

December 23, 2014

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

Re: **Notice of Exempt Modification – Facility Modification
North Main Street, Marlborough, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the top of the existing 155.5-foot tower off North Main Street in Marlborough (the “Property”). The tower is owned by Crown Castle. Cellco’s shared use of this tower was approved by the Council in 1995 (Docket No. 169). Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model LNX-6514DS-VTM, 700 MHz antennas; two (2) model LNX-6514DS-VTM, 850 MHz antennas; one (1) model LNX-8513DS-VTM, 850 MHz antenna; three (3) model HBXX-6517DS-VTM, 1900 MHz antennas; and three (3) model HBXX-6517DS-VTM, 2100 MHz antennas, all at the same level on the tower. Cellco also intends to install six (6) remote radio heads (“RRHs”) behind its 1900 MHz and 2100 MHz antennas and two (2) HYBRIFLEX™ antenna cables, inside the monopole tower. Included in Attachment 1 are specifications for the 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 Catherine D. Gaudinski, First Selectman for the Town of Marlborough. A copy of this letter is also being sent to Village Properties LLC, the owner of the Property.

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

Robinson+Cole

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

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:

Catherine D. Gaudinski, Marlborough First Selectman
Village Properties LLC
Sandy M. Carter

ATTACHMENT 1

Product Specifications



LNX-6514DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

POWERED BY



Electrical Specifications

| Frequency Band, MHz | 698–806 | 806–896 |
|--------------------------------------|------------|------------|
| Gain, dBi | 15.7 | 16.3 |
| Beamwidth, Horizontal, degrees | 65 | 65 |
| Beamwidth, Vertical, degrees | 12.5 | 11.2 |
| Beam Tilt, degrees | 0–10 | 0–10 |
| USLS, typical, dB | 17 | 18 |
| Front-to-Back Ratio at 180°, dB | 32 | 30 |
| CPR at Boresight, dB | 20 | 20 |
| CPR at Sector, dB | 10 | 10 |
| Isolation, dB | 30 | 30 |
| VSWR Return Loss, dB | 1.4 15.6 | 1.4 15.6 |
| PIM, 3rd Order, 2 x 20 W, dBc | -153 | -153 |
| Input Power per Port, maximum, watts | 400 | 400 |
| Polarization | ±45° | ±45° |

Electrical Specifications, BASTA*

| Frequency Band, MHz | 698–806 | 806–896 |
|--|---------|---------|
| Beamwidth, Horizontal Tolerance, degrees | ±3 | ±3 |

* 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.](#)

Mechanical Specifications

| | |
|--|--|
| Color Radome Material | Light gray Fiberglass, UV resistant |
| Connector Interface Location Quantity | 7-16 DIN Female Bottom 2 |
| Wind Loading, maximum | 617.7 N @ 150 km/h 138.9 lbf @ 150 km/h |
| Wind Speed, maximum | 241.0 km/h 149.8 mph |
| Antenna Dimensions, L x W x D | 1847.0 mm x 301.0 mm x 181.0 mm 72.7 in x 11.9 in x 7.1 in |
| Net Weight | 14.2 kg 31.3 lb |
| Model with factory installed AISG 2.0 RET LNX-6514DS-A1M | |

Product Specifications

LNX-8513DS-VTM

Andrew® Teletilt® Antenna, 698–896 MHz, 85° horizontal beamwidth, RET compatible

POWERED BY



Electrical Specifications

| Frequency Band, MHz | 698–806 | 806–896 |
|--------------------------------------|------------|------------|
| Gain, dBi | 14.6 | 15.3 |
| Beamwidth, Horizontal, degrees | 85 | 85 |
| Beamwidth, Vertical, degrees | 12.2 | 11.0 |
| Beam Tilt, degrees | 0–10 | 0–10 |
| USLS, typical, dB | 17 | 17 |
| Front-to-Back Ratio at 180°, dB | 25 | 26 |
| Isolation, dB | 30 | 30 |
| VSWR Return Loss, dB | 1.4 15.6 | 1.4 15.6 |
| PIM, 3rd Order, 2 x 20 W, dBc | -153 | -153 |
| Input Power per Port, maximum, watts | 400 | 400 |
| Polarization | ±45° | ±45° |

Mechanical Specifications

| | |
|---|--|
| Color Radome Material | Light gray Fiberglass, UV resistant |
| Connector Interface Location Quantity | 7-16 DIN Female Bottom 2 |
| Wind Loading, maximum | 617.7 N @ 150 km/h 138.9 lbf @ 150 km/h |
| Wind Speed, maximum | 241.0 km/h 149.8 mph |
| Antenna Dimensions, L x W x D | 1847.0 mm x 301.0 mm x 181.0 mm 72.7 in x 11.9 in x 7.1 in |
| Net Weight | 17.8 kg 39.2 lb |

Model with factory installed AISG 2.0 RET LNX-8513DS-A1M



Product Specifications

COMMSCOPE®

HBXX-6517DS-VTM

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



Electrical Specifications

| 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 3° 18.7 6° 18.4 | 0° 18.4 3° 18.7 6° 18.5 | 0° 18.7 3° 18.9 6° 18.6 |
| Beamwidth, Horizontal, degrees | 67 | 66 | 65 |
| Beamwidth, Horizontal Tolerance, degrees | ±2.4 | ±1.7 | ±2.9 |
| Beamwidth, Vertical, degrees | 5.0 | 4.7 | 4.4 |
| Beamwidth, Vertical Tolerance, degrees | ±0.3 | ±0.3 | ±0.3 |
| Beam Tilt, degrees | 0–6 | 0–6 | 0–6 |
| 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 |
| 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° |

*Values calculated using NGMN Alliance N-P-BASTA v9.6

Mechanical Specifications

| | |
|---|--|
| Color Radome Material | Light gray PVC, UV resistant |
| Connector Interface Location Quantity | 7-16 DIN Female Bottom 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 |
| Antenna Dimensions, L x W x D | 1903.0 mm x 305.0 mm x 166.0 mm 74.9 in x 12.0 in x 6.5 in |
| Net Weight | 19.5 kg 43.0 lb |
| Model with factory installed AISG 2.0 RET | HBXX-6517DS-A2M |

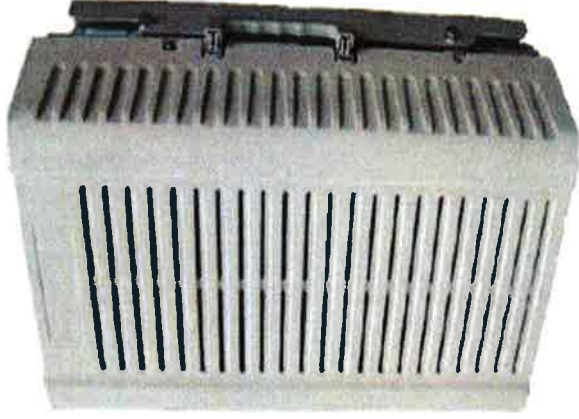


PCS RF MODULES

RRH1900 2X60 - HW CHARACTERISTICS

LA6.0.1/13.3

| | |
|-------------------------|--|
| RRH2x60 | |
| RF Output Power | 2X60W |
| Instantaneous Bandwidth | 20MHz |
| Transmitter | 2 TX |
| Receiver | 1900 HW version 1900A HW version |
| Features | 2 Branch RX – LA6.0.1 4 Branch RX – LR13.3 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) |

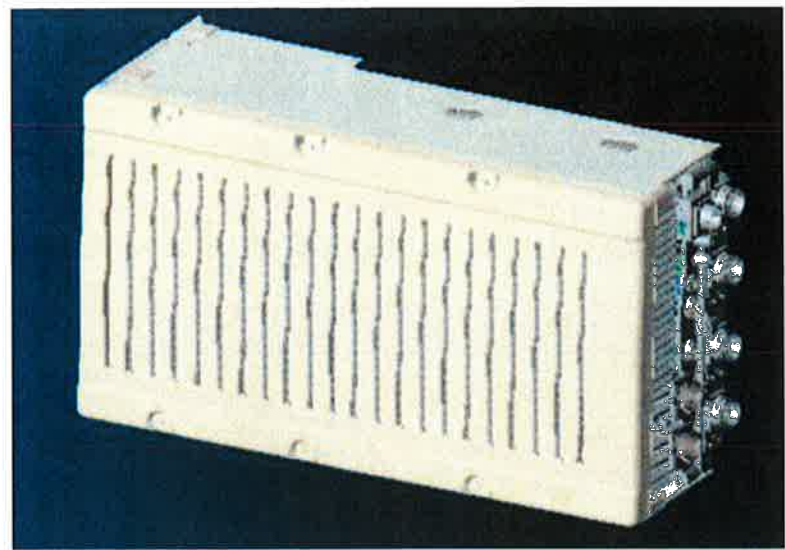


** Not a Verizon Wireless deployed product

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.

SUPERIOR RF PERFORMANCE

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.

OPTIMIZED TCO

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.

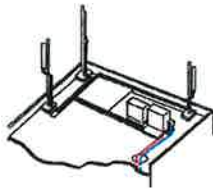
EASY INSTALLATION

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.

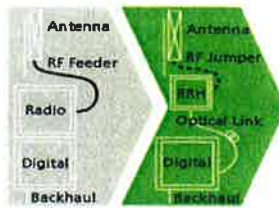
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

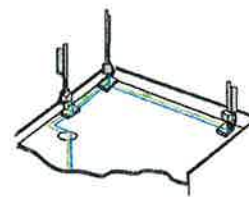
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- 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

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 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)

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

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)

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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, 3 4mm ² 18AWG | | [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) | | | UL34-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

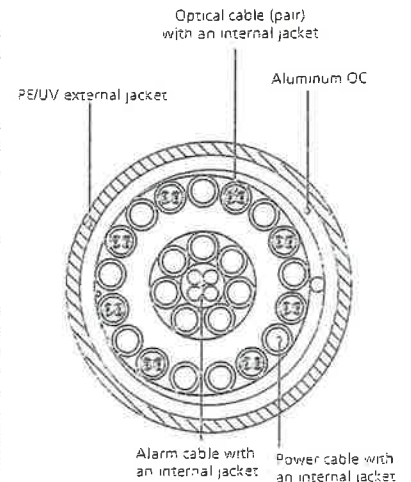


Figure 2: Construction Detail

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

ATTACHMENT 2

ATTACHMENT 3

Date: **November 18, 2014**

Cheryl Schultz
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277



Aero Solutions LLC
5500 Flatiron Parkway, Suite 100
Boulder, CO 80301
(720) 304-6882

Subject: Structural Analysis Report

| | | |
|--------------------------------------|---|-------------------|
| Carrier Designation: | Verizon Wireless Co-Locate | |
| | Carrier Site Name: | Marlborough, CT |
| Crown Castle Designation: | Crown Castle BU Number: | 806366 |
| | Crown Castle Site Name: | HRT 107(C) 943204 |
| | Crown Castle JDE Job Number: | 314810 |
| | Crown Castle Work Order Number: | 967288 |
| | Crown Castle Application Number: | 272724 Rev. 0 |
| Engineering Firm Designation: | Aero Solutions LLC Project Number: | 003-14-1253 |
| Site Data: | NORTH MAIN STREET, MARLBOROUGH, Hartford County, CT Latitude 41° 37' 47.3", Longitude -72° 27' 59.4" 155.5 Foot - Monopole Tower | |

Dear Cheryl Schultz,

Aero Solutions 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 730558, in accordance with application 272724, revision 0.

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

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

This analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code with 2009 amendment based upon a wind speed of 80 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 Aero Solutions 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: Marcus Benson, E.I.

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE# PEN0028187
Expires: 1/31/2015



11.18.2014

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1) INTRODUCTION

This tower is a 155.5 ft Monopole tower designed by FWT INC. in December of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 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 |
|---------------------|----------------------------|--------------------|----------------------|-------------------------------|----------------------|---------------------|------|
| 158.0 | 159.0 | 3 | alcatel lucent | RRH2X60-AWS | 2 | 1-5/8" | |
| | | 3 | alcatel lucent | RRH2X60-PCS | | | |
| | | 6 | commscope | HBXX-6517DS-A2M w/ Mount Pipe | | | |
| | | 3 | commscope | LNx-6514DS-A1M w/ Mount Pipe | | | |
| | | 2 | commscope | LNx-6514DS-AIM w/ Mount Pipe | | | |
| | | 1 | commscope | LNx-8513DS-VTM w/ Mount Pipe | | | |
| | | 2 | rfs celwave | DB-T1-6Z-8AB-0Z | | | |

Table 2 - Existing Antenna and Cable Information

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---------------------|----------------------------|--------------------|------------------------|-------------------------------------|----------------------|------------------------|------|
| 158.0 | 162.0 | 6 | rfs celwave | FD9R6004/2C-3L | 15 | 1-5/8" | 1 |
| | 159.0 | 2 | antel | BXA-171063-12BF w/ Mount Pipe | | | 2 |
| | | 1 | antel | BXA-171063-8BF-2 w/ Mount Pipe | | | |
| | | 3 | antel | BXA-70063/4CF w/ Mount Pipe | | | |
| | | 6 | antel | LPA-80080/6CF w/ Mount Pipe | | | |
| | | 3 | decibel | DB809K-Y | | | |
| | 158.0 | 1 | tower mounts | Platform Mount [LP 1001-1] | | | 1 |
| 144.0 | 144.0 | 6 | ericsson | RRUS-11 | 12 2 1 | 1-1/4" 3/4" 3/8" | 1 |
| | | 3 | kmw communications | AM-X-CD-16-65-00T-RET w/ Mount Pipe | | | |
| | | 6 | powerwave technologies | 7770.00 w/ Mount Pipe | | | |

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) | Note |
|---------------------|----------------------------|--------------------|------------------------|----------------------------|----------------------|---------------------|------|
| | 142.0 | 1 | raycap | DC6-48-60-18-8F | | | |
| | | 1 | tower mounts | Platform Mount [LP 1001-1] | | | |
| | | 6 | powerwave technologies | LGP 17201 | | | |
| | | 6 | powerwave technologies | LGP21903 | | | |
| 135.0 | 135.0 | 3 | kathrein | 742 213 w/ Mount Pipe | 6 | 1-1/4" | 1 |
| 126.0 | 128.0 | 6 | decibel | DB980H90E-M w/ Mount Pipe | 6 | 1-1/4" | 1 |
| | 127.0 | 1 | tower mounts | T-Arm Mount [TA 602-3] | | | |
| | 125.0 | 1 | tower mounts | T-Arm Mount [TA 602-3] | | | |
| | 120.0 | 3 | decibel | DB809K-Y | | | |
| 100.0 | 100.0 | 6 | ems wireless | RR90-17-02DP w/ Mount Pipe | 6 | 1-5/8" | 1 |
| | | 1 | tower mounts | Side Arm Mount [SO 104-3] | | | |

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

Table 3 - Design Antenna and Cable Information

| Mounting Level (ft) | Center Line Elevation (ft) | Number of Antennas | Antenna Manufacturer | Antenna Model | Number of Feed Lines | Feed Line Size (in) |
|---------------------|----------------------------|--------------------|----------------------|---------------|----------------------|---------------------|
| 157.75 | 157.75 | 12 | Swedcom | ALP-9212-N | | |
| 144.25 | 144.25 | 9 | Swedcom | ALP-9212-N | | |
| 132 | 132 | 2 | Celwave | PD1142 | | |
| | | 1 | Celwave | PD201 | | |
| | | 2 | Celwave | PD220 | | |
| | | 9 | Decibel | DB980 | | |

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

| Document | Remarks | Reference | Source |
|--|-----------------------|-----------|----------|
| 4-GEOTECHNICAL REPORTS | FDH Engineering, Inc. | 2208816 | CCISITES |
| 4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS | FWT, Inc. | 823125 | CCISITES |
| 4-TOWER MANUFACTURER DRAWINGS | FWT, Inc. | 823126 | 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.

This analysis may be affected if any assumptions are not valid or have been made in error. Aero Solutions 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 |
|-------------|----------------|----------------|----------------------|------------------|--------|----------------|------------|-------------|
| L1 | 155.5 - 110 | Pole | TP64.606x58.6x0.375 | 1 | -20.75 | 3194.44 | 16.9 | Pass |
| L2 | 110 - 72.5 | Pole | TP68.805x62.8x0.4375 | 2 | -36.21 | 4260.83 | 31.2 | Pass |
| L3 | 72.5 - 36 | Pole | TP72.748x66.8082x0.5 | 3 | -54.17 | 5424.19 | 41.0 | Pass |
| L4 | 36 - 0 | Pole | TP76.5x70.56x0.5 | 4 | -78.04 | 5547.27 | 61.6 | Pass |
| | | | | | | | Summary | |
| | | | | | | Pole (L4) | 61.6 | Pass |
| | | | | | | Rating = | 61.6 | Pass |

Table 6 - Tower Component Stresses vs. Capacity – LC5

| Notes | Component | Elevation (ft) | % Capacity | Pass / Fail |
|-------|----------------------------------|----------------|------------|-------------|
| 1 | Anchor Rods | 0 | 61.0 | Pass |
| 1 | Base Plate | 0 | 30.3 | Pass |
| 1 | Base Foundation | 0 | 37.4 | Pass |
| 1 | Base Foundation Soil Interaction | 0 | 38.3 | Pass |

| | |
|---|--------------|
| Structure Rating (max from all components) = | 61.6% |
|---|--------------|

Notes:

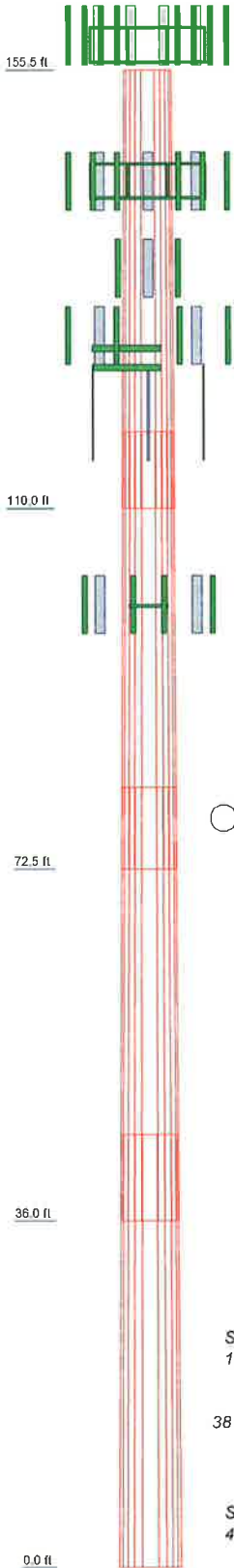
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

| Section | Length (ft) | Number of Sides | Thickness (in) | Socket Length (ft) | Top Dia (in) | Bot Dia (in) | Grade | Weight (K) |
|---------|-------------|-----------------|----------------|--------------------|--------------|--------------|---------|------------|
| 1 | 45.50 | 12 | 0.3750 | 8.00 | 58.6000 | 64.6060 | A572-65 | 11.4 |
| 2 | 45.50 | 12 | 0.4375 | 8.50 | 62.8000 | 68.8050 | A572-65 | 14.3 |
| 3 | 45.00 | 12 | 0.5000 | 9.00 | 66.8082 | 72.7480 | A572-65 | 17.1 |
| 4 | 45.00 | 12 | 0.5000 | 70.5600 | 76.5000 | | A572-65 | 18.0 |
| | | | | | | | | 60.8 |



DESIGNED APPURTENANCE LOADING

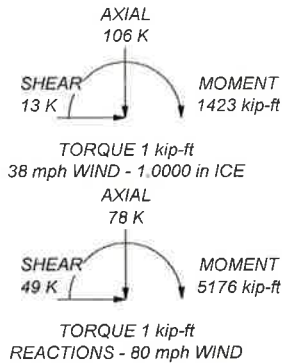
| TYPE | ELEVATION | TYPE | ELEVATION |
|-------------------------------------|-----------|-------------------------------------|-----------|
| DB809K-Y | 158 | (2) LGP 17201 | 144 |
| (2) FD9R6004/2C-3L | 158 | (2) LGP21903 | 144 |
| (2) HBXX-6517DS-A2M w/ Mount Pipe | 158 | (2) RRUS-11 | 144 |
| LNX-6514DS-A1M w/ Mount Pipe | 158 | AM-X-CD-16-65-00T-RET w/ Mount Pipe | 144 |
| LNX-8513DS-VTM w/ Mount Pipe | 158 | (2) 7770.00 w/ Mount Pipe | 144 |
| RRH2X60-AWS | 158 | (2) LGP 17201 | 144 |
| RRH2X60-PCS | 158 | (2) LGP21903 | 144 |
| (2) DB-T1-6Z-8AB-0Z | 158 | (2) RRUS-11 | 144 |
| DB809K-Y | 158 | AM-X-CD-16-65-00T-RET w/ Mount Pipe | 144 |
| (2) FD9R6004/2C-3L | 158 | Platform Mount (LP 1001-1) | 144 |
| (2) HBXX-6517DS-A2M w/ Mount Pipe | 158 | (2) 6' x 2' Mount Pipe | 144 |
| LNX-6514DS-A1M w/ Mount Pipe | 158 | (2) 6' x 2' Mount Pipe | 144 |
| LNX-6514DS-AIM w/ Mount Pipe | 158 | 742 213 w/ Mount Pipe | 135 |
| RRH2X60-AWS | 158 | 742 213 w/ Mount Pipe | 135 |
| RRH2X60-PCS | 158 | 742 213 w/ Mount Pipe | 135 |
| DB809K-Y | 158 | (2) LGP 17201 | 144 |
| (2) FD9R6004/2C-3L | 158 | (2) RRUS-11 | 144 |
| (2) HBXX-6517DS-A2M w/ Mount Pipe | 158 | AM-X-CD-16-65-00T-RET w/ Mount Pipe | 144 |
| LNX-6514DS-A1M w/ Mount Pipe | 158 | Platform Mount (LP 1001-1) | 144 |
| LNX-6514DS-AIM w/ Mount Pipe | 158 | (2) 6' x 2' Mount Pipe | 144 |
| RRH2X60-AWS | 158 | (2) 6' x 2' Mount Pipe | 144 |
| RRH2X60-PCS | 158 | 742 213 w/ Mount Pipe | 135 |
| Platform Mount (LP 1001-1) | 158 | 742 213 w/ Mount Pipe | 135 |
| (2) 6' x 2' Mount Pipe | 158 | DB809K-Y | 126 |
| (2) 6' x 2' Mount Pipe | 158 | DB809K-Y | 126 |
| (2) 7770.00 w/ Mount Pipe | 144 | DB809K-Y | 126 |
| (2) LGP 17201 | 144 | (2) DB980H90E-M w/ Mount Pipe | 126 |
| (2) LGP21903 | 144 | (2) DB980H90E-M w/ Mount Pipe | 126 |
| (2) RRUS-11 | 144 | (2) DB980H90E-M w/ Mount Pipe | 126 |
| AM-X-CD-16-65-00T-RET w/ Mount Pipe | 144 | T-Arm Mount (TA 602-3) | 126 |
| DC6-46-60-18-8F | 144 | T-Arm Mount (TA 602-3) | 126 |
| (2) 7770.00 w/ Mount Pipe | 144 | 6' x 2' Mount Pipe | 126 |
| | | 6' x 2' Mount Pipe | 126 |
| | | (2) RR90-17-02DP w/ Mount Pipe | 100 |
| | | (2) RR90-17-02DP w/ Mount Pipe | 100 |
| | | (2) RR90-17-02DP w/ Mount Pipe | 100 |
| | | Side Arm Mount (SO 104-3) | 100 |

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 61.6%



| | | | |
|----------------------------------|--|--|-------------------|
| Aero Solutions LLC | | Job: BU# 806366 HRT 107-C-943204 | |
| 5500 Flatiron Parkway, Suite 100 | | Project: Existing 155.5' Monopole | |
| Boulder, CO 80301 | | Client: Crown Castle | Drawn by: MBenson |
| Phone: (720) 304-6882 | | Code: TIA/EIA-222-F | Date: 11/18/14 |
| FAX: (720) 304-6883 | | Path: | Scale: NTS |
| | | | Dwg No. E-1 |

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- 3) Tower is located in Hartford County, Connecticut.
- 4) Basic wind speed of 80 mph.
- 5) Nominal ice thickness of 1.0000 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 pole 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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys ✓ Escalate Ice Always Use Max Kz Use Special Wind Profile Include Bolts In Member Capacity Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Use TIA-222-G Tension Splice Capacity Exemption | Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feedline Torque Include Angle Block Shear Check Poles ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|---|

Tapered Pole Section Geometry

| Section | Elevation ft | Section Length ft | Splice Length ft | Number of Sides | Top Diameter in | Bottom Diameter in | Wall Thickness in | Bend Radius in | Pole Grade |
|---------|-----------------|-------------------------|------------------------|-----------------------|-----------------------|--------------------------|-------------------------|----------------------|---------------------|
| L1 | 155.50-110.00 | 45.50 | 8.00 | 12 | 58.6000 | 64.6060 | 0.3750 | 1.5000 | A572-65 (65 ksi) |
| L2 | 110.00-72.50 | 45.50 | 8.50 | 12 | 62.8000 | 68.8050 | 0.4375 | 1.7500 | A572-65 (65 ksi) |
| L3 | 72.50-36.00 | 45.00 | 9.00 | 12 | 66.8082 | 72.7480 | 0.5000 | 2.0000 | A572-65 (65 ksi) |
| L4 | 36.00-0.00 | 45.00 | | 12 | 70.5600 | 76.5000 | 0.5000 | 2.0000 | A572-65 (65 ksi) |

Tapered Pole Properties

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|-----|
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|-----|

| Section | Tip Dia. in | Area in ² | I in ⁴ | r in | C in | I/C in ³ | J in ⁴ | I/Q in ² | w in | w/t |
|---------|----------------|-------------------------|----------------------|---------|---------|------------------------|----------------------|------------------------|---------|--------|
| L1 | 60.6672 | 70.3067 | 30422.968 0 | 20.8446 | 30.3548 | 1002.2457 | 61645.181 3 | 34.6028 | 14.6998 | 39.199 |
| | 66.8851 | 77.5589 | 40842.013 1 | 22.9947 | 33.4659 | 1220.4065 | 82756.991 3 | 38.1721 | 16.3094 | 43.492 |
| L2 | 66.1084 | 87.8532 | 43610.436 1 | 22.3258 | 32.5304 | 1340.6056 | 88366.567 0 | 43.2387 | 15.6579 | 35.789 |
| | 71.2322 | 96.3127 | 57460.444 0 | 24.4756 | 35.6410 | 1612.2011 | 116430.43 78 | 47.4022 | 17.2672 | 39.468 |
| L3 | 70.3265 | 106.7562 | 59911.926 8 | 23.7383 | 34.6066 | 1731.2263 | 121397.80 66 | 52.5421 | 16.5646 | 33.129 |
| | 75.3143 | 116.3193 | 77497.789 3 | 25.8648 | 37.6835 | 2056.5463 | 157031.53 18 | 57.2488 | 18.1565 | 36.313 |
| L4 | 74.2790 | 112.7967 | 70668.018 4 | 25.0815 | 36.5501 | 1933.4563 | 143192.56 43 | 55.5151 | 17.5701 | 35.14 |
| | 79.1986 | 122.3600 | 90209.568 0 | 27.2080 | 39.6270 | 2276.4673 | 182789.04 18 | 60.2219 | 19.1620 | 38.324 |

| Tower Elevation | Gusset Area (per face) | Gusset Thickness | Gusset Grade | Adjst. Factor A _r | Adjst. Factor A _r | Weight Mult. | Double Angle Stitch Bolt Spacing Diagonals | Double Angle Stitch Bolt Spacing Horizontals |
|------------------|------------------------|------------------|--------------|------------------------------|------------------------------|--------------|--|--|
| ft | ft ² | in | | | | | in | in |
| L1 155.50-110.00 | | | | 1 | 1 | 1 | | |
| L2 110.00-72.50 | | | | 1 | 1 | 1 | | |
| L3 72.50-36.00 | | | | 1 | 1 | 1 | | |
| L4 36.00-0.00 | | | | 1 | 1 | 1 | | |

Feed Line/Linear Appurtenances - Entered As Area

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | C _A A _A ft ² /ft | Weight plf | |
|---------------------------|-------------|--------------|----------------|-----------------|--------------|--|---------------|------|
| 561(1-5/8") | C | No | Inside Pole | 155.50 - 0.00 | 12 | No Ice | 0.00 | 1.35 |
| | | | | | | 1/2" Ice | 0.00 | 1.35 |
| | | | | | | 1" Ice | 0.00 | 1.35 |
| | | | | | | 2" Ice | 0.00 | 1.35 |
| | | | | | | 4" Ice | 0.00 | 1.35 |
| LDF7-50A(1-5/8") | B | No | Inside Pole | 155.50 - 0.00 | 3 | No Ice | 0.00 | 0.82 |
| | | | | | | 1/2" Ice | 0.00 | 0.82 |
| | | | | | | 1" Ice | 0.00 | 0.82 |
| | | | | | | 2" Ice | 0.00 | 0.82 |
| | | | | | | 4" Ice | 0.00 | 0.82 |
| HB158-1-08U8-S8J18(1-5/8) | C | No | Inside Pole | 155.50 - 0.00 | 2 | No Ice | 0.00 | 1.30 |
| | | | | | | 1/2" Ice | 0.00 | 1.30 |
| | | | | | | 1" Ice | 0.00 | 1.30 |
| | | | | | | 2" Ice | 0.00 | 1.30 |
| | | | | | | 4" Ice | 0.00 | 1.30 |
| *** | | | | | | | | |
| UCF114-50JA(1 1/4") | B | No | Inside Pole | 144.00 - 0.00 | 12 | No Ice | 0.00 | 0.55 |
| | | | | | | 1/2" Ice | 0.00 | 0.55 |
| | | | | | | 1" Ice | 0.00 | 0.55 |
| | | | | | | 2" Ice | 0.00 | 0.55 |
| | | | | | | 4" Ice | 0.00 | 0.55 |
| FB-L98B-002-75000(3/8") | B | No | Inside Pole | 144.00 - 0.00 | 1 | No Ice | 0.00 | 0.06 |
| | | | | | | 1/2" Ice | 0.00 | 0.06 |
| | | | | | | 1" Ice | 0.00 | 0.06 |
| | | | | | | 2" Ice | 0.00 | 0.06 |
| | | | | | | 4" Ice | 0.00 | 0.06 |
| WR-VG86ST-BRD(3/4) | B | No | Inside Pole | 144.00 - 0.00 | 2 | No Ice | 0.00 | 0.58 |
| | | | | | | 1/2" Ice | 0.00 | 0.58 |
| | | | | | | 1" Ice | 0.00 | 0.58 |
| | | | | | | 2" Ice | 0.00 | 0.58 |
| | | | | | | 4" Ice | 0.00 | 0.58 |

| Description | Face or Leg | Allow Shield | Component Type | Placement ft | Total Number | | C _A A _A ft ² /ft | Weight plf |
|------------------|-------------|--------------|----------------|-----------------|--------------|----------|--|---------------|
| 2" Rigid Conduit | B | No | Inside Pole | 144.00 - 0.00 | 1 | No Ice | 0.00 | 2.80 |
| | | | | | | 1/2" Ice | 0.00 | 2.80 |
| | | | | | | 1" Ice | 0.00 | 2.80 |
| | | | | | | 2" Ice | 0.00 | 2.80 |
| | | | | | | 4" Ice | 0.00 | 2.80 |
| *** | | | | | | | | |
| AVA6-50(1-1/4") | A | No | Inside Pole | 135.00 - 0.00 | 6 | No Ice | 0.00 | 0.45 |
| | | | | | | 1/2" Ice | 0.00 | 0.45 |
| | | | | | | 1" Ice | 0.00 | 0.45 |
| | | | | | | 2" Ice | 0.00 | 0.45 |
| | | | | | | 4" Ice | 0.00 | 0.45 |
| *** | | | | | | | | |
| LDF6-50A(1-1/4") | C | No | Inside Pole | 126.00 - 0.00 | 6 | No Ice | 0.00 | 0.66 |
| | | | | | | 1/2" Ice | 0.00 | 0.66 |
| | | | | | | 1" Ice | 0.00 | 0.66 |
| | | | | | | 2" Ice | 0.00 | 0.66 |
| | | | | | | 4" Ice | 0.00 | 0.66 |
| *** | | | | | | | | |
| LDF6-50A(1-1/4") | A | No | Inside Pole | 100.00 - 0.00 | 6 | No Ice | 0.00 | 0.66 |
| | | | | | | 1/2" Ice | 0.00 | 0.66 |
| | | | | | | 1" Ice | 0.00 | 0.66 |
| | | | | | | 2" Ice | 0.00 | 0.66 |
| | | | | | | 4" Ice | 0.00 | 0.66 |

Feed Line/Linear Appurtenances Section Areas

| Tower Section n | Tower Elevation ft | Face | 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 |
|-----------------|--------------------|------|-----------------------------------|-----------------------------------|---|--|-------------|
| L1 | 155.50-110.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.07 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.47 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.92 |
| L2 | 110.00-72.50 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.21 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.49 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.85 |
| L3 | 72.50-36.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.24 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.48 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.83 |
| L4 | 36.00-0.00 | A | 0.000 | 0.000 | 0.000 | 0.000 | 0.24 |
| | | B | 0.000 | 0.000 | 0.000 | 0.000 | 0.47 |
| | | C | 0.000 | 0.000 | 0.000 | 0.000 | 0.82 |

Feed Line/Linear Appurtenances Section Areas - With Ice

| Tower Section n | 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 |
|-----------------|--------------------|-------------|------------------|-----------------------------------|-----------------------------------|---|--|-------------|
| L1 | 155.50-110.00 | A | 1.182 | 0.000 | 0.000 | 0.000 | 0.000 | 0.07 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.47 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.92 |
| L2 | 110.00-72.50 | A | 1.130 | 0.000 | 0.000 | 0.000 | 0.000 | 0.21 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.49 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.85 |
| L3 | 72.50-36.00 | A | 1.062 | 0.000 | 0.000 | 0.000 | 0.000 | 0.24 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.48 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.83 |
| L4 | 36.00-0.00 | A | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.24 |
| | | B | | 0.000 | 0.000 | 0.000 | 0.000 | 0.47 |
| | | C | | 0.000 | 0.000 | 0.000 | 0.000 | 0.82 |

Feed Line Center of Pressure

| Section | Elevation | CP _x | CP _z | CP _x Ice | CP _z Ice |
|---------|---------------|-----------------|-----------------|------------------------|------------------------|
| | ft | in | in | in | in |
| L1 | 155.50-110.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L2 | 110.00-72.50 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L3 | 72.50-36.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| L4 | 36.00-0.00 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

Discrete Tower Loads

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K | |
|--------------------------------------|-------------|-------------|---|--------------------------------|-----------------|---|--|--|--------------------------------------|
| *** | | | | | | | | | |
| DB809K-Y | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 2.85 1/2" 4.03 Ice 5.21 1" Ice 7.17 2" Ice 10.06 4" Ice 10.06 | 2.85 4.03 5.21 7.17 10.06 | 0.03 0.05 0.08 0.16 0.42 | |
| (2) FD9R6004/2C-3L | A | From Leg | 4.00 0.00 4.00 | 0.0000 | 158.00 | No Ice 0.37 1/2" 0.45 Ice 0.54 1" Ice 0.75 2" Ice 1.28 4" Ice 1.28 | 0.37 0.45 0.54 0.75 1.28 | 0.08 0.14 0.20 0.34 0.74 | 0.00 0.01 0.01 0.02 0.06 |
| (2) HBXX-6517DS-A2M w/ Mount Pipe | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 8.98 1/2" 9.65 Ice 10.29 1" Ice 11.59 2" Ice 14.32 4" Ice 14.32 | 8.98 9.65 10.29 11.59 14.32 | 6.96 8.18 9.14 11.02 15.03 | 0.07 0.14 0.21 0.40 0.91 |
| LNx-6514DS-A1M w/ Mount Pipe | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 8.65 1/2" 9.31 Ice 9.93 1" Ice 11.20 2" Ice 13.87 4" Ice 13.87 | 8.65 9.31 9.93 11.20 13.87 | 7.08 8.27 9.18 11.02 15.06 | 0.06 0.13 0.21 0.39 0.90 |
| LNx-8513DS-VTM w/ Mount Pipe | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 8.65 1/2" 9.31 Ice 9.93 1" Ice 11.20 2" Ice 13.87 4" Ice 13.87 | 8.65 9.31 9.93 11.20 13.87 | 7.08 8.27 9.18 11.02 15.06 | 0.06 0.13 0.21 0.39 0.90 |
| RRH2X60-AWS | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 2.19 1/2" 2.40 Ice 2.61 1" Ice 3.07 2" Ice 4.09 4" Ice 4.09 | 2.19 2.40 2.61 3.07 4.09 | 1.43 1.61 1.80 2.21 3.13 | 0.04 0.06 0.08 0.13 0.26 |
| RRH2X60-PCS | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 2.57 1/2" 2.79 Ice 3.02 1" Ice 3.52 2" Ice 4.61 4" Ice 4.61 | 2.57 2.79 3.02 3.52 4.61 | 2.01 2.22 2.43 2.89 3.92 | 0.06 0.08 0.10 0.16 0.31 |
| (2) DB-T1-6Z-8AB-0Z | A | From Leg | 4.00 0.00 1.00 | 0.0000 | 158.00 | No Ice 5.60 1/2" 5.92 Ice 6.24 1" Ice 6.91 2" Ice 8.37 4" Ice 8.37 | 5.60 5.92 6.24 6.91 8.37 | 2.33 2.56 2.79 3.28 4.37 | 0.04 0.08 0.12 0.21 0.45 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _{AA} Front | C _{AA} Side | Weight |
|-----------------------------------|-------------|-------------|--------------|---------|--------------------|-----------|-----------------------|----------------------|--------|
| | | | Horz Lateral | Vert | | | | | |
| DB809K-Y | B | From Leg | 4.00 | 30.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 2.85 | 2.85 | 0.03 |
| | | | | | | 1/2" Ice | 4.03 | 4.03 | 0.05 |
| | | | | | | 1" Ice | 5.21 | 5.21 | 0.08 |
| | | | | | | 2" Ice | 7.17 | 7.17 | 0.16 |
| (2) FD9R6004/2C-3L | B | From Leg | 4.00 | 20.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 0.37 | 0.08 | 0.00 |
| | | | | | | 1/2" Ice | 0.45 | 0.14 | 0.01 |
| | | | | | | 1" Ice | 0.54 | 0.20 | 0.01 |
| | | | | | | 2" Ice | 0.75 | 0.34 | 0.02 |
| (2) HBXX-6517DS-A2M w/ Mount Pipe | B | From Leg | 4.00 | 20.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 8.98 | 6.96 | 0.07 |
| | | | | | | 1/2" Ice | 9.65 | 8.18 | 0.14 |
| | | | | | | 1" Ice | 10.29 | 9.14 | 0.21 |
| | | | | | | 2" Ice | 11.59 | 11.02 | 0.40 |
| LNx-6514DS-A1M w/ Mount Pipe | B | From Leg | 4.00 | 20.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 8.65 | 7.08 | 0.06 |
| | | | | | | 1/2" Ice | 9.31 | 8.27 | 0.13 |
| | | | | | | 1" Ice | 9.93 | 9.18 | 0.21 |
| | | | | | | 2" Ice | 11.20 | 11.02 | 0.39 |
| LNx-6514DS-AIM w/ Mount Pipe | B | From Leg | 4.00 | 20.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 8.65 | 7.08 | 0.06 |
| | | | | | | 1/2" Ice | 9.31 | 8.27 | 0.13 |
| | | | | | | 1" Ice | 9.93 | 9.18 | 0.21 |
| | | | | | | 2" Ice | 11.20 | 11.02 | 0.39 |
| RRH2X60-AWS | B | From Leg | 4.00 | 20.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 2.19 | 1.43 | 0.04 |
| | | | | | | 1/2" Ice | 2.40 | 1.61 | 0.06 |
| | | | | | | 1" Ice | 2.61 | 1.80 | 0.08 |
| | | | | | | 2" Ice | 3.07 | 2.21 | 0.13 |
| RRH2X60-PCS | B | From Leg | 4.00 | 20.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 2.57 | 2.01 | 0.06 |
| | | | | | | 1/2" Ice | 2.79 | 2.22 | 0.08 |
| | | | | | | 1" Ice | 3.02 | 2.43 | 0.10 |
| | | | | | | 2" Ice | 3.52 | 2.89 | 0.16 |
| DB809K-Y | C | From Leg | 4.00 | 30.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 2.85 | 2.85 | 0.03 |
| | | | | | | 1/2" Ice | 4.03 | 4.03 | 0.05 |
| | | | | | | 1" Ice | 5.21 | 5.21 | 0.08 |
| | | | | | | 2" Ice | 7.17 | 7.17 | 0.16 |
| (2) FD9R6004/2C-3L | C | From Leg | 4.00 | 10.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 0.37 | 0.08 | 0.00 |
| | | | | | | 1/2" Ice | 0.45 | 0.14 | 0.01 |
| | | | | | | 1" Ice | 0.54 | 0.20 | 0.01 |
| | | | | | | 2" Ice | 0.75 | 0.34 | 0.02 |
| (2) HBXX-6517DS-A2M w/ Mount Pipe | C | From Leg | 4.00 | 10.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 8.98 | 6.96 | 0.07 |
| | | | | | | 1/2" Ice | 9.65 | 8.18 | 0.14 |
| | | | | | | 1" Ice | 10.29 | 9.14 | 0.21 |
| | | | | | | 2" Ice | 11.59 | 11.02 | 0.40 |
| LNx-6514DS-A1M w/ Mount Pipe | C | From Leg | 4.00 | 10.0000 | 158.00 | 4" Ice | | | |
| | | | | | | No Ice | 8.65 | 7.08 | 0.06 |
| | | | | | | 1/2" Ice | 9.31 | 8.27 | 0.13 |
| | | | | | | 1" Ice | 9.93 | 9.18 | 0.21 |
| | | | | | | 2" Ice | 11.20 | 11.02 | 0.39 |

| Description | Face or Leg | Offset Type | Offsets: Horz Lateral Vert ft ft ft | Azimuth Adjustmen t ° | Placement ft | C _A A _A Front ft ² | C _A A _A Side ft ² | Weight K | |
|----------------------------------|-------------|-------------|---|-----------------------------|-----------------|---|--|-------------|------|
| LNX-6514DS-AIM w/ Mount Pipe | C | From Leg | 4.00 0.00 1.00 | 10.0000 | 158.00 | 2" Ice | 13.87 | 15.06 | 0.90 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 8.65 | 7.08 | 0.06 |
| | | | | | | 1/2" | 9.31 | 8.27 | 0.13 |
| | | | | | | Ice | 9.93 | 9.18 | 0.21 |
| | | | | | | 1" Ice | 11.20 | 11.02 | 0.39 |
| RRH2X60-AWS | C | From Leg | 4.00 0.00 1.00 | 10.0000 | 158.00 | 2" Ice | 13.87 | 15.06 | 0.90 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 2.19 | 1.43 | 0.04 |
| | | | | | | 1/2" | 2.40 | 1.61 | 0.06 |
| | | | | | | Ice | 2.61 | 1.80 | 0.08 |
| | | | | | | 1" Ice | 3.07 | 2.21 | 0.13 |
| RRH2X60-PCS | C | From Leg | 4.00 0.00 1.00 | 10.0000 | 158.00 | 2" Ice | 4.09 | 3.13 | 0.26 |
| | | | | | | 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 |
| Platform Mount [LP 1001- 1] | C | None | | 0.0000 | 158.00 | 2" Ice | 4.61 | 3.92 | 0.31 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 47.70 | 47.70 | 3.02 |
| | | | | | | 1/2" | 59.50 | 59.50 | 3.62 |
| | | | | | | Ice | 71.30 | 71.30 | 4.22 |
| | | | | | | 1" Ice | 94.90 | 94.90 | 5.43 |
| (2) 6' x 2" Mount Pipe | A | From Leg | 4.00 0.00 0.00 | 0.0000 | 158.00 | 2" Ice | 142.10 | 142.10 | 7.85 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 1.43 | 1.43 | 0.02 |
| | | | | | | 1/2" | 1.92 | 1.92 | 0.03 |
| | | | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| (2) 6' x 2" Mount Pipe | B | From Leg | 4.00 0.00 0.00 | 0.0000 | 158.00 | 2" Ice | 4.70 | 4.70 | 0.23 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 1.43 | 1.43 | 0.02 |
| | | | | | | 1/2" | 1.92 | 1.92 | 0.03 |
| | | | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| (2) 6' x 2" Mount Pipe | C | From Leg | 4.00 0.00 0.00 | 0.0000 | 158.00 | 2" Ice | 4.70 | 4.70 | 0.23 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 1.43 | 1.43 | 0.02 |
| | | | | | | 1/2" | 1.92 | 1.92 | 0.03 |
| | | | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| *** (2) 7770.00 w/ Mount Pipe | A | From Leg | 4.00 0.00 0.00 | 6.0000 | 144.00 | 2" Ice | 10.36 | 10.41 | 0.66 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 6.12 | 4.25 | 0.06 |
| | | | | | | 1/2" | 6.63 | 5.01 | 0.10 |
| | | | | | | Ice | 7.13 | 5.71 | 0.16 |
| | | | | | | 1" Ice | 8.16 | 7.16 | 0.29 |
| (2) LGP 17201 | A | From Leg | 4.00 0.00 -2.00 | 6.0000 | 144.00 | 2" Ice | 3.69 | 1.73 | 0.19 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 1.95 | 0.52 | 0.03 |
| | | | | | | 1/2" | 2.13 | 0.64 | 0.04 |
| | | | | | | Ice | 2.33 | 0.77 | 0.06 |
| | | | | | | 1" Ice | 2.75 | 1.06 | 0.09 |
| (2) LGP21903 | A | From Leg | 4.00 0.00 -2.00 | 6.0000 | 144.00 | 2" Ice | 3.69 | 1.73 | 0.19 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 0.27 | 0.18 | 0.01 |
| | | | | | | 1/2" | 0.34 | 0.25 | 0.01 |
| | | | | | | Ice | 0.43 | 0.32 | 0.02 |
| | | | | | | 1" Ice | 0.62 | 0.49 | 0.03 |
| (2) RRUS-11 | A | From Leg | 4.00 0.00 | 6.0000 | 144.00 | 2" Ice | 1.10 | 0.94 | 0.07 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 3.25 | 1.37 | 0.05 |
| | | | | | | 1/2" | 3.49 | 1.55 | 0.07 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight | |
|-------------------------------------|-------------|-------------|--------------|------|--------------------|-----------|-------------------------------------|------------------------------------|--------|------|
| | | | Horz Lateral | Vert | | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K | |
| | | | | 0.00 | | | 1/2" | 3.49 | 1.55 | 0.07 |
| | | | | 0.00 | | | 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 | | | |
| AM-X-CD-16-65-00T-RET w/ Mount Pipe | C | From Leg | 4.00 | | 10.0000 | 144.00 | No Ice | 8.50 | 6.30 | 0.07 |
| | | | 0.00 | | | | 1/2" | 9.15 | 7.48 | 0.14 |
| | | | 0.00 | | | | Ice | 9.77 | 8.37 | 0.21 |
| | | | | | | | 1" Ice | 11.03 | 10.18 | 0.38 |
| | | | | | | | 2" Ice | 13.68 | 14.02 | 0.87 |
| | | | | | | | 4" Ice | | | |
| Platform Mount [LP 1001-1] | C | None | | | 0.0000 | 144.00 | No Ice | 47.70 | 47.70 | 3.02 |
| | | | | | | | 1/2" | 59.50 | 59.50 | 3.62 |
| | | | | | | | Ice | 71.30 | 71.30 | 4.22 |
| | | | | | | | 1" Ice | 94.90 | 94.90 | 5.43 |
| | | | | | | | 2" Ice | 142.10 | 142.10 | 7.85 |
| | | | | | | | 4" Ice | | | |
| (2) 6' x 2" Mount Pipe | A | From Leg | 4.00 | | 0.0000 | 144.00 | No Ice | 1.43 | 1.43 | 0.02 |
| | | | 0.00 | | | | 1/2" | 1.92 | 1.92 | 0.03 |
| | | | 0.00 | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| | | | | | | | 2" Ice | 4.70 | 4.70 | 0.23 |
| | | | | | | | 4" Ice | | | |
| (2) 6' x 2" Mount Pipe | B | From Leg | 4.00 | | 0.0000 | 144.00 | No Ice | 1.43 | 1.43 | 0.02 |
| | | | 0.00 | | | | 1/2" | 1.92 | 1.92 | 0.03 |
| | | | 0.00 | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| | | | | | | | 2" Ice | 4.70 | 4.70 | 0.23 |
| | | | | | | | 4" Ice | | | |
| (2) 6' x 2" Mount Pipe | C | From Leg | 4.00 | | 0.0000 | 144.00 | No Ice | 1.43 | 1.43 | 0.02 |
| | | | 0.00 | | | | 1/2" | 1.92 | 1.92 | 0.03 |
| | | | 0.00 | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| | | | | | | | 2" Ice | 4.70 | 4.70 | 0.23 |
| | | | | | | | 4" Ice | | | |
| *** | | | | | | | | | | |
| 742 213 w/ Mount Pipe | A | From Leg | 1.00 | | 30.0000 | 135.00 | No Ice | 5.37 | 4.62 | 0.05 |
| | | | 0.00 | | | | 1/2" | 5.95 | 6.00 | 0.09 |
| | | | 0.00 | | | | Ice | 6.50 | 6.98 | 0.15 |
| | | | | | | | 1" Ice | 7.61 | 8.85 | 0.28 |
| | | | | | | | 2" Ice | 9.93 | 12.79 | 0.68 |
| | | | | | | | 4" Ice | | | |
| 742 213 w/ Mount Pipe | B | From Leg | 1.00 | | 30.0000 | 135.00 | No Ice | 5.37 | 4.62 | 0.05 |
| | | | 0.00 | | | | 1/2" | 5.95 | 6.00 | 0.09 |
| | | | 0.00 | | | | Ice | 6.50 | 6.98 | 0.15 |
| | | | | | | | 1" Ice | 7.61 | 8.85 | 0.28 |
| | | | | | | | 2" Ice | 9.93 | 12.79 | 0.68 |
| | | | | | | | 4" Ice | | | |
| 742 213 w/ Mount Pipe | C | From Leg | 1.00 | | 30.0000 | 135.00 | No Ice | 5.37 | 4.62 | 0.05 |
| | | | 0.00 | | | | 1/2" | 5.95 | 6.00 | 0.09 |
| | | | 0.00 | | | | Ice | 6.50 | 6.98 | 0.15 |
| | | | | | | | 1" Ice | 7.61 | 8.85 | 0.28 |
| | | | | | | | 2" Ice | 9.93 | 12.79 | 0.68 |
| | | | | | | | 4" Ice | | | |
| *** | | | | | | | | | | |
| DB809K-Y | A | From Leg | 4.00 | | 0.0000 | 126.00 | No Ice | 2.85 | 2.85 | 0.03 |
| | | | 0.00 | | | | 1/2" | 4.03 | 4.03 | 0.05 |
| | | | -6.00 | | | | Ice | 5.21 | 5.21 | 0.08 |
| | | | | | | | 1" Ice | 7.17 | 7.17 | 0.16 |
| | | | | | | | 2" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | | 4" Ice | | | |
| DB809K-Y | B | From Leg | 4.00 | | 0.0000 | 126.00 | No Ice | 2.85 | 2.85 | 0.03 |
| | | | 0.00 | | | | 1/2" | 4.03 | 4.03 | 0.05 |
| | | | -6.00 | | | | Ice | 5.21 | 5.21 | 0.08 |
| | | | | | | | 1" Ice | 7.17 | 7.17 | 0.16 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight |
|---------------------------------------|-------------|-------------|--------------|----------|--------------------|-----------|-------------------------------------|------------------------------------|--------|
| | | | Horz Lateral | Vert | | | | | |
| DB809K-Y | C | From Leg | 4.00 | 0.0000 | 126.00 | 2" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | 4" Ice | | | |
| | | | | | | No Ice | 2.85 | 2.85 | 0.03 |
| | | | | | | 1/2" Ice | 4.03 | 4.03 | 0.05 |
| | | | | | | 1" Ice | 5.21 | 5.21 | 0.08 |
| | | | | | | 2" Ice | 7.17 | 7.17 | 0.16 |
| (2) DB980H90E-M w/ Mount Pipe | A | From Leg | 4.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 4.04 | 3.62 | 0.03 |
| | | | | | | 1/2" Ice | 4.50 | 4.48 | 0.07 |
| | | | | | | Ice | 4.95 | 5.22 | 0.11 |
| | | | | | | 1" Ice | 5.87 | 6.74 | 0.22 |
| | | | | | | 2" Ice | 8.05 | 10.00 | 0.55 |
| (2) DB980H90E-M w/ Mount Pipe | B | From Leg | 4.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 4.04 | 3.62 | 0.03 |
| | | | | | | 1/2" Ice | 4.50 | 4.48 | 0.07 |
| | | | | | | Ice | 4.95 | 5.22 | 0.11 |
| | | | | | | 1" Ice | 5.87 | 6.74 | 0.22 |
| | | | | | | 2" Ice | 8.05 | 10.00 | 0.55 |
| (2) DB980H90E-M w/ Mount Pipe | C | From Leg | 4.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 4.04 | 3.62 | 0.03 |
| | | | | | | 1/2" Ice | 4.50 | 4.48 | 0.07 |
| | | | | | | Ice | 4.95 | 5.22 | 0.11 |
| | | | | | | 1" Ice | 5.87 | 6.74 | 0.22 |
| | | | | | | 2" Ice | 8.05 | 10.00 | 0.55 |
| T-Arm Mount [TA 602-3] | C | From Leg | 0.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 11.59 | 11.59 | 0.77 |
| | | | | | | 1/2" Ice | 15.44 | 15.44 | 0.99 |
| | | | | | | Ice | 19.29 | 19.29 | 1.21 |
| | | | | | | 1" Ice | 26.99 | 26.99 | 1.64 |
| | | | | | | 2" Ice | 42.39 | 42.39 | 2.50 |
| T-Arm Mount [TA 602-3] | C | From Leg | 0.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 11.59 | 11.59 | 0.77 |
| | | | | | | 1/2" Ice | 15.44 | 15.44 | 0.99 |
| | | | | | | Ice | 19.29 | 19.29 | 1.21 |
| | | | | | | 1" Ice | 26.99 | 26.99 | 1.64 |
| | | | | | | 2" Ice | 42.39 | 42.39 | 2.50 |
| 6' x 2" Mount Pipe | A | From Leg | 4.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 1.43 | 1.43 | 0.02 |
| | | | | | | 1/2" Ice | 1.92 | 1.92 | 0.03 |
| | | | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| | | | | | | 2" Ice | 4.70 | 4.70 | 0.23 |
| 6' x 2" Mount Pipe | B | From Leg | 4.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 1.43 | 1.43 | 0.02 |
| | | | | | | 1/2" Ice | 1.92 | 1.92 | 0.03 |
| | | | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| | | | | | | 2" Ice | 4.70 | 4.70 | 0.23 |
| 6' x 2" Mount Pipe | C | From Leg | 4.00 | 0.0000 | 126.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 1.43 | 1.43 | 0.02 |
| | | | | | | 1/2" Ice | 1.92 | 1.92 | 0.03 |
| | | | | | | Ice | 2.29 | 2.29 | 0.05 |
| | | | | | | 1" Ice | 3.06 | 3.06 | 0.09 |
| | | | | | | 2" Ice | 4.70 | 4.70 | 0.23 |
| *** (2) RR90-17-02DP w/ Mount Pipe | A | From Leg | 2.00 | -15.0000 | 100.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 4.59 | 3.32 | 0.03 |
| | | | | | | 1/2" Ice | 5.09 | 4.09 | 0.07 |
| | | | | | | Ice | 5.58 | 4.78 | 0.12 |
| | | | | | | 1" Ice | 6.59 | 6.23 | 0.22 |
| | | | | | | 2" Ice | 8.73 | 9.31 | 0.56 |
| (2) RR90-17-02DP w/ Mount Pipe | B | From Leg | 2.00 | 0.0000 | 100.00 | 4" Ice | 10.06 | 10.06 | 0.42 |
| | | | | | | No Ice | 4.59 | 3.32 | 0.03 |

| Description | Face or Leg | Offset Type | Offsets: | | Azimuth Adjustment | Placement | C _A A _A Front | C _A A _A Side | Weight | |
|-----------------------------------|-------------|-------------|--------------|------|--------------------|-----------|-------------------------------------|------------------------------------|--------|------|
| | | | Horz Lateral | Vert | | | | | | |
| | | | ft | ft | ° | ft | ft ² | ft ² | K | |
| | | | 0.00 | | | | | | | |
| | | | | | | Ice | 5.58 | 4.78 | 0.12 | |
| | | | | | | 1" Ice | 6.59 | 6.23 | 0.22 | |
| | | | | | | 2" Ice | 8.73 | 9.31 | 0.56 | |
| | | | | | | 4" Ice | | | | |
| (2) RR90-17-02DP w/ Mount Pipe | C | From Leg | 2.00 | | 10.0000 | 100.00 | No Ice | 4.59 | 3.32 | 0.03 |
| | | | 0.00 | | | | 1/2" | 5.09 | 4.09 | 0.07 |
| | | | 0.00 | | | | Ice | 5.58 | 4.78 | 0.12 |
| | | | | | | | 1" Ice | 6.59 | 6.23 | 0.22 |
| | | | | | | | 2" Ice | 8.73 | 9.31 | 0.56 |
| | | | | | | | 4" Ice | | | |
| Side Arm Mount [SO 104-3] | C | None | | | 0.0000 | 100.00 | No Ice | 3.30 | 3.30 | 0.29 |
| | | | | | | | 1/2" | 4.13 | 4.13 | 0.32 |
| | | | | | | | Ice | 4.96 | 4.96 | 0.35 |
| | | | | | | | 1" Ice | 6.62 | 6.62 | 0.41 |
| | | | | | | | 2" Ice | 9.94 | 9.94 | 0.53 |
| | | | | | | | 4" Ice | | | |

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 |

| Comb. No. | Description |
|-----------|-----------------------------|
| 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 |
|--------------------|-----------------|-------------------|------------------|-----------------------|------------|--------------------------------|--------------------------------|
| L1 | 155.5 - 110 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -35.18 | 5.78 | -1.02 |
| | | | Max. Mx | 11 | -20.76 | 655.64 | 1.40 |
| | | | Max. My | 8 | -20.75 | 0.71 | -667.49 |
| | | | Max. Vy | 11 | -24.99 | 655.64 | 1.40 |
| | | | Max. Vx | 8 | 25.27 | 0.71 | -667.49 |
| | | | Max. Torque | 12 | | | -1.70 |
| L2 | 110 - 72.5 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -55.64 | 5.78 | -1.02 |
| | | | Max. Mx | 11 | -36.22 | 1751.33 | 4.57 |
| | | | Max. My | 8 | -36.21 | -2.44 | -1772.75 |
| | | | Max. Vy | 11 | -34.08 | 1751.33 | 4.57 |
| | | | Max. Vx | 8 | 34.32 | -2.44 | -1772.75 |
| | | | Max. Torque | 2 | | | 1.55 |
| L3 | 72.5 - 36 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -77.70 | 5.78 | -1.02 |
| | | | Max. Mx | 11 | -54.17 | 3109.68 | 8.28 |
| | | | Max. My | 8 | -54.17 | -6.13 | -3139.75 |
| | | | Max. Vy | 11 | -41.16 | 3109.68 | 8.28 |
| | | | Max. Vx | 8 | 41.40 | -6.13 | -3139.75 |
| | | | Max. Torque | 2 | | | 1.41 |
| L4 | 36 - 0 | Pole | Max Tension | 1 | 0.00 | 0.00 | 0.00 |
| | | | Max. Compression | 14 | -106.24 | 5.78 | -1.02 |
| | | | Max. Mx | 11 | -78.04 | 5133.89 | 12.89 |
| | | | Max. My | 8 | -78.04 | -10.72 | -5174.65 |
| | | | Max. Vy | 11 | -48.63 | 5133.89 | 12.89 |
| | | | Max. Vx | 8 | 48.86 | -10.72 | -5174.65 |
| | | | Max. Torque | 2 | | | 1.41 |

Maximum Reactions

| Location | Condition | Gov. Load Comb. | Vertical K | Horizontal, X K | Horizontal, Z K |
|----------|---------------------|-----------------------|---------------|--------------------|--------------------|
| Pole | Max. Vert | 14 | 106.24 | 0.00 | -0.00 |
| | Max. H _x | 11 | 78.05 | 48.61 | 0.10 |
| | Max. H _z | 2 | 78.05 | 0.10 | 48.84 |
| | Max. M _x | 2 | 5171.85 | 0.10 | 48.84 |
| | Max. M _z | 5 | 5126.76 | -48.61 | -0.10 |
| | Max. Torsion | 2 | 1.41 | 0.10 | 48.84 |
| | Min. Vert | 8 | 78.05 | -0.10 | -48.84 |
| | Min. H _x | 5 | 78.05 | -48.61 | -0.10 |
| | Min. H _z | 8 | 78.05 | -0.10 | -48.84 |
| | Min. M _x | 8 | -5174.65 | -0.10 | -48.84 |
| | Min. M _z | 11 | -5133.89 | 48.61 | 0.10 |
| | Min. Torsion | 8 | -1.40 | -0.10 | -48.84 |

Tower Mast Reaction Summary

| Load Combination | Vertical K | Shear _x K | Shear _z K | Overturing Moment, M _x kip-ft | Overturing Moment, M _z kip-ft | Torque kip-ft |
|---------------------|---------------|-------------------------|-------------------------|--|--|------------------|
|---------------------|---------------|-------------------------|-------------------------|--|--|------------------|

| Load Combination | Vertical | Shear _x | Shear _z | Overturing Moment, M _x | Overturing Moment, M _z | Torque |
|-----------------------------|----------|--------------------|--------------------|-----------------------------------|-----------------------------------|--------|
| | K | K | K | kip-ft | kip-ft | kip-ft |
| Dead Only | 78.05 | -0.00 | 0.00 | 1.37 | 3.49 | 0.00 |
| Dead+Wind 0 deg - No Ice | 78.05 | -0.10 | -48.84 | -5171.85 | 17.86 | -1.41 |
| Dead+Wind 30 deg - No Ice | 78.05 | 24.22 | -42.25 | -4471.97 | -2549.41 | -1.37 |
| Dead+Wind 60 deg - No Ice | 78.05 | 42.05 | -24.34 | -2573.05 | -4432.62 | -0.96 |
| Dead+Wind 90 deg - No Ice | 78.05 | 48.61 | 0.10 | 15.69 | -5126.76 | -0.28 |
| Dead+Wind 120 deg - No Ice | 78.05 | 42.15 | 24.51 | 2600.61 | -4446.91 | 0.47 |
| Dead+Wind 150 deg - No Ice | 78.05 | 24.39 | 42.35 | 4489.06 | -2574.16 | 1.08 |
| Dead+Wind 180 deg - No Ice | 78.05 | 0.10 | 48.84 | 5174.65 | -10.72 | 1.40 |
| Dead+Wind 210 deg - No Ice | 78.05 | -24.22 | 42.25 | 4474.77 | 2556.55 | 1.34 |
| Dead+Wind 240 deg - No Ice | 78.05 | -42.05 | 24.34 | 2575.86 | 4439.76 | 0.94 |
| Dead+Wind 270 deg - No Ice | 78.05 | -48.61 | -0.10 | -12.89 | 5133.89 | 0.29 |
| Dead+Wind 300 deg - No Ice | 78.05 | -42.15 | -24.51 | -2597.81 | 4454.04 | -0.44 |
| Dead+Wind 330 deg - No Ice | 78.05 | -24.39 | -42.35 | -4486.26 | 2581.30 | -1.06 |
| Dead+Ice+Temp | 106.24 | -0.00 | 0.00 | 1.02 | 5.78 | 0.00 |
| Dead+Wind 0 deg+Ice+Temp | 106.24 | -0.01 | -12.73 | -1420.77 | 7.87 | -0.77 |
| Dead+Wind 30 deg+Ice+Temp | 106.24 | 6.33 | -11.02 | -1229.34 | -698.84 | -0.65 |
| Dead+Wind 60 deg+Ice+Temp | 106.24 | 10.97 | -6.35 | -708.22 | -1216.70 | -0.35 |
| Dead+Wind 90 deg+Ice+Temp | 106.24 | 12.68 | 0.01 | 2.95 | -1406.94 | 0.04 |
| Dead+Wind 120 deg+Ice+Temp | 106.24 | 10.99 | 6.38 | 713.61 | -1218.59 | 0.42 |
| Dead+Wind 150 deg+Ice+Temp | 106.24 | 6.35 | 11.03 | 1233.34 | -702.12 | 0.69 |
| Dead+Wind 180 deg+Ice+Temp | 106.24 | 0.01 | 12.73 | 1422.89 | 4.08 | 0.77 |
| Dead+Wind 210 deg+Ice+Temp | 106.24 | -6.33 | 11.02 | 1231.45 | 710.80 | 0.65 |
| Dead+Wind 240 deg+Ice+Temp | 106.24 | -10.97 | 6.35 | 710.33 | 1228.65 | 0.35 |
| Dead+Wind 270 deg+Ice+Temp | 106.24 | -12.68 | -0.01 | -0.84 | 1418.90 | -0.04 |
| Dead+Wind 300 deg+Ice+Temp | 106.24 | -10.99 | -6.38 | -711.50 | 1230.55 | -0.42 |
| Dead+Wind 330 deg+Ice+Temp | 106.24 | -6.35 | -11.03 | -1231.23 | 714.08 | -0.68 |
| Dead+Wind 0 deg - Service | 78.05 | -0.04 | -19.08 | -2019.57 | 9.15 | -0.55 |
| Dead+Wind 30 deg - Service | 78.05 | 9.46 | -16.50 | -1746.02 | -993.70 | -0.53 |
| Dead+Wind 60 deg - Service | 78.05 | 16.42 | -9.51 | -1004.25 | -1729.33 | -0.37 |
| Dead+Wind 90 deg - Service | 78.05 | 18.99 | 0.04 | 6.98 | -2000.63 | -0.11 |
| Dead+Wind 120 deg - Service | 78.05 | 16.46 | 9.57 | 1016.72 | -1734.91 | 0.18 |
| Dead+Wind 150 deg - Service | 78.05 | 9.53 | 16.54 | 1754.40 | -1003.36 | 0.42 |
| Dead+Wind 180 deg - Service | 78.05 | 0.04 | 19.08 | 2022.37 | -2.01 | 0.55 |
| Dead+Wind 210 deg - Service | 78.05 | -9.46 | 16.50 | 1748.82 | 1000.83 | 0.53 |
| Dead+Wind 240 deg - Service | 78.05 | -16.42 | 9.51 | 1007.05 | 1736.46 | 0.37 |
| Dead+Wind 270 deg - Service | 78.05 | -18.99 | -0.04 | -4.18 | 2007.76 | 0.11 |
| Dead+Wind 300 deg - Service | 78.05 | -16.46 | -9.57 | -1013.92 | 1742.04 | -0.18 |
| Dead+Wind 330 deg - Service | 78.05 | -9.53 | -16.54 | -1751.60 | 1010.50 | -0.42 |

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 | -78.05 | 0.00 | 0.00 | 78.05 | -0.00 | 0.000% |
| 2 | -0.10 | -78.05 | -48.85 | 0.10 | 78.05 | 48.84 | 0.004% |

| Load Comb. | Sum of Applied Forces | | | Sum of Reactions | | | % Error |
|------------|-----------------------|---------|---------|------------------|---------|---------|---------|
| | PX K | PY K | PZ K | PX K | PY K | PZ K | |
| 3 | 24.22 | -78.05 | -42.25 | -24.22 | 78.05 | 42.25 | 0.000% |
| 4 | 42.05 | -78.05 | -24.34 | -42.05 | 78.05 | 24.34 | 0.000% |
| 5 | 48.61 | -78.05 | 0.10 | -48.61 | 78.05 | -0.10 | 0.004% |
| 6 | 42.15 | -78.05 | 24.51 | -42.15 | 78.05 | -24.51 | 0.000% |
| 7 | 24.39 | -78.05 | 42.35 | -24.39 | 78.05 | -42.35 | 0.000% |
| 8 | 0.10 | -78.05 | 48.85 | -0.10 | 78.05 | -48.84 | 0.004% |
| 9 | -24.22 | -78.05 | 42.25 | 24.22 | 78.05 | -42.25 | 0.000% |
| 10 | -42.05 | -78.05 | 24.34 | 42.05 | 78.05 | -24.34 | 0.000% |
| 11 | -48.61 | -78.05 | -0.10 | 48.61 | 78.05 | 0.10 | 0.004% |
| 12 | -42.15 | -78.05 | -24.51 | 42.15 | 78.05 | 24.51 | 0.000% |
| 13 | -24.39 | -78.05 | -42.35 | 24.39 | 78.05 | 42.35 | 0.000% |
| 14 | 0.00 | -106.24 | 0.00 | 0.00 | 106.24 | -0.00 | 0.000% |
| 15 | -0.01 | -106.24 | -12.73 | 0.01 | 106.24 | 12.73 | 0.000% |
| 16 | 6.33 | -106.24 | -11.02 | -6.33 | 106.24 | 11.02 | 0.000% |
| 17 | 10.97 | -106.24 | -6.35 | -10.97 | 106.24 | 6.35 | 0.000% |
| 18 | 12.68 | -106.24 | 0.01 | -12.68 | 106.24 | -0.01 | 0.000% |
| 19 | 10.99 | -106.24 | 6.38 | -10.99 | 106.24 | -6.38 | 0.000% |
| 20 | 6.35 | -106.24 | 11.03 | -6.35 | 106.24 | -11.03 | 0.000% |
| 21 | 0.01 | -106.24 | 12.73 | -0.01 | 106.24 | -12.73 | 0.000% |
| 22 | -6.33 | -106.24 | 11.02 | 6.33 | 106.24 | -11.02 | 0.000% |
| 23 | -10.97 | -106.24 | 6.35 | 10.97 | 106.24 | -6.35 | 0.000% |
| 24 | -12.68 | -106.24 | -0.01 | 12.68 | 106.24 | 0.01 | 0.000% |
| 25 | -10.99 | -106.24 | -6.38 | 10.99 | 106.24 | 6.38 | 0.000% |
| 26 | -6.35 | -106.24 | -11.03 | 6.35 | 106.24 | 11.03 | 0.000% |
| 27 | -0.04 | -78.05 | -19.08 | 0.04 | 78.05 | 19.08 | 0.002% |
| 28 | 9.46 | -78.05 | -16.50 | -9.46 | 78.05 | 16.50 | 0.002% |
| 29 | 16.43 | -78.05 | -9.51 | -16.42 | 78.05 | 9.51 | 0.002% |
| 30 | 18.99 | -78.05 | 0.04 | -18.99 | 78.05 | -0.04 | 0.002% |
| 31 | 16.47 | -78.05 | 9.57 | -16.46 | 78.05 | -9.57 | 0.002% |
| 32 | 9.53 | -78.05 | 16.54 | -9.53 | 78.05 | -16.54 | 0.002% |
| 33 | 0.04 | -78.05 | 19.08 | -0.04 | 78.05 | -19.08 | 0.002% |
| 34 | -9.46 | -78.05 | 16.50 | 9.46 | 78.05 | -16.50 | 0.002% |
| 35 | -16.43 | -78.05 | 9.51 | 16.42 | 78.05 | -9.51 | 0.002% |
| 36 | -18.99 | -78.05 | -0.04 | 18.99 | 78.05 | 0.04 | 0.002% |
| 37 | -16.47 | -78.05 | -9.57 | 16.46 | 78.05 | 9.57 | 0.002% |
| 38 | -9.53 | -78.05 | -16.54 | 9.53 | 78.05 | 16.54 | 0.002% |

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 | 0.00013973 |
| 3 | Yes | 10 | 0.00000001 | 0.00007509 |
| 4 | Yes | 10 | 0.00000001 | 0.00007992 |
| 5 | Yes | 8 | 0.00000001 | 0.00009580 |
| 6 | Yes | 10 | 0.00000001 | 0.00008003 |
| 7 | Yes | 10 | 0.00000001 | 0.00007736 |
| 8 | Yes | 8 | 0.00000001 | 0.00012836 |
| 9 | Yes | 10 | 0.00000001 | 0.00008182 |
| 10 | Yes | 10 | 0.00000001 | 0.00007617 |
| 11 | Yes | 8 | 0.00000001 | 0.00009981 |
| 12 | Yes | 10 | 0.00000001 | 0.00007866 |
| 13 | Yes | 10 | 0.00000001 | 0.00008215 |
| 14 | Yes | 6 | 0.00000001 | 0.00000001 |
| 15 | Yes | 10 | 0.00000001 | 0.00008494 |
| 16 | Yes | 10 | 0.00000001 | 0.00008626 |
| 17 | Yes | 10 | 0.00000001 | 0.00008581 |
| 18 | Yes | 10 | 0.00000001 | 0.00008379 |
| 19 | Yes | 10 | 0.00000001 | 0.00008615 |
| 20 | Yes | 10 | 0.00000001 | 0.00008666 |
| 21 | Yes | 10 | 0.00000001 | 0.00008514 |
| 22 | Yes | 10 | 0.00000001 | 0.00008716 |
| 23 | Yes | 10 | 0.00000001 | 0.00008698 |
| 24 | Yes | 10 | 0.00000001 | 0.00008499 |

| | | | | |
|----|-----|----|------------|------------|
| 25 | Yes | 10 | 0.00000001 | 0.00008709 |
| 26 | Yes | 10 | 0.00000001 | 0.00008721 |
| 27 | Yes | 8 | 0.00000001 | 0.00004776 |
| 28 | Yes | 8 | 0.00000001 | 0.00007338 |
| 29 | Yes | 8 | 0.00000001 | 0.00008671 |
| 30 | Yes | 8 | 0.00000001 | 0.00004395 |
| 31 | Yes | 8 | 0.00000001 | 0.00008410 |
| 32 | Yes | 8 | 0.00000001 | 0.00007674 |
| 33 | Yes | 8 | 0.00000001 | 0.00004745 |
| 34 | Yes | 8 | 0.00000001 | 0.00009172 |
| 35 | Yes | 8 | 0.00000001 | 0.00007610 |
| 36 | Yes | 8 | 0.00000001 | 0.00004433 |
| 37 | Yes | 8 | 0.00000001 | 0.00008027 |
| 38 | Yes | 8 | 0.00000001 | 0.00008986 |

Maximum Tower Deflections - Service Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------------|-----------------------|-----------|------------|
| L1 | 155.5 - 110 | 10.564 | 33 | 0.4890 | 0.0004 |
| L2 | 118 - 72.5 | 6.807 | 33 | 0.4559 | 0.0003 |
| L3 | 81 - 36 | 3.562 | 33 | 0.3643 | 0.0002 |
| L4 | 45 - 0 | 1.237 | 33 | 0.2330 | 0.0001 |

Critical Deflections and Radius of Curvature - Service Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|-----------------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 158.00 | DB809K-Y | 33 | 10.564 | 0.4890 | 0.0004 | 246213 |
| 144.00 | (2) 7770.00 w/ Mount Pipe | 33 | 9.388 | 0.4827 | 0.0004 | 107049 |
| 135.00 | 742 213 w/ Mount Pipe | 33 | 8.478 | 0.4762 | 0.0004 | 60052 |
| 126.00 | DB809K-Y | 33 | 7.583 | 0.4671 | 0.0003 | 41731 |
| 100.00 | (2) RR90-17-02DP w/ Mount Pipe | 33 | 5.151 | 0.4182 | 0.0003 | 26384 |

Maximum Tower Deflections - Design Wind

| Section No. | Elevation ft | Horz. Deflection in | Gov. Load Comb. | Tilt ° | Twist ° |
|-------------|-----------------|---------------------------|-----------------------|-----------|------------|
| L1 | 155.5 - 110 | 27.020 | 8 | 1.2508 | 0.0010 |
| L2 | 118 - 72.5 | 17.413 | 8 | 1.1659 | 0.0008 |
| L3 | 81 - 36 | 9.113 | 8 | 0.9319 | 0.0005 |
| L4 | 45 - 0 | 3.166 | 13 | 0.5962 | 0.0003 |

Critical Deflections and Radius of Curvature - Design Wind

| Elevation ft | Appurtenance | Gov. Load Comb. | Deflection in | Tilt ° | Twist ° | Radius of Curvature ft |
|-----------------|---------------------------|-----------------------|------------------|-----------|------------|------------------------------|
| 158.00 | DB809K-Y | 8 | 27.020 | 1.2508 | 0.0010 | 96400 |
| 144.00 | (2) 7770.00 w/ Mount Pipe | 8 | 24.013 | 1.2346 | 0.0010 | 41913 |
| 135.00 | 742 213 w/ Mount Pipe | 8 | 21.684 | 1.2179 | 0.0009 | 23511 |
| 126.00 | DB809K-Y | 8 | 19.397 | 1.1946 | 0.0009 | 16338 |

| Elevation | Appurtenance | Gov. Load Comb. | Deflection | Tilt | Twist | Radius of Curvature |
|-----------|--------------------------------|-----------------|------------|--------|--------|---------------------|
| ft | | | in | ° | ° | ft |
| 100.00 | (2) RR90-17-02DP w/ Mount Pipe | 8 | 13.176 | 1.0695 | 0.0007 | 10330 |

Compression Checks

Pole Design Data

| Section No. | Elevation | Size | L | L_u | Kl/r | F_a | A | Actual P | Allow. P_a | Ratio $\frac{P}{P_a}$ |
|-------------|-----------------|----------------------|-------|-------|--------|--------|---------|----------|--------------|-----------------------|
| | ft | | ft | ft | | ksi | in^2 | K | K | |
| L1 | 155.5 - 110 (1) | TP64.606x58.6x0.375 | 45.50 | 0.00 | 0.0 | 31.415 | 76.2838 | -20.75 | 2396.43 | 0.009 |
| L2 | 110 - 72.5 (2) | TP68.805x62.8x0.4375 | 45.50 | 0.00 | 0.0 | 33.742 | 94.7324 | -36.21 | 3196.42 | 0.011 |
| L3 | 72.5 - 36 (3) | TP72.748x66.8082x0.5 | 45.00 | 0.00 | 0.0 | 35.568 | 114.407 | -54.17 | 4069.16 | 0.013 |
| L4 | 36 - 0 (4) | TP76.5x70.56x0.5 | 45.00 | 0.00 | 0.0 | 34.010 | 122.360 | -78.04 | 4161.49 | 0.019 |

Pole Bending Design Data

| Section No. | Elevation | Size | Actual M_x | Actual f_{bx} | Allow. F_{bx} | Ratio $\frac{f_{bx}}{F_{bx}}$ | Actual M_y | Actual f_{by} | Allow. F_{by} | Ratio $\frac{f_{by}}{F_{by}}$ |
|-------------|-----------------|----------------------|--------------|-----------------|-----------------|-------------------------------|--------------|-----------------|-----------------|-------------------------------|
| | ft | | kip-ft | ksi | ksi | | kip-ft | ksi | ksi | |
| L1 | 155.5 - 110 (1) | TP64.606x58.6x0.375 | 667.49 | 6.785 | 31.415 | 0.216 | 0.00 | 0.000 | 31.415 | 0.000 |
| L2 | 110 - 72.5 (2) | TP68.805x62.8x0.4375 | 1772.75 | 13.640 | 33.742 | 0.404 | 0.00 | 0.000 | 33.742 | 0.000 |
| L3 | 72.5 - 36 (3) | TP72.748x66.8082x0.5 | 3139.76 | 18.940 | 35.568 | 0.533 | 0.00 | 0.000 | 35.568 | 0.000 |
| L4 | 36 - 0 (4) | TP76.5x70.56x0.5 | 5175.88 | 27.284 | 34.010 | 0.802 | 0.00 | 0.000 | 34.010 | 0.000 |

Pole Shear Design Data

| Section No. | Elevation | Size | Actual V | Actual f_v | Allow. F_v | Ratio $\frac{f_v}{F_v}$ | Actual T | Actual f_{vt} | Allow. F_{vt} | Ratio $\frac{f_{vt}}{F_{vt}}$ |
|-------------|-----------------|----------------------|----------|--------------|--------------|-------------------------|----------|-----------------|-----------------|-------------------------------|
| | ft | | K | ksi | ksi | | kip-ft | ksi | ksi | |
| L1 | 155.5 - 110 (1) | TP64.606x58.6x0.375 | 25.27 | 0.331 | 26.000 | 0.026 | 1.54 | 0.007 | 26.000 | 0.000 |
| L2 | 110 - 72.5 (2) | TP68.805x62.8x0.4375 | 34.32 | 0.362 | 26.000 | 0.028 | 1.40 | 0.005 | 26.000 | 0.000 |
| L3 | 72.5 - 36 (3) | TP72.748x66.8082x0.5 | 41.40 | 0.362 | 26.000 | 0.028 | 1.40 | 0.004 | 26.000 | 0.000 |
| L4 | 36 - 0 (4) | TP76.5x70.56x0.5 | 48.90 | 0.400 | 26.000 | 0.031 | 1.06 | 0.003 | 26.000 | 0.000 |

Pole Interaction Design Data

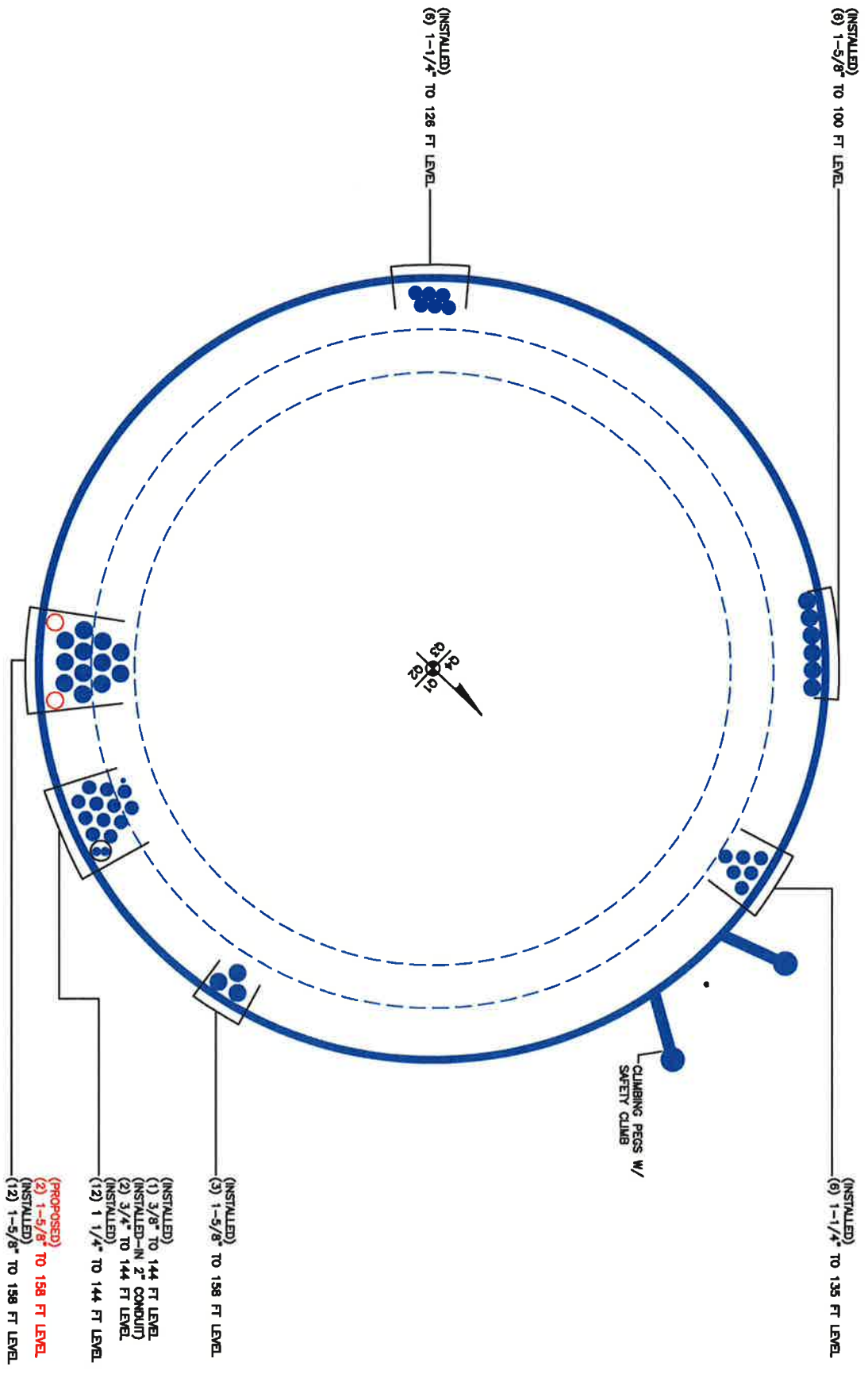
| Section No. | Elevation | Ratio $\frac{P}{P_a}$ | Ratio $\frac{f_{bx}}{F_{bx}}$ | Ratio $\frac{f_{by}}{F_{by}}$ | Ratio $\frac{f_v}{F_v}$ | Ratio $\frac{f_{vt}}{F_{vt}}$ | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|-----------------|-----------------------|-------------------------------|-------------------------------|-------------------------|-------------------------------|--------------------|---------------------|-----------|
| L1 | 155.5 - 110 (1) | 0.009 | 0.216 | 0.000 | 0.026 | 0.000 | 0.225 | 1.333 | H1-3+VT ✓ |

| Section No. | Elevation ft | Ratio $\frac{P}{P_a}$ | Ratio $\frac{f_{bx}}{F_{bx}}$ | Ratio $\frac{f_{by}}{F_{by}}$ | Ratio $\frac{f_v}{F_v}$ | Ratio $\frac{f_{vt}}{F_{vt}}$ | Comb. Stress Ratio | Allow. Stress Ratio | Criteria |
|-------------|----------------|-----------------------|-------------------------------|-------------------------------|-------------------------|-------------------------------|--------------------|---------------------|-----------|
| L2 | 110 - 72.5 (2) | 0.011 | 0.404 | 0.000 | 0.028 | 0.000 | 0.416 ✓ | 1.333 | H1-3+VT ✓ |
| L3 | 72.5 - 36 (3) | 0.013 | 0.533 | 0.000 | 0.028 | 0.000 | 0.546 ✓ | 1.333 | H1-3+VT ✓ |
| L4 | 36 - 0 (4) | 0.019 | 0.802 | 0.000 | 0.031 | 0.000 | 0.821 ✓ | 1.333 | H1-3+VT ✓ |

Section Capacity Table

| Section No. | Elevation ft | Component Type | Size | Critical Element | P K | SF*P _{allow} K | % Capacity | Pass Fail |
|-----------------|--------------|----------------|----------------------|------------------|--------|-------------------------|-------------|-------------|
| L1 | 155.5 - 110 | Pole | TP64.606x58.6x0.375 | 1 | -20.75 | 3194.44 | 16.9 | Pass |
| L2 | 110 - 72.5 | Pole | TP68.805x62.8x0.4375 | 2 | -36.21 | 4260.83 | 31.2 | Pass |
| L3 | 72.5 - 36 | Pole | TP72.748x66.8082x0.5 | 3 | -54.17 | 5424.19 | 41.0 | Pass |
| L4 | 36 - 0 | Pole | TP76.5x70.56x0.5 | 4 | -78.04 | 5547.27 | 61.6 | Pass |
| Summary | | | | | | | | |
| Pole (L4) | | | | | | | 61.6 | Pass |
| RATING = | | | | | | | 61.6 | Pass |

APPENDIX B
BASE LEVEL DRAWING



APPENDIX C
ADDITIONAL CALCULATIONS

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

TIA Rev F

Site Data

| |
|---------------------------------|
| BU#: 806366 |
| Site Name: HRT 107-C- 943204 |
| App #: 272724 |
| Pole Manufacturer: Other |

| Reactions | | |
|-----------|-----------|---------|
| Moment: | 5175.8717 | ft-kips |
| Axial: | 78.0379 | kips |
| Shear: | 48.897295 | kips |

| Anchor Rod Data | | |
|-----------------|--------|-----|
| Qty: | 24 | |
| Diam: | 2.25 | in |
| Rod Material: | A615-J | |
| Strength (Fu): | 100 | ksi |
| Yield (Fy): | 75 | ksi |
| Bolt Circle: | 84.75 | in |

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

Anchor Rod Results

Maximum Rod Tension: 118.9 Kips
 Allowable Tension: 195.0 Kips
 Anchor Rod Stress Ratio: 61.0% **Pass**

| |
|-------------|
| Rigid |
| Service ASD |
| Fty*ASIF |

| Plate Data | | |
|-------------------|-------|-----|
| Diam: | 91 | in |
| Thick: | 3.25 | in |
| Grade: | 60 | ksi |
| Single-Rod B-eff: | 10.25 | in |

Base Plate Results

Base Plate Stress: 18.2 ksi
 Allowable Plate Stress: 60.0 ksi
 Base Plate Stress Ratio: 30.3% **Pass**

Flexural Check

| |
|--------------|
| Rigid |
| Service ASD |
| 0.75*Fy*ASIF |
| Y.L. Length: |
| 36.47 |

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

n/a

Stiffener Results

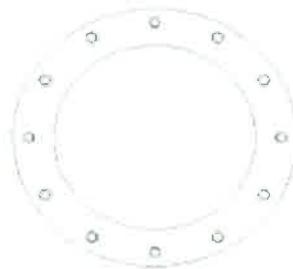
Horizontal Weld : n/a
 Vertical Weld: n/a
 Plate Flex+Shear, fb/Fb+(fv/Fv)^2: n/a
 Plate Tension+Shear, ft/Ft+(fv/Fv)^2: n/a
 Plate Comp. (AISC Bracket): n/a

Pole Results

Pole Punching Shear Check: n/a

| Pole Data | | |
|--------------------|------|--------------|
| Diam: | 76.5 | in |
| Thick: | 0.5 | in |
| Grade: | 65 | ksi |
| # of Sides: | 12 | "0" IF Round |
| Fu | 80 | ksi |
| Reinf. Fillet Weld | 0 | "0" if None |

| Stress Increase Factor | | |
|------------------------|-------|--|
| ASIF: | 1.333 | |



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

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

(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

| |
|------------------------------|
| BU#: 806366 |
| Site Name: HRT 107-C- 943204 |
| App #: ???? |

Enter Load Factors Below:

| | | |
|---------------------|------|--------------------|
| For P (DL) | 1.2 | <---- Enter Factor |
| For P,V, and M (WL) | 1.35 | <---- Enter Factor |

Pad & Pier Data

| | | |
|---------------------------|--------|--------------|
| Base PL Dist. Above Pier: | 0 | in |
| Pier Dist. Above Grade: | 6 | in |
| Pad Bearing Depth, D: | 7.5 | ft |
| Pad Thickness, T: | 4.5 | ft |
| Pad Width=Length, L: | 33.25 | ft |
| Pier Cross Section Shape: | Square | <--Pull Down |
| Enter Pier Side Width: | 9 | ft |
| Concrete Density: | 150.0 | pcf |
| Pier Cross Section Area: | 81.00 | ft^2 |
| Pier Height: | 3.50 | ft |
| Soil (above pad) Height: | 3.00 | ft |

Soil Parameters

| | | |
|---------------------------------------|-------|---------|
| Unit Weight, γ : | 130.0 | pcf |
| Ultimate Bearing Capacity, q_n : | 21.00 | ksf |
| Strength Reduct. factor, ϕ : | 0.75 | |
| Angle of Friction, Φ : | 40.0 | degrees |
| Undrained Shear Strength, C_u : | 0.00 | ksf |
| Allowable Bearing: $\phi \cdot q_n$: | 15.75 | ksf |
| Passive Pres. Coeff., K_p : | 4.60 | |

Forces/Moments due to Wind and Lateral Soil

| | | |
|--|---------|---------|
| Minimum of ($\phi \cdot$ Ultimate Pad Passive Force, V_u): | 66.0 | kips |
| Pad Force Location Above D: | 1.93 | ft |
| ϕ (Passive Pressure Moment): | 127.31 | ft-kips |
| Factored O.T. M(WL), "1.6W": | 7515.5 | ft-kips |
| Factored OT (MW-Msoil), M1 | 7388.21 | ft-kips |

Resistance due to Foundation Gravity

| | | |
|------------------------------------|---------|------|
| Soil Wedge Projection grade, a : | 2.52 | ft |
| Sum of Soil Wedges Wt: | 29.74 | kips |
| Soil Wedges ecc, K_1 : | 14.77 | ft |
| Ftg+Soil above Pad wt: | 1188.4 | kips |
| Unfactored (Total ftg-soil Wt): | 1218.10 | kips |
| 1.2D. No Soil Wedges. | 1519.68 | kips |
| 0.9D. With Soil Wedges | 1166.52 | kips |

Resistance due to Cohesion (Vertical)

| | | |
|---|------|------|
| $\phi \cdot (1/2 \cdot C_u)$ (Total Vert. Planes) | 0.00 | kips |
| Cohesion Force Eccentricity, K_2 | 0.00 | ft |

Monopole Base Reaction Forces

| | | |
|--------------------------|----------|--------------|
| TIA Revision: | F | <--Pull Down |
| Unfactored DL Axial, PD: | 78.0379 | kips |
| Unfactored WL Axial, PW: | 0 | kips |
| Unfactored WL Shear, V: | 48.8973 | kips |
| Unfactored WL Moment, M: | 5175.872 | ft-kips |

Load Factor Shaft Factored Loads

| | | | |
|------|----------------|----------|---------|
| 1.20 | 1.2D+1.6W, Pu: | 93.64548 | kips |
| 0.90 | 0.9D+1.6W, Pu: | 70.23411 | kips |
| 1.35 | Vu: | 66.01135 | kips |
| | Mu: | 6987.427 | ft-kips |

1.2D+1.6W Load Combination, Bearing Results:

| | | |
|---|---------|--------------------------|
| (No Soil Wedges) [Reaction+Conc+Soil] | 1519.68 | P1="1.2D+1.6W" (Kips) |
| Factored "1.6W" Overturning Moment (MW-Msoil), M1 | 7388.21 | ft-kips |

Orthogonal Direction:

$ecc1 = M1/P1 = 4.86 \text{ ft}$
 $Orthogonal \text{ } q_u = 2.18 \text{ ksf}$
 $q_u/\phi \cdot q_n \text{ Ratio} = 13.83\% \text{ Pass}$

Diagonal Direction:

$ecc2 = (0.707M1)/P1 = 3.44 \text{ ft}$
 $Diagonal \text{ } q_u = 2.18 \text{ ksf}$
 $q_u/\phi \cdot q_n \text{ Ratio} = 13.87\% \text{ Pass}$

<-- Press Upon Completing All Input

Overtuning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

| | | |
|---|---------|--------------------------|
| (w/ Soil Wedges) [Reaction+Conc+Soil] | 1166.52 | P2="0.9D+1.6W" (Kips) |
| Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2 | 6993.01 | ft-kips |

$Orthogonal \text{ } ecc3 = M2/P2 = 5.99 \text{ ft}$
 $Ortho \text{ Non Bearing Length, NBL} = 11.99 \text{ ft}$
 $Orthogonal \text{ } q_u = 1.82 \text{ ksf}$
 $Diagonal \text{ } q_u = 1.90 \text{ ksf}$

Max Reaction Moment (ft-kips) so that $q_u = \phi \cdot q_n = 100\%$ Capacity Rating

| | | | |
|---------------|----------|--------|------|
| Actual M: | 5175.87 | | |
| M Orthogonal: | 13517.34 | 38.29% | Pass |
| M Diagonal: | 13517.34 | 38.29% | Pass |

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

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

Site Data

| |
|------------------------------|
| BU#: 806366 |
| Site Name: HRT 107-C- 943204 |
| App #: 272724 |

Enter Load Factors Below:

| | | |
|------------|-----|--------------------|
| For M (WL) | 1.3 | <---- Enter Factor |
| For P (DL) | 1.3 | <---- Enter Factor |

Pier Properties

| | |
|----------------------------|------------------------|
| Concrete: | |
| Pier Diameter = | 9.0 ft |
| Concrete Area = | 9160.9 in ² |
| Reinforcement: | |
| Clear Cover to Tie= | 3.00 in |
| Horiz. Tie Bar Size= | 5 |
| Vert. Cage Diameter = | 8.28 ft |
| Vert. Cage Diameter = | 99.34 in |
| Vertical Bar Size = | 11 |
| Bar Diameter = | 1.41 in |
| Bar Area = | 1.56 in ² |
| Number of Bars = | 59 |
| As Total= | 92.04 in ² |
| A s/ Aconc, Rho: | 0.0100 1.00% |

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

$$(3) * (\text{sqrt}(f'c) / Fy) = 0.0032$$

$$200 / Fy = 0.0033$$

Minimum Rho Check:

| | | |
|------------------------|-------|----------|
| Actual Req'd Min. Rho: | 0.33% | Flexural |
| Provided Rho: | 1.00% | OK |

| Maximum Shaft Superimposed Forces | | |
|-----------------------------------|----------|------------------|
| TIA Revision: | F | |
| Max. Service Shaft M: | 5347.012 | ft-kips (* Note) |
| Max. Service Shaft P: | 78.0379 | kips |
| Max Axial Force Type: | Comp. | |

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

| Load Factor | Shaft Factored Loads | |
|-------------|----------------------|---------|
| 1.30 | Mu: 6951.116 | ft-kips |
| 1.30 | Pu: 101.4493 | kips |

Material Properties

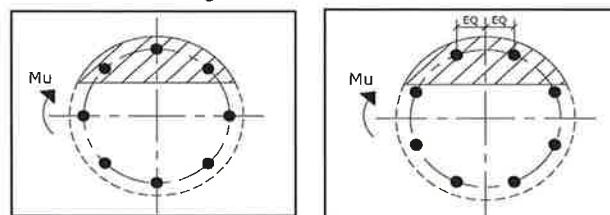
| Concrete Comp. strength, f'c = | 4000 | psi |
|--|---------|-----|
| Reinforcement yield strength, Fy = | 60 | ksi |
| Reinforcing Modulus of Elasticity, E = | 29000 | ksi |
| Reinforcement yield strain = | 0.00207 | |
| Limiting compressive strain = | 0.003 | |
| ACI 318 Code | | |
| Select Analysis ACI Code= | 2002 | |
| Seismic Properties | | |
| Seismic Design Category = | D | |
| Seismic Risk = | High | |

Solve
(Run)

<-- Press Upon Completing All Input

Results:

Governing Orientation Case: 1



Case 1

Case 2

Dist. From Edge to Neutral Axis: **19.35** in
Extreme Steel Strain, et: **0.0131**

et > 0.0050, Tension Controlled

Reduction Factor, φ: **0.900**

| Ref. Shaft Max Axial Capacities. φ Max(Pn or Tn): | | |
|---|----------|---------|
| Max Pu = (φ=0.65) Pn. | | |
| Pn per ACI 318 (10-2) | 18905.36 | kips |
| at Mu=(φ=0.65)Mn= | 14903.09 | ft-kips |
| | | |
| Max Tu, (φ=0.9) Tn = | 4970.16 | kips |
| at Mu=φ=(0.90)Mn= | 0.00 | ft-kips |

Output Note: Negative Pu=Tension
For Axial Compression, φ Pn = Pu: 101.45 kips
Drilled Shaft Moment Capacity, φ Mn: **18573.81** ft-kips
Drilled Shaft Superimposed Mu: **6951.12** ft-kips

| | |
|---|--------------|
| (Mu/φMn, Drilled Shaft Flexure CSR): | 37.4% |
|---|--------------|