six (6) running on the exterior of the existing tower). One (1) 1-5/8" ∅ fiber cable running on the exterior of the existing tower.
- TOWN (Existing):
  Antennas: One (1) 2' ∅ dish w/ radome flush mounted with a RAD center elevation of 148-ft above exiting grade.
  Coax Cables: One (1) 1-5/8" ∅ coax cable running on the inside of the existing tower.
- AT&T (Existing):
  Antennas: Six (6) Ericsson RRUS-11 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestors on one (1) universal tri-bracket with a RAD center elevation of 142-ft above exiting grade.
- AT&T (Existing):
  Antennas: Six (6) Powerwave 7770 panel antennas, one (1) Andrew SBNH-1D6565C panel antenna, one (1) Powerwave P65-17-XLH-RR panel antenna, one (1) KMW AM-X-CD-16-65-00T-RET panel antenna and twelve (12) LGP21401 TMA's mounted to three (3) T-Arms with grating with a RAD center elevation of 140-ft above exiting grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber cable and two (2) DC cables running on the inside of the existing tower.
- TOWN (Existing):
  Antennas: Five (5) GPS antennas flush mounted with a RAD center elevation of 50-ft above exiting grade.
  Coax Cables: Five (5) LMR-400 cables running on the exterior of the existing tower.
- VERIZON WIRELESS (Existing to Remain):
  Antennas: Three (3) Antel BXA-70063-6CF panel antennas, three (3) Antel BXA-70063-4CF panel antennas and one (1) RFS DB-T1-6Z-8AB-0Z main distribution box mounted to one (1) low profile platform with a RAD center elevation of 130-ft above exiting grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower and one (1) 1-5/8" ∅ fiber cable running on the exterior of the existing tower.
- VERIZON WIRELESS (Existing to Remove):
  Antennas: Three (3) RYMSA MG D3-800T0 panel antennas, three (3) BXA-171063-12CF panel antennas and three (3) Alcatel-Lucent RRH2x40-AWS Remote Radio Heads mounted to one (1) low profile platform with a RAD center elevation of 130-ft above exiting grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables on the exterior of the existing tower.

- **VERIZON (Proposed):**
  Antennas: Six (6) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads and one (1) RFS DB-T1-6Z-8AB-0Z main distribution mounted to one (1) low profile platform with a RAD center elevation of 130-ft above exiting grade.
  Coax Cables: One (1) 1-5/8" ∅ fiber cable running on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 90-105 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Wethersfield; v = 97 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 4-8 of the TIA code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **74.2%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L4)	0.00'-45.50'	74.2%	**PASS**

Foundation and Anchors

The existing foundation consists of a 8.5-ft square x 4.5-ft long reinforced concrete pier on a 30.0-ft square x 2.5-ft thick reinforce concrete pad. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned original design documents by FWT job no; J060713001, dated July 18, 2006. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 6-ft into the concrete foundation structure. The baseplate was reinforced with (16) stiffener plates per design drawings prepared by Raymaker for Sprint, job no. 28752, dated October 8, 2014.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	42 kips
	Compression	66 kips
	Moment	4870 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[1]	Proposed Loading (FS)[1]	Result
Reinforced Concrete Pad and Pier	OTM[2]	1.0	2.13	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Shear	77.6%	**PASS**
Base Plate	Bending	36.7%	**PASS**

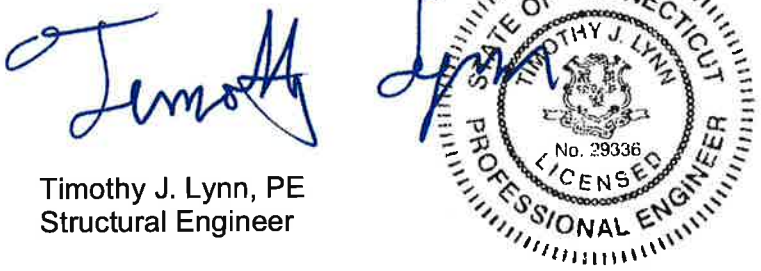
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration.

The analysis is based, in part, on the information provided to this office by Verizon Wireless. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

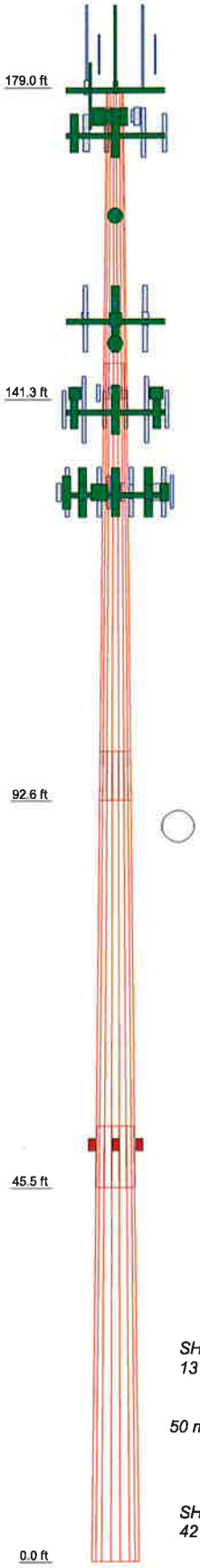
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

General Description of Structural Analysis Program

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



Section	1	2	3	4
Length (ft)	37.75	53.00	53.00	53.00
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3750	0.3750	0.3750
Socket Length (ft)	4.33	5.92	7.50	
Top Dia (in)	23.1000	31.5841	43.4931	54.9756
Bot Dia (in)	33.2490	45.8340	57.7420	69.2250
Grade	A572-65			
Weight (K)	2.8	8.2	10.8	13.2

Total Weight: 35.1

ALL REACTIONS ARE FACTORED

AXIAL 147 K

SHEAR 13 K

MOMENT 1602 kip-ft

TORQUE 1 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 66 K

SHEAR 42 K

MOMENT 4870 kip-ft

TORQUE 2 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' x 3" Dia Omni (Town - Existing)	179	Valmont Uni-Tri Bracket (ATI - Existing)	142
10' x 3" Dia Omni (Town - Existing)	179	SBNH-1D6565C (ATI - Existing)	140
10' x 3" Dia Omni (Town - Existing)	179	P65-17-XLH-RR (ATI - Existing)	140
SC473-HF1LDF (Town - Existing)	179	AM-X-CD-16-65-00T-RET(72") (ATI - Existing)	140
SC473-HF1LDF (Town - Existing)	179	(2) 7770.00 (ATI - Existing)	140
Filter Box (Town - Existing)	179	(4) LPG21401 TMA (ATI - Existing)	140
Tower Top Amplifier (Town - Existing)	179	(4) LPG21401 TMA (ATI - Existing)	140
Valmont T-Arm (3) (Town - Existing)	179	(4) LPG21401 TMA (ATI - Existing)	140
FD-RRH 4x45 1900 (Sprint - Existing)	175.5	Valmont T-Arm w/ Grating (3) (ATI - Existing)	140
FD-RRH 4x45 1900 (Sprint - Existing)	175.5	(2) 7770.00 (ATI - Existing)	140
FD-RRH 4x45 1900 (Sprint - Existing)	175.5	(2) 7770.00 (ATI - Existing)	140
FD-RRH 2x50 800 (Sprint - Existing)	175.5	SBNHH-1D65B (Verizon - Proposed)	130
FD-RRH 2x50 800 (Sprint - Existing)	175.5	BXA-70063/4CF (Verizon - Existing)	130
FD-RRH 2x50 800 (Sprint - Existing)	175.5	SBNHH-1D65B (Verizon - Proposed)	130
Valmont Uni-Tri Bracket (Sprint - Existing)	175.5	BXA-70063/6CF (Verizon - Existing)	130
TD-RRH8x20-25 (Sprint - Existing)	175.5	SBNHH-1D65B (Verizon - Proposed)	130
TD-RRH8x20-25 (Sprint - Existing)	175.5	BXA-70063/4CF (Verizon - Existing)	130
TD-RRH8x20-25 (Sprint - Existing)	175.5	SBNHH-1D65B (Verizon - Proposed)	130
DS4C03F36U-D (Town - Existing)	175	BXA-70063/6CF (Verizon - Existing)	130
APXVTM14 (Sprint - Existing)	173.5	SBNHH-1D65B (Verizon - Proposed)	130
APXVTM14 (Sprint - Existing)	173.5	BXA-70063/4CF (Verizon - Existing)	130
APXVTM14 (Sprint - Existing)	173.5	RRH4x45/2x90-AWS (Verizon - Proposed)	130
APXVSPP18-C-A20 (Sprint - Existing)	173.5	RRH4x45/2x90-AWS (Verizon - Proposed)	130
APXVSPP18-C-A20 (Sprint - Existing)	173.5	RRH4x45/2x90-AWS (Verizon - Proposed)	130
P40-16-XLPP-RR-A (Sprint - Existing)	173.5	RRH2x60-07-U (Verizon - Proposed)	130
Valmont T-Arm (3) (Sprint - Existing)	173.5	RRH2x60-07-U (Verizon - Proposed)	130
Andrew 2' w/Radome (Town - Existing)	163.5	RRH2x60-07-U (Verizon - Proposed)	130
(2) AIR21 (T-Mobile - Existing)	151	RRH2x60-PCS (Verizon - Proposed)	130
(2) AIR21 (T-Mobile - Existing)	151	RRH2x60-PCS (Verizon - Proposed)	130
TMA 10"x8"x3" (T-Mobile - Existing)	151	RRH2x60-PCS (Verizon - Proposed)	130
TMA 10"x8"x3" (T-Mobile - Existing)	151	DB-T1-6Z-8AB-0Z (Verizon - Existing)	130
TMA 10"x8"x3" (T-Mobile - Existing)	151	DB-T1-6Z-8AB-0Z (Verizon - Proposed)	130
SBNHH-1D65C (T-Mobile - Existing)	151	Valmont 13' Low Profile Platform (Verizon - Existing)	130
SBNHH-1D65C (T-Mobile - Existing)	151	SBNHH-1D65B (Verizon - Proposed)	130
SBNHH-1D65C (T-Mobile - Existing)	151	BXA-70063/6CF (Verizon - Existing)	130
RRUS-11 (T-Mobile - Existing)	151	GPS (Town - Existing)	50
RRUS-11 (T-Mobile - Existing)	151	(2) GPS (Town - Existing)	50
RRUS-11 (T-Mobile - Existing)	151	(2) GPS (Town - Existing)	50
Valmont T-Arm (3) (T-Mobile - Existing)	151		
(2) AIR21 (T-Mobile - Existing)	151		
Andrew 2' w/Radome (Town - Existing)	148		
(2) RRUS-11 (ATI - Existing)	142		
(2) RRUS-11 (ATI - Existing)	142		
(2) RRUS-11 (ATI - Existing)	142		
DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	142		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 74.2%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 15001.063 - Wethersfield 3		
Project: 179' FWT Monopole - 23 Kelleher Court Wethersfield,		
Client: Verizon Wireless	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 11/15/16	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

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

Basic wind speed of 97 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
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		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification		Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz		Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

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	179.00-141.25	37.75	4.33	18	23.1000	33.2490	0.2500	1.0000	A572-65 (65 ksi)
L2	141.25-92.58	53.00	5.92	18	31.5841	45.8340	0.3750	1.5000	A572-65

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
L3	92.58-45.50	53.00	7.50	18	43.4931	57.7420	0.3750	1.5000	(65 ksi) A572-65 (65 ksi)
L4	45.50-0.00	53.00		18	54.9756	69.2250	0.3750	1.5000	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	23.4564	18.1315	1196.0325	8.1118	11.7348	101.9219	2393.6388	9.0675	3.6256	14.502
	33.7619	26.1847	3602.3567	11.7146	16.8905	213.2772	7209.4536	13.0948	5.4118	21.647
L2	33.2543	37.1466	4571.0783	11.0792	16.0447	284.8962	9148.1714	18.5768	4.8988	13.063
	46.5411	54.1076	14126.5228	16.1379	23.2837	606.7137	28271.6336	27.0589	7.4068	19.751
L3	45.7794	51.3213	12054.6618	15.3069	22.0945	545.5955	24125.1854	25.6655	6.9948	18.653
	58.6328	68.2811	28389.7820	20.3653	29.3329	967.8466	56816.9200	34.1470	9.5026	25.34
L4	57.8713	64.9884	24477.6125	19.3832	27.9276	876.4658	48987.4332	32.5004	9.0157	24.042
	70.2929	81.9487	49078.0698	24.4417	35.1663	1395.5995	98220.7178	40.9821	11.5236	30.73

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	Double Angle Stitch Bolt Spacing Redundants in
L1 179.00-141.25				1	1	1			
L2 141.25-92.58				1	1	1			
L3 92.58-45.50				1	1	1			
L4 45.50-0.00				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
1 5/8 (Sprint - Existing)	A	No	Inside Pole	173.50 - 6.00	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8 (T-Mobile - Existing)	B	No	Inside Pole	151.00 - 3.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8 (AT&T - Existing)	C	No	Inside Pole	140.00 - 10.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8 (Verizon - Existing)	A	No	Inside Pole	130.00 - 10.00	12	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1/2 (Town - Existing)	B	No	Inside Pole	179.00 - 10.00	4	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
5/8	C	No	Inside Pole	179.00 - 10.00	1	No Ice	0.00	0.40

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
(Town - Existing)						1/2" Ice	0.00	0.40
						1" Ice	0.00	0.40
7/8	C	No	Inside Pole	179.00 - 10.00	1	No Ice	0.00	0.54
(Town - Existing)						1/2" Ice	0.00	0.54
						1" Ice	0.00	0.54
1 5/8	C	No	Inside Pole	179.00 - 10.00	1	No Ice	0.00	1.04
(Town - Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	163.50 - 10.00	1	No Ice	0.00	1.04
(Town - Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	148.00 - 10.00	1	No Ice	0.00	1.04
(Town - Existing)						1/2" Ice	0.00	1.04
						1" Ice	0.00	1.04
RG6-Fiber	C	No	Inside Pole	140.00 - 10.00	1	No Ice	0.00	1.00
(AT&T - Existing)						1/2" Ice	0.00	1.00
						1" Ice	0.00	1.00
#8 AWG Copper WIre	C	No	Inside Pole	140.00 - 10.00	2	No Ice	0.00	0.05
(AT&T - Existing)						1/2" Ice	0.00	0.05
						1" Ice	0.00	0.05
1 5/8	B	No	CaAa (Out Of Face)	151.00 - 10.00	2	No Ice	0.20	1.04
(T-Mobile - Existing)						1/2" Ice	0.30	2.55
						1" Ice	0.40	4.68
1 5/8	B	No	CaAa (Out Of Face)	151.00 - 10.00	4	No Ice	0.00	1.04
(T-Mobile - Existing)						1/2" Ice	0.00	2.55
						1" Ice	0.00	4.68
HYBRIFLEX 1-1/4"	C	No	CaAa (Out Of Face)	173.50 - 10.00	2	No Ice	0.15	1.30
(Sprint - Existing)						1/2" Ice	0.25	2.55
						1" Ice	0.35	4.40
HYBRIFLEX 1-1/4"	C	No	CaAa (Out Of Face)	173.50 - 10.00	2	No Ice	0.00	1.30
(Sprint - Existing)						1/2" Ice	0.00	2.55
						1" Ice	0.00	4.40
HYBRIFLEX 1-5/8"	A	No	CaAa (Out Of Face)	130.00 - 10.00	1	No Ice	0.20	1.90
(Verizon - Existing)						1/2" Ice	0.30	3.41
						1" Ice	0.40	5.54
HYBRIFLEX 1-5/8"	A	No	CaAa (Out Of Face)	130.00 - 10.00	1	No Ice	0.00	1.90
(Verizon - Proposed)						1/2" Ice	0.00	3.41
						1" Ice	0.00	5.54
1/2	B	No	CaAa (Out Of Face)	179.00 - 10.00	1	No Ice	0.00	0.25
(Town - Existing)						1/2" Ice	0.00	0.91
						1" Ice	0.00	2.18
7/8	B	No	CaAa (Out Of Face)	179.00 - 10.00	2	No Ice	0.00	0.54
(Town - Existing)						1/2" Ice	0.00	1.52
						1" Ice	0.00	3.12
1 5/8	B	No	CaAa (Out Of Face)	179.00 - 10.00	1	No Ice	0.00	1.04
(Town - Existing)						1/2" Ice	0.00	2.55
						1" Ice	0.00	4.68
HYBRIFLEX 1-5/8"	B	No	CaAa (Out Of Face)	151.00 - 10.00	1	No Ice	0.00	1.90
(T-Mobile - Existing)						1/2" Ice	0.00	3.41
						1" Ice	0.00	5.54
LMR-400 (13/32 FOAM)	C	No	CaAa (Out Of Face)	50.00 - 0.00	5	No Ice	0.00	0.07
(Town - Existing)						1/2" Ice	0.00	0.63
						1" Ice	0.00	1.79

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	179.00-141.25	A	0.000	0.000	0.000	0.000	0.20
		B	0.000	0.000	0.000	3.861	0.33
		C	0.000	0.000	0.000	9.933	0.27
L2	141.25-92.58	A	0.000	0.000	0.000	7.409	0.91
		B	0.000	0.000	0.000	19.272	1.17
		C	0.000	0.000	0.000	14.989	1.09
L3	92.58-45.50	A	0.000	0.000	0.000	9.322	1.06
		B	0.000	0.000	0.000	18.645	1.13
		C	0.000	0.000	0.000	14.501	1.08
L4	45.50-0.00	A	0.000	0.000	0.000	7.029	0.82
		B	0.000	0.000	0.000	14.058	0.94
		C	0.000	0.000	0.000	10.934	0.83

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	179.00-141.25	A	2.341	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	12.990	2.85
		C		0.000	0.000	0.000	40.129	1.79
L2	141.25-92.58	A	2.268	0.000	0.000	0.000	24.925	1.89
		B		0.000	0.000	0.000	64.839	7.72
		C		0.000	0.000	0.000	60.557	3.39
L3	92.58-45.50	A	2.152	0.000	0.000	0.000	30.677	2.22
		B		0.000	0.000	0.000	61.354	7.11
		C		0.000	0.000	0.000	57.211	3.35
L4	45.50-0.00	A	1.922	0.000	0.000	0.000	22.308	1.62
		B		0.000	0.000	0.000	44.616	5.02
		C		0.000	0.000	0.000	41.493	3.86

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	179.00-141.25	-0.1709	0.2472	-0.5112	0.6237
L2	141.25-92.58	0.0895	0.2278	0.0550	0.5461
L3	92.58-45.50	0.0933	0.1884	0.0620	0.4944
L4	45.50-0.00	0.0760	0.1535	0.0568	0.4356

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert / ft / ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
10' x 3" Dia Omni	A	From Face	3.00	0.0000	179.00	No Ice	3.00	3.00	0.03
(Town - Existing)			0.00			1/2" Ice	4.03	4.03	0.05
			5.00			1" Ice	5.03	5.03	0.08
10' x 3" Dia Omni	B	From Face	3.00	0.0000	179.00	No Ice	3.00	3.00	0.03
(Town - Existing)			0.00			1/2" Ice	4.03	4.03	0.05
			5.00			1" Ice	5.03	5.03	0.08
10' x 3" Dia Omni	C	From Face	3.00	0.0000	179.00	No Ice	3.00	3.00	0.03
(Town - Existing)			0.00			1/2" Ice	4.03	4.03	0.05
			5.00			1" Ice	5.03	5.03	0.08
SC473-HF1LDF	A	From Face	3.00	0.0000	179.00	No Ice	1.44	1.44	0.02
(Town - Existing)			3.00			1/2" Ice	1.74	1.74	0.03
			4.00			1" Ice	2.05	2.05	0.05
SC473-HF1LDF	B	From Face	3.00	0.0000	179.00	No Ice	1.44	1.44	0.02
(Town - Existing)			3.00			1/2" Ice	1.74	1.74	0.03
			4.00			1" Ice	2.05	2.05	0.05
DS4C03F36U-D	C	From Face	3.00	0.0000	175.00	No Ice	2.40	2.40	0.03
(Town - Existing)			3.00			1/2" Ice	3.19	3.19	0.04
			3.00			1" Ice	3.67	3.67	0.07
Filter Box	C	From Face	3.00	0.0000	179.00	No Ice	0.92	0.64	0.02
(Town - Existing)			0.00			1/2" Ice	1.05	0.77	0.02
			0.00			1" Ice	1.19	0.90	0.03
Tower Top Amplifier	A	From Face	3.00	0.0000	179.00	No Ice	2.67	1.03	0.04
(Town - Existing)			0.00			1/2" Ice	2.87	1.17	0.06
			0.00			1" Ice	3.08	1.32	0.08
Valmont T-Arm (3)	C	None		0.0000	179.00	No Ice	21.00	21.00	1.01
(Town - Existing)						1/2" Ice	29.00	29.00	1.24
						1" Ice	37.00	37.00	1.46
P40-16-XLPP-RR-A	A	From Face	3.00	0.0000	173.50	No Ice	9.07	3.52	0.05
(Sprint - Existing)			0.00			1/2" Ice	9.47	3.87	0.11
			0.00			1" Ice	9.87	4.22	0.16
APXVSPP18-C-A20	B	From Face	3.00	0.0000	173.50	No Ice	8.02	5.28	0.06
(Sprint - Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSPP18-C-A20	C	From Face	3.00	0.0000	173.50	No Ice	8.02	5.28	0.06
(Sprint - Existing)			0.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
FD-RRH 4x45 1900	A	From Face	1.00	0.0000	175.50	No Ice	2.32	2.38	0.06
(Sprint - Existing)			-1.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	B	From Face	1.00	0.0000	175.50	No Ice	2.32	2.38	0.06
(Sprint - Existing)			-1.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	C	From Face	1.00	0.0000	175.50	No Ice	2.32	2.38	0.06
(Sprint - Existing)			-1.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 2x50 800	A	From Face	1.00	0.0000	175.50	No Ice	2.06	1.93	0.06
(Sprint - Existing)			1.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Face	1.00	0.0000	175.50	No Ice	2.06	1.93	0.06
(Sprint - Existing)			1.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	C	From Face	1.00	0.0000	175.50	No Ice	2.06	1.93	0.06
(Sprint - Existing)			1.00			1/2" Ice	2.24	2.11	0.09
			0.00			1" Ice	2.43	2.29	0.11
Valmont Uni-Tri Bracket	A	From Face	0.00	0.0000	175.50	No Ice	1.75	1.75	0.29
(Sprint - Existing)			0.00			1/2" Ice	1.94	1.94	0.31

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" Ice	2.13	2.13	0.32
APXVTM14	A	From Face	3.00	0.0000	173.50	No Ice	6.34	3.61	0.06
(Sprint - Existing)			5.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Face	3.00	0.0000	173.50	No Ice	6.34	3.61	0.06
(Sprint - Existing)			5.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Face	3.00	0.0000	173.50	No Ice	6.34	3.61	0.06
(Sprint - Existing)			5.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
TD-RRH8x20-25	A	From Face	1.00	0.0000	175.50	No Ice	4.05	1.53	0.07
(Sprint - Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Face	1.00	0.0000	175.50	No Ice	4.05	1.53	0.07
(Sprint - Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Face	1.00	0.0000	175.50	No Ice	4.05	1.53	0.07
(Sprint - Existing)			2.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
Valmont T-Arm (3)	C	None		0.0000	173.50	No Ice	21.00	21.00	1.01
(Sprint - Existing)						1/2" Ice	29.00	29.00	1.24
						1" Ice	37.00	37.00	1.46
(2) AIR21	A	From Face	3.00	0.0000	151.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
(2) AIR21	B	From Face	3.00	0.0000	151.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
(2) AIR21	C	From Face	3.00	0.0000	151.00	No Ice	6.53	4.36	0.08
(T-Mobile - Existing)			0.00			1/2" Ice	6.98	4.77	0.12
			0.00			1" Ice	7.43	5.20	0.17
TMA 10"x8"x3"	A	From Face	3.00	0.0000	151.00	No Ice	0.67	0.26	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	B	From Face	3.00	0.0000	151.00	No Ice	0.67	0.26	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	C	From Face	3.00	0.0000	151.00	No Ice	0.67	0.26	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
SBNHH-1D65C	A	From Face	3.00	0.0000	151.00	No Ice	11.45	7.70	0.05
(T-Mobile - Existing)			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
SBNHH-1D65C	B	From Face	3.00	0.0000	151.00	No Ice	11.45	7.70	0.05
(T-Mobile - Existing)			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
SBNHH-1D65C	C	From Face	3.00	0.0000	151.00	No Ice	11.45	7.70	0.05
(T-Mobile - Existing)			0.00			1/2" Ice	12.06	8.29	0.12
			0.00			1" Ice	12.69	8.89	0.19
RRUS-11	A	From Face	3.00	0.0000	151.00	No Ice	2.57	1.07	0.05
(T-Mobile - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	B	From Face	3.00	0.0000	151.00	No Ice	2.57	1.07	0.05
(T-Mobile - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Face	3.00	0.0000	151.00	No Ice	2.57	1.07	0.05
(T-Mobile - Existing)			0.00			1/2" Ice	2.76	1.21	0.07

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" Ice	2.97	1.36	0.09
Valmont T-Arm (3)	C	None		0.0000	151.00	No Ice	21.00	21.00	1.01
(T-Mobile - Existing)						1/2" Ice	29.00	29.00	1.24
						1" Ice	37.00	37.00	1.46
(2) 7770.00	A	From Face	3.00	0.0000	140.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(2) 7770.00	B	From Face	3.00	0.0000	140.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(2) 7770.00	C	From Face	3.00	0.0000	140.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			0.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(4) LPG21401 TMA	A	From Face	3.00	0.0000	140.00	No Ice	0.00	0.37	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.00	0.48	0.02
			0.00			1" Ice	1.24	0.60	0.03
(4) LPG21401 TMA	B	From Face	3.00	0.0000	140.00	No Ice	0.00	0.37	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.00	0.48	0.02
			0.00			1" Ice	1.24	0.60	0.03
(4) LPG21401 TMA	C	From Face	3.00	0.0000	140.00	No Ice	0.00	0.37	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.00	0.48	0.02
			0.00			1" Ice	1.24	0.60	0.03
Valmont T-Arm w/ Grating (3)	C	None		0.0000	140.00	No Ice	25.00	25.00	1.30
						1/2" Ice	34.00	34.00	1.70
(AT&T - Existing)						1" Ice	43.00	43.00	2.10
SBNH-1D6565C	A	From Face	3.00	0.0000	140.00	No Ice	11.41	7.70	0.06
(AT&T - Existing)			0.00			1/2" Ice	12.03	8.29	0.13
			0.00			1" Ice	12.65	8.89	0.20
P65-17-XLH-RR	B	From Face	3.00	0.0000	140.00	No Ice	11.47	6.80	0.06
(AT&T - Existing)			0.00			1/2" Ice	12.08	7.38	0.12
			0.00			1" Ice	12.71	7.98	0.19
AM-X-CD-16-65-00T-RET(72")	C	From Face	3.00	0.0000	140.00	No Ice	8.02	4.64	0.05
			0.00			1/2" Ice	8.48	5.09	0.10
(AT&T - Existing)			0.00			1" Ice	8.94	5.54	0.15
(2) RRUS-11	A	From Face	1.00	0.0000	142.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-11	B	From Face	1.00	0.0000	142.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
(2) RRUS-11	C	From Face	1.00	0.0000	142.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			0.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
DC6-48-60-18-8F Surge Arrestor	A	From Face	1.00	0.0000	142.00	No Ice	1.91	1.91	0.02
			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T - Existing)			0.00			1" Ice	2.29	2.29	0.06
Valmont Uni-Tri Bracket	A	From Face	0.00	0.0000	142.00	No Ice	1.75	1.75	0.29
(AT&T - Existing)			0.00			1/2" Ice	1.94	1.94	0.31
			0.00			1" Ice	2.13	2.13	0.32
SBNHH-1D65B	A	From Face	3.00	0.0000	130.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/6CF	A	From Face	3.00	0.0000	130.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65B	A	From Face	3.00	0.0000	130.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			4.00			1/2" Ice	8.53	5.79	0.09

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" Ice	9.00	6.26	0.15
BXA-70063/4CF	A	From Face	3.00	0.0000	130.00	No Ice	4.71	2.44	0.01
(Verizon - Existing)			6.00			1/2" Ice	5.03	2.74	0.04
			0.00			1" Ice	5.35	3.05	0.07
SBNHH-1D65B	B	From Face	3.00	0.0000	130.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/6CF	B	From Face	3.00	0.0000	130.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65B	B	From Face	3.00	0.0000	130.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/4CF	B	From Face	3.00	0.0000	130.00	No Ice	4.71	2.44	0.01
(Verizon - Existing)			6.00			1/2" Ice	5.03	2.74	0.04
			0.00			1" Ice	5.35	3.05	0.07
SBNHH-1D65B	C	From Face	3.00	0.0000	130.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			-4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/6CF	C	From Face	3.00	0.0000	130.00	No Ice	7.57	4.16	0.01
(Verizon - Existing)			0.00			1/2" Ice	8.02	4.60	0.05
			0.00			1" Ice	8.47	5.04	0.10
SBNHH-1D65B	C	From Face	3.00	0.0000	130.00	No Ice	8.08	5.34	0.04
(Verizon - Proposed)			4.00			1/2" Ice	8.53	5.79	0.09
			0.00			1" Ice	9.00	6.26	0.15
BXA-70063/4CF	C	From Face	3.00	0.0000	130.00	No Ice	4.71	2.44	0.01
(Verizon - Existing)			6.00			1/2" Ice	5.03	2.74	0.04
			0.00			1" Ice	5.35	3.05	0.07
RRH4x45/2x90-AWS	A	From Face	3.00	0.0000	130.00	No Ice	2.58	1.69	0.08
(Verizon - Proposed)			-6.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	B	From Face	3.00	0.0000	130.00	No Ice	2.58	1.69	0.08
(Verizon - Proposed)			-6.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	C	From Face	3.00	0.0000	130.00	No Ice	2.58	1.69	0.08
(Verizon - Proposed)			-6.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH2x60-07-U	A	From Face	3.00	0.0000	130.00	No Ice	2.10	1.41	0.05
(Verizon - Proposed)			-4.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-07-U	B	From Face	3.00	0.0000	130.00	No Ice	2.10	1.41	0.05
(Verizon - Proposed)			-4.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-07-U	C	From Face	3.00	0.0000	130.00	No Ice	2.10	1.41	0.05
(Verizon - Proposed)			-4.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-PCS	A	From Face	3.00	0.0000	130.00	No Ice	2.15	1.35	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	B	From Face	3.00	0.0000	130.00	No Ice	2.15	1.35	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Face	3.00	0.0000	130.00	No Ice	2.15	1.35	0.06
(Verizon - Proposed)			4.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
DB-T1-6Z-8AB-0Z	B	From Face	3.00	0.0000	130.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			2.00			1/2" Ice	5.07	2.19	0.08

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" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	C	From Face	3.00	0.0000	130.00	No Ice	4.80	2.00	0.04
(Verizon - Proposed)			2.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
Valmont 13' Low Profile	C	None		0.0000	130.00	No Ice	15.70	15.70	1.30
Platform						1/2" Ice	20.10	20.10	1.76
(Verizon - Existing)						1" Ice	24.50	24.50	2.23
(2) GPS	A	From Face	1.00	0.0000	50.00	No Ice	1.00	1.00	0.01
(Town - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
(2) GPS	B	From Face	1.00	0.0000	50.00	No Ice	1.00	1.00	0.01
(Town - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
GPS	C	From Face	1.00	0.0000	50.00	No Ice	1.00	1.00	0.01
(Town - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
Andrew 2' w/Radome		Paraboloid	None		Worst		163.50	2.00	No Ice	3.14	0.07
(Town - Existing)		w/Radome							1/2" Ice	3.41	0.28
									1" Ice	3.68	0.49
Andrew 2' w/Radome		Paraboloid	None		Worst		148.00	2.00	No Ice	3.14	0.07
(Town - Existing)		w/Radome							1/2" Ice	3.41	0.28
									1" Ice	3.68	0.49

Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	159.15	1.129	26	90.000	A	0.000	90.000	90.000	100.00	0.000	0.000
179.00-141.25					B	0.000	90.000		100.00	0.000	3.861
					C	0.000	90.000		100.00	0.000	9.933
L2	115.93	1.031	24	161.808	A	0.000	161.808	161.808	100.00	0.000	7.409
141.25-92.58					B	0.000	161.808		100.00	0.000	19.272
					C	0.000	161.808		100.00	0.000	14.989
L3 92.58-45.50	68.65	0.888	20	204.835	A	0.000	204.835	204.835	100.00	0.000	9.322
					B	0.000	204.835		100.00	0.000	18.645

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	204.835		100.00	0.000	14.501
L4 45.50-0.00	22.22	0.7	16	242.978	A	0.000	242.978	242.978	100.00	0.000	7.029
					B	0.000	242.978		100.00	0.000	14.058
					C	0.000	242.978		100.00	0.000	10.934

Tower Pressure - With Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	159.15	1.129	7	2.3408	104.727	A	0.000	104.727	104.727	100.00	0.000	0.000
179.00-141.25						B	0.000	104.727		100.00	0.000	12.990
						C	0.000	104.727		100.00	0.000	40.129
L2 141.25-92.58	115.93	1.031	6	2.2678	180.795	A	0.000	180.795	180.795	100.00	0.000	24.925
						B	0.000	180.795		100.00	0.000	64.839
						C	0.000	180.795		100.00	0.000	60.557
L3 92.58-45.50	68.65	0.888	5	2.1520	222.630	A	0.000	222.630	222.630	100.00	0.000	30.677
						B	0.000	222.630		100.00	0.000	61.354
						C	0.000	222.630		100.00	0.000	57.211
L4 45.50-0.00	22.22	0.7	4	1.9224	259.297	A	0.000	259.297	259.297	100.00	0.000	22.308
						B	0.000	259.297		100.00	0.000	44.616
						C	0.000	259.297		100.00	0.000	41.493

Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	159.15	1.129	9	90.000	A	0.000	90.000	90.000	100.00	0.000	0.000
179.00-141.25					B	0.000	90.000		100.00	0.000	3.861
					C	0.000	90.000		100.00	0.000	9.933
L2	115.93	1.031	8	161.808	A	0.000	161.808	161.808	100.00	0.000	7.409
141.25-92.58					B	0.000	161.808		100.00	0.000	19.272
					C	0.000	161.808		100.00	0.000	14.989
L3 92.58-45.50	68.65	0.888	7	204.835	A	0.000	204.835	204.835	100.00	0.000	9.322
					B	0.000	204.835		100.00	0.000	18.645
					C	0.000	204.835		100.00	0.000	14.501
L4 45.50-0.00	22.22	0.7	6	242.978	A	0.000	242.978	242.978	100.00	0.000	7.029
					B	0.000	242.978		100.00	0.000	14.058
					C	0.000	242.978		100.00	0.000	10.934

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	26	1	1	90.000	2.19	58.02	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	24	1	1	161.808	6.11	125.49	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	20	1	1	204.835	4.55	96.59	C
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	16	1	1	242.978	3.49	76.68	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	1446.33 kip-ft	16.33		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	26	1	1	90.000	2.19	58.02	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	24	1	1	161.808	6.11	125.49	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	20	1	1	204.835	4.55	96.59	C
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	16	1	1	242.978	3.49	76.68	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	1446.33 kip-ft	16.33		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	26	1	1	90.000	2.19	58.02	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	24	1	1	161.808	6.11	125.49	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	20	1	1	204.835	4.55	96.59	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	16	1	1	242.978	3.49	76.68	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	1446.33 kip-ft	16.33		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	26	1	1	90.000	2.19	58.02	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	24	1	1	161.808	6.11	125.49	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	20	1	1	204.835	4.55	96.59	C
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	16	1	1	242.978	3.49	76.68	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	1446.33 kip-ft	16.33		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	4.84	6.17	A	1	1.2	7	1	1	104.727	1.35	35.72	C
179.00-141.25			B	1	1.2		1	1	104.727			
			C	1	1.2		1	1	104.727			
L2	12.99	13.89	A	1	1.2	6	1	1	180.795	2.53	51.93	C
141.25-92.58			B	1	1.2		1	1	180.795			
			C	1	1.2		1	1	180.795			
L3	12.68	17.48	A	1	1.2	5	1	1	222.630	2.46	52.21	C
92.58-45.50			B	1	1.2		1	1	222.630			
			C	1	1.2		1	1	222.630			
L4 45.50-0.00	10.51	20.27	A	1	1.2	4	1	1	259.297	2.00	43.92	C
			B	1	1.2		1	1	259.297			
			C	1	1.2		1	1	259.297			
Sum Weight:	41.03	57.82						OTM	720.76 kip-ft	8.33		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	4.84	6.17	A	1	1.2	7	1	1	104.727	1.35	35.72	C
179.00-141.25			B	1	1.2		1	1	104.727			
			C	1	1.2		1	1	104.727			
L2	12.99	13.89	A	1	1.2	6	1	1	180.795	2.53	51.93	C
141.25-92.58			B	1	1.2		1	1	180.795			
			C	1	1.2		1	1	180.795			
L3	12.68	17.48	A	1	1.2	5	1	1	222.630	2.46	52.21	C
92.58-45.50			B	1	1.2		1	1	222.630			
			C	1	1.2		1	1	222.630			
L4 45.50-0.00	10.51	20.27	A	1	1.2	4	1	1	259.297	2.00	43.92	C
			B	1	1.2		1	1	259.297			
			C	1	1.2		1	1	259.297			
Sum Weight:	41.03	57.82						OTM	720.76 kip-ft	8.33		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	4.84	6.17	A	1	1.2	7	1	1	104.727	1.35	35.72	C
179.00-141.25			B	1	1.2		1	1	104.727			
			C	1	1.2		1	1	104.727			
L2	12.99	13.89	A	1	1.2	6	1	1	180.795	2.53	51.93	C
141.25-92.58			B	1	1.2		1	1	180.795			
			C	1	1.2		1	1	180.795			
L3	12.68	17.48	A	1	1.2	5	1	1	222.630	2.46	52.21	C
92.58-45.50			B	1	1.2		1	1	222.630			
			C	1	1.2		1	1	222.630			
L4 45.50-0.00	10.51	20.27	A	1	1.2	4	1	1	259.297	2.00	43.92	C
			B	1	1.2		1	1	259.297			
			C	1	1.2		1	1	259.297			
Sum Weight:	41.03	57.82						OTM	720.76 kip-ft	8.33		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	4.84	6.17	A	1	1.2	7	1	1	104.727	1.35	35.72	C
179.00-141.25			B	1	1.2		1	1	104.727			
			C	1	1.2		1	1	104.727			
L2	12.99	13.89	A	1	1.2	6	1	1	180.795	2.53	51.93	C
141.25-92.58			B	1	1.2		1	1	180.795			
			C	1	1.2		1	1	180.795			
L3	12.68	17.48	A	1	1.2	5	1	1	222.630	2.46	52.21	C
92.58-45.50			B	1	1.2		1	1	222.630			
			C	1	1.2		1	1	222.630			
L4 45.50-0.00	10.51	20.27	A	1	1.2	4	1	1	259.297	2.00	43.92	C
			B	1	1.2		1	1	259.297			
			C	1	1.2		1	1	259.297			
Sum Weight:	41.03	57.82						OTM	720.76 kip-ft	8.33		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	9	1	1	90.000	0.75	19.86	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	8	1	1	161.808	2.09	42.96	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	7	1	1	204.835	1.56	33.07	C
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	6	1	1	242.978	1.19	26.25	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	495.13 kip-ft	5.59		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	9	1	1	90.000	0.75	19.86	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	8	1	1	161.808	2.09	42.96	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	7	1	1	204.835	1.56	33.07	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	6	1	1	242.978	1.19	26.25	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	495.13 kip-ft	5.59		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	9	1	1	90.000	0.75	19.86	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	8	1	1	161.808	2.09	42.96	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	7	1	1	204.835	1.56	33.07	C
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	6	1	1	242.978	1.19	26.25	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	495.13 kip-ft	5.59		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.80	2.85	A	1	0.704	9	1	1	90.000	0.75	19.86	C
179.00-141.25			B	1	0.704		1	1	90.000			
			C	1	0.704		1	1	90.000			
L2	3.17	8.23	A	1	1.2	8	1	1	161.808	2.09	42.96	C
141.25-92.58			B	1	1.2		1	1	161.808			
			C	1	1.2		1	1	161.808			
L3	3.27	10.79	A	1	0.792	7	1	1	204.835	1.56	33.07	C
92.58-45.50			B	1	0.792		1	1	204.835			
			C	1	0.792		1	1	204.835			
L4 45.50-0.00	2.59	13.25	A	1	0.669	6	1	1	242.978	1.19	26.25	C
			B	1	0.669		1	1	242.978			
			C	1	0.669		1	1	242.978			
Sum Weight:	9.83	35.11						OTM	495.13 kip-ft	5.59		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	35.11					
Bracing Weight	0.00					
Total Member Self-Weight	35.11			1.17	-0.56	
Total Weight	55.24			1.17	-0.56	
Wind 0 deg - No Ice		-0.02	-26.15	-2924.57	4.33	0.04
Wind 30 deg - No Ice		13.08	-22.64	-2530.14	-1463.76	0.65
Wind 45 deg - No Ice		18.51	-18.48	-2064.18	-2072.37	0.91
Wind 60 deg - No Ice		22.68	-13.06	-1457.46	-2539.79	1.10
Wind 90 deg - No Ice		26.20	0.02	6.06	-2935.44	1.24
Wind 120 deg - No Ice		22.70	13.09	1468.27	-2544.69	1.06
Wind 135 deg - No Ice		18.54	18.50	2073.43	-2079.30	0.85
Wind 150 deg - No Ice		13.12	22.66	2537.37	-1472.24	0.59
Wind 180 deg - No Ice		0.02	26.15	2926.90	-5.46	-0.04
Wind 210 deg - No Ice		-13.08	22.64	2532.48	1462.64	-0.65
Wind 225 deg - No Ice		-18.51	18.48	2066.51	2071.25	-0.91
Wind 240 deg - No Ice		-22.68	13.06	1459.79	2538.67	-1.10
Wind 270 deg - No Ice		-26.20	-0.02	-3.73	2934.31	-1.24
Wind 300 deg - No Ice		-22.70	-13.09	-1465.94	2543.56	-1.06
Wind 315 deg - No Ice		-18.54	-18.50	-2071.10	2078.17	-0.85
Wind 330 deg - No Ice		-13.12	-22.66	-2535.04	1471.12	-0.59
Member Ice	22.71					
Total Weight Ice	133.72			22.91	-16.29	
Wind 0 deg - Ice		-0.01	-12.96	-1400.42	-14.78	-0.20
Wind 30 deg - Ice		6.48	-11.22	-1208.97	-727.97	0.47
Wind 45 deg - Ice		9.17	-9.16	-982.46	-1023.54	0.77
Wind 60 deg - Ice		11.23	-6.48	-687.44	-1250.47	1.01
Wind 90 deg - Ice		12.98	0.01	24.43	-1442.28	1.28
Wind 120 deg - Ice		11.24	6.49	735.89	-1251.99	1.21
Wind 135 deg - Ice		9.18	9.17	1030.43	-1025.69	1.05
Wind 150 deg - Ice		6.49	11.23	1256.31	-730.60	0.81
Wind 180 deg - Ice		0.01	12.96	1446.24	-17.81	0.20
Wind 210 deg - Ice		-6.48	11.22	1254.80	695.39	-0.47
Wind 225 deg - Ice		-9.17	9.16	1028.29	990.96	-0.77
Wind 240 deg - Ice		-11.23	6.48	733.27	1217.89	-1.01
Wind 270 deg - Ice		-12.98	-0.01	21.40	1409.70	-1.28
Wind 300 deg - Ice		-11.24	-6.49	-690.06	1219.41	-1.21
Wind 315 deg - Ice		-9.18	-9.17	-984.60	993.10	-1.05
Wind 330 deg - Ice		-6.49	-11.23	-1210.48	698.01	-0.81
Total Weight	55.24			1.17	-0.56	
Wind 0 deg - Service		-0.01	-8.95	-1001.81	2.33	-0.08
Wind 30 deg - Service		4.48	-7.75	-866.79	-500.25	-0.07
Wind 45 deg - Service		6.34	-6.33	-707.27	-708.60	-0.06
Wind 60 deg - Service		7.76	-4.47	-499.57	-868.62	-0.04
Wind 90 deg - Service		8.97	0.01	1.45	-1004.06	0.00
Wind 120 deg - Service		7.77	4.48	502.02	-870.29	0.04
Wind 135 deg - Service		6.35	6.33	709.19	-710.97	0.06
Wind 150 deg - Service		4.49	7.76	868.01	-503.16	0.07
Wind 180 deg - Service		0.01	8.95	1001.36	-1.02	0.08
Wind 210 deg - Service		-4.48	7.75	866.34	501.56	0.07
Wind 225 deg - Service		-6.34	6.33	706.82	709.91	0.06
Wind 240 deg - Service		-7.76	4.47	499.12	869.93	0.04
Wind 270 deg - Service		-8.97	-0.01	-1.90	1005.37	-0.00

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 300 deg - Service		-7.77	-4.48	-502.47	871.61	-0.04
Wind 315 deg - Service		-6.35	-6.33	-709.64	712.28	-0.06
Wind 330 deg - Service		-4.49	-7.76	-868.46	504.47	-0.07

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	179 - 141.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-29.27	-0.00	-2.61
			Max. Mx	26	-9.53	237.41	2.66
			Max. My	18	-9.54	-2.30	-234.33
			Max. Vy	26	-12.16	237.41	2.66
			Max. Vx	18	12.06	-2.30	-234.33
			Max. Torque	13			-0.73
L2	141.25 - 92.583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-74.56	-6.40	-9.27
			Max. Mx	26	-27.20	1291.71	4.64
			Max. My	18	-27.21	-4.69	-1284.53
			Max. Vy	10	28.97	-1290.90	-5.51
			Max. Vx	18	28.89	-4.69	-1284.53
			Max. Torque	13			-1.13
L3	92.583 - 45.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-106.76	-14.12	-16.69
			Max. Mx	10	-43.59	-2782.70	-7.51
			Max. My	18	-43.60	-6.71	-2772.50
			Max. Vy	10	36.14	-2782.70	-7.51
			Max. Vx	18	36.06	-6.71	-2772.50
			Max. Torque	27			1.58
L4	45.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-147.28	-18.26	-25.63
			Max. Mx	10	-66.26	-4865.80	-9.70
			Max. My	18	-66.26	-8.93	-4851.30
			Max. Vy	10	41.96	-4865.80	-9.70
			Max. Vx	18	41.88	-8.93	-4851.30
			Max. Torque	27			1.97

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	42	147.28	-6.49	-11.23
	Max. H_x	26	66.29	41.92	0.03
	Max. H_z	2	66.29	0.03	41.84
	Max. M_x	2	4848.40	0.03	41.84
	Max. M_z	10	4865.80	-41.92	-0.03
	Max. Torsion	27	1.97	41.92	0.03
	Min. Vert	7	49.71	-29.62	29.56
	Min. H_x	10	66.29	-41.92	-0.03
	Min. H_z	18	66.29	-0.03	-41.84
	Min. M_x	18	-4851.30	-0.03	-41.84
	Min. M_z	26	-4864.45	41.92	0.03
	Min. Torsion	11	-1.96	-41.92	-0.03

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	55.24	0.00	0.00	1.17	-0.56	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	66.29	-0.03	-41.84	-4848.40	7.58	0.03
0.9 Dead+1.6 Wind 0 deg - No Ice	49.71	-0.03	-41.84	-4804.28	7.64	0.04
1.2 Dead+1.6 Wind 30 deg - No Ice	66.29	20.93	-36.22	-4194.53	-2426.11	1.01
0.9 Dead+1.6 Wind 30 deg - No Ice	49.71	20.93	-36.22	-4156.43	-2403.71	1.02
1.2 Dead+1.6 Wind 45 deg - No Ice	66.29	29.62	-29.56	-3422.09	-3435.03	1.41
0.9 Dead+1.6 Wind 45 deg - No Ice	49.71	29.62	-29.56	-3391.08	-3403.36	1.42
1.2 Dead+1.6 Wind 60 deg - No Ice	66.29	36.29	-20.89	-2416.33	-4209.90	1.71
0.9 Dead+1.6 Wind 60 deg - No Ice	49.71	36.29	-20.89	-2394.55	-4171.10	1.72
1.2 Dead+1.6 Wind 90 deg - No Ice	66.29	41.92	0.03	9.70	-4865.80	1.96
0.9 Dead+1.6 Wind 90 deg - No Ice	49.71	41.92	0.03	9.22	-4820.97	1.96
1.2 Dead+1.6 Wind 120 deg - No Ice	66.29	36.32	20.95	2433.50	-4218.13	1.68
0.9 Dead+1.6 Wind 120 deg - No Ice	49.71	36.32	20.95	2410.79	-4179.22	1.68
1.2 Dead+1.6 Wind 135 deg - No Ice	66.29	29.66	29.61	3436.62	-3446.68	1.36
0.9 Dead+1.6 Wind 135 deg - No Ice	49.71	29.66	29.61	3404.71	-3414.85	1.36
1.2 Dead+1.6 Wind 150 deg - No Ice	66.29	20.99	36.25	4205.65	-2440.40	0.95
0.9 Dead+1.6 Wind 150 deg - No Ice	49.71	20.99	36.25	4166.69	-2417.80	0.95
1.2 Dead+1.6 Wind 180 deg - No Ice	66.29	0.03	41.84	4851.30	-8.93	-0.03
0.9 Dead+1.6 Wind 180 deg - No Ice	49.71	0.03	41.84	4806.44	-8.65	-0.04
1.2 Dead+1.6 Wind 210 deg -	66.29	-20.93	36.22	4197.43	2424.77	-1.01

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
No Ice 0.9 Dead+1.6 Wind 210 deg - No Ice	49.71	-20.93	36.22	4158.58	2402.70	-1.02
1.2 Dead+1.6 Wind 225 deg - No Ice	66.29	-29.62	29.56	3424.98	3433.69	-1.41
0.9 Dead+1.6 Wind 225 deg - No Ice	49.71	-29.62	29.56	3393.23	3402.35	-1.42
1.2 Dead+1.6 Wind 240 deg - No Ice	66.29	-36.29	20.89	2419.23	4208.56	-1.71
0.9 Dead+1.6 Wind 240 deg - No Ice	49.71	-36.29	20.89	2396.70	4170.09	-1.72
1.2 Dead+1.6 Wind 270 deg - No Ice	66.29	-41.92	-0.03	-6.81	4864.45	-1.96
0.9 Dead+1.6 Wind 270 deg - No Ice	49.71	-41.92	-0.03	-7.07	4819.96	-1.97
1.2 Dead+1.6 Wind 300 deg - No Ice	66.29	-36.32	-20.95	-2430.61	4216.78	-1.68
0.9 Dead+1.6 Wind 300 deg - No Ice	49.71	-36.32	-20.95	-2408.64	4178.20	-1.68
1.2 Dead+1.6 Wind 315 deg - No Ice	66.29	-29.66	-29.61	-3433.73	3445.33	-1.36
0.9 Dead+1.6 Wind 315 deg - No Ice	49.71	-29.66	-29.61	-3402.56	3413.83	-1.36
1.2 Dead+1.6 Wind 330 deg - No Ice	66.29	-20.99	-36.25	-4202.76	2439.04	-0.95
0.9 Dead+1.6 Wind 330 deg - No Ice	49.71	-20.99	-36.25	-4164.54	2416.78	-0.95
1.2 Dead+1.0 Ice+1.0 Temp	147.28	0.00	0.00	25.63	-18.26	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	147.28	-0.01	-12.96	-1542.12	-16.63	-0.21
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	147.28	6.48	-11.22	-1331.19	-802.32	0.44
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	147.28	9.17	-9.16	-1081.66	-1127.94	0.74
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	147.28	11.23	-6.48	-756.66	-1377.95	0.98
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	147.28	12.98	0.01	27.53	-1589.28	1.26
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	147.28	11.24	6.49	811.24	-1379.70	1.20
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	147.28	9.18	9.17	1135.68	-1130.41	1.04
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	147.28	6.49	11.23	1384.49	-805.35	0.82
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	147.28	0.01	12.96	1593.68	-20.13	0.21
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	147.28	-6.48	11.22	1382.75	765.56	-0.44
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	147.28	-9.17	9.16	1133.22	1091.19	-0.74
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	147.28	-11.23	6.48	808.22	1341.20	-0.98
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	147.28	-12.98	-0.01	24.03	1552.53	-1.26
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	147.28	-11.24	-6.49	-759.69	1342.94	-1.20
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	147.28	-9.18	-9.17	-1084.13	1093.66	-1.04
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	147.28	-6.49	-11.23	-1332.94	768.59	-0.81
Dead+Wind 0 deg - Service	55.24	-0.01	-8.95	-1030.86	1.19	-0.09

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 30 deg - Service	55.24	4.48	-7.75	-891.71	-516.70	-0.08
Dead+Wind 45 deg - Service	55.24	6.34	-6.33	-727.34	-731.40	-0.07
Dead+Wind 60 deg - Service	55.24	7.76	-4.47	-513.31	-896.30	-0.05
Dead+Wind 90 deg - Service	55.24	8.97	0.01	2.96	-1035.88	-0.00
Dead+Wind 120 deg - Service	55.24	7.77	4.48	518.75	-898.05	0.04
Dead+Wind 135 deg - Service	55.24	6.35	6.33	732.22	-733.88	0.06
Dead+Wind 150 deg - Service	55.24	4.49	7.76	895.87	-519.74	0.08
Dead+Wind 180 deg - Service	55.24	0.01	8.95	1033.27	-2.31	0.09
Dead+Wind 210 deg - Service	55.24	-4.48	7.75	894.12	515.58	0.08
Dead+Wind 225 deg - Service	55.24	-6.34	6.33	729.74	730.28	0.07
Dead+Wind 240 deg - Service	55.24	-7.76	4.47	515.72	895.17	0.05
Dead+Wind 270 deg - Service	55.24	-8.97	-0.01	-0.55	1034.76	0.00
Dead+Wind 300 deg - Service	55.24	-7.77	-4.48	-516.34	896.93	-0.04
Dead+Wind 315 deg - Service	55.24	-6.35	-6.33	-729.81	732.76	-0.06
Dead+Wind 330 deg - Service	55.24	-4.49	-7.76	-893.46	518.62	-0.08

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	0.00	-55.24	0.00	0.00	55.24	0.00	0.000%
2	-0.03	-66.29	-41.84	0.03	66.29	41.84	0.000%
3	-0.03	-49.71	-41.84	0.03	49.71	41.84	0.000%
4	20.93	-66.29	-36.22	-20.93	66.29	36.22	0.000%
5	20.93	-49.71	-36.22	-20.93	49.71	36.22	0.000%
6	29.62	-66.29	-29.56	-29.62	66.29	29.56	0.000%
7	29.62	-49.71	-29.56	-29.62	49.71	29.56	0.000%
8	36.29	-66.29	-20.89	-36.29	66.29	20.89	0.000%
9	36.29	-49.71	-20.89	-36.29	49.71	20.89	0.000%
10	41.92	-66.29	0.03	-41.92	66.29	-0.03	0.000%
11	41.92	-49.71	0.03	-41.92	49.71	-0.03	0.000%
12	36.32	-66.29	20.95	-36.32	66.29	-20.95	0.000%
13	36.32	-49.71	20.95	-36.32	49.71	-20.95	0.000%
14	29.66	-66.29	29.61	-29.66	66.29	-29.61	0.000%
15	29.66	-49.71	29.61	-29.66	49.71	-29.61	0.000%
16	20.99	-66.29	36.25	-20.99	66.29	-36.25	0.000%
17	20.99	-49.71	36.25	-20.99	49.71	-36.25	0.000%
18	0.03	-66.29	41.84	-0.03	66.29	-41.84	0.000%
19	0.03	-49.71	41.84	-0.03	49.71	-41.84	0.000%
20	-20.93	-66.29	36.22	20.93	66.29	-36.22	0.000%
21	-20.93	-49.71	36.22	20.93	49.71	-36.22	0.000%
22	-29.62	-66.29	29.56	29.62	66.29	-29.56	0.000%
23	-29.62	-49.71	29.56	29.62	49.71	-29.56	0.000%
24	-36.29	-66.29	20.89	36.29	66.29	-20.89	0.000%
25	-36.29	-49.71	20.89	36.29	49.71	-20.89	0.000%
26	-41.92	-66.29	-0.03	41.92	66.29	0.03	0.000%
27	-41.92	-49.71	-0.03	41.92	49.71	0.03	0.000%
28	-36.32	-66.29	-20.95	36.32	66.29	20.95	0.000%
29	-36.32	-49.71	-20.95	36.32	49.71	20.95	0.000%
30	-29.66	-66.29	-29.61	29.66	66.29	29.61	0.000%
31	-29.66	-49.71	-29.61	29.66	49.71	29.61	0.000%
32	-20.99	-66.29	-36.25	20.99	66.29	36.25	0.000%
33	-20.99	-49.71	-36.25	20.99	49.71	36.25	0.000%
34	0.00	-147.28	0.00	-0.00	147.28	-0.00	0.000%
35	-0.01	-147.28	-12.96	0.01	147.28	12.96	0.000%
36	6.48	-147.28	-11.22	-6.48	147.28	11.22	0.000%
37	9.17	-147.28	-9.16	-9.17	147.28	9.16	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
38	11.23	-147.28	-6.48	-11.23	147.28	6.48	0.000%
39	12.98	-147.28	0.01	-12.98	147.28	-0.01	0.000%
40	11.24	-147.28	6.49	-11.24	147.28	-6.49	0.000%
41	9.18	-147.28	9.17	-9.18	147.28	-9.17	0.000%
42	6.49	-147.28	11.23	-6.49	147.28	-11.23	0.000%
43	0.01	-147.28	12.96	-0.01	147.28	-12.96	0.000%
44	-6.48	-147.28	11.22	6.48	147.28	-11.22	0.000%
45	-9.17	-147.28	9.16	9.17	147.28	-9.16	0.000%
46	-11.23	-147.28	6.48	11.23	147.28	-6.48	0.000%
47	-12.98	-147.28	-0.01	12.98	147.28	0.01	0.000%
48	-11.24	-147.28	-6.49	11.24	147.28	6.49	0.000%
49	-9.18	-147.28	-9.17	9.18	147.28	9.17	0.000%
50	-6.49	-147.28	-11.23	6.49	147.28	11.23	0.000%
51	-0.01	-55.24	-8.95	0.01	55.24	8.95	0.000%
52	4.48	-55.24	-7.75	-4.48	55.24	7.75	0.000%
53	6.34	-55.24	-6.33	-6.34	55.24	6.33	0.000%
54	7.76	-55.24	-4.47	-7.76	55.24	4.47	0.000%
55	8.97	-55.24	0.01	-8.97	55.24	-0.01	0.000%
56	7.77	-55.24	4.48	-7.77	55.24	-4.48	0.000%
57	6.35	-55.24	6.33	-6.35	55.24	-6.33	0.000%
58	4.49	-55.24	7.76	-4.49	55.24	-7.76	0.000%
59	0.01	-55.24	8.95	-0.01	55.24	-8.95	0.000%
60	-4.48	-55.24	7.75	4.48	55.24	-7.75	0.000%
61	-6.34	-55.24	6.33	6.34	55.24	-6.33	0.000%
62	-7.76	-55.24	4.47	7.76	55.24	-4.47	0.000%
63	-8.97	-55.24	-0.01	8.97	55.24	0.01	0.000%
64	-7.77	-55.24	-4.48	7.77	55.24	4.48	0.000%
65	-6.35	-55.24	-6.33	6.35	55.24	6.33	0.000%
66	-4.49	-55.24	-7.76	4.49	55.24	7.76	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	0.00025014
3	Yes	4	0.00000001	0.00013485
4	Yes	5	0.00000001	0.00041497
5	Yes	5	0.00000001	0.00019155
6	Yes	5	0.00000001	0.00046799
7	Yes	5	0.00000001	0.00021415
8	Yes	5	0.00000001	0.00040883
9	Yes	5	0.00000001	0.00018838
10	Yes	4	0.00000001	0.00042891
11	Yes	4	0.00000001	0.00026541
12	Yes	5	0.00000001	0.00042910
13	Yes	5	0.00000001	0.00019791
14	Yes	5	0.00000001	0.00047545
15	Yes	5	0.00000001	0.00021721
16	Yes	5	0.00000001	0.00041398
17	Yes	5	0.00000001	0.00019050
18	Yes	4	0.00000001	0.00019543
19	Yes	4	0.00000001	0.00009031
20	Yes	5	0.00000001	0.00041241
21	Yes	5	0.00000001	0.00019010
22	Yes	5	0.00000001	0.00046882

23	Yes	5	0.00000001	0.00021443
24	Yes	5	0.00000001	0.00042056
25	Yes	5	0.00000001	0.00019412
26	Yes	4	0.00000001	0.00033744
27	Yes	4	0.00000001	0.00020265
28	Yes	5	0.00000001	0.00041275
29	Yes	5	0.00000001	0.00018985
30	Yes	5	0.00000001	0.00047504
31	Yes	5	0.00000001	0.00021705
32	Yes	5	0.00000001	0.00042586
33	Yes	5	0.00000001	0.00019641
34	Yes	4	0.00000001	0.00008045
35	Yes	5	0.00000001	0.00041421
36	Yes	5	0.00000001	0.00053057
37	Yes	5	0.00000001	0.00056169
38	Yes	5	0.00000001	0.00052728
39	Yes	5	0.00000001	0.00043035
40	Yes	5	0.00000001	0.00055932
41	Yes	5	0.00000001	0.00058862
42	Yes	5	0.00000001	0.00055102
43	Yes	5	0.00000001	0.00042990
44	Yes	5	0.00000001	0.00053432
45	Yes	5	0.00000001	0.00056802
46	Yes	5	0.00000001	0.00053900
47	Yes	5	0.00000001	0.00041868
48	Yes	5	0.00000001	0.00051448
49	Yes	5	0.00000001	0.00054903
50	Yes	5	0.00000001	0.00052062
51	Yes	4	0.00000001	0.00002886
52	Yes	4	0.00000001	0.00011757
53	Yes	4	0.00000001	0.00013697
54	Yes	4	0.00000001	0.00012025
55	Yes	4	0.00000001	0.00002841
56	Yes	4	0.00000001	0.00012394
57	Yes	4	0.00000001	0.00013989
58	Yes	4	0.00000001	0.00011954
59	Yes	4	0.00000001	0.00002871
60	Yes	4	0.00000001	0.00012196
61	Yes	4	0.00000001	0.00013788
62	Yes	4	0.00000001	0.00011972
63	Yes	4	0.00000001	0.00002836
64	Yes	4	0.00000001	0.00012007
65	Yes	4	0.00000001	0.00013949
66	Yes	4	0.00000001	0.00012401

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
L1	179 - 141.25	19.627	56	0.9081	0.0005
L2	145.583 - 92.583	13.485	56	0.8262	0.0003
L3	98.5 - 45.5	6.301	56	0.6009	0.0001
L4	53 - 0	1.842	56	0.3171	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.00	10' x 3" Dia Omni	56	19.627	0.9081	0.0005	94972
175.50	FD-RRH 4x45 1900	56	18.967	0.9010	0.0005	94972
175.00	DS4C03F36U-D	56	18.873	0.9000	0.0005	94972
173.50	P40-16-XLPP-RR-A	56	18.591	0.8970	0.0005	86338
163.50	Andrew 2' w/Radome	56	16.722	0.8755	0.0004	30636
151.00	(2) AIR21	56	14.442	0.8432	0.0003	16959
148.00	Andrew 2' w/Radome	56	13.909	0.8341	0.0003	15360
142.00	(2) RRUS-11	56	12.865	0.8138	0.0003	13836
140.00	(2) 7770.00	56	12.523	0.8065	0.0003	13628
130.00	SBNHH-1D65B	56	10.869	0.7656	0.0003	12698
50.00	(2) GPS	56	1.657	0.2984	0.0000	7668

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	179 - 141.25	92.288	12	4.2692	0.0060
L2	145.583 - 92.583	63.391	12	3.8889	0.0036
L3	98.5 - 45.5	29.615	12	2.8266	0.0020
L4	53 - 0	8.653	12	1.4903	0.0009

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
179.00	10' x 3" Dia Omni	12	92.288	4.2692	0.0061	20557
175.50	FD-RRH 4x45 1900	12	89.186	4.2366	0.0058	20557
175.00	DS4C03F36U-D	12	88.743	4.2319	0.0058	20557
173.50	P40-16-XLPP-RR-A	12	87.416	4.2178	0.0057	18688
163.50	Andrew 2' w/Radome	12	78.620	4.1183	0.0049	6630
151.00	(2) AIR21	12	67.894	3.9680	0.0040	3668
148.00	Andrew 2' w/Radome	12	65.387	3.9254	0.0038	3321
142.00	(2) RRUS-11	12	60.474	3.8307	0.0035	2988
140.00	(2) 7770.00	12	58.868	3.7962	0.0034	2941
130.00	SBNHH-1D65B	12	51.090	3.6040	0.0029	2732
50.00	(2) GPS	12	7.784	1.4025	0.0008	1632

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	179 - 141.25 (1)	TP33.249x23.1x0.25	37.75	179.00	190.1	25.2603	-9.52	157.96	0.060
L2	141.25 - 92.583 (2)	TP45.834x31.5841x0.375	53.00	179.00	137.9	52.2140	-27.20	620.03	0.044
L3	92.583 - 45.5 (3)	TP57.742x43.4931x0.375	53.00	179.00	109.3	65.8811	-43.59	1245.47	0.035
L4	45.5 - 0 (4)	TP69.225x54.9756x0.375	53.00	179.00	87.9	81.9487	-66.26	2303.18	0.029

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	179 - 141.25 (1)	TP33.249x23.1x0.25	238.98	1144.51	0.209	0.00	1144.51	0.000
L2	141.25 - 92.583 (2)	TP45.834x31.5841x0.375	1294.02	3348.60	0.386	0.00	3348.60	0.000
L3	92.583 - 45.5 (3)	TP57.742x43.4931x0.375	2786.09	4912.19	0.567	0.00	4912.19	0.000
L4	45.5 - 0 (4)	TP69.225x54.9756x0.375	4869.76	6830.50	0.713	0.00	6830.50	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	179 - 141.25 (1)	TP33.249x23.1x0.25	12.21	874.18	0.014	0.73	2291.82	0.000
L2	141.25 - 92.583 (2)	TP45.834x31.5841x0.375	28.98	1857.33	0.016	1.13	6705.39	0.000
L3	92.583 - 45.5 (3)	TP57.742x43.4931x0.375	36.15	2155.57	0.017	1.47	9836.42	0.000
L4	45.5 - 0 (4)	TP69.225x54.9756x0.375	41.96	2406.49	0.017	1.68	13677.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	179 - 141.25 (1)	0.060	0.209	0.000	0.014	0.000	0.269 ✔	1.000	4.8.2 ✔
L2	141.25 - 92.583 (2)	0.044	0.386	0.000	0.016	0.000	0.431 ✔	1.000	4.8.2 ✔
L3	92.583 - 45.5 (3)	0.035	0.567	0.000	0.017	0.000	0.602 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L4	45.5 - 0 (4)	0.029	0.713	0.000	0.017	0.000	0.742 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	179 - 141.25	Pole	TP33.249x23.1x0.25	1	-9.52	157.96	26.9	Pass
L2	141.25 - 92.583	Pole	TP45.834x31.5841x0.375	2	-27.20	620.03	43.1	Pass
L3	92.583 - 45.5	Pole	TP57.742x43.4931x0.375	3	-43.59	1245.47	60.2	Pass
L4	45.5 - 0	Pole	TP69.225x54.9756x0.375	4	-66.26	2303.18	74.2	Pass
							Summary	
						Pole (L4)	74.2	Pass
						RATING =	**74.2**	**Pass**

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Subject: Anchor Bolt and Baseplate Analysis

Location: 180-FT FWT Monopole
Wethersfield, CT

Rev. 3: 11/15/16

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 15001.063

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 4870·ft·kips	(Input From RisaTower)
Shear Force =	Shear := 42·kips	(Input From RisaTower)
Axial Force =	Axial := 66·kips	(Input From RisaTower)

Anchor Bolt Data:

ASTM A615 Grade 75

Number of Anchor Bolts =	N := 16	(User Input)
Diameter of Bolt Circle =	D_{bc} := 76·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strength =	F_u := 100·ksi	(User Input)
Bolt Yield Strength =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)
Top of Concrete to Bot Leveling Nut =	l_{ar} := 2·in	(User Input)

Base Plate Data:

Use ASTM A633 Grade E

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 2.25·in	(User Input)
Base Plate Diameter =	D_{bp} := 82·in	(User Input)
Outer Pole Diameter =	D_{pole} := 69.225·in	(User Input)
	η := 0.5	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 38 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 14.54 \cdot in$

$d_2 = 26.87 \cdot in$

$d_3 = 35.11 \cdot in$

$d_4 = 38.00 \cdot in$

$d_5 = 35.11 \cdot in$

$d_6 = 26.87 \cdot in$

$d_7 = 14.54 \cdot in$

$d_8 = 0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 34.6 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$

$MA_3 = 0.49 \cdot in$

$MA_4 = 3.39 \cdot in$

$MA_5 = 0.49 \cdot in$

$MA_6 = 0.00 \cdot in$

$MA_7 = 0.00 \cdot in$

$MA_8 = 0.00 \cdot in$

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 35.2 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 1.155 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 188.1 \cdot kips$

Maximum Compressive Force = $P_u := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 196.4 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 2.6 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \cdot 100 = 77.6$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta}\right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed"\right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$$

Bolt % of Capacity = $$\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2\right] \cdot 100 = 57.2$$

Condition2 = $$\text{Condition2} := \text{if}\left[\left(\frac{V_u}{\Phi R_{nv}}\right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}}\right)^2 \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 77.7 \cdot kips$

$C_2 = 140.1 \cdot kips$

$C_3 = 181.7 \cdot kips$

$C_4 = 196.4 \cdot kips$

$C_5 = 181.7 \cdot kips$

$C_6 = 140.1 \cdot kips$

$C_7 = 77.7 \cdot kips$

$C_8 = 4.1 \cdot kips$

Maximum Bending Moment in Plate = $M_{bp} := \sum_i \left(C_i \cdot MA_i\right) = 845.1 \cdot in \cdot kips$

Section Modulus of Plate With Stiffeners = $S_{pl} := 71 \cdot in^3$

Maximum Bending Stress in Plate = $f_{bp} := \frac{M_{bp}}{S_{pl}} = 11.9 \cdot ksi$

$Fy_{stiff} := 36ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$

Allowable Bending Stress in Stiffener = $F_{stiff} := 0.9 \cdot Fy_{stiff} = 32.4 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{stiff}} \cdot 100 = 36.7$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Subject: Foundation Analysis

Location: 180-ft FWT Monopole
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Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	OM := 4870·ft·kips	(User Input from tnxTower)	
Shear Force =	Shear := 42·kip	(User Input from tnxTower)	
Axial Force =	Axial := 66·kip	(User Input from tnxTower)	
Tower Height =	H_t := 180·ft	(User Input)	

Footing Data:

Overall Depth of Footing =	D_f := 6.5·ft	(User Input)	
Length of Pier =	L_p := 4.5·ft	(User Input)	
Extension of Pier Above Grade =	L_{pag} := 0.5·ft	(User Input)	
Diameter of Pier =	d_p := 8.5·ft	(User Input)	
Thickness of Footing =	T_f := 2.5·ft	(User Input)	
Width of Footing =	W_f := 30.0·ft	(User Input)	

Anchor Bolt Data:

Length of Anchor Bolts =	L_{st} := 84·in	(User Input)	
Projection of Anchor Bolts Above Pier =	A_{BP} := 12.0·in	(User Input)	
Anchor Bolt Diameter =	d_{anchor} := 2.25·in	(User Input)	
Base Plate Bolt Circle =	MP := 76.0·in	(User Input)	

Material Properties:

Concrete Compressive Strength =	f_c := 4000·psi	(User Input)	
Steel Reinforcment Yield Strength =	f_y := 60000·psi	(User Input)	
Anchor Bolt Yield Strength =	f_{ya} := 75000·psi	(User Input)	
Internal Friction Angle of Soil =	Φ_s := 30·deg	(User Input)	
Ultimate Soil Bearing Capacity =	q_s := 8000·psf	(User Input)	
Unit Weight of Soil =	γ_{soil} := 100·pcf	(User Input)	
Unit Weight of Concrete =	γ_{conc} := 150·pcf	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	n := 0·ft	(User Input)	
Cohesion of Clay Type Soil =	c := 0·ksf	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	Z := 2	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	μ := 0.45	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 9$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.128 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 41$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 0.5 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 9$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.128 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 33$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 9$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.128 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 33$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0.999 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 0.999 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 0.999 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Load Factor = $LF := 1$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 100 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 1.2 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 1.2 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.95 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.575 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 2.5$

$A_p := W_f \cdot T_p = 75$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 118.125 \cdot kip$

Weight of Concrete Pad = $WT_c := \left[\left(W_f^2 \cdot T_f\right) + d_p^2 \cdot L_p\right] \cdot \gamma_c = 386.269 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left[\left(W_f^2 - d_p^2\right) \cdot \begin{vmatrix} (L_p - L_{pag} - n) & \text{if } (L_p - L_{pag} - n) \geq 0 \\ 0 & \text{if } (L_p - L_{pag} - n) \leq 0 \end{vmatrix}\right] \cdot \gamma_s = 331.1 \cdot kip$

Weight of Soil Wedge at Back Face = $WT_{s2} := \left(\frac{D_f^2 \cdot \tan(\Phi_s)}{2} \cdot W_f\right) \cdot \gamma_s = 36.59 \cdot kip$

Weight of Soil Wedge at back face Corners = $WT_{s3} := 2 \cdot \left[(D_f)^3 \cdot \frac{\tan(\Phi_s)}{3}\right] \cdot \gamma_s = 10.57 \cdot kips$

Total Weight = $WT_{tot} := 0.9WT_c + 0.75WT_{s1} + 0.9Axial = 655.367 \cdot kip$

Resisting Moment = $M_r := (WT_{tot}) \cdot \frac{W_f}{2} + 0.75S_u \cdot \frac{T_f}{3} + \left[(0.75WT_{s2} + 0.75WT_{s3}) \cdot \left(W_f + \frac{D_f \cdot \tan(\Phi_s)}{3}\right)\right] = 11010 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + Shear \cdot (L_p + T_f) = 5164 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.13$

Factor of Safety Required = $FS_{req} := 1$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{\mu \cdot WT_{tot}}{FS_{req}} = 294.915 \cdot kips$

$Shear\_Check := if(S_p > Shear, "Okay", "No Good")$

Shear_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_f^2 = 900$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 4500 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{OM}{S} = 1.81 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < 0.75 q_s, "Okay", "No Good")$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{OM}{S} = -0.354 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < 0.75 q_s), "Okay", "No Good"]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 8.364$

Distance to Kern = $X_k := \frac{W_f}{6} = 5$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{OM}{WT_{tot}} = 7.431$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \left(\frac{W_f}{2} - e \right)} = 1.924 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.924 \cdot ksf$

$Pressure\_Check := if(q_{adj} < 0.75 q_s, "Okay", "No Good")$

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.806 \times 10^4 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if\left(P_b > LF \cdot Axial, "Okay", "No Good"\right)$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear:

(Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} = 27 \cdot in$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := LF \cdot \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear:

(Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 33.8$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 90.8$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 809.2$

Guess Value = $v_u := 1ksf$

(From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{WT_{tot}}{\pi \cdot v_u}$

$v_u := \text{Find}(v_u) = 8.6 \cdot ksf$

$V_u := v_u \cdot d \cdot W_f = 582.2 \cdot kips$

Required Shear Strength = $V_{req} := LF \cdot V_u = 582.2 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 2352.9 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := \text{if}(V_{req} < V_{Avail}, \text{"Okay"}, \text{"No Good"})$

$Punching\_Shear\_Check = \text{"Okay"}$

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$q_b := q_{adj} - d_1 \cdot Slope = 1.013 \cdot ksf$

Maximum Bending at Face of Pier = $M_u := LF \cdot \left[\left(q_{adj} - q_b \right) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f = 2809 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.85$$

(ACI-200810.2.7.3)

$R_n := \frac{M_u}{\phi_m \cdot W_f \cdot d^2} = 142.7 \cdot psi$

$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0.85 \cdot f_c}} \right) = 0.0024$

$\rho_{min} := \rho = 0.00243$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$$ (ACI -2008 7.12.2.1)

Check Bottom Bars:

$$As := \begin{cases} \rho_{min} \cdot W_f \cdot d & \text{if } \rho_{min} > \frac{\rho_{sh}}{2} \\ \rho_{sh} \cdot W_f \cdot \frac{d}{2} & \text{otherwise} \end{cases} = 23.626 \cdot in^2$$

$$As_{prov} := A_{bbot} \cdot NB_{bot} = 33 \cdot in^2$$

$$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := \rho_{sh} \cdot \left(W_f \cdot \frac{d}{2}\right) = 8.7 \cdot in^2$$

$$As_{prov} := A_{btop} \cdot NB_{top} = 33 \cdot in^2$$

$$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, "Okay", "No Good"\right)$$

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 9.9 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3 \cdot in$$

Transverse Reinforcement Index =

$$k_{tr} := 0$$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 30.2 \cdot in$$

Minimum Development Length =

$$L_{dbmin} := 12 \cdot in$$ (ACI-2008 12.2.1)

$$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, "Use\ L.dbt", "Use\ L.dbmin"\right)$$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 126 \cdot in$$

$$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, "Okay", "No Good"\right)$$

Lpad_Check = "Okay"

Steel Reinforcement in Pier:

Area of Pier = $A_p := \frac{\pi \cdot d_p^2}{4} = 8171.28 \cdot in^2$

$A_{smin} := 0.0033 \cdot A_p = 26.97 \cdot in^2$

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 40.97 \cdot in^2$

$Steel\_Area\_Check := if(A_{sprov} > A_{smin}, "Okay", "No Good")$

Steel_Area_Check = "Okay"

Bar Spacing In Pier = $B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 6.688 \cdot in$

Diameter of Reinforcement Cage = $Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 96 \cdot in$

Maximum Moment in Pier = $M_p := \left[OM + Shear \cdot \left(L_p + \frac{A_{BP}}{2} \right) \right] \cdot LF = 60960 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$(D \ N \ n \ P_u \ M_{xu}) := \left(d_p \cdot 12 \ \ NB_{pier} \ \ BS_{pier} \ \ \frac{Axial \cdot 1.333}{kips} \ \ \frac{M_p}{in \cdot kips} \right)$

$(D \ N \ n \ P_u \ M_{xu}) = (102 \ \ 41 \ \ 9 \ \ 87.978 \ \ 6.096 \times 10^4)$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) := (0 \ \ 0 \ \ 0 \ \ 0)$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) := \phi P'_n(D, N, n, P_u, M_{xu})^T$

$(\phi P_n \ \ \phi M_{xn} \ \ f_{sp} \ \ \rho) = (145.279 \ \ 1.007 \times 10^5 \ \ -60 \ \ 5.018 \times 10^{-3})$

$Axial\_Load\_Check := if(\phi P_n \geq P_u, "Okay", "No Good")$

Axial_Load_Check = "Okay"

$Bending\_Check := if(\phi M_{xn} \geq M_{xu}, "Okay", "No Good")$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 51 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 27 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

$c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 3 \cdot in$

Transverse Reinforcement =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 30.18 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 14.982 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right)$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 21.402 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 20.304 \cdot in$

$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 21.402 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$

Tie Size and Spacing in Column:

Minimum Tie Size =

$Tie_{min} := if(BS_{pier} \le 10, 3, 4) = 3$

Used #4 Ties

Seismic Factor =

$z := if(Z \le 2, 1, 0.5) = 1$ (ACI-2008 21.10.5)

$s_{lim1} := 16 \cdot d_{bpier} \cdot z = 18.048 \cdot in$

$s_{lim2} := 48 \cdot d_{Tie} \cdot z = 24 \cdot in$

$s_{lim3} := D_f \cdot z = 78 \cdot in$

$s_{lim4} := 18in$

Maximum Spacing =

$$s_{tie} := \min\left(\begin{pmatrix} s_{lim1} \\ s_{lim2} \\ s_{lim3} \\ s_{lim4} \end{pmatrix}\right) = 18 \cdot in$$

Number of Ties Required =

$$n_{tie} := \frac{L_{pier} - 3 \cdot in}{s_{tie}} + 1 = 3.667$$

Check Anchor Steel Embedment:

Depth Available =

$D_{ab} := L_{st} - A_{BP} = 6 \cdot ft$

Length of Anchor Bolt =

$$L_{anchor} := \frac{(0.11 \cdot f_{ya}) \cdot in}{\sqrt{f_c \cdot psi}} = 10.87 \cdot ft$$

$Depth\_Check := if(D_{ab} \ge L_{anchor}, "Okay", "No Good")$

Depth_Check = "No Good"

Note: Anchor plate is provided

SITE NAME	WETHERSFIELD 3 CT		ECP - CELL #	AWS1	8	159
LATITUDE	41-42-55.50 N		LONGITUDE	72-41-26.30		
700 tilt change plus RET antenna swap outs and 40W to 90W RRH upgrades. The 60W 4 port 700 RRH will be connected to the low band ports on the AWS and PCS antenna. Please note the electrical tilt for 700 are on the SBNHH antennas			SAVE BUTTON			
			STRUCTURE TYPE	MONOPOLE		
700 Mhz - LTE Current Config	**ALPHA**		**BETA**	**GAMMA**		
EQUIPMENT TYPE	700 eNodeB		700 eNodeB	700 eNodeB		
ANTENNA TYPE	BXA-70063-6CF_4		BXA-70063-6CF_4	BXA-70063-6CF_4		
QTY OF ANTENNAS PER FACE	save as placeholder		save as placeholder	save as placeholder		
ORIENTATION (DEG)	90		210	330		
DOWN TILT (MECH/DEG)	6		3	3		
RAD CTR (FT AGL)	130		130	130		
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
700 Mhz - LTE Future Config	**ALPHA**		**BETA**	**GAMMA**		
EQUIPMENT TYPE	700 eNodeB		700 eNodeB	700 eNodeB		
ANTENNA TYPE	SBNHH-1D65B		SBNHH-1D65B	SBNHH-1D65B		
QTY OF ANTENNAS PER FACE	same as PCS/AWS		same as PCS/AWS	same as PCS/AWS		
ORIENTATION (DEG)	90		210	330		
DOWN TILT (MECH/DEG)	11 elect		7 elect	8 elect		
RAD CTR (FT AGL)	130		130	130		
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X60-700U	1	ALU RH_2X60-700U	1	ALU RH_2X60-700U
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX						
850 Celluar - Current Config	**ALPHA**		**BETA**	**GAMMA**		
EQUIPMENT TYPE	Cellular Mod 4.0B		Cellular Mod 4.0B	Cellular Mod 4.0B		
ANTENNA TYPE	BXA-70063-4CF		BXA-70063-4CF	BXA-70063-4CF		
QTY OF ANTENNAS PER FACE	1		1	1		
ORIENTATION (DEG)	90		210	330		
DOWN TILT (MECH/DEG)	10		8	8		
RAD CTR (FT AGL)	130		130	130		
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
850 Celluar - Future Config	**ALPHA**		**BETA**	**GAMMA**		
EQUIPMENT TYPE	Cellular Mod 4.0B		Cellular Mod 4.0B	Cellular Mod 4.0B		
ANTENNA TYPE	BXA-70063-4CF		BXA-70063-4CF	BXA-70063-4CF		
QTY OF ANTENNAS PER FACE	1		1	1		
ORIENTATION (DEG)	90		210	330		
DOWN TILT (MECH/DEG)	10		8	8		
RAD CTR (FT AGL)	130		130	130		
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
DIPLEX WITH LTE CABLE						
1900 PCS - Current Config	**ALPHA**		**BETA**	**GAMMA**		
EQUIPMENT TYPE	PCS Mod 4.0B		PCS Mod 4.0B	PCS Mod 4.0B		
ANTENNA TYPE	MG D3-800T0		MG D3-800T0	MG D3-800T0		
QTY OF ANTENNAS PER FACE	1		1	1		
ORIENTATION (DEG)	90		210	330		
DOWN TILT (MECH/DEG)	0		0	0		
RAD CTR (FT AGL)	130		130	130		
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
1900 PCS - Future Config	**ALPHA**		**BETA**	**GAMMA**		
EQUIPMENT TYPE	PCS Mod 4.0B		PCS Mod 4.0B	PCS Mod 4.0B		
ANTENNA TYPE	SBNHH-1D65B		SBNHH-1D65B	SBNHH-1D65B		
QTY OF ANTENNAS PER FACE	1		1	1		
ORIENTATION (DEG)	90		210	330		
DOWN TILT (MECH/DEG)	2 elect		2 elect	2 elect		
RAD CTR (FT AGL)	130		130	130		
TMA - QTY / MODEL						
DIPLEX WITH CELLULAR CABLE						
RRH - QTY/MODEL	1	ALU RH_2X60-PCS	1	ALU RH_2X60-PCS	1	ALU RH_2X60-PCS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			

AWS - LTE Current Config	ALPHA		BETA		GAMMA	
EQUIPMENT TYPE	2100 MHz BBU		2100 MHz BBU		2100 MHz BBU	
ANTENNA TYPE	BXA-171063-12CF-EDIN-2		BXA-171063-12CF-EDIN-0		BXA-171063-12CF-EDIN-2	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	2		0		0	
RAD CTR (FT AGL)	130		130		130	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS	1	ALU RH_2X40-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			
AWS - LTE Future Config	**ALPHA**		**BETA**		**GAMMA**	
EQUIPMENT TYPE	2100 MHz BBU		2100 MHz BBU		2100 MHz BBU	
ANTENNA TYPE	SBNHH-1D65B		SBNHH-1D65B		SBNHH-1D65B	
QTY OF ANTENNAS PER FACE	1		1		1	
ORIENTATION (DEG)	90		210		330	
DOWN TILT (MECH/DEG)	5 elect		0		2 elect	
RAD CTR (FT AGL)	130		130		130	
TMA - QTY / MODEL						
DIPLEXER - QTY / MODEL						
RRH - QTY/MODEL	1	ALU RH_2X90-AWS	1	ALU RH_2X90-AWS	1	ALU RH_2X90-AWS
SECTOR DISTRIBUTION BOX						
MAIN DISTRIBUTION BOX	1		DB-T1-6Z-8AB-0Z			

NUMBER OF CABLE'S NEEDED						Fiber Lines Model number			
TOTAL # FIBER LINES	2	TOTAL # OF MAINLINES			12	FIBER LINE MODEL #			HB158-1-08U8-S8J18
TOTAL # TOP JUMPERS	9	TOTAL # OF TOP JUMPERS			36	FIBER TOP JUMPER MODEL #			HB114-1-08U4-S4J18
Equipment Cable Ordering		MAIN CABLE #	18	-	6	TOP JUMPER #	24	+	12

TX / RX FREQUENCIES			TX POWER OUTPUT	
Cellular A-Band	PCS F / AWS-Band	700 Mhz C - E	Cellular (Watts)	20
TX - 869-880,890-891.5 MHz	TX - 1970-1975 / 2145-2155	TX - 746-757	PCS (Watts)	16
RX - 824-835,845-846.5 MHz	RX - 1890-1895 / 1745-1755	RX - 776-787	LTE/ AWS (Watts)	40

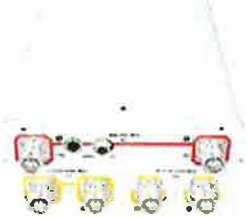
ALPHA				BETA				GAMMA			
Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code	Ant.	Freq.	Func.	Color Code
A1-A	800	Tx1/Rx0	RED	A5-A	800	Tx2/Rx0	BLUE	A9-A	800	Tx3/Rx0	GREEN
A1-B	1900	Tx1/Rx0	RED/ WHITE	A5-B	1900	Tx2/Rx0	BLUE/ WHITE	A9-B	1900	Tx3/Rx0	GREEN/WHITE
A2	700	Tx1/Rx0	RED/ ORANGE	A6	700	Tx2/Rx0	BLUE/ ORANGE	A10	700	Tx3/Rx0	GREEN/ORANGE
A3	700	Tx4/Rx1	RED/RED/ ORANGE	A7	700	Tx5/Rx1	BLUE/BLUE/ORANGE	A11	700	Tx6/Rx1	GREEN/GREEN/ORANGE
A4-B	1900	Tx4/Rx1	RED/RED/ WHITE	A8-B	1900	Tx5/Rx1	BLUE/BLUE/WHITE	A12-B	1900	Tx6/Rx1	GREEN/GREEN/WHITE
A4-A	800	Tx4/Rx1	RED/RED	A8-A	800	Tx5/Rx1	BLUE/BLUE	A12-A	800	Tx6/Rx1	GREEN/GREEN
F1-A	1700	Tx/Rx	RED/ BROWN	F1-B	1700	Tx/Rx	BLUE/BROWN	F1-C	1700	Tx/Rx	GREEN/BROWN
F1-D	1700	Tx/Rx	RED/RED/ BROWN	F1-E	1700	Tx/Rx	BLUE/BLUE/BROWN	F1-F	1700	Tx/Rx	GREEN/GREEN/BROWN

RF ENGINEER	RF MANAGER	INITIALS	DATE
Prepared By: Mark Brauer	Alex Restrepo	MB	10/13/2015

Product Specifications

COMMSCOPE®

POWERED BY ANDREW.



SBNHH-1D65B

Andrew® Tri-band Antenna, 698–896 and 2 x 1710–2360 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	1710–1880	1850–1990	1920–2180	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, 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	1710–1880	1850–1990	1920–2180	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, 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	1710 – 2360 MHz | 698 – 896 MHz

Mechanical Specifications

Product Specifications

SBNHH-1D65B

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	241.4 km/h | 150.0 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1828.0 mm | 72.0 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®

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

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.

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.

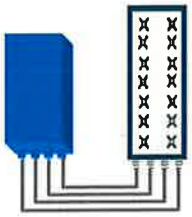
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

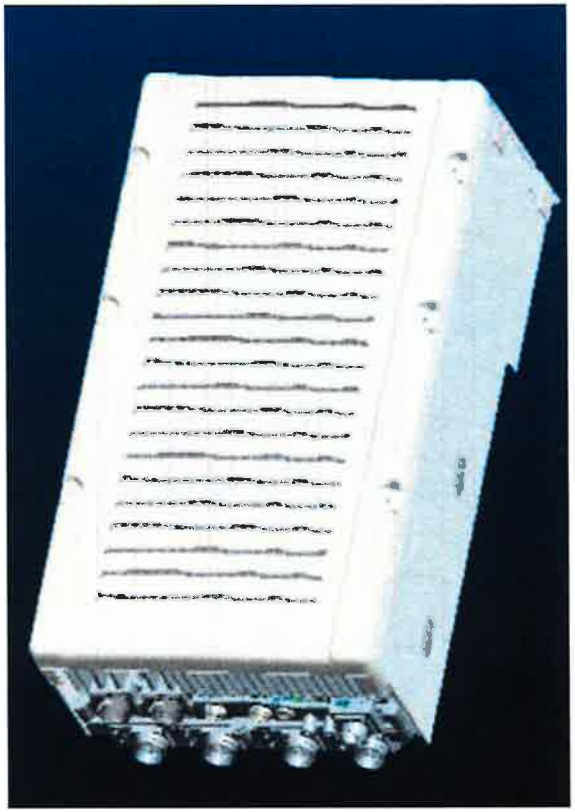
Alcatel·Lucent

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

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.)

VZW Network Equipment Reporting Form (NERF)

Vendor	Alcatel-Lucent		Model	B66a RRH 4Tx/4Rx 4x45W or 2x 90W (SW selectable)		Function	RRH for distributed architecture with a CPRI interface between digital and RF processing components. The RRH has 4 Tx ports and 4 Rx ports. Can be SW configured for 2 Tx with 90W rf per port or 4 Tx with 45W rf per port. The RRH has passive cooling only.		
*1)Equipment Configuration	*2)Heat Release @50°F Intake Temp [W]		*3)Airflow Rate @ 100% Activity Rate [cfm]		*4)Dimensions [in]		Non-Thermal Data		
	100% Activity	50% Activity	Nominal (70°F)	Max (95°F)	External (WxDxH)	Clear (F/R/S)	Installed Weight [lb]	*5)Sound @ Nominal [L_{WAd}]	*6)Name Plate [W]
Minimum			N/A Convection cooled	N/A Convection cooled	w/o Solar Shield W = 11.4in D = 6.7in H = 25.2in (W=290mm) (D=170mm) (H=640mm)	Front: 12" Rear: 7.5" Right: 12" Left: 12" Top: 12" Bottom: 24"			
Typical			N/A Convection cooled	N/A Convection cooled	with Solar Shield W = 12in D = 7.6in H = 25.8in (W=304mm) (D=193mm) (H=655mm)		62lb 72 lb(w mounting brackets)	N/A Convection cooled	
Full	825W (add 60W for AISG)	TBD	N/A Convection cooled	N/A Convection cooled	N/A			N/A Convection cooled	

*7)Equipment EC-Class	N/A Convection cooled	*10)Fan Speed	N/A Convection cooled	*13)Fan Hot-Swap	N/A Convection cooled	*16)Environ. Tests	N/A Convection cooled	*18)Temp. Rise [°F]	N/A Convection cooled
*8)Non-Optimal EC-Class	N/A Convection cooled	*11)Fan Logic	N/A Convection cooled	*14)Shut-Down	N/A Convection cooled	*17)Allow. Max [°F]	N/A Convection cooled	*19)Rec. Max [°F]	N/A Convection cooled
*9)Exhaust Openings	N/A Convection cooled	*12)Fan Alarm	N/A Convection cooled	*15)Temp. Access	N/A Convection cooled	*17)Allow. Min [°F]	N/A Convection cooled	*19)Rec. Min [°F]	N/A Convection cooled

Power Reporting					
Power Input	-48V	No. Power Supplies	N/A (Customer provided power plant)	Number of Inputs per Power Supply	1
*24)Maximum Demand (total system in Watts)	825W (add 60W for AISG)	Maximum Input (each power supply in Watts)	N/A (Customer provided power plant)	Maximum Output (each power supply in Watts)	58W (to AISG port, 29V/2A)
Power Supply Connection Type	DC entry via Conduit Box	Power Supply Make & Model	N/A (Customer provided power plant)		
Input Protection	no input fuse	Input Protection Make & Model	N/A (Customer provided power plant)		
Redundancy Scheme	N/A				
Nominal Voltage	-48VDC	Maximum Voltage	-57V	Minimum Voltage	-38V
*25)Max Current at Nominal Voltage	17.2A (add 1.2A if AISG port loaded 2A*29V)	*25)Max Current at Maximum Voltage	14.5A (add 1A if AISG port loaded 2A*29V)	*25)Max Current at Minimum Voltage	21.7A (add 1.5A if AISG port loaded 2A*29V)

Return completed forms to Engineering and Operations Support (EOS)

Richard.damiano@verizonwireless.com

Product Data Sheet DB-B1 and DB-T1 Series

DC and Fiber Management Distribution Boxes for HYBRIFLEX™ Cable

Product Description

The RFS Distribution Box design comes with the option for pluggable over voltage protection (OVP) for up to 6 remote radios and the connection for 6 pairs of optical fiber with LC optical fiber cable management. There is a hybrid cable input with a jumper configuration for power and optical fiber to the remote radio heads (RRHs). A custom wall, a 2-inch pole, and an H-Frame mounting bracket are included. Both the compact and standard design are available with lightening protection.

Features/Benefits

- Designed to accommodate varying diameters of HYBRIFLEX™ (combined power and fiber optic) cables – up to 2 inches
- Supports Single- and Multi-Mode Optical fiber
- NEMA 4x rated enclosure – allows **flexibility for indoor or outdoor installation** on a roof or tower top
- Weatherproof enclosure and ports – **improves system reliability**
- Modular design – makes replacement or addition of OVP easy without removal of other components within the box
- Strikesorb OVP technology – protects equipment from damaging surges up to 60 kA on an 8/20 waveform and up to 5 kA on a 10/350 waveform (certain models only)
- Low residual voltage and high impedance – **ideally suited for RRH technology** – won't shut down the RRH the way spark gap technology does (certain models only)

Technical Specifications

Mechanical Specifications

Model Number	DB-B1-6C-8AB-0Z	DB-T1-6Z-8AB-0Z
Enclosure Design	Standard, 6 OVP's	Standard without OVP
Dimensions - H x W x D, mm (in)	610 x 610 x 254 (24 x 24 x 10)	610 x 610 x 254 (24 x 24 x 10)
Weight, kg (lb)	20 (44)	20 (44)
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum	
Fiber Connection Method	LC-LC Single- or Multi-mode duplex	
Environmental Rating	NEMA 4x	
Operating Temperature, °C (°F)	-40 to +80 (-40 to +176)	
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs	

Electrical Specifications

Nominal Operating Voltage	48 VDC	
Nominal Discharge Current (I_n) per UL 1449 3rd Ed	20 kA 8/20 µs	N/A
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs	N/A
Maximum Impulse (Lightning) Current (I_{imp}) per IEC 61643-1	5 kA 10/350 µs	N/A
Maximum Continuous Operating Voltage (U_c)	75 VDC	N/A
Voltage Protection Rating per UL1449 3rd Ed	400 V	N/A
Protection Class as per IEC 61643-1	Class 1	N/A
Strikesorb OVP Compliance	ANSI/UL 1449-3rd Ed	N/A
	IEEE C62.41	N/A
	NEMA LS-1	N/A
	IEC 61643-1	N/A
	IEC 61643-12	N/A
	EN 61643-11	N/A

* This data is provisional and subject to change.

ATTACHMENT 4

Property Information

Property ID	073060
Location	23 KELLEHER CT
Owner	WETHERSFIELD TOWN OF

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Wethersfield, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 2/3/2016
Properties updated 8/10/2016

sion ID: 10410 | Account #073-060- | Bldg #: 1 of 1 | Sec #: 1 of 1 | Card 1 of 1 | Print Date: 02/22/2014 17:26

CURRENT OWNER	TOPO.	UTILITIES	STRT./ROAD	LOCATION
ETHERSFIELD TOWN OF	1 Level	1 All Public		
REHOUSE #3				
KELLEHER CT				
ETHERSFIELD, CT 06109				
ditional Owners:				

SUPPLEMENTAL DATA

Other ID:		SIDE	E1
LOT NO	7-18	SEQ NO	470400
CALLBACK		PENALTY	
CENSUS	4923	Notice 1 Val	
SECTION	1	DISBLD EX	

GIS ID: 073060 *ASSOC PID#*

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
EXEMPT	BAAX	642,900	450,000
EXEMPT	BAAX	117,400	82,200
EXEMPT	BAAX	1,371,600	960,100
	Total	2,131,900	1,492,300

6159
WETHERSFIELD, C

VISION

RECORD OF OWNERSHIP	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
ETHERSFIELD TOWN OF	0169/0075	06/25/1956	U		0	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2012	100	1,629,500	2010	BAAX	467,300	2008	BAAX	467,3
2012	100	84,700	2010	BAAX	84,700	2008	BAAX	84,7
			2010	BAAX	1,162,200	2008	BAAX	1,162,2
	Total:	1,714,200	*Total:*		1,714,200	*Total:*		1,714,2

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD NAME	STREET INDEX NAME	TRACING	BATCH
0001/A				

NOTES

LL TOWER + EQUIP ON SITE
0 GAL DIESEL TANK
LL TOWER VALUE= 5 SITES@ 3000/MONTH
3000 X 12= 180,000
SS 25% EXP= 135,000/.11= 1,227,250

METRO PCS LEASE
FIREHOUSE 3

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	642,9
Appraised XF (B) Value (Bldg)	
Appraised OB (L) Value (Bldg)	1,371,6
Appraised Land Value (Bldg)	117,4
Special Land Value	
Total Appraised Parcel Value	2,131,9
Valuation Method:	
Adjustment:	
Net Total Appraised Parcel Value	2,131,9

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
M-13-170	08/14/2013	HA	HVAC	21,165	10/07/2013	100	10/01/2013	REPL ONE ROOFTOP A
B-13-46	03/26/2013	CM	Commercial	20,000	05/01/2013	100	10/01/2013	LEASE AREA EXPANDI
B-10-152	08/12/2010	BP		15,000	05/11/2012	100	03/02/2012	Install 3 antnnas, 3 dishes
BP0097	05/11/2009	BP		5,000	10/05/2009	100		Add antenna's and cabine
BP-0093	04/29/2009	BP		15,000	10/05/2009	100		Install antennas and radi
EP-0320	11/25/2008	CM	Commercial	15,000	10/05/2009	100		100 amp service & shutof
EP07225	07/27/2007	EL	Electric	6,400		100		200 amp svce for T-Mobil

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result	
10/7/2013			CR	49	No Change	After Ins
5/1/2013			CR	49	No Change	After Ins
5/11/2012			CR	49	No Change	After Ins
10/5/2009			CR	49	No Change	After Ins
7/25/2008			JL	51	Field review	

LAND LINE VALUATION SECTION

Use Code	Use Description	Zone	D	Frontage	Depth	Units		Unit Price	I. Factor	S.A.		C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing		Adj. Unit Price	Land Value
901C	Municipal MDL-94	A1				1.00	AC	118,800.00	1.00	F		1.00	010	0.90				106,920.00	106,9
901C	Municipal MDL-94	A1				1.30	AC	9,000.00	1.00	0		1.00	010	0.90				8,100.00	10,5

Total Card Land Units: 2.30 AC Parcel Total Land Area: 2.3 AC | Total Land Value: 117,4

sion ID: 10410 | Account #073-060- | Bldg #: 1 of 1 | Sec #: 1 of 1 | Card 1 of 1 | Print Date: 02/22/2014 17:26

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
le	59		Fire Station
del	96		Ind/Comm
ade	06		Good
cupancy	1		
erior Wall 1	20		Brick
erior Wall 2			
of Structure	03		Gable/Hip
of Cover	03		Asphalt Shingl
erior Wall 1	05		Drywall
erior Wall 2	03		Plaster
erior Floor 1	05		Vinyl/Asphalt
erior Floor 2	03		Concr-Finished
ating Fuel	03		Oil/Gas
ating Type	05		Hot Water
Type	03		Central
lg Use	907		Fire-Vol
al Rooms			
al Bedrms	00		
al Baths	0		
at/AC	02		HEAT/AC SPLIT
me Type	03		MASONRY
hs/Plumbing	02		AVERAGE
ling/Wall	06		CEIL & WALLS
oms/Prtns	02		AVERAGE
ll Height	12		
Comn Wall	0		

CONSTRUCTION DETAIL (CONTINUED)

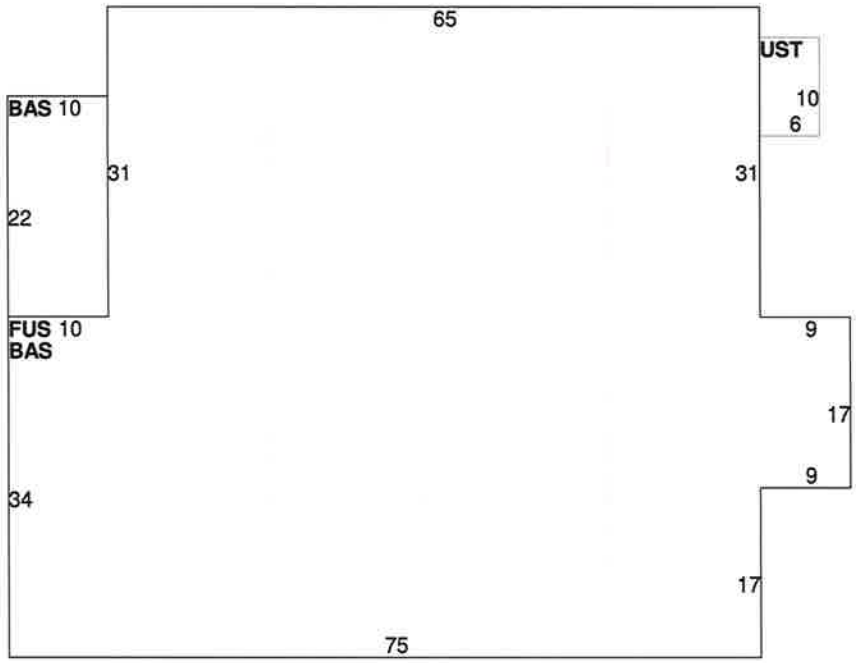
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
901C	Municipal MDL-94	100

COST/MARKET VALUATION

Adj. Base Rate:	85.19
AYB	1969
Dep Code	G
Remodel Rating	
Year Remodeled	
Dep %	22
Functional Obslnc	0
External Obslnc	0
Cost Trend Factor	
Condition	
% Complete	
Overall % Cond	78
Apprais Val	642,900
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

de	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
V1	Asphalt Paving			L	3,600	1.60	1999			G	75	4,300
3	PreCastConCel			L	200	350.00	2008			A	50	35,000
3	PreCastConCel			L	240	350.00	2008			A	50	42,000
3	PreCastConCel			L	360	350.00	2008			A	50	63,000
	CELL SITES			L	5	245,450.00	2008					1,227,300

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
S	First Floor	4,938	4,938			
S	Finished Upper Story	4,718	4,718			
T	Unfinished Storage	0	60