Robinson+Cole

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Also admitted in Massachusetts

June 20, 2016

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

Re: **Notice of Exempt Modification – Facility Modification**
21 Acorn Road, Branford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains fifteen (15) wireless telecommunications antennas at the 116-foot level on an existing 147-foot tower at 21 Acorn Road in Branford, Connecticut (the "Property"). The tower is owned by Crown Castle ("Crown"). Cellco's use of the tower was approved by the Council in 2005. Cellco now intends to modify its facility by removing nine (9) antennas and replacing them with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model HBXX-6517DS, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 116-foot level on the tower. Cellco also intends to replace three (3) remote radio heads ("RRHs") behind its 2100 MHz antennas, install six (6) new RRHs behind its 700 MHz and 1900 MHz antennas and install one (1) HYBRIFLEX™ antenna cable attached to the outside of the monopole. Included in Attachment 1 are specifications for Cellco's replacement antennas, RRHs and HYBRIFLEX™ cable.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this notice is being sent to James B. Cosgrove, First Selectman of the Town of Branford. A copy of this letter is also being sent to Altrio Investment Group 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).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed at the 116-foot level on the existing 147-foot tower.

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

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

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

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

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

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

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:
James B. Cosgrove, Branford First Selectman
Altrio Investment Group LLC
Crown Castle
Tim Parks

ATTACHMENT 1

Product Specifications

COMMSCOPE®

SBNHH-1D65B

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

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

Electrical Specifications

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

Electrical Specifications, BASTA*

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

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

General Specifications

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

Product Specifications

SBNHH-1D65B

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum | Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, 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

Depth	180.0 mm | 7.1 in
Length	1851.0 mm | 72.9 in
Width	301.0 mm | 11.9 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

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

Regulatory Compliance/Certifications

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

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

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM | HBXX-6517DS-A2M

Andrew® Quad Port Antenna, 1710–2180 MHz, 65° horizontal beamwidth, RET compatible

- Superior azimuth tracking and pattern symmetry with excellent passive intermodulation suppression

Electrical Specifications

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain, dBi	19.0	19.1	19.2
Beamwidth, Horizontal, degrees	67	66	65
Beamwidth, Vertical, degrees	5.0	4.7	4.4
Beam Tilt, degrees	0–6	0–6	0–6
USLS (First Lobe), dB	18	18	18
Front-to-Back Ratio at 180°, dB	30	30	30
CPR at Boresight, dB	21	22	21
CPR at Sector, dB	10	11	9
Isolation, dB	30	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350
Polarization	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	1710–1880	1850–1990	1920–2180
Gain by all Beam Tilts, average, dBi	18.5	18.6	18.8
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.4
Gain by Beam Tilt, average, dBi	0 ° | 18.4	0 ° | 18.4	0 ° | 18.7
	3 ° | 18.7	3 ° | 18.7	3 ° | 18.9
	6 ° | 18.4	6 ° | 18.5	6 ° | 18.6
Beamwidth, Horizontal Tolerance, degrees	±2.4	±1.7	±2.9
Beamwidth, Vertical Tolerance, degrees	±0.3	±0.3	±0.3
USLS, beampeak to 20° above beampeak, dB	18	19	19
Front-to-Back Total Power at 180° ± 30°, dB	25	26	26
CPR at Boresight, dB	22	23	22
CPR at Sector, dB	10	10	9

* 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® quad
Band	Single band
Brand	DualPol®
Operating Frequency Band	1710 – 2180 MHz

Product Specifications

HBXX-6517DS-VTM | HBXX-6517DS-A2M

Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Low loss circuit board
Radome Material	PVC, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	4
Wind Loading, frontal	668.0 N @ 150 km/h 150.2 lbf @ 150 km/h
Wind Loading, lateral	175.0 N @ 150 km/h 39.3 lbf @ 150 km/h
Wind Loading, rear	777.0 N @ 150 km/h 174.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	166.0 mm | 6.5 in
Length	1906.0 mm | 75.0 in
Width	305.0 mm | 12.0 in
Net Weight, without mounting kit	18.5 kg | 40.8 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 2.0 Actuator	HBXX-6517DS-A2M

Packed Dimensions

Depth	292.0 mm | 11.5 in
Length	2036.0 mm | 80.2 in
Width	402.0 mm | 15.8 in
Shipping Weight	28.2 kg | 62.2 lb

Regulatory Compliance/Certifications

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

Included Products

600899A-2 — 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.

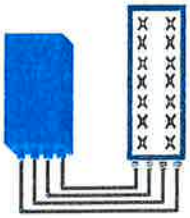
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the 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
WIRELESS PRODUCT DATASHEET
RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.

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

The Alcatel-Lucent RRH2x60-1900A-4R is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent RRH2x60-1900A-4R integrates all the latest technologies. This allows operators to offer best-in-class characteristics.

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

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

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

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

OPTIMIZED TCO

The Alcatel-Lucent RRH2x60-1900A-4R is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

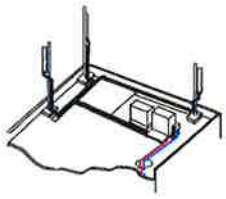
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



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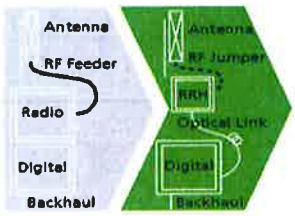
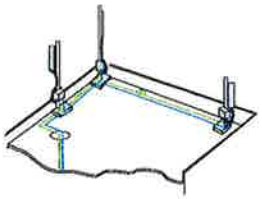


RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)
- RRH2x60-1900A-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -105 dBm for LTE

Connectivity

- Two CPRI optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 500m using MM fiber, up to 15km using SM fiber
- TMA/RETA: AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions: ETS300-019-1-4 class4.1E
- Ingress Protection: IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

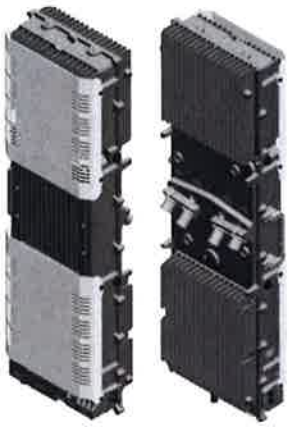
Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

ALCATEL-LUCENT
WIRELESS PRODUCT DATASHEET
B4 RRH2X60-4R FOR AWS BAND APPLICATIONS

The Alcatel-Lucent B4 RRH2x60-4R is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



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

The Alcatel-Lucent B4 RRH2x60-4R is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

SUPERIOR RF PERFORMANCE

The Alcatel-Lucent B4 RRH2x60-4R integrates all the latest technologies. This allows operators to offer best-in-class characteristics.

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

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

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

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

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

OPTIMIZED TCO

The Alcatel-Lucent B4 RRH2x60-4R is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent B4 RRH2x60-4R is a very cost-effective solution to deploy LTE MIMO.

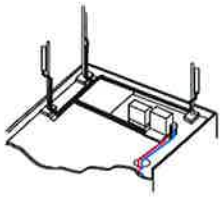
EASY INSTALLATION

The B4 RRH2x60-4R includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

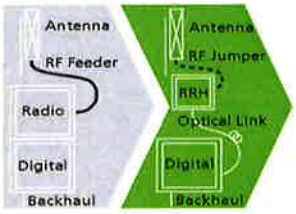
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent B4 RRH2x60-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent B4 RRH2x60-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

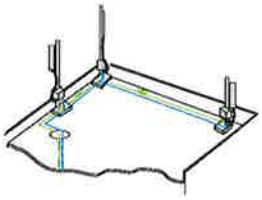
Installation can easily be done by a single person as the Alcatel–Lucent B4 RRH2x60-4R is compact and weighs about 25 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- B4 RRH2x60-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- B4 RRH2x60-4R is optimized for LTE operation
- B4 RRH2x60-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

BENEFITS

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

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 930x270x146 mm (with solar shield)
- Weight : 25 kg (55 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-38 to -57V)
- Power Consumption: 346W typ. @2x30W (100%RF), 560W typ. @2x60W (100%RF)

RF Characteristics

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

Connectivity

- Two CPRI (3-6) optical ports for daisychaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 300m using MM fiber, up to 15km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Four external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

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

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B
- Health : EN 50385

Alcatel·Lucent

ATTACHMENT 2

	General	Power	Density					
Site Name: Branford 3								
Tower Height: 147ft								
CARRIER	**# OF CHAN.**	**WATTS ERP**	**HEIGHT**	**CALC. POWER DENS**	**FREQ.**	**MAX. PERMISS. EXP.**	**FRACTION MPE**	**Total**
*AT&T	13	500	105	1900	0.2385	1.0000	2.38%	
*AT&T	6	296	105	880	0.0652	0.5867	1.11%	
*AT&T	9	427	105	1900	0.1410	1.0000	1.41%	
*AT&T	1	500	105	740	0.0183	0.4933	0.37%	
*MetroPCS LTE	2	24	135	2100	0.0010	1.0000	0.01%	
* MetroPCS GSM/UMTS	2	12	135	1950	0.0005	1.0000	0.01%	
* MetroPCS UMTS	2	12	135	2100	0.0005	1.0000	0.01%	
*Sprint	3	348	147	1900	0.0189	1.0000	0.19%	
*Sprint	1	195	147	850	0.0035	0.5667	0.06%	
*Sprint	2	195	147	2500	0.0071	1.0000	0.07%	
*Nextel	9	100	130	851	0.0210	0.5673	0.37%	
Verizon PCS	**1**	**2410**	**116**	**0.0644**	**1970**	**1.0000**	**6.44%**	
Verizon Cellular	**9**	**406**	**116**	**0.0976**	**869**	**0.5793**	**16.85%**	
Verizon AWS	**1**	**2306**	**116**	**0.0616**	**2145**	**1.0000**	**6.16%**	
Verizon 700	**1**	**1048**	**116**	**0.0280**	**746**	**0.4973**	**5.63%**	
								41.08%
* Source: Siting Council								

ATTACHMENT 3

PAUL J. FORD & COMPANY

Date: **June 10, 2016**

Darcy Tarr
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

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

Subject: **Structural Analysis Report**

Carrier Designation:	***Verizon Wireless* Co-Locate**	
	Carrier Site Number:	N/A
	Carrier Site Name:	Branford 3, CT
Crown Castle Designation:	**Crown Castle BU Number:**	876316
	Crown Castle Site Name:	SECONDINO PROPERTY
	Crown Castle JDE Job Number:	337988
	Crown Castle Work Order Number:	1114371
	Crown Castle Application Number:	300679 Rev. 4
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-2140.003.7805
		Revise Antennas to be Removed at 116-Ft
Site Data:	**21 Acorn Road, BRANFORD, New Haven County, CT**	
	Latitude *41° 17' 35.06"*, Longitude *-72° 45' 46.4"*	
	147 Foot - Monopole Tower	

Dear Darcy Tarr,

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 822317, in accordance with application 300679, revision 4.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

The mount installed at the 126 ft level must be removed 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:

Thomas J. Dehnke, EI
Project Engineer
tdehnke@pjfweb.com

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED PROFESSIONAL ENGINEER
6-13-16

tnxTower Report - version 6.1.4.1

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1) INTRODUCTION

This tower is a 147 ft Monopole tower designed by SUMMIT in August of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
116.0	116.0	3	alcatel lucent	RRH2X60-PCS	1	1-5/8	-
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		3	commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147.0	147.0	3	alcatel lucent	1900MHz RRH (65MHz)	1 3	5/8 1-1/4	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Pipe			
		1	tower mounts	Platform Mount [LP 712-1]			
	143.0	1	tower mounts	Miscellaneous (NA507-1)			
135.0	135.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1 6	1-3/16 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		1	tower mounts	T-Arm Mount [TA 601-3]			
126.0	126.0	1	tower mounts	Platform Mount [LP 712-1]	-	-	2
116.0	116.0	2	adc	ClearGain Dual Band 800/1900 MHz	7	1-5/8	1
		2	antel	LPA-80063/6CF w/ Mount Pipe			
		2	antel	LPA-80080/4CF w/ Mount Pipe			
		2	rfs celwave	APL868013 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 712-1]			
		3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	6	1-5/8	2
		3	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe			
		2	antel	BXA-70063/6CF-2 w/ Pipe			
		1	antel	BXA-70063/6CF-2 w/ Pipe			
		3	alcatel lucent	RRH2x40-AWS			
		6	rfs celwave	FD9R6004/2C-3L			
106.0	108.0	6	ericsson	RRUS-11	1 2 12 1	3/8 7/8 1-1/4 17/64	1
		3	kmw	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		6	powerwave	7770.00 w/ Mount Pipe			
		12	powerwave	LGP2140X			
		1	raycap	DC6-48-60-18-8F			
	106.0	1	tower mounts	Platform Mount [LP 712-1]			
80.0	81.0	1	kathreinscala	Kathrein OG-860/1920/GPS-A	-	-	1
		2	lucent	KS24019-L112A			
	80.0	1	tower mounts	Side Arm Mount [SO 701-3]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 12/16/1996	1529736	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41708-0180, 03/15/2009	2417887	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit/PJF, 2737/29297-566, 09/29/1997	1632435	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit/PJF, 2737-97/29297-566, 09/29/1997	1632399	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced 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 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	147 - 105	Pole	TP29.141x22x0.25	1	-8.37	1075.85	61.0	Pass
L2	105 - 89.75	Pole	TP31.2343x28.0034x0.3125	2	-13.40	1471.82	89.6	Pass
L3	89.75 - 88.25	Pole	TP31.4893x31.2343x0.3125	3	-13.62	1464.66	93.3	Pass
L4	88.25 - 86	Pole	TP31.8719x31.4893x0.5085	4	-14.10	2314.39	62.8	Pass
L5	86 - 84.25	Pole	TP32.1695x31.8719x0.5063	5	-14.47	2304.61	65.5	Pass
L6	84.25 - 73.75	Pole	TP33.955x32.1695x0.455	6	-15.92	2207.19	76.9	Pass
L7	73.75 - 42.75	Pole	TP38.601x32.3223x0.537	7	-24.06	2922.04	89.3	Pass
L8	42.75 - 8.25	Pole	TP43.7172x36.6809x0.5757	8	-36.72	3650.30	99.0	Pass
L9	8.25 - 6.25	Pole	TP44.0573x43.7172x0.596	9	-37.39	3777.23	96.9	Pass
L10	6.25 - 0	Pole	TP45.12x44.0573x0.5918	10	-39.48	3837.49	98.8	Pass
							Summary	
						Pole (L8)	99.0	Pass
						Rating =	99.0	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	99.8	Pass
1	Base Plate	0	89.6	Pass
1	Base Foundation Structural Steel	0	61.5	Pass
1, 2	Base Foundation Soil Interaction	0	78.2	Pass

Structure Rating (max from all components) =	99.8%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Foundation Analysis Notes: According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson 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 caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

4.1) Recommendations

Remove the 126' elevation.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

3) Tower is located in New Haven County, Connecticut.
4) Basic wind speed of 85 mph.
5) Nominal ice thickness of 0.7500 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Deflections calculated using a wind speed of 50 mph.
10) A non-linear (P-delta) analysis was used.
11) Pressures are calculated at each section.
12) Stress ratio used in pole design is 1.333.
13) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
√ Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	**Poles**
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	147.00-105.00	42.00	3.75	18	22.0000	29.1410	0.2500	1.0000	A607-60 (60 ksi)
L2	105.00-89.75	19.00	0.00	18	28.0034	31.2343	0.3125	1.2500	A607-60 (60 ksi)
L3	89.75-88.25	1.50	0.00	18	31.2343	31.4893	0.3125	1.2500	Reinf 59.22 ksi (59 ksi)
L4	88.25-86.00	2.25	0.00	18	31.4893	31.8719	0.5085	2.0338	Reinf 57.17 ksi (57 ksi)
L5	86.00-84.25	1.75	0.00	18	31.8719	32.1695	0.5063	2.0252	Reinf 56.63 ksi (57 ksi)
L6	84.25-73.75	10.50	4.25	18	32.1695	33.9550	0.4550	1.8200	Reinf 58.30 ksi (58 ksi)
L7	73.75-42.75	35.25	4.75	18	32.3223	38.6010	0.5370	2.1481	Reinf 57.59 ksi (58 ksi)
L8	42.75-8.25	39.25	0.00	18	36.6809	43.7172	0.5757	2.3026	Reinf 57.90 ksi (58 ksi)
L9	8.25-6.25	2.00	0.00	18	43.7172	44.0573	0.5960	2.3841	Reinf 57.44 ksi (57 ksi)
L10	6.25-0.00	6.25		18	44.0573	45.1200	0.5918	2.3670	Reinf 57.37 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 (57 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	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	29.5905	22.9250	2417.5313	10.2563	14.8036	163.3067	4838.2436	11.4647	4.6888	18.755
L2	29.0829	27.4659	2660.7626	9.8303	14.2257	187.0387	5325.0263	13.7356	4.3786	14.012
	31.7161	30.6705	3704.9933	10.9772	15.8670	233.5029	7414.8618	15.3382	4.9472	15.831
L3	31.7161	30.6705	3704.9933	10.9772	15.8670	233.5029	7414.8618	15.3382	4.9472	15.831
	31.9751	30.9235	3797.4379	11.0678	15.9966	237.3905	7599.8725	15.4647	4.9921	15.975
L4	31.9751	49.9986	6062.9281	10.9982	15.9966	379.0139	12133.8339	25.0040	4.6472	9.14
	32.3636	50.6160	6290.3368	11.1340	16.1909	388.5095	12588.9506	25.3128	4.7146	9.272
L5	32.3636	50.4045	6264.9089	11.1348	16.1909	386.9390	12538.0613	25.2070	4.7184	9.319
	32.6658	50.8827	6444.9201	11.2404	16.3421	394.3749	12898.3205	25.4462	4.7707	9.423
L6	32.6658	45.8012	5820.0967	11.2587	16.3421	356.1409	11647.8516	22.9049	4.8610	10.684
	34.4788	48.3797	6859.4641	11.8925	17.2491	397.6699	13727.9542	24.1944	5.1753	11.374
L7	33.5896	54.1791	6915.4569	11.2838	16.4197	421.1675	13840.0134	27.0947	4.7436	8.833
	39.1965	64.8813	11876.4096	13.5127	19.6093	605.6516	23768.4465	32.4468	5.8486	10.891
L8	38.1114	65.9695	10864.7624	12.8174	18.6339	583.0648	21743.8209	32.9910	5.4427	9.455
	44.3916	78.8258	18535.2035	15.3152	22.2083	834.6056	37094.7960	39.4204	6.6811	11.606
L9	44.3916	81.5766	19163.9090	15.3080	22.2083	862.9151	38353.0344	40.7960	6.6452	11.149
	44.7369	82.2200	19620.9094	15.4287	22.3811	876.6732	39267.6364	41.1178	6.7051	11.25
L10	44.7369	81.6376	19485.7703	15.4303	22.3811	870.6351	38997.1804	40.8266	6.7126	11.344
	45.8160	83.6336	20950.2650	15.8075	22.9210	914.0221	41928.0969	41.8247	6.8996	11.66

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 147.00-105.00				1	1	1		
L2 105.00-89.75				1	1	1		
L3 89.75-88.25				1	1	1		
L4 88.25-86.00				1	1	1		
L5 86.00-84.25				1	1	1		
L6 84.25-73.75				1	1	1		
L7 73.75-42.75				1	1	1		
L8 42.75-8.25				1	1	1		
L9 8.25-6.25				1	1	1		
L10 6.25-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

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

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
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	147.00 - 0.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
						2" Ice	0.00	1.20
						4" Ice	0.00	1.20
HB058-M12-XXXF(5/8")	C	No	CaAa (Out Of Face)	147.00 - 0.00	1	No Ice	0.08	0.24
						1/2" Ice	0.18	1.06
						1" Ice	0.28	2.49
						2" Ice	0.48	7.18
						4" Ice	0.88	23.89
***								
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	135.00 - 0.00	5	No Ice	0.00	0.83
						1/2" Ice	0.00	2.34
						1" Ice	0.00	4.47
						2" Ice	0.00	10.55
						4" Ice	0.00	30.05
561(1-5/8")	C	No	CaAa (Out Of Face)	135.00 - 0.00	1	No Ice	0.16	1.35
						1/2" Ice	0.26	2.65
						1" Ice	0.36	4.56
						2" Ice	0.56	10.21
						4" Ice	0.96	28.84
1.2 Masterline Extreme Hybrid(1 3/16")	C	No	CaAa (Out Of Face)	135.00 - 0.00	1	No Ice	0.00	0.95
						1/2" Ice	0.00	1.99
						1" Ice	0.00	3.64
						2" Ice	0.00	8.77
						4" Ice	0.00	26.37
***								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	116.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	116.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30
***								
LDF2-50A(3/8")	C	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
						2" Ice	0.00	0.08
						4" Ice	0.00	0.08
LDF6-50A (1-1/4 FOAM)	C	No	Inside Pole	106.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
2" (Nominal) Conduit	C	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
						2" Ice	0.00	0.72
						4" Ice	0.00	0.72

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
VXL5-50 (7/8 FOAM)	C	No	Inside Pole	106.00 - 0.00	2	No Ice	0.00	0.29
						1/2" Ice	0.00	0.29
						1" Ice	0.00	0.29
						2" Ice	0.00	0.29
						4" Ice	0.00	0.29
LDF1-50A (1/4 FOAM)	C	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
***								
***								
Aero MP3-05	C	No	CaAa (Out Of Face)	90.50 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
						2" Ice	0.88	0.00
						4" Ice	1.32	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	147.00-105.00	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	8.403	0.45
L2	105.00-89.75	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	4.020	0.41
L3	89.75-88.25	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	0.891	0.04
L4	88.25-86.00	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	1.337	0.06
L5	86.00-84.25	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	1.040	0.05
L6	84.25-73.75	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	6.240	0.29
L7	73.75-42.75	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	18.423	0.84
L8	42.75-8.25	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	20.503	0.94
L9	8.25-6.25	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	1.189	0.05
L10	6.25-0.00	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	3.714	0.17

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	147.00-105.00	A	0.880	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	21.078	1.15
L2	105.00-89.75	A	0.854	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	9.575	0.76
L3	89.75-88.25	A	0.845	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	1.742	0.07
L4	88.25-86.00	A	0.843	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	2.609	0.11
L5	86.00-84.25	A	0.840	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	2.025	0.08
L6	84.25-73.75	A	0.833	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	12.079	0.51
L7	73.75-42.75	A	0.803	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	35.662	1.50
L8	42.75-8.25	A	0.750	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	38.743	1.63
L9	8.25-6.25	A	0.750	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	2.150	0.09
L10	6.25-0.00	A	0.750	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	6.718	0.29

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	147.00-105.00	-0.2431	0.1404	-0.5094	0.2941
L2	105.00-89.75	-0.3105	0.1793	-0.6236	0.3600
L3	89.75-88.25	-0.6290	0.3631	-1.0070	0.5814
L4	88.25-86.00	-0.6302	0.3638	-1.0092	0.5827
L5	86.00-84.25	-0.6314	0.3645	-1.0115	0.5840
L6	84.25-73.75	-0.6350	0.3666	-1.0180	0.5878
L7	73.75-42.75	-0.6439	0.3718	-1.0438	0.6027
L8	42.75-8.25	-0.6567	0.3792	-1.0639	0.6142
L9	8.25-6.25	-0.6641	0.3834	-1.0513	0.6070
L10	6.25-0.00	-0.6656	0.3843	-1.0554	0.6094

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice	8.50 9.15 9.77 11.03	6.95 8.13 9.02 10.84	0.08 0.15 0.23 0.41

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
						2" Ice	13.68	14.85	0.91
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
1900MHz RRH (65MHz)	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.84 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
1900MHz RRH (65MHz)	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.84 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
1900MHz RRH (65MHz)	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.84 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice	2.49 2.71 2.93	2.07 2.27 2.48	0.05 0.07 0.10

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
						1" Ice	3.41	2.93	0.16
						2" Ice	4.46	3.93	0.32
						4" Ice			
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
Platform Mount [LP 712-1]	C	None		0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
Miscellaneous (NA507-1)	C	From Leg	0.00 0.00 -4.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.80 6.70 8.60 12.40 20.00	4.80 6.70 8.60 12.40 20.00	0.25 0.29 0.34 0.44 0.64
(2) 5' x 2' Pipe Mount	A	From Leg	4.00 0.00	0.0000	147.00	No Ice 1/2"	1.00 1.39	1.00 1.39	0.03 0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			-2.00			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
(2) 5' x 2' Pipe Mount	B	From Leg	4.00	0.0000	147.00	No Ice	1.00	1.00	0.03
			0.00			1/2"	1.39	1.39	0.04
			-2.00			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
(2) 5' x 2' Pipe Mount	C	From Leg	4.00	0.0000	147.00	No Ice	1.00	1.00	0.03
			0.00			1/2"	1.39	1.39	0.04
			-2.00			Ice	1.70	1.70	0.05
						1" Ice	2.35	2.35	0.08
						2" Ice	3.78	3.78	0.20
						4" Ice			
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	0.0000	135.00	No Ice	6.83	5.64	0.11
			0.00			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
(2) ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	0.0000	135.00	No Ice	6.83	5.64	0.11
			0.00			1/2"	7.35	6.48	0.17
			0.00			Ice	7.86	7.26	0.23
						1" Ice	8.93	8.86	0.38
						2" Ice	11.18	12.29	0.81
						4" Ice			
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	0.0000	135.00	No Ice	6.82	5.63	0.11
			0.00			1/2"	7.34	6.47	0.17
			0.00			Ice	7.85	7.25	0.23
						1" Ice	8.92	8.85	0.38
						2" Ice	11.17	12.28	0.81
						4" Ice			
(2) ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	0.0000	135.00	No Ice	6.82	5.63	0.11
			0.00			1/2"	7.34	6.47	0.17
			0.00			Ice	7.85	7.25	0.23
						1" Ice	8.92	8.85	0.38
						2" Ice	11.17	12.28	0.81
						4" Ice			
T-Arm Mount [TA 601-3]	C	None		0.0000	135.00	No Ice	10.90	10.90	0.73
						1/2"	14.65	14.65	0.93
						Ice	18.40	18.40	1.13
						1" Ice	25.90	25.90	1.52
						2" Ice	40.90	40.90	2.32
						4" Ice			
***									
***									
(2) LPA-80080/4CF w/ Mount Pipe	A	From Face	4.00	0.0000	116.00	No Ice	2.86	7.23	0.03
			0.00			1/2"	3.22	7.92	0.08
			0.00			Ice	3.59	8.63	0.13
						1" Ice	4.45	10.11	0.25
						2" Ice	6.32	13.34	0.61
						4" Ice			
(2) LPA-80063/6CF w/ Mount Pipe	B	From Face	4.00	0.0000	116.00	No Ice	10.58	10.67	0.05
			0.00			1/2"	11.24	11.93	0.14
			0.00			Ice	11.87	12.91	0.25
						1" Ice	13.16	14.92	0.48
						2" Ice	15.87	19.16	1.09
						4" Ice			
(2) APL868013 w/ Mount Pipe	C	From Face	4.00	0.0000	116.00	No Ice	3.10	4.92	0.02
			0.00			1/2"	3.48	5.60	0.06
			0.00			Ice	3.88	6.28	0.11
						1" Ice	4.76	7.71	0.22

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
						2" Ice	6.66	10.83	0.54
						4" Ice			
(2) ClearGain Dual Band 800/1900 MHz	B	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.54 1.71 1.89 2.27 3.14	0.80 0.94 1.08 1.39 2.11	0.02 0.03 0.05 0.08 0.18
RRH2x60-700	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH4X45-AWS4 B66	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.10 3.36 3.62 4.17 5.38	1.76 1.98 2.21 2.69 3.77	0.06 0.08 0.11 0.17 0.33
RRH2X60-PCS	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.30 9.92 11.20 13.86	7.07 8.26 9.18 11.01 15.05	0.07 0.14 0.21 0.39 0.90
RRH2x60-700	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH4X45-AWS4 B66	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.10 3.36 3.62 4.17 5.38	1.76 1.98 2.21 2.69 3.77	0.06 0.08 0.11 0.17 0.33
RRH2X60-PCS	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	8.64 9.30 9.92	7.07 8.26 9.18	0.07 0.14 0.21

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
						1" Ice	11.20	11.01	0.39
						2" Ice	13.86	15.05	0.90
						4" Ice			
RRH2x60-700	C	From Leg	4.00	0.0000	116.00	No Ice	3.96	1.82	0.06
			0.00			1/2"	4.27	2.08	0.08
			0.00			Ice	4.60	2.36	0.11
						1" Ice	5.27	2.96	0.17
						2" Ice	6.72	4.25	0.35
						4" Ice			
RRH4X45-AWS4 B66	C	From Leg	4.00	0.0000	116.00	No Ice	3.10	1.76	0.06
			0.00			1/2"	3.36	1.98	0.08
			0.00			Ice	3.62	2.21	0.11
						1" Ice	4.17	2.69	0.17
						2" Ice	5.38	3.77	0.33
						4" Ice			
RRH2X60-PCS	C	From Leg	4.00	0.0000	116.00	No Ice	2.57	2.01	0.06
			0.00			1/2"	2.79	2.22	0.08
			0.00			Ice	3.02	2.43	0.10
						1" Ice	3.52	2.89	0.16
						2" Ice	4.61	3.92	0.31
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00	0.0000	116.00	No Ice	8.98	6.96	0.07
			0.00			1/2"	9.65	8.18	0.14
			0.00			Ice	10.29	9.14	0.21
						1" Ice	11.59	11.02	0.40
						2" Ice	14.32	15.03	0.91
						4" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.0000	116.00	No Ice	8.64	7.07	0.07
			0.00			1/2"	9.30	8.26	0.14
			0.00			Ice	9.92	9.18	0.21
						1" Ice	11.20	11.01	0.39
						2" Ice	13.86	15.05	0.90
						4" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.0000	116.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			0.00			Ice	6.24	2.79	0.12
						1" Ice	6.91	3.28	0.21
						2" Ice	8.37	4.37	0.45
						4" Ice			
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.0000	116.00	No Ice	5.60	2.33	0.04
			0.00			1/2"	5.92	2.56	0.08
			0.00			Ice	6.24	2.79	0.12
						1" Ice	6.91	3.28	0.21
						2" Ice	8.37	4.37	0.45
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.0000	116.00	No Ice	24.53	24.53	1.34
						1/2"	29.94	29.94	1.65
						Ice	35.35	35.35	1.96
						1" Ice	46.17	46.17	2.58
						2" Ice	67.81	67.81	3.82
						4" Ice			
***									
(2) 7770.00 w/ Mount Pipe	A	From Face	4.00	0.0000	106.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			2.00			Ice	7.22	6.21	0.21
						1" Ice	8.26	7.67	0.36
						2" Ice	10.48	11.06	0.76
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Face	4.00	0.0000	106.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			2.00			Ice	7.22	6.21	0.21
						1" Ice	8.26	7.67	0.36
						2" Ice	10.48	11.06	0.76
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Face	4.00	0.0000	106.00	No Ice	6.22	4.82	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00 2.00			1/2" Ice	6.71 7.22	5.51 6.21	0.14 0.21
						1" Ice	8.26	7.67	0.36
						2" Ice	10.48	11.06	0.76
						4" Ice			
AM-X-CD-14-65-00T-RET w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	0.05 0.10 0.15 0.27 0.63
AM-X-CD-14-65-00T-RET w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	0.05 0.10 0.15 0.27 0.63
AM-X-CD-14-65-00T-RET w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.74 6.20 6.66 7.62 9.67	4.02 4.63 5.28 6.68 9.74	0.05 0.10 0.15 0.27 0.63
(4) LGP2140X	A	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(4) LGP2140X	B	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
(4) LGP2140X	C	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.26 1.42 1.58 1.94 2.75	0.38 0.49 0.62 0.89 1.54	0.01 0.02 0.03 0.05 0.13
DC6-48-60-18-8F	A	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.02 0.04 0.06 0.11 0.24
(2) RRUS-11	A	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
(2) RRUS-11	B	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
(2) RRUS-11	C	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31

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
2.375" OD x 6' Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.03 0.04 0.05 0.09 0.23
2.375" OD x 6' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.03 0.04 0.05 0.09 0.23
2.375" OD x 6' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.03 0.04 0.05 0.09 0.23
Platform Mount [LP 712-1]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.53 29.94 35.35 46.17 67.81	24.53 29.94 35.35 46.17 67.81	1.34 1.65 1.96 2.58 3.82
***									
KS24019-L112A	A	From Face	3.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	0.01 0.01 0.01 0.01 0.02
Kathrein OG-860/1920/GPS-A	B	From Face	3.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.23 0.33 0.57 1.17	0.14 0.23 0.33 0.57 1.17	0.00 0.00 0.01 0.02 0.05
KS24019-L112A	C	From Face	3.00 0.00 1.00	0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	0.01 0.01 0.01 0.01 0.02
Side Arm Mount [SO 701-3]	C	None		0.0000	80.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.83 3.92 5.01 7.19 11.55	2.83 3.92 5.01 7.19 11.55	0.20 0.24 0.28 0.36 0.53

Tower Pressures - No Ice

G_H = 1.690

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 147.00-	125.27	1.464	27	89.497	A	0.000	89.497	89.497	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
105.00					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	8.403
L2 105.00-89.75	97.26	1.362	25	38.046	A	0.000	38.046	38.046	100.00	0.000	0.000
					B	0.000	38.046		100.00	0.000	0.000
					C	0.000	38.046		100.00	0.000	4.020
L3 89.75-88.25	89.00	1.328	25	3.920	A	0.000	3.920	3.920	100.00	0.000	0.000
					B	0.000	3.920		100.00	0.000	0.000
					C	0.000	3.920		100.00	0.000	0.891
L4 88.25-86.00	87.12	1.32	24	5.940	A	0.000	5.940	5.940	100.00	0.000	0.000
					B	0.000	5.940		100.00	0.000	0.000
					C	0.000	5.940		100.00	0.000	1.337
L5 86.00-84.25	85.12	1.311	24	4.670	A	0.000	4.670	4.670	100.00	0.000	0.000
					B	0.000	4.670		100.00	0.000	0.000
					C	0.000	4.670		100.00	0.000	1.040
L6 84.25-73.75	78.95	1.283	24	28.929	A	0.000	28.929	28.929	100.00	0.000	0.000
					B	0.000	28.929		100.00	0.000	0.000
					C	0.000	28.929		100.00	0.000	6.240
L7 73.75-42.75	58.15	1.176	22	92.587	A	0.000	92.587	92.587	100.00	0.000	0.000
					B	0.000	92.587		100.00	0.000	0.000
					C	0.000	92.587		100.00	0.000	18.423
L8 42.75-8.25	25.10	1	19	116.796	A	0.000	116.796	116.796	100.00	0.000	0.000
					B	0.000	116.796		100.00	0.000	0.000
					C	0.000	116.796		100.00	0.000	20.503
L9 8.25-6.25	7.25	1	18	7.315	A	0.000	7.315	7.315	100.00	0.000	0.000
					B	0.000	7.315		100.00	0.000	0.000
					C	0.000	7.315		100.00	0.000	1.189
L10 6.25-0.00	3.11	1	18	23.223	A	0.000	23.223	23.223	100.00	0.000	0.000
					B	0.000	23.223		100.00	0.000	0.000
					C	0.000	23.223		100.00	0.000	3.714

Tower Pressure - With Ice

G_H = 1.690

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 147.00-105.00	125.27	1.464	5	0.8802	95.658	A	0.000	95.658	95.658	100.00	0.000	0.000
						B	0.000	95.658		100.00	0.000	0.000
						C	0.000	95.658		100.00	0.000	21.078
L2 105.00-89.75	97.26	1.362	5	0.8539	40.283	A	0.000	40.283	40.283	100.00	0.000	0.000
						B	0.000	40.283		100.00	0.000	0.000
						C	0.000	40.283		100.00	0.000	9.575
L3 89.75-88.25	89.00	1.328	5	0.8448	4.131	A	0.000	4.131	4.131	100.00	0.000	0.000
						B	0.000	4.131		100.00	0.000	0.000
						C	0.000	4.131		100.00	0.000	1.742
L4 88.25-86.00	87.12	1.32	5	0.8427	6.256	A	0.000	6.256	6.256	100.00	0.000	0.000
						B	0.000	6.256		100.00	0.000	0.000
						C	0.000	6.256		100.00	0.000	2.609
L5 86.00-84.25	85.12	1.311	5	0.8403	4.915	A	0.000	4.915	4.915	100.00	0.000	0.000
						B	0.000	4.915		100.00	0.000	0.000
						C	0.000	4.915		100.00	0.000	2.025
L6 84.25-73.75	78.95	1.283	5	0.8328	30.387	A	0.000	30.387	30.387	100.00	0.000	0.000
						B	0.000	30.387		100.00	0.000	0.000
						C	0.000	30.387		100.00	0.000	12.079
L7 73.75-42.75	58.15	1.176	4	0.8028	96.890	A	0.000	96.890	96.890	100.00	0.000	0.000
						B	0.000	96.890		100.00	0.000	0.000
						C	0.000	96.890		100.00	0.000	35.662
L8 42.75-8.25	25.10	1	4	0.7500	121.412	A	0.000	121.412	121.412	100.00	0.000	0.000
						B	0.000	121.412		100.00	0.000	0.000
						C	0.000	121.412		100.00	0.000	38.743
L9 8.25-6.25	7.25	1	4	0.7500	7.565	A	0.000	7.565	7.565	100.00	0.000	0.000
						B	0.000	7.565		100.00	0.000	0.000
						C	0.000	7.565		100.00	0.000	2.150

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
L10 6.25-0.00	3.11	1	4	0.7500	24.005	A	0.000	24.005	24.005	100.00	0.000	0.000
						B	0.000	24.005		100.00	0.000	0.000
						C	0.000	24.005		100.00	0.000	6.718

Tower Pressure - Service

G_H = 1.690

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 147.00-105.00	125.27	1.464	9	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000
					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	8.403
L2 105.00-89.75	97.26	1.362	9	38.046	A	0.000	38.046	38.046	100.00	0.000	0.000
					B	0.000	38.046		100.00	0.000	0.000
					C	0.000	38.046		100.00	0.000	4.020
L3 89.75-88.25	89.00	1.328	8	3.920	A	0.000	3.920	3.920	100.00	0.000	0.000
					B	0.000	3.920		100.00	0.000	0.000
					C	0.000	3.920		100.00	0.000	0.891
L4 88.25-86.00	87.12	1.32	8	5.940	A	0.000	5.940	5.940	100.00	0.000	0.000
					B	0.000	5.940		100.00	0.000	0.000
					C	0.000	5.940		100.00	0.000	1.337
L5 86.00-84.25	85.12	1.311	8	4.670	A	0.000	4.670	4.670	100.00	0.000	0.000
					B	0.000	4.670		100.00	0.000	0.000
					C	0.000	4.670		100.00	0.000	1.040
L6 84.25-73.75	78.95	1.283	8	28.929	A	0.000	28.929	28.929	100.00	0.000	0.000
					B	0.000	28.929		100.00	0.000	0.000
					C	0.000	28.929		100.00	0.000	6.240
L7 73.75-42.75	58.15	1.176	7	92.587	A	0.000	92.587	92.587	100.00	0.000	0.000
					B	0.000	92.587		100.00	0.000	0.000
					C	0.000	92.587		100.00	0.000	18.423
L8 42.75-8.25	25.10	1	6	116.796	A	0.000	116.796	116.796	100.00	0.000	0.000
					B	0.000	116.796		100.00	0.000	0.000
					C	0.000	116.796		100.00	0.000	20.503
L9 8.25-6.25	7.25	1	6	7.315	A	0.000	7.315	7.315	100.00	0.000	0.000
					B	0.000	7.315		100.00	0.000	0.000
					C	0.000	7.315		100.00	0.000	1.189
L10 6.25-0.00	3.11	1	6	23.223	A	0.000	23.223	23.223	100.00	0.000	0.000
					B	0.000	23.223		100.00	0.000	0.000
					C	0.000	23.223		100.00	0.000	3.714

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice

Comb. No.	Description
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	147 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-17.53	0.76	-0.24
			Max. Mx	11	-8.41	373.63	-2.73
			Max. My	8	-8.43	2.97	-372.25
			Max. Vy	11	-18.39	373.63	-2.73
			Max. Vx	8	18.24	2.97	-372.25
			Max. Torque	12			-1.43
L2	105 - 89.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-25.74	1.59	-0.44
			Max. Mx	11	-13.44	820.17	-9.06
			Max. My	8	-13.46	9.49	-815.80
			Max. Vy	11	-24.59	820.17	-9.06
			Max. Vx	8	24.44	9.49	-815.80
			Max. Torque	11			-1.50
L3	89.75 - 88.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.02	1.64	-0.47
			Max. Mx	11	-13.66	857.15	-9.56
			Max. My	8	-13.68	10.00	-852.56
			Max. Vy	11	-24.72	857.15	-9.56
			Max. Vx	8	24.58	10.00	-852.56
			Max. Torque	11			-1.48
L4	88.25 - 86	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.59	1.72	-0.51
			Max. Mx	11	-14.14	913.02	-10.32
			Max. My	8	-14.16	10.77	-908.09
			Max. Vy	11	-24.94	913.02	-10.32
			Max. Vx	8	24.79	10.77	-908.09
			Max. Torque	11			-1.48
L5	86 - 84.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-27.04	1.78	-0.55
			Max. Mx	11	-14.50	956.82	-10.91
			Max. My	8	-14.52	11.37	-951.63
			Max. Vy	11	-25.12	956.82	-10.91
			Max. Vx	8	24.97	11.37	-951.63
			Max. Torque	11			-1.47
L6	84.25 - 73.75	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	14	-28.84	2.00	-0.68
			Max. Mx	11	-15.95	1115.93	-13.02
			Max. My	8	-15.97	13.52	-1109.79
			Max. Vy	11	-25.84	1115.93	-13.02
			Max. Vx	8	25.70	13.52	-1109.79
			Max. Torque	11			-1.47
L7	73.75 - 42.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-38.36	3.06	-1.29
			Max. Mx	11	-24.08	1947.89	-23.33
			Max. My	8	-24.09	23.96	-1937.14
			Max. Vy	5	28.59	-1945.99	22.58
			Max. Vx	8	28.45	23.96	-1937.14
			Max. Torque	11			-1.44
L8	42.75 - 8.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-52.61	4.53	-2.15
			Max. Mx	11	-36.72	3127.32	-36.47
			Max. My	8	-36.73	37.27	-3110.68
			Max. Vy	5	31.37	-3124.70	35.28
			Max. Vx	8	31.23	37.27	-3110.68
			Max. Torque	11			-1.35
L9	8.25 - 6.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-53.34	4.61	-2.20
			Max. Mx	11	-37.40	3190.16	-37.13
			Max. My	8	-37.40	37.94	-3173.23
			Max. Vy	5	31.49	-3187.49	35.92
			Max. Vx	8	31.35	37.94	-3173.23
			Max. Torque	11			-1.25
L10	6.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.64	4.85	-2.34
			Max. Mx	11	-39.48	3388.19	-39.19
			Max. My	8	-39.48	40.03	-3370.33
			Max. Vy	5	31.89	-3385.39	37.89
			Max. Vx	8	31.75	40.03	-3370.33
			Max. Torque	11			-1.24

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	55.64	-0.00	0.00
	Max. H_x	11	39.49	31.87	-0.32
	Max. H_z	2	39.49	-0.32	31.73
	Max. M_x	2	3369.06	-0.32	31.73
	Max. M_z	5	3385.39	-31.87	0.32
	Max. Torsion	5	1.22	-31.87	0.32
	Min. Vert	11	39.49	31.87	-0.32
	Min. H_x	5	39.49	-31.87	0.32
	Min. H_z	8	39.49	0.32	-31.73
	Min. M_x	8	-3370.33	0.32	-31.73
	Min. M_z	11	-3388.19	31.87	-0.32
	Min. Torsion	11	-1.22	31.87	-0.32

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	39.49	-0.00	0.00	0.62	1.42	0.00
Dead+Wind 0 deg - No Ice	39.49	0.32	-31.73	-3369.06	-37.06	-0.26
Dead+Wind 30 deg - No Ice	39.49	16.22	-27.64	-2937.00	-1725.35	-0.83

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 60 deg - No Ice	39.49	27.76	-16.14	-1717.64	-2950.92	-1.19
Dead+Wind 90 deg - No Ice	39.49	31.87	-0.32	-37.89	-3385.39	-1.22
Dead+Wind 120 deg - No Ice	39.49	27.44	15.59	1652.28	-2912.55	-0.93
Dead+Wind 150 deg - No Ice	39.49	15.66	27.32	2899.92	-1658.69	-0.39
Dead+Wind 180 deg - No Ice	39.49	-0.32	31.73	3370.33	40.02	0.25
Dead+Wind 210 deg - No Ice	39.49	-16.22	27.64	2938.27	1728.31	0.83
Dead+Wind 240 deg - No Ice	39.49	-27.76	16.14	1718.93	2953.87	1.19
Dead+Wind 270 deg - No Ice	39.49	-31.87	0.32	39.19	3388.19	1.22
Dead+Wind 300 deg - No Ice	39.49	-27.44	-15.59	-1650.98	2915.52	0.93
Dead+Wind 330 deg - No Ice	39.49	-15.66	-27.32	-2898.64	1661.67	0.39
Dead+Ice	55.64	0.00	-0.00	2.34	4.85	-0.00
Dead+Wind 0 deg+Ice	55.64	0.06	-7.76	-845.13	-2.51	-0.16
Dead+Wind 30 deg+Ice	55.64	3.95	-6.75	-735.40	-426.89	-0.24
Dead+Wind 60 deg+Ice	55.64	6.77	-3.93	-427.97	-735.50	-0.25
Dead+Wind 90 deg+Ice	55.64	7.79	-0.06	-5.20	-845.65	-0.19
Dead+Wind 120 deg+Ice	55.64	6.71	3.83	419.63	-727.83	-0.09
Dead+Wind 150 deg+Ice	55.64	3.84	6.69	732.68	-413.60	0.04
Dead+Wind 180 deg+Ice	55.64	-0.06	7.76	850.07	12.84	0.16
Dead+Wind 210 deg+Ice	55.64	-3.95	6.75	740.35	437.21	0.24
Dead+Wind 240 deg+Ice	55.64	-6.77	3.93	432.91	745.82	0.25
Dead+Wind 270 deg+Ice	55.64	-7.79	0.06	10.15	855.97	0.19
Dead+Wind 300 deg+Ice	55.64	-6.71	-3.83	-414.68	738.15	0.09
Dead+Wind 330 deg+Ice	55.64	-3.84	-6.69	-727.73	423.92	-0.04
Dead+Wind 0 deg - Service	39.49	0.11	-10.98	-1166.87	-11.87	-0.09
Dead+Wind 30 deg - Service	39.49	5.61	-9.56	-1017.30	-596.89	-0.29
Dead+Wind 60 deg - Service	39.49	9.61	-5.59	-594.78	-1021.57	-0.42
Dead+Wind 90 deg - Service	39.49	11.03	-0.11	-12.71	-1171.93	-0.43
Dead+Wind 120 deg - Service	39.49	9.50	5.39	572.93	-1008.23	-0.33
Dead+Wind 150 deg - Service	39.49	5.42	9.45	1005.23	-573.76	-0.14
Dead+Wind 180 deg - Service	39.49	-0.11	10.98	1168.14	14.84	0.09
Dead+Wind 210 deg - Service	39.49	-5.61	9.56	1018.58	599.86	0.29
Dead+Wind 240 deg - Service	39.49	-9.61	5.59	596.06	1024.54	0.42
Dead+Wind 270 deg - Service	39.49	-11.03	0.11	13.99	1174.90	0.43
Dead+Wind 300 deg - Service	39.49	-9.50	-5.39	-571.65	1011.20	0.33
Dead+Wind 330 deg - Service	39.49	-5.42	-9.45	-1003.95	576.74	0.14

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-39.49	0.00	0.00	39.49	-0.00	0.000%
2	0.32	-39.49	-31.73	-0.32	39.49	31.73	0.005%
3	16.22	-39.49	-27.64	-16.22	39.49	27.64	0.000%
4	27.76	-39.49	-16.14	-27.76	39.49	16.14	0.000%
5	31.87	-39.49	-0.32	-31.87	39.49	0.32	0.002%
6	27.44	-39.49	15.59	-27.44	39.49	-15.59	0.000%
7	15.66	-39.49	27.32	-15.66	39.49	-27.32	0.000%
8	-0.32	-39.49	31.73	0.32	39.49	-31.73	0.005%
9	-16.22	-39.49	27.64	16.22	39.49	-27.64	0.000%
10	-27.76	-39.49	16.14	27.76	39.49	-16.14	0.000%
11	-31.87	-39.49	0.32	31.87	39.49	-0.32	0.005%
12	-27.44	-39.49	-15.59	27.44	39.49	15.59	0.000%
13	-15.66	-39.49	-27.32	15.66	39.49	27.32	0.000%
14	0.00	-55.64	0.00	-0.00	55.64	0.00	0.003%
15	0.06	-55.64	-7.76	-0.06	55.64	7.76	0.002%
16	3.95	-55.64	-6.75	-3.95	55.64	6.75	0.002%
17	6.78	-55.64	-3.93	-6.77	55.64	3.93	0.002%
18	7.79	-55.64	-0.06	-7.79	55.64	0.06	0.002%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
19	6.71	-55.64	3.83	-6.71	55.64	-3.83	0.002%
20	3.84	-55.64	6.69	-3.84	55.64	-6.69	0.002%
21	-0.06	-55.64	7.76	0.06	55.64	-7.76	0.002%
22	-3.95	-55.64	6.75	3.95	55.64	-6.75	0.002%
23	-6.78	-55.64	3.93	6.77	55.64	-3.93	0.002%
24	-7.79	-55.64	0.06	7.79	55.64	-0.06	0.002%
25	-6.71	-55.64	-3.83	6.71	55.64	3.83	0.002%
26	-3.84	-55.64	-6.69	3.84	55.64	6.69	0.002%
27	0.11	-39.49	-10.98	-0.11	39.49	10.98	0.005%
28	5.61	-39.49	-9.56	-5.61	39.49	9.56	0.001%
29	9.61	-39.49	-5.59	-9.61	39.49	5.59	0.001%
30	11.03	-39.49	-0.11	-11.03	39.49	0.11	0.005%
31	9.50	-39.49	5.39	-9.50	39.49	-5.39	0.001%
32	5.42	-39.49	9.45	-5.42	39.49	-9.45	0.001%
33	-0.11	-39.49	10.98	0.11	39.49	-10.98	0.005%
34	-5.61	-39.49	9.56	5.61	39.49	-9.56	0.001%
35	-9.61	-39.49	5.59	9.61	39.49	-5.59	0.001%
36	-11.03	-39.49	0.11	11.03	39.49	-0.11	0.005%
37	-9.50	-39.49	-5.39	9.50	39.49	5.39	0.001%
38	-5.42	-39.49	-9.45	5.42	39.49	9.45	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	14	0.00004776	0.00012967
3	Yes	18	0.00000001	0.00012230
4	Yes	18	0.00000001	0.00012531
5	Yes	15	0.00000001	0.00011455
6	Yes	18	0.00000001	0.00011485
7	Yes	18	0.00000001	0.00011774
8	Yes	14	0.00004776	0.00013438
9	Yes	18	0.00000001	0.00012474
10	Yes	18	0.00000001	0.00012200
11	Yes	14	0.00004772	0.00007136
12	Yes	18	0.00000001	0.00011885
13	Yes	18	0.00000001	0.00011571
14	Yes	6	0.00000001	0.00001334
15	Yes	14	0.00010620	0.00002841
16	Yes	14	0.00010603	0.00012383
17	Yes	14	0.00010602	0.00013498
18	Yes	14	0.00010618	0.00003176
19	Yes	14	0.00010605	0.00011839
20	Yes	14	0.00010606	0.00012442
21	Yes	14	0.00010619	0.00002942
22	Yes	14	0.00010603	0.00013815
23	Yes	14	0.00010604	0.00012791
24	Yes	14	0.00010620	0.00003005
25	Yes	14	0.00010608	0.00013009
26	Yes	14	0.00010607	0.00012301
27	Yes	13	0.00012307	0.00008010
28	Yes	15	0.00000001	0.00010835
29	Yes	15	0.00000001	0.00011636
30	Yes	13	0.00012305	0.00010362
31	Yes	15	0.00000001	0.00009920
32	Yes	15	0.00000001	0.00010662
33	Yes	13	0.00012307	0.00008048
34	Yes	15	0.00000001	0.00011484
35	Yes	15	0.00000001	0.00010775
36	Yes	13	0.00012306	0.00008785
37	Yes	15	0.00000001	0.00010969
38	Yes	15	0.00000001	0.00010135

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	36.379	35	2.0878	0.0026
L2	108.75 - 89.75	20.483	35	1.7822	0.0025
L3	89.75 - 88.25	13.945	35	1.4580	0.0015
L4	88.25 - 86	13.492	35	1.4250	0.0014
L5	86 - 84.25	12.828	35	1.3928	0.0013
L6	84.25 - 73.75	12.322	35	1.3675	0.0013
L7	78 - 42.75	10.601	35	1.2620	0.0011
L8	47.5 - 8.25	3.979	35	0.7758	0.0005
L9	8.25 - 6.25	0.115	35	0.1337	0.0001
L10	6.25 - 0	0.066	35	0.1012	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	APXVSPP18-C-A20 w/ Mount Pipe	35	36.379	2.0878	0.0029	30972
135.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	35	31.187	2.0153	0.0029	12905
116.00	(2) LPA-80080/4CF w/ Mount Pipe	35	23.294	1.8632	0.0027	4994
106.00	(2) 7770.00 w/ Mount Pipe	35	19.456	1.7470	0.0024	3736
80.00	KS24019-L112A	35	11.138	1.2968	0.0011	3706

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	104.576	10	6.0061	0.0070
L2	108.75 - 89.75	58.947	10	5.1314	0.0070
L3	89.75 - 88.25	40.152	10	4.1995	0.0042
L4	88.25 - 86	38.850	10	4.1044	0.0040
L5	86 - 84.25	36.940	10	4.0119	0.0038
L6	84.25 - 73.75	35.485	10	3.9391	0.0036
L7	78 - 42.75	30.532	10	3.6356	0.0031
L8	47.5 - 8.25	11.467	10	2.2358	0.0014
L9	8.25 - 6.25	0.333	10	0.3854	0.0002
L10	6.25 - 0	0.191	10	0.2919	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	APXVSPP18-C-A20 w/ Mount Pipe	10	104.576	6.0061	0.0088	11018
135.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	10	89.678	5.7992	0.0088	4589
116.00	(2) LPA-80080/4CF w/ Mount Pipe	10	67.022	5.3635	0.0080	1773

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
106.00	(2) 7770.00 w/ Mount Pipe	10	55.996	5.0302	0.0069	1324
80.00	KS24019-L112A	10	32.077	3.7357	0.0033	1300

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	147 - 105 (1)	TP29.141x22x0.25	42.00	0.00	0.0	36.000	22.4191	-8.37	807.09	0.010
L2	105 - 89.75 (2)	TP31.2343x28.0034x0.3125	19.00	0.00	0.0	36.000	30.6705	-13.40	1104.14	0.012
L3	89.75 - 88.25 (3)	TP31.4893x31.2343x0.3125	1.50	0.00	0.0	35.532	30.9235	-13.62	1098.77	0.012
L4	88.25 - 86 (4)	TP31.8719x31.4893x0.5085	2.25	0.00	0.0	34.302	50.6160	-14.10	1736.23	0.008
L5	86 - 84.25 (5)	TP32.1695x31.8719x0.5063	1.75	0.00	0.0	33.978	50.8827	-14.47	1728.89	0.008
L6	84.25 - 73.75 (6)	TP33.955x32.1695x0.455	10.50	0.00	0.0	34.980	47.3360	-15.92	1655.81	0.010
L7	73.75 - 42.75 (7)	TP38.601x32.3223x0.537	35.25	0.00	0.0	34.554	63.4392	-24.06	2192.08	0.011
L8	42.75 - 8.25 (8)	TP43.7172x36.6809x0.5757	39.25	0.00	0.0	34.740	78.8258	-36.72	2738.41	0.013
L9	8.25 - 6.25 (9)	TP44.0573x43.7172x0.596	2.00	0.00	0.0	34.464	82.2200	-37.39	2833.63	0.013
L10	6.25 - 0 (10)	TP45.12x44.0573x0.5918	6.25	0.00	0.0	34.422	83.6336	-39.48	2878.84	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	147 - 105 (1)	TP29.141x22x0.25	375.56	28.862	36.000	0.802	0.00	0.000	36.000	0.000
L2	105 - 89.75 (2)	TP31.2343x28.0034x0.3125	826.86	42.493	36.000	1.180	0.00	0.000	36.000	0.000
L3	89.75 - 88.25 (3)	TP31.4893x31.2343x0.3125	864.23	43.686	35.532	1.229	0.00	0.000	35.532	0.000
L4	88.25 - 86 (4)	TP31.8719x31.4893x0.5085	920.67	28.437	34.302	0.829	0.00	0.000	34.302	0.000
L5	86 - 84.25 (5)	TP32.1695x31.8719x0.5063	964.91	29.360	33.978	0.864	0.00	0.000	33.978	0.000
L6	84.25 - 73.75 (6)	TP33.955x32.1695x0.455	1125.61	35.491	34.980	1.015	0.00	0.000	34.980	0.000
L7	73.75 - 42.75 (7)	TP38.601x32.3223x0.537	1965.35	40.744	34.554	1.179	0.00	0.000	34.554	0.000
L8	42.75 - 8.25 (8)	TP43.7172x36.6809x0.5757	3154.70	45.358	34.740	1.306	0.00	0.000	34.740	0.000
L9	8.25 - 6.25 (9)	TP44.0573x43.7172x0.596	3218.03	44.049	34.464	1.278	0.00	0.000	34.464	0.000
L10	6.25 - 0 (10)	TP45.12x44.0573x0.5918	3417.61	44.869	34.422	1.304	0.00	0.000	34.422	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	147 - 105 (1)	TP29.141x22x0.25	18.64	0.831	24.000	0.069	0.91	0.034	24.000	0.001
L2	105 - 89.75 (2)	TP31.2343x28.0034x0.3125	24.84	0.810	24.000	0.067	1.19	0.030	24.000	0.001
L3	89.75 - 88.25 (3)	TP31.4893x31.2343x0.3125	24.98	0.808	23.688	0.068	1.19	0.029	23.688	0.001
L4	88.25 - 86 (4)	TP31.8719x31.4893x0.5085	25.20	0.498	22.868	0.044	1.19	0.018	22.868	0.001
L5	86 - 84.25 (5)	TP32.1695x31.8719x0.5063	25.37	0.499	22.652	0.044	1.19	0.018	22.652	0.001
L6	84.25 - 73.75 (6)	TP33.955x32.1695x0.455	26.10	0.551	23.320	0.047	1.19	0.018	23.320	0.001
L7	73.75 - 42.75 (7)	TP38.601x32.3223x0.537	28.85	0.455	23.036	0.039	1.19	0.012	23.036	0.001
L8	42.75 - 8.25 (8)	TP43.7172x36.6809x0.5757	31.62	0.401	23.160	0.035	1.19	0.008	23.160	0.000
L9	8.25 - 6.25 (9)	TP44.0573x43.7172x0.596	31.74	0.386	22.976	0.034	1.19	0.008	22.976	0.000
L10	6.25 - 0 (10)	TP45.12x44.0573x0.5918	32.13	0.384	22.948	0.033	1.19	0.008	22.948	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147 - 105 (1)	0.010	0.802	0.000	0.069	0.001	0.813 ✔	1.333	H1-3+VT ✔
L2	105 - 89.75 (2)	0.012	1.180	0.000	0.067	0.001	1.194 ✔	1.333	H1-3+VT ✔
L3	89.75 - 88.25 (3)	0.012	1.229	0.000	0.068	0.001	1.243 ✔	1.333	H1-3+VT ✔
L4	88.25 - 86 (4)	0.008	0.829	0.000	0.044	0.001	0.838 ✔	1.333	H1-3+VT ✔
L5	86 - 84.25 (5)	0.008	0.864	0.000	0.044	0.001	0.873 ✔	1.333	H1-3+VT ✔
L6	84.25 - 73.75 (6)	0.010	1.015	0.000	0.047	0.001	1.025 ✔	1.333	H1-3+VT ✔
L7	73.75 - 42.75 (7)	0.011	1.179	0.000	0.039	0.001	1.191 ✔	1.333	H1-3+VT ✔
L8	42.75 - 8.25 (8)	0.013	1.306	0.000	0.035	0.000	1.319 ✔	1.333	H1-3+VT ✔
L9	8.25 - 6.25 (9)	0.013	1.278	0.000	0.034	0.000	1.292 ✔	1.333	H1-3+VT ✔
L10	6.25 - 0 (10)	0.014	1.304	0.000	0.033	0.000	1.317 ✔	1.333	H1-3+VT ✔

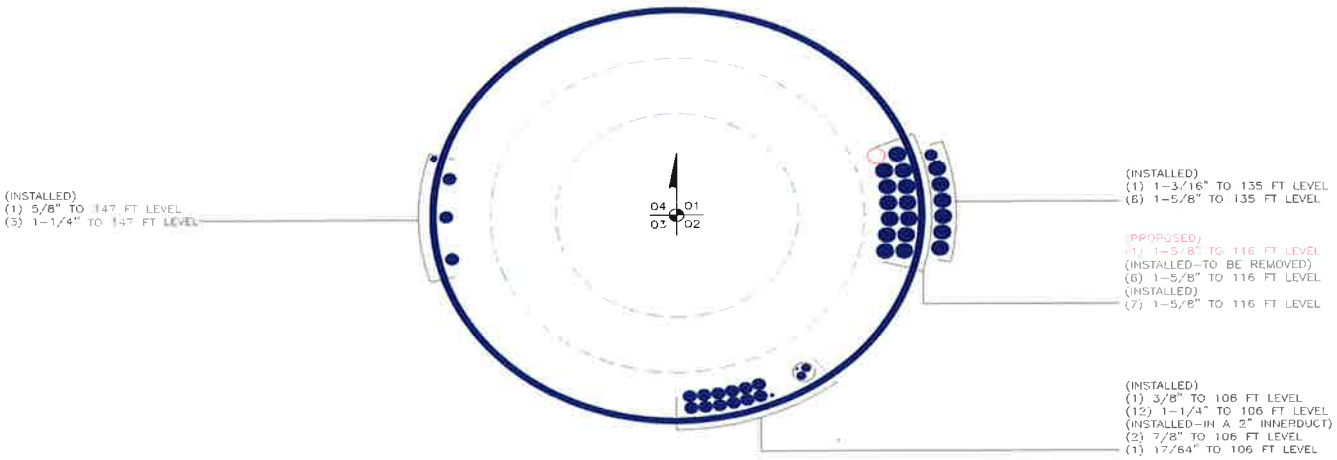
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	147 - 105	Pole	TP29.141x22x0.25	1	-8.37	1075.85	61.0	Pass
L2	105 - 89.75	Pole	TP31.2343x28.0034x0.3125	2	-13.40	1471.82	89.6	Pass
L3	89.75 - 88.25	Pole	TP31.4893x31.2343x0.3125	3	-13.62	1464.66	93.3	Pass
L4	88.25 - 86	Pole	TP31.8719x31.4893x0.5085	4	-14.10	2314.39	62.8	Pass
L5	86 - 84.25	Pole	TP32.1695x31.8719x0.5063	5	-14.47	2304.61	65.5	Pass
L6	84.25 - 73.75	Pole	TP33.955x32.1695x0.455	6	-15.92	2207.19	76.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L7	73.75 - 42.75	Pole	TP38.601x32.3223x0.537	7	-24.06	2922.04	89.3	Pass
L8	42.75 - 8.25	Pole	TP43.7172x36.6809x0.5757	8	-36.72	3650.30	99.0	Pass
L9	8.25 - 6.25	Pole	TP44.0573x43.7172x0.596	9	-37.39	3777.23	96.9	Pass
L10	6.25 - 0	Pole	TP45.12x44.0573x0.5918	10	-39.48	3837.49	98.8	Pass
							Summary	
						Pole (L8)	99.0	Pass
						RATING =	**99.0**	**Pass**

APPENDIX B

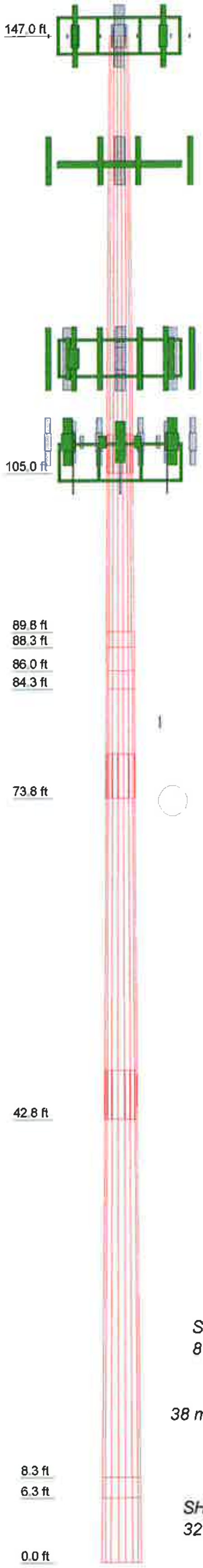
BASE LEVEL DRAWING


(INSTALLED)
(1) 5/8" TO 147 FT LEVEL
(5) 1-1/4" TO 147 FT LEVEL
04
01
03
02
(INSTALLED)
(1) 1-3/16" TO 135 FT LEVEL
(6) 1-5/8" TO 135 FT LEVEL
(PROPOSED)
(1) 1-5/8" TO 116 FT LEVEL
(INSTALLED-TO BE REMOVED)
(6) 1-5/8" TO 116 FT LEVEL
(INSTALLED)
(7) 1-5/8" TO 116 FT LEVEL
(INSTALLED)
(1) 3/8" TO 106 FT LEVEL
(12) 1-1/4" TO 106 FT LEVEL
(INSTALLED-IN A 2" INNERDUCT)
(2) 7/8" TO 106 FT LEVEL
(1) 17/64" TO 106 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

Section	10	9	8	7	6	5	4	3	2	1
Length (ft)	6.25	2.00	39.25	35.25	10.50	1.75	2.25	1.50	19.00	42.00
Number of Sides	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.5918	0.5960	0.5757	0.5370	0.4550	[illegible]	[illegible]	0.3125	0.3125	0.2500
Socket Length (ft)				4.75	4.25					3.75
Top Dia (in)	44.0573	43.7172	36.6809	32.3223	32.1695	31.[illegible]	[illegible]	28.[illegible]	28.0034	22.0000
Bot Dia (in)	45.1200	44.0573	43.7172	38.6010	33.9550	32.[illegible]	[illegible]	31.[illegible]	31.2343	29.1410
Grade	Reinf 57.44 ksi / Reinf 57.37 ksi		Reinf 57.90 ksi	Reinf 58.30 ksi / Reinf 57.59 ksi	Reinf 56.63 ksi	[illegible]	[illegible]	Reinf 59.22 ksi		A607-60
Weight (K) 26.4	1.8	0.6	9.7	7.1	1.7	0.3	0.4	0.2	1.9	2.9



AXIAL
56 K
SHEAR
8 K
MOMENT
862 kip-ft
TORQUE 0 kip-ft
38 mph WIND - 0.7500 in ICE

AXIAL
39 K
SHEAR
32 K
MOMENT
3418 kip-ft
TORQUE 1 kip-ft
REACTIONS - 85 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	147	RRH4X45-AWS4 B66	116
APXVSPP18-C-A20 w/ Mount Pipe	147	RRH2X60-PCS	116
APXVSPP18-C-A20 w/ Mount Pipe	147	HBXX-6517DS-A2M w/ Mount Pipe	116
800 EXTERNAL NOTCH FILTER	147	(2) SBNHH-1D65B w/ Mount Pipe	116
800 EXTERNAL NOTCH FILTER	147	RRH2x60-700	116
800 EXTERNAL NOTCH FILTER	147	RRH4X45-AWS4 B66	116
(3) ACU-A20-N	147	RRH2X60-PCS	116
(3) ACU-A20-N	147	HBXX-6517DS-A2M w/ Mount Pipe	116
(3) ACU-A20-N	147	(2) SBNHH-1D65B w/ Mount Pipe	116
1900MHz RRH (65MHz)	147	RRH2x60-700	116
1900MHz RRH (65MHz)	147	RRH4X45-AWS4 B66	116
1900MHz RRH (65MHz)	147	RRH2X60-PCS	116
800MHZ RRH	147	HBXX-6517DS-A2M w/ Mount Pipe	116
800MHZ RRH	147	(2) SBNHH-1D65B w/ Mount Pipe	116
800MHZ RRH	147	DB-T1-6Z-8AB-0Z	116
APXVTM14-C-120 w/ Mount Pipe	147	DB-T1-6Z-8AB-0Z	116
APXVTM14-C-120 w/ Mount Pipe	147	Platform Mount [LP 712-1]	116
APXVTM14-C-120 w/ Mount Pipe	147	(2) 7770.00 w/ Mount Pipe	106
TD-RRH8x20-25	147	(2) 7770.00 w/ Mount Pipe	106
TD-RRH8x20-25	147	(2) 7770.00 w/ Mount Pipe	106
TD-RRH8x20-25	147	AM-X-CD-14-65-00T-RET w/ Mount Pipe	106
Platform Mount [LP 712-1]	147	AM-X-CD-14-65-00T-RET w/ Mount Pipe	106
Miscellaneous (NA507-1)	147	AM-X-CD-14-65-00T-RET w/ Mount Pipe	106
(2) 5' x 2' Pipe Mount	147	(4) LGP2140X	106
(2) 5' x 2' Pipe Mount	147	(4) LGP2140X	106
(2) 5' x 2' Pipe Mount	147	(4) LGP2140X	106
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	135	DC6-48-60-18-8F	106
(2) ERICSSON AIR 21 B2A B4P w/ Mount Pipe	135	(2) RRUS-11	106
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	135	(2) RRUS-11	106
(2) ERICSSON AIR 21 B4A B2P w/ Mount Pipe	135	(2) RRUS-11	106
T-Arm Mount [TA 601-3]	135	2.375" OD x 6' Mount Pipe	106
(2) LPA-80080/4CF w/ Mount Pipe	116	2.375" OD x 6' Mount Pipe	106
(2) LPA-80063/6CF w/ Mount Pipe	116	2.375" OD x 6' Mount Pipe	106
(2) APL868013 w/ Mount Pipe	116	Platform Mount [LP 712-1]	106
(2) ClearGain Dual Band 800/1900 MHz	116	KS24019-L112A	80
RRH2x60-700	116	Kathrein OG-860/1920/GPS-A	80
		KS24019-L112A	80
		Side Arm Mount [SO 701-3]	80

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 57.59 ksi	58 ksi	72 ksi
Reinf 59.22 ksi	59 ksi	75 ksi	Reinf 57.90 ksi	58 ksi	73 ksi
Reinf 57.17 ksi	57 ksi	72 ksi	Reinf 57.44 ksi	57 ksi	72 ksi
Reinf 56.63 ksi	57 ksi	71 ksi	Reinf 57.37 ksi	57 ksi	72 ksi
Reinf 58.30 ksi	58 ksi	73 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99%

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: **147 ft Monopole / Secondino Property**			
Project: **PJF 37515-2140/ BU 876316**			
Client: CCI	Drawn by: John J Woolley	App'd:	
Code: TIA/EIA-222-F	Date: 09/10/15	Scale: N	
Path: [illegible]		Dwg No.	

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876316*
Site Name: *Secondino Property*
App #:

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	0	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
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:	45.12	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3416	ft-kips
Unfactored Axial, P:	39	kips
Unfactored Shear, V:	32	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	194.6 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	99.8% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	44.8 ksi
Allowable PL Bending Stress:	50.0 ksi
Base Plate Stress Ratio:	89.6% **Pass**

PL Ref. Data
Yield Line (in): 29.83
Max PL Length: 29.83

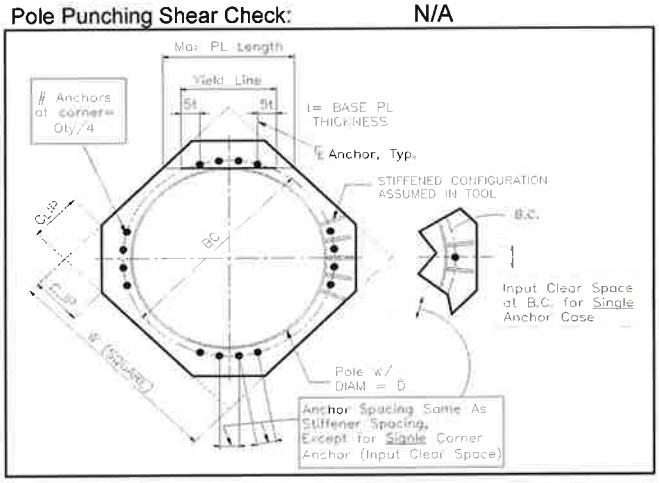
N/A - Unstiffened

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



** 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: 37515-2140.003.7805
Site Number: 876316
Site Name: Secondino Property

By: JJW
Date: 9/10/2015

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	3416.0		k-ft
Shear, V =	32.0		kips
Axial Load, P =	39.0		kips
OTM =	3432.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	22.5	ft
fc' =	3	ksi
εc =	0.003	in/in
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/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00 + Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	32	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	5.00	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 =	100.0%
Maximum Steel Ratio =	100.0%

Define Soil Layers

Note: Cohesion = Undrained Shear Strength = 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	3	116	0	45	Sand		80		3
2	2	115	0	38	Sand		180		5
3	2	116	0	41	Sand		240		7
4	3	117		45	Sand		380		10
5	5	117		45	Sand		480		15
6	5	117	3250		Clay		1200		20
7	5	117		45	Sand	29050	760		25
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	15.99	ft, from Grade
Bending Moment, M =	3943.82	k-ft, from COR
Resisting Moment, Ma =	5040.29	k-ft, from COR

MOMENT RATIO = 78.2% OK

Shear, V =	32.00	kips
Resisting Shear, Va =	40.90	kips

SHEAR RATIO = 78.2% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	72.60	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	39.00	kips
Allowable Comp. Cap., Ca =	661.22	kips

COMPRESSION RATIO = 5.9% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	49.92	sq in
Allowable Min Axial, Pa =	-2073.60	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	6799.77	kips, Where Ma = 0 k-ft

Axial Load, P =	68.08	kips @ 5.25 ft Below Grade
Moment, M =	3574.92	k-ft @ 5.25 ft Below Grade
Allowable Moment, Ma =	5815.85	k-ft

MOMENT RATIO = 61.5% 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#: *876316*
Site Name: *Secondino Property*
App #:

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

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

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	32	
As Total=	49.92	in^2
A s/ Aconc, Rho:	0.0090	0.90%

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:	0.90%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8839.70	kips
at Mu=(ϕ=0.65)Mn=	5309.39	ft-kips
Max Tu, (φ=0.9) Tn =	2695.68	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	3574.92	ft-kips **(* Note)**
Max. Service Shaft P:	68.08	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**		
1.30	Mu:	4647.396	ft-kips
1.30	Pu:	88.504	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=	2002

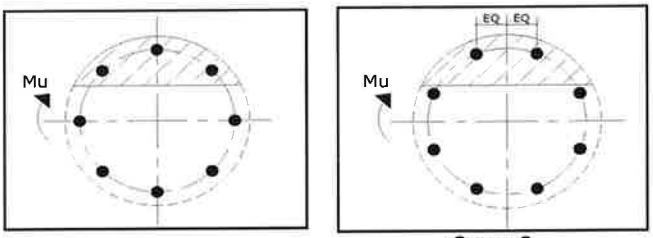
Seismic Properties

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:	**17.08**	in
Extreme Steel Strain, εt:	**0.0108**	
	εt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	88.50	kips
Drilled Shaft Moment Capacity, φMn:	**7560.61**	ft-kips
Drilled Shaft Superimposed Mu:	**4647.40**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**61.5%**

ATTACHMENT 4

Town of Branford, Connecticut - Assessment Parcel Map

Parcel: H05-000-003-00010 Address: 21 ACORN RD

Approximate Scale: 1 inch = 100 feet

0 20 40 60 80 Feet

Grand List Date October 2015

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user. The Town of Branford and its mapping

21 ACORN RD

Location	21 ACORN RD	**Mblu**	H05/000 003/ 00010/ /
Acct#	008133	**Owner**	ALTRIO INVESTMENT GROUP LLC
Assessment	$634,200	**Appraisal**	$905,900
PID	1176	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$477,600	$428,300	$905,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$334,300	$299,900	$634,200

Owner of Record

Owner	ALTRIO INVESTMENT GROUP LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	P O BOX 622 BRANFORD, CT 06405	**Book & Page**	0568/0731
		Sale Date	04/08/1994

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
ALTRIO INVESTMENT GROUP LLC			0568/0731	04/08/1994

Building Information

Building 1 : Section 1

Year Built:	2001
Living Area:	10911
Replacement Cost:	$647,741
Building Percent Good:	67
Replacement Cost Less Depreciation:	$434,000

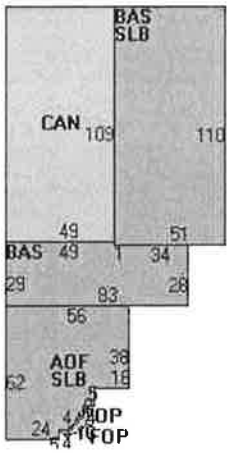
Building Attributes	
Field	**Description**

STYLE	Warehouse
MODEL	Ind/Comm
Grade	B
Stories:	1
Occupancy	1
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	COMM WHS MDL96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3160
Heat/AC	HEAT/AC SPLIT
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	17
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/BranfordCTPhotos//\00\01\93/

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	7983	7983
AOF	Office	2928	2928
CAN	Canopy	5341	0
FOP	Porch, Open	80	0
SLB	Slab	8538	0
		24870	10911

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR1	SPRINKLERS-WET	13324 S.F.	$8,900	1
SPR2	WET/CONCEALED	2928 S.F.	$2,600	1
A/C	AIR CONDITION	2928 S.F.	$4,300	1

Land

Land Use

Use Code	3160
Description	COMM WHS MDL96
Zone	IG-2
Neighborhood	350
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.56
Frontage	
Depth	
Assessed Value	$299,900
Appraised Value	$428,300

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	PAVING-ASPHALT			21000 S.F.	$24,300	1
FN3	FENCE-6' CHAIN			500 L.F.	$3,500	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$477,600	$428,300	$905,900
2014	$477,600	$428,300	$905,900
2013	$547,900	$428,300	$976,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$334,300	$299,900	$634,200
2014	$334,300	$299,900	$634,200
2013	$383,500	$299,900	$683,400