STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
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VIA ELECTRONIC MAIL

April 22, 2020

Mark Roberts
QC Development
P.O. Box 916
Storrs, CT 06268

RE: **EM-CING-144b-200413** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 124 Quarry Road, Trumbull, Connecticut.

Dear Mr. Roberts:

The Connecticut Siting Council (Council) is in receipt of your correspondence of April 22, 2020 submitted in response to the Council's April 21, 2020 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

s/ Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/emr

From: Mark Roberts <mark.roberts@qcdevelopment.net>
Sent: Tuesday, April 21, 2020 4:44 PM
To: Robidoux, Evan <Evan.Robidoux@ct.gov>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: RE: Council Incomplete Letter for EM-CING-144b-200413 (124 Quarry Road, Trumbull)
Importance: High

Hello Evan – please find attached the correct Tower Structural Analysis for the Eversource facility at 124 Quarry Rd. My apologies for any confusion.

Mark Roberts
QC Development
860-670-9068

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Tower

AT&T Site Ref: CT5089

Eversource Structure No. 844
150' Electric Transmission Tower

124 Quarry road
Trumbull, CT

CENTEK Project No. 19031.00

Date: March 5, 2019

Prepared for:
AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

Table of Contents

Introduction

The purpose of this report is to analyze the existing mast and 150' tower located at 124 Quarry Road in Trumbull, CT for the proposed antenna and equipment upgrade by AT&T.

The existing/proposed loads consist of the following:

- SPRINT (Existing to Remain):
  Antennas: Three (3) Commscope DHHTT65B-3XR panel antennas, three (3) RFS KIT-FD9R6004/1C-DL Diplexers and three (3) CCI DPO-7126Y-0-T1 Diplexers mounted to the existing mast with a RAD center elevation of 100-ft above grade.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
- AT&T (Existing to Remain):
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the exterior of the existing tower.
  Mast: HSS 6.625"x0.432" x 21-ft long.
- AT&T (Existing to Remove):
  Antennas: Three (3) Qunitel QS66512-2 panel antennas and six (6) Kaelus TMA2117F00V1-1 TMAs flush mounted on the existing mast with a RAD center elevation of 160-ft above grade.
- **AT&T (Proposed):**
  Antennas: Three (3) Kathrein 800-10991 panel antennas and six (6) Commscope TMAT21X23B68-31-43 TMAs flush mounted on the existing mast with a RAD center elevation of 160-ft above grade.

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE 48-11, "Design of Steel Transmission Pole Structures", defines steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

Structural analysis of the existing antenna mast was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc.

The existing mast consisting of a HSS 6.625"x0.432" x 21' long pipe connected at two points to the existing pole was analyzed for its ability to resist loads prescribed by the TIA-222-G standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

An envelope solution was first made to determine maximum and minimum forces, stresses, and deflections to confirm the selected section as adequate. Additional analyses were then made to determine the NESC forces to be applied to the pole structure.

The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized. The forces calculated in RISA-3D using NESC guidelines were then applied to the pole. Maximum usage for the pole was calculated considering the additional forces from the mast and associated appurtenances.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE 48-11, "Design of Steel Transmission Pole Structures", NESC C2-2012 and Northeast Utilities Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE 48-11.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure.……………………………….. 4.0 psf
  Radial Ice Thickness………………………. 0.5"
  Vertical Overload Capacity Factor…………. 1.50
  Wind Overload Capacity Factor……………. 2.50
  Wire Tension Overload Capacity Factor…… 1.65

  Load Case 2: NESC Extreme
  Wind Speed.………………………………. 110 mph (1)
  Radial Ice Thickness………………………. 0"

  Note 1: NESC C2-2012, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

Mast, appurtenances and connections to the utility tower were analyzed and designed in accordance with the Eversource Design Criteria Table, TIA-222-G and AISC standards.

Load cases considered:

Load Case 1:
Wind Speed………………………………... 97 mph (2018 CSBC Appendix-N)
Radial Ice Thickness………………………. 0"

Load Case 2:
Wind Pressure.……………………………. 50 mph wind pressure
Radial Ice Thickness……………………….. 0.75"

Results

- MAST ASSEMBLY

The mast assembly was determined to be structurally **adequate**.

Member	Stress Ratio (% of capacity)	Result
HSS 6.625"x0.432"	98.6%	**PASS**
3/4" ∅ ASTM A36 Threaded Rod	69.4%	**PASS**

- UTILITY TOWER

This analysis finds that the subject utility pole is adequate to support the proposed antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE 48-11, "Design of Steel Transmission Pole Structures" for the applied NESC Heavy and Extreme load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

A maximum usage of **96.7%** occurs in the utility tower under the **NESC Extreme** loading condition.

TOWER SECTION:

The utility tower was found to be within allowable limits.

Tower Section	Stress Ratio (% of capacity)	Result
70'	96.7%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft x 8-ft x 8.0-ft long reinforced concrete pier with twelve (12) rock anchors embedded 13-ft into rock. The base of the tower is connected to the foundation by means of twenty-six (26) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure. Foundation information was obtained from Northeast Utilities drawing 01064-60000.

BASE REACTIONS:

From analysis of pole based on NESC/NU prescribed loads.

Load Case	Transverse	Axial	Overturning Moment
NESC Heavy Wind x-direction	20.5 kips	105.7 kips	2837.4 ft-kips
NESC Extreme Wind x-direction	39.9 kips	50.9 kips	4510.8 ft-kips
NESC Heavy Wind y-direction	10.5 kips	105.7 kips	1201.5 ft-kips
NESC Extreme Wind y-direction	36.6 kips	50.9 kips	3382.6 ft-kips

FLANGE BOLTS / FLANGE PLATE:

The flange bolts and plate was found to be within allowable limits.

Component	Design Limit	Stress Ratio (percent of capacity)	Result
Flange Bolts	Tension	96.0%	**PASS**
Flange Plate	Bending	87.5%	**PASS**

ANCHOR BOLTS / BASE PLATE:

The anchor bolts and plate was found to be within allowable limits.

Component	Design Limit	Stress Ratio (percent of capacity)	Result
Anchor Bolts	Tension	78.0%	**PASS**
Base Plate	Bending	90.3%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading	Result
Reinf. Conc. Pier w/ Rock Anchors	OTM (1)	1.0 FS (2)	1.18 FS (2)	**PASS**

Note 1: OTM denote overturning moment.
Note 2: FS denotes Factor of Safety

C o n c l u s i o n

This analysis shows that the subject utility pole **is adequate** to support the proposed AT&T equipment upgrade.

The analysis is based, in part on the information provided to this office by Eversource and AT&T. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.

- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.

- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.

- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.

- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

RISA-3D Structural Analysis Program is an integrated structural analysis and design software package for buildings, bridges, tower structures, etc.

Modeling Features:

- Comprehensive CAD-like graphic drawing/editing capabilities that let you draw, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, etc.
- Versatile drawing grids (orthogonal, radial, skewed)
- Universal snaps and object snaps allow drawing without grids
- Versatile general truss generator
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet selection, with locking
- Saved selections to quickly recall desired selections
- Modification tools that modify single items or entire selections
- Real spreadsheets with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and views so you can edit or view any data in the plotted views or in the spreadsheets
- Simultaneous view of multiple spreadsheets
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection libraries
- Import DXF, RISA-2D, STAAD and ProSteel 3D files
- Export DXF, SDNF and ProSteel 3D files

Analysis Features:

- Static analysis and P-Delta effects
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS mode combinations
- Automatic inclusion of mass offset (5% or user defined) for dynamic analysis
- Physical member modeling that does not require members to be broken up at intermediate joints
- State of the art 3 or 4 node plate/shell elements
- High-end automatic mesh generation — draw a polygon with any number of sides to create a mesh of well-formed quadrilateral (NOT triangular) elements.
- Accurate analysis of tapered wide flanges - web, top and bottom flanges may all taper independently
- Automatic rigid diaphragm modeling
- Area loads with one-way or two-way distributions
- Multiple simultaneous moving loads with standard AASHTO loads and custom moving loads for bridges, cranes, etc.
- Torsional warping calculations for stiffness, stress and design
- Automatic Top of Member offset modeling
- Member end releases & rigid end offsets
- Joint master-slave assignments
- Joints detachable from diaphragms
- Enforced joint displacements
- 1-Way members, for tension only bracing, slipping, etc.

- 1-Way springs, for modeling soils and other effects
- Euler members that take compression up to their buckling load, then turn off.
- Stress calculations on any arbitrary shape
- Inactive members, plates, and diaphragms allows you to quickly remove parts of structures from consideration
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members and plates
- Automatic subgrade soil spring generator

Graphics Features:

- Unlimited simultaneous model view windows
- Extraordinary “true to scale” rendering, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamic scrolling stops right where you want
- Plot & print virtually everything with color coding & labeling
- Rotate, zoom, pan, scroll and snap views
- Saved views to quickly restore frequent or desired views
- Full render or wire-frame animations of deflected model and dynamic mode shapes with frame and speed control
- Animation of moving loads with speed control
- High quality customizable graphics printing

Design Features:

- Designs concrete, hot rolled steel, cold formed steel and wood
- ACI 1999/2002, BS 8110-97, CSA A23.3-94, IS456:2000,EC 2-1992 with consistent bar sizes through adjacent spans
- Exact integration of concrete stress distributions using parabolic or rectangular stress blocks
- Concrete beam detailing (Rectangular, T and L)
- Concrete column interaction diagrams
- Steel Design Codes: AISC ASD 9th, LRFD 2nd & 3rd, HSS Specification, CAN/CSA-S16.1-1994 & 2004, BS 5950-1-2000, IS 800-1984, Euro 3-1993 including local shape databases
- AISI 1999 cold formed steel design
- NDS 1991/1997/2001 wood design, including Structural Composite Lumber, multi-ply, full sawn
- Automatic spectra generation for UBC 1997, IBC 2000/2003
- Generation of load combinations: ASCE, UBC, IBC, BOCA, SBC, ACI
- Unbraced lengths for physical members that recognize connecting elements and full lengths of members
- Automatic approximation of K factors
- Tapered wide flange design with either ASD or LRFD codes
- Optimization of member sizes for all materials and all design codes, controlled by standard or user-defined lists of available sizes and criteria such as maximum depths
- Automatic calculation of custom shape properties
- Steel Shapes: AISC, HSS, CAN, ARBED, British, Euro, Indian, Chilean
- Light Gage Shapes: AISI, SSMA, Dale / Incor, Dietrich, Marino\WARE
- Wood Shapes: Complete NDS species/grade database
- Full seamless integration with RISAFoot (Ver 2 or better) for advanced footing design and detailing
- Plate force summation tool

Results Features:

- Graphic presentation of color-coded results and plotted designs
- Color contours of plate stresses and forces with quadratic smoothing, the contours may also be animated
- Spreadsheet results with sorting and filtering of: reactions, member & joint deflections, beam & plate forces/stresses, optimized sizes, code designs, concrete reinforcing, material takeoffs, frequencies and mode shapes
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams that display magnitudes at any dialed location
- Saved solutions quickly restore analysis and design results.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

PLS-TOWER is a Microsoft Windows program for the analysis and design of steel latticed towers used in electric power lines or communication facilities. Both self-supporting and guyed towers can be modeled. The program performs design checks of structures under user specified loads. For electric power structures it can also calculate maximum allowable wind and weight spans and interaction diagrams between different ratios of allowable wind and weight spans.

Modeling Features:

- Powerful graphics module (stress usages shown in different colors)
- Graphical selection of joints and members allows graphical editing and checking
- Towers can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces
- Can extract geometry and connectivity information from a DXF CAD drawing
- CAD design drawings, title blocks, drawing borders or photos can be tied to structure model
- XML based post processor interface
- Steel Detailing Neutral File (SDNF) export to link with detailing packages
- Can link directly to line design program PLS-CADD
- Automatic generation of structure files for PLS-CADD
- Databases of steel angles, rounds, bolts, guys, etc.
- Automatic generation of joints and members by symmetries and interpolations
- Automated mast generation (quickly builds model for towers that have regular repeating sections) via graphical copy/paste
- Steel angles and rounds modeled either as truss, beam or tension-only elements
- Guys are easily handled (can be modeled as exact cable elements)

Analysis Features:

- Automatic handling of tension-only members
- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Automatic calculation of tower dead, ice, and wind loads as well as drag coefficients according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Minimization of problems caused by unstable joints and mechanisms
- Automatic bandwidth minimization and ability to solve large problems
- Design checks according to (other standards can be added easily):
    - ASCE Standard 10-90

- AS 3995 (Australian Standard 3995)
- BS 8100 (British Standard 8100)
- EN50341-1 (CENELEC, both empirical and analytical methods are available)
- ECCS 1985
- NGT-ECCS
- PN-90/B-03200
- EIA/TIA 222-F
- ANSI/TIA 222-G
- CSA S37-01
- EDF/RTE Resal
- IS 802 (India Standard 802)

Results Features:

- Design summaries printed for each group of members
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Capability to batch run multiple tower configurations and consolidate the results
- Automated optimum angle member size selection and bolt quantity determination

Tool for interactive angle member sizing and bolt quantity determination.

Criteria for Design of PCS Facilities On or Extending Above Metal Electric Transmission Towers & Analysis of Transmission Towers Supporting PCS Masts [(1)]

Introduction

This criteria is the result from an evaluation of the methods and loadings specified by the separate standards, which are used in designing telecommunications towers and electric transmission towers. That evaluation is detailed elsewhere, but in summary; the methods and loadings are significantly different. This criteria specifies the manner in which the appropriate standard is used to design PCS facilities including masts and brackets (hereafter referred to as “masts”), and to evaluate the electric transmission towers to support PCS masts. The intent is to achieve an equivalent level of safety and security under the extreme design conditions expected in Connecticut and Massachusetts.

ANSI Standard TIA-222 covering the design of telecommunications structures specifies a working strength/allowable stress design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed some defined percentage of failure strength (allowable stress).

ANSI Standard C2-2007 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

Each standard defines the details of how loads are to be calculated differently. Most of the NU effort in “unifying” both codes was to establish what level of strength each approach would provide, and then increasing the appropriate elements of each to achieve a similar level of security under extreme weather loadings.

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 50-year recurrence (2% annual probability). The second is a winter condition combining wind and ice loadings.

The following sections describe the design criteria for any PCS mast extending above the top of an electric transmission tower, and the analysis criteria for evaluating the loads on the transmission tower from such a mast from the lower portions of such a mast, and loads on the pre-existing electric lower portions of such a mast, and loads on the pre-existing electric transmission tower and the conductors it supports.

Note 1: Prepared from documentation provide from Northeast Utilities.

P C S M a s t

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA 222-G:

E L E C T R I C T R A N S M I S S I O N T O W E R

The electric transmission tower shall be analyzed using yield stress theory in accordance with the attached table titled "NU Design Criteria". This specifies uniform loadings (different from the TIA loadings) on the each of the following components of the installed facility:

- PCS mast for its total height above ground level, including the initial and planned future support platforms, antennas, etc. above the top of an electric transmission structure.
- Conductors are related devices and hardware.
- Electric transmission structure. The loads from the PCS facility and from the electric conductors shall be applied to the structure at conductor and PCS mast attachment points, where those load transfer to the tower.

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to TIA and its loads and factors with the exceptions noted above. (Note that the NESC does not require the projected wind surfaces of structures and equipment to be increased by the ice covering.)

In the event that the electric transmission tower is not sufficient to support the additional loadings of the PCS mast, reinforcement will be necessary to upgrade the strength of the overstressed members.

Attachment A
Eversource Design Criteria

Condition	Standard	Attachment A NU Design Criteria	Basic Wind Speed V (MPH)	Pressure Q (PSF)	Height factor Kz	Gust Factor Gh	Load or Stress Factor	Force Coef. - Shape Factor
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	____	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	____	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor Loads Provided by NU					
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condition	NESC Extreme Wind	Conductors:	Conductor Loads Provided by NU					
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load 1.25 X Gust Response Factor Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Condition*		Conductors:	Conductor Loads Provided by NU					
		* Only for structures installed after 2007						

mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition

With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "Eversource Design Criteria." This specifies uniform loadings (different from the TIA loadings) on each of the following components of the installed facility:

a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.

b) Conductors and related devices and hardware (wire loads will be provided by Eversource).

c) Electric Transmission Structure

   i) The loads from the wireless communication equipment components based on NESC and Eversource Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.

   ii) Shape Factor Multiplier:

NESC Structure Shape	Cd
Polyround (for polygonal steel poles)	1.3
Flat	1.6
Open Lattice	3.2
Pole with Coaxial Cable	1.6

   iii) When Coaxial Cables are mounted alongside the pole structure, the shape multiplier shall be:

Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.6

d) The uniform loadings and factors specified for the above components in Attachment A, "Eversource Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA and its loads and factors with the exceptions noted above.

   Note: The NESC does not require ice load be included in the supporting structure. (Ice on conductors and shield wire only, and Eversource will provide these loads).

e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

Project: *Lines 1714 & 1710, Structure 844*
Date: *10/03/2018*
Engineer: *TG*
Checked By: *JS*
Purpose *Recalculate wire loads.*

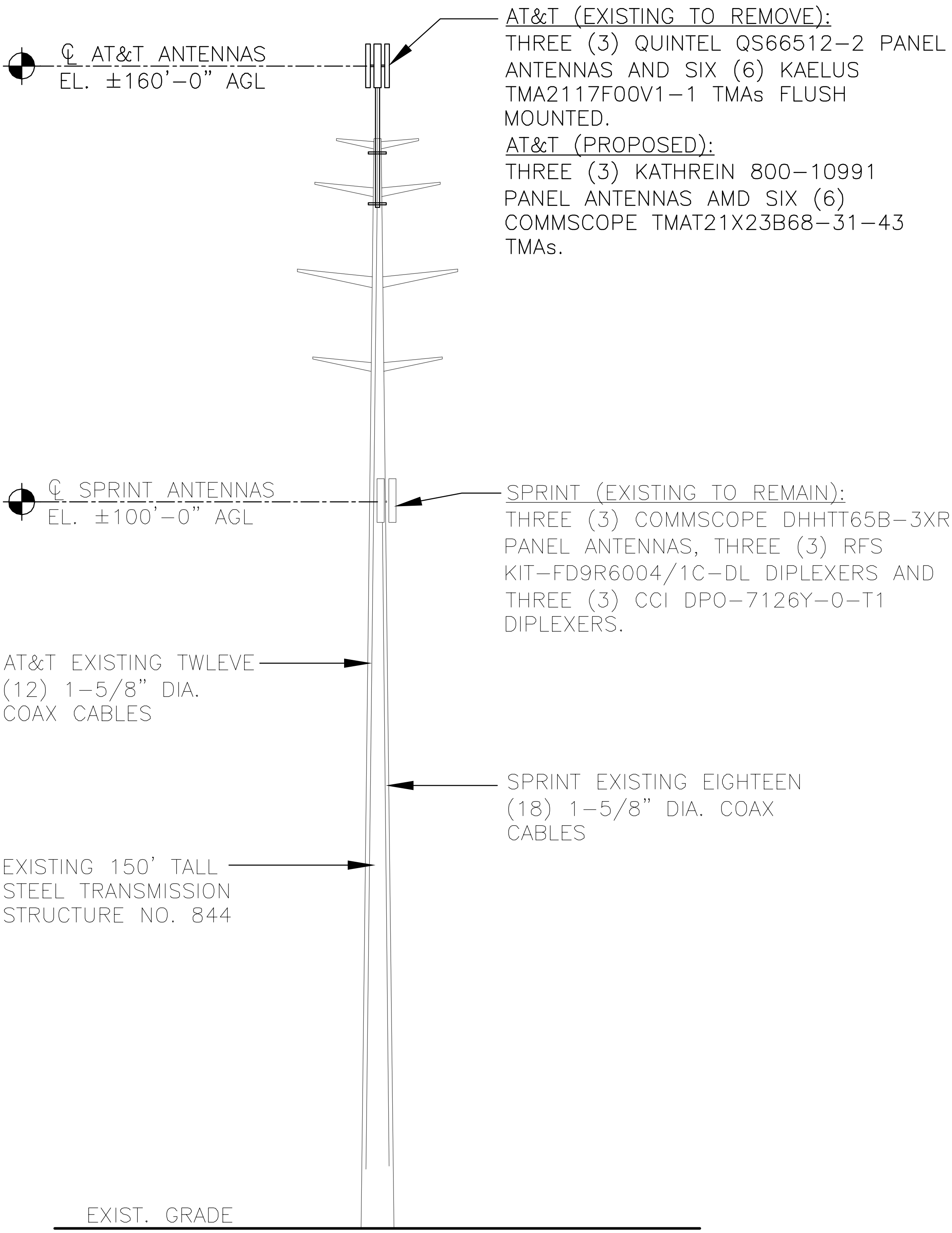
1714 Line
Conductor: *1590 Lapwing ACSR, sagged in PLS-CADD*
Shield Wire: *FOCAS 0.738" OPGW, sagged in PLS-CADD*

1710 Line
Conductor: *1590 Lapwing ACSR, sagged in PLS-CADD*
Shield Wire: *7#8 Alumoweld, sagged in PLS-CADD*

NESC 250B	***Vertical***	***Transverse***	***Longitudinal***
Conductor	5810	1860	0
Alumoweld	1514	999	0
OPGW	2558	1266	0

NESC 250C	***Vertical***	***Transverse***	***Longitudinal***
Conductor	2894	3158	100
Alumoweld	532	786	100
OPGW	1117	1514	100

HISTORICAL NESC 250C	***Vertical***	***Transverse***	***Longitudinal***
Conductor	2679	2346	100
Alumoweld	473	584	100
OPGW	994	1125	100



1
EL–1

TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	3/5/19	ISSUED FOR REVIEW

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CT5089
STRUCTURE 844

124 QUARRY ROAD
TRUMBULL, CT 06611

PROJECT NO:	19031.00
DRAWN BY:	TJL
CHECKED BY:	CAG
SCALE:	AS NOTED
DATE:	3/5/19

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed	$V := 97$	mph	(User Input - 2016 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)
Basic Wind Speed Service Loads	$V_{Ser} := 60$	mph	(User Input - TIA-222-G Section 2.8.3)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := III		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 150$	ft	(User Input)
Height to Center of Antennas =	$z_{ATT} := 160$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 151$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H := 1.35$		(User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1.15$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1.25$$

Wind Direction Probability Factor (Service) = $K_{dSer} := 0.85$ (Per Section 2.8.3 of TIA-222-G)

Importance Factor (Service) = $I_{Ser} := 1$ (Per Section 2.8.3 of TIA-222-G)

$$K_{iz} := \left(\frac{z_{ATT}}{33}\right)^{0.1} = 1.171 \qquad t_{izATT} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.196$$

Velocity Pressure Coefficient Antennas = $Kz_{ATT} := 2.01\left(\left(\frac{z_{ATT}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.397$

Velocity Pressure w/o Ice Antennas = $qz_{ATT} := 0.00256 \cdot K_d \cdot Kz_{ATT} \cdot V^2 \cdot I_{Wind} = 36.769$

Velocity Pressure with Ice Antennas = $qz_{ice.ATT} := 0.00256 \cdot K_d \cdot Kz_{ATT} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.495$

Velocity Pressure Service = $qz_{ATT.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{ATT} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.946$

$$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.164 \qquad t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.183$$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.38$

Velocity Pressure w/o Ice Mast= $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 36.323$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.392$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.813$

CENTEK engineering Centered on Solutions™ www.centekeng.com 63-2 North Branford Road P: (203) 488-0580 Branford, CT 06405 F: (203) 488-8587	Subject: Location: Rev. 0: 3/4/19	Loads on AT&T Mast - Structure 844 Trumbull, CT Prepared by: T.J.L. Checked by: C.A.G. Job No. 19031.00

Development of Wind & Ice Load on Mast

Mast Data: (HSS6.625x0.432) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 6.625$ in (User Input)

Mast Length = $L_{mast} := 21$ ft (User Input)

Mast Thickness = $t_{mast} := 0.432$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 38.0$

Mast Force Coefficient = $Ca_{mast} = 1.2$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.552$ sf/ft

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 32$ plf **BLC 5,7**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast1})}{12} = 0.916$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 12$ plf **BLC 4,6**

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 10$ plf **BLC 8**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + t_{izMast1} \cdot 2)^2 - D_{mast}^2\right] = 60.4$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 23$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = Kathrein 800-10991

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 78.7$ in (User Input)

Antenna Width = $W_{ant} := 20.0$ in (User Input)

Antenna Thickness = $T_{ant} := 6.9$ in (User Input)

Antenna Weight = $WT_{ant} := 112$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.9$

Antenna Force Coefficient = $Ca_{ant} = 1.26$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 10.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 32.8$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2057$ lbs **BLC 5,7**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izATT}) \cdot (W_{ant} + 2 \cdot t_{izATT})}{144} = 14.1$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 42.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 612$ lbs **BLC 4,6**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{ATT.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 612$ lbs **BLC 8**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 336$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izATT})(W_{ant} + 2 \cdot t_{izATT}) \cdot (T_{ant} + 2 \cdot t_{izATT}) - V_{ant} = 1 \times 10^4$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 390$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 1169$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = Commscope TMAT21X23B68-31-43

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 9.7$ in (User Input)

Antenna Width = $W_{ant} := 11.0$ in (User Input)

Antenna Thickness = $T_{ant} := 3.9$ in (User Input)

Antenna Weight = $WT_{ant} := 23$ lbs (User Input)

Number of Antennas = $N_{ant} := 6$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 0.9$

Antenna Force Coefficient = $Ca_{ant} = 1.2$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.7$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 4.4$ sf

Total Antenna Wind Force = $F_{ant} := qz_{ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 265$ lbs **BLC 5,7**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izATT}) \cdot (W_{ant} + 2 \cdot t_{izATT})}{144} = 1.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.ATT} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 124$ lbs **BLC 4,6**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{ATT.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 79$ lbs **BLC 8**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 138$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 416$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izATT})(W_{ant} + 2 \cdot t_{izATT}) \cdot (T_{ant} + 2 \cdot t_{izATT}) - V_{ant} = 1382$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 45$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 269$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	Pipe Mounts		
Mount Shape =	Round		(User Input)
Pipe Mount Length =	$L_{mnt} := 60$	in	(User Input)
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	(User Input)
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	(User Input)
Number of Mounting Pipes =	$N_{mnt} := 3$		(User Input)
Mount Bracket Weight =	$W_{b.mnt} := 101$	lbs	(User Input)
Mount Aspect Ratio =	$Ar_{mnt} := \frac{L_{mnt}}{D_{mnt}} = 25$		
Mount Force Coefficient =	$Ca_{mnt} := 1.2$		

Wind Load (without ice)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area =	$A_{mnt} := 0.0$	sf	
Total Mount Wind Force =	$F_{mnt} := qz_{ATT} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 0$	lbs	**BLC 5**

Wind Load (with ice)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice =	$A_{ICEmnt} := 0.0$	sf	
Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.ATT} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICEmnt} = 0$	lbs	**BLC 4**

Gravity Loads (without ice)

Weight Each Pipe Mount =	$WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 18$	lbs	
Weight of All Mounts =	$WT_{mnt} \cdot N_{mnt} + W_{b.mnt} = 156$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Pipe =	$V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^2 \cdot L_{mnt} = 266$	cu in	
Volume of Ice on Each Pipe =	$V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 2 \cdot t_{izATT}\right)^2\right] \cdot \left(L_{mnt} + 2 \cdot t_{izATT}\right)\right] - V_{mnt} = 2 \times 10^3$	cu in	
Weight of Ice each mount (incl, hardware) =	$W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 66$	lbs	
Weight of Ice on All Mounts =	$W_{ICEmnt} \cdot N_{mnt} + 30 = 229$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 21$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 12$ (User Input)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 3$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 127.3$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 29$ plf **BLC 5,7**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 0.9$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 12$ plf **BLC 4,6**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 9$ plf **BLC 8**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{izMast1})^2 - D_{coax}^2\right] = 28.5$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 133$ plf **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Standard Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Mast	HSS6.625X0.432	Column	Pipe	A500 Gr.42	Typical	7.86	38.2	38.2	76.4

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Existing Mast	21.5			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTTO...	TOP-MA...			Existing Mast	Column	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-MAST	0	0	0	0	
2	BOTTOM-BRACE	0	.5	0	0	
3	TOP-BRACE	0	7.5	0	0	
4	ANTENNA-CL	0	19.5	0	0	
5	TOP-MAST	0	21.5	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTTOM-BRACE	Reaction	Reaction	Reaction		Reaction	
2	TOP-BRACE	Reaction	Reaction	Reaction		Reaction	

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	16

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.023	-.023	0	0
2	M1	Y	-.133	-.133	0	16

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.012	.012	0	16
2	M1	X	.012	.012	0	16

Member Distributed Loads (BLC 5 : (x) TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.032	.032	0	16
2	M1	X	.029	.029	0	16

Member Distributed Loads (BLC 6 : Service)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.01	.01	0	16
2	M1	X	.009	.009	0	16

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None				3		1		
3	Weight of Ice Only	None				3		2		
4	(x) TIA Wind with Ice	None				2		2		
5	(x) TIA Wind	None				2		2		
6	Service	None				2		2		

Load Combinations

	Description	Solve	PDelta S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-direction)	Yes	Y	1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-direction)	Yes	Y	1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0Wi (X...	Yes	Y	1	1.2	2	1.2	3	1	4	1												
4	1.0D + 1.0WService	Yes	Y	1	1	2	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTTOM-BRA...	max	6.572	1	.81	3	0	4	0	4	0	4	0	4
2		min	1.22	4	.139	2	0	1	0	1	0	1	0	1
3	TOP-BRACE	max	-2.215	4	5.156	3	0	4	0	4	0	4	0	4
4		min	-11.848	1	1.118	2	0	1	0	1	0	1	0	1
5	Totals:	max	-.995	4	5.966	3	0	4						
6		min	-5.277	1	1.257	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	BOTTOM-M...	max	.053	1	0	2	0	4	0	4	0	4	8.87e-03	1
2		min	.01	4	0	3	0	1	0	1	0	1	1.65e-03	4
3	BOTTOM-BR...	max	0	4	0	4	0	4	0	4	0	4	8.87e-03	1
4		min	0	1	0	1	0	1	0	1	0	1	1.65e-03	4
5	TOP-BRACE	max	0	4	0	4	0	4	0	4	0	4	-3.425e-03	4
6		min	0	1	0	1	0	1	0	1	0	1	-1.841e-02	1
7	ANTENNA-CL	max	7.088	1	0	2	0	4	0	4	0	4	-1.192e-02	4
8		min	1.318	4	-.003	3	0	1	0	1	0	1	-6.412e-02	1
9	TOP-MAST	max	8.626	1	0	2	0	4	0	4	0	4	-1.192e-02	4
10		min	1.605	4	-.003	3	0	1	0	1	0	1	-6.412e-02	1

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	M1	HSS6.625X0.432	.986	7.6...	1	.082	7.3...		1	128....	297....	49.14	49.14	...	H1-...

Joint Reactions (By Combination)

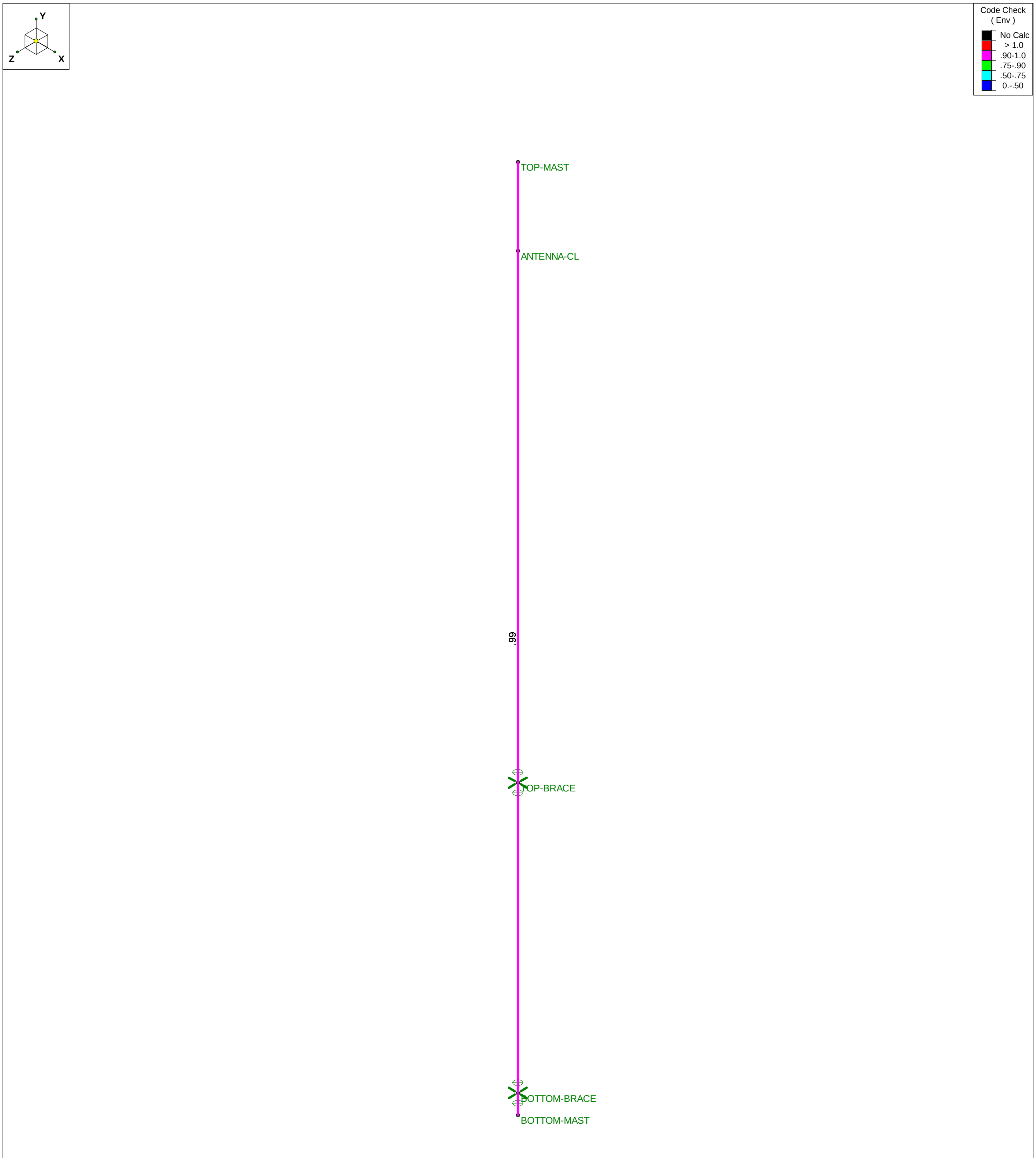
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-BRACE	6.572	.186	0	0	0	0
2	1	TOP-BRACE	-11.848	1.49	0	0	0	0
3	1	Totals:	-5.277	1.676	0			
4	1	COG (ft):	X: 0	Y: 14.318	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-BRACE	6.549	.139	0	0	0	0
2	2	TOP-BRACE	-11.825	1.118	0	0	0	0
3	2	Totals:	-5.277	1.257	0			
4	2	COG (ft):	X: 0	Y: 14.318	Z: 0			

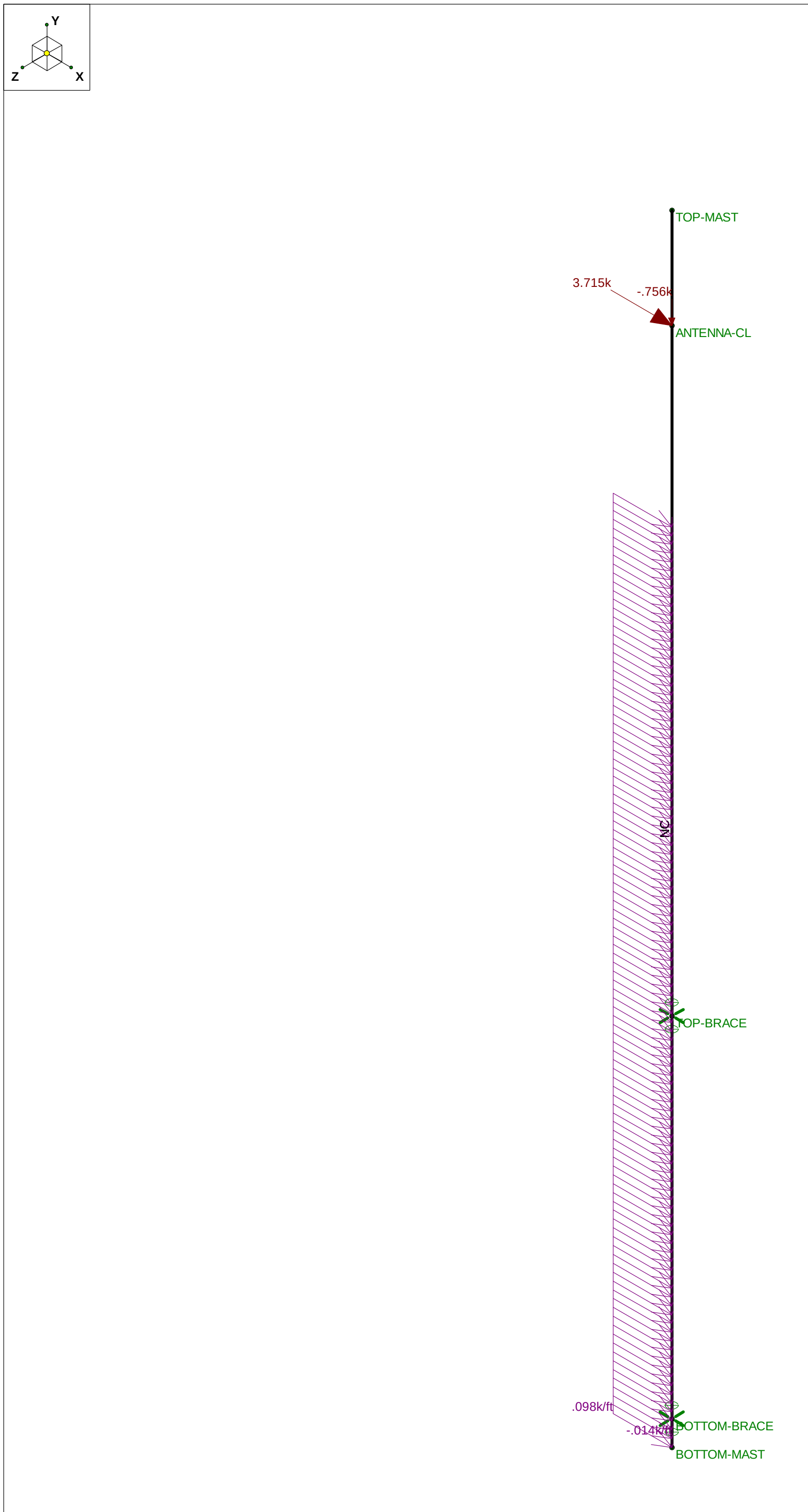
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTTOM-BRACE	1.35	.81	0	0	0	0
2	3	TOP-BRACE	-2.47	5.156	0	0	0	0
3	3	Totals:	-1.12	5.966	0			
4	3	COG (ft):	X: 0	Y: 13.217	Z: 0			



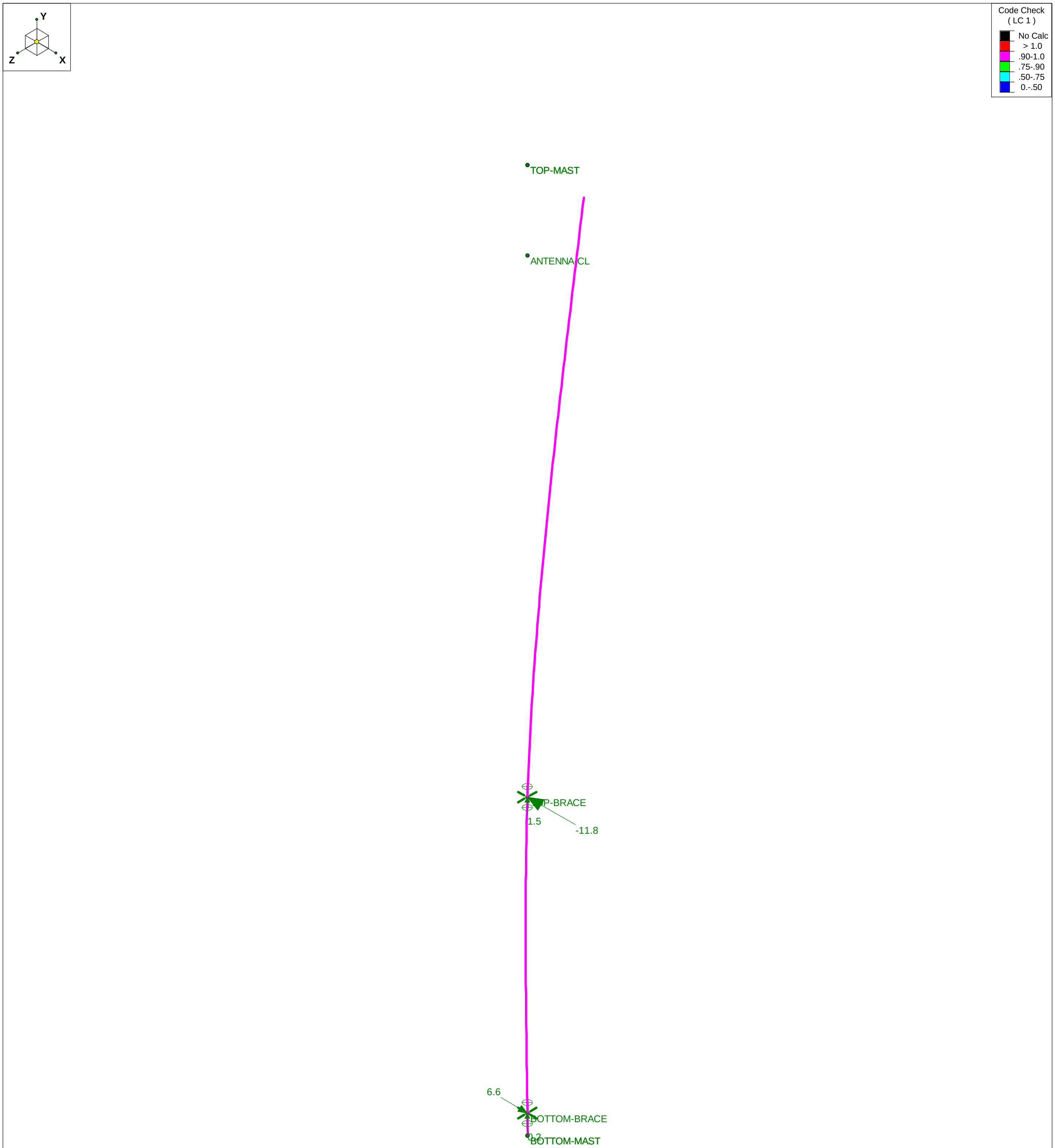
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CENTEK Engineering, INC.	Tower # 844 - AT&T Mast	
TJL		Mar 4, 2019 at 4:13 PM
19031.00 - CT5089	Unity Check	TIA - AT&T.r3d



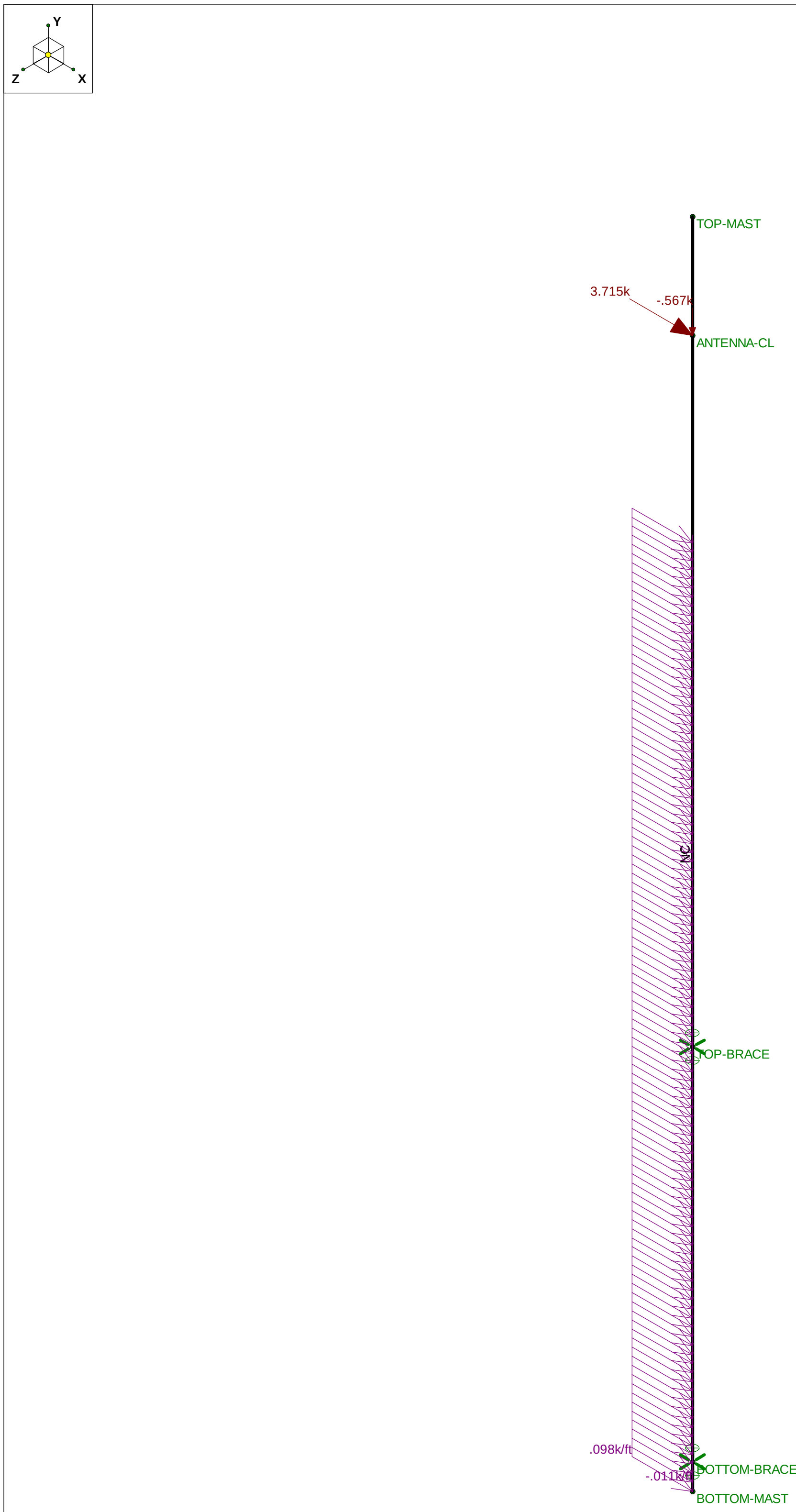
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W (X-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:13 PM
19031.00 - CT5089	LC #1 Loads	TIA - AT&T.r3d



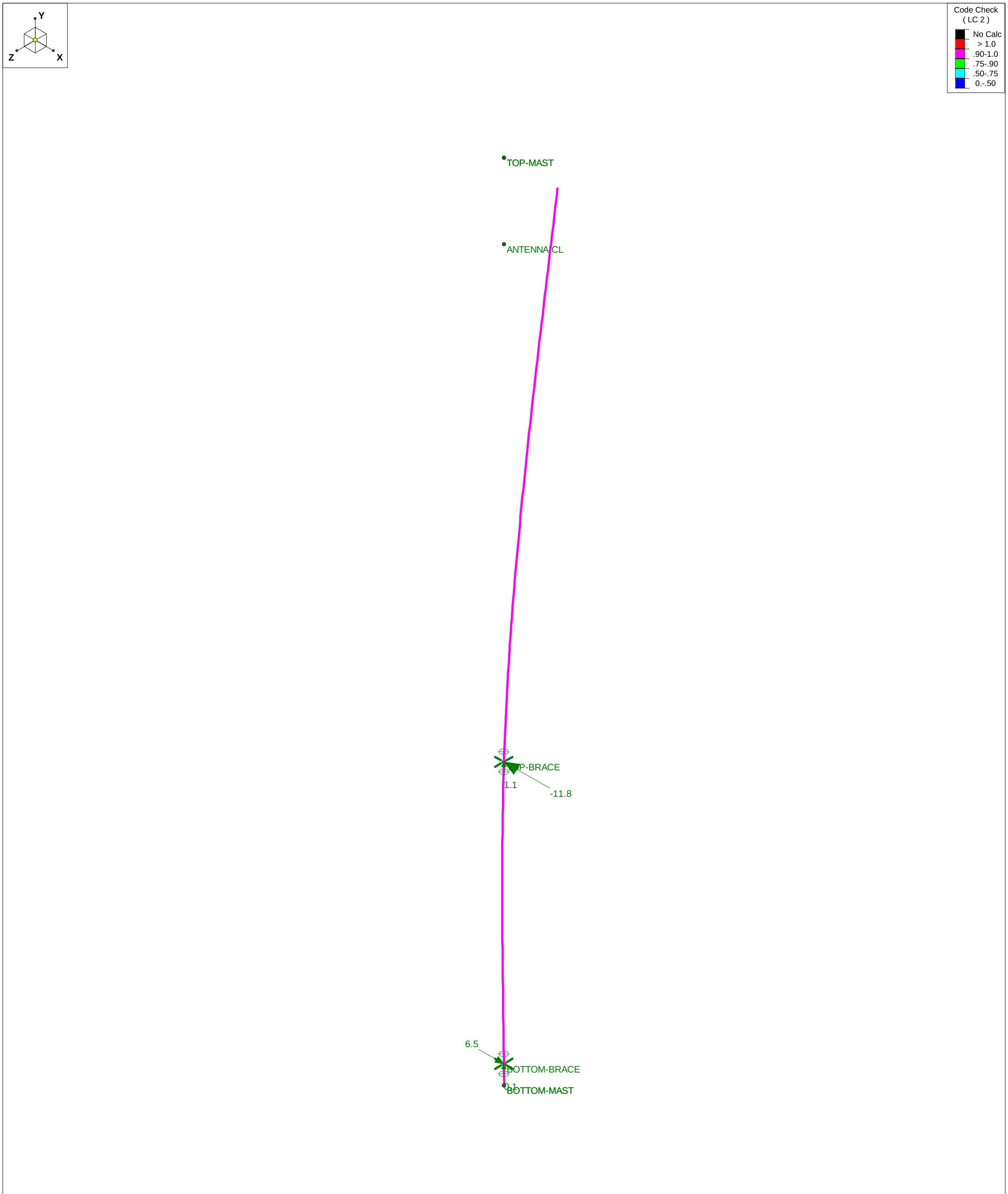
Member Code Checks Displayed
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:16 PM
19031.00 - CT5089	LC #1 Reactions and Deflected Shape	TIA - AT&T.r3d



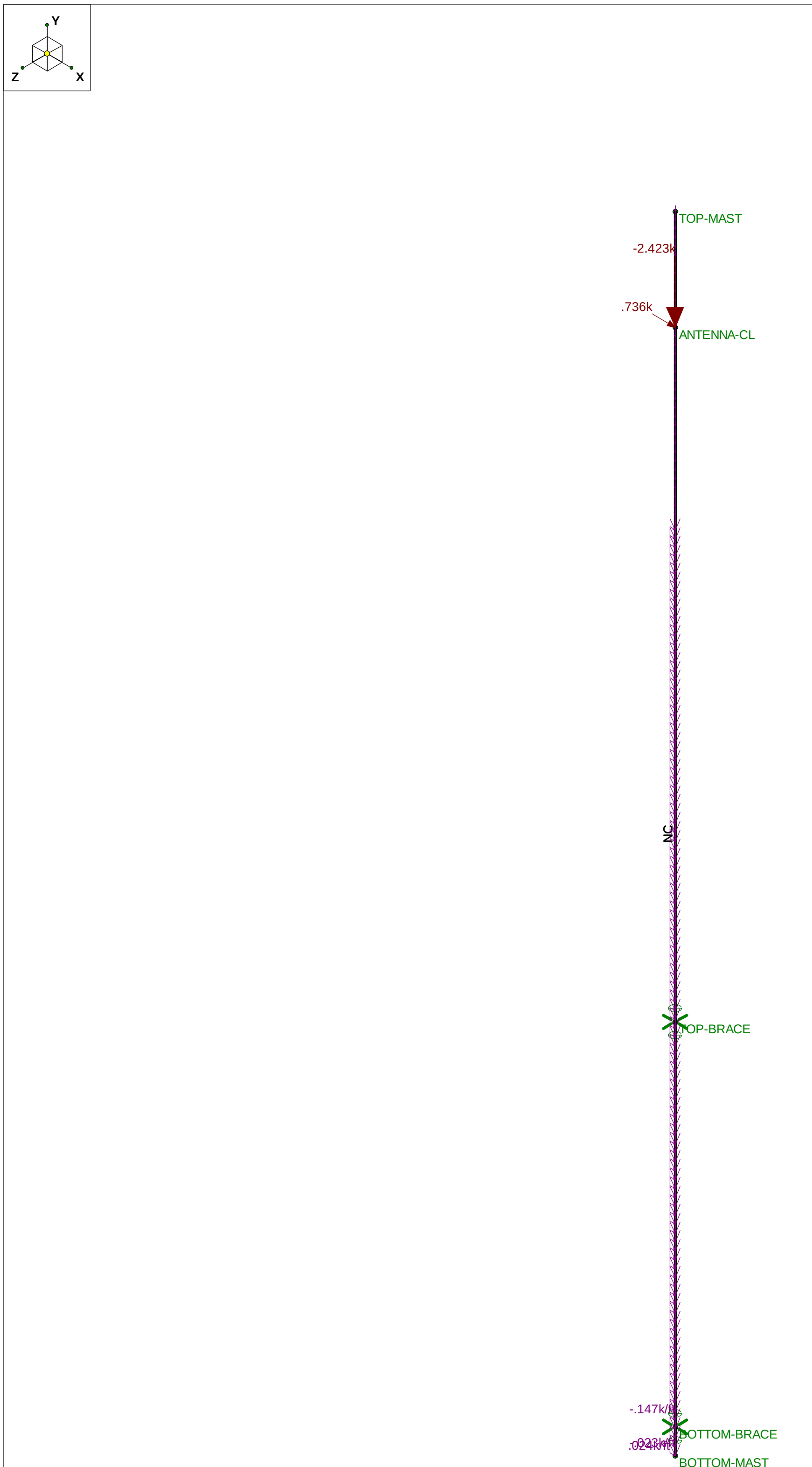
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W (X-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:13 PM
19031.00 - CT5089	LC #2 Loads	TIA - AT&T.r3d



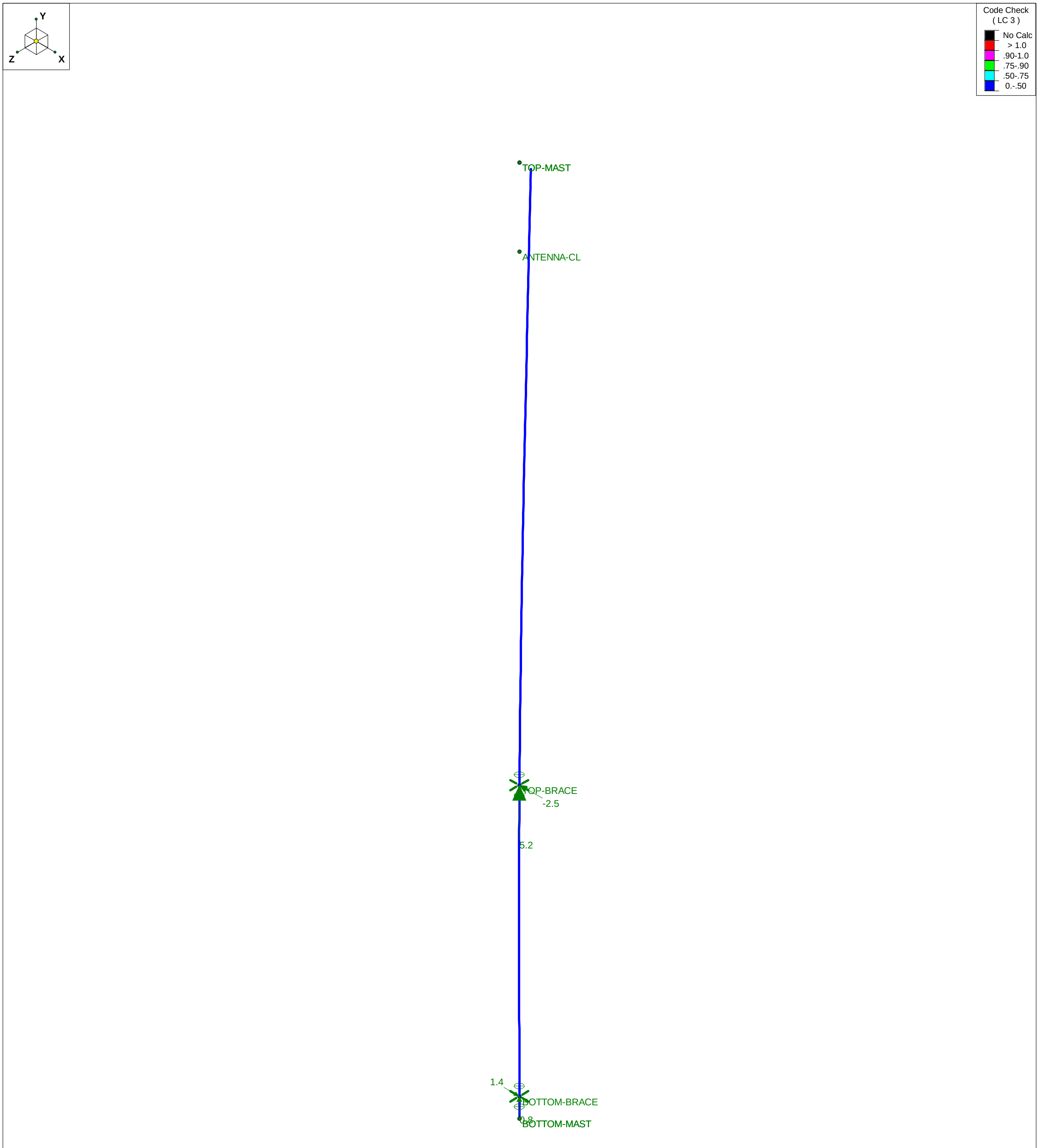
Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:17 PM
19031.00 - CT5089	LC #2 Reactions and Deflected Shape	TIA - AT&T.r3d



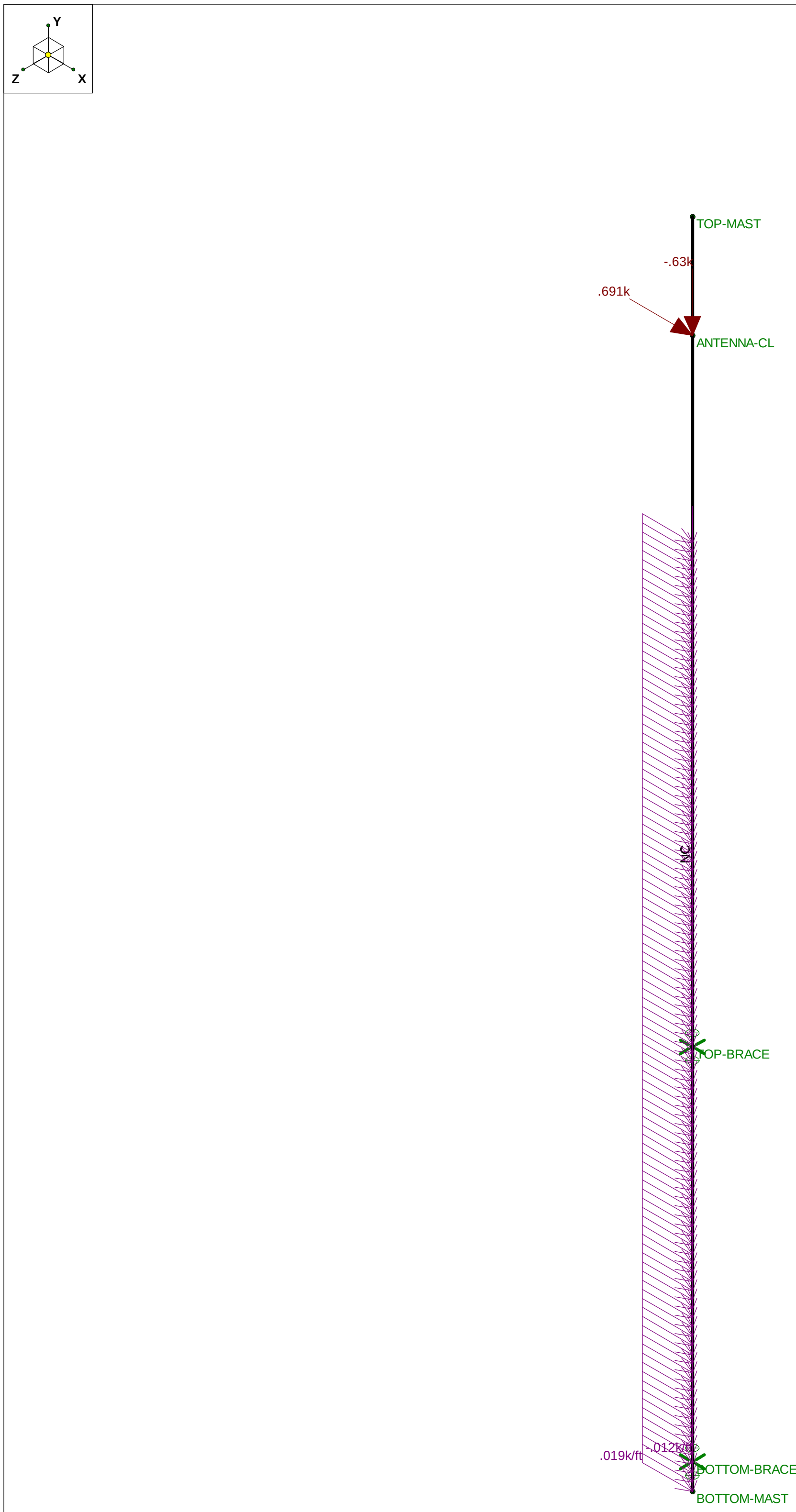
Member Code Checks Displayed
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:14 PM
19031.00 - CT5089	LC #3 Loads	TIA - AT&T.r3d



Member Code Checks Displayed
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:18 PM
19031.00 - CT5089	LC #3 Reactions and Deflected Shape	TIA - AT&T.r3d

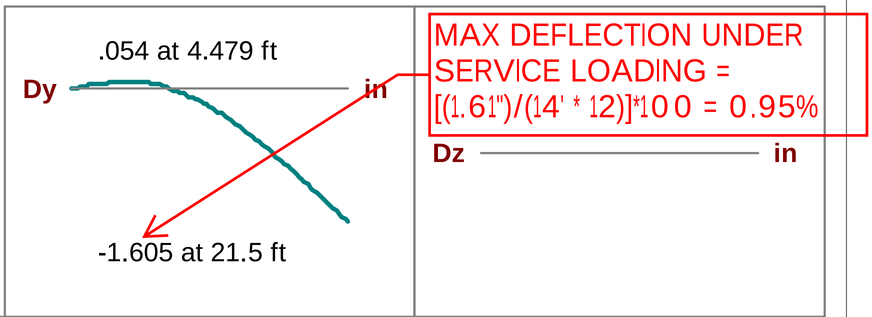


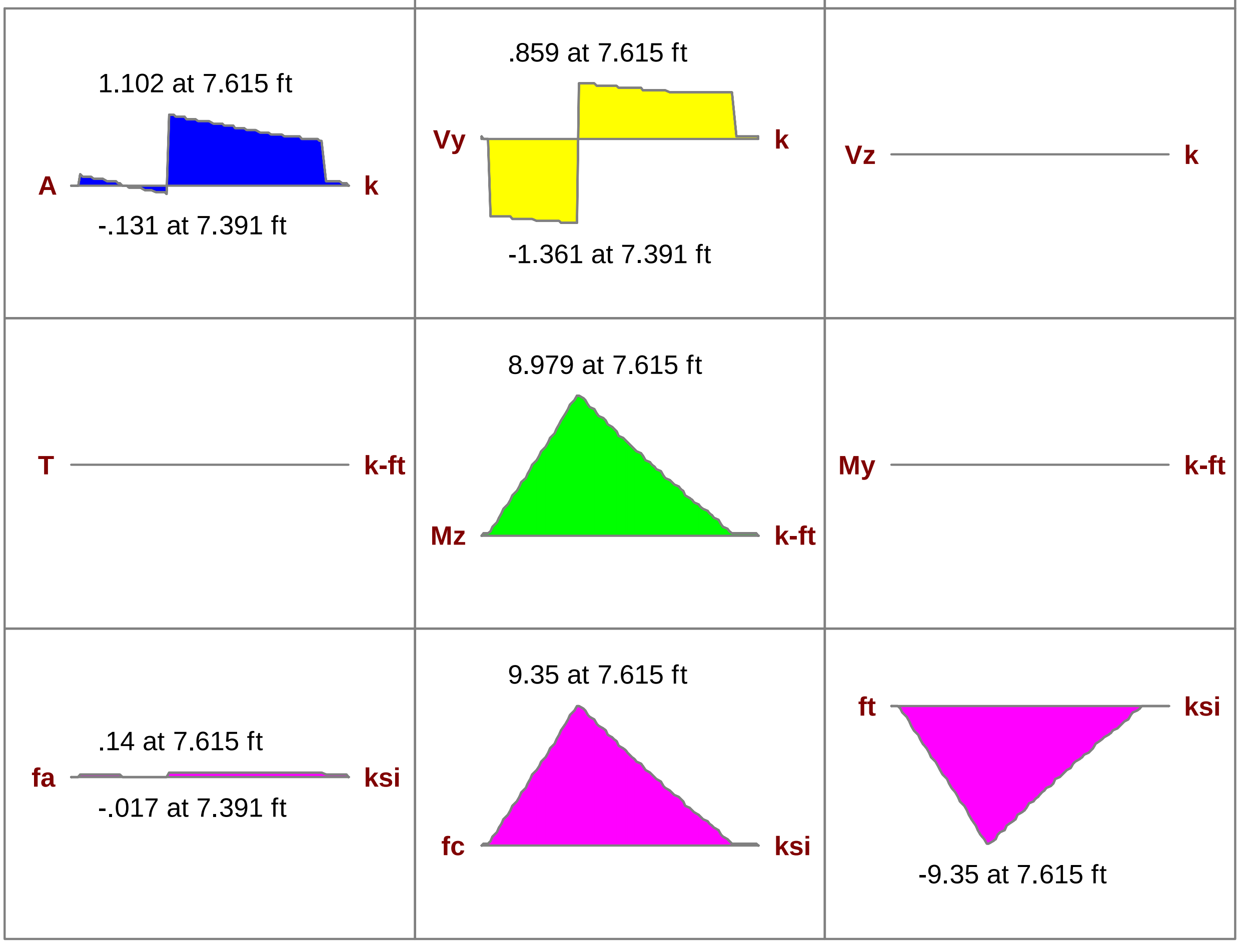
Member Code Checks Displayed
Loads: LC 4, 1.0D + 1.0WService

CENTEK Engineering, INC.		
TJL	Tower # 844 - AT&T Mast	Mar 4, 2019 at 4:14 PM
19031.00 - CT5089	LC #4 Loads	TIA - AT&T.r3d

Column: ***M1***

Shape: **HSS6.625X0.432**
Material: **A500 Gr.42**
Length: **21.5 ft**
I Joint: **BOTTOM-MAST**
J Joint: **TOP-MAST**
LC 4: 1.0D + 1.0WService
Code Check: **0.187 (bending)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.187**	Max Shear Check	**0.015 (s)**
Location	**7.615 ft**	Location	**7.391 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/161**
Bending	**Compact**	Compression	**Non-Slender**

				y-y	z-z
Fy	**42 ksi**		Lb	**21.5 ft**	**21.5 ft**
phi*Pnc	**128.111 k**		KL/r	**117.031**	**117.031**
phi*Pnt	**297.108 k**				
phi*Mny	**49.14 k-ft**		L Comp Flange	**21.5 ft**	
phi*Mnz	**49.14 k-ft**		L-torque	**21.5 ft**	
phi*Vny	**89.132 k**		Tau_b	**1**	
phi*Vnz	**89.132 k**				
phi*Tn	**46.292 k-ft**				
Cb	**1.522**				

Mast Connection to Tower:

Reactions:

Moment =	$Moment := 0 \cdot kips$	(Input From Risa-3D)
Vertical =	$Vertical := 1.5 \cdot kips$	(Input From Risa-3D)
Horizontal x-dir =	$Horizontal := 11.9 \cdot kips$	(Input From Risa-3D)

Bolt Data:

Bolt Type =	ASTMA36	(User Input)
Bolt Diameter =	$D := 0.75 \cdot in$	(User Input)
Number of Bolts =	$N_b := 2$	(User Input)
Nominal Bolt Area =	$A_b := \frac{1}{4} \cdot \pi \cdot D^2 = 0.442 \cdot in^2$	(User Input)
Bolt Ultimate Strength =	$F_u := 58 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 36 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Design Tensile Strength =	$F_{nt} := \phi \cdot 0.75 \cdot F_u \cdot A_b = 14.4 \cdot kips$	(User Input)
Design Shear Strength =	$F_{nv} := \phi \cdot 0.45 \cdot F_u \cdot A_b = 8.6 \cdot kips$	(User Input)

Shear Force = $f_v := \frac{\sqrt{Horizontal^2 + Vertical^2}}{N_b} = 6 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_{nv}} = 69.35 \cdot \%$

Check Bolt Shear = $Bolt\_Shear := if\left(\frac{f_v}{F_{nv}} \le 1.00, "OK", "Overstressed"\right)$

$Bolt\_Shear = "OK"$

Tension Force = $f_t := \frac{Horizontal}{N_b} = 6 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_{nt}} = 41.28 \cdot \%$

Check Bolt Tension = $Bolt\_Tension := if\left(\frac{f_t}{F_{nt}} \le 1.00, "OK", "Overstressed"\right)$

$Bolt\_Tension = "OK"$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2012 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	$TME := 163$	ft	(User Input)
Multiplier Gust Response Factor =	$m := 1.25$		(User Input - Only for NESC Extreme wind case)
NESC Factor =	$kv := 1.43$		(User Input from NESC 2012 Table 250-3 equation)
Importance Factor =	$I := 1.0$		(User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.403$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.292$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.783$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.83$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36$ psf (NESC 2012 Section 250.C.2)

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Overload Factors for Vertical Loads:

NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on Mast (AT&T)

Mast Data: (HSS6.625x0.432)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 6.625$ in (User Input)

Mast Length = $L_{mast} := 21$ ft (User Input)

Mast Thickness = $t_{mast} := 0.432$ in (User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.552$ sf/ft

Total Mast Wind Force (Above NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 40$ plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} = 32$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.635$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_{coax} \cdot AICE_{mast} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\,2}\right] = 11.2$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 4$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (AT&T)

Antenna Model = Kathrein 800-10991

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 78.7$ in (User Input)

Antenna Width = $W_{ant} := 20.0$ in (User Input)

Antenna Thickness = $T_{ant} := 6.9$ in (User Input)

Antenna Weight = $WT_{ant} := 112$ lbs (User Input)

Number of Antennas = $N_{ant} := 3$ (User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 10.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 32.8$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2364$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 11.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 34.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 223$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 336$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 2362$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 77$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 230$ lbs **BLC 3**

Development of Wind & Ice Load on TMA's

TMA Data: (AT&T)

TMA Model = Commscope TMAT21X23B68-31-43

TMA Shape = Flat (User Input)

TMA Height = $L_{TMA} := 9.7$ in (User Input)

TMA Width = $W_{TMA} := 11.0$ in (User Input)

TMA Thickness = $T_{TMA} := 3.9$ in (User Input)

TMA Weight = $WT_{TMA} := 23$ lbs (User Input)

Number of TMA's = $N_{TMA} := 6$ (User Input)

Wind Load (NESC Extreme)

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.7$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 4.4$ sf

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 321$ lbs **BLC 5**

Wind Load (NESC Heavy)

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 0.9$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 5.3$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 34$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMA's = $WT_{TMA} \cdot N_{TMA} = 138$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 416$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 213$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 7$ lbs

Weight of Ice on All TMA's $W_{ICETMA} \cdot N_{TMA} = 41$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (AT&T)

Mount Type: Site Pro Tri-Sector Chain Mount w/ 3 Pipes

Mount Shape =	Round		(User Input)
Pipe Mount Length =	$L_{mnt} := 60$	in	(User Input)
2 inch Pipe Mount Linear Weight =	$W_{mnt} := 3.66$	plf	(User Input)
Pipe Mount Outside Diameter =	$D_{mnt} := 2.375$	in	(User Input)
Number of Mounting Pipes =	$N_{mnt} := 3$		(User Input)
Tri Sector Chain Mount Weight =	$W_{tsc.mnt} := 101$	lbs	(User Input)

Wind Load (NESC Extreme)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area = $A_{mnt} := 0.0$ sf

Total Mount Wind Force = $F_{mnt} := qz \cdot Cd_F \cdot A_{mnt} \cdot m = 0$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Mount is Shielded by Antenna

Mount Projected Surface Area w/ Ice = $A_{ICEmnt} := 0.0$ sf

Total Mount Wind Force = $Fi_{mnt} := p \cdot Cd_F \cdot A_{ICEmnt} = 0$ lbs **BLC 4**

Gravity Loads (without ice) (per TIA/EIA-222-F-1996)

Weight Each Pipe Mount = $WT_{mnt} := W_{mnt} \cdot \frac{L_{mnt}}{12} = 18$ lbs

Weight of All Mounts = $WT_{mnt} \cdot N_{mnt} + W_{tsc.mnt} = 156$ lbs **BLC 2**

Gravity Load (ice only) (per TIA/EIA-222-F-1996)

Volume of Each Pipe = $V_{mnt} := \frac{\pi}{4} \cdot D_{mnt}^{2} \cdot L_{mnt} = 266$ cu in

Volume of Ice on Each Pipe = $V_{ice} := \left[\frac{\pi}{4} \cdot \left[\left(D_{mnt} + 1\right)^2\right] \cdot \left(L_{mnt} + 1\right)\right] - V_{mnt} = 280$ cu in

Weight of Ice each mount (incl, hardware) = $W_{ICEmnt} := \frac{V_{ice}}{1728} \cdot Id = 9$ lbs

Weight of Ice on All Mounts = $W_{ICEmnt} \cdot N_{mnt} + 5 = 32$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (AT&T - on mast)

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 21$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 3$		(User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 36$ plf **BLC 5**

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 29$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 4$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 2**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^{\ 2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 18$ plf **BLC 3**

Development of Wind & Ice Load on Mast

(Sprint)

Mast Data: (HSS2.875x0.203)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 2.875$	in	(User Input)
Mast Length =	$L_{mast} := 10$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.203$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.24$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 11$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.323$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 2$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}{}^2\right] = 5.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 2$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = Commscope DHHTT65B-3XR

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72.1$ in (User Input)

Antenna Width = $W_{ant} := 11.9$ in (User Input)

Antenna Thickness = $T_{ant} := 7.1$ in (User Input)

Antenna Weight = $WT_{ant} := 46$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 46$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6092$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1546$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 50$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 6.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 42$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 6$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} = 344$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = RFS KIT-FD9R6004/1C-DL Diplexer

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.8$ in (User Input)

Antenna Width = $W_{ant} := 6.5$ in (User Input)

Antenna Thickness = $T_{ant} := 4.6$ in (User Input)

Antenna Weight = $WT_{ant} := 7$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 7$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 173$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 112$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 4$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 0.4$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.4$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 2$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.3$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} = 15$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model =	CCI DPO-7126Y-0-T1 Diplexer		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 4.07$	in	(User Input)
Antenna Width =	$W_{ant} := 7.42$	in	(User Input)
Antenna Thickness =	$T_{ant} := 6.26$	in	(User Input)
Antenna Weight =	$WT_{ant} := 8$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 8$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 189$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 121$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 4$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 2$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.2$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.2$ sf

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} = 12$ lbs

Development of Wind & Ice Load on Mast (Sprint)

Mast Data: (2 Std. Pipe)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 2.375$ in (User Input)

Mast Length = $L_{mast} := 6$ ft (User Input)

Mast Thickness = $t_{mast} := 0.154$ in (User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.198$ sf/ft

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_R \cdot A_{mast} = 9$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.281$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 1$ plf **BLC 4**

Gravity Loads (without ice)

Weight of the mast = Self Weight **(Computed internally by Risa-3D)** plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\ 2}\right] = 4.5$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 2$ plf **BLC 3**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Standard Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz Mast	HSS2.875X0.203	Beam	Pipe	A500 Gr.42	Typical	1.59	1.45	1.45	2.89
2	Pipe Mast	PIPE_2.0	Column	Wide Flange	A53 Gr. B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Horz Mast	10			Lbyy									Lateral
2	M2	Pipe Mast	6			Lbyy									Lateral
3	M3	Pipe Mast	6			Lbyy									Lateral
4	M4	Pipe Mast	6			Lbyy									Lateral
5	M5	Horz Mast	10			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N3			Horz Mast	Beam	Pipe	A500 Gr....	Typical
2	M2	N6	N5			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
3	M3	N8	N7			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
4	M4	N10	N9			Pipe Mast	Column	Wide Flange	A53 Gr. B	Typical
5	M5	N12	N14			Horz Mast	Beam	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	4	0	0	0	
3	N3	10	0	0	0	
4	N4	2	0	0	0	
5	N5	0	3	0	0	
6	N6	0	-3	0	0	
7	N7	2	3	0	0	
8	N8	2	-3	0	0	
9	N9	10	3	0	0	
10	N10	10	-3	0	0	
11	N11	6	0	0	0	
12	N12	0	2	0	0	
13	N13	4	2	0	0	
14	N14	10	2	0	0	
15	N15	2	2	0	0	
16	N16	6	2	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N2	Reaction	Reaction	Reaction			
2	N11	Reaction	Reaction	Reaction			
3	N13	Reaction	Reaction	Reaction			
4	N16	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.023	.5
2	M3	Y	-.023	.5
3	M4	Y	-.023	.5
4	M2	Y	-.023	5.5
5	M3	Y	-.023	5.5
6	M4	Y	-.023	5.5
7	M2	Y	-.007	1.5
8	M3	Y	-.007	1.5
9	M4	Y	-.007	1.5
10	M2	Y	-.008	4.5
11	M3	Y	-.008	4.5
12	M4	Y	-.008	4.5

Member Point Loads (BLC 3 : Weight of Ice Only on PCS Struct)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.025	.5
2	M3	Y	-.025	.5
3	M4	Y	-.025	.5
4	M2	Y	-.025	5.5
5	M3	Y	-.025	5.5
6	M4	Y	-.025	5.5
7	M2	Y	-.004	1.5
8	M3	Y	-.004	1.5
9	M4	Y	-.004	1.5
10	M2	Y	-.004	4.5
11	M3	Y	-.004	4.5
12	M4	Y	-.004	4.5

Member Point Loads (BLC 4 : x-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.021	.5
2	M3	X	.021	.5
3	M4	X	.021	.5
4	M2	X	.021	5.5
5	M3	X	.021	5.5
6	M4	X	.021	5.5
7	M2	X	.002	1.5
8	M3	X	.002	1.5
9	M4	X	.002	1.5
10	M2	X	.002	4.5
11	M3	X	.002	4.5
12	M4	X	.002	4.5

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.172	.5
2	M3	X	.172	.5
3	M4	X	.172	.5
4	M2	X	.172	5.5

Member Point Loads (BLC 5 : x-dir NESC Extreme Wind on PCS S) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M3	X	.172	5.5
6	M4	X	.172	5.5
7	M2	X	.015	1.5
8	M3	X	.015	1.5
9	M4	X	.015	1.5
10	M2	X	.012	4.5
11	M3	X	.012	4.5
12	M4	X	.012	4.5

Member Point Loads (BLC 6 : z-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	.021	.5
2	M3	Z	.021	.5
3	M4	Z	.021	.5
4	M2	Z	.021	5.5
5	M3	Z	.021	5.5
6	M4	Z	.021	5.5
7	M2	Z	.002	1.5
8	M3	Z	.002	1.5
9	M4	Z	.002	1.5
10	M2	Z	.002	4.5
11	M3	Z	.002	4.5
12	M4	Z	.002	4.5

Member Point Loads (BLC 7 : z-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Z	.172	.5
2	M3	Z	.172	.5
3	M4	Z	.172	.5
4	M2	Z	.172	5.5
5	M3	Z	.172	5.5
6	M4	Z	.172	5.5
7	M2	Z	.015	1.5
8	M3	Z	.015	1.5
9	M4	Z	.015	1.5
10	M2	Z	.012	4.5
11	M3	Z	.012	4.5
12	M4	Z	.012	4.5

Member Distributed Loads (BLC 3 : Weight of Ice Only on PCS Struct)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.002	-.002	0	0
2	M5	Y	-.002	-.002	0	0

Member Distributed Loads (BLC 6 : z-dir NESC Heavy Wind on PCS Str)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.002	.002	0	0
2	M5	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : z-dir NESC Extreme Wind on PCS S)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.011	.011	0	0
2	M5	Z	.011	.011	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Appurtenances	None					12			
3	Weight of Ice Only on PCS Struct	None					12	2		
4	x-dir NESC Heavy Wind on PCS Str	None					12			
5	x-dir NESC Extreme Wind on PCS S	None					12			
6	z-dir NESC Heavy Wind on PCS Str	None					12	2		
7	z-dir NESC Extreme Wind on PCS S	None					12	2		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-dir NESC Heavy Wind...	Yes			1	1.5	2	1.5	3	1.5	4	2.5												
2	x-dir NESC Extreme Wi...	Yes			1	1	2	1	5	1														
3	z-dir NESC Heavy Wind...	Yes			1	1.5	2	1.5	3	1.5	6	2.5												
4	z-dir NESC Extreme Wi...	Yes			1	1	2	1	7	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N2	max	-.188	4	.261	3	0	2	0	4	0	4	0	4
2		min	-.885	2	.039	2	-1.187	4	0	1	0	1	0	1
3	N11	max	.25	3	.186	1	0	2	0	4	0	4	0	4
4		min	-.242	2	.071	4	-.043	4	0	1	0	1	0	1
5	N13	max	.469	3	.306	1	0	2	0	4	0	4	0	4
6		min	.143	2	.106	4	-.036	4	0	1	0	1	0	1
7	N16	max	-.101	4	.165	3	0	2	0	4	0	4	0	4
8		min	-.259	1	-.08	2	-.067	4	0	1	0	1	0	1
9	Totals:	max	0	4	.852	3	0	2						
10		min	-1.113	2	.354	2	-1.333	4						

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	-.684	.24	0	0	0	0
2	1	N11	.144	.186	0	0	0	0
3	1	N13	.454	.306	0	0	0	0
4	1	N16	-.259	.119	0	0	0	0
5	1	Totals:	-.345	.852	0			
6	1	COG (ft):	X: 4.261	Y: .269	Z: 0			

Joint Reactions (By Combination)

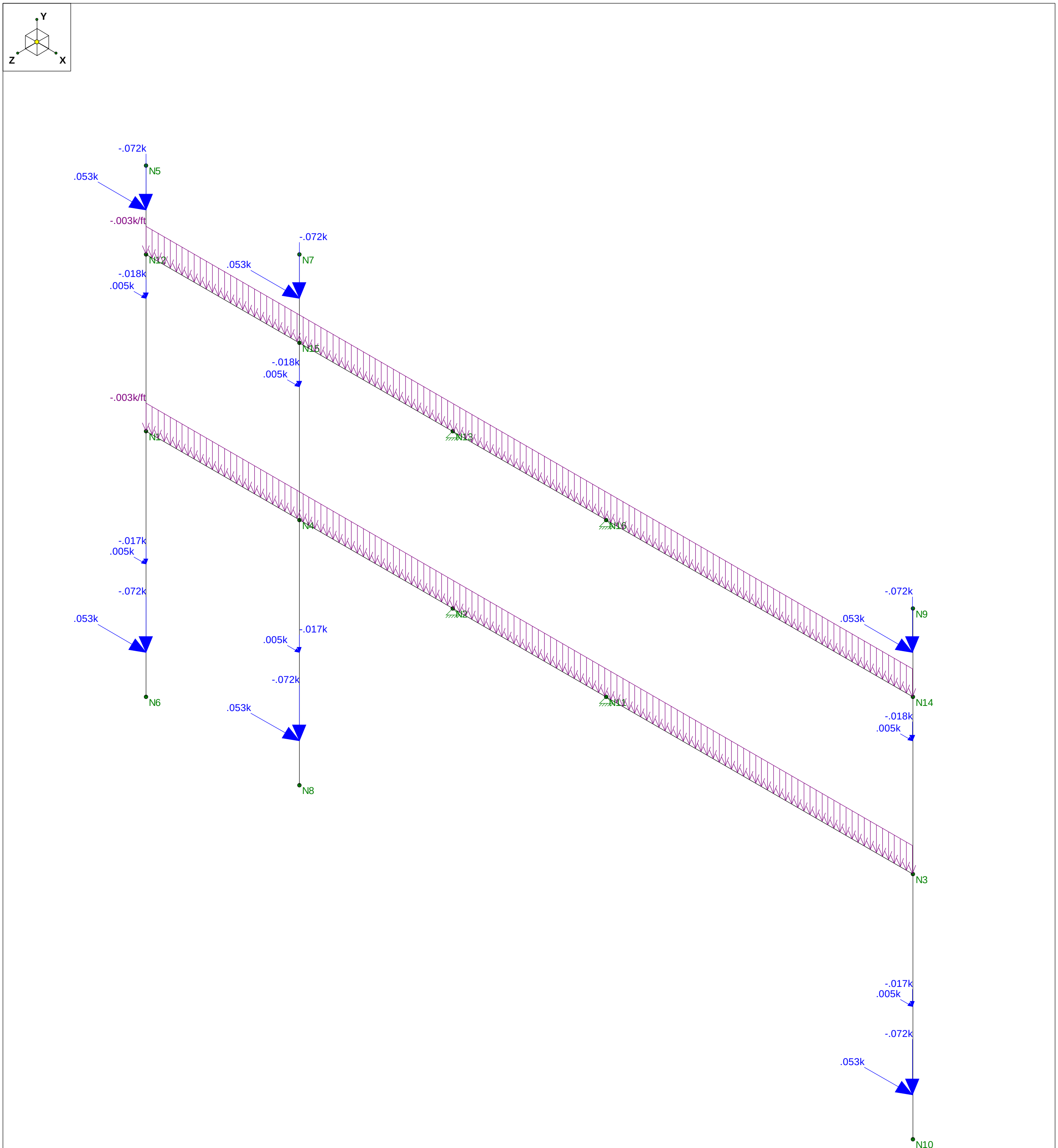
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	-.885	.039	0	0	0	0
2	2	N11	-.242	.141	0	0	0	0
3	2	N13	.143	.254	0	0	0	0
4	2	N16	-.129	-.08	0	0	0	0
5	2	Totals:	-1.113	.354	0			
6	2	COG (ft):	X: 4.306	Y: .319	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N2	-.469	.261	-.374	0	0	0
2	3	N11	.25	.165	-.021	0	0	0
3	3	N13	.469	.261	-.021	0	0	0
4	3	N16	-.25	.165	-.029	0	0	0
5	3	Totals:	0	.852	-.445			
6	3	COG (ft):	X: 4.261	Y: .269	Z: 0			

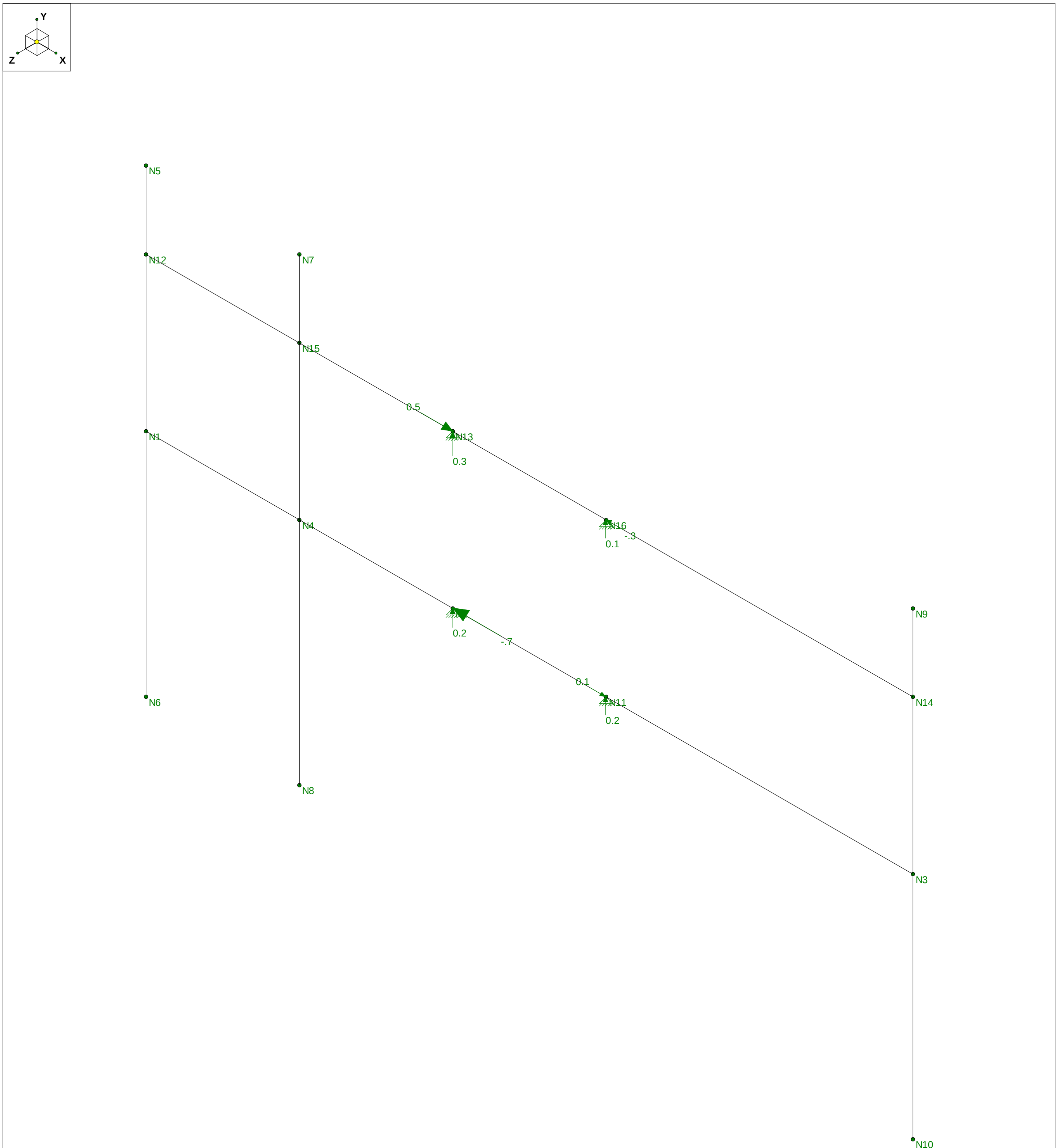
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N2	-.188	.106	-1.187	0	0	0
2	4	N11	.101	.071	-.043	0	0	0
3	4	N13	.188	.106	-.036	0	0	0
4	4	N16	-.101	.071	-.067	0	0	0
5	4	Totals:	0	.354	-1.333			
6	4	COG (ft):	X: 4.306	Y: .319	Z: 0			



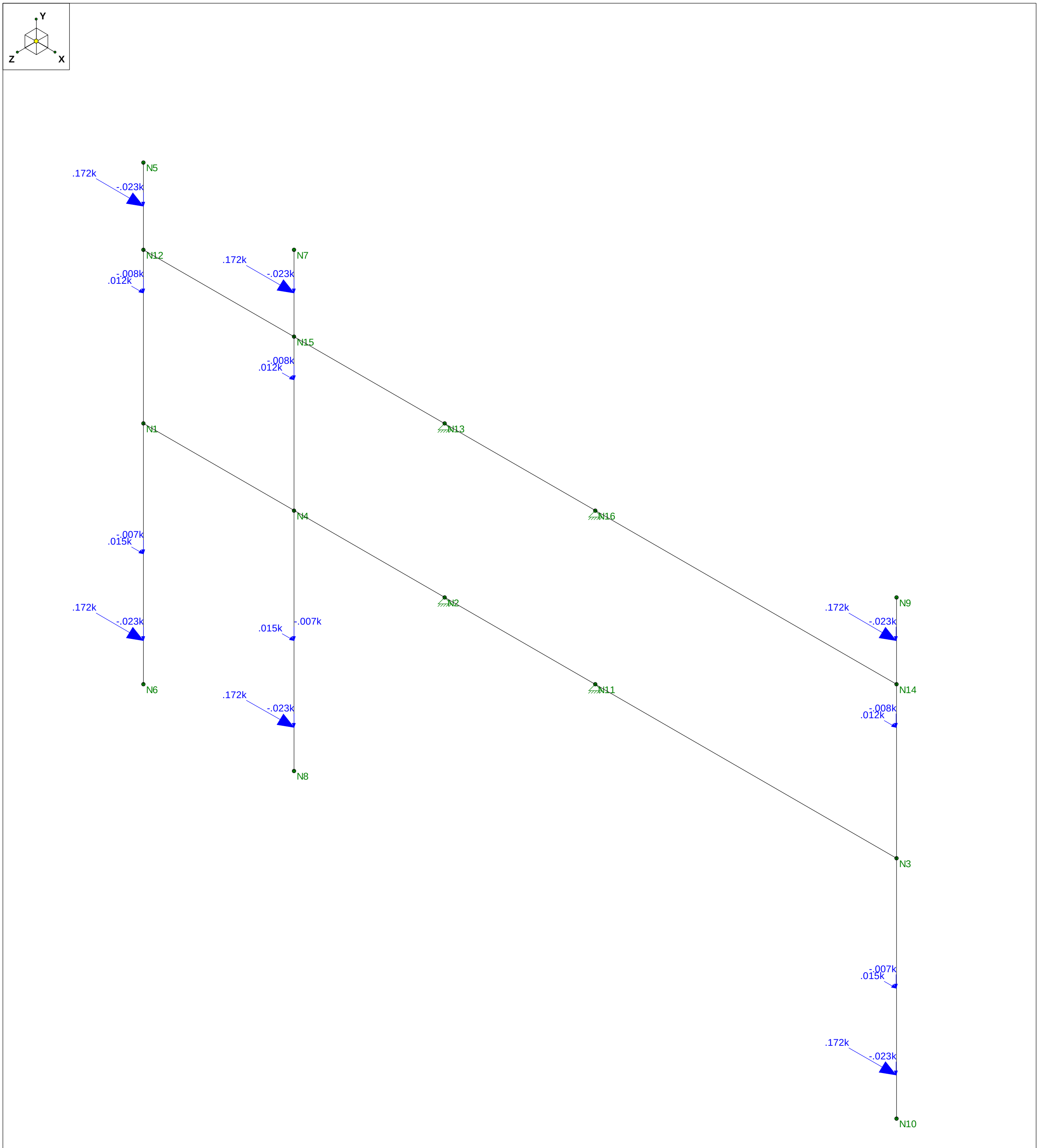
Loads: LC 1, x-dir NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:16 PM
17159.16 - CT43XC811	LC #1 Loads	NESC - Sprint.r3d



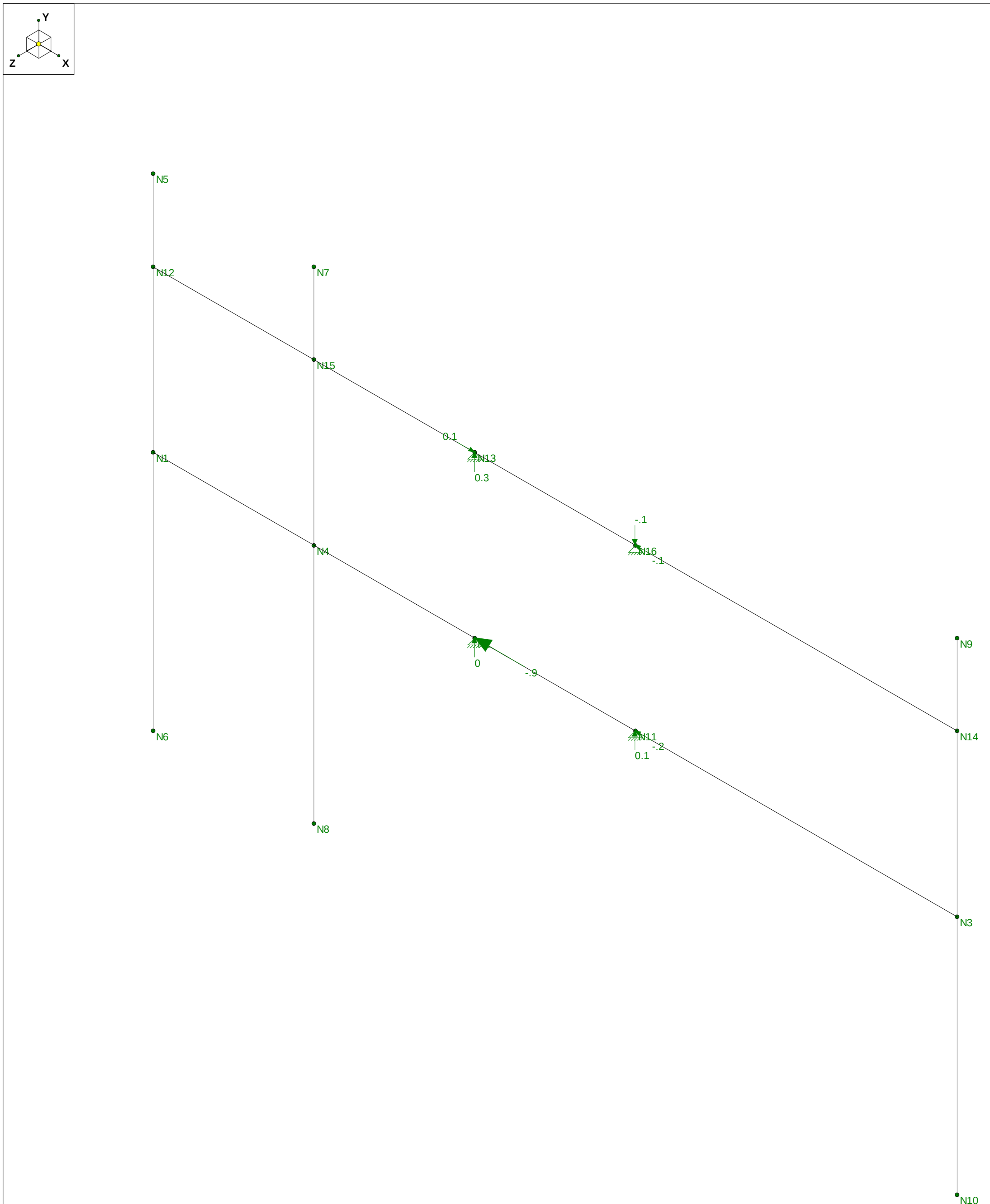
Results for LC 1, x-dir NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:19 PM
17159.16 - CT43XC811	LC #1 Reactions	NESC - Sprint.r3d



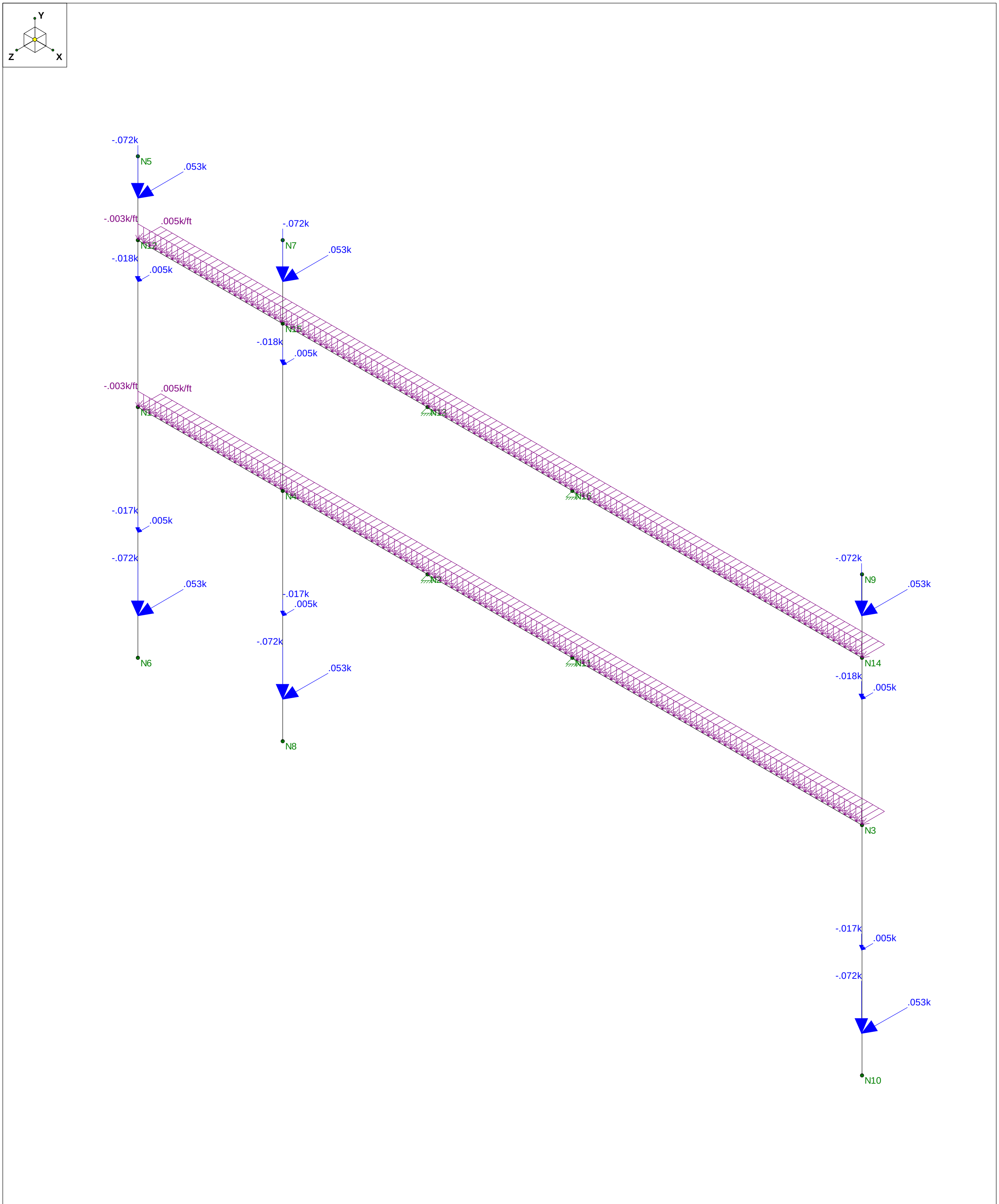
Loads: LC 2, x-dir NESC Extreme Wind on PCS Structure

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:16 PM
17159.16 - CT43XC811	LC #2 Loads	NESC - Sprint.r3d



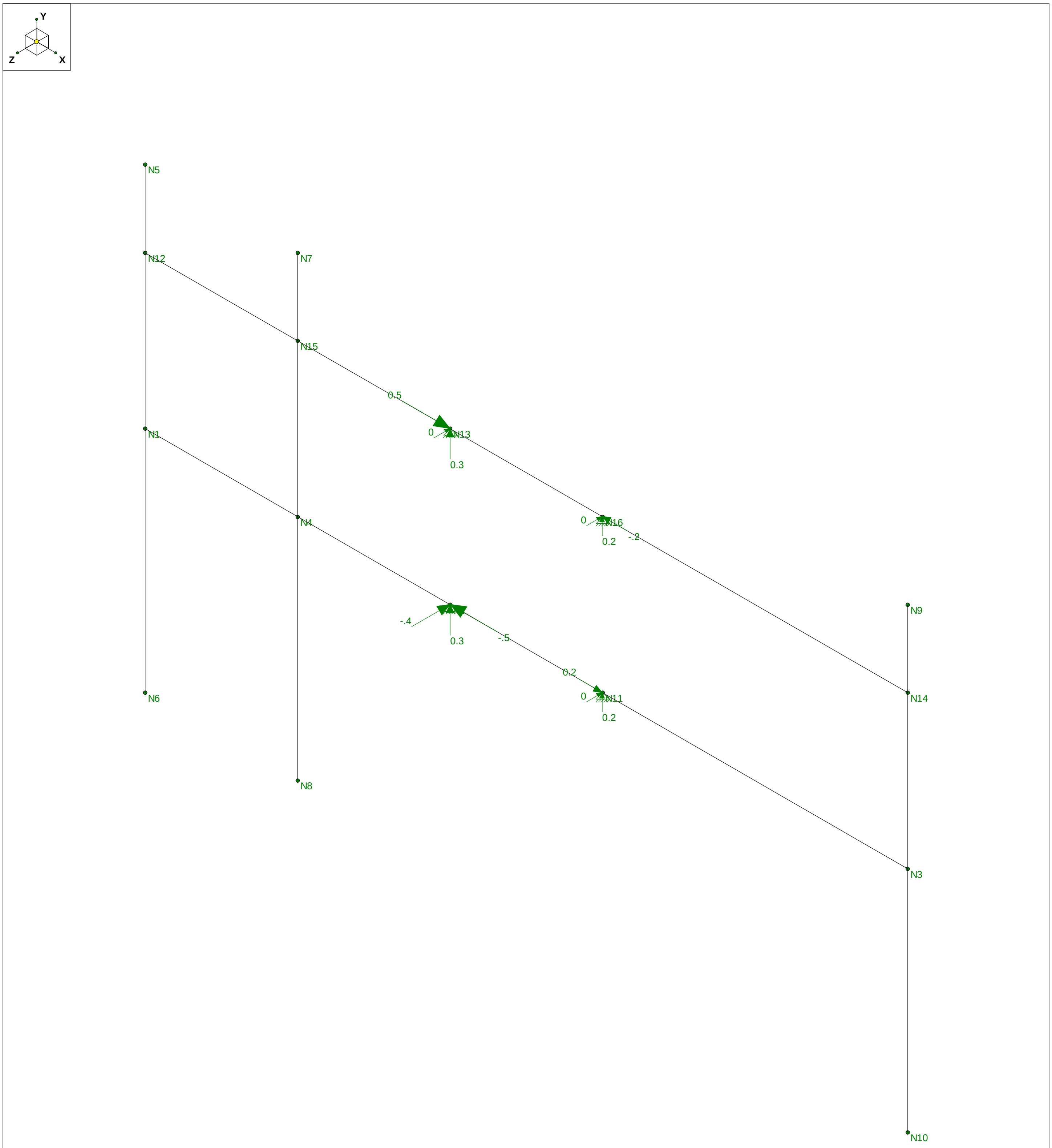
Results for LC 2, x-dir NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:19 PM
17159.16 - CT43XC811	LC #2 Reactions	NESC - Sprint.r3d



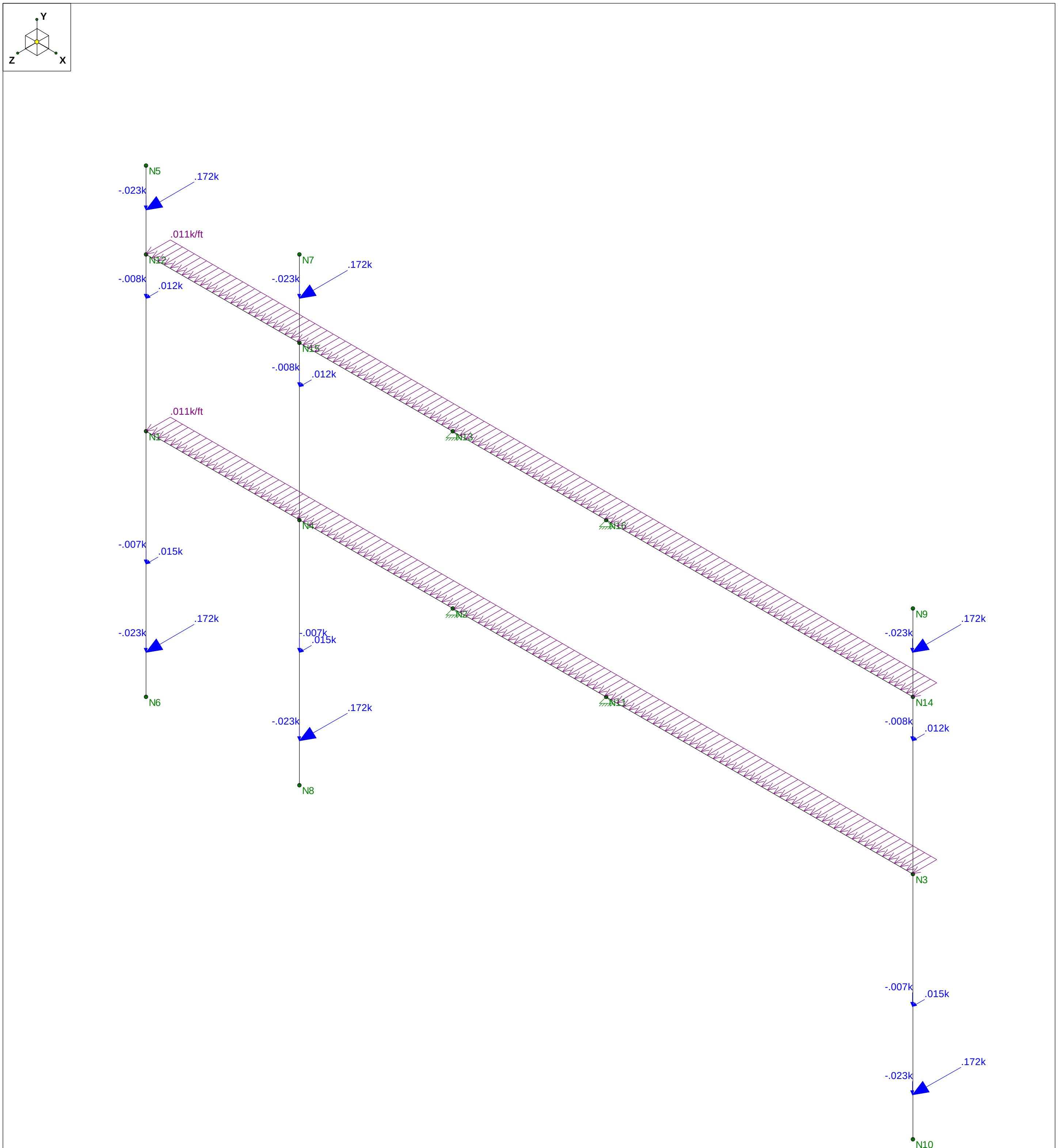
Loads: LC 3, z-dir NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:16 PM
17159.16 - CT43XC811	LC #3 Loads	NESC - Sprint.r3d



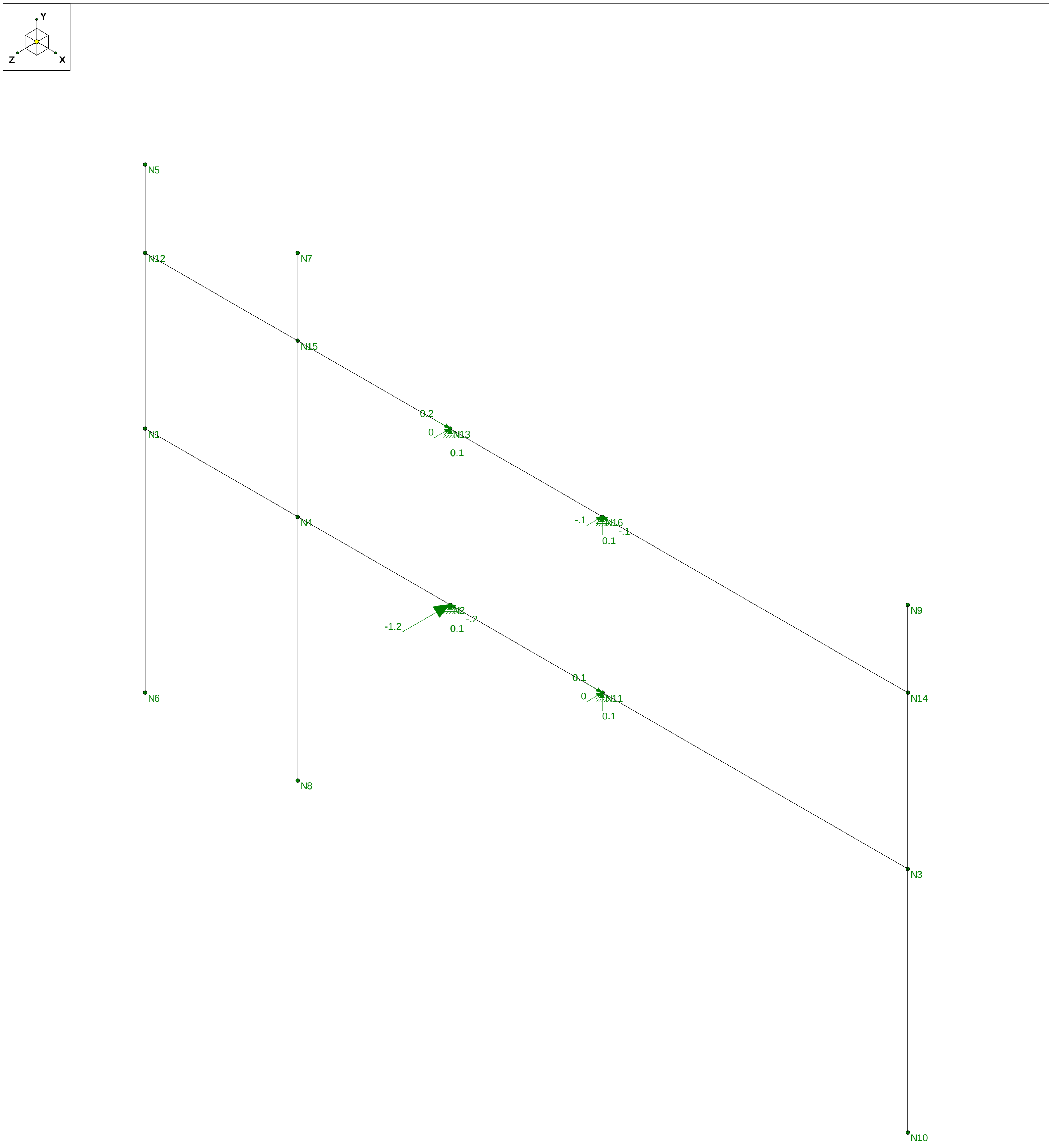
Results for LC 3, z-dir NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
TJL	Tower # 844 - Sprint	Feb 15, 2019 at 12:20 PM
17159.16 - CT43XC811	LC #3 Reactions	NESC - Sprint.r3d



Loads: LC 4, z-dir NESC Extreme Wind on PCS Structure

CENTEK Engineering, Inc.	Tower # 844 - Sprint	
TJL		Feb 15, 2019 at 12:17 PM
17159.16 - CT43XC811	LC #4 Loads	NESC - Sprint.r3d



Results for LC 4, z-dir NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.	Tower # 844 - Sprint	
TJL		Feb 15, 2019 at 12:20 PM
17159.16 - CT43XC811	LC #4 Reactions	NESC - Sprint.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Existing Mast	HSS6.625X0.432	Column	Pipe	A500 Gr.42	Typical	7.86	38.2	38.2	76.4

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Existing ...	21.5			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTTO...	TOP-MA...			Existing Mast	Column	Pipe	A500 Gr....	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-MAST	0	0	0	0	
2	BOTTOM-BRACE	0	.5	0	0	
3	TOP-BRACE	0	7.5	0	0	
4	ANTENNA-CL	0	19.5	0	0	
5	TOP-MAST	0	21.5	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTTOM-BRACE	Reaction	Reaction	Reaction		Reaction	
2	TOP-BRACE	Reaction	Reaction	Reaction		Reaction	

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	16

Member Distributed Loads (BLC 3 : Weight of Ice Only)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.004	-.004	0	0
2	M1	Y	-.018	-.018	0	16

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	16
2	M1	X	.004	.004	0	16

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.032	.032	0	9
2	M1	X	.04	.04	9	16
3	M1	X	.029	.029	0	9
4	M1	X	.036	.036	9	16

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None				3		1		
3	Weight of Ice Only	None				3		2		
4	NESC Heavy Wind	None				2		2		
5	NESC Extreme Wind	None				2		4		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	NESC Heavy Wind on P...	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind on...	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Joint Reactions

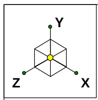
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTTOM-BRA...	max	4.748	2	.364	1	0	2	0	2	0	2	0	2
2		min	1.124	1	.155	2	0	1	0	1	0	1	0	1
3	TOP-BRACE	max	-2.087	1	2.747	1	0	2	0	2	0	2	0	2
4		min	-8.514	2	1.242	2	0	1	0	1	0	1	0	1
5	Totals:	max	-.963	1	3.111	1	0	2						
6		min	-3.766	2	1.397	2	0	1						

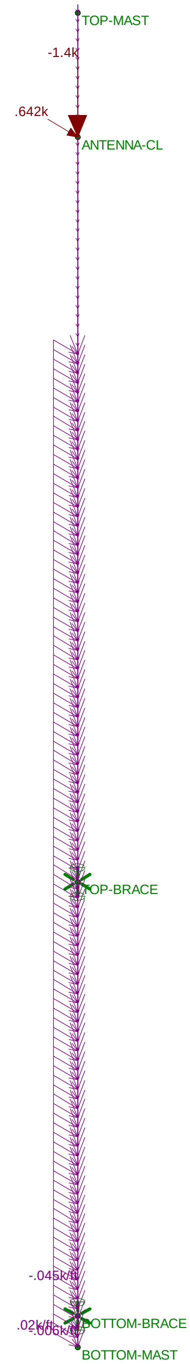
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-BRACE	1.124	.364	0	0	0	0
2	1	TOP-BRACE	-2.087	2.747	0	0	0	0
3	1	Totals:	-.963	3.111	0			
4	1	COG (ft):	X: 0	Y: 14.05	Z: 0			

Joint Reactions (By Combination)

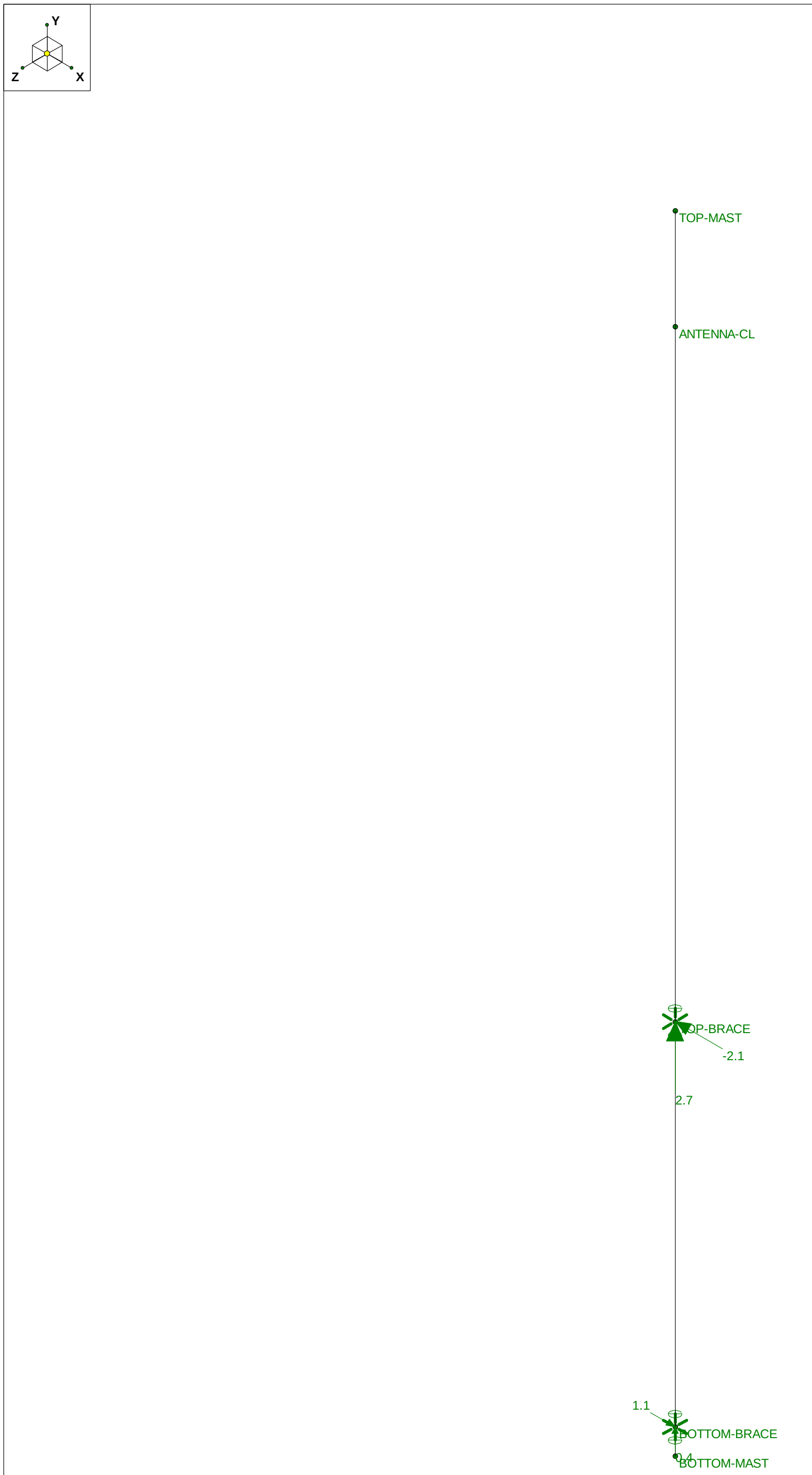
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-BRACE	4.748	.155	0	0	0	0
2	2	TOP-BRACE	-8.514	1.242	0	0	0	0
3	2	Totals:	-3.766	1.397	0			
4	2	COG (ft):	X: 0	Y: 14.318	Z: 0			





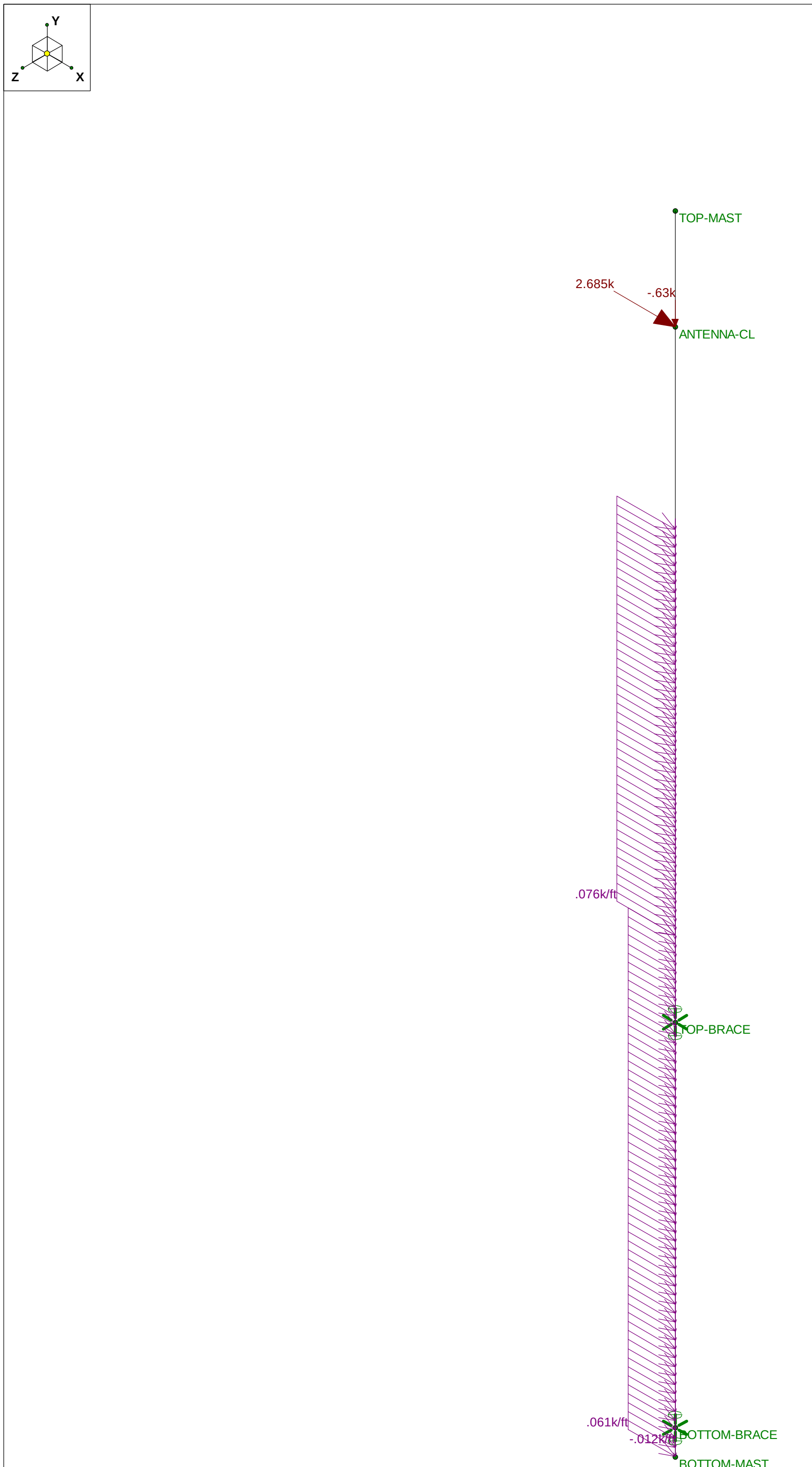
Loads: LC 1, NESC Heavy Wind on PCS Structure

Centek Engineering		
TJL	Structure # 844 AT&T Mast	Mar 4, 2019 at 4:20 PM
19031.00 / CT5089	LC #1 Loads	NESC - AT&T.r3d



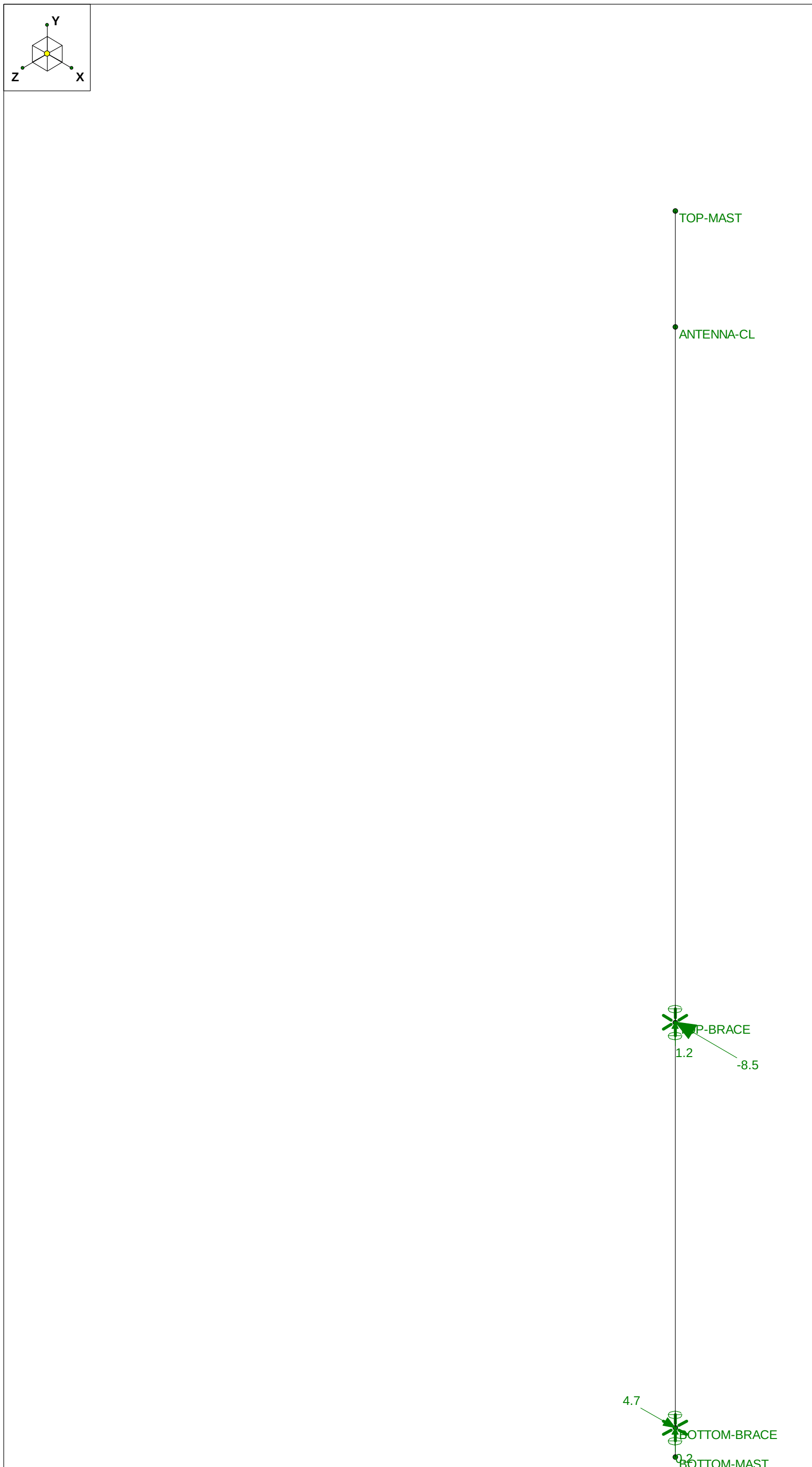
Results for LC 1, NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

Centek Engineering	Structure # 844 AT&T Mast	
TJL		Mar 4, 2019 at 4:20 PM
19031.00 / CT5089	LC #1 Reactions	NESC - AT&T.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

Centek Engineering		
TJL	Structure # 844 AT&T Mast	Mar 4, 2019 at 4:20 PM
19031.00 / CT5089	LC #2 Loads	NESC - AT&T.r3d



Results for LC 2, NESC Extreme Wind on PCS Structure
Reaction and Moment Units are k and k-ft

Centek Engineering	Structure # 844 AT&T Mast	
TJL		Mar 4, 2019 at 4:21 PM
19031.00 / CT5089	LC #2 Reactions	NESC - AT&T.r3d

CENTEK engineering
Centered on Solutions™ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	Load Analysis of Pole #844
Location:	Trumbull, CT
Rev. 0: 1/7/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.16

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2012 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade =	$TME := 163$	ft	(User Input)
Multiplier Gust Response Factor =	$m := 1.25$		(User Input - Only for NESC Extreme wind case)
NESC Factor =	$kv := 1.43$		(User Input from NESC 2012 Table 250-3 equation)
Importance Factor =	$I := 1.0$		(User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.403$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.292$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.783$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.83$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36$ psf (NESC 2012 Section 250.C.2)

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

NESC Heavy Loading =	**2.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

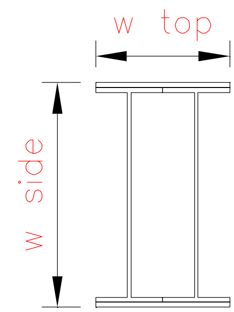
Overload Factors for Vertical Loads:

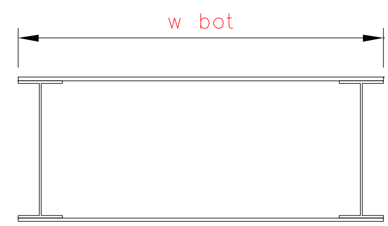
NESC Heavy Loading =	**1.5**	(User Input)	Apply in Risa-3D Analysis
NESC Extreme Loading =	**1.0**	(User Input)	Apply in Risa-3D Analysis

Development of Wind & Ice Load on CL&P Pole

Pole Data:

Shape =	Flat	
Width Side =	$W_{side} := 21.7$	in
Width Top =	$W_{top} := 12$	in
Width Bottom =	$W_{bot} := 54$	in
Length =	$L := 150$	ft
Area Top =	$A_{top} := 30.9$	sq in
Area Bottom =	$A_{bot} := 80.0$	sq in
Weight of Steel =	$W_{steel} := 490$	pcf
Area Top w/ Ice =	$Ai_{top} := 40$	sq in
Area Bottom w/ Ice =	$Ai_{bot} := 112$	sq in





Gravity Loads (without ice)

Weight Pole Top =	$Wt_{top} := \frac{A_{top}}{144} \cdot W_{steel} = 105$	plf	**BLC 2**
Weight Pole Bottom =	$Wt_{bot} := \frac{A_{bot}}{144} \cdot W_{steel} = 272$	plf	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on Pole Top =	$W_{ICE.top} := Id \cdot \frac{Ai_{top}}{144} = 16$	plf	**BLC 3**
Weight of Ice on Pole Bottom =	$W_{ICE.bot} := Id \cdot \frac{Ai_{bot}}{144} = 44$	plf	**BLC 3**

Wind Load (NESC Extreme)

Pole Projected Surface Area Top =	$A_{top} := \frac{W_{top}}{12} = 1$	sq ft/ft	
Pole Projected Surface Area Bottom =	$A_{bot} := \frac{W_{bot}}{12} = 4.5$	sq ft/ft	
Pole Projected Surface Area Side =	$A_{side} := \frac{W_{side}}{12} = 1.808$	sq ft/ft	
Total Pole Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 58$	plf	**BLC 7**
Total Pole Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 260$	plf	**BLC 7**
Total Pole Wind Force Side =	$qz \cdot Cd_F \cdot A_{side} = 104$	plf	**BLC 5**

Wind Load (NESE Heavy)

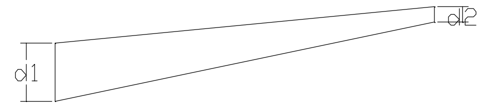
Pole Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(W_{top} + 2 \cdot Ir)}{12} = 1.083$	sq ft/ft	
Pole Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(W_{bot} + 2 \cdot Ir)}{12} = 4.583$	sq ft/ft	
Pole Projected Surface Area w/ Ice Side =	$AICE_{side} := \frac{(W_{side} + 2 \cdot Ir)}{12} = 1.892$	sq ft/ft	
Total Pole Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 7$	plf	**BLC 6**
Total Pole Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 29$	plf	**BLC 6**
Total Pole Wind Force w/ Ice Side =	$p \cdot Cd_F \cdot AICE_{side} = 12$	plf	**BLC 4**

Development of Wind & Ice Load on CL&P Pole Arms

ARM Data:

Shape = Flat

Depth of Arm at Top = $ARM_{d1} := 12$



Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 8$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := (ARM_{d1} \cdot ARM_{W1}) - [(ARM_{W1} - 2ARM_t) \cdot (ARM_{d1} - 2ARM_t)]$

Arm Area Bottom = $A_{armbot} := (ARM_{d2} \cdot ARM_{W2}) - [(ARM_{W2} - 2ARM_t) \cdot (ARM_{d2} - 2ARM_t)]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 33$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := (ARM_{d1} + 2 \cdot Ir) \cdot (ARM_{W1} + 2 \cdot Ir) - ARM_{d1} \cdot ARM_{W1} = 21$

Arm Area w/ Ice Bottom = $Ai_{armbot} := (ARM_{d2} + 2 \cdot Ir) \cdot (ARM_{W2} + 2 \cdot Ir) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 8$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 58$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 19$	plf	**BLC 7**

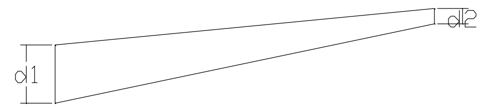
Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.083$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 7$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on CL&P Pole Arms

ARM Data:

Shape = Flat



Depth of Arm at Top = $ARM_{d1} := 15$

Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 10$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := (ARM_{d1} \cdot ARM_{W1}) - [(ARM_{W1} - 2ARM_t) \cdot (ARM_{d1} - 2ARM_t)]$

Arm Area Bottom = $A_{armbot} := (ARM_{d2} \cdot ARM_{W2}) - [(ARM_{W2} - 2ARM_t) \cdot (ARM_{d2} - 2ARM_t)]$

Weight Arm Top = $Wt_{top} := \frac{A_{armtop}}{144} \cdot W_{steel} = 42$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \frac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := (ARM_{d1} + 2 \cdot Ir) \cdot (ARM_{W1} + 2 \cdot Ir) - ARM_{d1} \cdot ARM_{W1} = 26$

Arm Area w/ Ice Bottom = $Ai_{armbot} := (ARM_{d2} + 2 \cdot Ir) \cdot (ARM_{W2} + 2 \cdot Ir) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \frac{Ai_{armtop}}{144} = 10$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \frac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top =	$A_{top} := \frac{ARM_{d1}}{12} = 1.25$	sq ft/ft	
Arm Projected Surface Area Bottom =	$A_{bot} := \frac{ARM_{d2}}{12} = 0.333$	sq ft/ft	
Total Arm Wind Force Top =	$qz \cdot Cd_F \cdot A_{top} = 72$	plf	**BLC 7**
Total Arm Wind Force Bottom =	$qz \cdot Cd_F \cdot A_{bot} = 19$	plf	**BLC 7**

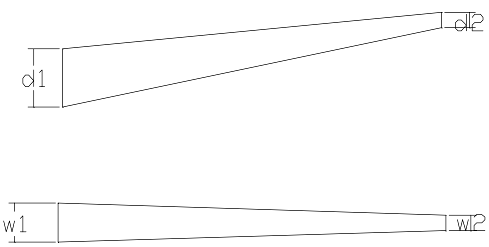
Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top =	$AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.333$	sq ft/ft	
Arm Projected Surface Area w/ Ice Bottom =	$AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$	sq ft/ft	
Total Arm Wind Force w/ Ice Top =	$p \cdot Cd_F \cdot AICE_{top} = 9$	plf	**BLC 6**
Total Arm Wind Force w/ Ice Bottom =	$p \cdot Cd_F \cdot AICE_{bot} = 3$	plf	**BLC 6**

Development of Wind & Ice Load on CL&P Pole Arms

ARM Data:

Shape = Flat



Depth of Arm at Top = $ARM_{d1} := 18$

Depth of Arm at Bottom = $ARM_{d2} := 4$

Width of Arm at Top = $ARM_{W1} := 12$

Width of Arm at Bottom = $ARM_{W2} := 4$

Thickness of Arm Wall = $ARM_t := 0.25$

Gravity Loads (without ice)

Arm Area Top = $A_{armtop} := \left(ARM_{d1} \cdot ARM_{W1}\right) - \left[\left(ARM_{W1} - 2ARM_t\right) \cdot \left(ARM_{d1} - 2ARM_t\right)\right]$

Arm Area Bottom = $A_{armbot} := \left(ARM_{d2} \cdot ARM_{W2}\right) - \left[\left(ARM_{W2} - 2ARM_t\right) \cdot \left(ARM_{d2} - 2ARM_t\right)\right]$

Weight Arm Top = $Wt_{top} := \dfrac{A_{armtop}}{144} \cdot W_{steel} = 50$ plf **BLC 2**

Weight Arm Bottom = $Wt_{bot} := \dfrac{A_{armbot}}{144} \cdot W_{steel} = 13$ plf **BLC 2**

Gravity Loads (ice only)

Arm Area w/ Ice Top = $Ai_{armtop} := \left(ARM_{d1} + 2 \cdot Ir\right) \cdot \left(ARM_{W1} + 2 \cdot Ir\right) - ARM_{d1} \cdot ARM_{W1} = 31$

Arm Area w/ Ice Bottom = $Ai_{armbot} := \left(ARM_{d2} + 2 \cdot Ir\right) \cdot \left(ARM_{W2} + 2 \cdot Ir\right) - ARM_{d2} \cdot ARM_{W2} = 9$

Weight of Ice on Arm Top = $W_{ICE.top} := Id \cdot \dfrac{Ai_{armtop}}{144} = 12$ plf **BLC 3**

Weight of Ice on Arm Bottom = $W_{ICE.bot} := Id \cdot \dfrac{Ai_{armbot}}{144} = 4$ plf **BLC 3**

Wind Load (NESC Extreme)

Arm Projected Surface Area Top = $A_{top} := \frac{ARM_{d1}}{12} = 1.5$ sq ft/ft

Arm Projected Surface Area Bottom = $A_{bot} := \frac{ARM_{d2}}{12} = 0.333$ sq ft/ft

Total Arm Wind Force Top = $qz \cdot Cd_F \cdot A_{top} = 87$ plf **BLC 7**

Total Arm Wind Force Bottom = $qz \cdot Cd_F \cdot A_{bot} = 19$ plf **BLC 7**

Wind Load (NESE Heavy)

Arm Projected Surface Area w/ Ice Top = $AICE_{top} := \frac{(ARM_{d1} + 2 \cdot Ir)}{12} = 1.583$ sq ft/ft

Arm Projected Surface Area w/ Ice Bottom = $AICE_{bot} := \frac{(ARM_{d2} + 2 \cdot Ir)}{12} = 0.417$ sq ft/ft

Total Arm Wind Force w/ Ice Top = $p \cdot Cd_F \cdot AICE_{top} = 10$ plf **BLC 6**

Total Arm Wind Force w/ Ice Bottom = $p \cdot Cd_F \cdot AICE_{bot} = 3$ plf **BLC 6**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (0-ft to 100-ft)

Coax Type =	HELIAX 1-5/8"			
Shape =	Round		(User Input)	
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)	
Coax Cable Length =	$L_{coax} := 100$	ft	(User Input)	
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)	
Total Number of Coax =	$N_{coax} := 30$		(User Input)	(12 AT&T and 18 Sprint)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 3$		(User Input)	

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.5$ ft

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 29$ plf **BLC 19 & 21**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.6$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 4$ plf **BLC 18 & 20**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 31$ plf **BLC 16**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^{\ 2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 45$ plf **BLC 17**

CENTEK engineering
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Branford, CT 06405 F: (203) 488-8587

Subject:	Load Analysis of Pole #844
Location:	Trumbull, CT
Rev. 0: 1/7/19	Prepared by: T.J.L Checked by: C.A.G. Job No. 17159.16

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (100-ft to 140-ft)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 40$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

Total Number of Coax = $N_{coax} := 12$ (User Input) (12 AT&T)

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 2$ (User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.3$ ft

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 19$ plf **BLC 19 & 21**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 0.4$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 3$ plf **BLC 18 & 20**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 12$ plf **BLC 16**

Gravity Load (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot Ir)^2 - D_{coax}^{\ 2}\right] = 3.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 18$ plf **BLC 17**

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	No
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	None
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-91/97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05: ASD
Aluminum Code	AA ADM1-05: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Om Z	1
Om X	1
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1.5
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.2
3	A572 Gr.60	29000	11154	.3	.65	.49	60	1.5	75	1.2
4	A992	29000	11154	.3	.65	.49	50	1.1	65	1.2
5	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
6	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
7	A53 Gr. B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Pole 0'	0'	Column	Wide Flange	A572 Gr.60	Typical	79.56	27580.7	7721	13783.6
2	Pole 5'	5'	Column	Wide Flange	A572 Gr.60	Typical	78.189	25786.2	7566.93	13245.5
3	Pole 10'	10'	Column	Wide Flange	A572 Gr.60	Typical	76.818	24065.1	7412.85	12710.5
4	Pole 15'	15	Column	Wide Flange	A572 Gr.60	Typical	75.447	22416.3	7258.78	12178.9
5	Pole 20'	20'	Column	Wide Flange	A572 Gr.60	Typical	74.076	20881.3	7104.7	11681.1
6	Pole 25'	25'	Column	Wide Flange	A572 Gr.60	Typical	72.705	19330	6950.63	11125.1
7	Pole 30'	30'_HRA	Column	Wide Flange	A572 Gr.60	Typical	59.89	15891.8	5464.86	8906
8	Pole 35'	35'_HRA	Column	Wide Flange	A572 Gr.60	Typical	58.866	14697.5	5351.08	8498.88
9	Pole 40'	40'_HRA	Column	Wide Flange	A572 Gr.60	Typical	57.842	13558.4	5237.4	8092.32
10	Pole 45'	45'_HRA	Column	Wide Flange	A572 Gr.60	Typical	56.818	12472.9	5123.63	7689.9
11	Pole 50'	50'_HRA	Column	Wide Flange	A572 Gr.60	Typical	55.793	11440.4	5009.85	7288.87
12	Pole 55'	55'_HRA	Column	Wide Flange	A572 Gr.60	Typical	54.77	10460.3	4896.17	6891.98
13	Pole 60'	60'_HRA	Column	Wide Flange	A572 Gr.60	Typical	49.078	8981.09	4248.65	5847.37
14	Pole 65'	65'_HRA	Column	Wide Flange	A572 Gr.60	Typical	48.224	8159.94	4154.34	5508.5
15	Pole 70'	70'_HRA	Column	Wide Flange	A572 Gr.60	Typical	47.369	7383.44	4059.95	5172.75
16	Pole 75'	75'_HRA	Column	Wide Flange	A572 Gr.60	Typical	46.515	6651.33	3965.65	4839.63
17	Pole 80'	80'_HRA	Column	Wide Flange	A572 Gr.60	Typical	45.66	5962.43	3871.25	4510.21
18	Pole 85'	85'_HRA	Column	Wide Flange	A572 Gr.60	Typical	44.805	5316.3	3776.94	4183.58
19	Pole 90'	90'	Column	Wide Flange	A572 Gr.60	Typical	40.254	4445.95	3264.77	3431.03
20	Pole 95'	95'	Column	Wide Flange	A572 Gr.60	Typical	39.571	3917.71	3189.81	3161.77
21	Pole 100'	100'	Column	Wide Flange	A572 Gr.60	Typical	38.888	3426.45	3114.94	2895.62
22	Pole 105'	105'	Column	Wide Flange	A572 Gr.60	Typical	38.205	2971.38	3039.98	2632.46
23	Pole 110'	110'	Column	Wide Flange	A572 Gr.60	Typical	37.522	2551.93	2965.03	2373.18
24	Pole 115'	115'	Column	Wide Flange	A572 Gr.60	Typical	36.84	2167.55	2890.15	2117.95
25	Pole 120'	120'	Column	Wide Flange	A572 Gr.60	Typical	33.523	1718.78	2521.02	1659.03
26	Pole 125'	125'	Column	Wide Flange	A572 Gr.60	Typical	33.009	1420.3	2465	1457.02
27	Pole 130'	130'	Column	Wide Flange	A572 Gr.60	Typical	32.496	1152.64	2409.03	1259.46
28	Pole 135'	135'	Column	Wide Flange	A572 Gr.60	Typical	31.983	915.275	2353.07	1065.44
29	Pole 140'	140'	Column	Wide Flange	A572 Gr.60	Typical	31.47	707.682	2297.04	876.406
30	Pole 145'	145'	Column	Wide Flange	A572 Gr.60	Typical	30.956	529.465	2241.07	694.633
31	5' Arm Base	5' Arm Base	Beam	Tube	A36 Gr.36	Typical	9.75	107.703	201.453	215.555
32	5' Arm Mid	5' Arm Mid	Beam	Tube	A36 Gr.36	Typical	6.75	40.016	62.641	75.013
33	8' Arm Base	8' Arm Base	Beam	Tube	A36 Gr.36	Typical	12.25	214.005	399.005	426.748
34	8' Arm Mid	8' Arm Mid	Beam	Tube	A36 Gr.36	Typical	8	65.573	105.26	123.877
35	10.5' Arm Base	10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical	14.75	374.057	695.932	743.994
36	10.5 Arm Mid	10.5' Arm Mid	Beam	Tube	A36 Gr.36	Typical	9.25	100.193	163.818	190.317

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Pole 0'	5			Lbyy									Lateral
2	M2	8' Arm Mid	4.503			Lbyy									Lateral
3	M3	8' Arm Mid	4.503			Lbyy									Lateral
4	M4	10.5 Arm...	5.427			Lbyy									Lateral
5	M5	10.5 Arm...	5.427			Lbyy									Lateral
6	M6	8' Arm Mid	4.37			Lbyy									Lateral
7	M7	8' Arm Mid	4.37			Lbyy									Lateral
8	M8	5' Arm Mid	2.815			Lbyy									Lateral
9	M9	5' Arm Mid	2.815			Lbyy									Lateral
10	M10	Pole 5'	5			Lbyy									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
11	M11	Pole 10'	5			Lbyy									Lateral
12	M12	Pole 15'	5			Lbyy									Lateral
13	M13	Pole 20'	5			Lbyy									Lateral
14	M14	Pole 25'	5			Lbyy									Lateral
15	M15	Pole 30'	5			Lbyy									Lateral
16	M16	Pole 35'	5			Lbyy									Lateral
17	M17	Pole 40'	5			Lbyy									Lateral
18	M18	Pole 45'	5			Lbyy									Lateral
19	M19	Pole 50'	5			Lbyy									Lateral
20	M20	Pole 55'	5			Lbyy									Lateral
21	M21	Pole 60'	5			Lbyy									Lateral
22	M22	Pole 65'	5			Lbyy									Lateral
23	M23	Pole 70'	5			Lbyy									Lateral
24	M24	Pole 75'	5			Lbyy									Lateral
25	M25	Pole 80'	5			Lbyy									Lateral
26	M26	Pole 85'	5			Lbyy									Lateral
27	M27	Pole 90'	5			Lbyy									Lateral
28	M28	Pole 95'	5			Lbyy									Lateral
29	M29	Pole 100'	5			Lbyy									Lateral
30	M30	Pole 105'	5			Lbyy									Lateral
31	M31	Pole 110'	5			Lbyy									Lateral
32	M32	Pole 115'	5			Lbyy									Lateral
33	M33	Pole 120'	5			Lbyy									Lateral
34	M34	Pole 125'	5			Lbyy									Lateral
35	M35	Pole 130'	5			Lbyy									Lateral
36	M36	Pole 135'	5			Lbyy									Lateral
37	M37	Pole 140'	5			Lbyy									Lateral
38	M38	Pole 145'	5			Lbyy									Lateral
39	M39	8' Arm B...	4.503			Lbyy									Lateral
40	M40	8' Arm B...	4.503			Lbyy									Lateral
41	M41	10.5' Arm...	5.427			Lbyy									Lateral
42	M42	10.5' Arm...	5.427			Lbyy									Lateral
43	M43	8' Arm B...	4.37			Lbyy									Lateral
44	M44	8' Arm B...	4.37			Lbyy									Lateral
45	M45	5' Arm B...	2.815			Lbyy									Lateral
46	M46	5' Arm B...	2.815			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTTO...	N19		90	Pole 0'	Column	Wide Flange	A572 Gr....	Typical
2	M2	ARM1-L...	N47			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
3	M3	ARM1-R...	N48			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
4	M4	ARM2-L...	N49			10.5 Arm Mid	Beam	Tube	A36 Gr.36	Typical
5	M5	ARM2-R...	N50			10.5 Arm Mid	Beam	Tube	A36 Gr.36	Typical
6	M6	ARM3-L...	N51			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
7	M7	ARM3-R...	N52			8' Arm Mid	Beam	Tube	A36 Gr.36	Typical
8	M8	ARM4-R...	N53			5' Arm Mid	Beam	Tube	A36 Gr.36	Typical
9	M9	ARM4-L...	N54			5' Arm Mid	Beam	Tube	A36 Gr.36	Typical
10	M10	N19	N20		90	Pole 5'	Column	Wide Flange	A572 Gr....	Typical
11	M11	N20	N21		90	Pole 10'	Column	Wide Flange	A572 Gr....	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
12	M12	N21	N22		90	Pole 15'	Column	Wide Flange	A572 Gr....	Typical
13	M13	N22	N23		90	Pole 20'	Column	Wide Flange	A572 Gr....	Typical
14	M14	N23	N24		90	Pole 25'	Column	Wide Flange	A572 Gr....	Typical
15	M15	N24	N25		90	Pole 30'	Column	Wide Flange	A572 Gr....	Typical
16	M16	N25	N26		90	Pole 35'	Column	Wide Flange	A572 Gr....	Typical
17	M17	N26	N27		90	Pole 40'	Column	Wide Flange	A572 Gr....	Typical
18	M18	N27	N28		90	Pole 45'	Column	Wide Flange	A572 Gr....	Typical
19	M19	N28	N29		90	Pole 50'	Column	Wide Flange	A572 Gr....	Typical
20	M20	N29	N30		90	Pole 55'	Column	Wide Flange	A572 Gr....	Typical
21	M21	N30	N31		90	Pole 60'	Column	Wide Flange	A572 Gr....	Typical
22	M22	N31	N32		90	Pole 65'	Column	Wide Flange	A572 Gr....	Typical
23	M23	N32	N33		90	Pole 70'	Column	Wide Flange	A572 Gr....	Typical
24	M24	N33	N34		90	Pole 75'	Column	Wide Flange	A572 Gr....	Typical
25	M25	N34	N35		90	Pole 80'	Column	Wide Flange	A572 Gr....	Typical
26	M26	N35	POLE-C...		90	Pole 85'	Column	Wide Flange	A572 Gr....	Typical
27	M27	POLE-C...	N36		90	Pole 90'	Column	Wide Flange	A572 Gr....	Typical
28	M28	N36	N37		90	Pole 95'	Column	Wide Flange	A572 Gr....	Typical
29	M29	N37	N38		90	Pole 100'	Column	Wide Flange	A572 Gr....	Typical
30	M30	N38	N39		90	Pole 105'	Column	Wide Flange	A572 Gr....	Typical
31	M31	N39	N40		90	Pole 110'	Column	Wide Flange	A572 Gr....	Typical
32	M32	N40	N41		90	Pole 115'	Column	Wide Flange	A572 Gr....	Typical
33	M33	N41	N42		90	Pole 120'	Column	Wide Flange	A572 Gr....	Typical
34	M34	N42	N43		90	Pole 125'	Column	Wide Flange	A572 Gr....	Typical
35	M35	N43	N44		90	Pole 130'	Column	Wide Flange	A572 Gr....	Typical
36	M36	N44	N45		90	Pole 135'	Column	Wide Flange	A572 Gr....	Typical
37	M37	N45	N46		90	Pole 140'	Column	Wide Flange	A572 Gr....	Typical
38	M38	N46	TOP-PO...		90	Pole 145'	Column	Wide Flange	A572 Gr....	Typical
39	M39	N47	ARM1			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
40	M40	N48	ARM1			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
41	M41	N49	ARM2			10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical
42	M42	N50	ARM2			10.5' Arm Base	Beam	Tube	A36 Gr.36	Typical
43	M43	N51	ARM3			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
44	M44	N52	ARM3			8' Arm Base	Beam	Tube	A36 Gr.36	Typical
45	M45	N53	ARM4			5' Arm Base	Beam	Tube	A36 Gr.36	Typical
46	M46	N54	ARM4			5' Arm Base	Beam	Tube	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTTOM-POLE	0	0	0	0	
2	POLE-CONNECTION	0	90	0	0	
3	ARM1-LEFT	-8.88	120	0	0	
4	ARM2-LEFT	-10.75	132	0	0	
5	ARM3-LEFT	-8.61	144	0	0	
6	ARM4-LEFT	-5.54	150	0	0	
7	TOP-POLE	0	150	0	0	
8	ARM1-RIGHT	8.88	120	0	0	
9	ARM2-RIGHT	10.75	132	0	0	
10	ARM3-RIGHT	8.61	144	0	0	
11	ARM4-RIGHT	5.54	150	0	0	
12	ARM1	0	118.5	0	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
13	ARM2	0	130.5	0	0	
14	ARM3	0	142.5	0	0	
15	ARM4	0	149	0	0	
16	BOTTOM-BRACE	0	141	0	0	
17	TOP-BRACE	0	148	0	0	
18	SPRINTBOT	0	101	0	0	
19	N19	0	5	0	0	
20	N20	0	10	0	0	
21	N21	0	15	0	0	
22	N22	0	20	0	0	
23	N23	0	25	0	0	
24	N24	0	30	0	0	
25	N25	0	35	0	0	
26	N26	0	40	0	0	
27	N27	0	45	0	0	
28	N28	0	50	0	0	
29	N29	0	55	0	0	
30	N30	0	60	0	0	
31	N31	0	65	0	0	
32	N32	0	70	0	0	
33	N33	0	75	0	0	
34	N34	0	80	0	0	
35	N35	0	85	0	0	
36	N36	0	95	0	0	
37	N37	0	100	0	0	
38	N38	0	105	0	0	
39	N39	0	110	0	0	
40	N40	0	115	0	0	
41	N41	0	120	0	0	
42	N42	0	125	0	0	
43	N43	0	130	0	0	
44	N44	0	135	0	0	
45	N45	0	140	0	0	
46	N46	0	145	0	0	
47	N47	-4.44	119.25	0	0	
48	N48	4.44	119.25	0	0	
49	N49	-5.375	131.25	0	0	
50	N50	5.375	131.25	0	0	
51	N51	-4.305	143.25	0	0	
52	N52	4.305	143.25	0	0	
53	N53	2.77	149.5	0	0	
54	N54	-2.77	149.5	0	0	
55	SPRINTTOP	0	103	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTTOM-POLE	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	POLE-CONNECTION						
3	ARM2-LEFT						
4	ARM1-LEFT						

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Joint Loads and Enforced Displacements (BLC 8 : x-direction NESC Heavy Wire Load)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-1.514
2	ARM4-RIGHT	L	Y	-2.558
3	ARM3-LEFT	L	Y	-5.81
4	ARM3-RIGHT	L	Y	-5.81
5	ARM2-RIGHT	L	Y	-5.81
6	ARM2-LEFT	L	Y	-5.81
7	ARM1-LEFT	L	Y	-5.81
8	ARM1-RIGHT	L	Y	-5.81
9	ARM4-LEFT	L	X	.999
10	ARM4-RIGHT	L	X	1.266
11	ARM3-LEFT	L	X	1.86
12	ARM3-RIGHT	L	X	1.86
13	ARM2-LEFT	L	X	1.86
14	ARM2-RIGHT	L	X	1.86
15	ARM1-LEFT	L	X	1.86
16	ARM1-RIGHT	L	X	1.86

Joint Loads and Enforced Displacements (BLC 9 : x-driection NESC Extreme Wire Lo)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-.473
2	ARM4-RIGHT	L	Y	-.994
3	ARM3-LEFT	L	Y	-2.679
4	ARM3-RIGHT	L	Y	-2.679
5	ARM2-LEFT	L	Y	-2.679
6	ARM2-RIGHT	L	Y	-2.679
7	ARM1-RIGHT	L	Y	-2.679
8	ARM1-LEFT	L	Y	-2.679
9	ARM4-LEFT	L	X	.584
10	ARM4-RIGHT	L	X	1.125
11	ARM3-LEFT	L	X	2.346
12	ARM3-RIGHT	L	X	2.346
13	ARM2-RIGHT	L	X	2.346
14	ARM2-LEFT	L	X	2.346
15	ARM1-LEFT	L	X	2.346
16	ARM1-RIGHT	L	X	2.346
17	ARM4-LEFT	L	Z	.1
18	ARM4-RIGHT	L	Z	.1
19	ARM3-LEFT	L	Z	.1
20	ARM3-RIGHT	L	Z	.1
21	ARM2-RIGHT	L	Z	.1
22	ARM2-LEFT	L	Z	.1
23	ARM1-LEFT	L	Z	.1
24	ARM1-RIGHT	L	Z	.1

Joint Loads and Enforced Displacements (BLC 10 : z-direction NESC Heavy Wire Lo)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-1.514
2	ARM4-RIGHT	L	Y	-2.558
3	ARM3-LEFT	L	Y	-5.81
4	ARM3-RIGHT	L	Y	-5.81
5	ARM2-LEFT	L	Y	-5.81
6	ARM2-RIGHT	L	Y	-5.81
7	ARM1-LEFT	L	Y	-5.81
8	ARM1-RIGHT	L	Y	-5.81

Joint Loads and Enforced Displacements (BLC 11 : z-direction NESC Extreme Wire Lo)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	ARM4-LEFT	L	Y	-.473
2	ARM4-RIGHT	L	Y	-.994
3	ARM3-LEFT	L	Y	-2.679
4	ARM3-RIGHT	L	Y	-2.679
5	ARM2-LEFT	L	Y	-2.679
6	ARM2-RIGHT	L	Y	-2.679
7	ARM1-LEFT	L	Y	-2.679
8	ARM1-RIGHT	L	Y	-2.679
9	ARM4-LEFT	L	Z	.1
10	ARM4-RIGHT	L	Z	.1
11	ARM3-LEFT	L	Z	.1
12	ARM3-RIGHT	L	Z	.1
13	ARM2-RIGHT	L	Z	.1
14	ARM2-LEFT	L	Z	.1
15	ARM1-LEFT	L	Z	.1
16	ARM1-RIGHT	L	Z	.1

Joint Loads and Enforced Displacements (BLC 12 : x-direction NESC Heavy Mast Reac)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	X	2.087
2	BOTTOM-BRACE	L	X	-1.124
3	TOP-BRACE	L	Y	-2.747
4	BOTTOM-BRACE	L	Y	-.364
5	SPRINTBOT	L	Y	-.426
6	SPRINTBOT	L	X	.54
7	SPRINTTOP	L	Y	-.425
8	SPRINTTOP	L	X	-.195

Joint Loads and Enforced Displacements (BLC 13 : x-direction NESC Extreme Mast Re)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	X	8.514
2	BOTTOM-BRACE	L	X	-4.748
3	TOP-BRACE	L	Y	-1.242
4	BOTTOM-BRACE	L	Y	-.155
5	SPRINTBOT	L	Y	-.18
6	SPRINTBOT	L	X	1.127
7	SPRINTTOP	L	Y	-.174
8	SPRINTTOP	L	X	-.014

Joint Loads and Enforced Displacements (BLC 14 : z-direction NESC Heavy Mast Reac)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	Z	2.087
2	BOTTOM-BRACE	L	Z	-1.124
3	TOP-BRACE	L	Y	-2.747
4	BOTTOM-BRACE	L	Y	-.364
5	SPRINTBOT	L	Y	-.426
6	SPRINTBOT	L	Z	.395
7	SPRINTBOT	L	X	.219
8	SPRINTTOP	L	Y	-.426
9	SPRINTTOP	L	Z	.05
10	SPRINTTOP	L	X	-.219

Joint Loads and Enforced Displacements (BLC 15 : z-direction NESC Extreme Mast Re)

	Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
1	TOP-BRACE	L	Z	8.514
2	BOTTOM-BRACE	L	Z	-4.748
3	TOP-BRACE	L	Y	-1.242
4	BOTTOM-BRACE	L	Y	-.155
5	SPRINTBOT	L	Y	-.177
6	SPRINTBOT	L	Z	1.23
7	SPRINTBOT	L	X	.087
8	SPRINTTOP	L	Y	-.177
9	SPRINTTOP	L	Z	.103
10	SPRINTTOP	L	X	-.087

Member Distributed Loads (BLC 3 : Weight of Ice Only on Pole and A)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.044	-.043	0	0
2	M9	Y	-.004	-.006	0	0
3	M8	Y	-.004	-.006	0	0
4	M6	Y	-.004	-.007	0	0
5	M7	Y	-.004	-.007	0	0
6	M3	Y	-.004	-.007	0	0
7	M2	Y	-.004	-.007	0	0
8	M4	Y	-.004	-.008	0	0
9	M5	Y	-.004	-.008	0	0
10	M10	Y	-.043	-.042	0	0
11	M11	Y	-.042	-.041	0	0
12	M12	Y	-.041	-.04	0	0
13	M13	Y	-.04	-.039	0	0
14	M14	Y	-.039	-.038	0	0
15	M15	Y	-.038	-.037	0	0
16	M16	Y	-.037	-.037	0	0
17	M17	Y	-.037	-.036	0	0
18	M18	Y	-.036	-.035	0	0
19	M19	Y	-.035	-.034	0	0
20	M20	Y	-.034	-.033	0	0
21	M21	Y	-.033	-.032	0	0
22	M22	Y	-.032	-.031	0	0
23	M23	Y	-.031	-.03	0	0
24	M24	Y	-.03	-.029	0	0

Member Distributed Loads (BLC 3 : Weight of Ice Only on Pole and A) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
25	M25	Y	-.029	-.028	0	0
26	M26	Y	-.028	-.027	0	0
27	M27	Y	-.027	-.026	0	0
28	M28	Y	-.026	-.025	0	0
29	M29	Y	-.025	-.024	0	0
30	M30	Y	-.024	-.023	0	0
31	M31	Y	-.023	-.023	0	0
32	M32	Y	-.023	-.022	0	0
33	M33	Y	-.022	-.021	0	0
34	M34	Y	-.021	-.02	0	0
35	M35	Y	-.02	-.019	0	0
36	M36	Y	-.019	-.018	0	0
37	M37	Y	-.018	-.017	0	0
38	M38	Y	-.017	-.016	0	5
39	M39	Y	-.007	-.01	0	4.503
40	M40	Y	-.007	-.01	0	4.503
41	M41	Y	-.008	-.012	0	5.427
42	M42	Y	-.008	-.012	0	5.427
43	M43	Y	-.007	-.01	0	4.37
44	M44	Y	-.007	-.01	0	4.37
45	M45	Y	-.006	-.008	0	2.815
46	M46	Y	-.006	-.008	0	2.815

Member Distributed Loads (BLC 4 : x-direction NESC Heavy Wind on P)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.012	.012	0	0
2	M10	X	.012	.012	0	0
3	M11	X	.012	.012	0	0
4	M12	X	.012	.012	0	0
5	M13	X	.012	.012	0	0
6	M14	X	.012	.012	0	0
7	M15	X	.012	.012	0	0
8	M16	X	.012	.012	0	0
9	M17	X	.012	.012	0	0
10	M18	X	.012	.012	0	0
11	M19	X	.012	.012	0	0
12	M20	X	.012	.012	0	0
13	M21	X	.012	.012	0	0
14	M22	X	.012	.012	0	0
15	M23	X	.012	.012	0	0
16	M24	X	.012	.012	0	0
17	M25	X	.012	.012	0	0
18	M26	X	.012	.012	0	0
19	M27	X	.012	.012	0	0
20	M28	X	.012	.012	0	0
21	M29	X	.012	.012	0	0
22	M30	X	.012	.012	0	0
23	M31	X	.012	.012	0	0
24	M32	X	.012	.012	0	0
25	M33	X	.012	.012	0	0
26	M34	X	.012	.012	0	0

Member Distributed Loads (BLC 4 : x-direction NESC Heavy Wind on P) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
27	M35	X	.012	.012	0	0
28	M36	X	.012	.012	0	0
29	M37	X	.012	.012	0	0
30	M38	X	.012	.012	0	5

Member Distributed Loads (BLC 5 : x-direction NESC Extreme Wind on)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.104	.104	0	0
2	M10	X	.104	.104	0	0
3	M11	X	.104	.104	0	0
4	M12	X	.104	.104	0	0
5	M13	X	.104	.104	0	0
6	M14	X	.104	.104	0	0
7	M15	X	.104	.104	0	0
8	M16	X	.104	.104	0	0
9	M17	X	.104	.104	0	0
10	M18	X	.104	.104	0	0
11	M19	X	.104	.104	0	0
12	M20	X	.104	.104	0	0
13	M21	X	.104	.104	0	0
14	M22	X	.104	.104	0	0
15	M23	X	.104	.104	0	0
16	M24	X	.104	.104	0	0
17	M25	X	.104	.104	0	0
18	M26	X	.104	.104	0	0
19	M27	X	.104	.104	0	0
20	M28	X	.104	.104	0	0
21	M29	X	.104	.104	0	0
22	M30	X	.104	.104	0	0
23	M31	X	.104	.104	0	0
24	M32	X	.104	.104	0	0
25	M33	X	.104	.104	0	0
26	M34	X	.104	.104	0	0
27	M35	X	.104	.104	0	0
28	M36	X	.104	.104	0	0
29	M37	X	.104	.104	0	0
30	M38	X	.104	.104	0	5

Member Distributed Loads (BLC 6 : z-direction NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.028	0	0
2	M8	Z	.003	.005	0	0
3	M9	Z	.003	.005	0	0
4	M7	Z	.003	.006	0	0
5	M6	Z	.003	.006	0	0
6	M3	Z	.003	.006	0	0
7	M2	Z	.003	.006	0	0
8	M5	Z	.003	.006	0	0
9	M4	Z	.003	.006	0	0
10	M10	Z	.028	.028	0	0
11	M11	Z	.028	.027	0	0

Member Distributed Loads (BLC 6 : z-direction NESC Heavy Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
12	M12	Z	.027	.026	0	0
13	M13	Z	.026	.025	0	0
14	M14	Z	.025	.025	0	0
15	M15	Z	.025	.024	0	0
16	M16	Z	.024	.023	0	0
17	M17	Z	.023	.022	0	0
18	M18	Z	.022	.022	0	0
19	M19	Z	.022	.021	0	0
20	M20	Z	.021	.02	0	0
21	M21	Z	.02	.019	0	0
22	M22	Z	.019	.019	0	0
23	M23	Z	.019	.018	0	0
24	M24	Z	.018	.017	0	0
25	M25	Z	.017	.017	0	0
26	M26	Z	.017	.016	0	0
27	M27	Z	.016	.015	0	0
28	M28	Z	.015	.014	0	0
29	M29	Z	.014	.014	0	0
30	M30	Z	.014	.013	0	0
31	M31	Z	.013	.012	0	0
32	M32	Z	.012	.011	0	0
33	M33	Z	.011	.011	0	0
34	M34	Z	.011	.01	0	0
35	M35	Z	.01	.009	0	0
36	M36	Z	.009	.008	0	0
37	M37	Z	.008	.008	0	0
38	M38	Z	.008	.007	0	5
39	M39	Z	.006	.009	0	4.503
40	M40	Z	.006	.009	0	4.503
41	M41	Z	.006	.01	0	5.427
42	M42	Z	.006	.01	0	5.427
43	M43	Z	.006	.009	0	4.37
44	M44	Z	.006	.009	0	4.37
45	M45	Z	.005	.007	0	2.815
46	M46	Z	.005	.007	0	2.815

Member Distributed Loads (BLC 7 : z-direction NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.26	.253	0	0
2	M8	Z	.019	.038	0	0
3	M9	Z	.019	.038	0	0
4	M7	Z	.019	.045	0	0
5	M6	Z	.019	.045	0	0
6	M2	Z	.019	.045	0	0
7	M3	Z	.019	.045	0	0
8	M5	Z	.019	.053	0	0
9	M4	Z	.019	.053	0	0
10	M10	Z	.253	.247	0	0
11	M11	Z	.247	.24	0	0
12	M12	Z	.24	.233	0	0
13	M13	Z	.233	.226	0	0

Member Distributed Loads (BLC 7 : z-direction NESC Extreme Wind) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
14	M14	Z	.226	.22	0	0
15	M15	Z	.22	.213	0	0
16	M16	Z	.213	.206	0	0
17	M17	Z	.206	.199	0	0
18	M18	Z	.199	.193	0	0
19	M19	Z	.193	.186	0	0
20	M20	Z	.186	.179	0	0
21	M21	Z	.179	.172	0	0
22	M22	Z	.172	.166	0	0
23	M23	Z	.166	.159	0	0
24	M24	Z	.159	.152	0	0
25	M25	Z	.152	.146	0	0
26	M26	Z	.146	.139	0	0
27	M27	Z	.139	.132	0	0
28	M28	Z	.132	.125	0	0
29	M29	Z	.125	.119	0	0
30	M30	Z	.119	.112	0	0
31	M31	Z	.112	.105	0	0
32	M32	Z	.105	.098	0	0
33	M33	Z	.098	.092	0	0
34	M34	Z	.092	.085	0	0
35	M35	Z	.085	.078	0	0
36	M36	Z	.078	.071	0	0
37	M37	Z	.071	.065	0	0
38	M38	Z	.065	.058	0	5
39	M39	Z	.045	.072	0	4.503
40	M40	Z	.045	.072	0	4.503
41	M41	Z	.053	.087	0	5.427
42	M42	Z	.053	.087	0	5.427
43	M43	Z	.045	.072	0	4.37
44	M44	Z	.045	.072	0	4.37
45	M45	Z	.038	.058	0	2.815
46	M46	Z	.038	.058	0	2.815

Member Distributed Loads (BLC 16 : Weight of Coax Cables)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.031	-.031	0	0
2	M29	Y	-.012	-.012	0	0
3	M10	Y	-.031	-.031	0	0
4	M11	Y	-.031	-.031	0	0
5	M12	Y	-.031	-.031	0	0
6	M13	Y	-.031	-.031	0	0
7	M14	Y	-.031	-.031	0	0
8	M15	Y	-.031	-.031	0	0
9	M16	Y	-.031	-.031	0	0
10	M17	Y	-.031	-.031	0	0
11	M18	Y	-.031	-.031	0	0
12	M19	Y	-.031	-.031	0	0
13	M20	Y	-.031	-.031	0	0
14	M21	Y	-.031	-.031	0	0
15	M22	Y	-.031	-.031	0	0

Member Distributed Loads (BLC 16 : Weight of Coax Cables) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
16	M23	Y	-.031	-.031	0	0
17	M24	Y	-.031	-.031	0	0
18	M25	Y	-.031	-.031	0	0
19	M26	Y	-.031	-.031	0	0
20	M27	Y	-.031	-.031	0	0
21	M28	Y	-.031	-.031	0	5
22	M30	Y	-.012	-.012	0	0
23	M31	Y	-.012	-.012	0	0
24	M32	Y	-.012	-.012	0	0
25	M33	Y	-.012	-.012	0	0
26	M34	Y	-.012	-.012	0	0
27	M35	Y	-.012	-.012	0	0
28	M36	Y	-.012	-.012	0	5

Member Distributed Loads (BLC 17 : Weight of Ice on Coax Cables)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.045	-.045	0	0
2	M29	Y	-.018	-.018	0	0
3	M10	Y	-.045	-.045	0	0
4	M11	Y	-.045	-.045	0	0
5	M12	Y	-.045	-.045	0	0
6	M13	Y	-.045	-.045	0	0
7	M14	Y	-.045	-.045	0	0
8	M15	Y	-.045	-.045	0	0
9	M16	Y	-.045	-.045	0	0
10	M17	Y	-.045	-.045	0	0
11	M18	Y	-.045	-.045	0	0
12	M19	Y	-.045	-.045	0	0
13	M20	Y	-.045	-.045	0	0
14	M21	Y	-.045	-.045	0	0
15	M22	Y	-.045	-.045	0	0
16	M23	Y	-.045	-.045	0	0
17	M24	Y	-.045	-.045	0	0
18	M25	Y	-.045	-.045	0	0
19	M26	Y	-.045	-.045	0	0
20	M27	Y	-.045	-.045	0	0
21	M28	Y	-.045	-.045	0	5
22	M30	Y	-.018	-.018	0	0
23	M31	Y	-.018	-.018	0	0
24	M32	Y	-.018	-.018	0	0
25	M33	Y	-.018	-.018	0	0
26	M34	Y	-.018	-.018	0	0
27	M35	Y	-.018	-.018	0	0
28	M36	Y	-.018	-.018	0	5

Member Distributed Loads (BLC 18 : x-direction NESC Heavy Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.004	.004	0	0
2	M29	X	.003	.003	0	0
3	M10	X	.004	.004	0	0
4	M11	X	.004	.004	0	0

Member Distributed Loads (BLC 18 : x-direction NESC Heavy Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
5	M12	X	.004	.004	0	0
6	M13	X	.004	.004	0	0
7	M14	X	.004	.004	0	0
8	M15	X	.004	.004	0	0
9	M16	X	.004	.004	0	0
10	M17	X	.004	.004	0	0
11	M18	X	.004	.004	0	0
12	M19	X	.004	.004	0	0
13	M20	X	.004	.004	0	0
14	M21	X	.004	.004	0	0
15	M22	X	.004	.004	0	0
16	M23	X	.004	.004	0	0
17	M24	X	.004	.004	0	0
18	M25	X	.004	.004	0	0
19	M26	X	.004	.004	0	0
20	M27	X	.004	.004	0	0
21	M28	X	.004	.004	0	5
22	M30	X	.003	.003	0	0
23	M31	X	.003	.003	0	0
24	M32	X	.003	.003	0	0
25	M33	X	.003	.003	0	0
26	M34	X	.003	.003	0	0
27	M35	X	.003	.003	0	0
28	M36	X	.003	.003	0	5

Member Distributed Loads (BLC 19 : x-direction NESC Extreme Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.029	.029	0	0
2	M29	X	.019	.019	0	0
3	M10	X	.029	.029	0	0
4	M11	X	.029	.029	0	0
5	M12	X	.029	.029	0	0
6	M13	X	.029	.029	0	0
7	M14	X	.029	.029	0	0
8	M15	X	.029	.029	0	0
9	M16	X	.029	.029	0	0
10	M17	X	.029	.029	0	0
11	M18	X	.029	.029	0	0
12	M19	X	.029	.029	0	0
13	M20	X	.029	.029	0	0
14	M21	X	.029	.029	0	0
15	M22	X	.029	.029	0	0
16	M23	X	.029	.029	0	0
17	M24	X	.029	.029	0	0
18	M25	X	.029	.029	0	0
19	M26	X	.029	.029	0	0
20	M27	X	.029	.029	0	0
21	M28	X	.029	.029	0	5
22	M30	X	.019	.019	0	0
23	M31	X	.019	.019	0	0
24	M32	X	.019	.019	0	0

Member Distributed Loads (BLC 19 : x-direction NESC Extreme Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
25	M33	X	.019	.019	0	0
26	M34	X	.019	.019	0	0
27	M35	X	.019	.019	0	0
28	M36	X	.019	.019	0	5

Member Distributed Loads (BLC 20 : z-direction NESC Heavy Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.004	.004	0	0
2	M29	Z	.003	.003	0	0
3	M10	Z	.004	.004	0	0
4	M11	Z	.004	.004	0	0
5	M12	Z	.004	.004	0	0
6	M13	Z	.004	.004	0	0
7	M14	Z	.004	.004	0	0
8	M15	Z	.004	.004	0	0
9	M16	Z	.004	.004	0	0
10	M17	Z	.004	.004	0	0
11	M18	Z	.004	.004	0	0
12	M19	Z	.004	.004	0	0
13	M20	Z	.004	.004	0	0
14	M21	Z	.004	.004	0	0
15	M22	Z	.004	.004	0	0
16	M23	Z	.004	.004	0	0
17	M24	Z	.004	.004	0	0
18	M25	Z	.004	.004	0	0
19	M26	Z	.004	.004	0	0
20	M27	Z	.004	.004	0	0
21	M28	Z	.004	.004	0	5
22	M30	Z	.003	.003	0	0
23	M31	Z	.003	.003	0	0
24	M32	Z	.003	.003	0	0
25	M33	Z	.003	.003	0	0
26	M34	Z	.003	.003	0	0
27	M35	Z	.003	.003	0	0
28	M36	Z	.003	.003	0	5

Member Distributed Loads (BLC 21 : z-direction NESC Extreme Coax)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.029	0	0
2	M29	Z	.019	.019	0	0
3	M10	Z	.029	.029	0	0
4	M11	Z	.029	.029	0	0
5	M12	Z	.029	.029	0	0
6	M13	Z	.029	.029	0	0
7	M14	Z	.029	.029	0	0
8	M15	Z	.029	.029	0	0
9	M16	Z	.029	.029	0	0
10	M17	Z	.029	.029	0	0
11	M18	Z	.029	.029	0	0
12	M19	Z	.029	.029	0	0
13	M20	Z	.029	.029	0	0

Member Distributed Loads (BLC 21 : z-direction NESC Extreme Coax) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
14	M21	Z	.029	.029	0	0
15	M22	Z	.029	.029	0	0
16	M23	Z	.029	.029	0	0
17	M24	Z	.029	.029	0	0
18	M25	Z	.029	.029	0	0
19	M26	Z	.029	.029	0	0
20	M27	Z	.029	.029	0	0
21	M28	Z	.029	.029	0	5
22	M30	Z	.019	.019	0	0
23	M31	Z	.019	.019	0	0
24	M32	Z	.019	.019	0	0
25	M33	Z	.019	.019	0	0
26	M34	Z	.019	.019	0	0
27	M35	Z	.019	.019	0	0
28	M36	Z	.019	.019	0	5

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight Pole and Arms	None								
3	Weight of Ice Only on Pole and A	None						46		
4	x-direction NESC Heavy Wind on P	None						30		
5	x-direction NESC Extreme Wind on	None						30		
6	z-direction NESC Heavy Wind	None						46		
7	z-direction NESC Extreme Wind	None						46		
8	x-direction NESC Heavy Wire Load	None				16				
9	x-driection NESC Extreme Wire Lo	None				24				
10	z-direction NESC Heavy Wire Lo	None				8				
11	z-direction NESC Extreme Wire Lo	None				16				
12	x-direction NESC Heavy Mast Reac	None				8				
13	x-direction NESC Extreme Mast Re	None				8				
14	z-direction NESC Heavy Mast Reac	None				10				
15	z-direction NESC Extreme Mast Re	None				10				
16	Weight of Coax Cables	None						28		
17	Weight of Ice on Coax Cables	None						28		
18	x-direction NESC Heavy Coax	None						28		
19	x-direction NESC Extreme Coax	None						28		
20	z-direction NESC Heavy Coax	None						28		
21	z-direction NESC Extreme Coax	None						28		

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	x-direction NESC Heavy...	Yes	Y		1	1.5	3	1.5	4	2.5	8	1	12	1	16	1.5	17	1.5	18	2.5				
2	x-direction NESC Extre...	Yes	Y		1	1	5	1	9	1	13	1	16	1	19	1								
3	z-direction NESC Heavy...	Yes	Y		1	1.5	3	1.5	6	2.5	10	1	14	1	16	1.5	17	1.5	20	2.5				
4	z-direction NESC Extre...	Yes	Y		1	1	7	1	11	1	15	1	16	1	21	1								

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTTOM-POLE	max	0	4	105.681	3	0	1	0	1	.018	4	4510.81	2
2		min	-39.924	2	50.94	2	-36.608	4	-3382.573	4	-.212	2	3.143	4
3	Totals:	max	0	4	105.681	3	0	1						
4		min	-39.924	2	50.94	2	-36.608	4						

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTTOM-POLE	-20.533	105.68	0	0	0	2837.344
2	1	Totals:	-20.533	105.68	0			
3	1	COG (ft):	X: .055	Y: 94.052	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	1	M21	1	1.527	0	-.898	0	0	39.913	-39.913
2			2	1.517	0	-.895	0	0	39.251	-39.251
3			3	1.506	0	-.893	0	0	38.591	-38.591
4			4	1.496	0	-.891	0	0	37.932	-37.932
5			5	1.485	0	-.889	0	0	37.276	-37.276
6	1	M22	1	1.511	0	-.933	0	0	39.536	-39.536
7			2	1.501	0	-.93	0	0	38.834	-38.834
8			3	1.49	0	-.928	0	0	38.133	-38.133
9			4	1.48	0	-.926	0	0	37.434	-37.434
10			5	1.469	0	-.924	0	0	36.736	-36.736
11	1	M23	1	1.496	0	-.97	0	0	39.068	-39.068
12			2	1.485	0	-.968	0	0	38.32	-38.32
13			3	1.474	0	-.965	0	0	37.574	-37.574
14			4	1.464	0	-.963	0	0	36.83	-36.83
15			5	1.453	0	-.961	0	0	36.087	-36.087
16	1	M24	1	1.48	0	-1.01	0	0	38.49	-38.49
17			2	1.469	0	-1.007	0	0	37.692	-37.692
18			3	1.459	0	-1.005	0	0	36.896	-36.896
19			4	1.448	0	-1.003	0	0	36.102	-36.102
20			5	1.437	0	-1	0	0	35.31	-35.31
21	1	M15	1	1.482	0	-.609	0	0	38.314	-38.314
22			2	1.472	0	-.608	0	0	37.863	-37.863
23			3	1.462	0	-.606	0	0	37.413	-37.413
24			4	1.452	0	-.605	0	0	36.964	-36.964
25			5	1.442	0	-.603	0	0	36.516	-36.516
26	1	M16	1	1.467	0	-.629	0	0	38.305	-38.305
27			2	1.457	0	-.628	0	0	37.831	-37.831
28			3	1.447	0	-.626	0	0	37.358	-37.358
29			4	1.437	0	-.625	0	0	36.886	-36.886
30			5	1.427	0	-.623	0	0	36.415	-36.415
31	1	M17	1	1.452	0	-.65	0	0	38.26	-38.26
32			2	1.442	0	-.649	0	0	37.761	-37.761
33			3	1.432	0	-.647	0	0	37.263	-37.263
34			4	1.422	0	-.646	0	0	36.766	-36.766
35			5	1.412	0	-.644	0	0	36.27	-36.27
36	1	M18	1	1.438	0	-.673	0	0	38.175	-38.175
37			2	1.428	0	-.671	0	0	37.649	-37.649
38			3	1.418	0	-.67	0	0	37.123	-37.123
39			4	1.408	0	-.668	0	0	36.599	-36.599
40			5	1.398	0	-.667	0	0	36.077	-36.077
41	1	M19	1	1.423	0	-.697	0	0	38.044	-38.044
42			2	1.413	0	-.695	0	0	37.488	-37.488
43			3	1.403	0	-.693	0	0	36.933	-36.933

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	1.393	0	-.692	0	0	36.38	-36.38
45			5	1.383	0	-.69	0	0	35.828	-35.828
46	1	M27	1	1.565	0	-1.438	0	0	38.012	-38.012
47			2	1.554	0	-1.435	0	0	36.966	-36.966
48			3	1.542	0	-1.432	0	0	35.922	-35.922
49			4	1.531	0	-1.428	0	0	34.88	-34.88
50			5	1.52	0	-1.425	0	0	33.841	-33.841
51	1	M20	1	1.409	0	-.722	0	0	37.858	-37.858
52			2	1.399	0	-.72	0	0	37.27	-37.27
53			3	1.389	0	-.718	0	0	36.683	-36.683
54			4	1.379	0	-.717	0	0	36.098	-36.098
55			5	1.368	0	-.715	0	0	35.514	-35.514
56	1	M25	1	1.464	0	-1.053	0	0	37.782	-37.782
57			2	1.454	0	-1.05	0	0	36.929	-36.929
58			3	1.443	0	-1.048	0	0	36.077	-36.077
59			4	1.432	0	-1.045	0	0	35.227	-35.227
60			5	1.422	0	-1.043	0	0	34.379	-34.379
61	1	M26	1	1.449	0	-1.099	0	0	36.919	-36.919
62			2	1.438	0	-1.096	0	0	36.003	-36.003
63			3	1.427	0	-1.094	0	0	35.088	-35.088
64			4	1.417	0	-1.091	0	0	34.176	-34.176
65			5	1.406	0	-1.088	0	0	33.267	-33.267
66	1	M28	1	1.546	0	-1.507	0	0	36.619	-36.619
67			2	1.535	0	-1.504	0	0	35.488	-35.488
68			3	1.524	0	-1.5	0	0	34.359	-34.359
69			4	1.513	0	-1.497	0	0	33.233	-33.233
70			5	1.502	0	-1.493	0	0	32.109	-32.109
71	1	M29	1	1.528	0	-1.577	0	0	34.924	-34.924
72			2	1.508	0	-1.535	0	0	33.704	-33.704
73			3	1.499	0	-1.532	0	0	32.512	-32.512
74			4	1.479	0	-1.546	0	0	31.314	-31.314
75			5	1.47	0	-1.542	0	0	30.113	-30.113
76	1	M14	1	1.258	0	-.443	0	0	33.962	-33.962
77			2	1.249	0	-.442	0	0	33.581	-33.581
78			3	1.239	0	-.441	0	0	33.2	-33.2
79			4	1.23	0	-.439	0	0	32.821	-32.821
80			5	1.221	0	-.438	0	0	32.442	-32.442
81	1	M13	1	1.272	0	-.429	0	0	33.855	-33.855
82			2	1.263	0	-.428	0	0	33.491	-33.491
83			3	1.253	0	-.427	0	0	33.129	-33.129
84			4	1.244	0	-.426	0	0	32.767	-32.767
85			5	1.235	0	-.425	0	0	32.406	-32.406
86	1	M12	1	1.286	0	-.417	0	0	33.757	-33.757
87			2	1.277	0	-.416	0	0	33.41	-33.41
88			3	1.267	0	-.415	0	0	33.064	-33.064
89			4	1.258	0	-.414	0	0	32.719	-32.719
90			5	1.249	0	-.413	0	0	32.374	-32.374
91	1	M11	1	1.3	0	-.405	0	0	33.629	-33.629
92			2	1.291	0	-.404	0	0	33.297	-33.297
93			3	1.282	0	-.403	0	0	32.967	-32.967
94			4	1.272	0	-.402	0	0	32.637	-32.637
95			5	1.263	0	-.401	0	0	32.308	-32.308

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	1	M10	1	1.314	0	-.394	0	0	33.486	-33.486
97			2	1.305	0	-.393	0	0	33.17	-33.17
98			3	1.296	0	-.392	0	0	32.853	-32.853
99			4	1.286	0	-.391	0	0	32.538	-32.538
100			5	1.277	0	-.39	0	0	32.224	-32.224
101	1	M1	1	1.328	0	-.383	0	0	33.331	-33.331
102			2	1.319	0	-.382	0	0	33.028	-33.028
103			3	1.31	0	-.381	0	0	32.726	-32.726
104			4	1.301	0	-.38	0	0	32.424	-32.424
105			5	1.292	0	-.379	0	0	32.123	-32.123
106	1	M30	1	1.496	0	-1.635	0	0	32.945	-32.945
107			2	1.487	0	-1.632	0	0	31.627	-31.627
108			3	1.478	0	-1.628	0	0	30.311	-30.311
109			4	1.469	0	-1.624	0	0	28.999	-28.999
110			5	1.46	0	-1.62	0	0	27.689	-27.689
111	1	M31	1	1.487	0	-1.726	0	0	30.5	-30.5
112			2	1.478	0	-1.722	0	0	29.05	-29.05
113			3	1.469	0	-1.718	0	0	27.603	-27.603
114			4	1.46	0	-1.714	0	0	26.159	-26.159
115			5	1.451	0	-1.71	0	0	24.719	-24.719
116	1	M32	1	1.477	0	-1.824	0	0	27.442	-27.442
117			2	1.468	0	-1.82	0	0	25.838	-25.838
118			3	1.459	0	-1.816	0	0	24.238	-24.238
119			4	1.105	0	-1.38	0	0	22.268	-22.268
120			5	1.096	0	-1.376	0	0	21.055	-21.055
121	1	M33	1	1.204	0	-1.953	0	0	24.944	-24.944
122			2	1.195	0	-1.947	0	0	23.508	-23.508
123			3	1.185	0	-1.942	0	0	22.075	-22.075
124			4	1.176	0	-1.936	0	0	20.647	-20.647
125			5	1.167	0	-1.93	0	0	19.223	-19.223
126	1	M34	1	1.185	0	-2.068	0	0	21.764	-21.764
127			2	1.176	0	-2.062	0	0	20.153	-20.153
128			3	1.167	0	-2.055	0	0	18.546	-18.546
129			4	1.157	0	-2.049	0	0	16.945	-16.945
130			5	1.148	0	-2.043	0	0	15.349	-15.349
131	1	M35	1	1.166	0	-2.195	0	0	17.61	-17.61
132			2	.751	0	-1.453	0	0	15.441	-15.441
133			3	.741	0	-1.447	0	0	14.232	-14.232
134			4	.732	0	-1.44	0	0	13.029	-13.029
135			5	.723	0	-1.433	0	0	11.831	-11.831
136	1	M36	1	.734	0	-1.539	0	0	13.798	-13.798
137			2	.725	0	-1.532	0	0	12.415	-12.415
138			3	.716	0	-1.524	0	0	11.039	-11.039
139			4	.707	0	-1.517	0	0	9.67	-9.67
140			5	.698	0	-1.51	0	0	8.307	-8.307
141	1	M37	1	.709	0	-1.634	0	0	9.886	-9.886
142			2	.69	0	-1.809	0	0	8.242	-8.242
143			3	.683	0	-1.802	0	0	6.462	-6.462
144			4	.271	0	-.926	0	0	4.547	-4.547
145			5	.264	0	-.92	0	0	3.637	-3.637
146	1	M38	1	.268	0	-.998	0	0	4.439	-4.439
147			2	.261	0	-.991	0	0	3.346	-3.346

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.254	0	-.984	0	0	2.261	-2.261
149			4	.157	0	-.527	0	0	1.48	-1.48
150			5	0	0	-.002	0	0	0	0
151	1	M2	1	.35	-1.088	0	0	0	0	0
152			2	.351	-1.099	0	-3.166	3.166	0	0
153			3	.352	-1.11	0	-6.364	6.364	0	0
154			4	.354	-1.122	0	-9.596	9.596	0	0
155			5	.355	-1.134	0	-12.862	12.862	0	0
156	1	M3	1	-.108	-1.254	0	0	0	0	0
157			2	-.107	-1.265	0	-3.647	3.647	0	0
158			3	-.106	-1.276	0	-7.326	7.326	0	0
159			4	-.105	-1.288	0	-11.038	11.038	0	0
160			5	-.104	-1.3	0	-14.785	14.785	0	0
161	1	M4	1	.286	-.951	0	0	0	0	0
162			2	.287	-.964	0	-2.88	2.88	0	0
163			3	.288	-.978	0	-5.8	5.8	0	0
164			4	.289	-.992	0	-8.761	8.761	0	0
165			5	.291	-1.006	0	-11.765	11.765	0	0
166	1	M5	1	-.112	-1.073	0	0	0	0	0
167			2	-.111	-1.086	0	-3.246	3.246	0	0
168			3	-.11	-1.1	0	-6.533	6.533	0	0
169			4	-.109	-1.114	0	-9.86	9.86	0	0
170			5	-.108	-1.128	0	-13.231	13.231	0	0
171	1	M6	1	.354	-1.074	0	0	0	0	0
172			2	.355	-1.085	0	-3.034	3.034	0	0
173			3	.356	-1.096	0	-6.098	6.098	0	0
174			4	.357	-1.107	0	-9.194	9.194	0	0
175			5	.358	-1.119	0	-12.322	12.322	0	0
176	1	M7	1	-.104	-1.253	0	0	0	0	0
177			2	-.103	-1.263	0	-3.535	3.535	0	0
178			3	-.102	-1.274	0	-7.101	7.101	0	0
179			4	-.101	-1.286	0	-10.698	10.698	0	0
180			5	-.1	-1.297	0	-14.327	14.327	0	0
181	1	M8	1	-.117	-.664	0	0	0	0	0
182			2	-.116	-.671	0	-1.439	1.439	0	0
183			3	-.116	-.678	0	-2.894	2.894	0	0
184			4	-.115	-.685	0	-4.364	4.364	0	0
185			5	-.114	-.693	0	-5.85	5.85	0	0
186	1	M9	1	.185	-.293	0	0	0	0	0
187			2	.186	-.3	0	-.64	.64	0	0
188			3	.187	-.308	0	-1.296	1.296	0	0
189			4	.188	-.315	0	-1.968	1.968	0	0
190			5	.189	-.322	0	-2.655	2.655	0	0
191	1	M39	1	.232	-.716	0	-5.357	5.357	0	0
192			2	.233	-.727	0	-6.732	6.732	0	0
193			3	.234	-.738	0	-8.128	8.128	0	0
194			4	.235	-.75	0	-9.545	9.545	0	0
195			5	.236	-.761	0	-10.983	10.983	0	0
196	1	M40	1	-.068	-.824	0	-6.158	6.158	0	0
197			2	-.067	-.835	0	-7.738	7.738	0	0
198			3	-.065	-.846	0	-9.339	9.339	0	0
199			4	-.064	-.857	0	-10.961	10.961	0	0

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	-.063	-.869	0	-12.604	12.604	0	0
201	1	M41	1	.182	-.614	0	-4.532	4.532	0	0
202			2	.183	-.627	0	-5.707	5.707	0	0
203			3	.184	-.64	0	-6.907	6.907	0	0
204			4	.186	-.654	0	-8.133	8.133	0	0
205			5	.187	-.668	0	-9.385	9.385	0	0
206	1	M42	1	-.068	-.69	0	-5.096	5.096	0	0
207			2	-.066	-.704	0	-6.417	6.417	0	0
208			3	-.065	-.717	0	-7.763	7.763	0	0
209			4	-.064	-.73	0	-9.134	9.134	0	0
210			5	-.063	-.744	0	-10.531	10.531	0	0
211	1	M43	1	.234	-.707	0	-5.132	5.132	0	0
212			2	.235	-.718	0	-6.449	6.449	0	0
213			3	.236	-.728	0	-7.785	7.785	0	0
214			4	.237	-.739	0	-9.141	9.141	0	0
215			5	.239	-.75	0	-10.517	10.517	0	0
216	1	M44	1	-.065	-.823	0	-5.968	5.968	0	0
217			2	-.064	-.833	0	-7.497	7.497	0	0
218			3	-.063	-.844	0	-9.047	9.047	0	0
219			4	-.062	-.855	0	-10.617	10.617	0	0
220			5	-.061	-.866	0	-12.206	12.206	0	0
221	1	M45	1	-.079	-.462	0	-2.728	2.728	0	0
222			2	-.078	-.469	0	-3.431	3.431	0	0
223			3	-.077	-.476	0	-4.145	4.145	0	0
224			4	-.077	-.483	0	-4.868	4.868	0	0
225			5	-.076	-.49	0	-5.603	5.603	0	0
226	1	M46	1	.131	-.214	0	-1.238	1.238	0	0
227			2	.131	-.221	0	-1.567	1.567	0	0
228			3	.132	-.228	0	-1.906	1.906	0	0
229			4	.133	-.235	0	-2.256	2.256	0	0
230			5	.134	-.242	0	-2.616	2.616	0	0

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTTOM-POLE	-39.924	50.94	-.8	-130.884	-.212	4510.81
2	2	Totals:	-39.924	50.94	-.8			
3	2	COG (ft):	X: .057	Y: 92.464	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	2	M15	1	.705	-.061	-1.08	2.478	-2.478	58.002	-58.002
2			2	.7	-.061	-1.076	2.451	-2.451	57.202	-57.202
3			3	.695	-.061	-1.071	2.425	-2.425	56.406	-56.406
4			4	.691	-.061	-1.066	2.398	-2.398	55.614	-55.614
5			5	.686	-.061	-1.061	2.371	-2.371	54.825	-54.825
6	2	M16	1	.698	-.062	-1.099	2.421	-2.421	57.512	-57.512
7			2	.693	-.062	-1.094	2.394	-2.394	56.684	-56.684
8			3	.688	-.062	-1.089	2.366	-2.366	55.86	-55.86
9			4	.683	-.062	-1.084	2.338	-2.338	55.04	-55.04
10			5	.678	-.062	-1.079	2.31	-2.31	54.224	-54.224
11	2	M21	1	.722	-.066	-1.449	2.316	-2.316	57.511	-57.511
12			2	.717	-.066	-1.441	2.279	-2.279	56.444	-56.444
13			3	.712	-.066	-1.434	2.242	-2.242	55.383	-55.383
14			4	.707	-.066	-1.427	2.205	-2.205	54.327	-54.327
15			5	.702	-.066	-1.42	2.168	-2.168	53.277	-53.277
16	2	M17	1	.69	-.063	-1.119	2.36	-2.36	56.972	-56.972
17			2	.685	-.063	-1.113	2.331	-2.331	56.114	-56.114
18			3	.68	-.063	-1.108	2.302	-2.302	55.26	-55.26
19			4	.675	-.063	-1.103	2.274	-2.274	54.411	-54.411
20			5	.67	-.063	-1.098	2.245	-2.245	53.565	-53.565
21	2	M22	1	.715	-.066	-1.48	2.217	-2.217	56.508	-56.508
22			2	.71	-.066	-1.473	2.179	-2.179	55.394	-55.394
23			3	.705	-.066	-1.466	2.141	-2.141	54.286	-54.286
24			4	.7	-.066	-1.458	2.103	-2.103	53.183	-53.183
25			5	.694	-.066	-1.451	2.064	-2.064	52.086	-52.086
26	2	M18	1	.682	-.063	-1.139	2.295	-2.295	56.379	-56.379
27			2	.677	-.063	-1.134	2.265	-2.265	55.488	-55.488
28			3	.672	-.063	-1.128	2.235	-2.235	54.602	-54.602
29			4	.668	-.063	-1.123	2.205	-2.205	53.72	-53.72
30			5	.663	-.063	-1.118	2.175	-2.175	52.843	-52.843
31	2	M19	1	.675	-.064	-1.161	2.224	-2.224	55.724	-55.724
32			2	.67	-.064	-1.155	2.193	-2.193	54.799	-54.799
33			3	.665	-.064	-1.15	2.163	-2.163	53.878	-53.878
34			4	.66	-.064	-1.144	2.132	-2.132	52.961	-52.961
35			5	.655	-.064	-1.139	2.101	-2.101	52.049	-52.049
36	2	M23	1	.707	-.067	-1.514	2.112	-2.112	55.392	-55.392
37			2	.702	-.067	-1.507	2.073	-2.073	54.226	-54.226
38			3	.697	-.067	-1.499	2.034	-2.034	53.066	-53.066
39			4	.692	-.067	-1.491	1.994	-1.994	51.912	-51.912
40			5	.687	-.067	-1.484	1.955	-1.955	50.763	-50.763
41	2	M20	1	.667	-.065	-1.184	2.149	-2.149	54.998	-54.998
42			2	.662	-.065	-1.178	2.117	-2.117	54.035	-54.035
43			3	.657	-.065	-1.172	2.085	-2.085	53.076	-53.076

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	.652	-.065	-1.167	2.053	-2.053	52.122	-52.122
45			5	.647	-.065	-1.161	2.021	-2.021	51.173	-51.173
46	2	M24	1	.699	-.067	-1.551	2.001	-2.001	54.144	-54.144
47			2	.694	-.067	-1.543	1.961	-1.961	52.92	-52.92
48			3	.689	-.067	-1.535	1.92	-1.92	51.703	-51.703
49			4	.684	-.067	-1.527	1.879	-1.879	50.491	-50.491
50			5	.679	-.067	-1.519	1.839	-1.839	49.287	-49.287
51	2	M1	1	.64	-.053	-.741	2.207	-2.207	52.99	-52.99
52			2	.636	-.053	-.738	2.19	-2.19	52.403	-52.403
53			3	.631	-.053	-.735	2.173	-2.173	51.819	-51.819
54			4	.626	-.053	-.732	2.156	-2.156	51.238	-51.238
55			5	.621	-.053	-.729	2.139	-2.139	50.658	-50.658
56	2	M10	1	.632	-.055	-.752	2.182	-2.182	52.808	-52.808
57			2	.627	-.055	-.748	2.164	-2.164	52.204	-52.204
58			3	.623	-.055	-.745	2.147	-2.147	51.602	-51.602
59			4	.618	-.055	-.742	2.129	-2.129	51.003	-51.003
60			5	.613	-.055	-.739	2.111	-2.111	50.407	-50.407
61	2	M25	1	.692	-.068	-1.59	1.884	-1.884	52.738	-52.738
62			2	.687	-.068	-1.581	1.842	-1.842	51.451	-51.451
63			3	.681	-.068	-1.573	1.8	-1.8	50.17	-50.17
64			4	.676	-.068	-1.565	1.758	-1.758	48.896	-48.896
65			5	.671	-.068	-1.557	1.716	-1.716	47.628	-47.628
66	2	M11	1	.624	-.056	-.762	2.155	-2.155	52.605	-52.605
67			2	.619	-.056	-.759	2.136	-2.136	51.982	-51.982
68			3	.615	-.056	-.756	2.117	-2.117	51.362	-51.362
69			4	.61	-.056	-.753	2.099	-2.099	50.744	-50.744
70			5	.605	-.056	-.749	2.08	-2.08	50.129	-50.129
71	2	M12	1	.616	-.057	-.773	2.124	-2.124	52.377	-52.377
72			2	.611	-.057	-.77	2.105	-2.105	51.734	-51.734
73			3	.607	-.057	-.767	2.086	-2.086	51.094	-51.094
74			4	.602	-.057	-.763	2.066	-2.066	50.457	-50.457
75			5	.597	-.057	-.76	2.047	-2.047	49.823	-49.823
76	2	M27	1	.739	-.069	-2.1	1.825	-1.825	52.281	-52.281
77			2	.733	-.069	-2.089	1.776	-1.776	50.755	-50.755
78			3	.728	-.069	-2.077	1.726	-1.726	49.238	-49.238
79			4	.723	-.069	-2.066	1.676	-1.676	47.729	-47.729
80			5	.718	-.069	-2.055	1.627	-1.627	46.228	-46.228
81	2	M13	1	.608	-.058	-.784	2.091	-2.091	52.101	-52.101
82			2	.603	-.058	-.78	2.071	-2.071	51.438	-51.438
83			3	.599	-.058	-.777	2.051	-2.051	50.777	-50.777
84			4	.594	-.058	-.774	2.031	-2.031	50.12	-50.12
85			5	.589	-.058	-.77	2.01	-2.01	49.465	-49.465
86	2	M14	1	.6	-.059	-.797	2.055	-2.055	51.839	-51.839
87			2	.595	-.059	-.794	2.034	-2.034	51.153	-51.153
88			3	.591	-.059	-.79	2.013	-2.013	50.47	-50.47
89			4	.586	-.059	-.787	1.992	-1.992	49.79	-49.79
90			5	.581	-.059	-.783	1.971	-1.971	49.113	-49.113
91	2	M26	1	.684	-.068	-1.632	1.759	-1.759	51.147	-51.147
92			2	.679	-.068	-1.623	1.716	-1.716	49.788	-49.788
93			3	.674	-.068	-1.615	1.673	-1.673	48.436	-48.436
94			4	.669	-.068	-1.606	1.63	-1.63	47.091	-47.091
95			5	.664	-.068	-1.597	1.587	-1.587	45.754	-45.754

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	2	M28	1	.73	-.069	-2.163	1.665	-1.665	50.023	-50.023
97			2	.725	-.069	-2.151	1.614	-1.614	48.402	-48.402
98			3	.72	-.069	-2.139	1.563	-1.563	46.789	-46.789
99			4	.714	-.069	-2.128	1.512	-1.512	45.186	-45.186
100			5	.709	-.069	-2.116	1.461	-1.461	43.591	-43.591
101	2	M29	1	.722	-.069	-2.229	1.496	-1.496	47.412	-47.412
102			2	.712	-.069	-2.134	1.444	-1.444	45.697	-45.697
103			3	.708	-.069	-2.122	1.392	-1.392	44.042	-44.042
104			4	.699	-.069	-2.113	1.34	-1.34	42.394	-42.394
105			5	.694	-.069	-2.102	1.288	-1.288	40.755	-40.755
106	2	M30	1	.706	-.069	-2.221	1.319	-1.319	44.589	-44.589
107			2	.702	-.069	-2.209	1.266	-1.266	42.801	-42.801
108			3	.697	-.069	-2.197	1.212	-1.212	41.023	-41.023
109			4	.693	-.069	-2.184	1.159	-1.159	39.255	-39.255
110			5	.688	-.069	-2.172	1.105	-1.105	37.497	-37.497
111	2	M31	1	.7	-.069	-2.304	1.133	-1.133	41.302	-41.302
112			2	.696	-.069	-2.291	1.079	-1.079	39.37	-39.37
113			3	.691	-.069	-2.278	1.024	-1.024	37.449	-37.449
114			4	.686	-.069	-2.265	.969	-.969	35.538	-35.538
115			5	.682	-.069	-2.252	.914	-.914	33.638	-33.638
116	2	M32	1	.694	-.069	-2.394	.938	-.938	37.344	-37.344
117			2	.69	-.069	-2.38	.882	-.882	35.242	-35.242
118			3	.685	-.069	-2.367	.826	-.826	33.152	-33.152
119			4	.518	-.052	-1.868	.759	-.759	30.652	-30.652
120			5	.513	-.052	-1.855	.717	-.717	29.013	-29.013
121	2	M33	1	.564	-.052	-2.628	.817	-.817	34.373	-34.373
122			2	.56	-.052	-2.609	.769	-.769	32.444	-32.444
123			3	.555	-.052	-2.59	.721	-.721	30.529	-30.529
124			4	.55	-.052	-2.57	.673	-.673	28.629	-28.629
125			5	.545	-.052	-2.551	.625	-.625	26.742	-26.742
126	2	M34	1	.554	-.052	-2.729	.639	-.639	30.277	-30.277
127			2	.549	-.052	-2.708	.59	-.59	28.155	-28.155
128			3	.545	-.052	-2.688	.541	-.541	26.05	-26.05
129			4	.54	-.052	-2.667	.492	-.492	23.961	-23.961
130			5	.535	-.052	-2.646	.444	-.444	21.888	-21.888
131	2	M35	1	.544	-.052	-2.842	.454	-.454	25.113	-25.113
132			2	.347	-.034	-2.009	.398	-.398	22.365	-22.365
133			3	.342	-.034	-1.987	.365	-.365	20.699	-20.699
134			4	.337	-.034	-1.965	.333	-.333	19.052	-19.052
135			5	.333	-.034	-1.942	.3	-.3	17.424	-17.424
136	2	M36	1	.338	-.034	-2.09	.307	-.307	20.32	-20.32
137			2	.333	-.034	-2.066	.274	-.274	18.449	-18.449
138			3	.328	-.034	-2.043	.24	-.24	16.598	-16.598
139			4	.324	-.034	-2.019	.207	-.207	14.77	-14.77
140			5	.319	-.034	-1.995	.174	-.174	12.963	-12.963
141	2	M37	1	.324	-.033	-2.163	.178	-.178	15.426	-15.426
142			2	.315	-.033	-2.937	.144	-.144	13.147	-13.147
143			3	.311	-.033	-2.915	.11	-.11	10.262	-10.262
144			4	.117	-.016	-1.937	.077	-.077	7.231	-7.231
145			5	.113	-.016	-1.915	.061	-.061	5.333	-5.333
146	2	M38	1	.115	-.016	-2.089	.063	-.063	6.509	-6.509
147			2	.11	-.016	-2.065	.046	-.046	4.227	-4.227

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.106	-.016	-2.041	.03	-.03	1.971	-1.971
149			4	.062	-.015	-.398	.014	-.014	.809	-.809
150			5	0	0	-.002	0	0	0	0
151	2	M2	1	.345	-.397	.03	0	0	0	0
152			2	.346	-.403	.03	-1.158	1.158	.075	-.075
153			3	.346	-.409	.03	-2.335	2.335	.151	-.151
154			4	.347	-.416	.03	-3.529	3.529	.226	-.226
155			5	.347	-.422	.03	-4.743	4.743	.302	-.302
156	2	M6	1	.346	-.38	.03	0	0	0	0
157			2	.347	-.386	.03	-1.075	1.075	.073	-.073
158			3	.348	-.392	.03	-2.168	2.168	.147	-.147
159			4	.348	-.398	.03	-3.278	3.278	.22	-.22
160			5	.349	-.404	.03	-4.406	4.406	.294	-.294
161	2	M4	1	.291	-.352	.026	0	0	0	0
162			2	.292	-.359	.026	-1.069	1.069	.068	-.068
163			3	.292	-.367	.026	-2.161	2.161	.135	-.135
164			4	.293	-.375	.026	-3.276	3.276	.203	-.203
165			5	.294	-.382	.026	-4.414	4.414	.27	-.27
166	2	M39	1	.227	-.267	.021	-1.976	1.976	.132	-.132
167			2	.228	-.273	.021	-2.489	2.489	.165	-.165
168			3	.228	-.279	.021	-3.014	3.014	.198	-.198
169			4	.229	-.285	.021	-3.551	3.551	.231	-.231
170			5	.229	-.291	.021	-4.1	4.1	.264	-.264
171	2	M43	1	.228	-.255	.021	-1.835	1.835	.129	-.129
172			2	.229	-.261	.021	-2.312	2.312	.161	-.161
173			3	.229	-.267	.021	-2.801	2.801	.193	-.193
174			4	.23	-.273	.021	-3.3	3.3	.225	-.225
175			5	.23	-.279	.021	-3.81	3.81	.257	-.257
176	2	M9	1	.098	-.064	.034	0	0	0	0
177			2	.098	-.068	.034	-.143	.143	.064	-.064
178			3	.098	-.072	.034	-.294	.294	.128	-.128
179			4	.099	-.076	.034	-.453	.453	.192	-.192
180			5	.099	-.08	.034	-.622	.622	.256	-.256
181	2	M46	1	.069	-.053	.025	-.29	.29	.127	-.127
182			2	.069	-.057	.025	-.373	.373	.159	-.159
183			3	.07	-.061	.025	-.461	.461	.19	-.19
184			4	.07	-.064	.025	-.556	.556	.222	-.222
185			5	.07	-.068	.025	-.656	.656	.254	-.254
186	2	M41	1	.184	-.233	.017	-1.7	1.7	.109	-.109
187			2	.185	-.24	.017	-2.149	2.149	.136	-.136
188			3	.186	-.248	.017	-2.612	2.612	.163	-.163
189			4	.186	-.255	.017	-3.088	3.088	.19	-.19
190			5	.187	-.263	.017	-3.58	3.58	.217	-.217
191	2	M3	1	-.233	-.585	-.028	0	0	0	0
192			2	-.233	-.592	-.028	-1.704	1.704	-.07	.07
193			3	-.232	-.598	-.028	-3.427	3.427	-.14	.14
194			4	-.231	-.604	-.028	-5.168	5.168	-.21	.21
195			5	-.231	-.611	-.028	-6.927	6.927	-.28	.28
196	2	M5	1	-.211	-.489	-.024	0	0	0	0
197			2	-.211	-.496	-.024	-1.481	1.481	-.063	.063
198			3	-.21	-.504	-.024	-2.985	2.985	-.127	.127
199			4	-.209	-.512	-.024	-4.512	4.512	-.19	.19

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	-.209	-.52	-.024	-6.063	6.063	-.254	.254
201	2	M7	1	-.231	-.579	-.028	0	0	0	0
202			2	-.231	-.585	-.028	-1.635	1.635	-.068	.068
203			3	-.23	-.591	-.028	-3.287	3.287	-.136	.136
204			4	-.23	-.597	-.028	-4.957	4.957	-.204	.204
205			5	-.229	-.603	-.028	-6.644	6.644	-.272	.272
206	2	M8	1	-.138	-.258	-.033	0	0	0	0
207			2	-.137	-.262	-.033	-.56	.56	-.062	.062
208			3	-.137	-.266	-.033	-1.129	1.129	-.125	.125
209			4	-.137	-.27	-.033	-1.706	1.706	-.187	.187
210			5	-.136	-.274	-.033	-2.292	2.292	-.249	.249
211	2	M42	1	-.131	-.318	-.016	-2.335	2.335	-.102	.102
212			2	-.13	-.326	-.016	-2.946	2.946	-.127	.127
213			3	-.13	-.333	-.016	-3.57	3.57	-.153	.153
214			4	-.129	-.341	-.016	-4.208	4.208	-.178	.178
215			5	-.128	-.348	-.016	-4.861	4.861	-.204	.204
216	2	M44	1	-.149	-.383	-.019	-2.768	2.768	-.119	.119
217			2	-.149	-.389	-.019	-3.481	3.481	-.149	.149
218			3	-.148	-.395	-.019	-4.205	4.205	-.178	.178
219			4	-.148	-.401	-.019	-4.941	4.941	-.208	.208
220			5	-.147	-.407	-.019	-5.688	5.688	-.238	.238
221	2	M40	1	-.151	-.388	-.019	-2.885	2.885	-.123	.123
222			2	-.15	-.394	-.019	-3.629	3.629	-.153	.153
223			3	-.149	-.4	-.019	-4.385	4.385	-.184	.184
224			4	-.149	-.406	-.019	-5.153	5.153	-.215	.215
225			5	-.148	-.412	-.019	-5.932	5.932	-.246	.246
226	2	M45	1	-.094	-.183	-.025	-1.069	1.069	-.124	.124
227			2	-.094	-.187	-.025	-1.348	1.348	-.154	.154
228			3	-.093	-.19	-.025	-1.632	1.632	-.185	.185
229			4	-.093	-.194	-.025	-1.923	1.923	-.216	.216
230			5	-.093	-.198	-.025	-2.219	2.219	-.247	.247

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTTOM-POLE	0	105.681	-10.484	-1201.462	.014	7.437
2	3	Totals:	0	105.681	-10.484			
3	3	COG (ft):	X: .055	Y: 94.052	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	3	M15	1	1.482	-.68	0	20.992	-20.992	.127	-.127
2			2	1.472	-.674	0	20.693	-20.693	.127	-.127
3			3	1.462	-.668	0	20.397	-20.397	.127	-.127
4			4	1.452	-.662	0	20.103	-20.103	.127	-.127
5			5	1.442	-.656	0	19.811	-19.811	.127	-.127
6	3	M1	1	1.328	-.704	0	20.26	-20.26	.087	-.087
7			2	1.319	-.697	0	20.036	-20.036	.087	-.087
8			3	1.31	-.69	0	19.814	-19.814	.087	-.087
9			4	1.301	-.684	0	19.594	-19.594	.087	-.087
10			5	1.292	-.677	0	19.376	-19.376	.087	-.087
11	3	M16	1	1.467	-.674	0	20.233	-20.233	.133	-.133
12			2	1.457	-.669	0	19.93	-19.93	.133	-.133
13			3	1.447	-.663	0	19.629	-19.629	.133	-.133
14			4	1.437	-.657	0	19.331	-19.331	.133	-.133
15			5	1.427	-.651	0	19.036	-19.036	.133	-.133
16	3	M10	1	1.314	-.701	0	19.771	-19.771	.091	-.091
17			2	1.305	-.695	0	19.543	-19.543	.091	-.091
18			3	1.296	-.688	0	19.317	-19.317	.091	-.091
19			4	1.286	-.682	0	19.093	-19.093	.091	-.091
20			5	1.277	-.675	0	18.871	-18.871	.091	-.091
21	3	M17	1	1.453	-.668	0	19.449	-19.449	.139	-.139
22			2	1.442	-.662	0	19.142	-19.142	.139	-.139
23			3	1.432	-.656	0	18.838	-18.838	.139	-.139
24			4	1.422	-.651	0	18.537	-18.537	.139	-.139
25			5	1.412	-.645	0	18.238	-18.238	.139	-.139
26	3	M11	1	1.3	-.698	0	19.264	-19.264	.095	-.095
27			2	1.291	-.691	0	19.032	-19.032	.095	-.095
28			3	1.282	-.685	0	18.803	-18.803	.095	-.095
29			4	1.272	-.678	0	18.575	-18.575	.095	-.095
30			5	1.263	-.672	0	18.35	-18.35	.095	-.095
31	3	M12	1	1.286	-.692	0	18.74	-18.74	.099	-.099
32			2	1.277	-.686	0	18.505	-18.505	.099	-.099
33			3	1.267	-.68	0	18.272	-18.272	.099	-.099
34			4	1.258	-.674	0	18.042	-18.042	.099	-.099
35			5	1.249	-.667	0	17.814	-17.814	.099	-.099
36	3	M18	1	1.438	-.66	0	18.643	-18.643	.146	-.146
37			2	1.428	-.654	0	18.333	-18.333	.146	-.146
38			3	1.418	-.649	0	18.026	-18.026	.146	-.146
39			4	1.408	-.643	0	17.722	-17.722	.146	-.146
40			5	1.398	-.638	0	17.42	-17.42	.145	-.145
41	3	M13	1	1.272	-.686	0	18.2	-18.2	.103	-.103
42			2	1.263	-.68	0	17.962	-17.962	.103	-.103
43			3	1.253	-.674	0	17.727	-17.727	.103	-.103

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	1.244	-.667	0	17.494	-17.494	.103	-.103
45			5	1.235	-.661	0	17.262	-17.262	.103	-.103
46	3	M21	1	1.527	-.633	0	18.014	-18.014	.18	-.18
47			2	1.517	-.628	0	17.66	-17.66	.18	-.18
48			3	1.506	-.623	0	17.308	-17.308	.179	-.179
49			4	1.496	-.618	0	16.959	-16.959	.179	-.179
50			5	1.485	-.614	0	16.613	-16.613	.179	-.179
51	3	M19	1	1.423	-.65	0	17.815	-17.815	.153	-.153
52			2	1.413	-.645	0	17.503	-17.503	.153	-.153
53			3	1.403	-.64	0	17.193	-17.193	.153	-.153
54			4	1.393	-.635	0	16.886	-16.886	.153	-.153
55			5	1.383	-.629	0	16.581	-16.581	.152	-.152
56	3	M14	1	1.258	-.678	0	17.645	-17.645	.108	-.108
57			2	1.249	-.672	0	17.405	-17.405	.108	-.108
58			3	1.239	-.666	0	17.167	-17.167	.108	-.108
59			4	1.23	-.66	0	16.931	-16.931	.108	-.108
60			5	1.221	-.654	0	16.697	-16.697	.108	-.108
61	3	M22	1	1.511	-.623	0	16.99	-16.99	.189	-.189
62			2	1.501	-.618	0	16.633	-16.633	.189	-.189
63			3	1.49	-.613	0	16.28	-16.28	.189	-.189
64			4	1.48	-.609	0	15.928	-15.928	.188	-.188
65			5	1.469	-.604	0	15.58	-15.58	.188	-.188
66	3	M20	1	1.409	-.64	0	16.966	-16.966	.161	-.161
67			2	1.399	-.635	0	16.652	-16.652	.161	-.161
68			3	1.389	-.63	0	16.34	-16.34	.161	-.161
69			4	1.379	-.625	0	16.03	-16.03	.16	-.16
70			5	1.368	-.62	0	15.723	-15.723	.16	-.16
71	3	M23	1	1.496	-.612	0	15.942	-15.942	.2	-.2
72			2	1.485	-.607	0	15.584	-15.584	.199	-.199
73			3	1.474	-.602	0	15.229	-15.229	.199	-.199
74			4	1.464	-.597	0	14.876	-14.876	.198	-.198
75			5	1.453	-.593	0	14.526	-14.526	.198	-.198
76	3	M24	1	1.48	-.599	0	14.871	-14.871	.211	-.211
77			2	1.469	-.594	0	14.512	-14.512	.211	-.211
78			3	1.459	-.59	0	14.155	-14.155	.21	-.21
79			4	1.448	-.585	0	13.802	-13.802	.209	-.209
80			5	1.437	-.581	0	13.451	-13.451	.209	-.209
81	3	M25	1	1.464	-.585	0	13.779	-13.779	.224	-.224
82			2	1.454	-.581	0	13.419	-13.419	.223	-.223
83			3	1.443	-.577	0	13.062	-13.062	.222	-.222
84			4	1.432	-.572	0	12.707	-12.707	.222	-.222
85			5	1.422	-.568	0	12.356	-12.356	.221	-.221
86	3	M27	1	1.565	-.56	-.001	12.929	-12.929	.268	-.268
87			2	1.554	-.556	-.001	12.526	-12.526	.267	-.267
88			3	1.542	-.552	-.001	12.125	-12.125	.266	-.266
89			4	1.531	-.548	-.001	11.728	-11.728	.265	-.265
90			5	1.52	-.544	-.001	11.334	-11.334	.264	-.264
91	3	M26	1	1.449	-.571	0	12.664	-12.664	.237	-.237
92			2	1.438	-.567	0	12.305	-12.305	.237	-.237
93			3	1.427	-.563	0	11.948	-11.948	.236	-.236
94			4	1.417	-.558	0	11.593	-11.593	.235	-.235
95			5	1.406	-.554	0	11.242	-11.242	.234	-.234

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	3	M28	1	1.546	-.545	-.001	11.6	-11.6	.286	-.286
97			2	1.535	-.541	-.001	11.198	-11.198	.285	-.285
98			3	1.524	-.537	-.001	10.799	-10.799	.284	-.284
99			4	1.513	-.533	-.001	10.403	-10.403	.282	-.282
100			5	1.502	-.53	-.001	10.01	-10.01	.281	-.281
101	3	M29	1	1.528	-.53	-.002	10.251	-10.251	.306	-.306
102			2	1.508	-.498	.015	9.855	-9.855	.307	-.307
103			3	1.499	-.495	.015	9.478	-9.478	.319	-.319
104			4	1.479	-.486	-.002	9.107	-9.107	.323	-.323
105			5	1.47	-.483	-.002	8.74	-8.74	.321	-.321
106	3	M30	1	1.496	-.483	-.002	8.956	-8.956	.351	-.351
107			2	1.487	-.48	-.002	8.582	-8.582	.35	-.35
108			3	1.478	-.476	-.002	8.211	-8.211	.348	-.348
109			4	1.469	-.473	-.002	7.843	-7.843	.347	-.347
110			5	1.46	-.469	-.002	7.477	-7.477	.345	-.345
111	3	M31	1	1.487	-.469	-.002	7.666	-7.666	.38	-.38
112			2	1.478	-.465	-.002	7.294	-7.294	.378	-.378
113			3	1.469	-.462	-.002	6.925	-6.925	.376	-.376
114			4	1.46	-.459	-.002	6.559	-6.559	.374	-.374
115			5	1.451	-.456	-.002	6.195	-6.195	.372	-.372
116	3	M32	1	1.477	-.454	-.003	6.355	-6.355	.413	-.413
117			2	1.468	-.451	-.003	5.986	-5.986	.411	-.411
118			3	1.459	-.448	-.003	5.619	-5.619	.409	-.409
119			4	1.105	-.366	-.002	5.258	-5.258	.406	-.406
120			5	1.096	-.363	-.002	4.961	-4.961	.404	-.404
121	3	M33	1	1.204	-.363	-.003	5.654	-5.654	.478	-.478
122			2	1.195	-.36	-.003	5.32	-5.32	.476	-.476
123			3	1.185	-.357	-.003	4.988	-4.988	.473	-.473
124			4	1.176	-.354	-.003	4.66	-4.66	.471	-.471
125			5	1.167	-.351	-.003	4.334	-4.334	.469	-.469
126	3	M34	1	1.185	-.347	-.004	4.432	-4.432	.531	-.531
127			2	1.176	-.344	-.004	4.105	-4.105	.528	-.528
128			3	1.167	-.342	-.004	3.781	-3.781	.524	-.524
129			4	1.157	-.339	-.004	3.459	-3.459	.521	-.521
130			5	1.148	-.336	-.004	3.14	-3.14	.518	-.518
131	3	M35	1	1.166	-.334	-.004	3.213	-3.213	.595	-.595
132			2	.751	-.241	-.003	2.931	-2.931	.59	-.59
133			3	.741	-.238	-.003	2.7	-2.7	.588	-.588
134			4	.732	-.235	-.003	2.471	-2.471	.585	-.585
135			5	.723	-.233	-.003	2.244	-2.244	.583	-.583
136	3	M36	1	.734	-.228	-.004	2.298	-2.298	.679	-.679
137			2	.725	-.225	-.004	2.073	-2.073	.676	-.676
138			3	.716	-.223	-.004	1.851	-1.851	.673	-.673
139			4	.707	-.22	-.004	1.632	-1.632	.67	-.67
140			5	.698	-.218	-.004	1.415	-1.415	.666	-.666
141	3	M37	1	.709	-.215	-.004	1.449	-1.449	.793	-.793
142			2	.69	-.286	-.004	1.217	-1.217	.789	-.789
143			3	.683	-.285	-.004	.927	-.927	.784	-.784
144			4	.271	-.201	-.002	.711	-.711	.78	-.78
145			5	.264	-.199	-.002	.508	-.508	.778	-.778
146	3	M38	1	.268	-.197	-.002	.521	-.521	.95	-.95
147			2	.261	-.195	-.002	.317	-.317	.947	-.947

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.254	-.194	-.002	.115	-.115	.945	-.945
149			4	.157	-.035	-.001	.012	-.012	.943	-.943
150			5	0	0	0	0	0	0	0
151	3	M2	1	.121	-1.207	.003	0	0	0	0
152			2	.122	-1.218	.006	-3.51	3.51	.012	-.012
153			3	.123	-1.229	.009	-7.053	7.053	.031	-.031
154			4	.124	-1.241	.013	-10.629	10.629	.059	-.059
155			5	.126	-1.253	.018	-14.24	14.24	.098	-.098
156	3	M3	1	.121	-1.207	-.003	0	0	0	0
157			2	.122	-1.218	-.006	-3.511	3.511	-.012	.012
158			3	.123	-1.229	-.009	-7.055	7.055	-.031	.031
159			4	.124	-1.241	-.013	-10.632	10.632	-.059	.059
160			5	.126	-1.253	-.018	-14.242	14.242	-.098	.098
161	3	M4	1	.087	-1.047	.002	0	0	0	0
162			2	.088	-1.06	.005	-3.166	3.166	.009	-.009
163			3	.089	-1.073	.009	-6.373	6.373	.026	-.026
164			4	.09	-1.087	.013	-9.621	9.621	.054	-.054
165			5	.091	-1.102	.018	-12.911	12.911	.095	-.095
166	3	M5	1	.087	-1.047	-.002	0	0	0	0
167			2	.088	-1.06	-.005	-3.167	3.167	-.009	.009
168			3	.089	-1.074	-.009	-6.375	6.375	-.026	.026
169			4	.09	-1.088	-.013	-9.623	9.623	-.054	.054
170			5	.091	-1.102	-.018	-12.914	12.914	-.095	.095
171	3	M6	1	.125	-1.206	.004	0	0	0	0
172			2	.126	-1.216	.006	-3.403	3.403	.012	-.012
173			3	.127	-1.227	.009	-6.836	6.836	.031	-.031
174			4	.128	-1.239	.013	-10.301	10.301	.059	-.059
175			5	.129	-1.25	.018	-13.797	13.797	.097	-.097
176	3	M7	1	.125	-1.206	-.004	0	0	0	0
177			2	.126	-1.217	-.006	-3.404	3.404	-.012	.012
178			3	.127	-1.228	-.009	-6.839	6.839	-.031	.031
179			4	.128	-1.239	-.013	-10.305	10.305	-.059	.059
180			5	.129	-1.251	-.018	-13.803	13.803	-.097	.097
181	3	M8	1	.067	-.63	-.002	0	0	0	0
182			2	.068	-.637	-.004	-1.366	1.366	-.006	.006
183			3	.069	-.644	-.006	-2.747	2.747	-.015	.015
184			4	.07	-.651	-.009	-4.144	4.144	-.029	.029
185			5	.07	-.659	-.011	-5.556	5.556	-.048	.048
186	3	M9	1	.04	-.372	.001	0	0	0	0
187			2	.041	-.379	.003	-.811	.811	.004	-.004
188			3	.041	-.387	.005	-1.637	1.637	.012	-.012
189			4	.042	-.394	.008	-2.479	2.479	.024	-.024
190			5	.043	-.401	.011	-3.337	3.337	.042	-.042
191	3	M46	1	.03	-.268	.008	-1.556	1.556	.021	-.021
192			2	.03	-.274	.01	-1.965	1.965	.032	-.032
193			3	.031	-.281	.013	-2.385	2.385	.047	-.047
194			4	.032	-.288	.016	-2.815	2.815	.065	-.065
195			5	.033	-.295	.019	-3.255	3.255	.086	-.086
196	3	M45	1	.049	-.439	-.009	-2.592	2.592	-.024	.024
197			2	.05	-.446	-.011	-3.259	3.259	-.036	.036
198			3	.05	-.453	-.013	-3.937	3.937	-.051	.051
199			4	.051	-.46	-.016	-4.626	4.626	-.07	.07

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	.052	-.467	-.019	-5.325	5.325	-.092	.092
201	3	M41	1	.057	-.673	.012	-4.973	4.973	.038	-.038
202			2	.058	-.686	.016	-6.261	6.261	.06	-.06
203			3	.06	-.699	.021	-7.574	7.574	.089	-.089
204			4	.061	-.713	.025	-8.912	8.912	.125	-.125
205			5	.062	-.727	.031	-10.276	10.276	.169	-.169
206	3	M42	1	.057	-.673	-.012	-4.974	4.974	-.038	.038
207			2	.058	-.686	-.016	-6.262	6.262	-.06	.06
208			3	.06	-.7	-.021	-7.576	7.576	-.089	.089
209			4	.061	-.713	-.025	-8.914	8.914	-.125	.125
210			5	.062	-.727	-.031	-10.279	10.279	-.169	.169
211	3	M43	1	.084	-.791	.012	-5.747	5.747	.042	-.042
212			2	.086	-.802	.016	-7.219	7.219	.064	-.064
213			3	.087	-.813	.02	-8.711	8.711	.091	-.091
214			4	.088	-.824	.024	-10.223	10.223	.125	-.125
215			5	.089	-.835	.029	-11.755	11.755	.166	-.166
216	3	M44	1	.084	-.792	-.012	-5.749	5.749	-.042	.042
217			2	.086	-.802	-.016	-7.222	7.222	-.064	.064
218			3	.087	-.813	-.02	-8.715	8.715	-.091	.091
219			4	.088	-.824	-.024	-10.227	10.227	-.125	.125
220			5	.089	-.835	-.029	-11.76	11.76	-.166	.166
221	3	M39	1	.082	-.793	.013	-5.931	5.931	.043	-.043
222			2	.083	-.804	.016	-7.452	7.452	.065	-.065
223			3	.084	-.815	.02	-8.993	8.993	.094	-.094
224			4	.085	-.826	.025	-10.556	10.556	.129	-.129
225			5	.087	-.838	.029	-12.14	12.14	.172	-.172
226	3	M40	1	.082	-.793	-.013	-5.932	5.932	-.043	.043
227			2	.083	-.804	-.016	-7.453	7.453	-.065	.065
228			3	.084	-.815	-.02	-8.995	8.995	-.094	.094
229			4	.085	-.826	-.025	-10.558	10.558	-.129	.129
230			5	.087	-.838	-.029	-12.143	12.143	-.172	.172

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTTOM-POLE	0	50.94	-36.608	-3382.573	.018	3.143
2	4	Totals:	0	50.94	-36.608			
3	4	COG (ft):	X: .057	Y: 92.464	Z: 0			

Member Section Stresses (By Combination)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
1	4	M1	1	.64	-2.429	0	57.041	-57.041	.037	-.037
2			2	.636	-2.405	0	56.267	-56.267	.037	-.037
3			3	.631	-2.381	0	55.501	-55.501	.037	-.037
4			4	.626	-2.358	0	54.742	-54.742	.037	-.037
5			5	.621	-2.335	0	53.991	-53.991	.037	-.037
6	4	M15	1	.705	-2.077	0	55.749	-55.749	.054	-.054
7			2	.7	-2.056	0	54.835	-54.835	.054	-.054
8			3	.695	-2.036	0	53.931	-53.931	.054	-.054
9			4	.691	-2.015	0	53.036	-53.036	.054	-.054
10			5	.686	-1.995	0	52.149	-52.149	.054	-.054
11	4	M10	1	.632	-2.367	0	55.09	-55.09	.038	-.038
12			2	.627	-2.344	0	54.32	-54.32	.038	-.038
13			3	.623	-2.321	0	53.558	-53.558	.038	-.038
14			4	.618	-2.298	0	52.804	-52.804	.038	-.038
15			5	.613	-2.275	0	52.057	-52.057	.038	-.038
16	4	M16	1	.698	-2.018	0	53.258	-53.258	.057	-.057
17			2	.693	-1.998	0	52.352	-52.352	.057	-.057
18			3	.688	-1.978	0	51.455	-51.455	.057	-.057
19			4	.683	-1.958	0	50.566	-50.566	.057	-.057
20			5	.678	-1.938	0	49.687	-49.687	.057	-.057
21	4	M11	1	.624	-2.305	0	53.139	-53.139	.04	-.04
22			2	.619	-2.282	0	52.374	-52.374	.04	-.04
23			3	.615	-2.26	0	51.616	-51.616	.04	-.04
24			4	.61	-2.238	0	50.866	-50.866	.04	-.04
25			5	.605	-2.215	0	50.124	-50.124	.04	-.04
26	4	M12	1	.616	-2.242	0	51.188	-51.188	.042	-.042
27			2	.611	-2.22	0	50.428	-50.428	.042	-.042
28			3	.607	-2.198	0	49.675	-49.675	.042	-.042
29			4	.602	-2.176	0	48.931	-48.931	.042	-.042
30			5	.597	-2.155	0	48.193	-48.193	.042	-.042
31	4	M17	1	.69	-1.958	0	50.766	-50.766	.059	-.059
32			2	.685	-1.938	0	49.867	-49.867	.059	-.059
33			3	.68	-1.919	0	48.977	-48.977	.059	-.059
34			4	.675	-1.9	0	48.097	-48.097	.059	-.059
35			5	.67	-1.881	0	47.225	-47.225	.059	-.059
36	4	M13	1	.608	-2.178	0	49.238	-49.238	.044	-.044
37			2	.603	-2.157	0	48.484	-48.484	.044	-.044
38			3	.599	-2.135	0	47.737	-47.737	.044	-.044
39			4	.594	-2.114	0	46.998	-46.998	.044	-.044
40			5	.589	-2.093	0	46.266	-46.266	.044	-.044
41	4	M18	1	.682	-1.898	0	48.274	-48.274	.062	-.062
42			2	.677	-1.879	0	47.383	-47.383	.062	-.062
43			3	.672	-1.86	0	46.502	-46.502	.062	-.062

Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
44			4	.668	-1.841	0	45.629	-45.629	.062	-.062
45			5	.663	-1.823	0	44.766	-44.766	.062	-.062
46	4	M14	1	.6	-2.114	0	47.291	-47.291	.046	-.046
47			2	.595	-2.093	0	46.543	-46.543	.046	-.046
48			3	.591	-2.072	0	45.802	-45.802	.046	-.046
49			4	.586	-2.052	0	45.069	-45.069	.046	-.046
50			5	.581	-2.031	0	44.343	-44.343	.046	-.046
51	4	M19	1	.675	-1.838	0	45.782	-45.782	.066	-.066
52			2	.67	-1.819	0	44.901	-44.901	.066	-.066
53			3	.665	-1.801	0	44.028	-44.028	.066	-.066
54			4	.66	-1.783	0	43.164	-43.164	.066	-.066
55			5	.655	-1.765	0	42.309	-42.309	.065	-.065
56	4	M21	1	.722	-1.728	0	45.661	-45.661	.078	-.078
57			2	.717	-1.711	0	44.695	-44.695	.077	-.077
58			3	.712	-1.694	0	43.738	-43.738	.077	-.077
59			4	.707	-1.677	0	42.791	-42.791	.077	-.077
60			5	.702	-1.66	0	41.853	-41.853	.077	-.077
61	4	M20	1	.667	-1.777	0	43.291	-43.291	.069	-.069
62			2	.662	-1.759	0	42.419	-42.419	.069	-.069
63			3	.657	-1.742	0	41.555	-41.555	.069	-.069
64			4	.652	-1.724	0	40.7	-40.7	.069	-.069
65			5	.647	-1.707	0	39.854	-39.854	.069	-.069
66	4	M22	1	.715	-1.671	0	42.804	-42.804	.082	-.082
67			2	.71	-1.654	0	41.848	-41.848	.082	-.082
68			3	.705	-1.637	0	40.902	-40.902	.082	-.082
69			4	.7	-1.621	0	39.966	-39.966	.082	-.082
70			5	.694	-1.604	0	39.039	-39.039	.082	-.082
71	4	M23	1	.707	-1.613	0	39.947	-39.947	.087	-.087
72			2	.702	-1.597	0	39.003	-39.003	.087	-.087
73			3	.697	-1.581	0	38.069	-38.069	.087	-.087
74			4	.692	-1.565	0	37.144	-37.144	.087	-.087
75			5	.687	-1.549	0	36.228	-36.228	.086	-.086
76	4	M24	1	.699	-1.556	0	37.089	-37.089	.092	-.092
77			2	.694	-1.54	0	36.158	-36.158	.092	-.092
78			3	.689	-1.525	0	35.235	-35.235	.092	-.092
79			4	.684	-1.509	0	34.322	-34.322	.092	-.092
80			5	.679	-1.494	0	33.418	-33.418	.092	-.092
81	4	M25	1	.692	-1.499	0	34.233	-34.233	.098	-.098
82			2	.687	-1.484	0	33.313	-33.313	.098	-.098
83			3	.681	-1.469	0	32.402	-32.402	.098	-.098
84			4	.676	-1.454	0	31.501	-31.501	.098	-.098
85			5	.671	-1.439	0	30.609	-30.609	.098	-.098
86	4	M27	1	.739	-1.395	0	31.971	-31.971	.119	-.119
87			2	.733	-1.381	0	30.968	-30.968	.119	-.119
88			3	.728	-1.367	0	29.975	-29.975	.119	-.119
89			4	.723	-1.354	0	28.991	-28.991	.119	-.119
90			5	.718	-1.34	0	28.018	-28.018	.118	-.118
91	4	M26	1	.684	-1.442	0	31.373	-31.373	.105	-.105
92			2	.679	-1.428	0	30.466	-30.466	.105	-.105
93			3	.674	-1.413	0	29.568	-29.568	.105	-.105
94			4	.669	-1.399	0	28.68	-28.68	.104	-.104
95			5	.664	-1.385	0	27.8	-27.8	.104	-.104

Member Section Stresses (By Combination) (Continued)

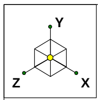
	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
96	4	M28	1	.73	-1.342	0	28.676	-28.676	.128	-.128
97			2	.725	-1.328	0	27.689	-27.689	.128	-.128
98			3	.72	-1.315	0	26.712	-26.712	.128	-.128
99			4	.714	-1.302	0	25.744	-25.744	.127	-.127
100			5	.709	-1.289	0	24.786	-24.786	.127	-.127
101	4	M29	1	.722	-1.289	0	25.382	-25.382	.138	-.138
102			2	.713	-1.192	.006	24.423	-24.423	.139	-.139
103			3	.708	-1.18	.006	23.524	-23.524	.144	-.144
104			4	.699	-1.159	0	22.639	-22.639	.146	-.146
105			5	.694	-1.148	0	21.765	-21.765	.145	-.145
106	4	M30	1	.706	-1.147	0	22.302	-22.302	.159	-.159
107			2	.702	-1.136	0	21.416	-21.416	.159	-.159
108			3	.697	-1.124	0	20.539	-20.539	.158	-.158
109			4	.693	-1.113	0	19.67	-19.67	.158	-.158
110			5	.688	-1.102	0	18.811	-18.811	.158	-.158
111	4	M31	1	.7	-1.1	0	19.286	-19.286	.174	-.174
112			2	.696	-1.089	0	18.415	-18.415	.173	-.173
113			3	.691	-1.078	0	17.552	-17.552	.173	-.173
114			4	.686	-1.068	0	16.698	-16.698	.173	-.173
115			5	.682	-1.057	0	15.853	-15.853	.172	-.172
116	4	M32	1	.694	-1.055	0	16.264	-16.264	.191	-.191
117			2	.69	-1.044	0	15.407	-15.407	.191	-.191
118			3	.685	-1.034	0	14.558	-14.558	.19	-.19
119			4	.518	-.881	0	13.704	-13.704	.19	-.19
120			5	.513	-.871	0	12.99	-12.99	.189	-.189
121	4	M33	1	.564	-.873	0	14.804	-14.804	.224	-.224
122			2	.56	-.863	0	14.002	-14.002	.224	-.224
123			3	.555	-.853	0	13.208	-13.208	.223	-.223
124			4	.55	-.844	0	12.423	-12.423	.223	-.223
125			5	.545	-.834	0	11.647	-11.647	.222	-.222
126	4	M34	1	.554	-.829	0	11.912	-11.912	.251	-.251
127			2	.549	-.82	0	11.132	-11.132	.251	-.251
128			3	.545	-.811	0	10.361	-10.361	.25	-.25
129			4	.54	-.802	0	9.598	-9.598	.249	-.249
130			5	.535	-.793	0	8.844	-8.844	.249	-.249
131	4	M35	1	.544	-.79	0	9.049	-9.049	.285	-.285
132			2	.347	-.607	0	8.337	-8.337	.285	-.285
133			3	.342	-.599	0	7.753	-7.753	.284	-.284
134			4	.337	-.59	0	7.178	-7.178	.283	-.283
135			5	.333	-.582	0	6.61	-6.61	.283	-.283
136	4	M36	1	.338	-.576	0	6.768	-6.768	.33	-.33
137			2	.333	-.567	0	6.201	-6.201	.329	-.329
138			3	.328	-.559	0	5.643	-5.643	.329	-.329
139			4	.324	-.551	0	5.093	-5.093	.328	-.328
140			5	.319	-.544	0	4.55	-4.55	.327	-.327
141	4	M37	1	.324	-.54	0	4.661	-4.661	.389	-.389
142			2	.315	-.852	0	4.052	-4.052	.388	-.388
143			3	.311	-.846	0	3.19	-3.19	.388	-.388
144			4	.117	-.694	0	2.437	-2.437	.387	-.387
145			5	.113	-.688	0	1.736	-1.736	.386	-.386
146	4	M38	1	.115	-.684	0	1.779	-1.779	.471	-.471
147			2	.11	-.679	0	1.07	-1.07	.471	-.471

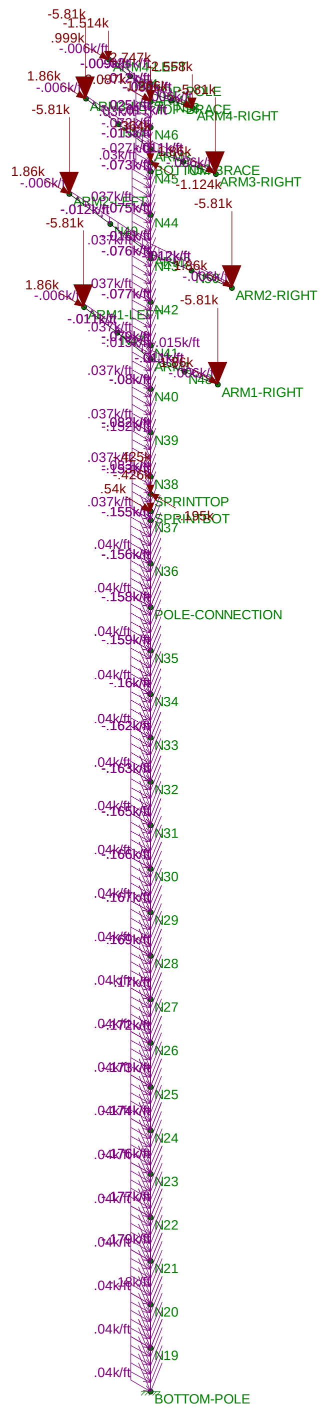
Member Section Stresses (By Combination) (Continued)

	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
148			3	.106	-.674	0	.366	-.366	.471	-.471
149			4	.062	-.073	0	.039	-.039	.47	-.47
150			5	0	0	0	0	0	0	0
151	4	M2	1	.056	-.556	.033	0	0	0	0
152			2	.056	-.563	.04	-1.62	1.62	.091	-.091
153			3	.057	-.569	.049	-3.258	3.258	.202	-.202
154			4	.058	-.575	.06	-4.915	4.915	.34	-.34
155			5	.058	-.582	.074	-6.59	6.59	.509	-.509
156	4	M3	1	.056	-.556	-.033	0	0	0	0
157			2	.056	-.563	-.04	-1.62	1.62	-.091	.091
158			3	.057	-.569	-.049	-3.259	3.259	-.202	.202
159			4	.058	-.575	-.06	-4.916	4.916	-.34	.34
160			5	.058	-.582	-.074	-6.591	6.591	-.509	.509
161	4	M4	1	.04	-.483	.027	0	0	0	0
162			2	.041	-.49	.035	-1.462	1.462	.081	-.081
163			3	.041	-.498	.046	-2.948	2.948	.186	-.186
164			4	.042	-.506	.06	-4.456	4.456	.324	-.324
165			5	.043	-.513	.076	-5.988	5.988	.5	-.5
166	4	M5	1	.04	-.483	-.027	0	0	0	0
167			2	.041	-.49	-.035	-1.462	1.462	-.081	.081
168			3	.041	-.498	-.046	-2.948	2.948	-.186	.186
169			4	.042	-.506	-.06	-4.456	4.456	-.324	.324
170			5	.043	-.513	-.076	-5.988	5.988	-.5	.5
171	4	M6	1	.057	-.556	.033	0	0	0	0
172			2	.058	-.562	.04	-1.57	1.57	.089	-.089
173			3	.059	-.568	.049	-3.158	3.158	.197	-.197
174			4	.059	-.574	.06	-4.763	4.763	.33	-.33
175			5	.06	-.58	.073	-6.385	6.385	.493	-.493
176	4	M7	1	.057	-.556	-.033	0	0	0	0
177			2	.058	-.562	-.04	-1.571	1.571	-.089	.089
178			3	.059	-.568	-.049	-3.159	3.159	-.197	.197
179			4	.059	-.574	-.06	-4.764	4.764	-.33	.33
180			5	.06	-.581	-.073	-6.387	6.387	-.493	.493
181	4	M8	1	.026	-.245	-.035	0	0	0	0
182			2	.027	-.249	-.04	-.532	.532	-.072	.072
183			3	.027	-.253	-.047	-1.072	1.072	-.154	.154
184			4	.027	-.257	-.054	-1.621	1.621	-.25	.25
185			5	.028	-.261	-.062	-2.179	2.179	-.36	.36
186	4	M9	1	.012	-.116	.034	0	0	0	0
187			2	.013	-.12	.039	-.255	.255	.07	-.07
188			3	.013	-.124	.046	-.519	.519	.15	-.15
189			4	.014	-.128	.053	-.792	.792	.244	-.244
190			5	.014	-.132	.061	-1.073	1.073	.352	-.352
191	4	M46	1	.01	-.088	.046	-.5	.5	.174	-.174
192			2	.01	-.092	.053	-.636	.636	.237	-.237
193			3	.011	-.096	.061	-.778	.778	.308	-.308
194			4	.011	-.1	.07	-.925	.925	.391	-.391
195			5	.011	-.103	.08	-1.079	1.079	.485	-.485
196	4	M45	1	.019	-.174	-.047	-1.016	1.016	-.178	.178
197			2	.02	-.177	-.054	-1.281	1.281	-.241	.241
198			3	.02	-.181	-.062	-1.552	1.552	-.314	.314
199			4	.021	-.185	-.071	-1.828	1.828	-.398	.398

Member Section Stresses (By Combination) (Continued)

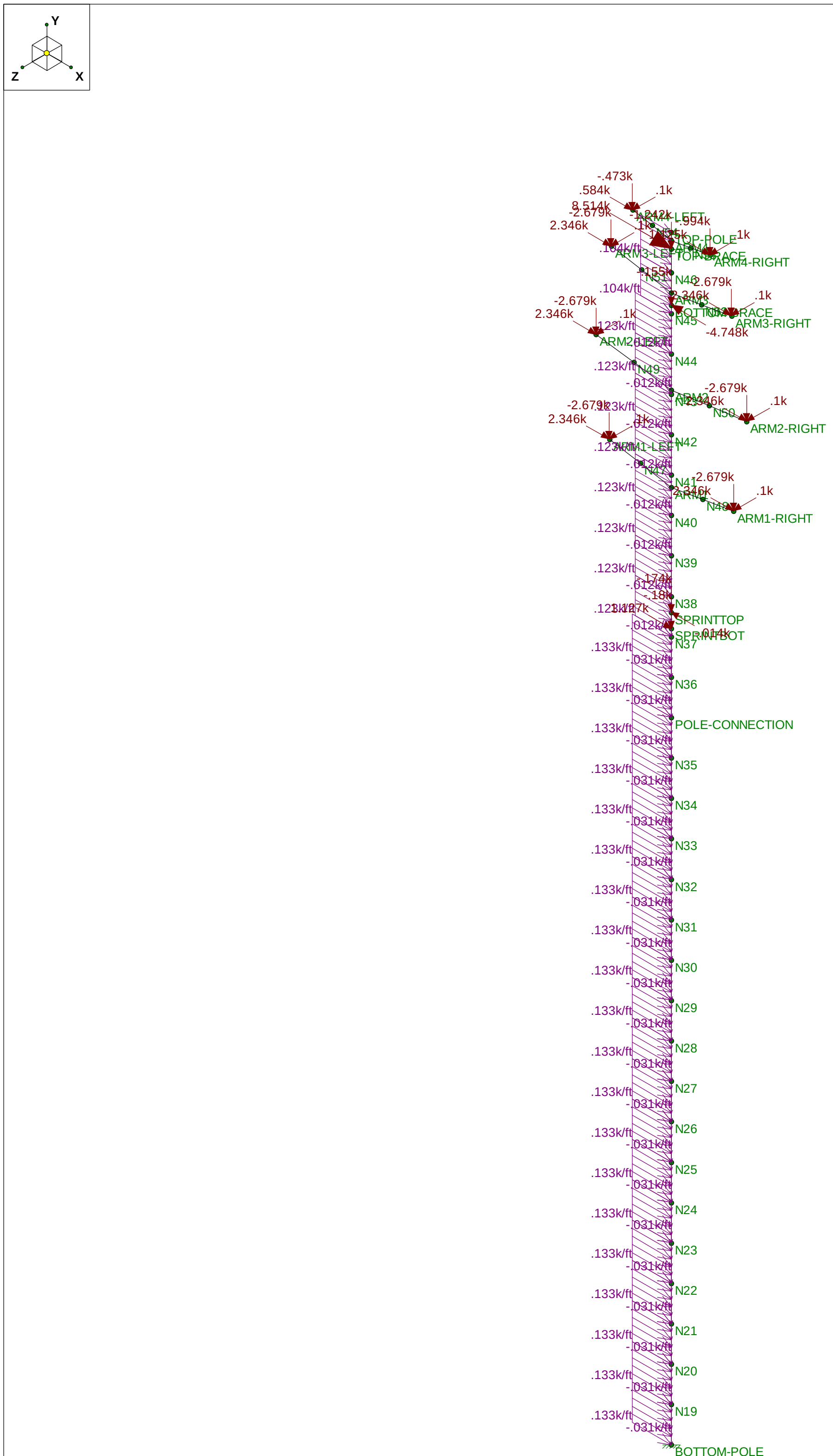
	LC	Member Label	Sec	Axial[ksi]	y Shear[ksi]	z Shear[ksi]	y top Bendin...	y bot Bendin...	z top Bendin...	z bot Bendin...
200			5	.021	-.189	-.081	-2.111	2.111	-.493	.493
201	4	M41	1	.027	-.314	.051	-2.306	2.306	.201	-.201
202			2	.027	-.321	.064	-2.908	2.908	.291	-.291
203			3	.028	-.329	.079	-3.523	3.523	.402	-.402
204			4	.029	-.336	.096	-4.153	4.153	.539	-.539
205			5	.029	-.344	.114	-4.797	4.797	.703	-.703
206	4	M42	1	.027	-.314	-.051	-2.307	2.307	-.201	.201
207			2	.027	-.321	-.064	-2.908	2.908	-.291	.291
208			3	.028	-.329	-.079	-3.524	3.524	-.402	.402
209			4	.029	-.336	-.096	-4.154	4.154	-.539	.539
210			5	.029	-.344	-.114	-4.798	4.798	-.703	.703
211	4	M43	1	.039	-.368	.051	-2.66	2.66	.216	-.216
212			2	.04	-.374	.062	-3.345	3.345	.303	-.303
213			3	.04	-.379	.074	-4.04	4.04	.407	-.407
214			4	.041	-.385	.088	-4.747	4.747	.531	-.531
215			5	.042	-.391	.103	-5.465	5.465	.676	-.676
216	4	M44	1	.039	-.368	-.051	-2.66	2.66	-.216	.216
217			2	.04	-.374	-.062	-3.345	3.345	-.303	.303
218			3	.04	-.38	-.074	-4.041	4.041	-.407	.407
219			4	.041	-.386	-.088	-4.748	4.748	-.531	.531
220			5	.042	-.392	-.103	-5.466	5.466	-.676	.676
221	4	M39	1	.038	-.368	.052	-2.745	2.745	.223	-.223
222			2	.039	-.375	.063	-3.453	3.453	.313	-.313
223			3	.039	-.381	.075	-4.172	4.172	.422	-.422
224			4	.04	-.387	.089	-4.902	4.902	.552	-.552
225			5	.041	-.393	.105	-5.645	5.645	.705	-.705
226	4	M40	1	.038	-.368	-.052	-2.745	2.745	-.223	.223
227			2	.039	-.375	-.063	-3.453	3.453	-.313	.313
228			3	.039	-.381	-.075	-4.172	4.172	-.422	.422
229			4	.04	-.387	-.089	-4.903	4.903	-.552	.552
230			5	.041	-.393	-.105	-5.646	5.646	-.705	.705





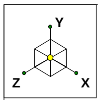
Loads: LC 1, x-direction NESC Heavy Wind

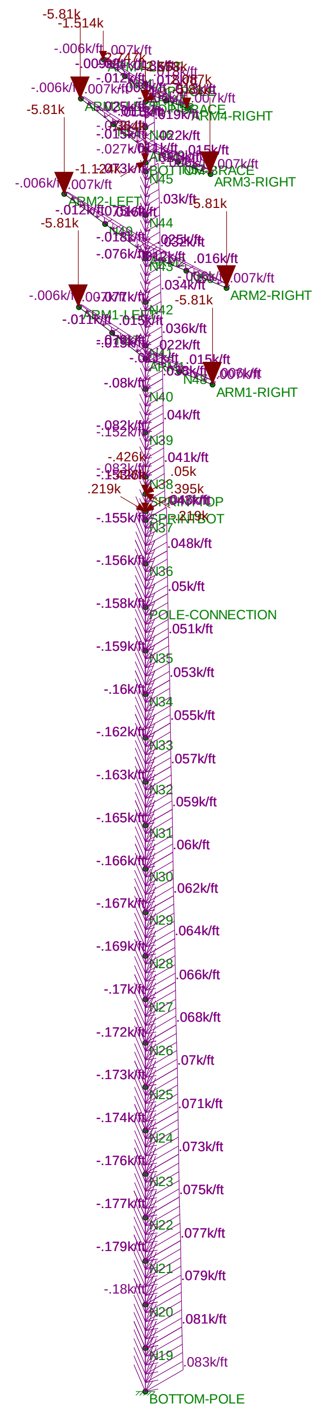
Centek Engineering		
TJL	Pole # 844	Mar 5, 2019 at 7:46 AM
19031.00 / CT5089	LC #1 Loads	NESC - Pole.r3d



Loads: LC 2, x-direction NESC Extreme Wind

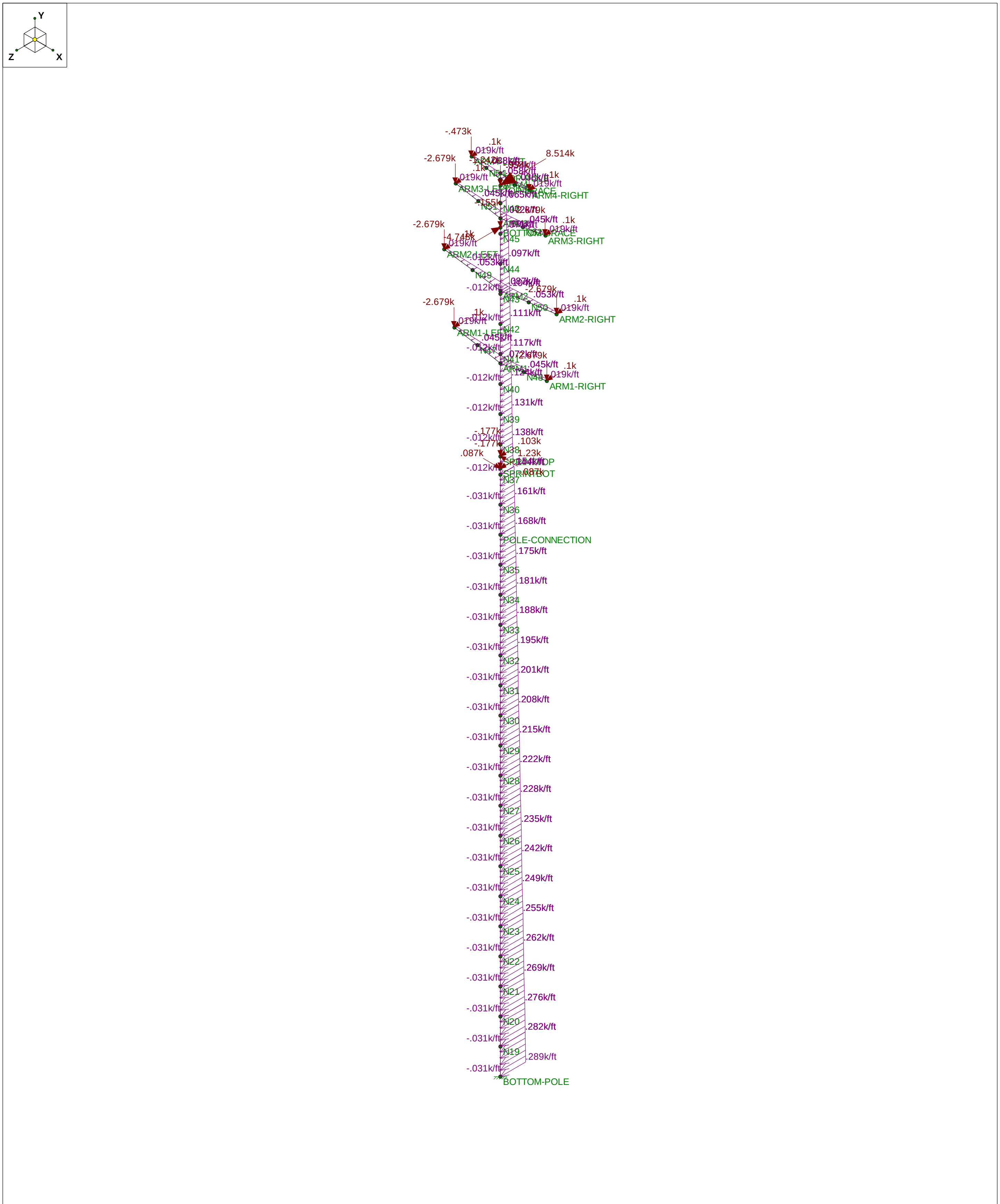
Centek Engineering		
TJL	Pole # 844	Mar 5, 2019 at 7:46 AM
19031.00 / CT5089	LC #2 Loads	NESC - Pole.r3d





Loads: LC 3, z-direction NESC Heavy Wind

Centek Engineering		
TJL	Pole # 844	Mar 5, 2019 at 7:47 AM
19031.00 / CT5089	LC #3 Loads	NESC - Pole.r3d



Loads: LC 4, z-direction NESC Extreme Wind

Centek Engineering		
TJL	Pole # 844	Mar 5, 2019 at 7:47 AM
19031.00 / CT5089	LC #4 Loads	NESC - Pole.r3d

Pole Analysis:

Pole Properties:

Wide Flange Moment of Inertia Iy =	$I_{yy} := 20.7 \cdot in^4$	(User Input)
Wide Flange Moment of Inertia Ix =	$I_{xx} := 843 \cdot in^4$	(User Input)
Wide Flange Area =	$A_{wf} := 13.0 \cdot in^2$	(User Input)
Flange Wdith =	$b_f := 6.5 \cdot in$	(User Input)
Wide Flange Depth =	$d_{wf} := 20.7 \cdot in$	(User Input)
Tower Width Top =	$W_{TTop} := 13 \cdot in$	(User Input)
Tower Width Base =	$W_{TBase} := 54 \cdot in$	(User Input)
Plate Thickness Top =	$Plt_{tTop} := 0.1875 \cdot in$	(User Input)
Plate Thickness Base =	$Plt_{tBase} := 0.5 \cdot in$	(User Input)
Length of Pole =	$L_{pole} := 150 \cdot ft$	(User Input)
Nominal Bending Stress =	$F_b := 60 \cdot ksi$	(User Input)
Modulus of Elasticity =	$E := 29000 \cdot ksi$	(User Input)

Member Forces:

Maximum Bending Stress x-direction = $f_{bxmax} := 58.0 \cdot ksi$ From Risa3D

Percent Stressed = $\frac{f_{bxmax}}{F_b} = 96.7 \cdot \%$

$Bending\_Check\_x := if(f_{bxmax} < F_b, "OK", "NG")$

$Bending\_Check\_x = "OK"$

Maximum Bending Stress y-direction = $f_{bymax} := 57.0 \cdot ksi$ From Risa3D

Percent Stressed = $\frac{f_{bymax}}{F_b} = 95 \cdot \%$

$Bending\_Check\_y := if(f_{bymax} < F_b, "OK", "NG")$

$Bending\_Check\_y = "OK"$

Flange Bolts and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 1318 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 29.7 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 30.9 \cdot kips$	(Input From Risa-3D)

Flange Bolt Data:

Use ASTM A490

Number of Flange Bolts =	$N := 24$	(User Input)
Bolt Ultimate Strength =	$F_u := 150 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 125 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 0.875 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Flange Plate Data:

Use ASTM A572 Gr 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 2.0in$ (User Input)

$d_2 := 7.0in$ (User Input)

$d_3 := 12.0in$ (User Input)

$d_4 := 15.5in$ (User Input)

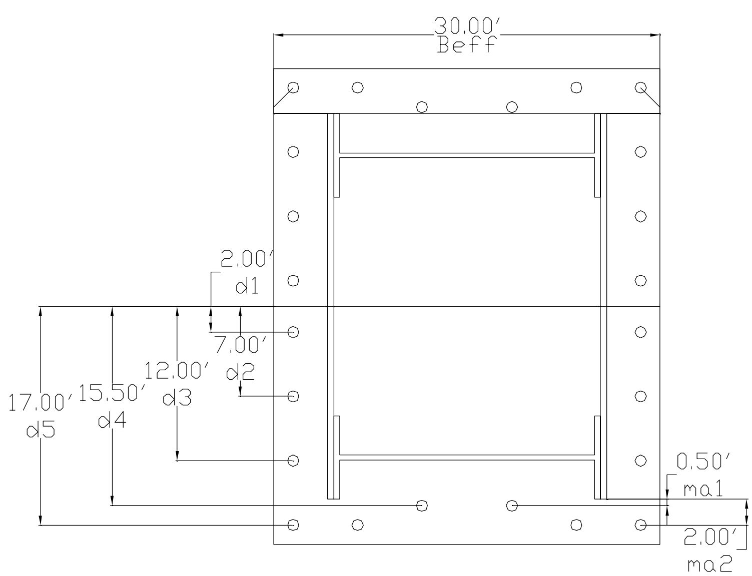
$d_5 := 17.0in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 0.5in$ (User Input)

$ma_2 := 2.0in$ (User Input)

Effective Width of Flange Plate for Bending = $B_{eff} := 30.0in$ (User Input)



FLANGE BOLT AND PLATE GEOMETRY

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2\cdot 4 + (d_2)^2\cdot 4 + (d_3)^2\cdot 4 + (d_4)^2\cdot 4 + (d_5)^2\cdot 8\right] = 4.061\times 10^3\cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4}\cdot D^2 = 0.601\cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4}\cdot\left(D - \frac{0.9743\cdot in}{n}\right)^2 = 0.341\cdot in^2$

Net Diameter = $D_n := \frac{2\cdot\sqrt{A_n}}{\sqrt{\pi}} = 0.658\cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.165\cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi\cdot D_n^{\ 3}}{32} = 0.028\cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM\cdot\frac{d_5}{I_p} - \frac{Axial}{N} = 64.9\cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL.Gross} := 0.75\cdot A_g\cdot F_u = 67.6\cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}}\cdot 100 = 96$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Note Shear stress is negligible

Flange Plate Analysis:

Force from Bolts =

$$C_1 := \frac{OM \cdot d_4}{I_p} + \frac{Axial}{N} = 61.7 \cdot kips$$

$$C_2 := \frac{OM \cdot d_5}{I_p} + \frac{Axial}{N} = 67.5 \cdot kips$$

Applied Bending Stress in Plate =

$$f_{bp} := \frac{6 \cdot \left(2C_1 \cdot ma_1 + 4 \cdot C_2 \cdot ma_2\right)}{B_{eff} \cdot t_{bp}^{\ 2}} = 39.29 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} \cdot 100 = 72.8$$

Condition3 =

$$Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$$

Condition2 = "Ok"

Flange Bolts and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 821 \cdot ft \cdot kips$	(Input From Risa-3D)
Shear Force =	$Shear := 20.7 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 29.7 \cdot kips$	(Input From Risa-3D)

Flange Bolt Data:

Use ASTM A490

Number of Flange Bolts =	$N := 24$	(User Input)
Bolt Ultimate Strength =	$F_u := 150 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 125 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 0.875 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

Flange Plate Data:

Use ASTM A572 Gr 60

Plate Yield Strength =	$Fy_{bp} := 60 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.75 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 3.5in$ (User Input)

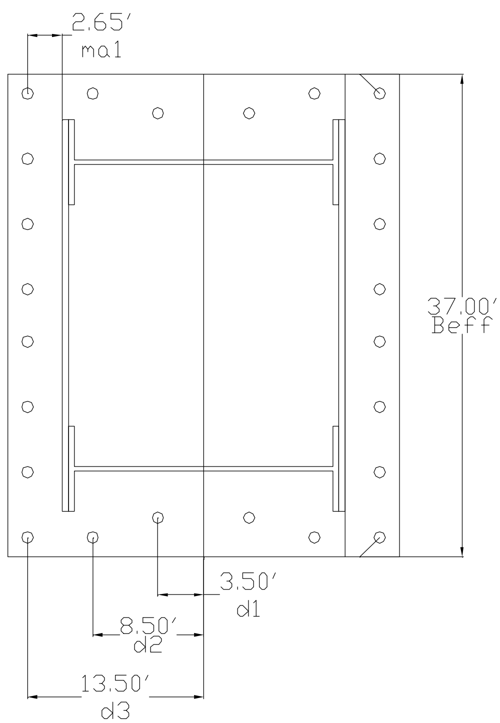
$d_2 := 8.5in$ (User Input)

$d_3 := 13.5in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.65in$ (User Input)

Effective Width of Flange Plate for Bending = $B_{eff} := 37.0in$ (User Input)



FLANGE BOLT AND PLATE GEOMETRY

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 16\right] = 3.254 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.601 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.341 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.658 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.165 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.028 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_3}{I_p} - \frac{Axial}{N} = 39.6 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL.Gross} := (.75 A_g \cdot F_u) = 67.6 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} \cdot 100 = 58.6$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Note Shear stress is negligible

Flange Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_3}{I_p} + \frac{Axial}{N} = 42.1 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot \left(8C_1 \cdot ma_1\right)}{B_{eff} \cdot t_{bp}^{\ 2}} = 47.27 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 54 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 87.5$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition2 = "Ok"

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment = $OM := 4511 \cdot ft \cdot kips$ (Input From Risa3D)

Shear Force = $Shear := 39.9 \cdot kips$ (Input From Risa3D)

Axial Force = $Axial := 50.9 \cdot kips$ (Input From Risa3D)

Anchor Bolt Data:

Use ASTM A615 Grade 60

Number of Anchor Bolts = $N := 26$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 90 \cdot ksi$ (User Input)

Bolt Yield Strength = $F_y := 60 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Base Plate Data:

Use ASTM A572 Grade 42

Plate Yield Strength = $Fy_{bp} := 42 \cdot ksi$ (User Input)

Base Plate Thickness = $t_{bp} := 3.0 \cdot in$ (User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 7.5in$ (User Input)

$d_2 := 15.0in$ (User Input)

$d_3 := 22.5in$ (User Input)

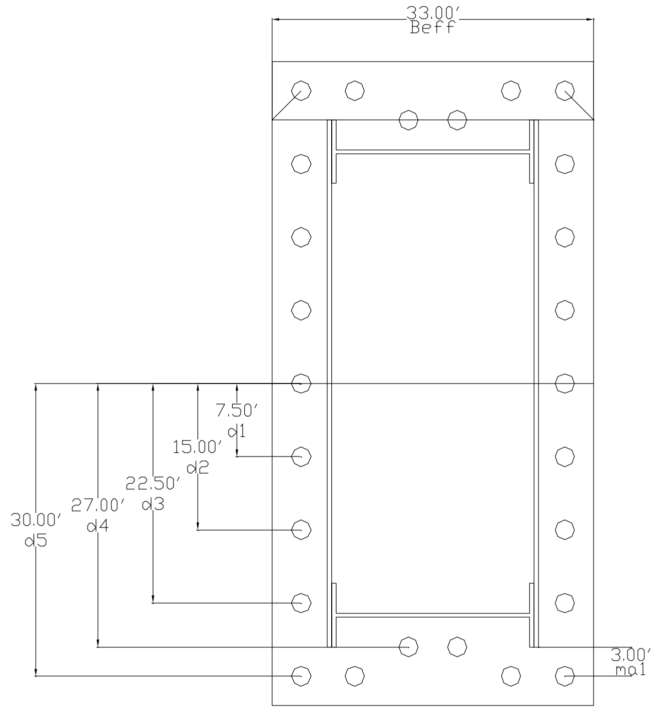
$d_4 := 27.0in$ (User Input)

$d_5 := 30in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 3.0in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 33.0in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 4 + (d_4)^2 \cdot 4 + (d_5)^2 \cdot 8\right] = 1.327 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_5}{I_p} - \frac{Axial}{N} = 120.5 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL} := (A_n \cdot F_y) = 194.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} \cdot 100 = 61.8$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Note Shear stress is negligible

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_5}{I_p} + \frac{Axial}{N} = 124.4 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot (4C_1 \cdot ma_1)}{B_{eff} \cdot t_{bp}^{2}} = 30.15 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := Fy_{bp} = 42 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 71.8$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

$Condition2 = \text{"Ok"}$

Anchor Bolt and Base Plate Analysis:

Input Data:

<u>Tower Reactions:</u>

Overturning Moment =	$OM := 3383 \cdot ft \cdot kips$	(Input From RISA-3D)
Shear Force =	$Shear := 36.6 \cdot kips$	(Input From Risa-3D)
Axial Force =	$Axial := 50.9 \cdot kips$	(Input From Risa-3D)

<u>Anchor Bolt Data:</u>

Use ASTM A615 Grade 60

Number of Anchor Bolts =	$N := 26$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)

<u>Base Plate Data:</u>

Use ASTM A572 Grade 42

Plate Yield Strength =	$Fy_{bp} := 42 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 3.0 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

$d_1 := 2.5in$ (User Input)

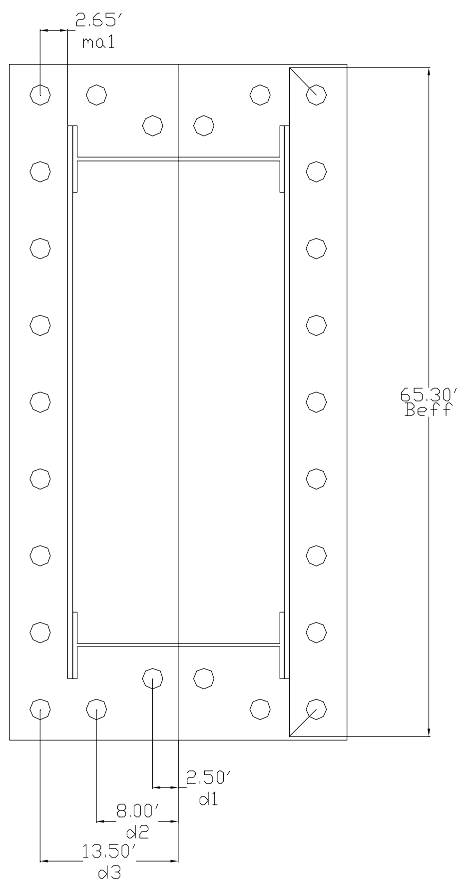
$d_2 := 8.0in$ (User Input)

$d_3 := 13.5in$ (User Input)

Critical Distances For Bending in Plate:

$ma_1 := 2.65in$ (User Input)

Effective Width of Baseplate for Bending = $B_{eff} := 65.3in$ (User Input)



ANCHOR BOLT AND PLATE GEOMETRY

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \left[(d_1)^2 \cdot 4 + (d_2)^2 \cdot 4 + (d_3)^2 \cdot 18\right] = 3.562 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{d_3}{I_p} - \frac{Axial}{N} = 151.9 \cdot kips$

Allowable Tensile Force (Gross Area) = $T_{ALL} := (A_n \cdot F_y) = 194.9 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL}} \cdot 100 = 78$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Note Shear stress is negligible

Base Plate Analysis:

Force from Bolts = $C_1 := \frac{OM \cdot d_3}{I_p} + \frac{Axial}{N} = 155.838 \cdot kips$

Applied Bending Stress in Plate = $f_{bp} := \frac{6 \cdot (9C_1 \cdot ma_1)}{B_{eff} \, t_{bp}^{\,2}} = 37.95 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := Fy_{bp} = 42 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} \cdot 100 = 90.3$

Condition3 = Condition3 := if$\left(\frac{f_{bp}}{F_{bp}} < 1.00, \text{"Ok"}, \text{"Overstressed"}\right)$

Condition3 = "Ok"

Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 4511 \cdot 1.1 \cdot ft \cdot kips = 4962 \cdot ft \cdot kips$	(User Input from PLS-Pole)
Shear Force =	$Shear := 39.9 \cdot kip \cdot 1.1 = 43.89 \cdot kips$	(User Input from PLS-Pole)
Axial Force =	$Axial := 50.9 \cdot kip \cdot 1.1 = 55.99 \cdot kips$	(User Input from PLS-Pole)
Tower Height =	$H_t := 150 \cdot ft$	(User Input)

Footing Data:

Depth to Bottom of Footing =	$D_f := 20.5 \cdot ft$	(User Input)
Length of Pier =	$L_p := 8 \cdot ft$	(User Input)
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)
Width of Pier =	$W_p := 8 \cdot ft$	(User Input)
Depth of Soil =	$D_{soil} := 8 \cdot ft$	(User Input)
Depth of Rock =	$D_{rock} := 13 \cdot ft$	(User Input)

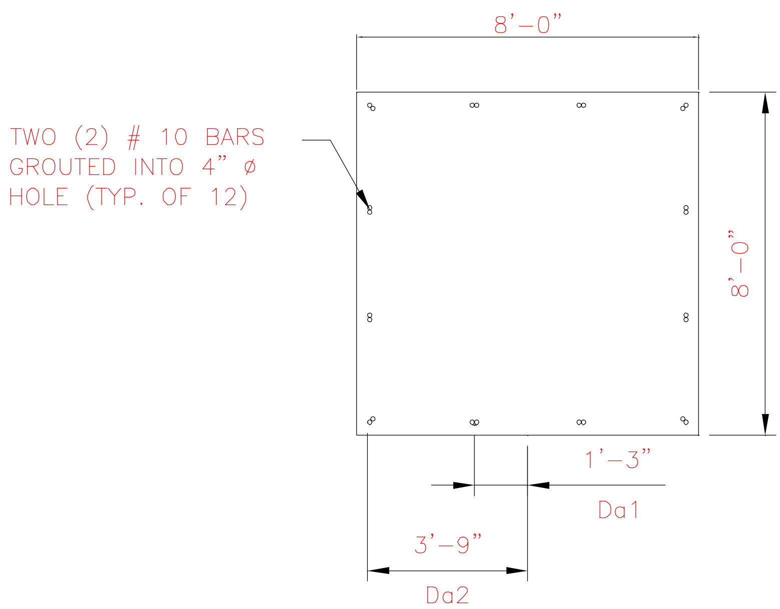
Material Properties:

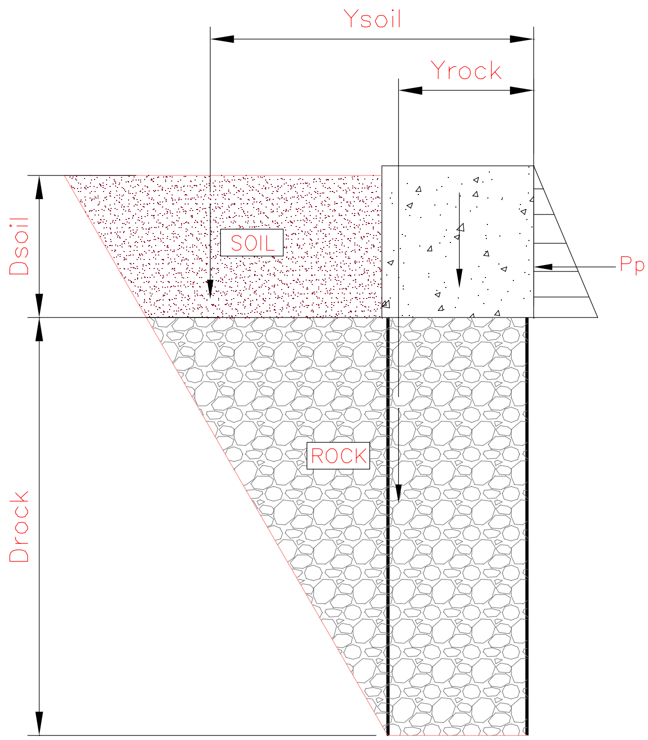
Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Internal Friction Angle of Rock =	$\Phi_r := 35 \cdot deg$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4000 \cdot psf$	(User Input)	
Allowable Rock Bearing Capacity =	$q_{rock} := 50000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 120 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Unit Weight of Rock =	$\gamma_{rock} := 160 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Rock Anchor Properties:

ASTM A615 Grade 60

Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)	
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)	
Anchor Diameter =	$d_{ra} := 2.54 \cdot in$	(User Input)	(2 # 10 Bars)
Hole Diameter =	$d_{Hole} := 4 \cdot in$	(User Input)	
Grout Strength =	$\tau := 120 \cdot psi$	(User Input)	(Assumed Conservative Value)
Distance to Rock Anchor Group 1 =	$D_{a1} := 15 \cdot in$	(User Input)	
Distance to Rock Anchor Group 2 =	$D_{a2} := 45 \cdot in$	(User Input)	
Number of Rock Anchors in Group 1 =	$N_{a1} := 4$	(User Input)	
Number of Rock Anchors in Group 2 =	$N_{a2} := 8$	(User Input)	
Total Number of Rock Anchors =	$N_{atot} := 12$	(User Input)	





Area 1 =	$A1 := \frac{1}{2}\cdot\tan(\Phi_s)\cdot D_{soil}^2 = 18.475\,ft^2$	sf
Area 2 =	$A2 := \tan(\Phi_r)\cdot D_{rock}\cdot D_{soil} = 72.822\,ft^2$	sf
Distance to Centroid 1 =	$Y1 := \tan(\Phi_r)\cdot D_{rock} + \frac{1}{3}\cdot\tan(\Phi_s)\cdot D_{soil} = 10.642\,ft$	ft
Distance to Centroid 2 =	$Y2 := \frac{1}{2}\cdot\tan(\Phi_r)\cdot D_{rock} = 4.551\,ft$	ft
Distance from Toe to Centroid of Soil =	$Y_{soil} := \frac{(A1\cdot Y1 + A2\cdot Y2)}{(A1 + A2)} + W_p = 13.78\,ft$	ft

Area 1 =	$A1 := \frac{1}{2}\cdot\tan(\Phi_r)\cdot D_{rock}^2 = 59.168\,ft^2$	sf
Area 2 =	$A2 := W_p\cdot D_{rock} = 104\,ft^2$	sf
Distance to Centroid 1 =	$Y1 := W_p + \frac{1}{3}\cdot\tan(\Phi_r)\cdot D_{rock} = 11.034\,ft$	ft
Distance to Centroid 2 =	$Y2 := \frac{W_p}{2} = 4\,ft$	ft
Distance from Toe to Centroid of Rock =	$Y_{rock} := \frac{(A1\cdot Y1 + A2\cdot Y2)}{(A1 + A2)} = 6.55\,ft$	ft

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{conc} - 62.4\text{pcf}, \gamma_{conc}) = 150 \cdot \text{pcf}$

Adjusted Soil Unit Weight = $\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{soil} - 62.4\text{pcf}, \gamma_{soil}) = 120 \cdot \text{pcf}$

Coefficient of Lateral Soil Pressure = $K_p := \dfrac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Passive Pressure = $P_{top} := 0 = 0 \cdot \text{ksf}$

$P_{bot} := K_p \cdot \gamma_s \cdot D_{soil} + c \cdot 2 \cdot \sqrt{K_p} = 2.88 \cdot \text{ksf}$

$P_{ave} := \dfrac{P_{top} + P_{bot}}{2} = 1.44 \cdot \text{ksf}$

$A_p := W_p \cdot (L_p - L_{pag}) = 60\,\text{ft}^2$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 86.4 \cdot \text{kip}$

Weight of Concrete Pad = $WT_c := \left(W_p^{\,2} \cdot L_p\right) \cdot \gamma_c = 76.8 \cdot \text{kip}$

Weight of Soil Wedge at Back Face = $WT_{s1} := \left[W_p \cdot D_{soil} \cdot \tan(\Phi_s) \cdot \left(\dfrac{D_{soil}}{2} + D_{rock}\right)\right] \cdot \gamma_s = 75.379 \cdot \text{kip}$

Weight of Soil Wedge at Back Face Corners = $WT_{s2} := 2 \cdot \left[\dfrac{\left(D_f^{\,3} - D_{rock}^{\,3}\right)}{3} \cdot \left(\tan(\Phi_s)\right)^2\right] \cdot \gamma_s = 171.15 \cdot \text{kips}$

Total Weight of Soil = $WT_{Stot} := WT_{s1} + WT_{s2} = 246.5 \cdot \text{kips}$

Weight of Rock Between Rock Anchors = $WT_{R1} := \left(W_p^{\,2} \cdot D_{rock}\right) \cdot \gamma_{rock} = 133.12 \cdot \text{kip}$

Weight of Rock Wedge at Back Face = $WT_{R2} := \left(\dfrac{D_{rock}^{\,2} \cdot \tan(\Phi_r)}{2} \cdot W_p\right) \cdot \gamma_{rock} = 75.734 \cdot \text{kip}$

Weight of Rock at Back Face Corners = $WT_{R3} := 2 \cdot \left[\dfrac{D_{rock}}{3} \cdot \left(\tan(\Phi_r) \cdot D_{rock}\right)^2\right] \cdot \gamma_{rock} = 114.898 \cdot \text{kips}$

Total Weight of Rock = $WT_{Rtot} := WT_{R1} + WT_{R2} + WT_{R3} = 323.8 \cdot \text{kips}$

Resisting Moment = $M_r := (WT_c + \text{Axial}) \cdot \dfrac{W_p}{2} + S_u \cdot \dfrac{(L_p - L_{pag})}{3} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 6266 \cdot \text{kip} \cdot \text{ft}$

Overturning Moment = $M_{ot} := OM + \text{Shear} \cdot L_p = 5313 \cdot \text{kip} \cdot \text{ft}$

Factor of Safety Actual = $FS := \dfrac{M_r}{M_{ot}} = 1.18$

Factor of Safety Required = $FS_{req} := 1.0$

$\text{OverTurning\_Moment\_Check} := \text{if}(FS \geq FS_{req}, \text{"Okay"}, \text{"No Good"})$

$\text{OverTurning\_Moment\_Check} = \text{"Okay"}$

Rock Anchor Check

Polar Moment of Inertia = $I_p := \left(D_{a1}^2 \cdot N_{a1} + D_{a2}^2 \cdot N_{a2}\right) = 17100 \cdot in^2$

Maximum Tension Force = $T_{Max} := \frac{OM \cdot D_{a2}}{I_p} - \frac{Axial + WT_c}{N_{atot}} = 145.6 \cdot kips$

Gross Area of Bolt Group = $A_g := \frac{\pi}{4} \cdot d_{ra}^2 = 5.067 \cdot in^2$

Allowable Tension = $T_{all} := A_g \cdot F_y = 304 \cdot kips$

$\frac{T_{Max}}{T_{all}} = 47.9 \cdot \%$

Condition1 := if($T_{Max} < T_{all}$, "OK", "NG")

Condition1 = "OK"

Check Bond Strength:

Bond Strength = $Bond\_Strength := d_{Hole} \cdot \pi \cdot D_{rock} \cdot \tau = 235 \cdot kips$

$\frac{T_{Max}}{Bond\_Strength} = 61.9 \cdot \%$

Condition2 := if($T_{Max} < Bond\_Strength$, "OK", "NG")

Condition2 = "OK"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTL05089	DATE:	12/19/2018	RF DESIGN ENG:	MD Mateen	RF PERF ENG:		RFDS PROGRAM TYPE:	2019 LTE Next Carrier
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	5107767382	RF PERF PHONE:		RFDS TECHNOLOGY:	LTE
REVISION:	Preliminary	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	mm093q@att.com	RF PERF EMAIL:		STATE/STATUS:	Preliminary/Approved

INITIATIVE / PROJECT:	LTE 5C AWSJ, LTE 700 BC 4T4R, LTE 1900 A3-A4 & E, LTE 850 5G NR Upgrade. TMA check availability

RFDS VERSION	1.00	RFDS ID:	2746129		
GSM FREQUENCY:		Created By:	mm093q	Updated By:	mm093q
UMTS FREQUENCY:	850	Created:	12/19/2018	Updated:	1/9/2019
LTE FREQUENCY:	700,850,1900,AWS,WCS				
5G FREQUENCY:	850				
IPLAN JOB # 1:	NER-RCTB-18-09443	PRD || SUB GRP #1	LTE Next Carrier || LTE 5C		
IPLAN JOB # 2:	NER-RCTB-18-09531	PRD || SUB GRP #2	Antenna Modifications || 4TX4RX Software Retrofit		
IPLAN JOB # 3:	NER-RCTB-18-09530	PRD || SUB GRP #3	Antenna Modifications || 4TX4RX Software Retrofit		
IPLAN JOB # 4:	NER-RCTB-18-09575	PRD || SUB GRP #4	Cell Site RF Modifications || 5G NR Upgrade		
IPLAN JOB # 5:		PRD || SUB GRP #5			
IPLAN JOB # 6:		PRD || SUB GRP #6			
IPLAN JOB # 7:		PRD || SUB GRP #7			
IPLAN JOB # 8:		PRD || SUB GRP #8			

Section 2 - LOCATION INFORMATION

USID:	**16687**	FA LOCATION CODE:	**10071285**	LOCATION NAME:	TRUMBULL SOUTH	ORACLE PRJT # 1:		PACE JOB #1:	MRCTB038084
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT	ORACLE PRJT # 2:		PACE JOB #2:	MRCTB038109
ADDRESS:.	124 QUARRY ROAD	CITY:	TRUMBULL	STATE:	CT	ORACLE PRJT # 3:		PACE JOB #3:	MRCTB038097
ZIP CODE:	06611	COUNTY:	FAIRFIELD	LONG (DEC. DEG.):	-73.1866989	ORACLE PRJT # 4:		PACE JOB #4:	MRCTB038096
LATITUDE (D-M-S):	41d 13m55.89084s	LONGITUDE (D-M-S):	-73d -11m-12.11604s	LAT (DEC. DEG.):	41.2321919	ORACLE PRJT # 5:		PACE JOB #5:	

DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:

TRUMBULL (CROWN THEATRES) CT-089
TAKE RT. 287 EAST TO EXIT 9-N MERRITT PARKWAY NORTH. GET OFF EXIT 49S (RT 25) FOLLOW TO EXIT 6 TAKE A LEFT AT END OF RAMP.FOLLOW TO NEXT LIGHT MAKE LEFT.FOLLOW TO END OF ROAD CHAIN GATE (COMBO 8899 FOR NOW) FOLLOW DIRT ROAD TO SITE (POWER POLE UP ON THE HILL).DEMARC IS IN GRAY BOX OUTSIDE SITE.
ADDRESS:124 QUARRY RD , TRUMBULL, CONNECTICUT 06606
ACCESS: (8899)GATE (5000)COMPOUND COMBO
CONTACT: SPRINT COMMUNICATIONS
SECURITY: NONE
POWER COMPANY: UNITED ILLUMINATING (800) 722-5584
METER#: 096503307
APPLETON PLUG: AR 200 33RS
FIRE: (203-261-3665) POLICE: (203-261-3665)
CIRCUITS: HCGS// 686414 HCGS// 686415
SNET: (800) 448-1008 AND (203) 420-3131 (24-HR REPAIR)
P.O.T.S (NOT INSTALLED)

AS PER FT< CID HCGS/694536 ET 106

ORACLE PRJT # 6:		PACE JOB #6:			
ORACLE PRJT # 7:		PACE JOB #7:			
ORACLE PRJT # 8:		PACE JOB #8:			
BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:			
AM STUDY REQ'D (Y/N):	No	SEARCH RING ID:			
FREQ COORD:		BTA:		MSA / RSA:	
OPS DISTRICT:	CT-South	LAC(GSM):			
OPS ZONE:	NE_CT_S_FRFD_CTL_CS	LAC(UMTS):	05989		
RF DISTRICT:	NPO Triage	BSC(GSM):			
RF ZONE:	Hotseat	RNC(UMTS):	BRIDGEPORT RNC06 ERICSSON 3820		
PARENT NAME(GSM):		MME POOL ID(LTE):	FF01		
PARENT NAME(UMTS):	BRPTCT04CRBR06				

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	CGSA LOSS:		PCS REDUCED - UPS ZIP:		CGSA CALL SIGNS:	KNKA256,KNKA256,KNKA256
CGSA - MINOR FILING NEEDED (Yes/No):	No	CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:			
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	CGSA SCORECARD UPDATED:					

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	No	GROUND ELEVATION (ft):		STRUCTURE TYPE:	UTILITY	MARKET LOCATION 700 MHz Band:	
ADDITIONAL REGULATORY?:	No	HEIGHT OVERALL (ft):	0.00	FCC ASR NUMBER:	NR	MARKET LOCATION 850 MHz Band:	
SUB-LEASE RIGHTS?:	No	STRUCTURE HEIGHT (ft):	160.72			MARKET LOCATION 1900 MHz Band:	
LIGHTING TYPE:	NOT REQUIRED					MARKET LOCATION AWS Band:	
						MARKET LOCATION WCS Band:	
						MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911				INTRADO_MIAMI		0		
SECTOR B				INTRADO_MIAMI		0		
SECTOR C				INTRADO_MIAMI		0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
SECTOR A E-911				INTRADO_MIAMI		0		
SECTOR B				INTRADO_MIAMI		0		
SECTOR C				INTRADO_MIAMI		0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 6 - RBS GENERAL INFORMATION - existing

	UMTS 1ST RBS	LTE 1ST RBS	5G 1ST RBS
RBS ID:	402370	360133	
CTS COMMON ID:	CTU4089	CTL05089	
CELL ID / BCF:	CTU4089	CTL05089	
BTA/TID:	321W	321L	
4-9 DIGIT SITE ID:	04089	5089	
COW OR TOY?:	No	No	
CELL SITE TYPE:	SECTORIZED	SECTORIZED	
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	
BTS LOCATION ID:	GROUND	INTERNAL	
BASE STATION TYPE:	OVERLAY	BASE	
EQUIPMENT NAME:	TRUMBULL SOUTH	TRUMBULL SOUTH	
DISASTER PRIORITY:	0	3	

Section 6 - RBS GENERAL INFORMATION - final

	UMTS 1ST RBS	LTE 1ST RBS	5G 1ST RBS
RBS ID:	402370	360133	RFDS_44049948
CTS COMMON ID:	CTU4089	CTL05089	CTCN005089
CELL ID / BCF:	CTU4089	CTL05089	CTCN005089
BTA/TID:	321W	321L	321L
4-9 DIGIT SITE ID:	04089	5089	005089
COW OR TOY?:	No	No	No
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL
BTS LOCATION ID:	GROUND	INTERNAL	INTERNAL
BASE STATION TYPE:	OVERLAY	BASE	BASE
EQUIPMENT NAME:	TRUMBULL SOUTH	TRUMBULL SOUTH	TRUMBULL SOUTH
DISASTER PRIORITY:	0	3	3

Section 7 - RBS SPECIFIC INFORMATION - existing

	UMTS 1ST RBS	LTE 1ST RBS	5G 1ST RBS
RAC:			
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	
EQUIPMENT TYPE:	6601 MAIN UNIT UMTS	6601 INDOOR MU	
BASEBAND CONFIGURATION:		1x6601 / 1x5216 / 1xXMU03	
LOCATION:			
CABINET LOCATION:			
MARKET STATE CODE:		CT	
AGPS:	Yes	Yes	
NODE B NUMBER:	0	5089	

Section 7 - RBS SPECIFIC INFORMATION - final

	UMTS 1ST RBS	LTE 1ST RBS	5G 1ST RBS
RAC:			
EQUIPMENT VENDOR:	ERICSSON	ERICSSON	ERICSSON
EQUIPMENT TYPE:	6601 MAIN UNIT UMTS	6601 INDOOR MU	BASEBAND 6630 5G
BASEBAND CONFIGURATION:		1x6601 / 1x6630 / 1xXMU03	xxxxx / 1x6630 / xxxxx
LOCATION:			
CABINET LOCATION:			
MARKET STATE CODE:		CT	CT
AGPS:	Yes	Yes	Yes
NODE B NUMBER:	0	5089	5089

Section 8 - RBS/SECTOR ASSOCIATION - existing

	UMTS 1ST RBS	LTE 1ST RBS	5G 1ST RBS
CTS Common ID	CTU4089	CTL05089	
Soft Sector IDs	CTV40891	CTL05089_3A_1	
	CTV40892	CTL05089_3B_1	
	CTV40893	CTL05089_3C_1	
		CTL05089_7A_1	
		CTL05089_7B_1	
		CTL05089_7C_1	
		CTL05089_8A_1	
		CTL05089_8B_1	
		CTL05089_8C_1	
		CTL05089_9A_1	
		CTL05089_9A_2	
		CTL05089_9B_1	
		CTL05089_9B_2	
		CTL05089_9C_1	
		CTL05089_9C_2	

Section 8 - RBS/SECTOR ASSOCIATION - final

	UMTS 1ST RBS	LTE 1ST RBS	5G 1ST RBS
CTS Common ID	CTU4089	CTL05089	CTCN005089
Soft Sector IDs	CTV40891	CTL05089_2A_2	CTCN005089_N005A_1
	CTV40892	CTL05089_2B_2	CTCN005089_N005B_1
	CTV40893	CTL05089_2C_2	CTCN005089_N005C_1
		CTL05089_3A_1	
		CTL05089_3B_1	
		CTL05089_3C_1	
		CTL05089_7A_1	
		CTL05089_7B_1	
		CTL05089_7C_1	
		CTL05089_8A_1	
		CTL05089_8B_1	
		CTL05089_8C_1	
		CTL05089_9A_1	
		CTL05089_9A_2	
		CTL05089_9B_1	
		CTL05089_9B_2	
		CTL05089_9C_1	
		CTL05089_9C_2	

Section 9 - SOFT SECTOR ID - existing

	UMTS 1ST 850	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST WCS	LTE 2ND 1900	LTE 4TH AWS	5G 1ST 850
USEID (excluding Hard Sector)	16687.850.3G.2							
SECTOR A SOFT SECTOR ID	CTV40891	CTL05089_7A_1	CTL05089_8A_1	CTL05089_9A_1	CTL05089_3A_1	CTL05089_9A_2		
SECTOR B	CTV40892	CTL05089_7B_1	CTL05089_8B_1	CTL05089_9B_1	CTL05089_3B_1	CTL05089_9B_2		
SECTOR C	CTV40893	CTL05089_7C_1	CTL05089_8C_1	CTL05089_9C_1	CTL05089_3C_1	CTL05089_9C_2		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 9 - SOFT SECTOR ID - final

	UMTS 1ST 850	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST WCS	LTE 2ND 1900	LTE 4TH AWS	5G 1ST 850
USEID (excluding Hard Sector)	16687.850.3G.2							
SECTOR A SOFT SECTOR ID	CTV40891	CTL05089_7A_1	CTL05089_8A_1	CTL05089_9A_1	CTL05089_3A_1	CTL05089_9A_2	CTL05089_2A_2	CTCN005089_N005A_1
SECTOR B	CTV40892	CTL05089_7B_1	CTL05089_8B_1	CTL05089_9B_1	CTL05089_3B_1	CTL05089_9B_2	CTL05089_2B_2	CTCN005089_N005B_1
SECTOR C	CTV40893	CTL05089_7C_1	CTL05089_8C_1	CTL05089_9C_1	CTL05089_3C_1	CTL05089_9C_2	CTL05089_2C_2	CTCN005089_N005C_1
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 9 - Cell Number - existing

	UMTS 1ST 850	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST WCS	LTE 2ND 1900	LTE 4TH AWS	5G 1ST 850
USEID (excluding Hard Sector)	16687.850.3G.2							
SECTOR A CELL NUMBER		15	1	8	149	178		
SECTOR B		16	2	9	150	179		
SECTOR C		17	3	10	151	180		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 9 - Cell Number - final

	UMTS 1ST 850	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST WCS	LTE 2ND 1900	LTE 4TH AWS	5G 1ST 850
USEID (excluding Hard Sector)	16687.850.3G.2							
SECTOR A CELL NUMBER		15	1	8	149	178	192	1
SECTOR B		16	2	9	150	179	193	2
SECTOR C		17	3	10	151	180	194	3
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 10 - CID/SAC - existing

	UMTS 1ST 850	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST WCS	LTE 2ND 1900	LTE 4TH AWS	5G 1ST 850
SECTOR A CID/SAC	40891							
SECTOR B	40892							
SECTOR C	40893							
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 10 - CID/SAC - final

	UMTS 1ST 850	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST WCS	LTE 2ND 1900	LTE 4TH AWS	5G 1ST 850
SECTOR A CID/SAC	40891							
SECTOR B	40892							
SECTOR C	40893							
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 11 - CURRENT RADIO COUNTS existing

Section 12 - CURRENT T1 COUNTS existing

Section 13 - NEW/PROPOSED RADIO COUNTS

Section 14 - NEW/PROPOSED T1 COUNTS

Section 15A - CURRENT TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	QS66512-2							
ANTENNA VENDOR	Quintel							
ANTENNA SIZE (H x W x D)	72X12X9.6							
ANTENNA WEIGHT	111							
AZIMUTH	30							
MAGNETIC DECLINATION								
RADIATION CENTER (feet)	160							
ANTENNA TIP HEIGHT	163							
MECHANICAL DOWNTILT	0							
FEEDER AMOUNT	4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)								
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)								
Antenna RET Motor (QTY/MODEL)		Built-in						
SURGE ARRESTOR (QTY/MODEL)	12	Andrew APTDC-BDFDM-DB						
DIPLEXER (QTY/MODEL)	4	CCI Pentaplexer 5PX-0726-O						
DUPLEXER (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070						
DC BLOCK (QTY/MODEL)								
TMA/LNA (QTY/MODEL)	2	TMA2117F00V1-1 (Twin PCS-						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	ATSBT-BOTTOM-FF-4G						
PDU FOR TMAS (QTY/MODEL)								
FILTER (QTY/MODEL)								
SQUID (QTY/MODEL)								
FIBER TRUNK (QTY/MODEL)								
DC TRUNK (QTY/MODEL)								
REPEATER (QTY/MODEL)								
RRH - 700 band (QTY/MODEL)	1	RRUS-11 (REUSE ONLY)						
RRH - 850 band (QTY/MODEL)	1	RRUS-12						
RRH - 1900 band (QTY/MODEL)	2	RRUS-12						
RRH - AWS band (QTY/MODEL)								
RRH - WCS band (QTY/MODEL)	1	RRUS-32						
Additional RRH #1 - any band (QTY/MODEL)								
Additional RRH #2 - any band (QTY/MODEL)								
Additional Component 1 (QTY/MODEL)								
Additional Component 2 (QTY/MODEL)								
Additional Component 3 (QTY/MODEL)								
Local Market Note 1								
Local Market Note 2								
Local Market Note 3								

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1		16687.A.850.3G.222	CTV40891	CTV40891		UMTS 850	2_849MHz_00DT	13.3	30	0	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			818.46		1	
	PORT 2		16687.A.850.4G.1	CTL05089_8A_1	CTL05089_8A_1		LTE 850	2_850MHz_04DT	13.6	30	4	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		1	
	PORT 3		16687.A.WCS.4G.1	CTL05089_3A_1	CTL05089_3A_1		LTE WCS	2_2355MHz_03DT	16.7	30	3	Bottom	Andrew 1-5/8	185						1285.2866		2	
	PORT 4		16687.A.1900.4G.1	CTL05089_9A_1	CTL05089_9A_1		LTE 1900	2_1930MHz_03DT	15.9	30	3	Bottom	Andrew 1-5/8	185						4842.058		2	
	PORT 5		16687.A.700.4G.1	CTL05089_7A_1	CTL05089_7A_1		LTE 700	2_722MHz_03DT	13.5	30	3	Bottom	Andrew 1-5/8	185						1475.7065		1	
	PORT 7		16687.A.1900.4G.2	CTL05089_9A_2	CTL05089_9A_2		LTE 1900	2_1930MHz_03DT	15.9	30	3	Bottom	Andrew 1-5/8	185						4842.058		2	

Section 15B - CURRENT TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	QS66512-2													
ANTENNA VENDOR	Quintel													
ANTENNA SIZE (H x W x D)	72X12X9.6													
ANTENNA WEIGHT	111													
AZIMUTH	150													
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160													
ANTENNA TIP HEIGHT	163													
MECHANICAL DOWNTILT	0													
FEEDER AMOUNT	4													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in												
SURGE ARRESTOR (QTY/MODEL)	12	Andrew APTDC-BDFDM-DB												
DIPLEXER (QTY/MODEL)	4	CCI Pentaplexer 5PX-0726-O												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	TMA2117F00V1-1 (Twin PCS-												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	ATSBT-BOTTOM-FF-4G												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	RRUS-11 (REUSE ONLY)												
RRH - 850 band (QTY/MODEL)	1	RRUS-12												
RRH - 1900 band (QTY/MODEL)	2	RRUS-12												
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)	1	RRUS-32												
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1		16687.B.850.3G.1	CTV40892	CTV40892		UMTS 850	RR_840MHz_00DT	14.69	150	0	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850					9	
	PORT 2		16687.B.850.4G.1	CTL05089_8B_1	CTL05089_8B_1		LTE 850	2_850MHz_10DT	13.5	150	10	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		9	
	PORT 3		16687.B.WCS.4G.1	CTL05089_3B_1	CTL05089_3B_1		LTE WCS	2_2355MHz_03DT	16.7	150	3	Bottom	Andrew 1-5/8	185						1285.2866		10	
	PORT 4		16687.B.1900.4G.1	CTL05089_9B_1	CTL05089_9B_1		LTE 1900	2_1930MHz_02DT	16	150	2	Bottom	Andrew 1-5/8	185						4842.058		10	
	PORT 5		16687.B.700.4G.1	CTL05089_7B_1	CTL05089_7B_1		LTE 700	2_722MHz_10DT	13.1	150	10	Bottom	Andrew 1-5/8	185						1475.7065		9	
	PORT 7		16687.B.1900.4G.2	CTL05089_9B_2	CTL05089_9B_2		LTE 1900	2_1930MHz_02DT	16	150	2	Bottom	Andrew 1-5/8	185						4842.058		10	

Section 15C - CURRENT TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	QS66512-2							
ANTENNA VENDOR	Quintel							
ANTENNA SIZE (H x W x D)	72X12X9.6							
ANTENNA WEIGHT	111							
AZIMUTH	270							
MAGNETIC DECLINATION								
RADIATION CENTER (feet)	160							
ANTENNA TIP HEIGHT	163							
MECHANICAL DOWNTILT	0							
FEEDER AMOUNT	4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)								
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)								
Antenna RET Motor (QTY/MODEL)		Built-in						
SURGE ARRESTOR (QTY/MODEL)	12	Andrew APTDC-BDFDM-DB						
DIPLEXER (QTY/MODEL)	4	CCI Pentaplexer 5PX-0726-O						
DUPLEXER (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL)								
DC BLOCK (QTY/MODEL)								
TMA/LNA (QTY/MODEL)	2	TMA2117F00V1-1 (Twin PCS-						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	ATSBT-BOTTOM-FF-4G						
PDU FOR TMAS (QTY/MODEL)								
FILTER (QTY/MODEL)								
SQUID (QTY/MODEL)								
FIBER TRUNK (QTY/MODEL)								
DC TRUNK (QTY/MODEL)								
REPEATER (QTY/MODEL)								
RRH - 700 band (QTY/MODEL)	1	RRUS-11 (REUSE ONLY)						
RRH - 850 band (QTY/MODEL)	1	RRUS-12						
RRH - 1900 band (QTY/MODEL)	2	RRUS-12						
RRH - AWS band (QTY/MODEL)								
RRH - WCS band (QTY/MODEL)	1	RRUS-32						
Additional RRH #1 - any band (QTY/MODEL)								
Additional RRH #2 - any band (QTY/MODEL)								
Additional Component 1 (QTY/MODEL)								
Additional Component 2 (QTY/MODEL)								
Additional Component 3 (QTY/MODEL)								
Local Market Note 1								
Local Market Note 2								
Local Market Note 3								

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1		16687.C.850.3G.1	CTV40893	CTV40893		UMTS 850	RR_840MHz_00DT	14.69	270	0	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850					17	
	PORT 2		16687.C.850.4G.1	CTL05089_8C_1	CTL05089_8C_1		LTE 850	2_850MHz_02DT	13.2	270	2	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		17	
	PORT 3		16687.C.WCS.4G.1	CTL05089_3C_1	CTL05089_3C_1		LTE WCS	2_2355MHz_03DT	16.7	270	3	Bottom	Andrew 1-5/8	185						1285.2866		18	
	PORT 4		16687.C.1900.4G.1	CTL05089_9C_1	CTL05089_9C_1		LTE 1900	2_1930MHz_03DT	15.9	270	3	Bottom	Andrew 1-5/8	185						4842.058		18	
	PORT 5		16687.C.700.4G.1	CTL05089_7C_1	CTL05089_7C_1		LTE 700	2_722MHz_02DT	13.6	270	2	Bottom	Andrew 1-5/8	185						1475.7065		17	
	PORT 7		16687.C.1900.4G.2	CTL05089_9C_2	CTL05089_9C_2		LTE 1900	2_1930MHz_03DT	15.9	270	3	Bottom	Andrew 1-5/8	185						4842.058		18	

Section 16A - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL	800-10991													
ANTENNA VENDOR	Kathrien													
ANTENNA SIZE (H x W x D)	78.7X20X6.9													
ANTENNA WEIGHT	100.9													
AZIMUTH	30													
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160													
ANTENNA TIP HEIGHT	163													
MECHANICAL DOWNTILT	0													
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in												
SURGE ARRESTOR (QTY/MODEL)	16	TSXDC-4310FM												
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	8-31-43 (Twin AWS-WCS												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	B5/B12 4449												
RRH - 850 band (QTY/MODEL)		with another band												
RRH - 1900 band (QTY/MODEL)	1	B2/B66A 8843												
RRH - AWS band (QTY/MODEL)		with another band												
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)	2	DBCT108F1V92-2												
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 700 BC 4T4R, LTE													
Local Market Note 2	Check TMA													
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2		16687.A.850.4G.1	CTL05089_8A_1	CTL05089_8A_1		LTE 850	80010991_849 MHz_04DT	13.3	30	4	Bottom	Andrew 1-5/8	185						1000			
	PORT 4		16687.A.1900.4G.1	CTL05089_9A_1	CTL05089_9A_1		LTE 1900	80010991_1930 MHz_03DT	17.3	30	3	Bottom	Andrew 1-5/8	185						3664.3757			
	PORT 5		16687.A.700.4G.1	CTL05089_7A_1	CTL05089_7A_1		LTE 700	80010991_730 MHz_04DT	15.3	30	3	Bottom	Andrew 1-5/8	185						1475.7065			
	PORT 6		16687.A.850.5G.1	CTCN005089_N005A_1	CTCN005089_N005A_1		5G 850	80010991_849 MHz_04DT	13.3	30	4	Bottom	Andrew 1-5/8	185						1000			
	PORT 7		16687.A.1900.4G.4	CTL05089_9A_2	CTL05089_9A_2		LTE 1900	80010991_1930 MHz_03DT	17.3	30	3	Bottom	Andrew 1-5/8	185						3664.3757			
	PORT 8		16687.A.AWS.4G.4	CTL05089_2A_2	CTL05089_2A_2		LTE AWS	80010991_2170 MHz_03DT	16.2	30	3	Bottom	Andrew 1-5/8	185						3837.0724			

Section 16B - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL	800-10991													
ANTENNA VENDOR	Kathrien													
ANTENNA SIZE (H x W x D)	78.7X20X6.9													
ANTENNA WEIGHT	100.9													
AZIMUTH	150													
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160													
ANTENNA TIP HEIGHT	163													
MECHANICAL DOWNTILT	0													
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in												
SURGE ARRESTOR (QTY/MODEL)	16	TSXDC-4310FM												
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	8-31-43 (Twin AWS-WCS												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	B5/B12 4449												
RRH - 850 band (QTY/MODEL)		with another band												
RRH - 1900 band (QTY/MODEL)	1	B2/B66A 8843												
RRH - AWS band (QTY/MODEL)		with another band												
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)	2	DBCT108F1V92-2												
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	// Swap Existing Antenna with 12 port Antenna, // Swap LTE 700 BC radio with LTE 700/850 RADIO,													
Local Market Note 2	Check TMA													
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2		16687.B.850.4G.1	CTL05089_8B_1	CTL05089_8B_1		LTE 850	80010991_850MHz_10DT	13.4	150	10	Bottom	Andrew 1-5/8	185						1000			
	PORT 4		16687.B.1900.4G.1	CTL05089_9B_1	CTL05089_9B_1		LTE 1900	80010991_1930MHz_03DT	17.3	150	3	Bottom	Andrew 1-5/8	185						3664.3757			
	PORT 5		16687.B.700.4G.1	CTL05089_7B_1	CTL05089_7B_1		LTE 700	80010991_730MHz_04DT	15.3	150	3	Bottom	Andrew 1-5/8	185						1475.7065			
	PORT 6		16687.B.850.5G.1	CTCN005089_N005B_1	CTCN005089_N005B_1		5G 850	80010991_850MHz_10DT	13.4	150	10	Bottom	Andrew 1-5/8	185						1000			
	PORT 7		16687.B.1900.4G.4	CTL05089_9B_2	CTL05089_9B_2		LTE 1900	80010991_1930MHz_03DT	17.3	150	3	Bottom	Andrew 1-5/8	185						3664.3757			
	PORT 8		16687.B.AWS.4G.4	CTL05089_2B_2	CTL05089_2B_2		LTE AWS	80010991_2170MHz_02DT	16.2	150	2	Bottom	Andrew 1-5/8	185						3837.0724			

Section 16C - PLANNED/PROPOSED TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
Existing Antenna?														
ANTENNA MAKE - MODEL	800-10991													
ANTENNA VENDOR	Kathrien													
ANTENNA SIZE (H x W x D)	78.7X20X6.9													
ANTENNA WEIGHT	100.9													
AZIMUTH	270													
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160													
ANTENNA TIP HEIGHT	163													
MECHANICAL DOWNTILT	0													
FEEDER AMOUNT														
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in												
SURGE ARRESTOR (QTY/MODEL)	16	TSXDC-4310FM												
DIPLEXER (QTY/MODEL)														
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	8-31-43 (Twin AWS-WCS												
CURRENT INJECTORS FOR TMA (QTY/MODEL)														
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	B5/B12 4449												
RRH - 850 band (QTY/MODEL)		with another band												
RRH - 1900 band (QTY/MODEL)	1	B2/B66A 8843												
RRH - AWS band (QTY/MODEL)		with another band												
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)	2	DBCT108F1V92-2												
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	// Swap Existing Antenna with 12 port Antenna, // Swap LTE 700 BC radio with LTE 700/850 RADIO,													
Local Market Note 2	Check TMA													
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 2		16687.C.850.4G.1	CTL05089_8C_1	CTL05089_8C_1		LTE 850	80010991_850MHz_02DT	13.2	270	2	Bottom	Andrew 1-5/8	185						1000			
	PORT 4		16687.C.1900.4G.1	CTL05089_9C_1	CTL05089_9C_1		LTE 1900	80010991_1930MHz_03DT	17.3	270	3	Bottom	Andrew 1-5/8	185						3664.3757			
	PORT 5		16687.C.700.4G.1	CTL05089_7C_1	CTL05089_7C_1		LTE 700	80010991_730MHz_04DT	15.3	270	3	Bottom	Andrew 1-5/8	185						1475.7065			
	PORT 6		16687.C.850.5G.1	CTCN005089_N005C_1	CTCN005089_N005C_1		5G 850	80010991_850MHz_02DT	13.2	270	2	Bottom	Andrew 1-5/8	185						1000			
	PORT 7		16687.C.1900.4G.4	CTL05089_9C_2	CTL05089_9C_2		LTE 1900	80010991_1930MHz_03DT	17.3	270	3	Bottom	Andrew 1-5/8	185						3664.3757			
	PORT 8		16687.C.AWS.4G.4	CTL05089_2C_2	CTL05089_2C_2		LTE AWS	80010991_2170MHz_03DT	16.2	270	3	Bottom	Andrew 1-5/8	185						3837.0724			

Section 16.5A - SCOPING TOWER CONFIGURATION - SECTOR A (OR OMNI)

Section 17A - FINAL TOWER CONFIGURATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10991							
ANTENNA VENDOR	Kathrien							
ANTENNA SIZE (H x W x D)	78.7X20X6.9							
ANTENNA WEIGHT	100.9							
AZIMUTH	30							
MAGNETIC DECLINATION								
RADIATION CENTER (feet)	160							
ANTENNA TIP HEIGHT	163							
MECHANICAL DOWNTILT	0							
FEEDER AMOUNT	4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)								
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)								
Antenna RET Motor (QTY/MODEL)		Built-in						
SURGE ARRESTOR (QTY/MODEL)	16	TSXDC-4310FM						
DIPLEXER (QTY/MODEL)	4	CCI Pentaplexer 5PX-0726-O						
DUPLEXER (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070						
DC BLOCK (QTY/MODEL)								
TMA/LNA (QTY/MODEL)	2	8-31-43 (Twin AWS-WCS						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	ATSBT-BOTTOM-FF-4G						
PDU FOR TMAS (QTY/MODEL)								
FILTER (QTY/MODEL)								
SQUID (QTY/MODEL)								
FIBER TRUNK (QTY/MODEL)								
DC TRUNK (QTY/MODEL)								
REPEATER (QTY/MODEL)								
RRH - 700 band (QTY/MODEL)	1	B5/B12 4449						
RRH - 850 band (QTY/MODEL)		with another band						
RRH - 1900 band (QTY/MODEL)	1	B2/B66A 8843						
RRH - AWS band (QTY/MODEL)		with another band						
RRH - WCS band (QTY/MODEL)	1	RRUS-32						
Additional RRH #1 - any band (QTY/MODEL)								
Additional RRH #2 - any band (QTY/MODEL)								
Additional Component 1 (QTY/MODEL)	2	DBCT108F1V92-2						
Additional Component 2 (QTY/MODEL)								
Additional Component 3 (QTY/MODEL)								
Local Market Note 1	// Swap Existing Antenna with 12 port Antenna, // Swap LTE 700 BC radio with LTE 700/850 RADIO,							
Local Market Note 2	Check TMA							
Local Market Note 3								

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH
ANTENNA POSITION 1	PORT 1	16687.A.850.3G.2	16687.A.850.3G.222	CTV40891	CTV40891		UMTS 850	80010991_849MHz_00DT	13.3	30
	PORT 2	16687.A.850.4G.1	16687.A.850.4G.1	CTL05089_8A_1	CTL05089_8A_1		LTE 850	80010991_849MHz_04DT	13.3	30
	PORT 3	16687.A.WCS.4G.1	16687.A.WCS.4G.1	CTL05089_3A_1	CTL05089_3A_1		LTE WCS	80010991_2355MHz_03DT	17.3	30
	PORT 4	16687.A.1900.4G.1	16687.A.1900.4G.1	CTL05089_9A_1	CTL05089_9A_1		LTE 1900	80010991_1930MHz_03DT	17.3	30
	PORT 5	16687.A.700.4G.1	16687.A.700.4G.1	CTL05089_7A_1	CTL05089_7A_1		LTE 700	80010991_730MHz_04DT	15.3	30
	PORT 6	16687.A.850.5G.tmp1	16687.A.850.5G.1	CTCN005089_N005A_1	CTCN005089_N005A_1		5G 850	80010991_849MHz_04DT	13.3	30
	PORT 7	16687.A.1900.4G.2	16687.A.1900.4G.4	CTL05089_9A_2	CTL05089_9A_2		LTE 1900	80010991_1930MHz_03DT	17.3	30
	PORT 8	16687.A.AWS.4G.tmp4	16687.A.AWS.4G.4	CTL05089_2A_2	CTL05089_2A_2		LTE AWS	80010991_2170MHz_03DT	16.2	30

PORT NUMBER	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
PORT 1	0	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			818.46		1	
PORT 2	4	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		1	
PORT 3	3	Bottom	Andrew 1-5/8	185						1285.2866		2	
PORT 4	3	Bottom	Andrew 1-5/8	185						3664.3757		2	
PORT 5	3	Bottom	Andrew 1-5/8	185						1475.7065		1	
PORT 6	4	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		1	
PORT 7	3	Bottom	Andrew 1-5/8	185						3664.3757		2	
PORT 8	3	Bottom	Andrew 1-5/8	185						3837.0724		2	

Section 17B - FINAL TOWER CONFIGURATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	800-10991													
ANTENNA VENDOR	Kathrien													
ANTENNA SIZE (H x W x D)	78.7X20X6.9													
ANTENNA WEIGHT	100.9													
AZIMUTH	150													
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	160													
ANTENNA TIP HEIGHT	163													
MECHANICAL DOWNTILT	0													
FEEDER AMOUNT	4													
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)		Built-in												
SURGE ARRESTOR (QTY/MODEL)	16	TSXDC-4310FM												
DIPLEXER (QTY/MODEL)	4	CCI Pentaplexer 5PX-0726-O												
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	8-31-43 (Twin AWS-WCS												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	ATSBT-BOTTOM-FF-4G												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
REPEATER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)	1	B5/B12 4449												
RRH - 850 band (QTY/MODEL)		with another band												
RRH - 1900 band (QTY/MODEL)	1	B2/B66A 8843												
RRH - AWS band (QTY/MODEL)		with another band												
RRH - WCS band (QTY/MODEL)	1	RRUS-32												
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)	2	DBCT108F1V92-2												
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	// Swap Existing Antenna with 12 port Antenna, // Swap LTE 700 BC radio with LTE 700/850 RADIO,													
Local Market Note 2	Check TMA													
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1	16687.B.850.3G.2	16687.B.850.3G.1	CTV40892	CTV40892		UMTS 850	80010991_840MHz_00DT	14.69	150	0	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850					9	
	PORT 2	16687.B.850.4G.1	16687.B.850.4G.1	CTL05089_8B_1	CTL05089_8B_1		LTE 850	80010991_850MHz_10DT	13.4	150	10	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		9	
	PORT 3	16687.B.WCS.4G.1	16687.B.WCS.4G.1	CTL05089_3B_1	CTL05089_3B_1		LTE WCS	80010991_2355MHz_03DT	17.3	150	3	Bottom	Andrew 1-5/8	185						1285.2866		10	
	PORT 4	16687.B.1900.4G.1	16687.B.1900.4G.1	CTL05089_9B_1	CTL05089_9B_1		LTE 1900	80010991_1930MHz_03DT	17.3	150	3	Bottom	Andrew 1-5/8	185						3664.3757		10	
	PORT 5	16687.B.700.4G.1	16687.B.700.4G.1	CTL05089_7B_1	CTL05089_7B_1		LTE 700	80010991_730MHz_04DT	15.3	150	3	Bottom	Andrew 1-5/8	185						1475.7065		9	
	PORT 6	16687.B.850.5G.tmp1	16687.B.850.5G.1	CTCN005089_N005B_1	CTCN005089_N005B_1		5G 850	80010991_850MHz_10DT	13.4	150	10	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		9	
	PORT 7	16687.B.1900.4G.2	16687.B.1900.4G.4	CTL05089_9B_2	CTL05089_9B_2		LTE 1900	80010991_1930MHz_03DT	17.3	150	3	Bottom	Andrew 1-5/8	185						3664.3757		10	
	PORT 8	16687.B.AWS.4G.tmp4	16687.B.AWS.4G.4	CTL05089_2B_2	CTL05089_2B_2		LTE AWS	80010991_2170MHz_02DT	16.2	150	2	Bottom	Andrew 1-5/8	185						3837.0724		10	

Section 17C - FINAL TOWER CONFIGURATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA (unless otherwise specified)	ANTENNA POSITION 1		ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	800-10991							
ANTENNA VENDOR	Kathrien							
ANTENNA SIZE (H x W x D)	78.7X20X6.9							
ANTENNA WEIGHT	100.9							
AZIMUTH	270							
MAGNETIC DECLINATION								
RADIATION CENTER (feet)	160							
ANTENNA TIP HEIGHT	163							
MECHANICAL DOWNTILT	0							
FEEDER AMOUNT	4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)								
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)								
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)								
Antenna RET Motor (QTY/MODEL)		Built-in						
SURGE ARRESTOR (QTY/MODEL)	16	TSXDC-4310FM						
DIPLEXER (QTY/MODEL)	4	CCI Pentaplexer 5PX-0726-O						
DUPLEXER (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL)								
DC BLOCK (QTY/MODEL)								
TMA/LNA (QTY/MODEL)	2	8-31-43 (Twin AWS-WCS						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	ATSBT-BOTTOM-FF-4G						
PDU FOR TMAS (QTY/MODEL)								
FILTER (QTY/MODEL)								
SQUID (QTY/MODEL)								
FIBER TRUNK (QTY/MODEL)								
DC TRUNK (QTY/MODEL)								
REPEATER (QTY/MODEL)								
RRH - 700 band (QTY/MODEL)	1	B5/B12 4449						
RRH - 850 band (QTY/MODEL)		with another band						
RRH - 1900 band (QTY/MODEL)	1	B2/B66A 8843						
RRH - AWS band (QTY/MODEL)		with another band						
RRH - WCS band (QTY/MODEL)	1	RRUS-32						
Additional RRH #1 - any band (QTY/MODEL)								
Additional RRH #2 - any band (QTY/MODEL)								
Additional Component 1 (QTY/MODEL)	2	DBCT108F1V92-2						
Additional Component 2 (QTY/MODEL)								
Additional Component 3 (QTY/MODEL)								
Local Market Note 1	// Swap Existing Antenna with 12 port Antenna, // Swap LTE 700 BC radio with LTE 700/850 RADIO,							
Local Market Note 2	Check TMA							
Local Market Note 3								

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX?	TECHNOLOGY / FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID(cssng)
ANTENNA POSITION 1	PORT 1	16687.C.850.3G.2	16687.C.850.3G.1	CTV40893	CTV40893		UMTS 850	80010991_840 MHz_00DT	14.69	270	0	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850					17	
	PORT 2	16687.C.850.4G.1	16687.C.850.4G.1	CTL05089_8C_1	CTL05089_8C_1		LTE 850	80010991_850 MHz_02DT	13.2	270	2	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		17	
	PORT 3	16687.C.WCS.4G.1	16687.C.WCS.4G.1	CTL05089_3C_1	CTL05089_3C_1		LTE WCS	80010991_2355 MHz_03DT	17.3	270	3	Bottom	Andrew 1-5/8	185						1285.2866		18	
	PORT 4	16687.C.1900.4G.1	16687.C.1900.4G.1	CTL05089_9C_1	CTL05089_9C_1		LTE 1900	80010991_1930 MHz_03DT	17.3	270	3	Bottom	Andrew 1-5/8	185						3664.3757		18	
	PORT 5	16687.C.700.4G.1	16687.C.700.4G.1	CTL05089_7C_1	CTL05089_7C_1		LTE 700	80010991_730 MHz_04DT	15.3	270	3	Bottom	Andrew 1-5/8	185						1475.7065		17	
	PORT 6	16687.C.850.5G.tmp1	16687.C.850.5G.1	CTCN005089_N005C_1	CTCN005089_N005C_1		5G 850	80010991_850 MHz_02DT	13.2	270	2	Bottom	Andrew 1-5/8	185	RxAIT 850	1	LLC 850			1000		17	
	PORT 7	16687.C.1900.4G.2	16687.C.1900.4G.4	CTL05089_9C_2	CTL05089_9C_2		LTE 1900	80010991_1930 MHz_03DT	17.3	270	3	Bottom	Andrew 1-5/8	185						3664.3757		18	
	PORT 8	16687.C.AWS.4G.tmp4	16687.C.AWS.4G.4	CTL05089_2C_2	CTL05089_2C_2		LTE AWS	80010991_2170 MHz_03DT	16.2	270	3	Bottom	Andrew 1-5/8	185						3837.0724		18	

KATHREIN

12-Port Antenna	R1	R2	Y1	Y2	Y3	Y4
Frequency Range	698–960	698–960	1695–2690	1695–2690	1695–2690	1695–2690
Dual Polarization	X	X	X	X	X	X
HPBW	65°	65°	65°	65°	65°	65°
Adjust. Electr. DT	2°–12°	2°–12°	2°–14°	2°–14°	2°–14°	2°–14°

set by *Flex*RET

AISG Antenna Interface Standards Group

12-Port Antenna 698–960/698–960/1695–2690/1695–2690/1695–2690/1695–2690 65°/65°/65°/65°/65°/65° 15.5/15.5/16/16.5/16/16.5dBi 2°–12°/2°–12°/2°–14°/2°–14°/2°–14°/2°–14°T

Type No.		80010991			
Left side, lowband		**R1, connector 1–2**			
		698–960			
Frequency Range	MHz	698 – 806	791 – 862	824 – 894	880 – 960
Gain at mid Tilt	dBi	14.8	15.4	15.6	15.9
Gain over all Tilts	dBi	14.8 ± 0.5	15.4 ± 0.3	15.6 ± 0.2	15.8 ± 0.2
Horizontal Pattern:					
Azimuth Beamwidth	°	62 ± 3.9	61 ± 3.2	60 ± 2.7	60 ± 2.1
Front-to-Back Ratio, Total Power, ± 30°	dB	> 22	> 25	> 27	> 25
Vertical Pattern:					
Elevation Beamwidth	°	11.9 ± 0.8	11.0 ± 0.8	10.5 ± 0.5	10.1 ± 0.4
Electrical Downtilt continuously adjustable	°	2.0 – 12.0			
Tilt Accuracy	°	< 0.7	< 0.8	< 0.7	< 0.7
First Upper Side Lobe Suppression	dB	> 14	> 14	> 15	> 14
Cross Polar Isolation	dB	> 30			
Port to Port Isolation	dB	> 26 (R1 // R2) > 30 (R1 // Y1, Y2, Y3, Y4)			
Max. Effective Power per Port	W	400 (at 50 °C ambient temperature)			
Max. Effective Power Port 1–2	W	800 (at 50 °C ambient temperature)			

Values based on NGMN-P-BASTA (version 9.6) requirements.

936.5489.1 ngmn 04.26.02.04 Subject to alteration.

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Phone: 214.238.8800 Fax: 214.238.8801 Email: info@kathrein.com

Electrical specifications, all systems		
Impedance	Ω	50
VSWR		< 1.5
Return Loss	dB	> 14
Interband Isolation	dB	> 26
Passive Intermodulation	dBc	< –153 (2 x 43 dBm carrier)
Polarization	°	+45, –45
Max. Effective Power for the Antenna	W	1300 (at 50 °C ambient temperature)

Values based on NGMN-P-BASTA (version 9.6) requirements.

Mechanical specifications		
Input		12 x 4.3-10 female
Connector Position		bottom
Adjustment Mechanism		FlexRET, continuously adjustable
Wind load (at Rated Wind Speed: 150 km/h) (93 mph)	N | lbf	Frontal: 1130 | 254 Maximal: 1140 | 256 Lateral: 200 | 45
EPA (m^2 | ft^2)		Front: 1.041 | 11.21 Lateral: .183 | 1.97
Max. Wind Velocity	km/h mph	241 150
Height / Width / Depth	mm inches	1999 / 508 / 175 78.7 / 20.0 / 6.9
Category of Mounting Hardware		XH (X-Heavy)
Weight	kg lb	45.8 / 50.8 (clamps incl.) 100.9 / 111.9 (clamps incl.)
Packing Size	mm inches	2200 / 542 / 268 86.6 / 21.3 / 10.6
Scope of Supply		Panel and 2 units of clamps for 55–115 mm | 2.2–4.5 inches diameter

Accessories (order separately if required)

Type No.	Description	Remarks mm | inches	Weight approx. kg | lb	Units per antenna
85010097	2 clamps	Mast diameter: 110 – 220 | 4.3 – 8.7	9.4 | 20.7	1
85010099	1 downtilt kit	Downtilt angle: 0° – 11°	10.6 | 23.4	1
86010154	Site Sharing Adapter	3-way (see figure below)	0.7 | 1.5	
86010155	Site Sharing Adapter	6-way (see figure below)	1.4 | 3.1	
86010162	Gender Adapter	Solely to be used in combination with the FlexRET module 86010153V01	0.045 | 0.099	1
86010163	Port Extender		0.16 | 0.35	1

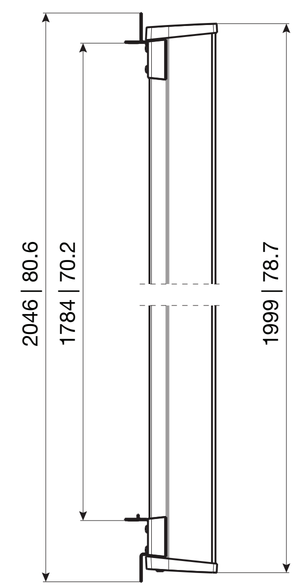
Accessories (included in the scope of supply)

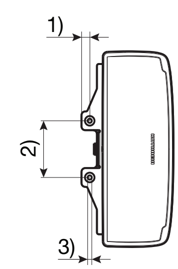
85010096	2 clamps	Mast diameter: 55 – 115 | 2.2 – 4.5	5.0 | 11.0	1
86010153V01	FlexRET			1

For downtilt mounting use the clamps for an appropriate mast diameter together with the downtilt kit.
Wall mounting: No additional mounting kit needed.

Material: **Reflector screen:** Aluminum.
Fiberglass housing: It covers totally the internal antenna components. The special design reduces the sealing areas to a minimum and guarantees the best weather protection. Fiberglass material guarantees optimum performance with regards to stability, stiffness, UV resistance and painting. The color of the radome is light grey.
All nuts and bolts: Stainless steel or hot-dip galvanized steel.

Grounding: The metal parts of the antenna including the mounting kit and the inner conductors are DC grounded.

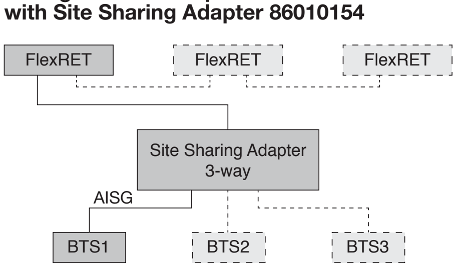




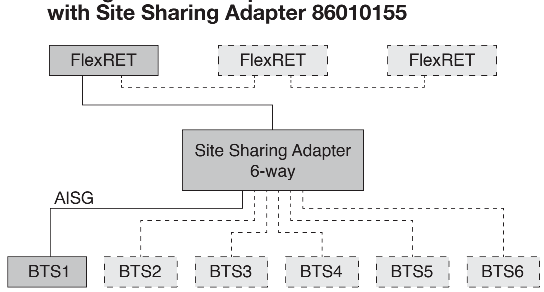
1) 22 | 0.9
2) 150 | 5.9
3) ∅ 11 | 0.4

All dimensions in mm | inches

Configuration example with Site Sharing Adapter 86010154



Configuration example with Site Sharing Adapter 86010155



For more information please refer to the respective data sheets.

936.5489.1 ngmn 04.26.02.04 Subject to alteration.

All specifications are subject to change without notice.
The latest specifications are available at www.kathreinusa.com

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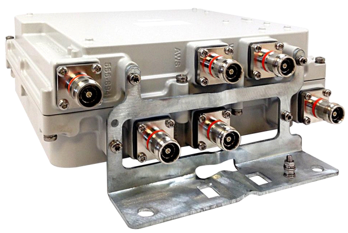


Twin TMA AWS/WCS with 555-894 Bypass, 4.3-10 connectors

Electrical Specifications

Sub-module	1 | 2	1 | 2	1 | 2
Branch	1	2	3
Port Designation	ANT 555-894	ANT AWS	ANT WCS
AISG 2.0 Device Subunit		E25A01P12 1/3	E25A01P12 2/4
License Band	CEL 850, Band Pass USA 700, Band Pass USA 750, Band Pass	AWS 1700, LNA	WCS 2300, LNA

Electrical Specifications Rx (Uplink)

Frequency Range		1695–1780 MHz	2305–2315 MHz
Gain, nominal		13.0 dB	13.0 dB
Noise Figure, typical		1.4 dB	1.8 dB
Total Group Delay, maximum		80 ns	150 ns
Return Loss, typical		20 dB	21 dB
Insertion Loss - Bypass Mode, typical		2.2 dB	3.0 dB
Return Loss - Bypass Mode, typical		18 dB	18 dB

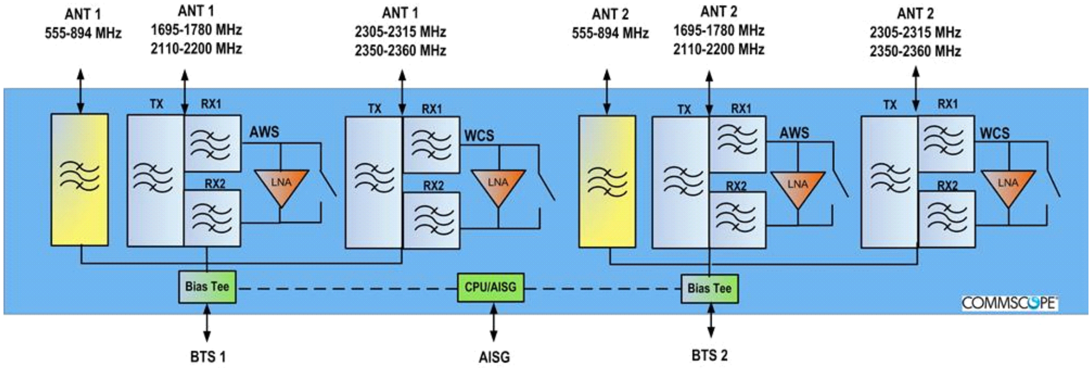
Electrical Specifications Tx (Downlink)

Frequency Range		2110–2200 MHz	2350–2360 MHz
Insertion Loss, typical		0.25 dB	0.50 dB
Total Group Delay, maximum		15 ns	50 ns
Return Loss, typical		22 dB	22 dB
Input Power, RMS, maximum		200 W	200 W
Input Power, PEP, maximum		2 kW	2 kW
Higher Order PIM, maximum		-153 dBc	-153 dBc
Higher Order PIM Test Method		2 x 20 W CW tones	2 x 20 W CW tones

Electrical Specifications, Band Pass

Frequency Range	555–894 MHz
Insertion Loss, maximum	0.20 dB
Return Loss, minimum	20 dB
Isolation, minimum	60 dB
Input Power, RMS, maximum	200 W
Input Power, PEP, maximum	2 kW

Block Diagram



Mechanical Specifications

RF Connector Interface	4.3-10 Female
RF Connector Interface Body Style	Long neck
Ground Screw Diameter	5.00 mm

Dimensions

Height	247.0 mm | 9.7 in
Width	280.0 mm | 11.0 in
Depth	99.0 mm | 3.9 in
Weight, without mounting hardware	9.6 kg | 21.2 lb
Mounting Hardware Weight	0.7 kg | 1.5 lb

Environmental Specifications

Operating Temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Relative Humidity	Up to 100%
Ingress Protection Test Method	IEC 60529:2001, IP67