

January __, 2017

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

Re: **Notice of Exempt Modification – Facility Modification
Brendan Street, Stafford, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 115-foot level of the 129-foot tower off Brendan Street in Stafford, Connecticut (the “Property”). The tower is owned by Crown Castle (“Crown”). The Council approved Cellco’s use of this tower in 1994 (Docket No. 165). Cellco now intends to replace six (6) of its existing antennas with three (3) model SBNHH-1D85C, 700/2100 MHz antennas and three (3) model SBNHH-1D85C, 1900 MHz antennas, all at the same 115-foot level on the tower. Cellco also intends to replace three (3) existing remote radio heads (“RRHs”) and install six (6) new RRHs. Included in Attachment 1 are specifications for Cellco’s replacement antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Anthony Frassinelli, First Selectman of the Town of Stafford. A copy of this letter is also being sent to Tiziani LLC, the owner of the Property and Crown, the tower owner.

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

Melanie A. Bachman
January 11, 2017
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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRH's will be located at the 115-foot level on the 129-foot tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative worst-case General Power Density table for Cellco's modified facility is included in Attachment 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report included in Attachment 3*).

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

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Anthony Frassinelli, Stafford First Selectman
Tiziani LLC
Crown
Tim Parks

ATTACHMENT 1



SBNHH-1D85C

Andrew® Tri-band Antenna, 698–896 and 2x 1695–2360 MHz, 85° horizontal beamwidth, internal RETs.

- Interleaved dipole technology providing for attractive, low wind load mechanical package
- Three internal RETs for independent tilt on all three bands

Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	15.6	15.6	17.0	17.6	17.9	17.8
Beamwidth, Horizontal, degrees	82	83	82	79	79	80
Beamwidth, Vertical, degrees	8.9	8.1	5.6	5.2	5.0	4.6
Beam Tilt, degrees	0–10	0–10	0–8	0–8	0–8	0–8
USLS (First Lobe), dB	16	17	14	14	14	15
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	25	25	25	25
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	300	300	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	15.4	15.4	16.6	17.3	17.6	17.6
Gain by all Beam Tilts Tolerance, dB	±0.2	±0.3	±0.6	±0.2	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0° 15.2	0° 15.1	0° 16.6	0° 17.3	0° 17.6	0° 17.5
	5° 15.5	5° 15.4	4° 16.6	4° 17.4	4° 17.7	4° 17.7
	10° 15.5	10° 15.5	8° 16.4	8° 17.2	8° 17.5	8° 17.3
Beamwidth, Horizontal Tolerance, degrees	±2.3	±1.4	±4.5	±2.4	±2.9	±2.6
Beamwidth, Vertical Tolerance, degrees	±0.5	±0.5	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	17	18	15	16	16	17
Front-to-Back Total Power at 180° ± 30°, dB	23	24	27	26	25	27
CPR at Boresight, dB	20	20	21	22	18	25
CPR at Sector, dB	14	16	13	12	11	6

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

General Specifications

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

Mechanical Specifications

Color	Light gray
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SBNHH-1D85C

POWERED BY



Lightning Protection	dc Ground
Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, maximum	875.0 N @ 150 km/h 196.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Depth	180.0 mm 7.1 in
Length	2438.0 mm 96.0 in
Width	301.0 mm 11.9 in
Net Weight	22.5 kg 49.6 lb

Remote Electrical Tilt (RET) Information

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

Packed Dimensions

Depth	299.0 mm 11.8 in
Length	2561.0 mm 100.8 in
Width	409.0 mm 16.1 in
Shipping Weight	35.0 kg 77.2 lb

Regulatory Compliance/Certifications

Agency

RoHS 2011/65/EU
China RoHS SJ/T 11364-2006
ISO 9001:2008

Classification

Compliant by Exemption
Above Maximum Concentration Value (MCV)
Designed, manufactured and/or distributed under this quality management system



Included Products

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

Product Specifications

COMMSCOPE®

SBNHH-1D85C



* 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.

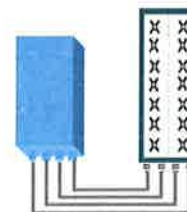


FEATURES

- 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

TECHNICAL SPECIFICATIONS

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.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load (In 2Tx or 4TX mode)
Environmental conditions	-40°C (-40°F) /+55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	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

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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.

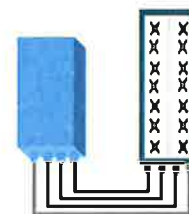


FEATURES

- 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

TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	3GPP bands 2 & 25 (PCS-G) DL: 1930 - 1995 MHz UL: 1850 - 1915 MHz
Instantaneous bandwidth - #carriers	65MHz – Up to 4 LTE carriers (in 40MHz occupied bandwidth)
LTE carrier bandwidth	3, 5, 10, 15 or 20 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure (3GPP band 2)	2.0 dB typ. (<2.5 dB max)
RX Diversity scheme	2 or 4 way Rx diversity
Sizes (HxWxD)(w/ solar shield) in mm (in.)	538 x 304 x 182 (21.2" x 12.0" x 7.2")
Volume (w/ solar shield) in L	30
Weight (w/ solar shield) in kg (lb)	24 (53)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	580W typical @100% RF load
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) IP65
Wind load (@150km/h or 93mph)	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

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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.

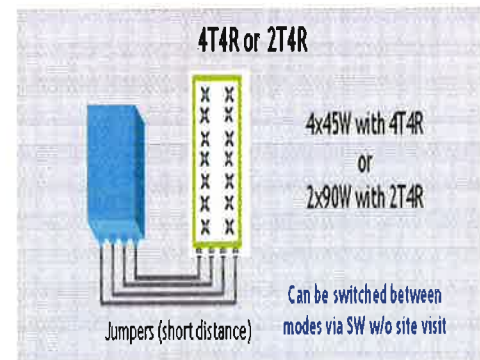
Its compactness and slim design makes the Alcatel-Lucent B66a RRH4x45 easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the 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



TECHNICAL SPECIFICATIONS

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	2 dB typical (<2.5 dB max) – 2 or 4 way Rx diversity
Receiver Sensivity (FRC A1-3)	-104.5 dBm maximum
Sizes (HxWxD) in mm (in.)	655x299x182 (25.8x11.8x7.2) (with solar shield) 640x290x160 (25.2x11.4x6.3) (without solar shield)
Volume in Liters	35.5 (with solar shield) 29.7 (without solar shield)
Weight in kg (lb) (w/o mounting HW)	25.8kg (56.8lb) (with solar shield)
DC voltage range	Nominal: -48V, -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	750W typical @100% RF load (in 2Tx or 4Tx mode); Add 58W for 2A*29V for AISG
Environmental conditions	-40°C (-40°F) / +55°C (+131°F) UL50E Type 4 Enclosure
Wind load (@150km/h or 93mph)	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

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ATTACHMENT 2

Site Name: Stafford Tower Height: 129'		General	Power	Density				
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*AT&T	2	565	90	880	0.0576	0.5867	0.98%	
*AT&T	2	875	90	1900	0.0892	1.0000	0.89%	
*AT&T	4	777	90	1900	0.1584	1.0000	1.58%	
*AT&T	1	647	90	880	0.0330	0.5867	0.56%	
*AT&T	1	1615	90	734	0.0823	0.4893	1.68%	
*T-Mobile	8	238	125	1930	0.0484	1.0000	0.48%	
*Sprint	11	122	100	1962.5	0.0546	1.0000	0.55%	
*Nextel	9	100	76	851	0.0661	0.5673	1.16%	
Verizon	1	2809	115	0.0764	1970	1.0000	7.64%	
Verizon	9	401	115	0.0981	869	0.5793	16.94%	
Verizon	1	6127	115	0.1666	2145	1.0000	16.66%	
Verizon	1	2060	115	0.0560	746	0.4973	11.26%	
								60.4%
* Source: Siting Council								

ATTACHMENT 3



Date: November 09, 2016

Charles McGuirt
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
704.405.6607

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679
stschanen@pjfweb.com

Subject: Structural Analysis Report

Carrier Designation: Verizon Wireless Co-Locate
Carrier Site Number: 119688
Carrier Site Name: Stafford CT

Crown Castle Designation: Crown Castle BU Number: 806365
Crown Castle Site Name: HRT 303 943203
Crown Castle JDE Job Number: 406259
Crown Castle Work Order Number: 1323460
Crown Castle Application Number: 367400 Rev. 1

Engineering Firm Designation: Paul J Ford and Company Project Number: 37516-3555.001.7805

Site Data: BRENDON & QUINN STREETS, STAFFORD, Tolland County, CT
Latitude 41° 57' 51.2", Longitude -72° 18' 17.8"
129 Foot - Monopole Tower

Dear Charles McGuirt,

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 968473, in accordance with application 367400, revision 1.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing 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 were used in this analysis.

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:

Seth Tschanen, E.I.
Structural Designer



11/9/16

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1) INTRODUCTION

This tower is a 129 ft Monopole tower designed by VALMONT in January of 1995. 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 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
113.0	115.0	3	alcatel lucent	AWS4 (B66) 4x45 RRH	--	--	--
		3	alcatel lucent	B13 RRH 4X30			
		3	alcatel lucent	PCS B25 RRH4x30			
		6	andrew	SBNH-1D8585C w/ Mount Pipe			

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
123.0	123.0	3	commscope	ATBT-BOTTOM-24V	12	1 5/8	1
		3	commscope	LNX-6515DS-VTM w/ Mount Pipe			
		3	ems wireless	RR90-17-02DP w/ Mount Pipe			
		3	ericsson	KRY 112 489/2			
		1	tower mounts	T-Arm Mount [TA 602-3]			
113.0	115.0	3	alcatel lucent	RRH2X60-AWS	--	--	2
		6	andrew	HBXX-6517DS-VTM w/ Mount Pipe			
		6	andrew	LNX-8513DS-VTM w/ Mount Pipe			
	2	rfs celwave	DB-B1-6C-12AB-0Z	12	7/8	1	
	113.0	1	tower mounts	Platform Mount [LP 602-1]	2	1 5/8	
100.0	100.0	6	decibel	DB980H90E-M w/ Mount Pipe	6	1 5/8	1
		1	tower mounts	Platform Mount [LP 1201-1]			
92.0	94.0	3	ericsson	RRUS 11	--	--	1
		1	raycap	DC6-48-60-18-8F			
	1	tower mounts	Side Arm Mount [SO 102-3]				

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
90.0	90.0	6	communication components inc.	DTMABP7819VG12A	1 2 1 12	3/8 3/4 1 5/8 1 1/4	1
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		8	powerwave technologies	LGP13519			
		6	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 601-1]			
59.0	59.0	1	gps	GPS_A	1	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:

- 1) Existing Equipment
- 2) Equipment to Be Removed

Table 3 - Design Antenna and Cable Information

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

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.E., P.C., 1/9/1994	262167	CCISITES
4-TOWER FOUNDATION MAPPING	TEP, 081976, 7/31/2008	2294383	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont, 11298-94, 1/3/1995	2046046	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37515-0530.002.7700, 3/3/2015	5577072	CCISITES
4-POST-MODIFICATION INSPECTION	FDH Velocitel, 15BORF1500, 6/2/2015	5734218	CCISITES
4-POST-MODIFICATION INSPECTION	ETS, 151790, 3/10/2016	6133277	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	Crown Castle, 606069, 5/9/2013	3833112	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) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) Pier foundation vertical steel information was assumed based on the Crown Castle structural analysis referenced in Table 4 (CCI Doc #3833112).
- 5) Monopole was modified in conformance with the referenced 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	129 - 115.5	Pole	TP16x16x0.375	1	-2.12	579.85	11.4	Pass
L2	115.5 - 115	Pole	TP17.81x16x0.375	2	-2.14	579.85	11.4	Pass
L3	115 - 92.0833	Pole	TP23.0822x17.81x0.2188	3	-9.07	1113.42	65.8	Pass
L4	92.0833 - 73.75	Pole	TP27.3x23.0822x0.399	4	-14.05	1440.57	88.0	Pass
L5	73.75 - 71.5	Pole	TP27.3778x25.5242x0.4884	5	-15.98	1831.33	83.5	Pass
L6	71.5 - 56.5	Pole	TP30.8233x27.3778x0.5177	6	-19.81	2406.71	83.9	Pass
L7	56.5 - 36.75	Pole	TP35.36x30.8233x0.4947	7	-23.69	2562.80	95.4	Pass
L8	36.75 - 22	Pole	TP38.1343x33.1647x0.5988	8	-31.52	3515.83	86.8	Pass
L9	22 - 20.5	Pole	TP38.4797x38.1343x0.5965	9	-32.05	3527.17	87.7	Pass
L10	20.5 - 19.0833	Pole	TP38.8059x38.4797x0.5943	10	-32.56	3545.74	88.2	Pass
L11	19.0833 - 18	Pole	TP39.0553x38.8059x0.517	11	-32.91	3460.14	90.8	Pass
L12	18 - 4	Pole	TP42.279x39.0553x0.6525	12	-38.59	4072.34	86.2	Pass
L13	4 - 3	Pole	TP42.5092x42.279x0.737	13	-39.05	4741.47	74.9	Pass
L14	3 - 0	Pole	TP43.2x42.5092x0.7883	14	-40.53	5630.49	64.5	Pass
							Summary	
						Pole (L7)	95.4	Pass
						Rating =	95.4	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	70.8	Pass
1	Base Plate	0	42.5	Pass
1	Base Foundation Steel	0	71.7	Pass
1	Base Foundation Soil Interaction	0	8.6	Pass
1	Flange Connection	115	7.7	Pass

Structure Rating (max from all components) =	95.4%
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Notes:

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

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 Tolland County, Connecticut.
- 2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- 3) Basic wind speed of 97 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 mph is used in combination with ice.
- 12) Temperature drop of 50 °F.
- 13) Deflections calculated using a wind speed of 60 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	129.0000- 115.5000	13.5000	0.00	Round	16.0000	16.0000	0.3750		A53-B-35 (35 ksi)
L2	115.5000- 115.0000	0.5000	0.00	Round	16.0000	17.8100	0.3750		A53-B-35 (35 ksi)
L3	115.0000- 92.0833	22.9167	0.00	12	17.8100	23.0822	0.2188	0.8752	A572-65 (65 ksi)
L4	92.0833- 73.7500	18.3333	4.25	12	23.0822	27.3000	0.3990	1.5961	Reinf 38.14 ksi (38 ksi)
L5	73.7500- 71.5000	6.5000	0.00	12	25.5242	27.3778	0.4884	1.9536	Reinf 38.19 ksi (38 ksi)
L6	71.5000- 56.5000	15.0000	0.00	12	27.3778	30.8233	0.5177	2.0708	Reinf 42.01 ksi (42 ksi)
L7	56.5000- 36.7500	19.7500	5.25	12	30.8233	35.3600	0.4947	1.9788	Reinf 42.15 ksi (42 ksi)
L8	36.7500-	20.0000	0.00	12	33.1647	38.1343	0.5988	2.3951	Reinf 42.84 ksi

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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 (ksi)
L9	22.0000-20.5000	1.5000	0.00	12	38.1343	38.4797	0.5965	2.3858	Reinf 42.75 ksi (43 ksi)
L10	20.5000-19.0833	1.4167	0.00	12	38.4797	38.8059	0.5943	2.3772	Reinf 42.76 ksi (43 ksi)
L11	19.0833-18.0000	1.0833	0.00	12	38.8059	39.0553	0.5170	2.0680	Reinf 47.56 ksi (48 ksi)
L12	18.0000-4.0000	14.0000	0.00	12	39.0553	42.2790	0.6525	2.6100	Reinf 41.06 ksi (41 ksi)
L13	4.0000-3.0000	1.0000	0.00	12	42.2790	42.5092	0.7370	2.9479	Reinf 42.18 ksi (42 ksi)
L14	3.0000-0.0000	3.0000		12	42.5092	43.2000	0.7883	3.1533	Reinf 46.12 ksi (46 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	I/Q in ²	w in	w/t
L1	16.0000	18.4078	562.0841	5.5259	8.0000	70.2605	1124.1682	9.1984	0.0000	0
L2	16.0000	18.4078	562.0841	5.5259	8.0000	70.2605	1124.1682	9.1984	0.0000	0
L3	17.8100	20.5401	780.8325	6.1656	8.9050	87.6847	1561.6650	10.2639	0.0000	0
L4	23.8965	16.1081	1074.7644	8.1851	11.9566	89.8888	2177.7642	7.9279	5.5997	19.135
L5	28.2630	34.5636	3192.5727	9.6306	14.1414	225.7607	6469.0178	17.0111	6.2470	15.656
L6	31.9107	50.5193	5922.2995	10.8494	15.9665	370.9206	12000.1844	24.8641	6.8732	13.276
L7	36.6074	55.5381	8617.1559	12.4818	18.3165	470.4592	17460.6941	27.3342	8.1507	16.476
L8	39.4795	72.3712	13014.7572	13.4377	19.7536	658.8562	26371.4266	35.6189	8.6153	14.388
L9	39.8371	72.7574	13327.7509	13.5622	19.9325	668.6451	27005.6367	35.8090	8.7141	14.455
L10	40.1748	73.1235	13628.0237	13.6797	20.1015	677.9622	27614.0707	35.9891	8.8073	14.61
L11	40.4331	72.4992	13281.9700	13.5630	19.9325	666.3483	26912.8722	35.6819	8.7198	14.672
L12	43.7704	87.4606	19343.5918	14.9023	21.9005	883.2488	39195.3612	43.0454	9.5820	14.82
L13	44.0088	105.9039	23529.1031	14.9361	22.0198	1002.6338	44735.5509	48.7875	9.4174	17.436
L14	44.7239	107.6574	24717.2867	15.1834	22.3776	1104.5549	50083.9240	52.9857	9.2798	17.565

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 129.0000-115.5000				1	1	1			
L2 115.5000-115.0000				1	1	1			
L3 115.0000-92.0833				1	1	1			
L4 92.0833-73.7500				1	1	1			
L5 73.7500-71.5000				1	1	1			
L6 71.5000-56.5000				1	1	1			
L7 56.5000-36.7500				1	1	1			
L8 36.7500-				1	1	1			

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Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
22.0000									
L9 22.0000-20.5000				1	1	1			
L10 20.5000-19.0833				1	1	1			
L11 19.0833-18.0000				1	1	1			
L12 18.0000-4.0000				1	1	1			
L13 4.0000-3.0000				1	1	1			
L14 3.0000-0.0000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement	Total Number		$C_{A,A}$	Weight
				ft			ft ² /ft	plf
AVA7-50(1-5/8")	C	No	CaAa (Out Of Face)	123.0000 - 0.0000	2	No Ice	0.1980	0.72
						1/2" Ice	0.2980	2.23
						1" Ice	0.3980	4.36
AVA7-50(1-5/8")	C	No	CaAa (Out Of Face)	123.0000 - 0.0000	4	No Ice	0.0000	0.72
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.36
AL7-50(1-5/8")	C	No	CaAa (Out Of Face)	123.0000 - 0.0000	6	No Ice	0.0000	0.52
						1/2" Ice	0.0000	2.02
						1" Ice	0.0000	4.14

LDF5-50A(7/8")	C	No	Inside Pole	113.0000 - 0.0000	12	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	Inside Pole	113.0000 - 0.0000	2	No Ice	0.0000	1.30
						1/2" Ice	0.0000	1.30
						1" Ice	0.0000	1.30

LDF7-50A(1-5/8")	C	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82

LDF6-50A(1-1/4")	C	No	Inside Pole	90.0000 - 0.0000	12	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
FB-L98B-002-75000(3/8")	C	No	Inside Pole	90.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4")	C	No	Inside Pole	90.0000 - 0.0000	2	No Ice	0.0000	0.58
						1/2" Ice	0.0000	0.58
						1" Ice	0.0000	0.58
0(1 5/8")	C	No	Inside Pole	90.0000 - 0.0000	1	No Ice	0.0000	0.00
						1/2" Ice	0.0000	0.00
						1" Ice	0.0000	0.00
2" (Nominal) Conduit	C	No	Inside Pole	90.0000 - 0.0000	2	No Ice	0.0000	0.72
						1/2" Ice	0.0000	0.72
						1" Ice	0.0000	0.72

FLC 12-50J(1/2")	C	No	Inside Pole	59.0000 - 0.0000	1	No Ice	0.0000	0.17
						1/2" Ice	0.0000	0.17
						1" Ice	0.0000	0.17

1" Flat Reinforcement	C	No	CaAa (Out Of Face)	20.5000 - 0.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	59.0000 - 39.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _A A ₁		Weight
						ft ² /ft	plf	
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	40.5833 - 0.0000	1	1" Ice	0.3889	0.00
						No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	94.0833 - 54.0000	1	1" Ice	0.4306	0.00
						No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R	A _F	C _A A ₁ In Face	C _A A ₁ Out Face	Weight
			ft ²	ft ²	ft ²	ft ²	K
L1	129.0000-115.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.970	0.06
L2	115.5000-115.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.198	0.00
L3	115.0000-92.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	9.408	0.35
L4	92.0833-73.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.316	0.52
L5	73.7500-71.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.266	0.07
L6	71.5000-56.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.857	0.44
L7	56.5000-36.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.953	0.59
L8	36.7500-22.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	8.914	0.44
L9	22.0000-20.5000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.906	0.04
L10	20.5000-19.0833	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.092	0.04
L11	19.0833-18.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.835	0.03
L12	18.0000-4.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	10.794	0.42
L13	4.0000-3.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.771	0.03
L14	3.0000-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.313	0.09

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R	A_F	C_{AA}	C_{AA}	Weight K
				ft ²	ft ²	In Face ft ²	Out Face ft ²	
L1	129.0000-115.5000	A	2.280	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.809	1.17
L2	115.5000-115.0000	A	2.266	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.651	0.08
L3	115.0000-92.0833	A	2.241	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	30.949	3.66
L4	92.0833-73.7500	A	2.192	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	35.324	3.07
L5	73.7500-71.5000	A	2.164	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	4.335	0.38
L6	71.5000-56.5000	A	2.136	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	29.984	2.43
L7	56.5000-36.7500	A	2.069	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	39.260	3.05
L8	36.7500-22.0000	A	1.976	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	27.906	2.27
L9	22.0000-20.5000	A	1.914	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.693	0.21
L10	20.5000-19.0833	A	1.900	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	3.366	0.20
L11	19.0833-18.0000	A	1.888	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.562	0.15
L12	18.0000-4.0000	A	1.790	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	31.960	1.83
L13	4.0000-3.0000	A	1.598	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.120	0.12
L14	3.0000-0.0000	A	1.468	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	6.031	0.32

Feed Line Center of Pressure

Section	Elevation ft	CP_x	CP_z	CP_x	CP_z
		in	in	Ice in	Ice in
L1	129.0000-115.5000	-0.2453	0.1416	-0.5158	0.2978
L2	115.5000-115.0000	-0.4015	0.2318	-0.7717	0.4455
L3	115.0000-92.0833	-0.4196	0.2423	-0.8613	0.4973
L4	92.0833-73.7500	-0.5608	0.3238	-1.1767	0.6793
L5	73.7500-71.5000	-0.5689	0.3284	-1.2198	0.7043
L6	71.5000-56.5000	-0.6012	0.3471	-1.2976	0.7492
L7	56.5000-36.7500	-0.6264	0.3616	-1.3714	0.7918
L8	36.7500-22.0000	-0.6356	0.3670	-1.3848	0.7995
L9	22.0000-20.5000	-0.6411	0.3701	-1.3737	0.7931
L10	20.5000-19.0833	-0.7857	0.4536	-1.6491	0.9521
L11	19.0833-18.0000	-0.7868	0.4543	-1.6507	0.9531
L12	18.0000-4.0000	-0.7931	0.4579	-1.6503	0.9528
L13	4.0000-3.0000	-0.7990	0.4613	-1.6100	0.9295
L14	3.0000-0.0000	-0.8005	0.4622	-1.5669	0.9047

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
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Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.0000	0.00	123.0000	No Ice	4.5931	3.3194	0.03
			0.00			1/2" Ice	5.0183	4.0888	0.07
			0.00			1" Ice	5.4362	4.7844	0.12
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.0000	0.00	123.0000	No Ice	4.5931	3.3194	0.03
			0.00			1/2" Ice	5.0183	4.0888	0.07
			0.00			1" Ice	5.4362	4.7844	0.12
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.0000	0.00	123.0000	No Ice	4.5931	3.3194	0.03
			0.00			1/2" Ice	5.0183	4.0888	0.07
			0.00			1" Ice	5.4362	4.7844	0.12
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.0000	0.00	123.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2" Ice	12.4043	11.3657	0.17
			0.00			1" Ice	13.1351	12.9138	0.27
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.0000	0.00	123.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2" Ice	12.4043	11.3657	0.17
			0.00			1" Ice	13.1351	12.9138	0.27
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.0000	0.00	123.0000	No Ice	11.6828	9.8418	0.08
			0.00			1/2" Ice	12.4043	11.3657	0.17
			0.00			1" Ice	13.1351	12.9138	0.27
ATBT-BOTTOM-24V	A	From Leg	4.0000	0.00	123.0000	No Ice	0.1039	0.0645	0.00
			0.00			1/2" Ice	0.1476	0.1021	0.00
			0.00			1" Ice	0.1987	0.1471	0.01
ATBT-BOTTOM-24V	B	From Leg	4.0000	0.00	123.0000	No Ice	0.1039	0.0645	0.00
			0.00			1/2" Ice	0.1476	0.1021	0.00
			0.00			1" Ice	0.1987	0.1471	0.01
ATBT-BOTTOM-24V	C	From Leg	4.0000	0.00	123.0000	No Ice	0.1039	0.0645	0.00
			0.00			1/2" Ice	0.1476	0.1021	0.00
			0.00			1" Ice	0.1987	0.1471	0.01
KRY 112 489/2	A	From Leg	4.0000	0.00	123.0000	No Ice	0.5592	0.3651	0.02
			0.00			1/2" Ice	0.6579	0.4484	0.02
			0.00			1" Ice	0.7640	0.5420	0.03
KRY 112 489/2	B	From Leg	4.0000	0.00	123.0000	No Ice	0.5592	0.3651	0.02
			0.00			1/2" Ice	0.6579	0.4484	0.02
			0.00			1" Ice	0.7640	0.5420	0.03
KRY 112 489/2	C	From Leg	4.0000	0.00	123.0000	No Ice	0.5592	0.3651	0.02
			0.00			1/2" Ice	0.6579	0.4484	0.02
			0.00			1" Ice	0.7640	0.5420	0.03
T-Arm Mount [TA 602-3]	C	None		0.00	123.0000	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

(2) LNX-8513DS-VTM w/ Mount Pipe	A	From Leg	4.0000	0.00	113.0000	No Ice	8.4106	7.0817	0.06
			0.00			1/2" Ice	8.9745	8.2729	0.13
			2.00			1" Ice	9.5048	9.1847	0.21
(2) LNX-8513DS-VTM w/ Mount Pipe	B	From Leg	4.0000	0.00	113.0000	No Ice	8.4106	7.0817	0.06
			0.00			1/2" Ice	8.9745	8.2729	0.13
			2.00			1" Ice	9.5048	9.1847	0.21
(2) LNX-8513DS-VTM w/ Mount Pipe	C	From Leg	4.0000	0.00	113.0000	No Ice	8.4106	7.0817	0.06
			0.00			1/2" Ice	8.9745	8.2729	0.13
			2.00			1" Ice	9.5048	9.1847	0.21
(2) DB-B1-6C-12AB-0Z	A	From Leg	4.0000	0.00	113.0000	No Ice	3.3636	2.1921	0.03
			0.00			1/2" Ice	3.5972	2.3950	0.06
			2.00			1" Ice	3.8383	2.6056	0.09
(2) SBNH-1D8585C w/ Mount Pipe	A	From Leg	4.0000	0.00	113.0000	No Ice	11.6828	9.8418	0.09
			0.00			1/2" Ice	12.4043	11.3657	0.18
			2.00			1" Ice	13.1351	12.9138	0.28
(2) SBNH-1D8585C w/	B	From Leg	4.0000	0.00	113.0000	No Ice	11.6828	9.8418	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
Mount Pipe			0.00			1/2" Ice 12.4043	11.3657	0.18
			2.00			1" Ice 13.1351	12.9138	0.28
(2) SBNH-1D8585C w/ Mount Pipe	C	From Leg	4.0000	0.00	113.0000	No Ice 11.6828	9.8418	0.09
			0.00			1/2" Ice 12.4043	11.3657	0.18
			2.00			1" Ice 13.1351	12.9138	0.28
B13 RRH 4X30	A	From Leg	4.0000	0.00	113.0000	No Ice 2.0552	1.3201	0.06
			0.00			1/2" Ice 2.2405	1.4754	0.07
			2.00			1" Ice 2.4333	1.6376	0.09
B13 RRH 4X30	B	From Leg	4.0000	0.00	113.0000	No Ice 2.0552	1.3201	0.06
			0.00			1/2" Ice 2.2405	1.4754	0.07
			2.00			1" Ice 2.4333	1.6376	0.09
B13 RRH 4X30	C	From Leg	4.0000	0.00	113.0000	No Ice 2.0552	1.3201	0.06
			0.00			1/2" Ice 2.2405	1.4754	0.07
			2.00			1" Ice 2.4333	1.6376	0.09
AWS4 (B66) 4x45 RRH	A	From Leg	4.0000	0.00	113.0000	No Ice 2.6600	1.5861	0.06
			0.00			1/2" Ice 2.8781	1.7690	0.08
			2.00			1" Ice 3.1037	1.9588	0.11
AWS4 (B66) 4x45 RRH	B	From Leg	4.0000	0.00	113.0000	No Ice 2.6600	1.5861	0.06
			0.00			1/2" Ice 2.8781	1.7690	0.08
			2.00			1" Ice 3.1037	1.9588	0.11
AWS4 (B66) 4x45 RRH	C	From Leg	4.0000	0.00	113.0000	No Ice 2.6600	1.5861	0.06
			0.00			1/2" Ice 2.8781	1.7690	0.08
			2.00			1" Ice 3.1037	1.9588	0.11
PCS B25 RRH4x30	A	From Leg	4.0000	0.00	113.0000	No Ice 2.2000	1.7417	0.06
			0.00			1/2" Ice 2.3926	1.9204	0.08
			2.00			1" Ice 2.5926	2.1065	0.10
PCS B25 RRH4x30	B	From Leg	4.0000	0.00	113.0000	No Ice 2.2000	1.7417	0.06
			0.00			1/2" Ice 2.3926	1.9204	0.08
			2.00			1" Ice 2.5926	2.1065	0.10
PCS B25 RRH4x30	C	From Leg	4.0000	0.00	113.0000	No Ice 2.2000	1.7417	0.06
			0.00			1/2" Ice 2.3926	1.9204	0.08
			2.00			1" Ice 2.5926	2.1065	0.10
Platform Mount [LP 602-1]	C	None		0.00	113.0000	No Ice 32.0300	32.0300	1.34
						1/2" Ice 38.7100	38.7100	1.80
						1" Ice 45.3900	45.3900	2.26

(2) DB980H90E-M w/ Mount Pipe	A	From Leg	4.0000	0.00	100.0000	No Ice 4.0361	3.6194	0.03
			0.00			1/2" Ice 4.4987	4.4808	0.07
			0.00			1" Ice 4.9468	5.2186	0.11
(2) DB980H90E-M w/ Mount Pipe	B	From Leg	4.0000	0.00	100.0000	No Ice 4.0361	3.6194	0.03
			0.00			1/2" Ice 4.4987	4.4808	0.07
			0.00			1" Ice 4.9468	5.2186	0.11
(2) DB980H90E-M w/ Mount Pipe	C	From Leg	4.0000	0.00	100.0000	No Ice 4.0361	3.6194	0.03
			0.00			1/2" Ice 4.4987	4.4808	0.07
			0.00			1" Ice 4.9468	5.2186	0.11
Platform Mount [LP 1201-1]	C	None		0.00	100.0000	No Ice 23.1000	23.1000	2.10
						1/2" Ice 26.8000	26.8000	2.50
						1" Ice 30.5000	30.5000	2.90

RRUS 11	A	From Leg	2.0000	0.00	92.0000	No Ice 2.7908	1.1923	0.05
			0.00			1/2" Ice 2.9984	1.3395	0.07
			2.00			1" Ice 3.2134	1.4957	0.10
RRUS 11	B	From Leg	2.0000	0.00	92.0000	No Ice 2.7908	1.1923	0.05
			0.00			1/2" Ice 2.9984	1.3395	0.07
			2.00			1" Ice 3.2134	1.4957	0.10
RRUS 11	C	From Leg	2.0000	0.00	92.0000	No Ice 2.7908	1.1923	0.05
			0.00			1/2" Ice 2.9984	1.3395	0.07
			2.00			1" Ice 3.2134	1.4957	0.10
DC6-48-60-18-8F	A	From Leg	2.0000	0.00	92.0000	No Ice 0.9167	0.9167	0.02
			0.00			1/2" Ice 1.4583	1.4583	0.04
			2.00			1" Ice 1.6431	1.6431	0.06
5' x 2" Pipe Mount	A	From Leg	2.0000	0.00	92.0000	No Ice 1.0000	1.0000	0.03
			0.00			1/2" Ice 1.3932	1.3932	0.04
			0.00			1" Ice 1.7031	1.7031	0.05
5' x 2" Pipe Mount	B	From Leg	2.0000	0.00	92.0000	No Ice 1.0000	1.0000	0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			0.00			1/2" Ice 1.3932	1.3932	0.04
			0.00			1" Ice 1.7031	1.7031	0.05
5' x 2" Pipe Mount	C	From Leg	2.0000	0.00	92.0000	No Ice 1.0000	1.0000	0.03
			0.00			1/2" Ice 1.3932	1.3932	0.04
			0.00			1" Ice 1.7031	1.7031	0.05
Side Arm Mount [SO 102-3]	C	None		0.00	92.0000	No Ice 3.0000	3.0000	0.08
						1/2" Ice 3.4800	3.4800	0.11
						1" Ice 3.9600	3.9600	0.14

7770.00 w/ Mount Pipe	A	From Leg	4.0000	0.00	90.0000	No Ice 5.8181	4.6567	0.09
			0.00			1/2" Ice 6.2677	5.5082	0.14
			0.00			1" Ice 6.6966	6.2127	0.21
7770.00 w/ Mount Pipe	B	From Leg	4.0000	0.00	90.0000	No Ice 5.8181	4.6567	0.09
			0.00			1/2" Ice 6.2677	5.5082	0.14
			0.00			1" Ice 6.6966	6.2127	0.21
7770.00 w/ Mount Pipe	C	From Leg	4.0000	0.00	90.0000	No Ice 5.8181	4.6567	0.09
			0.00			1/2" Ice 6.2677	5.5082	0.14
			0.00			1" Ice 6.6966	6.2127	0.21
(2) P65-17-XLH-RR w/ Mount Pipe	A	From Leg	4.0000	0.00	90.0000	No Ice 11.8229	9.0563	0.09
			0.00			1/2" Ice 12.5940	10.6186	0.18
			0.00			1" Ice 13.3752	12.2051	0.28
(2) P65-17-XLH-RR w/ Mount Pipe	B	From Leg	4.0000	0.00	90.0000	No Ice 11.8229	9.0563	0.09
			0.00			1/2" Ice 12.5940	10.6186	0.18
			0.00			1" Ice 13.3752	12.2051	0.28
(2) P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.0000	0.00	90.0000	No Ice 11.8229	9.0563	0.09
			0.00			1/2" Ice 12.5940	10.6186	0.18
			0.00			1" Ice 13.3752	12.2051	0.28
(4) LGP13519	A	From Leg	4.0000	0.00	90.0000	No Ice 0.2897	0.1806	0.01
			0.00			1/2" Ice 0.3617	0.2407	0.01
			0.00			1" Ice 0.4411	0.3103	0.01
(2) LGP13519	B	From Leg	4.0000	0.00	90.0000	No Ice 0.2897	0.1806	0.01
			0.00			1/2" Ice 0.3617	0.2407	0.01
			0.00			1" Ice 0.4411	0.3103	0.01
(2) LGP13519	C	From Leg	4.0000	0.00	90.0000	No Ice 0.2897	0.1806	0.01
			0.00			1/2" Ice 0.3617	0.2407	0.01
			0.00			1" Ice 0.4411	0.3103	0.01
(2) DTMABP7819VG12A	A	From Leg	4.0000	0.00	90.0000	No Ice 0.9762	0.3387	0.02
			0.00			1/2" Ice 1.1002	0.4192	0.03
			0.00			1" Ice 1.2316	0.5098	0.04
(2) DTMABP7819VG12A	B	From Leg	4.0000	0.00	90.0000	No Ice 0.9762	0.3387	0.02
			0.00			1/2" Ice 1.1002	0.4192	0.03
			0.00			1" Ice 1.2316	0.5098	0.04
(2) DTMABP7819VG12A	C	From Leg	4.0000	0.00	90.0000	No Ice 0.9762	0.3387	0.02
			0.00			1/2" Ice 1.1002	0.4192	0.03
			0.00			1" Ice 1.2316	0.5098	0.04
6' x 2" Mount Pipe	A	From Leg	4.0000	0.00	90.0000	No Ice 1.4250	1.4250	0.02
			0.00			1/2" Ice 1.9250	1.9250	0.03
			0.00			1" Ice 2.2939	2.2939	0.05
6' x 2" Mount Pipe	B	From Leg	4.0000	0.00	90.0000	No Ice 1.4250	1.4250	0.02
			0.00			1/2" Ice 1.9250	1.9250	0.03
			0.00			1" Ice 2.2939	2.2939	0.05
6' x 2" Mount Pipe	C	From Leg	4.0000	0.00	90.0000	No Ice 1.4250	1.4250	0.02
			0.00			1/2" Ice 1.9250	1.9250	0.03
			0.00			1" Ice 2.2939	2.2939	0.05
Platform Mount [LP 601-1]	C	None		0.00	90.0000	No Ice 28.4700	28.4700	1.12
						1/2" Ice 33.5900	33.5900	1.51
						1" Ice 38.7100	38.7100	1.91

GPS_A	C	From Leg	3.0000	0.00	59.0000	No Ice 0.2550	0.2550	0.00
			0.00			1/2" Ice 0.3205	0.3205	0.00
			0.00			1" Ice 0.3934	0.3934	0.01
4' x 2" Pipe Mount	C	From Leg	3.0000	0.00	59.0000	No Ice 0.7852	0.7852	0.03
			0.00			1/2" Ice 1.0284	1.0284	0.04
			0.00			1" Ice 1.2809	1.2809	0.04
Side Arm Mount [SO 701-1]	C	None		0.00	59.0000	No Ice 0.8500	1.6700	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
						1/2" Ice	1.1400	2.3400	0.08
						1" Ice	1.4300	3.0100	0.09

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
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	129 - 115.5	Pole	Max Tension	8	0.00	0.00	-0.00
			Max. Compression	26	-7.70	0.74	-0.40
			Max. Mx	20	-2.12	26.43	-0.01
			Max. My	14	-2.12	0.03	-26.42
			Max. Vy	20	-3.61	26.43	-0.01
			Max. Vx	2	-3.61	0.03	26.38
L2	115.5 - 115	Pole	Max. Torque	25			0.10
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-7.85	0.79	-0.43
			Max. Mx	20	-2.16	28.25	-0.01
			Max. My	14	-2.16	0.04	-28.24
			Max. Vy	20	-3.67	28.25	-0.01
L3	115 - 92.0833	Pole	Max. Vx	2	-3.67	0.04	28.19
			Max. Torque	25			0.11
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.52	3.85	-0.09
			Max. Mx	20	-9.09	333.62	0.19
			Max. My	2	-9.07	0.20	335.98
L4	92.0833 - 73.75	Pole	Max. Vy	20	-16.57	333.62	0.19
			Max. Vx	2	-16.67	0.20	335.98
			Max. Torque	9			0.79
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.89	6.12	-0.62
			Max. Mx	20	-14.06	652.42	0.27
L5	73.75 - 71.5	Pole	Max. My	2	-14.04	0.33	656.29
			Max. Vy	20	-24.44	652.42	0.27
			Max. Vx	2	-24.55	0.33	656.29
			Max. Torque	17			-0.98
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-51.52	7.18	-1.19
L6	71.5 - 56.5	Pole	Max. Mx	20	-16.00	815.01	0.24
			Max. My	2	-15.98	0.39	819.51
			Max. Vy	20	-25.56	815.01	0.24
			Max. Vx	2	-25.67	0.39	819.51
			Max. Torque	17			-1.08
			Max Tension	1	0.00	0.00	0.00
L7	56.5 - 36.75	Pole	Max. Compression	26	-58.46	10.16	-2.83
			Max. Mx	20	-19.82	1216.73	0.10
			Max. My	2	-19.81	0.67	1222.47
			Max. Vy	20	-28.11	1216.73	0.10
			Max. Vx	14	28.22	0.67	-1222.24
			Max. Torque	15			-1.57
L8	36.75 - 22	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-65.12	12.73	-4.26
			Max. Mx	20	-23.70	1640.78	0.01
			Max. My	2	-23.69	0.83	1647.88
			Max. Vy	20	-30.41	1640.78	0.01
			Max. Vx	14	30.52	0.83	-1647.83
L9	22 - 20.5	Pole	Max. Torque	15			-2.01
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.38	16.40	-6.33
			Max. Mx	20	-31.52	2282.19	-0.11
			Max. My	14	-31.52	1.06	-2291.33
			Max. Vy	20	-33.62	2282.19	-0.11
L10	20.5 - 19.0833	Pole	Max. Vx	14	33.72	1.06	-2291.33
			Max. Torque	15			-2.64
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.19	16.66	-6.48
			Max. Mx	20	-32.05	2332.77	-0.12
			Max. My	14	-32.05	1.08	-2342.07

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L11	19.0833 - 18	Pole	Max. Compression	26	-78.95	16.91	-6.62
			Max. Mx	20	-32.56	2380.84	-0.13
			Max. My	14	-32.56	1.10	-2390.28
			Max. Vy	20	-34.05	2380.84	-0.13
			Max. Vx	14	34.15	1.10	-2390.28
			Max. Torque	15			-2.74
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-79.50	17.09	-6.73
			Max. Mx	20	-32.92	2417.79	-0.14
			Max. My	14	-32.91	1.11	-2427.35
L12	18 - 4	Pole	Max. Vy	20	-34.20	2417.79	-0.14
			Max. Vx	14	34.31	1.11	-2427.35
			Max. Torque	15			-2.78
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-87.55	19.35	-8.03
			Max. Mx	20	-38.59	2910.70	-0.24
			Max. My	14	-38.59	1.29	-2921.70
			Max. Vy	20	-36.24	2910.70	-0.24
			Max. Vx	14	36.35	1.29	-2921.70
			Max. Torque	15			-3.32
L13	4 - 3	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-88.16	19.50	-8.12
			Max. Mx	20	-39.05	2947.02	-0.25
			Max. My	14	-39.05	1.30	-2958.11
			Max. Vy	20	-36.39	2947.02	-0.25
			Max. Vx	14	36.50	1.30	-2958.11
			Max. Torque	15			-3.36
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-90.06	19.90	-8.35
			Max. Mx	20	-40.53	3056.88	-0.28
L14	3 - 0	Pole	Max. My	14	-40.53	1.34	-3068.28
			Max. Vy	20	-36.85	3056.88	-0.28
			Max. Vx	14	36.96	1.34	-3068.28
			Max. Torque	25			3.50

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	90.06	0.00	-0.00
	Max. H _x	20	40.55	36.84	-0.00
	Max. H _z	3	30.41	0.00	36.95
	Max. M _x	2	3067.73	0.00	36.95
	Max. M _z	8	3054.19	-36.84	-0.00
	Max. Torsion	25	3.50	18.42	32.00
	Min. Vert	7	30.41	-31.90	18.47
	Min. H _x	8	40.55	-36.84	-0.00
	Min. H _z	15	30.41	0.00	-36.95
	Min. M _x	14	-3068.28	0.00	-36.95
	Min. M _z	20	-3056.88	36.84	-0.00
	Min. Torsion	13	-3.50	-18.42	-32.00

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	33.79	0.00	0.00	0.23	1.09	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	40.55	0.00	-36.95	-3067.73	1.34	-3.49
0.9 Dead+1.6 Wind 0 deg - No Ice	30.41	-0.00	-36.95	-3044.54	1.00	-3.49
1.2 Dead+1.6 Wind 30 deg - No Ice	40.55	18.42	-32.00	-2656.70	-1526.41	-2.53

129 Ft Monopole Tower Structural Analysis
 Project Number 37516-3555.001.7805, Application 367400, Revision 1

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Ice						
0.9 Dead+1.6 Wind 30 deg - No Ice	30.41	18.42	-32.00	-2636.63	-1515.18	-2.54
1.2 Dead+1.6 Wind 60 deg - No Ice	40.55	31.90	-18.47	-1533.74	-2644.82	-0.90
0.9 Dead+1.6 Wind 60 deg - No Ice	30.41	31.90	-18.47	-1522.18	-2625.12	-0.90
1.2 Dead+1.6 Wind 90 deg - No Ice	40.55	36.84	0.00	0.28	-3054.19	0.97
0.9 Dead+1.6 Wind 90 deg - No Ice	30.41	36.84	0.00	0.21	-3031.39	0.97
1.2 Dead+1.6 Wind 120 deg - No Ice	40.55	31.90	18.47	1534.29	-2644.82	2.58
0.9 Dead+1.6 Wind 120 deg - No Ice	30.41	31.90	18.47	1522.60	-2625.12	2.58
1.2 Dead+1.6 Wind 150 deg - No Ice	40.55	18.42	32.00	2657.25	-1526.41	3.50
0.9 Dead+1.6 Wind 150 deg - No Ice	30.41	18.42	32.00	2637.04	-1515.18	3.50
1.2 Dead+1.6 Wind 180 deg - No Ice	40.55	0.00	36.95	3068.28	1.34	3.49
0.9 Dead+1.6 Wind 180 deg - No Ice	30.41	-0.00	36.95	3044.96	1.00	3.49
1.2 Dead+1.6 Wind 210 deg - No Ice	40.55	-18.42	32.00	2657.26	1529.10	2.54
0.9 Dead+1.6 Wind 210 deg - No Ice	30.41	-18.42	32.00	2637.05	1517.18	2.54
1.2 Dead+1.6 Wind 240 deg - No Ice	40.55	-31.90	18.47	1534.30	2647.51	0.91
0.9 Dead+1.6 Wind 240 deg - No Ice	30.41	-31.90	18.47	1522.60	2627.12	0.91
1.2 Dead+1.6 Wind 270 deg - No Ice	40.55	-36.84	0.00	0.28	3056.88	-0.97
0.9 Dead+1.6 Wind 270 deg - No Ice	30.41	-36.84	0.00	0.21	3033.39	-0.97
1.2 Dead+1.6 Wind 300 deg - No Ice	40.55	-31.90	-18.47	-1533.75	2647.51	-2.58
0.9 Dead+1.6 Wind 300 deg - No Ice	30.41	-31.90	-18.47	-1522.19	2627.12	-2.58
1.2 Dead+1.6 Wind 330 deg - No Ice	40.55	-18.42	-32.00	-2656.71	1529.10	-3.50
0.9 Dead+1.6 Wind 330 deg - No Ice	30.41	-18.42	-32.00	-2636.63	1517.18	-3.50
1.2 Dead+1.0 Ice+1.0 Temp	90.06	-0.00	0.00	8.35	19.90	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	90.06	-0.00	-9.65	-871.94	19.96	-1.84
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	90.06	4.81	-8.36	-754.00	-418.92	-1.21
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	90.06	8.34	-4.82	-431.78	-740.21	-0.25
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	90.06	9.63	0.00	8.37	-857.81	0.77
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	90.06	8.34	4.82	448.53	-740.21	1.59
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	90.06	4.81	8.36	770.75	-418.92	1.98
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	90.06	-0.00	9.65	888.68	19.96	1.84
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	90.06	-4.81	8.36	770.75	458.84	1.21
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	90.06	-8.34	4.82	448.53	780.13	0.25
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	90.06	-9.63	0.00	8.37	897.73	-0.77
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	90.06	-8.34	-4.82	-431.78	780.13	-1.59
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	90.06	-4.81	-8.36	-754.00	458.84	-1.98
Dead+Wind 0 deg - Service	33.79	0.00	-7.91	-653.71	1.12	-0.04

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg - Service	33.79	3.94	-6.85	-566.09	-324.51	-0.13
Dead+Wind 60 deg - Service	33.79	6.83	-3.95	-326.74	-562.89	-0.20
Dead+Wind 90 deg - Service	33.79	7.88	0.00	0.23	-650.15	-0.21
Dead+Wind 120 deg - Service	33.79	6.83	3.95	327.19	-562.89	-0.16
Dead+Wind 150 deg - Service	33.79	3.94	6.85	566.55	-324.51	-0.07
Dead+Wind 180 deg - Service	33.79	0.00	7.91	654.16	1.12	0.04
Dead+Wind 210 deg - Service	33.79	-3.94	6.85	566.55	326.76	0.13
Dead+Wind 240 deg - Service	33.79	-6.83	3.95	327.19	565.14	0.20
Dead+Wind 270 deg - Service	33.79	-7.88	0.00	0.23	652.39	0.21
Dead+Wind 300 deg - Service	33.79	-6.83	-3.95	-326.74	565.14	0.16
Dead+Wind 330 deg - Service	33.79	-3.94	-6.85	-566.09	326.76	0.07

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-33.79	0.00	0.00	33.79	0.00	0.000%
2	0.00	-40.55	-36.95	0.00	40.55	36.95	0.000%
3	0.00	-30.41	-36.95	0.00	30.41	36.95	0.000%
4	18.42	-40.55	-32.00	-18.42	40.55	32.00	0.000%
5	18.42	-30.41	-32.00	-18.42	30.41	32.00	0.000%
6	31.90	-40.55	-18.47	-31.90	40.55	18.47	0.000%
7	31.90	-30.41	-18.47	-31.90	30.41	18.47	0.000%
8	36.84	-40.55	0.00	-36.84	40.55	-0.00	0.000%
9	36.84	-30.41	0.00	-36.84	30.41	-0.00	0.000%
10	31.90	-40.55	18.47	-31.90	40.55	-18.47	0.000%
11	31.90	-30.41	18.47	-31.90	30.41	-18.47	0.000%
12	18.42	-40.55	32.00	-18.42	40.55	-32.00	0.000%
13	18.42	-30.41	32.00	-18.42	30.41	-32.00	0.000%
14	0.00	-40.55	36.95	0.00	40.55	-36.95	0.000%
15	0.00	-30.41	36.95	0.00	30.41	-36.95	0.000%
16	-18.42	-40.55	32.00	18.42	40.55	-32.00	0.000%
17	-18.42	-30.41	32.00	18.42	30.41	-32.00	0.000%
18	-31.90	-40.55	18.47	31.90	40.55	-18.47	0.000%
19	-31.90	-30.41	18.47	31.90	30.41	-18.47	0.000%
20	-36.84	-40.55	0.00	36.84	40.55	-0.00	0.000%
21	-36.84	-30.41	0.00	36.84	30.41	-0.00	0.000%
22	-31.90	-40.55	-18.47	31.90	40.55	18.47	0.000%
23	-31.90	-30.41	-18.47	31.90	30.41	18.47	0.000%
24	-18.42	-40.55	-32.00	18.42	40.55	32.00	0.000%
25	-18.42	-30.41	-32.00	18.42	30.41	32.00	0.000%
26	0.00	-90.06	0.00	0.00	90.06	-0.00	0.000%
27	0.00	-90.06	-9.65	0.00	90.06	9.65	0.000%
28	4.81	-90.06	-8.36	-4.81	90.06	8.36	0.000%
29	8.34	-90.06	-4.82	-8.34	90.06	4.82	0.000%
30	9.63	-90.06	0.00	-9.63	90.06	-0.00	0.000%
31	8.34	-90.06	4.82	-8.34	90.06	-4.82	0.000%
32	4.81	-90.06	8.36	-4.81	90.06	-8.36	0.000%
33	0.00	-90.06	9.65	0.00	90.06	-9.65	0.000%
34	-4.81	-90.06	8.36	4.81	90.06	-8.36	0.000%
35	-8.34	-90.06	4.82	8.34	90.06	-4.82	0.000%
36	-9.63	-90.06	0.00	9.63	90.06	-0.00	0.000%
37	-8.34	-90.06	-4.82	8.34	90.06	4.82	0.000%
38	-4.81	-90.06	-8.36	4.81	90.06	8.36	0.000%
39	0.00	-33.79	-7.91	0.00	33.79	7.91	0.000%
40	3.94	-33.79	-6.85	-3.94	33.79	6.85	0.000%
41	6.83	-33.79	-3.95	-6.83	33.79	3.95	0.000%
42	7.88	-33.79	0.00	-7.88	33.79	0.00	0.000%
43	6.83	-33.79	3.95	-6.83	33.79	-3.95	0.000%
44	3.94	-33.79	6.85	-3.94	33.79	-6.85	0.000%
45	0.00	-33.79	7.91	0.00	33.79	-7.91	0.000%
46	-3.94	-33.79	6.85	3.94	33.79	-6.85	0.000%
47	-6.83	-33.79	3.95	6.83	33.79	-3.95	0.000%
48	-7.88	-33.79	0.00	7.88	33.79	0.00	0.000%
49	-6.83	-33.79	-3.95	6.83	33.79	3.95	0.000%
50	-3.94	-33.79	-6.85	3.94	33.79	6.85	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005677
3	Yes	4	0.00000001	0.00091919
4	Yes	5	0.00000001	0.00097102
5	Yes	5	0.00000001	0.00038943
6	Yes	6	0.00000001	0.00003623
7	Yes	5	0.00000001	0.00041482
8	Yes	4	0.00000001	0.00071787
9	Yes	4	0.00000001	0.00041956
10	Yes	6	0.00000001	0.00003553
11	Yes	5	0.00000001	0.00040660
12	Yes	5	0.00000001	0.00098016
13	Yes	5	0.00000001	0.00039374
14	Yes	5	0.00000001	0.00005678
15	Yes	4	0.00000001	0.00091926
16	Yes	6	0.00000001	0.00003665
17	Yes	5	0.00000001	0.00041958
18	Yes	5	0.00000001	0.00097850
19	Yes	5	0.00000001	0.00039291
20	Yes	4	0.00000001	0.00071832
21	Yes	4	0.00000001	0.00042170
22	Yes	5	0.00000001	0.00099555
23	Yes	5	0.00000001	0.00040060
24	Yes	6	0.00000001	0.00003624
25	Yes	5	0.00000001	0.00041476
26	Yes	4	0.00000001	0.00025919
27	Yes	6	0.00000001	0.00015005
28	Yes	6	0.00000001	0.00019360
29	Yes	6	0.00000001	0.00019754
30	Yes	6	0.00000001	0.00014440
31	Yes	6	0.00000001	0.00020183
32	Yes	6	0.00000001	0.00019606
33	Yes	6	0.00000001	0.00015202
34	Yes	6	0.00000001	0.00021604
35	Yes	6	0.00000001	0.00021042
36	Yes	6	0.00000001	0.00015228
37	Yes	6	0.00000001	0.00020641
38	Yes	6	0.00000001	0.00021381
39	Yes	4	0.00000001	0.00005301
40	Yes	4	0.00000001	0.00042592
41	Yes	4	0.00000001	0.00048190
42	Yes	4	0.00000001	0.00009820
43	Yes	4	0.00000001	0.00041647
44	Yes	4	0.00000001	0.00046179
45	Yes	4	0.00000001	0.00005295
46	Yes	4	0.00000001	0.00046995
47	Yes	4	0.00000001	0.00041785
48	Yes	4	0.00000001	0.00009857
49	Yes	4	0.00000001	0.00048303
50	Yes	4	0.00000001	0.00043350

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	129 - 115.5	18.73	39	1.31	0.00
L2	115.5 - 115	15.04	39	1.30	0.00
L3	115 - 92.0833	14.90	39	1.30	0.00
L4	92.0833 - 73.75	9.24	39	1.01	0.00
L5	78 - 71.5	6.51	45	0.83	0.00
L6	71.5 - 56.5	5.41	45	0.78	0.00
L7	56.5 - 36.75	3.27	45	0.59	0.00
L8	42 - 22	1.76	45	0.40	0.00

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L9	22 - 20.5	0.45	45	0.21	0.00
L10	20.5 - 19.0833	0.39	45	0.19	0.00
L11	19.0833 - 18	0.33	45	0.18	0.00
L12	18 - 4	0.29	45	0.16	0.00
L13	4 - 3	0.01	45	0.03	0.00
L14	3 - 0	0.01	45	0.02	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.0000	RR90-17-02DP w/ Mount Pipe	39	17.09	1.30	0.00	67088
113.0000	(2) LNX-8513DS-VTM w/ Mount Pipe	39	14.37	1.29	0.00	8611
100.0000	(2) DB980H90E-M w/ Mount Pipe	39	11.04	1.13	0.00	4286
92.0000	RRUS 11	39	9.22	1.01	0.00	3530
90.0000	7770.00 w/ Mount Pipe	39	8.80	0.98	0.00	3637
59.0000	GPS_A	45	3.58	0.62	0.00	4294

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	129 - 115.5	87.81	2	6.13	0.01
L2	115.5 - 115	70.54	2	6.08	0.01
L3	115 - 92.0833	69.90	2	6.07	0.01
L4	92.0833 - 73.75	43.35	2	4.73	0.01
L5	78 - 71.5	30.57	14	3.91	0.01
L6	71.5 - 56.5	25.41	14	3.64	0.01
L7	56.5 - 36.75	15.33	14	2.77	0.00
L8	42 - 22	8.27	14	1.89	0.00
L9	22 - 20.5	2.11	14	0.97	0.00
L10	20.5 - 19.0833	1.82	14	0.89	0.00
L11	19.0833 - 18	1.56	14	0.82	0.00
L12	18 - 4	1.38	14	0.76	0.00
L13	4 - 3	0.06	14	0.14	0.00
L14	3 - 0	0.03	14	0.11	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.0000	RR90-17-02DP w/ Mount Pipe	2	80.11	6.12	0.01	14666
113.0000	(2) LNX-8513DS-VTM w/ Mount Pipe	2	67.38	6.04	0.01	1889
100.0000	(2) DB980H90E-M w/ Mount Pipe	2	51.82	5.33	0.01	932
92.0000	RRUS 11	2	43.27	4.72	0.01	764
90.0000	7770.00 w/ Mount Pipe	2	41.29	4.58	0.01	786
59.0000	GPS_A	14	16.81	2.93	0.00	919

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L _u	Kl/r	A	P _u	φP _n	Ratio P _u
	ft		ft	ft		in ²	K	K	φP _n
L1	129 - 115.5 (1)	TP16x16x0.375	13.5000	0.0000	0.0	18.4078	-2.12	579.85	0.004
L2	115.5 - 115 (2)	TP17.81x16x0.375	0.5000	0.0000	0.0	18.4078	-2.14	579.85	0.004
L3	115 - 92.0833 (3)	TP23.0822x17.81x0.2188	22.9167	0.0000	0.0	16.1081	-9.07	1113.42	0.008
L4	92.0833 - 73.75 (4)	TP27.3x23.0822x0.399	18.3333	0.0000	0.0	33.3073	-14.05	1440.57	0.010
L5	73.75 - 71.5 (5)	TP27.3778x25.5242x0.4884	6.5000	0.0000	0.0	42.2867	-15.98	1831.33	0.009
L6	71.5 - 56.5 (6)	TP30.8233x27.3778x0.5177	15.0000	0.0000	0.0	50.5193	-19.81	2406.71	0.008
L7	56.5 - 36.75 (7)	TP35.36x30.8233x0.4947	19.7500	0.0000	0.0	53.6171	-23.69	2562.80	0.009
L8	36.75 - 22 (8)	TP38.1343x33.1647x0.5988	20.0000	0.0000	0.0	72.3711	-31.52	3515.83	0.009
L9	22 - 20.5 (9)	TP38.4797x38.1343x0.5965	1.5000	0.0000	0.0	72.7574	-32.05	3527.17	0.009
L10	20.5 - 19.0833 (10)	TP38.8059x38.4797x0.5943	1.4167	0.0000	0.0	73.1235	-32.56	3545.74	0.009
L11	19.0833 - 18 (11)	TP39.0553x38.8059x0.517	1.0833	0.0000	0.0	64.1563	-32.91	3460.14	0.010
L12	18 - 4 (12)	TP42.279x39.0553x0.6525	14.0000	0.0000	0.0	87.4606	-38.59	4072.34	0.009
L13	4 - 3 (13)	TP42.5092x42.279x0.737	1.0000	0.0000	0.0	99.1274	-39.05	4741.47	0.008
L14	3 - 0 (14)	TP43.2x42.5092x0.7883	3.0000	0.0000	0.0	107.657	-40.53	5630.49	0.007

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux}	φM _{ux}	Ratio M _{ux}	M _{uy}	φM _{uy}	Ratio M _{uy}
			kip-ft	kip-ft	φM _{ux}	kip-ft	kip-ft	φM _{uy}
L1	129 - 115.5 (1)	TP16x16x0.375	26.44	240.37	0.110	0.00	240.37	0.000
L2	115.5 - 115 (2)	TP17.81x16x0.375	26.43	240.37	0.110	0.00	240.37	0.000
L3	115 - 92.0833 (3)	TP23.0822x17.81x0.2188	335.98	517.77	0.649	0.00	517.77	0.000
L4	92.0833 - 73.75 (4)	TP27.3x23.0822x0.399	656.29	755.20	0.869	0.00	755.20	0.000
L5	73.75 - 71.5 (5)	TP27.3778x25.5242x0.4884	819.51	993.13	0.825	0.00	993.13	0.000
L6	71.5 - 56.5 (6)	TP30.8233x27.3778x0.5177	1222.47	1472.53	0.830	0.00	1472.53	0.000
L7	56.5 - 36.75 (7)	TP35.36x30.8233x0.4947	1647.88	1745.66	0.944	0.00	1745.66	0.000
L8	36.75 - 22 (8)	TP38.1343x33.1647x0.5988	2291.33	2667.30	0.859	0.00	2667.30	0.000
L9	22 - 20.5 (9)	TP38.4797x38.1343x0.5965	2342.07	2701.24	0.867	0.00	2701.24	0.000
L10	20.5 - 19.0833 (10)	TP38.8059x38.4797x0.5943	2390.28	2739.53	0.873	0.00	2739.53	0.000
L11	19.0833 - 18 (11)	TP39.0553x38.8059x0.517	2427.35	2701.93	0.898	0.00	2701.93	0.000
L12	18 - 4 (12)	TP42.279x39.0553x0.6525	2921.70	3427.16	0.853	0.00	3427.16	0.000
L13	4 - 3 (13)	TP42.5092x42.279x0.737	2958.12	3996.51	0.740	0.00	3996.51	0.000
L14	3 - 0 (14)	TP43.2x42.5092x0.7883	3068.28	4814.02	0.637	0.00	4814.02	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V _u	φV _n	Ratio V _u	Actual T _u	φT _n	Ratio T _u
			K	K	φV _n	kip-ft	kip-ft	φT _n
L1	129 - 115.5 (1)	TP16x16x0.375	3.61	289.92	0.012	0.00	368.87	0.000
L2	115.5 - 115 (2)	TP17.81x16x0.375	3.67	323.51	0.011	0.06	368.87	0.000
L3	115 - 92.0833 (3)	TP23.0822x17.81x0.2188	16.67	556.71	0.030	0.45	1049.88	0.000
L4	92.0833 - 73.75 (4)	TP27.3x23.0822x0.399	24.55	720.28	0.034	0.79	1531.32	0.001
L5	73.75 - 71.5 (5)	TP27.3778x25.5242x0.4884	25.67	915.66	0.028	0.97	2013.75	0.000
L6	71.5 - 56.5 (6)	TP30.8233x27.3778x0.5177	28.22	1203.35	0.023	1.57	2985.84	0.001
L7	56.5 - 36.75 (7)	TP35.36x30.8233x0.4947	30.52	1281.40	0.024	2.01	3539.64	0.001
L8	36.75 - 22 (8)	TP38.1343x33.1647x0.5988	33.72	1757.92	0.019	2.64	5408.45	0.000

129 Ft Monopole Tower Structural Analysis
Project Number 37516-3555.001.7805, Application 367400, Revision 1

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio V_u ϕV_n	Actual T_u kip-ft	ϕT_n kip-ft	Ratio T_u ϕT_n
L9	22 - 20.5 (9)	TP38.4797x38.1343x0.5965	33.94	1763.58	0.019	2.68	5477.27	0.000
L10	20.5 - 19.0833 (10)	TP38.8059x38.4797x0.5943	34.15	1772.87	0.019	2.74	5554.90	0.000
L11	19.0833 - 18 (11)	TP39.0553x38.8059x0.517	34.31	1730.07	0.020	2.78	5478.68	0.001
L12	18 - 4 (12)	TP42.279x39.0553x0.6525	36.35	2036.17	0.018	3.32	6949.20	0.000
L13	4 - 3 (13)	TP42.5092x42.279x0.737	36.50	2370.74	0.015	3.36	8103.67	0.000
L14	3 - 0 (14)	TP43.2x42.5092x0.7883	36.96	2815.25	0.013	3.49	9761.33	0.000

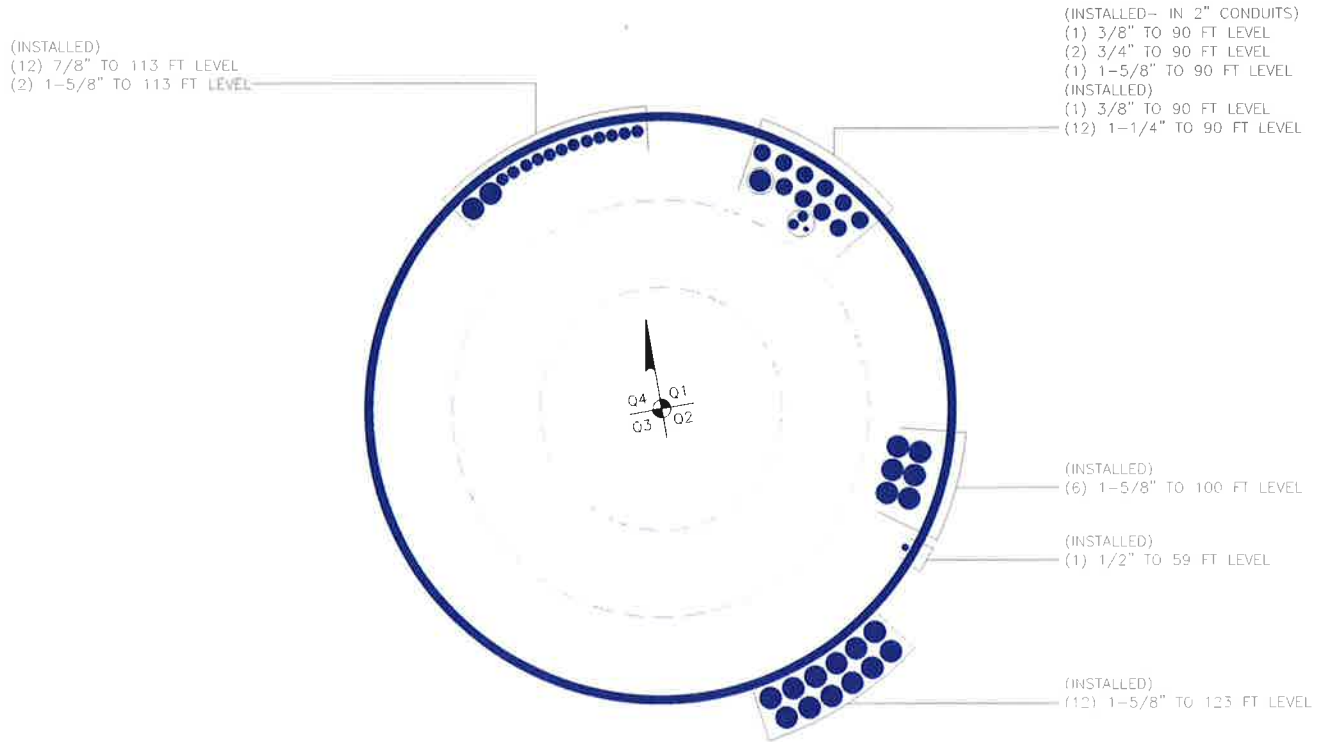
Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_n ϕP_n	Ratio M_{ux} ϕM_{ux}	Ratio M_{uy} ϕM_{uy}	Ratio V_u ϕV_n	Ratio T_u ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	129 - 115.5 (1)	0.004	0.110	0.000	0.012	0.000	0.114 ✓	1.000	4.8.2 ✓
L2	115.5 - 115 (2)	0.004	0.110	0.000	0.011	0.000	0.114 ✓	1.000	4.8.2 ✓
L3	115 - 92.0833 (3)	0.008	0.649	0.000	0.030	0.000	0.658 ✓	1.000	4.8.2 ✓
L4	92.0833 - 73.75 (4)	0.010	0.869	0.000	0.034	0.001	0.880 ✓	1.000	4.8.2 ✓
L5	73.75 - 71.5 (5)	0.009	0.825	0.000	0.028	0.000	0.835 ✓	1.000	4.8.2 ✓
L6	71.5 - 56.5 (6)	0.008	0.830	0.000	0.023	0.001	0.839 ✓	1.000	4.8.2 ✓
L7	56.5 - 36.75 (7)	0.009	0.944	0.000	0.024	0.001	0.954 ✓	1.000	4.8.2 ✓
L8	36.75 - 22 (8)	0.009	0.859	0.000	0.019	0.000	0.868 ✓	1.000	4.8.2 ✓
L9	22 - 20.5 (9)	0.009	0.867	0.000	0.019	0.000	0.877 ✓	1.000	4.8.2 ✓
L10	20.5 - 19.0833 (10)	0.009	0.873	0.000	0.019	0.000	0.882 ✓	1.000	4.8.2 ✓
L11	19.0833 - 18 (11)	0.010	0.898	0.000	0.020	0.001	0.908 ✓	1.000	4.8.2 ✓
L12	18 - 4 (12)	0.009	0.853	0.000	0.018	0.000	0.862 ✓	1.000	4.8.2 ✓
L13	4 - 3 (13)	0.008	0.740	0.000	0.015	0.000	0.749 ✓	1.000	4.8.2 ✓
L14	3 - 0 (14)	0.007	0.637	0.000	0.013	0.000	0.645 ✓	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	129 - 115.5	Pole	TP16x16x0.375	1	-2.12	579.85	11.4	Pass
L2	115.5 - 115	Pole	TP17.81x16x0.375	2	-2.14	579.85	11.4	Pass
L3	115 - 92.0833	Pole	TP23.0822x17.81x0.2188	3	-9.07	1113.42	65.8	Pass
L4	92.0833 - 73.75	Pole	TP27.3x23.0822x0.399	4	-14.05	1440.57	88.0	Pass
L5	73.75 - 71.5	Pole	TP27.3778x25.5242x0.4884	5	-15.98	1831.33	83.5	Pass
L6	71.5 - 56.5	Pole	TP30.8233x27.3778x0.5177	6	-19.81	2406.71	83.9	Pass
L7	56.5 - 36.75	Pole	TP35.36x30.8233x0.4947	7	-23.69	2562.80	95.4	Pass
L8	36.75 - 22	Pole	TP38.1343x33.1647x0.5988	8	-31.52	3515.83	86.8	Pass
L9	22 - 20.5	Pole	TP38.4797x38.1343x0.5965	9	-32.05	3527.17	87.7	Pass
L10	20.5 - 19.0833	Pole	TP38.8059x38.4797x0.5943	10	-32.56	3545.74	88.2	Pass
L11	19.0833 - 18	Pole	TP39.0553x38.8059x0.517	11	-32.91	3460.14	90.8	Pass
L12	18 - 4	Pole	TP42.279x39.0553x0.6525	12	-38.59	4072.34	86.2	Pass
L13	4 - 3	Pole	TP42.5092x42.279x0.737	13	-39.05	4741.47	74.9	Pass
L14	3 - 0	Pole	TP43.2x42.5092x0.7883	14	-40.53	5630.49	64.5	Pass
Summary								
Pole (L7)							95.4	Pass
RATING =							95.4	Pass

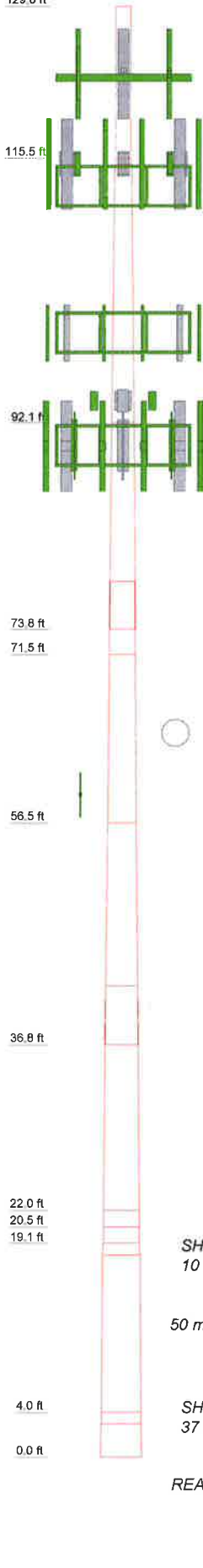
APPENDIX B BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

129.0 ft

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	0.5000	1	0.3750					13.5000
2	22.9167	12	0.2188					16.0000
3	18.3333	12	0.3990	4.2500	23.0822	27.3000		17.8100
4	6.5000	12	0.4884		25.5242	27.3778		23.0822
5	15.0000	12	0.5177		27.3778	30.8233		23.0822
6	19.7500	12	0.4947	5.2500	30.8233	35.3600		23.0822
7	20.0000	12	0.5986		33.1647	38.1343		23.0822
8	11.1111	12	0.5110		38.1343	42.2790		23.0822
9	1.0833	12	0.5110		42.2790	46.4237		23.0822
10	12.1212	12	0.5110		46.4237	50.5684		23.0822
11	0.5110	12	0.5110		50.5684	54.7131		23.0822
12	14.0000	12	0.6625		54.7131	58.8578		23.0822
13	3.0000	12	0.7803		58.8578	62.9990		23.0822
14	1.1	1	0.8		62.9990	67.1402		23.0822



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
RR90-17-02DP w/ Mount Pipe	123	(2) DB980H90E-M w/ Mount Pipe	100
RR90-17-02DP w/ Mount Pipe	123	(2) DB980H90E-M w/ Mount Pipe	100
RR90-17-02DP w/ Mount Pipe	123	Platform Mount [LP 1201-1]	100
LNX-6515DS-VTM w/ Mount Pipe	123	RRUS 11	92
LNX-6515DS-VTM w/ Mount Pipe	123	RRUS 11	92
LNX-6515DS-VTM w/ Mount Pipe	123	RRUS 11	92
ATBT-BOTTOM-24V	123	DC6-48-60-18-8F	92
ATBT-BOTTOM-24V	123	5' x 2" Pipe Mount	92
ATBT-BOTTOM-24V	123	5' x 2" Pipe Mount	92
KRY 112 489/2	123	5' x 2" Pipe Mount	92
KRY 112 489/2	123	Side Arm Mount [SO 102-3]	92
KRY 112 489/2	123	7770.00 w/ Mount Pipe	90
T-Arm Mount [TA 602-3]	123	7770.00 w/ Mount Pipe	90
(2) LNX-8513DS-VTM w/ Mount Pipe	113	7770.00 w/ Mount Pipe	90
(2) LNX-8513DS-VTM w/ Mount Pipe	113	(2) P65-17-XLH-RR w/ Mount Pipe	90
(2) LNX-8513DS-VTM w/ Mount Pipe	113	(2) P65-17-XLH-RR w/ Mount Pipe	90
(2) DB-B1-6C-12AB-0Z	113	(2) P65-17-XLH-RR w/ Mount Pipe	90
(2) SBNH-1D8585C w/ Mount Pipe	113	(4) LGP13519	90
(2) SBNH-1D8585C w/ Mount Pipe	113	(2) LGP13519	90
(2) SBNH-1D8585C w/ Mount Pipe	113	(2) LGP13519	90
B13 RRH 4X30	113	(2) DTMAP7819VG12A	90
B13 RRH 4X30	113	(2) DTMAP7819VG12A	90
B13 RRH 4X30	113	(2) DTMAP7819VG12A	90
AWS4 (B66) 4x45 RRH	113	6' x 2" Mount Pipe	90
AWS4 (B66) 4x45 RRH	113	6' x 2" Mount Pipe	90
AWS4 (B66) 4x45 RRH	113	6' x 2" Mount Pipe	90
PCS B25 RRH4x30	113	Platform Mount [LP 601-1]	90
PCS B25 RRH4x30	113	GPS_A	59
PCS B25 RRH4x30	113	4' x 2" Pipe Mount	59
Platform Mount [LP 602-1]	113	Side Arm Mount [SO 701-1]	59
(2) DB980H90E-M w/ Mount Pipe	100		

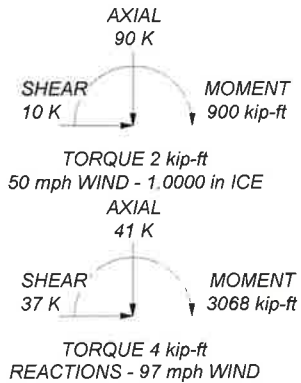
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	Reinf 42.75 ksi	43 ksi	54 ksi
A572-65	65 ksi	80 ksi	Reinf 42.76 ksi	43 ksi	54 ksi
Reinf 38.14 ksi	38 ksi	48 ksi	Reinf 47.56 ksi	48 ksi	60 ksi
Reinf 38.19 ksi	38 ksi	48 ksi	Reinf 41.06 ksi	41 ksi	52 ksi
Reinf 42.01 ksi	42 ksi	53 ksi	Reinf 42.18 ksi	42 ksi	53 ksi
Reinf 42.15 ksi	42 ksi	53 ksi	Reinf 46.12 ksi	46 ksi	58 ksi
Reinf 42.84 ksi	43 ksi	54 ksi			

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 95.4%

ALL REACTIONS ARE FACTORED



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 FAX: 614.448.4105

Job: **129' Monopole / Stafford, CT**
 Project: **37516-3555.001.7805 / BU 806365**
 Client: **Crown Castle International** Drawn by: **Seth Tschanen** App'd:
 Code: **TIA-222-G** Date: **11/09/16** Scale: **N**
 Path: _____ Dwg No. _____

v4.4 - Effective 7-12-13

Asymmetric Anchor Rod Analysis

Moment =	3068	k-ft	TIA Ref.	G	Location =	Base Plate
Axial =	41.0	kips	ASIF =	N/A	η =	0.50 for BP, Rev. G Sect. 4.9.9
Shear =	37.0	kips	Max Ratio =	100.0%	Threads =	N/A for FP, Rev. G
Anchor Qty =	15					

**** 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	51.23	0.00	3.98	177.15	171.68	182.08	0.00	260.00	70.0%
2	2.250	#18J A615 Gr 75	75	100	30.0	51.23	0.00	3.98	175.44	169.97	180.38	0.00	260.00	69.4%
3	2.250	#18J A615 Gr 75	75	100	60.0	51.23	0.00	3.98	174.78	169.31	179.72	0.00	260.00	69.1%
4	2.250	#18J A615 Gr 75	75	100	90.0	51.23	0.00	3.98	176.17	170.71	181.11	0.00	260.00	69.7%
5	2.250	#18J A615 Gr 75	75	100	120.0	51.23	0.00	3.98	178.40	172.93	183.33	0.00	260.00	70.5%
6	2.250	#18J A615 Gr 75	75	100	150.0	51.23	0.00	3.98	179.25	173.78	184.18	0.00	260.00	70.8%
7	2.250	#18J A615 Gr 75	75	100	180.0	51.23	0.00	3.98	177.71	172.24	182.65	0.00	260.00	70.2%
8	2.250	#18J A615 Gr 75	75	100	210.0	51.23	0.00	3.98	174.97	169.50	179.91	0.00	260.00	69.2%
9	2.250	#18J A615 Gr 75	75	100	240.0	51.23	0.00	3.98	173.39	167.92	178.33	0.00	260.00	68.6%
10	2.250	#18J A615 Gr 75	75	100	270.0	51.23	0.00	3.98	174.25	168.78	179.19	0.00	260.00	68.9%
11	2.250	#18J A615 Gr 75	75	100	300.0	51.23	0.00	3.98	176.47	171.01	181.41	0.00	260.00	69.8%
12	2.250	#18J A615 Gr 75	75	100	330.0	51.23	0.00	3.98	177.82	172.35	182.76	0.00	260.00	70.3%
13	2.250	A193 Gr B7	105	125	73.0	63.22	0.00	3.98	215.10	209.64	220.03	0.00	325.00	67.7%
14	2.250	A193 Gr B7	105	125	197.0	63.22	0.00	3.98	216.53	211.07	221.46	0.00	325.00	68.1%
15	2.250	A193 Gr B7	105	125	313.0	63.22	-0.00	3.98	218.12	212.66	223.05	0.00	325.00	68.6%

59.69

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#:	806365
Site Name:	HRT 303 943203
App #:	
Pole Manufacturer:	Other

Reactions			Reactions adjusted to account for additional anchor rods.
Mu:	2260.7	ft-kips	
Axial, Pu:	32.8	kips	
Shear, Vu:	29.6	kips	
Eta Factor, η	0.5	TIA G (Fig. 4-4)	

Anchor Rod Data

Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	51.23	in

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

Anchor Rod Results

Max Rod (Cu+ Vu/r): 184.2 Kips
 Allowable Axial, φ*Fu*Anet: 260.0 Kips
 Anchor Rod Stress Ratio: 70.8% **Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data

Diam:	57.23	in
Thick:	2.625	in
Grade:	60	ksi
Single-Rod B-eff:	11.58	in

Base Plate Results

Base Plate Stress: 22.9 ksi
 Allowable Plate Stress: 54.0 ksi
 Base Plate Stress Ratio: 42.5% **Pass**

Flexural Check

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 27.54

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:		in
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

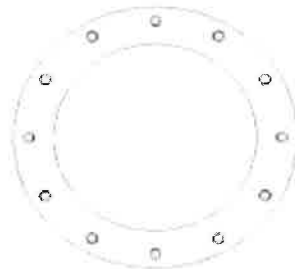
Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2 n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data

Diam:	43.2	in
Thick:	0.375	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None



* 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

Factored Foundation Loads:

Factored Axial Load (+Comp, -Ten) = **41** kips
 Factored Horiz. Load at Top of Pier = **37** kips
 Factored OTM at Top of Pier = **3068** kips

LC1 **41** kips
 LC2 **30.75** kips
37 kips
3068 kips

Concrete Vol = **155.95** yd³

LRFD Resistance and Load Factors:

φ

Soil Bearing =	0.75
Soil Weight =	0.75
Concrete Weight =	0.75

Dead Load Factors

	1.2	0.9
	1.2	0.9

Soil Properties:

Depth to Water Table = **5** ft
 Uplift Cone from **Top** of footing

Layer Thk ft	Soil Density pcf	Cohesion ksf	Friction Angle degrees	Ult Bearing ksf	Depth ft
11	135	0	36	20	11.00

Dimensions:

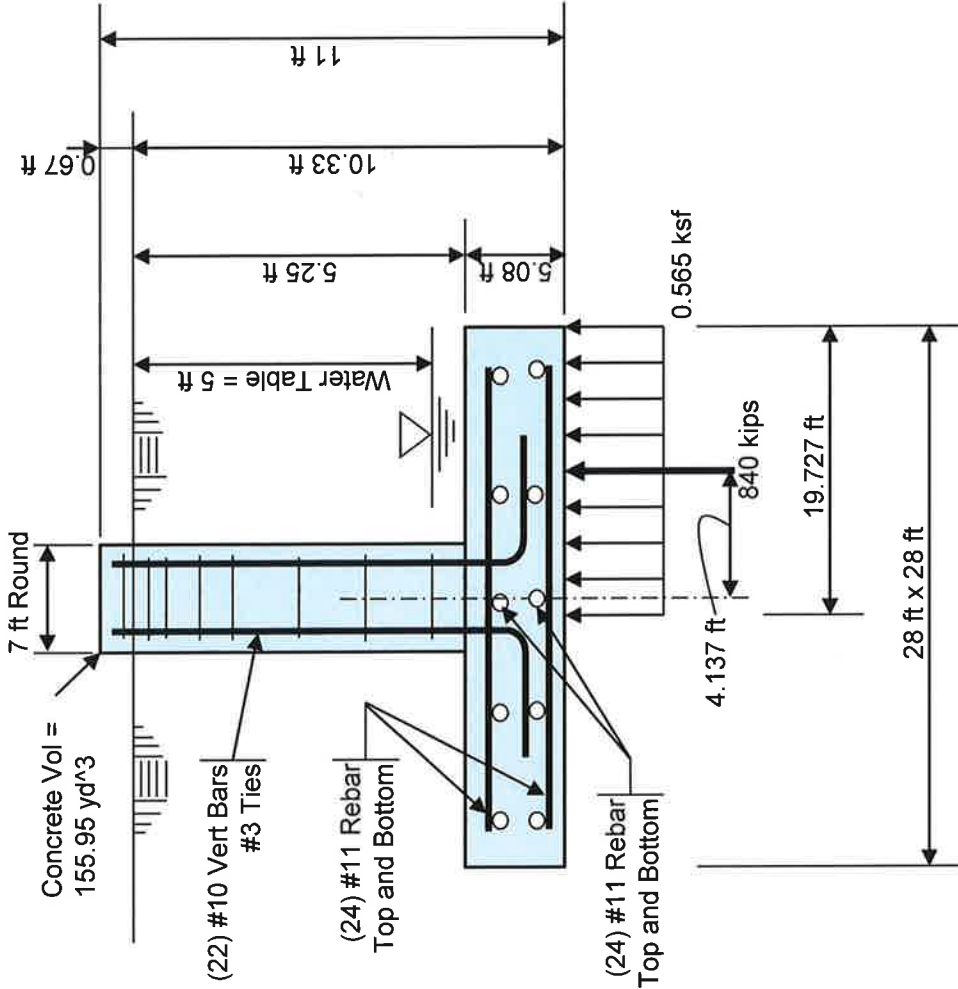
Pier Shape = **Round**
 Pier Width = **7** ft Diameter
 Pier Height above Grade = **0.67** ft
 Depth to Bottom of Footing = **10.33** ft
 Footing Thickness = **5.08** ft
 Footing Width, B = **28** ft
 Footing Length, L = **28** ft

Concrete:

Concrete Strength = **3** ksi
 Rebar Strength = **60** ksi

Summary Results:

	Required	Available
Maximum Net Soil Bearing =	0.581 ksf	15.000 ksf
Uplift =	0.0 kips	798.1 kips
Punching Shear Stress =	0.015 ksi	0.164 ksi
Bending Shear Stress =	133.3 kips	1541.6 kips
Bending Moment =	1196.5 k-ft	9187.9 k-ft
Conc Pier Reinforcing Steel =	3287.0 k-ft	4587.0 k-ft



Total Pad Reinf Stl = **74.88** in² >= 36.87 in² = Min Stl, OK
 Total Pier Reinf Stl = **27.94** in² >= 27.71 in² = Min Stl, OK
 Footing Thickness = **5.08** ft >= 1.87 ft = Min Fig Thk, OK

Stress Ratio = **3.9%** in Soil Bearing
 Stress Ratio = **0.0%** in Uplift
 Stress Ratio = **9.2%** in Punching Shear
 Stress Ratio = **8.6%** in Bending Shear
 Stress Ratio = **13.0%** in Bending Moment
 Stress Ratio = **71.7%** in Pier Rebar

Tube Bypass Analysis

Revision= LRFD Passing= 100%

Design/Analysis = Analysis @ 115 ft - 0 in elevation

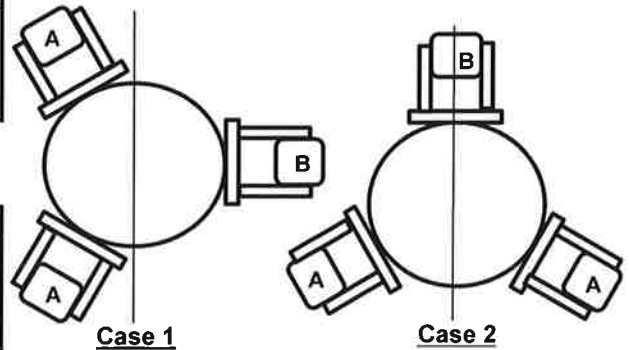
TNX Tower Output @ Connection:	
Moment	= 26.43 k-ft
Axial	= 2.14 kips
Shear	= 3.67 kips
Design Capacity	
Extension Geometry:	
Diameter	= 16.00 in
Thickness	= 3/8 in
Height	= 14 ft
Steel Grade	= A53 Gr. B
Extension Offset	= in
Gap Height	= in
Pole Offset	= in
Pole Geometry:	
Diameter	= 17.81 in
Thickness	= 3/16 in
Steel Grade	= A572 Gr. 65
Flange/Mount Diam.	= in
Tube Bypass Information:	
Number of Legs	= 3
Unbraced Length	= 48 in
Tube Circle	= 34.31 in
K	= 2.10
Type	HSS 6x6x5/8
	Extension Pole
Blind Bolt	EXISTING AJAX EXISTING AJAX
Method	Case 2 Case 2
Bolt Qty.	9 9
Spacing (in)	3 3
End Dist. (in)	3 3

New Port Information	
Elevation #1=	50 ft
Elevation #2=	ft
Elevation #3=	ft
Elevation #4=	ft

Analysis Reactions		
Moment	Axial	Shear
k-ft	kips	kips
26.43	2.14	3.67

Load Distribution	
Moment of Inertia, I	Axial / Leg
in ²	kips
441.44	0.713

Member Forces						
Case	d	Tension (kips)	Comp. (kips)	Mx (k-in)	My (k-in)	M (k-in)
1a	8.58	5.45	6.88	50.85	29.36	58.72
1b	17.16	11.61	13.04	0.00	58.72	58.72
2a	14.86	9.96	11.39	29.36	50.85	58.72
2b	0.00	0.71	0.71	58.72	0.00	58.72



Compression Strength							
Case	4.71* √(E/F _y)	KL/r	F _e ksi	F _{cr} ksi	φcP _{nc} kips	P _{rc} kips	Capacity
1a	118.26	46.45	132.65	39.79	418.94	6.88	1.6%
1b	118.26	46.45	132.65	39.79	418.94	13.04	3.1%
2a	118.26	46.45	132.65	39.79	418.94	11.39	2.7%
2b	118.26	46.45	132.65	39.79	418.94	0.71	0.2%

Flexural Strength						
Case	φ	I ₃ in ⁴	∑I in ⁴	M k-in	φbM _n k-in	Capacity
1a	60.00	55.10	165.30	58.72	960.48	6.1%
1b	0.00	55.10	165.30	58.72	960.48	6.1%
2a	30.00	55.10	165.30	58.72	960.48	6.1%
2b	90.00	55.10	165.30	58.72	960.48	6.1%

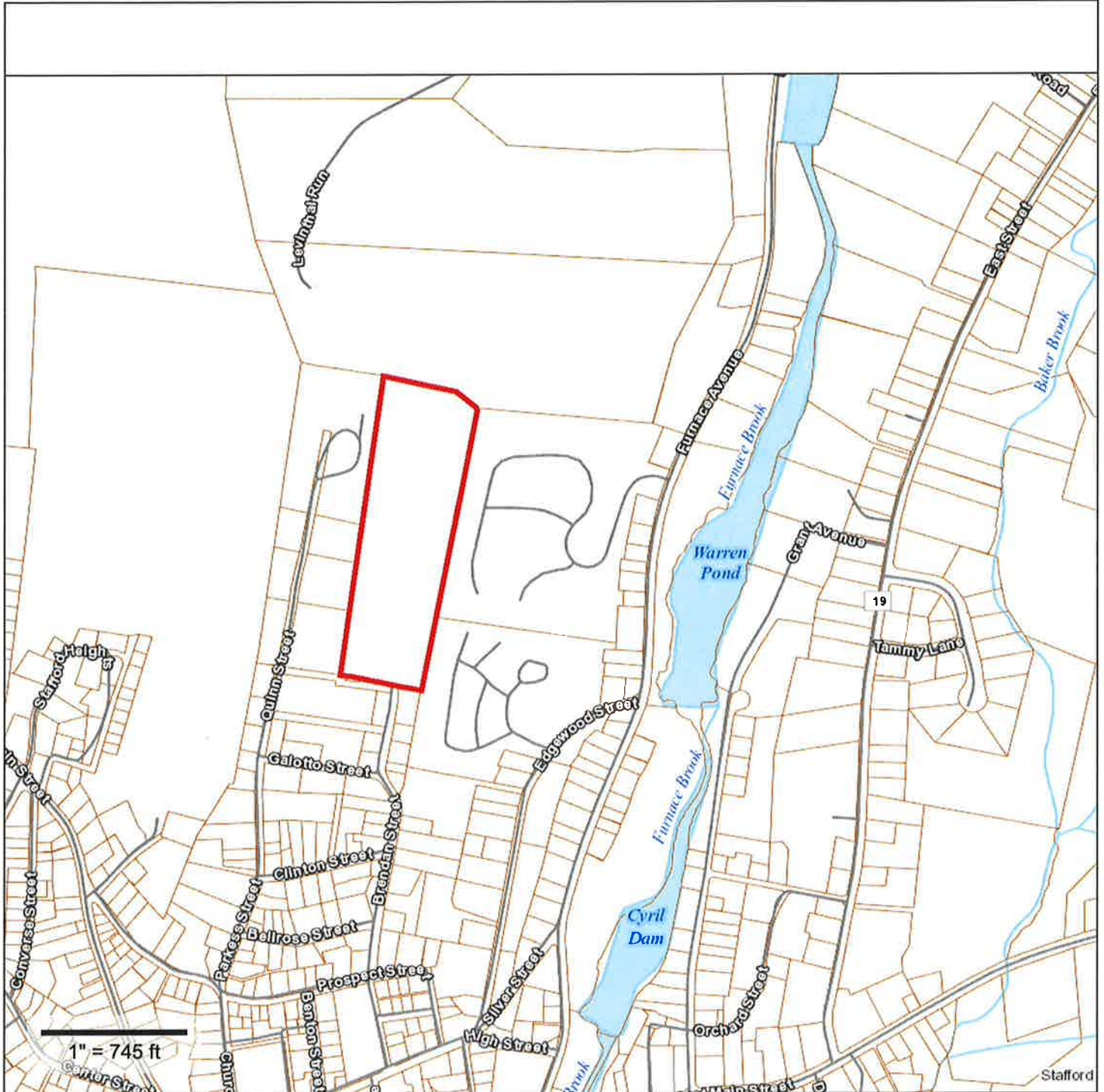
Tensile Strength					
Case	P _{n1} kips	P _{n2} kips	φtP _{nt} kips	P _t kips	Capacity
1a	538.20	597.04	447.78	5.45	1.2%
1b	538.20	597.04	447.78	11.61	2.6%
2a	538.20	597.04	447.78	9.96	2.2%
2b	538.20	597.04	447.78	0.71	0.2%

Combined Strength			
Flexure + Tension (H1)			
Case	Prt / Pnt	Mr / Mn	Capacity
1a	0.006	0.061	6.7%
1b	0.013	0.061	7.4%
2a	0.011	0.061	7.2%
2b	0.001	0.061	6.2%
Flexure + Compression (H1)			
Case	Prc / Pnc	Mr / Mn	Capacity
1a	0.008	0.061	6.9%
1b	0.016	0.061	7.7%
2a	0.014	0.061	7.5%
2b	0.001	0.061	6.2%

Bolt Check									
Case	Location	Tube 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	6.88	9.155	0.77	45.32	37.00	1.10	30.00	0.2%
	Pole	6.88	8.25	1.46	30.21	37.00	1.50	30.00	0.5%
1b	Ext	13.04	9.155	1.45	45.32	37.00	2.13	30.00	0.7%
	Pole	13.04	8.25	1.45	30.21	37.00	2.91	30.00	1.2%
2a	Ext	11.39	9.155	1.27	45.32	37.00	1.86	30.00	0.5%
	Pole	11.39	8.25	1.46	30.21	37.00	2.53	30.00	0.9%
2b	Ext	0.71	9.155	0.16	45.32	37.00	0.11	30.00	0.0%
	Pole	0.71	8.25	1.44	30.21	37.00	0.10	30.00	0.2%

- All equations based on AISC 13th Edition

ATTACHMENT 4



Property Information

Property ID 09013134-49/004
Location 46 BRENDAN ST
Owner TIZIANI LLC
 C/O TIZIANI GLENN+PETER



**MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT**

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Parcels updated October 1, 2013



46 BRENDAN ST

Location 46 BRENDAN ST

Mblu 49 / 4 /

Acct# 00284400

Owner TIZIANI LLC

Assessment \$190,680

Appraisal \$272,400

PID 3247

Building Count 1

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$18,400	\$254,000	\$272,400

Assessment			
Valuation Year	Improvements	Land	Total
2015	\$12,880	\$177,800	\$190,680

Owner of Record

Owner TIZIANI LLC
Co-Owner C/O TIZIANI GLENN+PETER
Address 1014 BUCKLEY HWY
UNION, CT 06076

Sale Price \$0
Certificate 1
Book & Page 334/ 507
Sale Date 02/26/1996

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
TIZIANI LLC	\$0	1	334/ 507	02/26/1996
TIZIANI GLENN+PETER	\$60,000	2	195/ 177	04/20/1982

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	Vacant Ind
Model	
Grade:	
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:	
Num Kitchens	
Fireplaces	
Extra Openings	
Prefab Fpl(s)	
Attic Type	
Bsmt Type	
Bsmt Garage(s)	
Fin Bsmnt	
Fn. Bmt. Qual.	
Unfin Area	

Building Photo



(<http://images.vgsi.com/photos2/StaffordCTPhotos//\00\01\26/>)

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 A
Neighborhood 502
Alt Land Appr Category No

Land Line Valuation

Size (Acres) 14.5
Frontage
Depth
Assessed Value \$177,800
Appraised Value \$254,000

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN1	FENCE-4' CHAIN			1440 L.F.	\$600	1
SHD1	Shed	MS	Masonry	600 S.F.	\$4,800	1
SHD1	Shed	MS	Masonry	200 S.F.	\$1,600	1
SHD1	Shed	MS	Masonry	200 S.F.	\$1,600	1
PAV1	Paving Asphalt			10000 S.F.	\$9,800	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2014	\$5,400	\$254,000	\$259,400
2013	\$5,400	\$254,000	\$259,400
2011	\$5,400	\$254,000	\$259,400

Assessment			
Valuation Year	Improvements	Land	Total
2014	\$3,780	\$177,800	\$181,580
2013	\$3,780	\$177,800	\$181,580
2011	\$3,780	\$177,800	\$181,580

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