

July 8, 2015

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

Re: **Notice of Exempt Modification – Facility Modification
East Street (aka Route 322), Wolcott, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains fifteen (15) wireless telecommunications antennas at the 177-foot level on the existing 180-foot tower off East Street in Wolcott, Connecticut (the “Property”). The tower is owned by Crown Castle. The Council approved Cellco’s shared use of this tower in 1986. Cellco now intends to modify its facility by replacing nine (9) of its existing antennas with three (3) model SBNHH-1D65B, 700 MHz antennas; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the same 177-foot level on the tower. Cellco also intends to install nine (9) remote radio heads (“RRHs”) and two (2) HYBRIFLEX™ antenna cables. Included in Attachment 1 are specifications for Cellco’s replacement antennas, RRHs and HYBRIFLEX™ cables.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Thomas G. Dunn, Mayor for the Town of Wolcott. A copy of this letter is also being sent to Augustinho and Joanne Rodrigues, the owners of the Property.

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

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1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement antennas and RRHs will be located at the 177-foot level on the 180-foot tower.
2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table is included in Attachment 2.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support Cellco's proposed modifications. (*See Structural Analysis Report included in Attachment 3*).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Thomas G. Dunn, Wolcott Mayor
Augustinho and Joanne Rodrigues
Tim Parks

ATTACHMENT 1

Product Specifications

COMMScope®

POWERED BY



HBXX-6517DS-VTM

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, 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, 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® Teletilt® |
| Operating Frequency Band | 1710 – 2180 MHz |

Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM



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, maximum | 668.0 N @ 150 km/h 150.2 lbf @ 150 km/h |
| Wind Speed, maximum | 241.0 km/h 149.8 mph |

Dimensions

| | |
|------------|---------------------|
| Depth | 166.0 mm 6.5 in |
| Length | 1903.0 mm 74.9 in |
| Width | 305.0 mm 12.0 in |
| Net Weight | 19.5 kg 43.0 lb |

Remote Electrical Tilt (RET) Information

| | |
|--|-----------------|
| Model with Factory Installed AISG 2.0 Actuator | HBXX-6517DS-A2M |
| RET System | Teletilt® |

Regulatory Compliance/Certifications

Agency

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

Classification

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



Included Products

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



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 | 1920–2180 | 2300–2360 |
|--------------------------------------|------------|------------|------------|------------|------------|------------|
| Gain, dBi | 14.9 | 14.7 | 17.7 | 18.2 | 18.6 | 18.6 |
| Beamwidth, Horizontal, degrees | 68 | 66 | 69 | 66 | 63 | 58 |
| Beamwidth, Vertical, degrees | 12.1 | 10.7 | 5.6 | 5.2 | 5.0 | 4.5 |
| Beam Tilt, degrees | 0–14 | 0–14 | 0–7 | 0–7 | 0–7 | 0–7 |
| USLS, dB | 14 | 13 | 15 | 15 | 15 | 13 |
| Front-to-Back Ratio at 180°, dB | 27 | 29 | 28 | 28 | 28 | 27 |
| CPR at Boresight, dB | 20 | 23 | 20 | 20 | 17 | 21 |
| CPR at Sector, dB | 14 | 10 | 12 | 10 | 9 | 1 |
| Isolation, dB | 25 | 25 | 25 | 25 | 25 | 25 |
| Isolation, Intersystem, dB | 30 | 30 | 30 | 30 | 30 | 30 |
| VSWR Return Loss, dB | 1.5 14.0 | 1.5 14.0 | 1.5 14.0 | 1.5 14.0 | 1.5 14.0 | 1.5 14.0 |
| PIM, 3rd Order, 2 x 20 W, dBc | -153 | -153 | -153 | -153 | -153 | -153 |
| Input Power per Port, maximum, watts | 350 | 350 | 350 | 350 | 350 | 300 |
| Polarization | ±45° | ±45° | ±45° | ±45° | ±45° | ±45° |
| Impedance | 50 ohm | 50 ohm | 50 ohm | 50 ohm | 50 ohm | 50 ohm |

Electrical Specifications, BASTA*

| Frequency Band, MHz | 698–806 | 806–896 | 1695–1880 | 1850–1990 | 1920–2180 | 2300–2360 |
|---|------------|------------|-----------|-----------|-----------|-----------|
| Gain by all Beam Tilts, average, dBi | 14.5 | 14.3 | 17.4 | 17.9 | 18.2 | 18.3 |
| Gain by all Beam Tilts Tolerance, dB | ±0.5 | ±0.8 | ±0.4 | ±0.3 | ±0.5 | ±0.3 |
| | 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, dB | 16 | 14 | 16 | 16 | 16 | 15 |
| Front-to-Back Total Power at 180° ± 30°, dB | 25 | 26 | 27 | 26 | 26 | 26 |
| CPR at Boresight, dB | 22 | 23 | 21 | 20 | 20 | 22 |
| CPR at Sector, dB | 13 | 11 | 16 | 12 | 11 | 4 |

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

General Specifications

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

SBNHH-1D65B

POWERED BY



Mechanical Specifications

| | |
|------------------------------|--|
| Color | Light gray |
| Lightning Protection | dc Ground |
| Radiator Material | Aluminum Low loss circuit board |
| Radome Material | Fiberglass, UV resistant |
| Reflector Material | Aluminum |
| RF Connector Interface | 7-16 DIN Female |
| RF Connector Location | Bottom |
| RF Connector Quantity, total | 6 |
| Wind Loading, maximum | 617.7 N @ 150 km/h 138.9 lbf @ 150 km/h |
| Wind Speed, maximum | 241.4 km/h 150.0 mph |

Dimensions

| | |
|------------|---------------------|
| Depth | 181.0 mm 7.1 in |
| Length | 1851.0 mm 72.9 in |
| Width | 301.0 mm 11.9 in |
| Net Weight | 18.4 kg 40.6 lb |

Remote Electrical Tilt (RET) Information

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

Regulatory Compliance/Certifications

Agency

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

Classification

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



Included Products

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

* Footnotes

Performance Note Severe environmental conditions may degrade optimum performance

ALCATEL-LUCENT B13 RRH4X30-4R

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

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



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

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

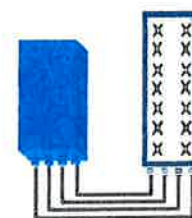
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

FEATURES

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

BENEFITS

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



4x30W with 4T4R
or
2x60W with 2T4R

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

TECHNICAL SPECIFICATIONS

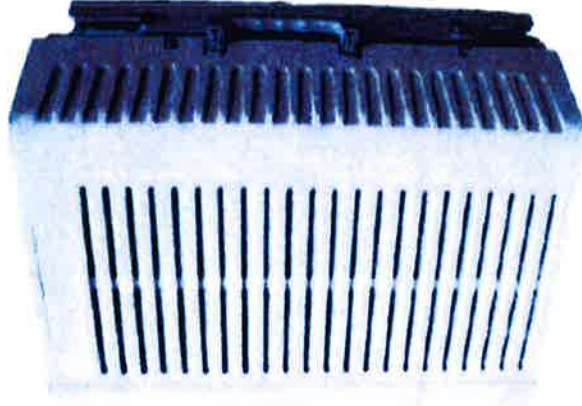
| Features & performance | |
|-------------------------------------|---|
| Number of TX/RX paths | 4 duplexed (either 4T4R or 2T4R by SW) |
| Frequency band | U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz |
| Instantaneous bandwidth - #carriers | 10MHz – 1 LTE carrier (in 10MHz occupied bandwidth) |
| LTE carrier bandwidth | 10 MHz |
| RF output power | 2x60W or 4x30W (by SW) |
| Noise figure – RX Diversity scheme | 2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity |
| Sizes (HxWxD) in mm (in.) | 550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) |
| Volume in L | 38 (with solar shield) |
| Weight in kg (lb) (w/o mounting HW) | 26 (57.2) (with solar shield) |
| DC voltage range | -40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption |
| DC power consumption | 550W typical @100% RF load (in 2Tx or 4TX mode) |
| Environmental conditions | -40°C (-40°F) / +55°C (+131°F) |
| Wind load (@150km/h or 93mph) | 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 |

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PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3



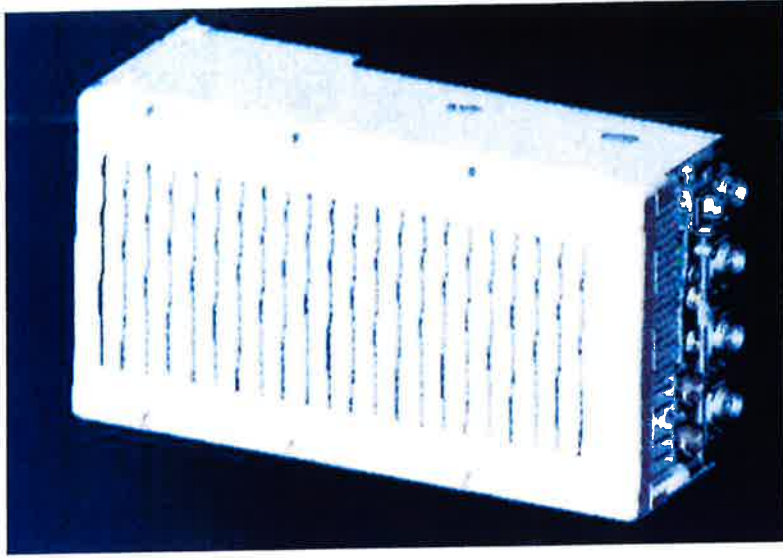
| | |
|-------------------------|---|
| RRH2x60 | |
| RF Output Power | 2x60W |
| Instantaneous Bandwidth | 20MHz |
| Transmitter | 2 TX |
| Receiver | 2 Branch RX – LA6.0.1 4 Branch RX – LR13.3 |
| Features | AISG 2.0 for RET/TMA Internal Smart Bias-T |
| Power | -48VDC |
| CPRI Ports | 2 CPRI Rate 3 Ports |
| External Alarms | 4 External User Alarms |
| Monitor Ports | TX |
| Environmental | GR487 Compliance |
| RF Connectors | 7/16 DIN (top mounted) |

** Not a Verizon Wireless deployed product

NEW PCS RF MODULES FOR VZW RRH2X60 - HW CHARACTERISTICS

LR14.3

| | |
|--|---------------------------------|
| | RRH2x60 |
| RF Output Power | 2x60W (4x30W HW Ready) |
| Instantaneous Bandwidth | 60MHz |
| Target Reliability (Annual Return Rate) | <2% |
| Receiver | 4 Branch Rx |
| Features | AISG 2.0 for RET/TMA |
| Power | -48VDC Internal Smart Bias-T |
| CPRI Ports | 2 CPRI Rate 5 Ports |
| External Alarms | 4 External User Alarms |
| Monitor Ports | TX, RX |
| Environmental | GR487 Compliance |
| RF Connectors | 7/16 DIN (downward facing) |
| Dimensions | 22"(h) x 12"(w) x 9.4" (d)** |
| Weight | 55lb** |



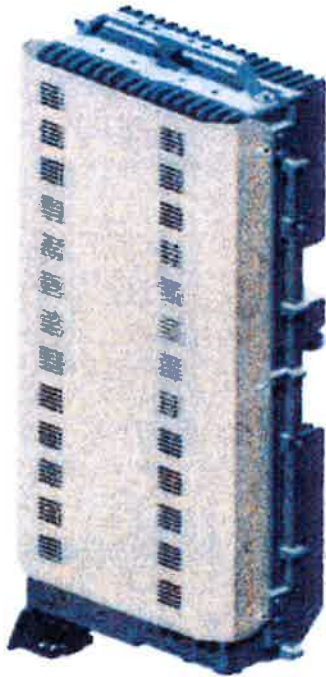
** - Includes solar shield but not mounting brackets (8 lbs.)



ALCATEL-LUCENT - CONFIDENTIAL - SOLELY FOR AUTHORIZED PERSONS HAVING A NEED TO KNOW - PROPRIETARY - USE PURSUANT TO COMPANY INSTRUCTION

ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET RRH2x60-AWS FOR BAND 4 APPLICATIONS

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



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

The Alcatel-Lucent RRH2x60-AWS is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals

along with operations, administration and maintenance (OA&M) information.

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

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

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

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

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

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

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

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

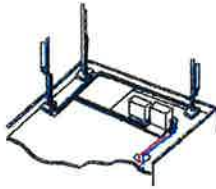
The RRH2x60-AWS includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

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

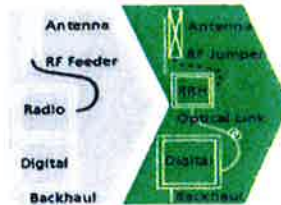
The Alcatel-Lucent RRH2x60-AWS is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

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

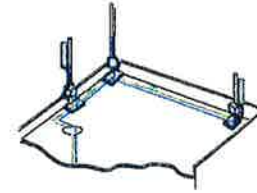




Macro



RRH for space-constrained cell sites



Distributed

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

- 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.

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

Dimensions and weights

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

Electrical Data

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

RF Characteristics

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

Connectivity

- Two CPRI optical ports for daisy chaining 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 20km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six external alarms
- Surge protection for all external ports (DC and RF)

Environmental specifications

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

Safety and Regulatory Data

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

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AT THE SPEED OF IDEAS™

Alcatel-Lucent 



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

Product Description

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

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

Features/Benefits

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



Figure 1: HYBRIFLEX Series

Technical Specifications

| | | | |
|---|--------------------------------|-------------------|---|
| Outer Conductor Armor | Corrugated Aluminum | [mm (in.)] | 46.5 (1.83) |
| Jacket | Polyethylene, PE | [mm (in.)] | 50.3 (1.98) |
| UV-Protection | Individual and External Jacket | | Yes |
| Weight, Approximate | | [kg/m (lb/ft)] | 1.9 (1.30) |
| Minimum Bending Radius, Single Bending | | [mm (in.)] | 200 (8) |
| Minimum Bending Radius, Repeated Bending | | [mm (in.)] | 500 (20) |
| Recommended/Maximum Clamp Spacing | | [m (ft)] | 1.0 / 1.2 (3.25 / 4.0) |
| DC-Resistance Outer Conductor Armor | | [Ω/km (Ω/1000ft)] | 068 (0.205) |
| DC-Resistance Power Cable, 8.4mm² (8AWG) | | [Ω/km (Ω/1000ft)] | 2.1 (0.307) |
| Version | | | Single-mode OM3 |
| Quantity, Fiber Count | | | 16 (8 pairs) |
| Core/Clad | | [μm] | 50/125 |
| Primary Coating (Acrylate) | | [μm] | 245 |
| Buffer Diameter, Nominal | | [μm] | 900 |
| Secondary Protection, Jacket, Nominal | | [mm (in.)] | 2.0 (0.08) |
| Minimum Bending Radius | | [mm (in.)] | 104 (4.1) |
| Insertion Loss @ wavelength 850nm | | dB/km | 3.0 |
| Insertion Loss @ wavelength 1310nm | | dB/km | 1.0 |
| Standards (Meets or exceeds) | | | UL94-V0, UL1666 RoHS Compliant |
| Size (Power) | | [mm (AWG)] | 8.4 (8) |
| Quantity, Wire Count (Power) | | | 16 (8 pairs) |
| Size (Alarm) | | [mm (AWG)] | 0.8 (18) |
| Quantity, Wire Count (Alarm) | | | 4 (2 pairs) |
| Type | | | UV protected |
| Strands | | | 19 |
| Primary Jacket Diameter, Nominal | | [mm (in.)] | 6.8 (0.27) |
| Standards (Meets or exceeds) | | | NFPA 130, ICEA S-95-658 UL Type XHHW-2, UL 44 UL-LS Limited Smoke, UL VW-1 IEEE-383 (1974), IEEE1202/FT4 RoHS Compliant |
| Installation Temperature | | [°C (°F)] | -40 to +65 (-40 to 149) |
| Operation Temperature | | [°C (°F)] | -40 to +65 (-40 to 149) |

* This data is provisional and subject to change

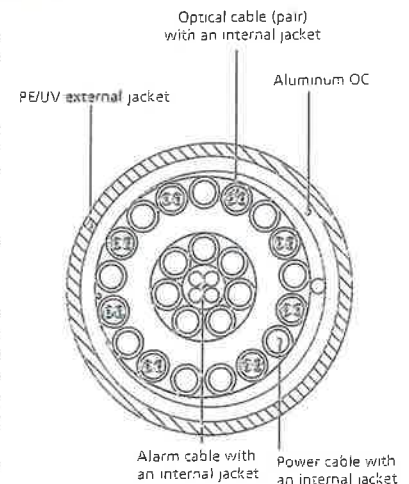


Figure 2: Construction Detail

All information contained in the present datasheet is subject to confirmation at time of ordering.

ATTACHMENT 2

ATTACHMENT 3

Date: **June 22, 2015**

Holly Haas
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277



Destek Engineering, LLC
1281 Kennestone Circle, Suite 100
Marietta, GA 30066
(770) 693-0835

Subject: Structural Analysis Report

Carrier Designation: **Verizon Wireless Co-Locate**
Carrier Site Name: Wolcott, CT

Crown Castle Designation: **Crown Castle BU Number:** 806362
Crown Castle Site Name: NHV 108 943133
Crown Castle JDE Job Number: 337921
Crown Castle Work Order Number: 1078045
Crown Castle Application Number: 300632 Rev. 6

Engineering Firm Designation: **Destek Engineering, LLC Project Number:** 1502266

Site Data: **INTERSECTION OF RTE 322/MERIDIAN RDWOLCOTT SITE,**
WOLCOTT, New Haven County, CT
Latitude 41° 33' 34.41", Longitude -72° 56' 49.1"
180 Foot - Self Support Tower

Dear Holly Haas,

Destek Engineering, LLC 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 798186, in accordance with application 300632, revision 6.

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

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

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code based upon a wind speed of 85 mph fastest mile.

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

We at Destek Engineering, LLC 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.

Structural analysis prepared by: Wade Baxter, EIT

Respectfully submitted by:

Ahmet Colakoglu, PE
President



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1) INTRODUCTION

This tower is a 180 ft Self Support tower designed by ROHN in September of 1986. The tower was originally designed for E.I.A. zone C with 1" radial ice. The tower has been modified per reinforcement drawings prepared by All-Points Technology Corp., P.C., August of 2002. Reinforcement consists of the addition of concrete caps to the existing foundations.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 38 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 |
|---------------------|----------------------------|--------------------|----------------------|-------------------------------|----------------------|---------------------|------|
| 177.0 | 177.0 | 3 | alcatel lucent | RRH2X60-AWS | 2 | 1-5/8 | - |
| | | 3 | alcatel lucent | RRH2X60-PCS | | | |
| | | 3 | alcatel lucent | RRH2x60-700 | | | |
| | | 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 |
|---------------------|----------------------------|--------------------|----------------------|-------------------------------|----------------------|---------------------|------|
| 180.0 | 188.0 | 3 | ericsson | AIR 21 | 18 | 1-5/8 | 1 |
| | | 6 | rfs celwave | ATMAA1412D-1A20 | | | |
| 177.0 | 177.0 | 3 | alcatel lucent | RRH2x40-AWS | - | - | 3 |
| | | 2 | andrew | DB846F65ZAXY w/ Mount Pipe | 12 | 1-5/8 | 1 |
| | | 3 | antel | BXA-171063/8CF | 1 | 1-1/4 | 3 |
| | | 1 | antel | BXA-185063/12CFx2 | | | |
| | | 3 | antel | BXA-70040/6CFx4 | | | |
| | | 2 | antel | LPA-80063/6CFx5 w/ Mount Pipe | - | - | 1 |
| | | 1 | crown mounts | Sector Mount [SM 502-3] | | | |
| | | 6 | rfs celwave | FD9R6004/2C-3L | | | |
| | | 2 | rfs/celwave | APX18-206516L-CT0 | | | |
| | | 1 | rfs/celwave | DB-T1-6Z-8AB-0Z | | | |
| | | 2 | swedcom | SC-E 6014 rev2 w/ Mount Pipe | | | 1 |
| 168.0 | 168.0 | 3 | argus technologies | LLPX310R w/ Mount Pipe | 3 1 | 5/16 1/2 | 1 |
| | | 3 | crown mounts | Pipe Mount [PM 601-3] | | | |
| | | 1 | dragonwave | A-ANT-18G-2-C | | | |

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note | | | |
|---------------------|----------------------------|--------------------|-------------------------------|---------------------------------------|----------------------|---------------------|------|---|-------|---|
| | | 3 | samsung telecommunications | FDD_R6_RRH | | | | | | |
| 158.0 | 160.0 | 6 | adc | DUAL BAND 800/1900 FULL BAND MASTHEAD | 12 1 2 | 1-1/4 3/8 3/4 | 1 | | | |
| | | 2 | andrew | SBNH-1D6565C w/ Mount Pipe | | | | | | |
| | | 3 | communication components inc. | DTMABP7819VG12A | | | | | | |
| | | 3 | ericsson | RRU-12 | | | | | | |
| | | 3 | ericsson | RRUS-11 | | | | | | |
| | | 4 | kmw communications | AM-X-CD-16-65-00T-RET w/ Mount Pipe | | | | | | |
| | | 3 | powerwave technologies | 7020.00 | | | | | | |
| | | 3 | powerwave technologies | 7770.00 w/ Mount Pipe | | | | | | |
| | | 6 | powerwave technologies | LGP13519 | | | | | | |
| | | 1 | raycap | DC6-48-60-18-8F | | | | | | |
| 158.0 | 1 | crown mounts | Sector Mount [SM 502-3] | | | | | | | |
| 148.0 | 148.0 | 3 | rfs celwave | APXV18-206517S-C w/ Mount Pipe | | | | 6 | 1-5/8 | 1 |
| 40.0 | 40.0 | 1 | crown mounts | Side Arm Mount [SO 201-1] | | | | 1 | 1/2 | 1 |
| | | 1 | gps | GPS_A | | | | | | |

- Notes:
 1) Existing Equipment
 2) Reserved Equipment
 3) Equipment to be Removed

Table 3 - Design Antenna and Cable Information

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) |
|---------------------|----------------------------|--------------------|----------------------|---------------|----------------------|---------------------|
| 180 | 180 | 4 | RFS | PD10017 | - | - |
| 170 | 170 | 3 | RFS | PD1132D | - | - |
| 160 | 160 | 2 | - | 6' STD Dish | - | - |

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

| Document | Remarks | Reference | Source |
|--|-----------------------|-----------|---------|
| 4-GEOTECHNICAL REPORTS | FDH Engineering, Inc. | 2303630 | CCSITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | Rohn | 217670 | CCSITES |

| Document | Remarks | Reference | Source |
|--|-----------------------------|-----------|----------|
| 4-TOWER MANUFACTURER DRAWINGS | Rohn | 529684 | CCISITES |
| 4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA | All Points Technology Corp. | 903539 | 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) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) The analysis was performed for the main tower members and their connections. It does not include an evaluation of the antenna mounts and their connections.

This analysis may be affected if any assumptions are not valid or have been made in error. Destek Engineering, LLC should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P _{allow} (K) | % Capacity | Pass / Fail |
|-------------|----------------|----------------|----------------|------------------|---------|---------------------------|------------------|-------------|
| T1 | 180 - 160 | Leg | ROHN 2.5 STD | 2 | -15.11 | 41.14 | 36.7 | Pass |
| T2 | 160 - 140 | Leg | ROHN 3 X-STR | 41 | -48.17 | 83.78 | 57.5 | Pass |
| T3 | 140 - 120 | Leg | ROHN 4 X-STR | 80 | -79.49 | 139.07 | 57.2 | Pass |
| T4 | 120 - 100 | Leg | ROHN 5 X-STR | 119 | -102.93 | 177.42 | 58.0 | Pass |
| T5 | 100 - 80 | Leg | ROHN 5 X-STR | 146 | -127.67 | 177.35 | 72.0 | Pass |
| T6 | 80 - 60 | Leg | ROHN 6 EHS | 173 | -150.24 | 212.13 | 70.8 | Pass |
| T7 | 60 - 40 | Leg | ROHN 6 X-STR | 200 | -172.64 | 264.22 | 65.3 | Pass |
| T8 | 40 - 20 | Leg | ROHN 6 X-STR | 227 | -194.01 | 264.19 | 73.4 | Pass |
| T9 | 20 - 0 | Leg | ROHN 8 EHS | 254 | -204.00 | 332.47 | 61.4 | Pass |
| T1 | 180 - 160 | Diagonal | ROHN 2 STD | 9 | -6.90 | 15.54 | 44.4 | Pass |
| T2 | 160 - 140 | Diagonal | ROHN 2 STD | 45 | -8.47 | 13.38 | 63.3 | Pass |
| T3 | 140 - 120 | Diagonal | ROHN 2 STD | 84 | -8.13 | 11.51 | 70.6 | Pass |
| T4 | 120 - 100 | Diagonal | ROHN 2.5 STD | 123 | -9.78 | 14.43 | 67.8 | Pass |
| T5 | 100 - 80 | Diagonal | ROHN 2.5 STD | 150 | -8.83 | 12.60 | 70.1 | Pass |
| T6 | 80 - 60 | Diagonal | ROHN 2.5 STD | 177 | -9.24 | 11.15 | 82.9 | Pass |
| T7 | 60 - 40 | Diagonal | ROHN 2.5 X-STR | 204 | -9.50 | 12.30 | 77.2 | Pass |
| T8 | 40 - 20 | Diagonal | ROHN 3 STD | 230 | -9.30 | 16.86 | 55.2 | Pass |
| T9 | 20 - 0 | Diagonal | ROHN 3 STD | 260 | -14.42 | 28.18 | 51.2 56.0 (b) | Pass |
| T1 | 180 - 160 | Horizontal | ROHN 1.5 STD | 7 | -3.71 | 20.29 | 18.3 | Pass |

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail | |
|-------------|----------------|-----------------------------|-------------------|------------------|-------|----------------|----------------------------|-------------|------|
| | | | | | | | 21.6 (b) | | |
| T2 | 160 - 140 | Horizontal | ROHN 1.5 STD | 43 | -5.25 | 17.38 | 30.2 30.6 (b) | Pass | |
| T3 | 140 - 120 | Horizontal | ROHN 2 STD | 82 | -5.57 | 24.65 | 22.6 32.4 (b) | Pass | |
| T4 | 120 - 100 | Horizontal | ROHN 2 STD | 121 | -5.83 | 20.43 | 28.5 33.9 (b) | Pass | |
| T5 | 100 - 80 | Horizontal | ROHN 2 STD | 148 | -5.78 | 14.77 | 39.1 | Pass | |
| T6 | 80 - 60 | Horizontal | ROHN 2.5 STD | 175 | -6.43 | 25.42 | 25.3 37.4 (b) | Pass | |
| T7 | 60 - 40 | Horizontal | ROHN 2.5 STD | 202 | -6.89 | 19.66 | 35.0 40.5 (b) | Pass | |
| T8 | 40 - 20 | Horizontal | ROHN 2.5 STD | 229 | -6.99 | 15.57 | 44.9 | Pass | |
| T9 | 20 - 0 | Horizontal | ROHN 3 STD | 256 | -7.85 | 27.51 | 28.5 45.7 (b) | Pass | |
| T1 | 180 - 160 | Top Girt | ROHN 1.5 STD | 4 | -1.70 | 20.34 | 8.4 | Pass | |
| T9 | 20 - 0 | Redund Horz 1 Bracing | ROHN TS1.5x11 ga | 261 | -3.54 | 4.90 | 72.3 | Pass | |
| T9 | 20 - 0 | Redund Diag 1 Bracing | ROHN 1.5 STD | 262 | -3.23 | 3.58 | 90.4 | Pass | |
| T9 | 20 - 0 | Redund Hip 1 Bracing | ROHN TS1.5x11 ga | 281 | -0.04 | 4.35 | 1.0 | Pass | |
| T9 | 20 - 0 | Redund Hip Diagonal Bracing | ROHN 2.5 STD | 282 | -0.05 | 6.98 | 0.7 | Pass | |
| T1 | 180 - 160 | Inner Bracing | L2x2x1/8 | 37 | -0.03 | 5.86 | 0.5 | Pass | |
| T2 | 160 - 140 | Inner Bracing | L2x2x1/8 | 52 | -0.01 | 4.29 | 0.3 | Pass | |
| T3 | 140 - 120 | Inner Bracing | L2x2x1/8 | 91 | -0.01 | 2.93 | 0.4 | Pass | |
| T4 | 120 - 100 | Inner Bracing | L2x2x1/8 | 132 | -0.01 | 2.21 | 0.4 | Pass | |
| T5 | 100 - 80 | Inner Bracing | L2 1/2x2 1/2x3/16 | 158 | -0.01 | 3.47 | 0.5 | Pass | |
| T6 | 80 - 60 | Inner Bracing | L3x3x3/16 | 184 | -0.01 | 4.55 | 0.5 | Pass | |
| T7 | 60 - 40 | Inner Bracing | L3 1/2x3 1/2x1/4 | 212 | -0.01 | 7.45 | 0.5 | Pass | |
| T8 | 40 - 20 | Inner Bracing | L3 1/2x3 1/2x1/4 | 238 | -0.01 | 5.93 | 0.5 | Pass | |
| T9 | 20 - 0 | Inner Bracing | ROHN 3 STD | 283 | -0.01 | 19.74 | 0.4 | Pass | |
| | | | | | | | Summary | | |
| | | | | | | | Leg (T8) | 73.4 | Pass |
| | | | | | | | Diagonal (T6) | 82.9 | Pass |
| | | | | | | | Horizontal (T9) | 45.7 | Pass |
| | | | | | | | Top Girt (T1) | 8.4 | Pass |
| | | | | | | | Redund Horz 1 Bracing (T9) | 72.3 | Pass |
| | | | | | | | Redund Diag 1 Bracing (T9) | 90.4 | Pass |
| | | | | | | | Redund Hip 1 Bracing (T9) | 1.0 | Pass |
| | | | | | | | Redund Hip Diagonal | 0.7 | Pass |

| Section No. | Elevation (ft) | Component Type | Size | Critical Element | P (K) | SF*P_allow (K) | % Capacity | Pass / Fail |
|-------------|----------------|----------------|------|------------------|-------|--------------------|------------|-------------|
| | | | | | | Bracing (T9) | | |
| | | | | | | Inner Bracing (T8) | 0.5 | Pass |
| | | | | | | Bolt Checks | 56.0 | Pass |
| | | | | | | Rating = | 90.4 | Pass |

Table 6 - Tower Component Stresses vs. Capacity – LC7

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|----------------------------------|----------------|------------|-------------|
| - | Anchor Rods | 0 | 51.0 | Pass |
| 1 | Base Foundation Soil Interaction | 0 | 59.7 | Pass |
| 1 | Base Foundation | 0 | 30.7 | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 90.4% |
|---|--------------|

Notes:

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

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

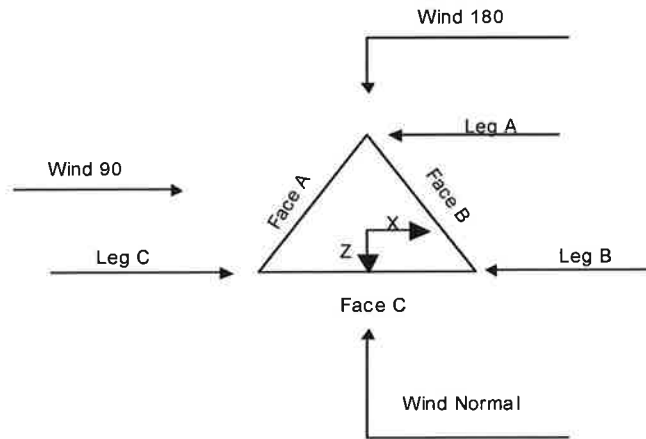
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 180.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 8.50 ft at the top and 27.68 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

- 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) Temperature drop of 50 °F.
- 10) Deflections calculated using a wind speed of 50 mph.
- 11) A non-linear (P-delta) analysis was used.
- 12) Pressures are calculated at each section.
- 13) Stress ratio used in tower member design is 1.333.
- 14) 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 | |



Triangular Tower

Tower Section Geometry

| Tower Section | Tower Elevation | Assembly Database | Description | Section Width | Number of Sections | Section Length |
|---------------|-----------------|-------------------|-------------|---------------|--------------------|----------------|
| | ft | | | ft | | ft |
| T1 | 180.00-160.00 | | | 8.50 | 1 | 20.00 |
| T2 | 160.00-140.00 | | | 8.54 | 1 | 20.00 |
| T3 | 140.00-120.00 | | | 10.63 | 1 | 20.00 |
| T4 | 120.00-100.00 | | | 12.71 | 1 | 20.00 |
| T5 | 100.00-80.00 | | | 14.96 | 1 | 20.00 |
| T6 | 80.00-60.00 | | | 17.54 | 1 | 20.00 |
| T7 | 60.00-40.00 | | | 20.04 | 1 | 20.00 |
| T8 | 40.00-20.00 | | | 22.54 | 1 | 20.00 |
| T9 | 20.00-0.00 | | | 25.18 | 1 | 20.00 |

Tower Section Geometry (cont'd)

| Tower Section | Tower Elevation | Diagonal Spacing | Bracing Type | Has K Brace End Panels | Has Horizontals | Top Girt Offset | Bottom Girt Offset |
|---------------|-----------------|------------------|--------------|------------------------|-----------------|-----------------|--------------------|
| | ft | ft | | | | in | in |
| T1 | 180.00-160.00 | 6.67 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T2 | 160.00-140.00 | 6.67 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T3 | 140.00-120.00 | 6.67 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T4 | 120.00-100.00 | 10.00 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T5 | 100.00-80.00 | 10.00 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T6 | 80.00-60.00 | 10.00 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T7 | 60.00-40.00 | 10.00 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T8 | 40.00-20.00 | 10.00 | K Brace Down | No | Yes | 0.0000 | 0.0000 |
| T9 | 20.00-0.00 | 20.00 | K1 Down | No | Yes | 0.0000 | 0.0000 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg Type | Leg Size | Leg Grade | Diagonal Type | Diagonal Size | Diagonal Grade |
|-----------------------|----------|--------------|---------------------|---------------|----------------|---------------------|
| T1 180.00-160.00 | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) | Pipe | ROHN 2 STD | A572-50 (50 ksi) |
| T2 160.00-140.00 | Pipe | ROHN 3 X-STR | A572-50 (50 ksi) | Pipe | ROHN 2 STD | A572-50 (50 ksi) |
| T3 140.00-120.00 | Pipe | ROHN 4 X-STR | A572-50 (50 ksi) | Pipe | ROHN 2 STD | A572-50 (50 ksi) |
| T4 120.00-100.00 | Pipe | ROHN 5 X-STR | A572-50 (50 ksi) | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) |
| T5 100.00-80.00 | Pipe | ROHN 5 X-STR | A572-50 (50 ksi) | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) |
| T6 80.00-60.00 | Pipe | ROHN 6 EHS | A572-50 (50 ksi) | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) |
| T7 60.00-40.00 | Pipe | ROHN 6 X-STR | A572-50 (50 ksi) | Pipe | ROHN 2.5 X-STR | A572-50 (50 ksi) |
| T8 40.00-20.00 | Pipe | ROHN 6 X-STR | A572-50 (50 ksi) | Pipe | ROHN 3 STD | A572-50 (50 ksi) |
| T9 20.00-0.00 | Pipe | ROHN 8 EHS | A572-50 (50 ksi) | Pipe | ROHN 3 STD | A572-50 (50 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation ft | No. of Mid Girts | Mid Girt Type | Mid Girt Size | Mid Girt Grade | Horizontal Type | Horizontal Size | Horizontal Grade |
|-----------------------|------------------|---------------|---------------|-----------------|-----------------|-----------------|---------------------|
| T1 180.00-160.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 1.5 STD | A572-50 (50 ksi) |
| T2 160.00-140.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 1.5 STD | A572-50 (50 ksi) |
| T3 140.00-120.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 2 STD | A572-50 (50 ksi) |
| T4 120.00-100.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 2 STD | A572-50 (50 ksi) |
| T5 100.00-80.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 2 STD | A572-50 (50 ksi) |
| T6 80.00-60.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) |
| T7 60.00-40.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) |
| T8 40.00-20.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 2.5 STD | A572-50 (50 ksi) |
| T9 20.00-0.00 | None | Flat Bar | | A36 (36 ksi) | Pipe | ROHN 3 STD | A572-50 (50 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Secondary Horizontal Type | Secondary Horizontal Size | Secondary Horizontal Grade | Inner Bracing Type | Inner Bracing Size | Inner Bracing Grade |
|-----------------------|---------------------------|---------------------------|----------------------------|--------------------|--------------------|---------------------|
| T1 180.00-160.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L2x2x1/8 | A36 (36 ksi) |
| T2 160.00-140.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L2x2x1/8 | A36 (36 ksi) |
| T3 140.00-120.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L2x2x1/8 | A36 (36 ksi) |
| T4 120.00-100.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L2x2x1/8 | A36 (36 ksi) |

| Tower Elevation | Secondary Horizontal Type | Secondary Horizontal Size | Secondary Horizontal Grade | Inner Bracing Type | Inner Bracing Size | Inner Bracing Grade |
|-----------------|---------------------------|---------------------------|----------------------------|--------------------|--------------------|---------------------|
| ft | | | | | | |
| T5 100.00-80.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L2 1/2x2 1/2x3/16 | A36 (36 ksi) |
| T6 80.00-60.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L3x3x3/16 | A36 (36 ksi) |
| T7 60.00-40.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L3 1/2x3 1/2x1/4 | A36 (36 ksi) |
| T8 40.00-20.00 | Solid Round | | A572-50 (50 ksi) | Equal Angle | L3 1/2x3 1/2x1/4 | A36 (36 ksi) |
| T9 20.00-0.00 | Solid Round | | A572-50 (50 ksi) | Pipe | ROHN 3 STD | A572-50 (50 ksi) |

Tower Section Geometry (cont'd)

| Tower Elevation | Redundant Bracing Grade | Redundant Type | Redundant Size | K Factor |
|-----------------|-------------------------|----------------|-----------------------|----------|
| ft | | | | |
| T9 20.00-0.00 | A572-50 (50 ksi) | Horizontal (1) | Pipe ROHN TS1.5x11 ga | 1 |
| | | Diagonal (1) | Pipe ROHN 1.5 STD | 1 |
| | | Hip (1) | Pipe ROHN TS1.5x11 ga | 1 |
| | | Hip Diagonal | ROHN 2.5 STD | 1 |

Tower Section Geometry (cont'd)

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjust. Factor A _r | Adjust. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontals |
|------------------|------------------------|------------------|--------------|-------------------------------|-------------------------------|--------------|--|--|
| ft | | | | | | | | |
| T1 180.00-160.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T2 160.00-140.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T3 140.00-120.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T4 120.00-100.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T5 100.00-80.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T6 80.00-60.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T7 60.00-40.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T8 40.00-20.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |
| T9 20.00-0.00 | 0.00 | 0.0000 | A36 (36 ksi) | 1.03 | 1 | 1.05 | 36.0000 | 36.0000 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Calc K Single Angles | Calc K Solid Rounds | Legs | K Factors ¹ | | | | | | | |
|-----------------------|-------------------------|------------------------|------|----------------------------|----------------------------|---------------------------|-----------------|------------------|--------------------------|--------------------------|---|
| | | | | X Brace Diags X Y | K Brace Diags X Y | Single Diags X Y | Girts X Y | Horiz. X Y | Sec. Horiz. X Y | Inner Brace X Y | |
| | | | | | | | | | | | |
| T1 180.00-160.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T2 160.00-140.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T3 140.00-120.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T4 120.00-100.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T5 100.00-80.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T6 80.00-60.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T7 60.00-40.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T8 40.00-20.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| T9 20.00-0.00 | Yes | Yes | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

¹Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|-----------------------|---------------------------|---|---------------------------|---|---------------------------|------|---------------------------|------|---------------------------|------|---------------------------|---|---------------------------|------|
| | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U | Net Width Deduct in | U |
| T1 180.00-160.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T2 160.00-140.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T3 140.00-120.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T4 120.00-100.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T5 100.00-80.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T6 80.00-60.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T7 60.00-40.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T8 40.00-20.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |
| T9 20.00-0.00 | 0.0000 | 1 | 0.0000 | 1 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 0.75 | 0.0000 | 1 | 0.0000 | 0.75 |

Tower Section Geometry (cont'd)

| Tower Elevation ft | Leg Connection Type | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|-----------------------|---------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|------------------|-----|
| | | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. |
| T1 180.00-160.00 | Flange | 0.7500 A325N | 4 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |

| Tower Elevation ft | Leg Connection Type | Leg | | Diagonal | | Top Girt | | Bottom Girt | | Mid Girt | | Long Horizontal | | Short Horizontal | |
|--------------------|---------------------|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|-----------------|-----|------------------|-----|
| | | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. | Bolt Size in | No. |
| T2 160.00-140.00 | Flange | 0.8750 A325N | 4 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T3 140.00-120.00 | Flange | 1.0000 A325N | 4 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T4 120.00-100.00 | Flange | 1.0000 A325N | 4 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T5 100.00-80.00 | Flange | 1.0000 A325N | 6 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T6 80.00-60.00 | Flange | 1.0000 A325N | 6 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T7 60.00-40.00 | Flange | 1.0000 A325N | 6 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T8 40.00-20.00 | Flange | 1.0000 A325N | 8 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |
| T9 20.00-0.00 | Flange | 1.0000 A449 | 8 | 0.6250 A325N | 3 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 0 | 0.6250 A325N | 2 | 0.6250 A325N | 0 |

Feed Line/Linear Appurtenances - Entered As Round Or Flat

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # | # Per Row | Clear Spacing in | Width or Diameter in | Perimeter in | Weight plf |
|-----------------------------------|-------------|--------------|----------------|-----------------|----------------|--------------------------|----|-----------|------------------|----------------------|--------------|------------|
| LCF158-50A(1-5/8") | C | Yes | Ar (CfAe) | 158.00 - 0.00 | -1.0000 | -0.44 | 30 | 15 | 0.5000 | 1.9800 | | 0.80 |
| LCF158-50A(1-5/8") *** | C | Yes | Ar (CfAe) | 180.00 - 158.00 | -1.5000 | -0.44 | 18 | 12 | 0.5000 | 1.9800 | | 0.80 |
| 561(1-5/8") | A | Yes | Ar (CfAe) | 177.00 - 0.00 | 1.0000 | -0.35 | 12 | 2 | 0.5000 | 1.6250 | | 1.35 |
| 561(1-5/8") | A | Yes | Ar (CfAe) | 177.00 - 0.00 | 0.0000 | -0.36 | 2 | 2 | 0.5000 | 1.6250 | | 1.35 |
| HB114-21U3M12-XXXF(1-1/4") *** | A | Yes | Ar (CfAe) | 177.00 - 0.00 | 0.0000 | -0.38 | 1 | 1 | 1.5400 | 1.5400 | | 1.22 |
| 7983A(1/2") | A | Yes | Ar (CfAe) | 168.00 - 0.00 | 0.0000 | 0.45 | 1 | 1 | 0.5000 | 0.0000 | | 0.08 |
| 9207(5/16") | A | Yes | Ar (CfAe) | 168.00 - 0.00 | 0.0000 | 0.48 | 3 | 3 | 0.3300 | 0.0000 | | 0.60 |
| 2" Rigid Conduit *** | A | Yes | Ar (CfAe) | 168.00 - 0.00 | 0.0000 | 0.48 | 2 | 2 | 1.0000 | 2.0000 | | 2.80 |
| FB-L98B-002-75000(3/8") | C | Yes | Ar (CfAe) | 158.00 - 0.00 | 0.0000 | -0.4 | 1 | 1 | 0.3937 | 0.0000 | | 0.06 |
| WR-VG86ST-BRD(3/4) | C | Yes | Ar (CfAe) | 158.00 - 0.00 | 0.0000 | -0.4 | 2 | 2 | 0.5000 | 0.0000 | | 0.58 |
| 2" Rigid Conduit *** | C | Yes | Ar (CfAe) | 158.00 - 0.00 | 0.0000 | -0.4 | 1 | 1 | 2.0000 | 2.0000 | | 2.80 |
| LCF158-50JL(1-5/8") *** | A | Yes | Ar (CfAe) | 148.00 - 0.00 | 0.0000 | 0.4 | 6 | 3 | 0.5000 | 1.9800 | | 0.52 |
| LDF4-50A(1/2") *** | A | Yes | Ar (CfAe) | 40.00 - 0.00 | 0.0000 | -0.45 | 1 | 1 | 0.5000 | 0.6300 | | 0.15 |
| Feedline Ladder (Af) 1.5" | A | Yes | Af (CfAe) | 177.00 - 0.00 | 0.0000 | -0.4 | 1 | 1 | 1.5000 | 1.5000 | 6.0000 | 4.20 |
| Feedline Ladder (Af) 1.5" | A | Yes | Af (CfAe) | 168.00 - 0.00 | 0.0000 | 0.4 | 1 | 1 | 1.5000 | 1.5000 | 6.0000 | 4.20 |
| T-Brackets Feedline Ladder (Af) | A | Yes | Af (CfAe) | 177.00 - 0.00 | 0.0000 | -0.35 | 1 | 1 | 1.0000 | 1.0000 | 4.0000 | 8.40 |
| | C | Yes | Af (CfAe) | 180.00 - 0.00 | -2.0000 | -0.4 | 2 | 1 | 3.0000 | 3.0000 | 12.0000 | 8.40 |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Face Offset in | Lateral Offset (Frac FW) | # Per Row | # Row | Clear Spacing in | Width or Diameter in | Perimeter in | Weight plf |
|--------------------|-------------|--------------|----------------|-----------------|-------------------|-----------------------------|--------------|----------|---------------------|-------------------------|-----------------|---------------|
| *** | | | | | | | | | | | | |
| Safety Line 3/8 | C | Yes | Ar (CfAe) | 180.00 - 0.00 | 0.0000 | 0.5 | 1 | 1 | 0.3750 | 0.3750 | | 0.22 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section | Tower Elevation ft | Face | A _R ft ² | A _F ft ² | C _{AA} In Face ft ² | C _{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
| T1 | 180.00-160.00 | A | 14.057 | 4.542 | 0.000 | 0.000 | 0.65 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 40.225 | 5.000 | 0.000 | 0.000 | 0.63 |
| T2 | 160.00-140.00 | A | 24.027 | 6.667 | 0.000 | 0.000 | 0.91 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 52.135 | 5.000 | 0.000 | 0.000 | 0.87 |
| T3 | 140.00-120.00 | A | 29.967 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |
| T4 | 120.00-100.00 | A | 29.967 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |
| T5 | 100.00-80.00 | A | 29.967 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |
| T6 | 80.00-60.00 | A | 29.967 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |
| T7 | 60.00-40.00 | A | 29.967 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |
| T8 | 40.00-20.00 | A | 31.017 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |
| T9 | 20.00-0.00 | A | 31.017 | 6.667 | 0.000 | 0.000 | 0.95 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | 53.458 | 5.000 | 0.000 | 0.000 | 0.90 |

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} In Face ft ² | C _{AA} Out Face ft ² | Weight K |
|---------------|-----------------------|-------------|---------------------|-----------------------------------|-----------------------------------|---|--|-------------|
| T1 | 180.00-160.00 | A | 0.913 | 19.532 | 17.263 | 0.000 | 0.000 | 1.32 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 10.012 | 52.496 | 0.000 | 0.000 | 1.65 |
| T2 | 160.00-140.00 | A | 0.899 | 31.825 | 29.153 | 0.000 | 0.000 | 1.92 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 21.016 | 64.375 | 0.000 | 0.000 | 2.31 |
| T3 | 140.00-120.00 | A | 0.884 | 35.246 | 34.011 | 0.000 | 0.000 | 2.09 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 21.994 | 65.665 | 0.000 | 0.000 | 2.37 |
| T4 | 120.00-100.00 | A | 0.867 | 34.837 | 33.894 | 0.000 | 0.000 | 2.07 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 21.701 | 65.626 | 0.000 | 0.000 | 2.35 |
| T5 | 100.00-80.00 | A | 0.846 | 34.356 | 33.756 | 0.000 | 0.000 | 2.05 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 21.358 | 65.580 | 0.000 | 0.000 | 2.32 |
| T6 | 80.00-60.00 | A | 0.821 | 33.769 | 33.589 | 0.000 | 0.000 | 2.02 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 20.939 | 65.524 | 0.000 | 0.000 | 2.29 |
| T7 | 60.00-40.00 | A | 0.788 | 33.011 | 33.372 | 0.000 | 0.000 | 1.98 |

| Tower Section | Tower Elevation ft | Face or Leg | Ice Thickness in | A _R ft ² | A _F ft ² | C _A A _A In Face ft ² | C _A A _A Out Face ft ² | Weight K |
|---------------|--------------------|-------------|------------------|--------------------------------|--------------------------------|---|--|----------|
| T8 | 40.00-20.00 | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 20.397 | 65.452 | 0.000 | 0.000 | 2.25 |
| | | A | 0.750 | 35.667 | 33.117 | 0.000 | 0.000 | 1.96 |
| T9 | 20.00-0.00 | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 19.758 | 65.367 | 0.000 | 0.000 | 2.21 |
| | | A | 0.750 | 35.667 | 33.117 | 0.000 | 0.000 | 1.96 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.00 |
| | | C | | 19.758 | 65.367 | 0.000 | 0.000 | 2.21 |

Feed Line Shielding

| Section | Elevation ft | Face | A _R ft ² | A _R Ice ft ² | A _F ft ² | A _F Ice ft ² |
|---------|---------------|------|--------------------------------|------------------------------------|--------------------------------|------------------------------------|
| T1 | 180.00-160.00 | A | 1.466 | 5.607 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.566 | 9.150 | 0.000 | 0.000 |
| T2 | 160.00-140.00 | A | 2.257 | 8.557 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 4.202 | 11.555 | 0.000 | 0.000 |
| T3 | 140.00-120.00 | A | 2.714 | 9.333 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 4.331 | 11.457 | 0.000 | 0.000 |
| T4 | 120.00-100.00 | A | 2.228 | 7.162 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.556 | 8.829 | 0.000 | 0.000 |
| T5 | 100.00-80.00 | A | 2.086 | 6.589 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.328 | 8.163 | 0.000 | 0.000 |
| T6 | 80.00-60.00 | A | 2.138 | 6.427 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.412 | 8.011 | 0.000 | 0.000 |
| T7 | 60.00-40.00 | A | 2.066 | 6.027 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.297 | 7.574 | 0.000 | 0.000 |
| T8 | 40.00-20.00 | A | 2.321 | 6.433 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.601 | 7.757 | 0.000 | 0.000 |
| T9 | 20.00-0.00 | A | 2.354 | 7.028 | 0.000 | 0.000 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 |
| | | C | 3.652 | 8.475 | 0.000 | 0.000 |

Feed Line Center of Pressure

| Section | Elevation ft | CP _x in | CP _z in | CP _x Ice in | CP _z Ice in |
|---------|---------------|--------------------|--------------------|------------------------|------------------------|
| T1 | 180.00-160.00 | 9.0710 | 9.5919 | 5.6690 | 6.6552 |
| T2 | 160.00-140.00 | 10.6574 | 8.0263 | 7.8208 | 6.4855 |
| T3 | 140.00-120.00 | 11.3182 | 6.7260 | 8.7659 | 6.4218 |
| T4 | 120.00-100.00 | 12.9068 | 7.7014 | 10.4701 | 7.6150 |
| T5 | 100.00-80.00 | 14.8655 | 8.8989 | 12.1252 | 8.7821 |
| T6 | 80.00-60.00 | 15.6336 | 9.3819 | 13.1605 | 9.4886 |
| T7 | 60.00-40.00 | 17.2897 | 10.3950 | 14.7271 | 10.5423 |
| T8 | 40.00-20.00 | 17.4253 | 11.1081 | 14.4007 | 11.7803 |
| T9 | 20.00-0.00 | 17.5571 | 11.2042 | 14.5557 | 11.9285 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | CA _{AA} Front ft ² | CA _{AA} Side ft ² | Weight K | |
|--|-------------------|----------------|---|--------------------------------|---------------------|--|---|-----------------|------|
| Lightning Rod | C | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 0.25 | 0.25 | 0.03 |
| | | | 0.00 | | | 1/2" | 0.66 | 0.66 | 0.03 |
| | | | 2.00 | | | Ice | 0.97 | 0.97 | 0.04 |
| | | | | | | 1" Ice | 1.49 | 1.49 | 0.06 |
| | | | | | | 2" Ice | 2.68 | 2.68 | 0.14 |
| | | | | | | | | | |
| **** 8'x2 1/2" Pipe Mount | B | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 2.30 | 2.30 | 0.04 |
| | | | 0.00 | | | 1/2" | 3.13 | 3.13 | 0.06 |
| | | | 4.00 | | | Ice | 3.62 | 3.62 | 0.08 |
| | | | | | | 1" Ice | 4.62 | 4.62 | 0.14 |
| | | | | | | 2" Ice | 6.73 | 6.73 | 0.33 |
| | | | | | | | | | |
| (3) AIR 21 w/ Mount Pipe | B | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 6.77 | 5.70 | 0.11 |
| | | | 0.00 | | | 1/2" | 7.29 | 6.55 | 0.17 |
| | | | 8.00 | | | Ice | 7.81 | 7.33 | 0.23 |
| | | | | | | 1" Ice | 8.87 | 8.94 | 0.38 |
| | | | | | | 2" Ice | 11.12 | 12.37 | 0.81 |
| | | | | | | | | | |
| (6) ATMAA1412D-1A20 | B | From Leg | 0.00 | 0.0000 | 180.00 | No Ice | 1.17 | 0.47 | 0.01 |
| | | | 0.00 | | | 1/2" | 1.31 | 0.57 | 0.02 |
| | | | 8.00 | | | Ice | 1.47 | 0.69 | 0.03 |
| | | | | | | 1" Ice | 1.81 | 0.95 | 0.06 |
| | | | | | | 2" Ice | 2.58 | 1.57 | 0.14 |
| | | | | | | | | | |
| *** (2) DB846F65ZAXY w/ Mount Pipe | A | From Leg | 4.00 | 0.0000 | 177.00 | No Ice | 7.27 | 7.82 | 0.05 |
| | | | 0.00 | | | 1/2" | 7.88 | 9.01 | 0.11 |
| | | | 0.00 | | | Ice | 8.48 | 9.91 | 0.19 |
| | | | | | | 1" Ice | 9.72 | 11.81 | 0.37 |
| | | | | | | 2" Ice | 12.33 | 15.98 | 0.87 |
| | | | | | | | | | |
| (2) LPA-80063/6CFx5 w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 177.00 | No Ice | 10.55 | 10.65 | 0.05 |
| | | | 0.00 | | | 1/2" | 11.21 | 11.91 | 0.14 |
| | | | 0.00 | | | Ice | 11.84 | 12.88 | 0.25 |
| | | | | | | 1" Ice | 13.13 | 14.89 | 0.48 |
| | | | | | | 2" Ice | 15.83 | 19.13 | 1.09 |
| | | | | | | | | | |
| (2) SC-E 6014 rev2 w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 177.00 | No Ice | 3.78 | 4.40 | 0.03 |
| | | | 0.00 | | | 1/2" | 4.18 | 5.01 | 0.07 |
| | | | 0.00 | | | Ice | 4.59 | 5.64 | 0.12 |
| | | | | | | 1" Ice | 5.44 | 6.96 | 0.22 |
| | | | | | | 2" Ice | 7.29 | 9.90 | 0.54 |
| | | | | | | | | | |
| (2) DB-T1-6Z-8AB-0Z | C | From Leg | 4.00 | 0.0000 | 177.00 | 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 |
| | | | | | | | | | |
| (2) SBNHH-1D65B w/ Mount Pipe | A | From Leg | 4.00 | 0.0000 | 177.00 | No Ice | 8.57 | 7.00 | 0.07 |
| | | | 0.00 | | | 1/2" | 9.22 | 8.19 | 0.13 |
| | | | 0.00 | | | Ice | 9.84 | 9.08 | 0.21 |
| | | | | | | 1" Ice | 11.10 | 10.90 | 0.39 |
| | | | | | | 2" Ice | 13.75 | 14.93 | 0.90 |
| | | | | | | | | | |
| (2) SBNHH-1D65B w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 177.00 | No Ice | 8.57 | 7.00 | 0.07 |
| | | | 0.00 | | | 1/2" | 9.22 | 8.19 | 0.13 |
| | | | 0.00 | | | Ice | 9.84 | 9.08 | 0.21 |
| | | | | | | 1" Ice | 11.10 | 10.90 | 0.39 |
| | | | | | | 2" Ice | 13.75 | 14.93 | 0.90 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment | Placement ft | | CA _A Front ft ² | CA _A Side ft ² | Weight K |
|-------------------------------|-------------|-------------|--|--------------------|-----------------|----------|--|---|-------------|
| (2) SBNHH-1D65B w/ Mount Pipe | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 8.57 | 7.00 | 0.07 |
| | | | | | | 1/2" Ice | 9.22 | 8.19 | 0.13 |
| | | | | | | Ice | 9.84 | 9.08 | 0.21 |
| | | | | | | 1" Ice | 11.10 | 10.90 | 0.39 |
| | | | | | | 2" Ice | 13.75 | 14.93 | 0.90 |
| HBXX-6517DS-A2M w/ Mount Pipe | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 8.98 | 6.96 | 0.07 |
| | | | | | | 1/2" Ice | 9.65 | 8.18 | 0.14 |
| | | | | | | Ice | 10.29 | 9.14 | 0.21 |
| | | | | | | 1" Ice | 11.59 | 11.02 | 0.40 |
| | | | | | | 2" Ice | 14.32 | 15.03 | 0.91 |
| HBXX-6517DS-A2M w/ Mount Pipe | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 8.98 | 6.96 | 0.07 |
| | | | | | | 1/2" Ice | 9.65 | 8.18 | 0.14 |
| | | | | | | Ice | 10.29 | 9.14 | 0.21 |
| | | | | | | 1" Ice | 11.59 | 11.02 | 0.40 |
| | | | | | | 2" Ice | 14.32 | 15.03 | 0.91 |
| HBXX-6517DS-A2M w/ Mount Pipe | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 8.98 | 6.96 | 0.07 |
| | | | | | | 1/2" Ice | 9.65 | 8.18 | 0.14 |
| | | | | | | Ice | 10.29 | 9.14 | 0.21 |
| | | | | | | 1" Ice | 11.59 | 11.02 | 0.40 |
| | | | | | | 2" Ice | 14.32 | 15.03 | 0.91 |
| RRH2x60-700 | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 3.96 | 1.82 | 0.06 |
| | | | | | | 1/2" Ice | 4.27 | 2.08 | 0.08 |
| | | | | | | Ice | 4.60 | 2.36 | 0.11 |
| | | | | | | 1" Ice | 5.27 | 2.96 | 0.17 |
| | | | | | | 2" Ice | 6.72 | 4.25 | 0.35 |
| RRH2x60-700 | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 3.96 | 1.82 | 0.06 |
| | | | | | | 1/2" Ice | 4.27 | 2.08 | 0.08 |
| | | | | | | Ice | 4.60 | 2.36 | 0.11 |
| | | | | | | 1" Ice | 5.27 | 2.96 | 0.17 |
| | | | | | | 2" Ice | 6.72 | 4.25 | 0.35 |
| RRH2x60-700 | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 3.96 | 1.82 | 0.06 |
| | | | | | | 1/2" Ice | 4.27 | 2.08 | 0.08 |
| | | | | | | Ice | 4.60 | 2.36 | 0.11 |
| | | | | | | 1" Ice | 5.27 | 2.96 | 0.17 |
| | | | | | | 2" Ice | 6.72 | 4.25 | 0.35 |
| RRH2X60-AWS | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 3.96 | 2.16 | 0.06 |
| | | | | | | 1/2" Ice | 4.27 | 2.44 | 0.08 |
| | | | | | | Ice | 4.60 | 2.73 | 0.11 |
| | | | | | | 1" Ice | 5.27 | 3.34 | 0.18 |
| | | | | | | 2" Ice | 6.72 | 4.66 | 0.37 |
| RRH2X60-AWS | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 3.96 | 2.16 | 0.06 |
| | | | | | | 1/2" Ice | 4.27 | 2.44 | 0.08 |
| | | | | | | Ice | 4.60 | 2.73 | 0.11 |
| | | | | | | 1" Ice | 5.27 | 3.34 | 0.18 |
| | | | | | | 2" Ice | 6.72 | 4.66 | 0.37 |
| RRH2X60-AWS | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 3.96 | 2.16 | 0.06 |
| | | | | | | 1/2" Ice | 4.27 | 2.44 | 0.08 |
| | | | | | | Ice | 4.60 | 2.73 | 0.11 |
| | | | | | | 1" Ice | 5.27 | 3.34 | 0.18 |
| | | | | | | 2" Ice | 6.72 | 4.66 | 0.37 |
| RRH2X60-PCS | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 177.00 | No Ice | 2.57 | 2.01 | 0.06 |
| | | | | | | 1/2" Ice | 2.79 | 2.22 | 0.08 |
| | | | | | | Ice | 3.02 | 2.43 | 0.10 |
| | | | | | | 1" Ice | 3.52 | 2.89 | 0.16 |
| | | | | | | 2" Ice | 4.61 | 3.92 | 0.31 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _{Front} | C _A A _{Side} | Weight | |
|-------------------------|-------------|-------------|--------------|------|--------------------|-----------|-----------------------------------|----------------------------------|--------|------|
| | | | Horz Lateral | Vert | | | | | | |
| | | | ft | ft | ft | ft | ft ² | ft ² | K | |
| RRH2X60-PCS | B | From Leg | 4.00 | 0.00 | 0.0000 | 177.00 | 4" Ice | | | |
| | | | | | | | No Ice | 2.57 | 2.01 | 0.06 |
| | | | | | | | 1/2" | 2.79 | 2.22 | 0.08 |
| | | | | | | | Ice | 3.02 | 2.43 | 0.10 |
| | | | | | | | 1" Ice | 3.52 | 2.89 | 0.16 |
| RRH2X60-PCS | C | From Leg | 4.00 | 0.00 | 0.0000 | 177.00 | 2" Ice | 4.61 | 3.92 | 0.31 |
| | | | | | | | 4" Ice | | | |
| | | | | | | | No Ice | 2.57 | 2.01 | 0.06 |
| | | | | | | | 1/2" | 2.79 | 2.22 | 0.08 |
| | | | | | | | Ice | 3.02 | 2.43 | 0.10 |
| Sector Mount [SM 502-3] | C | None | | | 0.0000 | 177.00 | 1" Ice | 3.52 | 2.89 | 0.16 |
| | | | | | | | 2" Ice | 4.61 | 3.92 | 0.31 |
| | | | | | | | 4" Ice | | | |
| | | | | | | | No Ice | 33.02 | 33.02 | 1.67 |
| | | | | | | | 1/2" | 47.36 | 47.36 | 2.22 |
| *** LLPX310R | A | From Leg | 4.00 | 0.00 | 0.0000 | 168.00 | Ice | 61.70 | 61.70 | 2.77 |
| | | | | | | | 1" Ice | 90.38 | 90.38 | 3.88 |
| | | | | | | | 2" Ice | 147.74 | 147.74 | 6.08 |
| | | | | | | | 4" Ice | | | |
| | | | | | | | No Ice | 4.84 | 1.96 | 0.03 |
| FDD_R6_RRH | A | From Leg | 4.00 | 0.00 | 0.0000 | 168.00 | 1/2" | 5.19 | 2.23 | 0.05 |
| | | | | | | | Ice | 5.55 | 2.50 | 0.08 |
| | | | | | | | 1" Ice | 6.30 | 3.13 | 0.16 |
| | | | | | | | 2" Ice | 7.91 | 4.55 | 0.36 |
| | | | | | | | 4" Ice | | | |
| LLPX310R | B | From Leg | 4.00 | 0.00 | 0.0000 | 168.00 | No Ice | 1.79 | 0.78 | 0.03 |
| | | | | | | | 1/2" | 1.97 | 0.92 | 0.04 |
| | | | | | | | Ice | 2.16 | 1.07 | 0.06 |
| | | | | | | | 1" Ice | 2.57 | 1.39 | 0.09 |
| | | | | | | | 2" Ice | 3.49 | 2.14 | 0.20 |
| FDD_R6_RRH | B | From Leg | 4.00 | 0.00 | 0.0000 | 168.00 | 4" Ice | | | |
| | | | | | | | No Ice | 1.79 | 0.78 | 0.03 |
| | | | | | | | 1/2" | 1.97 | 0.92 | 0.04 |
| | | | | | | | Ice | 2.16 | 1.07 | 0.06 |
| | | | | | | | 1" Ice | 2.57 | 1.39 | 0.09 |
| LLPX310R | C | From Leg | 4.00 | 0.00 | 0.0000 | 168.00 | 2" Ice | 3.49 | 2.14 | 0.20 |
| | | | | | | | 4" Ice | | | |
| | | | | | | | No Ice | 4.84 | 1.96 | 0.03 |
| | | | | | | | 1/2" | 5.19 | 2.23 | 0.05 |
| | | | | | | | Ice | 5.55 | 2.50 | 0.08 |
| FDD_R6_RRH | C | From Leg | 4.00 | 0.00 | 0.0000 | 168.00 | 1" Ice | 6.30 | 3.13 | 0.16 |
| | | | | | | | 2" Ice | 7.91 | 4.55 | 0.36 |
| | | | | | | | 4" Ice | | | |
| | | | | | | | No Ice | 1.79 | 0.78 | 0.03 |
| | | | | | | | 1/2" | 1.97 | 0.92 | 0.04 |
| Pipe Mount [PM 601-3] | A | From Leg | 0.00 | 0.00 | 0.0000 | 168.00 | Ice | 2.16 | 1.07 | 0.06 |
| | | | | | | | 1" Ice | 2.57 | 1.39 | 0.09 |
| | | | | | | | 2" Ice | 3.49 | 2.14 | 0.20 |
| | | | | | | | 4" Ice | | | |
| | | | | | | | No Ice | 4.39 | 4.39 | 0.20 |
| Pipe Mount [PM 601-3] | B | From Leg | 0.00 | 0.00 | 0.0000 | 168.00 | 1/2" | 5.48 | 5.48 | 0.24 |
| | | | | | | | Ice | 6.57 | 6.57 | 0.28 |
| | | | | | | | 1" Ice | 8.75 | 8.75 | 0.36 |
| | | | | | | | 2" Ice | 13.11 | 13.11 | 0.53 |
| | | | | | | | 4" Ice | | | |
| Pipe Mount [PM 601-3] | B | From Leg | 0.00 | 0.00 | 0.0000 | 168.00 | No Ice | 4.39 | 4.39 | 0.20 |
| | | | | | | | 1/2" | 5.48 | 5.48 | 0.24 |
| | | | | | | | Ice | 6.57 | 6.57 | 0.28 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustment t | Placement ft | CAAA Front ft ² | CAAA Side ft ² | Weight K | |
|---|-------------|-------------|--|-------------------------|-----------------|-------------------------------|------------------------------|-------------|------|
| | | | | | | 1" Ice | 8.75 | 8.75 | 0.36 |
| | | | | | | 2" Ice | 13.11 | 13.11 | 0.53 |
| | | | | | | 4" Ice | | | |
| Pipe Mount [PM 601-3] | C | From Leg | 0.00 0.00 0.00 | 0.0000 | 168.00 | No Ice | 4.39 | 4.39 | 0.20 |
| | | | | | | 1/2" Ice | 5.48 | 5.48 | 0.24 |
| | | | | | | 1" Ice | 6.57 | 6.57 | 0.28 |
| | | | | | | 2" Ice | 8.75 | 8.75 | 0.36 |
| | | | | | | 4" Ice | 13.11 | 13.11 | 0.53 |
| *** | | | | | | | | | |
| 7770.00 w/ Mount Pipe | A | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | | | | 1" Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 2" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 4" Ice | 10.36 | 10.41 | 0.66 |
| 7770.00 w/ Mount Pipe | B | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | | | | 1" Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 2" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 4" Ice | 10.36 | 10.41 | 0.66 |
| 7770.00 w/ Mount Pipe | C | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" Ice | 6.63 | 5.01 | 0.10 |
| | | | | | | 1" Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 2" Ice | 8.16 | 7.16 | 0.29 |
| | | | | | | 4" Ice | 10.36 | 10.41 | 0.66 |
| (2) AM-X-CD-16-65-00T-RET w/ Mount Pipe | A | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 8.50 | 6.30 | 0.07 |
| | | | | | | 1/2" Ice | 9.15 | 7.48 | 0.14 |
| | | | | | | 1" Ice | 9.77 | 8.37 | 0.21 |
| | | | | | | 2" Ice | 11.03 | 10.18 | 0.38 |
| | | | | | | 4" Ice | 13.68 | 14.02 | 0.87 |
| (2) SBNH-1D6565C w/ Mount Pipe | B | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 11.68 | 9.84 | 0.10 |
| | | | | | | 1/2" Ice | 12.40 | 11.37 | 0.19 |
| | | | | | | 1" Ice | 13.14 | 12.91 | 0.29 |
| | | | | | | 2" Ice | 14.60 | 15.27 | 0.52 |
| | | | | | | 4" Ice | 17.87 | 20.14 | 1.17 |
| (2) AM-X-CD-16-65-00T-RET w/ Mount Pipe | C | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 8.50 | 6.30 | 0.07 |
| | | | | | | 1/2" Ice | 9.15 | 7.48 | 0.14 |
| | | | | | | 1" Ice | 9.77 | 8.37 | 0.21 |
| | | | | | | 2" Ice | 11.03 | 10.18 | 0.38 |
| | | | | | | 4" Ice | 13.68 | 14.02 | 0.87 |
| 7020.00 | A | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 0.12 | 0.20 | 0.00 |
| | | | | | | 1/2" Ice | 0.17 | 0.28 | 0.01 |
| | | | | | | 1" Ice | 0.23 | 0.36 | 0.01 |
| | | | | | | 2" Ice | 0.38 | 0.56 | 0.02 |
| | | | | | | 4" Ice | 0.78 | 1.05 | 0.07 |
| 7020.00 | B | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 0.12 | 0.20 | 0.00 |
| | | | | | | 1/2" Ice | 0.17 | 0.28 | 0.01 |
| | | | | | | 1" Ice | 0.23 | 0.36 | 0.01 |
| | | | | | | 2" Ice | 0.38 | 0.56 | 0.02 |
| | | | | | | 4" Ice | 0.78 | 1.05 | 0.07 |
| 7020.00 | C | From Leg | 4.00 0.00 2.00 | 0.0000 | 158.00 | No Ice | 0.12 | 0.20 | 0.00 |
| | | | | | | 1/2" Ice | 0.17 | 0.28 | 0.01 |
| | | | | | | 1" Ice | 0.23 | 0.36 | 0.01 |
| | | | | | | 2" Ice | 0.38 | 0.56 | 0.02 |
| | | | | | | 4" Ice | 0.78 | 1.05 | 0.07 |
| DTMABP7819VG12A | A | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 1.14 | 0.39 | 0.02 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _{Front} | C _A A _{Side} | Weight |
|---|-------------|-------------|----------|--------|--------------------|-----------|-----------------------------------|----------------------------------|--------|
| | | | Horz | Vert | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K |
| | | | 0.00 | | | 1/2" | 1.28 | 0.49 | 0.03 |
| | | | 2.00 | | | Ice | 1.44 | 0.59 | 0.04 |
| | | | | | | 1" Ice | 1.77 | 0.83 | 0.06 |
| | | | | | | 2" Ice | 2.54 | 1.41 | 0.14 |
| | | | | | | 4" Ice | | | |
| DTMABP7819VG12A | B | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 1.14 | 0.39 | 0.02 |
| | | | 0.00 | | | 1/2" | 1.28 | 0.49 | 0.03 |
| | | | 2.00 | | | Ice | 1.44 | 0.59 | 0.04 |
| | | | | | | 1" Ice | 1.77 | 0.83 | 0.06 |
| | | | | | | 2" Ice | 2.54 | 1.41 | 0.14 |
| | | | | | | 4" Ice | | | |
| DTMABP7819VG12A | C | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 1.14 | 0.39 | 0.02 |
| | | | 0.00 | | | 1/2" | 1.28 | 0.49 | 0.03 |
| | | | 2.00 | | | Ice | 1.44 | 0.59 | 0.04 |
| | | | | | | 1" Ice | 1.77 | 0.83 | 0.06 |
| | | | | | | 2" Ice | 2.54 | 1.41 | 0.14 |
| | | | | | | 4" Ice | | | |
| (2) LGP13519 | A | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 0.34 | 0.21 | 0.01 |
| | | | 0.00 | | | 1/2" | 0.42 | 0.28 | 0.01 |
| | | | 2.00 | | | Ice | 0.51 | 0.36 | 0.01 |
| | | | | | | 1" Ice | 0.73 | 0.55 | 0.02 |
| | | | | | | 2" Ice | 1.25 | 1.03 | 0.07 |
| | | | | | | 4" Ice | | | |
| (2) LGP13519 | B | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 0.34 | 0.21 | 0.01 |
| | | | 0.00 | | | 1/2" | 0.42 | 0.28 | 0.01 |
| | | | 2.00 | | | Ice | 0.51 | 0.36 | 0.01 |
| | | | | | | 1" Ice | 0.73 | 0.55 | 0.02 |
| | | | | | | 2" Ice | 1.25 | 1.03 | 0.07 |
| | | | | | | 4" Ice | | | |
| (2) LGP13519 | C | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 0.34 | 0.21 | 0.01 |
| | | | 0.00 | | | 1/2" | 0.42 | 0.28 | 0.01 |
| | | | 2.00 | | | Ice | 0.51 | 0.36 | 0.01 |
| | | | | | | 1" Ice | 0.73 | 0.55 | 0.02 |
| | | | | | | 2" Ice | 1.25 | 1.03 | 0.07 |
| | | | | | | 4" Ice | | | |
| RRUS-11 | A | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 3.25 | 1.37 | 0.05 |
| | | | 0.00 | | | 1/2" | 3.49 | 1.55 | 0.07 |
| | | | 2.00 | | | Ice | 3.74 | 1.74 | 0.09 |
| | | | | | | 1" Ice | 4.27 | 2.14 | 0.15 |
| | | | | | | 2" Ice | 5.43 | 3.04 | 0.31 |
| | | | | | | 4" Ice | | | |
| (2) RRUS-11 | B | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 3.25 | 1.37 | 0.05 |
| | | | 0.00 | | | 1/2" | 3.49 | 1.55 | 0.07 |
| | | | 2.00 | | | Ice | 3.74 | 1.74 | 0.09 |
| | | | | | | 1" Ice | 4.27 | 2.14 | 0.15 |
| | | | | | | 2" Ice | 5.43 | 3.04 | 0.31 |
| | | | | | | 4" Ice | | | |
| (2) DUAL BAND 800/1900 FULL BAND MASTHEAD | A | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 1.55 | 0.81 | 0.03 |
| | | | 0.00 | | | 1/2" | 1.72 | 0.94 | 0.04 |
| | | | 2.00 | | | Ice | 1.90 | 1.09 | 0.05 |
| | | | | | | 1" Ice | 2.28 | 1.40 | 0.09 |
| | | | | | | 2" Ice | 3.14 | 2.12 | 0.19 |
| | | | | | | 4" Ice | | | |
| (2) DUAL BAND 800/1900 FULL BAND MASTHEAD | B | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 1.55 | 0.81 | 0.03 |
| | | | 0.00 | | | 1/2" | 1.72 | 0.94 | 0.04 |
| | | | 2.00 | | | Ice | 1.90 | 1.09 | 0.05 |
| | | | | | | 1" Ice | 2.28 | 1.40 | 0.09 |
| | | | | | | 2" Ice | 3.14 | 2.12 | 0.19 |
| | | | | | | 4" Ice | | | |
| (2) DUAL BAND 800/1900 FULL BAND MASTHEAD | C | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 1.55 | 0.81 | 0.03 |
| | | | 0.00 | | | 1/2" | 1.72 | 0.94 | 0.04 |
| | | | 2.00 | | | Ice | 1.90 | 1.09 | 0.05 |
| | | | | | | 1" Ice | 2.28 | 1.40 | 0.09 |
| | | | | | | 2" Ice | 3.14 | 2.12 | 0.19 |
| | | | | | | 4" Ice | | | |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | CAAA Front | CAAA Side | Weight |
|--|-------------|-------------|--------------|--------|--------------------|-----------|-----------------|-----------------|--------|
| | | | Horz Lateral | Vert | | | | | |
| | | | ft | ft | ft | ft | ft ² | ft ² | K |
| DC6-48-60-18-8F | A | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 2.57 | 2.57 | 0.02 |
| | | | 0.00 | | | 1/2" | 2.80 | 2.80 | 0.04 |
| | | | 2.00 | | | Ice | 3.04 | 3.04 | 0.07 |
| | | | | | | 1" Ice | 3.54 | 3.54 | 0.13 |
| | | | | | | 2" Ice | 4.66 | 4.66 | 0.30 |
| | | | | | | 4" Ice | | | |
| RRU-12 | A | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 3.67 | 1.49 | 0.05 |
| | | | 0.00 | | | 1/2" | 3.93 | 1.67 | 0.07 |
| | | | 2.00 | | | Ice | 4.19 | 1.87 | 0.10 |
| | | | | | | 1" Ice | 4.75 | 2.28 | 0.16 |
| | | | | | | 2" Ice | 5.96 | 3.21 | 0.34 |
| | | | | | | 4" Ice | | | |
| (2) RRU-12 | C | From Leg | 4.00 | 0.0000 | 158.00 | No Ice | 3.67 | 1.49 | 0.05 |
| | | | 0.00 | | | 1/2" | 3.93 | 1.67 | 0.07 |
| | | | 2.00 | | | Ice | 4.19 | 1.87 | 0.10 |
| | | | | | | 1" Ice | 4.75 | 2.28 | 0.16 |
| | | | | | | 2" Ice | 5.96 | 3.21 | 0.34 |
| | | | | | | 4" Ice | | | |
| Sector Mount [SM 502-3] | C | None | | 0.0000 | 158.00 | No Ice | 33.02 | 33.02 | 1.67 |
| | | | | | | 1/2" | 47.36 | 47.36 | 2.22 |
| | | | | | | Ice | 61.70 | 61.70 | 2.77 |
| | | | | | | 1" Ice | 90.38 | 90.38 | 3.88 |
| | | | | | | 2" Ice | 147.74 | 147.74 | 6.08 |
| | | | | | | 4" Ice | | | |
| *** APXV18-206517S-C w/ Mount Pipe | A | From Leg | 0.50 | 0.0000 | 148.00 | No Ice | 5.40 | 4.70 | 0.05 |
| | | | 0.00 | | | 1/2" | 5.96 | 5.86 | 0.10 |
| | | | 0.00 | | | Ice | 6.48 | 6.73 | 0.15 |
| | | | | | | 1" Ice | 7.55 | 8.51 | 0.28 |
| | | | | | | 2" Ice | 9.92 | 12.28 | 0.68 |
| | | | | | | 4" Ice | | | |
| APXV18-206517S-C w/ Mount Pipe | B | From Leg | 0.50 | 0.0000 | 148.00 | No Ice | 5.40 | 4.70 | 0.05 |
| | | | 0.00 | | | 1/2" | 5.96 | 5.86 | 0.10 |
| | | | 0.00 | | | Ice | 6.48 | 6.73 | 0.15 |
| | | | | | | 1" Ice | 7.55 | 8.51 | 0.28 |
| | | | | | | 2" Ice | 9.92 | 12.28 | 0.68 |
| | | | | | | 4" Ice | | | |
| APXV18-206517S-C w/ Mount Pipe | C | From Leg | 0.50 | 0.0000 | 148.00 | No Ice | 5.40 | 4.70 | 0.05 |
| | | | 0.00 | | | 1/2" | 5.96 | 5.86 | 0.10 |
| | | | 0.00 | | | Ice | 6.48 | 6.73 | 0.15 |
| | | | | | | 1" Ice | 7.55 | 8.51 | 0.28 |
| | | | | | | 2" Ice | 9.92 | 12.28 | 0.68 |
| | | | | | | 4" Ice | | | |
| *** *** GPS_A | A | From Leg | 1.00 | 0.0000 | 40.00 | No Ice | 0.30 | 0.30 | 0.00 |
| | | | 0.00 | | | 1/2" | 0.37 | 0.37 | 0.00 |
| | | | 0.00 | | | Ice | 0.46 | 0.46 | 0.01 |
| | | | | | | 1" Ice | 0.65 | 0.65 | 0.02 |
| | | | | | | 2" Ice | 1.15 | 1.15 | 0.08 |
| | | | | | | 4" Ice | | | |
| Side Arm Mount [SO 201-1] | A | From Leg | 0.50 | 0.0000 | 40.00 | No Ice | 2.96 | 2.11 | 0.10 |
| | | | 0.00 | | | 1/2" | 4.10 | 2.93 | 0.12 |
| | | | 0.00 | | | Ice | 5.24 | 3.75 | 0.14 |
| | | | | | | 1" Ice | 7.52 | 5.39 | 0.18 |
| | | | | | | 2" Ice | 12.08 | 8.67 | 0.26 |
| | | | | | | 4" Ice | | | |

Dishes

| Description | Face or Leg | Dish Type | Offset Type | Offsets: Horz Lateral Vert ft | Azimuth Adjustment ° | 3 dB Beam Width ° | Elevation ft | Outside Diameter ft | Aperture Area ft ² | Weight K |
|---------------|-------------------|--------------------------|----------------|---|----------------------------|----------------------------|-----------------|---------------------------|---|--------------------------------------|
| A-ANT-18G-2-C | C | Paraboloid w/o Radome | From Leg | 3.00 0.00 0.00 | 90.0000 | ° | 168.00 | 2.17 | No Ice 3.72 1/2" Ice 4.01 1" Ice 4.30 2" Ice 4.88 4" Ice 6.04 | 0.03 0.05 0.07 0.11 0.19 |
| *** | | | | | | | | | | |
| *** | | | | | | | | | | |
| *** | | | | | | | | | | |

Load Combinations

| Comb. No. | Description |
|--------------|-----------------------------|
| 1 | Dead Only |
| 2 | Dead+Wind 0 deg - No Ice |
| 3 | Dead+Wind 30 deg - No Ice |
| 4 | Dead+Wind 60 deg - No Ice |
| 5 | Dead+Wind 90 deg - No Ice |
| 6 | Dead+Wind 120 deg - No Ice |
| 7 | Dead+Wind 150 deg - No Ice |
| 8 | Dead+Wind 180 deg - No Ice |
| 9 | Dead+Wind 210 deg - No Ice |
| 10 | Dead+Wind 240 deg - No Ice |
| 11 | Dead+Wind 270 deg - No Ice |
| 12 | Dead+Wind 300 deg - No Ice |
| 13 | Dead+Wind 330 deg - No Ice |
| 14 | Dead+Ice+Temp |
| 15 | Dead+Wind 0 deg+Ice+Temp |
| 16 | Dead+Wind 30 deg+Ice+Temp |
| 17 | Dead+Wind 60 deg+Ice+Temp |
| 18 | Dead+Wind 90 deg+Ice+Temp |
| 19 | Dead+Wind 120 deg+Ice+Temp |
| 20 | Dead+Wind 150 deg+Ice+Temp |
| 21 | Dead+Wind 180 deg+Ice+Temp |
| 22 | Dead+Wind 210 deg+Ice+Temp |
| 23 | Dead+Wind 240 deg+Ice+Temp |
| 24 | Dead+Wind 270 deg+Ice+Temp |
| 25 | Dead+Wind 300 deg+Ice+Temp |
| 26 | Dead+Wind 330 deg+Ice+Temp |
| 27 | Dead+Wind 0 deg - Service |
| 28 | Dead+Wind 30 deg - Service |
| 29 | Dead+Wind 60 deg - Service |
| 30 | Dead+Wind 90 deg - Service |
| 31 | Dead+Wind 120 deg - Service |
| 32 | Dead+Wind 150 deg - Service |
| 33 | Dead+Wind 180 deg - Service |
| 34 | Dead+Wind 210 deg - Service |
| 35 | Dead+Wind 240 deg - Service |
| 36 | Dead+Wind 270 deg - Service |
| 37 | Dead+Wind 300 deg - Service |
| 38 | Dead+Wind 330 deg - Service |

Maximum Member Forces

| Sectio n No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft | |
|--------------------|------------------|-------------------|------------------|-----------------------|------------|--------------------------------|--------------------------------|-------|
| T1 | 180 - 160 | Leg | Max Tension | 8 | 10.49 | -0.54 | 0.09 | |
| | | | Max. Compression | 6 | -15.11 | 0.50 | 0.01 | |
| | | | Max. Mx | 4 | -0.35 | 2.80 | -0.12 | |
| | | | Max. My | 9 | -1.53 | -0.01 | -3.01 | |
| | | | Max. Vy | 6 | 1.28 | 0.00 | 0.00 | |
| | | Diagonal | Max. Vx | 9 | 1.54 | 0.00 | 0.00 | |
| | | | Max Tension | 5 | 6.83 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -6.90 | 0.00 | 0.00 | |
| | | | Max. Mx | 20 | 1.65 | 0.03 | 0.00 | |
| | | | Max. My | 10 | 0.74 | 0.00 | 0.00 | |
| | | | Max. Vy | 20 | -0.02 | 0.00 | 0.00 | |
| | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 | |
| | | | Horizontal | Max Tension | 5 | 3.68 | 0.00 | 0.00 |
| | | | | Max. Compression | 5 | -3.71 | 0.00 | 0.00 |
| | | | | Max. Mx | 21 | 0.10 | -0.02 | -0.00 |
| | | Max. My | | 12 | -0.96 | -0.01 | -0.01 | |
| | | Max. Vy | | 21 | -0.02 | -0.02 | -0.00 | |
| | | Top Girt | Max. Vx | 12 | 0.00 | -0.01 | -0.01 | |
| | | | Max Tension | 4 | 1.71 | -0.01 | 0.00 | |
| | | | Max. Compression | 10 | -1.70 | -0.01 | -0.00 | |
| | | | Max. Mx | 21 | -0.11 | -0.02 | -0.00 | |
| | | | Max. My | 6 | 0.75 | -0.01 | 0.00 | |
| | | Inner Bracing | Max. Vy | 21 | -0.02 | -0.02 | -0.00 | |
| | | | Max. Vx | 6 | -0.00 | 0.00 | 0.00 | |
| | | | Max Tension | 10 | 0.03 | 0.00 | 0.00 | |
| | | | Max. Compression | 10 | -0.03 | 0.00 | 0.00 | |
| | | | Max. Mx | 14 | -0.00 | -0.01 | 0.00 | |
| | | | Max. My | 19 | 0.00 | 0.00 | -0.00 | |
| | | | Max. Vy | 14 | 0.01 | 0.00 | 0.00 | |
| | | | Max. Vx | 19 | 0.00 | 0.00 | 0.00 | |
| T2 | 160 - 140 | | Leg | Max Tension | 8 | 38.91 | -0.13 | 0.04 |
| | | | | Max. Compression | 6 | -48.17 | 0.12 | -0.00 |
| | | Max. Mx | | 8 | 18.87 | 1.43 | 0.07 | |
| | | Max. My | | 3 | -4.04 | -0.03 | 1.57 | |
| | | Max. Vy | | 4 | -1.00 | -0.55 | -0.08 | |
| | | Diagonal | Max. Vx | 9 | 1.11 | -0.03 | 0.62 | |
| | | | Max Tension | 5 | 8.62 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -8.69 | 0.00 | 0.00 | |
| | | | Max. Mx | 20 | 2.10 | 0.04 | 0.00 | |
| | | | Max. My | 10 | 1.03 | 0.00 | 0.00 | |
| | | Horizontal | Max. Vy | 20 | -0.02 | 0.00 | 0.00 | |
| | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 | |
| | | | Max Tension | 5 | 5.24 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -5.25 | -0.01 | -0.00 | |
| | | | Max. Mx | 21 | 0.24 | -0.03 | -0.00 | |
| Inner Bracing | Max. My | 6 | 1.00 | 0.00 | 0.01 | | | |
| | Max. Vy | 21 | -0.02 | -0.03 | -0.00 | | | |
| | Max. Vx | 6 | -0.00 | 0.00 | 0.01 | | | |
| | Max Tension | 3 | 0.00 | 0.00 | 0.00 | | | |
| | Max. Compression | 5 | -0.01 | 0.00 | 0.00 | | | |
| | Max. Mx | 14 | -0.00 | -0.02 | 0.00 | | | |
| | Max. My | 19 | -0.00 | 0.00 | -0.00 | | | |
| | Max. Vy | 14 | 0.01 | 0.00 | 0.00 | | | |
| | Max. Vx | 19 | 0.00 | 0.00 | 0.00 | | | |
| | T3 | 140 - 120 | Leg | Max Tension | 8 | 67.30 | -0.15 | 0.02 |
| Max. Compression | | | | 6 | -79.49 | 0.35 | -0.00 | |
| Max. Mx | | | | 12 | 66.86 | -0.36 | 0.00 | |
| Max. My | | | | 9 | -6.29 | -0.01 | 0.41 | |
| Max. Vy | | | | 12 | 0.07 | -0.36 | 0.00 | |
| Diagonal | | | Max. Vx | 3 | 0.11 | -0.01 | -0.41 | |
| | | | Max Tension | 5 | 8.22 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -8.32 | 0.00 | 0.00 | |
| | | | Max. Mx | 20 | 2.03 | 0.05 | 0.00 | |
| | | | Max. My | 10 | 1.03 | 0.00 | 0.00 | |
| Horizontal | | | Max. Vy | 20 | -0.02 | 0.00 | 0.00 | |
| | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 | |
| | | | Max Tension | 5 | 5.55 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -5.57 | -0.02 | -0.00 | |
| | | | Max. Mx | 21 | 0.36 | -0.05 | -0.00 | |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft | |
|---------------|------------------|------------------|------------------|------------------|---------|--------------------------|--------------------------|-------|
| T4 | 120 - 100 | Inner Bracing | Max. My | 12 | -0.73 | -0.04 | -0.01 | |
| | | | Max. Vy | 21 | -0.03 | -0.05 | -0.00 | |
| | | | Max. Vx | 12 | 0.00 | -0.04 | -0.01 | |
| | | | Max Tension | 3 | 0.00 | 0.00 | 0.00 | |
| | | | Max. Compression | 4 | -0.01 | 0.00 | 0.00 | |
| | | | Max. Mx | 14 | -0.00 | -0.03 | 0.00 | |
| | | | Max. My | 19 | -0.00 | 0.00 | -0.00 | |
| | | | Max. Vy | 14 | 0.02 | 0.00 | 0.00 | |
| | | | Max. Vx | 19 | 0.00 | 0.00 | 0.00 | |
| | | | Leg | Max Tension | 8 | 87.92 | -0.37 | 0.07 |
| | | | | Max. Compression | 6 | -102.93 | 0.42 | -0.00 |
| | | | | Max. Mx | 12 | 87.22 | -0.44 | 0.00 |
| | | Max. My | | 9 | -7.76 | -0.01 | 0.48 | |
| | | Max. Vy | | 12 | 0.08 | -0.44 | 0.00 | |
| | | Max. Vx | | 9 | -0.12 | -0.02 | 0.45 | |
| | | Diagonal | | Max Tension | 5 | 9.75 | 0.00 | 0.00 |
| | | | | Max. Compression | 5 | -9.90 | 0.00 | 0.00 |
| | | | | Max. Mx | 20 | 2.47 | 0.12 | 0.00 |
| | | | | Max. My | 10 | 1.27 | 0.00 | 0.00 |
| | | | | Max. Vy | 20 | -0.04 | 0.00 | 0.00 |
| | | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 5 | 5.75 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -5.83 | -0.03 | -0.00 | |
| | | | Max. Mx | 21 | 0.45 | -0.06 | -0.00 | |
| | | | Max. My | 12 | -0.95 | -0.05 | -0.01 | |
| | | | Max. Vy | 21 | -0.03 | -0.06 | -0.00 | |
| | | | Max. Vx | 12 | 0.00 | -0.05 | -0.01 | |
| | | Inner Bracing | Max Tension | 3 | 0.00 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -0.01 | 0.00 | 0.00 | |
| | | | Max. Mx | 14 | -0.00 | -0.03 | 0.00 | |
| Max. My | 19 | | -0.00 | 0.00 | -0.00 | | | |
| Max. Vy | 14 | | -0.02 | 0.00 | 0.00 | | | |
| Max. Vx | 19 | | 0.00 | 0.00 | 0.00 | | | |
| Leg | Max Tension | | 8 | 109.27 | -0.36 | 0.06 | | |
| | Max. Compression | | 6 | -127.67 | 0.43 | -0.00 | | |
| | Max. Mx | | 12 | 108.42 | -0.46 | 0.00 | | |
| | Max. My | | 9 | -9.42 | -0.02 | 0.54 | | |
| | Max. Vy | | 12 | 0.08 | -0.46 | 0.00 | | |
| | Max. Vx | | 3 | 0.12 | -0.02 | -0.54 | | |
| | Diagonal | Max Tension | 5 | 8.70 | 0.00 | 0.00 | | |
| | | Max. Compression | 5 | -8.89 | 0.00 | 0.00 | | |
| | | Max. Mx | 20 | 2.18 | 0.15 | 0.00 | | |
| | | Max. My | 10 | 1.19 | 0.00 | 0.00 | | |
| | | Max. Vy | 20 | -0.04 | 0.00 | 0.00 | | |
| | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 | | |
| Horizontal | Max Tension | 5 | 5.69 | 0.00 | 0.00 | | | |
| | Max. Compression | 5 | -5.78 | -0.03 | -0.00 | | | |
| | Max. Mx | 21 | 0.56 | -0.07 | -0.00 | | | |
| | Max. My | 2 | 1.42 | -0.01 | 0.01 | | | |
| | Max. Vy | 21 | -0.04 | -0.07 | -0.00 | | | |
| | Max. Vx | 2 | -0.00 | -0.01 | 0.01 | | | |
| Inner Bracing | Max Tension | 3 | 0.00 | 0.00 | 0.00 | | | |
| | Max. Compression | 5 | -0.01 | 0.00 | 0.00 | | | |
| | Max. Mx | 14 | -0.01 | -0.06 | 0.00 | | | |
| | Max. My | 6 | -0.00 | 0.00 | -0.00 | | | |
| | Max. Vy | 14 | 0.03 | 0.00 | 0.00 | | | |
| | Max. Vx | 6 | 0.00 | 0.00 | 0.00 | | | |
| Leg | Max Tension | 8 | 128.18 | -0.56 | 0.05 | | | |
| | Max. Compression | 6 | -150.24 | 0.51 | -0.00 | | | |
| | Max. Mx | 12 | 117.77 | -0.57 | 0.01 | | | |
| | Max. My | 9 | -11.21 | -0.02 | 0.63 | | | |
| | Max. Vy | 12 | 0.09 | -0.57 | 0.01 | | | |
| | Max. Vx | 9 | -0.12 | -0.01 | 0.59 | | | |
| | Diagonal | Max Tension | 5 | 8.95 | 0.00 | 0.00 | | |
| | | Max. Compression | 5 | -9.24 | 0.00 | 0.00 | | |
| | | Max. Mx | 20 | 2.25 | 0.17 | 0.00 | | |
| | | Max. My | 10 | 1.11 | 0.00 | 0.00 | | |
| | | Max. Vy | 20 | -0.05 | 0.00 | 0.00 | | |
| | | Max. Vx | 10 | -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 | |
|-------------|------------------|------------------|------------------|------------------|---------|--------------------------|--------------------------|-------|
| T7 | 60 - 40 | Horizontal | Max Tension | 5 | 6.39 | 0.00 | 0.00 | |
| | | | Max. Compression | 5 | -6.43 | -0.07 | -0.00 | |
| | | | Max. Mx | 21 | 0.66 | -0.13 | -0.00 | |
| | | | Max. My | 12 | -1.38 | -0.10 | -0.01 | |
| | | | Max. Vy | 21 | -0.06 | -0.13 | -0.00 | |
| | | | Max. Vx | 12 | 0.00 | -0.10 | -0.01 | |
| | | Inner Bracing | Max Tension | 3 | 0.00 | 0.00 | 0.00 | |
| | | | Max. Compression | 25 | -0.01 | 0.00 | 0.00 | |
| | | | Max. Mx | 14 | -0.01 | -0.10 | 0.00 | |
| | | | Max. My | 6 | -0.00 | 0.00 | -0.00 | |
| | | | Max. Vy | 14 | 0.04 | 0.00 | 0.00 | |
| | | | Max. Vx | 6 | 0.00 | 0.00 | 0.00 | |
| | | Leg | Max Tension | 8 | 146.38 | -0.53 | 0.05 | |
| | | | Max. Compression | 6 | -172.64 | 0.40 | -0.00 | |
| | | | Max. Mx | 12 | 136.65 | -0.54 | 0.01 | |
| | | | Max. My | 9 | -11.81 | -0.02 | 0.63 | |
| | | | Max. Vy | 12 | -0.09 | -0.54 | 0.00 | |
| | | | Max. Vx | 3 | -0.12 | -0.02 | -0.63 | |
| | | | Diagonal | Max Tension | 5 | 9.09 | 0.00 | 0.00 |
| | | | | Max. Compression | 5 | -9.50 | 0.00 | 0.00 |
| | | | | Max. Mx | 20 | 2.24 | 0.25 | 0.00 |
| | | | | Max. My | 10 | 1.04 | 0.00 | 0.00 |
| | | | | Max. Vy | 20 | -0.07 | 0.00 | 0.00 |
| | | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 |
| Horizontal | Max Tension | 5 | 6.95 | 0.00 | 0.00 | | | |
| | Max. Compression | 5 | -6.89 | -0.09 | -0.00 | | | |
| | Max. Mx | 21 | 0.77 | -0.15 | -0.00 | | | |
| | Max. My | 2 | 1.30 | -0.05 | 0.01 | | | |
| | Max. Vy | 21 | -0.07 | -0.15 | -0.00 | | | |
| | Max. Vx | 2 | -0.00 | -0.05 | 0.01 | | | |
| | Inner Bracing | Max Tension | 1 | 0.00 | 0.00 | 0.00 | | |
| | | Max. Compression | 25 | -0.01 | 0.00 | 0.00 | | |
| | | Max. Mx | 14 | -0.01 | -0.16 | 0.00 | | |
| | | Max. My | 10 | -0.00 | 0.00 | -0.00 | | |
| | | Max. Vy | 14 | 0.06 | 0.00 | 0.00 | | |
| | | Max. Vx | 10 | 0.00 | 0.00 | 0.00 | | |
| T8 | 40 - 20 | Leg | Max Tension | 8 | 163.12 | -0.84 | 0.02 | |
| | | | Max. Compression | 6 | -194.01 | -1.52 | -0.00 | |
| | | | Max. Mx | 6 | -194.01 | -1.52 | -0.00 | |
| | | | Max. My | 9 | -15.52 | -0.31 | 2.02 | |
| | | | Max. Vy | 2 | 0.29 | 0.96 | -0.01 | |
| | | | Max. Vx | 9 | -0.28 | -0.31 | 2.02 | |
| | | Diagonal | Max Tension | 11 | 8.82 | 0.00 | 0.00 | |
| | | | Max. Compression | 11 | -9.30 | 0.00 | 0.00 | |
| | | | Max. Mx | 20 | 2.13 | 0.30 | 0.00 | |
| | | | Max. My | 10 | 0.97 | 0.00 | 0.00 | |
| | | | Max. Vy | 20 | -0.07 | 0.00 | 0.00 | |
| | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 | |
| | | Horizontal | Max Tension | 5 | 7.14 | 0.00 | 0.00 | |
| | | | Max. Compression | 11 | -6.99 | -0.11 | -0.00 | |
| | | | Max. Mx | 21 | 0.88 | -0.18 | -0.00 | |
| | | | Max. My | 2 | 1.57 | -0.07 | 0.01 | |
| | | | Max. Vy | 21 | -0.07 | -0.18 | -0.00 | |
| | | | Max. Vx | 2 | -0.00 | -0.07 | 0.01 | |
| | | | Inner Bracing | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | | Max. Compression | 25 | -0.01 | 0.00 | 0.00 |
| | | | | Max. Mx | 14 | -0.01 | -0.20 | 0.00 |
| | | | | Max. My | 10 | -0.00 | 0.00 | -0.00 |
| | | | | Max. Vy | 14 | 0.07 | 0.00 | 0.00 |
| | | | | Max. Vx | 10 | 0.00 | 0.00 | 0.00 |
| Leg | Max Tension | 8 | 169.42 | 0.83 | 0.17 | | | |
| | Max. Compression | 6 | -204.00 | -0.00 | -0.00 | | | |
| | Max. Mx | 6 | -203.61 | 5.70 | 0.01 | | | |
| | Max. My | 9 | -16.41 | -0.30 | 2.02 | | | |
| | Max. Vy | 6 | -0.78 | 5.70 | 0.01 | | | |
| | Max. Vx | 9 | 0.46 | -0.30 | 2.02 | | | |
| | Diagonal | Max Tension | 11 | 13.92 | -0.16 | -0.04 | | |
| | | Max. Compression | 5 | -14.42 | 0.00 | 0.00 | | |
| | | Max. Mx | 8 | 9.76 | -0.19 | 0.06 | | |

| Section No. | Elevation ft | Component Type | Condition | Gov. Load Comb. | Force K | Major Axis Moment kip-ft | Minor Axis Moment kip-ft |
|-------------|--------------|-----------------------------|------------------|-----------------|---------|--------------------------|--------------------------|
| | | | Max. My | 11 | -13.95 | 0.02 | -0.10 |
| | | | Max. Vy | 21 | 0.05 | -0.14 | 0.01 |
| | | | Max. Vx | 11 | -0.01 | 0.00 | 0.00 |
| | | Horizontal | Max Tension | 11 | 7.73 | -0.17 | -0.00 |
| | | | Max. Compression | 11 | -7.85 | -0.17 | -0.00 |
| | | | Max. Mx | 21 | -1.02 | -0.25 | -0.00 |
| | | | Max. My | 2 | 1.49 | -0.09 | 0.02 |
| | | | Max. Vy | 21 | 0.09 | -0.25 | -0.00 |
| | | | Max. Vx | 2 | -0.00 | -0.09 | 0.02 |
| | | Redund Horz 1 Bracing | Max Tension | 6 | 3.54 | 0.00 | 0.00 |
| | | | Max. Compression | 6 | -3.54 | 0.00 | 0.00 |
| | | | Max. Mx | 15 | 1.41 | 0.02 | 0.00 |
| | | | Max. Vy | 15 | -0.01 | 0.00 | 0.00 |
| | | Redund Diag 1 Bracing | Max Tension | 6 | 3.23 | 0.00 | 0.00 |
| | | | Max. Compression | 6 | -3.23 | 0.00 | 0.00 |
| | | | Max. Mx | 19 | 1.41 | 0.04 | 0.00 |
| | | | Max. My | 2 | 3.16 | 0.00 | -0.00 |
| | | | Max. Vy | 19 | -0.02 | 0.00 | 0.00 |
| | | | Max. Vx | 2 | 0.00 | 0.00 | 0.00 |
| | | Redund Hip 1 Bracing | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 5 | -0.04 | 0.00 | 0.00 |
| | | | Max. Mx | 14 | -0.01 | 0.02 | 0.00 |
| | | | Max. Vy | 14 | -0.01 | 0.00 | 0.00 |
| | | Redund Hip Diagonal Bracing | Max Tension | 5 | 0.07 | 0.00 | 0.00 |
| | | | Max. Compression | 10 | -0.06 | 0.00 | 0.00 |
| | | | Max. Mx | 21 | 0.05 | 0.20 | 0.00 |
| | | | Max. My | 10 | 0.03 | 0.00 | 0.00 |
| | | | Max. Vy | 21 | -0.05 | 0.00 | 0.00 |
| | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 |
| | | Inner Bracing | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 2 | -0.01 | 0.00 | 0.00 |
| | | | Max. Mx | 14 | -0.01 | 0.23 | 0.00 |
| | | | Max. My | 10 | -0.01 | 0.00 | 0.00 |
| | | | Max. Vy | 14 | -0.07 | 0.00 | 0.00 |
| | | | Max. Vx | 10 | -0.00 | 0.00 | 0.00 |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------|------------|-----------------|-----------------|
| Leg C | Max. Vert | 10 | 221.69 | 23.94 | -12.71 |
| | Max. H _x | 10 | 221.69 | 23.94 | -12.71 |
| | Max. H _z | 3 | -158.31 | -17.39 | 11.27 |
| | Min. Vert | 4 | -185.25 | -21.33 | 11.23 |
| | Min. H _x | 4 | -185.25 | -21.33 | 11.23 |
| | Min. H _z | 10 | 221.69 | 23.94 | -12.71 |
| Leg B | Max. Vert | 6 | 223.66 | -23.58 | -13.55 |
| | Max. H _x | 12 | -185.08 | 20.90 | 12.05 |
| | Max. H _z | 13 | -158.12 | 16.63 | 12.68 |
| | Min. Vert | 12 | -185.08 | 20.90 | 12.05 |
| | Min. H _x | 6 | 223.66 | -23.58 | -13.55 |
| | Min. H _z | 7 | 194.54 | -19.12 | -13.96 |
| Leg A | Max. Vert | 2 | 219.40 | 0.91 | 27.01 |
| | Max. H _x | 11 | 15.93 | 3.64 | 1.45 |
| | Max. H _z | 2 | 219.40 | 0.91 | 27.01 |
| | Min. Vert | 8 | -186.40 | -0.91 | -24.09 |
| | Min. H _x | 6 | -87.17 | -3.66 | -11.53 |
| | Min. H _z | 8 | -186.40 | -0.91 | -24.09 |

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 | 50.82 | -0.00 | -0.00 | 31.05 | -12.02 | -0.00 |
| Dead+Wind 0 deg - No Ice | 50.82 | -0.02 | -44.88 | -4852.88 | -7.71 | 44.35 |
| Dead+Wind 30 deg - No Ice | 50.82 | 22.30 | -38.49 | -4161.05 | -2448.07 | 51.46 |
| Dead+Wind 60 deg - No Ice | 50.82 | 38.51 | -22.12 | -2377.12 | -4223.68 | 45.11 |
| Dead+Wind 90 deg - No Ice | 50.82 | 44.70 | 0.17 | 61.70 | -4904.34 | 28.17 |
| Dead+Wind 120 deg - No Ice | 50.82 | 39.07 | 22.57 | 2495.41 | -4280.74 | 2.20 |
| Dead+Wind 150 deg - No Ice | 50.82 | 22.39 | 38.58 | 4241.72 | -2466.56 | -23.91 |
| Dead+Wind 180 deg - No Ice | 50.82 | 0.11 | 44.38 | 4873.82 | -32.23 | -43.00 |
| Dead+Wind 210 deg - No Ice | 50.82 | -22.20 | 38.60 | 4242.58 | 2407.57 | -50.36 |
| Dead+Wind 240 deg - No Ice | 50.82 | -39.00 | 22.40 | 2464.63 | 4243.87 | -45.81 |
| Dead+Wind 270 deg - No Ice | 50.82 | -44.65 | -0.03 | 24.28 | 4871.71 | -26.94 |
| Dead+Wind 300 deg - No Ice | 50.82 | -38.58 | -22.18 | -2389.22 | 4211.89 | -1.35 |
| Dead+Wind 330 deg - No Ice | 50.82 | -22.36 | -38.53 | -4170.55 | 2437.22 | 24.38 |
| Dead+Ice+Temp | 93.82 | -0.00 | -0.00 | 72.24 | -55.67 | -0.00 |
| Dead+Wind 0 deg+Ice+Temp | 93.82 | 0.01 | -13.95 | -1408.00 | -56.97 | 11.66 |
| Dead+Wind 30 deg+Ice+Temp | 93.82 | 6.52 | -11.26 | -1137.10 | -757.86 | 13.21 |
| Dead+Wind 60 deg+Ice+Temp | 93.82 | 11.01 | -6.35 | -611.84 | -1246.21 | 11.76 |
| Dead+Wind 90 deg+Ice+Temp | 93.82 | 13.05 | 0.03 | 77.30 | -1460.90 | 8.05 |
| Dead+Wind 120 deg+Ice+Temp | 93.82 | 12.11 | 7.00 | 815.93 | -1343.93 | 1.68 |
| Dead+Wind 150 deg+Ice+Temp | 93.82 | 6.52 | 11.28 | 1284.09 | -758.43 | -5.30 |
| Dead+Wind 180 deg+Ice+Temp | 93.82 | 0.01 | 12.70 | 1443.26 | -58.32 | -10.31 |
| Dead+Wind 210 deg+Ice+Temp | 93.82 | -6.50 | 11.29 | 1286.36 | 642.46 | -12.96 |
| Dead+Wind 240 deg+Ice+Temp | 93.82 | -12.11 | 6.98 | 812.54 | 1231.43 | -13.16 |
| Dead+Wind 270 deg+Ice+Temp | 93.82 | -13.03 | 0.00 | 72.99 | 1347.22 | -7.77 |
| Dead+Wind 300 deg+Ice+Temp | 93.82 | -11.01 | -6.34 | -610.91 | 1135.24 | -1.28 |
| Dead+Wind 330 deg+Ice+Temp | 93.82 | -6.52 | -11.26 | -1137.14 | 645.54 | 5.41 |
| Dead+Wind 0 deg - Service | 50.82 | -0.01 | -15.53 | -1658.85 | -10.55 | 15.35 |
| Dead+Wind 30 deg - Service | 50.82 | 7.72 | -13.32 | -1419.47 | -854.95 | 17.81 |
| Dead+Wind 60 deg - Service | 50.82 | 13.33 | -7.65 | -802.14 | -1469.38 | 15.60 |
| Dead+Wind 90 deg - Service | 50.82 | 15.47 | 0.06 | 41.71 | -1704.92 | 9.75 |
| Dead+Wind 120 deg - Service | 50.82 | 13.52 | 7.81 | 883.85 | -1489.14 | 0.76 |
| Dead+Wind 150 deg - Service | 50.82 | 7.75 | 13.35 | 1488.11 | -861.38 | -8.27 |
| Dead+Wind 180 deg - Service | 50.82 | 0.04 | 15.36 | 1706.80 | -19.07 | -14.88 |
| Dead+Wind 210 deg - Service | 50.82 | -7.68 | 13.36 | 1488.38 | 825.22 | -17.43 |
| Dead+Wind 240 deg - Service | 50.82 | -13.49 | 7.75 | 873.18 | 1460.60 | -15.85 |
| Dead+Wind 270 deg - Service | 50.82 | -15.45 | -0.01 | 28.77 | 1677.83 | -9.32 |
| Dead+Wind 300 deg - Service | 50.82 | -13.35 | -7.67 | -806.34 | 1449.50 | -0.47 |
| Dead+Wind 330 deg - Service | 50.82 | -7.74 | -13.33 | -1422.74 | 835.45 | 8.44 |

Solution Summary

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 1 | 0.00 | -50.82 | 0.00 | 0.00 | 50.82 | 0.00 | 0.000% |
| 2 | -0.02 | -50.82 | -44.88 | 0.02 | 50.82 | 44.88 | 0.001% |
| 3 | 22.30 | -50.82 | -38.49 | -22.30 | 50.82 | 38.49 | 0.001% |
| 4 | 38.51 | -50.82 | -22.12 | -38.51 | 50.82 | 22.12 | 0.001% |
| 5 | 44.70 | -50.82 | 0.17 | -44.70 | 50.82 | -0.17 | 0.001% |
| 6 | 39.07 | -50.82 | 22.57 | -39.07 | 50.82 | -22.57 | 0.001% |
| 7 | 22.39 | -50.82 | 38.58 | -22.39 | 50.82 | -38.58 | 0.001% |
| 8 | 0.11 | -50.82 | 44.38 | -0.11 | 50.82 | -44.38 | 0.001% |
| 9 | -22.20 | -50.82 | 38.60 | 22.20 | 50.82 | -38.60 | 0.001% |
| 10 | -39.00 | -50.82 | 22.40 | 39.00 | 50.82 | -22.40 | 0.001% |
| 11 | -44.65 | -50.82 | -0.03 | 44.65 | 50.82 | 0.03 | 0.001% |
| 12 | -38.58 | -50.82 | -22.18 | 38.58 | 50.82 | 22.18 | 0.001% |
| 13 | -22.36 | -50.82 | -38.53 | 22.36 | 50.82 | 38.53 | 0.001% |
| 14 | 0.00 | -93.82 | 0.00 | 0.00 | 93.82 | 0.00 | 0.001% |
| 15 | 0.01 | -93.82 | -13.96 | -0.01 | 93.82 | 13.95 | 0.000% |
| 16 | 6.52 | -93.82 | -11.26 | -6.52 | 93.82 | 11.26 | 0.000% |
| 17 | 11.01 | -93.82 | -6.35 | -11.01 | 93.82 | 6.35 | 0.000% |
| 18 | 13.05 | -93.82 | 0.03 | -13.05 | 93.82 | -0.03 | 0.000% |
| 19 | 12.11 | -93.82 | 7.00 | -12.11 | 93.82 | -7.00 | 0.000% |
| 20 | 6.52 | -93.82 | 11.28 | -6.52 | 93.82 | -11.28 | 0.000% |
| 21 | 0.01 | -93.82 | 12.70 | -0.01 | 93.82 | -12.70 | 0.000% |
| 22 | -6.50 | -93.82 | 11.29 | 6.50 | 93.82 | -11.29 | 0.000% |
| 23 | -12.11 | -93.82 | 6.98 | 12.11 | 93.82 | -6.98 | 0.000% |
| 24 | -13.04 | -93.82 | 0.00 | 13.03 | 93.82 | -0.00 | 0.000% |
| 25 | -11.02 | -93.82 | -6.34 | 11.01 | 93.82 | 6.34 | 0.000% |
| 26 | -6.52 | -93.82 | -11.26 | 6.52 | 93.82 | 11.26 | 0.000% |
| 27 | -0.01 | -50.82 | -15.53 | 0.01 | 50.82 | 15.53 | 0.000% |
| 28 | 7.72 | -50.82 | -13.32 | -7.72 | 50.82 | 13.32 | 0.000% |
| 29 | 13.33 | -50.82 | -7.65 | -13.33 | 50.82 | 7.65 | 0.000% |
| 30 | 15.47 | -50.82 | 0.06 | -15.47 | 50.82 | -0.06 | 0.000% |
| 31 | 13.52 | -50.82 | 7.81 | -13.52 | 50.82 | -7.81 | 0.000% |
| 32 | 7.75 | -50.82 | 13.35 | -7.75 | 50.82 | -13.35 | 0.000% |
| 33 | 0.04 | -50.82 | 15.36 | -0.04 | 50.82 | -15.36 | 0.000% |
| 34 | -7.68 | -50.82 | 13.36 | 7.68 | 50.82 | -13.36 | 0.000% |
| 35 | -13.49 | -50.82 | 7.75 | 13.49 | 50.82 | -7.75 | 0.000% |
| 36 | -15.45 | -50.82 | -0.01 | 15.45 | 50.82 | 0.01 | 0.000% |
| 37 | -13.35 | -50.82 | -7.67 | 13.35 | 50.82 | 7.67 | 0.000% |
| 38 | -7.74 | -50.82 | -13.33 | 7.74 | 50.82 | 13.33 | 0.000% |

Non-Linear Convergence Results

| Load Combination | Converged? | Number of Cycles | Displacement Tolerance | Force Tolerance |
|------------------|------------|------------------|------------------------|-----------------|
| 1 | Yes | 6 | 0.00000001 | 0.00000001 |
| 2 | Yes | 8 | 0.00000001 | 0.00009204 |
| 3 | Yes | 8 | 0.00000001 | 0.00008853 |
| 4 | Yes | 8 | 0.00000001 | 0.00008495 |
| 5 | Yes | 8 | 0.00000001 | 0.00008887 |
| 6 | Yes | 8 | 0.00000001 | 0.00009232 |
| 7 | Yes | 8 | 0.00000001 | 0.00008866 |
| 8 | Yes | 8 | 0.00000001 | 0.00008480 |
| 9 | Yes | 8 | 0.00000001 | 0.00008852 |
| 10 | Yes | 8 | 0.00000001 | 0.00009238 |
| 11 | Yes | 8 | 0.00000001 | 0.00008884 |
| 12 | Yes | 8 | 0.00000001 | 0.00008476 |
| 13 | Yes | 8 | 0.00000001 | 0.00008827 |
| 14 | Yes | 6 | 0.00000001 | 0.00014951 |
| 15 | Yes | 8 | 0.00000001 | 0.00014598 |
| 16 | Yes | 8 | 0.00000001 | 0.00014508 |
| 17 | Yes | 8 | 0.00000001 | 0.00014624 |
| 18 | Yes | 9 | 0.00000001 | 0.00003193 |
| 19 | Yes | 9 | 0.00000001 | 0.00003267 |
| 20 | Yes | 9 | 0.00000001 | 0.00003210 |
| 21 | Yes | 8 | 0.00000001 | 0.00014859 |
| 22 | Yes | 8 | 0.00000001 | 0.00014871 |
| 23 | Yes | 8 | 0.00000001 | 0.00014983 |
| 24 | Yes | 8 | 0.00000001 | 0.00014472 |
| 25 | Yes | 8 | 0.00000001 | 0.00014078 |
| 26 | Yes | 8 | 0.00000001 | 0.00014167 |
| 27 | Yes | 8 | 0.00000001 | 0.00008579 |
| 28 | Yes | 8 | 0.00000001 | 0.00008478 |
| 29 | Yes | 8 | 0.00000001 | 0.00008387 |
| 30 | Yes | 8 | 0.00000001 | 0.00008530 |
| 31 | Yes | 8 | 0.00000001 | 0.00008643 |
| 32 | Yes | 8 | 0.00000001 | 0.00008510 |
| 33 | Yes | 8 | 0.00000001 | 0.00008387 |
| 34 | Yes | 8 | 0.00000001 | 0.00008507 |
| 35 | Yes | 8 | 0.00000001 | 0.00008637 |
| 36 | Yes | 8 | 0.00000001 | 0.00008509 |
| 37 | Yes | 8 | 0.00000001 | 0.00008358 |
| 38 | Yes | 8 | 0.00000001 | 0.00008450 |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|------------------------|-----------------|-----------|------------|
| T1 | 180 - 160 | 3.964 | 31 | 0.2029 | 0.0733 |
| T2 | 160 - 140 | 3.104 | 31 | 0.1915 | 0.0617 |
| T3 | 140 - 120 | 2.315 | 31 | 0.1655 | 0.0461 |
| T4 | 120 - 100 | 1.648 | 31 | 0.1367 | 0.0340 |
| T5 | 100 - 80 | 1.113 | 31 | 0.1117 | 0.0254 |
| T6 | 80 - 60 | 0.694 | 31 | 0.0844 | 0.0180 |
| T7 | 60 - 40 | 0.384 | 31 | 0.0589 | 0.0124 |
| T8 | 40 - 20 | 0.170 | 31 | 0.0383 | 0.0081 |
| T9 | 20 - 0 | 0.042 | 27 | 0.0175 | 0.0041 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|--------------------------------|-----------------|------------------|-----------|------------|---------------------------|
| 180.00 | Lightning Rod | 31 | 3.964 | 0.2029 | 0.0733 | 263243 |
| 177.00 | (2) DB846F65ZAXY w/ Mount Pipe | 31 | 3.834 | 0.2017 | 0.0718 | 263243 |

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|-----------------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 168.00 | A-ANT-18G-2-C | 31 | 3.444 | 0.1974 | 0.0668 | 109685 |
| 158.00 | 7770.00 w/ Mount Pipe | 31 | 3.021 | 0.1895 | 0.0602 | 60952 |
| 148.00 | APXV18-206517S-C w/ Mount Pipe | 31 | 2.618 | 0.1772 | 0.0523 | 44217 |
| 40.00 | GPS_A | 31 | 0.170 | 0.0383 | 0.0081 | 62021 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|----------------|-----------------|---------------------------|-----------------------|-----------|------------|
| T1 | 180 - 160 | 11.321 | 6 | 0.5747 | 0.2120 |
| T2 | 160 - 140 | 8.876 | 6 | 0.5447 | 0.1783 |
| T3 | 140 - 120 | 6.625 | 6 | 0.4719 | 0.1333 |
| T4 | 120 - 100 | 4.721 | 6 | 0.3902 | 0.0982 |
| T5 | 100 - 80 | 3.192 | 6 | 0.3189 | 0.0734 |
| T6 | 80 - 60 | 1.991 | 6 | 0.2409 | 0.0522 |
| T7 | 60 - 40 | 1.104 | 6 | 0.1682 | 0.0358 |
| T8 | 40 - 20 | 0.491 | 6 | 0.1093 | 0.0234 |
| T9 | 20 - 0 | 0.121 | 2 | 0.0501 | 0.0119 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|-----------------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 180.00 | Lightning Rod | 6 | 11.321 | 0.5747 | 0.2120 | 98265 |
| 177.00 | (2) DB846F65ZAXY w/ Mount Pipe | 6 | 10.950 | 0.5717 | 0.2075 | 98265 |
| 168.00 | A-ANT-18G-2-C | 6 | 9.842 | 0.5608 | 0.1931 | 40944 |
| 158.00 | 7770.00 w/ Mount Pipe | 6 | 8.640 | 0.5393 | 0.1741 | 22496 |
| 148.00 | APXV18-206517S-C w/ Mount Pipe | 6 | 7.490 | 0.5047 | 0.1514 | 15788 |
| 40.00 | GPS_A | 6 | 0.491 | 0.1093 | 0.0234 | 21738 |

Bolt Design Data

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt K | Allowable Load K | Ratio Load Allowable | Allowable Ratio | Criteria |
|----------------|-----------------|-------------------|---------------|-----------------|-----------------------|----------------------------------|------------------------|----------------------------|--------------------|--------------|
| T1 | 180 | Leg | A325N | 0.7500 | 4 | 2.62 | 19.44 | 0.135 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 2.30 | 6.44 | 0.357 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 1.85 | 6.44 | 0.288 ✓ | 1.333 | Bolt Shear |
| T2 | 160 | Leg | A325N | 0.8750 | 4 | 9.73 | 26.46 | 0.368 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 2.90 | 6.44 | 0.450 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 2.63 | 6.44 | 0.408 ✓ | 1.333 | Bolt Shear |
| T3 | 140 | Leg | A325N | 1.0000 | 4 | 16.83 | 34.56 | 0.487 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 2.77 | 6.44 | 0.430 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 2.78 | 6.44 | 0.432 ✓ | 1.333 | Bolt Shear |
| T4 | 120 | Leg | A325N | 1.0000 | 4 | 21.98 | 34.56 | 0.636 ✓ | 1.333 | Bolt Tension |

| Section No. | Elevation ft | Component Type | Bolt Grade | Bolt Size in | Number Of Bolts | Maximum Load per Bolt K | Allowable Load K | Ratio Load Allowable | Allowable Ratio | Criteria |
|-------------|-----------------|----------------|------------|-----------------|-----------------|----------------------------|---------------------|-------------------------|-----------------|--------------|
| T5 | 100 | Diagonal | A325N | 0.6250 | 3 | 3.30 | 6.44 | 0.512 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 2.91 | 6.44 | 0.452 ✓ | 1.333 | Bolt Shear |
| | | Leg | A325N | 1.0000 | 6 | 18.21 | 34.56 | 0.527 ✓ | 1.333 | Bolt Tension |
| T6 | 80 | Diagonal | A325N | 0.6250 | 3 | 2.96 | 6.44 | 0.460 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 2.89 | 6.44 | 0.448 ✓ | 1.333 | Bolt Shear |
| | | Leg | A325N | 1.0000 | 6 | 21.36 | 34.56 | 0.618 ✓ | 1.333 | Bolt Tension |
| T7 | 60 | Diagonal | A325N | 0.6250 | 3 | 3.08 | 6.44 | 0.478 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 3.22 | 6.44 | 0.499 ✓ | 1.333 | Bolt Shear |
| | | Leg | A325N | 1.0000 | 6 | 24.40 | 34.56 | 0.706 ✓ | 1.333 | Bolt Tension |
| T8 | 40 | Diagonal | A325N | 0.6250 | 3 | 3.17 | 6.44 | 0.492 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 3.47 | 6.44 | 0.539 ✓ | 1.333 | Bolt Shear |
| | | Leg | A325N | 1.0000 | 8 | 20.39 | 34.56 | 0.590 ✓ | 1.333 | Bolt Tension |
| T9 | 20 | Diagonal | A325N | 0.6250 | 3 | 3.10 | 6.44 | 0.481 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 3.57 | 6.44 | 0.554 ✓ | 1.333 | Bolt Shear |
| | | Leg | A449 | 1.0000 | 8 | 21.14 | 31.10 | 0.680 ✓ | 1.333 | Bolt Tension |
| | | Diagonal | A325N | 0.6250 | 3 | 4.81 | 6.44 | 0.746 ✓ | 1.333 | Bolt Shear |
| | | Horizontal | A325N | 0.6250 | 2 | 3.92 | 6.44 | 0.609 ✓ | 1.333 | Bolt Shear |

Compression Checks

Leg Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 2.5 STD | 20.00 | 6.67 | 84.4 K=1.00 | 18.110 | 1.7040 | -15.11 | 30.86 | 0.490 ✓ |
| T2 | 160 - 140 | ROHN 3 X-STR | 20.04 | 6.68 | 70.5 K=1.00 | 20.840 | 3.0159 | -48.17 | 62.85 | 0.766 ✓ |
| T3 | 140 - 120 | ROHN 4 X-STR | 20.04 | 6.68 | 54.3 K=1.00 | 23.671 | 4.4074 | -79.49 | 104.33 | 0.762 ✓ |
| T4 | 120 - 100 | ROHN 5 X-STR | 20.04 | 10.02 | 65.4 K=1.00 | 21.776 | 6.1120 | -102.93 | 133.10 | 0.773 ✓ |
| T5 | 100 - 80 | ROHN 5 X-STR | 20.06 | 10.03 | 65.4 K=1.00 | 21.769 | 6.1120 | -127.67 | 133.05 | 0.960 ✓ |
| T6 | 80 - 60 | ROHN 6 EHS | 20.05 | 10.03 | 54.1 K=1.00 | 23.705 | 6.7133 | -150.24 | 159.14 | 0.944 ✓ |
| T7 | 60 - 40 | ROHN 6 X-STR | 20.05 | 10.03 | 54.8 K=1.00 | 23.583 | 8.4049 | -172.64 | 198.21 | 0.871 ✓ |
| T8 | 40 - 20 | ROHN 6 X-STR | 20.06 | 10.03 | 54.8 K=1.00 | 23.580 | 8.4049 | -194.01 | 198.19 | 0.979 ✓ |
| T9 | 20 - 0 | ROHN 8 EHS | 20.05 | 10.03 | 41.2 K=1.00 | 25.662 | 9.7193 | -204.00 | 249.41 | 0.818 ✓ |

Diagonal Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|----------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 2 STD | 7.92 | 7.70 | 117.3 K=1.00 | 10.850 | 1.0745 | -6.90 | 11.66 | 0.592 ✓ |
| T2 | 160 - 140 | ROHN 2 STD | 8.53 | 8.29 | 126.4 K=1.00 | 9.342 | 1.0745 | -8.47 | 10.04 | 0.844 ✓ |
| T3 | 140 - 120 | ROHN 2 STD | 9.21 | 8.94 | 136.3 K=1.00 | 8.039 | 1.0745 | -8.13 | 8.64 | 0.941 ✓ |
| T4 | 120 - 100 | ROHN 2.5 STD | 12.49 | 12.10 | 153.3 K=1.00 | 6.353 | 1.7040 | -9.78 | 10.82 | 0.903 ✓ |
| T5 | 100 - 80 | ROHN 2.5 STD | 13.31 | 12.96 | 164.1 K=1.00 | 5.546 | 1.7040 | -8.83 | 9.45 | 0.935 ✓ |
| T6 | 80 - 60 | ROHN 2.5 STD | 14.16 | 13.77 | 174.4 K=1.00 | 4.908 | 1.7040 | -9.24 | 8.36 | 1.104 ✓ |
| T7 | 60 - 40 | ROHN 2.5 X-STR | 15.07 | 14.70 | 190.9 K=1.00 | 4.096 | 2.2535 | -9.50 | 9.23 | 1.029 ✓ |
| T8 | 40 - 20 | ROHN 3 STD | 16.08 | 15.73 | 162.2 K=1.00 | 5.675 | 2.2285 | -9.30 | 12.65 | 0.735 ✓ |
| T9 | 20 - 0 | ROHN 3 STD | 24.33 | 12.17 | 125.5 K=1.00 | 9.486 | 2.2285 | -14.42 | 21.14 | 0.682 ✓ |

Horizontal Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.53 | 4.14 | 79.9 K=1.00 | 19.038 | 0.7995 | -3.71 | 15.22 | 0.244 ✓ |
| T2 | 160 - 140 | ROHN 1.5 STD | 9.93 | 4.82 | 92.9 K=1.00 | 16.310 | 0.7995 | -5.25 | 13.04 | 0.403 ✓ |
| T3 | 140 - 120 | ROHN 2 STD | 12.01 | 5.82 | 88.7 K=1.00 | 17.212 | 1.0745 | -5.57 | 18.50 | 0.301 ✓ |
| T4 | 120 - 100 | ROHN 2 STD | 13.83 | 6.68 | 101.9 K=1.00 | 14.260 | 1.0745 | -5.83 | 15.32 | 0.380 ✓ |
| T5 | 100 - 80 | ROHN 2 STD | 16.25 | 7.89 | 120.3 K=1.00 | 10.313 | 1.0745 | -5.78 | 11.08 | 0.521 ✓ |
| T6 | 80 - 60 | ROHN 2.5 STD | 18.79 | 9.12 | 115.5 K=1.00 | 11.192 | 1.7040 | -6.43 | 19.07 | 0.337 ✓ |
| T7 | 60 - 40 | ROHN 2.5 STD | 21.29 | 10.37 | 131.3 K=1.00 | 8.656 | 1.7040 | -6.89 | 14.75 | 0.467 ✓ |
| T8 | 40 - 20 | ROHN 2.5 STD | 23.86 | 11.65 | 147.6 K=1.00 | 6.854 | 1.7040 | -6.99 | 11.68 | 0.598 ✓ |
| T9 | 20 - 0 | ROHN 3 STD | 25.18 | 12.31 | 127.0 K=1.00 | 9.262 | 2.2285 | -7.85 | 20.64 | 0.380 ✓ |

Top Girt Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.50 | 4.13 | 79.6 K=1.00 | 19.091 | 0.7995 | -1.70 | 15.26 | 0.111 ✓ |

Redundant Horizontal (1) Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN TS1.5x11 ga | 6.29 | 5.93 | 145.4 K=1.00 | 7.062 | 0.5202 | -3.54 | 3.67 | 0.964 ✓ |

Redundant Diagonal (1) Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN 1.5 STD | 11.50 | 10.94 | 210.9 K=1.00 | 3.357 | 0.7995 | -3.23 | 2.68 | 1.205 ✓ |

Redundant Hip (1) Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN TS1.5x11 ga | 6.29 | 6.29 | 154.2 K=1.00 | 6.278 | 0.5202 | -0.04 | 3.27 | 0.013 ✓ |

Redundant Hip Diagonal Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN 2.5 STD | 15.07 | 15.07 | 190.9 K=1.00 | 4.096 | 1.7040 | -0.05 | 6.98 | 0.007 ✓ |

* DL controls

Inner Bracing Design Data (Compression)

| 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 P P _a |
|-------------|-----------------|-------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | L2x2x1/8 | 4.25 | 4.25 | 128.3 K=1.00 | 9.074 | 0.4844 | -0.03 | 4.39 | 0.007 ✓ |
| T2 | 160 - 140 | L2x2x1/8 | 4.97 | 4.97 | 149.9 K=1.00 | 6.648 | 0.4844 | -0.01 | 3.22 | 0.002 ✓ |
| T3 | 140 - 120 | L2x2x1/8 | 6.01 | 6.01 | 181.3 K=1.00 | 4.542 | 0.4844 | -0.01 | 2.20 | 0.003 ✓ |
| T4 | 120 - 100 | L2x2x1/8 | 6.92 | 6.92 | 208.8 K=1.00 | 3.426 | 0.4844 | -0.01 | 1.66 | 0.004 ✓ |
| T5 | 100 - 80 | L2 1/2x2 1/2x3/16 | 8.13 | 8.13 | 197.0 K=1.00 | 3.849 | 0.9020 | -0.01 | 3.47 | 0.002 ✓ |
| T6 | 80 - 60 | L3x3x3/16 | 9.40 | 9.40 | 189.2 K=1.00 | 4.173 | 1.0900 | -0.01 | 4.55 | 0.002 ✓ |

| Section No. | Elevation ft | Size | L ft | L _u ft | KI/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P P _a |
|-------------|-----------------|------------------|---------|----------------------|-----------------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T7 | 60 - 40 | L3 1/2x3 1/2x1/4 | 10.65 | 10.65 | 184.1 K=1.00 | 4.407 | 1.6900 | -0.01 | 7.45 | 0.001 |
| T8 | 40 - 20 | L3 1/2x3 1/2x1/4 | 11.93 | 11.93 | 206.3 K=1.00 | 3.510 | 1.6900 | -0.01 | 5.93 | 0.002 |
| T9 | 20 - 0 | ROHN 3 STD | 12.59 | 12.59 | 129.8 K=1.00 | 8.860 | 2.2285 | -0.01 | 19.74 | 0.001 |

* DL controls

Tension Checks

Leg Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _u ft | KI/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P P _a |
|-------------|-----------------|--------------|---------|----------------------|------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 2.5 STD | 20.00 | 6.67 | 84.4 | 30.000 | 1.7040 | 10.49 | 51.12 | 0.205 |
| T2 | 160 - 140 | ROHN 3 X-STR | 20.04 | 6.68 | 70.5 | 30.000 | 3.0159 | 38.91 | 90.48 | 0.430 |
| T3 | 140 - 120 | ROHN 4 X-STR | 20.04 | 6.68 | 54.3 | 30.000 | 4.4074 | 67.30 | 132.22 | 0.509 |
| T4 | 120 - 100 | ROHN 5 X-STR | 20.04 | 10.02 | 65.4 | 30.000 | 6.1120 | 87.92 | 183.36 | 0.479 |
| T5 | 100 - 80 | ROHN 5 X-STR | 20.06 | 10.03 | 65.4 | 30.000 | 6.1120 | 109.27 | 183.36 | 0.596 |
| T6 | 80 - 60 | ROHN 6 EHS | 20.05 | 10.03 | 54.1 | 30.000 | 6.7133 | 128.18 | 201.40 | 0.636 |
| T7 | 60 - 40 | ROHN 6 X-STR | 20.05 | 10.03 | 54.8 | 30.000 | 8.4049 | 146.38 | 252.15 | 0.581 |
| T8 | 40 - 20 | ROHN 6 X-STR | 20.06 | 10.03 | 54.8 | 30.000 | 8.4049 | 163.12 | 252.15 | 0.647 |
| T9 | 20 - 0 | ROHN 8 EHS | 20.05 | 10.03 | 41.2 | 30.000 | 9.7193 | 169.42 | 291.58 | 0.581 |

Diagonal Design Data (Tension)

| Section No. | Elevation ft | Size | L ft | L _u ft | KI/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P P _a |
|-------------|-----------------|--------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 2 STD | 7.92 | 7.70 | 117.3 | 30.000 | 1.0745 | 6.83 | 32.24 | 0.212 |
| T2 | 160 - 140 | ROHN 2 STD | 8.31 | 8.08 | 123.2 | 30.000 | 1.0745 | 8.62 | 32.24 | 0.267 |
| T3 | 140 - 120 | ROHN 2 STD | 8.75 | 8.48 | 129.2 | 30.000 | 1.0745 | 8.22 | 32.24 | 0.255 |
| T4 | 120 - 100 | ROHN 2.5 STD | 12.16 | 11.78 | 149.2 | 30.000 | 1.7040 | 9.75 | 51.12 | 0.191 |
| T5 | 100 - 80 | ROHN 2.5 STD | 12.89 | 12.54 | 158.8 | 30.000 | 1.7040 | 8.70 | 51.12 | 0.170 |
| T6 | 80 - 60 | ROHN 2.5 STD | 14.16 | 13.77 | 174.4 | 30.000 | 1.7040 | 8.95 | 51.12 | 0.175 |

| 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 P P _a |
|-------------|-----------------|----------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T7 | 60 - 40 | ROHN 2.5 X-STR | 15.07 | 14.70 | 190.9 | 30.000 | 2.2535 | 9.09 | 67.61 | 0.134 |
| T8 | 40 - 20 | ROHN 3 STD | 16.08 | 15.73 | 162.2 | 30.000 | 2.2285 | 8.82 | 66.85 | 0.132 |
| T9 | 20 - 0 | ROHN 3 STD | 24.33 | 12.17 | 125.5 | 30.000 | 2.2285 | 13.92 | 66.85 | 0.208 |

Horizontal Design Data (Tension)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.53 | 4.14 | 79.9 | 30.000 | 0.7995 | 3.68 | 23.98 | 0.153 |
| T2 | 160 - 140 | ROHN 1.5 STD | 9.93 | 4.82 | 92.9 | 30.000 | 0.7995 | 5.24 | 23.98 | 0.218 |
| T3 | 140 - 120 | ROHN 2 STD | 12.01 | 5.82 | 88.7 | 30.000 | 1.0745 | 5.55 | 32.24 | 0.172 |
| T4 | 120 - 100 | ROHN 2 STD | 13.83 | 6.68 | 101.9 | 30.000 | 1.0745 | 5.75 | 32.24 | 0.178 |
| T5 | 100 - 80 | ROHN 2 STD | 16.25 | 7.89 | 120.3 | 30.000 | 1.0745 | 5.69 | 32.24 | 0.177 |
| T6 | 80 - 60 | ROHN 2.5 STD | 18.79 | 9.12 | 115.5 | 30.000 | 1.7040 | 6.39 | 51.12 | 0.125 |
| T7 | 60 - 40 | ROHN 2.5 STD | 21.29 | 10.37 | 131.3 | 30.000 | 1.7040 | 6.95 | 51.12 | 0.136 |
| T8 | 40 - 20 | ROHN 2.5 STD | 23.86 | 11.65 | 147.6 | 30.000 | 1.7040 | 7.14 | 51.12 | 0.140 |
| T9 | 20 - 0 | ROHN 3 STD | 25.18 | 12.31 | 127.0 | 30.000 | 2.2285 | 7.73 | 66.85 | 0.116 |

Top Girt Design Data (Tension)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | ROHN 1.5 STD | 8.50 | 4.13 | 79.6 | 30.000 | 0.7995 | 1.71 | 23.98 | 0.071 |

Redundant Horizontal (1) Design Data (Tension)

| 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 P P _a |
|-------------|-----------------|------------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN TS1.5x11 ga | 6.29 | 5.93 | 145.4 | 30.000 | 0.5202 | 3.54 | 15.61 | 0.227 |

Redundant Diagonal (1) Design Data (Tension)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN 1.5 STD | 11.50 | 10.94 | 210.9 | 30.000 | 0.7995 | 3.23 | 23.98 | 0.135 ✓ |

Redundant Hip Diagonal Design Data (Tension)

| 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 P P _a |
|-------------|-----------------|--------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T9 | 20 - 0 | ROHN 2.5 STD | 15.07 | 15.07 | 190.9 | 30.000 | 1.7040 | 0.07 | 51.12 | 0.001 ✓ |

Inner Bracing Design Data (Tension)

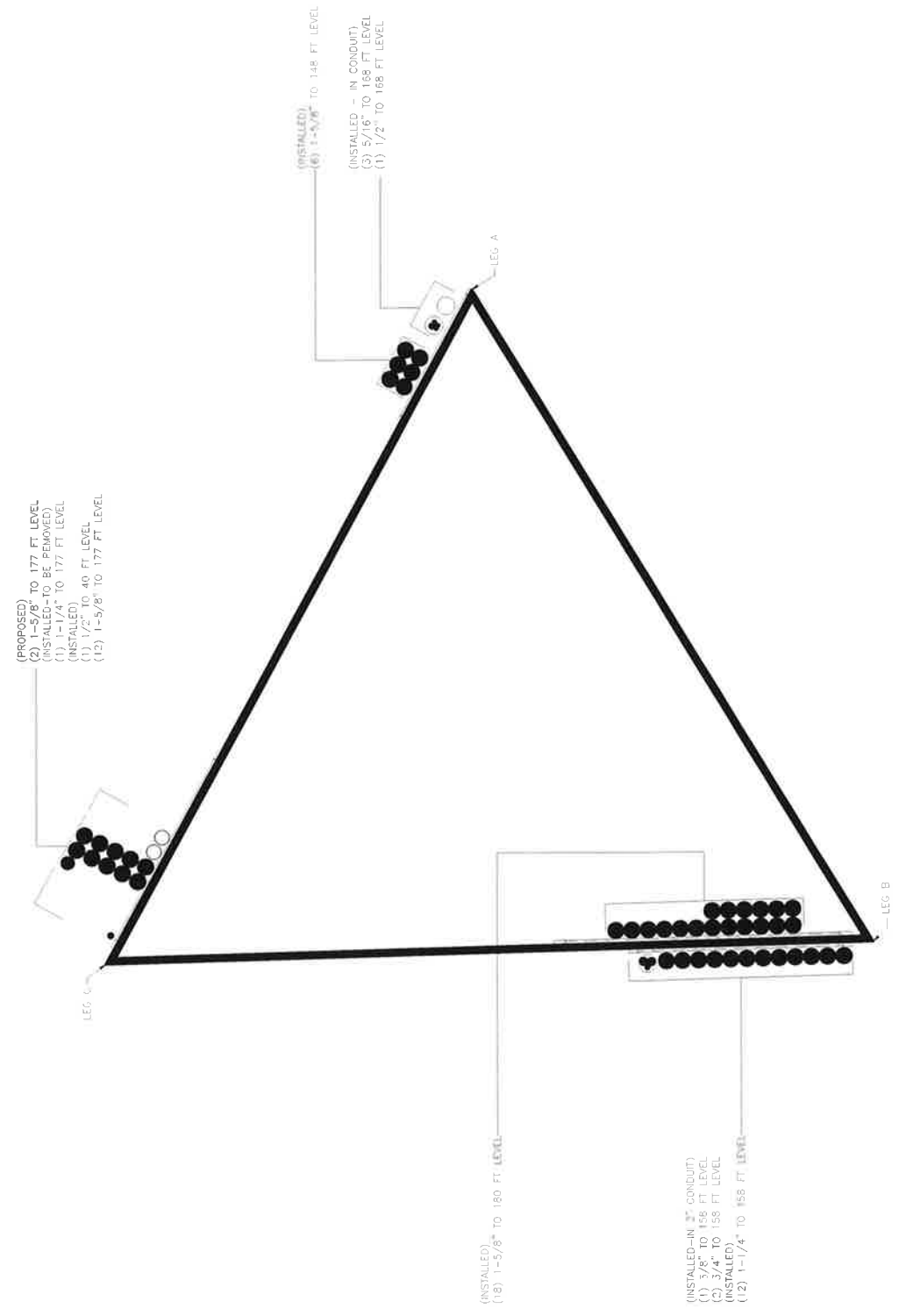
| Section No. | Elevation ft | Size | L ft | L _u ft | Kl/r | F _a ksi | A in ² | Actual P K | Allow. P _a K | Ratio P P _a |
|-------------|-----------------|-------------------|---------|----------------------|-------|-----------------------|----------------------|---------------|----------------------------|---------------------------|
| T1 | 180 - 160 | L2x2x1/8 | 4.25 | 4.25 | 81.4 | 21.600 | 0.4844 | 0.03 | 10.46 | 0.003 ✓ |
| T2 | 160 - 140 | L2x2x1/8 | 4.27 | 4.27 | 81.8 | 21.600 | 0.4844 | 0.00 | 10.46 | 0.000 ✓ |
| T3 | 140 - 120 | L2x2x1/8 | 5.31 | 5.31 | 101.8 | 21.600 | 0.4844 | 0.00 | 10.46 | 0.000 ✓ |
| T4 | 120 - 100 | L2x2x1/8 | 6.35 | 6.35 | 121.8 | 21.600 | 0.4844 | 0.00 | 10.46 | 0.000 ✓ |
| T5 | 100 - 80 | L2 1/2x2 1/2x3/16 | 7.48 | 7.48 | 115.4 | 21.600 | 0.9020 | 0.00 | 19.48 | 0.000 ✓ |
| T6 | 80 - 60 | L3x3x3/16 | 8.77 | 8.77 | 112.1 | 21.600 | 1.0900 | 0.00 | 23.54 | 0.000 ✓ |

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail |
|-------------|-----------------|----------------|----------------|------------------|---------|----------------------------|---------------|--------------|
| T1 | 180 - 160 | Leg | ROHN 2.5 STD | 2 | -15.11 | 41.14 | 36.7 | Pass |
| T2 | 160 - 140 | Leg | ROHN 3 X-STR | 41 | -48.17 | 83.78 | 57.5 | Pass |
| T3 | 140 - 120 | Leg | ROHN 4 X-STR | 80 | -79.49 | 139.07 | 57.2 | Pass |
| T4 | 120 - 100 | Leg | ROHN 5 X-STR | 119 | -102.93 | 177.42 | 58.0 | Pass |
| T5 | 100 - 80 | Leg | ROHN 5 X-STR | 146 | -127.67 | 177.35 | 72.0 | Pass |
| T6 | 80 - 60 | Leg | ROHN 6 EHS | 173 | -150.24 | 212.13 | 70.8 | Pass |
| T7 | 60 - 40 | Leg | ROHN 6 X-STR | 200 | -172.64 | 264.22 | 65.3 | Pass |
| T8 | 40 - 20 | Leg | ROHN 6 X-STR | 227 | -194.01 | 264.19 | 73.4 | Pass |
| T9 | 20 - 0 | Leg | ROHN 8 EHS | 254 | -204.00 | 332.47 | 61.4 | Pass |
| T1 | 180 - 160 | Diagonal | ROHN 2 STD | 9 | -6.90 | 15.54 | 44.4 | Pass |
| T2 | 160 - 140 | Diagonal | ROHN 2 STD | 45 | -8.47 | 13.38 | 63.3 | Pass |
| T3 | 140 - 120 | Diagonal | ROHN 2 STD | 84 | -8.13 | 11.51 | 70.6 | Pass |
| T4 | 120 - 100 | Diagonal | ROHN 2.5 STD | 123 | -9.78 | 14.43 | 67.8 | Pass |
| T5 | 100 - 80 | Diagonal | ROHN 2.5 STD | 150 | -8.83 | 12.60 | 70.1 | Pass |
| T6 | 80 - 60 | Diagonal | ROHN 2.5 STD | 177 | -9.24 | 11.15 | 82.9 | Pass |
| T7 | 60 - 40 | Diagonal | ROHN 2.5 X-STR | 204 | -9.50 | 12.30 | 77.2 | Pass |
| T8 | 40 - 20 | Diagonal | ROHN 3 STD | 230 | -9.30 | 16.86 | 55.2 | Pass |
| T9 | 20 - 0 | Diagonal | ROHN 3 STD | 260 | -14.42 | 28.18 | 51.2 | Pass |
| | | | | | | | 56.0 (b) | |
| T1 | 180 - 160 | Horizontal | ROHN 1.5 STD | 7 | -3.71 | 20.29 | 18.3 | Pass |

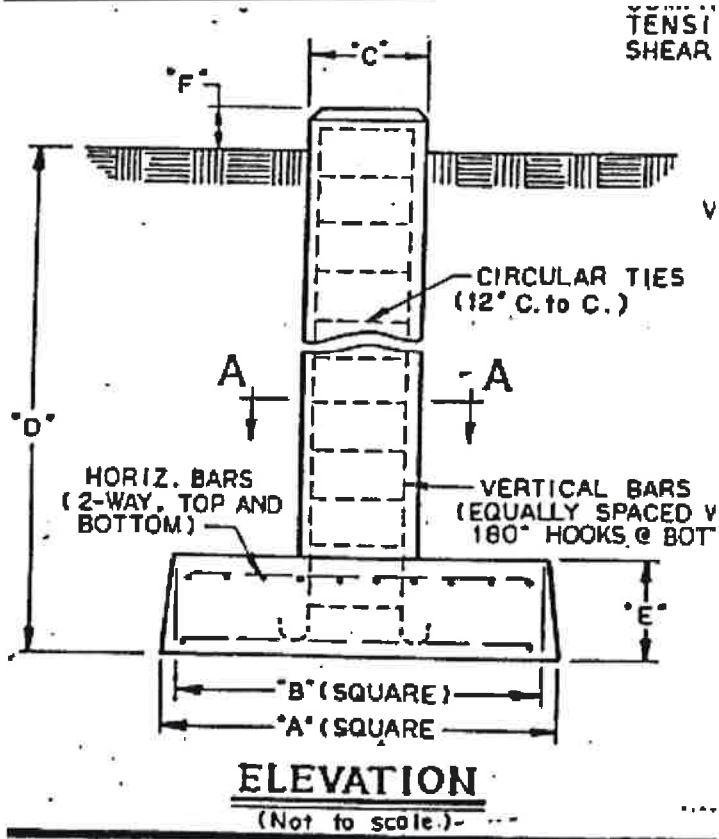
| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail | |
|-------------|--------------|-----------------------------|-------------------|------------------|-------|-------------------------|----------------------------------|-------------|-------------|
| T2 | 160 - 140 | Horizontal | ROHN 1.5 STD | 43 | -5.25 | 17.38 | 21.6 (b) 30.2 | Pass | |
| T3 | 140 - 120 | Horizontal | ROHN 2 STD | 82 | -5.57 | 24.65 | 30.6 (b) 22.6 | Pass | |
| T4 | 120 - 100 | Horizontal | ROHN 2 STD | 121 | -5.83 | 20.43 | 32.4 (b) 28.5 | Pass | |
| T5 | 100 - 80 | Horizontal | ROHN 2 STD | 148 | -5.78 | 14.77 | 33.9 (b) 39.1 | Pass | |
| T6 | 80 - 60 | Horizontal | ROHN 2.5 STD | 175 | -6.43 | 25.42 | 25.3 37.4 (b) | Pass | |
| T7 | 60 - 40 | Horizontal | ROHN 2.5 STD | 202 | -6.89 | 19.66 | 35.0 40.5 (b) | Pass | |
| T8 | 40 - 20 | Horizontal | ROHN 2.5 STD | 229 | -6.99 | 15.57 | 44.9 | Pass | |
| T9 | 20 - 0 | Horizontal | ROHN 3 STD | 256 | -7.85 | 27.51 | 28.5 45.7 (b) | Pass | |
| T1 | 180 - 160 | Top Girt | ROHN 1.5 STD | 4 | -1.70 | 20.34 | 8.4 | Pass | |
| T9 | 20 - 0 | Redund Horz 1 Bracing | ROHN TS1.5x11 ga | 261 | -3.54 | 4.90 | 72.3 | Pass | |
| T9 | 20 - 0 | Redund Diag 1 Bracing | ROHN 1.5 STD | 262 | -3.23 | 3.58 | 90.4 | Pass | |
| T9 | 20 - 0 | Redund Hip 1 Bracing | ROHN TS1.5x11 ga | 281 | -0.04 | 4.35 | 1.0 | Pass | |
| T9 | 20 - 0 | Redund Hip Diagonal Bracing | ROHN 2.5 STD | 282 | -0.05 | 6.98 | 0.7 | Pass | |
| T1 | 180 - 160 | Inner Bracing | L2x2x1/8 | 37 | -0.03 | 5.86 | 0.5 | Pass | |
| T2 | 160 - 140 | Inner Bracing | L2x2x1/8 | 52 | -0.01 | 4.29 | 0.3 | Pass | |
| T3 | 140 - 120 | Inner Bracing | L2x2x1/8 | 91 | -0.01 | 2.93 | 0.4 | Pass | |
| T4 | 120 - 100 | Inner Bracing | L2x2x1/8 | 132 | -0.01 | 2.21 | 0.4 | Pass | |
| T5 | 100 - 80 | Inner Bracing | L2 1/2x2 1/2x3/16 | 158 | -0.01 | 3.47 | 0.5 | Pass | |
| T6 | 80 - 60 | Inner Bracing | L3x3x3/16 | 184 | -0.01 | 4.55 | 0.5 | Pass | |
| T7 | 60 - 40 | Inner Bracing | L3 1/2x3 1/2x1/4 | 212 | -0.01 | 7.45 | 0.5 | Pass | |
| T8 | 40 - 20 | Inner Bracing | L3 1/2x3 1/2x1/4 | 238 | -0.01 | 5.93 | 0.5 | Pass | |
| T9 | 20 - 0 | Inner Bracing | ROHN 3 STD | 283 | -0.01 | 19.74 | 0.4 | Pass | |
| | | | | | | | Summary | | |
| | | | | | | | Leg (T8) | 73.4 | Pass |
| | | | | | | | Diagonal (T6) | 82.9 | Pass |
| | | | | | | | Horizontal (T9) | 45.7 | Pass |
| | | | | | | | Top Girt (T1) | 8.4 | Pass |
| | | | | | | | Redund Horz 1 Bracing (T9) | 72.3 | Pass |
| | | | | | | | Redund Diag 1 Bracing (T9) | 90.4 | Pass |
| | | | | | | | Redund Hip 1 Bracing (T9) | 1.0 | Pass |
| | | | | | | | Redund Hip Diagonal Bracing (T9) | 0.7 | Pass |
| | | | | | | | Inner Bracing (T8) | 0.5 | Pass |
| | | | | | | | Bolt Checks | 56.0 | Pass |
| | | | | | | | RATING = | 90.4 | Pass |

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

SST Pad&Pier Check

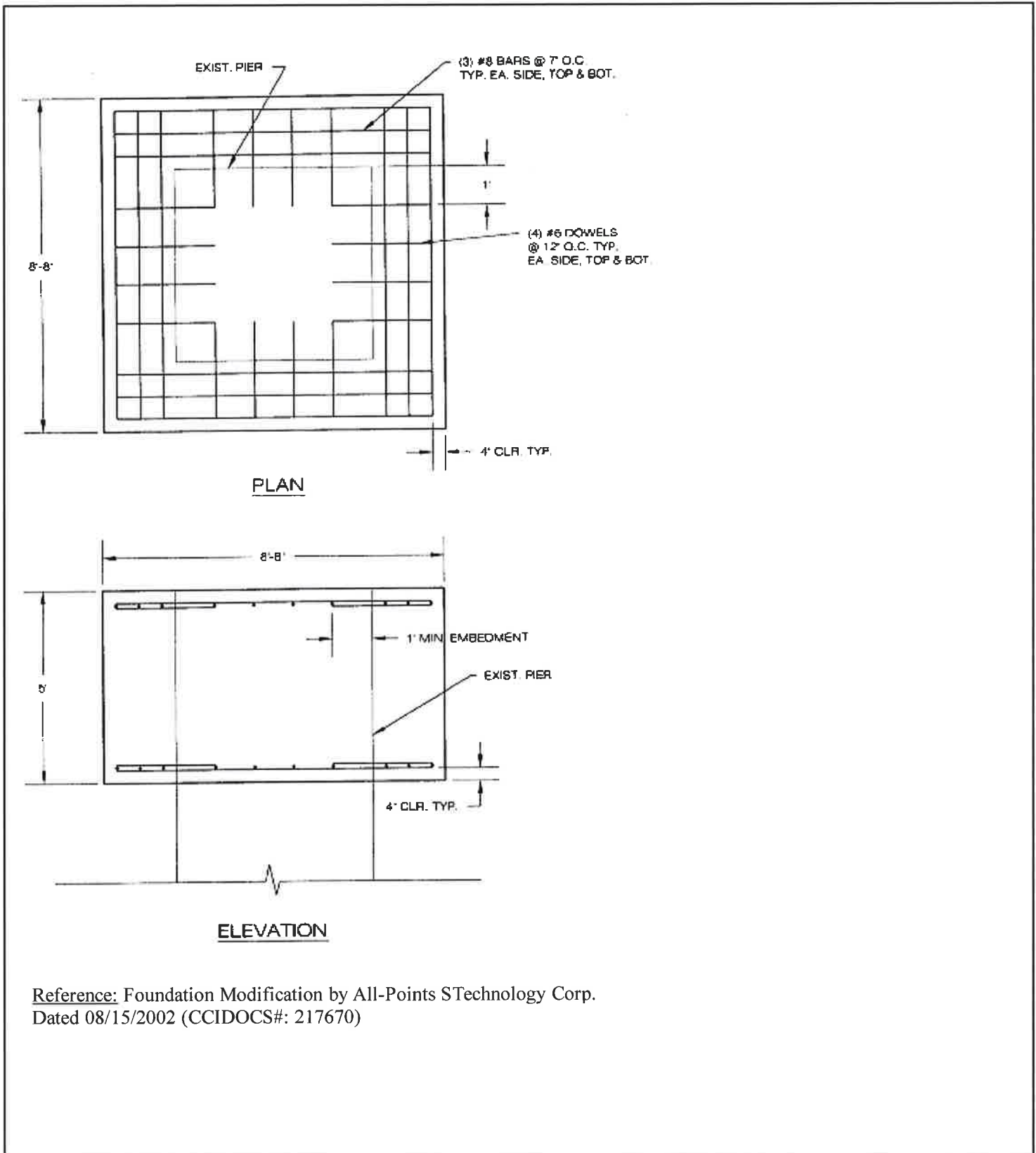


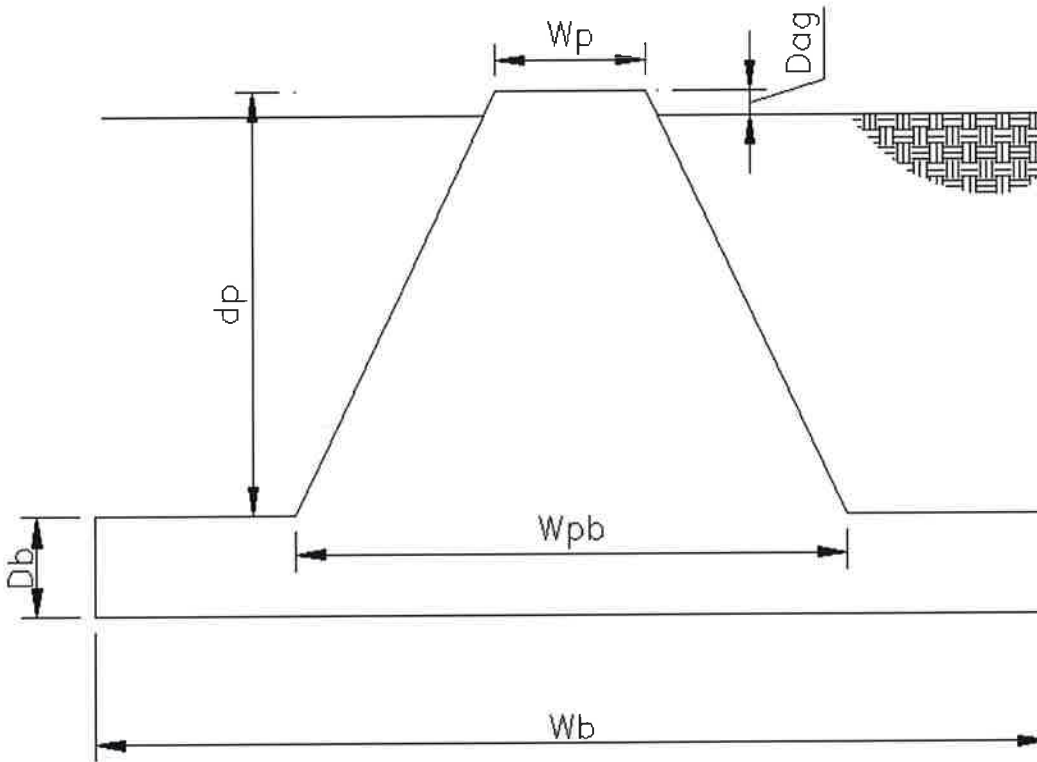
FOUNDATION SCHEDULE

| "A" | "B" | "C" | "D" | "E" | "F" | H-BARS | V-BARS | TIES |
|-------|-------|-------|--------|-------|-----|------------|-------------|-------|
| 9'-3" | 8'-9" | 3'-0" | 12'-6" | 2'-0" | 6" | (10) NO. 7 | (16) NO. 10 | NO. 4 |

NOTE: SEE - TOWER ASSEMBLY FOR FOUNDATION LAYOUT AND ANCHORAGE EMBEDMENTS. SEE STANDARD FOUNDATION NOTES BB41300.

Reference: Foundation Drawings by UNR-ROHN dated 09/09/1986 (CCIDOCs#: 217670)





Tower Reactions:

$P_{uplift} := 186 \cdot kip$ Maximum Uplift Force per Leg

$P_{comp} := 224 \cdot kip$ Maximum Compression Force per Leg

Foundation Dimensions:

$d_p := 11 ft$

Pier Height:

$w_p := 3 \cdot ft$

Pier Diameter (circular)

$w_b := 9.25 \cdot ft$

Pad Width:

$w_t := 2 ft$

Pad Thickness

$h_g := 0.5 \cdot ft$

Pier Height Above Grade:

$df := d_p - h_g$

Depth from grade to the top of the pad

$w_{bmp} := 8.67 \cdot ft$

Modification Pad Width

$w_{tmp} := 5 \cdot ft$

Modification Pad Thickness

Properties of Pad & Pier:

| | |
|---|-----------------------------------|
| $V_{\text{pier}} := [w_p^2 \cdot (d_p)] = 99 \cdot \text{ft}^3$ | Volume of Pier |
| $V_{\text{pad}} := w_b^2 \cdot w_t = 171.1 \cdot \text{ft}^3$ | Volume of Pad |
| $V_{\text{conc}} := V_{\text{pier}} + V_{\text{pad}} = 270.1 \cdot \text{ft}^3$ | Total Volume of Foundation |
| $P_o := 4 \cdot w_b = 37 \text{ ft}$ | Pad Perimeter |
| $A_s := P_o \cdot w_t = 74 \text{ ft}^2$ | Surface area around pad perimeter |
| $\gamma_{\text{conc}} := 150 \text{ pcf}$ | Concrete Density |

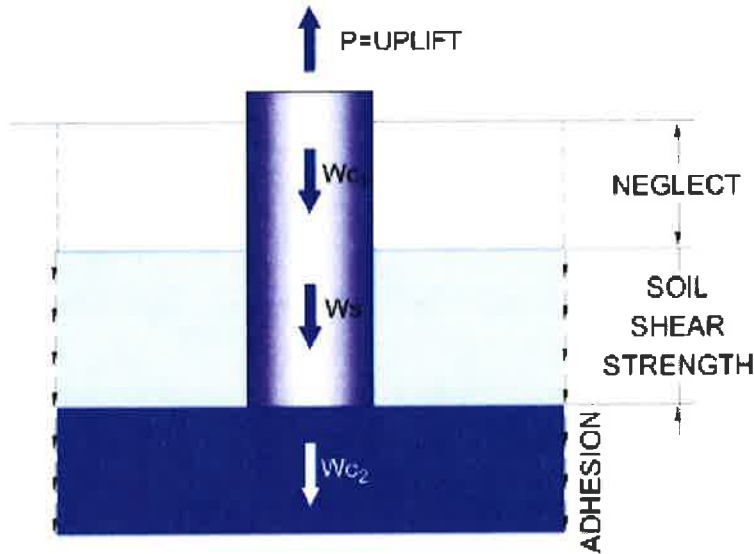
Properties of Modification Pad:

| | |
|---|----------------------------|
| $V_{\text{mp}} := (w_{\text{bmp}}^2 - w_p^2) \cdot w_{\text{tmp}} = 330.8 \cdot \text{ft}^3$ | Volume of Modification Pad |
| $P_o := 4 \cdot w_b = 37 \text{ ft}$ | Pad Perimeter |
| $W_{\text{conc}} := (V_{\text{conc}} + V_{\text{mp}}) \cdot \gamma_{\text{conc}} = 90.1 \cdot \text{kip}$ | Weight of Concrete |

Volume of Soil above pad

| | |
|---|--|
| $\gamma_{\text{soil}} := 120 \cdot \text{pcf}$ | Soil Density |
| $C := 7 \cdot \text{ksf}$ | Cohesion (10.5' to 6' below grade) |
| $d_{\text{fr}} := 48 \text{ in}$ | Frost Depth |
| $D_f := 10.5 \cdot \text{ft} - 6 \cdot \text{ft} = 4.5 \text{ ft}$ | Effective Depth of cohesive soil above Block |
| $V_{\text{soil}} := (w_b^2 \cdot d_f) - [w_p^2 \cdot (d_f - w_{\text{tmp}})] - w_{\text{bmp}}^2 \cdot (w_{\text{tmp}} - h_g) = 510.6 \cdot \text{ft}^3$ | Volume of Soil above Pad |
| $W_{\text{soil}} := V_{\text{soil}} \cdot \gamma_{\text{soil}} = 61.3 \cdot \text{kip}$ | Weight of Soil |

Check Uplift Capacity



**UPLIFT RESISTANCE
 (COHESIVE SOIL)**

$$\alpha_{\text{soil}} := .31 + \frac{.34}{\left(\frac{C}{\text{ksf}}\right)} = 0.4$$

Adhesion Factor

$$C_a := \alpha_{\text{soil}} \cdot C = 2.5 \cdot \text{ksf}$$

αC Adhesion (from 6'-10.5' Below Grade)

$$R_{\text{soil}} := W_{\text{soil}} + C_a \cdot P_o \cdot D_f = 479.2 \cdot \text{kip}$$

Uplift Resistance from Soil

$$R_{\text{conc}} := W_{\text{conc}}$$

Uplift Resistance from Concrete Weight

$$R_{\text{allowable}} := \min\left(\frac{R_{\text{soil}}}{2} + \frac{R_{\text{conc}}}{1.25}, \frac{R_{\text{soil}}}{1.5} + \frac{R_{\text{conc}}}{1.5}\right) = 311.7 \cdot \text{kip} \text{ Allowable Uplift Resistance}$$

$$\text{Usage}_{\text{uplift}} := \frac{P_{\text{uplift}}}{R_{\text{allowable}}} = 59.7\% < 110\% \text{ OK....in Uplift}$$

Check for Bearing Capacity of Base Foundation:

$B_a := w_b^2 = 85.6 \text{ ft}^2$ Bearing Area

$\sigma_{all} := 12 \text{ ksf}$ Allowable net bearing Capacity

$\sigma := \frac{P_{comp}}{B_a} = 2.6 \cdot \text{ksf}$ Applied Bearing Pressure

$Usage_{bearing} := \frac{\sigma}{\sigma_{all}} = 21.8\% < 110\%$ OK in bearing
 (Shear is assumed to be resisted by passive pressures and not by soil bearing)

Base Pad Check:

$f_c := 3000 \text{ psi}$ Compressive Strength of Concrete

$f_y := 60000 \text{ psi}$ Yield Strength of rebar

$\gamma_c := 150 \text{ pcf}$ Concrete Density

$c := 3 \text{ in}$ clear spacing, ACI 318: 7.7.1

$dia_{bar} := \frac{7}{8} \text{ in}$ Diameter of rebar

$A_{bar} := dia_{bar}^2 \cdot 0.25 \cdot \pi = 0.6 \cdot \text{in}^2$ Area of rebars

$n := 1$ Number of rebars per foot

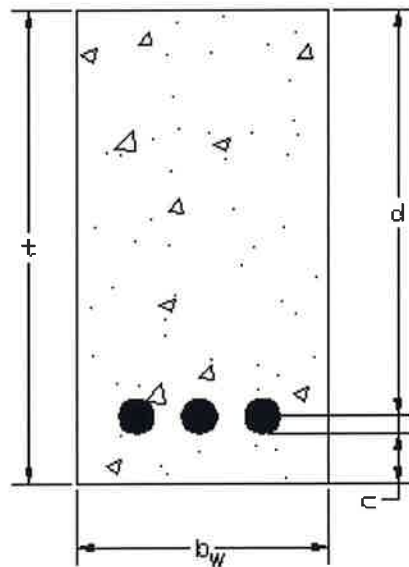
$d := w_t - c - dia_{bar} \cdot 0.5 = 20.6 \cdot \text{in}$

$b_w := 12 \text{ in}$ effective slab width considered

$l_{foot} := \frac{w_b - w_p}{2} = 3.1 \text{ ft}$ Cantilever Length

$M := l_{foot} \cdot b_w \cdot \sigma \cdot \frac{l_{foot}}{2} = 12.8 \cdot \text{kip} \cdot \text{ft}$

$M_u := M \cdot 1.3 = 16.6 \cdot \text{kip} \cdot \text{ft}$ Maximum Applied Moment



Check Bending

$$A_s := n \cdot A_{\text{bar}} = 0.6 \cdot \text{in}^2 \quad \text{Area of steel per foot}$$

Minimum Steel Check

$$\rho := \frac{A_s}{b_w \cdot d} = 0.002437$$

$$\rho_{\text{min}} := 0.0018 \quad \text{ACI 318: 7.12.2.1}$$

Test := $\left\{ \begin{array}{l} \text{"Steel amount is more than minimum"} \quad \text{if } \rho_{\text{min}} < \rho \\ \text{"Increase steel amount"} \quad \text{otherwise} \end{array} \right.$

Test = "Steel amount is more than minimum"

Pad Check

$$a := \frac{A_s \cdot f_y}{0.85 \cdot f_c \cdot b_w} = 1.2 \cdot \text{in}$$

$$M_n := A_s \cdot f_y \cdot (d - a \cdot 0.5) = 60.051 \cdot \text{kip} \cdot \text{ft} \quad \phi_b := 0.9$$

$$\phi_b \cdot M_n = 54.046 \cdot \text{kip} \cdot \text{ft} \quad \text{Moment capacity of pad}$$

Test := $\left\{ \begin{array}{l} \text{"Moment Capacity is adequate"} \quad \text{if } \phi_b \cdot M_n > M_u \\ \text{"Change Section Properties"} \quad \text{otherwise} \end{array} \right.$

Test = "Moment Capacity is adequate"

$$\text{Usage} := \left[\frac{(M_u)}{\phi_b \cdot M_n} \right] = 30.7 \% \quad < 105\% \quad \text{.....OK!}$$

Punching Shear Check of Base Foundation:

$\beta_c := 1$

Ratio of long side to short side of loaded area

$\phi := 0.75$

$b_o := 4 \cdot (w_p + d) = 226.3 \cdot \text{in}$

Length of critical perimeter

$V_u := P_{\text{comp}} - \sigma \cdot (w_p + d)^2 = 165.8 \cdot \text{kip}$

Shear at critical perimeter

$$\phi V_c := \begin{cases} \left(4 \cdot \phi \cdot d \cdot b_o \cdot \sqrt{f_c \cdot \text{psi}} \right) & \text{if } \beta_c \leq 2 \\ \left[\left[\phi \cdot d \cdot b_o \cdot \left(2 + \frac{4}{\beta_c} \right) \cdot \sqrt{f_c \cdot \text{psi}} \right] \right] & \text{otherwise} \end{cases}$$

Punching Shear Strength, ACI Eq (11-35)

$\phi V_c = 764.4 \cdot \text{kip}$

$\text{Usage}_{\text{punching}} := \frac{1.3 \cdot V_u}{\phi V_c} = 28.2\% < 105\%$

.....OK in punching shear

Check for Flexural-Shear Capacity of Base Foundation:

$x := \left[\frac{(w_b - w_p)}{2} - d \right] = 1.4 \text{ ft}$

Distance from the edge of the footing to the critical section for flexural shear

$V_u := \sigma \cdot w_b \cdot x = 34.2 \cdot \text{kip}$

Shear Force at the critical section

$\phi V_c := 2 \cdot \phi \cdot w_b \cdot d \cdot \sqrt{f_c \cdot \text{psi}} = 187.5 \cdot \text{kip}$

Shear Capacity of the footing , ACI Eq (11-3)

$\text{Usage}_{\text{FlexShear}} := \frac{1.3 \cdot V_u}{\phi V_c} = 23.7\% < 105\%$

.....OK in flexural-shear capacity

Pier Check:

$$n_{\text{pier}} := 10$$

Number of pier rebar

$$\text{dia}_{\text{bar}} := \frac{7}{8} \text{ in}$$

Diameter of pier rebar

$$A_{\text{bar}} := \pi \cdot \frac{\text{dia}_{\text{bar}}^2}{4} = 0.6 \cdot \text{in}^2$$

Area of rebar

$$A_{\text{st}} := n_{\text{pier}} \cdot A_{\text{bar}} = 6 \cdot \text{in}^2$$

Total Steel Area

$$A_{\text{g}} := w_{\text{p}}^2 = 9 \text{ ft}^2$$

Gross cross-sectional area of pier

$$P_{\text{n}} := 0.8 \cdot [0.85 \cdot f_{\text{c}} \cdot (A_{\text{g}} - A_{\text{st}}) + A_{\text{st}} \cdot f_{\text{y}}] = 2920.2 \cdot \text{kip}$$

Axial Load Capacity of Pier

$$P_{\text{u}} := 1.3 P_{\text{comp}} = 291.2 \cdot \text{kip}$$

$$\phi_{\text{c}} := 0.65$$

$$\text{Usage} := \frac{P_{\text{u}}}{\phi_{\text{c}} \cdot P_{\text{n}}} = 15.3\% < 105\%$$

.....OK!