Robinson+Cole

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Also admitted in Massachusetts

July 31, 2017

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
Oliver Road, Enfield, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) antennas at the 149-foot level of an existing 160-foot tower off Oliver Road in Enfield, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). The Council approved Cellco's use of this tower in 1991 (Docket No. 139). Cellco now intends to remove twelve (12) of its existing antennas and install nine (9) new antennas (one (1) model BXA-80063-4CF, 850 MHZ antenna; two (2) model BXA-80080-4CF, 850 MHz antennas; three (3) model SBNHH-1D65B, 700 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas) all at the 149-foot level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") with three (3) newer model RRHs and install six (6) new RRHs and install two (2) HYBRIFLEX™ fiber optic antenna cables attached to the outside of the monopole. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent Bryan Chodkowski, Town Manager of the Town of Enfield; Roger J. O'Brien, Enfield's Town Planner; Crown, the tower owner; and Oliver Road Holding LLC, the owner of the Property.

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

1. The proposed modifications will not result in an increase in the height of the existing structure. Cellco's new antennas and RRHs will be attached to its existing antenna platform at the 149-foot level of the tower.

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

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

4. The installation of new antennas and RRHs 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 parcel map and property owner information is included in Attachment 4. A Certificate of Mailing verifying that this filing was sent to municipal officials and the owner of the Property is included in Attachment 5.

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:
Bryan Chodkowski, Enfield Town Manager
Roger J. O'Brien, Enfield Director of Planning
Oliver Road Holding LLC
Crown Castle
Tim Parks

ATTACHMENT 1

BXA-80063-4CF-EDIN-X

X-Pol | FET Panel | 63° | 13.0 dBd

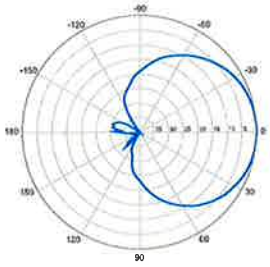
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics				
Frequency bands	806-900 MHz*			
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)			
Polarization	±45°			
Horizontal beamwidth	63°			
Vertical beamwidth	15°			
Gain	13.0 dBd (15.1 dBi)			
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 9, 10, 12, 14			
Impedance	50Ω			
VSWR	≤1.4:1			
Upper sidelobe suppression (0°)	-22.1 dB			
Front-to-back ratio (+/-30°)	-34.9 dB			
Null fill	5% (-26.02 dB)			
Isolation between ports	< -25 dB			
Input power with EDIN connectors	500 W			
Input power with NE connectors	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1205 x 285 x 133 mm		47.4 x 11.2 x 5.2 in	
Depth with z-brackets	173 mm		6.8 in	
Weight without mounting brackets	4.5 kg		9.9 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.34 m²	Side: 0.16 m²	Front: 3.7 ft²	Side: 1.7 ft²
Wind load @ 161 km/hr (100 mph)	Front: 498 N	Side: 260 N	Front: 111 lbf	Side: 55 lbf

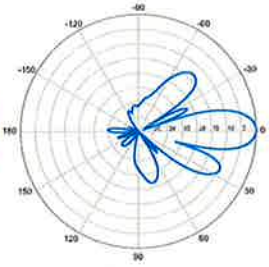
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-80063-4CF-EDIN-X-FP		

BXA-80063-4CF-EDIN-X



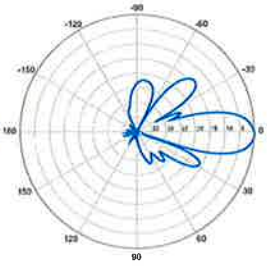
Horizontal

BXA-80063-4CF-EDIN-0



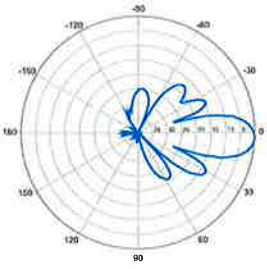
0° | Vertical

BXA-80063-4CF-EDIN-2



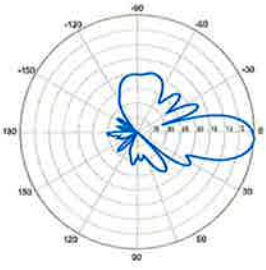
2° | Vertical

BXA-80063-4CF-EDIN-3



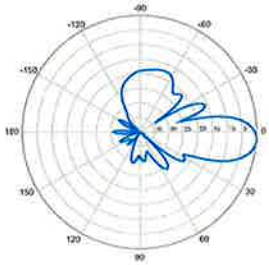
3° | Vertical

BXA-80063-4CF-EDIN-4



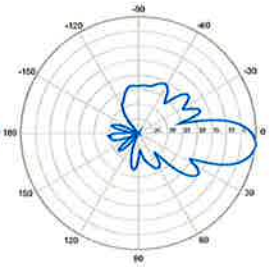
4° | Vertical

BXA-80063-4CF-EDIN-5



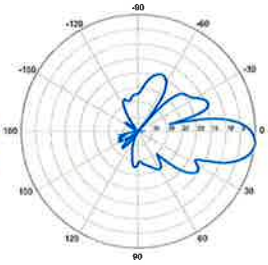
5° | Vertical

BXA-80063-4CF-EDIN-6



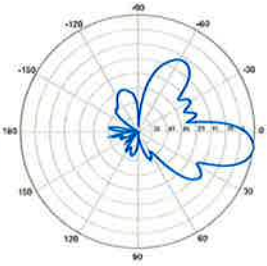
6° | Vertical

BXA-80063-4CF-EDIN-8



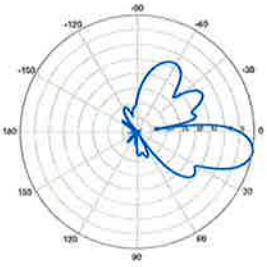
8° | Vertical

BXA-80063-4CF-EDIN-9



9° | Vertical

BXA-80063-4CF-EDIN-10



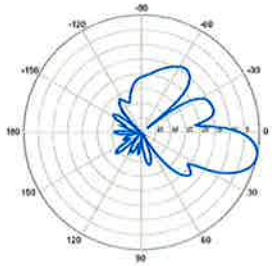
10° | Vertical

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

BXA-80063-4CF-EDIN-X

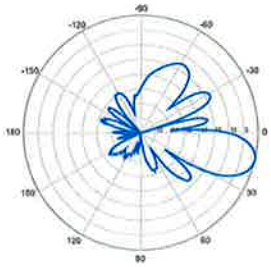
X-Pol | FET Panel | 63° | 13.0 dBd

BXA-80063-4CF-EDIN-12



12° | Vertical

BXA-80063-4CF-EDIN-14



14° | Vertical

BXA-80080-4CF-EDIN-X

X-Pol | FET Panel | 80° | 12.0 dBd

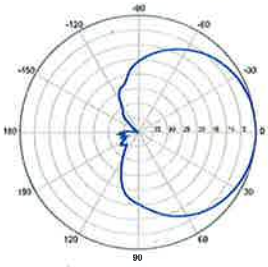
Replace "X" with desired electrical downtilt.

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

Electrical Characteristics		
Frequency bands	806-900 MHz*	
*Optional frequency band for iDEN	806-941 MHz (specify when ordering)	
Polarization	±45°	
Horizontal beamwidth	80°	
Vertical beamwidth	15°	
Gain	12.0 dBd (14.1 dBi)	
Electrical downtilt (X)	0, 2, 4, 6, 8, 10, 12, 14	
Impedance	50Ω	
VSWR	≤1.4:1	
Upper sidelobe suppression (0°)	-13.1 dB	
Front-to-back ratio (+/-30°)	-36.7 dB	
Null fill	5% (-26.02 dB)	
Isolation between ports	< -30 dB	
Input power with EDIN connectors	500 W	
Input power with NE connectors	300 W	
Lightning protection	Direct Ground	
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)	
Mechanical Characteristics		
Dimensions Length x Width x Depth	1206 x 204 x 151 mm	47.5 x 8.0 x 5.9 in
Depth with z-brackets	196 mm	7.7 in
Weight without mounting brackets	5.4 kg	12 lbs
Survival wind speed	> 201 km/hr	> 125 mph
Wind area	Front: 0.25 m^2 Side: 0.18 m^2	Front: 2.6 ft^2 Side: 1.9 ft^2
Wind load @ 161 km/hr (100 mph)	Front: 351 N Side: 280 N	Front: 79 lbf Side: 61 lbf

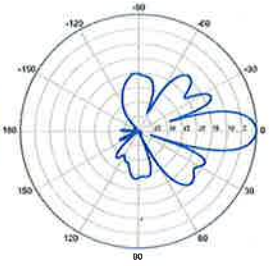
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting & Downtilt Bracket Kit	36210006	40-115 mm 1.57-4.5 in	4.1 kg 9 lbs
Concealment Configurations	For concealment configurations, order BXA-80080-4CF-EDIN-X-FP		

BXA-80080-4CF-EDIN-X



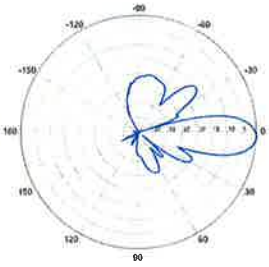
Horizontal

BXA-80080-4CF-EDIN-0



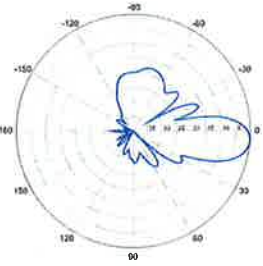
0° | Vertical

BXA-80080-4CF-EDIN-2



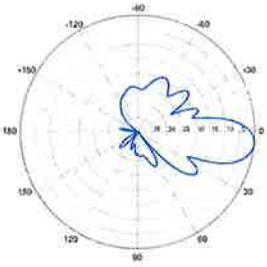
2° | Vertical

BXA-80080-4CF-EDIN-4



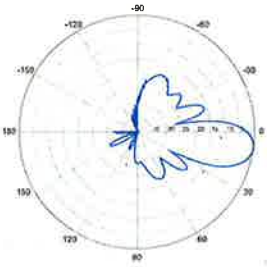
4° | Vertical

BXA-80080-4CF-EDIN-6



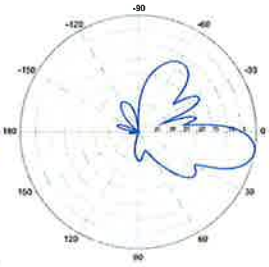
6° | Vertical

BXA-80080-4CF-EDIN-8



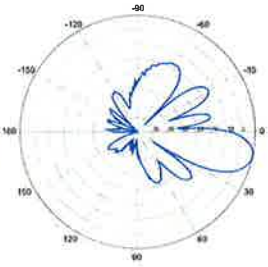
8° | Vertical

BXA-80080-4CF-EDIN-10



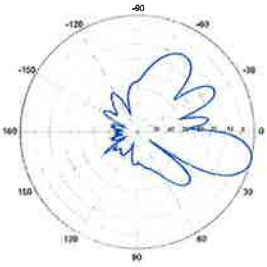
10° | Vertical

BXA-80080-4CF-EDIN-12



12° | Vertical

BXA-80080-4CF-EDIN-14



14° | Vertical

Product Specifications

COMMSCOPE®

SBNHH-1D65B

6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 65° HPBW, 2x RET. Both high bands share the same electrical tilt.

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

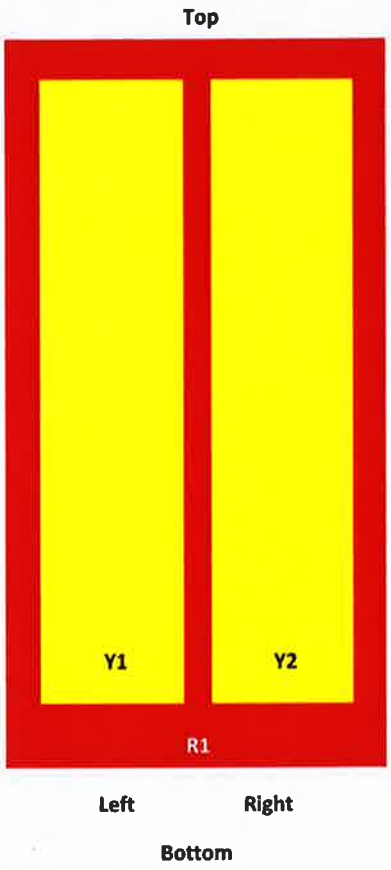
* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

Array Layout

Product Specifications

SBNHH-1D65B

SBNHH 65



Array	Freq (MHz)	Conns	RET (MRET)	AISG RET UID
R1	698-896	1-2	1	ANxxxxxxxxxxxxxxxxx.1
Y1	1695-2360	3-4	2	ANxxxxxxxxxxxxxxxxx.2
Y2	1695-2360	5-6		

View from the front of the antenna

(Sizes of colored boxes are not true depictions of array sizes)

General Specifications

Operating Frequency Band	1695 – 2360 MHz | 698 – 896 MHz
Antenna Type	Sector
Band	Multiband
Performance Note	Outdoor usage

Mechanical Specifications

RF Connector Quantity, total	6
RF Connector Quantity, low band	2
RF Connector Quantity, high band	4
RF Connector Interface	7-16 DIN Female

Product Specifications

SBNHH-1D65B

Color	Light gray
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Location	Bottom
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

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

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

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

Regulatory Compliance/Certifications

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

Product Specifications

SBNHH-1D65B

Included Products

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

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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

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

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

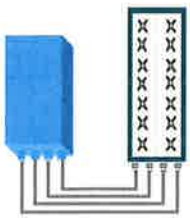
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

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.

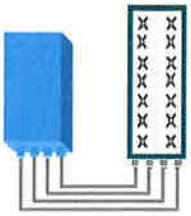
Its compactness and slim design makes the Alcatel-Lucent B25 RRH4x30 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

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.

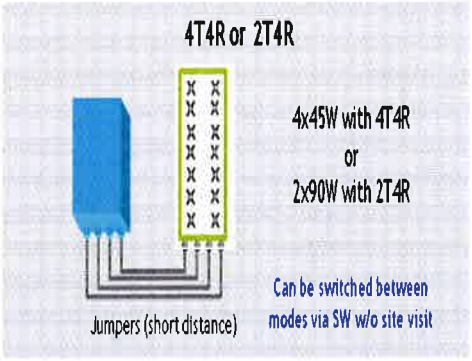
The Alcatel-Lucent B66a RRH4x45 product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x90W or 4x45W RF output power. It also supports 4-way Rx diversity at the 70 MHz instantaneous bandwidth.

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

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)

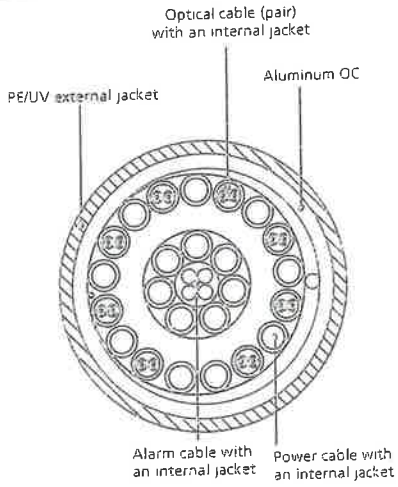


Figure 2: Construction Detail

* This data is provisional and subject to change

ATTACHMENT 2

	General	Power	Density					
Site Name: Enfield								
Tower Height: 160Ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T UMTS	2	565	160	880	0.0171	0.5867	0.29%	
*AT&T UMTS	2	875	160	1900	0.0265	1.0000	0.27%	
*AT&T GSM	1	283	160	880	0.0043	0.5867	0.07%	
*AT&T GSM	4	525	160	1900	0.0318	1.0000	0.32%	
*AT&T LTE	1	1375	160	734	0.0208	0.4893	0.43%	
*T-Mobile GSM/UMTS	2	2334	117	1900	0.1363	1.0000	1.36%	
*T-Mobile UMTS	4	1167	117	1900	0.1363	1.0000	1.36%	
*T-Mobile LTE	1	865	117	700	0.0253	0.4667	0.54%	
*Clearwire	2	153	137	2496	0.0064	1.0000	0.06%	
*Clearwire	1	211	139	11 GHz	0.0043	1.0000	0.04%	
*Sprint CDMA/LTE	3	348	135	1900	0.0225	1.0000	0.23%	
*Sprint CDMA/LTE	1	195	135	850	0.0042	0.5667	0.07%	
*Sprint CDMA/LTE	2	195	135	2500	0.0084	1.0000	0.08%	
*Nextel	1	542	130	851	0.0127	0.5673	0.22%	
*XM Sat Radio	1	293	95	2330	0.0133	1.0000	0.13%	
*Page Net	1	510	110	930	0.0170	0.6200	0.27%	
Verizon	**0**	**408**	**149**	**0.0000**	**1970**	**1.0000**	**0.00%**	
Verizon	**9**	**399**	**149**	**0.0582**	**869**	**0.5793**	**10.04%**	
Verizon	**1**	**7951**	**149**	**0.1288**	**2145**	**1.0000**	**12.88%**	
Verizon	**1**	**2583**	**149**	**0.0418**	**746**	**0.4973**	**8.41%**	
								37.09%
* Source: Siting Council								

ATTACHMENT 3

PJF PAUL J. FORD & COMPANY

Date: **December 12, 2016**

Sean Dempsey
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Paul J. Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
mscroggy@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	NA
	Carrier Site Name:	Enfield, CT
Crown Castle Designation:	**Crown Castle BU Number:**	806373
	Crown Castle Site Name:	HRT 101 943232
	Crown Castle JDE Job Number:	392783
	Crown Castle Work Order Number:	1313984
	Crown Castle Application Number:	357336 Rev. 7
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37516-2997.003.7805
Site Data:	**4 Oliver Road, ENFIELD, Hartford County, CT**	
	Latitude 41° 57' 36.2", Longitude -72° 35' 32.3"	
	160 Foot - Monopole Tower	

Dear Sean Dempsey,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 968318, in accordance with application 357336, revision 7.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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

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

Respectfully submitted by:

Morgan Scroggy, E.I.
Structural Designer

STATE OF CONNECTICUT JUSTIN TERAINE No. 30301 LICENSED PROFESSIONAL ENGINEER

12/12/16

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by VALMONT in November of 1991. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-E.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
149.0	149.0	3	alcatel lucent	B13 RRH 4X30	2	1-5/8	-
		3	alcatel lucent	PCS B25 RRH4x30			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		1	antel	BXA-80063/4CF w/ Mount Pipe			
		2	antel	BXA-80080/4CF w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
158.0	163.0	3	andrew	SBNH-1D6565C w/ Mount Pipe	1 2 1 12	3/8 3/4 1/8 1-5/8	1
		3	ericsson	RRUS-11			
		6	powerwave technologies	7770.00 w/ Mount Pipe			
		6		LGP13519			
		6		LGP21401			
		1	raycap	DC6-48-60-18-8F			
	158.0	1	tower mounts	Platform Mount [LP 303-1]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
149.0	149.0	2	antel	LPA-80063/4CF w/ Mount Pipe	2 1	7/8 1-1/4	2
		6	rfs celwave	FD9R6004/2C-3L			
		4	antel	LPA-80080/4CF w/ Mount Pipe			
		3	kathrein	742 213 w/ Mount Pipe			
		3	alcatel lucent	RRH2x40-AWS			
		1	antel	BXA-185063/8CF w/ Mount Pipe			
		2	antel	BXA-185090/8CFx2 w/ Pipe			
		1	antel	BXA-70063/6CF w/ Mount Pipe	10	7/8	1
		1	antel	BXA-70063/6CFx4 w/ Mount Pipe			
		1	antel	BXA-70063/6CFx6 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount (LP 101-1)			
137.0	138.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-	1
	137.0	1	tower mounts	Side Arm Mount [SO 102-3]			
	135.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
135.0	139.0	1	andrew	VHLP2.5-11	1 3 6 1	5/8 1-1/4 1/4 1/2	1
		1	dragonwave	HORIZON COMPACT			
	135.0	3	alcatel lucent	TD-RRH8x20-25			
		3	argus technologies	LLPX310R-V1 w/ Mount Pipe			
		1	motorola	TIMING 2000			
		1	rfs celwave	APXV9ERR18-C-A20 w/ Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	samsung telecom	WIMAX DAP HEAD			
		1	tower mounts	Platform Mount [LP 602-1]			
116.0	117.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	1 6	1-1/4 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	KRY 112 144/1			
		3	ericsson	RRUS 11 B12			
	116.0	1	tower mounts	T-Arm Mount [TA 602-3]			
47.0	48.0	1	lucent	KS24019-L112A	1	1/2	1
	47.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed, Not Considered in this SA

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
-	-	-	-	-	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 07-07210G, 07/26/2007	821582	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 128355, 02/12/2013	3747614	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	SAC, 1991-16, 11/06/1991	821581	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 10614-91, 11/09/1991	822743	CCISITES
4-TOWER PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37516-2997.002.7700, 9/29/2016	6488069	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Monopole was fabricated and installed in accordance with the manufacturer's specifications.
2) Monopole has been properly maintained in accordance with manufacturer's specifications.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was modified in conformance with the referenced modification drawings.
5) Monopole will be modified in conformance with the attached proposed modification drawings.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 150.5	Pole	TP20x20x0.25	1	-2.31	488.62	28.1	Pass
L2	150.5 - 150	Pole	TP20.3x20x0.25	2	-2.34	496.04	28.7	Pass
L3	150 - 120	Pole	TP26.4499x20.3x0.25	3	-9.35	1456.15	85.3	Pass
L4	120 - 111.75	Pole	TP28.1411x26.4499x0.2846	4	-12.21	1809.32	88.0	Pass
L5	111.75 - 97.17	Pole	TP31.13x28.1411x0.3051	5	-13.92	2077.52	96.6	Pass
L6	97.17 - 79.3333	Pole	TP34.2872x29.5297x0.3795	6	-19.43	3029.58	97.2	Pass
L7	79.3333 - 75.25	Pole	TP35.1244x34.2872x0.4787	7	-20.57	3936.04	79.1	Pass
L8	75.25 - 63.25	Pole	TP37.5848x35.1244x0.4623	8	-24.00	4073.53	87.1	Pass
L9	63.25 - 49.08	Pole	TP40.49x37.5848x0.5249	9	-26.72	4828.03	79.8	Pass
L10	49.08 - 37.75	Pole	TP42.0621x38.2264x0.5505	10	-34.46	5423.96	83.6	Pass
L11	37.75 - 35.75	Pole	TP42.472x42.0621x0.5819	11	-35.25	5785.32	79.7	Pass
L12	35.75 - 0	Pole	TP49.8x42.472x0.5142	12	-49.40	5826.66	98.4	Pass
							Summary	
						Pole (L12)	98.4	Pass
						RATING =	**98.4**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	99.2	Pass
1	Base Plate	0	63.6	Pass
1	Base Foundation – Steel	0	70.9	Pass
1	Base Foundation Soil Interaction	0	81.8	Pass
1	Extension Connection	150	14.5	Pass

Structure Rating (max from all components) =	**99.2%**

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

4.1) Recommendations

The monopole and its foundation will have sufficient capacity to carry the proposed loading configuration once the proposed modifications are installed.

- Install the proposed modifications per the referenced drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.00 mph.
4) Structure Class II.
5) Exposure Category C.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 1.0000 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50.00 mph is used in combination with ice.
12) Temperature drop of 50.00 °F.
13) Deflections calculated using a wind speed of 60.00 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) 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	160.0000-150.5000	9.5000	0.00	Round	20.0000	20.0000	0.2500		A53-B-35 (35 ksi)
L2	150.5000-150.0000	0.5000	0.00	Round	20.0000	20.3000	0.2500		A53-B-35 (35 ksi)
L3	150.0000-120.0000	30.0000	0.00	12	20.3000	26.4499	0.2500	1.0000	A572-65 (65 ksi)
L4	120.0000-111.7500	8.2500	0.00	12	26.4499	28.1411	0.2846	1.1386	Reinf 65.00 ksi (65 ksi)
L5	111.7500-	14.5800	4.83	12	28.1411	31.1300	0.3051	1.2203	Reinf 65.00 ksi

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
	97.1700								(65 ksi)
L6	97.1700-79.3333	22.6667	0.00	12	29.5297	34.2872	0.3795	1.5182	Reinf 65.00 ksi (65 ksi)
L7	79.3333-75.2500	4.0833	0.00	12	34.2872	35.1244	0.4787	1.9146	Reinf 65.00 ksi (65 ksi)
L8	75.2500-63.2500	12.0000	0.00	12	35.1244	37.5848	0.4623	1.8493	Reinf 65.00 ksi (65 ksi)
L9	63.2500-49.0800	14.1700	5.92	12	37.5848	40.4900	0.5249	2.0997	Reinf 65.00 ksi (65 ksi)
L10	49.0800-37.7500	17.2500	0.00	12	38.2264	42.0621	0.5505	2.2020	Reinf 65.00 ksi (65 ksi)
L11	37.7500-35.7500	2.0000	0.00	12	42.0621	42.4720	0.5819	2.3275	Reinf 65.00 ksi (65 ksi)
L12	35.7500-0.0000	35.7500		12	42.4720	49.8000	0.5142	2.0569	Reinf 65.00 ksi (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	20.0000	15.5116	756.4335	6.9832	10.0000	75.6434	1512.8671	7.7512	0.0000	0
	20.0000	15.5116	756.4335	6.9832	10.0000	75.6434	1512.8671	7.7512	0.0000	0
L2	20.0000	15.5116	756.4335	6.9832	10.0000	75.6434	1512.8671	7.7512	0.0000	0
	20.3000	15.7472	791.4264	7.0893	10.1500	77.9730	1582.8528	7.8689	0.0000	0
L3	21.0161	16.1403	828.1804	7.1779	10.5154	78.7588	1678.1181	7.9437	4.7704	19.082
	27.3830	21.0909	1847.9118	9.3796	13.7011	134.8737	3744.3702	10.3803	6.4186	25.674
L4	27.3830	23.9815	2095.6242	9.3672	13.7011	152.9535	4246.3029	11.8030	6.3257	22.224
	29.1339	25.5316	2528.8170	9.9726	14.5771	173.4786	5124.0688	12.5659	6.7790	23.816
L5	29.1339	27.3450	2704.4493	9.9653	14.5771	185.5271	5479.9476	13.4584	6.7242	22.041
	32.2281	30.2811	3672.4969	11.0353	16.1253	227.7469	7441.4743	14.9034	7.5252	24.666
L6	31.6209	35.6250	3863.8685	10.4358	15.2964	252.6001	7829.2451	17.5335	6.8968	18.171
	35.4967	41.4392	6081.2604	12.1389	17.7608	342.3983	12322.2824	20.3951	8.1718	21.531
L7	35.4967	52.1086	7602.3696	12.1035	17.7608	428.0426	15404.4619	25.6463	7.9062	16.517
	36.3635	53.3990	8181.2349	12.4032	18.1944	449.6557	16577.3999	26.2814	8.1305	16.986
L8	36.3635	51.6015	7913.3023	12.4090	18.1944	434.9296	16034.4959	25.3967	8.1743	17.681
	38.9106	55.2642	9720.8163	13.2898	19.4689	499.2997	19697.0093	27.1994	8.8337	19.107
L9	38.9106	62.6413	10981.2842	13.2674	19.4689	564.0423	22251.0590	30.8301	8.6659	16.509
	41.9183	67.5519	13771.6174	14.3075	20.9738	656.6099	27905.0306	33.2470	9.4445	17.992
L10	40.9377	66.7858	12100.3146	13.4880	19.8013	611.0881	24518.5179	32.8700	8.7693	15.929
	43.5459	73.5851	16185.0557	14.8611	21.7882	742.8375	32795.3108	36.2164	9.7973	17.797
L11	43.5459	77.7195	17068.5828	14.8499	21.7882	783.3883	34585.5763	38.2512	9.7132	16.693
	43.9703	78.4876	17579.6813	14.9967	22.0005	799.0578	35621.2005	38.6292	9.8231	16.882
L12	43.9703	69.4746	15611.2384	15.0209	22.0005	709.5852	31632.6015	34.1933	10.0044	19.455
	51.5568	81.6084	25302.5254	17.6443	25.7964	980.8549	51269.7763	40.1652	11.9683	23.274

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
FB-L98B-002-75000(3/8")	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	158.0000 - 0.0000	2	No Ice	0.0000	0.59
						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
2" Conduit	C	No	Inside Pole	158.0000 - 0.0000	1	No Ice	0.0000	1.16
						1/2" Ice	0.0000	1.16
						1" Ice	0.0000	1.16
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	158.0000 - 0.0000	9	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	158.0000 - 0.0000	3	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
1266A(1/8")	C	No	CaAa (Out Of Face)	158.0000 - 0.0000	1	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.53
						1" Ice	0.0000	1.54
***								
LDF5-50A(7/8")	C	No	Inside Pole	149.0000 - 0.0000	10	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
HB158-1-08U8-S8J18(1-5/8")	C	No	CaAa (Out Of Face)	149.0000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	2.81
						1" Ice	0.0000	4.94
HB158-1-08U8-S8J18(1-5/8")	C	No	CaAa (Out Of Face)	135.0000 - 0.0000	1	No Ice	0.0000	1.30
						1/2" Ice	0.0000	2.81
						1" Ice	0.0000	4.94
HB158-1-08U8-S8J18(1-5/8")	C	No	CaAa (Out Of Face)	149.0000 - 135.0000	1	No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
***								
LDF1-50A(1/4")	C	No	Inside Pole	135.0000 - 0.0000	6	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
FSJ4-50B(1/2")	C	No	CaAa (Out Of Face)	135.0000 - 0.0000	1	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.76
						1" Ice	0.0000	2.00
2" Conduit	C	No	CaAa (Out Of Face)	135.0000 - 0.0000	1	No Ice	0.1740	1.16
						1/2" Ice	0.2740	2.53
						1" Ice	0.3740	4.51
HB058-M12-XXXF(5/8")	C	No	Inside Pole	135.0000 - 0.0000	1	No Ice	0.0000	0.24
						1/2" Ice	0.0000	0.24
						1" Ice	0.0000	0.24
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	135.0000 - 0.0000	3	No Ice	0.0000	1.08
						1/2" Ice	0.0000	1.08
						1" Ice	0.0000	1.08
***								
AL7-50(1 5/8)	C	No	CaAa (Out Of Face)	116.0000 - 0.0000	6	No Ice	0.0000	0.52
						1/2" Ice	0.0000	2.02
						1" Ice	0.0000	4.14
MLE Hybrid 3Power/6Fiber RL 2(1 1/4")	C	No	CaAa (Out Of Face)	116.0000 - 0.0000	1	No Ice	0.0000	0.68
						1/2" Ice	0.0000	1.75
						1" Ice	0.0000	3.43
***								
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	47.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.84
						1" Ice	0.0000	2.14
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	112.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
3/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	120.2500 - 112.5000	1	No Ice	0.1250	0.00
						1/2" Ice	0.2361	0.00
						1" Ice	0.3472	0.00
***								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	82.0100 - 32.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00

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
SBNH-1D6565C w/ Mount Pipe	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	11.5561 12.2227 12.8929	9.7151 11.1857 12.5942	0.10 0.19 0.28
SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	11.5561 12.2227 12.8929	9.7151 11.1857 12.5942	0.10 0.19 0.28
SBNH-1D6565C w/ Mount Pipe	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	11.5561 12.2227 12.8929	9.7151 11.1857 12.5942	0.10 0.19 0.28
(2) 7770.00 w/ Mount Pipe	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	5.8041 6.2677 6.6966	4.5789 5.5082 6.2127	0.09 0.14 0.21
(2) 7770.00 w/ Mount Pipe	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	5.8041 6.2677 6.6966	4.5789 5.5082 6.2127	0.09 0.14 0.21
(2) 7770.00 w/ Mount Pipe	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	5.8041 6.2677 6.6966	4.5789 5.5082 6.2127	0.09 0.14 0.21
(2) LGP21401	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.01 0.02 0.03
(2) LGP21401	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.01 0.02 0.03
(2) LGP21401	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	1.1040 1.2388 1.3810	0.3471 0.4422 0.5444	0.01 0.02 0.03
(2) LGP13519	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	0.2897 0.3617 0.4411	0.1806 0.2407 0.3103	0.01 0.01 0.01
(2) LGP13519	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	0.2897 0.3617 0.4411	0.1806 0.2407 0.3103	0.01 0.01 0.01
(2) LGP13519	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	0.2897 0.3617 0.4411	0.1806 0.2407 0.3103	0.01 0.01 0.01
RRUS-11	A	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-11	B	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
RRUS-11	C	From Leg	4.0000 0.00 5.00	0.0000	158.0000	No Ice 1/2" Ice 1" Ice	2.7908 2.9984 3.2134	1.1923 1.3395 1.4957	0.05 0.07 0.09
DC6-48-60-18-8F	A	From Leg	4.0000 0.00	0.0000	158.0000	No Ice 1/2"	0.9167 1.4583	0.9167 1.4583	0.02 0.04

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
			5.00			Ice	1.6431	1.6431	0.06
						1" Ice			
Platform Mount [LP 303-1]	C	None		0.0000	158.0000	No Ice	14.6600	14.6600	1.25
						1/2" Ice	18.8700	18.8700	1.48
						1" Ice	23.0800	23.0800	1.71
***									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	8.3995	7.0730	0.07
						1/2" Ice	8.9639	8.2637	0.14
						1" Ice	9.4943	9.1753	0.21
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	8.3995	7.0730	0.07
						1/2" Ice	8.9639	8.2637	0.14
						1" Ice	9.4943	9.1753	0.21
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	8.3995	7.0730	0.07
						1/2" Ice	8.9639	8.2637	0.14
						1" Ice	9.4943	9.1753	0.21
B13 RRH 4X30	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.0552	1.3201	0.06
						1/2" Ice	2.2405	1.4754	0.07
						1" Ice	2.4333	1.6376	0.09
B13 RRH 4X30	B	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.0552	1.3201	0.06
						1/2" Ice	2.2405	1.4754	0.07
						1" Ice	2.4333	1.6376	0.09
B13 RRH 4X30	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.0552	1.3201	0.06
						1/2" Ice	2.2405	1.4754	0.07
						1" Ice	2.4333	1.6376	0.09
PCS B25 RRH4x30	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.2000	1.7417	0.06
						1/2" Ice	2.3926	1.9204	0.08
						1" Ice	2.5926	2.1065	0.10
PCS B25 RRH4x30	B	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.2000	1.7417	0.06
						1/2" Ice	2.3926	1.9204	0.08
						1" Ice	2.5926	2.1065	0.10
PCS B25 RRH4x30	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.2000	1.7417	0.06
						1/2" Ice	2.3926	1.9204	0.08
						1" Ice	2.5926	2.1065	0.10
RRH4X45-AWS4 B66	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.6600	1.5861	0.06
						1/2" Ice	2.8781	1.7690	0.08
						1" Ice	3.1037	1.9588	0.11
RRH4X45-AWS4 B66	B	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.6600	1.5861	0.06
						1/2" Ice	2.8781	1.7690	0.08
						1" Ice	3.1037	1.9588	0.11
RRH4X45-AWS4 B66	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	2.6600	1.5861	0.06
						1/2" Ice	2.8781	1.7690	0.08
						1" Ice	3.1037	1.9588	0.11
DB-T1-6Z-8AB-0Z	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	4.8000	2.0000	0.04
						1/2" Ice	5.0704	2.1926	0.08
						1" Ice	5.3481	2.3926	0.12
BXA-80063/4CF w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice	4.9453	3.4238	0.03
						1/2" Ice	5.3243	4.0221	0.07
						1" Ice	5.7120	4.6369	0.12
BXA-80080/4CF w/ Mount Pipe	B	From Leg	4.0000 0.00	0.0000	149.0000	No Ice	5.0367	4.0332	0.03
						1/2"	5.4214	4.6550	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			Ice	5.8135	5.2815	0.13
						1" Ice			
BXA-80080/4CF w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	5.0367 5.4214 5.8135	4.0332 4.6550 5.2815	0.03 0.08 0.13
BXA-70063/6CFx6 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	7.8065 8.3569 8.8720	5.3981 6.5465 7.4089	0.04 0.10 0.17
BXA-70063/6CF w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	7.8193 8.3705 8.8861	5.4071 6.5581 7.4216	0.04 0.10 0.17
BXA-70063/6CFx4 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	7.8065 8.3569 8.8720	5.3981 6.5465 7.4089	0.04 0.10 0.17
DB-T1-6Z-8AB-0Z	A	From Leg	4.0000 0.00 0.00	0.0000	149.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
Platform Mount (LP 101-1)	C	None		0.0000	149.0000	No Ice 1/2" Ice 1" Ice	36.2100 42.8200 49.4300	36.2100 42.8200 49.4300	1.50 2.30 3.10
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	2.0000 0.00 -2.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice	2.0583 2.2398 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	2.0000 0.00 -2.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice	2.0583 2.2398 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	2.0000 0.00 -2.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice	2.0583 2.2398 2.4287	1.9317 2.1087 2.2931	0.06 0.09 0.11
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.0000 0.00 1.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.0000 0.00 1.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.0000 0.00 1.00	0.0000	137.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2381 2.4407 2.6507	0.06 0.08 0.11
Side Arm Mount [SO 102-3]	C	None		0.0000	137.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
***									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	6.9458 8.1266 9.0212	0.08 0.15 0.23
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	8.2619 8.8215 9.3462	7.4708 8.6564 9.5559	0.09 0.16 0.24
APXVSPP18-C-A20 w/	C	From Leg	4.0000	0.0000	135.0000	No Ice	8.2619	6.9458	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Mount Pipe			0.00 0.00			1/2" Ice 1" Ice	8.8215 9.3462	8.1266 9.0212	0.15 0.23
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	6.5799 7.0306 7.4733	4.9591 5.7544 6.4723	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
LLPX310R-V1 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	4.5378 4.8914 5.2539	2.9834 3.5263 4.0859	0.05 0.08 0.13
LLPX310R-V1 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	4.5378 4.8914 5.2539	2.9834 3.5263 4.0859	0.05 0.08 0.13
LLPX310R-V1 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	4.5378 4.8914 5.2539	2.9834 3.5263 4.0859	0.05 0.08 0.13
TIMING 2000	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	0.1079 0.1518 0.2031	0.1079 0.1518 0.2031	0.00 0.00 0.01
WIMAX DAP HEAD	A	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	1.5467 1.7037 1.8681	0.6840 0.7999 0.9228	0.03 0.04 0.06
WIMAX DAP HEAD	B	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	1.5467 1.7037 1.8681	0.6840 0.7999 0.9228	0.03 0.04 0.06
WIMAX DAP HEAD	C	From Leg	4.0000 0.00 0.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	1.5467 1.7037 1.8681	0.6840 0.7999 0.9228	0.03 0.04 0.06
HORIZON COMPACT	C	From Leg	4.0000 0.00 4.00	0.0000	135.0000	No Ice 1/2" Ice 1" Ice	0.7208 0.8278 0.9422	0.3681 0.4499 0.5391	0.01 0.02 0.03
Platform Mount [LP 602-1]	C	None		0.0000	135.0000	No Ice 1/2" Ice 1" Ice	32.0300 38.7100 45.3900	32.0300 38.7100 45.3900	1.34 1.80 2.26
***									
ERICSSON AIR 21 B4A	A	From Leg	4.0000	0.0000	116.0000	No Ice	6.3186	5.6334	0.11

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
B2P w/ Mount Pipe			0.00					1/2" Ice	6.7646	6.4160	0.17
			1.00					1" Ice	7.2032	7.1208	0.23
ERICSSON AIR 21 B4A	B	From Leg	4.0000			0.0000	116.0000	No Ice	6.3186	5.6334	0.11
B2P w/ Mount Pipe			0.00					1/2" Ice	6.7646	6.4160	0.17
			1.00					1" Ice	7.2032	7.1208	0.23
ERICSSON AIR 21 B4A	C	From Leg	4.0000			0.0000	116.0000	No Ice	6.3186	5.6334	0.11
B2P w/ Mount Pipe			0.00					1/2" Ice	6.7646	6.4160	0.17
			1.00					1" Ice	7.2032	7.1208	0.23
ERICSSON AIR 21 B2A	A	From Leg	4.0000			0.0000	116.0000	No Ice	6.3292	5.6424	0.11
B4P w/ Mount Pipe			0.00					1/2" Ice	6.7751	6.4259	0.17
			1.00					1" Ice	7.2137	7.1313	0.23
ERICSSON AIR 21 B2A	B	From Leg	4.0000			0.0000	116.0000	No Ice	6.3292	5.6424	0.11
B4P w/ Mount Pipe			0.00					1/2" Ice	6.7751	6.4259	0.17
			1.00					1" Ice	7.2137	7.1313	0.23
ERICSSON AIR 21 B2A	C	From Leg	4.0000			0.0000	116.0000	No Ice	6.3292	5.6424	0.11
B4P w/ Mount Pipe			0.00					1/2" Ice	6.7751	6.4259	0.17
			1.00					1" Ice	7.2137	7.1313	0.23
KRY 112 144/1	A	From Leg	4.0000			0.0000	116.0000	No Ice	0.3500	0.1750	0.01
			0.00					1/2" Ice	0.4259	0.2343	0.01
			1.00					1" Ice	0.5093	0.3009	0.02
KRY 112 144/1	B	From Leg	4.0000			0.0000	116.0000	No Ice	0.3500	0.1750	0.01
			0.00					1/2" Ice	0.4259	0.2343	0.01
			1.00					1" Ice	0.5093	0.3009	0.02
KRY 112 144/1	C	From Leg	4.0000			0.0000	116.0000	No Ice	0.3500	0.1750	0.01
			0.00					1/2" Ice	0.4259	0.2343	0.01
			1.00					1" Ice	0.5093	0.3009	0.02
LNX-6515DS-VTM w/	A	From Leg	4.0000			0.0000	116.0000	No Ice	11.6828	9.8418	0.08
Mount Pipe			0.00					1/2" Ice	12.4043	11.3657	0.17
			1.00					1" Ice	13.1351	12.9138	0.27
LNX-6515DS-VTM w/	B	From Leg	4.0000			0.0000	116.0000	No Ice	11.6828	9.8418	0.08
Mount Pipe			0.00					1/2" Ice	12.4043	11.3657	0.17
			1.00					1" Ice	13.1351	12.9138	0.27
LNX-6515DS-VTM w/	C	From Leg	4.0000			0.0000	116.0000	No Ice	11.6828	9.8418	0.08
Mount Pipe			0.00					1/2" Ice	12.4043	11.3657	0.17
			1.00					1" Ice	13.1351	12.9138	0.27
RRUS 11 B12	A	From Leg	4.0000			0.0000	116.0000	No Ice	2.8333	1.1821	0.05
			0.00					1/2" Ice	3.0426	1.3299	0.07
			1.00					1" Ice	3.2593	1.4848	0.10
RRUS 11 B12	B	From Leg	4.0000			0.0000	116.0000	No Ice	2.8333	1.1821	0.05
			0.00					1/2" Ice	3.0426	1.3299	0.07
			1.00					1" Ice	3.2593	1.4848	0.10
RRUS 11 B12	C	From Leg	4.0000			0.0000	116.0000	No Ice	2.8333	1.1821	0.05
			0.00					1/2" Ice	3.0426	1.3299	0.07
			1.00					1" Ice	3.2593	1.4848	0.10
T-Arm Mount [TA 602-3]	C	None				0.0000	116.0000	No Ice	11.5900	11.5900	0.77
								1/2" Ice	15.4400	15.4400	0.99
								1" Ice	19.2900	19.2900	1.21
***											
KS24019-L112A	B	From Leg	3.0000			0.0000	47.0000	No Ice	0.1407	0.1407	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 1.00			1/2" Ice 1" Ice	0.1979 0.2621	0.1979 0.2621	0.01 0.01
Side Arm Mount [SO 701-1]	B	None		0.0000	47.0000	No Ice 1/2" Ice 1" Ice	0.8500 1.1400 1.4300	1.6700 2.3400 3.0100	0.07 0.08 0.09

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
VHLP2.5-11	C	Paraboloid w/Shroud (HP)	From Leg	4.0000 0.00 4.00	0.0000		135.0000	2.9167	No Ice 1/2" Ice 1" Ice	6.6800 7.0700 7.4600	0.05 0.08 0.12

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 160.0000-150.5000	155.2500	1.388	31.77	15.833	A	0.000	15.833	15.833	100.00	0.000	0.000
					B	0.000	15.833		100.00	0.000	0.000
					C	0.000	15.833		100.00	0.000	4.455
L2 150.5000-150.0000	150.2494	1.379	31.55	0.840	A	0.000	0.840	0.840	100.00	0.000	0.000
					B	0.000	0.840		100.00	0.000	0.000
					C	0.000	0.840		100.00	0.000	0.297
L3 150.0000-120.0000	134.3423	1.347	30.82	60.499	A	0.000	60.499	60.499	100.00	0.000	0.000
					B	0.000	60.499		100.00	0.000	0.000
					C	0.000	60.499		100.00	0.000	23.233
L4 120.0000-111.7500	115.8324	1.305	29.87	19.428	A	0.000	19.428	19.428	100.00	0.000	0.000
					B	0.000	19.428		100.00	0.000	0.000
					C	0.000	19.428		100.00	0.000	7.399
L5 111.7500-97.1700	104.3375	1.277	29.22	37.277	A	0.000	37.277	37.277	100.00	0.000	0.000
					B	0.000	37.277		100.00	0.000	0.000
					C	0.000	37.277		100.00	0.000	13.627
L6 97.1700-79.3333	88.0800	1.232	28.20	49.882	A	0.000	49.882	49.882	100.00	0.000	0.000
					B	0.000	49.882		100.00	0.000	0.000
					C	0.000	49.882		100.00	0.000	17.229
L7 79.3333-75.2500	77.2834	1.199	27.43	12.226	A	0.000	12.226	12.226	100.00	0.000	0.000
					B	0.000	12.226		100.00	0.000	0.000
					C	0.000	12.226		100.00	0.000	4.667
L8 75.2500-63.2500	69.1823	1.171	26.80	37.637	A	0.000	37.637	37.637	100.00	0.000	0.000
					B	0.000	37.637		100.00	0.000	0.000
					C	0.000	37.637		100.00	0.000	13.716
L9 63.2500-49.0800	56.0771	1.121	25.64	47.723	A	0.000	47.723	47.723	100.00	0.000	0.000
					B	0.000	47.723		100.00	0.000	0.000
					C	0.000	47.723		100.00	0.000	16.196
L10 49.0800-37.7500	43.3567	1.061	24.29	39.883	A	0.000	39.883	39.883	100.00	0.000	0.000
					B	0.000	39.883		100.00	0.000	0.000
					C	0.000	39.883		100.00	0.000	12.950
L11 37.7500-35.7500	36.7484	1.025	23.46	7.293	A	0.000	7.293	7.293	100.00	0.000	0.000
					B	0.000	7.293		100.00	0.000	0.000
					C	0.000	7.293		100.00	0.000	2.286
L12 35.7500-	17.9375	0.881	20.64	142.29	A	0.000	142.295	142.295	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
0.0000				5	B	0.000	142.295		100.00	0.000	0.000
					C	0.000	142.295		100.00	0.000	34.196

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 160.0000-150.5000	155.2500	1.388	8.44	2.3350	19.530	A	0.000	19.530	19.530	100.00	0.000	0.000
						B	0.000	19.530		100.00	0.000	0.000
						C	0.000	19.530		100.00	0.000	14.962
L2 150.5000-150.0000	150.2494	1.379	8.38	2.3273	1.034	A	0.000	1.034	1.034	100.00	0.000	0.000
						B	0.000	1.034		100.00	0.000	0.000
						C	0.000	1.034		100.00	0.000	0.995
L3 150.0000-120.0000	134.3423	1.347	8.19	2.3014	72.006	A	0.000	72.006	72.006	100.00	0.000	0.000
						B	0.000	72.006		100.00	0.000	0.000
						C	0.000	72.006		100.00	0.000	78.135
L4 120.0000-111.7500	115.8324	1.305	7.94	2.2676	22.546	A	0.000	22.546	22.546	100.00	0.000	0.000
						B	0.000	22.546		100.00	0.000	0.000
						C	0.000	22.546		100.00	0.000	26.522
L5 111.7500-97.1700	104.3375	1.277	7.76	2.2440	42.730	A	0.000	42.730	42.730	100.00	0.000	0.000
						B	0.000	42.730		100.00	0.000	0.000
						C	0.000	42.730		100.00	0.000	47.072
L6 97.1700-79.3333	88.0800	1.232	7.49	2.2063	56.552	A	0.000	56.552	56.552	100.00	0.000	0.000
						B	0.000	56.552		100.00	0.000	0.000
						C	0.000	56.552		100.00	0.000	59.479
L7 79.3333-75.2500	77.2834	1.199	7.29	2.1776	13.708	A	0.000	13.708	13.708	100.00	0.000	0.000
						B	0.000	13.708		100.00	0.000	0.000
						C	0.000	13.708		100.00	0.000	15.733
L8 75.2500-63.2500	69.1823	1.171	7.12	2.1537	41.944	A	0.000	41.944	41.944	100.00	0.000	0.000
						B	0.000	41.944		100.00	0.000	0.000
						C	0.000	41.944		100.00	0.000	45.877
L9 63.2500-49.0800	56.0771	1.121	6.81	2.1089	52.703	A	0.000	52.703	52.703	100.00	0.000	0.000
						B	0.000	52.703		100.00	0.000	0.000
						C	0.000	52.703		100.00	0.000	53.384
L10 49.0800-37.7500	43.3567	1.061	6.45	2.0553	43.866	A	0.000	43.866	43.866	100.00	0.000	0.000
						B	0.000	43.866		100.00	0.000	0.000
						C	0.000	43.866		100.00	0.000	42.685
L11 37.7500-35.7500	36.7484	1.025	6.23	2.0216	7.967	A	0.000	7.967	7.967	100.00	0.000	0.000
						B	0.000	7.967		100.00	0.000	0.000
						C	0.000	7.967		100.00	0.000	7.318
L12 35.7500-0.0000	17.9375	0.881	5.48	1.8817	153.507	A	0.000	153.507	153.507	100.00	0.000	0.000
						B	0.000	153.507		100.00	0.000	0.000
						C	0.000	153.507		100.00	0.000	104.530

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 160.0000-150.5000	155.2500	1.388	10.88	15.833	A	0.000	15.833	15.833	100.00	0.000	0.000
					B	0.000	15.833		100.00	0.000	0.000
					C	0.000	15.833		100.00	0.000	4.455
L2 150.5000-150.0000	150.2494	1.379	10.80	0.840	A	0.000	0.840	0.840	100.00	0.000	0.000
					B	0.000	0.840		100.00	0.000	0.000
					C	0.000	0.840		100.00	0.000	0.297
L3 150.0000-120.0000	134.3423	1.347	10.55	60.499	A	0.000	60.499	60.499	100.00	0.000	0.000
					B	0.000	60.499		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	60.499		100.00	0.000	23.233
L4 120.0000-111.7500	115.8324	1.305	10.23	19.428	A	0.000	19.428	19.428	100.00	0.000	0.000
					B	0.000	19.428		100.00	0.000	0.000
					C	0.000	19.428		100.00	0.000	7.399
L5 111.7500-97.1700	104.3375	1.277	10.00	37.277	A	0.000	37.277	37.277	100.00	0.000	0.000
					B	0.000	37.277		100.00	0.000	0.000
					C	0.000	37.277		100.00	0.000	13.627
L6 97.1700-79.3333	88.0800	1.232	9.65	49.882	A	0.000	49.882	49.882	100.00	0.000	0.000
					B	0.000	49.882		100.00	0.000	0.000
					C	0.000	49.882		100.00	0.000	17.229
L7 79.3333-75.2500	77.2834	1.199	9.39	12.226	A	0.000	12.226	12.226	100.00	0.000	0.000
					B	0.000	12.226		100.00	0.000	0.000
					C	0.000	12.226		100.00	0.000	4.667
L8 75.2500-63.2500	69.1823	1.171	9.17	37.637	A	0.000	37.637	37.637	100.00	0.000	0.000
					B	0.000	37.637		100.00	0.000	0.000
					C	0.000	37.637		100.00	0.000	13.716
L9 63.2500-49.0800	56.0771	1.121	8.78	47.723	A	0.000	47.723	47.723	100.00	0.000	0.000
					B	0.000	47.723		100.00	0.000	0.000
					C	0.000	47.723		100.00	0.000	16.196
L10 49.0800-37.7500	43.3567	1.061	8.31	39.883	A	0.000	39.883	39.883	100.00	0.000	0.000
					B	0.000	39.883		100.00	0.000	0.000
					C	0.000	39.883		100.00	0.000	12.950
L11 37.7500-35.7500	36.7484	1.025	8.03	7.293	A	0.000	7.293	7.293	100.00	0.000	0.000
					B	0.000	7.293		100.00	0.000	0.000
					C	0.000	7.293		100.00	0.000	2.286
L12 35.7500-0.0000	17.9375	0.881	7.07	142.295	A	0.000	142.295	142.295	100.00	0.000	0.000
					B	0.000	142.295		100.00	0.000	0.000
					C	0.000	142.295		100.00	0.000	34.196

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 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	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	160 - 150.5	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	26	-11.03	1.17	-0.01
			Max. Mx	20	-2.31	66.47	0.01
			Max. My	2	-2.31	0.04	66.48
			Max. Vy	20	-6.72	66.47	0.01
			Max. Vx	14	6.72	0.10	-66.33
			Max. Torque	4			0.22
L2	150.5 - 150	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.18	1.25	-0.05
			Max. Mx	20	-2.33	69.85	0.01
			Max. My	2	-2.33	0.05	69.86
			Max. Vy	8	6.80	-69.71	0.06
			Max. Vx	2	-6.80	0.05	69.86
			Max. Torque	4			0.23
L3	150 - 120	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.33	11.40	-4.46
			Max. Mx	20	-9.40	652.18	-4.62
			Max. My	14	-9.40	5.75	-652.74
			Max. Vy	8	25.43	-652.04	4.69
			Max. Vx	2	-25.39	-5.79	652.62
			Max. Torque	25			2.78
L4	120 - 111.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.29	14.38	-6.11
			Max. Mx	8	-12.25	-888.63	6.49
			Max. My	14	-12.26	7.82	-889.02
			Max. Vy	8	31.10	-888.63	6.49
			Max. Vx	2	-31.05	-8.24	888.88
			Max. Torque	25			3.21
L5	111.75 - 97.17	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.33	18.53	-8.43
			Max. Mx	8	-13.95	-1200.87	8.59
			Max. My	14	-13.96	10.32	-1200.97
			Max. Vy	8	33.03	-1200.87	8.59
			Max. Vx	2	-32.99	-11.10	1200.76
			Max. Torque	25			3.76
L6	97.17 - 79.3333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.14	28.53	-14.06
			Max. Mx	8	-19.46	-2004.14	13.47
			Max. My	14	-19.46	16.12	-2003.60
			Max. Vy	8	37.84	-2004.14	13.47
			Max. Vx	2	-37.79	-17.74	2003.18
			Max. Torque	25			5.17
L7	79.3333 -	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	75.25						
			Max. Compression	26	-77.63	30.33	-15.08
			Max. Mx	8	-20.59	-2160.34	14.34
			Max. My	14	-20.60	17.17	-2159.70
			Max. Vy	8	38.75	-2160.34	14.34
			Max. Vx	2	-38.71	-18.93	2159.23
			Max. Torque	25			5.48
L8	75.25 - 63.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-84.98	35.67	-18.11
			Max. Mx	8	-24.02	-2640.62	16.89
			Max. My	14	-24.03	20.24	-2639.71
			Max. Vy	8	41.40	-2640.62	16.89
			Max. Vx	2	-41.35	-22.40	2639.08
			Max. Torque	25			6.44
L9	63.25 - 49.08	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-90.35	39.37	-20.22
			Max. Mx	8	-26.74	-2989.19	18.63
			Max. My	14	-26.74	22.36	-2988.12
			Max. Vy	8	43.21	-2989.19	18.63
			Max. Vx	2	-43.16	-24.76	2987.36
			Max. Torque	25			7.11
L10	49.08 - 37.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-104.51	47.19	-24.78
			Max. Mx	8	-34.48	-3769.33	22.23
			Max. My	14	-34.48	26.78	-3767.95
			Max. Vy	8	47.16	-3769.33	22.23
			Max. Vx	2	-47.11	-29.69	3766.87
			Max. Torque	25			8.53
L11	37.75 - 35.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-105.91	48.07	-25.28
			Max. Mx	8	-35.26	-3863.95	22.64
			Max. My	14	-35.27	27.29	-3862.54
			Max. Vy	8	47.57	-3863.95	22.64
			Max. Vx	2	-47.52	-30.26	3861.42
			Max. Torque	25			8.69
L12	35.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-129.73	62.86	-33.79
			Max. Mx	8	-49.40	-5671.43	29.87
			Max. My	14	-49.40	36.39	-5669.67
			Max. Vy	8	53.52	-5671.43	29.87
			Max. Vx	2	-53.47	-40.06	5667.75
			Max. Torque	25			11.06

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 150.5	40.783	47	2.3675	0.0031
L2	150.5 - 150	36.092	47	2.3416	0.0032
L3	150 - 120	35.847	47	2.3390	0.0032
L4	120 - 111.75	22.228	47	1.9136	0.0017
L5	111.75 - 97.17	19.064	47	1.7462	0.0014
L6	102 - 79.3333	15.707	47	1.5396	0.0010
L7	79.3333 - 75.25	9.270	47	1.1346	0.0006
L8	75.25 - 63.25	8.328	47	1.0688	0.0005
L9	63.25 - 49.08	5.893	47	0.8692	0.0004
L10	55 - 37.75	4.495	47	0.7488	0.0003
L11	37.75 - 35.75	2.115	47	0.5413	0.0002
L12	35.75 - 0	1.894	47	0.5144	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	SBNH-1D6565C w/ Mount Pipe	47	39.792	2.3643	0.0032	19792
149.0000	(2) SBNHH-1D65B w/ Mount Pipe	47	35.358	2.3332	0.0033	8706
139.0000	VHLP2.5-11	47	30.564	2.2354	0.0030	4844
137.0000	800MHz 2X50W RRH W/FILTER	47	29.631	2.2085	0.0029	4458
135.0000	APXVSPP18-C-A20 w/ Mount Pipe	47	28.710	2.1795	0.0028	4129
116.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	47	20.655	1.8339	0.0016	2645
47.0000	KS24019-L112A	47	3.296	0.6522	0.0003	4701

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 150.5	189.779	4	11.0668	0.0425
L2	150.5 - 150	168.071	4	10.9464	0.0424
L3	150 - 120	166.938	4	10.9341	0.0424
L4	120 - 111.75	103.794	4	8.9571	0.0294
L5	111.75 - 97.17	89.074	4	8.1760	0.0256
L6	102 - 79.3333	73.432	4	7.2109	0.0217
L7	79.3333 - 75.25	43.384	4	5.3159	0.0152
L8	75.25 - 63.25	38.980	4	5.0079	0.0142
L9	63.25 - 49.08	27.591	4	4.0730	0.0113
L10	55 - 37.75	21.050	4	3.5087	0.0096
L11	37.75 - 35.75	9.909	4	2.5363	0.0068
L12	35.75 - 0	8.873	4	2.4105	0.0064

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
158.0000	SBNH-1D6565C w/ Mount Pipe	4	185.193	11.0519	0.0433	4575
149.0000	(2) SBNHH-1D65B w/ Mount Pipe	4	164.675	10.9069	0.0432	2014
139.0000	VHLP2.5-11	4	142.474	10.4532	0.0403	1110
137.0000	800MHz 2X50W RRH W/FILTER	4	138.153	10.3281	0.0394	1020
135.0000	APXVSPP18-C-A20 w/ Mount Pipe	4	133.880	10.1933	0.0384	944
116.0000	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	4	96.480	8.5854	0.0280	594
47.0000	KS24019-L112A	4	15.437	3.0562	0.0083	1010

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	160 - 150.5 (1)	TP20x20x0.25	9.5000	0.0000	0.0	15.511 6	-2.31	488.62	0.005
L2	150.5 - 150	TP20.3x20x0.25	0.5000	0.0000	0.0	15.747	-2.34	496.04	0.005

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	(2)					2			
L3	150 - 120 (3)	TP26.4499x20.3x0.25	30.000 0	0.0000	0.0	21.090 9	-9.35	1456.15	0.006
L4	120 - 111.75 (4)	TP28.1411x26.4499x0.28 46	8.2500	0.0000	0.0	25.531 6	-12.21	1809.32	0.007
L5	111.75 - 97.17 (5)	TP31.13x28.1411x0.3051	14.580 0	0.0000	0.0	29.308 4	-13.92	2077.52	0.007
L6	97.17 - 79.3333 (6)	TP34.2872x29.5297x0.37 95	22.666 7	0.0000	0.0	41.439 2	-19.43	3029.58	0.006
L7	79.3333 - 75.25 (7)	TP35.1244x34.2872x0.47 87	4.0833	0.0000	0.0	53.399 0	-20.57	3936.04	0.005
L8	75.25 - 63.25 (8)	TP37.5848x35.1244x0.46 23	12.000 0	0.0000	0.0	55.264 2	-24.00	4073.53	0.006
L9	63.25 - 49.08 (9)	TP40.49x37.5848x0.5249	14.170 0	0.0000	0.0	65.500 3	-26.72	4828.03	0.006
L10	49.08 - 37.75 (10)	TP42.0621x38.2264x0.55 05	17.250 0	0.0000	0.0	73.585 1	-34.46	5423.96	0.006
L11	37.75 - 35.75 (11)	TP42.472x42.0621x0.581 9	2.0000	0.0000	0.0	78.487 6	-35.25	5785.32	0.006
L12	35.75 - 0 (12)	TP49.8x42.472x0.5142	35.750 0	0.0000	0.0	81.608 4	-49.40	5826.66	0.008

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	160 - 150.5 (1)	TP20x20x0.25	66.50	241.13	0.276	0.00	241.13	0.000
L2	150.5 - 150 (2)	TP20.3x20x0.25	69.88	247.91	0.282	0.00	247.91	0.000
L3	150 - 120 (3)	TP26.4499x20.3x0.25	655.92	775.99	0.845	0.00	775.99	0.000
L4	120 - 111.75 (4)	TP28.1411x26.4499x0.28 46	893.63	1024.47	0.872	0.00	1024.47	0.000
L5	111.75 - 97.17 (5)	TP31.13x28.1411x0.3051	1207.22	1259.87	0.958	0.00	1259.87	0.000
L6	97.17 - 79.3333 (6)	TP34.2872x29.5297x0.37 95	2013.60	2086.03	0.965	0.00	2086.03	0.000
L7	79.3333 - 75.25 (7)	TP35.1244x34.2872x0.47 87	2170.37	2762.01	0.786	0.00	2762.01	0.000
L8	75.25 - 63.25 (8)	TP37.5848x35.1244x0.46 23	2652.29	3066.95	0.865	0.00	3066.95	0.000
L9	63.25 - 49.08 (9)	TP40.49x37.5848x0.5249	3001.99	3790.43	0.792	0.00	3790.43	0.000
L10	49.08 - 37.75 (10)	TP42.0621x38.2264x0.55 05	3784.47	4562.88	0.829	0.00	4562.88	0.000
L11	37.75 - 35.75 (11)	TP42.472x42.0621x0.581 9	3879.37	4908.22	0.790	0.00	4908.22	0.000
L12	35.75 - 0 (12)	TP49.8x42.472x0.5142	5691.63	5835.90	0.975	0.00	5835.90	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	160 - 150.5 (1)	TP20x20x0.25	6.72	244.31	0.028	0.09	397.13	0.000
L2	150.5 - 150 (2)	TP20.3x20x0.25	6.82	248.02	0.027	0.10	409.36	0.000
L3	150 - 120 (3)	TP26.4499x20.3x0.25	25.57	728.08	0.035	1.45	1573.47	0.001
L4	120 - 111.75 (4)	TP28.1411x26.4499x0.28 46	31.25	904.66	0.035	1.67	2077.32	0.001
L5	111.75 -	TP31.13x28.1411x0.3051	33.18	1038.76	0.032	1.94	2554.63	0.001

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 $\frac{T_u}{\phi T_n}$
	97.17 (5)							
L6	97.17 - 79.3333 (6)	TP34.2872x29.5297x0.3795	37.98	1514.79	0.025	2.64	4229.82	0.001
L7	79.3333 - 75.25 (7)	TP35.1244x34.2872x0.4787	38.90	1968.02	0.020	2.80	5600.49	0.001
L8	75.25 - 63.25 (8)	TP37.5848x35.1244x0.4623	41.54	2036.76	0.020	3.28	6218.82	0.001
L9	63.25 - 49.08 (9)	TP40.49x37.5848x0.5249	43.34	2414.02	0.018	3.62	7685.79	0.000
L10	49.08 - 37.75 (10)	TP42.0621x38.2264x0.5505	47.29	2711.98	0.017	4.30	9252.08	0.000
L11	37.75 - 35.75 (11)	TP42.472x42.0621x0.5819	47.70	2892.66	0.016	4.38	9952.33	0.000
L12	35.75 - 0 (12)	TP49.8x42.472x0.5142	53.65	2913.33	0.018	5.56	11833.42	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	160 - 150.5 (1)	0.005	0.276	0.000	0.028	0.000	0.281 ✔	1.000	4.8.2 ✔
L2	150.5 - 150 (2)	0.005	0.282	0.000	0.027	0.000	0.287 ✔	1.000	4.8.2 ✔
L3	150 - 120 (3)	0.006	0.845	0.000	0.035	0.001	0.853 ✔	1.000	4.8.2 ✔
L4	120 - 111.75 (4)	0.007	0.872	0.000	0.035	0.001	0.880 ✔	1.000	4.8.2 ✔
L5	111.75 - 97.17 (5)	0.007	0.958	0.000	0.032	0.001	0.966 ✔	1.000	4.8.2 ✔
L6	97.17 - 79.3333 (6)	0.006	0.965	0.000	0.025	0.001	0.972 ✔	1.000	4.8.2 ✔
L7	79.3333 - 75.25 (7)	0.005	0.786	0.000	0.020	0.001	0.791 ✔	1.000	4.8.2 ✔
L8	75.25 - 63.25 (8)	0.006	0.865	0.000	0.020	0.001	0.871 ✔	1.000	4.8.2 ✔
L9	63.25 - 49.08 (9)	0.006	0.792	0.000	0.018	0.000	0.798 ✔	1.000	4.8.2 ✔
L10	49.08 - 37.75 (10)	0.006	0.829	0.000	0.017	0.000	0.836 ✔	1.000	4.8.2 ✔
L11	37.75 - 35.75 (11)	0.006	0.790	0.000	0.016	0.000	0.797 ✔	1.000	4.8.2 ✔
L12	35.75 - 0 (12)	0.008	0.975	0.000	0.018	0.000	0.984 ✔	1.000	4.8.2 ✔

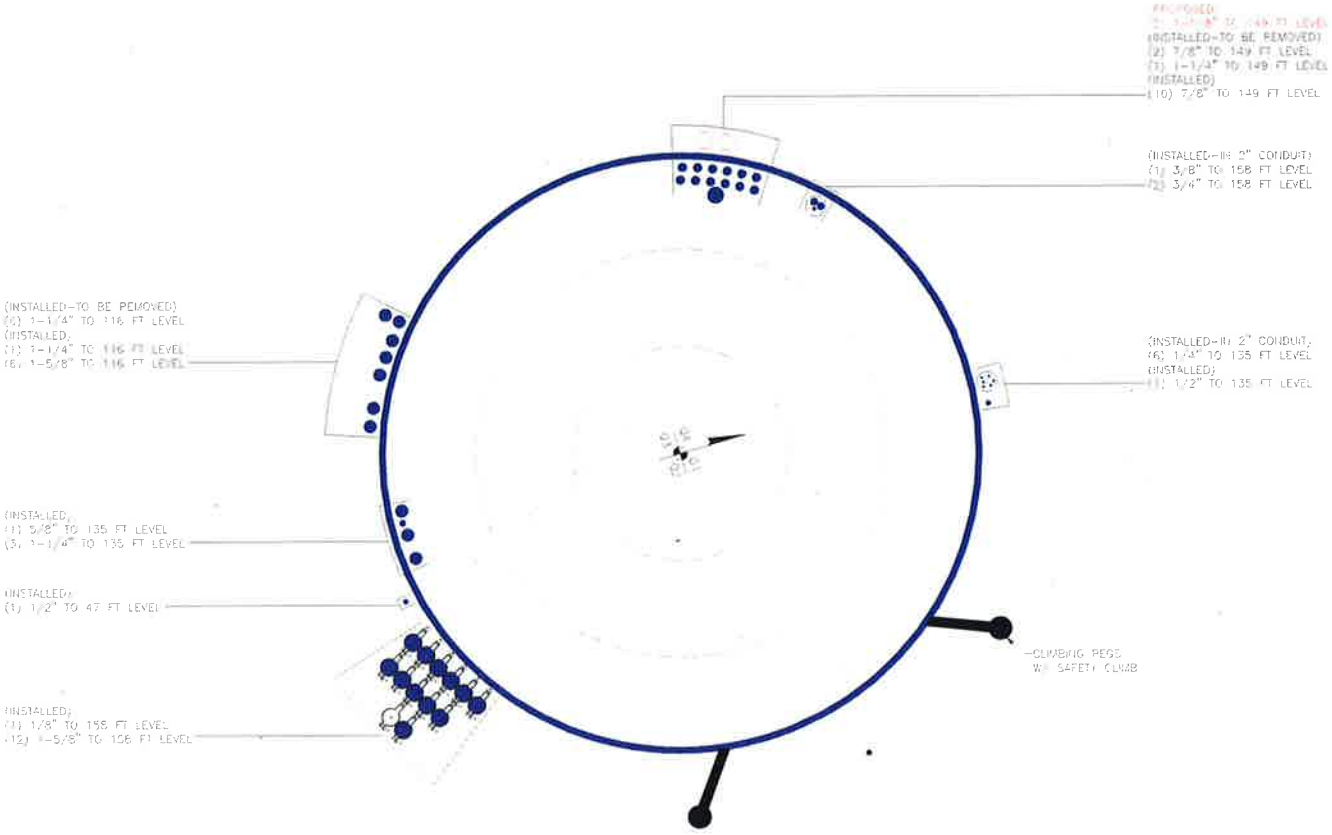
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 150.5	Pole	TP20x20x0.25	1	-2.31	488.62	28.1	Pass
L2	150.5 - 150	Pole	TP20.3x20x0.25	2	-2.34	496.04	28.7	Pass
L3	150 - 120	Pole	TP26.4499x20.3x0.25	3	-9.35	1456.15	85.3	Pass
L4	120 - 111.75	Pole	TP28.1411x26.4499x0.2846	4	-12.21	1809.32	88.0	Pass
L5	111.75 - 97.17	Pole	TP31.13x28.1411x0.3051	5	-13.92	2077.52	96.6	Pass
L6	97.17 - 79.3333	Pole	TP34.2872x29.5297x0.3795	6	-19.43	3029.58	97.2	Pass
L7	79.3333 - 75.25	Pole	TP35.1244x34.2872x0.4787	7	-20.57	3936.04	79.1	Pass
L8	75.25 - 63.25	Pole	TP37.5848x35.1244x0.4623	8	-24.00	4073.53	87.1	Pass
L9	63.25 - 49.08	Pole	TP40.49x37.5848x0.5249	9	-26.72	4828.03	79.8	Pass
L10	49.08 - 37.75	Pole	TP42.0621x38.2264x0.5505	10	-34.46	5423.96	83.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L11	37.75 - 35.75	Pole	TP42.472x42.0621x0.5819	11	-35.25	5785.32	79.7	Pass
L12	35.75 - 0	Pole	TP49.8x42.472x0.5142	12	-49.40	5826.66	98.4	Pass
							Summary	
						Pole (L12)	98.4	Pass
						RATING =	**98.4**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



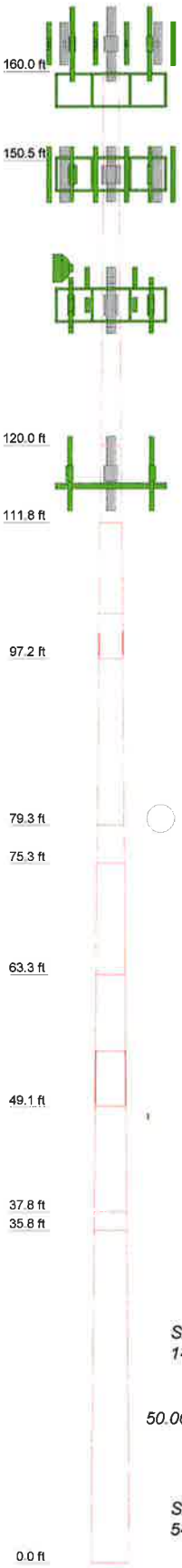
APPENDIX C

ADDITIONAL CALCULATIONS

Program Version 7.0.5.1 - 2/1/2016 File:G:/TOWER/375_Crown_Castle/2016/37516-2997_806373_HRT 101 943232/37516-2997.003.7805_SA_1313984/37516-2997.003.7805_Reinforced.eri

Section	1	2	3	4	5	6	7	8	9	10	11	12
Length (ft)	9.5000	0.5000	30.0000	8.2500	14.5800	22.6667	4.0833	12.0000	14.1700	17.2500	2.0000	35.7500
Number of Sides	1	1	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.2500	0.2500	0.2500	0.2846	0.3051	0.3795	0.4787	0.4623	0.5249	0.5505	0.5819	0.5142
Socket Length (ft)					4.8300				5.9200			
Top Dia (in)	20.000020.0000		20.3000	26.4499	28.1411	29.5297	34.2872	35.1244	37.5848	38.2264	42.0621	42.4720
Bot Dia (in)	20.300020.0000		26.4499	28.1411	31.1300	34.2872	35.1244	37.5848	40.4900	42.0621	42.4720	49.8000
Grade	A53-B-35			A572-65				Reinf 65.00 ksi				
Weight (K)	0.5	0.0	1.9	0.7	1.4	3.0	0.7	2.2	3.1	4.1	0.5	9.2

27.4



ALL REACTIONS ARE FACTORED

AXIAL 130 K

SHEAR 14 K

MOMENT 1827 kip-ft

TORQUE 6 kip-ft
50.00 mph WIND - 1.0000 in ICE

AXIAL 49 K

SHEAR 54 K

MOMENT 5692 kip-ft

TORQUE 11 kip-ft
REACTIONS - 97.00 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
SBNH-1D6565C w/ Mount Pipe	158	Side Arm Mount [SO 102-3]	137
SBNH-1D6565C w/ Mount Pipe	158	APXVSPP18-C-A20 w/ Mount Pipe	135
SBNH-1D6565C w/ Mount Pipe	158	APXV9ERR18-C-A20 w/ Mount Pipe	135
(2) 7770.00 w/ Mount Pipe	158	APXVSPP18-C-A20 w/ Mount Pipe	135
(2) 7770.00 w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	135
(2) 7770.00 w/ Mount Pipe	158	APXVTM14-C-120 w/ Mount Pipe	135
(2) LGP21401	158	APXVTM14-C-120 w/ Mount Pipe	135
(2) LGP21401	158	TD-RRH8x20-25	135
(2) LGP21401	158	TD-RRH8x20-25	135
(2) LGP13519	158	TD-RRH8x20-25	135
(2) LGP13519	158	LLPX310R-V1 w/ Mount Pipe	135
(2) LGP13519	158	LLPX310R-V1 w/ Mount Pipe	135
RRUS-11	158	LLPX310R-V1 w/ Mount Pipe	135
RRUS-11	158	TIMING 2000	135
RRUS-11	158	WIMAX DAP HEAD	135
DC6-48-60-18-8F	158	WIMAX DAP HEAD	135
Platform Mount [LP 303-1]	158	WIMAX DAP HEAD	135
(2) SBNHH-1D65B w/ Mount Pipe	149	HORIZON COMPACT	135
(2) SBNHH-1D65B w/ Mount Pipe	149	Platform Mount [LP 602-1]	135
(2) SBNHH-1D65B w/ Mount Pipe	149	VHLP2.5-11	135
B13 RRH 4X30	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
B13 RRH 4X30	149		
B13 RRH 4X30	149	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
PCS B25 RRH4x30	149		
PCS B25 RRH4x30	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
PCS B25 RRH4x30	149		
RRH4X45-AWS4 B66	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
RRH4X45-AWS4 B66	149		
RRH4X45-AWS4 B66	149	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	116
DB-T1-6Z-8AB-0Z	149	KRY 112 144/1	116
BXA-80063/4CF w/ Mount Pipe	149	KRY 112 144/1	116
BXA-80080/4CF w/ Mount Pipe	149	KRY 112 144/1	116
BXA-80080/4CF w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	116
BXA-70063/6CFx6 w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	116
BXA-70063/6CF w/ Mount Pipe	149	LNX-6515DS-VTM w/ Mount Pipe	116
BXA-70063/6CFx4 w/ Mount Pipe	149	RRUS 11 B12	116
DB-T1-6Z-8AB-0Z	149	RRUS 11 B12	116
Platform Mount (LP 101-1)	149	RRUS 11 B12	116
800MHz 2X50W RRH W/FILTER	137	T-Arm Mount [TA 602-3]	116
800MHz 2X50W RRH W/FILTER	137	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	116
800MHz 2X50W RRH W/FILTER	137		
PCS 1900MHz 4x45W-65MHz	137	Side Arm Mount [SO 701-1]	47
PCS 1900MHz 4x45W-65MHz	137	KS24019-L112A	47
PCS 1900MHz 4x45W-65MHz	137		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	Reinf 65.00 ksi	65 ksi	82 ksi
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 98.4%

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

Job: 160 ft Monopole / HRT 101 943232			
Project: PJF 37516-2997 / BU 806373			
Client: Crown Castle	Drawn by: Morgan Scroggy		App'd:
Code: TIA-222-G	Date: 12/12/16		Scale: N
Path:			Dwg No.

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

Job Number:	37516-2997.003.7805	Page:	1
Site Number:	806373	Date:	12/12/2016
Site Name:	HRT 101 943232	Version:	2.6
By:	MLS	Effective:	12/10/2015

Channel Jump Analysis

Revision= LRFD Passing= 100% Design/Analysis = Analysis @ 150 ft - in elevation

TNX Tower Output @ Connection:			
Moment	=	69.88	k-ft
Axial	=	2.31	kips
Shear	=	6.82	kips
Design Capacity	=		
Pole Geometry:			
Diameter	=	20.3	in
Thickness	=	1/4	in
Pole Grade	=	A572 Gr. 65	
Extension Geometry:			
Diameter	=	20	in
Thickness	=	1/4	in
Height	=	10	ft
Extension Grade	=	A53 Gr. B	
Channel Jump Information			
Number of Legs	=	3	
Unbraced Length	=	18	in
Channel Grade	=	A572 Gr. 50	
K	=	2.10	
Channel Circle	=	22.54	in
Circle Override	=		in
Type	=	MC10X28.5	

	Extension	Pole
Blind Bolt	EXISTING AJAX	EXISTING AJAX
Bolt Method	Case 1	Case 1
Bolt Qty.	6	6
Spacing (in)	3	3
End Dist. (in)	2	2

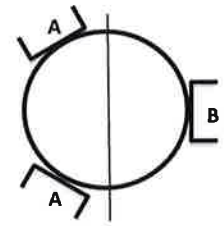
New Port Information			
Elevation #1	=		ft
Elevation #2	=		ft
Elevation #3	=		ft
Elevation #4	=		ft

Design Reactions

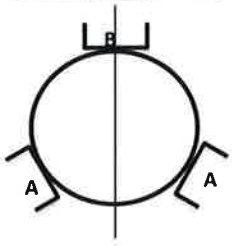
Moment k-ft	Axial kips	Shear kips
69.88	2.31	6.82

Load Distribution

Moment of Inertia, I in⁴	Axial / Leg kips
190.52	0.770



Case 1



Case 2

Member Forces

Case	d	Tension (kips)	Comp. (kips)	Mx (k-in)	My (k-in)	M (k-in)
1a	5.64	24.03	25.57	50.24	29.01	58.01
1b	11.27	48.83	50.37	0.00	6.74	6.74
2a	9.76	42.19	43.73	11.91	20.64	23.83
2b	0.00	0.77	0.77	75.10	0.00	75.10

Tensile Strength

Case	P_{n1} kips	P_{n2} kips	øtPnt kips	P_{rt} kips	Capacity
1a	418.5	508.655	376.65	24.03	6.4%
1b	418.5	508.655	376.65	48.83	13.0%
2a	418.5	508.655	376.65	42.19	11.2%
2b	418.5	508.655	376.65	0.77	0.2%

Compression Strength

Case	$4.71*\sqrt{(E/F_y)}$	KL/r	F_e ksi	F_{cr} ksi	øcPnc kips	P_{rc} kips	Capacity
1a	113.43	32.59	269.54	46.26	348.51	25.57	7.3%
1b	113.43	32.59	269.54	46.26	348.51	50.37	14.5%
2a	113.43	32.59	269.54	46.26	348.51	43.73	12.5%
2b	113.43	32.59	269.54	46.26	348.51	0.77	0.2%

Flexural Strength

Case	ø	I_3 in⁴	ΣI in⁴	M k-in	f_A ksi	F_A ksi	øbMn k-in	Capacity
1a	60	97.325	205.95	58.01	4.8686	45	-	10.8%
1b	0	11.3	205.95	6.74	-	-	287.28	2.3%
2a	30	39.975	205.95	23.83	2.51806	45	-	5.6%
2b	90	126	205.95	75.10	-	-	1350	5.6%

Combined Strength

Case	Flexure + Tension (H1) Prt / Pnt	Mr / Mn	Capacity
1a	0.032	0.108	14.0%
1b	0.065	0.023	8.8%
2a	0.056	0.056	11.2%
2b	0.001	0.056	5.7%

Case	Flexure + Compression (H1) Prc / Pnc	Mr / Mn	Capacity
1a	0.037	0.108	14.5%
1b	0.072	0.023	9.6%
2a	0.063	0.056	11.9%
2b	0.001	0.056	5.7%

Bolt Check

Case	Location	Channel Comp. kips	e in	Shear on Bolt kips	Bearing Capacity kips	Shear Capacity kips	Tension on Bolt kips	Tension Capacity kips	Limit Capacity
1a	Ext	25.57	1.27	4.27	24.36	37.00	1.18	30.00	3.2%
	Pole	25.57	1.12	5.06	32.48	37.00	1.95	30.00	2.8%
1b	Ext	50.37	1.27	8.40	24.36	37.00	2.33	30.00	12.5%
	Pole	50.37	1.12	8.40	32.48	37.00	2.31	30.00	7.3%
2a	Ext	43.73	1.27	7.29	24.36	37.00	2.02	30.00	9.4%
	Pole	43.73	1.12	7.33	32.48	37.00	2.45	30.00	5.8%
2b	Ext	0.77	1.27	0.40	24.36	37.00	0.03	30.00	0.0%
	Pole	0.77	1.12	3.96	32.48	37.00	0.03	30.00	1.5%

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

v4.4 - Effective 7-12-13

Date: 12/12/2016
PJF Project: 37516-2997.003.7805
Client Ref. # 806373
Site Name: HRT 101 943232
Description: 160' Pole
Owner: Crown Castle
Engineer: MLS

Asymmetric Anchor Rod Analysis

Moment =	5692	k-ft	TIA Ref.	G	Location =	Base Plate	
Axial =	49.0	kips	ASIF =	1.0000	η =	0.50	for BP, Rev. G Sect. 4.9.9
Shear =	54.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	19						

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	0.0	58.06	0.00	3.98	243.72	238.56	249.41	0.00	260.00	95.9%
2	2.250	#18J A615 Gr 75	75	100	22.5	58.06	0.00	3.98	239.32	234.16	245.01	0.00	260.00	94.2%
3	2.250	#18J A615 Gr 75	75	100	45.0	58.06	0.00	3.98	237.83	232.67	243.52	0.00	260.00	93.7%
4	2.250	#18J A615 Gr 75	75	100	67.5	58.06	0.00	3.98	239.64	234.48	245.32	0.00	260.00	94.4%
5	2.250	#18J A615 Gr 75	75	100	90.0	58.06	0.00	3.98	243.13	237.97	248.81	0.00	260.00	95.7%
6	2.250	#18J A615 Gr 75	75	100	112.5	58.06	0.00	3.98	245.86	240.70	251.54	0.00	260.00	96.7%
7	2.250	#18J A615 Gr 75	75	100	135.0	58.06	0.00	3.98	246.05	240.89	251.74	0.00	260.00	96.8%
8	2.250	#18J A615 Gr 75	75	100	157.5	58.06	0.00	3.98	243.59	238.43	249.27	0.00	260.00	95.9%
9	2.250	#18J A615 Gr 75	75	100	180.0	58.06	0.00	3.98	240.06	234.90	245.74	0.00	260.00	94.5%
10	2.250	#18J A615 Gr 75	75	100	202.5	58.06	0.00	3.98	237.90	232.74	243.58	0.00	260.00	93.7%
11	2.250	#18J A615 Gr 75	75	100	225.0	58.06	0.00	3.98	238.92	233.76	244.61	0.00	260.00	94.1%
12	2.250	#18J A615 Gr 75	75	100	247.5	58.06	0.00	3.98	243.03	237.87	248.72	0.00	260.00	95.7%
13	2.250	#18J A615 Gr 75	75	100	270.0	58.06	0.00	3.98	248.23	243.07	253.92	0.00	260.00	97.7%
14	2.250	#18J A615 Gr 75	75	100	292.5	58.06	0.00	3.98	251.87	246.72	257.56	0.00	260.00	99.1%
15	2.250	#18J A615 Gr 75	75	100	315.0	58.06	0.00	3.98	252.13	246.97	257.81	0.00	260.00	99.2%
16	2.250	#18J A615 Gr 75	75	100	337.5	58.06	0.00	3.98	248.86	243.70	254.55	0.00	260.00	97.9%
17	2.250	A193 Gr B7	105	125	12.3	63.00	0.00	3.98	260.99	255.84	266.67	0.00	325.00	82.1%
18	2.250	A193 Gr B7	105	125	125.3	63.00	0.00	3.98	267.07	261.91	272.75	0.00	325.00	83.9%
19	2.250	A193 Gr B7	105	125	238.3	63.00	0.00	3.98	260.99	255.84	266.67	0.00	325.00	82.1%
								75.61						

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

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

Site Data

BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	58.06	in

Plate Data		
Diam:	64.06	in
Thick:	2.75	in
Grade:	60	ksi
Single-Rod B-eff:	10.01	in

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

Pole Data		
Diam:	49.8	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Reactions		
Mu:	4829.6	ft-kips
Axial, Pu:	41.3	kips
Shear, Vu:	45.5	kips
Eta Factor, η	0.5	TIA G (Fig. 4-4)

Reactions adjusted to account for post installed anchors

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

Anchor Rod Results

		Rigid
Max Rod (Cu+ Vu/ή):	257.8 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	99.2% Pass	

Base Plate Results Flexural Check

		Rigid
Base Plate Stress:	34.3 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	63.6% Pass	Y.L. Length: 29.85

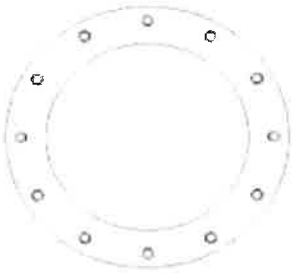
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



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

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

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

Job Number: 37516-2997.003.7805
Site Number: 806373
Site Name: HRT 101 943232

By: MLS
Date: 12/12/2016

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	5692.0		k-ft
Shear, Vu =	54.0		kips
Axial Load, Pu1 =	49.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	36.8	0.0	kips (from 0.9D + 1.6W)**
OTMu =	5746.0	0.0	k-ft @ Ground

*Axial Load, Pu1 will be used for Soil Compression Analysis.
**Axial Load, Pu2 will be used for Steel Analysis.

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-08
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	7 ft
Height Above Grade =	1 ft
Depth Below Grade =	24.5 ft
fc' =	3 ksi
εc =	0.003 in/in
L / D Ratio =	3.64
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	36
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#4
Side Clear Cover to Ties =	3 in

Soil Parameters

Water Table Depth =	4.00 ft
Depth to Ignore Soil =	3.50 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?*	Ground

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =	in
Dia @ Depth Below Grade =	in
Number of Sides =	
Thickness =	in
Fy =	ksi
Backfill Condition =	

Maximum Capacity Ratios

Maximum Soil Ratio =	110.0%
Maximum Steel Ratio =	105.0%

*Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	4	100	0	28	Sand				4
2	1	125	0	42	Sand				5
3	19.5	127.4	0	42	Sand	17000			24.5
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	17.48	ft, from Grade
Bending Moment, Mu =	6690.04	k-ft, from COR
Resisting Moment, ΦMn =	8181.55	k-ft, from COR

MOMENT RATIO = 81.8% OK

Shear, Vu =	54.00	kips
Resisting Shear, ΦVn =	66.04	kips

SHEAR RATIO = 81.8% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	88.18	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	49.00	kips
Comp. Capacity, ΦCn =	453.01	kips

COMPRESSION RATIO = 10.8% OK

Steel Results (ACI 318-08):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	56.16	sq in
Axial, ΦPn (min) =	-3032.64	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	9026.11	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	67.28	kips @ 5.50 ft Below Grade
Moment, Mu =	5999.81	k-ft @ 5.50 ft Below Grade
Moment, ΦMn =	8466.77	k-ft

MOMENT RATIO = 70.9% OK

Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *806373*
Site Name: *HRT 101 943232*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	3.00	in
Horiz. **Tie** Bar Size=	4	
Vert. Cage Diameter =	6.30	ft
Vert. Cage Diameter =	75.59	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	36	
As Total=	56.16	in^2
A s/ Aconc, Rho:	0.0101	1.01%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	1.01%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	9026.11	kips
at Mu=(ϕ=0.65)Mn=	5472.88	ft-kips
Max Tu, (φ=0.9) Tn =	3032.64	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	5999.81	ft-kips **(* Note)**
Max. Factored Shaft Pu:	67.28	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.00	Mu:	5999.81	ft-kips
1.00	Pu:	67.28	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2008

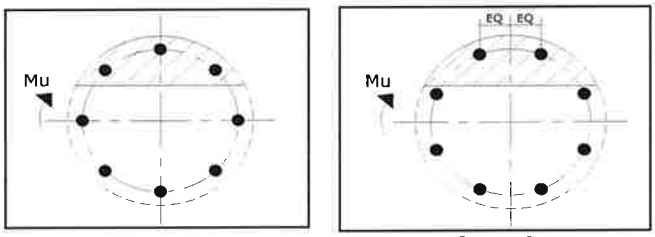
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis:	**17.47**	in
Extreme Steel Strain, εt:	**0.0107**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	67.28	kips
Drilled Shaft Moment Capacity, φMn:	**8466.77**	ft-kips
Drilled Shaft Superimposed Mu:	**5999.81**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**70.9%**

ATTACHMENT 4

Enfield, CT

N
W E
S

Feet
0 50 100 200 300 400 500
1 inch = 414 feet

OLIVER RD

Location	OLIVER RD	**Mblu**	017/ / 0094/ /
Acct#	002100020005	**Owner**	OLIVER ROAD HOLDING LLC
Assessment	$886,600	**Appraisal**	$1,299,630
PID	4299	**Building Count**	1
Fire District	1		

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$1,062,140	$237,490	$1,299,630

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$743,500	$143,100	$886,600

Owner of Record

Owner	OLIVER ROAD HOLDING LLC
Co-Owner	C/O CROWN CASTLE
Address	PMB 353 - 4017 WASHINGTON RD MCMURRAY, PA 15317

Sale Price	$150,000
Certificate	
Book & Page	2520/ 875
Sale Date	10/25/2010
Instrument	28

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
OLIVER ROAD HOLDING LLC	$150,000		2520/ 875	28	10/25/2010
SMYTH MICHAEL E	$0	1	454/ 889		12/05/1980

Building Information

Building 1 : Section 1

Year Built:	
Living Area:	0
Replacement Cost:	$0
Building Percent Good:	

Replacement Cost
Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Outbuildings
Model	
Grade:	
Stories	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Full Bthrms:	
Half Baths:	
Extra Fixtures	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Extra Kitchens	
Fireplace(s)	
Extra Opening(s)	
Gas Fireplace(s)	
Blocked FPL(s)	
Bsmt Garage(s)	
Fin Bsmt	
FBM Quality	
Whirlpool(s)	
Walk Out	
Solar	

Building Photo

(http://images.vgsi.com/photos2/EnfieldCTPhotos//\00\01\64/5

Building Layout

Building Layout

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

Extra Features

Extra Features	Legend

No Data for Extra Features

Land

Land Use

Use Code	300
Description	Ind Land
Zone	I-1
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	10.22
Frontage	
Depth	
Assessed Value	$143,100
Appraised Value	$237,490

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN2	FENCE-6' CHAIN			220 L.F.	$1,870	1
SHD1	Shed	FR	Frame	120 S.F.	$1,130	1
TWR6	Cell Twr 6 Carriers			1 UNITS	$918,750	1
BRN8	Pole Barn	TY	Typical	11050 S.F.	$140,390	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$1,062,140	$237,490	$1,299,630
2015	$1,062,140	$237,490	$1,299,630
2014	$1,062,140	$237,490	$1,299,630

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$743,500	$143,100	$886,600
2015	$743,500	$131,370	$874,870
2014	$743,500	$131,370	$874,870

ATTACHMENT 5

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	3	3	neopost 07/31/2017 US POSTAGE $002.38⁰ ZIP 06103 041L1220336O
	Postmaster, per *(name of receiving employee)* V.P		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Bryan Chodkowski, Town Manager Town of Enfield 820 Enfield Street Enfield, CT 06082				
2.	Roger J. O'Brien, Director of Planning Town of Enfield 820 Enfield Street Enfield, CT 06082		OLD STATE HOUSE STATION 06103 JUL 31 2017 USPS	[redacted]	
3.	Oliver Road Holding LLC 4 Oliver Road Enfield, CT 06082				
4.					
5.					
6.					