CENTEK engineering

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Structural Analysis of Antenna Mast and Tower

Verizon Site Ref: Greenwich 3

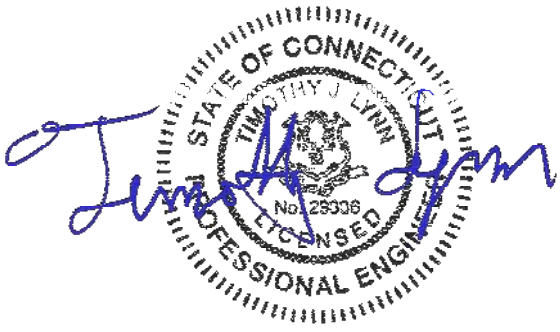
Eversource Structure No. 1281
129' Electric Transmission Lattice Tower

9 Sound Shore Drive
Greenwich, CT

CENTEK Project No. 21007.68

~~Date: February 16, 2024~~
Rev 10: November 8, 2024

Max Stress Ratio = 98.1%



Prepared for:
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20 Alexander Drive
Wallingford, CT 06492

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- DISH RFDS
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Introduction

The purpose of this report is to analyze the reinforced 150' FWT Powermount job no. 18404 dated January 5, 1999 and 128.75' utility tower located at 9 Sound Shore Drive in Greenwich, CT for the proposed antenna and equipment upgrade by Verizon.

The loads considered in this analysis consist of the following:

- SPRINT (Existing to Be Removed):
  Antennas: Three (3) RFS APXVSPP18-C panel antennas mounted on an existing 14-ft low profile platform to the powermount with a RAD center elevation of 148-ft above grade.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the inside of the existing powermount. Twelve (12) 1-5/8" ∅ coax cables mounted on Site Pro Super Universal T-Brackets p/n T1200 running on a leg of the existing tower as indicated in section 4 of this report.
- DISH (Reserved):
  Antennas: Three (3) Commscope FFVV-65B-R2 panel antennas and three (3) Commscope CDX623T-DS-T diplexers mounted on an existing 14-ft low profile platform to the powermount with a RAD center elevation of 148-ft above grade.
  Coax Cables: Twelve (12) 1-1/4" ∅ coax cables running on the inside of the powermount as indicated in section 4 of this report
- **VERIZON WIRELESS (Existing to Remove):**
  Antennas: Three (3) Decibel DB854DG65ESX panel antennas, three (3) Andrew HBXX-6516DS panel antennas, three (3) Andrew SBNHH-1D65B panel antennas mounted on a (3) T-Arms with a RAD center elevation of 139-ft above grade.
  Coax Cables: Eighteen (18) 1-5/8" ∅ coax cables running on the outside of the powermount as indicated in section 4 of this report
- **VERIZON WIRELESS (Proposed):**
  Antennas: Four (4) JMA MX10FRO640-03 panel antennas, four (4) JMA MX06FRO660-03 panel antennas, four (4) Samsung MT6413-77A panel antennas, two (2) RO440CC panel antennas, four (4) Samsung 4439d-25A RRHs, four (4) Samsung 4461d-13A RRHs, four (4) CBRS RRH RT4423-48A and three (3) RVZDC-6627-PF-48 OVP Boxes mounted on one (1) PV-LPPGS-12M-HR2 platform with a RAD center elevation of 139-ft above grade.
  Coax Cables: Three (3) 1-5/8" hybrid cables running on the outside of the powermount as indicated in section 4 of this report

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 15th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 10-15, "Design of Latticed Steel Transmission Structures", defines allowable steel stresses for evaluation of the utility tower.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed within the antenna mast unless specified otherwise.
- Antenna mast will be properly installed and maintained.
- No residual stresses exist due to incorrect tower erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- Antenna mast and utility tower will be in plumb condition.
- Utility tower 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.
- For TIA-H analysis, shielding of antennas was accounted for using Ka factor per TIA-H, Section 2.6.9.2.2.

Analysis

Structural analysis of the existing powermount was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc. 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 existing FWT powermount consisting of a 12-in SCH. 40 pipe (O.D. = 12.75") connected at six points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. Load cases and combinations used in RISA-3D for TIA/EIA loading are listed in report Section 6.

Structural analysis of the existing tower structure was completed using the current version of PLS-Tower computer program licensed to CENTEK Engineering, Inc. The NESC program contains a library of all AISC angle shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized.

The existing 129-ft tall lattice tower was analyzed for its ability to resist loads prescribed by the NESC standard. Maximum usage for the tower was calculated considering the additional forces from the powermount and associated appurtenances. Section 7 of this report details these gravity and lateral wind loads.

Design Basis

Our analysis was performed in accordance with TIA-222-H, ASCE Manual No. 10-15, "Design of Latticed Steel Transmission Structures", NESC C2-2023 and Eversource Design Criteria.

The utility tower structure, considering existing and future conductor and shield wire loading, with the proposed antenna mast was analyzed under two conditions:

- UTILITY TOWER ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the EVERSOURCE Design Criteria Table, NESC C2-2023 ~ Construction Grade B, and ASCE Manual No. 10-15, "Design of Latticed Steel Transmission Structures".

  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 C2-2023, 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-H and AISC standards.

  Load cases considered:

  Load Case 1:
  Wind Speed…….. 130 mph (2022 CSBC Appendix-P)
  Radial Ice Thickness…….. 0”

  Load Case 2:
  Wind Pressure..…….. 50 mph wind pressure
  Radial Ice Thickness…..…….. 1.0”

R e s u l t s

- ANTENNA MAST

  The existing antenna mast was determined to be structurally **adequate**.

FWT Powermount	Stress Ratio (% of capacity)	Result
12” Sch. 40 Pipe	69.9%	**PASS**
L2.5x2.5x1/4 Brace	54.7%	**PASS**
Connection	98.4%	**PASS**

- UTILITY TOWER

  This analysis finds that the subject utility structure is adequate to support the proposed antenna mast and related appurtenances. The tower stresses meet the requirements set forth by the ASCE Manual No. 10-15, “Design of Latticed Steel Transmission Structures”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 8 of this report. The analysis results are summarized as follows:

  A maximum usage of **98.11%** occurs in the utility structure under the **NESC Extreme** loading condition.

  TOWER SECTION:
  The utility structure **with reinforcements** was determined to be structurally adequate.

Tower Member	Stress Ratio (% of capacity)	Result
Angle 3Y	98.11%	**PASS**

- FOUNDATION AND ANCHORS

  The existing foundation consists of four (4) 5-ft square x varied length reinforced concrete piers with eight (8) rock anchor groups embedded 12-ft into rock The base of the tower is connected to the foundation by four (4) 2.00” Ø A36 bolts per leg. Foundation information was obtained from NUSCO drawing no. 01037-60010.

BASE REACTIONS:

From PLS-Tower analysis of utility tower based on NESC/EVERSOURCE prescribed loads.

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	42.47 kips	160.91 kips	186.80 kips
NESC Extreme Wind	43.55 kips	156.66 kips	170.65 kips

Note 1 – 10% increase to be applied to the above tower base reactions for foundation verification per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Component	Design Check	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	74.5%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Check	Design Limit	Proposed Loading	Result
Reinf. Conc. Pier w/ Rock Anchors	Uplift	1.0 FS (2)	1.98 FS (2)	**PASS**
	OTM (1)	1.0 FS (2)	1.57 FS (2)	**PASS**
	Rock Anchor Tension	153.6 kips	95 kips	**PASS**
	Rock Anchor Compression	153.6 kips	100 kips	**PASS**

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

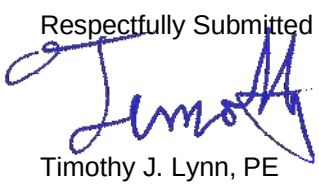
Conclusion

This analysis shows that the subject utility tower and antenna mast **with the reinforcements detailed in section 4 are adequate** to support the proposed equipment installation.

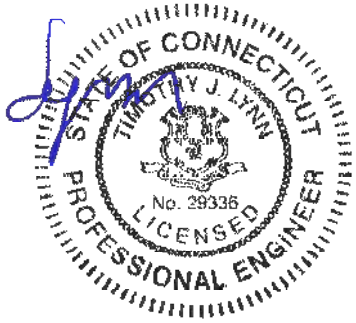
The analysis is based, in part on the information provided to this office by Eversource and Dish. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

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-H covering the design of telecommunications structures specifies LRFD design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed code defined percentage of failure strength.

ANSI Standard C2-2023 (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 Eversource 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 1700-year recurrence for TIA-222-H risk category III and a 100-year recurrence for NESC Grade B. 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-H:

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 “Eversource 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 2023 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

		Attachment A ES Design Criteria	Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	-----	4	1	1	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	-----	4	1	1	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:	Conductor Loads Provided by ES					
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	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
		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
		Conductors:	Conductor Loads Provided by ES					
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
		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
		Conductors:	Conductor Loads Provided by ES					
		*Only for structures installed after 2007						

determined from NESC applied loading conditions (not TIA Loads) on the structure and 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)

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	See Below Table

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

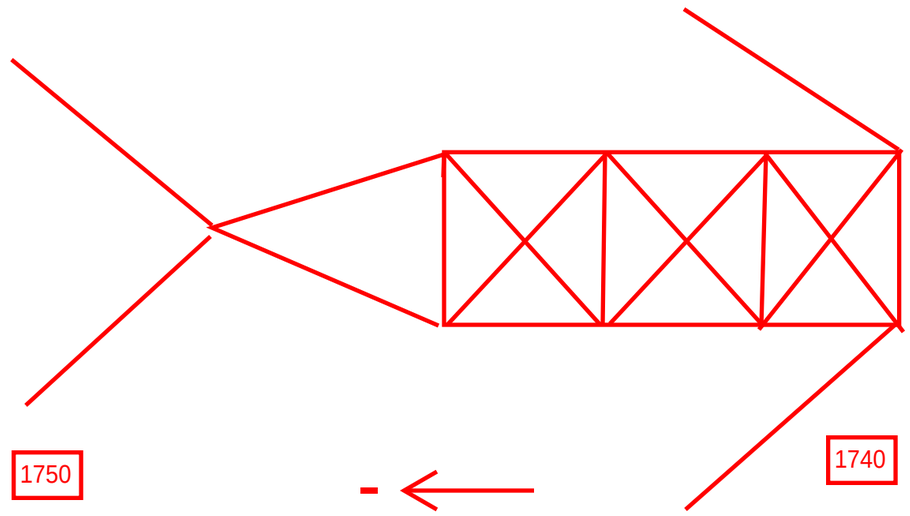
d) The uniform loadings and factors specified for the above components in Attachment A, "Eversource Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared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

Str. No.	LC #	WC #	Load Case Description	Set No.	Phase No.	Structure Loads Vert. (lbs)	Structure Loads Trans. (lbs)	Structure Loads Long. (lbs)
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	11	1	24	-6881	**6662**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	12	1	136	-5129	**5014**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	13	1	-64	-8360	**8022**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	14	1	-91	-5560	**5296**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	15	1	15	-4500	**4441**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	21	1	173	-5526	**5370**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	22	1	219	-4988	**4885**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	23	1	98	-6750	**6488**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	24	1	1192	-2755	**-2465**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	25	1	1456	-2647	**-4141**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	31	1	1450	-2857	**-2554**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	32	1	1519	-3219	**-3994**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	33	1	1097	-3320	**-3451**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	41	1	3069	-5279	**-8141**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	42	1	2962	-8403	**-9006**
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	43	1	2005	-6704	**-8564**
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	11	1	**24**	**-7219**	6294
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	12	1	**136**	**-5464**	4647
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	13	1	**-64**	**-8698**	7654
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	14	1	**-91**	**-5810**	5021
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	15	1	**15**	**-4786**	4131
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	21	1	**173**	**-5895**	4962
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	22	1	**219**	**-5360**	4474
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	23	1	**98**	**-7120**	6080
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	24	1	**1192**	**-2924**	-2263
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	25	1	**1456**	**-2879**	-3983
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	31	1	**1450**	**-3075**	-2287
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	32	1	**1519**	**-3463**	-3784
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	33	1	**1097**	**-3544**	-3221
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	41	1	**3069**	**-5592**	-7930
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	42	1	**2962**	**-8671**	-8748
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	43	1	**2005**	**-6978**	-8343
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	11	1	-157	-3839	**4195**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	12	1	-100	-3107	**3482**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	13	1	-180	-4221	**4518**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	14	1	-174	-2835	**2925**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	15	1	-130	-2479	**2704**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	21	1	-98	-3406	**3805**

1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	22	1	-67	-3116	**3532**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	23	1	-125	-3801	**4139**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	24	1	754	-1348	**-1355**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	25	1	891	-1198	**-2112**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	31	1	996	-1699	**-1807**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	32	1	970	-1711	**-2454**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	33	1	693	-1868	**-2227**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	41	1	1648	-2197	**-3881**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	42	1	1480	-3368	**-3999**
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	43	1	1025	-2775	**-3942**
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	11	1	**-157**	**-4504**	3472
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	12	1	**-100**	**-3753**	2774
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	13	1	**-180**	**-4858**	3825
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	14	1	**-174**	**-3186**	2538
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	15	1	**-130**	**-2893**	2255
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	21	1	**-98**	**-4126**	3009
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	22	1	**-67**	**-3826**	2746
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	23	1	**-125**	**-4493**	3375
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	24	1	**754**	**-1577**	-1080
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	25	1	**891**	**-1524**	-1890
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	31	1	**996**	**-2110**	-1303
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	32	1	**970**	**-2168**	-2062
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	33	1	**693**	**-2279**	-1804
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	41	1	**1648**	**-2785**	-3483
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	42	1	**1480**	**-3865**	-3521
1281	4	3	RULE 250C NA- "DESIGN LOAD 2"	43	1	**1025**	**-3276**	-3536

		AHEAD	BACK
COND	1740		
	1750		
SW	1740		
	1750		

CENTEK COMMENT
TOWER ORIENTATION IN CENTEK PLS MODEL IS FLIPPED 180 DEGREES FROM ORIENTATION OF TOWER IN LOADS PROVIDED BY EVEROURCE. SIGN DIRECTION FOR TRANS. AND LONG. LOADS AND FOR LOAD CASE HAVE BEEN ADJUSTED IN MODEL.



NESC 250B NA+

	1740		1750
	Linnet		OPGW
V	1471		1101
T	-7147		-8315
L	300		2831
	Top Phase		Top Phase
	Ahead	Back	
V	3069	173	1474
T	-5279	-5526	-9738
L	-8141	5370	4108
	Middle Phase		Middle Phase
	Ahead	Back	
V	2962	219	1655
T	-8403	-4988	-8348
L	-9006	4885	1020
	Bottom Phase		Bottom Phase
	Ahead	Back	
V	2005	98	1033
T	-6704	-6750	-11680
L	-8564	6488	4571

NESC 250B NA-

	1740		1750
	Linnet		OPGW
V	1471		1101
T	-7665		-8734
L	148		2758
	Top Phase		Top Phase
	Ahead	Back	
V	3069	173	1474
T	-5592	-5895	-10294
L	-7930	4962	4007
	Middle Phase		Middle Phase
	Ahead	Back	
V	2962	219	1655
T	-8671	-5360	-8927
L	-8748	4474	863
	Bottom Phase		Bottom Phase
	Ahead	Back	
V	2005	98	1033
T	-6978	-7120	-12242
L	-8343	6080	4433

CENTEK COMMENT
TOWER ORIENTATION IN CENTEK PLS MODEL IS FLIPPED 180 DEGREES FROM ORIENTATION OF TOWER IN LOADS PROVIDED BY EVEROURCE. SIGN DIRECTION FOR TRANS. AND LONG. LOADS AND FOR LOAD CASE HAVE BEEN ADJUSTED IN MODEL.

NESC 250C NA+

	1740		1750
	Linnet		OPGW
V	761		580
T	-3677		-4183
L	592		1570
	Top Phase		Top Phase
	Ahead	Back	
V	1648	-98	839
T	-2197	-3406	-5538
L	-3881	3805	2388
	Middle Phase		Middle Phase
	Ahead	Back	
V	1480	-67	870
T	-3368	-3116	-4818
L	-3999	3532	1028
	Bottom Phase		Bottom Phase
	Ahead	Back	
V	1025	-125	513
T	-2775	-3801	-6089
L	-3942	4139	2291

NESC 250C NA-

	1740		1750
	Linnet		OPGW
V	761		580
T	-4417		-4763
L	365		1458
	Top Phase		Top Phase
	Ahead	Back	
V	1648	-98	839
T	-2785	-4126	-6614
L	-3483	3009	2169
	Middle Phase		Middle Phase
	Ahead	Back	
V	1480	-67	870
T	-3865	-3826	-5921
L	-3521	2746	712
	Bottom Phase		Bottom Phase
	Ahead	Back	
V	1025	-125	513
T	-3276	-4493	-7137
L	-3536	3375	2021

CENTEK COMMENT
TOWER ORIENTATION IN CENTEK PLS MODEL IS FLIPPED 180 DEGREES FROM ORIENTATION OF TOWER IN LOADS PROVIDED BY EVEROURCE. SIGN DIRECTION FOR TRANS. AND LONG. LOADS AND FOR LOAD CASE HAVE BEEN ADJUSTED IN MODEL.

REINFORCEMENT DESIGN

EVERSOURCE STRUCT. NO. 1281
9 SOUND SHORE DRIVE
GREENWICH, CT 06830

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	9 SOUND SHORE DRIVE GREENWICH CT, 06830
PROJECT COORDINATES:	LAT: 41°–01'–47.00N LON: 73°–35'–54.11W ELEV: ±22' AMSL
EVERSOURCE CONTACT:	RICH BADON 860.728.4852
EVERSOURCE STRCT NO.:	1281
VERIZON SITE REF.:	GREENWICH 3
VERIZON CONTACT:	COREY VACCARO 781.227.1314
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	TIMOTHY J. LYNN, PE 203.433.7507

SHEET INDEX

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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
10	11/8/24	TJL	CFC	ISSUED FOR CONSTRUCTION

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SCALE:	AS SHOWN
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TITLE SHEET

SHEET NO.
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DESIGN BASIS

1. GOVERNING CODE: 2021 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2022 CT STATE SUPPLEMENT.

2. TIA–222–H, ASCE MANUAL NO. 10–15 – "DESIGN OF LATTICE STEEL TRANSMISSION STRUCTURES", NESC C2–2023 AND EVERSOURCE DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   ULTIMATE DESIGN WIND SPEED (V) = 130 MPH (2022 CSBC: APPENDIX 'P')

   WIND LOAD: (UTILITY TOWER & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3–SECOND GUST) BASED ON NESC C2–2023, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., FOR VERIZON, DATED 11/8/24.

2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.

3. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

5. PCS MAST INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

6. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

7. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

8. NO DRILLING WELDING OR TAPING IS PERMITTED ON EVERSOURCE OWNED EQUIPMENT.

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DESIGN BASIS AND GENERAL NOTES

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STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY LOAD RESISTANCE FACTOR DESIGN (LRFD).

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B. U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.

4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.

5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.

6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.

7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.

8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.

9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 15TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.

14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.

15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.

16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.

17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.

18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

19. FABRICATE BEAMS WITH MILL CAMBER UP.

20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.

21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

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STRUCTURAL NOTES

SHEET NO.
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Sheet No. 3 of 6

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	–	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	–	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL–OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	–	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	–	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
3. "–" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
4. EOR – ENGINEER OF RECORD
4. MPII – "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).

2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.

3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.

4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.

5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON–SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:

   – REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
   – WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON–SITE INSPECTIONS.
   – DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.

2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

CORRECTION OF FAILING MODIFICATION INSPECTION

1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:

   – CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
   – WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS–BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:

   – PRE–CONSTRUCTION: GENERAL CONDITION OF THE SITE.
   – DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
   – POST–CONSTRUCTION: FINAL CONDITION OF THE SITE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
10	11/8/24	TJL	CFC	ISSUED FOR CONSTRUCTION

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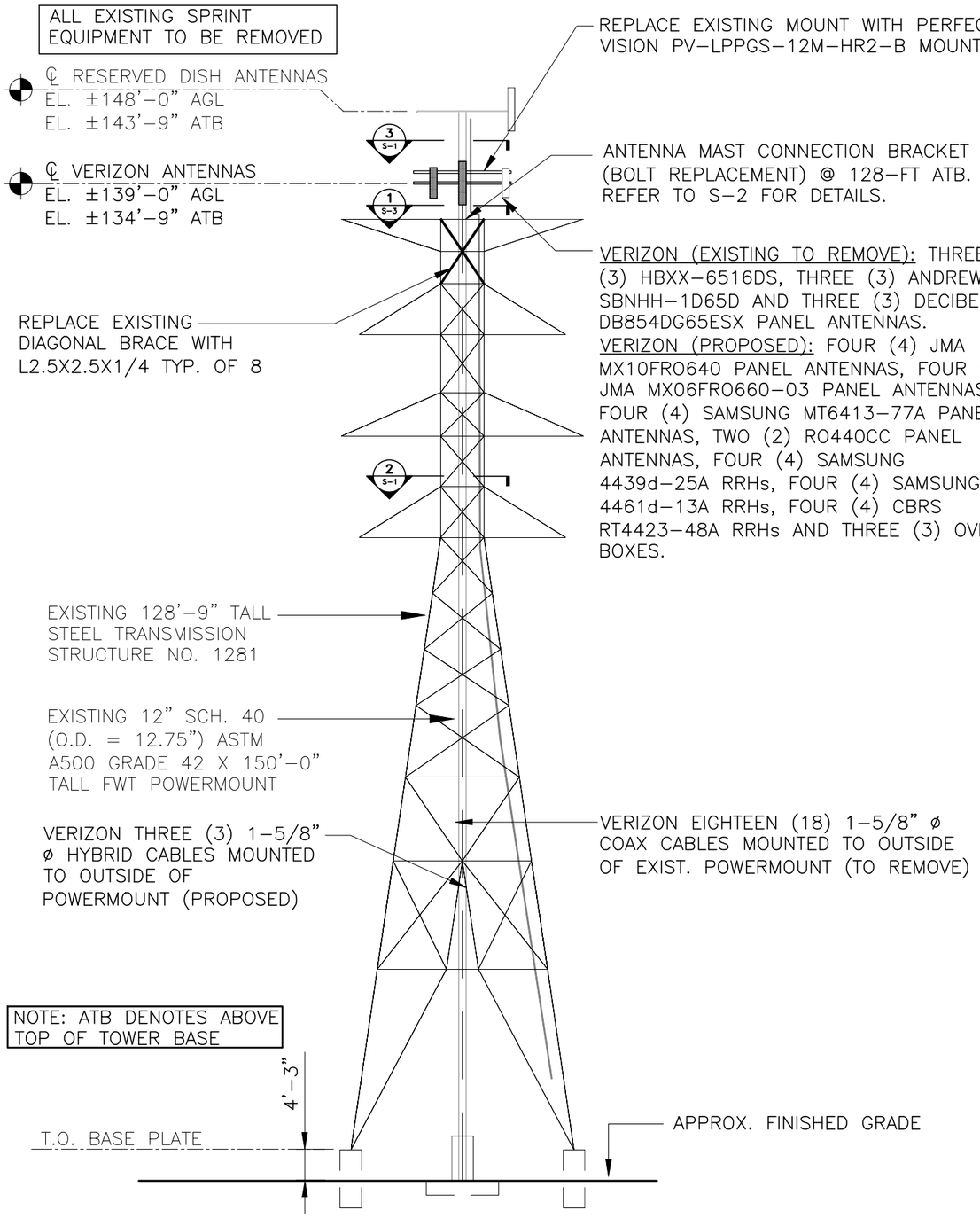
CL&P STRUCTURE 1281
9 SOUND SHORE DRIVE
GREENWICH, CT 06830

DATE: 2/15/22
SCALE: AS SHOWN
JOB NO. 21007.68

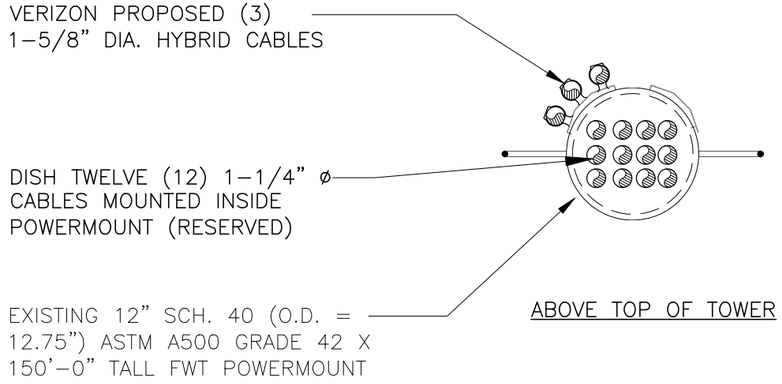
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI-1
Sheet No. 4 of 6



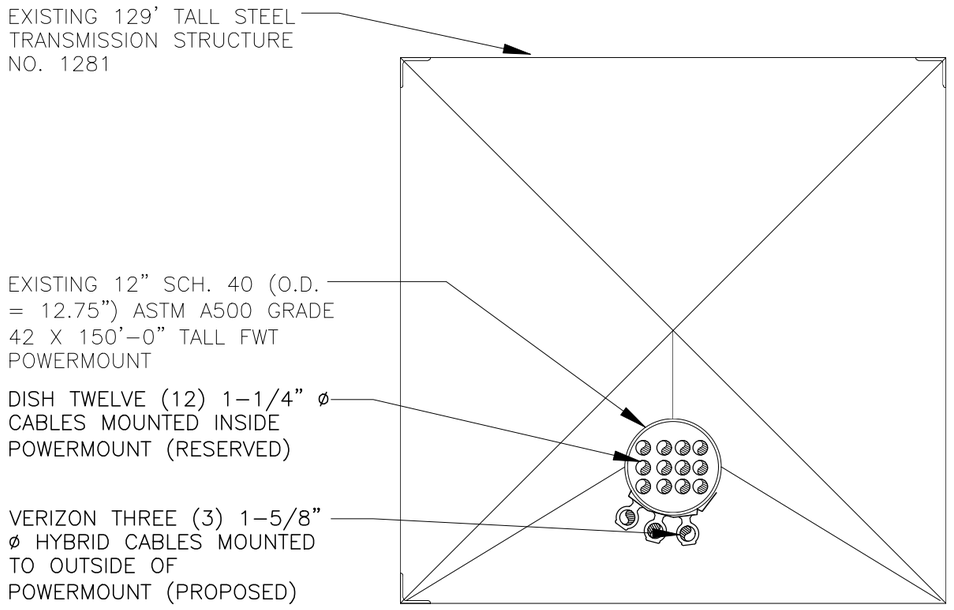
1 / S-1 TOWER & POWERMOUNT ELEVATION

SCALE: NOT TO SCALE



3 / S-1 FEEDLINE PLAN - POWERMOUNT

SCALE: NOT TO SCALE



2 / S-1 FEEDLINE PLAN - TOWER

SCALE: NOT TO SCALE

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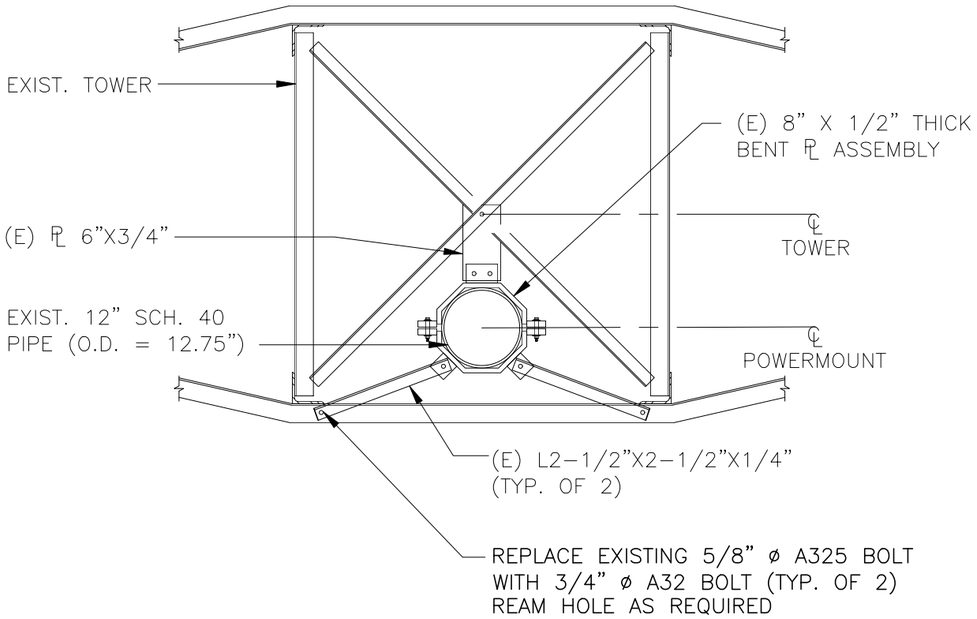
DATE:	2/15/22
SCALE:	AS SHOWN
JOB NO.	21007.68

TOWER ELEVATION AND FEEDLINE PLAN

SHEET NO.
S-1
Sheet No. 5 of 8



1 / S-2 **BRACKET PLAN**

SCALE: 1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
10	11/8/24	TJL	CFC	ISSUED FOR CONSTRUCTION

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REINFORCEMENT DETAILS

SHEET NO.

S-2

Sheet No. 5 of 6

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Subject: Loads on Equipment Structure 1281

Location: Greenwich, CT

Rev. 10: 11/7/24

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68

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

Wind Speeds

Basic Wind Speed	$V := 130$	mph	(User Input - 2022 CSBC Appendix P)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-H)

Input

Structure Type =	$Structure\_Type := Lattice$		(User Input)
Structure Category =	$SC := III$		(User Input)
Exposure Category =	$Exp := C$		(User Input)
Structure Height =	$h := 129$	ft	(User Input)
Height to Center of Antennas =	$z_{Dish} := 148$	ft	(User Input)
Height to Center of Antennas =	$z_{VZ} := 139$	ft	(User Input)
Height to Center of Mast =	$z_{Mast8} := 145$	ft	(User Input)
Height to Center of Mast =	$z_{Mast7} := 130$	ft	(User Input)
Height to Center of Mast =	$z_{Mast6} := 110$	ft	(User Input)
Height to Center of Mast =	$z_{Mast5} := 90$	ft	(User Input) Mast Based on Max 20-ft Section per 2.6.11.1.3
Height to Center of Mast =	$z_{Mast4} := 70$	ft	(User Input)
Height to Center of Mast =	$z_{Mast3} := 50$	ft	(User Input)
Height to Center of Mast =	$z_{Mast2} := 30$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 10$	ft	(User Input)
Radial Ice Thickness =	$t_i := 1.00$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	
Topographic Factor =	$K_{zt} := 1.0$		(User Input)
Shielding Factor for Appurtenances =	$K_a := 0.8$		(User Input)
Ground Elevation Factor =	$K_e = 0.996$		(User Input)
Gust Response Factor =	$G_H := 1.35$		(User Input)

(User Input - Section 2.6.9.4 of TIA-222-H)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

$$I_{ice} := \begin{cases} \text{if } SC = 1 \\ \quad 0 \\ \text{if } SC = 2 \\ \quad 1.00 \\ \text{if } SC = 3 \\ \quad 1.15 \\ \text{if } SC = 4 \\ \quad 1.25 \end{cases} = 1.15$$

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

$$K_{iz} := \left(\frac{z_{Dish}}{33}\right)^{0.1} = 1.162 \qquad t_{izDish} := t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.336$$

Velocity Pressure Coefficient Antennas = $$Kz_{Dish} := 2.01 \cdot \left(\left(\frac{z_{Dish}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.375$$

Velocity Pressure w/o Ice Antennas = $$qz_{Dish} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Dish} \cdot V^2 = 50.324$$

Velocity Pressure with Ice Antennas = $$qz_{ice.Dish} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Dish} \cdot V_i^2 = 7.444$$

$$K_{iz} := \left(\frac{z_{VZ}}{33}\right)^{0.1} = 1.155 \qquad t_{izVZ} := t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.328$$

Velocity Pressure Coefficient Antennas = $$Kz_{VZ} := 2.01 \cdot \left(\left(\frac{z_{VZ}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.356$$

Velocity Pressure w/o Ice Antennas = $$qz_{VZ} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{VZ} \cdot V^2 = 49.664$$

Velocity Pressure with Ice Antennas = $$qz_{ice.VZ} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{VZ} \cdot V_i^2 = 7.347$$

$$K_{izMast8} := \left(\frac{z_{Mast8}}{33}\right)^{0.1} = 1.16 \qquad t_{izMast8} := t_i \cdot I_{ice} \cdot K_{izMast8} \cdot K_{zt}^{0.35} = 1.333$$

Velocity Pressure Coefficient Mast = $$Kz_{Mast8} := 2.01 \cdot \left(\left(\frac{z_{Mast8}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.369$$

Velocity Pressure w/o Ice Mast = $$qz_{Mast8} := 0.00258 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast8} \cdot V^2 = 50.499$$

Velocity Pressure with Ice Mast = $$qz_{ice.Mast8} := 0.00258 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast8} \cdot V_i^2 = 7.47$$

$$K_{izMast7} := \left(\frac{z_{Mast7}}{33}\right)^{0.1} = 1.147 \qquad t_{izMast7} := t_i \cdot I_{ice} \cdot K_{izMast7} \cdot K_{zt}^{0.35} = 1.319$$

Velocity Pressure Coefficient Mast = $$Kz_{Mast7} := 2.01 \cdot \left(\left(\frac{z_{Mast7}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.337$$

Velocity Pressure w/o Ice Mast = $$qz_{Mast7} := 0.00257 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast7} \cdot V^2 = 49.16$$

Velocity Pressure with Ice Mast = $$qz_{ice.Mast7} := 0.00257 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast7} \cdot V_i^2 = 7.272$$

$$K_{izMast6} := \left(\frac{z_{Mast6}}{33}\right)^{0.1} = 1.128 \qquad t_{izMast6} := t_i \cdot I_{ice} \cdot K_{izMast6} \cdot K_{zt}^{0.35} = 1.297$$

Velocity Pressure Coefficient Mast = $$Kz_{Mast6} := 2.01 \cdot \left(\left(\frac{z_{Mast6}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.291$$

Velocity Pressure w/o Ice Mast = $$qz_{Mast6} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast6} \cdot V^2 = 47.276$$

Velocity Pressure with Ice Mast = $$qz_{ice.Mast6} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast6} \cdot V_i^2 = 6.994$$

$K_{izMast5} := \left(\frac{z_{Mast5}}{33}\right)^{0.1} = 1.106$

$t_{izMast5} := t_i \cdot I_{ice} \cdot K_{izMast5} \cdot K_{zt}^{0.35} = 1.271$

Velocity Pressure Coefficient Mast =

$Kz_{Mast5} := 2.01 \cdot \left(\left(\frac{z_{Mast5}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.238$

Velocity Pressure w/o Ice Mast =

$qz_{Mast5} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast5} \cdot V^2 = 45.321$

Velocity Pressure with Ice Mast =

$qz_{ice.Mast5} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast5} \cdot V_i^2 = 6.704$

$K_{izMast4} := \left(\frac{z_{Mast4}}{33}\right)^{0.1} = 1.078$

$t_{izMast4} := t_i \cdot I_{ice} \cdot K_{izMast4} \cdot K_{zt}^{0.35} = 1.24$

Velocity Pressure Coefficient Mast =

$Kz_{Mast4} := 2.01 \cdot \left(\left(\frac{z_{Mast4}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.174$

Velocity Pressure w/o Ice Mast =

$qz_{Mast4} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast4} \cdot V^2 = 42.985$

Velocity Pressure with Ice Mast =

$qz_{ice.Mast4} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast4} \cdot V_i^2 = 6.359$

$K_{izMast3} := \left(\frac{z_{Mast3}}{33}\right)^{0.1} = 1.042$

$t_{izMast3} := t_i \cdot I_{ice} \cdot K_{izMast3} \cdot K_{zt}^{0.35} = 1.199$

Velocity Pressure Coefficient Mast =

$Kz_{Mast3} := 2.01 \cdot \left(\left(\frac{z_{Mast3}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.094$

Velocity Pressure w/o Ice Mast =

$qz_{Mast3} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast3} \cdot V^2 = 40.046$

Velocity Pressure with Ice Mast =

$qz_{ice.Mast3} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast3} \cdot V_i^2 = 5.924$

$K_{izMast2} := \left(\frac{z_{Mast2}}{33}\right)^{0.1} = 0.991$

$t_{izMast2} := t_i \cdot I_{ice} \cdot K_{izMast2} \cdot K_{zt}^{0.35} = 1.139$

Velocity Pressure Coefficient Mast =

$Kz_{Mast2} := 2.01 \cdot \left(\left(\frac{z_{Mast2}}{zg}\right)\right)^{\frac{2}{\alpha}} = 0.982$

Velocity Pressure w/o Ice Mast =

$qz_{Mast2} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast2} \cdot V^2 = 35.963$

Velocity Pressure with Ice Mast =

$qz_{ice.Mast2} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast2} \cdot V_i^2 = 5.32$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 0.887$

$t_{izMast1} := t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 1.021$

Velocity Pressure Coefficient Mast =

$Kz_{Mast1} := 2.01 \cdot \left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 0.779$

Velocity Pressure w/o Ice Mast =

$qz_{Mast1} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast1} \cdot V^2 = 28.537$

Velocity Pressure with Ice Mast =

$qz_{ice.Mast1} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 = 4.221$

Development of Wind & Ice Load on Mast

Mast Data:	(12" Sch. 40 Pipe)		(User Input)	
Mast Shape =	*Round*		(User Input)	
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)	
Mast Length =	$L_{mast} := 150$	ft	(User Input)	
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)	
Mast Aspect Ratio =	$Ar_{mast} := \frac{12 \cdot L_{mast}}{D_{mast}} = 141.2$			
Mast Force Coefficient =	$Ca_{mast} = 1.2$			

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast8} \cdot 2)^2 - D_{mast}^2 \right) = 59$	sq in	
Weight of Ice on Mast =	$W_{ICEmast8} := Id \cdot \frac{Ai_{mast}}{144} = 23$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast7} \cdot 2)^2 - D_{mast}^2 \right) = 58.3$	sq in	
Weight of Ice on Mast =	$W_{ICEmast7} := Id \cdot \frac{Ai_{mast}}{144} = 23$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast6} \cdot 2)^2 - D_{mast}^2 \right) = 57.2$	sq in	
Weight of Ice on Mast =	$W_{ICEmast6} := Id \cdot \frac{Ai_{mast}}{144} = 22$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast5} \cdot 2)^2 - D_{mast}^2 \right) = 56$	sq in	
Weight of Ice on Mast =	$W_{ICEmast5} := Id \cdot \frac{Ai_{mast}}{144} = 22$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast4} \cdot 2)^2 - D_{mast}^2 \right) = 54.5$	sq in	
Weight of Ice on Mast =	$W_{ICEmast4} := Id \cdot \frac{Ai_{mast}}{144} = 21$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast3} \cdot 2)^2 - D_{mast}^2 \right) = 52.5$	sq in	
Weight of Ice on Mast =	$W_{ICEmast3} := Id \cdot \frac{Ai_{mast}}{144} = 20$	plf	**BLC 3**

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast2} \cdot 2)^2 - D_{mast}^2 \right) = 49.7$	sq in	
Weight of Ice on Mast =	$W_{ICEmast2} := Id \cdot \frac{Ai_{mast}}{144} = 19$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast1} \cdot 2)^2 - D_{mast}^2 \right) = 44.2$	sq in	
Weight of Ice on Mast =	$W_{ICEmast1} := Id \cdot \frac{Ai_{mast}}{144} = 17$	plf	**BLC 3**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast8})}{12} = 1.285$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast8} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 16$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast7})}{12} = 1.282$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast7} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 15$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast6})}{12} = 1.279$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast6} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 14$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast5})}{12} = 1.274$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast5} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 14$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast4})}{12} = 1.269$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast4} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 13$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast3})}{12} = 1.262$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast3} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 12$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast2})}{12} = 1.252$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast2} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 11$	plf	**BLC 4**
Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast1})}{12} = 1.233$	sf/ft	
Total Mast Wind Force w/ Ice =	$qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 8$	plf	**BLC 4**

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.063$ sf/ft

Total Mast Wind Force =	$qz_{Mast8} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 87$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast7} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 85$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast6} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 81$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast5} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 78$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast4} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 74$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast3} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 69$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast2} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 62$	plf	**BLC 5**
Total Mast Wind Force =	$qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 49$	plf	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Dish)

Antenna Model =	Commscope FFVV-65B-R2		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 71.969$	in	(User Input)
Antenna Width =	$W_{ant} := 19.606$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.756$	in	(User Input)
Antenna Weight =	$WT_{ant} := 65$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.7$		
Antenna Force Coefficient =	$Ca_{ant} = 1.25$		

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 195$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izDish}) \cdot (W_{ant} + 2 \cdot t_{izDish}) \cdot (T_{ant} + 2 \cdot t_{izDish}) - V_{ant} = 6397$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 207$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 622$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izDish}) \cdot (W_{ant} + 2 \cdot t_{izDish})}{144} = 11.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 34.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Dish} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 349$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.8$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 29.4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{Dish} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2000$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data:	(Dish)			
Antenna Model =	Commscope CDX623T-DS-T			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 8.858$	in	(User Input)	
Antenna Width =	$W_{ant} := 4.961$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 4.528$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 11$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.8$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			
Gravity Load (without ice)				
Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 33$	lbs	**BLC 2**	
Gravity Loads (ice only)				
Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 199$	cu in		
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izDish}) \cdot (W_{ant} + 2 \cdot t_{izDish}) \cdot (T_{ant} + 2 \cdot t_{izDish}) - V_{ant} = 435$	cu in		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 14$	lbs		
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 42$	lbs	**BLC 3**	
Wind Load (with ice)				
Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izDish}) \cdot (W_{ant} + 2 \cdot t_{izDish})}{144} = 0.6$	sf		
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.8$	sf		
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Dish} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 18$	lbs	**BLC 4**	
Wind Load (without ice)				
Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$	sf		
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.9$	sf		
Total Antenna Wind Force =	$F_{ant} := qz_{Dish} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 60$	lbs	**BLC 5**	

Development of Wind & Ice Load on Platform

Mount Data: (Dish)

Mount Type:	FWT 14' Low Profile Platform			
Mount Shape =	*Flat*			
Mount Projected Surface Area =	$CaAa := 33.72$	sf	(User Input)	
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 61.68$	sf	(User Input)	
Mount Weight =	$WT_{mnt} := 3020$	lbs	(User Input)	
Mount Weight w/ Ice =	$WT_{mnt.ice} := 4300$	lbs	(User Input)	

Gravity Loads (without ice)

Weight of All Mounts =	$WT_{mnt} = 3020$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts =	$WT_{mnt.ice} - WT_{mnt} = 1280$	lbs	**BLC 3**

Wind Load (with ice)

Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.Dish} \cdot G_H \cdot CaAa_{ice} = 620$	lbs	**BLC 4**

Wind Load (without ice)

Total Mount Wind Force =	$F_{mnt} := qz_{Dish} \cdot G_H \cdot CaAa = 2291$	lbs	**BLC 5**

Total Pipe Length = $TPL := 6 \cdot ft \cdot 9 = 54\ ft$

Total Antenna Length = $TAL := 72 \cdot in \cdot 3 = 18\ ft$

Exposed Pipe Area = $ExPA := (TPL - TAL) \cdot 2.375 \cdot in = 7.125\ ft^2$

CaAa = $1.2 \cdot ExPA + (4 \cdot in \cdot 168 \cdot in \cdot 1 + 4 \cdot in \cdot 168 \cdot in \cdot 2 \cdot \cos(60 \cdot deg)) \cdot 2.0 + (3 \cdot in \cdot 78 \cdot in \cdot 1 + 3 \cdot in \cdot 78 \cdot in \cdot 2 \cdot \cos(60 \cdot deg)) \cdot 2.0 = 33.717\ ft^2$

Exposed Pipe Area (with Ice) = $ExPA := (TPL - TAL) \cdot 5.055 \cdot in = 15.165\ ft^2$

CaAa (with ice) =

$1.2 \cdot ExPA + (6.68 \cdot in \cdot 168 \cdot in \cdot 1 + 6.68 \cdot in \cdot 168 \cdot in \cdot 2 \cdot \cos(60 \cdot deg)) \cdot 2.0 + (5.68 \cdot in \cdot 78 \cdot in \cdot 1 + 5.68 \cdot in \cdot 78 \cdot in \cdot 2 \cdot \cos(60 \cdot deg)) \cdot 2.0 = 61.678\ ft^2$

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	JMA MX10FRO640			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 71.6$	in	(User Input)	
Antenna Width =	$W_{ant} := 19.8$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 7.4$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 80$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 4$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.6$			
Antenna Force Coefficient =	$Ca_{ant} = 1.25$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 320$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 6277$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 203$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 814$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 11.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 46.3$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 459$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.8$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 39.4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2639$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	JMA MX06FRO660-03			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 71.3$	in	(User Input)	
Antenna Width =	$W_{ant} := 15.4$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 10.7$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 65$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 4$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$			
Antenna Force Coefficient =	$Ca_{ant} = 1.29$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 260$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 6085$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 197$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 789$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 9.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 37.1$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 381$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 30.5$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2118$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	Samsung MT6413-77A			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 28.9$	in	(User Input)	
Antenna Width =	$W_{ant} := 15.75$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 5.51$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 58$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 4$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.8$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 232$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2508$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 2235$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 72$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 290$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.1$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 154$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.2$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 12.6$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 814$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	Samsung RO440CC			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 12$	in	(User Input)	
Antenna Width =	$W_{ant} := 8.7$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 1.5$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 3$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 2$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.4$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 6$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 157$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 535$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 17$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 35$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 1.2$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2.3$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 22$	lbs	**BLC 4**

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 =	$A_{ant} := SA_{ant} \cdot N_{ant} = 1.5$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 93$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	Samsung RF4439d-25A RRH			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 15$	in	(User Input)	
Antenna Width =	$W_{ant} := 15$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 10$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 75$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 4$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.0$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 300$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2250$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 1695$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 55$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 220$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 2.2$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 82$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 6.3$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 402$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	Samsung RF4461d-13A RRH			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 15$	in	(User Input)	
Antenna Width =	$W_{ant} := 15$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 10.23$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 80$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 4$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.0$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 320$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2302$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 1715$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 56$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 222$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 2.2$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 82$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 6.3$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 402$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	CBRS RRH RT4423-48A			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 11.8$	in	(User Input)	
Antenna Width =	$W_{ant} := 8.7$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 5$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 20$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 4$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.4$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 80$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 513$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 743$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 24$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 96$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 1.1$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 43$	lbs	**BLC 4**

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 =	$A_{ant} := SA_{ant} \cdot N_{ant} = 2.9$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 184$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	Commscope RVZDC-6627-PF-48 OVP Box			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 29.5$	in	(User Input)	
Antenna Width =	$W_{ant} := 16.5$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 12.6$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 32$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.8$			
Antenna Force Coefficient =	$Ca_{ant} = 1.2$			

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 96$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6133$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 3264$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 106$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 317$	lbs	**BLC 3**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 12.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 122$	lbs	**BLC 4**

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.4$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 10.1$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 653$	lbs	**BLC 5**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (Verizon)

Mount Type: Perfect Vision PV-LPPGS-12M-HR2-B with (9) 8-ft antenna pipes, (4) pipe to pipes and (2) 4-ft OVP pipes.

Mount Shape = *Flat*

Mount Projected Surface Area = $CaAa := 30.8$ sf (User Input)

Mount Projected Surface Area w/ Ice = $CaAa_{ice} := 62$ sf (User Input)

Mount Weight = $WT_{mnt} := 1810$ lbs (User Input)

Mount Weight w/ Ice = $WT_{mnt.ice} := 3167$ lbs (User Input)

Gravity Loads (without ice)

Weight of All Mounts = $WT_{mnt} = 1810$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts = $WT_{mnt.ice} - WT_{mnt} = 1357$ lbs **BLC 3**

Wind Load (with ice)

Total Mount Wind Force = $Fi_{mnt} := qz_{ice.VZ} \cdot G_H \cdot CaAa_{ice} = 615$ lbs **BLC 4**

Wind Load (without ice)

Total Mount Wind Force = $F_{mnt} := qz_{VZ} \cdot G_H \cdot CaAa = 2065$ lbs **BLC 5**

Total Pipe Length = $TPL := 8 \cdot ft \cdot 13 + 4 \cdot ft \cdot 2 = 112\ ft$

Total Equipment Length = $TAL := 71.6 \cdot in \cdot 2 + 71.3 \cdot in \cdot 2 + 28.9 \cdot in \cdot 4 + 12 \cdot in \cdot 2 + 11.8 \cdot in \cdot 4 + 29.5\ in \cdot 2 = 44.3\ ft$

Exposed Pipe Area = $ExPA := (TPL - TAL) \cdot 2.375 \cdot in = 13.399\ ft^2$

CaAa = $1.2 \cdot ExPA + 2.375 \cdot in \cdot 150 \cdot in \cdot (1 + 2 \cdot \cos(60 \cdot deg)) \cdot 1.2 + 3.5 \cdot in \cdot 150 \cdot in \cdot (1 + 2 \cdot \cos(60 \cdot deg)) \cdot 1.2 = 30.8\ ft^2$

Exposed Pipe Area (with Ice) = $ExPA := (TPL - TAL) \cdot (2.375 + 2 \cdot t_{izVZ}) \cdot in = 28.381\ ft^2$

CaAa (with ice) = $1.2 \cdot ExPA + (2.375 + 2 \cdot t_{izVZ}) \cdot in \cdot 150 \cdot in \cdot (1 + 2 \cdot \cos(60 \cdot deg)) \cdot 1.2 + (3.5 + 2 \cdot t_{izVZ}) \cdot in \cdot 150 \cdot in \cdot (1 + 2 \cdot \cos(60 \cdot deg)) \cdot 1.2 = 62\ ft^2$

Weight = $1400 \cdot lb + 3.66 \cdot plf \cdot 8 \cdot ft \cdot 13 + 3.66 \cdot plf \cdot 4 \cdot ft \cdot 2 = 1810\ lb$

Weight (with ice) =

$$\left(\frac{\pi}{4} \cdot \left(\left((2.375 + 2 \cdot t_{izVZ}) \cdot in\right)^2 - (2.375 \cdot in)^2\right) \cdot (96 \cdot in \cdot 13 + 48 \cdot in \cdot 2 + 150 \cdot in \cdot 3) + \frac{\pi}{4} \cdot \left(\left((3.5 + 2 \cdot t_{izVZ}) \cdot in\right)^2 - (3.5 \cdot in)^2\right) \cdot (150 \cdot in \cdot 3) + \left(\left((4 + 2 \cdot t_{izVZ}) \cdot in\right)^2 - (4 \cdot in)^2\right) \cdot (60 \cdot in \cdot 3)\right) \cdot (ld \cdot pcf) = 1357\ lbf$$

Development of Wind & Ice Load on Coax Cables

(Below 139-ft AGL)

Cable Data:

Cable Type =	1-5/8"			
Shape =	*Round*		(User Input)	
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)	
Coax Cable Length =	$L_{coax} := 139$	ft	(User Input)	
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)	
Total Number of Coax =	$N_{coax} := 15$		(User Input - 12 Dish & 3 Verizon)	
Total Number of Exterior Coax =	$Ne_{coax} := 4$		(User Input)	
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 1$		(User Input)	
Coax aspect ratio,	$Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 842.4$			
Coax Cable Force Factor Coefficient =	$Ca_{coax} = 1.2$			

Gravity Loads (without ice)

Weight of all cables w/o ice	$WT_{coax} := Wt_{coax} \cdot N_{coax} = 16$	plf	**BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast7})^2 - D_{coax}^2 \right) = 13.7$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 21$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast6})^2 - D_{coax}^2 \right) = 13.4$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 21$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast5})^2 - D_{coax}^2 \right) = 13$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 20$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast4})^2 - D_{coax}^2 \right) = 12.5$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 20$	plf	**BLC 3**

Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left(\left(D_{coax} + 2 \cdot t_{izMast3} \right)^2 - D_{coax}^{\ 2} \right) = 12$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 19$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left(\left(D_{coax} + 2 \cdot t_{izMast2} \right)^2 - D_{coax}^{\ 2} \right) = 11.2$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 17$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4} \cdot \left(\left(D_{coax} + 2 \cdot t_{izMast1} \right)^2 - D_{coax}^{\ 2} \right) = 9.6$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 15$	plf	**BLC 3**
Wind Load (with ice)			
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast7} \right)}{12} = 0.4$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast7} \cdot G_H \cdot AICE_{coax} = 5$	plf	**BLC 4**
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast6} \right)}{12} = 0.4$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast6} \cdot G_H \cdot AICE_{coax} = 4$	plf	**BLC 4**
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast5} \right)}{12} = 0.4$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast5} \cdot G_H \cdot AICE_{coax} = 4$	plf	**BLC 4**
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast4} \right)}{12} = 0.4$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast4} \cdot G_H \cdot AICE_{coax} = 4$	plf	**BLC 4**
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast3} \right)}{12} = 0.4$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast3} \cdot G_H \cdot AICE_{coax} = 4$	plf	**BLC 4**
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast2} \right)}{12} = 0.4$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast2} \cdot G_H \cdot AICE_{coax} = 3$	plf	**BLC 4**
Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1} \right)}{12} = 0.3$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 2$	plf	**BLC 4**

Wind Load (without ice)

Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast7} \cdot G_H \cdot A_{coax} = 13$	plf	**BLC 5**
Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast6} \cdot G_H \cdot A_{coax} = 13$	plf	**BLC 5**
Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast5} \cdot G_H \cdot A_{coax} = 12$	plf	**BLC 5**
Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast4} \cdot G_H \cdot A_{coax} = 11$	plf	**BLC 5**
Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast3} \cdot G_H \cdot A_{coax} = 11$	plf	**BLC 5**
Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast2} \cdot G_H \cdot A_{coax} = 10$	plf	**BLC 5**
Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 8$	plf	**BLC 5**

Development of Wind & Ice Load on Coax Cables (Above 139-ft AGL)

Cable Data:

Cable Type =	1-1/4"		
Shape =	*Round*		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 12$	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 Dish)
Total Number of Exterior Coax =	$Ne_{coax} := 0$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 0$		(User Input)
Coax aspect ratio,	$Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 72.7$		
Coax Cable Force Factor Coefficient =	$Ca_{coax} = 1.2$		

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 =	$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast8})^2 - D_{coax}^2 \right) = 13.9$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 0$	plf	**BLC 3**

Wind Load (with ice)

Coax projected surface area w/ Ice =	$AICE_{coax} := 0 = 0$	sf/ft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast8} \cdot G_H \cdot AICE_{coax} = 0$	plf	**BLC 4**

Wind Load (without ice)

Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0$	sf/ft	
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast8} \cdot G_H \cdot A_{coax} = 0$	plf	**BLC 5**

Development of Wind & Ice Load on Brace Member

Member Data:	L2x2x3/16			
Antenna Shape =	Flat		(User Input)	
Height =	$H_{mem} := 2$	in	(User Input)	
Width =	$W_{mem} := 2$	in	(User Input)	
Thickness =	$t_{mem} := 0.1875$	in	(User Input)	
Length =	$L_{mem} := 18$	in	(User Input)	
Member Aspect Ratio =	$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 9.0$			
Member Force Coefficient =	$Ca_{mem} = 1.47$			

Gravity Load (without ice)

Weight of Member = Self Weight plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left(\left(H_{mem} + 2 \cdot t_{izMast6}\right) + \left(W_{mem} - t_{mem}\right)\right) \cdot \left(t_{mem} + 2 \cdot t_{izMast6}\right) - \left(H_{mem} + \left(W_{mem} + t_{mem}\right)\right) \cdot t_{mem} = 17 \text{ sq in}$$

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 7$ plf **BLC 3**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{\left(H_{mem} + 2 \cdot t_{izMast6}\right)}{12} = 0.4$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 5$ plf **BLC 4**

Wind Load (without ice)

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.2$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 15$ plf **BLC 5**

Development of Wind & Ice Load on Brace Member

Member Data:	L2.5x2.5x3/16			
Antenna Shape =	Flat		(User Input)	
Height =	$H_{mem} := 2.5$	in	(User Input)	
Width =	$W_{mem} := 2.5$	in	(User Input)	
Thickness =	$t_{mem} := 0.1875$	in	(User Input)	
Length =	$L_{mem} := 40$	in	(User Input)	
Member Aspect Ratio =	$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 16.0$			
Member Force Coefficient =	$Ca_{mem} = 1.7$			

Gravity Load (without ice)

Weight of Member = Self Weight plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left(\left(H_{mem} + 2 \cdot t_{izMast6}\right) + \left(W_{mem} - t_{mem}\right)\right) \cdot \left(t_{mem} + 2 \cdot t_{izMast6}\right) - \left(H_{mem} + \left(W_{mem} + t_{mem}\right)\right) \cdot t_{mem} = 20 \quad \text{sq in}$$

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 8$ plf **BLC 3**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{\left(H_{mem} + 2 \cdot t_{izMast6}\right)}{12} = 0.4$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 7$ plf **BLC 4**

Wind Load (without ice)

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.2$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 22$ plf **BLC 5**

Development of Wind & Ice Load on Brace Member

Member Data:	L3x3x3/16			
Antenna Shape =	Flat		(User Input)	
Height =	$H_{mem} := 3$	in	(User Input)	
Width =	$W_{mem} := 3$	in	(User Input)	
Thickness =	$t_{mem} := 0.1875$	in	(User Input)	
Length =	$L_{mem} := 96$	in	(User Input)	
Member Aspect Ratio =	$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 32.0$			
Member Force Coefficient =	$Ca_{mem} = 2$			

Gravity Load (without ice)

Weight of Member = Self Weight plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left(\left(H_{mem} + 2 \cdot t_{izMast6}\right) + \left(W_{mem} - t_{mem}\right)\right) \cdot \left(t_{mem} + 2 \cdot t_{izMast6}\right) - \left(H_{mem} + \left(W_{mem} + t_{mem}\right)\right) \cdot t_{mem} = 22 \text{ sq in}$$

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 9$ plf **BLC 3**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{\left(H_{mem} + 2 \cdot t_{izMast6}\right)}{12} = 0.5$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 8$ plf **BLC 4**

Wind Load (without ice)

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.3$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 31$ plf **BLC 5**

Development of Wind & Ice Load on Brace Member

Member Data:	L3.5x3.5x1/4			
Antenna Shape =	Flat		(User Input)	
Height =	$H_{mem} := 3.5$	in	(User Input)	
Width =	$W_{mem} := 3.5$	in	(User Input)	
Thickness =	$t_{mem} := 0.25$	in	(User Input)	
Length =	$L_{mem} := 133$	in	(User Input)	
Member Aspect Ratio =	$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 38.0$			
Member Force Coefficient =	$Ca_{mem} = 2$			

Gravity Load (without ice)

Weight of Member = Self Weight plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left(\left(H_{mem} + 2 \cdot t_{izMast6}\right) + \left(W_{mem} - t_{mem}\right)\right) \cdot \left(t_{mem} + 2 \cdot t_{izMast6}\right) - \left(H_{mem} + \left(W_{mem} + t_{mem}\right)\right) \cdot t_{mem} = 25 \quad \text{sq in}$$

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 10$ plf **BLC 3**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{\left(H_{mem} + 2 \cdot t_{izMast6}\right)}{12} = 0.5$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 9$ plf **BLC 4**

Wind Load (without ice)

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.3$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 36$ plf **BLC 5**

Development of Wind & Ice Load on Brace Member

Member Data: L4x4x1/4

Antenna Shape =	Flat		(User Input)
Height =	$H_{mem} := 4$	in	(User Input)
Width =	$W_{mem} := 4$	in	(User Input)
Thickness =	$t_{mem} := 0.25$	in	(User Input)
Length =	$L_{mem} := 159$	in	(User Input)
Member Aspect Ratio =	$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 39.8$		
Member Force Coefficient =	$Ca_{mem} = 2$		

Gravity Load (without ice)

Weight of Member = Self Weight plf **BLC 1**

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left(\left(H_{mem} + 2 \cdot t_{izMast6}\right) + \left(W_{mem} - t_{mem}\right)\right) \cdot \left(t_{mem} + 2 \cdot t_{izMast6}\right) - \left(H_{mem} + \left(W_{mem} + t_{mem}\right)\right) \cdot t_{mem} = 27 \quad \text{sq in}$$

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 11$ plf **BLC 3**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{\left(H_{mem} + 2 \cdot t_{izMast6}\right)}{12} = 0.5$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 10$ plf **BLC 4**

Wind Load (without ice)

Member Projected Surface Area = $A_{mem} := \frac{H_{mem}}{12} = 0.3$ sf/ft

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 41$ plf **BLC 5**

Model Settings

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes
Approximate Mesh Size (in)	12
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	No
Maximum Number of Iterations	3
Single	No
Multiple (Optimum)	Yes
Maximum	No

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes
Default Global Plane for z-axis	XZ
Plate Local Axis Orientation	Nodal

Hot Rolled Steel	AISC 15th (360-16): LRFD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 14th (360-10): ASD
Cold Formed Steel	AISI 1999: ASD
Stiffness Adjustment	Yes (Iterative)
Wood	AF&PA NDS-91/97: ASD
Temperature	< 100F
Concrete	ACI 318-02
Masonry	ACI 530-05: ASD
Aluminum	AA ADM1-05: ASD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): ASD
Stiffness Adjustment	Yes (Iterative)

Analysis Methodology	PCA Load Contour Method
Parme Beta Factor	0.65

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	Yes
List forces which were ignored for design in the Detail Report	Yes

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No
Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Code	UBC 1997

Model Settings (Continued)

Occupancy Cat	4
Seismic Zone	3
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	No
C_a	0.36
C_v	0.54
T Z (sec)	
T X (sec)	
C_tZ	0.035
C_tX	0.035
R Z	8.5
R X	8.5
Ω_0Z	1
Ω_0X	1
ρ Z	1
ρ X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	0.3	0.65	0.49	35	1.5	58	1.2
7	A500 Gr. 50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Powermount	12"FWTPOWERMOUNT	Column	Pipe	A500 Gr.42	Typical	14.579	279.335	279.335	558.67
2	Brace 1	L2X2X3	Beam	Single Angle	A36 Gr.36	Typical	0.722	0.271	0.271	0.009
3	Brace 2	L2.5X2.5X3	Beam	Single Angle	A36 Gr.36	Typical	0.901	0.535	0.535	0.011
4	Brace 3	L3X3X3	Beam	Single Angle	A36 Gr.36	Typical	1.09	0.948	0.948	0.014
5	Brace 4	L3.5X3.5X4	Beam	Single Angle	A36 Gr.36	Typical	1.7	2	2	0.039
6	Brace 5	L4X4X4	Beam	Single Angle	A36 Gr.36	Typical	1.93	3	3	0.044
7	6"x3/4" Plate	6"X3/4"PL	Beam	Single Angle	A36 Gr.36	Typical	4.5	0.211	13.5	0.777
8	L2.5x2.5x1/4	L2.5X2.5X4	Beam	Single Angle	A36 Gr.36	Typical	1.19	0.692	0.692	0.026

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp top [ft]	Channel Conn.	a [ft]	Function
1	M1	Powermount	148	Segment	Segment	Lbyy	N/A	N/A	Lateral
2	M2	Brace 4	10.25			Lbyy	N/A	N/A	Lateral
3	M3	Brace 5	13.25			Lbyy	N/A	N/A	Lateral
4	M4	Brace 3	8.083			Lbyy	N/A	N/A	Lateral
5	M5	Brace 4	11.083			Lbyy	N/A	N/A	Lateral
6	M6	Brace 5	11.845			Lbyy	N/A	N/A	Lateral
7	M7	Brace 5	11.845			Lbyy	N/A	N/A	Lateral
8	M8	Brace 4	9.7			Lbyy	N/A	N/A	Lateral
9	M9	Brace 4	9.7			Lbyy	N/A	N/A	Lateral
10	M10	Brace 2	3.354			Lbyy	N/A	N/A	Lateral
11	M11	Brace 2	3.354			Lbyy	N/A	N/A	Lateral
12	M12	Brace 1	1.5			Lbyy	N/A	N/A	Lateral
13	M13	Brace 2	3.354			Lbyy	N/A	N/A	Lateral
14	M14	Brace 2	3.354			Lbyy	N/A	N/A	Lateral
15	M15	Brace 1	1.5			Lbyy	N/A	N/A	Lateral
16	M16	Brace 2	3.354			Lbyy	N/A	N/A	Lateral
17	M17	Brace 2	3.354			Lbyy	N/A	N/A	Lateral
18	M18	Brace 1	1.5			Lbyy	N/A	N/A	Lateral
19	M19	6"x3/4" Plate	1.5			Lbyy	N/A	N/A	Lateral
20	M20	L2.5x2.5x1/4	3.354			Lbyy	N/A	N/A	Lateral
21	M21	L2.5x2.5x1/4	3.354			Lbyy	N/A	N/A	Lateral

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N8	Powermount	Column	Pipe	A500 Gr.42	Typical
2	M2	N9	N2	Brace 4	Beam	Single Angle	A36 Gr.36	Typical
3	M3	N2	N10	Brace 5	Beam	Single Angle	A36 Gr.36	Typical
4	M4	N13	N3	Brace 3	Beam	Single Angle	A36 Gr.36	Typical
5	M5	N3	N14	Brace 4	Beam	Single Angle	A36 Gr.36	Typical
6	M6	N11	N2	Brace 5	Beam	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
7	M7	N2	N12	Brace 5	Beam	Single Angle	A36 Gr.36	Typical
8	M8	N15	N3	Brace 4	Beam	Single Angle	A36 Gr.36	Typical
9	M9	N3	N16	Brace 4	Beam	Single Angle	A36 Gr.36	Typical
10	M10	N18	N4	Brace 2	Beam	Single Angle	A36 Gr.36	Typical
11	M11	N4	N19	Brace 2	Beam	Single Angle	A36 Gr.36	Typical
12	M12	N4	N17	Brace 1	Beam	Single Angle	A36 Gr.36	Typical
13	M13	N21	N5	Brace 2	Beam	Single Angle	A36 Gr.36	Typical
14	M14	N5	N22	Brace 2	Beam	Single Angle	A36 Gr.36	Typical
15	M15	N5	N20	Brace 1	Beam	Single Angle	A36 Gr.36	Typical
16	M16	N24	N6	Brace 2	Beam	Single Angle	A36 Gr.36	Typical
17	M17	N6	N25	Brace 2	Beam	Single Angle	A36 Gr.36	Typical
18	M18	N6	N23	Brace 1	Beam	Single Angle	A36 Gr.36	Typical
19	M19	N26	N7	6"x3/4" Plate	Beam	Single Angle	A36 Gr.36	Typical
20	M20	N27	N7	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical
21	M21	N28	N7	L2.5x2.5x1/4	Beam	Single Angle	A36 Gr.36	Typical

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	N1	0	0	0	
2	N2	0	29.25	0	
3	N3	0	44.25	0	
4	N4	0	89	0	
5	N5	0	103	0	
6	N6	0	117	0	
7	N7	0	133	0	
8	N8	0	148	0	
9	N9	0	29.25	10.25	
10	N10	0	29.25	-13.25	
11	N11	-11.75	29.25	-1.5	
12	N12	11.75	29.25	-1.5	
13	N13	0	44.25	8.083	
14	N14	0	44.25	-11.083	
15	N15	-9.583	44.25	-1.5	
16	N16	9.583	44.25	-1.5	
17	N17	0	89	-1.5	
18	N18	-3	89	1.5	
19	N19	3	89	1.5	
20	N20	0	103	-1.5	
21	N21	-3	103	1.5	
22	N22	3	103	1.5	
23	N23	0	117	-1.5	
24	N24	-3	117	1.5	
25	N25	3	117	1.5	
26	N26	0	133	-1.5	
27	N27	-3	133	1.5	
28	N28	3	133	1.5	

Node Boundary Conditions

	Node 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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2						
3	N3						
4	N4						

Node Boundary Conditions (Continued)

	Node 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]
5	N5						
6	N6						
7	N8						
8	N9	Reaction	Reaction	Reaction			
9	N10	Reaction	Reaction	Reaction			
10	N11	Reaction	Reaction	Reaction			
11	N12	Reaction	Reaction	Reaction			
12	N13	Reaction	Reaction	Reaction			
13	N14	Reaction	Reaction	Reaction			
14	N15	Reaction	Reaction	Reaction			
15	N16	Reaction	Reaction	Reaction			
16	N17	Reaction	Reaction	Reaction			
17	N18	Reaction	Reaction	Reaction			
18	N19	Reaction	Reaction	Reaction			
19	N20	Reaction	Reaction	Reaction			
20	N21	Reaction	Reaction	Reaction			
21	N23	Reaction	Reaction	Reaction			
22	N24	Reaction	Reaction	Reaction			
23	N22	Reaction	Reaction	Reaction			
24	N25	Reaction	Reaction	Reaction			
25	N28	Reaction	Reaction	Reaction			
26	N26	Reaction	Reaction	Reaction			
27	N27	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Y	-0.195	148
2	M1	Y	-0.033	148
3	M1	Y	-3.02	148
4	M1	Y	-0.32	139
5	M1	Y	-0.26	139
6	M1	Y	-0.232	139
7	M1	Y	-0.006	139
8	M1	Y	-0.3	139
9	M1	Y	-0.32	139
10	M1	Y	-0.08	139
11	M1	Y	-0.096	139
12	M1	Y	-1.81	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Y	-0.622	148
2	M1	Y	-0.042	148
3	M1	Y	-1.28	148
4	M1	Y	-0.814	139
5	M1	Y	-0.789	139
6	M1	Y	-0.29	139
7	M1	Y	-0.035	139
8	M1	Y	-0.22	139
9	M1	Y	-0.222	139
10	M1	Y	-0.096	139
11	M1	Y	-0.317	139
12	M1	Y	-1.357	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.349	148
2	M1	X	0.018	148
3	M1	X	0.62	148
4	M1	X	0.459	139
5	M1	X	0.381	139
6	M1	X	0.154	139
7	M1	X	0.022	139
8	M1	X	0.082	139
9	M1	X	0.082	139
10	M1	X	0.043	139
11	M1	X	0.122	139
12	M1	X	0.615	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	2	148
2	M1	X	0.06	148
3	M1	X	2.291	148
4	M1	X	2.639	139
5	M1	X	2.118	139
6	M1	X	0.814	139
7	M1	X	0.093	139
8	M1	X	0.402	139
9	M1	X	0.402	139
10	M1	X	0.184	139
11	M1	X	0.653	139
12	M1	X	2.065	139

Member Point Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	0.349	148
2	M1	Z	0.018	148
3	M1	Z	0.62	148
4	M1	Z	0.459	139
5	M1	Z	0.381	139
6	M1	Z	0.154	139
7	M1	Z	0.022	139
8	M1	Z	0.082	139
9	M1	Z	0.082	139
10	M1	Z	0.043	139
11	M1	Z	0.122	139
12	M1	Z	0.615	139

Member Point Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	2	148
2	M1	Z	0.06	148
3	M1	Z	2.291	148
4	M1	Z	2.639	139
5	M1	Z	2.118	139
6	M1	Z	0.814	139

Member Point Loads (BLC 7 : (z) TIA Wind) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
7	M1	Z	0.093	139
8	M1	Z	0.402	139
9	M1	Z	0.402	139
10	M1	Z	0.184	139
11	M1	Z	0.653	139
12	M1	Z	2.065	139

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.012	-0.012	139	148
2	M1	Y	-0.016	-0.016	0	139

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.023	-0.023	140	144
2	M1	Y	-0.023	-0.023	120	140
3	M1	Y	-0.022	-0.022	100	120
4	M1	Y	-0.022	-0.022	80	100
5	M1	Y	-0.021	-0.021	60	80
6	M1	Y	-0.02	-0.02	40	60
7	M1	Y	-0.019	-0.019	20	40
8	M1	Y	-0.017	-0.017	0	20
9	M1	Y	-0.021	-0.021	120	139
10	M1	Y	-0.021	-0.021	100	120
11	M1	Y	-0.02	-0.02	80	100
12	M1	Y	-0.02	-0.02	60	80
13	M1	Y	-0.019	-0.019	40	60
14	M1	Y	-0.017	-0.017	20	40
15	M1	Y	-0.015	-0.015	0	20
16	M18	Y	-0.007	-0.007	0	%100
17	M15	Y	-0.007	-0.007	0	%100
18	M12	Y	-0.007	-0.007	0	%100
19	M16	Y	-0.008	-0.008	0	%100
20	M17	Y	-0.008	-0.008	0	%100
21	M13	Y	-0.008	-0.008	0	%100
22	M14	Y	-0.008	-0.008	0	%100
23	M10	Y	-0.008	-0.008	0	%100
24	M11	Y	-0.008	-0.008	0	%100
25	M4	Y	-0.009	-0.009	0	%100
26	M2	Y	-0.01	-0.01	0	%100
27	M9	Y	-0.01	-0.01	0	%100
28	M5	Y	-0.01	-0.01	0	%100
29	M8	Y	-0.01	-0.01	0	%100
30	M6	Y	-0.011	-0.011	0	%100
31	M3	Y	-0.011	-0.011	0	%100
32	M7	Y	-0.011	-0.011	0	%100
33	M20	Y	-0.008	-0.008	0	%100
34	M21	Y	-0.008	-0.008	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.016	0.016	140	144
2	M1	X	0.015	0.015	120	140
3	M1	X	0.014	0.014	100	120
4	M1	X	0.014	0.014	80	100
5	M1	X	0.013	0.013	60	80
6	M1	X	0.012	0.012	40	60
7	M1	X	0.011	0.011	20	40
8	M1	X	0.008	0.008	0	20
9	M1	X	0.005	0.005	120	139
10	M1	X	0.004	0.004	100	120
11	M1	X	0.004	0.004	80	100
12	M1	X	0.004	0.004	60	80
13	M1	X	0.004	0.004	40	60
14	M1	X	0.003	0.003	20	40
15	M1	X	0.002	0.002	0	20
16	M18	X	0.005	0.005	0	%100
17	M15	X	0.005	0.005	0	%100
18	M12	X	0.005	0.005	0	%100
19	M16	X	0.007	0.007	0	%100
20	M17	X	0.007	0.007	0	%100
21	M13	X	0.007	0.007	0	%100
22	M14	X	0.007	0.007	0	%100
23	M10	X	0.007	0.007	0	%100
24	M11	X	0.007	0.007	0	%100
25	M4	X	0.008	0.008	0	%100
26	M2	X	0.009	0.009	0	%100
27	M5	X	0.009	0.009	0	%100
28	M3	X	0.01	0.01	0	%100
29	M20	X	0.007	0.007	0	%100
30	M21	X	0.007	0.007	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.087	0.087	140	144
2	M1	X	0.085	0.085	120	140
3	M1	X	0.081	0.081	100	120
4	M1	X	0.078	0.078	80	100
5	M1	X	0.074	0.074	60	80
6	M1	X	0.069	0.069	40	60
7	M1	X	0.062	0.062	20	40
8	M1	X	0.049	0.049	0	20
9	M1	X	0.013	0.013	120	139
10	M1	X	0.013	0.013	100	120
11	M1	X	0.012	0.012	80	100
12	M1	X	0.011	0.011	60	80
13	M1	X	0.011	0.011	40	60
14	M1	X	0.01	0.01	20	40
15	M1	X	0.008	0.008	0	20
16	M18	X	0.015	0.015	0	%100
17	M15	X	0.015	0.015	0	%100
18	M12	X	0.015	0.015	0	%100
19	M16	X	0.022	0.022	0	%100
20	M17	X	0.022	0.022	0	%100
21	M13	X	0.022	0.022	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
22	M14	X	0.022	0.022	0	%100
23	M10	X	0.022	0.022	0	%100
24	M11	X	0.022	0.022	0	%100
25	M4	X	0.031	0.031	0	%100
26	M2	X	0.036	0.036	0	%100
27	M5	X	0.036	0.036	0	%100
28	M3	X	0.041	0.041	0	%100
29	M20	X	0.022	0.022	0	%100
30	M21	X	0.022	0.022	0	%100

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.016	0.016	140	144
2	M1	Z	0.015	0.015	120	140
3	M1	Z	0.014	0.014	100	120
4	M1	Z	0.014	0.014	80	100
5	M1	Z	0.013	0.013	60	80
6	M1	Z	0.012	0.012	40	60
7	M1	Z	0.011	0.011	20	40
8	M1	Z	0.008	0.008	0	20
9	M1	Z	0.005	0.005	120	139
10	M1	Z	0.004	0.004	100	120
11	M1	Z	0.004	0.004	80	100
12	M1	Z	0.004	0.004	60	80
13	M1	Z	0.004	0.004	40	60
14	M1	Z	0.003	0.003	20	40
15	M1	Z	0.002	0.002	0	20
16	M16	Z	0.007	0.007	0	%100
17	M17	Z	0.007	0.007	0	%100
18	M13	Z	0.007	0.007	0	%100
19	M14	Z	0.007	0.007	0	%100
20	M10	Z	0.007	0.007	0	%100
21	M11	Z	0.007	0.007	0	%100
22	M8	Z	0.009	0.009	0	%100
23	M9	Z	0.009	0.009	0	%100
24	M6	Z	0.01	0.01	0	%100
25	M7	Z	0.01	0.01	0	%100
26	M20	Z	0.007	0.007	0	%100
27	M21	Z	0.007	0.007	0	%100

Member Distributed Loads (BLC 7 : (z) TIA Wind)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.087	0.087	140	144
2	M1	Z	0.085	0.085	120	140
3	M1	Z	0.081	0.081	100	120
4	M1	Z	0.078	0.078	80	100
5	M1	Z	0.074	0.074	60	80
6	M1	Z	0.069	0.069	40	60
7	M1	Z	0.062	0.062	20	40
8	M1	Z	0.049	0.049	0	20
9	M1	Z	0.013	0.013	120	139
10	M1	Z	0.013	0.013	100	120
11	M1	Z	0.012	0.012	80	100

Member Distributed Loads (BLC 7 : (z) TIA Wind) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
12	M1	Z	0.011	0.011	60	80
13	M1	Z	0.011	0.011	40	60
14	M1	Z	0.01	0.01	20	40
15	M1	Z	0.008	0.008	0	20
16	M16	Z	0.022	0.022	0	%100
17	M17	Z	0.022	0.022	0	%100
18	M13	Z	0.022	0.022	0	%100
19	M14	Z	0.022	0.022	0	%100
20	M10	Z	0.022	0.022	0	%100
21	M11	Z	0.022	0.022	0	%100
22	M8	Z	0.036	0.036	0	%100
23	M9	Z	0.036	0.036	0	%100
24	M6	Z	0.041	0.041	0	%100
25	M7	Z	0.041	0.041	0	%100
26	M20	Z	0.022	0.022	0	%100
27	M21	Z	0.022	0.022	0	%100

Basic Load Cases

	BLC Description	Category	Y Gravity	Point	Distributed
1	Self Weight	None	-1		
2	Weight of Appurtenances	None		12	2
3	Weight of Ice Only	None		12	34
4	(x) TIA Wind with Ice	None		12	30
5	(x) TIA Wind	None		12	30
6	(z) TIA Wind with Ice	None		12	27
7	(z) TIA Wind	None		12	27

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.2D + 1.0W (X-direction)	Yes	Y	1	1.2	2	1.2	5	1		
2	0.9D + 1.0W (X-direction)	Yes	Y	1	0.9	2	0.9	5	1		
3	1.2D + 1.0Di + 1.0Wi (X-direction)	Yes	Y	1	1.2	2	1.2	3	1	4	1
4	1.2D + 1.0W (Z-direction)	Yes	Y	1	1.2	2	1.2	7	1		
5	0.9D + 1.0W (Z-direction)	Yes	Y	1	0.9	2	0.9	7	1		
6	1.2D + 1.0Di + 1.0Wi (Z-direction)	Yes	Y	1	1.2	2	1.2	3	1	6	1

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N1	max	0	5	32.255	3	0	1	0	1	0	5	5.819	1
1		min	-1.014	2	14.938	5	-1.013	5	-5.812	4	0	1	0	5
2	N9	max	0	5	0.087	3	0	3	0	6	0	6	0	6
3		min	-0.184	1	0.027	5	-0.588	5	0	1	0	1	0	1
4	N10	max	0	6	0.125	6	0	3	0	6	0	6	0	6
5		min	-0.272	2	0.039	2	-0.516	5	0	1	0	1	0	1
6	N11	max	-0.015	6	0.112	3	-0.014	3	0	6	0	6	0	6
7		min	-0.545	2	0.035	5	-0.252	5	0	1	0	1	0	1
8	N12	max	0.073	5	0.112	6	0.07	2	0	6	0	6	0	6
9		min	-0.545	2	0.035	2	-0.252	5	0	1	0	1	0	1
10	N13	max	0	6	0.054	3	0	3	0	6	0	6	0	6
11		min	-0.125	2	0.013	5	-1.577	4	0	1	0	1	0	1
12	N14	max	0	4	0.094	6	0	3	0	6	0	6	0	6
13		min	-0.199	1	0.029	2	-1.794	4	0	1	0	1	0	1

Envelope Node Reactions (Continued)

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
14	N15	max	-0.065	6	0.082	3	-0.054	6	0	6	0	6	0	6
15		min	-1.723	1	0.025	5	-0.27	1	0	1	0	1	0	1
16	N16	max	0.313	4	0.082	6	0.27	1	0	6	0	6	0	6
17		min	-1.723	1	0.025	2	-0.224	4	0	1	0	1	0	1
18	N17	max	0	4	0.01	6	0	2	0	6	0	6	0	6
19		min	-0.011	1	0.002	2	-2.412	5	0	1	0	1	0	1
20	N18	max	0.538	5	0.02	3	0.747	2	0	6	0	6	0	6
21		min	-1.53	2	0.004	5	-0.306	5	0	1	0	1	0	1
22	N19	max	-0.107	6	0.019	6	-0.065	6	0	6	0	6	0	6
23		min	-1.53	2	0.003	2	-0.747	2	0	1	0	1	0	1
24	N20	max	0	4	0.012	4	0	1	0	6	0	6	0	6
25		min	-0.011	2	0.002	2	-3.13	4	0	1	0	1	0	1
26	N21	max	0.699	4	0.021	3	0.935	1	0	6	0	6	0	6
27		min	-1.907	1	0.004	5	-0.386	4	0	1	0	1	0	1
28	N23	max	0	5	0.007	3	9.282	4	0	6	0	6	0	6
29		min	-0.011	1	-0.03	4	0	3	0	1	0	1	0	1
30	N24	max	5.576	1	0.021	6	1	4	0	6	0	6	0	6
31		min	-2.072	4	-0.004	1	-2.807	1	0	1	0	1	0	1
32	N22	max	-0.154	6	0.019	6	-0.088	6	0	6	0	6	0	6
33		min	-1.907	1	0.002	2	-0.935	1	0	1	0	1	0	1
34	N25	max	5.577	1	0.023	3	2.806	1	0	6	0	6	0	6
35		min	0.463	6	0.007	5	0.22	6	0	1	0	1	0	1
36	N28	max	-0.251	6	0.021	6	-0.137	6	0	6	0	6	0	6
37		min	-12.854	1	-0.016	1	-6.413	1	0	1	0	1	0	1
38	N26	max	0	1	0.107	4	0.006	1	0	6	0	6	0	6
39		min	0	5	0.01	2	-24.522	4	0	1	0	1	0	1
40	N27	max	1.16	4	0.033	1	6.407	1	0	6	0	6	0	6
41		min	-12.858	1	0.004	5	-0.617	4	0	1	0	1	0	1
42	Totals:	max	0	4	33.2	3	0	1						
43		min	-27.796	1	15.28	2	-27.836	4						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
0	N1	max	0	2	0	5	0	5	0	4	0	1	0	5
1		min	0	5	0	3	0	1	0	1	0	5	0	1
2	N2	max	0.002	2	-0.015	5	0.002	5	0	1	0	1	5.278e-4	1
3		min	0	5	-0.032	3	0	3	-5.248e-4	4	0	5	0	6
4	N3	max	0.005	1	-0.021	5	0.006	4	1.17e-3	4	0	1	0	4
5		min	0	5	-0.047	3	0	3	0	1	0	5	-1.166e-3	1
6	N4	max	0.004	2	-0.038	5	0.003	5	0	1	0	1	1.291e-3	1
7		min	0	5	-0.084	3	0	2	-1.305e-3	4	0	5	0	6
8	N5	max	0.005	1	-0.043	5	0.003	4	1.073e-3	4	0	1	0	4
9		min	0	5	-0.094	3	0	1	0	1	0	5	-1.042e-3	1
10	N6	max	0	6	-0.047	5	0	3	0	3	0	1	3.28e-3	1
11		min	-0.014	1	-0.104	3	-0.01	4	-3.311e-3	4	0	5	0	5
12	N7	max	0.023	1	-0.051	5	0.004	4	1.325e-2	4	0	1	0	6
13		min	0	6	-0.113	3	0	1	0	3	0	5	-1.341e-2	1
14	N8	max	4.457	1	-0.054	5	4.408	4	2.871e-2	4	0	1	0	6
15		min	0	6	-0.118	3	0	2	0	3	0	5	-2.887e-2	1
16	N9	max	0	1	0	5	0	5	3.413e-3	2	2.193e-3	6	5.278e-4	1
17		min	0	5	0	3	0	3	-3.931e-3	6	-7.145e-3	2	0	6
18	N10	max	0	2	0	2	0	5	6.182e-3	6	1.187e-2	2	5.278e-4	1
19		min	0	6	0	6	0	3	-5.897e-3	2	-3.621e-3	6	0	6
20	N11	max	0	2	0	5	0	5	5.824e-4	3	2.587e-3	3	4.032e-3	5
21		min	0	6	0	3	0	3	-1.039e-3	5	-8.411e-3	5	-4.461e-3	3

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
22	N12	max	0	2	0	2	0	5	5.569e-4	3	8.411e-3	5	4.464e-3	3
23		min	0	5	0	6	0	2	-1.039e-3	5	-2.587e-3	3	-4.032e-3	5
24	N13	max	0	2	0	5	0	4	3.284e-3	2	1.85e-3	6	0	4
25		min	0	6	0	3	0	3	-3.539e-3	6	-6.647e-3	2	-1.166e-3	1
26	N14	max	0	1	0	2	0	4	4.992e-3	6	9.052e-3	2	0	4
27		min	0	4	0	6	0	3	-4.305e-3	2	-2.773e-3	6	-1.166e-3	1
28	N15	max	0	1	0	5	0	1	7.733e-4	4	1.86e-3	3	2.908e-3	5
29		min	0	6	0	3	0	6	-1.678e-6	2	-6.015e-3	5	-3.476e-3	3
30	N16	max	0	1	0	2	0	4	7.733e-4	4	6.015e-3	5	3.465e-3	3
31		min	0	4	0	6	0	1	3.544e-4	2	-1.857e-3	3	-2.908e-3	5
32	N17	max	0	1	0	2	0	5	4.733e-3	6	2.689e-4	2	1.291e-3	1
33		min	0	4	0	6	0	2	2.112e-3	2	-2.971e-5	6	0	6
34	N18	max	0	2	0	5	0	5	-9.032e-4	2	1.071e-4	3	-9.387e-5	5
35		min	0	5	0	3	0	2	-1.506e-3	4	-5.81e-4	5	-2.077e-3	3
36	N19	max	0	2	0	2	0	2	-2.668e-5	2	5.81e-4	5	2.281e-3	3
37		min	0	6	0	6	0	6	-1.506e-3	4	-3.909e-4	1	9.387e-5	5
38	N20	max	0	2	0	2	0	4	5.292e-3	6	3.182e-4	2	0	4
39		min	0	4	0	4	0	1	2.363e-3	2	-2.971e-5	6	-1.042e-3	1
40	N21	max	0	1	0	5	0	4	4.978e-4	5	1.04e-4	3	-1.083e-3	2
41		min	0	4	0	3	0	1	-1.087e-3	3	-5.978e-4	5	-2.398e-3	3
42	N22	max	0	1	0	2	0	1	4.978e-4	5	5.978e-4	5	2.407e-3	3
43		min	0	6	0	6	0	6	-1.315e-3	3	-4.01e-4	1	9.778e-4	2
44	N23	max	0	1	0	4	0	3	5.802e-3	6	-6.603e-6	5	3.28e-3	1
45		min	0	5	0	3	0	4	2.59e-3	2	-6.836e-4	1	0	5
46	N24	max	0	4	0	1	0	1	-1.567e-3	3	1.485e-4	3	5.126e-4	5
47		min	0	1	0	6	0	4	-3.238e-3	4	-3.03e-4	5	-2.413e-3	3
48	N25	max	0	6	0	5	0	6	6.675e-4	2	3.03e-4	5	2.801e-3	3
49		min	0	1	0	3	0	1	-3.238e-3	4	-2.635e-4	3	-5.126e-4	5
50	N26	max	0	5	0	2	0	4	6.284e-3	3	1.298e-3	1	0	6
51		min	0	1	0	4	0	1	2.842e-3	5	0	6	-1.341e-2	1
52	N27	max	0	1	0	5	0	4	1.006e-2	5	4.491e-5	3	-3.322e-3	3
53		min	0	4	0	1	0	1	-1.831e-4	3	-4.809e-4	5	-6.678e-3	4
54	N28	max	0	1	0	1	0	1	9.829e-3	5	5.937e-4	4	7.145e-3	4
55		min	0	6	0	6	0	6	-6.116e-3	1	-4.285e-4	2	-1.572e-3	2

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
0	M1	12"FWTPOWERMOUNT	0.699	132.583	1	0.089	134.125		1	489.665	551.086	180.952	180.952	1	H1-1b
1	M2	L3.5X3.5X4	0.221	5.125	2	0.011	10.25	z	2	12.016	55.08	2.416	3.731	1.136	H2-1
2	M3	L4X4X4	0.341	6.625	2	0.014	13.25	z	2	10.574	62.532	3.138	4.34	1.136	H2-1
3	M4	L3X3X3	0.219	4.042	2	0.011	8.083	z	2	8.988	35.316	1.32	2.019	1.136	H2-1
4	M5	L3.5X3.5X4	0.262	5.542	2	0.012	11.083	z	2	10.278	55.08	2.416	3.613	1.136	H2-1
5	M6	L4X4X4	0.265	5.923	5	0.012	11.845	z	5	13.23	62.532	3.138	4.585	1.136	H2-1
6	M7	L4X4X4	0.265	5.923	5	0.012	11.845	z	4	13.23	62.532	3.138	4.585	1.136	H2-1
7	M8	L3.5X3.5X4	0.199	4.85	5	0.01	9.7	z	4	13.418	55.08	2.416	3.812	1.136	H2-1
8	M9	L3.5X3.5X4	0.199	4.85	5	0.01	9.7	z	5	13.418	55.08	2.416	3.812	1.136	H2-1
9	M10	L2.5X2.5X3	0.072	1.607	2	0.004	3.354	z	5	20.223	29.192	0.873	1.781	1.136	H2-1
10	M11	L2.5X2.5X3	0.101	1.747	1	0.004	3.354	z	5	20.223	29.192	0.873	1.781	1.136	H2-1
11	M12	L2X2X3	0.105	0.75	4	0.002	1.5	z	2	20.899	23.393	0.558	1.239	1.136	H2-1
12	M13	L2.5X2.5X3	0.086	1.607	2	0.004	3.354	z	5	20.223	29.192	0.873	1.781	1.136	H2-1
13	M14	L2.5X2.5X3	0.122	1.747	1	0.004	3.354	z	4	20.223	29.192	0.873	1.781	1.136	H2-1
14	M15	L2X2X3	0.135	0.75	4	0.002	1.5	z	1	20.899	23.393	0.558	1.239	1.136	H2-1
15	M16	L2.5X2.5X3	0.325	1.782	1	0.004	3.354	z	4	20.223	29.192	0.873	1.781	1.136	H2-1
16	M17	L2.5X2.5X3	0.234	1.642	1	0.004	3.354	z	5	20.223	29.192	0.873	1.781	1.136	H2-1
17	M18	L2X2X3	0.446	0.75	4	0.002	1.5	z	1	20.899	23.393	0.558	1.239	1.136	H2-1

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
18	M19	6"X3/4"PL	0.168	1.5	4	0	1.5	y	3	101.328	145.8	2.278	18.225	1.136	H1-1b*
19	M20	L2.5X2.5X4	0.382	1.607	1	0.003	3.354	z	4	26.71	38.556	1.114	2.43	1.136	H2-1
20	M21	L2.5X2.5X4	0.547	1.572	1	0.003	3.354	z	5	26.71	38.556	1.114	2.43	1.136	H2-1

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	1	N1	-1.014	19.994	0	0	0	5.819
1	1	N9	-0.184	0.036	0	0	0	0
2	1	N10	-0.272	0.052	0	0	0	0
3	1	N11	-0.545	0.047	-0.07	0	0	0
4	1	N12	-0.545	0.047	0.07	0	0	0
5	1	N13	-0.125	0.018	0	0	0	0
6	1	N14	-0.199	0.038	0	0	0	0
7	1	N15	-1.723	0.034	-0.27	0	0	0
8	1	N16	-1.723	0.033	0.27	0	0	0
9	1	N17	-0.011	0.002	0	0	0	0
10	1	N18	-1.529	0.008	0.746	0	0	0
11	1	N19	-1.529	0.004	-0.746	0	0	0
12	1	N20	-0.011	0.002	0	0	0	0
13	1	N21	-1.907	0.009	0.935	0	0	0
14	1	N23	-0.011	0.002	0.001	0	0	0
15	1	N24	5.576	-0.004	-2.807	0	0	0
16	1	N22	-1.907	0.003	-0.935	0	0	0
17	1	N25	5.577	0.016	2.806	0	0	0
18	1	N28	-12.854	-0.016	-6.413	0	0	0
19	1	N26	0	0.014	0.006	0	0	0
20	1	N27	-12.858	0.033	6.407	0	0	0
21	1	Totals:	-27.796	20.373	0			
22	1	COG (ft):	X: 0	Y: 100.26	Z: -0.039			

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	2	N1	-1.014	14.996	0	0	0	5.819
1	2	N9	-0.184	0.027	0	0	0	0
2	2	N10	-0.272	0.039	0	0	0	0
3	2	N11	-0.545	0.035	-0.07	0	0	0
4	2	N12	-0.545	0.035	0.07	0	0	0
5	2	N13	-0.125	0.013	0	0	0	0
6	2	N14	-0.199	0.029	0	0	0	0
7	2	N15	-1.723	0.026	-0.27	0	0	0
8	2	N16	-1.723	0.025	0.27	0	0	0
9	2	N17	-0.011	0.002	0	0	0	0
10	2	N18	-1.53	0.006	0.747	0	0	0
11	2	N19	-1.53	0.003	-0.747	0	0	0
12	2	N20	-0.011	0.002	0	0	0	0
13	2	N21	-1.898	0.007	0.931	0	0	0
14	2	N23	-0.011	0.002	0.001	0	0	0
15	2	N24	5.544	-0.003	-2.792	0	0	0
16	2	N22	-1.898	0.002	-0.931	0	0	0
17	2	N25	5.546	0.012	2.79	0	0	0
18	2	N28	-12.83	-0.012	-6.401	0	0	0
19	2	N26	0	0.01	0.006	0	0	0
20	2	N27	-12.834	0.024	6.394	0	0	0
21	2	Totals:	-27.796	15.28	0			
22	2	COG (ft):	X: 0	Y: 100.26	Z: -0.039			

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	3	N1	-0.182	32.255	0	0	0	1.059
1	3	N9	-0.046	0.087	0	0	0	0
2	3	N10	-0.066	0.125	0	0	0	0
3	3	N11	-0.111	0.112	-0.014	0	0	0
4	3	N12	-0.111	0.112	0.014	0	0	0
5	3	N13	-0.032	0.054	0	0	0	0
6	3	N14	-0.05	0.094	0	0	0	0
7	3	N15	-0.355	0.082	-0.056	0	0	0
8	3	N16	-0.355	0.082	0.056	0	0	0
9	3	N17	-0.004	0.007	0	0	0	0
10	3	N18	-0.309	0.02	0.148	0	0	0
11	3	N19	-0.309	0.019	-0.148	0	0	0
12	3	N20	-0.004	0.007	0	0	0	0
13	3	N21	-0.423	0.021	0.206	0	0	0
14	3	N23	-0.004	0.007	0	0	0	0
15	3	N24	1.242	0.016	-0.627	0	0	0
16	3	N22	-0.423	0.019	-0.206	0	0	0
17	3	N25	1.242	0.023	0.627	0	0	0
18	3	N28	-2.783	0.013	-1.386	0	0	0
19	3	N26	0	0.014	0	0	0	0
20	3	N27	-2.784	0.03	1.386	0	0	0
21	3	Totals:	-5.865	33.2	0			
22	3	COG (ft):	X: 0	Y: 101.91	Z: -0.053			

Node Reactions

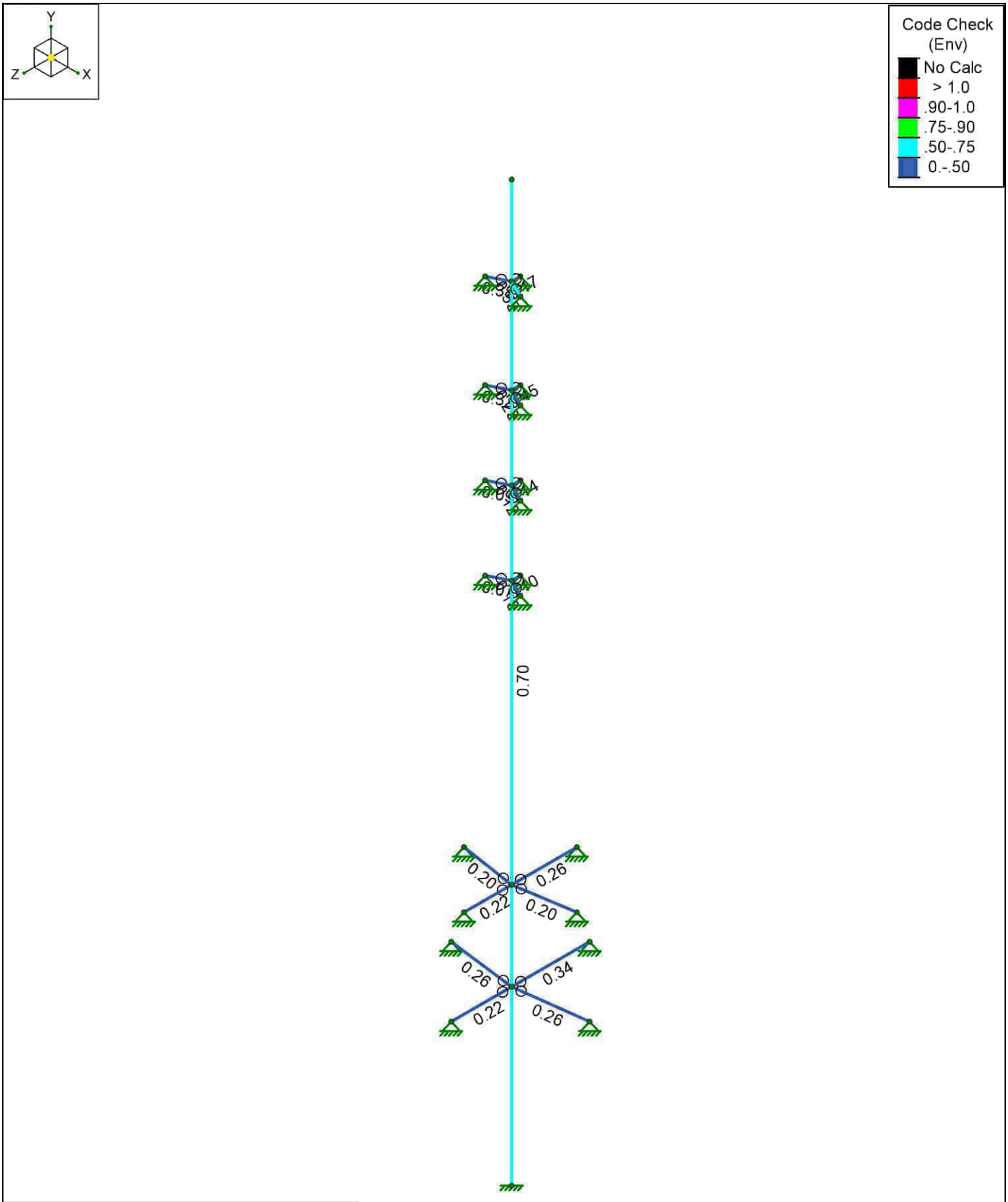
	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	4	N1	0	19.918	-1.013	-5.812	0	0
1	4	N9	0	0.035	-0.588	0	0	0
2	4	N10	0	0.052	-0.516	0	0	0
3	4	N11	-0.073	0.047	-0.252	0	0	0
4	4	N12	0.073	0.047	-0.252	0	0	0
5	4	N13	0	0.018	-1.577	0	0	0
6	4	N14	0	0.039	-1.794	0	0	0
7	4	N15	-0.313	0.034	-0.224	0	0	0
8	4	N16	0.313	0.034	-0.224	0	0	0
9	4	N17	0	0.009	-2.409	0	0	0
10	4	N18	0.538	0.005	-0.306	0	0	0
11	4	N19	-0.538	0.005	-0.306	0	0	0
12	4	N20	0	0.012	-3.13	0	0	0
13	4	N21	0.699	0.005	-0.386	0	0	0
14	4	N23	0	-0.03	9.282	0	0	0
15	4	N24	-2.072	0.01	1	0	0	0
16	4	N22	-0.699	0.005	-0.386	0	0	0
17	4	N25	2.072	0.01	1	0	0	0
18	4	N28	-1.16	0.006	-0.617	0	0	0
19	4	N26	0	0.107	-24.522	0	0	0
20	4	N27	1.16	0.006	-0.617	0	0	0
21	4	Totals:	0	20.373	-27.836			
22	4	COG (ft):	X: 0	Y: 100.26	Z: -0.039			

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	5	N1	0	14.938	-1.013	-5.812	0	0
1	5	N9	0	0.027	-0.588	0	0	0
2	5	N10	0	0.039	-0.516	0	0	0
3	5	N11	-0.073	0.035	-0.252	0	0	0
4	5	N12	0.073	0.035	-0.252	0	0	0
5	5	N13	0	0.013	-1.577	0	0	0
6	5	N14	0	0.029	-1.794	0	0	0
7	5	N15	-0.313	0.025	-0.224	0	0	0
8	5	N16	0.313	0.025	-0.224	0	0	0
9	5	N17	0	0.007	-2.412	0	0	0
10	5	N18	0.538	0.004	-0.306	0	0	0
11	5	N19	-0.538	0.004	-0.306	0	0	0
12	5	N20	0	0.009	-3.115	0	0	0
13	5	N21	0.695	0.004	-0.385	0	0	0
14	5	N23	0	-0.022	9.23	0	0	0
15	5	N24	-2.06	0.007	0.994	0	0	0
16	5	N22	-0.695	0.004	-0.385	0	0	0
17	5	N25	2.06	0.007	0.994	0	0	0
18	5	N28	-1.158	0.004	-0.616	0	0	0
19	5	N26	0	0.08	-24.476	0	0	0
20	5	N27	1.158	0.004	-0.616	0	0	0
21	5	Totals:	0	15.28	-27.836			
22	5	COG (ft):	X: 0	Y: 100.26	Z: -0.039			

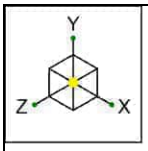
Node Reactions

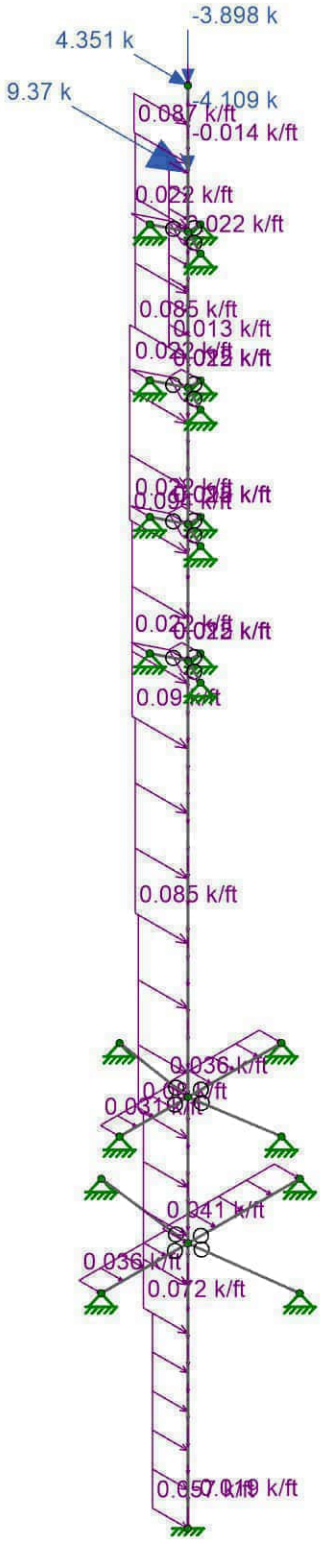
	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	6	N1	0	32.228	-0.182	-1.058	0	0
1	6	N9	0	0.087	-0.119	0	0	0
2	6	N10	0	0.125	-0.105	0	0	0
3	6	N11	-0.015	0.112	-0.061	0	0	0
4	6	N12	0.015	0.112	-0.061	0	0	0
5	6	N13	0	0.054	-0.325	0	0	0
6	6	N14	0	0.094	-0.37	0	0	0
7	6	N15	-0.065	0.082	-0.054	0	0	0
8	6	N16	0.065	0.082	-0.054	0	0	0
9	6	N17	0	0.01	-0.478	0	0	0
10	6	N18	0.107	0.019	-0.065	0	0	0
11	6	N19	-0.107	0.019	-0.065	0	0	0
12	6	N20	0	0.011	-0.688	0	0	0
13	6	N21	0.154	0.019	-0.088	0	0	0
14	6	N23	0	-0.004	2.074	0	0	0
15	6	N24	-0.463	0.021	0.22	0	0	0
16	6	N22	-0.154	0.019	-0.088	0	0	0
17	6	N25	0.463	0.021	0.22	0	0	0
18	6	N28	-0.251	0.021	-0.137	0	0	0
19	6	N26	0	0.047	-5.302	0	0	0
20	6	N27	0.251	0.021	-0.137	0	0	0
21	6	Totals:	0	33.2	-5.865			
22	6	COG (ft):	X: 0	Y: 101.91	Z: -0.053			



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

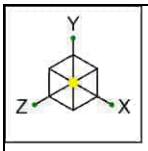
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

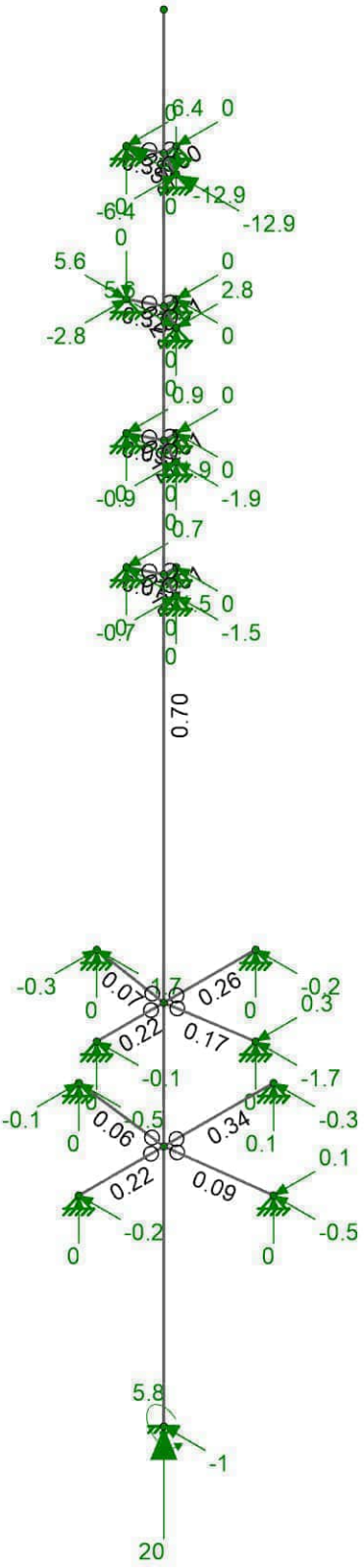




Loads: LC 1, 1.2D + 1.0W (X-direction)

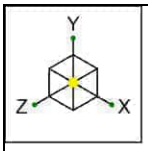
IRISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

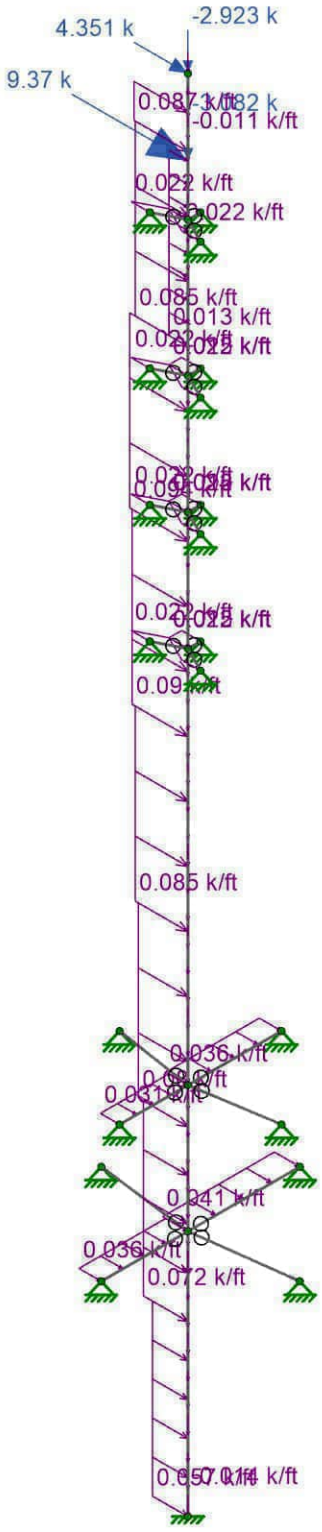




Member Code Checks Displayed
Results for LC 1, 1.2D + 1.0W (X-direction)
Reaction and Moment Units are kips and kip-ft

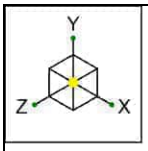
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

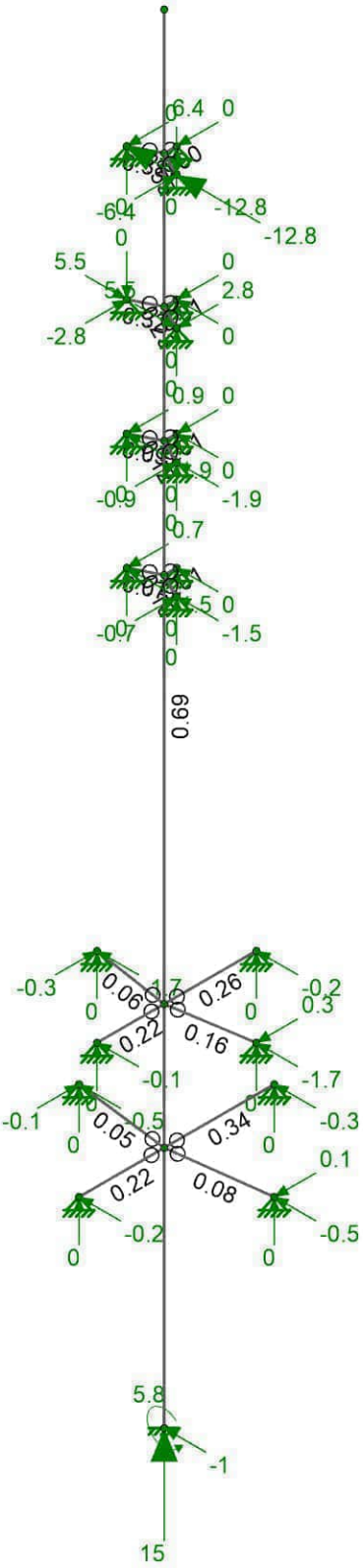




Loads: LC 2, 0.9D + 1.0W (X-direction)

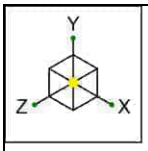
IRISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

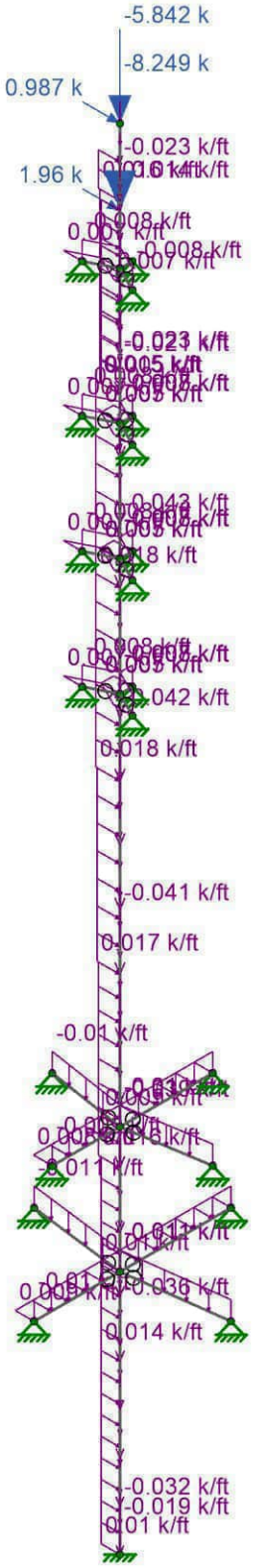




Member Code Checks Displayed
Results for LC 2, 0.9D + 1.0W (X-direction)
Reaction and Moment Units are kips and kip-ft

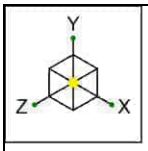
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

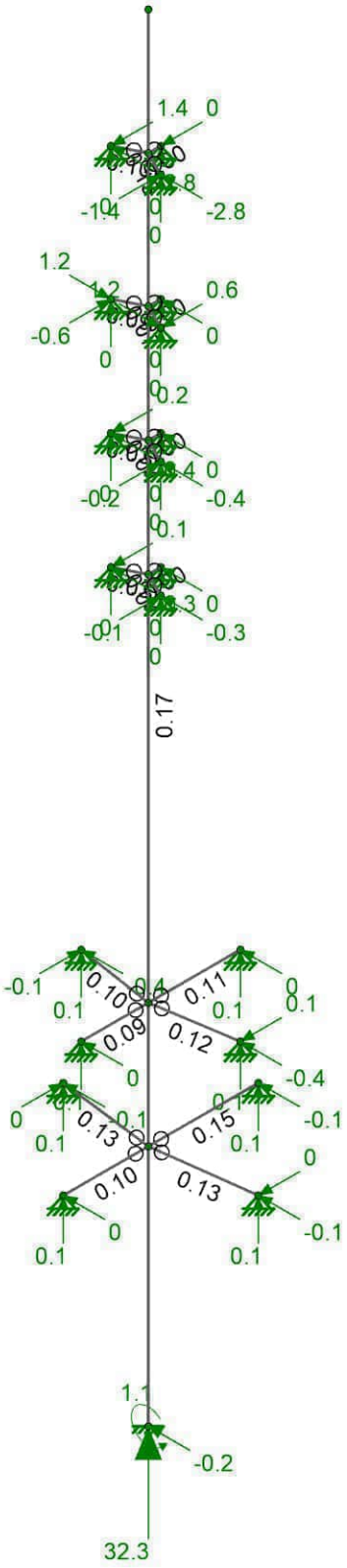




Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

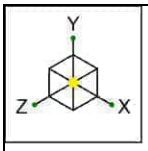
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

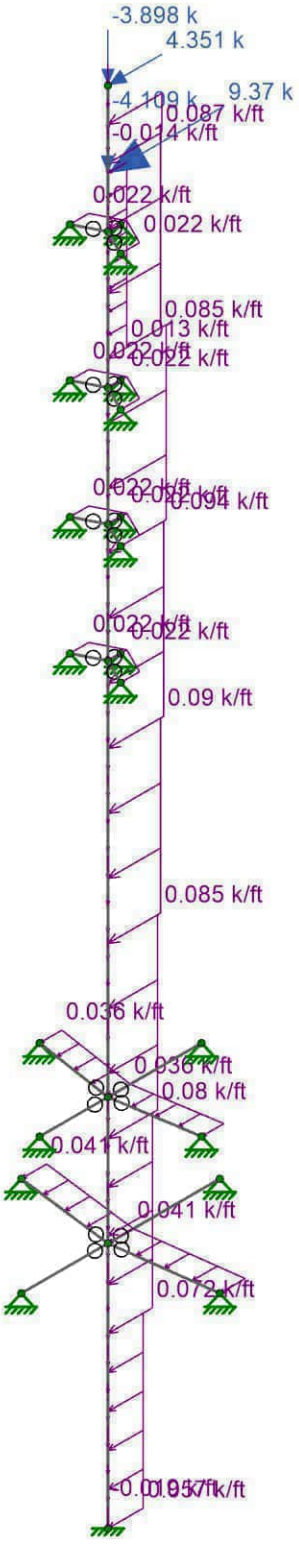




Member Code Checks Displayed
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are kips and kip-ft

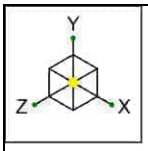
IRISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

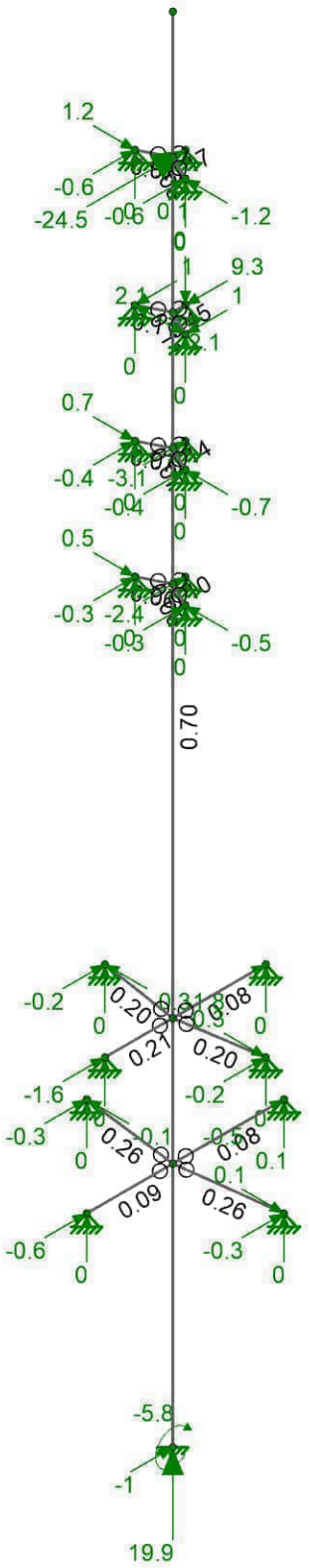




Loads: LC 4, 1.2D + 1.0W (Z-direction)

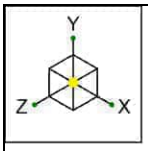
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

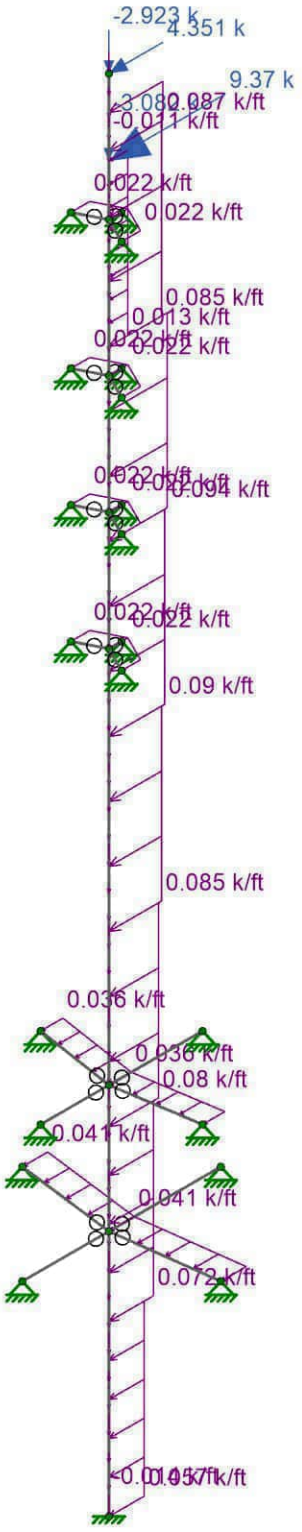




Member Code Checks Displayed
Results for LC 4, 1.2D + 1.0W (Z-direction)
Reaction and Moment Units are kips and kip-ft

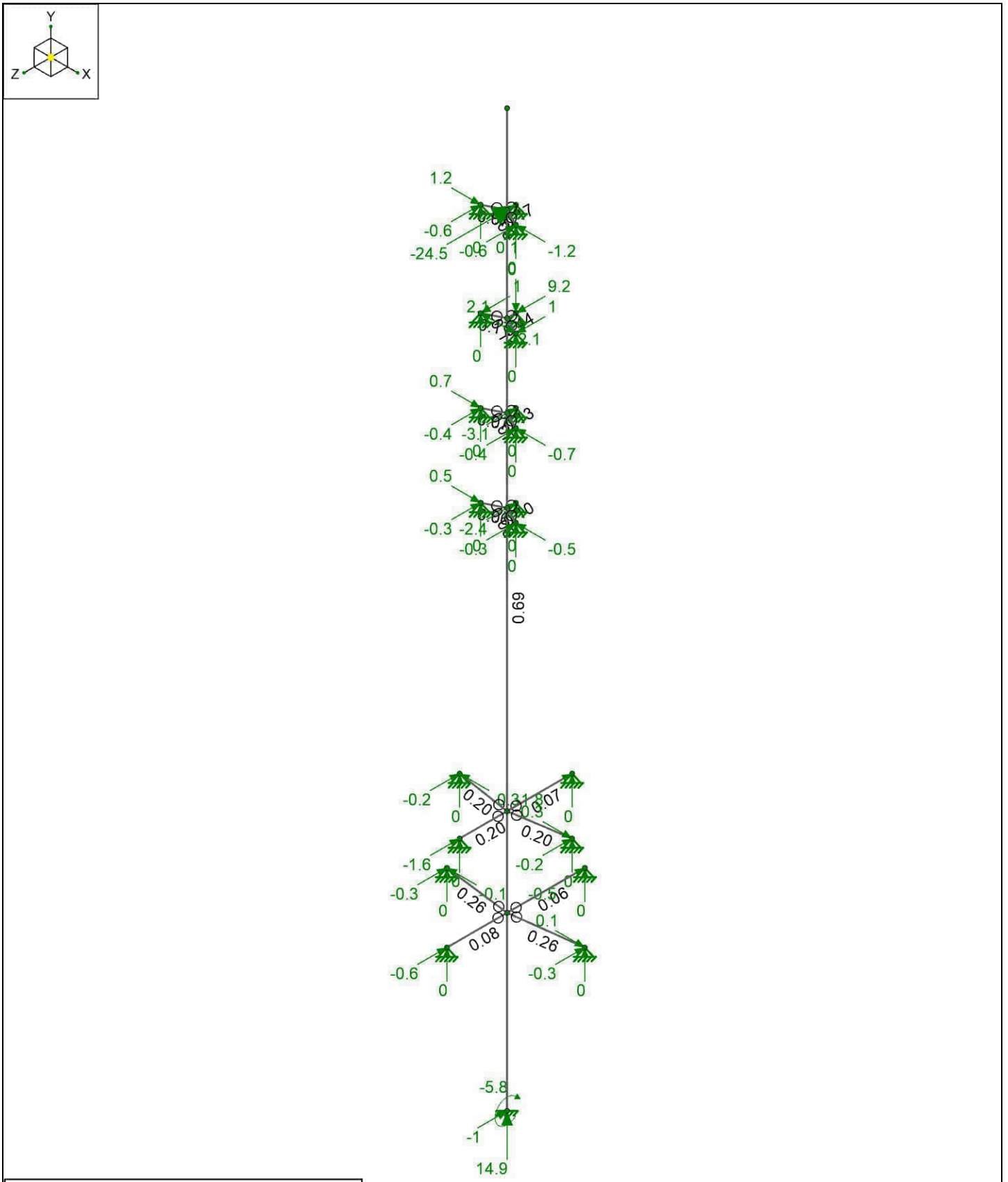
IRISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		





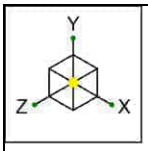
Loads: LC 5, 0.9D + 1.0W (Z-direction)

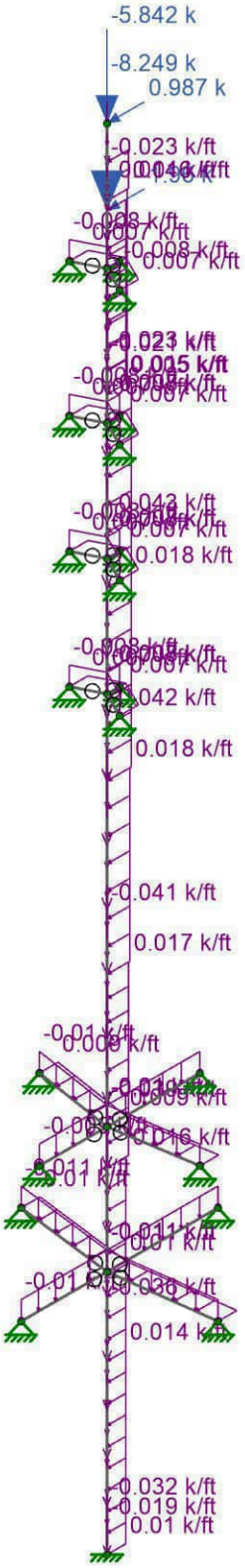
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		



Member Code Checks Displayed
Results for LC 5, 0.9D + 1.0W (Z-direction)
Reaction and Moment Units are kips and kip-ft

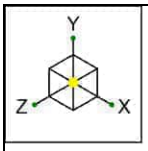
RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

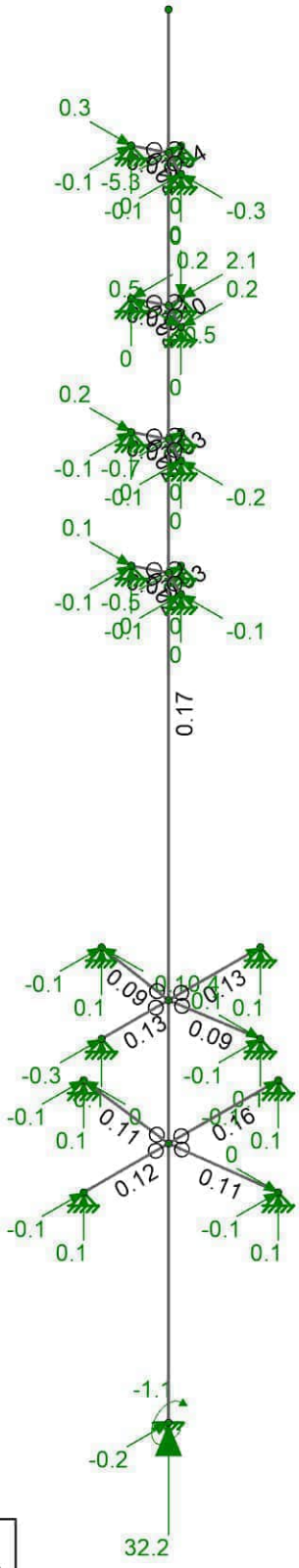




Loads: LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)

RISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		





Member Code Checks Displayed
Results for LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)
Reaction and Moment Units are kips and kip-ft

IRISA	CENTEK Engineering, INC.	Struct. #1281 - Antenna Mast	
	TJL		TIA-222 Mast.r3d
	21007.68 - Greenwich 3		

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P: (203) 488-0580
F: (203) 488-8587

Subject: Connection of Powermount to Tower # 1281

Location: Greenwich, CT

Rev. 10: 11/8/24

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68

Powermount Connection to Tower:

Reactions:		
Tension =	$Tension := 25.7 \cdot kip$	(Input From Risa-3D LC #4)
Shear =	$Shear := 25.7 \cdot kip$	(Input From Risa-3D LC #1)
Bolt Data:		
Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.75 \cdot in$	(User Input)
Number of Bolts =	$N_b := 4$	(User Input)
Design Tensile Strength =	$F_t := 29.8 \cdot kip$	(User Input)
Design Shear Strength =	$F_v := 17.9 \cdot kip$	(User Input)
Plate Data:		
Plate Width =	$W_{plt} := 5 \cdot in$	(User Input)
Plate Thickness =	$t_{plt} := 1 \cdot in$	(User Input)
Distance from Bolt to Collar =	$d_{st} := 1.75 \cdot in$	(User Input)
Yield Strength =	$F_y := 36 \cdot ksi$	(User Input)
Weld Data:		
Weld Size =	$sw := \frac{5}{16} \cdot in$	(User Input)
Weld Length =	$l_w := 5 \cdot in$	(User Input)
Number of Welds =	$n_w := 2$	(User Input)
Weld Strength =	$F_w := 70 \cdot ksi$	(User Input)

Check Pipe Collar Bolts:

Shear Force = $f_v := \frac{Shear}{N_b} = 6.4\ kip$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 35.9\%$

Check Bolt Shear = $Bolt\_Shear := \text{if}\left(\frac{f_v}{F_v} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$

$Bolt\_Shear = \text{“OK”}$

Tension Force = $f_t := \frac{Tension}{N_b} = 6.4\ kip$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 21.6\%$

Check Bolt Tension = $Bolt\_Tension := \text{if}\left(\frac{f_t}{F_t} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$

$Bolt\_Tension = \text{“OK”}$

Check Pipe Collar Plate:

Design Bending Strength = $F_b := 0.9 \cdot F_y = 32.4\ ksi$

Plate Section Modulus = $Z_{plt} := \frac{1}{4} \cdot W_{plt} \cdot t_{plt}^{\ 2} = 1.25\ in^3$

Plate Bending Moment = $M := \frac{f_t \cdot N_b}{2} \cdot d_{st} = 22.488\ in \cdot kip$

Plate Bending Stress = $f_b := \frac{M}{Z_{plt}} = 17.99\ ksi$

$\frac{f_b}{F_b} = 55.5\%$

$Plate\_Bending := \text{if}\left(f_b < F_b, \text{“OK”}, \text{“Overstressed”}\right)$

$Plate\_Bending = \text{“OK”}$

Check Pipe Collar Weld:

Design Weld Strength = $F_w := 0.45 \cdot F_w = 31.5\ ksi$

Weld Section Modulus = $S_w := \frac{1}{6} \cdot .707 \cdot sw \cdot l_w^{\ 2} = 0.921\ in^3$

Weld Area = $A_w := .707 \cdot sw \cdot l_w = 1.105\ in^2$

Plate Stress = $f_w := \frac{\frac{f_t \cdot N_b}{2}}{A_w \cdot n_w} = 5.816\ ksi$

$Weld := \text{if}\left(f_w < F_w, \text{“OK”}, \text{“Overstressed”}\right)$ $\frac{f_w}{F_w} = 18.5\%$

$Weld = \text{“OK”}$

Check Pipe Collar to Angle Brace Bolts:

Reactions:

Axial Force in Member =	$Axial := 14.4 \cdot kip$	(User Input)

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.75 \cdot in$	(User Input)
Number of Bolts =	$N_b := 1$	(User Input)
Design Tensile Strength =	$F_t := 29.8 \cdot kip$	(User Input)
Design Shear Strength =	$F_v := 17.9 \cdot kip$	(User Input)
Shear Force =	$f_v := \frac{Axial}{N_b} = 14.4\ kip$	
Bolt Shear % of Capacity =	$\frac{f_v}{F_v} = 80.4\%$	
Check Bolt Shear =	$Bolt\_Shear := \text{if}\left(\frac{f_v}{F_v} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$	
	$Bolt\_Shear = \text{“OK”}$	

Check Angle Brace to Tower Bolts:

Reactions:

Axial Force in Member =	$Axial := 14.4 \cdot kip$	(User Input)

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.75 \cdot in$	(User Input)
Number of Bolts =	$N_b := 1$	(User Input)
Design Tensile Strength =	$F_t := 29.8 \cdot kip$	(User Input)
Design Shear Strength =	$F_v := 17.9 \cdot kip$	(User Input)
Shear Force =	$f_v := \frac{Axial}{N_b} = 14.4\ kip$	
Bolt Shear % of Capacity =	$\frac{f_v}{F_v} = 80.4\%$	
Check Bolt Shear =	$Bolt\_Shear := \text{if}\left(\frac{f_v}{F_v} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$	
	$Bolt\_Shear = \text{“OK”}$	

Check Pipe Collar to Plate Brace Bolts:

Reactions:

Axial Force in Member =	$Axial := 24.5 \cdot kip$	(User Input)

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.75 \cdot in$	(User Input)
Number of Bolts =	$N_b := 2$	(User Input)
Design Tensile Strength =	$F_t := 29.8 \cdot kip$	(User Input)
Design Shear Strength =	$F_v := 17.9 \cdot kip$	(User Input)
Shear Force =	$f_v := \frac{Axial}{N_b} = 12.3\ kip$	
Bolt Shear % of Capacity =	$\frac{f_v}{F_v} = 68.4\%$	
Check Bolt Shear =	$Bolt\_Shear := \text{if}\left(\frac{f_v}{F_v} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$	
	$Bolt\_Shear = \text{“OK”}$	

Check Plate Brace to Tower Bolts:

Reactions:

Axial Force in Member =	$Axial := 24.5 \cdot kip$	(User Input)

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.625 \cdot in$	(User Input)
Number of Bolts =	$N_b := 1$	(User Input)
Design Tensile Strength =	$F_t := 20.7 \cdot kip$	(User Input)
Design Shear Strength =	$F_v := 24.9 \cdot kip$	(User Input - Double Shear)
Shear Force =	$f_v := \frac{Axial}{N_b} = 24.5\ kip$	
Bolt Shear % of Capacity =	$\frac{f_v}{F_v} = 98.4\%$	
Check Bolt Shear =	$Bolt\_Shear := \text{if}\left(\frac{f_v}{F_v} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$	
	$Bolt\_Shear = \text{“OK”}$	

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Subject: Connection of Powermount to Tower # 1281

Location: Greenwich, CT

Rev. 10: 11/8/24

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68

Check Angle Brace to Tower Bolts:

Reactions:

Axial Force in Member =	$Axial := 9.3 \cdot kip$	(User Input)

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.625 \cdot in$	(User Input)
Number of Bolts =	$N_b := 1$	(User Input)
Design Tensile Strength =	$F_t := 20.7 \cdot kip$	(User Input)
Design Shear Strength =	$F_v := 12.4 \cdot kip$	(User Input)
Shear Force =	$f_v := \frac{Axial}{N_b} = 9.3\ kip$	
Bolt Shear % of Capacity =	$\frac{f_v}{F_v} = 75\%$	
Check Bolt Shear =	$Bolt\_Shear := \text{if}\left(\frac{f_v}{F_v} \le 1.00, \text{“OK”}, \text{“Overstressed”}\right)$	
	$Bolt\_Shear = \text{“OK”}$	

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2023 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input)
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input NESC 2023 Figure 250-1 & Table 250-1)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	$TME := 148$	ft	(User Input)
Multiplier Gust Response Factor =	$m := 1.25$		(User Input - Only for NESC Extreme wind case)
Velocity Pressure Coefficient =	$Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.375$		(NESC 2023 Table 250-2)
Turbulence Intensity Constant =	$C_{exp} := 0.2$		(NESC 2023 Table 250-3)
Integral Length Scale of Turbulence Constant =	$L_s := 220$		(NESC 2023 Table 250-3)
Effective Height =	$z_s := 0.67 \cdot TME = 99.16$		(NESC 2023 Table 250-3)
Turbulence Intensity =	$I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.166$		(NESC 2023 Table 250-3)
Response Term =	$B_t := \left(\frac{1}{\left(1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right)}\right)^{0.5} = 0.894$		(NESC 2023 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left(1 + \left(4.61 \cdot I_z \cdot B_t\right)\right)}{\left(1 + 6.1 \cdot I_z\right)} = 0.836$		(NESC 2023 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 35.6$	psf	(NESC 2023 Section 250.C.1)

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 Open Lattice =	$Cd_{OL} := 3.2$	(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

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Subject: Load Analysis of Equipment on Structure #1281

Location: Greenwich, CT

Rev. 10: 11/7/24

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21007.68

Development of Wind & Ice Load on Antennas

(Dish)

Antenna Data:

Antenna Model =	Commscope FFVV-65B-R2		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 71.969$	in	(User Input)
Antenna Width =	$W_{ant} := 19.606$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.756$	in	(User Input)
Antenna Weight =	$WT_{ant} := 65$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 195$ lbs

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 2222$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 72$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 216$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 10.44$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 4.4$

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 10.44$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.94$

Antenna Projected Surface Area w/ Ice = $EPA_{tot} := EPA_{A1} + EPA_{A2} \cdot 2 = 22.318$

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 143$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 9.8$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 3.88$

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 9.8$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.36$

Antenna Projected Surface Area = $EPA_{tot} := EPA_{A1} + EPA_{A2} \cdot 2 = 20.513$

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 1461$ lbs

Development of Wind & Ice Load on Antennas (Dish)

Antenna Data:

Antenna Model =	Commscope CDX623T-DS-T		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 8.858$	in	(User Input)
Antenna Width =	$W_{ant} := 4.961$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.528$	in	(User Input)
Antenna Weight =	$WT_{ant} := 11$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 33$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 199$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 126$ cu in

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

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 12$ lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.41$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 0.3$

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.41$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.39$

Antenna Projected Surface Area w/ Ice = $EPA_{tot} := EPA_{A1} + EPA_{A2} \cdot 2 = 1.18$

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot EPA_{tot} = 8$ lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 0.31$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.28$

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.31$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.29$

Antenna Projected Surface Area = $EPA_{tot} := EPA_{A1} + EPA_{A2} \cdot 2 = 0.876$

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 62$ lbs

Development of Wind & Ice Load on Platform

Platform Data: (Dish)

Platform Model = FWT 14' Low Profile Platform

Platform Shape = Flat

Platform Projected Surface Area = $CdAa := 29.4$ sf (User Input)

Platform Projected Surface Area w/ Ice = $CdAa_{ice} := 38.8$ sf (User Input)

Platform Weight = $WT_{plt} := 3020$ lbs (User Input)

Platform Weight w/ Ice = $WT_{ICEplt} := 4300$ lbs (User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{plt} = 3020$ lbs

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{ICEplt} - WT_{plt}\right) = 1280$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 155$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 1309$ lbs

Total Pipe Length = $TPL := 6 \cdot ft \cdot 9 = 54\ ft$

Total Antenna Length = $TAL := 72 \cdot in \cdot 3 = 18\ ft$

Exposed Pipe Area = $ExPA := \left(TPL - TAL\right) \cdot 2.375 \cdot in = 7.125\ ft^2$

CaAa = $1.3 \cdot ExPA + \left(4 \cdot in \cdot 168 \cdot in \cdot 1 + 4 \cdot in \cdot 168 \cdot in \cdot 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.6 + \left(3 \cdot in \cdot 78 \cdot in \cdot 1 + 3 \cdot in \cdot 78 \cdot in \cdot 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.6 = 29.396\ ft^2$

Exposed Pipe Area (with Ice) = $ExPA := \left(TPL - TAL\right) \cdot 3.375 \cdot in = 10.125\ ft^2$

CaAa (with ice) =

$$1.3 \cdot ExPA + \left(5 \cdot in \cdot 168 \cdot in \cdot 1 + 5 \cdot in \cdot 168 \cdot in \cdot 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.6 + \left(4 \cdot in \cdot 78 \cdot in \cdot 1 + 4 \cdot in \cdot 78 \cdot in \cdot 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.6 = 38.763\ ft^2$$

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	JMA MX10FRO640		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 71.6$	in	(User Input)
Antenna Width =	$W_{ant} := 19.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.4$	in	(User Input)
Antenna Weight =	$WT_{ant} := 80$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 4$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 320$ lbs

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 2194$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 71$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 284$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 10.49$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 4.24$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 10.49$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.8$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 5.8$

$EPA_{tot} := 4\ EPA_{A1} + 0\ EPA_{A2} + 0 \cdot EPA_{A3} = 41.947$

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot EPA_{tot} = 268$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 9.85$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 3.68$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 9.85$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.22$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 5.22$

$EPA_{tot} := 4\ EPA_{A1} + 0\ EPA_{A2} + 0\ EPA_{A3} = 39.38$

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 2805$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	JMA MX06FRO660-03		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 71.3$	in	(User Input)
Antenna Width =	$W_{ant} := 15.4$	in	(User Input)
Antenna Thickness =	$T_{ant} := 10.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 65$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 4$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant4} := WT_{ant} \cdot N_{ant} = 260$ lbs

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 2124$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 69$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant4} := W_{ICEant} \cdot N_{ant} = 275$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 8.23$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 5.87$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 8.23$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 6.46$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 6.46$

$EPA_{tot} := 0\ EPA_{A1} + 2\ EPA_{A2} + 2\ EPA_{A3} = 25.857$

Total Antenna Wind Force w/ Ice = $Fi_{ant4} := p \cdot Cd_F \cdot EPA_{tot} = 165$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 7.63$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 5.3$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 7.63$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 5.88$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 5.88$

$EPA_{tot} := 0\ EPA_{A1} + 2\ EPA_{A2} + 2\ EPA_{A3} = 23.519$

Total Antenna Wind Force = $F_{ant4} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 1675$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Samsung MT6413-77A		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 28.9$	in	(User Input)
Antenna Width =	$W_{ant} := 15.75$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.51$	in	(User Input)
Antenna Weight =	$WT_{ant} := 58$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 4$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant5} := WT_{ant} \cdot N_{ant} = 232$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2508$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 752$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 24$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant5} := W_{ICEant} \cdot N_{ant} = 98$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 3.48$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 1.35$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.48$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 1.88$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 1.88$

$EPA_{tot} := 1\ EPA_{A1} + 2\ EPA_{A2} + 1\ EPA_{A3} = 9.128$

Total Antenna Wind Force w/ Ice = $Fi_{ant5} := p \cdot Cd_F \cdot EPA_{tot} = 58$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 3.16$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 1.11$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.16$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 1.62$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 1.62$

$EPA_{tot} := 1\ EPA_{A1} + 2\ EPA_{A2} + 1\ EPA_{A3} = 8.02$

Total Antenna Wind Force = $F_{ant5} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 571$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Samsung RO440CC		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 12$	in	(User Input)
Antenna Width =	$W_{ant} := 8.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 1.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 3$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 2$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant6} := WT_{ant} \cdot N_{ant} = 6$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 157$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 159$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 5$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant6} := W_{ICEant} \cdot N_{ant} = 10$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.88$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 0.23$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.88$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.39$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.39$

$EPA_{tot} := 0\ EPA_{A1} + 1\ EPA_{A2} + 1\ EPA_{A3} = 0.776$

Total Antenna Wind Force w/ Ice = $Fi_{ant6} := p \cdot Cd_F \cdot EPA_{tot} = 5$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 0.73$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.13$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.73$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.28$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.28$

$EPA_{tot} := 0\ EPA_{A1} + 1\ EPA_{A2} + 1\ EPA_{A3} = 0.55$

Total Antenna Wind Force = $F_{ant6} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 39$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Samsung RF4439d-25A RRH		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 15$	in	(User Input)
Antenna Width =	$W_{ant} := 15$	in	(User Input)
Antenna Thickness =	$T_{ant} := 10$	in	(User Input)
Antenna Weight =	$WT_{ant} := 75$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 4$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant7} := WT_{ant} \cdot N_{ant} = 300$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2250$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 566$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 18$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant7} := W_{ICEant} \cdot N_{ant} = 73$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 1.78$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 1.22$

Antenna Projected Surface Area =

$$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.78$$

$$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 1.36$$

$$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 1.36$$

$$EPA_{tot} := 2\ EPA_{A1} + 1\ EPA_{A2} + 1\ EPA_{A3} = 6.278$$

Total Antenna Wind Force w/ Ice = $Fi_{ant7} := p \cdot Cd_F \cdot EPA_{tot} = 40$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 1.56$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 1.04$

Antenna Projected Surface Area =

$$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.56$$

$$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 1.17$$

$$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 1.17$$

$$EPA_{tot} := 2\ EPA_{A1} + 1\ EPA_{A2} + 1\ EPA_{A3} = 5.469$$

Total Antenna Wind Force = $F_{ant7} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 389$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Samsung RF4461d-13A RRH		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 15$	in	(User Input)
Antenna Width =	$W_{ant} := 15$	in	(User Input)
Antenna Thickness =	$T_{ant} := 10.23$	in	(User Input)
Antenna Weight =	$WT_{ant} := 80$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 4$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant8} := WT_{ant} \cdot N_{ant} = 320$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2302$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 573$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 19$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant8} := W_{ICEant} \cdot N_{ant} = 74$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 1.78$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 1.25$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.78$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 1.38$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 1.38$

$EPA_{tot} := 2\ EPA_{A1} + 1\ EPA_{A2} + 1\ EPA_{A3} = 6.316$

Total Antenna Wind Force w/ Ice = $Fi_{ant8} := p \cdot Cd_F \cdot EPA_{tot} = 40$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 1.56$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 1.07$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.56$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 1.19$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 1.19$

$EPA_{tot} := 2\ EPA_{A1} + 1\ EPA_{A2} + 1\ EPA_{A3} = 5.505$

Total Antenna Wind Force = $F_{ant8} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 392$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CBRS RRH RT4423-48A		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 11.8$	in	(User Input)
Antenna Width =	$W_{ant} := 8.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 20$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 4$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant9} := WT_{ant} \cdot N_{ant} = 80$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 513$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 232$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 8$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant9} := W_{ICEant} \cdot N_{ant} = 30$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.86$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 0.53$

Antenna Projected Surface Area =

$$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.86$$

$$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.62$$

$$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.62$$

$$EPA_{tot} := 1\ EPA_{A1} + 2\ EPA_{A2} + 1\ EPA_{A2} = 2.709$$

Total Antenna Wind Force w/ Ice = $Fi_{ant9} := p \cdot Cd_F \cdot EPA_{tot} = 17$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 0.71$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.41$

Antenna Projected Surface Area =

$$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.71$$

$$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 0.49$$

$$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 0.49$$

$$EPA_{tot} := 1\ EPA_{A1} + 2\ EPA_{A2} + 1\ EPA_{A2} = 2.169$$

Total Antenna Wind Force = $F_{ant9} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 155$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope RVZDC-6627-PF-48 OVP Box		(Verizon)
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 29.5$	in	(User Input)
Antenna Width =	$W_{ant} := 16.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 12.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 32$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 2$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant10} := WT_{ant} \cdot N_{ant} = 64$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6133$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 1126$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 36$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant10} := W_{ICEant} \cdot N_{ant} = 73$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 3.71$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 2.88$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.71$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 3.09$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 3.09$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 9.881$

Total Antenna Wind Force w/ Ice = $Fi_{ant10} := p \cdot Cd_F \cdot EPA_{tot} = 63$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 3.38$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 2.58$

Antenna Projected Surface Area =

$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.38$

$EPA_{A2} := EPA_N \cdot \cos(120 \cdot deg - \phi)^2 + EPA_T \cdot \sin(120 \cdot deg - \phi)^2 = 2.78$

$EPA_{A3} := EPA_N \cdot \cos(240 \cdot deg - \phi)^2 + EPA_T \cdot \sin(240 \cdot deg - \phi)^2 = 2.78$

$EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 8.942$

Total Antenna Wind Force = $F_{ant10} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 637$ lbs

Development of Wind & Ice Load on Platform

Platform Data:

Mount Type =	Perfect Vision PV-LPPGS-12M-HR2-B with (9) 8-ft antenna pipes, (4) pipe to pipes and (2) 4-ft OVP pipes.		
Mount Shape =	Flat		(User Input)
Mount Area =	$CdA_{mnt} := 33.3$	sq ft	(User Input)
Mount Area w/ Ice =	$CdA_{ICEmnt} := 46.1$	sq ft	(User Input)
Mount Weight =	$WT_{mnt} := 1810$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{ICEmnt} := 2217$	lbs	(User Input)

Gravity Load (without ice)

Weight of Mount = $Wt_{mnt2} := WT_{mnt} = 1810$ lbs

Gravity Load (ice only)

Weight of Ice on Mount = $Wt_{ice.mnt2} := \left(WT_{ICEmnt} - WT_{mnt}\right) = 407$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt2} := p \cdot Cd_F \cdot CdA_{ICEmnt} = 295$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt2} := qz \cdot Cd_F \cdot CdA_{mnt} \cdot m = 2372$ lbs

Total Pipe Length = $TPL := 8 \cdot ft \cdot 13 + 4 \cdot ft \cdot 2 = 112\ ft$

Total Antenna Length = $TAL := 71.6 \cdot in \cdot 2 + 71.3 \cdot in \cdot 2 + 28.9 \cdot in \cdot 4 + 12 \cdot in \cdot 2 + 11.8 \cdot in \cdot 4 + 29.5 \cdot in \cdot 2 = 44.3\ ft$

Exposed Pipe Area = $ExPA := \left(TPL - TAL\right) \cdot 2.375 \cdot in = 13.399\ ft^2$

CaAa = $1.3 \cdot ExPA + 2.375 \cdot in \cdot 150 \cdot in \cdot \left(1 + 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.3 + 3.5 \cdot in \cdot 150 \cdot in \cdot \left(1 + 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.3 = 33.3\ ft^2$

Exposed Pipe Area (with Ice) = $ExPA := \left(TPL - TAL\right) \cdot 3.375 \cdot in = 19.041\ ft^2$

CaAa (with ice) = $1.3 \cdot ExPA + \left(2.375 + 2 \cdot lr\right) \cdot in \cdot 150 \cdot in \cdot \left(1 + 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.3 + \left(3.5 + 2 \cdot lr\right) \cdot in \cdot 150 \cdot in \cdot \left(1 + 2 \cdot \cos\left(60 \cdot deg\right)\right) \cdot 1.3 = 46.1\ ft^2$

Weight = $1400 \cdot lb + 3.66 \cdot plf \cdot 8 \cdot ft \cdot 13 + 3.66 \cdot plf \cdot 4 \cdot ft \cdot 2 = 1810\ lb$

Weight (with ice) =

$$\left(\frac{\pi}{4} \cdot \left(\left(\left(2.375 + 2 \cdot lr\right) \cdot in\right)^2 - \left(2.375 \cdot in\right)^2\right) \cdot \left(96 \cdot in \cdot 13 + 48 \cdot in \cdot 2 + 150 \cdot in \cdot 3\right) + \frac{\pi}{4} \cdot \left(\left(\left(3.5 + 2 \cdot lr\right) \cdot in\right)^2 - \left(3.5 \cdot in\right)^2\right) \cdot \left(150 \cdot in \cdot 3\right) + \left(\left(\left(4 + 2 \cdot lr\right) \cdot in\right)^2 - \left(4 \cdot in\right)^2\right) \cdot \left(60 \cdot in \cdot 3\right)\right) \cdot \left(ld \cdot pcf\right) = 407\ lbf$$

Total Equipment Loads:

Dish @ 148-ft AGL

NESC Heavy Wind Vertical = $\left(Wt_{ant1} + Wt_{ice.ant1} + Wt_{ant2} + Wt_{ice.ant2} + Wt_{mnt1} + Wt_{ice.mnt1}\right) \cdot 1.5 = 7134$

NESC Heavy Wind Transverse = $\left(Fi_{ant1} + Fi_{ant2} + Fi_{mnt1}\right) \cdot 2.5 = 764$

NESC Extreme Wind Vertical = $\left(Wt_{ant1} + Wt_{ant2} + Wt_{mnt1}\right) = 3248$

NESC Extreme Wind Transverse = $\left(F_{ant1} + F_{ant2} + F_{mnt1}\right) = 2832$

Verizon @ 139-ft AGL

NESC Heavy Wind Vertical =

$NESC\_Heavy\_Vert := \left(Wt_{ant3} + Wt_{ice.ant3} + Wt_{ant4} + Wt_{ice.ant4} + Wt_{ant5} + Wt_{ice.ant5} + Wt_{ant6} + Wt_{ice.ant6} + Wt_{ant7} + Wt_{ice.ant7} + Wt_{ant8} + Wt_{ice.ant8} + Wt_{ant9} + Wt_{ice.ant9} + Wt_{ant10} + Wt_{ice.ant10} + Wt_{mnt2} + Wt_{ice.mnt2}\right) \cdot 1.5$

$NESC\_Heavy\_Vert = 7076$

NESC Heavy Wind Transverse = $\left(Fi_{ant3} + Fi_{ant4} + Fi_{ant5} + Fi_{ant6} + Fi_{ant7} + Fi_{ant8} + Fi_{ant9} + Fi_{ant10} + Fi_{mnt2}\right) \cdot 2.5 = 2384$

NESC Extreme Wind Vertical = $\left(Wt_{ant3} + Wt_{ant4} + Wt_{ant5} + Wt_{ant6} + Wt_{ant7} + Wt_{ant8} + Wt_{ant9} + Wt_{ant10} + Wt_{mnt2}\right) = 3392$

NESC Extreme Wind Transverse = $\left(F_{ant3} + F_{ant4} + F_{ant5} + F_{ant6} + F_{ant7} + F_{ant8} + F_{ant9} + F_{ant10} + F_{mnt2}\right) = 9035$

Coax Cables

Heavy Wind Pressure = $p := 4 \cdot psf$ (User Input NESC 2023 Figure 250-1 & Table 250-1)

Radial Ice Thickness = $Ir := 0.5 \cdot in$ (User Input NESC 2023 Figure 250-1 & Table 250-1)

Radial Ice Density = $Id := 56 \cdot pcf$ (User Input NESC 2023 Figure 250-1 & Table 250-1)

Basic Windspeed = $V := 110$ mph (User Input)

Height to Top of Coax Above Grade = $TC := 148$ ft (User Input)

Multiplier Gust Response Factor = $m := 1.25$ (User Input - Only for NESC Extreme wind case)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67 \cdot TC}{900}\right)^{\frac{2}{9.5}} = 1.263$ (NESC 2023 Table 250-2)

Turbulence Intensity Constant = $C_{exp} := 0.2$ (NESC 2023 Table 250-3)

Integral Length Scale of Turbulence Constant = $L_s := 220$ (NESC 2023 Table 250-3)

Effective Height = $z_s := 0.67 \cdot TC = 99.16$ (NESC 2023 Table 250-3)

Turbulence Intensity = $I_z := C_{exp} \cdot \left(\frac{33}{z_s}\right)^{\frac{1}{6}} = 0.166$ (NESC 2023 Table 250-3)

Response Term = $B_t := \left(\frac{1}{\left(1 + \left(0.56 \cdot \frac{z_s}{L_s}\right)\right)}\right)^{0.5} = 0.894$ (NESC 2023 Table 250-3)

Gust Response Factor = $Grf := \frac{\left(1 + \left(4.61 \cdot I_z \cdot B_t\right)\right)}{\left(1 + 6.1 \cdot I_z\right)} = 0.836$ (NESC 2023 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf = 32.7$ (NESC 2023 Section 250.C.1)

Shape Factor = $Cd_{coax} := 1.6$ (User Input)

Overload Factor for NESC Heavy Wind Load = $OF_{HW} := 2.5$ (User Input)

Overload Factor for NESC Extreme Wind Load = $OF_{EW} := 1.0$ (User Input)

Overload Factor for NESC Heavy Vertical Load = $OF_{HV} := 1.5$ (User Input)

Overload Factor for NESC Extreme Vertical Load = $OF_{EV} := 1.0$ (User Input)

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Subject: Coax Cable on Powermount and Tower # 1281

Location: Greenwich, CT

Rev. 10: 11/7/24

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21007.68

Coax Cable on Powermount

(Below 139-ft AGL)

Distance Between Coax Cable Attach Points = $Coax_{Span} := \begin{bmatrix} 6 \\ 8 \\ 15 \\ 14 \\ 29.375 \\ 29.875 \\ 32.5 \end{bmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.98 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 1.04 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 15$ *(User Input - 12 Dish & 3 Verizon)*

Number of Coax Cables Exterior = $Nex_{coax} := 4$ *(User Input)*

Number of Projected Coax Cables Transverse = $NP_{Tcoax} := 1$ *(User Input)*

Project Width with Ice = $A_{Tice} := \left(NP_{Tcoax} \cdot D_{coax} + 2 \cdot Ir\right) = 2.98\ in$

Project Width without Ice = $A_T := \left(NP_{Tcoax} \cdot D_{coax}\right) = 1.98\ in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left(\left(D_{coax} + 2 \cdot Ir\right)^2 - {D_{coax}}^2\right) = 0.027\ ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot Nex_{coax} = 6.06\ \frac{lb}{ft}$

Heavy Vertical Load = $Heavy_{Vert} := \overrightarrow{\left(\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HV}\right)}$

Heavy Transverse Load = $Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW}\right)}$

$Heavy_{Vert} = \begin{bmatrix} 195 \\ 260 \\ 487 \\ 455 \\ 954 \\ 971 \\ 1056 \end{bmatrix} lb$ $Heavy_{Trans} = \begin{bmatrix} 24 \\ 32 \\ 60 \\ 56 \\ 117 \\ 119 \\ 129 \end{bmatrix} lb$

Extreme Vertical Load = $Extreme_{Vert} := \overrightarrow{\left(\left(N_{coax} \cdot W_{coax}\right) \cdot Coax_{Span} \cdot OF_{EV}\right)}$

Extreme Transverse Load = $Extreme_{Trans} := \overrightarrow{\left(\left(qz \cdot psf \cdot A_T \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EW}\right)}$

$Extreme_{Vert} = \begin{bmatrix} 94 \\ 125 \\ 234 \\ 218 \\ 458 \\ 466 \\ 507 \end{bmatrix} lb$ $Extreme_{Trans} = \begin{bmatrix} 52 \\ 69 \\ 130 \\ 121 \\ 254 \\ 258 \\ 281 \end{bmatrix} lb$

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Subject: Coax Cable on Powermount and Tower # 1281

Location: Greenwich, CT

Rev. 10: 11/7/24

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21007.68

Cables on Powermount

(139-ft AGL to 149-ft AGL)

Coax Cable Span = $Coax_{Span} := 9 \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.98 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 1.04 \cdot plf$ *(User Input)*

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

Number of Coax Cables Exterior = $Nex_{coax} := 0$ *(User Input)*

Number of Projected Coax Cables Transverse = $NP_{Tcoax} := 0$ *(User Input)*

Project Width with Ice = $A_{Tice} := 0$

Project Width without Ice = $A_T := \langle NP_{Tcoax} \cdot D_{coax} \rangle = 0\ in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left(\left(D_{coax} + 2 \cdot Ir \right)^2 - {D_{coax}}^2 \right) = 0.027\ ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot Nex_{coax} = 0\ plf$

Heavy Vertical Load =

$Heavy_{Vert} := \overrightarrow{\left(\left(N_{coax} \cdot W_{coax} + W_{ice} \right) \cdot Coax_{Span} \cdot OF_{HV} \right)}$ $Heavy_{Vert} = 168\ lb$

Heavy Transverse Load =

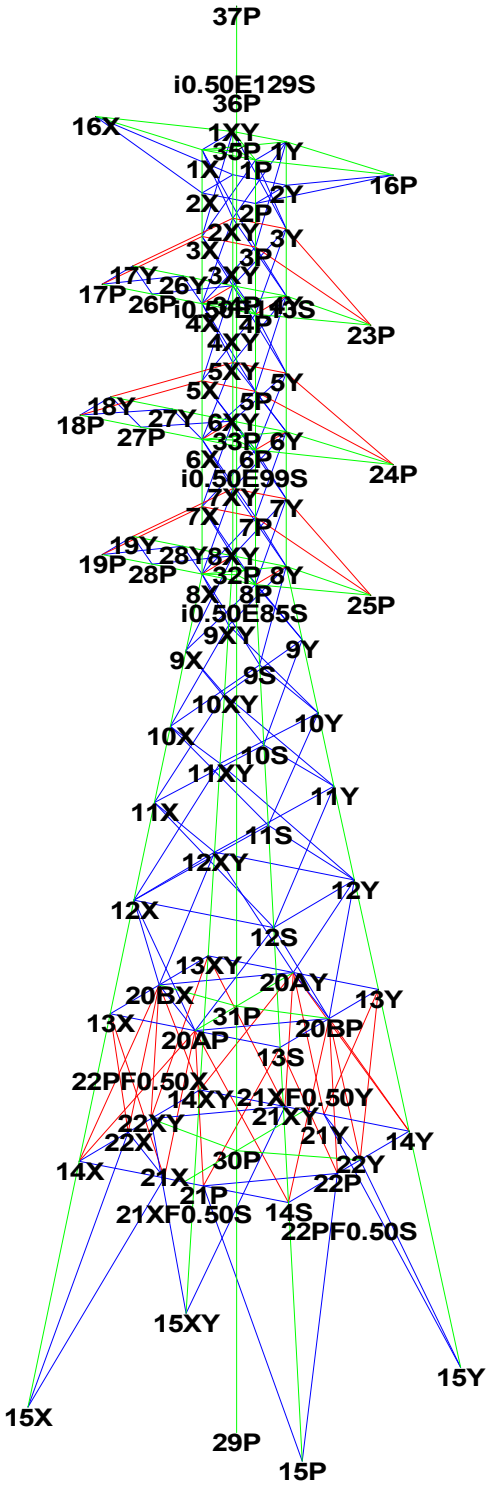
$Heavy_{Trans} := \overrightarrow{\left(p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW} \right)}$ $Heavy_{Trans} = 0\ \frac{lb}{ft}$

Extreme Vertical Load =

$Extreme_{Vert} := \overrightarrow{\left(\left(N_{coax} \cdot W_{coax} \right) \cdot Coax_{Span} \cdot OF_{EV} \right)}$ $Extreme_{Vert} = 112\ lb$

Extreme Transverse Load =

$Extreme_{Trans} := \overrightarrow{\left(\left(qz \cdot psf \cdot m \cdot A_T \cdot Cd_{coax} \right) \cdot Coax_{Span} \cdot OF_{EW} \right)}$ $Extreme_{Trans} = 0\ lb$


37P
i0.50E129S
36P
16X
1XY
35P
1Y
1X
1P
16P
2Y
2X
2P
2XY
3Y
3X
3P
17Y
3XY
26Y
17P
26P
i0.50E113S
4X
4P
23P
4XY
5XY
5Y
5X
5P
18Y
18P
27Y
6XY
27P
33P
6Y
6X
6P
24P
i0.50E99S
7XY
7Y
7X
7P
19Y
19P
28Y
8XY
28P
32P
8Y
8X
8P
25P
i0.50E85S
9XY
9Y
9X
9S
10XY
10Y
10X
10S
11XY
11Y
11X
11S
12XY
12Y
12X
12S
13XY
20AY
20BX
13Y
31P
13X
20BP
20AP
13S
22PF0.50X
14XY
21XF0.50Y
21XY
22XY
21Y
14Y
22X
30P
22Y
14X
21X
22P
21P
21XF0.50S
14S
22PF0.50S
15XY
15Y
15X
29P
15P

Project Name : 21007.68 - Greenwich, CT
Project Notes: Structure #1281 / Greenwich 3
Project File : J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Backup Documentation\Rev (10)\Calcs\PLS Tower\CL&P # 1281.tow
Date run : 9:37:36 AM Friday, November 8, 2024
by : Tower Version 18.01
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

KL/R value of 200.30 exceeds maximum of 200.00 for member "g118P" ??
Problem calculating gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??
Problem calculating gross area of longitudinal face for section "2": width is zero at elevation 0.00 (ft) which is not the top of the section. ??
Unusual number of fixed joints found: 5. Towers normally have from between 1 and 4 fixed joints. ??
The model has 4 warnings. ??

Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None
Climbing load check: None
Redundant members checked with: Actual Force

Loads from file: J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Backup Documentation\Rev (10)\Calcs\PLS Tower\cl&p # 1281.lca

*** Analysis Results:

Maximum element usage is 98.11% for Angle "3Y" in load case "NESC Extreme +"
Maximum insulator usage is 26.15% for Clamp "11" in load case "NESC Heavy +"

Foundation Design Forces For All Load Cases:

Note: loads are factored.

Load Case	Foundation Description	Axial Force (kips)	Shear Force (kips)	Resultant Force (kips)	Bending Moment (ft-k)	Foundation Usage %
NESC Heavy -	15P	140.17	25.73	142.51	7.77	0.00
NESC Heavy -	29P	30.91	1.16	30.93	10.36	0.00
NESC Heavy -	15X	-123.62	29.74	127.14	2.39	0.00
NESC Heavy -	15XY	-107.05	27.44	110.51	4.63	0.00
NESC Heavy -	15Y	151.21	26.73	153.56	6.41	0.00
NESC Extreme -	15P	54.16	4.82	54.38	6.37	0.00
NESC Extreme -	29P	13.09	1.77	13.21	19.07	0.00
NESC Extreme -	15X	-58.94	12.56	60.27	0.86	0.00
NESC Extreme -	15XY	-36.16	10.91	37.78	3.87	0.00
NESC Extreme -	15Y	82.54	11.36	83.31	7.89	0.00
NESC Heavy +	15P	181.27	34.12	184.46	8.85	0.00
NESC Heavy +	29P	31.25	1.10	31.27	12.04	0.00
NESC Heavy +	15X	-160.91	42.47	166.42	5.24	0.00
NESC Heavy +	15XY	-146.80	36.98	151.38	3.43	0.00
NESC Heavy +	15Y	186.80	35.97	190.23	4.59	0.00
NESC Extreme +	15P	159.24	31.46	162.32	6.73	0.00
NESC Extreme +	29P	13.38	1.77	13.49	20.03	0.00
NESC Extreme +	15X	-156.66	43.55	162.60	5.22	0.00
NESC Extreme +	15XY	-131.92	33.47	136.10	0.89	0.00
NESC Extreme +	15Y	170.65	35.62	174.32	3.00	0.00

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy -	15P	-15.53	-20.52	-140.17	25.73	-0.43	7.76	7.77	-0.10	0.00
NESC Heavy -	29P	0.23	1.14	-30.91	1.16	-8.36	6.11	10.36	-4.18	0.00
NESC Heavy -	15X	20.42	-21.62	123.62	29.74	1.90	-1.46	2.39	-0.72	0.00
NESC Heavy -	15XY	-23.11	-14.80	107.05	27.44	-4.23	-1.87	4.63	-0.13	0.00
NESC Heavy -	15Y	21.86	-15.38	-151.21	26.73	-6.37	0.72	6.41	0.05	0.00
NESC Extreme -	15P	-4.32	-2.14	-54.16	4.82	-3.92	5.02	6.37	-0.41	0.00
NESC Extreme -	29P	0.08	1.77	-13.09	1.77	-18.89	2.61	19.07	-2.02	0.00
NESC Extreme -	15X	10.69	-6.60	58.94	12.56	-0.83	-0.22	0.86	-0.65	0.00
NESC Extreme -	15XY	-9.94	-4.50	36.16	10.91	-3.44	-1.76	3.87	0.33	0.00
NESC Extreme -	15Y	11.03	-2.74	-82.54	11.36	-7.85	-0.86	7.89	0.59	0.00
NESC Heavy +	15P	-21.56	-26.44	-181.27	34.12	0.68	8.83	8.85	0.13	0.00
NESC Heavy +	29P	0.23	-1.08	-31.25	1.10	10.21	6.37	12.04	-4.50	0.00
NESC Heavy +	15X	26.62	-33.09	160.91	42.47	5.03	-1.48	5.24	-0.35	0.00
NESC Heavy +	15XY	-29.59	-22.18	146.80	36.98	-3.07	-1.52	3.43	-0.43	0.00
NESC Heavy +	15Y	27.00	-23.76	-186.80	35.97	-4.54	0.71	4.59	-0.29	0.00
NESC Extreme +	15P	-21.40	-23.07	-159.24	31.46	0.03	6.73	6.73	0.39	0.00
NESC Extreme +	29P	0.18	-1.76	-13.38	1.77	19.58	4.23	20.03	-2.02	0.00
NESC Extreme +	15X	28.19	-33.19	156.66	43.55	5.21	0.13	5.22	0.14	0.00
NESC Extreme +	15XY	-25.55	-21.62	131.92	33.47	0.29	-0.84	0.89	-0.36	0.00
NESC Extreme +	15Y	23.89	-26.42	-170.65	35.62	-2.34	-1.88	3.00	-0.36	0.00

Summary of Joint Support Reactions For All Load Cases in Direction of Leg:

Load Case	Support Joint	Origin Joint	Leg Member	Force In Leg Dir. (kips)	Residual Shear Perpendicular To Leg (kips)	Residual Shear Horizontal To Leg - Res. (kips)	Residual Shear Horizontal To Leg - Long. (kips)	Residual Shear Horizontal To Leg - Tran. (kips)	Total Long. Force (kips)	Total Tran. Force (kips)	Total Vert. Force (kips)
NESC Heavy -	15P	14S	14P	142.422	4.993	5.047	-5.046	-0.056	-15.53	-20.52	-140.17
NESC Heavy -	15X	14X	14X	-127.079	4.067	4.150	-2.270	3.474	20.42	-21.62	123.62
NESC Heavy -	15XY	14XY	14XY	-110.264	7.398	7.457	7.400	-0.915	-23.11	-14.80	107.05
NESC Heavy -	15Y	14Y	14Y	153.407	6.748	6.825	0.336	-6.817	21.86	-15.38	-151.21
NESC Extreme -	15P	14S	14P	53.960	6.717	6.853	-3.626	-5.815	-4.32	-2.14	-54.16
NESC Extreme -	15X	14X	14X	-60.198	2.892	2.892	-2.035	-2.055	10.69	-6.60	58.94
NESC Extreme -	15XY	14XY	14XY	-37.485	4.671	4.703	4.633	-0.808	-9.94	-4.50	36.16
NESC Extreme -	15Y	14Y	14Y	82.791	9.320	9.441	1.090	-9.378	11.03	-2.74	-82.54
NESC Heavy +	15P	14S	14P	184.388	4.999	5.055	-5.052	-0.164	-21.56	-26.44	-181.27
NESC Heavy +	15X	14X	14X	-166.133	9.773	9.936	-3.002	9.472	26.62	-33.09	160.91
NESC Heavy +	15XY	14XY	14XY	-151.175	7.971	8.068	8.044	0.628	-29.59	-22.18	146.80
NESC Heavy +	15Y	14Y	14Y	190.198	3.639	3.686	0.417	-3.662	27.00	-23.76	-186.80
NESC Extreme +	15P	14S	14P	162.310	1.973	2.000	-1.976	-0.308	-21.40	-23.07	-159.24
NESC Extreme +	15X	14X	14X	-162.215	11.224	11.440	-5.194	10.193	28.19	-33.19	156.66
NESC Extreme +	15XY	14XY	14XY	-135.949	6.470	6.583	6.184	2.256	-25.55	-21.62	131.92
NESC Extreme +	15Y	14Y	14Y	174.315	1.791	1.792	1.158	1.367	23.89	-26.42	-170.65

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)	CoG X (ft)	CoG Y (ft)	CoG Z (ft)	
1	143.750	84.750	59	188	0.00	6.00	309.150	0.00	28.50	817.275	0.419	-0.359	106.089	Problem calculating gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??
2	84.750	-4.250	52	147	6.00	0.00	1226.814	6.00	0.00	1226.814	0.249	0.000	41.192	Problem calculating

gross area of longitudinal face for section "2": width is zero at elevation 0.00 (ft) which is not the top of the section. ??

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress
Printed capacities do not include the strength factor entered for each load case.
The Group Summary reports on the member and load case that resulted in maximum usage
which may not necessarily be the same as that which produces maximum force.

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Cont-rol	Max Use In Comp. %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/r Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/r KL/r	Length (ft)	Curve No.	No. Of Comp. Member	No. Of Bolts
1	LEG1	SAE	3.5X3.5X0.25	36.0	98.11	Comp	98.11	3Y	-32.194	NESC Ext	32.813	36.400	54.375	1.000	1.000	1.000	121.04	121.04	7.000	4	4
2	LEG2	SAE	6X6X0.3125	36.0	83.81	Comp	83.81	5Y	-83.038	NESC Ext	99.083	109.200	203.906	1.000	1.000	1.000	60.50	60.50	6.050	1	12
3	LEG3	SAE	8X8X0.5	36.0	57.61	Tens	56.40	7Y	-140.805	NESC Ext	249.636	254.800	380.624	1.000	1.000	1.000	52.83	52.83	7.000	1	14
4	LEG4	SAE	8X8X0.625	36.0	60.61	Comp	60.61	10Y	-176.491	NESC Hea	306.646	291.200	543.749	1.000	1.000	1.000	60.12	60.12	7.915	1	16
5	LEG5	SAE	8X8X0.75	36.0	55.77	Comp	55.77	13P	-203.019	NESC Hea	368.010	364.000	815.624	0.500	0.500	0.500	58.18	58.18	15.320	1	20
6	X1	SAE	2.5X2.5X0.1875	36.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.000	0	0
7	X2	SAU	2.5X2X0.1875	36.0	95.03	Comp	95.03	16AX	-13.592	NESC Ext	14.303	18.200	20.391	0.500	0.500	0.500	129.55	127.32	9.220	5	2
8	X3	SAU	4X3X0.25	36.0	70.22	Comp	70.22	17AX	-27.818	NESC Hea	39.613	45.500	67.969	0.500	0.750	0.500	100.45	105.33	10.000	2	5
9	X4	SAU	3.5X2.5X0.25	36.0	60.46	Comp	60.46	18AX	-19.793	NESC Hea	32.738	36.400	54.375	0.500	0.750	0.500	104.34	108.25	8.521	2	4
10	X5	SAU	4X3.5X0.3125	36.0	70.02	Comp	70.02	19AX	-42.854	NESC Hea	61.204	63.700	118.945	0.500	0.750	0.500	77.55	88.16	9.220	2	7
11	X6	SAU	5X3.5X0.25	36.0	59.26	Comp	59.26	21BY	-26.271	NESC Hea	44.335	54.600	81.562	0.580	0.580	0.580	95.79	101.84	10.597	2	6
12	X7	SAU	4X3X0.25	36.0	49.59	Comp	49.59	22BX	-15.366	NESC Hea	30.985	36.400	54.375	0.560	0.560	0.560	126.41	124.92	12.246	5	4
13	X8	SAU	3.5X3X0.25	36.0	40.33	Comp	40.33	23AX	-9.091	NESC Hea	22.542	27.300	40.781	0.550	0.550	0.550	147.17	140.74	14.070	5	3
14	X9	SAU	5X3X0.25	36.0	49.48	Comp	49.48	24AX	-10.603	NESC Hea	21.431	27.300	40.781	0.550	0.550	0.550	173.71	160.96	17.450	5	3
15	D1	SAU	5X3X0.25	36.0	87.24	Tens	12.56	25AY	-4.245	NESC Ext	33.799	63.700	95.156	1.000	0.500	0.500	127.63	125.86	14.103	5	7
16	D2	SAE	2X2X0.1875	36.0	78.02	Comp	78.02	26AY	-3.155	NESC Ext	4.044	18.200	20.391	0.500	0.500	0.500	256.65	224.16	16.853	5	2
17	D3	SAU	3X2X0.25	36.0	67.55	Tens	56.64	27BX	-3.636	NESC Ext	6.420	36.400	54.375	1.000	0.500	0.500	264.74	230.33	19.194	5	4
18	D4	SAU	4X3X0.25	36.0	97.48	Comp	97.48	28AP	-11.200	NESC Ext	11.489	45.500	67.969	0.500	1.000	0.500	205.19	205.19	15.321	4	5
19	D5	SAU	3.5X3X0.25	36.0	59.03	Tens	16.74	29AX	-4.295	NESC Ext	25.652	45.500	67.969	0.250	0.250	0.250	135.61				

```
131.93 28.523     5     5
     20            H1   SAE 1.75X1.75X0.1875     36.0 42.51  Tens 22.49     32X   -0.906 NESC Ext    4.027    9.100   10.195 1.000 1.000 1.000 209.91
209.91  6.000     4     1
     21            H2   SAU       4X3.5X0.25     36.0 47.26  Comp 47.26    37AP  -12.902 NESC Hea   27.341   27.300   40.781 1.000 0.500 0.500 148.70
137.65 15.738     6     3
     22            H3   SAE       3X3X0.1875     36.0 42.63  Comp 42.63    38AP   -4.904 NESC Ext   11.503   18.200   20.391 1.000 1.000 1.000 192.66
164.68  9.569     6     2
     23            H4   SAU         5X3X0.25     36.0 47.41  Comp 47.41    39AP   -8.629 NESC Hea   21.560   18.200   27.187 1.000 1.000 1.000 173.07
160.48  9.562     5     2
     24            H5   SAE     3.5X3.5X0.25     36.0 14.22  Comp 14.22     40X   -1.904 NESC Ext   13.386   18.200   27.187 1.000 1.000 1.000 233.97
190.09 13.531     6     2
     25           X10   SAE 1.75X1.75X0.1875     36.0  0.00        0.00           0.000              0.000    0.000    0.000 0.000 0.000 0.000   0.00
0.00  0.000     0     0
     26           X11   SAE       2X2X0.1875     36.0 41.59  Comp 41.59   43CXY   -5.235 NESC Hea   12.587   18.200   20.391 1.000 1.000 1.000 129.22
127.06  4.243     5     2
     27           X12   SAU     2.5X2X0.1875     36.0 24.57  Comp 24.57    44BP   -3.571 NESC Hea   14.533   18.200   20.391 0.750 0.500 0.500 128.22
126.30  9.125     5     2
     28            H6   SAU         4X3X0.25     36.0 41.84  Tens  0.00    45BP    0.000             35.407   18.200   27.187 1.000 1.000 1.000 110.60
115.30  6.000     3     2
     29            D6   SAU       3X2X0.1875     36.0 40.42  Comp 40.42    46XY   -3.127 NESC Hea    7.736   18.200   20.391 1.000 0.500 0.500 201.94
182.48 14.775     5     2
     30          HGR1   SAU     2.5X2X0.1875     36.0 46.40  Tens  8.84    49AP   -0.485 NESC Hea    5.486   18.200   20.391 1.000 0.500 0.500 205.58
205.58 13.585     4     2
     31          HGR2   SAE       3X3X0.1875     36.0 41.49  Tens  1.10    48AP   -0.090 NESC Hea    8.140   18.200   20.391 1.000 0.500 0.500 195.77
195.77 15.319     4     2
     32            A1   SAE         3X3X0.25     36.0 64.73  Tens 10.55     50X   -1.919 NESC Hea   21.867   18.200   27.187 0.500 0.500 0.500 142.64
137.29 14.073     5     2
     33            A2   SAU       3.5X3X0.25     36.0 53.76  Comp 53.76    51BP  -14.676 NESC Hea   33.416   27.300   40.781 1.000 1.000 1.000 106.97
113.49  5.625     3     3
     34            A#   SAE         4X4X0.25     36.0 54.24  Comp 54.24    52BP  -22.900 NESC Hea   42.220   45.500   67.969 1.000 1.000 1.000 103.77
111.89  6.875     3     5
     35            H7   SAU     2.5X2X0.1875     36.0 20.90  Comp 20.90     54X   -1.704 NESC Ext    8.154    9.100   10.195 1.000 1.000 1.000 168.62
168.62  6.000     4     1
     36            H8   DAE 1.75X1.75X0.1875     36.0 61.15  Comp 61.15     36P  -10.273 NESC Hea   19.743   16.800   20.391 1.000 1.000 1.000 134.08
134.08  6.000     4     1
  Pwmnt 12" Std. Pipe Pwmnt    Pipe 12" Std.     42.0  8.96  Comp  8.96   g101P  -23.303 NESC Hea  260.146    0.000    0.000 1.000 1.000 1.000 122.32
122.32 44.750     4     0
  PMBR1     L2x2x3/16   SAE       2X2X0.1875     36.0  9.17  Comp  9.17   g108P   -0.935 NESC Hea   20.044   16.800   10.195 1.000 1.000 1.000  45.69
82.84  1.500     3     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g107P g108P  ??
  PMBR2 L2.5x2.5x3/16   SAE   2.5X2.5X0.1875     36.0 52.19  Comp 52.19   g111P   -5.321 NESC Ext   22.126   16.800   10.195 1.000 1.000 1.000  81.32
100.66  3.354     3     1
  PMBR3     L3x3x3/16   SAE       3X3X0.1875     36.0  2.84  Comp  2.84   g114P   -0.289 NESC Hea   11.823   16.800   10.195 1.000 1.000 1.000 162.44
162.44  8.068     4     1
  PMBR4  L3.5x3.5x1/4   SAE     3.5X3.5X0.25     36.0  8.72  Tens  8.63   g116X   -1.173 NESC Ext   17.249   16.800   13.594 1.000 1.000 1.000 167.46
167.46  9.685     4     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g117P  ??
  PMBR5      L4x4x1/4   SAE         4X4X0.25     36.0  8.07  Comp  8.07   g120X   -1.097 NESC Ext   16.004   16.800   13.594 1.000 1.000 1.000 186.27
186.27 12.340     4     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g118P  ??
    20a            H1   SAE 1.75X1.75X0.1875     36.0 29.14  Comp 29.14    30AY   -2.652 NESC Hea   13.441    9.100   10.195 0.500 0.500 0.500 104.96
112.48  6.000     3     1
 AngleR      L2x2x1/4   SAE         2X2X0.25     36.0 65.96  Tens 59.84    42XY   -5.445 NESC Ext   15.869    9.100   13.594 1.000 1.000 1.000 130.21
130.21  4.243     4     1
 BraceR  L2.5x2.5x1/4   SAE     2.5X2.5X0.25     36.0 90.77  Tens 69.38   g110X  -11.318 NESC Ext   29.101   23.900   16.312 1.000 1.000 1.000  81.98
100.99  3.354     3     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g110P g110X  ??
  Plate    6"x3/4" PL   Bar             6x3/4     36.0  4.95  Tens  0.00   g106P    0.000           109.423   16.800   40.781 1.000 1.000 1.000  83.19
101.59  1.501     3     1
```

6R	X1	SAE	2.5X2.5X0.25	36.0	75.93	Tens	63.51	15AX	-17.267	NESC Ext	31.115	33.600	27.187	0.250	0.500	0.250	84.40	93.30	10.817	2	2

Group Summary (Tension Portion):

Group No.	Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Control	Max Use In Tens. %	Tension Control Member	Tension Force (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. Shear Capacity (kips)	Tension Connect. Bearing Capacity (kips)	Tension Connect. Rupture Capacity (kips)	Length Tens. Member (ft)	No. Of Bolts	Hole Diameter (in)	Holes
1	LEG1	SAE	3.5X3.5X0.25	36.0	98.11	Comp	84.56	3X	30.780	NESC Ext	47.340	36.400	54.375	60.417	7.000	4	2.000	0.75	
2	LEG2	SAE	6X6X0.3125	36.0	83.81	Comp	78.35	5X	76.504	NESC Ext	97.650	109.200	203.906	183.656	6.050	12	4.000	0.75	
3	LEG3	SAE	8X8X0.5	36.0	57.61	Tens	57.61	7X	133.522	NESC Ext	231.750	254.800	380.624	395.849	7.000	14	3.500	0.75	
4	LEG4	SAE	8X8X0.625	36.0	60.61	Comp	56.55	9X	162.244	NESC Hea	286.897	0.000	0.000	0.000	7.915	0	3.500	0.75	
5	LEG5	SAE	8X8X0.75	36.0	55.77	Comp	48.99	11X	162.080	NESC Hea	330.839	0.000	0.000	0.000	10.131	0	4.000	0.75	
6	X1	SAE	2.5X2.5X0.1875	36.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0	
7	X2	SAU	2.5X2X0.1875	36.0	95.03	Comp	76.93	16AP	13.944	NESC Ext	18.650	18.200	20.391	18.125	9.220	2	1.000	0.75	
8	X3	SAU	4X3X0.25	36.0	70.22	Comp	66.69	17AP	29.468	NESC Hea	44.185	45.500	67.969	52.912	10.000	5	1.740	0.75	
9	X4	SAU	3.5X2.5X0.25	36.0	60.46	Comp	55.24	18AP	20.108	NESC Hea	40.399	36.400	54.375	42.647	8.521	4	1.030	0.75	
10	X5	SAU	4X3.5X0.3125	36.0	70.02	Comp	69.36	19AP	41.136	NESC Hea	59.307	63.700	118.945	74.976	9.220	7	1.790	0.75	
11	X6	SAU	5X3.5X0.25	36.0	59.26	Comp	58.86	21BXY	26.592	NESC Hea	45.178	54.600	81.562	46.012	10.597	6	1.550	0.75	
12	X7	SAU	4X3X0.25	36.0	49.59	Comp	39.66	22BP	14.438	NESC Hea	40.581	36.400	54.375	42.206	12.246	4	1.000	0.75	
13	X8	SAU	3.5X3X0.25	36.0	40.33	Comp	39.48	23AP	10.778	NESC Hea	40.419	27.300	40.781	38.516	14.070	3	1.000	0.75	
14	X9	SAU	5X3X0.25	36.0	49.48	Comp	25.26	24BXY	6.897	NESC Hea	40.581	27.300	40.781	36.250	17.450	3	1.000	0.75	
15	D1	SAU	5X3X0.25	36.0	87.24	Tens	87.24	25AP	31.640	NESC Hea	36.268	63.700	95.156	72.037	14.103	7	1.710	0.75	
16	D2	SAE	2X2X0.1875	36.0	78.02	Comp	48.84	26AX	8.852	NESC Ext	18.448	18.200	20.391	18.125	16.853	2	1.000	0.75	
17	D3	SAU	3X2X0.25	36.0	67.55	Tens	67.55	27AX	16.469	NESC Hea	24.381	36.400	54.375	48.333	19.194	4	1.000	0.75	
18	D4	SAU	4X3X0.25	36.0	97.48	Comp	57.53	28AXY	26.175	NESC Ext	47.101	45.500	67.969	60.337	15.321	5	1.260	0.75	
19	D5	SAU	3.5X3X0.25	36.0	59.03	Tens	59.03	29AX	26.249	NESC Ext	44.469	45.500	67.969	50.906	28.523	5	1.000	0.75	
20	H1	SAE	1.75X1.75X0.1875	36.0	42.51	Tens	42.51	33Y	2.809	NESC Hea	15.532	9.100	10.195	6.609	6.000	1	1.000	0.75	
21	H2	SAU	4X3.5X0.25	36.0	47.26	Comp	6.06	37AY	1.655	NESC Ext	48.519	27.300	40.781	36.250	15.738	3	1.000	0.75	

22		H3	SAE	3X3X0.1875	36.0	42.63	Comp	3.31	38AXY	0.600	NESC Ext	30.760	18.200	20.391	18.125	9.569	2	1.000	0.75
23		H4	SAU	5X3X0.25	36.0	47.41	Comp	42.04	F39C2118X	7.651	NESC Ext	40.581	18.200	27.187	24.167	2.208	2	1.000	0.75
24		H5	SAE	3.5X3.5X0.25	36.0	14.22	Comp	11.51	40P	2.094	NESC Ext	48.681	18.200	27.187	25.677	13.531	2	1.000	0.75
25		X10	SAE	1.75X1.75X0.1875	36.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
26		X11	SAE	2X2X0.1875	36.0	41.59	Comp	31.64	43BX	3.906	NESC Hea	18.448	18.200	20.391	12.347	4.243	2	1.000	0.75
27		X12	SAU	2.5X2X0.1875	36.0	24.57	Comp	20.09	44CY	3.641	NESC Hea	18.650	18.200	20.391	18.125	9.125	2	1.000	0.75
28		H6	SAU	4X3X0.25	36.0	41.84	Tens	41.84	45BP	7.615	NESC Hea	40.581	18.200	27.187	24.167	6.000	2	1.000	0.75
29		D6	SAU	3X2X0.1875	36.0	40.42	Comp	0.00	46Y	0.000		18.529	18.200	20.391	12.755	14.775	2	1.000	0.75
30		HGR1	SAU	2.5X2X0.1875	36.0	46.40	Tens	46.40	47P	5.918	NESC Hea	18.650	18.200	20.391	12.755	13.250	2	1.000	0.75
31		HGR2	SAE	3X3X0.1875	36.0	41.49	Tens	41.49	48P	7.520	NESC Hea	30.760	18.200	20.391	18.125	15.022	2	1.000	0.75
32		A1	SAE	3X3X0.25	36.0	64.73	Tens	64.73	50P	11.732	NESC Hea	36.997	18.200	27.187	18.125	14.073	2	1.590	0.75
33		A2	SAU	3.5X3X0.25	36.0	53.76	Comp	45.87	53P	15.084	NESC Hea	32.886	36.400	54.375	42.647	11.643	4	2.240	0.75
34		A#	SAE	4X4X0.25	36.0	54.24	Comp	13.99	52P	6.366	NESC Hea	46.393	45.500	67.969	48.262	14.073	5	2.710	0.75
35		H7	SAU	2.5X2X0.1875	36.0	20.90	Comp	10.51	54P	0.957	NESC Ext	21.688	9.100	10.195	9.629	6.000	1	1.000	0.75
36		H8	DAE	1.75X1.75X0.1875	36.0	61.15	Comp	57.06	36X	8.481	NESC Hea	31.823	16.800	20.391	14.864	6.000	1	2.000	0.6875
Pwmnt	12" Std. Pipe	Pwmnt		Pipe 12" Std.	42.0	8.96	Comp	0.00	g121P	0.000		571.199	0.000	0.000	0.000	9.000	0	0.000	0
PMBR1	**L2x2x3/16**	**SAE**		**2X2X0.1875**	**36.0**	**9.17**	**Comp**	**0.00**	**g109P**	**0.000**		**18.827**	**16.800**	**10.195**	**10.343**	**1.500**	**1**	**1.000**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g107P g108P ??**
PMBR2	L2.5x2.5x3/16	SAE		2.5X2.5X0.1875	36.0	52.19	Comp	44.55	g111X	4.542	NESC Ext	25.048	16.800	10.195	11.328	3.354	1	1.000	0.6875
PMBR3	L3x3x3/16	SAE		3X3X0.1875	36.0	2.84	Comp	0.00	g114P	0.000		31.139	16.800	10.195	11.328	8.068	1	1.000	0.6875
PMBR4	**L3.5x3.5x1/4**	**SAE**		**3.5X3.5X0.25**	**36.0**	**8.72**	**Tens**	**8.72**	**g116X**	**1.186**	**NESC Hea**	**49.187**	**16.800**	**13.594**	**15.104**	**9.685**	**1**	**1.000**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g117P ??**
PMBR5	**L4x4x1/4**	**SAE**		**4X4X0.25**	**36.0**	**8.07**	**Comp**	**7.86**	**g120P**	**1.069**	**NESC Ext**	**57.287**	**16.800**	**13.594**	**15.104**	**12.340**	**1**	**1.000**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g118P ??**
20a		H1	SAE	1.75X1.75X0.1875	36.0	29.14	Comp	7.88	30BP	0.521	NESC Hea	15.532	9.100	10.195	6.609	6.000	1	1.000	0.75
AngleR	L2x2x1/4	SAE		2X2X0.25	36.0	65.96	Tens	65.96	42Y	5.813	NESC Ext	24.381	9.100	13.594	8.812	4.243	1	1.000	0.75
BraceR	**L2.5x2.5x1/4**	**SAE**		**2.5X2.5X0.25**	**36.0**	**90.77**	**Tens**	**90.77**	**g110P**	**10.968**	**NESC Ext**	**31.468**	**23.900**	**16.312**	**12.083**	**3.354**	**1**	**1.000**	**0.875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g110P g110X ??**
Plate	6"x3/4" PL	Bar		6x3/4	36.0	4.95	Tens	4.95	g106P	0.832	NESC Hea	129.094	16.800	40.781	45.312	1.501	1	1.000	0.6875
6R		X1	SAE	2.5X2.5X0.25	36.0	75.93	Tens	75.93	15AP	18.287	NESC Ext	32.987	33.600	27.187	24.084	10.817	2	1.000	0.6875

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy -	71.45	25AXY	Angle
NESC Extreme -	97.48	28AP	Angle
NESC Heavy +	87.24	25AP	Angle
NESC Extreme +	98.11	3Y	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	15.81	NESC Heavy +	0.0
2	Clamp	18.49	NESC Heavy +	0.0
3	Clamp	20.47	NESC Heavy +	0.0
4	Clamp	15.50	NESC Heavy +	0.0
5	Clamp	25.47	NESC Heavy +	0.0
6	Clamp	14.07	NESC Heavy +	0.0
7	Clamp	22.22	NESC Heavy +	0.0
8	Clamp	18.81	NESC Heavy +	0.0
9	Clamp	22.33	NESC Heavy +	0.0
10	Clamp	18.33	NESC Heavy +	0.0
11	Clamp	26.15	NESC Heavy +	0.0
12	Clamp	0.55	NESC Extreme -	0.0
13	Clamp	0.64	NESC Heavy -	0.0
14	Clamp	0.96	NESC Heavy -	0.0
15	Clamp	2.11	NESC Extreme -	0.0
16	Clamp	1.56	NESC Extreme -	0.0
17	Clamp	2.31	NESC Heavy -	0.0
18	Clamp	1.90	NESC Heavy -	0.0
19	Clamp	2.95	NESC Heavy -	0.0
20	Clamp	6.34	NESC Heavy +	0.0
21	Clamp	7.34	NESC Heavy +	0.0
22	Clamp	6.89	NESC Heavy +	0.0
23	Clamp	3.21	NESC Heavy +	0.0
24	Clamp	3.44	NESC Heavy +	0.0
25	Clamp	2.39	NESC Heavy +	0.0
26	Clamp	19.98	NESC Extreme +	0.0
27	Clamp	15.38	NESC Heavy +	0.0
28	Clamp	1.56	NESC Extreme -	0.0
29	Clamp	2.56	NESC Heavy -	0.0
30	Clamp	2.06	NESC Heavy -	0.0
31	Clamp	3.19	NESC Heavy -	0.0

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 38400.0
Total: 38400.0

*** End of Report

```
*****************************************************************************
*                                                                           *
* TOWER - Analysis and Design -  Copyright Power Line Systems 1986-2023     *
*                                                                           *
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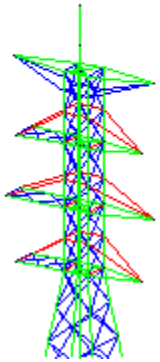
Project Name : 21007.68 - Greenwich, CT
Project Notes: Structure #1281 / Greenwich 3
Project File : J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Backup Documentation\Rev (10)\Calcs\PLS Tower\CL&P # 1281.tow
Date run     : 9:37:35 AM Friday, November 8, 2024
by           : Tower Version 18.01
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis
```

KL/R value of 200.30 exceeds maximum of 200.00 for member "g118P" ??
Problem calculating gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??
Problem calculating gross area of longitudinal face for section "2": width is zero at elevation 0.00 (ft) which is not the top of the section. ??
Unusual number of fixed joints found: 5. Towers normally have from between 1 and 4 fixed joints. ??
The model has 4 warnings. ??



Nonlinear convergence parameters: Use Standard Parameters
Tension only member maximum compression load as a percent of compression capacity: 100%
Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None
Climbing load check: None
Redundant members checked with: Actual Force

Joints Geometry:

Joint Label	Symmetry Code	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
1P	XY-Symmetry	3	3	128.8	Free	Free	Free	Free	Free	Free

2P	XY-Symmetry	3	3	124.3	Free	Free	Free	Free	Free	Free
3P	XY-Symmetry	3	3	119.8	Free	Free	Free	Free	Free	Free
4P	XY-Symmetry	3	3	112.8	Free	Free	Free	Free	Free	Free
5P	XY-Symmetry	3	3	104.8	Free	Free	Free	Free	Free	Free
6P	XY-Symmetry	3	3	98.75	Free	Free	Free	Free	Free	Free
7P	XY-Symmetry	3	3	91.75	Free	Free	Free	Free	Free	Free
8P	XY-Symmetry	3	3	84.75	Free	Free	Free	Free	Free	Free
15P	XY-Symmetry	15.44	15.44	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16P	X-Symmetry	0	16.75	128.8	Free	Free	Free	Free	Free	Free
17P	Y-Symmetry	3	-14.25	112.8	Free	Free	Free	Free	Free	Free
18P	Y-Symmetry	3	-16.75	98.75	Free	Free	Free	Free	Free	Free
19P	Y-Symmetry	3	-14.25	84.75	Free	Free	Free	Free	Free	Free
20AP	Y-Symmetry	9.568	0	40	Free	Free	Free	Free	Free	Free
20BP	X-Symmetry	0	9.568	40	Free	Free	Free	Free	Free	Free
21P	XY-Symmetry	11.77	2.208	25	Free	Free	Free	Free	Free	Free
22P	XY-Symmetry	2.208	11.77	25	Free	Free	Free	Free	Free	Free
23P	None	0	14.25	112.8	Free	Free	Free	Free	Free	Free
24P	None	0	16.75	98.75	Free	Free	Free	Free	Free	Free
25P	None	0	14.25	84.75	Free	Free	Free	Free	Free	Free
26P	Y-Symmetry	3	-8.625	112.8	Free	Free	Free	Free	Free	Free
27P	Y-Symmetry	3	-9.875	98.75	Free	Free	Free	Free	Free	Free
28P	Y-Symmetry	3	-8.625	84.75	Free	Free	Free	Free	Free	Free
29P	None	1.5	0	-4.25	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
30P	None	1.5	0	25	Free	Free	Free	Free	Free	Free
31P	None	1.5	0	40	Free	Free	Free	Free	Free	Free
32P	None	1.5	0	84.75	Free	Free	Free	Free	Free	Free
33P	None	1.5	0	98.75	Free	Free	Free	Free	Free	Free
34P	None	1.5	0	112.8	Free	Free	Free	Free	Free	Free
35P	None	1.5	0	128.8	Free	Free	Free	Free	Free	Free
36P	None	1.5	0	134.8	Free	Free	Free	Free	Free	Free
37P	None	1.5	0	143.8	Free	Free	Free	Free	Free	Free
1X	X-GenXY	3	-3	128.8	Free	Free	Free	Free	Free	Free
1XY	XY-GenXY	-3	-3	128.8	Free	Free	Free	Free	Free	Free
1Y	Y-GenXY	-3	3	128.8	Free	Free	Free	Free	Free	Free
2X	X-GenXY	3	-3	124.3	Free	Free	Free	Free	Free	Free
2XY	XY-GenXY	-3	-3	124.3	Free	Free	Free	Free	Free	Free
2Y	Y-GenXY	-3	3	124.3	Free	Free	Free	Free	Free	Free
3X	X-GenXY	3	-3	119.8	Free	Free	Free	Free	Free	Free
3XY	XY-GenXY	-3	-3	119.8	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	-3	3	119.8	Free	Free	Free	Free	Free	Free
4X	X-GenXY	3	-3	112.8	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	-3	-3	112.8	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	-3	3	112.8	Free	Free	Free	Free	Free	Free
5X	X-GenXY	3	-3	104.8	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	-3	-3	104.8	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	-3	3	104.8	Free	Free	Free	Free	Free	Free
6X	X-GenXY	3	-3	98.75	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	-3	-3	98.75	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	-3	3	98.75	Free	Free	Free	Free	Free	Free
7X	X-GenXY	3	-3	91.75	Free	Free	Free	Free	Free	Free
7XY	XY-GenXY	-3	-3	91.75	Free	Free	Free	Free	Free	Free
7Y	Y-GenXY	-3	3	91.75	Free	Free	Free	Free	Free	Free
8X	X-GenXY	3	-3	84.75	Free	Free	Free	Free	Free	Free
8XY	XY-GenXY	-3	-3	84.75	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	-3	3	84.75	Free	Free	Free	Free	Free	Free
15X	X-GenXY	15.44	-15.44	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15XY	XY-GenXY	-15.44	-15.44	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
15Y	Y-GenXY	-15.44	15.44	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
16X	X-Gen	0	-16.75	128.8	Free	Free	Free	Free	Free	Free

17Y	Y-Gen	-3	-14.25	112.8	Free	Free	Free	Free	Free	Free
18Y	Y-Gen	-3	-16.75	98.75	Free	Free	Free	Free	Free	Free
19Y	Y-Gen	-3	-14.25	84.75	Free	Free	Free	Free	Free	Free
20AY	Y-Gen	-9.568	0	40	Free	Free	Free	Free	Free	Free
20BX	X-Gen	0	-9.568	40	Free	Free	Free	Free	Free	Free
21X	X-GenXY	11.77	-2.208	25	Free	Free	Free	Free	Free	Free
21XY	XY-GenXY	-11.77	-2.208	25	Free	Free	Free	Free	Free	Free
21Y	Y-GenXY	-11.77	2.208	25	Free	Free	Free	Free	Free	Free
22X	X-GenXY	2.208	-11.77	25	Free	Free	Free	Free	Free	Free
22XY	XY-GenXY	-2.208	-11.77	25	Free	Free	Free	Free	Free	Free
22Y	Y-GenXY	-2.208	11.77	25	Free	Free	Free	Free	Free	Free
26Y	Y-Gen	-3	-8.625	112.8	Free	Free	Free	Free	Free	Free
27Y	Y-Gen	-3	-9.875	98.75	Free	Free	Free	Free	Free	Free
28Y	Y-Gen	-3	-8.625	84.75	Free	Free	Free	Free	Free	Free

Secondary Joints and Coordinates:

Joint Label	Symmetry Code	Origin Joint	End Joint	Fraction	Elevation (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)
9S	XY-Symmetry	8P	15P	0	77	Free	Free	Free	Free	Free	Free	4.138	4.138	77
10S	XY-Symmetry	8P	15P	0	69.25	Free	Free	Free	Free	Free	Free	5.275	5.275	69.25
11S	XY-Symmetry	8P	15P	0	61.5	Free	Free	Free	Free	Free	Free	6.413	6.413	61.5
12S	XY-Symmetry	8P	15P	0	51.58	Free	Free	Free	Free	Free	Free	7.869	7.869	51.58
13S	XY-Symmetry	8P	15P	0	40	Free	Free	Free	Free	Free	Free	9.569	9.569	40
14S	XY-Symmetry	8P	15P	0	25	Free	Free	Free	Free	Free	Free	11.77	11.77	25
i0.50E129S	None	1X	1Y	0.5	0	Free	Free	Free	Free	Free	Free	0	0	128.8
i0.50E113S	None	4X	4Y	0.5	0	Free	Free	Free	Free	Free	Free	0	0	112.8
i0.50E99S	None	6X	6Y	0.5	0	Free	Free	Free	Free	Free	Free	0	0	98.75
i0.50E85S	None	8X	8Y	0.5	0	Free	Free	Free	Free	Free	Free	0	0	84.75
21XF0.50S	Y-Symmetry	21X	21P	0.5	0	Free	Free	Free	Free	Free	Free	11.77	0	25
22PF0.50S	X-Symmetry	22P	22Y	0.5	0	Free	Free	Free	Free	Free	Free	0	11.77	25
9X	X-GenXY	8P	15P	0	77	Free	Free	Free	Free	Free	Free	4.138	-4.138	77
9XY	XY-GenXY	8P	15P	0	77	Free	Free	Free	Free	Free	Free	-4.138	-4.138	77
9Y	Y-GenXY	8P	15P	0	77	Free	Free	Free	Free	Free	Free	-4.138	4.138	77
10X	X-GenXY	8P	15P	0	69.25	Free	Free	Free	Free	Free	Free	5.275	-5.275	69.25
10XY	XY-GenXY	8P	15P	0	69.25	Free	Free	Free	Free	Free	Free	-5.275	-5.275	69.25
10Y	Y-GenXY	8P	15P	0	69.25	Free	Free	Free	Free	Free	Free	-5.275	5.275	69.25
11X	X-GenXY	8P	15P	0	61.5	Free	Free	Free	Free	Free	Free	6.413	-6.413	61.5
11XY	XY-GenXY	8P	15P	0	61.5	Free	Free	Free	Free	Free	Free	-6.413	-6.413	61.5
11Y	Y-GenXY	8P	15P	0	61.5	Free	Free	Free	Free	Free	Free	-6.413	6.413	61.5
12X	X-GenXY	8P	15P	0	51.58	Free	Free	Free	Free	Free	Free	7.869	-7.869	51.58
12XY	XY-GenXY	8P	15P	0	51.58	Free	Free	Free	Free	Free	Free	-7.869	-7.869	51.58
12Y	Y-GenXY	8P	15P	0	51.58	Free	Free	Free	Free	Free	Free	-7.869	7.869	51.58
13X	X-GenXY	8P	15P	0	40	Free	Free	Free	Free	Free	Free	9.569	-9.569	40
13XY	XY-GenXY	8P	15P	0	40	Free	Free	Free	Free	Free	Free	-9.569	-9.569	40
13Y	Y-GenXY	8P	15P	0	40	Free	Free	Free	Free	Free	Free	-9.569	9.569	40
14X	X-GenXY	8P	15P	0	25	Free	Free	Free	Free	Free	Free	11.77	-11.77	25
14XY	XY-GenXY	8P	15P	0	25	Free	Free	Free	Free	Free	Free	-11.77	-11.77	25
14Y	Y-GenXY	8P	15P	0	25	Free	Free	Free	Free	Free	Free	-11.77	11.77	25
21XF0.50Y	Y-Gen	21X	21P	0.5	0	Free	Free	Free	Free	Free	Free	-11.77	0	25
22PF0.50X	X-Gen	22P	22Y	0.5	0	Free	Free	Free	Free	Free	Free	0	-11.77	25

The model contains 74 primary and 32 secondary joints for a total of 106 joints.

Steel Material Properties:

Steel	Modulus	Yield	Ultimate	Member	Member	Member	Member	Member	Member	Hyper

Material Label	Modulus of Elasticity (ksi)	Stress Fy (ksi)	Stress All. Fu (ksi)	Stress All. Hyp. 1 (ksi)	Stress All. Hyp. 2 (ksi)	Rupture Hyp. 1	Rupture Hyp. 2	Bearing Hyp. 1 (ksi)	Bearing Hyp. 2 (ksi)	Static Exponent
A 36	2.9e+04	36	58	0	0	0	0	0	0	0
A500-42	2.9e+04	42	58	0	0	0	0	0	0	0

Bolt Properties:

Bolt Label	Bolt Diameter (in)	Hole Diameter (in)	Ultimate Shear Capacity (kips)	Default End Distance (in)	Default Bolt Spacing (in)	Shear Capacity Hyp. 1 (kips)	Shear Capacity Hyp. 2 (kips)	Ultimate Stress Fub (ksi)	Short Edge Dist. (in)
5/8 A394	0.625	0.75	9.1	1.125	1.5	0	0	0	0
5/8 A325	0.625	0.6875	16.8	1.25	1.5	0	0	0	0
3/4 A325	0.75	0.875	23.9	1	2.25	0	0	0	0

Number Bolts Used By Type:

Bolt Type	Number Bolts
5/8 A394	1230
5/8 A325	36
3/4 A325	2

Angle Properties:

Angle Type	Angle Size	Long Leg (in)	Short Leg (in)	Thick. (in)	Unit Weight (lbs/ft)	Gross Area (in^2)	w/t Ratio	Radius of Gyration Rx (in)	Radius of Gyration Ry (in)	Radius of Gyration Rz (in)	Angle Cross Section	Wind Width (in)	Short Edge Dist. (in)	Long Edge Dist. (in)	Optimize Cost Factor	Section Modulus (in^3)	Center of Gravity About X-X (in)	Center of Gravity About Y-Y (in)	Radius of Toe (in)
SAE	8X8X0.75	8	8	0.75	38.9	11.44	8.83	2.47	2.47	1.58	Single	8	4	0	1.0000	0	0	0	0
SAE	8X8X0.625	8	8	0.625	32.7	9.61	10.8	2.49	2.49	1.58	Single	8	4	0	1.0000	0	0	0	0
SAE	8X8X0.5	8	8	0.5	26.4	7.75	13.75	2.5	2.5	1.59	Single	8	4	0	1.0000	0	0	0	0
SAE	6X6X0.3125	6	6	0.3125	12.5	3.65	16.6	1.89	1.89	1.2	Single	6	3	0	1.0000	0	0	0	0
SAE	4X4X0.25	4	4	0.25	6.6	1.94	13.5	1.25	1.25	0.795	Single	4	2	0	1.0000	0	0	0	0
SAE	3.5X3.5X0.25	3.5	3.5	0.25	5.8	1.69	11.5	1.09	1.09	0.694	Single	3.5	1.75	0	1.0000	0	0	0	0
SAE	3X3X0.25	3	3	0.25	4.9	1.44	9.75	0.93	0.93	0.592	Single	3	1.5	0	1.0000	0	0	0	0
SAE	3X3X0.1875	3	3	0.1875	3.71	1.09	13.33	0.939	0.939	0.596	Single	3	1.5	0	1.0000	0	0	0	0
SAE	2.5X2.5X0.25	2.5	2.5	0.25	4.1	1.19	7.75	0.769	0.769	0.491	Single	2.5	1.25	0	1.0000	0	0	0	0
SAE	2.5X2.5X0.1875	2.5	2.5	0.1875	3.07	0.902	10.67	0.778	0.778	0.495	Single	2.5	1.25	0	1.0000	0	0	0	0

SAE	2X2X0.25	2	2	0.25	3.19	0.94	5	0.609	0.609	0.391	Single	2	1	0	1.0000	0	0	0
SAE	2X2X0.1875	2	2	0.1875	2.44	0.71	8	0.617	0.617	0.394	Single	2	1	0	1.0000	0	0	0
SAE	1.75X1.75X0.1875	1.75	1.75	0.1875	2.12	0.62	6	0.537	0.537	0.343	Single	1.75	0.875	0	1.0000	0	0	0
SAU	5X3.5X0.25	5	3.5	0.25	7	2.06	17	1.62	1.04	0.77	Single	5	1.75	0	1.0000	0	0	0
SAU	5X3X0.25	5	3	0.25	6.6	1.94	17	1.62	0.861	0.663	Single	5	1.5	0	1.0000	0	0	0
SAU	4X3.5X0.3125	4	3.5	0.3125	7.7	2.25	10.4	1.26	1.07	0.73	Single	4	1.75	0	1.0000	0	0	0
SAU	4X3.5X0.25	4	3.5	0.25	6.2	1.81	13.25	1.27	1.07	0.734	Single	4	1.75	0	1.0000	0	0	0
SAU	4X3X0.25	4	3	0.25	5.8	1.69	13.25	1.28	0.896	0.651	Single	4	1.5	0	1.0000	0	0	0
SAU	3.5X3X0.25	3.5	3	0.25	5.4	1.56	11.25	1.11	0.914	0.631	Single	3.5	1.5	0	1.0000	0	0	0
SAU	3.5X2.5X0.25	3.5	2.5	0.25	4.9	1.44	11.25	1.12	0.735	0.544	Single	3.5	1.25	0	1.0000	0	0	0
SAU	3X2X0.25	3	2	0.25	4.1	1.19	9.75	0.957	0.574	0.435	Single	3	1	0	1.0000	0	0	0
SAU	3X2X0.1875	3	2	0.1875	3.07	0.9	13.33	0.966	0.583	0.439	Single	3	1	0	1.0000	0	0	0
SAU	2.5X2X0.1875	2.5	2	0.1875	2.75	0.81	10.67	0.793	0.6	0.427	Single	2.5	1	0	1.0000	0	0	0
Pwmnt	Pipe 12" Std.	12.75	12	0	49.6	13.6	1	4.39	4.39	4.39	Round	12.75	0	0	0.0000	0	0	0
Bar	6x3/4	6	0.75	0.75	15.3	4.5	8	0.2165	1.732	1.732	Single	6	0	0	0.0000	0	0	0
DAE	1.75X1.75X0.1875	1.75	1.75	0.1875	4.2	1.24	7	0.537	0.738	0.537	DoubleLBB	3.5	0	0	0.0000	0	0	0

Angle Groups:

Group Label	Group Description	Angle Type	Angle Size	Material Type	Element Type	Group Type	Optimize Group	Allow. Add. Angle Width For Optimize (in)
1	LEG1	SAE	3.5X3.5X0.25	A 36	Beam	Leg	None	0.000
2	LEG2	SAE	6X6X0.3125	A 36	Beam	Leg	None	0.000
3	LEG3	SAE	8X8X0.5	A 36	Beam	Leg	None	0.000
4	LEG4	SAE	8X8X0.625	A 36	Beam	Leg	None	0.000
5	LEG5	SAE	8X8X0.75	A 36	Beam	Leg	None	0.000
6	X1	SAE	2.5X2.5X0.1875	A 36	Truss	Crossing Diagonal	None	0.000
7	X2	SAU	2.5X2X0.1875	A 36	Truss	Crossing Diagonal	None	0.000
8	X3	SAU	4X3X0.25	A 36	Truss	Crossing Diagonal	None	0.000
9	X4	SAU	3.5X2.5X0.25	A 36	Truss	Crossing Diagonal	None	0.000
10	X5	SAU	4X3.5X0.3125	A 36	Truss	Crossing Diagonal	None	0.000
11	X6	SAU	5X3.5X0.25	A 36	Truss	Crossing Diagonal	None	0.000
12	X7	SAU	4X3X0.25	A 36	Truss	Crossing Diagonal	None	0.000
13	X8	SAU	3.5X3X0.25	A 36	Truss	Crossing Diagonal	None	0.000
14	X9	SAU	5X3X0.25	A 36	Truss	Crossing Diagonal	None	0.000
15	D1	SAU	5X3X0.25	A 36	Truss	Other	None	0.000
16	D2	SAE	2X2X0.1875	A 36	T-Only	Other	None	0.000
17	D3	SAU	3X2X0.25	A 36	T-Only	Other	None	0.000
18	D4	SAU	4X3X0.25	A 36	T-Only	Other	None	0.000
19	D5	SAU	3.5X3X0.25	A 36	Truss	Other	None	0.000

20	H1	SAE	1.75X1.75X0.1875	A 36	T-Only		Other	None	0.000
21	H2	SAU	4X3.5X0.25	A 36	Truss		Other	None	0.000
22	H3	SAE	3X3X0.1875	A 36	Truss		Other	None	0.000
23	H4	SAU	5X3X0.25	A 36	Truss		Other	None	0.000
24	H5	SAE	3.5X3.5X0.25	A 36	Truss		Other	None	0.000
25	X10	SAE	1.75X1.75X0.1875	A 36	Beam		Other	None	0.000
26	X11	SAE	2X2X0.1875	A 36	Beam		Other	None	0.000
27	X12	SAU	2.5X2X0.1875	A 36	Truss		Other	None	0.000
28	H6	SAU	4X3X0.25	A 36	Truss		Other	None	0.000
29	D6	SAU	3X2X0.1875	A 36	Truss		Other	None	0.000
30	HGR1	SAU	2.5X2X0.1875	A 36	T-Only		Other	None	0.000
31	HGR2	SAE	3X3X0.1875	A 36	T-Only		Other	None	0.000
32	A1	SAE	3X3X0.25	A 36	Beam		Other	None	0.000
33	A2	SAU	3.5X3X0.25	A 36	Beam		Other	None	0.000
34	A#	SAE	4X4X0.25	A 36	Beam		Other	None	0.000
35	H7	SAU	2.5X2X0.1875	A 36	Truss		Other	None	0.000
36	H8	DAE	1.75X1.75X0.1875	A 36	T-Only	Beam	Other	None	0.000
Pwmnt	12" Std. Pipe	Pwmnt	Pipe 12" Std.	A500-42		Beam	Other	None	0.000
PMBR1	L2x2x3/16	SAE	2X2X0.1875	A 36		Beam	Other	None	12.000
PMBR2	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	A 36		Beam	Other	None	12.000
PMBR3	L3x3x3/16	SAE	3X3X0.1875	A 36		Beam	Other	None	12.000
PMBR4	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	A 36		Beam	Other	None	12.000
PMBR5	L4x4x1/4	SAE	4X4X0.25	A 36		Beam	Other	None	12.000
20a	H1	SAE	1.75X1.75X0.1875	A 36		Truss	Other	None	0.000
AngleR	L2x2x1/4	SAE	2X2X0.25	A 36		Beam	Other	None	0.000
BraceR	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	A 36		Beam	Other	None	0.000
Plate	6"x3/4" PL	Bar	6x3/4	A 36				None	0.000
6R	X1	SAE	2.5X2.5X0.25	A 36	Truss	Crossing Diagonal		None	0.000

Aggregate Angle Information:

Note: Estimate of surface area reported for painting purposes, not wind loading.

Angle Type	Angle Size	Material Type	Total Length (ft)	Total Surface Area (ft^2)	Total Weight (lbs)
SAE	3.5X3.5X0.25	A 36	212.92	248.41	1234.96
SAE	6X6X0.3125	A 36	56.20	112.40	702.50
SAE	8X8X0.5	A 36	56.00	149.33	1478.40
SAE	8X8X0.625	A 36	94.98	253.29	3105.93
SAE	8X8X0.75	A 36	251.24	669.98	9773.41
SAE	2.5X2.5X0.25	A 36	93.24	77.70	382.29
SAU	2.5X2X0.1875	A 36	295.39	221.54	812.33
SAU	4X3X0.25	A 36	318.53	371.62	1847.48
SAU	3.5X2.5X0.25	A 36	68.17	68.17	334.01
SAU	4X3.5X0.3125	A 36	147.51	184.39	1135.85
SAU	5X3.5X0.25	A 36	84.78	120.10	593.45
SAU	3.5X3X0.25	A 36	456.32	494.34	2464.10
SAU	5X3X0.25	A 36	346.59	462.12	2287.47
SAE	2X2X0.1875	A 36	190.24	126.82	464.18
SAU	3X2X0.25	A 36	153.55	127.96	629.55
SAE	1.75X1.75X0.1875	A 36	84.00	49.00	178.08
DAE	1.75X1.75X0.1875	A 36	12.00	7.00	50.40
SAU	4X3.5X0.25	A 36	62.95	78.69	390.29
SAE	3X3X0.1875	A 36	145.30	145.30	539.06
SAE	2X2X0.25	A 36	16.97	11.31	54.14
SAU	3X2X0.1875	A 36	59.10	49.25	181.44

SAE	3X3X0.25	A 36	68.29	68.29	334.64	
SAE	4X4X0.25	A 36	105.60	140.80	696.94	
Pwmnt	Pipe 12" Std.	A500-42	148.00	610.50	7340.80	
Bar	6x3/4	A 36	1.50	1.69	22.96	
SAE	2.5X2.5X0.1875	A 36	20.13	16.77	61.78	

Sections:
The adjustment factors below only apply to dead load and wind areas that are calculated for members in the model.
They do not apply to equipment or to manually input dead load and drag areas.

Section Label	Joint Defining Section	Dead Load Adjust. Factor	Transverse Drag x Area Factor For Face	Longitudinal Drag x Area Factor For Face	Transverse Area Factor (CD From Code)	Longitudinal Area Factor (CD From Code)	Af Flat For Face EIA Only	Ar Round For Face EIA Only	Transverse Drag x Area Factor For All	Longitudinal Drag x Area Factor For All	SAPS Angle Drag x Area Factor	SAPS Round Drag x Area Factor	Adjustment Type
	Bottom												
1	8X	1.000	3.200	3.200	1.000	1.000	0.000	0.000	1.000	1.000	0.000	0.000	None
2	29P	1.050	3.400	3.400	1.000	1.000	0.000	0.000	1.000	1.000	0.000	0.000	None

Angle Member Connectivity:

Member Label	Group Label	Section Label	Symmetry Code	Origin Joint	End Joint	Ecc. Code	Rest. Code	Ratio RLX	Ratio RLY	Ratio RLZ	Bolt Type	# Bolts	# Bolt Holes	# Shear Planes	Connect Leg	Short Edge Dist. (in)	Long Edge Dist. (in)	End Dist. (in)	Bolt Spacing (in)	Shear Path Length (in)	Tension Path Length (in)	Rest. Connect. Coef. Modifier
1P	1		XY-Symmetry	1P	2P	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
1X	1		X-GenXY	1X	2X	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
1XY	1		XY-GenXY	1XY	2XY	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
1Y	1		Y-GenXY	1Y	2Y	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
2P	1		XY-Symmetry	2P	3P	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
2X	1		X-GenXY	2X	3X	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
2XY	1		XY-GenXY	2XY	3XY	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
2Y	1		Y-GenXY	2Y	3Y	1	4	1	1	1	5/8 A394	0	2	1	Both	0	0	0	0	0	0	
3P	1		XY-Symmetry	3P	4P	1	4	1	1	1	5/8 A394	4	2	1	Both	1.875	0	1.25	2.5	0	0	
3X	1		X-GenXY	3X	4X	1	4	1	1	1	5/8 A394	4	2	1	Both	1.875	0	1.25	2.5	0	0	
3XY	1		XY-GenXY	3XY	4XY	1	4	1	1	1	5/8 A394	4	2	1	Both	1.875	0	1.25	2.5	0	0	
3Y	1		Y-GenXY	3Y	4Y	1	4	1	1	1	5/8 A394	4	2	1	Both	1.875	0	1.25	2.5	0	0	

4P	2		XY-Symmetry	4P	5P	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0	0	0	0	0
4X	2		X-GenXY	4X	5X	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0	0	0	0	0
4XY	2		XY-GenXY	4XY	5XY	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0	0	0	0	0
4Y	2		Y-GenXY	4Y	5Y	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0	0	0	0	0
5P	2		XY-Symmetry	5P	6P	1	4	1	1	1	5/8	A394	12	4	1	Both	1.125	3.125	1.25	3.5	12.75	4	0
5X	2		X-GenXY	5X	6X	1	4	1	1	1	5/8	A394	12	4	1	Both	1.125	3.125	1.25	3.5	12.75	4	0
5XY	2		XY-GenXY	5XY	6XY	1	4	1	1	1	5/8	A394	12	4	1	Both	1.125	3.125	1.25	3.5	12.75	4	0
5Y	2		Y-GenXY	5Y	6Y	1	4	1	1	1	5/8	A394	12	4	1	Both	1.125	3.125	1.25	3.5	12.75	4	0
6P	3		XY-Symmetry	6P	7P	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
6X	3		X-GenXY	6X	7X	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
6XY	3		XY-GenXY	6XY	7XY	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
6Y	3		Y-GenXY	6Y	7Y	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
7P	3		XY-Symmetry	7P	8P	1	4	1	1	1	5/8	A394	14	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
7X	3		X-GenXY	7X	8X	1	4	1	1	1	5/8	A394	14	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
7XY	3		XY-GenXY	7XY	8XY	1	4	1	1	1	5/8	A394	14	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
7Y	3		Y-GenXY	7Y	8Y	1	4	1	1	1	5/8	A394	14	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
8P	4		XY-Symmetry	8P	9S	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
8X	4		X-GenXY	8X	9X	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
8XY	4		XY-GenXY	8XY	9XY	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
8Y	4		Y-GenXY	8Y	9Y	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
9P	4		XY-Symmetry	9S	10S	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
9X	4		X-GenXY	9X	10X	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
9XY	4		XY-GenXY	9XY	10XY	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
9Y	4		Y-GenXY	9Y	10Y	1	4	1	1	1	5/8	A394	0	3.5	1	Both	0	0	0	0	0	0	0
10P	4		XY-Symmetry	10S	11S	1	4	1	1	1	5/8	A394	16	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
10X	4		X-GenXY	10X	11X	1	4	1	1	1	5/8	A394	16	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
10XY	4		XY-GenXY	10XY	11XY	1	4	1	1	1	5/8	A394	16	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
10Y	4		Y-GenXY	10Y	11Y	1	4	1	1	1	5/8	A394	16	3.5	2	Both	1.5	4.75	1.25	3	15.25	7.25	0
11P	5		XY-Symmetry	11S	12S	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0	0	0	0	0
11X	5		X-GenXY	11X	12X	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0				

0	0	0	0																						
	11XY	5		XY-GenXY	11XY	12XY	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0					
0	0	0	0																						
	11Y	5		Y-GenXY	11Y	12Y	1	4	1	1	1	5/8	A394	0	4	1	Both	0	0	0					
0	0	0	0																						
	12P	5		XY-Symmetry	12S	13S	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	12X	5		X-GenXY	12X	13X	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	12XY	5		XY-GenXY	12XY	13XY	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	12Y	5		Y-GenXY	12Y	13Y	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	13P	5		XY-Symmetry	13S	14S	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	13X	5		X-GenXY	13X	14X	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	13XY	5		XY-GenXY	13XY	14XY	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	13Y	5		Y-GenXY	13Y	14Y	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	14P	5		XY-Symmetry	14S	15P	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	14X	5		X-GenXY	14X	15X	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	14XY	5		XY-GenXY	14XY	15XY	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	14Y	5		Y-GenXY	14Y	15Y	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25					
3.5	18.25	7.25	0																						
	15AP	6R		XY-Symmetry	1P	3X	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15AX	6R		X-GenXY	1X	3P	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15AXY	6R		XY-GenXY	1XY	3Y	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15AY	6R		Y-GenXY	1Y	3XY	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15BP	6R		XY-Symmetry	3P	1Y	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15BX	6R		X-GenXY	3X	1XY	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15BXY	6R		XY-GenXY	3XY	1X	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	15BY	6R		Y-GenXY	3Y	1P	2	5	0.25	0.5	0.25	5/8	A325	2	1	1	Long only	0.875	0	1					
2.25	0	0	0																						
	16AP	7		XY-Symmetry	3P	4X	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.25	0	0	0																						
	16AX	7		X-GenXY	3X	4P	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.25	0	0	0																						
	16AXY	7		XY-GenXY	3XY	4Y	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.25	0	0	0																						
	16AY	7		Y-GenXY	3Y	4XY	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.25	0	0	0																						
	16BP	7		XY-Symmetry	4P	3Y	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.125	0	0	0																						
	16BX	7		X-GenXY	4X	3XY	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.125	0	0	0																						
	16BXY	7		XY-GenXY	4XY	3X	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1					
3.125	0	0	0																						

16BY	7		Y-GenXY	4Y	3P	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1	3.125
0	0	0																		
17AP	8		XY-Symmetry	4P	5X	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17AX	8		X-GenXY	4X	5P	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17AXY	8		XY-GenXY	4XY	5Y	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17AY	8		Y-GenXY	4Y	5XY	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17BP	8		XY-Symmetry	5P	4Y	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17BX	8		X-GenXY	5X	4XY	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17BXY	8		XY-GenXY	5XY	4X	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
17BY	8		Y-GenXY	5Y	4P	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1	2.25
3.625	2.375	0																		
18AP	9		XY-Symmetry	5P	6X	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18AX	9		X-GenXY	5X	6P	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18AXY	9		XY-GenXY	5XY	6Y	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18AY	9		Y-GenXY	5Y	6XY	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18BP	9		XY-Symmetry	6P	5Y	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18BX	9		X-GenXY	6X	5XY	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18BXY	9		XY-GenXY	6XY	5X	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
18BY	9		Y-GenXY	6Y	5P	2	5	0.5	0.75	0.5	5/8	A394	4	1.03	1	Long only	0.75	2.25	1	4
4.875	1.875	0																		
19AP	10		XY-Symmetry	6P	7X	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19AX	10		X-GenXY	6X	7P	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19AXY	10		XY-GenXY	6XY	7Y	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19AY	10		Y-GenXY	6Y	7XY	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19BP	10		XY-Symmetry	7P	6Y	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19BX	10		X-GenXY	7X	6XY	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19BXY	10		XY-GenXY	7XY	6X	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
19BY	10		Y-GenXY	7Y	6P	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	2
4.4375	2.375	0																		
20AP	10		XY-Symmetry	7P	8X	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1	1.75
4.4375	2.375	0																		
20AX	10		X-GenXY	7X	8P	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1	1.75
4.4375	2.375	0																		
20AXY	10		XY-GenXY	7XY	8Y	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1	1.75
4.4375	2.375	0																		
20AY	10		Y-GenXY	7Y	8XY	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1	1.75
4.4375	2.375	0																		
20BP	10		XY-Symmetry	8P	7Y	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625	

1.75	4.4375	2.375	0																					
	20BX	10		X-GenXY	8X	7XY	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625				
1.75	4.4375	2.375	0																					
	20BXY	10		XY-GenXY	8XY	7X	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625				
1.75	4.4375	2.375	0																					
	20BY	10		Y-GenXY	8Y	7P	2	5	0.5	0.75	0.5	5/8	A394	7	1.79	1	Long only	1	2.75	1.0625				
1.75	4.4375	2.375	0																					
	21AP	11		XY-Symmetry	8P	9X	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21AX	11		X-GenXY	8X	9S	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21AXY	11		XY-GenXY	8XY	9Y	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21AY	11		Y-GenXY	8Y	9XY	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21BP	11		XY-Symmetry	9S	8Y	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21BX	11		X-GenXY	9X	8XY	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21BXY	11		XY-GenXY	9XY	8X	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	21BY	11		Y-GenXY	9Y	8P	2	5	0.58	0.58	0.58	5/8	A394	6	1.55	1	Short only	1	2.25	1				
3.5	4.125	1.125	0																					
	22AP	12		XY-Symmetry	9S	10X	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22AX	12		X-GenXY	9X	10S	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22AXY	12		XY-GenXY	9XY	10Y	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22AY	12		Y-GenXY	9Y	10XY	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22BP	12		XY-Symmetry	10S	9Y	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22BX	12		X-GenXY	10X	9XY	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22BXY	12		XY-GenXY	10XY	9X	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	22BY	12		Y-GenXY	10Y	9S	2	5	0.56	0.56	0.56	5/8	A394	4	1	1	Short only	1.5	0	1.0625				
1.75	0	0	0																					
	23AP	13		XY-Symmetry	10S	11X	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23AX	13		X-GenXY	10X	11S	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23AXY	13		XY-GenXY	10XY	11Y	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23AY	13		Y-GenXY	10Y	11XY	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23BP	13		XY-Symmetry	11S	10Y	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23BX	13		X-GenXY	11X	10XY	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23BXY	13		XY-GenXY	11XY	10X	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	23BY	13		Y-GenXY	11Y	10S	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1.0625				
2.75	0	0	0																					
	24AP	14		XY-Symmetry	11S	12X	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1				
2.25	0	0	0																					
	24AX	14		X-GenXY	11X	12S	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1				
2.25	0	0	0																					

24AXY	14		XY-GenXY	11XY	12Y	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1	2.25	0	0	0
24AY	14		Y-GenXY	11Y	12XY	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1	2.25	0	0	0
24BP	14		XY-Symmetry	12S	11Y	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1	2.25	0	0	0
24BX	14		X-GenXY	12X	11XY	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1	2.25	0	0	0
24BXY	14		XY-GenXY	12XY	11X	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1	2.25	0	0	0
24BY	14		Y-GenXY	12Y	11S	2	5	0.55	0.55	0.55	5/8	A394	3	1	1	Short only	1.5	0	1	2.25	0	0	0
25AP	15		XY-Symmetry	12S	20AP	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25AX	15		X-GenXY	12X	20AP	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25AXY	15		XY-GenXY	12XY	20AY	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25AY	15		Y-GenXY	12Y	20AY	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25BP	15		XY-Symmetry	20BP	12S	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25BX	15		X-GenXY	20BX	12X	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25BXY	15		XY-GenXY	20BX	12XY	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
25BY	15		Y-GenXY	20BP	12Y	3	5	1	0.5	0.5	5/8	A394	7	1.71	1	Short only	0.75	2	1.0625	2	7.375	0.875	0
26AP	16		XY-Symmetry	21P	13S	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26AX	16		X-GenXY	21X	13X	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26AXY	16		XY-GenXY	21XY	13XY	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26AY	16		Y-GenXY	21Y	13Y	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26BP	16		XY-Symmetry	22P	13S	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26BX	16		X-GenXY	22X	13X	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26BXY	16		XY-GenXY	22XY	13XY	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
26BY	16		Y-GenXY	22Y	13Y	2	5	0.5	0.5	0.5	5/8	A394	2	1	1	Long only	1	0	1	4	0	0	0
27AP	17		XY-Symmetry	20AP	14S	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27AX	17		X-GenXY	20AP	14X	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27AXY	17		XY-GenXY	20AY	14XY	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27AY	17		Y-GenXY	20AY	14Y	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27BP	17		XY-Symmetry	14S	20BP	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27BX	17		X-GenXY	14X	20BX	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27BXY	17		XY-GenXY	14XY	20BX	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1	2.25	0	0	0
27BY	17		Y-GenXY	14Y	20BP	3	5	1	0.5	0.5	5/8	A394	4	1	1	Short only	0.875	0	1				

																		2.25	0	0	0
28AP	18	XY-Symmetry	21X	20AP	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28AX	18	X-GenXY	21P	20AP	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28AXY	18	XY-GenXY	21Y	20AY	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28AY	18	Y-GenXY	21XY	20AY	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28BP	18	XY-Symmetry	20BP	22P	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28BX	18	X-GenXY	20BX	22X	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28BXY	18	XY-GenXY	20BX	22XY	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
28BY	18	Y-GenXY	20BP	22Y	3	4	0.5	1	0.5	5/8 A394	5	1.26	1	Long only	2.875	1.375	1	3.5	5.125	1.75	0
29AP	19	XY-Symmetry	21P	15P	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29AX	19	X-GenXY	21X	15X	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29AXY	19	XY-GenXY	21XY	15XY	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29AY	19	Y-GenXY	21Y	15Y	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29BP	19	XY-Symmetry	15P	22P	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29BX	19	X-GenXY	15X	22X	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29BXY	19	XY-GenXY	15XY	22XY	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
29BY	19	Y-GenXY	15Y	22Y	2	5	0.25	0.25	0.25	5/8 A394	5	1	1	Long only	1.5	0	1.0625	1.75	0	0	0
30AP	20a	Y-Symmetry	2X	2P	3	4	0.5	0.5	0.5	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
30AY	20a	Y-Gen	2XY	2Y	3	4	0.5	0.5	0.5	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
30BP	20a	X-Symmetry	2P	2Y	3	4	0.5	0.5	0.5	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
30BX	20a	X-Gen	2X	2XY	3	4	0.5	0.5	0.5	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
31P	20	Y-Symmetry	3X	3P	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
31Y	20	Y-Gen	3XY	3Y	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
32P	20	X-Symmetry	4P	4Y	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1.0625	0	0	0	0
32X	20	X-Gen	4X	4XY	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1.0625	0	0	0	0
33P	20	Y-Symmetry	5X	5P	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
33Y	20	Y-Gen	5XY	5Y	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0
34P	20	X-Symmetry	6P	6Y	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1.0625	0	0	0	0
34X	20	X-Gen	6X	6XY	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1.0625	0	0	0	0
35P	20	Y-Symmetry	7X	7P	3	4	1	1	1	5/8 A394	1	1	1	Long only	0.75	0	1	0	0	0	0

35Y	20		Y-Gen	7XY	7Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1	0	0
36P	36		X-Symmetry	8P	8Y	3	4	1	1	1	5/8	A325	1	2	1	Long only	0.75	0	1.0625	0	0
36X	36		X-Gen	8X	8XY	3	4	1	1	1	5/8	A325	1	2	1	Long only	0.75	0	1.0625	0	0
37AP	21		Y-Symmetry	12X	12S	3	6	1	0.5	0.5	5/8	A394	3	1	1	Short only	1.75	0	1	2	0
37AY	21		Y-Gen	12XY	12Y	3	6	1	0.5	0.5	5/8	A394	3	1	1	Short only	1.75	0	1	2	0
37BP	21		X-Symmetry	12S	12Y	3	6	1	0.5	0.5	5/8	A394	3	1	1	Short only	1.75	0	1	2	0
37BX	21		X-Gen	12X	12XY	3	6	1	0.5	0.5	5/8	A394	3	1	1	Short only	1.75	0	1	2	0
38AP	22		XY-Symmetry	13X	20AP	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38AX	22		X-GenXY	13S	20AP	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38AXY	22		XY-GenXY	13Y	20AY	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38AY	22		Y-GenXY	13XY	20AY	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38BP	22		XY-Symmetry	13S	20BP	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38BX	22		X-GenXY	13X	20BX	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38BXY	22		XY-GenXY	13XY	20BX	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
38BY	22		Y-GenXY	13Y	20BP	3	6	1	1	1	5/8	A394	2	1	1	Long only	1.5	0	1	3.25	0
39AP	23		XY-Symmetry	14X	21X	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39AX	23		X-GenXY	21P	14S	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39AXY	23		XY-GenXY	14Y	21Y	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39AY	23		Y-GenXY	21XY	14XY	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39BP	23		XY-Symmetry	14S	22P	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39BX	23		X-GenXY	22X	14X	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39BXY	23		XY-GenXY	14XY	22XY	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39BY	23		Y-GenXY	22Y	14Y	3	5	1	1	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39C1P	23		Y-Symmetry	21X	21XF0.50S	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39C1Y	23		Y-Gen	21XY	21XF0.50Y	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
F39C197P	23		Y-Symmetry	21XF0.50S	21P	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
F39C197Y	23		Y-Gen	21XF0.50Y	21Y	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39C2P	23		X-Symmetry	22P	22PF0.50S	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
39C2X	23		X-Gen	22X	22PF0.50X	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1	3.25	0
F39C2118P	23		X-Symmetry	22PF0.50S	22Y	3	4	1	2	1	5/8	A394	2	1	1	Short only	1.5	0	1		

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3.25      0       0     0
 F39C2118X     23               X-Gen  22PF0.50X       22XY    3     4     1     2     1 5/8 A394     2      1       1 Short only    1.5     0      1
3.25      0       0     0
       40P     24            XY-Symmetry       20AP       20BP    3     6     1     1     1 5/8 A394     2      1       1  Long only    1.5 2.375 1.0625
2.125     2    1.25     0
       40X     24                X-GenXY       20AP       20BX    3     6     1     1     1 5/8 A394     2      1       1  Long only    1.5 2.375 1.0625
2.125     2    1.25     0
      40XY     24               XY-GenXY       20AY       20BX    3     6     1     1     1 5/8 A394     2      1       1  Long only    1.5 2.375 1.0625
2.125     2    1.25     0
       40Y     24                Y-GenXY       20AY       20BP    3     6     1     1     1 5/8 A394     2      1       1  Long only    1.5 2.375 1.0625
2.125     2    1.25     0
       41P     24            XY-Symmetry        21P        22P    3     6     1     1     1 5/8 A394     2      1       1  Long only      2     0 1.0625
2.5       0       0     0
       41X     24                X-GenXY        21X        22X    3     6     1     1     1 5/8 A394     2      1       1  Long only      2     0 1.0625
2.5       0       0     0
      41XY     24               XY-GenXY       21XY       22XY    3     6     1     1     1 5/8 A394     2      1       1  Long only      2     0 1.0625
2.5       0       0     0
       41Y     24                Y-GenXY        21Y        22Y    3     6     1     1     1 5/8 A394     2      1       1  Long only      2     0 1.0625
2.5       0       0     0
       42P AngleR            XY-Symmetry         1X i0.50E129S    2     4     1     1     1 5/8 A394     1      1       1  Long only   0.75     0      1
0         0       0     0
       42X AngleR                X-GenXY         1P i0.50E129S    2     4     1     1     1 5/8 A394     1      1       1  Long only   0.75     0      1
0         0       0     0
      42XY AngleR               XY-GenXY i0.50E129S         1Y    2     4     1     1     1 5/8 A394     1      1       1  Long only   0.75     0      1
0         0       0     0
       42Y AngleR                Y-GenXY        1XY i0.50E129S    2     4     1     1     1 5/8 A394     1      1       1  Long only   0.75     0      1
0         0       0     0
      43AP     26            XY-Symmetry         4X i0.50E113S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43AX     26                X-GenXY         4P i0.50E113S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
     43AXY     26               XY-GenXY i0.50E113S         4Y    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43AY     26                Y-GenXY        4XY i0.50E113S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43BP     26            XY-Symmetry         6X  i0.50E99S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43BX     26                X-GenXY         6P  i0.50E99S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
     43BXY     26               XY-GenXY  i0.50E99S         6Y    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43BY     26                Y-GenXY        6XY  i0.50E99S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43CP     26            XY-Symmetry         8X  i0.50E85S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43CX     26                X-GenXY         8P  i0.50E85S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
     43CXY     26               XY-GenXY  i0.50E85S         8Y    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
      43CY     26                Y-GenXY        8XY  i0.50E85S    2     5     1     1     1 5/8 A394     2      1       1  Long only  0.875     0      1
1.5       0       0     0
       44P     27             Y-Symmetry         8X        28Y    2     5  0.75   0.5   0.5 5/8 A394     2      1       1 Short only  0.875     0      1
4         0       0     0
       44Y     27                  Y-Gen        8XY        28P    2     5  0.75   0.5   0.5 5/8 A394     2      1       1 Short only  0.875     0      1
4         0       0     0
      44AP     27             Y-Symmetry        28P        19Y    2     5  0.75   0.5   0.5 5/8 A394     2      1       1 Short only  0.875     0      1
4         0       0     0
      44AY     27                  Y-Gen        28Y        19P    2     5  0.75   0.5   0.5 5/8 A394     2      1       1 Short only  0.875     0      1
4         0       0     0
```

	44BP	27	Y-Symmetry	6X	27Y	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44BY	27	Y-Gen	6XY	27P	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44CP	27	Y-Symmetry	27P	18Y	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44CY	27	Y-Gen	27Y	18P	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44DP	27	Y-Symmetry	4X	26Y	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44DY	27	Y-Gen	4XY	26P	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44EP	27	Y-Symmetry	26P	17Y	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	44EY	27	Y-Gen	26Y	17P	2	5	0.75	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
4	0	0	0																						
	45P	28	None	17P	17Y	3	5	1	1	1	5/8	A394	2		1	1	Short only	1.5	0	1					
4	0	0	0																						
	45AP	28	None	18P	18Y	3	5	1	1	1	5/8	A394	2		1	1	Short only	1.5	0	1					
4	0	0	0																						
	45BP	28	None	19P	19Y	3	5	1	1	1	5/8	A394	2		1	1	Short only	1.5	0	1					
4	0	0	0																						
	46P	29	XY-Symmetry	16P	2P	2	5	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.5	0	0	0																						
	46X	29	X-GenXY	16X	2X	2	5	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.5	0	0	0																						
	46XY	29	XY-GenXY	16X	2XY	2	5	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.5	0	0	0																						
	46Y	29	Y-GenXY	16P	2Y	2	5	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.5	0	0	0																						
	47P	30	Y-Symmetry	3X	17P	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
1.5625	0	0	0																						
	47Y	30	Y-Gen	3XY	17Y	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
1.5625	0	0	0																						
	47AP	30	Y-Symmetry	23P	3P	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.75	0	0	0																						
	47AY	30	Y-Gen	23P	3Y	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.75	0	0	0																						
	48P	31	Y-Symmetry	5X	18P	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
2.75	0	0	0																						
	48Y	31	Y-Gen	5XY	18Y	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
2.75	0	0	0																						
	48AP	31	Y-Symmetry	24P	5P	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
1.75	0	0	0																						
	48AY	31	Y-Gen	24P	5Y	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
1.75	0	0	0																						
	49P	30	Y-Symmetry	7X	19P	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.5625	0	0	0																						
	49Y	30	Y-Gen	7XY	19Y	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1.0625					
1.5625	0	0	0																						
	49AP	30	Y-Symmetry	25P	7P	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
1.75	0	0	0																						
	49AY	30	Y-Gen	25P	7Y	3	4	1	0.5	0.5	5/8	A394	2		1	1	Short only	0.875	0	1					
1.75	0	0	0																						
	50P	32	XY-Symmetry	16P	1P	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1		Long only	0.75	1.875	2.25					
1.125	2.125	0.875	0																						
	50X	32	X-GenXY	16X	1X	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1		Long only	0.75	1.875	2.25					
1.125	2.125	0.875	0																						
	50XY	32	XY-GenXY	16X	1XY	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1		Long only	0.75	1.875	2.25					

```
1.125  2.125   0.875     0
       50Y     32              Y-GenXY        16P         1Y    3     5   0.5   0.5   0.5 5/8 A394     2   1.59       1  Long only   0.75 1.875   2.25
1.125  2.125   0.875     0
      50AP     32          Y-Symmetry         1X         1P    3     6     1     1     1 5/8 A394     2    1.3       1  Long only 1.1875     2      2
1.25   2.125   0.875     0
      50AY     32               Y-Gen         1XY        1Y    3     6     1     1     1 5/8 A394     2    1.3       1  Long only 1.1875     2      2
1.25   2.125   0.875     0
       51P     33          Y-Symmetry        23P         4P    3     5   0.5   0.5   0.5 5/8 A394     4   2.24       1 Short only   0.75  1.75      1
2.25   6.25    0.375     0
       51Y     33               Y-Gen        23P         4Y    3     5   0.5   0.5   0.5 5/8 A394     4   2.24       1 Short only   0.75  1.75      1
2.25   6.25    0.375     0
      51AP     33          Y-Symmetry         4X         4P    3     6     1     1     1 5/8 A394     4   1.54       1 Short only   0.75  1.75      1
2.25   6.25    0.375     0
      51AY     33               Y-Gen         4XY        4Y    3     6     1     1     1 5/8 A394     4   1.54       1 Short only   0.75  1.75      1
2.25   6.25    0.375     0
      51BP     33          Y-Symmetry         4X        26P    3     5     1     1     1 5/8 A394     3    2.1       1 Short only   0.75   1.5      1
3  4.375   1.125     0
      51BY     33               Y-Gen         4XY       26Y    3     5     1     1     1 5/8 A394     3    2.1       1 Short only   0.75   1.5      1
3  4.375   1.125     0
      51CP     33          Y-Symmetry        26P         17P    3     5     1     1     1 5/8 A394     3    2.1       1  Long only   0.75   1.5      1
3.625  3.875   1.125     0
      51CY     33               Y-Gen        26Y         17Y    3     5     1     1     1 5/8 A394     3    2.1       1  Long only   0.75   1.5      1
3.625  3.875   1.125     0
       52P     34          Y-Symmetry        24P         6P    3     5   0.5   0.5   0.5 5/8 A394     5   2.71       1  Long only      1 2.625      1
2.25   4.125   1.375     0
       52Y     34               Y-Gen        24P         6Y    3     5   0.5   0.5   0.5 5/8 A394     5   2.71       1  Long only      1 2.625      1
2.25   4.125   1.375     0
      52AP     34          Y-Symmetry         6X         6P    3     6     1     1     1 5/8 A394     5   1.82       1  Long only    0.5   2.5      1
2  4.125   1.375     0
      52AY     34               Y-Gen         6XY        6Y    3     6     1     1     1 5/8 A394     5   1.82       1  Long only    0.5   2.5      1
2  4.125   1.375     0
      52BP     34          Y-Symmetry         6X        27P    3     5     1     1     1 5/8 A394     5      2       1  Long only      1   2.5    1.5
5  8.625   1.375     0
      52BY     34               Y-Gen         6XY       27Y    3     5     1     1     1 5/8 A394     5      2       1  Long only      1   2.5    1.5
5  8.625   1.375     0
      52CP     34          Y-Symmetry        27P         18P    3     5     1     1     1 5/8 A394     6   2.66       1  Long only   0.75  2.75      1
2.25   6.875   1.625     0
      52CY     34               Y-Gen        27Y         18Y    3     5     1     1     1 5/8 A394     6   2.66       1  Long only   0.75  2.75      1
2.25   6.875   1.625     0
       53P     33          Y-Symmetry        25P         8P    3     5   0.5   0.5   0.5 5/8 A394     4   2.24       1 Short only   0.75   1.5      1
3  4.375   0.625     0
       53Y     33               Y-Gen        25P         8Y    3     5   0.5   0.5   0.5 5/8 A394     4   2.24       1 Short only   0.75   1.5      1
3  4.375   0.625     0
      53AP     33          Y-Symmetry         8X         8P    3     6     1     1     1 5/8 A394     4      1       1 Short only   0.75   1.5      1
3  4.375   0.625     0
      53AY     33               Y-Gen         8XY        8Y    3     6     1     1     1 5/8 A394     4      1       1 Short only   0.75   1.5      1
3  4.375   0.625     0
      53BP     33          Y-Symmetry         8X        28P    3     5     1     1     1 5/8 A394     3      2       1 Short only   0.75   1.5 2.6875
4  4.625   0.625     0
      53BY     33               Y-Gen         8XY       28Y    3     5     1     1     1 5/8 A394     3      2       1 Short only   0.75   1.5 2.6875
4  4.625   0.625     0
      53CP     33          Y-Symmetry        28P         19P    3     5     1     1     1 5/8 A394     4   2.21       1  Long only   0.75  2.25      1
3.5  5.875   1.125     0
      53CY     33               Y-Gen        28Y         19Y    3     5     1     1     1 5/8 A394     4   2.21       1  Long only   0.75  2.25      1
3.5  5.875   1.125     0
       54P     35          X-Symmetry         1P         1Y    3     4     1     1     1 5/8 A394     1      1       1  Long only    1.5     0 1.0625
0      0       0     0
       54X     35               X-Gen         1X         1XY   3     4     1     1     1 5/8 A394     1      1       1  Long only    1.5     0 1.0625
0      0       0     0
```

g99P	Pwmnt		None	29P	30P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g100P	Pwmnt		None	30P	31P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g101P	Pwmnt		None	31P	32P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g102P	Pwmnt		None	32P	33P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g103P	Pwmnt		None	33P	34P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g104P	Pwmnt		None	34P	35P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g105P	Pwmnt		None	35P	36P	1	4	1	1	1		0	0	0		0	0	0	0	0	0
g106P	Plate		None	35P	i0.50E129S	3	4	1	1	1	5/8 A325	1	1	1	Long only	3	0	1.25	0	0	0
g107P	PMBR1		None	34P	i0.50E113S	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g108P	PMBR1		None	33P	i0.50E99S	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g109P	PMBR1		None	32P	i0.50E85S	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g110P	BraceR	X-Symmetry		1X	35P	3	4	1	1	1	3/4 A325	1	1	1	Long only	0	0	0	0	0	0
g110X	BraceR	X-Gen		1P	35P	3	4	1	1	1	3/4 A325	1	1	1	Long only	0	0	0	0	0	0
g111P	PMBR2	X-Symmetry		4X	34P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g111X	PMBR2	X-Gen		4P	34P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g112P	PMBR2	X-Symmetry		6X	33P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g112X	PMBR2	X-Gen		6P	33P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g113P	PMBR2	X-Symmetry		8X	32P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g113X	PMBR2	X-Gen		8P	32P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g114P	PMBR3		None	20AP	31P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g115P	PMBR4		None	31P	20AY	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g116P	PMBR4	X-Symmetry		20BX	31P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g116X	PMBR4	X-Gen		20BP	31P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g117P	PMBR4		None	21XF0.50S	30P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g118P	PMBR5		None	30P	21XF0.50Y	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g120P	PMBR5	X-Symmetry		22XY	30P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g120X	PMBR5	X-Gen		22Y	30P	3	4	1	1	1	5/8 A325	1	1	1	Long only	0	0	0	0	0	0
g121P	Pwmnt		None	36P	37P	1	4	1	1	1		0	0	0		0	0	0	0	0	0

Member Capacities and Overrides:

Member Label	Group Label	Design Comp.	Comp. Override	Design Control	Tension Override	L/r Length Override	L/r Override	Connection Heuristic	Connection Override	Net Section	Rupture Tension	RTE End Dist.	RTE Edge Dist.	Override Comp.	Warnings or Errors
		Capacity	Criterion	Capacity	Criterion			Capacity	Capacity	Capacity	Tension Capacity		Tension Capacity	Tension Capacity	
Capacity	Control	Capacity	Control	Member	Status	Load		Climb							
Unsup.	Criterion	(kips)	Criterion	ship (kips)		(ft)		(kips)	(kips)	(kips)	(kips)		(kips)	(kips)	
(kips)		(kips)				(lbs)			(deg)	(deg)					
1P	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180						
1X	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270						
1XY	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0						
1Y	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90						
2P	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180						
2X	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270						
2XY	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0						
2Y	1	49.257	L/r	47.340	Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90						
3P	1	32.813	L/r	36.400	Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180						
3X	1	32.813	L/r	36.400	Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270						
3XY	1	32.813	L/r	36.400	Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0						
3Y	1	32.813	L/r	36.400	Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90						
4P	2	91.206	L/r	97.650	Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180						
4X	2	91.206	L/r	97.650	Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270						
4XY	2	91.206	L/r	97.650	Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0						
4Y	2	91.206	L/r	97.650	Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90						
5P	2	99.083	L/r	97.650	Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180						
5X	2	99.083	L/r	97.650	Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270						
5XY	2	99.083	L/r	97.650	Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0						
5Y	2	99.083	L/r	97.650	Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90						
6P	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180						
6X	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270						

6XY	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0							
6Y	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90							
7P	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180							
7X	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-270							
7XY	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0							
7Y	3	249.636	L/r	231.750	Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-90							
8P	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
8X	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
8XY	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
8Y	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
9P	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
9X	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
9XY	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
9Y	4	306.646	L/r	286.897	Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
10P	4	291.200	Shear	286.897	Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
10X	4	291.200	Shear	286.897	Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
10XY	4	291.200	Shear	286.897	Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
10Y	4	291.200	Shear	286.897	Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
11P	5	335.162	L/r	330.839	Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
11X	5	335.162	L/r	330.839	Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
11XY	5	335.162	L/r	330.839	Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
11Y	5	335.162	L/r	330.839	Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
12P	5	364.000	Shear	330.839	Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
12X	5	364.000	Shear	330.839	Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
12XY	5	364.000	Shear	330.839	Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
12Y	5	364.000	Shear	330.839	Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
13P	5	364.000	Shear	330.839	Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
13X	5	364.000	Shear	330.839	Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	-136.184							
13XY	5	364.000	Shear	330.839	Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	226.184							
13Y	5	364.000	Shear	330.839	Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000	0.000

0.000		0.000		Automatic	Automatic		0.000		0	-136.184								
	14P	5	364.000	Shear	330.839	Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	226.184								
	14X	5	364.000	Shear	330.839	Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	-136.184								
	14XY	5	364.000	Shear	330.839	Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	226.184								
	14Y	5	364.000	Shear	330.839	Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	-136.184								
	15AP	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	15AX	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	15AXY	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	15AY	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	15BP	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	15BX	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	270								
	15BXY	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	15BY	6R	27.187	Bearing	24.084	Rupture	84	10.82	31.115	33.600	27.187	32.987	24.084	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	270								
	16AP	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
RDis, not RBsh.																		
	16AX	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
RDis, not RBsh.																		
	16AXY	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
RDis, not RBsh.																		
	16AY	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
RDis, not RBsh.																		
	16BP	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
RDis, not RBsh.																		
	16BX	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	270								
RDis, not RBsh.																		
	16BXY	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
RDis, not RBsh.																		
	16BY	7	14.303	L/r	18.125	Rupture	130	9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	270								
RDis, not RBsh.																		
	17AP	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	17AX	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	17AXY	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	17AY	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								
	17BP	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000		
0.000		0.000		Automatic	Automatic		0.000		0	180								

17BX	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270							
17BXY	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
17BY	8	39.613	L/r	44.185	Net Sect	100	10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270							
18AP	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180	Rupture capacity for member "18AP" controlled by RDis, not RBsh.						
18AX	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180	Rupture capacity for member "18AX" controlled by RDis, not RBsh.						
18AXY	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180	Rupture capacity for member "18AXY" controlled by RDis, not RBsh.						
18AY	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180	Rupture capacity for member "18AY" controlled by RDis, not RBsh.						
18BP	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180	Rupture capacity for member "18BP" controlled by RDis, not RBsh.						
18BX	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270	Rupture capacity for member "18BX" controlled by RDis, not RBsh.						
18BXY	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180	Rupture capacity for member "18BXY" controlled by RDis, not RBsh.						
18BY	9	32.738	L/r	36.400	Shear	104	8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270	Rupture capacity for member "18BY" controlled by RDis, not RBsh.						
19AP	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
19AX	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
19AXY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
19AY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
19BP	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
19BX	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270							
19BXY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
19BY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270							
20AP	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
20AX	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
20AXY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
20AY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
20BP	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	180							
20BX	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000
		0.000		Automatic	Automatic	0.000		0	270							
20BXY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000	0.000

0.000		0.000		Automatic	Automatic		0.000		0		180								
	20BY	10	61.204	L/r	59.307	Net Sect	78	9.22	61.204		63.700	118.945	59.307	74.976	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		270								
	21AP	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		167.706								
	21AX	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		186.648								
	21AXY	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		167.706								
	21AY	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		186.648								
	21BP	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		192.294								
	21BX	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		263.352								
	21BXY	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		192.294								
	21BY	11	44.335	L/r	45.178	Net Sect	96	10.60	44.335		54.600	81.562	45.178	46.012	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		263.352								
	22AP	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		259.492								
	22AX	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		190.508								
	22AXY	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		259.492								
	22AY	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		190.508								
	22BP	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		191.746								
	22BX	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		258.254								
	22BXY	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		191.746								
	22BY	12	30.985	L/r	36.400	Shear	126	12.25	30.985		36.400	54.375	40.581	42.206	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		258.254								
	23AP	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		260.229								
RDis, not RBsh.																			
	23AX	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		189.771								
RDis, not RBsh.																			
	23AXY	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		260.229								
RDis, not RBsh.																			
	23AY	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		189.771								
RDis, not RBsh.																			
	23BP	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		190.793								
RDis, not RBsh.																			
	23BX	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		259.207								
RDis, not RBsh.																			
	23BXY	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		190.793								
RDis, not RBsh.																			
	23BY	13	22.542	L/r	27.300	Shear	147	14.07	22.542		27.300	40.781	40.419	38.516	0.000		0.000		0.000
0.000		0.000		Automatic	Automatic		0.000		0		259.207								
RDis, not RBsh.																			

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      24AP     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   260.094                Rupture capacity for member "24AP" controlled by
RDis, not RBsh.
      24AX     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   189.906                Rupture capacity for member "24AX" controlled by
RDis, not RBsh.
     24AXY     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   260.094                Rupture capacity for member "24AXY" controlled by
RDis, not RBsh.
      24AY     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   189.906                Rupture capacity for member "24AY" controlled by
RDis, not RBsh.
      24BP     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   190.974                Rupture capacity for member "24BP" controlled by
RDis, not RBsh.
      24BX     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   259.026                Rupture capacity for member "24BX" controlled by
RDis, not RBsh.
     24BXY     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   190.974                Rupture capacity for member "24BXY" controlled by
RDis, not RBsh.
      24BY     14   21.431       L/r   27.300     Shear  174  17.45   21.431     27.300     40.781   40.581   36.250    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   259.026                Rupture capacity for member "24BY" controlled by
RDis, not RBsh.
      25AP     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   166.048
      25AX     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   194.307
     25AXY     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   166.048
      25AY     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   194.307
      25BP     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   253.939
      25BX     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   197.146
     25BXY     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   253.939
      25BY     15   33.799       L/r   36.268   Net Sect  128  14.10   33.799     63.700     95.156   36.268   72.037    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   197.146
      26AP     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   197.873                Rupture capacity for member "26AP" controlled by
RDis, not RBsh.
      26AX     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   251.905                Rupture capacity for member "26AX" controlled by
RDis, not RBsh.
     26AXY     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   197.873                Rupture capacity for member "26AXY" controlled by
RDis, not RBsh.
      26AY     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   251.905                Rupture capacity for member "26AY" controlled by
RDis, not RBsh.
      26BP     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   249.946                Rupture capacity for member "26BP" controlled by
RDis, not RBsh.
      26BX     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
0.000              0.000            Automatic Automatic    0.000         0   200.734                Rupture capacity for member "26BX" controlled by
RDis, not RBsh.
     26BXY     16    4.044       L/r   18.125    Rupture  257  16.85    4.044     18.200     20.391   18.448   18.125    0.000    0.000    0.000
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0.000 0.000 Automatic Automatic 0.000 0 249.946 Rupture capacity for member "26BXY" controlled by RDis, not RBsh.
26BY 16 4.044 L/r 18.125 Rupture 257 16.85 4.044 18.200 20.391 18.448 18.125 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 200.734 Rupture capacity for member "26BY" controlled by RDis, not RBsh.
27AP 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 194.13 Rupture capacity for member "27AP" controlled by RDis, not RBsh.
27AX 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 256.033 Rupture capacity for member "27AX" controlled by RDis, not RBsh.
27AXY 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 194.13 Rupture capacity for member "27AXY" controlled by RDis, not RBsh.
27AY 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 256.033 Rupture capacity for member "27AY" controlled by RDis, not RBsh.
27BP 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 191.908 Rupture capacity for member "27BP" controlled by RDis, not RBsh.
27BX 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 168.591 Rupture capacity for member "27BX" controlled by RDis, not RBsh.
27BXY 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 191.908 Rupture capacity for member "27BXY" controlled by RDis, not RBsh.
27BY 17 6.420 L/r 24.381 Net Sect 265 19.19 6.420 36.400 54.375 24.381 48.333 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 168.591 Rupture capacity for member "27BY" controlled by RDis, not RBsh.
28AP 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 226.044
28AX 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 315.01
28AXY 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 226.044
28AY 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 315.01
28BP 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 226.26
28BX 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 223.519
28BXY 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 312.376
28BY 18 11.489 L/r 45.500 Shear 205 15.32 11.489 45.500 67.969 47.101 60.337 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 227.242
29AP 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 198.174
29AX 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 251.894
29AXY 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 198.174
29AY 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 251.894
29BP 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 195.872
29BX 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 164.336
29BXY 19 25.652 L/r 44.469 Net Sect 136 28.52 25.652 45.500 67.969 44.469 50.906 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 195.872

29BY	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000	0.000	0.000	0.000
30AP	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
30AY	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
30BP	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
30BX	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
31P	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
31Y	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
32P	20	4.027	L/r	7.017	Rupture	210	6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000	0.000	0.000	0.000
32X	20	4.027	L/r	7.017	Rupture	210	6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000	0.000	0.000	0.000
33P	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
33Y	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
34P	20	4.027	L/r	7.017	Rupture	210	6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000	0.000	0.000	0.000
34X	20	4.027	L/r	7.017	Rupture	210	6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000	0.000	0.000	0.000
35P	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
35Y	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	0.000	0.000	0.000
36P	36	16.800	Shear	14.864	Rupture	134	6.00	19.743	16.800	20.391	31.823	14.864	0.000	0.000	0.000	0.000	0.000	0.000
36X	36	16.800	Shear	14.864	Rupture	134	6.00	19.743	16.800	20.391	31.823	14.864	0.000	0.000	0.000	0.000	0.000	0.000
37AP	21	27.300	Shear	27.300	Shear	149	15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
37AY	21	27.300	Shear	27.300	Shear	149	15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
37BP	21	27.300	Shear	27.300	Shear	149	15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
37BX	21	27.300	Shear	27.300	Shear	149	15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
38AP	22	11.503	L/r	18.125	Rupture	193	9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
38AX	22	11.503	L/r	18.125	Rupture	193	9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
38AXY	22	11.503	L/r	18.125	Rupture	193	9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
38AY	22	11.503	L/r	18.125	Rupture	193	9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	0.000	0.000	0.000
RDis, not RBsh.																		
38BP	22	11.503	L/r	18.125	Rupture	193	9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	0.000	0.000	0.000

0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "38BP" controlled by RDis, not RBsh.
38BX 22 11.503 L/r 18.125 Rupture 193 9.57 11.503 18.200 20.391 30.760 18.125 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 261.907 Rupture capacity for member "38BX" controlled by RDis, not RBsh.
38BXY 22 11.503 L/r 18.125 Rupture 193 9.57 11.503 18.200 20.391 30.760 18.125 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "38BXY" controlled by RDis, not RBsh.
38BY 22 11.503 L/r 18.125 Rupture 193 9.57 11.503 18.200 20.391 30.760 18.125 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 261.907 Rupture capacity for member "38BY" controlled by RDis, not RBsh.
39AP 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.434 Rupture capacity for member "39AP" controlled by RDis, not RBsh.
39AX 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.434 Rupture capacity for member "39AX" controlled by RDis, not RBsh.
39AXY 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.434 Rupture capacity for member "39AXY" controlled by RDis, not RBsh.
39AY 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.434 Rupture capacity for member "39AY" controlled by RDis, not RBsh.
39BP 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "39BP" controlled by RDis, not RBsh.
39BX 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "39BX" controlled by RDis, not RBsh.
39BXY 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "39BXY" controlled by RDis, not RBsh.
39BY 23 18.200 Shear 18.200 Shear 173 9.56 21.560 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "39BY" controlled by RDis, not RBsh.
39C1P 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.434 Rupture capacity for member "39C1P" controlled by RDis, not RBsh.
39C1Y 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 171.566 Rupture capacity for member "39C1Y" controlled by RDis, not RBsh.
F39C197P 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.434 Rupture capacity for member "F39C197P" controlled by RDis, not RBsh.
F39C197Y 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 171.566 Rupture capacity for member "F39C197Y" controlled by RDis, not RBsh.
39C2P 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "39C2P" controlled by RDis, not RBsh.
39C2X 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 171.907 Rupture capacity for member "39C2X" controlled by RDis, not RBsh.
F39C2118P 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 188.093 Rupture capacity for member "F39C2118P" controlled by RDis, not RBsh.
F39C2118X 23 18.200 Shear 18.200 Shear 62 2.21 44.853 18.200 27.187 40.581 24.167 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 171.907 Rupture capacity for member "F39C2118X" controlled by RDis, not RBsh.

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       40P     24   13.386       L/r   18.200     Shear  234  13.53   13.386     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   185.986                Rupture capacity for member "40P" controlled by
RDis, not RBsh.
       40X     24   13.386       L/r   18.200     Shear  234  13.53   13.386     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   258.158                Rupture capacity for member "40X" controlled by
RDis, not RBsh.
      40XY     24   13.386       L/r   18.200     Shear  234  13.53   13.386     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   185.986             Rupture capacity for member "40XY" controlled by
RDis, not RBsh.
       40Y     24   13.386       L/r   18.200     Shear  234  13.53   13.386     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   258.158                Rupture capacity for member "40Y" controlled by
RDis, not RBsh.
       41P     24   13.399       L/r   18.200     Shear  234  13.52   13.399     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   185.985                Rupture capacity for member "41P" controlled by
RDis, not RBsh.
       41X     24   13.399       L/r   18.200     Shear  234  13.52   13.399     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   174.015                Rupture capacity for member "41X" controlled by
RDis, not RBsh.
      41XY     24   13.399       L/r   18.200     Shear  234  13.52   13.399     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   185.985             Rupture capacity for member "41XY" controlled by
RDis, not RBsh.
       41Y     24   13.399       L/r   18.200     Shear  234  13.52   13.399     18.200     27.187   48.681   25.677    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   174.015                Rupture capacity for member "41Y" controlled by
RDis, not RBsh.
       42P AngleR    9.100     Shear    8.812   Rupture  130   4.24   15.869      9.100     13.594   24.381    8.812    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       42X AngleR    9.100     Shear    8.812   Rupture  130   4.24   15.869      9.100     13.594   24.381    8.812    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
      42XY AngleR    9.100     Shear    8.812   Rupture  130   4.24   15.869      9.100     13.594   24.381    8.812    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270
       42Y AngleR    9.100     Shear    8.812   Rupture  130   4.24   15.869      9.100     13.594   24.381    8.812    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       43AP     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       43AX     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
      43AXY     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270
       43AY     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       43BP     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       43BX     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
      43BXY     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270
       43BY     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       43CP     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       43CX     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
      43CXY     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270
       43CY     26   12.587       L/r   12.347   Rupture  129   4.24   12.587     18.200     20.391   18.448   12.347    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
       44P     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270                Rupture capacity for member "44P" controlled by
RDis, not RBsh.
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       44Y     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44Y" controlled by
RDis, not RBsh.
      44AP     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44AP" controlled by
RDis, not RBsh.
      44AY     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44AY" controlled by
RDis, not RBsh.
      44BP     27   14.533       L/r   18.125   Rupture  128   9.13   14.533     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270                  Rupture capacity for member "44BP" controlled by
RDis, not RBsh.
      44BY     27   14.533       L/r   18.125   Rupture  128   9.13   14.533     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44BY" controlled by
RDis, not RBsh.
      44CP     27   14.533       L/r   18.125   Rupture  128   9.13   14.533     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270                  Rupture capacity for member "44CP" controlled by
RDis, not RBsh.
      44CY     27   14.533       L/r   18.125   Rupture  128   9.13   14.533     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44CY" controlled by
RDis, not RBsh.
      44DP     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270                  Rupture capacity for member "44DP" controlled by
RDis, not RBsh.
      44DY     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44DY" controlled by
RDis, not RBsh.
      44EP     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44EP" controlled by
RDis, not RBsh.
      44EY     27   16.678       L/r   18.125   Rupture  116   8.22   16.678     18.200     20.391   18.650   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "44EY" controlled by
RDis, not RBsh.
       45P     28   18.200      Shear   18.200     Shear  111   6.00   35.407     18.200     27.187   40.581   24.167    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "45P" controlled by
RDis, not RBsh.
      45AP     28   18.200      Shear   18.200     Shear  111   6.00   35.407     18.200     27.187   40.581   24.167    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "45AP" controlled by
RDis, not RBsh.
      45BP     28   18.200      Shear   18.200     Shear  111   6.00   35.407     18.200     27.187   40.581   24.167    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180                  Rupture capacity for member "45BP" controlled by
RDis, not RBsh.
       46P     29    7.736       L/r   12.755   Rupture  202  14.78    7.736     18.200     20.391   18.529   12.755    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   266.198
       46X     29    7.736       L/r   12.755   Rupture  202  14.78    7.736     18.200     20.391   18.529   12.755    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   183.802
      46XY     29    7.736       L/r   12.755   Rupture  202  14.78    7.736     18.200     20.391   18.529   12.755    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   266.198
       46Y     29    7.736       L/r   12.755   Rupture  202  14.78    7.736     18.200     20.391   18.529   12.755    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   183.802
       47P     30    5.767       L/r   12.755   Rupture  201  13.25    5.767     18.200     20.391   18.650   12.755    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       270
       47Y     30    5.767       L/r   12.755   Rupture  201  13.25    5.767     18.200     20.391   18.650   12.755    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0       180
      47AP     30    5.486       L/r   14.386   Rupture  206  13.59    5.486     18.200     20.391   18.650   14.386    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   277.824
      47AY     30    5.486       L/r   14.386   Rupture  206  13.59    5.486     18.200     20.391   18.650   14.386    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000         0   172.176
       48P     31    8.465       L/r   18.125   Rupture  192  15.02    8.465     18.200     20.391   30.760   18.125    0.000    0.000    0.000
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0.000              0.000          Automatic Automatic    0.000        0       270                Rupture capacity for member "48P" controlled by
RDis, not RBsh.
       48Y     31    8.465       L/r   18.125   Rupture  192  15.02    8.465     18.200     20.391   30.760   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180                Rupture capacity for member "48Y" controlled by
RDis, not RBsh.
      48AP     31    8.140       L/r   13.978   Rupture  196  15.32    8.140     18.200     20.391   30.760   13.978    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   274.925
      48AY     31    8.140       L/r   13.978   Rupture  196  15.32    8.140     18.200     20.391   30.760   13.978    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   175.075
       49P     30    5.767       L/r   13.162   Rupture  201  13.25    5.767     18.200     20.391   18.650   13.162    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270
       49Y     30    5.767       L/r   13.162   Rupture  201  13.25    5.767     18.200     20.391   18.650   13.162    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180
      49AP     30    5.486       L/r   13.978   Rupture  206  13.59    5.486     18.200     20.391   18.650   13.978    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   277.824
      49AY     30    5.486       L/r   13.978   Rupture  206  13.59    5.486     18.200     20.391   18.650   13.978    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   172.176
       50P     32   18.200     Shear   18.125   Rupture  143  14.07   21.867     18.200     27.187   36.997   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270                Rupture capacity for member "50P" controlled by
RDis, not RBsh.
       50X     32   18.200     Shear   18.125   Rupture  143  14.07   21.867     18.200     27.187   36.997   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180                Rupture capacity for member "50X" controlled by
RDis, not RBsh.
      50XY     32   18.200     Shear   18.125   Rupture  143  14.07   21.867     18.200     27.187   36.997   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270             Rupture capacity for member "50XY" controlled by
RDis, not RBsh.
       50Y     32   18.200     Shear   18.125   Rupture  143  14.07   21.867     18.200     27.187   36.997   18.125    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180                Rupture capacity for member "50Y" controlled by
RDis, not RBsh.
      50AP     32   18.200     Shear   18.200     Shear  122   6.00   27.975     18.200     27.187   38.758   21.146    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180             Rupture capacity for member "50AP" controlled by
RDis, not RBsh.
      50AY     32   18.200     Shear   18.200     Shear  122   6.00   27.975     18.200     27.187   38.758   21.146    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270             Rupture capacity for member "50AY" controlled by
RDis, not RBsh.
       51P     33   32.661       L/r   32.886  Net Sect  111  11.64   32.661     36.400     54.375   32.886   42.647    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270                Rupture capacity for member "51P" controlled by
RDis, not RBsh.
       51Y     33   32.661       L/r   32.886  Net Sect  111  11.64   32.661     36.400     54.375   32.886   42.647    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180                Rupture capacity for member "51Y" controlled by
RDis, not RBsh.
      51AP     33   31.965       L/r   36.400     Shear  114   6.00   31.965     36.400     54.375   37.138   42.647    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180             Rupture capacity for member "51AP" controlled by
RDis, not RBsh.
      51AY     33   31.965       L/r   36.400     Shear  114   6.00   31.965     36.400     54.375   37.138   42.647    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270             Rupture capacity for member "51AY" controlled by
RDis, not RBsh.
      51BP     33   27.300     Shear   27.300     Shear  107   5.62   33.416     27.300     40.781   33.736   31.985    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270             Rupture capacity for member "51BP" controlled by
RDis, not RBsh.
      51BY     33   27.300     Shear   27.300     Shear  107   5.62   33.416     27.300     40.781   33.736   31.985    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180             Rupture capacity for member "51BY" controlled by
RDis, not RBsh.
      51CP     33   27.300     Shear   27.300     Shear  107   5.63   33.416     27.300     40.781   37.786   31.985    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270             Rupture capacity for member "51CP" controlled by
RDis, not RBsh.
      51CY     33   27.300     Shear   27.300     Shear  107   5.63   33.416     27.300     40.781   37.786   31.985    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180             Rupture capacity for member "51CY" controlled by
RDis, not RBsh.
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52P	34	41.627	L/r	45.500	Shear	106	14.07	41.627	45.500	67.969	46.393	48.262	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
52Y	34	41.627	L/r	45.500	Shear	106	14.07	41.627	45.500	67.969	46.393	48.262	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
52AP	34	45.317	L/r	35.539	Rupture	91	6.00	45.317	45.500	67.969	51.799	35.539	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "52AP" controlled by RDis, not RBsh.																		
52AY	34	45.317	L/r	35.539	Rupture	91	6.00	45.317	45.500	67.969	51.799	35.539	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "52AY" controlled by RDis, not RBsh.																		
52BP	34	42.220	L/r	45.500	Shear	104	6.88	42.220	45.500	67.969	50.706	71.078	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "52BP" controlled by RDis, not RBsh.																		
52BY	34	42.220	L/r	45.500	Shear	104	6.88	42.220	45.500	67.969	50.706	71.078	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "52BY" controlled by RDis, not RBsh.																		
52CP	34	42.220	L/r	46.696	Net Sect	104	6.88	42.220	54.600	81.562	46.696	63.970	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "52CP" controlled by RDis, not RBsh.																		
52CY	34	42.220	L/r	46.696	Net Sect	104	6.88	42.220	54.600	81.562	46.696	63.970	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "52CY" controlled by RDis, not RBsh.																		
53P	33	32.661	L/r	32.886	Net Sect	111	11.64	32.661	36.400	54.375	32.886	42.647	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "53P" controlled by RDis, not RBsh.																		
53Y	33	32.661	L/r	32.886	Net Sect	111	11.64	32.661	36.400	54.375	32.886	42.647	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "53Y" controlled by RDis, not RBsh.																		
53AP	33	31.965	L/r	36.400	Shear	114	6.00	31.965	36.400	54.375	40.419	42.647	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "53AP" controlled by RDis, not RBsh.																		
53AY	33	31.965	L/r	36.400	Shear	114	6.00	31.965	36.400	54.375	40.419	42.647	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "53AY" controlled by RDis, not RBsh.																		
53BP	33	27.300	Shear	27.300	Shear	107	5.62	33.416	27.300	40.781	34.344	31.985	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "53BP" controlled by RDis, not RBsh.																		
53BY	33	27.300	Shear	27.300	Shear	107	5.62	33.416	27.300	40.781	34.344	31.985	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "53BY" controlled by RDis, not RBsh.																		
53CP	33	33.416	L/r	36.400	Shear	107	5.63	33.416	36.400	54.375	37.118	42.647	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "53CP" controlled by RDis, not RBsh.																		
53CY	33	33.416	L/r	36.400	Shear	107	5.63	33.416	36.400	54.375	37.118	42.647	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "53CY" controlled by RDis, not RBsh.																		
54P	35	8.154	L/r	9.100	Shear	169	6.00	8.154	9.100	10.195	21.688	9.629	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	180								
Rupture capacity for member "54P" controlled by RDis, not RBsh.																		
54X	35	8.154	L/r	9.100	Shear	169	6.00	8.154	9.100	10.195	21.688	9.629	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	270								
Rupture capacity for member "54X" controlled by RDis, not RBsh.																		
g99P	Pwmnt	437.242	L/r	571.199	Net Sect	80	29.25	437.242	0.000	0.000	571.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	0								
g100P	Pwmnt	535.971	L/r	571.199	Net Sect	41	15.00	535.971	0.000	0.000	571.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	0								
g101P	Pwmnt	260.146	L/r	571.199	Net Sect	122	44.75	260.146	0.000	0.000	571.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Automatic Automatic								0.000	0	0								
g102P	Pwmnt	540.511	L/r	571.199	Net Sect	38	14.00	540.511	0.000	0.000	571.199	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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0.000              0.000          Automatic Automatic    0.000        0         0
     g103P  Pwmnt  540.511       L/r  571.199  Net Sect   38  14.00  540.511      0.000      0.000  571.199    0.000    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0         0
     g104P  Pwmnt  531.117       L/r  571.199  Net Sect   44  16.00  531.117      0.000      0.000  571.199    0.000    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0         0
     g105P  Pwmnt  565.563       L/r  571.199  Net Sect   16   6.00  565.563      0.000      0.000  571.199    0.000    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0         0
     g106P  Plate   16.800     Shear   16.800     Shear   83   1.50  109.423     16.800     40.781  129.094   45.312    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180              Rupture capacity for member "g106P" controlled by
RDis, not RBsh.
     g107P  PMBR1   10.195   Bearing   10.195   Bearing   46   1.50   20.042     16.800     10.195   18.827   10.343    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180
     g108P  PMBR1   10.195   Bearing   10.195   Bearing   46   1.50   20.044     16.800     10.195   18.827   10.343    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180
     g109P  PMBR1   10.195   Bearing   10.195   Bearing   46   1.50   20.044     16.800     10.195   18.827   10.343    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180
     g110P BraceR   16.312   Bearing   12.083   Rupture   82   3.35   29.101     23.900     16.312   31.468   12.083    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   179.573              Rupture capacity for member "g110P" controlled by
RDis, not RBsh.
     g110X BraceR   16.312   Bearing   12.083   Rupture   82   3.35   29.101     23.900     16.312   31.468   12.083    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   270.427              Rupture capacity for member "g110X" controlled by
RDis, not RBsh.
     g111P  PMBR2   10.195   Bearing   10.195   Bearing   81   3.35   22.126     16.800     10.195   25.048   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   179.573              Rupture capacity for member "g111P" controlled by
RDis, not RBsh.
     g111X  PMBR2   10.195   Bearing   10.195   Bearing   81   3.35   22.126     16.800     10.195   25.048   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   270.427              Rupture capacity for member "g111X" controlled by
RDis, not RBsh.
     g112P  PMBR2   10.195   Bearing   10.195   Bearing   81   3.35   22.127     16.800     10.195   25.048   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180              Rupture capacity for member "g112P" controlled by
RDis, not RBsh.
     g112X  PMBR2   10.195   Bearing   10.195   Bearing   81   3.35   22.127     16.800     10.195   25.048   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270              Rupture capacity for member "g112X" controlled by
RDis, not RBsh.
     g113P  PMBR2   10.195   Bearing   10.195   Bearing   81   3.35   22.127     16.800     10.195   25.048   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180              Rupture capacity for member "g113P" controlled by
RDis, not RBsh.
     g113X  PMBR2   10.195   Bearing   10.195   Bearing   81   3.35   22.127     16.800     10.195   25.048   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       270              Rupture capacity for member "g113X" controlled by
RDis, not RBsh.
     g114P  PMBR3   10.195   Bearing   10.195   Bearing  162   8.07   11.823     16.800     10.195   31.139   11.328    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0    184.24              Rupture capacity for member "g114P" controlled by
RDis, not RBsh.
     g115P  PMBR4   13.207       L/r   13.594   Bearing  191  11.07   13.207     16.800     13.594   49.187   15.104    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0    184.24              Rupture capacity for member "g115P" controlled by
RDis, not RBsh.
     g116P  PMBR4   13.594   Bearing   13.594   Bearing  167   9.68   17.249     16.800     13.594   49.187   15.104    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   194.546              Rupture capacity for member "g116P" controlled by
RDis, not RBsh.
     g116X  PMBR4   13.594   Bearing   13.594   Bearing  167   9.68   17.249     16.800     13.594   49.187   15.104    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0   166.125              Rupture capacity for member "g116X" controlled by
RDis, not RBsh.
     g117P  PMBR4   13.594   Bearing   13.594   Bearing  178  10.27   15.339     16.800     13.594   49.187   15.104    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180              Rupture capacity for member "g117P" controlled by
RDis, not RBsh.
     g118P  PMBR5   13.594   Bearing   13.594   Bearing  200  13.27   13.840     16.800     13.594   57.287   15.104    0.000    0.000    0.000
0.000              0.000          Automatic Automatic    0.000        0       180              KL/R value of 200.30 exceeds maximum of 200.00 for
member "g118P"  ??
     g120P  PMBR5   13.594   Bearing   13.594   Bearing  186  12.34   16.004     16.800     13.594   57.287   15.104    0.000    0.000    0.000
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0.000 0.000 Automatic Automatic 0.000 0 177.227 Rupture capacity for member "g120P" controlled by RDis, not RBsh.
g120X PMBR5 13.594 Bearing 13.594 Bearing 186 12.34 16.004 16.800 13.594 57.287 15.104 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 182.273 Rupture capacity for member "g120X" controlled by RDis, not RBsh.
g121P Pwmnt 558.517 L/r 571.199 Net Sect 25 9.00 558.517 0.000 0.000 571.199 0.000 0.000 0.000 0.000
0.000 0.000 Automatic Automatic 0.000 0 0

The model contains 335 angle members.

Sum of Unfactored Dead Load and Drag Areas From Equipment, Input and Calculated:

Joint Label	Dead Load (kips)	X-Drag Area (ft^2)	Y-Drag Area (ft^2)
1P	0.128	5.752	4.127
2P	0.0615	3.558	2.426
3P	0.128	7.249	6.224
4P	0.218	10.789	8.992
5P	0.222	10.953	9.482
6P	0.326	12.528	10.018
7P	0.352	11.891	10.866
8P	0.438	14.553	13.193
15P	0.651	16.233	16.233
16P	0.114	7.054	2.102
17P	0.0621	2.786	2.354
18P	0.0805	3.740	2.381
19P	0.0621	2.786	2.354
20AP	0.39	20.837	17.520
20BP	0.403	17.907	21.056
21P	0.22	11.891	8.870
22P	0.22	8.870	11.891
23P	0.1	6.042	2.462
24P	0.15	8.339	2.688
25P	0.1	6.042	2.462
26P	0.053	2.813	1.250
27P	0.0705	3.724	1.250
28P	0.053	2.813	1.250
29P	0.725	15.539	15.539
30P	1.25	27.431	28.453
31P	1.59	34.533	34.802
32P	1.47	31.836	31.648
33P	0.707	15.500	15.312
34P	0.756	16.567	16.375
35P	0.571	12.325	12.375
36P	0.372	7.969	7.969
37P	0.223	4.781	4.781
1X	0.128	5.752	4.127
1XY	0.122	5.439	3.970
1Y	0.122	5.439	3.970
2X	0.0615	3.558	2.426
2XY	0.0615	3.558	2.426
2Y	0.0615	3.558	2.426
3X	0.128	7.249	6.160
3XY	0.128	7.249	6.160
3Y	0.128	7.249	6.224
4X	0.213	10.554	9.179
4XY	0.208	10.242	9.023

4Y	0.213	10.476	8.835
5X	0.222	10.953	9.394
5XY	0.222	10.953	9.394
5Y	0.222	10.953	9.482
6X	0.315	12.098	10.143
6XY	0.31	11.786	9.986
6Y	0.321	12.216	9.861
7X	0.351	11.891	10.802
7XY	0.351	11.891	10.802
7Y	0.352	11.891	10.866
8X	0.433	14.318	13.381
8XY	0.427	14.006	13.224
8Y	0.432	14.240	13.037
15X	0.651	16.233	16.233
15XY	0.651	16.233	16.233
15Y	0.651	16.233	16.233
16X	0.114	7.054	2.102
17Y	0.0621	2.786	2.354
18Y	0.0805	3.740	2.381
19Y	0.0621	2.786	2.354
20AY	0.407	20.837	18.125
20BX	0.403	17.907	21.056
21X	0.22	11.891	8.870
21XY	0.22	11.891	8.870
21Y	0.22	11.891	8.870
22X	0.22	8.870	11.891
22XY	0.261	10.831	12.509
22Y	0.261	10.831	12.509
26Y	0.053	2.813	1.250
27Y	0.0705	3.724	1.250
28Y	0.053	2.813	1.250
9S	0.404	12.387	12.387
10S	0.406	11.747	11.747
11S	0.518	14.852	14.852
12S	0.733	20.933	20.933
13S	0.605	12.807	12.807
14S	0.936	19.747	19.747
i0.50E129S	0.0385	1.012	1.375
i0.50E113S	0.0225	1.004	1.125
i0.50E99S	0.0225	1.000	1.125
i0.50E85S	0.0225	1.000	1.125
21XF0.50S	0.0444	0.920	1.498
22PF0.50S	0.0146	0.000	0.920
9X	0.404	12.387	12.387
9XY	0.404	12.387	12.387
9Y	0.404	12.387	12.387
10X	0.406	11.747	11.747
10XY	0.406	11.747	11.747
10Y	0.406	11.747	11.747
11X	0.518	14.852	14.852
11XY	0.518	14.852	14.852
11Y	0.518	14.852	14.852
12X	0.733	20.933	20.933
12XY	0.733	20.933	20.933
12Y	0.733	20.933	20.933
13X	0.605	12.807	12.807
13XY	0.605	12.807	12.807
13Y	0.605	12.807	12.807
14X	0.936	19.747	19.747

14XY	0.936	19.747	19.747
14Y	0.936	19.747	19.747
21XF0.50Y	0.0584	0.920	2.212
22PF0.50X	0.0146	0.000	0.920
Total	37.1	1148.254	1068.534

Unadjusted Dead Load and Drag Areas by Section:

Section Label	Unfactored Dead Load (kips)	X-Drag Area All (ft^2)	Y-Drag Area All (ft^2)	X-Drag Area Face (ft^2)	Y-Drag Area Face (ft^2)
1	11.026	420.113	337.810	139.781	139.112
2	26.071	728.141	730.724	227.007	321.570
Total	37.096	1148.254	1068.534	366.789	460.682

Angle Member Weights and Surface Areas by Section:

Section Label	Unfactored Weight (kips)	Factored Weight (kips)	Unfactored Surface Area (ft^2)	Factored Surface Area (ft^2)
1	11.026	11.026	1715.817	1715.817
2	26.071	27.374	3034.480	3186.204
Total	37.096	38.400	4750.297	4902.021

Section Joint Information:

Section Label	Joint Label	Joint Elevation (ft)
1	1P	128.800
1	2P	124.300
1	1X	128.800
1	2X	124.300
1	1XY	128.800
1	2XY	124.300
1	1Y	128.800
1	2Y	124.300
1	3P	119.800
1	3X	119.800
1	3XY	119.800
1	3Y	119.800
1	4P	112.800
1	4X	112.800
1	4XY	112.800
1	4Y	112.800
1	5P	104.800
1	5X	104.800
1	5XY	104.800
1	5Y	104.800
1	6P	98.750
1	6X	98.750
1	6XY	98.750
1	6Y	98.750
1	7P	91.750
1	7X	91.750
1	7XY	91.750

1	7Y	91.750
1	8P	84.750
1	8X	84.750
1	8XY	84.750
1	8Y	84.750
1	i0.50E129S	128.800
1	i0.50E113S	112.800
1	i0.50E99S	98.750
1	i0.50E85S	84.750
1	28Y	84.750
1	28P	84.750
1	19Y	84.750
1	19P	84.750
1	27Y	98.750
1	27P	98.750
1	18Y	98.750
1	18P	98.750
1	26Y	112.800
1	26P	112.800
1	17Y	112.800
1	17P	112.800
1	16P	128.800
1	16X	128.800
1	23P	112.800
1	24P	98.750
1	25P	84.750
1	32P	84.750
1	33P	98.750
1	34P	112.750
1	35P	128.750
1	36P	134.750
1	37P	143.750
2	8P	84.750
2	9S	77.000
2	8X	84.750
2	9X	77.000
2	8XY	84.750
2	9XY	77.000
2	8Y	84.750
2	9Y	77.000
2	10S	69.250
2	10X	69.250
2	10XY	69.250
2	10Y	69.250
2	11S	61.500
2	11X	61.500
2	11XY	61.500
2	11Y	61.500
2	12S	51.580
2	12X	51.580
2	12XY	51.580
2	12Y	51.580
2	13S	40.000
2	13X	40.000
2	13XY	40.000
2	13Y	40.000
2	14S	25.000
2	14X	25.000
2	14XY	25.000

2	14Y	25.000
2	15P	0.000
2	15X	0.000
2	15XY	0.000
2	15Y	0.000
2	20AP	40.000
2	20AY	40.000
2	20BP	40.000
2	20BX	40.000
2	21P	25.000
2	21X	25.000
2	21XY	25.000
2	21Y	25.000
2	22P	25.000
2	22X	25.000
2	22XY	25.000
2	22Y	25.000
2	21XF0.50S	25.000
2	21XF0.50Y	25.000
2	22PF0.50S	25.000
2	22PF0.50X	25.000
2	29P	-4.250
2	30P	25.000
2	31P	40.000
2	32P	84.750

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)	CoG X (ft)	CoG Y (ft)	CoG Z (ft)	
1	143.750	84.750	59	188	0.00	6.00	309.150	0.00	28.50	817.275	0.419	-0.359	106.089	Problem calculating gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??
2	84.750	-4.250	52	147	6.00	0.00	1226.814	6.00	0.00	1226.814	0.249	0.000	41.192	Problem calculating gross area of longitudinal face for section "2": width is zero at elevation 0.00 (ft) which is not the top of the section. ??

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)	Hardware Capacity (lbs)	Notes
C-EX1		5e+04	0	

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
1	16X	C-EX1	No Limit
2	16P	C-EX1	No Limit
3	17P	C-EX1	No Limit
4	17Y	C-EX1	No Limit
5	18P	C-EX1	No Limit

6	18Y	C-EX1	No Limit
7	19P	C-EX1	No Limit
8	19Y	C-EX1	No Limit
9	23P	C-EX1	No Limit
10	24P	C-EX1	No Limit
11	25P	C-EX1	No Limit
12	2Y	C-EX1	No Limit
13	4Y	C-EX1	No Limit
14	6Y	C-EX1	No Limit
15	8Y	C-EX1	No Limit
16	10Y	C-EX1	No Limit
17	12Y	C-EX1	No Limit
18	13Y	C-EX1	No Limit
19	14Y	C-EX1	No Limit
20	30P	C-EX1	No Limit
21	31P	C-EX1	No Limit
22	32P	C-EX1	No Limit
23	33P	C-EX1	No Limit
24	34P	C-EX1	No Limit
25	35P	C-EX1	No Limit
26	36P	C-EX1	No Limit
27	37P	C-EX1	No Limit
28	10XY	C-EX1	No Limit
29	12XY	C-EX1	No Limit
30	13XY	C-EX1	No Limit
31	14XY	C-EX1	No Limit

*** Loads Data

Loads from file: J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Backup Documentation\Rev (10)\Calcs\PLS Tower\cl&p # 1281.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):

Z of ground for wind height adjust	0.00 (ft)	and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.
Ground elevation shift	0.00 (ft)	
Z of ground with shift	0.00 (ft)	
Z of structure top (highest joint)	143.75 (ft)	
Structure height	148.00 (ft)	
Structure height above ground	143.75 (ft)	
Tower Shape	Rectangular	

Load distributed evenly among joints in section for section based load cases

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Guys and Cables	SF for Insuls.	SF for Hardware	SF For Found.	SF For Climbing	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Joint Temperature Displ. (deg F)
NESC Heavy -	1.5000	2.5000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	21 loads	Wind on Face	-4	0	0.000	0.000	0.0
NESC Extreme -	1.0000	1.0000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	21 loads	NESC 2023	-31	0	0.000	0.000	0.0
NESC Heavy +	1.5000	2.5000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	21 loads	Wind on Face	4	0	0.000	0.000	0.0
NESC Extreme +	1.0000	1.0000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	21 loads	NESC 2023	31	0	0.000	0.000	0.0

Point Loads for Load Case "NESC Heavy -":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16X	1471	7147	-300	Shield Wire
16P	1101	8315	-2831	Shield Wire
19Y	98	6750	-6488	Conductor - Back
19P	2005	6704	8564	Conductor - Ahead
18Y	219	4988	-4885	Conductor - Back
18P	2962	8403	9006	Conductor - Ahead
17Y	173	5526	-5370	Conductor - Back
17P	3069	5279	8141	Conductor - Ahead
23P	1474	9738	-4108	Conductor
24P	1655	8348	-1020	Conductor

25P	1033	11680	-4571	Conductor
37P	7134	764	0	Dish Antennas
36P	7076	2384	0	Verizon Antennas
37P	168	0	0	Coax Cable on Powermount
36P	195	24	0	Coax Cable on Powermount
35P	260	32	0	Coax Cable on Powermount
34P	487	60	0	Coax Cable on Powermount
33P	455	56	0	Coax Cable on Powermount
32P	954	117	0	Coax Cable on Powermount
31P	971	119	0	Coax Cable on Powermount
30P	1056	129	0	Coax Cable on Powermount

Section Load Case Information (Standard) for "NESC Heavy -":

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	143.75	84.75	114.25	10.00	-10.00	3.200	-4451.6	0.00	3.200	0.0	0	16539
2	84.75	-4.25	40.25	10.00	-10.00	3.400	-10933.4	0.00	3.400	0.0	0	41061

Point Loads for Load Case "NESC Extreme -":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16X	761	3677	-592	Shield Wire
16P	580	4183	-1570	Shield Wire
19Y	-125	3801	-4139	Conductor - Back
19P	1025	2775	3942	Conductor - Ahead
18Y	-67	3116	-3532	Conductor - Back
18P	1480	3368	3999	Conductor - Ahead
17Y	-98	3406	-3805	Conductor - Back
17P	1648	2197	3881	Conductor - Ahead
23P	839	5538	-2388	Conductor
24P	870	4818	-1028	Conductor
25P	513	6089	-2291	Conductor
37P	3248	2832	0	Dish Antennas
36P	3392	9035	0	Verizon Antennas
37P	112	0	0	Coax Cable on Powermount
36P	94	52	0	Coax Cable on Powermount
35P	125	69	0	Coax Cable on Powermount
34P	234	130	0	Coax Cable on Powermount
33P	218	121	0	Coax Cable on Powermount
32P	458	254	0	Coax Cable on Powermount
31P	466	258	0	Coax Cable on Powermount
30P	507	281	0	Coax Cable on Powermount

Section Load Case Information (Code) for "NESC Extreme -":

Section Label	Z of Top	Z of Bottom	Ave. Elev. Above Ground	Res. Adj. Wind Pres.	Tran Adj. Wind Pres.	Tran Angle Face Area	Tran Round Face Area	Tran Gross Area	Tran Soli-dity Ratio	Tran Angle Drag Coef	Tran Round Drag Coef	Tran Wind Load	Long Adj. Wind Pres.	Long Angle Face Area	Long Round Face Area	Long Gross Area	Long Soli-dity Ratio	Long Angle Drag Coef	Long Round Drag Coef	Long Wind Load	Ice Weight	Total Weight
	Top	Bottom	Above Ground	Wind Pres.	Wind Pres.	Face Area	Face Area	Area	Ratio	Coef	Coef	Load	Pres.	Face Area	Face Area	Area	Ratio	Coef	Coef	Load		

	(ft)	(ft)	(ft)	(psf)	(psf)	(ft^2)	(ft^2)	(ft^2)				(lbs)	(psf)	(ft^2)	(ft^2)	(ft^2)				(lbs)	(lbs)	(lbs)
1	143.75	84.75	114.25	32.52	-32.52	76.42	62.69	309.15	0.450	3.200	2.000	-12028.4	0.00	139.78	0.00	817.27	0.171	3.200	2.000	0.0	0	11026
2	84.75	-4.25	40.25	32.52	-32.52	227.01	94.56	1226.81	0.262	3.200	2.000	-29769.0	0.00	227.01	0.00	1226.81	0.185	3.200	2.000	0.0	0	27374

Point Loads for Load Case "NESC Heavy +":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16X	1471	7665	-148	Shield Wire
16P	1101	8734	-2758	Shield Wire
19Y	98	7120	-6080	Conductor - Back
19P	2005	6978	8343	Conductor - Ahead
18Y	219	5360	-4474	Conductor - Back
18P	2962	8671	8748	Conductor - Ahead
17Y	173	5895	-4962	Conductor - Back
17P	3069	5592	7930	Conductor - Ahead
23P	1474	10294	-4007	Conductor
24P	1655	8927	-863	Conductor
25P	1033	12242	-4433	Conductor
37P	7134	764	0	Dish Antennas
36P	7076	2384	0	Verizon Antennas
37P	168	0	0	Coax Cable on Powermount
36P	195	24	0	Coax Cable on Powermount
35P	260	32	0	Coax Cable on Powermount
34P	487	60	0	Coax Cable on Powermount
33P	455	56	0	Coax Cable on Powermount
32P	954	117	0	Coax Cable on Powermount
31P	971	119	0	Coax Cable on Powermount
30P	1056	129	0	Coax Cable on Powermount

Section Load Case Information (Standard) for "NESC Heavy +":

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	143.75	84.75	114.25	10.00	10.00	3.200	4451.6	0.00	3.200	0.0	0	16539
2	84.75	-4.25	40.25	10.00	10.00	3.400	10933.4	0.00	3.400	0.0	0	41061

Point Loads for Load Case "NESC Extreme +":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16X	761	4417	-365	Shield Wire
16P	580	4763	-1458	Shield Wire
19Y	-125	4493	-3375	Conductor - Back
19P	1025	3276	3536	Conductor - Ahead
18Y	-67	3826	-2746	Conductor - Back

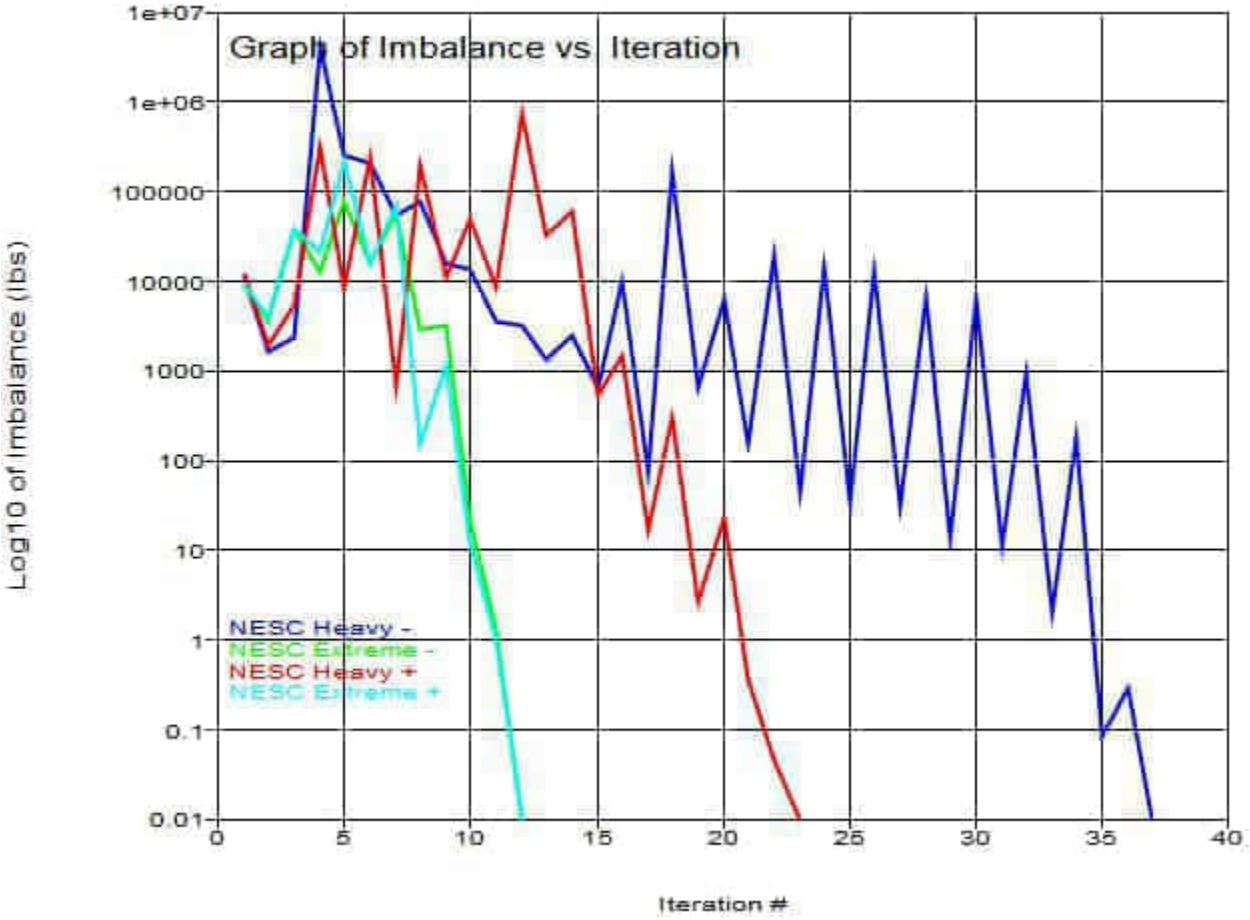
18P	1480	3865	3521	Conductor - Ahead
17Y	-98	4126	-3009	Conductor - Back
17P	1648	2785	3483	Conductor - Ahead
23P	839	6614	-2169	Conductor
24P	870	5921	-712	Conductor
25P	513	7137	-2021	Conductor
37P	3248	2832	0	Dish Antennas
36P	3392	9035	0	Verizon Antennas
37P	112	0	0	Coax Cable on Powermount
36P	94	52	0	Coax Cable on Powermount
35P	125	69	0	Coax Cable on Powermount
34P	234	130	0	Coax Cable on Powermount
33P	218	121	0	Coax Cable on Powermount
32P	458	254	0	Coax Cable on Powermount
31P	466	258	0	Coax Cable on Powermount
30P	507	281	0	Coax Cable on Powermount

Section Load Case Information (Code) for "NESC Extreme +":

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Angle Face Area (ft^2)	Tran Round Face Area (ft^2)	Tran Gross Area (ft^2)	Tran Soli-dity Ratio	Tran Angle Drag Coef	Tran Round Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Angle Face Area (ft^2)	Long Round Face Area (ft^2)	Long Gross Area (ft^2)	Long Soli-dity Ratio	Long Angle Drag Coef	Long Round Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	143.75	84.75	114.25	32.52	32.52	76.42	62.69	309.15	0.450	3.200	2.000	12028.4	0.00	139.78	0.00	817.27	0.171	3.200	2.000	0.0	0	11026
2	84.75	-4.25	40.25	32.52	32.52	227.01	94.56	1226.81	0.262	3.200	2.000	29769.0	0.00	227.01	0.00	1226.81	0.185	3.200	2.000	0.0	0	27374

*** Analysis Results:

Maximum element usage is 98.11% for Angle "3Y" in load case "NESC Extreme +"
Maximum insulator usage is 26.15% for Clamp "11" in load case "NESC Heavy +"



Angle Forces For All Load Cases:
Positive for tension - negative for compression

Group Label	Angle Label	Max. Usage For All LC %	Max. Tens. For All LC (kips)	Max. Comp. For All LC (kips)	LC 1 (kips)	LC 2 (kips)	LC 3 (kips)	LC 4 (kips)
1	1P	27.37	0.000	-13.483	-8.061	-10.681	-9.653	-13.483
1	1X	28.53	13.506	0.000	7.948	10.703	9.532	13.506
1	1XY	23.40	11.076	0.000	5.948	8.343	7.476	11.076
1	1Y	24.72	0.000	-12.177	-7.511	-9.615	-8.883	-12.177

1	2P	28.16	0.000	-13.869	-8.495	-11.056	-10.097	-13.869
1	2X	27.39	12.968	0.000	7.238	10.183	8.809	12.968
1	2XY	21.87	10.353	0.000	4.905	7.569	6.466	10.353
1	2Y	26.11	0.000	-12.861	-8.437	-10.333	-9.784	-12.861
1	3P	96.34	0.000	-31.612	-17.847	-23.893	-21.959	-31.612
1	3X	84.56	30.780	0.000	17.050	23.472	20.841	30.780
1	3XY	74.65	27.172	0.000	13.699	19.412	17.837	27.172
1	3Y	98.11	0.000	-32.194	-21.470	-25.147	-25.039	-32.194
2	4P	57.08	0.000	-52.059	-33.882	-36.043	-41.724	-52.059
2	4X	54.23	52.958	0.000	35.832	38.156	42.878	52.958
2	4XY	48.18	47.049	0.000	27.231	31.029	35.138	47.049
2	4Y	60.60	0.000	-55.275	-40.154	-40.809	-46.891	-55.275
2	5P	74.52	0.000	-73.836	-52.531	-47.938	-64.817	-73.836
2	5X	78.35	76.504	0.000	55.931	52.907	66.773	76.504
2	5XY	70.87	69.207	0.000	44.617	43.057	57.146	69.207
2	5Y	83.81	0.000	-83.038	-65.709	-59.656	-76.315	-83.038
3	6P	39.98	0.000	-99.808	-78.429	-61.010	-96.540	-99.808
3	6X	45.67	105.840	0.000	83.888	70.900	99.640	105.840
3	6XY	41.03	95.095	0.000	69.544	55.983	87.938	95.095
3	6Y	45.29	0.000	-113.052	-94.285	-78.252	-109.790	-113.052
3	7P	52.49	0.000	-131.036	-107.253	-75.285	-131.036	-126.553
3	7X	57.61	133.522	0.000	108.763	87.563	129.333	133.522
3	7XY	51.90	120.267	0.000	95.717	68.415	119.915	120.267
3	7Y	56.40	0.000	-140.805	-120.182	-94.819	-140.565	-140.805
4	8P	50.35	0.000	-154.396	-126.451	-80.387	-154.396	-141.524
4	8X	52.57	150.811	0.000	127.160	95.939	150.811	149.617
4	8XY	49.20	141.150	0.000	112.662	71.343	141.150	133.239
4	8Y	53.41	0.000	-163.766	-140.324	-104.384	-163.766	-158.300
4	9P	54.32	0.000	-166.581	-137.022	-80.559	-166.581	-147.222
4	9X	56.55	162.244	0.000	136.417	96.059	162.244	155.869
4	9XY	52.90	151.781	0.000	121.418	69.819	151.781	137.429
4	9Y	57.55	0.000	-176.466	-151.105	-105.737	-176.466	-165.850
4	10P	57.66	0.000	-167.911	-137.709	-75.575	-167.911	-144.850
4	10X	55.44	159.056	0.000	133.622	89.476	159.056	150.187
4	10XY	52.11	149.514	0.000	118.868	62.637	149.514	132.843
4	10Y	60.61	0.000	-176.491	-151.146	-100.965	-176.491	-162.139
5	11P	50.12	0.000	-167.977	-137.662	-72.074	-167.977	-143.924
5	11X	48.99	162.080	0.000	134.741	85.667	162.080	151.720
5	11XY	45.88	151.804	0.000	120.538	59.909	151.804	132.820
5	11Y	52.81	0.000	-176.983	-150.215	-96.048	-176.983	-162.488
5	12P	55.65	0.000	-202.551	-159.991	-71.650	-202.551	-164.655
5	12X	39.20	129.692	0.000	113.255	75.802	129.692	124.249
5	12XY	39.25	129.864	0.000	92.719	31.814	129.864	122.739
5	12Y	55.18	0.000	-200.866	-178.476	-113.382	-200.866	-165.656
5	13P	55.77	0.000	-203.019	-160.619	-73.517	-203.019	-167.924
5	13X	37.38	123.657	0.000	107.027	62.637	123.657	114.674
5	13XY	37.34	123.530	0.000	88.199	26.777	123.530	112.397
5	13Y	55.46	0.000	-201.871	-179.559	-114.198	-201.871	-172.538
5	14P	54.02	0.000	-196.619	-154.375	-76.853	-196.619	-168.359
5	14X	40.90	135.315	0.000	111.862	59.221	135.315	123.302
5	14XY	39.08	129.306	0.000	92.048	25.948	129.306	115.127
5	14Y	54.50	0.000	-198.394	-170.512	-108.364	-198.394	-172.968
6R	15AP	75.93	18.287	0.000	13.286	14.926	15.256	18.287
6R	15AX	63.51	0.000	-17.267	-11.236	-13.731	-13.364	-17.267
6R	15AXY	36.59	0.000	-9.949	-4.880	-7.327	-6.145	-9.949
6R	15AY	39.89	9.607	0.000	4.311	6.865	5.629	9.607
6R	15BP	20.29	4.887	0.000	4.531	4.356	4.887	4.842
6R	15BX	13.61	0.000	-3.700	-2.541	-2.910	-3.129	-3.700
6R	15BXY	6.69	1.611	0.000	1.337	0.998	1.611	1.109

6R	15BY	14.33	0.000	-3.895	-3.895	-2.720	-3.890	-2.475
7	16AP	76.93	13.944	0.000	8.358	10.266	10.126	13.944
7	16AX	95.03	0.000	-13.592	-7.766	-9.677	-9.727	-13.592
7	16AXY	72.18	0.000	-10.323	-5.154	-6.948	-6.583	-10.323
7	16AY	50.58	9.167	0.000	3.599	5.613	5.124	9.167
7	16BP	16.15	2.928	0.000	2.928	1.737	2.814	1.374
7	16BX	7.13	0.000	-1.020	-0.819	-0.451	-1.020	-0.474
7	16BXY	18.74	3.396	0.000	2.232	2.598	2.803	3.396
7	16BY	35.72	0.000	-5.108	-4.867	-4.255	-5.108	-4.605
8	17AP	66.69	29.468	0.000	26.449	14.978	29.468	21.506
8	17AX	70.22	0.000	-27.818	-24.410	-13.109	-27.818	-20.111
8	17AXY	30.41	0.000	-12.046	-5.505	-6.360	-7.735	-12.046
8	17AY	23.85	10.540	0.000	4.176	4.527	6.545	10.540
8	17BP	20.97	9.265	0.000	9.262	4.145	9.265	3.860
8	17BX	17.18	0.000	-6.806	-6.332	-0.779	-6.806	-1.265
8	17BXY	19.48	8.607	0.000	7.740	3.750	8.607	4.910
8	17BY	29.98	0.000	-11.877	-11.578	-7.621	-11.877	-7.829
9	18AP	55.24	20.108	0.000	17.460	10.423	20.108	16.315
9	18AX	60.46	0.000	-19.793	-16.727	-8.934	-19.793	-15.343
9	18AXY	34.68	0.000	-11.353	-6.260	-5.746	-8.558	-11.353
9	18AY	28.33	10.313	0.000	5.967	4.343	8.395	10.313
9	18BP	21.80	7.935	0.000	7.886	5.312	7.935	5.086
9	18BX	19.28	0.000	-6.312	-5.763	-2.368	-6.312	-2.930
9	18BXY	18.98	6.907	0.000	6.307	1.476	6.907	2.316
9	18BY	27.34	0.000	-8.952	-8.864	-4.605	-8.952	-4.586
10	19AP	69.36	41.136	0.000	36.695	19.188	41.136	28.624
10	19AX	70.02	0.000	-42.854	-37.973	-18.594	-42.854	-28.554
10	19AXY	26.52	0.000	-16.233	-6.547	-7.594	-10.115	-16.233
10	19AY	25.55	15.153	0.000	6.315	6.202	9.955	15.153
10	19BP	28.79	17.075	0.000	16.512	8.309	17.075	9.118
10	19BX	27.41	0.000	-16.774	-15.481	-4.400	-16.774	-6.402
10	19BXY	20.46	12.134	0.000	11.683	2.239	12.134	2.370
10	19BY	19.33	0.000	-11.828	-11.828	-5.744	-11.421	-4.446
10	20AP	67.34	39.938	0.000	35.590	18.687	39.938	28.111
10	20AX	63.25	0.000	-38.713	-33.603	-15.831	-38.713	-26.308
10	20AXY	28.28	0.000	-17.306	-8.520	-8.308	-12.275	-17.306
10	20AY	24.29	14.403	0.000	5.312	4.635	9.425	14.403
10	20BP	13.72	8.138	0.000	8.138	3.153	7.139	0.582
10	20BX	14.51	1.287	-8.881	-8.881	-0.016	-8.671	1.287
10	20BXY	34.54	20.482	0.000	18.569	6.744	20.482	10.136
10	20BY	33.85	0.000	-20.715	-19.670	-10.856	-20.715	-12.804
11	21AP	44.67	20.183	0.000	19.601	2.328	20.183	4.245
11	21AX	45.66	0.000	-20.242	-19.328	-1.530	-20.242	-3.471
11	21AXY	31.06	14.034	0.000	13.862	9.189	14.034	7.907
11	21AY	36.81	0.000	-16.319	-15.679	-11.065	-16.319	-10.332
11	21BP	20.76	9.377	-2.212	9.377	0.530	8.579	-2.212
11	21BX	23.01	2.176	-10.203	-10.203	-0.673	-9.231	2.176
11	21BXY	58.86	26.592	0.000	24.476	10.944	26.592	14.991
11	21BY	59.26	0.000	-26.271	-24.287	-11.602	-26.271	-15.237
12	22AP	33.76	12.288	-0.001	12.030	-0.001	12.288	1.935
12	22AX	45.36	0.000	-14.056	-12.774	-0.608	-14.056	-3.466
12	22AXY	28.40	10.339	0.000	10.339	7.513	10.256	6.241
12	22AY	34.46	0.000	-10.679	-10.571	-7.910	-10.679	-5.681
12	22BP	39.66	14.438	0.000	13.521	5.853	14.438	7.394
12	22BX	49.59	0.000	-15.366	-14.394	-5.921	-15.366	-7.671
12	22BXY	23.75	8.644	0.000	8.644	1.853	8.397	0.849
12	22BY	28.39	0.000	-8.796	-8.796	-2.091	-8.688	-1.183
13	23AP	39.48	10.778	-0.365	9.543	-0.365	10.778	3.530
13	23AX	40.33	0.310	-9.091	-8.471	0.310	-9.091	-1.910

13	23AXY	31.66	8.642	0.000	8.642	7.139	7.647	3.370
13	23AY	32.50	0.000	-7.326	-7.099	-5.483	-7.326	-3.968
13	23BP	31.72	8.660	0.000	8.424	2.766	8.660	2.711
13	23BX	33.89	0.000	-7.639	-7.587	-2.311	-7.639	-2.060
13	23BXY	35.89	9.799	0.000	9.289	3.352	9.799	4.186
13	23BY	37.81	0.000	-8.524	-8.144	-3.159	-8.524	-3.655
14	24AP	23.97	6.544	-0.927	6.502	-0.927	6.544	1.377
14	24AX	49.48	0.842	-10.603	-8.263	0.842	-10.603	-4.414
14	24AXY	18.83	5.140	0.000	5.140	4.035	4.805	2.439
14	24AY	37.12	0.000	-7.956	-7.956	-7.431	-6.908	-2.431
14	24BP	18.11	4.943	0.000	4.880	1.484	4.943	1.465
14	24BX	36.51	0.000	-7.824	-7.468	-2.474	-7.824	-3.011
14	24BXY	25.26	6.897	0.000	6.776	2.299	6.897	2.234
14	24BY	41.21	0.000	-8.832	-8.465	-3.229	-8.832	-3.570
15	25AP	87.24	31.640	-2.298	18.428	-2.298	31.640	22.237
15	25AX	37.35	13.546	0.000	3.163	1.643	11.612	13.546
15	25AXY	75.79	27.487	-0.620	25.913	27.487	15.812	-0.620
15	25AY	32.42	11.758	-4.245	8.897	11.758	2.443	-4.245
15	25BP	12.57	4.559	0.000	4.559	2.816	4.463	0.051
15	25BX	68.29	24.768	0.000	20.409	7.148	24.768	17.490
15	25BXY	32.74	11.874	0.000	5.247	2.040	9.076	11.874
15	25BY	61.15	22.177	0.000	21.390	9.050	22.177	6.872
16	26AP	19.23	2.325	-0.778	-0.532	1.637	-0.778	2.325
16	26AX	48.84	8.852	-0.400	0.117	8.852	-0.400	3.342
16	26AXY	26.76	4.851	-0.214	-0.214	0.516	1.530	4.851
16	26AY	78.02	3.570	-3.155	0.000	-3.155	0.000	3.570
16	26BP	7.06	0.437	-0.286	0.000	-0.286	0.000	0.437
16	26BX	36.08	6.540	0.000	5.659	4.947	5.954	6.540
16	26BXY	32.41	5.874	0.000	3.869	4.191	4.184	5.874
16	26BY	17.83	3.231	-0.213	-0.127	3.231	-0.213	3.172
17	27AP	42.89	0.000	-2.754	0.000	-2.754	0.000	0.000
17	27AX	67.55	16.469	0.000	9.611	0.000	16.469	10.354
17	27AXY	1.08	0.264	0.000	0.000	0.000	0.000	0.264
17	27AY	53.72	13.096	0.000	13.096	7.790	6.133	0.000
17	27BP	40.34	9.835	-0.900	9.633	-0.900	9.835	0.000
17	27BX	56.64	1.011	-3.636	-1.651	-3.636	0.010	1.011
17	27BXY	37.36	9.109	-0.474	6.655	-0.474	9.109	3.797
17	27BY	0.00	0.000	0.000	0.000	0.000	0.000	0.000
18	28AP	97.48	22.571	-11.200	9.810	-11.200	22.571	21.259
18	28AX	27.16	12.359	0.000	0.000	12.359	0.000	0.000
18	28AXY	57.53	26.175	-5.280	18.101	26.175	9.753	-5.280
18	28AY	1.00	0.455	0.000	0.000	0.000	0.000	0.455
18	28BP	30.53	13.890	0.000	13.460	10.126	13.890	5.307
18	28BX	19.05	8.667	0.000	1.138	1.720	3.174	8.667
18	28BXY	37.95	17.266	0.000	15.735	8.733	17.266	11.560
18	28BY	0.00	0.000	0.000	0.000	0.000	0.000	0.000
19	29AP	32.70	14.540	-1.079	-0.892	14.540	-1.079	1.593
19	29AX	59.03	26.249	-4.295	10.720	-4.295	24.474	26.249
19	29AXY	10.28	4.571	-0.605	-0.605	-0.263	1.147	4.571
19	29AY	56.80	25.260	-3.063	19.860	25.260	10.510	-3.063
19	29BP	34.02	15.128	0.000	14.644	10.200	15.128	5.457
19	29BX	34.81	15.480	0.000	6.542	5.965	9.212	15.480
19	29BXY	51.80	23.036	0.000	21.048	13.129	23.036	17.961
19	29BY	5.25	2.333	-0.753	-0.647	2.333	-0.753	2.268
20a	30AP	16.27	0.000	-1.481	-1.362	-0.772	-1.481	-0.808
20a	30AY	29.14	0.000	-2.652	-2.652	-1.679	-2.637	-1.533
20a	30BP	7.88	0.521	0.000	0.511	0.426	0.521	0.441
20a	30BX	6.66	0.440	0.000	0.440	0.156	0.405	0.104
20	31P	37.70	2.492	0.000	2.492	1.186	2.372	1.147

20	31Y	20.40	1.348	0.000	1.348	1.185	1.259	1.154
20	32P	14.35	1.007	0.000	0.635	0.623	0.883	1.007
20	32X	22.49	0.000	-0.906	-0.307	-0.444	-0.574	-0.906
20	33P	38.69	2.557	0.000	2.557	1.190	2.481	1.267
20	33Y	42.51	2.809	0.000	2.809	1.800	2.615	1.659
20	34P	3.78	0.265	0.000	0.200	0.151	0.265	0.163
20	34X	5.66	0.397	-0.121	0.397	0.071	0.253	-0.121
20	35P	17.38	1.149	0.000	1.130	0.075	1.149	0.291
20	35Y	29.26	1.934	0.000	1.934	1.655	1.684	1.399
36	36P	61.15	0.000	-10.273	-8.782	-6.339	-10.273	-9.781
36	36X	57.06	8.481	0.000	7.226	5.377	8.481	8.364
21	37AP	47.26	0.271	-12.902	-6.212	0.271	-12.902	-10.437
21	37AY	41.64	1.655	-11.369	-10.138	-11.369	-5.604	1.655
21	37BP	24.05	0.000	-6.566	-6.566	-2.734	-6.541	-0.608
21	37BX	41.66	0.000	-11.372	-8.672	-3.170	-11.372	-9.808
22	38AP	42.63	0.112	-4.904	0.112	-4.904	-0.488	-2.860
22	38AX	16.69	0.000	-1.919	-0.356	-1.919	-0.480	-1.676
22	38AXY	16.97	0.600	-1.952	-0.540	0.600	-0.498	-1.952
22	38AY	31.66	0.000	-3.642	-0.984	-1.122	-2.430	-3.642
22	38BP	9.23	0.000	-1.062	-0.586	-0.268	-0.764	-1.062
22	38BX	33.53	0.000	-3.858	-3.321	-3.135	-3.440	-3.858
22	38BXY	31.02	0.000	-3.569	-2.546	-2.687	-2.683	-3.569
22	38BY	26.50	0.000	-3.048	-1.258	-2.895	-1.264	-3.048
23	39AP	47.41	0.604	-8.629	-4.359	0.604	-8.629	-5.204
23	39AX	6.08	1.106	-0.077	-0.077	1.106	-0.032	0.814
23	39AXY	36.77	0.607	-6.693	-6.693	-4.049	-3.358	0.607
23	39AY	5.53	0.773	-1.006	0.346	0.773	-1.006	-0.802
23	39BP	26.99	0.810	-4.913	-4.737	0.810	-4.913	0.308
23	39BX	9.87	1.796	-0.557	0.494	1.796	-0.557	-0.553
23	39BXY	24.73	0.485	-4.500	-3.196	0.485	-4.500	-1.772
23	39BY	3.08	0.561	0.000	0.433	0.489	0.495	0.561
23	39C1P	27.50	5.005	-0.910	-0.789	5.005	-0.910	4.228
23	39C1Y	14.59	2.655	-0.078	-0.078	1.387	0.140	2.655
23	F39C197P	30.73	5.592	-0.933	-0.782	5.592	-0.933	3.649
23	F39C197Y	11.25	2.047	-0.078	-0.078	1.966	0.116	2.047
23	39C2P	18.11	3.295	0.000	0.085	3.295	0.079	2.740
23	39C2X	41.95	7.634	0.000	5.807	6.785	5.654	7.634
23	F39C2118P	18.25	3.321	0.000	0.086	3.321	0.080	2.768
23	F39C2118X	42.04	7.651	0.000	5.807	6.802	5.655	7.651
24	40P	11.51	2.094	-1.199	-0.449	-1.199	1.763	2.094
24	40X	14.22	1.485	-1.904	0.577	1.485	-1.371	-1.904
24	40XY	5.91	1.076	-0.710	1.076	0.496	-0.710	-0.667
24	40Y	9.85	0.373	-1.319	-1.319	-0.925	-0.280	0.373
24	41P	7.13	0.647	-0.955	-0.080	-0.955	-0.077	0.647
24	41X	6.31	0.441	-0.845	-0.040	0.441	-0.283	-0.845
24	41XY	1.59	0.000	-0.212	-0.072	-0.103	-0.075	-0.212
24	41Y	0.54	0.000	-0.072	-0.041	-0.072	-0.022	-0.048
AngleR	42P	58.37	0.000	-5.312	-2.567	-5.046	-3.084	-5.312
AngleR	42X	64.35	5.671	0.000	2.259	5.215	2.918	5.671
AngleR	42XY	59.84	0.000	-5.445	-1.961	-4.763	-2.605	-5.445
AngleR	42Y	65.96	5.813	0.000	2.829	5.199	3.394	5.813
26	43AP	18.00	1.035	-2.266	-2.168	0.866	-2.266	1.035
26	43AX	17.57	2.169	-1.082	2.041	-0.914	2.169	-1.082
26	43AXY	23.92	0.811	-3.010	-2.807	0.811	-3.010	0.563
26	43AY	15.49	1.913	-1.269	1.852	-1.248	1.913	-1.269
26	43BP	32.30	0.000	-4.066	-3.713	-1.310	-4.066	-1.431
26	43BX	31.64	3.906	0.000	3.638	1.140	3.906	1.141
26	43BXY	39.26	0.000	-4.941	-4.579	-1.464	-4.941	-1.928
26	43BY	28.23	3.486	0.000	3.181	0.885	3.486	1.133

26	43CP	36.11	0.000	-4.546	-4.046	-1.339	-4.546	-1.648
26	43CX	30.23	3.733	0.000	3.247	0.779	3.733	0.990
26	43CXY	41.59	0.000	-5.235	-4.605	-1.388	-5.235	-2.139
26	43CY	28.16	3.477	0.000	3.047	0.607	3.477	1.014
27	44P	8.36	0.321	-1.394	-1.364	0.321	-1.394	0.275
27	44Y	10.21	1.850	0.000	1.605	0.068	1.850	0.525
27	44AP	11.33	0.000	-1.890	-1.641	-0.076	-1.890	-0.533
27	44AY	7.91	1.433	-0.308	1.395	-0.308	1.433	-0.257
27	44BP	24.57	0.000	-3.571	-3.437	-0.490	-3.571	-0.773
27	44BY	16.73	3.032	0.000	2.907	0.208	3.032	0.413
27	44CP	21.80	0.000	-3.169	-3.035	-0.257	-3.169	-0.470
27	44CY	20.09	3.641	0.000	3.504	0.507	3.641	0.784
27	44DP	15.27	0.000	-2.546	-2.373	-0.315	-2.546	-0.679
27	44DY	9.37	1.698	-0.180	1.571	-0.180	1.698	0.026
27	44EP	10.42	0.172	-1.737	-1.607	0.172	-1.737	-0.039
27	44EY	14.19	2.572	0.000	2.399	0.315	2.572	0.672
28	45P	35.53	6.466	0.000	6.466	3.662	6.142	3.013
28	45AP	37.47	6.819	0.000	6.819	3.687	6.485	3.035
28	45BP	41.84	7.615	0.000	7.615	4.177	7.377	3.739
29	46P	14.98	0.000	-1.159	-1.125	-0.617	-1.159	-0.666
29	46X	26.92	0.000	-2.082	-2.033	-1.089	-2.082	-1.168
29	46XY	40.42	0.000	-3.127	-3.127	-1.919	-3.023	-1.772
29	46Y	35.41	0.000	-2.739	-2.739	-1.746	-2.655	-1.643
30	47P	46.40	5.918	0.000	5.918	3.567	5.891	3.532
30	47Y	3.65	0.465	0.000	0.465	0.237	0.442	0.198
30	47AP	12.45	1.792	0.000	1.792	0.533	1.547	0.220
30	47AY	10.83	1.558	0.000	1.135	1.326	1.333	1.558
31	48P	41.49	7.520	0.000	7.520	4.230	7.484	4.191
31	48Y	4.78	0.867	0.000	0.867	0.409	0.845	0.374
31	48AP	7.12	0.995	-0.090	0.175	0.995	-0.090	0.610
31	48AY	32.73	4.576	0.000	4.356	1.567	4.576	1.874
30	49P	29.95	3.943	0.000	3.943	2.393	3.925	2.375
30	49Y	2.54	0.335	0.000	0.335	0.199	0.325	0.185
30	49AP	8.84	0.616	-0.485	-0.239	0.616	-0.485	0.288
30	49AY	18.33	2.562	0.000	2.348	0.655	2.562	0.931
32	50P	64.73	11.732	0.000	11.691	6.238	11.732	6.506
32	50X	10.55	0.589	-1.919	-1.234	0.589	-1.919	-0.480
32	50XY	8.04	0.000	-1.463	-1.116	-1.292	-1.151	-1.463
32	50Y	4.96	0.898	0.000	0.555	0.104	0.898	0.797
32	50AP	21.41	3.897	0.000	3.897	2.870	3.712	2.669
32	50AY	3.42	0.000	-0.623	-0.409	-0.623	-0.317	-0.392
33	51P	34.94	11.492	0.000	11.223	6.877	11.492	7.467
33	51Y	10.96	0.000	-3.579	-3.579	-2.926	-3.228	-1.909
33	51AP	8.50	0.261	-2.715	-2.552	0.261	-2.715	-0.165
33	51AY	5.58	0.000	-1.782	-0.650	-1.782	-0.687	-1.743
33	51BP	53.76	0.000	-14.676	-13.979	-4.787	-14.676	-6.698
33	51BY	13.82	0.000	-3.773	-1.581	-2.911	-1.714	-3.773
33	51CP	45.15	0.000	-12.326	-11.806	-5.230	-12.326	-6.447
33	51CY	19.09	0.000	-5.213	-4.843	-3.544	-5.213	-4.491
34	52P	13.99	6.366	0.000	6.231	3.785	6.366	4.149
34	52Y	4.38	0.000	-1.822	-1.822	-1.404	-1.322	-0.149
34	52AP	17.45	0.000	-7.909	-7.808	-2.331	-7.909	-2.690
34	52AY	5.39	1.917	-0.409	1.917	-0.409	1.872	-0.408
34	52BP	54.24	0.000	-22.900	-22.255	-7.554	-22.900	-9.360
34	52BY	7.26	1.724	-3.067	1.724	-2.159	1.565	-3.067
34	52CP	43.17	0.000	-18.227	-17.778	-7.406	-18.227	-8.489
34	52CY	9.55	0.000	-4.034	-3.503	-3.113	-3.865	-4.034
33	53P	45.87	15.084	0.000	14.880	6.902	15.084	7.398
33	53Y	13.91	0.000	-4.544	-4.544	-1.887	-4.136	-0.832

33	53AP	3.16	1.149	-0.352	0.044	1.149	-0.352	0.383
33	53AY	10.23	0.000	-3.269	-3.269	-2.886	-3.054	-2.522
33	53BP	50.65	0.000	-13.829	-13.099	-4.277	-13.829	-6.240
33	53BY	18.59	0.000	-5.074	-4.035	-3.959	-4.292	-5.074
33	53CP	33.73	0.000	-11.270	-10.878	-4.381	-11.270	-5.312
33	53CY	18.63	0.000	-6.224	-5.922	-3.732	-6.224	-4.505
35	54P	14.86	0.957	-1.212	-1.212	0.905	-1.036	0.957
35	54X	20.90	0.000	-1.704	-0.282	-1.704	-0.348	-1.668
Pwmnt	g99P	6.89	0.000	-30.107	-29.762	-12.562	-30.107	-12.848
Pwmnt	g100P	5.00	0.000	-26.804	-26.540	-11.264	-26.804	-11.566
Pwmnt	g101P	8.96	0.000	-23.303	-23.038	-10.248	-23.303	-10.549
Pwmnt	g102P	3.68	0.000	-19.874	-19.676	-8.787	-19.874	-9.010
Pwmnt	g103P	3.37	0.000	-18.222	-18.095	-8.123	-18.222	-8.262
Pwmnt	g104P	3.11	0.000	-16.515	-16.450	-7.506	-16.515	-7.582
Pwmnt	g105P	2.73	0.000	-15.425	-15.425	-6.961	-15.402	-6.883
Plate	g106P	4.95	0.832	0.000	0.832	0.188	0.675	0.003
PMBR1	g107P	6.93	0.000	-0.707	-0.583	-0.278	-0.707	-0.472
PMBR1	g108P	9.17	0.000	-0.935	-0.935	-0.288	-0.917	-0.359
PMBR1	g109P	6.45	0.000	-0.658	-0.526	-0.150	-0.658	-0.327
BraceR	g110P	90.77	10.968	0.000	3.226	10.212	4.211	10.968
BraceR	g110X	69.38	0.000	-11.318	-1.553	-10.081	-2.998	-11.318
PMBR2	g111P	52.19	0.000	-5.321	-2.046	-4.898	-2.016	-5.321
PMBR2	g111X	44.55	4.542	0.000	1.012	4.504	0.750	4.542
PMBR2	g112P	13.38	0.972	-1.365	-1.365	0.575	-0.702	0.972
PMBR2	g112X	20.28	0.000	-2.068	-1.138	-1.458	-1.930	-2.068
PMBR2	g113P	6.81	0.232	-0.694	-0.694	-0.348	0.232	0.130
PMBR2	g113X	8.61	0.399	-0.877	0.173	0.399	-0.877	-0.435
PMBR3	g114P	2.84	0.000	-0.289	-0.289	-0.011	-0.172	-0.022
PMBR4	g115P	3.74	0.508	-0.052	-0.052	0.151	0.508	0.165
PMBR4	g116P	7.91	1.075	-0.903	-0.698	-0.903	0.670	1.075
PMBR4	g116X	8.72	1.186	-1.173	1.186	0.770	-1.166	-1.173
PMBR4	g117P	1.68	0.072	-0.228	0.072	-0.093	-0.028	-0.228
PMBR5	g118P	0.36	0.003	-0.049	0.003	-0.039	-0.002	-0.049
PMBR5	g120P	7.86	1.069	-1.037	0.530	1.069	-0.568	-1.037
PMBR5	g120X	8.07	0.918	-1.097	-0.048	-1.097	-0.065	0.918
Pwmnt	g121P	1.37	0.000	-7.626	-7.626	-3.476	-7.618	-3.449

*** Analysis Results for Load Case No. 1 "NESC Heavy -" - Number of iterations in SAPS 37

Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy -":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	-0.07002	0.5883	-0.04177	-0.5643	0.0353	0.8568	2.93	3.588	128.8
2P	-0.07128	0.5437	-0.04081	-0.6489	-0.0420	0.8247	2.929	3.544	124.3
3P	-0.06287	0.4874	-0.03967	-0.7039	-0.0611	0.7920	2.937	3.487	119.8
4P	-0.06175	0.4132	-0.03673	-0.5702	-0.0494	0.7406	2.938	3.413	112.8
5P	-0.05438	0.3336	-0.03377	-0.5501	0.0092	0.6683	2.946	3.334	104.8
6P	-0.05531	0.2794	-0.03052	-0.4757	-0.0405	0.6144	2.945	3.279	98.72
7P	-0.04964	0.2225	-0.02785	-0.4504	0.0044	0.5627	2.95	3.222	91.72
8P	-0.05255	0.1722	-0.02433	-0.3586	-0.0100	0.5114	2.947	3.172	84.73
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.2776	0.5446	-0.1905	-0.6375	0.0151	0.8779	-0.2776	17.29	128.6
17P	0.1722	0.4192	0.1279	-0.5955	0.0524	0.7854	3.172	-13.83	112.9
18P	0.1856	0.2871	0.117	-0.4750	0.0652	0.7136	3.186	-16.46	98.87
19P	0.1162	0.1763	0.08343	-0.4498	0.0494	0.5700	3.116	-14.07	84.83
20AP	-0.04351	0.05261	-0.01439	-0.1133	0.1306	0.3982	9.524	0.05261	39.99
20BP	-0.1018	-0.006226	-0.03288	-0.2012	-0.0405	0.3946	-0.1018	9.562	39.97
21P	-0.06037	0.01448	-0.001917	0.0000	0.0000	0.0000	11.71	2.222	25
22P	-0.08282	-0.008112	-0.03465	0.0000	0.0000	0.0000	2.125	11.76	24.97
23P	-0.219	0.3725	-0.1557	-0.6244	-0.0015	0.8329	-0.219	14.62	112.6
24P	-0.2201	0.2435	-0.1526	-0.5337	0.0065	0.7234	-0.2201	16.99	98.6
25P	-0.1706	0.1437	-0.1004	-0.4224	0.0244	0.6460	-0.1706	14.39	84.65
26P	0.0946	0.4169	0.07146	-0.5363	0.0534	0.8009	3.095	-8.208	112.9
27P	0.09888	0.2842	0.0629	-0.4052	0.0663	0.7408	3.099	-9.591	98.81
28P	0.05992	0.1745	0.04195	-0.3696	0.0503	0.5789	3.06	-8.45	84.79
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.02897	-0.01848	-0.002227	-0.0253	-0.0735	0.1721	1.471	-0.01848	25
31P	-0.04328	0.002941	-0.003259	-0.1126	-0.0265	0.2620	1.457	0.002941	40
32P	-0.0238	0.158	-0.006146	-0.3599	0.0261	0.4893	1.476	0.158	84.74
33P	-0.02157	0.263	-0.007238	-0.4938	0.0066	0.5495	1.478	0.263	98.74
34P	-0.02247	0.3934	-0.008488	-0.5531	-0.0026	0.5928	1.478	0.3934	112.7
35P	-0.02661	0.5668	-0.0101	-0.7596	-0.0102	0.6169	1.473	0.5668	128.7
36P	-0.02862	0.6528	-0.01095	-0.8606	-0.0104	0.6169	1.471	0.6528	134.7
37P	-0.03176	0.7913	-0.01219	-0.8927	-0.0106	0.6169	1.468	0.7913	143.7
1X	0.01569	0.5887	0.02254	-0.5606	0.0282	0.8379	3.016	-2.411	128.8
1XY	0.01639	0.5024	0.02187	-0.5812	0.0608	0.8121	-2.984	-2.498	128.8
1Y	-0.06908	0.5014	-0.04212	-0.5942	0.0470	0.8229	-3.069	3.501	128.8
2X	0.01387	0.5451	0.02202	-0.6496	0.0253	0.8147	3.014	-2.455	124.3
2XY	0.01438	0.4567	0.02156	-0.6195	-0.0216	0.7901	-2.986	-2.543	124.3
2Y	-0.0708	0.4549	-0.04119	-0.6150	0.0039	0.7946	-3.071	3.455	124.3
3X	0.01471	0.4873	0.02172	-0.7115	-0.0202	0.7922	3.015	-2.513	119.8
3XY	0.01944	0.4054	0.02141	-0.6454	-0.0256	0.7674	-2.981	-2.595	119.8
3Y	-0.06747	0.4049	-0.04013	-0.6346	-0.0556	0.7666	-3.067	3.405	119.8
4X	0.01691	0.4144	0.01967	-0.5725	0.0525	0.7557	3.017	-2.586	112.8
4XY	0.01755	0.3341	0.01981	-0.5397	-0.0085	0.7316	-2.982	-2.666	112.8
4Y	-0.06142	0.3332	-0.0367	-0.5403	0.0154	0.7214	-3.061	3.333	112.8
5X	0.01214	0.3333	0.01737	-0.5406	0.0002	0.6897	3.012	-2.667	104.8
5XY	0.01836	0.26	0.0181	-0.5077	0.0483	0.6721	-2.982	-2.74	104.8
5Y	-0.06039	0.2602	-0.03333	-0.5095	-0.0451	0.6580	-3.06	3.26	104.8
6X	0.01293	0.2808	0.01441	-0.4755	0.0647	0.6390	3.013	-2.719	98.76
6XY	0.01322	0.2098	0.01576	-0.4348	0.0096	0.6277	-2.987	-2.79	98.77
6Y	-0.05497	0.2095	-0.02936	-0.4348	0.0184	0.6093	-3.055	3.209	98.72

7X	0.005499	0.2225	0.01204	-0.4556	0.0319	0.5806	3.005	-2.778	91.76
7XY	0.01237	0.1585	0.01378	-0.3982	0.0507	0.5793	-2.988	-2.841	91.76
7Y	-0.05653	0.1587	-0.02624	-0.4032	-0.0217	0.5638	-3.057	3.159	91.72
8X	0.004643	0.1725	0.00883	-0.3553	0.0502	0.5219	3.005	-2.827	84.76
8XY	0.003717	0.1147	0.01094	-0.3042	0.0503	0.5309	-2.996	-2.885	84.76
8Y	-0.0508	0.1139	-0.02235	-0.3019	-0.0040	0.5181	-3.051	3.114	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.214	0.548	0.1542	-0.5428	0.0340	0.8243	0.214	-16.2	129
17Y	0.172	0.3366	0.1345	-0.6565	-0.0096	0.7994	-2.828	-13.91	112.9
18Y	0.1853	0.2116	0.1306	-0.5626	0.0087	0.7377	-2.815	-16.54	98.88
19Y	0.1156	0.1167	0.08183	-0.4417	0.0491	0.5697	-2.884	-14.13	84.83
20AY	-0.04306	-0.06406	-0.007228	-0.1127	-0.0186	0.3891	-9.611	-0.06406	39.99
20BX	0.01516	-0.005886	0.01216	-0.0886	-0.0299	0.3934	0.01516	-9.574	40.01
21X	-0.1968	0.02478	-0.0351	0.0000	0.0000	0.0000	11.57	-2.183	24.96
21XY	-0.001156	-0.05152	0.02694	0.0000	0.0000	0.0000	-11.77	-2.26	25.03
21Y	-0.002009	-0.06292	-0.01881	0.0000	0.0000	0.0000	-11.77	2.145	24.98
22X	0.01506	-0.1822	0.03872	0.0000	0.0000	0.0000	2.223	-11.95	25.04
22XY	0.01723	-0.03306	0.01084	-0.1088	-0.0475	0.2514	-2.191	-11.8	25.01
22Y	-0.04243	-0.02276	0.0186	0.1790	-0.0086	0.0122	-2.25	11.75	25.02
26Y	0.09362	0.3351	0.07259	-0.5767	-0.0085	0.7975	-2.906	-8.29	112.9
27Y	0.09691	0.2103	0.06683	-0.4685	0.0098	0.7339	-2.903	-9.665	98.82
28Y	0.0593	0.1156	0.04132	-0.3559	0.0500	0.5788	-2.941	-8.509	84.79
9S	-0.05635	0.1389	-0.02603	-0.2818	-0.0155	0.4639	4.081	4.276	76.97
10S	-0.06828	0.1123	-0.02766	-0.2275	0.0058	0.4168	5.207	5.387	69.22
11S	-0.07385	0.09224	-0.02739	-0.1840	0.0017	0.3646	6.339	6.505	61.47
12S	-0.08986	0.07143	-0.02847	-0.1409	0.0484	0.3142	7.779	7.94	51.55
13S	-0.1022	0.05232	-0.02723	-0.1519	-0.0200	0.2287	9.466	9.621	39.97
14S	-0.08366	0.01442	-0.02245	-0.1285	-0.2000	0.1105	11.69	11.78	24.98
i0.50E129S	-0.02653	0.5451	-0.01223	-0.6180	-0.0249	0.8169	-0.02653	0.5451	128.8
i0.50E113S	-0.0223	0.3738	-0.00854	-0.5502	-0.0114	0.8029	-0.0223	0.3738	112.8
i0.50E99S	-0.02139	0.2449	-0.00712	-0.4499	-0.0076	0.7143	-0.02139	0.2449	98.74
i0.50E85S	-0.02369	0.1427	-0.005937	-0.3231	-0.0004	0.5862	-0.02369	0.1427	84.74
21XF0.50S	-0.02955	0.01723	-0.1071	-0.0284	0.9133	0.2132	11.74	0.01723	24.89
22PF0.50S	-0.06623	-0.01545	-0.3047	0.0000	0.0000	0.0000	-0.06623	11.75	24.7
9X	0.003858	0.1391	0.01	-0.2804	0.0699	0.4704	4.141	-3.998	77.01
9XY	0.01032	0.06999	0.0134	-0.2137	0.0404	0.4687	-4.127	-4.068	77.01
9Y	-0.06342	0.07065	-0.02265	-0.2180	0.0058	0.4581	-4.201	4.208	76.98
10X	0.008426	0.113	0.0106	-0.2353	0.0418	0.4218	5.284	-5.162	69.26
10XY	0.009982	0.03447	0.01522	-0.1870	0.0585	0.4114	-5.265	-5.241	69.27
10Y	-0.06818	0.03348	-0.02293	-0.1795	0.0042	0.4035	-5.343	5.309	69.23
11X	0.009088	0.09159	0.009983	-0.1786	0.0557	0.3685	6.422	-6.321	61.51
11XY	0.01254	0.002778	0.01611	-0.1436	0.0287	0.3590	-6.4	-6.41	61.52
11Y	-0.07958	0.00449	-0.02107	-0.1489	0.0185	0.3521	-6.492	6.417	61.48
12X	0.01168	0.07367	0.008809	-0.1399	0.0326	0.3126	7.881	-7.795	51.59
12XY	0.01461	-0.02786	0.01659	-0.1420	0.0365	0.3023	-7.854	-7.897	51.6
12Y	-0.08756	-0.03128	-0.0204	-0.1522	0.0405	0.3024	-7.956	7.838	51.56
13X	0.01398	0.05278	0.008106	-0.1340	0.0316	0.2378	9.583	-9.516	40.01
13XY	0.01611	-0.06355	0.01829	-0.0606	0.0181	0.2286	-9.553	-9.632	40.02
13Y	-0.1012	-0.06441	-0.0167	-0.0721	-0.0851	0.2100	-9.67	9.504	39.98
14X	0.01279	0.02792	0.006554	-0.1104	0.0472	0.1407	11.78	-11.74	25.01
14XY	0.0178	-0.05155	0.01213	0.1583	0.0340	0.1108	-11.75	-11.82	25.01
14Y	-0.04235	-0.06415	-0.01672	0.1326	-0.2532	0.0762	-11.81	11.71	24.98
21XF0.50Y	-0.02808	-0.05883	-0.1505	-0.0228	-0.9234	0.1749	-11.8	-0.05883	24.85
22PF0.50X	0.01597	-0.1136	0.02042	0.0000	0.0000	0.0000	0.01597	-11.88	25.02

Joint Support Reactions for Load Case "NESC Heavy -":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
15P	-15.53	0.0	-20.52	0.0	0.0	-140.17	0.0	0.0	142.51	0.0	-0.43	0.0	7.8	0.0	0.0	-0.10	0.0	0.0
29P	0.23	0.0	1.14	0.0	0.0	-30.91	0.0	0.0	30.93	0.0	-8.36	0.0	6.1	0.0	0.0	-4.18	0.0	0.0
15X	20.42	0.0	-21.62	0.0	0.0	123.62	0.0	0.0	127.14	0.0	1.90	0.0	-1.5	0.0	0.0	-0.72	0.0	0.0
15XY	-23.11	0.0	-14.80	0.0	0.0	107.05	0.0	0.0	110.51	0.0	-4.23	0.0	-1.9	0.0	0.0	-0.13	0.0	0.0
15Y	21.86	0.0	-15.38	0.0	0.0	-151.21	0.0	0.0	153.56	0.0	-6.37	0.0	0.7	0.0	0.0	0.05	0.0	0.0

Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Heavy -":

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0000	-0.1927	-0.0000	-0.0000	0.1927	-0.0700	0.5883	-0.0418
2P	0.0000	0.0000	-0.0923	0.0000	0.0000	0.0923	-0.0713	0.5437	-0.0408
3P	0.0000	0.0000	-0.1921	0.0000	-0.0000	0.1921	-0.0629	0.4874	-0.0397
4P	0.0000	0.0000	-0.3270	-0.0000	0.0000	0.3270	-0.0617	0.4132	-0.0367
5P	0.0000	0.0000	-0.3335	-0.0000	0.0000	0.3335	-0.0544	0.3336	-0.0338
6P	0.0000	0.0000	-0.4888	-0.0000	-0.0000	0.4888	-0.0553	0.2794	-0.0305
7P	0.0000	0.0000	-0.5277	0.0000	0.0000	0.5277	-0.0496	0.2225	-0.0278
8P	0.0000	0.0000	-0.6716	-0.0000	-0.0000	0.6716	-0.0525	0.1722	-0.0243
15P	0.0000	0.0000	-1.0248	15.5279	20.5188	-139.1426	0.0000	0.0000	0.0000
16P	-2.8310	8.3150	-1.2725	2.8310	-8.3150	1.2725	-0.2776	0.5446	-0.1905
17P	8.1410	5.2237	-3.1622	-8.1410	-5.2237	3.1622	0.1722	0.4192	0.1279
18P	9.0060	8.3468	-3.0828	-9.0060	-8.3468	3.0828	0.1856	0.2871	0.1170
19P	8.5640	6.6487	-2.0982	-8.5640	-6.6487	2.0982	0.1162	0.1763	0.0834
20AP	0.0000	0.0000	-0.6136	-0.0000	-0.0000	0.6136	-0.0435	0.0526	-0.0144
20BP	0.0000	0.0000	-0.6343	0.0000	0.0000	0.6343	-0.1018	-0.0062	-0.0329
21P	0.0000	0.0000	-0.3466	0.0000	-0.0000	0.3466	-0.0604	0.0145	-0.0019
22P	0.0000	0.0000	-0.3466	-0.0000	-0.0000	0.3466	-0.0828	-0.0081	-0.0347
23P	-4.1080	9.7380	-1.6243	4.1080	-9.7380	1.6243	-0.2190	0.3725	-0.1557
24P	-1.0200	8.3480	-1.8796	1.0200	-8.3480	1.8796	-0.2201	0.2435	-0.1526
25P	-4.5710	11.6800	-1.1833	4.5710	-11.6800	1.1833	-0.1706	0.1437	-0.1004
26P	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.0946	0.4169	0.0715
27P	0.0000	0.0000	-0.1057	-0.0000	-0.0000	0.1057	0.0989	0.2842	0.0629
28P	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.0599	0.1745	0.0419
29P	0.0000	-0.5283	-1.1425	-0.2291	-0.6081	-29.7631	0.0000	0.0000	0.0000
30P	0.0000	-0.6703	-3.0286	0.0000	0.6703	3.0286	-0.0290	-0.0185	-0.0022
31P	0.0000	-0.9602	-3.4674	-0.0000	0.9602	3.4674	-0.0433	0.0029	-0.0033
32P	0.0000	-0.9293	-3.2409	0.0000	0.9293	3.2409	-0.0238	0.1580	-0.0061
33P	0.0000	-0.4200	-1.5148	0.0000	0.4200	1.5148	-0.0216	0.2630	-0.0072
34P	0.0000	-0.4590	-1.6212	-0.0000	0.4590	1.6212	-0.0225	0.3934	-0.0085
35P	0.0000	-0.3590	-1.1163	0.0000	0.3590	1.1163	-0.0266	0.5668	-0.0101
36P	0.0000	2.1530	-7.8290	-0.0000	-2.1530	7.8290	-0.0286	0.6528	-0.0109
37P	0.0000	0.6110	-7.6368	-0.0000	-0.6110	7.6368	-0.0318	0.7913	-0.0122
1X	0.0000	-0.0741	-0.1927	-0.0000	0.0741	0.1927	0.0157	0.5887	0.0225
1XY	0.0000	-0.0691	-0.1824	-0.0000	0.0691	0.1824	0.0164	0.5024	0.0219
1Y	0.0000	0.0000	-0.1824	-0.0000	-0.0000	0.1824	-0.0691	0.5014	-0.0421
2X	0.0000	-0.0776	-0.0923	-0.0000	0.0776	0.0923	0.0139	0.5451	0.0220
2XY	0.0000	-0.0776	-0.0923	0.0000	0.0776	0.0923	0.0144	0.4567	0.0216
2Y	0.0000	0.0000	-0.0923	0.0000	-0.0000	0.0923	-0.0708	0.4549	-0.0412
3X	0.0000	-0.1111	-0.1914	0.0000	0.1111	0.1914	0.0147	0.4873	0.0217
3XY	0.0000	-0.1111	-0.1914	0.0000	0.1111	0.1914	0.0194	0.4054	0.0214
3Y	0.0000	0.0000	-0.1921	0.0000	0.0000	0.1921	-0.0675	0.4049	-0.0401
4X	0.0000	-0.1531	-0.3196	-0.0000	0.1531	0.3196	0.0169	0.4144	0.0197

4XY	0.0000	-0.1481	-0.3118	-0.0000	0.1481	0.3118	0.0176	0.3341	0.0198
4Y	0.0000	0.0000	-0.3192	-0.0000	0.0000	0.3192	-0.0614	0.3332	-0.0367
5X	0.0000	-0.1813	-0.3327	-0.0000	0.1813	0.3327	0.0121	0.3333	0.0174
5XY	0.0000	-0.1813	-0.3327	-0.0000	0.1813	0.3327	0.0184	0.2600	0.0181
5Y	0.0000	0.0000	-0.3335	0.0000	-0.0000	0.3335	-0.0604	0.2602	-0.0333
6X	0.0000	-0.1636	-0.4720	-0.0000	0.1636	0.4720	0.0129	0.2808	0.0144
6XY	0.0000	-0.1636	-0.4643	-0.0000	0.1636	0.4643	0.0132	0.2098	0.0158
6Y	0.0000	0.0000	-0.4811	-0.0000	0.0000	0.4811	-0.0550	0.2095	-0.0294
7X	0.0000	-0.1963	-0.5270	0.0000	0.1963	0.5270	0.0055	0.2225	0.0120
7XY	0.0000	-0.1963	-0.5270	0.0000	0.1963	0.5270	0.0124	0.1585	0.0138
7Y	0.0000	0.0000	-0.5277	0.0000	0.0000	0.5277	-0.0565	0.1587	-0.0262
8X	0.0000	-0.2126	-0.6642	0.0000	0.2126	0.6642	0.0046	0.1725	0.0088
8XY	0.0000	-0.2126	-0.6565	-0.0000	0.2126	0.6565	0.0037	0.1147	0.0109
8Y	0.0000	0.0000	-0.6639	0.0000	0.0000	0.6639	-0.0508	0.1139	-0.0223
15X	0.0000	-0.4266	-1.0248	-20.4155	22.0462	124.6432	0.0000	0.0000	0.0000
15XY	0.0000	-0.4266	-1.0248	23.1137	15.2244	108.0746	0.0000	0.0000	0.0000
15Y	0.0000	0.0000	-1.0248	-21.8590	15.3784	-150.1866	0.0000	0.0000	0.0000
16X	-0.3000	7.0797	-1.6425	0.3000	-7.0797	1.6425	0.2140	0.5480	0.1542
17Y	-5.3700	5.4707	-0.2662	5.3700	-5.4707	0.2662	0.1720	0.3366	0.1345
18Y	-4.8850	4.9318	-0.3398	4.8850	-4.9318	0.3398	0.1853	0.2116	0.1306
19Y	-6.4880	6.6947	-0.1912	6.4880	-6.6947	0.1912	0.1156	0.1167	0.0818
20AY	0.0000	0.0000	-0.6406	-0.0000	-0.0000	0.6406	-0.0431	-0.0641	-0.0072
20BX	0.0000	-0.6136	-0.6343	0.0000	0.6136	0.6343	0.0152	-0.0059	0.0122
21X	0.0000	0.0000	-0.3466	0.0000	0.0000	0.3466	-0.1968	0.0248	-0.0351
21XY	0.0000	0.0000	-0.3466	-0.0000	0.0000	0.3466	-0.0012	-0.0515	0.0269
21Y	0.0000	0.0000	-0.3466	-0.0000	0.0000	0.3466	-0.0020	-0.0629	-0.0188
22X	0.0000	-0.3569	-0.3466	-0.0000	0.3569	0.3466	0.0151	-0.1822	0.0387
22XY	0.0000	-0.3569	-0.4107	0.0000	0.3569	0.4107	0.0172	-0.0331	0.0108
22Y	0.0000	0.0000	-0.4107	0.0000	0.0000	0.4107	-0.0424	-0.0228	0.0186
26Y	0.0000	0.0000	-0.0795	0.0000	0.0000	0.0795	0.0936	0.3351	0.0726
27Y	0.0000	0.0000	-0.1057	-0.0000	-0.0000	0.1057	0.0969	0.2103	0.0668
28Y	0.0000	0.0000	-0.0795	-0.0000	0.0000	0.0795	0.0593	0.1156	0.0413
9S	0.0000	0.0000	-0.6364	0.0000	-0.0000	0.6364	-0.0564	0.1389	-0.0260
10S	0.0000	0.0000	-0.6392	0.0000	-0.0000	0.6392	-0.0683	0.1123	-0.0277
11S	0.0000	0.0000	-0.8152	0.0000	0.0000	0.8152	-0.0739	0.0922	-0.0274
12S	0.0000	0.0000	-1.1543	0.0000	0.0000	1.1543	-0.0899	0.0714	-0.0285
13S	0.0000	0.0000	-0.9523	0.0000	0.0000	0.9523	-0.1022	0.0523	-0.0272
14S	0.0000	0.0000	-1.4748	0.0000	0.0000	1.4748	-0.0837	0.0144	-0.0224
i0.50E129S	0.0000	-0.0120	-0.0578	-0.0000	0.0120	0.0578	-0.0265	0.5451	-0.0122
i0.50E113S	0.0000	-0.0040	-0.0338	-0.0000	0.0040	0.0338	-0.0223	0.3738	-0.0085
i0.50E99S	0.0000	0.0000	-0.0338	-0.0000	-0.0000	0.0338	-0.0214	0.2449	-0.0071
i0.50E85S	0.0000	0.0000	-0.0338	-0.0000	-0.0000	0.0338	-0.0237	0.1427	-0.0059
21XF0.50S	0.0000	0.0000	-0.0699	0.0000	0.0000	0.0699	-0.0296	0.0172	-0.1071
22PF0.50S	0.0000	0.0000	-0.0230	-0.0000	-0.0000	0.0230	-0.0662	-0.0154	-0.3047
9X	0.0000	-0.3213	-0.6364	-0.0000	0.3213	0.6364	0.0039	0.1391	0.0100
9XY	0.0000	-0.3213	-0.6364	0.0000	0.3213	0.6364	0.0103	0.0700	0.0134
9Y	0.0000	0.0000	-0.6364	-0.0000	0.0000	0.6364	-0.0634	0.0707	-0.0226
10X	0.0000	-0.3162	-0.6392	0.0000	0.3162	0.6392	0.0084	0.1130	0.0106
10XY	0.0000	-0.3162	-0.6392	0.0000	0.3162	0.6392	0.0100	0.0345	0.0152
10Y	0.0000	0.0000	-0.6392	0.0000	0.0000	0.6392	-0.0682	0.0335	-0.0229
11X	0.0000	-0.3951	-0.8152	0.0000	0.3951	0.8152	0.0091	0.0916	0.0100
11XY	0.0000	-0.3951	-0.8152	0.0000	0.3951	0.8152	0.0125	0.0028	0.0161
11Y	0.0000	0.0000	-0.8152	-0.0000	-0.0000	0.8152	-0.0796	0.0045	-0.0211
12X	0.0000	-0.5578	-1.1543	0.0000	0.5578	1.1543	0.0117	0.0737	0.0088
12XY	0.0000	-0.5578	-1.1543	-0.0000	0.5578	1.1543	0.0146	-0.0279	0.0166
12Y	0.0000	0.0000	-1.1543	0.0000	0.0000	1.1543	-0.0876	-0.0313	-0.0204
13X	0.0000	-0.3925	-0.9523	0.0000	0.3925	0.9523	0.0140	0.0528	0.0081
13XY	0.0000	-0.3925	-0.9523	0.0000	0.3925	0.9523	0.0161	-0.0635	0.0183
13Y	0.0000	0.0000	-0.9523	0.0000	-0.0000	0.9523	-0.1012	-0.0644	-0.0167

14X	0.0000	-0.6070	-1.4748	-0.0000	0.6070	1.4748	0.0128	0.0279	0.0066
14XY	0.0000	-0.6070	-1.4748	-0.0000	0.6070	1.4748	0.0178	-0.0516	0.0121
14Y	0.0000	0.0000	-1.4748	-0.0000	-0.0000	1.4748	-0.0423	-0.0641	-0.0167
21XF0.50Y	0.0000	0.0000	-0.0919	-0.0000	-0.0000	0.0919	-0.0281	-0.0588	-0.1505
22PF0.50X	0.0000	-0.0313	-0.0230	0.0000	0.0313	0.0230	0.0160	-0.1136	0.0204

Summary of Clamp Capacities and Usages for Load Case "NESC Heavy -":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	7.274	50.00	50.00	14.55	0.00	0.00	0.00	14.55
2	8.875	50.00	50.00	17.75	0.00	0.00	0.00	17.75
3	10.177	50.00	50.00	20.35	0.00	0.00	0.00	20.35
4	7.670	50.00	50.00	15.34	0.00	0.00	0.00	15.34
5	12.660	50.00	50.00	25.32	0.00	0.00	0.00	25.32
6	6.950	50.00	50.00	13.90	0.00	0.00	0.00	13.90
7	11.043	50.00	50.00	22.09	0.00	0.00	0.00	22.09
8	9.325	50.00	50.00	18.65	0.00	0.00	0.00	18.65
9	10.693	50.00	50.00	21.39	0.00	0.00	0.00	21.39
10	8.618	50.00	50.00	17.24	0.00	0.00	0.00	17.24
11	12.598	50.00	50.00	25.20	0.00	0.00	0.00	25.20
12	0.092	50.00	50.00	0.18	0.00	0.00	0.00	0.18
13	0.319	50.00	50.00	0.64	0.00	0.00	0.00	0.64
14	0.481	50.00	50.00	0.96	0.00	0.00	0.00	0.96
15	0.664	50.00	50.00	1.33	0.00	0.00	0.00	1.33
16	0.639	50.00	50.00	1.28	0.00	0.00	0.00	1.28
17	1.154	50.00	50.00	2.31	0.00	0.00	0.00	2.31
18	0.952	50.00	50.00	1.90	0.00	0.00	0.00	1.90
19	1.475	50.00	50.00	2.95	0.00	0.00	0.00	2.95
20	3.102	50.00	50.00	6.20	0.00	0.00	0.00	6.20
21	3.598	50.00	50.00	7.20	0.00	0.00	0.00	7.20
22	3.372	50.00	50.00	6.74	0.00	0.00	0.00	6.74
23	1.572	50.00	50.00	3.14	0.00	0.00	0.00	3.14
24	1.685	50.00	50.00	3.37	0.00	0.00	0.00	3.37
25	1.173	50.00	50.00	2.35	0.00	0.00	0.00	2.35
26	8.120	50.00	50.00	16.24	0.00	0.00	0.00	16.24
27	7.661	50.00	50.00	15.32	0.00	0.00	0.00	15.32
28	0.713	50.00	50.00	1.43	0.00	0.00	0.00	1.43
29	1.282	50.00	50.00	2.56	0.00	0.00	0.00	2.56
30	1.030	50.00	50.00	2.06	0.00	0.00	0.00	2.06
31	1.595	50.00	50.00	3.19	0.00	0.00	0.00	3.19

*** Analysis Results for Load Case No. 2 "NESC Extreme -" - Number of iterations in SAPS 12

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme -":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	-0.07343	0.4043	-0.03281	-0.5078	-0.0510	0.4024	2.927	3.404	128.8
2P	-0.07144	0.3608	-0.03162	-0.5838	-0.0665	0.3847	2.929	3.361	124.3
3P	-0.06214	0.3151	-0.03036	-0.5685	-0.0829	0.3669	2.938	3.315	119.8
4P	-0.05869	0.252	-0.02666	-0.4598	-0.0721	0.3387	2.941	3.252	112.8
5P	-0.0486	0.1907	-0.0237	-0.4119	-0.0232	0.3042	2.951	3.191	104.8
6P	-0.04707	0.1504	-0.02082	-0.3494	-0.0570	0.2785	2.953	3.15	98.73
7P	-0.03977	0.1092	-0.0188	-0.3218	-0.0252	0.2571	2.96	3.109	91.73
8P	-0.03923	0.07363	-0.01636	-0.2509	-0.0248	0.2359	2.961	3.074	84.73
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.1762	0.3829	-0.1735	-0.5985	-0.0452	0.4423	-0.1762	17.13	128.6
17P	0.04288	0.2542	0.117	-0.6489	-0.0012	0.3329	3.043	-14	112.9
18P	0.057	0.1531	0.09722	-0.4692	0.0009	0.3018	3.057	-16.6	98.85
19P	0.03622	0.07492	0.06432	-0.4228	-0.0076	0.2507	3.036	-14.18	84.81
20AP	-0.02336	-0.01668	-0.004221	-0.0953	0.0396	0.2158	9.545	-0.01668	40
20BP	-0.05355	-0.04746	-0.02432	-0.1518	-0.0296	0.2091	-0.05355	9.521	39.98
21P	0.1233	-0.03058	0.01204	0.0000	0.0000	0.0000	11.89	2.177	25.01
22P	-0.04778	-0.2053	-0.04903	0.0000	0.0000	0.0000	2.16	11.56	24.95
23P	-0.1295	0.2343	-0.1305	-0.5466	-0.0348	0.3717	-0.1295	14.48	112.7
24P	-0.1212	0.1347	-0.1149	-0.4057	-0.0281	0.3243	-0.1212	16.88	98.64
25P	-0.093	0.06085	-0.07384	-0.3129	-0.0118	0.2947	-0.093	14.31	84.68
26P	0.01002	0.2531	0.05891	-0.4780	-0.0001	0.3384	3.01	-8.372	112.9
27P	0.0203	0.152	0.04676	-0.3228	0.0018	0.3143	3.02	-9.723	98.8
28P	0.01161	0.07421	0.0281	-0.2604	-0.0069	0.2507	3.012	-8.551	84.78
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.01446	-0.05702	-0.0009908	0.0337	-0.0441	0.0832	1.486	-0.05702	25
31P	-0.02331	-0.0428	-0.001429	-0.0951	-0.0207	0.1248	1.477	-0.0428	40
32P	-0.0257	0.06688	-0.002726	-0.2494	-0.0146	0.2228	1.474	0.06688	84.75
33P	-0.03196	0.1432	-0.003247	-0.3845	-0.0309	0.2475	1.468	0.1432	98.75
34P	-0.04087	0.2422	-0.003889	-0.3634	-0.0383	0.2654	1.459	0.2422	112.7
35P	-0.05304	0.3949	-0.004926	-1.0426	-0.0418	0.2757	1.447	0.3949	128.7
36P	-0.05808	0.5288	-0.006528	-1.4301	-0.0421	0.2754	1.442	0.5288	134.7
37P	-0.06584	0.766	-0.009739	-1.5497	-0.0422	0.2753	1.434	0.766	143.7
1X	-0.03351	0.4042	0.02327	-0.4988	0.0276	0.3870	2.966	-2.596	128.8
1XY	-0.03293	0.362	0.01867	-0.5550	0.0313	0.3852	-3.033	-2.638	128.8
1Y	-0.0735	0.3615	-0.03643	-0.5497	-0.0063	0.3946	-3.074	3.361	128.8
2X	-0.03268	0.3614	0.02249	-0.5834	-0.0199	0.3729	2.967	-2.639	124.3
2XY	-0.03258	0.318	0.01812	-0.5399	-0.0671	0.3690	-3.033	-2.682	124.3
2Y	-0.07142	0.3171	-0.03532	-0.5392	-0.0233	0.3765	-3.071	3.317	124.3
3X	-0.03008	0.315	0.02179	-0.5771	-0.0500	0.3587	2.97	-2.685	119.8
3XY	-0.02426	0.2776	0.01762	-0.5110	-0.0655	0.3518	-3.024	-2.722	119.8
3Y	-0.06846	0.2776	-0.0342	-0.5019	-0.0645	0.3584	-3.068	3.278	119.8
4X	-0.02329	0.2523	0.01872	-0.4445	0.0000	0.3359	2.977	-2.748	112.8
4XY	-0.02304	0.2174	0.0151	-0.4334	-0.0520	0.3247	-3.023	-2.783	112.8
4Y	-0.05879	0.2168	-0.03034	-0.4416	-0.0151	0.3296	-3.059	3.217	112.8
5X	-0.02207	0.1905	0.01608	-0.4136	-0.0452	0.3058	2.978	-2.809	104.8
5XY	-0.01617	0.1581	0.01298	-0.3983	-0.0033	0.2986	-3.016	-2.842	104.8
5Y	-0.05486	0.1585	-0.02704	-0.3981	-0.0692	0.2992	-3.055	3.158	104.8
6X	-0.01665	0.1509	0.01319	-0.3416	0.0016	0.2825	2.983	-2.849	98.76
6XY	-0.01659	0.1196	0.01064	-0.3306	-0.0362	0.2792	-3.017	-2.88	98.76
6Y	-0.04704	0.1194	-0.0235	-0.3304	-0.0163	0.2757	-3.047	3.119	98.73

7X	-0.01702	0.1093	0.0111	-0.3280	-0.0214	0.2589	2.983	-2.891	91.76
7XY	-0.01185	0.08043	0.00901	-0.3026	-0.0079	0.2610	-3.012	-2.92	91.76
7Y	-0.04526	0.08081	-0.02096	-0.3056	-0.0419	0.2563	-3.045	3.081	91.73
8X	-0.01249	0.07359	0.008466	-0.2429	-0.0068	0.2351	2.988	-2.926	84.76
8XY	-0.01333	0.04748	0.006956	-0.2293	-0.0034	0.2428	-3.013	-2.953	84.76
8Y	-0.03811	0.047	-0.01792	-0.2261	-0.0255	0.2368	-3.038	3.047	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.06205	0.3841	0.15	-0.5436	0.0243	0.4025	0.06205	-16.37	129
17Y	0.04254	0.2188	0.1131	-0.6479	-0.0532	0.3407	-2.957	-14.03	112.9
18Y	0.05664	0.1207	0.09869	-0.4933	-0.0369	0.3134	-2.943	-16.63	98.85
19Y	0.03576	0.04868	0.06023	-0.4091	-0.0042	0.2456	-2.964	-14.2	84.81
20AY	-0.02329	-0.07726	-0.0109	-0.0950	-0.0636	0.2050	-9.591	-0.07726	39.99
20BX	0.006765	-0.04728	0.01251	-0.0826	-0.0225	0.2075	0.006765	-9.615	40.01
21X	-0.2111	-0.01445	-0.02734	0.0000	0.0000	0.0000	11.56	-2.222	24.97
21XY	0.02996	-0.05102	0.02234	0.0000	0.0000	0.0000	-11.74	-2.259	25.02
21Y	0.004831	-0.07675	-0.02328	0.0000	0.0000	0.0000	-11.77	2.131	24.98
22X	0.004884	-0.2256	0.03895	0.0000	0.0000	0.0000	2.213	-12	25.04
22XY	0.01455	-0.06636	0.01139	-0.1134	0.0019	0.1707	-2.193	-11.84	25.01
22Y	-0.01467	-0.05734	0.000956	0.0196	-0.0485	-0.0395	-2.223	11.71	25
26Y	0.00932	0.218	0.05497	-0.4777	-0.0522	0.3353	-2.991	-8.407	112.9
27Y	0.01921	0.12	0.04542	-0.3442	-0.0362	0.3099	-2.981	-9.755	98.8
28Y	0.01142	0.04806	0.02533	-0.2475	-0.0035	0.2530	-2.989	-8.577	84.78
9S	-0.03772	0.049	-0.01738	-0.1847	-0.0260	0.2172	4.1	4.187	76.98
10S	-0.04215	0.0301	-0.01845	-0.1532	-0.0069	0.1962	5.233	5.305	69.23
11S	-0.0431	0.0146	-0.01866	-0.1243	-0.0102	0.1717	6.37	6.427	61.48
12S	-0.04935	-0.0008064	-0.01957	-0.1013	0.0127	0.1474	7.82	7.868	51.56
13S	-0.05368	-0.01732	-0.02001	-0.1007	-0.0024	0.1092	9.515	9.551	39.98
14S	-0.04927	-0.03199	-0.01804	0.0083	-0.0960	0.0648	11.72	11.74	24.98
i0.50E129S	-0.0532	0.3831	-0.01157	-0.5363	-0.0567	0.3962	-0.0532	0.3831	128.8
i0.50E113S	-0.04091	0.2347	-0.00648	-0.4305	-0.0803	0.3309	-0.04091	0.2347	112.8
i0.50E99S	-0.03192	0.1351	-0.005441	-0.3427	-0.0766	0.3173	-0.03192	0.1351	98.74
i0.50E85S	-0.02567	0.05993	-0.004754	-0.2389	-0.0674	0.2673	-0.02567	0.05993	84.75
21XF0.50S	-0.01495	-0.02397	-0.0931	0.0323	0.7925	0.2345	11.76	-0.02397	24.91
22PF0.50S	-0.03967	-0.3221	-0.1996	0.0000	0.0000	0.0000	-0.03967	11.45	24.8
9X	-0.01035	0.04963	0.009552	-0.1846	0.0112	0.2134	4.127	-4.088	77.01
9XY	-0.005993	0.01635	0.008445	-0.1627	-0.0083	0.2124	-4.144	-4.121	77.01
9Y	-0.04257	0.01741	-0.01852	-0.1668	-0.0079	0.2091	-4.18	4.155	76.98
10X	-0.00457	0.03017	0.01049	-0.1535	-0.0038	0.1926	5.271	-5.245	69.26
10XY	-0.003957	-0.007766	0.009699	-0.1461	0.0084	0.1860	-5.279	-5.283	69.26
10Y	-0.04227	-0.008547	-0.01927	-0.1360	-0.0120	0.1825	-5.317	5.267	69.23
11X	-0.002095	0.01506	0.0105	-0.1208	0.0105	0.1677	6.411	-6.398	61.51
11XY	0.0001326	-0.03031	0.01062	-0.1119	-0.0065	0.1618	-6.413	-6.443	61.51
11Y	-0.04641	-0.0281	-0.01857	-0.1192	0.0014	0.1606	-6.459	6.385	61.48
12X	0.002302	-0.0007737	0.01081	-0.1070	-0.0041	0.1417	7.871	-7.87	51.59
12XY	0.003333	-0.051	0.01135	-0.1170	0.0046	0.1375	-7.866	-7.92	51.59
12Y	-0.04843	-0.05453	-0.01912	-0.1196	0.0131	0.1389	-7.917	7.814	51.56
13X	0.005764	-0.01514	0.01067	-0.0505	0.0155	0.1119	9.574	-9.584	40.01
13XY	0.007626	-0.07684	0.01338	-0.0268	-0.0178	0.1003	-9.561	-9.645	40.01
13Y	-0.05263	-0.07713	-0.01768	-0.0661	-0.0667	0.0920	-9.621	9.491	39.98
14X	0.002759	-0.01209	0.006831	0.0283	0.0280	0.0760	11.77	-11.78	25.01
14XY	0.01448	-0.05113	0.007362	0.1764	0.0077	0.0317	-11.76	-11.82	25.01
14Y	-0.01472	-0.07746	-0.01786	0.1303	-0.1366	0.0186	-11.79	11.69	24.98
21XF0.50Y	-0.01237	-0.06651	-0.2357	0.0358	-1.4976	0.0208	-11.78	-0.06651	24.76
22PF0.50X	0.006894	-0.2389	-0.06041	0.0000	0.0000	0.0000	0.006894	-12.01	24.94

Joint Support Reactions for Load Case "NESC Extreme -":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
15P	-4.32	0.0	-2.14	0.0	0.0	-54.16	0.0	0.0	54.38	0.0	-3.92	0.0	5.0	0.0	0.0	-0.41	0.0	0.0
29P	0.08	0.0	1.77	0.0	0.0	-13.09	0.0	0.0	13.21	0.0	-18.89	0.0	2.6	0.0	0.0	-2.02	0.0	0.0
15X	10.69	0.0	-6.60	0.0	0.0	58.94	0.0	0.0	60.27	0.0	-0.83	0.0	-0.2	0.0	0.0	-0.65	0.0	0.0
15XY	-9.94	0.0	-4.50	0.0	0.0	36.16	0.0	0.0	37.78	0.0	-3.44	0.0	-1.8	0.0	0.0	0.33	0.0	0.0
15Y	11.03	0.0	-2.74	0.0	0.0	-82.54	0.0	0.0	83.31	0.0	-7.85	0.0	-0.9	0.0	0.0	0.59	0.0	0.0

Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Extreme -":

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0734	0.4043	-0.0328
2P	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0714	0.3608	-0.0316
3P	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0621	0.3151	-0.0304
4P	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0587	0.2520	-0.0267
5P	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0486	0.1907	-0.0237
6P	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0471	0.1504	-0.0208
7P	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0398	0.1092	-0.0188
8P	0.0000	-0.7764	-0.7133	-0.0000	0.7764	0.7133	-0.0392	0.0736	-0.0164
15P	0.0000	-0.5725	-0.5264	4.3243	2.7079	-53.6357	0.0000	0.0000	0.0000
16P	-1.5700	3.9791	-0.7669	1.5700	-3.9791	0.7669	-0.1762	0.3829	-0.1735
17P	3.8810	1.9931	-1.8349	-3.8810	-1.9931	1.8349	0.0429	0.2542	0.1170
18P	3.9990	3.1641	-1.6669	-3.9990	-3.1641	1.6669	0.0570	0.1531	0.0972
19P	3.9420	2.5711	-1.2119	-3.9420	-2.5711	1.2119	0.0362	0.0749	0.0643
20AP	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0234	-0.0167	-0.0042
20BP	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0536	-0.0475	-0.0243
21P	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.1233	-0.0306	0.0120
22P	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0478	-0.2053	-0.0490
23P	-2.3880	5.3341	-1.0259	2.3880	-5.3341	1.0259	-0.1295	0.2343	-0.1305
24P	-1.0280	4.6141	-1.0569	1.0280	-4.6141	1.0569	-0.1212	0.1347	-0.1149
25P	-2.2910	5.8851	-0.6999	2.2910	-5.8851	0.6999	-0.0930	0.0608	-0.0738
26P	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	0.0100	0.2531	0.0589
27P	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	0.0203	0.1520	0.0468
28P	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	0.0116	0.0742	0.0281
29P	0.0000	-0.5725	-0.5264	-0.0764	-1.1950	-12.5642	0.0000	0.0000	0.0000
30P	0.0000	-0.2915	-1.0334	-0.0000	0.2915	1.0334	-0.0145	-0.0570	-0.0010
31P	0.0000	-0.3145	-0.9924	0.0000	0.3145	0.9924	-0.0233	-0.0428	-0.0014
32P	0.0000	-0.5224	-1.1713	-0.0000	0.5224	1.1713	-0.0257	0.0669	-0.0027
33P	0.0000	-0.0829	-0.4049	-0.0000	0.0829	0.4049	-0.0320	0.1432	-0.0032
34P	0.0000	-0.0739	-0.4209	-0.0000	0.0739	0.4209	-0.0409	0.2422	-0.0039
35P	0.0000	-0.1349	-0.3119	-0.0000	0.1349	0.3119	-0.0530	0.3949	-0.0049
36P	0.0000	8.8831	-3.6729	0.0000	-8.8831	3.6729	-0.0581	0.5288	-0.0065
37P	0.0000	2.6281	-3.5469	0.0000	-2.6281	3.5469	-0.0658	0.7660	-0.0097
1X	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0335	0.4042	0.0233
1XY	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0329	0.3620	0.0187
1Y	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0735	0.3615	-0.0364
2X	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0327	0.3614	0.0225
2XY	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0326	0.3180	0.0181
2Y	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0714	0.3171	-0.0353
3X	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0301	0.3150	0.0218
3XY	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0243	0.2776	0.0176
3Y	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0685	0.2776	-0.0342
4X	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0233	0.2523	0.0187

4XY	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0230	0.2174	0.0151
4Y	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0588	0.2168	-0.0303
5X	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0221	0.1905	0.0161
5XY	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0162	0.1581	0.0130
5Y	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0549	0.1585	-0.0270
6X	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0166	0.1509	0.0132
6XY	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0166	0.1196	0.0106
6Y	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0470	0.1194	-0.0235
7X	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0170	0.1093	0.0111
7XY	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0118	0.0804	0.0090
7Y	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0453	0.0808	-0.0210
8X	0.0000	-0.7764	-0.7133	-0.0000	0.7764	0.7133	-0.0125	0.0736	0.0085
8XY	0.0000	-0.7764	-0.7133	-0.0000	0.7764	0.7133	-0.0133	0.0475	0.0070
8Y	0.0000	-0.7764	-0.7133	-0.0000	0.7764	0.7133	-0.0381	0.0470	-0.0179
15X	0.0000	-0.5725	-0.5264	-10.6873	7.1698	59.4710	0.0000	0.0000	0.0000
15XY	0.0000	-0.5725	-0.5264	9.9416	5.0727	36.6909	0.0000	0.0000	0.0000
15Y	0.0000	-0.5725	-0.5264	-11.0252	3.3095	-82.0098	0.0000	0.0000	0.0000
16X	-0.5920	3.4731	-0.9479	0.5920	-3.4731	0.9479	0.0620	0.3841	0.1500
17Y	-3.8050	3.2021	-0.0889	3.8050	-3.2021	0.0889	0.0425	0.2188	0.1131
18Y	-3.5320	2.9121	-0.1199	3.5320	-2.9121	0.1199	0.0566	0.1207	0.0987
19Y	-4.1390	3.5971	-0.0619	4.1390	-3.5971	0.0619	0.0358	0.0487	0.0602
20AY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0233	-0.0773	-0.0109
20BX	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0068	-0.0473	0.0125
21X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.2111	-0.0144	-0.0273
21XY	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0300	-0.0510	0.0223
21Y	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0048	-0.0767	-0.0233
22X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0049	-0.2256	0.0389
22XY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0146	-0.0664	0.0114
22Y	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0147	-0.0573	0.0010
26Y	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	0.0093	0.2180	0.0550
27Y	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	0.0192	0.1200	0.0454
28Y	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	0.0114	0.0481	0.0253
9S	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0377	0.0490	-0.0174
10S	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0422	0.0301	-0.0184
11S	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0431	0.0146	-0.0187
12S	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0493	-0.0008	-0.0196
13S	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0537	-0.0173	-0.0200
14S	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0493	-0.0320	-0.0180
i0.50E129S	0.0000	-0.2039	-0.1869	-0.0000	0.2039	0.1869	-0.0532	0.3831	-0.0116
i0.50E113S	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0409	0.2347	-0.0065
i0.50E99S	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0319	0.1351	-0.0054
i0.50E85S	0.0000	-0.2039	-0.1869	0.0000	0.2039	0.1869	-0.0257	0.0599	-0.0048
21XF0.50S	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0149	-0.0240	-0.0931
22PF0.50S	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0397	-0.3221	-0.1996
9X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0103	0.0496	0.0096
9XY	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0060	0.0164	0.0084
9Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0426	0.0174	-0.0185
10X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0046	0.0302	0.0105
10XY	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0040	-0.0078	0.0097
10Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0423	-0.0085	-0.0193
11X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0021	0.0151	0.0105
11XY	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0001	-0.0303	0.0106
11Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0464	-0.0281	-0.0186
12X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0023	-0.0008	0.0108
12XY	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0033	-0.0510	0.0113
12Y	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0484	-0.0545	-0.0191
13X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0058	-0.0151	0.0107
13XY	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0076	-0.0768	0.0134
13Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0526	-0.0771	-0.0177

14X	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0028	-0.0121	0.0068
14XY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0145	-0.0511	0.0074
14Y	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0147	-0.0775	-0.0179
21XF0.50Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0124	-0.0665	-0.2357
22PF0.50X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0069	-0.2389	-0.0604

Crossing Diagonal Check for Load Case "NESC Extreme -" (RLOUT controls):

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R Cap. (kips)	Original Supported RLX	Original Supported RLY	Original Supported RLZ	Original Supported L/R	Original Supported KL/R	Original Supported Curve No.	Alternate Unsupported L/R Cap. (kips)	Alternate Unsupported RLOUT	Alternate Unsupported L/R	Alternate Unsupported KL/R	Alternate Unsupported Curve No.
21BY	21BP	Short only	-11.60	0.53	44.33	0.580	0.580	0.580	95.79	101.84	2	42.37	1.000	95.79	107.89	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme -":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	3.649	50.00	50.00	7.30	0.00	0.00	0.00	7.30
2	4.346	50.00	50.00	8.69	0.00	0.00	0.00	8.69
3	4.733	50.00	50.00	9.47	0.00	0.00	0.00	9.47
4	4.974	50.00	50.00	9.95	0.00	0.00	0.00	9.95
5	5.365	50.00	50.00	10.73	0.00	0.00	0.00	10.73
6	4.579	50.00	50.00	9.16	0.00	0.00	0.00	9.16
7	4.860	50.00	50.00	9.72	0.00	0.00	0.00	9.72
8	5.484	50.00	50.00	10.97	0.00	0.00	0.00	10.97
9	5.934	50.00	50.00	11.87	0.00	0.00	0.00	11.87
10	4.844	50.00	50.00	9.69	0.00	0.00	0.00	9.69
11	6.354	50.00	50.00	12.71	0.00	0.00	0.00	12.71
12	0.277	50.00	50.00	0.55	0.00	0.00	0.00	0.55
13	0.277	50.00	50.00	0.55	0.00	0.00	0.00	0.55
14	0.277	50.00	50.00	0.55	0.00	0.00	0.00	0.55
15	1.054	50.00	50.00	2.11	0.00	0.00	0.00	2.11
16	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
17	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
18	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
19	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
20	1.074	50.00	50.00	2.15	0.00	0.00	0.00	2.15
21	1.041	50.00	50.00	2.08	0.00	0.00	0.00	2.08
22	1.283	50.00	50.00	2.57	0.00	0.00	0.00	2.57
23	0.413	50.00	50.00	0.83	0.00	0.00	0.00	0.83
24	0.427	50.00	50.00	0.85	0.00	0.00	0.00	0.85
25	0.340	50.00	50.00	0.68	0.00	0.00	0.00	0.68
26	9.612	50.00	50.00	19.22	0.00	0.00	0.00	19.22
27	4.414	50.00	50.00	8.83	0.00	0.00	0.00	8.83
28	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
29	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
30	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
31	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56

*** Analysis Results for Load Case No. 3 "NESC Heavy +" - Number of iterations in SAPS 23

Equilibrium Joint Positions and Rotations for Load Case "NESC Heavy +":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	-0.05276	0.6946	-0.04894	-0.6512	0.0590	0.9139	2.947	3.695	128.8
2P	-0.05542	0.6436	-0.04776	-0.7469	-0.0245	0.8800	2.945	3.644	124.3
3P	-0.04817	0.578	-0.04635	-0.8200	-0.0377	0.8451	2.952	3.578	119.8
4P	-0.04984	0.4925	-0.04269	-0.6544	-0.0335	0.7903	2.95	3.492	112.8
5P	-0.04445	0.4016	-0.03902	-0.6257	0.0347	0.7145	2.956	3.402	104.8
6P	-0.04792	0.34	-0.035	-0.5369	-0.0266	0.6582	2.952	3.34	98.71
7P	-0.04369	0.276	-0.0317	-0.5055	0.0253	0.6040	2.956	3.276	91.72
8P	-0.04948	0.2199	-0.02739	-0.3928	0.0068	0.5500	2.951	3.22	84.72
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.2743	0.6474	-0.2159	-0.7172	0.0364	0.9361	-0.2743	17.4	128.6
17P	0.1999	0.4991	0.1487	-0.7000	0.0823	0.8366	3.2	-13.75	112.9
18P	0.2097	0.3483	0.1352	-0.5540	0.0919	0.7610	3.21	-16.4	98.89
19P	0.1329	0.2245	0.09326	-0.5074	0.0679	0.6158	3.133	-14.03	84.84
20AP	-0.04937	0.0977	-0.02132	-0.0442	0.2086	0.4301	9.519	0.0977	39.98
20BP	-0.114	0.03335	-0.03271	-0.2294	-0.0647	0.4413	-0.114	9.601	39.97
21P	-0.07308	0.03777	0.00835	0.0000	0.0000	0.0000	11.7	2.246	25.01
22P	-0.094	0.01667	-0.03663	0.0000	0.0000	0.0000	2.114	11.79	24.96
23P	-0.2172	0.4488	-0.1788	-0.7213	0.0198	0.8853	-0.2172	14.7	112.6
24P	-0.224	0.3014	-0.1726	-0.6062	0.0257	0.7719	-0.224	17.05	98.58
25P	-0.176	0.1891	-0.1118	-0.4755	0.0407	0.6918	-0.176	14.44	84.64
26P	0.1171	0.4965	0.08233	-0.6327	0.0835	0.8550	3.117	-8.128	112.9
27P	0.1171	0.3452	0.072	-0.4770	0.0932	0.7911	3.117	-9.53	98.82
28P	0.07205	0.2225	0.04638	-0.4198	0.0689	0.6258	3.072	-8.402	84.8
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.03135	0.03624	-0.002272	-0.0508	-0.0819	0.1861	1.469	0.03624	25
31P	-0.04913	0.04402	-0.003304	-0.0429	-0.0346	0.2838	1.451	0.04402	40
32P	-0.01844	0.2048	-0.006248	-0.4057	0.0470	0.5268	1.482	0.2048	84.74
33P	-0.01175	0.3226	-0.00745	-0.5583	0.0261	0.5902	1.488	0.3226	98.74
34P	-0.007934	0.4714	-0.008889	-0.6307	0.0189	0.6357	1.492	0.4714	112.7
35P	-0.006415	0.6718	-0.01081	-0.9002	0.0126	0.6611	1.494	0.6718	128.7
36P	-0.006284	0.7747	-0.01193	-1.0374	0.0126	0.6611	1.494	0.7747	134.7
37P	-0.006243	0.9426	-0.01367	-1.0839	0.0126	0.6611	1.494	0.9426	143.7
1X	0.03884	0.6952	0.02528	-0.6343	0.0528	0.8957	3.039	-2.305	128.8
1XY	0.03964	0.6027	0.02689	-0.6633	0.0816	0.8696	-2.96	-2.397	128.8
1Y	-0.05178	0.6015	-0.04694	-0.6770	0.0626	0.8791	-3.052	3.601	128.8
2X	0.03559	0.6452	0.02469	-0.7508	0.0528	0.8706	3.036	-2.355	124.3
2XY	0.0362	0.5507	0.02651	-0.7153	-0.0022	0.8458	-2.964	-2.449	124.3
2Y	-0.05484	0.5487	-0.04582	-0.7111	0.0315	0.8490	-3.055	3.549	124.3
3X	0.03405	0.5782	0.02438	-0.8273	0.0078	0.8463	3.034	-2.422	119.8
3XY	0.03987	0.4906	0.02631	-0.7551	0.0003	0.8209	-2.96	-2.509	119.8
3Y	-0.05368	0.4898	-0.04453	-0.7443	-0.0308	0.8194	-3.054	3.49	119.8
4X	0.03411	0.4938	0.02191	-0.6534	0.0827	0.8068	3.034	-2.506	112.8
4XY	0.03491	0.4081	0.02425	-0.6201	0.0077	0.7819	-2.965	-2.592	112.8
4Y	-0.04952	0.4071	-0.04047	-0.6219	0.0423	0.7714	-3.05	3.407	112.8
5X	0.02586	0.4014	0.01921	-0.6171	0.0176	0.7378	3.026	-2.599	104.8
5XY	0.03342	0.323	0.02205	-0.5825	0.0759	0.7191	-2.967	-2.677	104.8
5Y	-0.05169	0.323	-0.03648	-0.5836	-0.0298	0.7053	-3.052	3.323	104.8
6X	0.02514	0.3415	0.01569	-0.5360	0.0917	0.6844	3.025	-2.658	98.77
6XY	0.02554	0.2656	0.01906	-0.4939	0.0253	0.6724	-2.974	-2.734	98.77
6Y	-0.04754	0.2651	-0.03184	-0.4950	0.0431	0.6542	-3.048	3.265	98.72

7X	0.01468	0.2761	0.0129	-0.5100	0.0504	0.6234	3.015	-2.724	91.76
7XY	0.02298	0.2073	0.01657	-0.4519	0.0734	0.6213	-2.977	-2.793	91.77
7Y	-0.05193	0.2073	-0.02818	-0.4559	-0.0054	0.6069	-3.052	3.207	91.72
8X	0.01234	0.2204	0.009089	-0.3910	0.0689	0.5620	3.012	-2.78	84.76
8XY	0.01125	0.1578	0.01302	-0.3367	0.0688	0.5702	-2.989	-2.842	84.76
8Y	-0.04743	0.157	-0.02362	-0.3370	0.0134	0.5594	-3.047	3.157	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.2519	0.6519	0.1777	-0.6266	0.0586	0.8870	0.2519	-16.1	129
17Y	0.1998	0.411	0.1573	-0.7578	0.0064	0.8545	-2.8	-13.84	113
18Y	0.2094	0.2677	0.1509	-0.6400	0.0241	0.7880	-2.791	-16.48	98.9
19Y	0.1323	0.1601	0.09359	-0.5009	0.0671	0.6150	-2.868	-14.09	84.84
20AY	-0.04899	-0.03105	-0.002305	-0.0433	0.0246	0.4409	-9.617	-0.03105	40
20BX	0.01534	0.03401	0.00928	-0.0979	-0.0262	0.4370	0.01534	-9.534	40.01
21X	0.08815	0.06174	-0.002361	0.0000	0.0000	0.0000	11.86	-2.146	25
21XY	-0.03959	-0.03242	0.02373	0.0000	0.0000	0.0000	-11.81	-2.24	25.02
21Y	0.02492	-0.0402	-0.01742	0.0000	0.0000	0.0000	-11.75	2.168	24.98
22X	0.01339	0.1372	-0.006805	0.0000	0.0000	0.0000	2.221	-11.63	24.99
22XY	0.0145	0.02203	0.005654	-0.0688	-0.0763	0.2413	-2.194	-11.75	25.01
22Y	-0.04714	0.0312	0.02891	0.2605	0.0171	0.0222	-2.255	11.8	25.03
26Y	0.1161	0.4092	0.0857	-0.6721	0.0076	0.8509	-2.884	-8.216	112.9
27Y	0.115	0.2662	0.07806	-0.5409	0.0255	0.7839	-2.885	-9.609	98.83
28Y	0.07147	0.1588	0.04755	-0.4074	0.0683	0.6279	-2.929	-8.466	84.8
9S	-0.05532	0.184	-0.02896	-0.3018	-0.0018	0.4999	4.082	4.322	76.97
10S	-0.07065	0.1557	-0.03046	-0.2343	0.0223	0.4507	5.205	5.431	69.22
11S	-0.07843	0.136	-0.0296	-0.1902	0.0143	0.3937	6.334	6.549	61.47
12S	-0.09829	0.1145	-0.03039	-0.1335	0.0677	0.3414	7.771	7.983	51.55
13S	-0.1144	0.09734	-0.02788	-0.1807	-0.0114	0.2434	9.454	9.666	39.97
14S	-0.09487	0.03769	-0.02406	-0.2256	-0.2217	0.1042	11.68	11.81	24.98
i0.50E129S	-0.006316	0.6484	-0.01312	-0.7150	-0.0066	0.8748	-0.006316	0.6484	128.8
i0.50E113S	-0.007726	0.4505	-0.008561	-0.6308	0.0024	0.8573	-0.007726	0.4505	112.8
i0.50E99S	-0.01155	0.3031	-0.006949	-0.5086	0.0035	0.7674	-0.01155	0.3031	98.74
i0.50E85S	-0.0183	0.1881	-0.005669	-0.3573	0.0102	0.6389	-0.0183	0.1881	84.74
21XF0.50S	-0.03342	0.04877	-0.2078	-0.0565	1.7595	0.0136	11.74	0.04877	24.79
22PF0.50S	-0.07535	0.02395	-0.3229	0.0000	0.0000	0.0000	-0.07535	11.79	24.68
9X	0.009341	0.1841	0.009678	-0.2966	0.0897	0.5081	4.147	-3.953	77.01
9XY	0.01712	0.1093	0.01534	-0.2323	0.0530	0.5031	-4.12	-4.028	77.02
9Y	-0.06374	0.1095	-0.02329	-0.2335	0.0241	0.4931	-4.201	4.247	76.98
10X	0.013	0.1569	0.009549	-0.2488	0.0550	0.4560	5.288	-5.118	69.26
10XY	0.01497	0.0708	0.017	-0.1952	0.0751	0.4399	-5.26	-5.204	69.27
10Y	-0.07059	0.07002	-0.02286	-0.1922	0.0194	0.4342	-5.346	5.345	69.23
11X	0.01226	0.1345	0.008148	-0.1795	0.0724	0.3991	6.425	-6.278	61.51
11XY	0.01634	0.03808	0.01733	-0.1494	0.0391	0.3842	-6.396	-6.375	61.52
11Y	-0.0851	0.03877	-0.02012	-0.1519	0.0357	0.3783	-6.498	6.452	61.48
12X	0.01319	0.1188	0.005545	-0.1308	0.0462	0.3398	7.882	-7.75	51.59
12XY	0.01701	0.005408	0.01735	-0.1399	0.0479	0.3221	-7.852	-7.863	51.6
12Y	-0.09594	0.003282	-0.01815	-0.1462	0.0596	0.3238	-7.965	7.872	51.56
13X	0.01409	0.0981	0.004015	-0.1467	0.0385	0.2565	9.583	-9.471	40
13XY	0.01637	-0.03007	0.01797	-0.0757	0.0324	0.2457	-9.552	-9.599	40.02
13Y	-0.1134	-0.03142	-0.01331	-0.0882	-0.0891	0.2270	-9.682	9.537	39.99
14X	0.01301	0.0635	0.003142	-0.1876	0.0473	0.1429	11.78	-11.71	25
14XY	0.01542	-0.03209	0.01258	0.0929	0.0385	0.1303	-11.75	-11.8	25.01
14Y	-0.04685	-0.04104	-0.01482	0.0759	-0.2865	0.0893	-11.82	11.73	24.99
21XF0.50Y	-0.03062	-0.03712	-0.12	-0.0490	-0.7218	0.3813	-11.8	-0.03712	24.88
22PF0.50X	0.01377	0.08571	-0.005056	0.0000	0.0000	0.0000	0.01377	-11.68	24.99

Joint Support Reactions for Load Case "NESC Heavy +":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
15P	-21.56	0.0	-26.44	0.0	0.0	-181.27	0.0	0.0	184.46	0.0	0.68	0.0	8.8	0.0	0.0	0.13	0.0	0.0
29P	0.23	0.0	-1.08	0.0	0.0	-31.25	0.0	0.0	31.27	0.0	10.21	0.0	6.4	0.0	0.0	-4.50	0.0	0.0
15X	26.62	0.0	-33.09	0.0	0.0	160.91	0.0	0.0	166.42	0.0	5.03	0.0	-1.5	0.0	0.0	-0.35	0.0	0.0
15XY	-29.59	0.0	-22.18	0.0	0.0	146.80	0.0	0.0	151.38	0.0	-3.07	0.0	-1.5	0.0	0.0	-0.43	0.0	0.0
15Y	27.00	0.0	-23.76	0.0	0.0	-186.80	0.0	0.0	190.23	0.0	-4.54	0.0	0.7	0.0	0.0	-0.29	0.0	0.0

Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Heavy +":

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0000	-0.1927	-0.0000	0.0000	0.1927	-0.0528	0.6946	-0.0489
2P	0.0000	0.0000	-0.0923	-0.0000	-0.0000	0.0923	-0.0554	0.6436	-0.0478
3P	0.0000	0.0000	-0.1921	0.0000	-0.0000	0.1921	-0.0482	0.5780	-0.0464
4P	0.0000	0.0000	-0.3270	-0.0000	-0.0000	0.3270	-0.0498	0.4925	-0.0427
5P	0.0000	0.0000	-0.3335	-0.0000	-0.0000	0.3335	-0.0445	0.4016	-0.0390
6P	0.0000	0.0000	-0.4888	-0.0000	-0.0000	0.4888	-0.0479	0.3400	-0.0350
7P	0.0000	0.0000	-0.5277	0.0000	0.0000	0.5277	-0.0437	0.2760	-0.0317
8P	0.0000	0.0000	-0.6716	-0.0000	0.0000	0.6716	-0.0495	0.2199	-0.0274
15P	0.0000	0.0000	-1.0248	21.5558	26.4443	-180.2485	0.0000	0.0000	0.0000
16P	-2.7580	8.7340	-1.2725	2.7580	-8.7340	1.2725	-0.2743	0.6474	-0.2159
17P	7.9300	5.6473	-3.1622	-7.9300	-5.6473	3.1622	0.1999	0.4991	0.1487
18P	8.7480	8.7272	-3.0828	-8.7480	-8.7272	3.0828	0.2097	0.3483	0.1352
19P	8.3430	7.0333	-2.0982	-8.3430	-7.0333	2.0982	0.1329	0.2245	0.0933
20AP	0.0000	0.0000	-0.6136	0.0000	0.0000	0.6136	-0.0494	0.0977	-0.0213
20BP	0.0000	0.0000	-0.6343	0.0000	0.0000	0.6343	-0.1140	0.0333	-0.0327
21P	0.0000	0.0000	-0.3466	0.0000	-0.0000	0.3466	-0.0731	0.0378	0.0084
22P	0.0000	0.0000	-0.3466	-0.0000	-0.0000	0.3466	-0.0940	0.0167	-0.0366
23P	-4.0070	10.2940	-1.6243	4.0070	-10.2940	1.6243	-0.2172	0.4488	-0.1788
24P	-0.8630	8.9270	-1.8796	0.8630	-8.9270	1.8796	-0.2240	0.3014	-0.1726
25P	-4.4330	12.2420	-1.1833	4.4330	-12.2420	1.1833	-0.1760	0.1891	-0.1118
26P	0.0000	0.0000	-0.0795	-0.0000	0.0000	0.0795	0.1171	0.4965	0.0823
27P	0.0000	0.0000	-0.1057	0.0000	-0.0000	0.1057	0.1171	0.3452	0.0720
28P	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.0721	0.2225	0.0464
29P	0.0000	0.5283	-1.1425	-0.2281	0.5508	-30.1081	0.0000	0.0000	0.0000
30P	0.0000	0.9283	-3.0286	0.0000	-0.9283	3.0286	-0.0314	0.0362	-0.0023
31P	0.0000	1.1982	-3.4674	-0.0000	-1.1982	3.4674	-0.0491	0.0440	-0.0033
32P	0.0000	1.1633	-3.2409	0.0000	-1.1633	3.2409	-0.0184	0.2048	-0.0062
33P	0.0000	0.5320	-1.5148	0.0000	-0.5320	1.5148	-0.0117	0.3226	-0.0075
34P	0.0000	0.5790	-1.6212	-0.0000	-0.5790	1.6212	-0.0079	0.4714	-0.0089
35P	0.0000	0.4230	-1.1163	0.0000	-0.4230	1.1163	-0.0064	0.6718	-0.0108
36P	0.0000	2.6630	-7.8290	-0.0000	-2.6630	7.8290	-0.0063	0.7747	-0.0119
37P	0.0000	0.9170	-7.6368	-0.0000	-0.9170	7.6368	-0.0062	0.9426	-0.0137
1X	0.0000	0.0741	-0.1927	-0.0000	-0.0741	0.1927	0.0388	0.6952	0.0253
1XY	0.0000	0.0691	-0.1824	-0.0000	-0.0691	0.1824	0.0396	0.6027	0.0269
1Y	0.0000	0.0000	-0.1824	-0.0000	-0.0000	0.1824	-0.0518	0.6015	-0.0469
2X	0.0000	0.0776	-0.0923	-0.0000	-0.0776	0.0923	0.0356	0.6452	0.0247
2XY	0.0000	0.0776	-0.0923	-0.0000	-0.0776	0.0923	0.0362	0.5507	0.0265
2Y	0.0000	0.0000	-0.0923	-0.0000	-0.0000	0.0923	-0.0548	0.5487	-0.0458
3X	0.0000	0.1111	-0.1914	0.0000	-0.1111	0.1914	0.0341	0.5782	0.0244
3XY	0.0000	0.1111	-0.1914	0.0000	-0.1111	0.1914	0.0399	0.4906	0.0263
3Y	0.0000	0.0000	-0.1921	0.0000	-0.0000	0.1921	-0.0537	0.4898	-0.0445
4X	0.0000	0.1531	-0.3196	-0.0000	-0.1531	0.3196	0.0341	0.4938	0.0219

4XY	0.0000	0.1481	-0.3118	-0.0000	-0.1481	0.3118	0.0349	0.4081	0.0243
4Y	0.0000	0.0000	-0.3192	-0.0000	-0.0000	0.3192	-0.0495	0.4071	-0.0405
5X	0.0000	0.1813	-0.3327	-0.0000	-0.1813	0.3327	0.0259	0.4014	0.0192
5XY	0.0000	0.1813	-0.3327	-0.0000	-0.1813	0.3327	0.0334	0.3230	0.0221
5Y	0.0000	0.0000	-0.3335	-0.0000	-0.0000	0.3335	-0.0517	0.3230	-0.0365
6X	0.0000	0.1636	-0.4720	-0.0000	-0.1636	0.4720	0.0251	0.3415	0.0157
6XY	0.0000	0.1636	-0.4643	-0.0000	-0.1636	0.4643	0.0255	0.2656	0.0191
6Y	0.0000	0.0000	-0.4811	-0.0000	-0.0000	0.4811	-0.0475	0.2651	-0.0318
7X	0.0000	0.1963	-0.5270	0.0000	-0.1963	0.5270	0.0147	0.2761	0.0129
7XY	0.0000	0.1963	-0.5270	0.0000	-0.1963	0.5270	0.0230	0.2073	0.0166
7Y	0.0000	0.0000	-0.5277	0.0000	0.0000	0.5277	-0.0519	0.2073	-0.0282
8X	0.0000	0.2126	-0.6642	0.0000	-0.2126	0.6642	0.0123	0.2204	0.0091
8XY	0.0000	0.2126	-0.6565	-0.0000	-0.2126	0.6565	0.0113	0.1578	0.0130
8Y	0.0000	0.0000	-0.6639	-0.0000	0.0000	0.6639	-0.0474	0.1570	-0.0236
15X	0.0000	0.4266	-1.0248	-26.6208	32.6645	161.9352	0.0000	0.0000	0.0000
15XY	0.0000	0.4266	-1.0248	29.5914	21.7493	147.8239	0.0000	0.0000	0.0000
15Y	0.0000	0.0000	-1.0248	-27.0024	23.7575	-185.7768	0.0000	0.0000	0.0000
16X	-0.1480	7.7323	-1.6425	0.1480	-7.7323	1.6425	0.2519	0.6519	0.1777
17Y	-4.9620	5.9503	-0.2662	4.9620	-5.9503	0.2662	0.1998	0.4110	0.1573
18Y	-4.4740	5.4162	-0.3398	4.4740	-5.4162	0.3398	0.2094	0.2677	0.1509
19Y	-6.0800	7.1753	-0.1912	6.0800	-7.1753	0.1912	0.1323	0.1601	0.0936
20AY	0.0000	0.0000	-0.6406	-0.0000	-0.0000	0.6406	-0.0490	-0.0310	-0.0023
20BX	0.0000	0.6136	-0.6343	0.0000	-0.6136	0.6343	0.0153	0.0340	0.0093
21X	0.0000	0.0000	-0.3466	-0.0000	-0.0000	0.3466	0.0881	0.0617	-0.0024
21XY	0.0000	0.0000	-0.3466	0.0000	0.0000	0.3466	-0.0396	-0.0324	0.0237
21Y	0.0000	0.0000	-0.3466	-0.0000	0.0000	0.3466	0.0249	-0.0402	-0.0174
22X	0.0000	0.3569	-0.3466	-0.0000	-0.3569	0.3466	0.0134	0.1372	-0.0068
22XY	0.0000	0.3569	-0.4107	0.0000	-0.3569	0.4107	0.0145	0.0220	0.0057
22Y	0.0000	0.0000	-0.4107	0.0000	-0.0000	0.4107	-0.0471	0.0312	0.0289
26Y	0.0000	0.0000	-0.0795	-0.0000	0.0000	0.0795	0.1161	0.4092	0.0857
27Y	0.0000	0.0000	-0.1057	0.0000	-0.0000	0.1057	0.1150	0.2662	0.0781
28Y	0.0000	0.0000	-0.0795	0.0000	-0.0000	0.0795	0.0715	0.1588	0.0475
9S	0.0000	0.0000	-0.6364	0.0000	0.0000	0.6364	-0.0553	0.1840	-0.0290
10S	0.0000	0.0000	-0.6392	-0.0000	-0.0000	0.6392	-0.0707	0.1557	-0.0305
11S	0.0000	0.0000	-0.8152	0.0000	0.0000	0.8152	-0.0784	0.1360	-0.0296
12S	0.0000	0.0000	-1.1543	0.0000	-0.0000	1.1543	-0.0983	0.1145	-0.0304
13S	0.0000	0.0000	-0.9523	-0.0000	-0.0000	0.9523	-0.1144	0.0973	-0.0279
14S	0.0000	0.0000	-1.4748	-0.0000	0.0000	1.4748	-0.0949	0.0377	-0.0241
i0.50E129S	0.0000	0.0120	-0.0578	-0.0000	-0.0120	0.0578	-0.0063	0.6484	-0.0131
i0.50E113S	0.0000	0.0040	-0.0338	-0.0000	-0.0040	0.0338	-0.0077	0.4505	-0.0086
i0.50E99S	0.0000	0.0000	-0.0338	-0.0000	0.0000	0.0338	-0.0116	0.3031	-0.0069
i0.50E85S	0.0000	0.0000	-0.0338	-0.0000	-0.0000	0.0338	-0.0183	0.1881	-0.0057
21XF0.50S	0.0000	0.0000	-0.0699	0.0000	0.0000	0.0699	-0.0334	0.0488	-0.2078
22PF0.50S	0.0000	0.0000	-0.0230	-0.0000	-0.0000	0.0230	-0.0754	0.0240	-0.3229
9X	0.0000	0.3213	-0.6364	0.0000	-0.3213	0.6364	0.0093	0.1841	0.0097
9XY	0.0000	0.3213	-0.6364	0.0000	-0.3213	0.6364	0.0171	0.1093	0.0153
9Y	0.0000	0.0000	-0.6364	0.0000	-0.0000	0.6364	-0.0637	0.1095	-0.0233
10X	0.0000	0.3162	-0.6392	0.0000	-0.3162	0.6392	0.0130	0.1569	0.0095
10XY	0.0000	0.3162	-0.6392	0.0000	-0.3162	0.6392	0.0150	0.0708	0.0170
10Y	0.0000	0.0000	-0.6392	0.0000	0.0000	0.6392	-0.0706	0.0700	-0.0229
11X	0.0000	0.3951	-0.8152	0.0000	-0.3951	0.8152	0.0123	0.1345	0.0081
11XY	0.0000	0.3951	-0.8152	0.0000	-0.3951	0.8152	0.0163	0.0381	0.0173
11Y	0.0000	0.0000	-0.8152	0.0000	-0.0000	0.8152	-0.0851	0.0388	-0.0201
12X	0.0000	0.5578	-1.1543	0.0000	-0.5578	1.1543	0.0132	0.1188	0.0055
12XY	0.0000	0.5578	-1.1543	0.0000	-0.5578	1.1543	0.0170	0.0054	0.0173
12Y	0.0000	0.0000	-1.1543	0.0000	0.0000	1.1543	-0.0959	0.0033	-0.0182
13X	0.0000	0.3925	-0.9523	0.0000	-0.3925	0.9523	0.0141	0.0981	0.0040
13XY	0.0000	0.3925	-0.9523	0.0000	-0.3925	0.9523	0.0164	-0.0301	0.0180
13Y	0.0000	0.0000	-0.9523	0.0000	0.0000	0.9523	-0.1134	-0.0314	-0.0133

14X	0.0000	0.6070	-1.4748	-0.0000	-0.6070	1.4748	0.0130	0.0635	0.0031
14XY	0.0000	0.6070	-1.4748	-0.0000	-0.6070	1.4748	0.0154	-0.0321	0.0126
14Y	0.0000	0.0000	-1.4748	-0.0000	0.0000	1.4748	-0.0469	-0.0410	-0.0148
21XF0.50Y	0.0000	0.0000	-0.0919	-0.0000	-0.0000	0.0919	-0.0306	-0.0371	-0.1200
22PF0.50X	0.0000	0.0313	-0.0230	0.0000	-0.0313	0.0230	0.0138	0.0857	-0.0051

Summary of Clamp Capacities and Usages for Load Case "NESC Heavy +":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	7.906	50.00	50.00	15.81	0.00	0.00	0.00	15.81
2	9.247	50.00	50.00	18.49	0.00	0.00	0.00	18.49
3	10.236	50.00	50.00	20.47	0.00	0.00	0.00	20.47
4	7.752	50.00	50.00	15.50	0.00	0.00	0.00	15.50
5	12.736	50.00	50.00	25.47	0.00	0.00	0.00	25.47
6	7.033	50.00	50.00	14.07	0.00	0.00	0.00	14.07
7	11.112	50.00	50.00	22.22	0.00	0.00	0.00	22.22
8	9.407	50.00	50.00	18.81	0.00	0.00	0.00	18.81
9	11.165	50.00	50.00	22.33	0.00	0.00	0.00	22.33
10	9.163	50.00	50.00	18.33	0.00	0.00	0.00	18.33
11	13.074	50.00	50.00	26.15	0.00	0.00	0.00	26.15
12	0.092	50.00	50.00	0.18	0.00	0.00	0.00	0.18
13	0.319	50.00	50.00	0.64	0.00	0.00	0.00	0.64
14	0.481	50.00	50.00	0.96	0.00	0.00	0.00	0.96
15	0.664	50.00	50.00	1.33	0.00	0.00	0.00	1.33
16	0.639	50.00	50.00	1.28	0.00	0.00	0.00	1.28
17	1.154	50.00	50.00	2.31	0.00	0.00	0.00	2.31
18	0.952	50.00	50.00	1.90	0.00	0.00	0.00	1.90
19	1.475	50.00	50.00	2.95	0.00	0.00	0.00	2.95
20	3.168	50.00	50.00	6.34	0.00	0.00	0.00	6.34
21	3.669	50.00	50.00	7.34	0.00	0.00	0.00	7.34
22	3.443	50.00	50.00	6.89	0.00	0.00	0.00	6.89
23	1.605	50.00	50.00	3.21	0.00	0.00	0.00	3.21
24	1.721	50.00	50.00	3.44	0.00	0.00	0.00	3.44
25	1.194	50.00	50.00	2.39	0.00	0.00	0.00	2.39
26	8.270	50.00	50.00	16.54	0.00	0.00	0.00	16.54
27	7.692	50.00	50.00	15.38	0.00	0.00	0.00	15.38
28	0.713	50.00	50.00	1.43	0.00	0.00	0.00	1.43
29	1.282	50.00	50.00	2.56	0.00	0.00	0.00	2.56
30	1.030	50.00	50.00	2.06	0.00	0.00	0.00	2.06
31	1.595	50.00	50.00	3.19	0.00	0.00	0.00	3.19

*** Analysis Results for Load Case No. 4 "NESC Extreme +" - Number of iterations in SAPS 12

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme +":

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	-0.03976	0.6366	-0.04598	-0.6480	-0.0069	0.4235	2.96	3.637	128.8
2P	-0.03998	0.5845	-0.04444	-0.7784	-0.0464	0.4042	2.96	3.584	124.3
3P	-0.03219	0.5159	-0.04264	-0.8534	-0.0489	0.3840	2.968	3.516	119.8
4P	-0.03323	0.4294	-0.03759	-0.6295	-0.0545	0.3525	2.967	3.429	112.8
5P	-0.02582	0.3447	-0.0332	-0.5713	0.0183	0.3152	2.974	3.345	104.8
6P	-0.02862	0.2891	-0.02872	-0.4751	-0.0412	0.2878	2.971	3.289	98.72
7P	-0.02302	0.2333	-0.02539	-0.4346	0.0073	0.2649	2.977	3.233	91.72
8P	-0.02747	0.186	-0.02129	-0.3192	-0.0006	0.2422	2.973	3.186	84.73
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.1477	0.6139	-0.2118	-0.7030	-0.0078	0.4636	-0.1477	17.36	128.6
17P	0.07364	0.4326	0.1613	-0.8586	0.0456	0.3471	3.074	-13.82	113
18P	0.08019	0.2926	0.1363	-0.6278	0.0433	0.3130	3.08	-16.46	98.89
19P	0.05157	0.1879	0.08535	-0.5375	0.0187	0.2633	3.052	-14.06	84.84
20AP	-0.02738	0.08509	-0.01469	0.0157	0.1460	0.2028	9.541	0.08509	39.99
20BP	-0.0583	0.05489	-0.02069	-0.1733	-0.0406	0.2148	-0.0583	9.623	39.98
21P	-0.3061	0.03266	-0.02841	0.0000	0.0000	0.0000	11.46	2.241	24.97
22P	-0.05912	0.2736	0.01123	0.0000	0.0000	0.0000	2.149	12.04	25.01
23P	-0.107	0.4106	-0.1776	-0.7480	-0.0037	0.3861	-0.107	14.66	112.6
24P	-0.1052	0.2726	-0.1561	-0.5576	-0.0002	0.3341	-0.1052	17.02	98.59
25P	-0.08251	0.1729	-0.09641	-0.4222	0.0115	0.3015	-0.08251	14.42	84.65
26P	0.03913	0.4311	0.08299	-0.6752	0.0469	0.3585	3.039	-8.194	112.9
27P	0.0419	0.2911	0.06725	-0.4713	0.0443	0.3304	3.042	-9.584	98.82
28P	0.02572	0.187	0.03831	-0.3620	0.0195	0.2627	3.026	-8.438	84.79
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.01944	0.06277	-0.001027	-0.0568	-0.0462	0.0836	1.481	0.06277	25
31P	-0.02733	0.06005	-0.001469	0.0161	-0.0104	0.1278	1.473	0.06005	40
32P	-0.01331	0.1791	-0.002826	-0.3387	0.0127	0.2327	1.487	0.1791	84.75
33P	-0.01293	0.2817	-0.003522	-0.5180	-0.0017	0.2586	1.487	0.2817	98.75
34P	-0.01469	0.4192	-0.004491	-0.5332	-0.0071	0.2773	1.485	0.4192	112.7
35P	-0.01831	0.6268	-0.006146	-1.2912	-0.0090	0.2888	1.482	0.6268	128.7
36P	-0.02009	0.7892	-0.00845	-1.7202	-0.0092	0.2887	1.48	0.7892	134.7
37P	-0.02297	1.074	-0.01304	-1.8586	-0.0092	0.2887	1.477	1.074	143.7
1X	0.002337	0.6369	0.03033	-0.6188	0.0537	0.4091	3.002	-2.363	128.8
1XY	0.00293	0.5922	0.02902	-0.6779	0.0633	0.4072	-2.997	-2.408	128.8
1Y	-0.03984	0.5915	-0.04623	-0.6737	0.0141	0.4147	-3.04	3.592	128.8
2X	0.001068	0.5853	0.02938	-0.7835	0.0234	0.3930	3.001	-2.415	124.3
2XY	0.001209	0.5395	0.02831	-0.7357	-0.0428	0.3894	-2.999	-2.461	124.3
2Y	-0.03995	0.5384	-0.0448	-0.7351	0.0203	0.3951	-3.04	3.538	124.3
3X	-8.915e-05	0.516	0.02872	-0.8605	-0.0104	0.3774	3	-2.484	119.8
3XY	0.007634	0.4768	0.0278	-0.7882	-0.0277	0.3701	-2.992	-2.523	119.8
3Y	-0.04041	0.4766	-0.0432	-0.7796	-0.0297	0.3763	-3.04	3.477	119.8
4X	0.003728	0.4299	0.02486	-0.6119	0.0472	0.3521	3.004	-2.57	112.8
4XY	0.004142	0.3933	0.02442	-0.6002	-0.0338	0.3402	-2.996	-2.607	112.8
4Y	-0.03345	0.3926	-0.03809	-0.6092	0.0297	0.3458	-3.033	3.393	112.8
5X	-0.0006328	0.3445	0.02131	-0.5732	-0.0244	0.3195	2.999	-2.655	104.8
5XY	0.008	0.3108	0.02129	-0.5567	0.0399	0.3111	-2.992	-2.689	104.8
5Y	-0.03485	0.311	-0.0335	-0.5558	-0.0507	0.3139	-3.035	3.311	104.8
6X	0.002975	0.2896	0.01719	-0.4676	0.0442	0.2939	3.003	-2.71	98.77
6XY	0.003104	0.2571	0.01758	-0.4549	-0.0184	0.2899	-2.997	-2.743	98.77
6Y	-0.02858	0.2568	-0.0285	-0.4561	0.0246	0.2887	-3.029	3.257	98.72

7X	-0.002366	0.2334	0.01412	-0.4393	0.0030	0.2681	2.998	-2.767	91.76
7XY	0.005847	0.2034	0.01482	-0.4145	0.0258	0.2705	-2.994	-2.797	91.76
7Y	-0.03164	0.2036	-0.02478	-0.4157	-0.0194	0.2697	-3.032	3.204	91.73
8X	0.0006174	0.1861	0.01012	-0.3147	0.0197	0.2421	3.001	-2.814	84.76
8XY	-0.0007163	0.1589	0.01122	-0.2957	0.0230	0.2512	-3.001	-2.841	84.76
8Y	-0.02578	0.1584	-0.02025	-0.2974	-0.0003	0.2506	-3.026	3.158	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.1042	0.6161	0.1859	-0.6537	0.0548	0.4302	0.1042	-16.13	129
17Y	0.07338	0.3953	0.1605	-0.8561	-0.0351	0.3641	-2.927	-13.85	113
18Y	0.07992	0.2587	0.1411	-0.6534	-0.0192	0.3316	-2.92	-16.49	98.89
19Y	0.05117	0.1604	0.08433	-0.5293	0.0219	0.2579	-2.949	-14.09	84.83
20AY	-0.0273	0.02387	0.0004165	0.0160	0.0199	0.2170	-9.595	0.02387	40
20BX	0.00352	0.05505	0.005385	-0.0699	0.0028	0.2133	0.00352	-9.513	40.01
21X	0.1065	0.05991	0.002515	0.0000	0.0000	0.0000	11.88	-2.148	25
21XY	-0.0387	0.009078	0.004132	0.0000	0.0000	0.0000	-11.81	-2.199	25
21Y	0.06367	-0.00736	-0.01553	0.0000	0.0000	0.0000	-11.71	2.201	24.98
22X	0.0001261	0.1679	-0.01401	0.0000	0.0000	0.0000	2.208	-11.6	24.99
22XY	0.00672	0.0548	0.001261	-0.0141	-0.0595	0.1487	-2.201	-11.72	25
22Y	-0.0102	0.06587	0.01661	0.1575	0.0214	-0.1096	-2.218	11.84	25.02
26Y	0.03803	0.3941	0.08234	-0.6755	-0.0341	0.3536	-2.962	-8.231	112.9
27Y	0.04042	0.2577	0.069	-0.4950	-0.0184	0.3250	-2.96	-9.617	98.82
28Y	0.02548	0.1596	0.03814	-0.3526	0.0228	0.2689	-2.975	-8.465	84.79
9S	-0.02735	0.1549	-0.02166	-0.2231	-0.0096	0.2253	4.11	4.293	76.98
10S	-0.03618	0.1316	-0.02208	-0.1678	0.0165	0.2073	5.239	5.407	69.23
11S	-0.03918	0.1156	-0.02065	-0.1337	0.0040	0.1807	6.374	6.528	61.48
12S	-0.04972	0.09835	-0.02022	-0.0865	0.0331	0.1592	7.819	7.967	51.56
13S	-0.05867	0.08453	-0.01755	-0.1465	0.0274	0.1116	9.51	9.653	39.98
14S	-0.06221	0.02967	-0.01811	-0.1934	-0.0928	0.0387	11.71	11.8	24.98
i0.50E129S	-0.01847	0.6144	-0.01292	-0.7412	-0.0293	0.4183	-0.01847	0.6144	128.8
i0.50E113S	-0.0147	0.4115	-0.006578	-0.6004	-0.0545	0.3456	-0.0147	0.4115	112.8
i0.50E99S	-0.01288	0.2732	-0.005028	-0.4638	-0.0567	0.3313	-0.01288	0.2732	98.74
i0.50E85S	-0.01327	0.1716	-0.004281	-0.3055	-0.0487	0.2823	-0.01327	0.1716	84.75
21XF0.50S	-0.02019	0.05303	-0.1201	-0.0582	1.0194	-0.1222	11.75	0.05303	24.88
22PF0.50S	-0.04581	0.3987	-0.1971	0.0000	0.0000	0.0000	-0.04581	12.17	24.8
9X	-0.002069	0.1551	0.009993	-0.2168	0.0430	0.2231	4.136	-3.982	77.01
9XY	0.005144	0.1213	0.0121	-0.1998	0.0075	0.2180	-4.132	-4.016	77.01
9Y	-0.0353	0.1218	-0.01954	-0.1948	0.0199	0.2168	-4.173	4.259	76.98
10X	0.001767	0.1324	0.009413	-0.1791	0.0145	0.2031	5.277	-5.143	69.26
10XY	0.003227	0.09267	0.01265	-0.1573	0.0347	0.1860	-5.272	-5.182	69.26
10Y	-0.03668	0.09271	-0.01874	-0.1600	0.0067	0.1886	-5.312	5.368	69.23
11X	0.001223	0.1143	0.007646	-0.1225	0.0386	0.1780	6.414	-6.298	61.51
11XY	0.004767	0.06995	0.01194	-0.1204	0.0072	0.1631	-6.408	-6.343	61.51
11Y	-0.04455	0.07001	-0.01618	-0.1179	0.0267	0.1640	-6.457	6.483	61.48
12X	0.001919	0.1016	0.004891	-0.0871	0.0185	0.1536	7.871	-7.767	51.58
12XY	0.004955	0.04703	0.01116	-0.0992	0.0222	0.1341	-7.864	-7.822	51.59
12Y	-0.04945	0.04741	-0.01368	-0.0942	0.0365	0.1387	-7.918	7.916	51.57
13X	0.002304	0.08602	0.002719	-0.0901	0.0262	0.1140	9.571	-9.483	40
13XY	0.00465	0.02502	0.009985	-0.0697	0.0058	0.1047	-9.564	-9.544	40.01
13Y	-0.05732	0.02322	-0.01002	-0.1134	-0.0749	0.0983	-9.626	9.592	39.99
14X	-0.000576	0.06139	0.0005221	-0.1483	0.0199	0.0572	11.77	-11.71	25
14XY	0.007133	0.009323	0.006632	-0.0282	0.0083	0.0625	-11.76	-11.76	25.01
14Y	-0.00997	-0.007544	-0.01324	-0.0481	-0.1626	0.0415	-11.78	11.76	24.99
21XF0.50Y	-0.01798	0.0007681	-0.1873	-0.0553	-1.1834	0.3584	-11.79	0.0007681	24.81
22PF0.50X	0.001041	0.194	-0.08242	0.0000	0.0000	0.0000	0.001041	-11.58	24.92

Joint Support Reactions for Load Case "NESC Extreme +":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
15P	-21.40	0.0	-23.07	0.0	0.0	-159.24	0.0	0.0	162.32	0.0	0.03	0.0	6.7	0.0	0.0	0.39	0.0	0.0
29P	0.18	0.0	-1.76	0.0	0.0	-13.38	0.0	0.0	13.49	0.0	19.58	0.0	4.2	0.0	0.0	-2.02	0.0	0.0
15X	28.19	0.0	-33.19	0.0	0.0	156.66	0.0	0.0	162.60	0.0	5.21	0.0	0.1	0.0	0.0	0.14	0.0	0.0
15XY	-25.55	0.0	-21.62	0.0	0.0	131.92	0.0	0.0	136.10	0.0	0.29	0.0	-0.8	0.0	0.0	-0.36	0.0	0.0
15Y	23.89	0.0	-26.42	0.0	0.0	-170.65	0.0	0.0	174.32	0.0	-2.34	0.0	-1.9	0.0	0.0	-0.36	0.0	0.0

Joint Displacements, Loads and Member Forces on Joints for Load Case "NESC Extreme +":

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0398	0.6366	-0.0460
2P	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0400	0.5845	-0.0444
3P	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0322	0.5159	-0.0426
4P	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0332	0.4294	-0.0376
5P	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0258	0.3447	-0.0332
6P	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0286	0.2891	-0.0287
7P	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0230	0.2333	-0.0254
8P	0.0000	0.7764	-0.7133	-0.0000	-0.7764	0.7133	-0.0275	0.1860	-0.0213
15P	0.0000	0.5725	-0.5264	21.3986	22.4941	-158.7169	0.0000	0.0000	0.0000
16P	-1.4580	4.9669	-0.7669	1.4580	-4.9669	0.7669	-0.1477	0.6139	-0.2118
17P	3.4830	2.9889	-1.8349	-3.4830	-2.9889	1.8349	0.0736	0.4326	0.1613
18P	3.5210	4.0689	-1.6669	-3.5210	-4.0689	1.6669	0.0802	0.2926	0.1363
19P	3.5360	3.4799	-1.2119	-3.5360	-3.4799	1.2119	0.0516	0.1879	0.0853
20AP	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0274	0.0851	-0.0147
20BP	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0583	0.0549	-0.0207
21P	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.3061	0.0327	-0.0284
22P	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0591	0.2736	0.0112
23P	-2.1690	6.8179	-1.0259	2.1690	-6.8179	1.0259	-0.1070	0.4106	-0.1776
24P	-0.7120	6.1249	-1.0569	0.7120	-6.1249	1.0569	-0.1052	0.2726	-0.1561
25P	-2.0210	7.3409	-0.6999	2.0210	-7.3409	0.6999	-0.0825	0.1729	-0.0964
26P	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0391	0.4311	0.0830
27P	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0419	0.2911	0.0673
28P	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0257	0.1870	0.0383
29P	0.0000	0.5725	-0.5264	-0.1819	1.1888	-12.8502	0.0000	0.0000	0.0000
30P	0.0000	0.8535	-1.0334	0.0000	-0.8535	1.0334	-0.0194	0.0628	-0.0010
31P	0.0000	0.8305	-0.9924	-0.0000	-0.8305	0.9924	-0.0273	0.0600	-0.0015
32P	0.0000	1.0304	-1.1713	0.0000	-1.0304	1.1713	-0.0133	0.1791	-0.0028
33P	0.0000	0.3249	-0.4049	0.0000	-0.3249	0.4049	-0.0129	0.2817	-0.0035
34P	0.0000	0.3339	-0.4209	-0.0000	-0.3339	0.4209	-0.0147	0.4192	-0.0045
35P	0.0000	0.2729	-0.3119	-0.0000	-0.2729	0.3119	-0.0183	0.6268	-0.0061
36P	0.0000	9.2909	-3.6729	0.0000	-9.2909	3.6729	-0.0201	0.7892	-0.0084
37P	0.0000	3.0359	-3.5469	0.0000	-3.0359	3.5469	-0.0230	1.0741	-0.0130
1X	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0023	0.6369	0.0303
1XY	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0029	0.5922	0.0290
1Y	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0398	0.5915	-0.0462
2X	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	0.0011	0.5853	0.0294
2XY	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	0.0012	0.5395	0.0283
2Y	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0400	0.5384	-0.0448
3X	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0001	0.5160	0.0287
3XY	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	0.0076	0.4768	0.0278
3Y	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0404	0.4766	-0.0432
4X	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0037	0.4299	0.0249

4XY	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0041	0.3933	0.0244
4Y	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0335	0.3926	-0.0381
5X	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0006	0.3445	0.0213
5XY	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	0.0080	0.3108	0.0213
5Y	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0349	0.3110	-0.0335
6X	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0030	0.2896	0.0172
6XY	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0031	0.2571	0.0176
6Y	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0286	0.2568	-0.0285
7X	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0024	0.2334	0.0141
7XY	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	0.0058	0.2034	0.0148
7Y	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0316	0.2036	-0.0248
8X	0.0000	0.7764	-0.7133	-0.0000	-0.7764	0.7133	0.0006	0.1861	0.0101
8XY	0.0000	0.7764	-0.7133	0.0000	-0.7764	0.7133	-0.0007	0.1589	0.0112
8Y	0.0000	0.7764	-0.7133	0.0000	-0.7764	0.7133	-0.0258	0.1584	-0.0202
15X	0.0000	0.5725	-0.5264	-28.1900	32.6163	157.1901	0.0000	0.0000	0.0000
15XY	0.0000	0.5725	-0.5264	25.5487	21.0479	132.4497	0.0000	0.0000	0.0000
15Y	0.0000	0.5725	-0.5264	-23.8904	25.8429	-170.1205	0.0000	0.0000	0.0000
16X	-0.3650	4.6209	-0.9479	0.3650	-4.6209	0.9479	0.1042	0.6161	0.1859
17Y	-3.0090	4.3299	-0.0889	3.0090	-4.3299	0.0889	0.0734	0.3953	0.1605
18Y	-2.7460	4.0299	-0.1199	2.7460	-4.0299	0.1199	0.0799	0.2587	0.1411
19Y	-3.3750	4.6969	-0.0619	3.3750	-4.6969	0.0619	0.0512	0.1604	0.0843
20AY	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0273	0.0239	0.0004
20BX	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0035	0.0551	0.0054
21X	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.1065	0.0599	0.0025
21XY	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0387	0.0091	0.0041
21Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0637	-0.0074	-0.0155
22X	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0001	0.1679	-0.0140
22XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0067	0.0548	0.0013
22Y	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0102	0.0659	0.0166
26Y	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0380	0.3941	0.0823
27Y	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0404	0.2577	0.0690
28Y	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	0.0255	0.1596	0.0381
9S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0273	0.1549	-0.0217
10S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0362	0.1316	-0.0221
11S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0392	0.1156	-0.0207
12S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0497	0.0984	-0.0202
13S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0587	0.0845	-0.0176
14S	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0622	0.0297	-0.0181
i0.50E129S	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0185	0.6144	-0.0129
i0.50E113S	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0147	0.4115	-0.0066
i0.50E99S	0.0000	0.2039	-0.1869	0.0000	-0.2039	0.1869	-0.0129	0.2732	-0.0050
i0.50E85S	0.0000	0.2039	-0.1869	-0.0000	-0.2039	0.1869	-0.0133	0.1716	-0.0043
21XF0.50S	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0202	0.0530	-0.1201
22PF0.50S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0458	0.3987	-0.1971
9X	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0021	0.1551	0.0100
9XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0051	0.1213	0.0121
9Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0353	0.1218	-0.0195
10X	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0018	0.1324	0.0094
10XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0032	0.0927	0.0127
10Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0367	0.0927	-0.0187
11X	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0012	0.1143	0.0076
11XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0048	0.0700	0.0119
11Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0445	0.0700	-0.0162
12X	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0019	0.1016	0.0049
12XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0050	0.0470	0.0112
12Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0494	0.0474	-0.0137
13X	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0023	0.0860	0.0027
13XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0047	0.0250	0.0100
13Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0573	0.0232	-0.0100

14X	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0006	0.0614	0.0005
14XY	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.0071	0.0093	0.0066
14Y	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0100	-0.0075	-0.0132
21XF0.50Y	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0180	0.0008	-0.1873
22PF0.50X	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0010	0.1940	-0.0824

Crossing Diagonal Check for Load Case "NESC Extreme +" (RLOUT controls):

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original-Supported L/R Cap. (kips)	RLX	RLY	RLZ	L/R	KL/R	Curve No.	Alternate-Unsupported L/R Cap. (kips)	RLOUT	L/R	KL/R	Curve No.
20BY	20BP	Long only	-12.80	0.58	61.20	0.500	0.750	0.500	77.55	88.16	2	49.22	1.000	103.40	111.70	3
21BP	21BY	Short only	-2.21	-15.24	44.33	0.580	0.580	0.580	95.79	101.84	2	42.37	1.000	95.79	107.89	3
21BY	21BP	Short only	-15.24	-2.21	44.33	0.580	0.580	0.580	95.79	101.84	2	42.37	1.000	95.79	107.89	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme +":

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	4.731	50.00	50.00	9.46	0.00	0.00	0.00	9.46
2	5.233	50.00	50.00	10.47	0.00	0.00	0.00	10.47
3	4.943	50.00	50.00	9.89	0.00	0.00	0.00	9.89
4	5.273	50.00	50.00	10.55	0.00	0.00	0.00	10.55
5	5.633	50.00	50.00	11.27	0.00	0.00	0.00	11.27
6	4.878	50.00	50.00	9.76	0.00	0.00	0.00	9.76
7	5.107	50.00	50.00	10.21	0.00	0.00	0.00	10.21
8	5.784	50.00	50.00	11.57	0.00	0.00	0.00	11.57
9	7.228	50.00	50.00	14.46	0.00	0.00	0.00	14.46
10	6.256	50.00	50.00	12.51	0.00	0.00	0.00	12.51
11	7.646	50.00	50.00	15.29	0.00	0.00	0.00	15.29
12	0.277	50.00	50.00	0.55	0.00	0.00	0.00	0.55
13	0.277	50.00	50.00	0.55	0.00	0.00	0.00	0.55
14	0.277	50.00	50.00	0.55	0.00	0.00	0.00	0.55
15	1.054	50.00	50.00	2.11	0.00	0.00	0.00	2.11
16	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
17	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
18	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
19	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
20	1.340	50.00	50.00	2.68	0.00	0.00	0.00	2.68
21	1.294	50.00	50.00	2.59	0.00	0.00	0.00	2.59
22	1.560	50.00	50.00	3.12	0.00	0.00	0.00	3.12
23	0.519	50.00	50.00	1.04	0.00	0.00	0.00	1.04
24	0.537	50.00	50.00	1.07	0.00	0.00	0.00	1.07
25	0.414	50.00	50.00	0.83	0.00	0.00	0.00	0.83
26	9.991	50.00	50.00	19.98	0.00	0.00	0.00	19.98
27	4.669	50.00	50.00	9.34	0.00	0.00	0.00	9.34
28	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
29	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
30	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56
31	0.778	50.00	50.00	1.56	0.00	0.00	0.00	1.56

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress
Printed capacities do not include the strength factor entered for each load case.
The Group Summary reports on the member and load case that resulted in maximum usage
which may not necessarily be the same as that which produces maximum force.

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Cont-rol	Max Use In Comp. %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/r Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/r KL/r Length (ft)	Curve Comp.	No. Of Member Bolts	No. Comp.
1	LEG1	SAE	3.5X3.5X0.25	36.0	98.11	Comp	98.11	3Y	-32.194	NESC Ext	32.813	36.400	54.375	1.000	1.000	1.000	121.04	121.04	7.000	4
2	LEG2	SAE	6X6X0.3125	36.0	83.81	Comp	83.81	5Y	-83.038	NESC Ext	99.083	109.200	203.906	1.000	1.000	1.000	60.50	60.50	6.050	1
3	LEG3	SAE	8X8X0.5	36.0	57.61	Tens	56.40	7Y	-140.805	NESC Ext	249.636	254.800	380.624	1.000	1.000	1.000	52.83	52.83	7.000	1
4	LEG4	SAE	8X8X0.625	36.0	60.61	Comp	60.61	10Y	-176.491	NESC Hea	306.646	291.200	543.749	1.000	1.000	1.000	60.12	60.12	7.915	1
5	LEG5	SAE	8X8X0.75	36.0	55.77	Comp	55.77	13P	-203.019	NESC Hea	368.010	364.000	815.624	0.500	0.500	0.500	58.18	58.18	15.320	1
6	X1	SAE	2.5X2.5X0.1875	36.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.000	0
7	X2	SAU	2.5X2X0.1875	36.0	95.03	Comp	95.03	16AX	-13.592	NESC Ext	14.303	18.200	20.391	0.500	0.500	0.500	129.55	127.32	9.220	5
8	X3	SAU	4X3X0.25	36.0	70.22	Comp	70.22	17AX	-27.818	NESC Hea	39.613	45.500	67.969	0.500	0.750	0.500	100.45	105.33	10.000	2
9	X4	SAU	3.5X2.5X0.25	36.0	60.46	Comp	60.46	18AX	-19.793	NESC Hea	32.738	36.400	54.375	0.500	0.750	0.500	104.34	108.25	8.521	2
10	X5	SAU	4X3.5X0.3125	36.0	70.02	Comp	70.02	19AX	-42.854	NESC Hea	61.204	63.700	118.945	0.500	0.750	0.500	77.55	88.16	9.220	2
11	X6	SAU	5X3.5X0.25	36.0	59.26	Comp	59.26	21BY	-26.271	NESC Hea	44.335	54.600	81.562	0.580	0.580	0.580	95.79	101.84	10.597	2
12	X7	SAU	4X3X0.25	36.0	49.59	Comp	49.59	22BX	-15.366	NESC Hea	30.985	36.400	54.375	0.560	0.560	0.560	126.41	124.92	12.246	5
13	X8	SAU	3.5X3X0.25	36.0	40.33	Comp	40.33	23AX	-9.091	NESC Hea	22.542	27.300	40.781	0.550	0.550	0.550	147.17	140.74	14.070	5
14	X9	SAU	5X3X0.25	36.0	49.48	Comp	49.48	24AX	-10.603	NESC Hea	21.431	27.300	40.781	0.550	0.550	0.550	173.71	160.96	17.450	5
15	D1	SAU	5X3X0.25	36.0	87.24	Tens	12.56	25AY	-4.245	NESC Ext	33.799	63.700	95.156	1.000	0.500	0.500	127.63	125.86	14.103	5
16	D2	SAE	2X2X0.1875	36.0	78.02	Comp	78.02	26AY	-3.155	NESC Ext	4.044	18.200	20.391	0.500	0.500	0.500	256.65	224.16	16.853	5
17	D3	SAU	3X2X0.25	36.0	67.55	Tens	56.64	27BX	-3.636	NESC Ext	6.420	36.400	54.375	1.000	0.500	0.500	264.74	230.33	19.194	5
18	D4	SAU	4X3X0.25	36.0	97.48	Comp	97.48	28AP	-11.200	NESC Ext	11.489	45.500	67.969	0.500	1.000	0.500	205.19	205.19	15.321	4
19	D5	SAU	3.5X3X0.25	36.0	59.03	Tens	16.74	29AX	-4.295	NESC Ext	25.652	45.500	67.969	0.250	0.250	0.250	135.61			

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131.93 28.523     5     5
     20            H1   SAE 1.75X1.75X0.1875     36.0 42.51  Tens 22.49     32X   -0.906 NESC Ext    4.027    9.100   10.195 1.000 1.000 1.000 209.91
209.91  6.000     4     1
     21            H2   SAU       4X3.5X0.25     36.0 47.26  Comp 47.26    37AP  -12.902 NESC Hea   27.341   27.300   40.781 1.000 0.500 0.500 148.70
137.65 15.738     6     3
     22            H3   SAE       3X3X0.1875     36.0 42.63  Comp 42.63    38AP   -4.904 NESC Ext   11.503   18.200   20.391 1.000 1.000 1.000 192.66
164.68  9.569     6     2
     23            H4   SAU         5X3X0.25     36.0 47.41  Comp 47.41    39AP   -8.629 NESC Hea   21.560   18.200   27.187 1.000 1.000 1.000 173.07
160.48  9.562     5     2
     24            H5   SAE     3.5X3.5X0.25     36.0 14.22  Comp 14.22     40X   -1.904 NESC Ext   13.386   18.200   27.187 1.000 1.000 1.000 233.97
190.09 13.531     6     2
     25           X10   SAE 1.75X1.75X0.1875     36.0  0.00        0.00           0.000              0.000    0.000    0.000 0.000 0.000 0.000   0.00
0.00  0.000     0     0
     26           X11   SAE       2X2X0.1875     36.0 41.59  Comp 41.59   43CXY   -5.235 NESC Hea   12.587   18.200   20.391 1.000 1.000 1.000 129.22
127.06  4.243     5     2
     27           X12   SAU     2.5X2X0.1875     36.0 24.57  Comp 24.57    44BP   -3.571 NESC Hea   14.533   18.200   20.391 0.750 0.500 0.500 128.22
126.30  9.125     5     2
     28            H6   SAU         4X3X0.25     36.0 41.84  Tens  0.00    45BP    0.000             35.407   18.200   27.187 1.000 1.000 1.000 110.60
115.30  6.000     3     2
     29            D6   SAU       3X2X0.1875     36.0 40.42  Comp 40.42    46XY   -3.127 NESC Hea    7.736   18.200   20.391 1.000 0.500 0.500 201.94
182.48 14.775     5     2
     30          HGR1   SAU     2.5X2X0.1875     36.0 46.40  Tens  8.84    49AP   -0.485 NESC Hea    5.486   18.200   20.391 1.000 0.500 0.500 205.58
205.58 13.585     4     2
     31          HGR2   SAE       3X3X0.1875     36.0 41.49  Tens  1.10    48AP   -0.090 NESC Hea    8.140   18.200   20.391 1.000 0.500 0.500 195.77
195.77 15.319     4     2
     32            A1   SAE         3X3X0.25     36.0 64.73  Tens 10.55     50X   -1.919 NESC Hea   21.867   18.200   27.187 0.500 0.500 0.500 142.64
137.29 14.073     5     2
     33            A2   SAU       3.5X3X0.25     36.0 53.76  Comp 53.76    51BP  -14.676 NESC Hea   33.416   27.300   40.781 1.000 1.000 1.000 106.97
113.49  5.625     3     3
     34            A#   SAE         4X4X0.25     36.0 54.24  Comp 54.24    52BP  -22.900 NESC Hea   42.220   45.500   67.969 1.000 1.000 1.000 103.77
111.89  6.875     3     5
     35            H7   SAU     2.5X2X0.1875     36.0 20.90  Comp 20.90     54X   -1.704 NESC Ext    8.154    9.100   10.195 1.000 1.000 1.000 168.62
168.62  6.000     4     1
     36            H8   DAE 1.75X1.75X0.1875     36.0 61.15  Comp 61.15     36P  -10.273 NESC Hea   19.743   16.800   20.391 1.000 1.000 1.000 134.08
134.08  6.000     4     1
  Pwmnt 12" Std. Pipe Pwmnt    Pipe 12" Std.     42.0  8.96  Comp  8.96   g101P  -23.303 NESC Hea  260.146    0.000    0.000 1.000 1.000 1.000 122.32
122.32 44.750     4     0
  PMBR1     L2x2x3/16   SAE       2X2X0.1875     36.0  9.17  Comp  9.17   g108P   -0.935 NESC Hea   20.044   16.800   10.195 1.000 1.000 1.000  45.69
82.84  1.500     3     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g107P g108P  ??
  PMBR2 L2.5x2.5x3/16   SAE   2.5X2.5X0.1875     36.0 52.19  Comp 52.19   g111P   -5.321 NESC Ext   22.126   16.800   10.195 1.000 1.000 1.000  81.32
100.66  3.354     3     1
  PMBR3     L3x3x3/16   SAE       3X3X0.1875     36.0  2.84  Comp  2.84   g114P   -0.289 NESC Hea   11.823   16.800   10.195 1.000 1.000 1.000 162.44
162.44  8.068     4     1
  PMBR4  L3.5x3.5x1/4   SAE     3.5X3.5X0.25     36.0  8.72  Tens  8.63   g116X   -1.173 NESC Ext   17.249   16.800   13.594 1.000 1.000 1.000 167.46
167.46  9.685     4     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g117P  ??
  PMBR5      L4x4x1/4   SAE         4X4X0.25     36.0  8.07  Comp  8.07   g120X   -1.097 NESC Ext   16.004   16.800   13.594 1.000 1.000 1.000 186.27
186.27 12.340     4     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g118P  ??
    20a            H1   SAE 1.75X1.75X0.1875     36.0 29.14  Comp 29.14    30AY   -2.652 NESC Hea   13.441    9.100   10.195 0.500 0.500 0.500 104.96
112.48  6.000     3     1
 AngleR      L2x2x1/4   SAE         2X2X0.25     36.0 65.96  Tens 59.84    42XY   -5.445 NESC Ext   15.869    9.100   13.594 1.000 1.000 1.000 130.21
130.21  4.243     4     1
 BraceR  L2.5x2.5x1/4   SAE     2.5X2.5X0.25     36.0 90.77  Tens 69.38   g110X  -11.318 NESC Ext   29.101   23.900   16.312 1.000 1.000 1.000  81.98
100.99  3.354     3     1 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize
moments): g110P g110X  ??
  Plate    6"x3/4" PL   Bar             6x3/4     36.0  4.95  Tens  0.00   g106P    0.000            109.423   16.800   40.781 1.000 1.000 1.000  83.19
101.59  1.501     3     1
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6R	X1	SAE	2.5X2.5X0.25	36.0	75.93	Tens	63.51	15AX	-17.267	NESC Ext	31.115	33.600	27.187	0.250	0.500	0.250	84.40	93.30	10.817	2	2

Group Summary (Tension Portion):

Group No.	Group Label	Angle Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Control	Max Use In Tens. %	Tension Control Member	Tension Force (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. Shear Capacity (kips)	Tension Connect. Bearing Capacity (kips)	Tension Connect. Rupture Capacity (kips)	Length Tens. Member (ft)	No. Of Bolts	Hole Diameter (in)	Holes
1	LEG1	LEG1	SAE	3.5X3.5X0.25	36.0	98.11	Comp	84.56	3X	30.780	NESC Ext	47.340	36.400	54.375	60.417	7.000	4	2.000	0.75
2	LEG2	LEG2	SAE	6X6X0.3125	36.0	83.81	Comp	78.35	5X	76.504	NESC Ext	97.650	109.200	203.906	183.656	6.050	12	4.000	0.75
3	LEG3	LEG3	SAE	8X8X0.5	36.0	57.61	Tens	57.61	7X	133.522	NESC Ext	231.750	254.800	380.624	395.849	7.000	14	3.500	0.75
4	LEG4	LEG4	SAE	8X8X0.625	36.0	60.61	Comp	56.55	9X	162.244	NESC Hea	286.897	0.000	0.000	0.000	7.915	0	3.500	0.75
5	LEG5	LEG5	SAE	8X8X0.75	36.0	55.77	Comp	48.99	11X	162.080	NESC Hea	330.839	0.000	0.000	0.000	10.131	0	4.000	0.75
6	X1	X1	SAE	2.5X2.5X0.1875	36.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
7	X2	X2	SAU	2.5X2X0.1875	36.0	95.03	Comp	76.93	16AP	13.944	NESC Ext	18.650	18.200	20.391	18.125	9.220	2	1.000	0.75
8	X3	X3	SAU	4X3X0.25	36.0	70.22	Comp	66.69	17AP	29.468	NESC Hea	44.185	45.500	67.969	52.912	10.000	5	1.740	0.75
9	X4	X4	SAU	3.5X2.5X0.25	36.0	60.46	Comp	55.24	18AP	20.108	NESC Hea	40.399	36.400	54.375	42.647	8.521	4	1.030	0.75
10	X5	X5	SAU	4X3.5X0.3125	36.0	70.02	Comp	69.36	19AP	41.136	NESC Hea	59.307	63.700	118.945	74.976	9.220	7	1.790	0.75
11	X6	X6	SAU	5X3.5X0.25	36.0	59.26	Comp	58.86	21BXY	26.592	NESC Hea	45.178	54.600	81.562	46.012	10.597	6	1.550	0.75
12	X7	X7	SAU	4X3X0.25	36.0	49.59	Comp	39.66	22BP	14.438	NESC Hea	40.581	36.400	54.375	42.206	12.246	4	1.000	0.75
13	X8	X8	SAU	3.5X3X0.25	36.0	40.33	Comp	39.48	23AP	10.778	NESC Hea	40.419	27.300	40.781	38.516	14.070	3	1.000	0.75
14	X9	X9	SAU	5X3X0.25	36.0	49.48	Comp	25.26	24BXY	6.897	NESC Hea	40.581	27.300	40.781	36.250	17.450	3	1.000	0.75
15	D1	D1	SAU	5X3X0.25	36.0	87.24	Tens	87.24	25AP	31.640	NESC Hea	36.268	63.700	95.156	72.037	14.103	7	1.710	0.75
16	D2	D2	SAE	2X2X0.1875	36.0	78.02	Comp	48.84	26AX	8.852	NESC Ext	18.448	18.200	20.391	18.125	16.853	2	1.000	0.75
17	D3	D3	SAU	3X2X0.25	36.0	67.55	Tens	67.55	27AX	16.469	NESC Hea	24.381	36.400	54.375	48.333	19.194	4	1.000	0.75
18	D4	D4	SAU	4X3X0.25	36.0	97.48	Comp	57.53	28AXY	26.175	NESC Ext	47.101	45.500	67.969	60.337	15.321	5	1.260	0.75
19	D5	D5	SAU	3.5X3X0.25	36.0	59.03	Tens	59.03	29AX	26.249	NESC Ext	44.469	45.500	67.969	50.906	28.523	5	1.000	0.75
20	H1	H1	SAE	1.75X1.75X0.1875	36.0	42.51	Tens	42.51	33Y	2.809	NESC Hea	15.532	9.100	10.195	6.609	6.000	1	1.000	0.75
21	H2	H2	SAU	4X3.5X0.25	36.0	47.26	Comp	6.06	37AY	1.655	NESC Ext	48.519	27.300	40.781	36.250	15.738	3	1.000	0.75

22		H3	SAE	3X3X0.1875	36.0	42.63	Comp	3.31	38AXY	0.600	NESC Ext	30.760	18.200	20.391	18.125	9.569	2	1.000	0.75
23		H4	SAU	5X3X0.25	36.0	47.41	Comp	42.04	F39C2118X	7.651	NESC Ext	40.581	18.200	27.187	24.167	2.208	2	1.000	0.75
24		H5	SAE	3.5X3.5X0.25	36.0	14.22	Comp	11.51	40P	2.094	NESC Ext	48.681	18.200	27.187	25.677	13.531	2	1.000	0.75
25		X10	SAE	1.75X1.75X0.1875	36.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
26		X11	SAE	2X2X0.1875	36.0	41.59	Comp	31.64	43BX	3.906	NESC Hea	18.448	18.200	20.391	12.347	4.243	2	1.000	0.75
27		X12	SAU	2.5X2X0.1875	36.0	24.57	Comp	20.09	44CY	3.641	NESC Hea	18.650	18.200	20.391	18.125	9.125	2	1.000	0.75
28		H6	SAU	4X3X0.25	36.0	41.84	Tens	41.84	45BP	7.615	NESC Hea	40.581	18.200	27.187	24.167	6.000	2	1.000	0.75
29		D6	SAU	3X2X0.1875	36.0	40.42	Comp	0.00	46Y	0.000		18.529	18.200	20.391	12.755	14.775	2	1.000	0.75
30		HGR1	SAU	2.5X2X0.1875	36.0	46.40	Tens	46.40	47P	5.918	NESC Hea	18.650	18.200	20.391	12.755	13.250	2	1.000	0.75
31		HGR2	SAE	3X3X0.1875	36.0	41.49	Tens	41.49	48P	7.520	NESC Hea	30.760	18.200	20.391	18.125	15.022	2	1.000	0.75
32		A1	SAE	3X3X0.25	36.0	64.73	Tens	64.73	50P	11.732	NESC Hea	36.997	18.200	27.187	18.125	14.073	2	1.590	0.75
33		A2	SAU	3.5X3X0.25	36.0	53.76	Comp	45.87	53P	15.084	NESC Hea	32.886	36.400	54.375	42.647	11.643	4	2.240	0.75
34		A#	SAE	4X4X0.25	36.0	54.24	Comp	13.99	52P	6.366	NESC Hea	46.393	45.500	67.969	48.262	14.073	5	2.710	0.75
35		H7	SAU	2.5X2X0.1875	36.0	20.90	Comp	10.51	54P	0.957	NESC Ext	21.688	9.100	10.195	9.629	6.000	1	1.000	0.75
36		H8	DAE	1.75X1.75X0.1875	36.0	61.15	Comp	57.06	36X	8.481	NESC Hea	31.823	16.800	20.391	14.864	6.000	1	2.000	0.6875
Pwmnt	12" Std. Pipe	Pwmnt		Pipe 12" Std.	42.0	8.96	Comp	0.00	g121P	0.000		571.199	0.000	0.000	0.000	9.000	0	0.000	0
PMBR1	**L2x2x3/16**	**SAE**		**2X2X0.1875**	**36.0**	**9.17**	**Comp**	**0.00**	**g109P**	**0.000**		**18.827**	**16.800**	**10.195**	**10.343**	**1.500**	**1**	**1.000**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g107P g108P ??**
PMBR2	L2.5x2.5x3/16	SAE		2.5X2.5X0.1875	36.0	52.19	Comp	44.55	g111X	4.542	NESC Ext	25.048	16.800	10.195	11.328	3.354	1	1.000	0.6875
PMBR3	L3x3x3/16	SAE		3X3X0.1875	36.0	2.84	Comp	0.00	g114P	0.000		31.139	16.800	10.195	11.328	8.068	1	1.000	0.6875
PMBR4	**L3.5x3.5x1/4**	**SAE**		**3.5X3.5X0.25**	**36.0**	**8.72**	**Tens**	**8.72**	**g116X**	**1.186**	**NESC Hea**	**49.187**	**16.800**	**13.594**	**15.104**	**9.685**	**1**	**1.000**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g117P ??**
PMBR5	**L4x4x1/4**	**SAE**		**4X4X0.25**	**36.0**	**8.07**	**Comp**	**7.86**	**g120P**	**1.069**	**NESC Ext**	**57.287**	**16.800**	**13.594**	**15.104**	**12.340**	**1**	**1.000**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g118P ??**
20a		H1	SAE	1.75X1.75X0.1875	36.0	29.14	Comp	7.88	30BP	0.521	NESC Hea	15.532	9.100	10.195	6.609	6.000	1	1.000	0.75
AngleR	L2x2x1/4	SAE		2X2X0.25	36.0	65.96	Tens	65.96	42Y	5.813	NESC Ext	24.381	9.100	13.594	8.812	4.243	1	1.000	0.75
BraceR	**L2.5x2.5x1/4**	**SAE**		**2.5X2.5X0.25**	**36.0**	**90.77**	**Tens**	**90.77**	**g110P**	**10.968**	**NESC Ext**	**31.468**	**23.900**	**16.312**	**12.083**	**3.354**	**1**	**1.000**	**0.875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g110P g110X ??**
Plate	6"x3/4" PL	Bar		6x3/4	36.0	4.95	Tens	4.95	g106P	0.832	NESC Hea	129.094	16.800	40.781	45.312	1.501	1	1.000	0.6875
6R		X1	SAE	2.5X2.5X0.25	36.0	75.93	Tens	75.93	15AP	18.287	NESC Ext	32.987	33.600	27.187	24.084	10.817	2	1.000	0.6875

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy -	71.45	25AXY	Angle
NESC Extreme -	97.48	28AP	Angle
NESC Heavy +	87.24	25AP	Angle
NESC Extreme +	98.11	3Y	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	15.81	NESC Heavy +	0.0
2	Clamp	18.49	NESC Heavy +	0.0
3	Clamp	20.47	NESC Heavy +	0.0
4	Clamp	15.50	NESC Heavy +	0.0
5	Clamp	25.47	NESC Heavy +	0.0
6	Clamp	14.07	NESC Heavy +	0.0
7	Clamp	22.22	NESC Heavy +	0.0
8	Clamp	18.81	NESC Heavy +	0.0
9	Clamp	22.33	NESC Heavy +	0.0
10	Clamp	18.33	NESC Heavy +	0.0
11	Clamp	26.15	NESC Heavy +	0.0
12	Clamp	0.55	NESC Extreme -	0.0
13	Clamp	0.64	NESC Heavy -	0.0
14	Clamp	0.96	NESC Heavy -	0.0
15	Clamp	2.11	NESC Extreme -	0.0
16	Clamp	1.56	NESC Extreme -	0.0
17	Clamp	2.31	NESC Heavy -	0.0
18	Clamp	1.90	NESC Heavy -	0.0
19	Clamp	2.95	NESC Heavy -	0.0
20	Clamp	6.34	NESC Heavy +	0.0
21	Clamp	7.34	NESC Heavy +	0.0
22	Clamp	6.89	NESC Heavy +	0.0
23	Clamp	3.21	NESC Heavy +	0.0
24	Clamp	3.44	NESC Heavy +	0.0
25	Clamp	2.39	NESC Heavy +	0.0
26	Clamp	19.98	NESC Extreme +	0.0
27	Clamp	15.38	NESC Heavy +	0.0
28	Clamp	1.56	NESC Extreme -	0.0
29	Clamp	2.56	NESC Heavy -	0.0
30	Clamp	2.06	NESC Heavy -	0.0
31	Clamp	3.19	NESC Heavy -	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)

NESC Heavy -	1	Clamp	16X	-0.300	7.080	1.642	7.274
NESC Heavy -	2	Clamp	16P	-2.831	8.315	1.272	8.875
NESC Heavy -	3	Clamp	17P	8.141	5.224	3.162	10.177
NESC Heavy -	4	Clamp	17Y	-5.370	5.471	0.266	7.670
NESC Heavy -	5	Clamp	18P	9.006	8.347	3.083	12.660
NESC Heavy -	6	Clamp	18Y	-4.885	4.932	0.340	6.950
NESC Heavy -	7	Clamp	19P	8.564	6.649	2.098	11.043
NESC Heavy -	8	Clamp	19Y	-6.488	6.695	0.191	9.325
NESC Heavy -	9	Clamp	23P	-4.108	9.738	1.624	10.693
NESC Heavy -	10	Clamp	24P	-1.020	8.348	1.880	8.618
NESC Heavy -	11	Clamp	25P	-4.571	11.680	1.183	12.598
NESC Heavy -	12	Clamp	2Y	0.000	-0.000	0.092	0.092
NESC Heavy -	13	Clamp	4Y	0.000	-0.000	0.319	0.319
NESC Heavy -	14	Clamp	6Y	0.000	-0.000	0.481	0.481
NESC Heavy -	15	Clamp	8Y	0.000	-0.000	0.664	0.664
NESC Heavy -	16	Clamp	10Y	0.000	-0.000	0.639	0.639
NESC Heavy -	17	Clamp	12Y	0.000	-0.000	1.154	1.154
NESC Heavy -	18	Clamp	13Y	0.000	-0.000	0.952	0.952
NESC Heavy -	19	Clamp	14Y	0.000	-0.000	1.475	1.475
NESC Heavy -	20	Clamp	30P	0.000	-0.670	3.029	3.102
NESC Heavy -	21	Clamp	31P	0.000	-0.960	3.467	3.598
NESC Heavy -	22	Clamp	32P	0.000	-0.929	3.241	3.372
NESC Heavy -	23	Clamp	33P	0.000	-0.420	1.515	1.572
NESC Heavy -	24	Clamp	34P	0.000	-0.459	1.621	1.685
NESC Heavy -	25	Clamp	35P	0.000	-0.359	1.116	1.173
NESC Heavy -	26	Clamp	36P	0.000	2.153	7.829	8.120
NESC Heavy -	27	Clamp	37P	0.000	0.611	7.637	7.661
NESC Heavy -	28	Clamp	10XY	0.000	-0.316	0.639	0.713
NESC Heavy -	29	Clamp	12XY	0.000	-0.558	1.154	1.282
NESC Heavy -	30	Clamp	13XY	0.000	-0.392	0.952	1.030
NESC Heavy -	31	Clamp	14XY	0.000	-0.607	1.475	1.595
NESC Extreme -	1	Clamp	16X	-0.592	3.473	0.948	3.649
NESC Extreme -	2	Clamp	16P	-1.570	3.979	0.767	4.346
NESC Extreme -	3	Clamp	17P	3.881	1.993	1.835	4.733
NESC Extreme -	4	Clamp	17Y	-3.805	3.202	0.089	4.974
NESC Extreme -	5	Clamp	18P	3.999	3.164	1.667	5.365
NESC Extreme -	6	Clamp	18Y	-3.532	2.912	0.120	4.579
NESC Extreme -	7	Clamp	19P	3.942	2.571	1.212	4.860
NESC Extreme -	8	Clamp	19Y	-4.139	3.597	0.062	5.484
NESC Extreme -	9	Clamp	23P	-2.388	5.334	1.026	5.934
NESC Extreme -	10	Clamp	24P	-1.028	4.614	1.057	4.844
NESC Extreme -	11	Clamp	25P	-2.291	5.885	0.700	6.354
NESC Extreme -	12	Clamp	2Y	0.000	-0.204	0.187	0.277
NESC Extreme -	13	Clamp	4Y	0.000	-0.204	0.187	0.277
NESC Extreme -	14	Clamp	6Y	0.000	-0.204	0.187	0.277
NESC Extreme -	15	Clamp	8Y	0.000	-0.776	0.713	1.054
NESC Extreme -	16	Clamp	10Y	0.000	-0.572	0.526	0.778
NESC Extreme -	17	Clamp	12Y	0.000	-0.572	0.526	0.778
NESC Extreme -	18	Clamp	13Y	0.000	-0.572	0.526	0.778
NESC Extreme -	19	Clamp	14Y	0.000	-0.572	0.526	0.778
NESC Extreme -	20	Clamp	30P	0.000	-0.291	1.033	1.074
NESC Extreme -	21	Clamp	31P	0.000	-0.314	0.992	1.041
NESC Extreme -	22	Clamp	32P	0.000	-0.522	1.171	1.283
NESC Extreme -	23	Clamp	33P	0.000	-0.083	0.405	0.413
NESC Extreme -	24	Clamp	34P	0.000	-0.074	0.421	0.427
NESC Extreme -	25	Clamp	35P	0.000	-0.135	0.312	0.340
NESC Extreme -	26	Clamp	36P	0.000	8.883	3.673	9.612
NESC Extreme -	27	Clamp	37P	0.000	2.628	3.547	4.414
NESC Extreme -	28	Clamp	10XY	0.000	-0.572	0.526	0.778

NESC Extreme -	29	Clamp	12XY	0.000	-0.572	0.526	0.778
NESC Extreme -	30	Clamp	13XY	0.000	-0.572	0.526	0.778
NESC Extreme -	31	Clamp	14XY	0.000	-0.572	0.526	0.778
NESC Heavy +	1	Clamp	16X	-0.148	7.732	1.642	7.906
NESC Heavy +	2	Clamp	16P	-2.758	8.734	1.272	9.247
NESC Heavy +	3	Clamp	17P	7.930	5.647	3.162	10.236
NESC Heavy +	4	Clamp	17Y	-4.962	5.950	0.266	7.752
NESC Heavy +	5	Clamp	18P	8.748	8.727	3.083	12.736
NESC Heavy +	6	Clamp	18Y	-4.474	5.416	0.340	7.033
NESC Heavy +	7	Clamp	19P	8.343	7.033	2.098	11.112
NESC Heavy +	8	Clamp	19Y	-6.080	7.175	0.191	9.407
NESC Heavy +	9	Clamp	23P	-4.007	10.294	1.624	11.165
NESC Heavy +	10	Clamp	24P	-0.863	8.927	1.880	9.163
NESC Heavy +	11	Clamp	25P	-4.433	12.242	1.183	13.074
NESC Heavy +	12	Clamp	2Y	0.000	0.000	0.092	0.092
NESC Heavy +	13	Clamp	4Y	0.000	0.000	0.319	0.319
NESC Heavy +	14	Clamp	6Y	0.000	0.000	0.481	0.481
NESC Heavy +	15	Clamp	8Y	0.000	0.000	0.664	0.664
NESC Heavy +	16	Clamp	10Y	0.000	0.000	0.639	0.639
NESC Heavy +	17	Clamp	12Y	0.000	0.000	1.154	1.154
NESC Heavy +	18	Clamp	13Y	0.000	0.000	0.952	0.952
NESC Heavy +	19	Clamp	14Y	0.000	0.000	1.475	1.475
NESC Heavy +	20	Clamp	30P	0.000	0.928	3.029	3.168
NESC Heavy +	21	Clamp	31P	0.000	1.198	3.467	3.669
NESC Heavy +	22	Clamp	32P	0.000	1.163	3.241	3.443
NESC Heavy +	23	Clamp	33P	0.000	0.532	1.515	1.605
NESC Heavy +	24	Clamp	34P	0.000	0.579	1.621	1.721
NESC Heavy +	25	Clamp	35P	0.000	0.423	1.116	1.194
NESC Heavy +	26	Clamp	36P	0.000	2.663	7.829	8.270
NESC Heavy +	27	Clamp	37P	0.000	0.917	7.637	7.692
NESC Heavy +	28	Clamp	10XY	0.000	0.316	0.639	0.713
NESC Heavy +	29	Clamp	12XY	0.000	0.558	1.154	1.282
NESC Heavy +	30	Clamp	13XY	0.000	0.392	0.952	1.030
NESC Heavy +	31	Clamp	14XY	0.000	0.607	1.475	1.595
NESC Extreme +	1	Clamp	16X	-0.365	4.621	0.948	4.731
NESC Extreme +	2	Clamp	16P	-1.458	4.967	0.767	5.233
NESC Extreme +	3	Clamp	17P	3.483	2.989	1.835	4.943
NESC Extreme +	4	Clamp	17Y	-3.009	4.330	0.089	5.273
NESC Extreme +	5	Clamp	18P	3.521	4.069	1.667	5.633
NESC Extreme +	6	Clamp	18Y	-2.746	4.030	0.120	4.878
NESC Extreme +	7	Clamp	19P	3.536	3.480	1.212	5.107
NESC Extreme +	8	Clamp	19Y	-3.375	4.697	0.062	5.784
NESC Extreme +	9	Clamp	23P	-2.169	6.818	1.026	7.228
NESC Extreme +	10	Clamp	24P	-0.712	6.125	1.057	6.256
NESC Extreme +	11	Clamp	25P	-2.021	7.341	0.700	7.646
NESC Extreme +	12	Clamp	2Y	0.000	0.204	0.187	0.277
NESC Extreme +	13	Clamp	4Y	0.000	0.204	0.187	0.277
NESC Extreme +	14	Clamp	6Y	0.000	0.204	0.187	0.277
NESC Extreme +	15	Clamp	8Y	0.000	0.776	0.713	1.054
NESC Extreme +	16	Clamp	10Y	0.000	0.572	0.526	0.778
NESC Extreme +	17	Clamp	12Y	0.000	0.572	0.526	0.778
NESC Extreme +	18	Clamp	13Y	0.000	0.572	0.526	0.778
NESC Extreme +	19	Clamp	14Y	0.000	0.572	0.526	0.778
NESC Extreme +	20	Clamp	30P	0.000	0.853	1.033	1.340
NESC Extreme +	21	Clamp	31P	0.000	0.830	0.992	1.294
NESC Extreme +	22	Clamp	32P	0.000	1.030	1.171	1.560
NESC Extreme +	23	Clamp	33P	0.000	0.325	0.405	0.519
NESC Extreme +	24	Clamp	34P	0.000	0.334	0.421	0.537
NESC Extreme +	25	Clamp	35P	0.000	0.273	0.312	0.414

NESC Extreme +	26	Clamp	36P	0.000	9.291	3.673	9.991
NESC Extreme +	27	Clamp	37P	0.000	3.036	3.547	4.669
NESC Extreme +	28	Clamp	10XY	0.000	0.572	0.526	0.778
NESC Extreme +	29	Clamp	12XY	0.000	0.572	0.526	0.778
NESC Extreme +	30	Clamp	13XY	0.000	0.572	0.526	0.778
NESC Extreme +	31	Clamp	14XY	0.000	0.572	0.526	0.778

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy -	86.563	-3.862	34.016	8982.008	408.542	-336.145
NESC Extreme -	56.000	-7.523	16.280	6136.665	778.906	-119.973
NESC Heavy +	91.163	-2.704	34.016	9464.925	287.791	-338.699
NESC Extreme +	64.255	-5.315	16.280	6993.634	550.802	-123.962

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 38400.0
Total: 38400.0

*** End of Report

Tower Anchor Bolt Analysis

Max Leg Reactions:

Uplift = $Uplift := 160.9 \cdot kips$ (User Input)

Shear = $Shear := 43.6 \cdot kips$ (User Input)

Compression = $Compression := 186.8 \cdot kips$ (User Input)

Anchor Bolt Data:

Use ASTM A36 (Assumed Conservative Value - Actual Grade Unknown)

Number of Anchor Bolts = $N := 4$ (User Input)

Bolt Ultimate Strength = $F_u := 58 \cdot ksi$ (User Input)

Bolt Yield Strength = $F_y := 36 \cdot ksi$ (User Input)

Diameter of Bolts = $D := 2.0 \cdot in$ (User Input)

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

Coefficient of Friction = $\mu := 0.55$ (User Input)

Anchor Bolt Area:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.142\ in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 2.498\ in^2$ (AISC 13th Ed. pg. 7-83)

Check Tensile Force:

Maximum Tensile Force (Gross Area) =

$F_{gross.area} := 1.0 \cdot (0.33 \cdot A_g \cdot F_u) = 60.1\ kips$

Maximum Tensile Force (Net Area) =

$F_{net.area} := 1.0 \cdot (0.60 \cdot A_n \cdot F_y) = 54\ kips$

Allowable Tension =

$$AllowableTension := \begin{cases} \text{if } F_{gross.area} < F_{net.area} \\ \quad F_{gross.area} \\ \text{if } F_{net.area} < F_{gross.area} \\ \quad F_{net.area} \end{cases}$$

$AllowableTension = 54\ kips$

Applied Tension =

$MaxTension := \frac{Uplift}{N} = 40.23\ kips$

$\frac{MaxTension}{F_{net.area}} = 74.5\%$

$Condition1 := \text{if}\left(\frac{MaxTension}{F_{net.area}} \le 1.00\ , \text{“OK”}\ , \text{“Overstressed”}\right)$

$Condition1 = \text{“OK”}$

Check Anchor Bolt Area:

Based on the ASCE 10-15 Design of
Latticed Steel Transmission Structures

Required Area =

$A_{s1} := \frac{Uplift}{F_y} + \frac{Shear}{\mu \cdot .85 \cdot F_y} = 7.1\ in^2$

$A_{s2} := \left(\frac{Shear - (0.3 \cdot Compression)}{\mu \cdot .85 \cdot F_y}\right) = -0.739\ in^2$

Provided Area =

$A_{sprovided} := A_n \cdot N = 10\ in^2$

$Condition2 := \text{if}\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00\ , \text{“OK”}\ , \text{“Overstressed”}\right)$

$Condition2 = \text{“OK”}$

$Condition3 := \text{if}\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00\ , \text{“OK”}\ , \text{“Overstressed”}\right)$

$Condition3 = \text{“OK”}$

Foundation: (Max Pier Height)

Input Data:

Tower Data

Shear (Compression Leg) =	$Shear_{comp} := 36 \cdot 1.1 \cdot kip = 39.6\ kip$		(User Input from PLS Tower)
Shear (Uplift Leg) =	$Shear_{up} := 42.47 \cdot 1.1 \cdot kip = 46.7\ kip$		(User Input from PLS Tower)
Compression =	$Comp := 186.8 \cdot 1.1 \cdot kip = 205.5\ kip$		(User Input from PLS Tower)
Uplift =	$Uplift := 160.9 \cdot 1.1 \cdot kip = 177\ kip$		(User Input from PLS Tower)
Tower Height =	$H_t := 129 \cdot ft$		(User Input)

Footing Data:

Depth to Bottom of Footing =	$D_f := 9 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 14.5 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 5.5 \cdot ft$	(User Input)	
Width of Pier =	$W_p := 5 \cdot ft$	(User Input)	
Depth of Soil =	$D_{soil} := 9 \cdot ft$	(User Input)	
Depth of Rock =	$D_{rock} := 12 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcement Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 36000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Soil Bearing Capacity =	$q_s := 9000 \cdot psf$	(User Input)	
Rock Bearing Capacity =	$q_{rock} := 50000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(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 Buoyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 4 \cdot ft$	(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:

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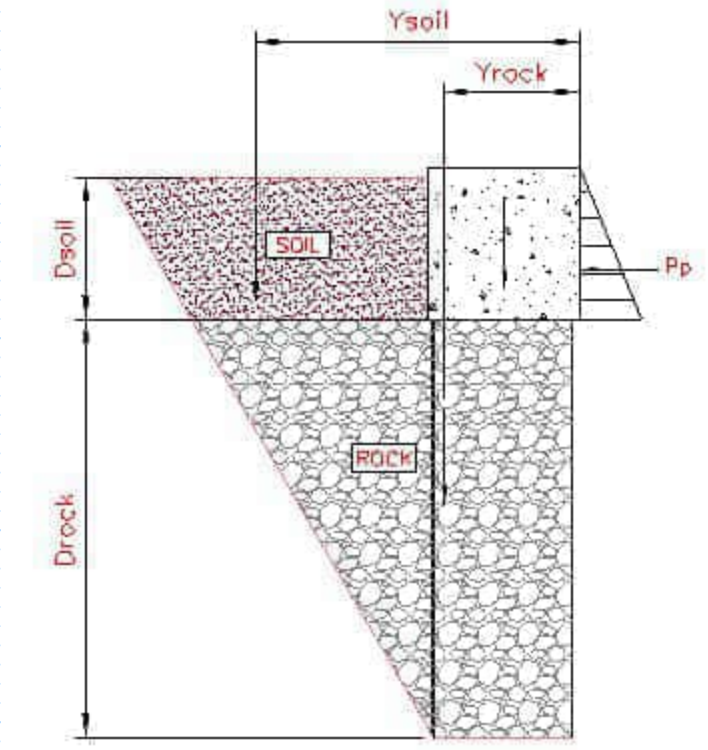
Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)	
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)	
Anchor Diameter =	$d_{ra1} := 1.128 \cdot in$	(User Input)	(1 # 9 and 1 # 11 per Rock Group)
Anchor Diameter =	$d_{ra2} := 1.41 \cdot in$	(User Input)	
Hole Diameter =	$d_{Hole} := 4 \cdot in$	(User Input)	
Grout Strength =	$\tau := 120 \cdot psi$	(User Input)	
Distance to Rock Anchor Group 1 =	$D_{a1} := 24 \cdot in$	(User Input)	
Number of Rock Anchors in Group 1 =	$N_{a1} := 6$	(User Input)	
Total Number of Rock Bolts =	$N_{atot} := 8$	(User Input)	
Rock Anchor Out to Out Spacing =	$S_a := 48 \cdot in$	(User Input)	

Check Uplift:

Effective Depth of Soil Used =	$D_{soil.eff} := \text{if}\left(D_{soil} - n \geq 0 , D_{soil} - n , 0\right) = 5\ ft$
Adjusted Concrete Unit Weight =	$\gamma_c := \text{if}\left(Bouyancy = 1 , \gamma_{conc} - 62.4 \cdot pcf , \gamma_{conc}\right) = 150\ pcf$
Adjusted Soil Unit Weight =	$\gamma_s := \text{if}\left(Bouyancy = 1 , \gamma_{soil} - 62.4 \cdot pcf , \gamma_{soil}\right) = 100\ pcf$
Weight of Concrete =	$WT_c := \left(W_p^{\ 2} \cdot L_p\right) \cdot \gamma_c = 54.375\ kip$
Base Area 1 of Resisting Pyramid =	$B_1 := \left(D_{a1} \cdot 2\right)^2 = 16\ ft^2$
Base Area 2 of Resisting Pyramid =	$B_2 := \left(\tan\left(\Phi_s\right) \cdot \left(D_{rock}\right) \cdot 2 + D_{a1} \cdot 2\right)^2 = 318.9\ ft^2$
Base Area 3 of Resisting Pyramid =	$B_3 := \left(\tan\left(\Phi_s\right) \cdot \left(D_{rock} + D_{soil}\right) \cdot 2 + D_{a1} \cdot 2\right)^2 = 798\ ft^2$
Weight of Soil =	$WT_{soil} := \left(\frac{D_{soil}}{3} \cdot \left(B_2 + B_3 + \sqrt{B_2 \cdot B_3}\right) - W_p^{\ 2} \cdot D_{soil}\right) \cdot \gamma_s = 463.878\ kip$
Weight of Rock =	$WT_{rock} := \left(\frac{D_{rock}}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right) \cdot \gamma_{rock} = 260.017\ kip$
Total Resistance =	$WT_{tot} := WT_c + WT_{rock} + WT_{soil} = 778.3\ kip$
Factor of Safety Actual =	$FS := \frac{WT_{tot}}{Uplift} = 4.4$
Factor of Safety Required =	$FS_{req} := 1.0$
	$Uplift\_Check := \text{if}\left(FS \geq FS_{req} , \text{“Okay”} , \text{“No Good”}\right)$
	$Uplift\_Check = \text{“Okay”}$



Check Overturning:

Volume 1 = $V1 := \left(\frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{soil}^{\ 2} \cdot \left(S_a + 2 \cdot \tan\left(\Phi_s\right) \cdot D_{rock}\right) + \frac{D_{soil}}{3} \cdot \left(\tan\left(\Phi_s\right) \cdot D_{soil}\right)^2 \cdot 2\right) = 579.531\ ft^3$

Volume 2 = $V2 := \left(S_a + \tan\left(\Phi_s\right) \cdot D_{rock}\right) \cdot \left(S_a + 2 \cdot \tan\left(\Phi_s\right) \cdot D_{rock}\right) \cdot D_{soil} + \frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{soil}^{\ 2} \cdot 2 \cdot \left(S_a + \tan\left(\Phi_s\right) \cdot D_{rock}\right) - W_p^{\ 2} \cdot D_{soil} = 2042\ ft^3$

Distance to Centroid 1 = $Y1 := S_a + \tan\left(\Phi_s\right) \cdot D_{rock} + \frac{1}{3} \cdot \tan\left(\Phi_s\right) \cdot D_{soil} = 12.66\ ft$

Distance to Centroid 2 = $Y2 := \frac{1}{2} \cdot \left(S_a + \tan\left(\Phi_s\right) \cdot D_{rock}\right) = 5.464\ ft$

Distance from Front Rock Anchor to Centroid of Soil = $Y_{soil} := \text{if}\left(V1 + V2 > 0, \frac{V1 \cdot Y1 + V2 \cdot Y2}{V1 + V2}, 0\right) = 7.05\ ft$

Volume 3 = $V3 := \left(\frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{rock}^{\ 2} \cdot S_a + \frac{D_{rock}}{3} \cdot \left(\tan\left(\Phi_s\right) \cdot D_{rock}\right)^2 \cdot 2\right) = 550.277\ ft^3$

Volume 4 = $V4 := \left(S_a \cdot D_{rock} + \frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{rock}^{\ 2} \cdot 2\right) \cdot S_a = 524.554\ ft^3$

Distance to Centroid 3 = $Y3 := S_a + \frac{1}{3} \cdot \tan\left(\Phi_s\right) \cdot D_{rock} = 6.309\ ft$

Distance to Centroid 4 = $Y4 := \frac{S_a}{2} = 2\ ft$

Distance from Front Rock Anchor to Centroid of Rock = $Y_{rock} := \frac{\left(V3 \cdot Y3 + V4 \cdot Y4\right)}{\left(V3 + V4\right)} = 4.21\ ft$

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

Passive Pressure = $P_{top} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 1.2$ **ksf**

$P_{bot} := K_p \cdot \gamma_s \cdot D_{soil} + c \cdot 2 \cdot \sqrt{K_p} = 2.7$ **ksf**

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.95$ **ksf**

$A_p := W_p \cdot (D_{soil.eff}) = 25$ **ft²**

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 48.75$ **kip**

Passive Pressure Resistance to Overturning = $PP_R := min(Shear_{up}, (S_u)) = 46.717$ **kip**

Weight of Concrete Pad = $WT_c := (W_p^{\ 2} \cdot L_p) \cdot \gamma_c = 54.375$ **kip**

Total Weight of Soil = $WT_{Stot} := (V1 + V2) \cdot \gamma_s = 262.2$ **kip**

Total Weight of Rock = $WT_{Rtot} := (V3 + V4) \cdot \gamma_{rock} = 172$ **kip**

Resisting Moment = $M_r := (WT_c) \cdot \frac{S_a}{2} + PP_R \cdot \frac{(D_{soil.eff})}{3} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 2760$ **kip · ft**

Overturning Moment = $M_{ot} := Uplift \cdot \frac{S_a}{2} + Shear_{up} \cdot L_p = 1031$ **kip · ft**

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 2.68$

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

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

$OverTurning\_Moment\_Check = \text{“Okay”}$

Check Rock Anchors:

Orthogonal

Polar Moment of Inertia = $I_p := \left(D_{a1}{}^2 \cdot N_{a1}\right) = 3456\ in^2$

Gross Area of Bolt Group = $A_g := \frac{\pi}{4} \cdot \left(d_{ra1}{}^2 + d_{ra2}{}^2\right) = 2.561\ in^2$

Maximum Tension Force = $T_{Max} := \frac{Uplift}{N_{atot}} + \frac{Shear_{up} \cdot L_p \cdot D_{a1}}{I_p} - \frac{WT_c}{N_{atot}} = 71.8\ kip$

Check Steel Strength:

Design Tension = $T_{desgin} := A_g \cdot F_y = 153.6\ kip$

$\frac{T_{Max}}{T_{desgin}} = 46.7\%$

$Condition1 := \text{if}\left(T_{Max} < T_{desgin}, \text{“OK”}, \text{“NG”}\right)$

$Condition1 = \text{“OK”}$

Check Bond Strength:

Bond Strength = $Bond\_Strength := d_{Hole} \cdot \pi \cdot \left(D_{rock}\right) \cdot \tau = 217\ kip$

$\frac{T_{Max}}{Bond\_Strength} = 33.1\%$

$Condition2 := \text{if}\left(T_{Max} < Bond\_Strength, \text{“OK”}, \text{“NG”}\right)$

$Condition2 = \text{“OK”}$

Maximum Compressive Force = $C_{max} := \frac{Comp + WT_c}{N_{atot}} + \frac{Shear_{comp} \cdot L_p \cdot D_{a1}}{I_p} = 80.3\ kip$

Check Steel Strength:

Design Compression = $C_{design} := A_g \cdot F_y = 153.6\ kip$

Rock Anchors Fully Braced by Grout
Fcr = Fy

$\frac{C_{max}}{C_{design}} = 52.3\%$

$Condition1 := \text{if}\left(C_{max} < C_{design}, \text{“OK”}, \text{“NG”}\right)$

$Condition1 = \text{“OK”}$

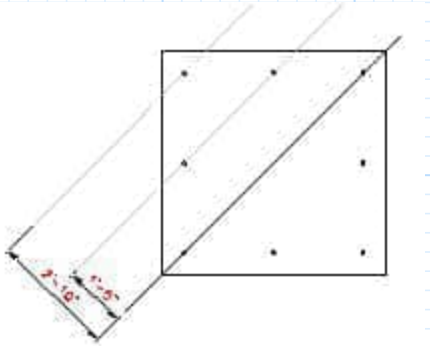
Bond Strength = $Bond\_Strength := d_{Hole} \cdot \pi \cdot \left(D_{rock}\right) \cdot \tau = 217\ kip$

$\frac{C_{max}}{Bond\_Strength} = 37\%$

$Condition2 := \text{if}\left(C_{max} < Bond\_Strength, \text{“OK”}, \text{“NG”}\right)$

$Condition2 = \text{“OK”}$

Diagonal



Distance to Rock Anchor Group 2 = $D_{a2} := 17 \cdot in$

Distance to Rock Anchor Group 3 = $D_{a3} := 34 \cdot in$

Number of Rock Anchors in Group 2 = $N_{a2} := 4$

Number of Rock Anchors in Group 3 = $N_{a3} := 2$

Polar Moment of Inertia = $I_p := \left({D_{a2}}^2 \cdot N_{a2} + {D_{a3}}^2 \cdot N_{a3} \right) = 3468\ in^2$

Maximum Tension Force = $T_{Max} := \frac{Uplift}{N_{atot}} + \frac{Shear_{up} \cdot L_p \cdot D_{a3}}{I_p} - \frac{WT_c}{N_{atot}} = 95\ kip$

Check Steel Strength:

$\frac{T_{Max}}{T_{desgin}} = 61.8\%$

$Condition1 := \text{if}\left(T_{Max} < T_{desgin}, \text{“OK”}, \text{“NG”} \right)$

$Condition1 = \text{“OK”}$

Check Bond Strength:

$\frac{T_{Max}}{Bond\_Strength} = 43.8\%$

$Condition2 := \text{if}\left(T_{Max} < Bond\_Strength, \text{“OK”}, \text{“NG”} \right)$

$Condition2 = \text{“OK”}$

Maximum Compressive Force = $C_{max} := \frac{Comp + WT_c}{N_{atot}} + \frac{Shear_{comp} \cdot L_p \cdot D_{a3}}{I_p} = 100\ kip$

Check Steel Strength:

$\frac{C_{max}}{C_{design}} = 65.1\%$

$Condition1 := \text{if}\left(C_{max} < C_{design}, \text{“OK”}, \text{“NG”} \right)$

$Condition1 = \text{“OK”}$

Check Bond Strength:

$\frac{C_{max}}{Bond\_Strength} = 46.1\%$

$Condition2 := \text{if}\left(C_{max} < Bond\_Strength, \text{“OK”}, \text{“NG”} \right)$

$Condition2 = \text{“OK”}$

Foundation:

(Min Pier Height)

Input Data:

Tower Data

Shear (Compression Leg) =	$Shear_{comp} := 36 \cdot 1.1 \cdot kip = 39.6\ kip$		(User Input from PLS Tower)
Shear (Uplift Leg) =	$Shear_{up} := 42.47 \cdot 1.1 \cdot kip = 46.7\ kip$		(User Input from PLS Tower)
Compression =	$Comp := 186.8 \cdot 1.1 \cdot kip = 205.5\ kip$		(User Input from PLS Tower)
Uplift =	$Uplift := 160.9 \cdot 1.1 \cdot kip = 177\ kip$		(User Input from PLS Tower)
Tower Height =	$H_t := 129 \cdot ft$		(User Input)

Footing Data:

Depth to Bottom of Footing =	$D_f := 2 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 6 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 4 \cdot ft$	(User Input)	
Width of Pier =	$W_p := 5 \cdot ft$	(User Input)	
Depth of Soil =	$D_{soil} := 2 \cdot ft$	(User Input)	
Depth of Rock =	$D_{rock} := 12 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3500 \cdot psi$	(User Input)	
Steel Reinforcement Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 36000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Soil Bearing Capacity =	$q_s := 9000 \cdot psf$	(User Input)	
Rock Bearing Capacity =	$q_{rock} := 50000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(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 Buoyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 4 \cdot ft$	(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:

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Bolt Ultimate Strength =	$F_u := 90 \cdot ksi$	(User Input)	
Bolt Yield Strength =	$F_y := 60 \cdot ksi$	(User Input)	
Anchor Diameter =	$d_{ra1} := 1.128 \cdot in$	(User Input)	(1 # 9 and 1 # 11 per Rock Group)
Anchor Diameter =	$d_{ra2} := 1.41 \cdot in$	(User Input)	
Hole Diameter =	$d_{Hole} := 4 \cdot in$	(User Input)	
Grout Strength =	$\tau := 120 \cdot psi$	(User Input)	
Distance to Rock Anchor Group 1 =	$D_{a1} := 24 \cdot in$	(User Input)	
Number of Rock Anchors in Group 1 =	$N_{a1} := 6$	(User Input)	
Total Number of Rock Bolts =	$N_{atot} := 8$	(User Input)	
Rock Anchor Out to Out Spacing =	$S_a := 48 \cdot in$	(User Input)	

Check Uplift:

Effective Depth of Soil Used = $D_{soil.eff} := \text{if}\left(D_{soil} - n \geq 0 , D_{soil} - n , 0\right) = 0$

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

Adjusted Soil Unit Weight = $\gamma_s := \text{if}\left(Bouyancy = 1 , \gamma_{soil} - 62.4 \cdot pcf , \gamma_{soil}\right) = 100\ pcf$

Weight of Concrete = $WT_c := \left(W_p^{\ 2} \cdot L_p\right) \cdot \gamma_c = 22.5\ kip$

Base Area 1 of Resisting Pyramid = $B_1 := \left(D_{a1} \cdot 2\right)^2 = 16\ ft^2$

Base Area 2 of Resisting Pyramid = $B_2 := \left(\tan\left(\Phi_s\right) \cdot \left(D_{rock}\right) \cdot 2 + D_{a1} \cdot 2\right)^2 = 318.9\ ft^2$

Base Area 3 of Resisting Pyramid = $B_3 := \left(\tan\left(\Phi_s\right) \cdot \left(D_{rock} + D_{soil}\right) \cdot 2 + D_{a1} \cdot 2\right)^2 = 406.7\ ft^2$

Weight of Soil = $WT_{soil} := \left(\frac{D_{soil}}{3} \cdot \left(B_2 + B_3 + \sqrt{B_2 \cdot B_3}\right) - W_p^{\ 2} \cdot D_{soil}\right) \cdot \gamma_s = 67.373\ kip$

Weight of Rock = $WT_{rock} := \left(\frac{D_{rock}}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right) \cdot \gamma_{rock} = 260.017\ kip$

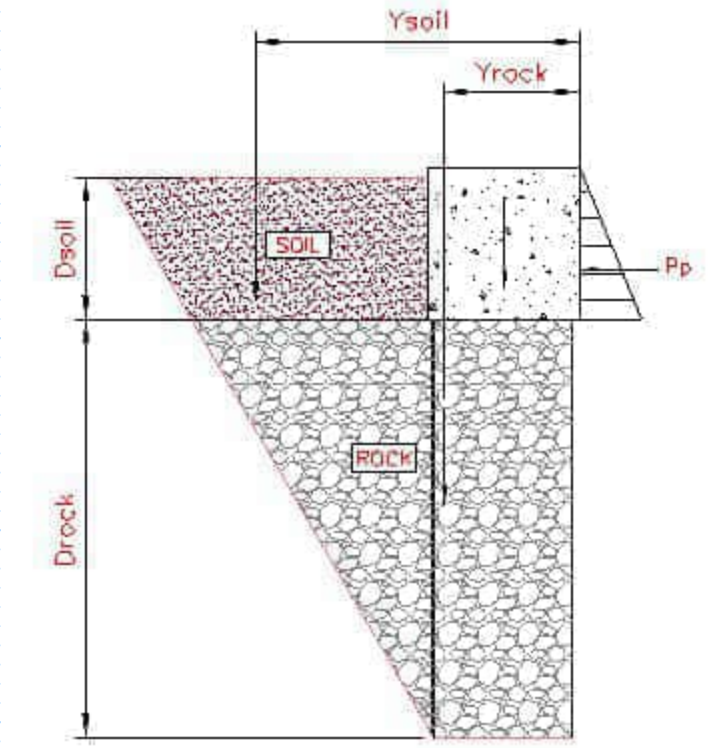
Total Resistance = $WT_{tot} := WT_c + WT_{rock} + WT_{soil} = 349.9\ kip$

Factor of Safety Actual = $FS := \frac{WT_{tot}}{Uplift} = 1.98$

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

$Uplift\_Check := \text{if}\left(FS \geq FS_{req} , \text{“Okay”} , \text{“No Good”}\right)$

$Uplift\_Check = \text{“Okay”}$



Check Overturning:

$$V1 := \left(\frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{soil}{}^2 \cdot \left(S_a + 2 \cdot \tan\left(\Phi_s\right) \cdot D_{rock}\right) + \frac{D_{soil}}{3} \cdot \left(\tan\left(\Phi_s\right) \cdot D_{soil}\right)^2 \cdot 2\right) = 22.397\ \mathit{ft}^3$$

$$V2 := \left(S_a + \tan\left(\Phi_s\right) \cdot D_{rock}\right) \cdot \left(S_a + 2 \cdot \tan\left(\Phi_s\right) \cdot D_{rock}\right) \cdot D_{soil} + \frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{soil}{}^2 \cdot 2 \cdot \left(S_a + \tan\left(\Phi_s\right) \cdot D_{rock}\right) - W_p{}^2 \cdot D_{soil} = 366\ \mathit{ft}^3$$

Distance to Centroid 1 = $Y1 := S_a + \tan\left(\Phi_s\right) \cdot D_{rock} + \frac{1}{3} \cdot \tan\left(\Phi_s\right) \cdot D_{soil} = 11.313\ \mathit{ft}$

Distance to Centroid 2 = $Y2 := \frac{1}{2} \cdot \left(S_a + \tan\left(\Phi_s\right) \cdot D_{rock}\right) = 5.464\ \mathit{ft}$

Distance from Front Rock Anchor to Centroid of Soil = $Y_{soil} := \mathbf{if}\left(V1 + V2 > 0, \frac{V1 \cdot Y1 + V2 \cdot Y2}{V1 + V2}, 0\right) = 5.8\ \mathit{ft}$

Volume 3 = $V3 := \left(\frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{rock}{}^2 \cdot S_a + \frac{D_{rock}}{3} \cdot \left(\tan\left(\Phi_s\right) \cdot D_{rock}\right)^2 \cdot 2\right) = 550.277\ \mathit{ft}^3$

Volume 4 = $V4 := \left(S_a \cdot D_{rock} + \frac{1}{2} \cdot \tan\left(\Phi_s\right) \cdot D_{rock}{}^2 \cdot 2\right) \cdot S_a = 524.554\ \mathit{ft}^3$

Distance to Centroid 3 = $Y3 := S_a + \frac{1}{3} \cdot \tan\left(\Phi_s\right) \cdot D_{rock} = 6.309\ \mathit{ft}$

Distance to Centroid 4 = $Y4 := \frac{S_a}{2} = 2\ \mathit{ft}$

Distance from Front Rock Anchor to Centroid of Rock = $Y_{rock} := \frac{\left(V3 \cdot Y3 + V4 \cdot Y4\right)}{\left(V3 + V4\right)} = 4.21\ \mathit{ft}$

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

Passive Pressure = $P_{top} := 0$

$P_{bot} := 0$

$P_{ave} := 0$

$A_p := W_p \cdot (D_{soil.eff}) = 0$ **ft**

Ultimate Shear = $S_u := 0 \cdot$ **kip**

Passive Pressure Resistance to Overturning = $PP_R := min(Shear_{up}, (S_u)) = 0$ **lbf**

Weight of Concrete Pad = $WT_c := (W_p^{\ 2} \cdot L_p) \cdot \gamma_c = 22.5$ **kip**

Total Weight of Soil = $WT_{Stot} := (V1 + V2) \cdot \gamma_s = 38.8$ **kip**

Total Weight of Rock = $WT_{Rtot} := (V3 + V4) \cdot \gamma_{rock} = 172$ **kip**

Resisting Moment = $M_r := (WT_c) \cdot \frac{S_a}{2} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 993$ **kip · ft**

Overturning Moment = $M_{ot} := Uplift \cdot \frac{S_a}{2} + Shear_{up} \cdot L_p = 634$ **kip · ft**

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.57$

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

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

$OverTurning\_Moment\_Check = \text{“Okay”}$

Check Rock Anchors:

Orthogonal

Polar Moment of Inertia = $I_p := \left(D_{a1}{}^2 \cdot N_{a1}\right) = 3456\ in^2$

Gross Area of Bolt Group = $A_g := \frac{\pi}{4} \cdot \left(d_{ra1}{}^2 + d_{ra2}{}^2\right) = 2.561\ in^2$

Maximum Tension Force = $T_{Max} := \frac{Uplift}{N_{atot}} + \frac{Shear_{up} \cdot L_p \cdot D_{a1}}{I_p} - \frac{WT_c}{N_{atot}} = 42.7\ kip$

Check Steel Strength:

Design Tension = $T_{desgin} := A_g \cdot F_y = 153.6\ kip$

$\frac{T_{Max}}{T_{desgin}} = 27.8\%$

$Condition1 := \text{if}\left(T_{Max} < T_{desgin}, \text{“OK”}, \text{“NG”}\right)$

$Condition1 = \text{“OK”}$

Check Bond Strength:

Bond Strength = $Bond\_Strength := d_{Hole} \cdot \pi \cdot \left(D_{rock}\right) \cdot \tau = 217\ kip$

$\frac{T_{Max}}{Bond\_Strength} = 19.7\%$

$Condition2 := \text{if}\left(T_{Max} < Bond\_Strength, \text{“OK”}, \text{“NG”}\right)$

$Condition2 = \text{“OK”}$

Maximum Compressive Force = $C_{max} := \frac{Comp + WT_c}{N_{atot}} + \frac{Shear_{comp} \cdot L_p \cdot D_{a1}}{I_p} = 48.3\ kip$

Check Steel Strength:

Design Compression = $C_{design} := A_g \cdot F_y = 153.6\ kip$

Rock Anchors Fully Braced by Grout
Fcr = Fy

$\frac{C_{max}}{C_{design}} = 31.4\%$

$Condition1 := \text{if}\left(C_{max} < C_{design}, \text{“OK”}, \text{“NG”}\right)$

$Condition1 = \text{“OK”}$

Bond Strength = $Bond\_Strength := d_{Hole} \cdot \pi \cdot \left(D_{rock}\right) \cdot \tau = 217\ kip$

$\frac{C_{max}}{Bond\_Strength} = 22.2\%$

$Condition2 := \text{if}\left(C_{max} < Bond\_Strength, \text{“OK”}, \text{“NG”}\right)$

$Condition2 = \text{“OK”}$

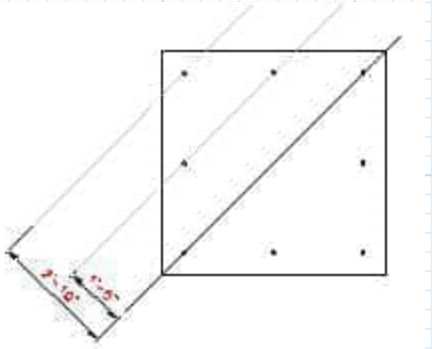
Diagonal

Distance to Rock Anchor Group 2 = $D_{a2} := 17 \cdot in$

Distance to Rock Anchor Group 3 = $D_{a3} := 34 \cdot in$

Number of Rock Anchors in Group 2 = $N_{a2} := 4$

Number of Rock Anchors in Group 3 = $N_{a3} := 2$



Polar Moment of Inertia = $I_p := \left(D_{a2}{}^2 \cdot N_{a2} + D_{a3}{}^2 \cdot N_{a3}\right) = 3468\ in^2$

Maximum Tension Force = $T_{Max} := \frac{Uplift}{N_{atot}} + \frac{Shear_{up} \cdot L_p \cdot D_{a3}}{I_p} - \frac{WT_c}{N_{atot}} = 52.3\ kip$

Check Steel Strength:

$\frac{T_{Max}}{T_{desgin}} = 34\%$

$Condition1 := \text{if}\left(T_{Max} < T_{desgin}, \text{“OK”}, \text{“NG”}\right)$

$Condition1 = \text{“OK”}$

Check Bond Strength:

$\frac{T_{Max}}{Bond\_Strength} = 24.1\%$

$Condition2 := \text{if}\left(T_{Max} < Bond\_Strength, \text{“OK”}, \text{“NG”}\right)$

$Condition2 = \text{“OK”}$

Maximum Compressive Force = $C_{max} := \frac{Comp + WT_c}{N_{atot}} + \frac{Shear_{comp} \cdot L_p \cdot D_{a3}}{I_p} = 56.5\ kip$

Check Steel Strength:

$\frac{C_{max}}{C_{design}} = 36.7\%$

$Condition1 := \text{if}\left(C_{max} < C_{design}, \text{“OK”}, \text{“NG”}\right)$

$Condition1 = \text{“OK”}$

Check Bond Strength:

$\frac{C_{max}}{Bond\_Strength} = 26\%$

$Condition2 := \text{if}\left(C_{max} < Bond\_Strength, \text{“OK”}, \text{“NG”}\right)$

$Condition2 = \text{“OK”}$

Units:

Angular

$rad \equiv 1$ $\quad deg \equiv \pi \cdot \frac{rad}{180}$

Weight

$lb \equiv lbf$

$kips \equiv 1000 \cdot lb$ $\quad k \equiv kips$

$tons \equiv 2000 \cdot lb$

Unit Weight

$plf \equiv \frac{lb}{ft}$ $\quad klf \equiv \frac{kips}{ft}$

Pressure

$psf \equiv \frac{lb}{ft^2}$ $\quad psi \equiv \frac{lb}{in^2}$

$ksf \equiv \frac{kips}{ft^2}$ $\quad ksi \equiv \frac{kips}{in^2}$

Density

$pcf \equiv \frac{lb}{ft^3}$

RF DESIGN SHEET

Issue Date	5/1/2024
Revision	2

RFDS Status	Preliminary
Created By	Vaishnavi Vajje

SITE INFORMATION	
DISH Site Number	NJJER01056B
DISH Site Name	0
Prequal Asset ID	
AOI	JER
PEA	0
Latitude	41.030048
Longitude	-73.597417
Address	22 Sound Shore Drive
City	Greenwich
State	CT
ZIP Code	06830
County	Fairfield
Rad Center (ft)	148
RAD Confirmed	Confirmed
Structure Type	Utility Transmission Tower

PROJECT ASSIGNMENTS	
Market Manager	Michael Fox
Site Development Mgr.	Steven Minarick
RF Engineer	Murugabiran Jayapal
Site Acq Specialist/Develop. Cord.	Nicholas Swan /
SAQ Vendor/A&E Vendor	NORTHEAST SITE SOLUTIONS LLC / O4 INNOVATIONS LLC
Asset Owner/Asset #	Private Owner / Tower #1281
Construction Mgr. (Lead/Field)	Calvin Gray / Victor Correa
Contractor (General/Tower/Civil)	MCPHEE ELECTRIC LTD / /
Power Company / Transport Provider	/ CABLEVISION LIGHTPATH LLC

EMERGENCY CONTACT INFORMATION	
Name	Temporary Emergency Line
Phone	866-624-6874

LEASE AREA	
Dimensions (ft.)	
Type	Steel Platform
Baseband Cabinet	EnerSys(Purcell)-H/EX
Dimensions (in)	32" x 30" x 73"
Baseband	gNB-CU
Generator Required	
Make/Model	

DESIGN COMMENTS
Preliminary

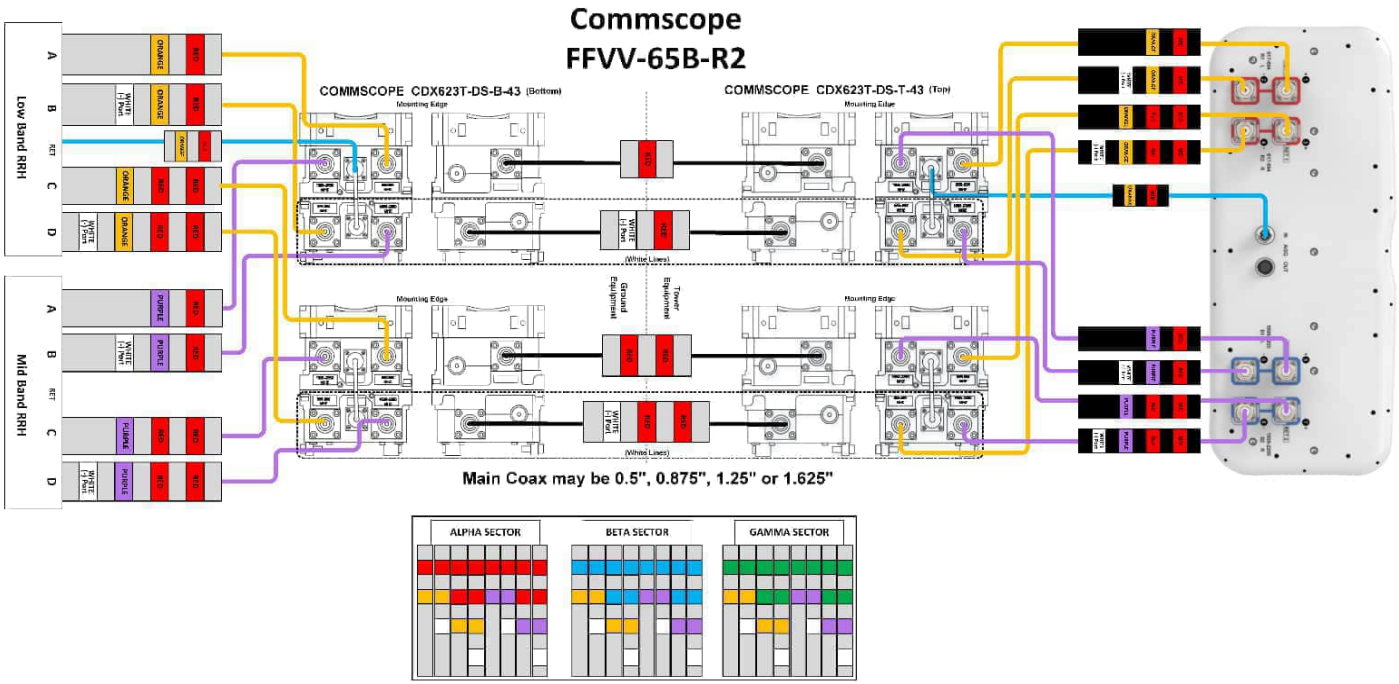
RF EQUIPMENT INFORMATION

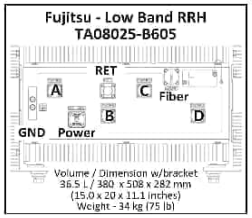
Issue Date/Revision	5/1/2024	**Revision:**	2	**Latitude**	41.030048
Site ID	NJJER01056B			**Prequal Asset ID**	
Site Address	22 Sound Shore Drive, Greenwich CT 06830			**SOW / RF Comments**	Dish proposes to place 3 antennas, 6 RRUs, 0 junction box(s), 12 coax cable(s), at the 148 foot RAD. Dish will require a lease area for ground equipment. Preliminary
Structure Type	Utility Transmission Tower				
sectors >20' apart?	No	***Confirmed RAD?***	Confirmed	148	

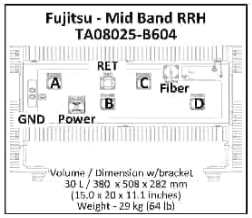
	Sector 1 (alpha)			Sector 2 (beta)			Sector 3 (gamma)		
ANTENNA									
Antenna Mount Position	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Antenna ID		1			2			3	
Manufacturer		Commscope			Commscope			Commscope	
Model Number		FFVV-65B-R2			FFVV-65B-R2			FFVV-65B-R2	
Dimensions H x W x D (in)		72.0" x 19.6" 7.8"			72.0" x 19.6" 7.8"			72.0" x 19.6" 7.8"	
Weight (lbs.)		70.8			70.8			70.8	
TX Power Output (watts)		40000			40000			40000	
ERP (dBm)		76.02			76.02			76.02	
RAD Centerline Height (ft.)		148			148			148	
Azimuths (True North)		100°			230°			350°	
Mech Down Tilt		0°			0°			0°	
Default Mount		Generic							
LOW BAND/RADIO #1									
Manufacturer		Samsung			Samsung			Samsung	
Model Number		RF4450t-71A			RF4450t-71A			RF4450t-71A	
Dimensions H x W x D (in.)		16.5" x 15.0" x 11.0"			16.5" x 15.0" x 11.0"			16.5" x 15.0" x 11.0"	
Weight (lbs.)		94.58			94.58			94.58	
Location		Cabinet			Cabinet			Cabinet	
Band		n71 |			n71 |			n71 |	
Quantity		1			1			1	
Port Assignment		Port 1-4			Port 1-4			Port 1-4	
Elec Down Tilt		2°			2°			2°	
MID BAND/RADIO #2									
Manufacturer		Samsung			Samsung			Samsung	
Model Number		RF4451d-70A			RF4451d-70A			RF4451d-70A	
Dimensions H x W x D (in)		15.0" x 15.0" x 8.9"			15.0" x 15.0" x 8.9"			15.0" x 15.0" x 8.9"	
Weight (lbs.)		61.3			61.3			61.3	
Location		Cabinet			Cabinet			Cabinet	
Quantity		1			1			1	
Band		n70 |n66			n70 |n66			n70 |n66	
Port Assignment		Port 5-8			Port 5-8			Port 5-8	
Elec Down Tilt		2°			2°			2°	
OVP (Junction Box)									
Manufacturer									
Model Number									
Dimensions H x W x D (in.)									
Weight (lbs.)									
Quantity									
LINE DETAILS									
Line Type			Coax			Coax			Coax
Manufacturer			Generic			Generic			Generic
Model Number			Generic 1 1/4" Coax Cable			Generic 1 1/4" Coax Cable			Generic 1 1/4" Coax Cable
Diameter (O.D. in.)			TBD			TBD			TBD
Weight (lbs. per ft.)			TBD			TBD			TBD
Quantity			4			4			4
Approx. Cable Length			178			178			178
OTHER EQUIPMENT									
Type of Equipment	Diplexer	Diplexer		Diplexer	Diplexer		Diplexer	Diplexer	
Manufacturer	Commscope	Commscope		Commscope	Commscope		Commscope	Commscope	
Model Number	CDX623T-DS-T-43 | E16V95P63	CDX623T-DS-B-43 | E16V95P62		CDX623T-DS-T-43 | E16V95P63	CDX623T-DS-B-43 | E16V95P62		CDX623T-DS-T-43 | E16V95P63	CDX623T-DS-B-43 | E16V95P62	
Dimensions H x W x D (in)	8.661" x 4.961" x 4.488"	8.661" x 4.961" x 4.488"		8.661" x 4.961" x 4.488"	8.661" x 4.961" x 4.488"		8.661" x 4.961" x 4.488"	8.661" x 4.961" x 4.488"	
Weight (lbs.)	10.582	10.582		10.582	10.582		10.582	10.582	
Equipment Location	Top	Bottom		Top	Bottom		Top	Bottom	
Quantity	1	1		1	1		1	1	

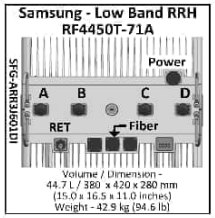
Frequencies	**n29**	**n66**	**n70**	**n71**
Downlink (TX)	-	|2160 - 2165| |2180 - 2200|	|1995 - 2020|	|632 - 652|
Uplink (RX)	-	|1760 - 1765|	|1695 - 1710|	|678 - 698|

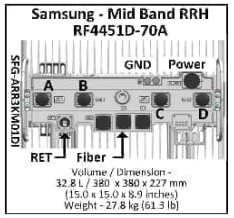
PLUMBING DIAGRAM ANTENNA

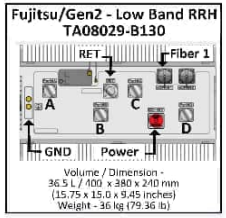


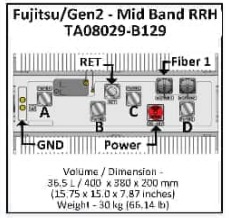


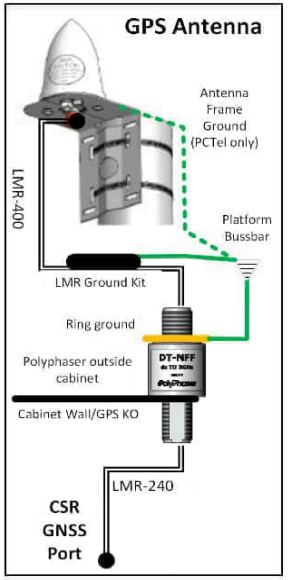












Wireless Engineering

Canister - RRU AND ANTENNA RF CABLING CONFIGURATION

(3) Commscope - 8 Port - 6ft
Low/Mid Radios + (6) CDX623T T&B
LOW Band RET cables

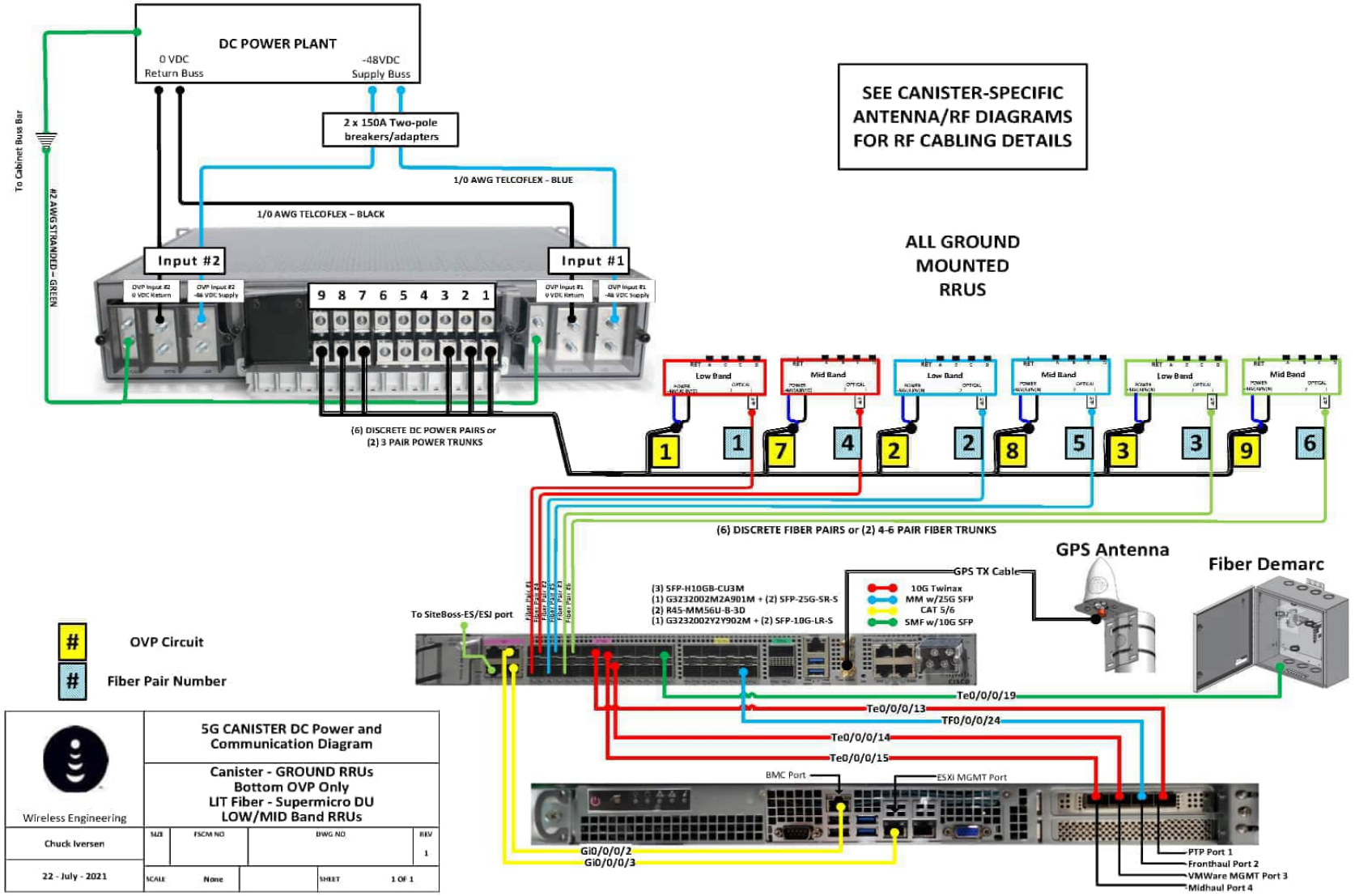
Chuck Iversen	SIZE	CAGE CODE	DWG NAME	REV
		50HD6	Canister_FFVV-65B-R2-Commscope-6ft_CDX623(2 sets)	1.0
13 - June - 2023	SCALE	None	SHEET	1 OF 1

Sector Color Bands	Frequency Color Bands	Main Coax
ALPHA SECTOR	LOW BAND (LB)	RET Cable
BETA SECTOR	MID BAND (MB)	RF Jumper - Low Band
GAMMA SECTOR	FUTURE	RF Jumper - Mid Band

- RF Connector recommended torque: 8 ft. lbs.
- RET connector recommended torque: 4.3-8.6 inch lbs.
- Weatherproof boots required on all RF jumpers.
- Ensure the dielectric grease provided with antenna is used on RET cable connection only.
- Weatherproof all GPS connections with self-sealing tape and/or cold shrink wrap.
- Protect unused ports with outdoor-rated/gasketed caps.
- Download latest RFDS for MT/ET down-tilt settings.
- Sector daisy-chaining of RETs not supported at this time.
- Use i-temp rated SFPs in RRUs (larger temp range).

- **When OOBE filters are used, provide straight-through connectivity (Ant port 1 --> RU port A) with each port and each set of RF jumpers color-coded accordingly.**
- Terminate and secure hybrid/power DC conductors in a method that allows for 'servicing' should the installer cut wires too short.
- Ensure all DC power lug hardware is torqued per manufacturers recommendations.
- Label all DC conductors and fibers appropriately.
- Utilize the fiber management tray for extra fiber coils.
- Velcro is used for securing fibers, zip ties are prohibited.

PLUMBING DIAGRAM OVP



RF COLOR CODING

RF Cable Color Codes

Low Bands (N71+N26) Optional - (N29)	AWS (N66+N70+H-block)	CBRS Tech (3 GHz)	Negative Slant Port on Ant/RRH
ORANGE	PURPLE	YELLOW	WHITE

RF Jumper Color Coding

3/4" tape widths with 3/4" spacing

Low-Band RRH -
(600MHz N71 baseband) +
(850MHz N26 band) +
(700MHz N29 band) - optional per market

Add Frequency Color to Sector Band
(CBRS will use Yellow bands)

ALPHA RRH				BETA RRH				GAMMA RRH			
Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant	Port 1 + slant	Port 2 - slant	Port 3 + slant	Port 4 - slant
RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
ORANGE	ORANGE	RED	RED	ORANGE	ORANGE	BLUE	BLUE	ORANGE	ORANGE	GREEN	GREEN
	WHITE (-) Port	ORANGE	ORANGE		WHITE (-) Port	ORANGE	ORANGE		WHITE (-) Port	ORANGE	ORANGE
			WHITE (-) Port				WHITE (-) Port				WHITE (-) Port

Mid-band RRH -
(AWS bands N66+N70)

Add Frequency Color to Sector Band
(CBRS will use Yellow bands)

RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
PURPLE	PURPLE	RED	RED	PURPLE	PURPLE	BLUE	BLUE	PURPLE	PURPLE	GREEN	GREEN
	WHITE (-) Port	PURPLE	PURPLE		WHITE (-) Port	PURPLE	PURPLE		WHITE (-) Port	PURPLE	PURPLE
			WHITE (-) Port				WHITE (-) Port				WHITE (-) Port

Hybrid/Discreet Cables

Include sector bands being supported along with frequency bands

Example 1 - Hybrid, or discreet, supports all sectors, both low-bands and mid-bands

Example 2 - Hybrid, or discreet, supports CBRS only, all sectors

Example 3 - Main Coax with ground mounted RRUs

Example 1	Example 2 (3rd Tech added)	Example 3 COAX#1 (Alpha)	(canister) COAX #2 (Alpha)
RED	RED	RED	RED
BLUE	BLUE		RED
GREEN	GREEN		
ORANGE	YELLOW		
PURPLE			

Fiber Jumpers to RRHs

Low Band RRH fiber cables have sector stripe only

Low Band RRH	Mid Band RRH	Low Band RRH	Mid Band RRH	Low Band RRH	Mid Band RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE

Power Cables to RRHs

Low Band RRH power cables have sector stripe only

Low Band RRH	Mid Band RRH	Low Band RRH	Mid Band RRH	Low Band RRH	Mid Band RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE

RET motors at Antennas

RET control is handled by the MID-band RRU when one set of RET ports exist on antenna.

Separate RET cables are used when antenna ports provide inputs for both LOW and MID bands.

Antenna 1 Mid Band / IN	Antenna 1 Low Band / IN	Antenna 1 Mid Band / IN	Antenna 1 Low Band / IN	Antenna 1 Mid Band / IN	Antenna 1 Low Band / IN
RED	RED	BLUE	BLUE	GREEN	GREEN
PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE

Microwave Radio Links

Links will have a 1.5-2 inch white wrap with the azimuth color overlapping in the middle. Add additional sector color bands for each additional MW radio.

Microwave cables will require P-touch labels inside the cabinet to identify the local and remote Site ID's.

Forward azimuth of 0-120 degrees		Forward azimuth of 120-240 degrees		Forward azimuth of 240-359 degrees	
Primary	Secondary	Primary	Secondary	Primary	Secondary
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
RED	RED	BLUE	BLUE	GREEN	GREEN
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
	RED		BLUE		GREEN
	WHITE		WHITE		WHITE

FFVV-65B-R2

8-port sector antenna, 4x 617-894 and 4x 1695-2200 MHz, 65° HPBW, 2x RET

- Antenna includes 2×Single Column X-Pol Arrays for 617-894MHz and 2×Single Column X-Pol Arrays for 1695-2200MHz

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light Gray (RAL 7035)
Grounding Type	RF connector inner conductor and body grounded to reflector and mounting bracket
Performance Note	Outdoor usage
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, mid band	4
RF Connector Quantity, low band	4
RF Connector Quantity, total	8

Remote Electrical Tilt (RET) Information

RET Hardware	CommRET v2
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male
Input Voltage	10–30 Vdc
Internal RET	Low band (1) | Mid band (1)
Power Consumption, active state, maximum	10 W
Power Consumption, idle state, maximum	2 W

Dimensions

Width	498 mm | 19.606 in
Depth	197 mm | 7.756 in

FFVV-65B-R2

Wind Speed, maximum	241 km/h | 149.75 mph

Packaging and Weights

Width, packed	608 mm | 23.937 in
Depth, packed	352 mm | 13.858 in
Length, packed	1970 mm | 77.559 in
Weight, gross	45.7 kg | 100.751 lb

Regulatory Compliance/Certifications

Agency	**Classification**
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system

Included Products

BSAMNT-2F	–	Mounting bracket for cylindrical pipe installations (60-115mm pipe diameter) for fix mechanical tilt applications.

* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance

CDX623T-DS-T | E15V95P63

Twin Diplexer,555–894 MHz/1695–2360 MHz, dc sense, LOC-top

- Automatic dc switching with dc sense
- dc redundancy with dummy current sink
- Integrated layer one converter (AISG modem)
- Convertible mounting brackets
- Stackable to single unit with included hardware
- Stackable in multiples with included hardware
- Feeder-to-antenna application

Product Classification

Product Type	Diplexer

General Specifications

Product Family	CDX623
Color	Gray
Common Port Label	Common
Modularity	2-Twin
Mounting	Frame | Pole | Rack | Rod | Wall
Mounting Pipe Hardware	Band clamps (2)
RF Connector Interface	7-16 DIN Female
RF Connector Interface Body Style	Medium neck

Dimensions

Height	225 mm | 8.858 in
Width	126 mm | 4.961 in
Depth	115 mm | 4.528 in
Ground Screw Diameter	8 mm | 0.315 in
Mounting Pipe Diameter Range	40–160 mm

Outline Drawing

Logic Table

Combining Mode Operation (Ground Based)				
RF Ports Input Voltage				
AISG Port	555–894 MHz	1695–2360 MHz	COMMON	DC/AISG Path Selection
<10	Any voltage	**>19 V**	<7	AISG "OFF" 555–894 MHz "OFF" **1695–2360 MHz to COMMON "ON"**
<10	**7≤ V ≤ 30**	<7 V	<7	AISG "OFF" **555–894 MHz "ON"** 1695–2360 MHz "OFF"
<10	<7 V	**7≤ V ≤ 30**	<7	AISG "OFF" 555–894 MHz "OFF" **1695–2360 MHz to COMMON "ON"**

Splitting Mode Operation (Tower top)				
RF Ports Input Voltage				
AISG Port	555–894 MHz	1695–2360 MHz	COMMON	DC/AISG Path Selection
Any 10-30 V	<7 V	<7 V	>7 V	**AISG "ON"** 555–894 MHz "OFF" 1695–2360 MHz to COMMON "OFF"

Environmental Specifications

Operating Temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Relative Humidity	5%–100%
Corrosion Test Method	IEC 60068-2-11, 30 days
Ingress Protection Test Method	IEC 60529:2001, IP67

Packaging and Weights

Included	Mounting hardware
Volume	3.2 L
Weight, net	4.6 kg | 10.141 lb

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2015	Designed, manufactured and/or distributed under this quality management system

NORTHEAST > North East > New England > Wallingford-2 > GREENWICH 3 CT

GADASU, SHIVA - shiva.gadasu@verizonwireless.com - 20240617_152101

Project Details		Location Information	
Carrier Aggregation	N	Site Id	323974
Ecip	N	Search Ring#	
Project Name	850 ADD	E-NodeB ID#	065159
Project Alt Name	GREENWICH 3 CT - 4TH SECTOR850LTECBRSLSUB6 ADD	PSLC#	469290
Project Id	15444631	Switch Name	Wallingford-2
Designed Sector Carrier 4G	20	Tower Type	
Designed Sector Carrier 5G	8	Site Type	MACRO
Additional Sector Carrier 4G	0	Street Address	9 Sound Shore Drive
Additional Sector Carrier 5G	0	City	Greenwich
Suffix	Rev13_06.17.2024	State	CT
FP Solution Type & Tech Type	MODIFICATION;5G_850;4G_CBRS;5G_L-Sub6;4G_Radio Swap	Zip Code	06830
		County	Fairfield
		Latitude	41.029711/ 41° 1' 46.960"
		Longitude	-73.59835/ 73° 35' 54.060"

Project Scope

4th sector add, Antenna, RRH swap
Sectors 01 & 02 will use (1) 12 OVP and (2) 6x12 Hybrids and Sectors 03 & 04 will use the remaining same

Rev13_06.17.2024 : Corrected duplicates in Non-Antenna Summary
Rev12_05.30.2024
Rev11_02.13.2024 : Revised to update (3) 6OVP and (3) 6x12 Hybrids as per RE comments, added RET naming
Rev10_10.09.2023 : Updated Cband to 4 sectors, updated Lowband RRH and Cband to Gen2,
Rev9_02.23.2023 : Adding Filters on lowband to avoid 850MHz Eversource interference.
Rev8_02.17.2023 : Revised to remove CDMA diplexers as it is decommissioned
Rev7_03.29.2022: Revised to update CLs on CBRS, LSub6 Beta and Gamma sectors as per latest CD, changed RRHs to ORAN models and

Project Scope

added 850NR carrier
Rev6_07.12.2021 : Revised to add OVP/Hybrids, added plumbing, Corrected CDMA antenna qty
Rev5_05.12.2021 : revised to add 4th sector and fully upgrade the site
Rev4_03.02.2020 : Revised to mount RRHs in shelter with new multiband Triplexers and new Hexport antennas. Plumbing attached
Rev3_02.27.2020 : Revised to delete OVP/Hybrid/700/AWS TRDU's reference from Removed non-antenna summary section, proposed to remove unused coax and any diplexers/SBT from shelter/tower
Rev2_20190917 : reverted back the design to Ant/RRH swap only, no CBRS
Rev1_20190212 : Initial design

Antenna Summary

Added Antenna

700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Center line	Tip Height	Azimuth	Install Type	Quantit
					5G	Samsung	MT6413-77A	140.8	142	10(A),110(B),240(C),315(D)	PHYSICAL	4
LTE	5G,LTE	LTE	LTE			JMA	MX06FRO660-03	139	142	110(2),240(3),110(183),240(184)	PHYSICAL	4
LTE	5G,LTE	LTE	LTE	LTE		JMA	MX10FRO640-03	139	142	10(1),315(4),10(19),315(22),10(182),315(185)	PHYSICAL	4
				LTE		Samsung	R0440CC_3550Mhz	136.5	136.9	110(20),240(21	PHYSICAL	2

Removed Antenna

700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Center line	Tip Height	Azimuth	Install Type	Quantit
						DECIBEL PRODUCTS	DB854DG65ESX	139	142	350(1)(A),120(2)(B),240(3)(C	SPARE	3
			LTE			ANDREW	HBXX-6516DS-A2M	139	141.1	350(1),120(2),240(3)	PHYSICAL	3
LTE	LTE	LTE				ANDREW	SBNHH-1D65B	139	142	350(1),120(2),240(3)	PHYSICAL	3

Retained Antenna

700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Center line	Tip Height	Azimuth	Install Type	Quantit

Added: 14	Removed: 9	Retained: 0

Non Antenna Summary

Added Non Antenna

Equipment Type	Locatio	700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Install Type	Quantity
OVP	Tower	LTE	LTE,5G	LTE	LTE		5G	ovp	12 OVP	PHYSICAL	2
Hybrid Cable	Tower	LTE	LTE,5G	LTE	LTE		5G	N/A	6x12 Hybriflex LI	PHYSICAL	4
RRU	Tower			LTE	LTE			Samsung	B2/B66A RRH ORAN (RF4439d-25A)	PHYSICAL	4
Mount	Tower							JMA	JMA Mount	PHYSICAL	4
RRU	Tower						5G	Samsung	MT6413-77A	PHYSICAL	0
RRU	Tower	LTE	5G,LTE					Samsung	RF4461d-13A	PHYSICAL	4
RRU	Tower					LTE		Samsung	RT4423-48A	PHYSICAL	4

Removed Non Antenna

Equipment Type	Locatio	700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Install Type	Quantity
RRU	Shelter			LTE	LTE			Samsung	B2/B66A RRH ORAN (RF4439d-25A)	PHYSICAL	3
RRU	Shelter	LTE	LTE					Samsung	B5/B13 RRH ORAN (RF4440d-13A)	PHYSICAL	3
Coaxial Cables	Tower							N/A	N/A	PHYSICAL	18

Retained Non Antenna

Equipment Type	Locatio	700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Install Type	Quantity

Added: 22	Removed: 24	Retained: 0

Services							
700 LTE	**0000 (8804185)**			**5GLS (8809112)**			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	5230	5230	5230	5230	5230	5230	5230
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	4	4	2	4	6	2
Tip Height	142	142	142	142	142	142	142
Regulatory Power	81.48 (W/MHz) ERP	81.48 (W/MHz) ERP	81.48 (W/MHz) ERP	120.44 (W/MHz) ERP	70.89 (W/MHz) ERP	70.89 (W/MHz) ERP	120.44 (W/MHz) ERP
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	46.0 dBm	46.0 dBm	46.0 dBm	46.0 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	RF4461d-13A	RF4461d-13A	RF4461d-13A	RF4461d-13A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844214	19844222	19844228	19931400	19931403	19931406	19931409
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	10	10	10	10	10	10	10
Ant. Dimensions H x W x D(inch)	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	40.51	40.51	40.51	76.3	60.0	60.0	76.3

Services							
850 LTE	**0000 (8804185)**			**5GLS (8809112)**			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	2450	2450	2450	2450	2450	2450	2450
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	4	6	2	10	10	2
Tip Height	142	142	142	142	142	142	142
Regulatory Power	160.62 (W/MHz) ERPSD	160.62 (W/MHz) ERPSD	160.62 (W/MHz) ERPSD	391.58 (W/MHz) ERPSD	283.54 (W/MHz) ERPSD	283.54 (W/MHz) ERPSD	391.58 (W/MHz) ERPSD
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	44.6 dBm	46.0 dBm	46.0 dBm	44.6 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	RF4461d-13A	RF4461d-13A	RF4461d-13A	RF4461d-13A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844234	19844235	19844237	19931416	19931417	19931418	19931419
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	10	10	10	10	10	10	10
Ant. Dimensions H x W x D(inch)	72.0 x 11.88 x 7.08	72.0 x 11.88 x 7.08	72.0 x 11.88 x 7.08	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	40.51	40.51	40.51	76.3	60.0	60.0	76.3

Services					
850 NR	**0000 (8804185)**	**5GLS (8809112)**			
Sector		0182	0183	0184	0185
Azimuth		10	110	240	315
Cell/Enodeb-Id		0659451	0659451	0659451	0659451
Antenna Model		MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make		JMA	JMA	JMA	JMA
Centerline		139	139	139	139
DLEARFCN		2450	2450	2450	2450
Mech Down-tilt		0	0	0	0
Elect Down-tilt		2	10	10	2
Tip Height		142	142	142	142
Regulatory Power		391.58 (W/MHz) ERPSD	283.54 (W/MHz) ERPSD	283.54 (W/MHz) ERPSD	391.58 (W/MHz) ERPSD
Transmitter Max Power		44.6 dBm	46.0 dBm	46.0 dBm	44.6 dBm
TMA Make					
TMA Model					
RRU Make		Samsung	Samsung	Samsung	Samsung
RRU Model		RF4461d-13A	RF4461d-13A	RF4461d-13A	RF4461d-13A
Number of Tx,Rx		4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count		0	0	0	0
Position					
Transmitter Id		19931416	19931417	19931418	19931419
Source		VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth		10	10	10	10
Ant. Dimensions H x W x D(inch)		71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)		76.3	60.0	60.0	76.3

Services							
1900 LTE	**0000 (8804185)**			**5GLS (8809112)**			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	1100	1100	1100	1100	1100	1100	1100
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	1	0	0	0	2	2	0
Tip Height	142	142	142	142	142	142	142
Regulatory Power	145.15 (W/MHz) EIRP	145.15 (W/MHz) EIRP	145.15 (W/MHz) EIRP	139.55 (W/MHz) EIRP	133.21 (W/MHz) EIRP	133.21 (W/MHz) EIRP	139.55 (W/MHz) EIRP
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	46.0 dBm	46.0 dBm	46.0 dBm	46.0 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844217	19844224	19844229	19931401	19931404	19931407	19931410
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	20	20	20	20	20	20	20
Ant. Dimensions H x W x D(inch)	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	40.51	40.51	40.51	76.3	60.0	60.0	76.3

Services							
AWS LTE	**0000 (8804185)**			**5GLS (8809112)**			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	HBXX-6516DS-A2M	HBXX-6516DS-A2M	HBXX-6516DS-A2M	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	2050	2050	2050	2050	2050	2050	2050
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	1	2	0	0	2	2	0
Tip Height	141.1	141.1	141.1	142	142	142	142
Regulatory Power	119.05 (W/MHz) EIRP	119.05 (W/MHz) EIRP	119.05 (W/MHz) EIRP	175.68 (W/MHz) EIRP	142.73 (W/MHz) EIRP	142.73 (W/MHz) EIRP	175.68 (W/MHz) EIRP
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	46.0 dBm	46.0 dBm	46.0 dBm	46.0 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844220	19844226	19844231	19931402	19931405	19931408	19931411
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	20	20	20	20	20	20	20
Ant. Dimensions H x W x D(inch)	50.9 x 12.0 x 6.49	50.9 x 12.0 x 6.49	50.9 x 12.0 x 6.49	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	30.53	30.53	30.53	76.3	60.0	60.0	76.3

Services					
CBRS LTE	**0000 (8804185)**	**5GLS (8809112)**			
Sector		19	20	21	22
Azimuth		10	110	240	315
Cell/Enodeb-Id		065159	065159	065159	065159
Antenna Model		MX10FRO640-03	R0440CC_3550Mh	R0440CC_3550Mh	MX10FRO640-03
Antenna Make		JMA	Samsung	Samsung	JMA
Centerline		139	136.5	136.5	139
DLEARFCN		55343, 55541, 55943, 56141	55343, 55541, 55943, 56141	55343, 55541, 55943, 56141	55343, 55541, 55943, 56141
Mech Down-tilt		0	0	0	0
Elect Down-tilt		2	9	9	2
Tip Height		142	136.9	136.9	142
Regulatory Power		8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD	4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD	4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD	8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD
Transmitter Max Power		37.02 dBm	37.02 dBm	37.02 dBm	37.02 dBm
TMA Make					
TMA Model					
RRU Make		Samsung	Samsung	Samsung	Samsung
RRU Model		RT4423-48A	RT4423-48A	RT4423-48A	RT4423-48A
Number of Tx,Rx		4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count		0	0	0	0
Position					
Transmitter Id		19931412	19931413	19931414	19931415
Source		VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth		20, 20, 20, 20	20, 20, 20, 20	20, 20, 20, 20	20, 20, 20, 20
Ant. Dimensions H x W x D(inch)		71.65 x 19.69 x 7.48	8.7 x 12.0 x 1.5	8.7 x 12.0 x 1.5	71.65 x 19.69 x 7.48
Weight(lb)		76.3	3.3	3.3	76.3

Services		
CBAND NR	**0000 (8804185)**	**5GLS (8809112)**

Sector	0182	0183	0184	0185
Azimuth	10	110	240	315
Cell/Enodeb-Id	0659451	0659451	0659451	0659451
Antenna Model	MT6413-77A	MT6413-77A	MT6413-77A	MT6413-77A
Antenna Make	Samsung	Samsung	Samsung	Samsung
Centerline	140.8	140.8	140.8	140.8
DLEARFCN	650006, 655324	650006, 655324	650006, 655324	650006, 655324
Mech Down-tilt	0	0	0	0
Elect Down-tilt	3	3	3	3
Tip Height	142	142	142	142
Regulatory Power	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP
Transmitter Max Power	52.02 dBm	52.02 dBm	52.02 dBm	52.02 dBm
TMA Make				
TMA Model				
RRU Make	Samsung	Samsung	Samsung	Samsung
RRU Model	MT6413-77A	MT6413-77A	MT6413-77A	MT6413-77A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	2 , 2
Operational Port Count	64	64	64	64
Position	3	3	3	3
Transmitter Id	19931420	19931421	19931422	19931423
Source	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	100, 60	100, 60	100, 60	100, 60
Ant. Dimensions H x W x D(inch)	29.53 x 15.75 x 5.51	29.53 x 15.75 x 5.51	29.53 x 15.75 x 5.51	29.53 x 15.75 x 5.51
Weight(lb)	55.1	55.1	55.1	55.1

Callsigns Per Antenna

Sector	Make	Model	Ant CL Height AG	Ant Tip Height	Azimuth	Elect Down-tilt	Mech Down-tilt	Gain	Bandwidth	Regulatory Power	700	850	1900	2100	28 GHz	31 GHz	39 GHz	LSub-6	CBRS
01	JMA	MX10FRO640-03	139	142	10	2	0	14.45	40	120.44	WQJQ689								
02	JMA	MX06FRO660-03	139	142	110	4	0	12.05	57.1	70.89	WQJQ689								
03	JMA	MX06FRO660-03	139	142	240	6	0	12.15	57.4	70.89	WQJQ689								
04	JMA	MX10FRO640-03	139	142	315	2	0	14.45	40	120.44	WQJQ689								
01	JMA	MX10FRO640-03	139	142	10	2	0	14.95	40	391.58		KNKA363							
0182	JMA	MX10FRO640-03	139	142	10	2	0	14.95	40	391.58		KNKA363							
0183	JMA	MX06FRO660-03	139	142	110	10	0	12.05	50.4	283.54		KNKA363							
0184	JMA	MX06FRO660-03	139	142	240	10	0	12.05	50.4	283.54		KNKA363							
0185	JMA	MX10FRO640-03	139	142	315	2	0	14.95	40	391.58		KNKA363							
02	JMA	MX06FRO660-03	139	142	110	10	0	12.05	50.4	283.54		KNKA363							
03	JMA	MX06FRO660-03	139	142	240	10	0	12.05	50.4	283.54		KNKA363							
04	JMA	MX10FRO640-03	139	142	315	2	0	14.95	40	391.58		KNKA363							
01	JMA	MX10FRO640-03	139	142	10	0	0	15.95	40	139.55			KNLF644,KNLH264,WQBT539						
02	JMA	MX06FRO660-03	139	142	110	2	0	15.75	57	133.21			KNLF644,KNLH264,WQBT539						
03	JMA	MX06FRO660-03	139	142	240	2	0	15.75	57	133.21			KNLF644,KNLH264,WQBT539						
04	JMA	MX10FRO640-03	139	142	315	0	0	15.95	40	139.55			KNLF644,KNLH264,WQBT539						
01	JMA	MX10FRO640-03	139	142	10	0	0	16.95	40	175.68				WQGA906,WQGB279					
02	JMA	MX06FRO660-03	139	142	110	2	0	16.05	50.4	142.73				WQGA906,WQGB279					
03	JMA	MX06FRO660-03	139	142	240	2	0	16.05	50.4	142.73				WQGA906,WQGB279					
04	JMA	MX10FRO640-03	139	142	315	0	0	16.95	40	175.68				WQGA906,WQGB279					
0182	Samsung	MT6413-77A	140.8	142	10	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	
0183	Samsung	MT6413-77A	140.8	142	110	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	

0184	Samsung	MT6413-77A	140.8	142	240	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	
0185	Samsung	MT6413-77A	140.8	142	315	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	
0182	Samsung	MT6413-77A	140.8	142	10	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
0183	Samsung	MT6413-77A	140.8	142	110	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
0184	Samsung	MT6413-77A	140.8	142	240	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
0185	Samsung	MT6413-77A	140.8	142	315	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									

Callsigns

Callsign	Market	Radio Code	Market #	Block	State	County	License Name	Wholly Owner	Total MHZ	Freq Range 1	Freq Range 2	Freq Range 3	Freq Range 4	Regulatory Power	Threshold (W)	POPs/Sq. mil	Status	Action	Approve for Insvc
WQJQ689	Northeast	WU	REA001	C	CT	9001	Cellco Partnership	Yes	22.000	746.000 - 757.000/.000 - .000	776.000 - 787.000/.000 - .000	746.000 - 757.000/.000 - .000	776.000 - 787.000/.000 - .000	120.44	1000	1532.14	proposed	added	1
KNKA363	Bridgeport-Stamford-Norwalk-Danbury, CT	CL	CMA042	A	CT	9001	Cellco Partnership	Yes	25.000	824.000 - 835.000/845.000 - 846.500	869.000 - 880.000/890.000 - 891.500	824.000 - 835.000/845.000 - 846.500	869.000 - 880.000/890.000 - 891.500	391.58	400	1532.14	proposed	added	1
WQBT539	New York, NY	CW	BTA321	C	CT	9001	Cellco Partnership	Yes	10.000	1895.000 1900.000/.000 - .000	1975.000 1980.000/.000 - .000	1895.000 1900.000/.000 - .000	1975.000 1980.000/.000 - .000	139.55	1640	1532.14	proposed	added	1
KNLF644	New York, NY	CW	BTA321	C	CT	9001	AirTouch Cellular	Yes	20.000	1900.000 1910.000/.000 - .000	1980.000 1990.000/.000 - .000	1900.000 1910.000/.000 - .000	1980.000 1990.000/.000 - .000	139.55	1640	1532.14	proposed	added	1
KNLH264	New York, NY	CW	BTA321	F	CT	9001	Cellco Partnership	Yes	10.000	1890.000 1895.000/.000 - .000	1970.000 1975.000/.000 - .000	1890.000 1895.000/.000 - .000	1970.000 1975.000/.000 - .000	139.55	1640	1532.14	proposed	added	1
CBRS_CALLSIGN	UNLICENSE	3.5 GHz	UNLICENSE	UNLICENSE	CT	UNLICENSE	UNLICENSE	UNLICENSE	UNLICENSE	UNLICENSED - UNLICENSED/UNLICENSED - UNLICENSE	UNLICENSED - UNLICENSED/UNLICENSED - UNLICENSE	- / -	- / -	8.45		1532.14	proposed	added	
WRLD511	D09001 - Fairfield, CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WRLD510	D09001 - Fairfield, CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WRLD509	D09001 - Fairfield, CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WRLD512	D09001 - Fairfield, CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WQGB279	Bridgeport-Stamford-Norwalk-Danbury, CT	AW	CMA042	A	CT	9001	Cellco Partnership	Yes	20.000	1710.000 1720.000/.000 - .000	2110.000 2120.000/.000 - .000	1710.000 1720.000/.000 - .000	2110.000 2120.000/.000 - .000	175.68	1640	1532.14	proposed	added	1

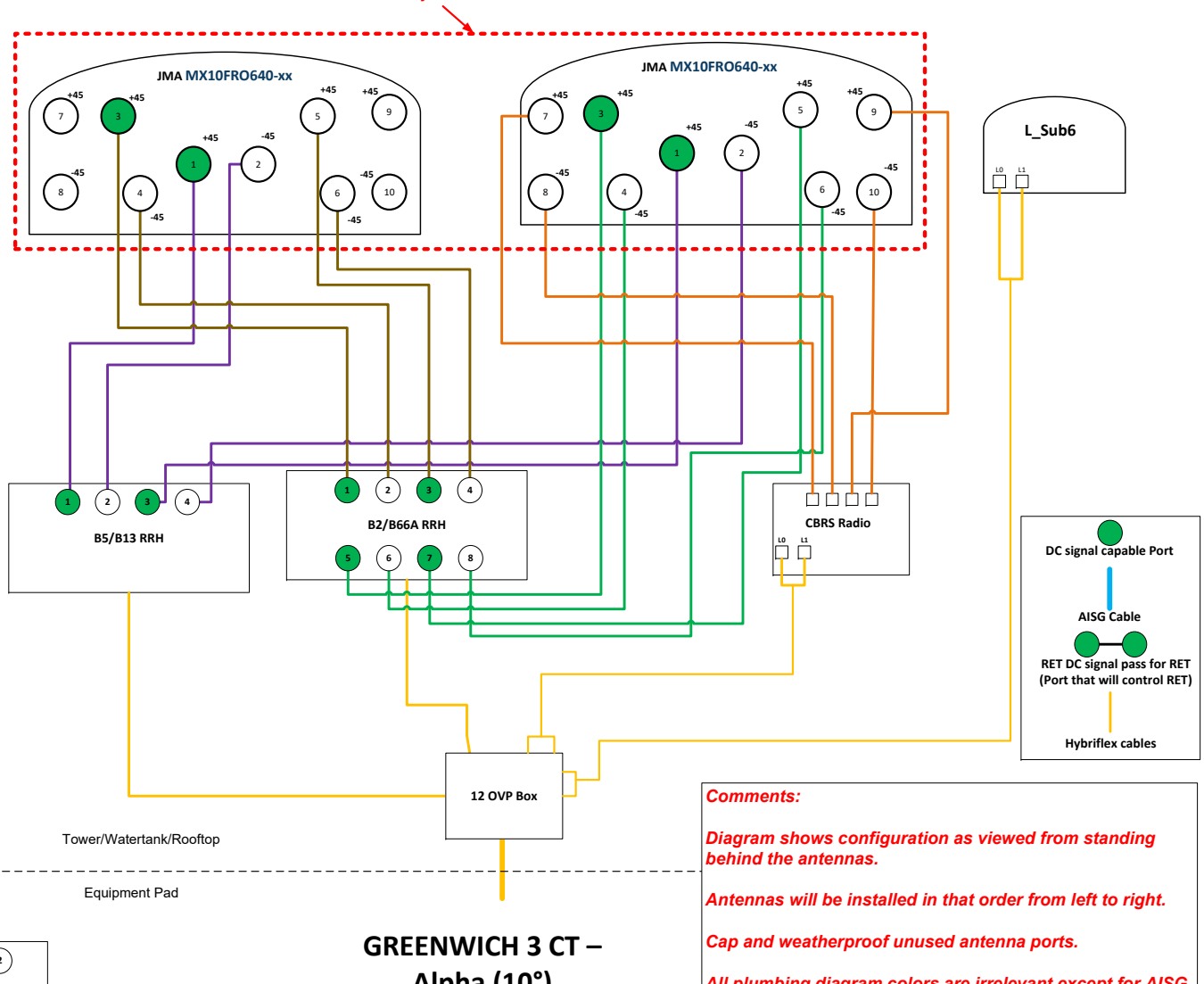
WRNE581	New York, NY	PM	PEA001	A1	CT	9001	Cellco Partnership	Yes	20.000	3700.000 3720.000/ .000 - .000	.000 - .000/.000 - .000	3700.000 3720.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE582	New York, NY	PM	PEA001	A2	CT	9001	Cellco Partnership	Yes	20.000	3720.000 3740.000/ .000 - .000	.000 - .000/.000 - .000	3720.000 3740.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE583	New York, NY	PM	PEA001	A3	CT	9001	Cellco Partnership	Yes	20.000	3740.000 3760.000/ .000 - .000	.000 - .000/.000 - .000	3740.000 3760.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE584	New York, NY	PM	PEA001	A4	CT	9001	Cellco Partnership	Yes	20.000	3760.000 3780.000/ .000 - .000	.000 - .000/.000 - .000	3760.000 3780.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE585	New York, NY	PM	PEA001	A5	CT	9001	Cellco Partnership	Yes	20.000	3780.000 3800.000/ .000 - .000	.000 - .000/.000 - .000	3780.000 3800.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WQGA906	New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-	AW	BEA010	B	CT	9001	Cellco Partnership	Yes	20.000	1720.000 1730.000/ .000 - .000	2120.000 2130.000/ .000 - .000	1720.000 1730.000/ .000 - .000	2120.000 2130.000/ .000 - .000	175.68	1640	1532.14	proposed	added	1
WRNE586	New York, NY	PM	PEA001	B1	CT	9001	Cellco Partnership	Yes	20.000	3800.000 3820.000/ .000 - .000	.000 - .000/.000 - .000	3800.000 3820.000/ .000 - .000	.000 - .000/.000 - .000	364.17	1640	1532.14	proposed	added	1
WRNE587	New York, NY	PM	PEA001	B2	CT	9001	Cellco Partnership	Yes	20.000	3820.000 3840.000/ .000 - .000	.000 - .000/.000 - .000	3820.000 3840.000/ .000 - .000	.000 - .000/.000 - .000	364.17	1640	1532.14	proposed	added	1
WRNE588	New York, NY	PM	PEA001	B3	CT	9001	Cellco Partnership	Yes	20.000	3840.000 3860.000/ .000 - .000	.000 - .000/.000 - .000	3840.000 3860.000/ .000 - .000	.000 - .000/.000 - .000	364.17	1640	1532.14	proposed	added	1

Sector	Antenna Desc	Base Station ID	Sector ID
Alpha	700-850	065159_1_16	065159_1,065159_1_6
Alpha	AWS	065159_1_2	065159_1_2
Alpha	PCS	065159_1_4	065159_1_4
Alpha	CBRS	065159_19	065159_19,EXCLUDE
Beta	700	065159_2	065159_2
Beta	850	065159_2_6	065159_2_6
Beta	AWS	065159_2_2	065159_2_2
Beta	PCS	065159_2_4	065159_2_4
Beta	CBRS	065159_20	065159_20,EXCLUDE
Gamma	700	065159_3	065159_3
Gamma	850	065159_3_6	065159_3_6
Gamma	AWS	065159_3_2	065159_3_2
Gamma	PCS	065159_3_4	065159_3_4
Gamma	CBRS	065159_21	065159_21,EXCLUDE
Delta	700-850	065159_4_16	065159_4,065159_4_6
Delta			
Delta	AWS	065159_4_2	065159_4_2
Delta	PCS	065159_4_4	065159_4_4
Delta	CBRS	065159_22	065159_22,EXCLUDE

- **Port 1 & 2 are for low band (698-896 MHz).**
- **Port 3,4,5, & 6 are for Mid band (1695-2360 MHz).**
- **Port 7,8,9,10 are for CBRS (3400-4200 MHz)**
- **Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for Mid band/CBRS.**
- **AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.**
- **Not all SBT ports are needed to control RET, only green port connection to green port will control RET.**

RET DC signal pass for RET
(Port that will control RET)

Side by Side mount



1 2
850 Cell

GREENWICH 3 CT – Alpha (10°)

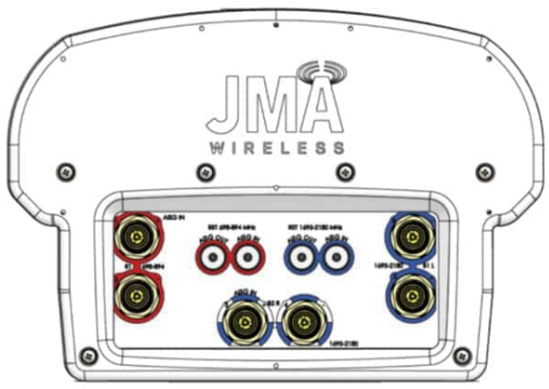
Comments:

Diagram shows configuration as viewed from standing behind the antennas.

Antennas will be installed in that order from left to right.

Cap and weatherproof unused antenna ports.

All plumbing diagram colors are irrelevant except for AISG & Hybriflex cable. (For the coax colors follow Coax Colors guide above)



- Port 1 & 2 are for low band (698-896 MHz).
- Port 3,4,5, & 6 are for high band (1695-2360 MHz).
- Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for high band.
- AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.
- Not all SBT ports are needed to control RET, only green port connection to green port will control RET.

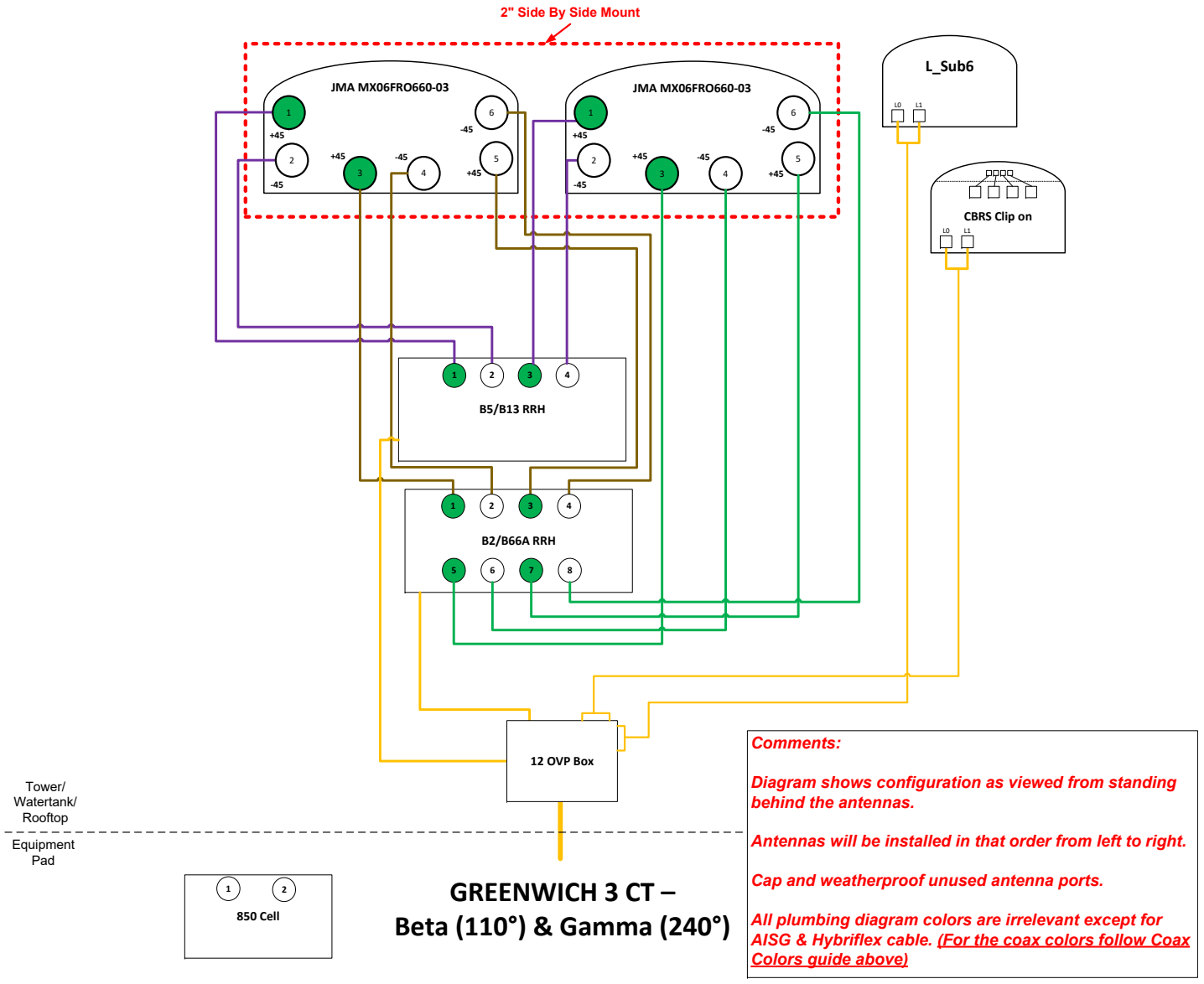
RET DC signal pass for RET
(Port that will control RET)

DC signal capable Port

AISG Cable

RET DC signal pass for RET
(Port that will control RET)

Hybriflex cables



Comments:

Diagram shows configuration as viewed from standing behind the antennas.

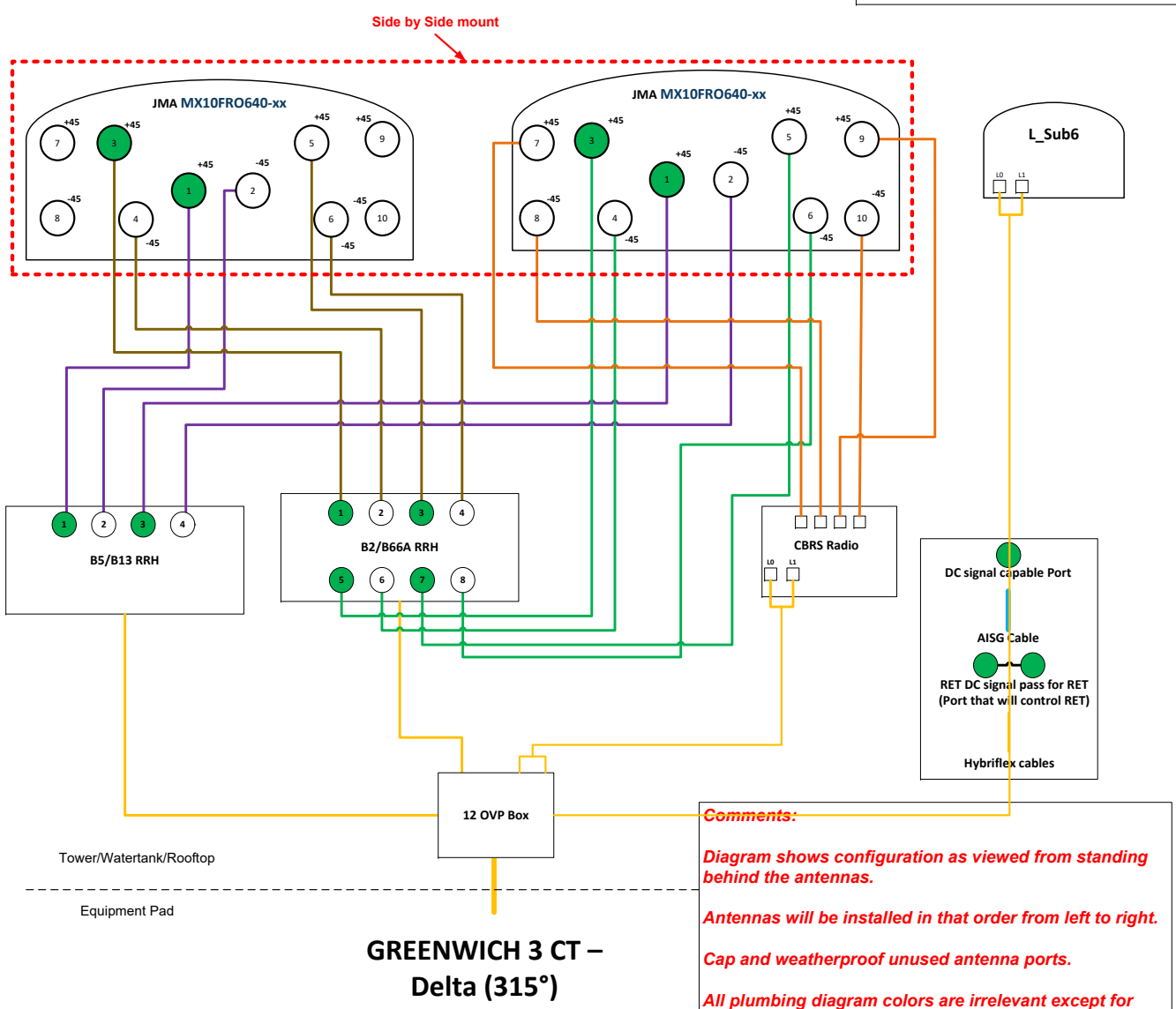
Antennas will be installed in that order from left to right.

Cap and weatherproof unused antenna ports.

All plumbing diagram colors are irrelevant except for AISG & Hybriflex cable. (For the coax colors follow Coax Colors guide above)

- **Port 1 & 2 are for low band (698-896 MHz).**
- **Port 3,4,5, & 6 are for Mid band (1695-2360 MHz).**
- **Port 7,8,9,10 are for CBRS (3400-4200 MHz)**
- **Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for Mid band/CBRS.**
- **AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.**
- **Not all SBT ports are needed to control RET, only green port connection to green port will control RET.**

RET DC signal pass for RET
(Port that will control RET)



GREENWICH 3 CT –
Delta (315°)

Comments:

Diagram shows configuration as viewed from standing behind the antennas.

Antennas will be installed in that order from left to right.

Cap and weatherproof unused antenna ports.

All plumbing diagram colors are irrelevant except for AISG & Hybriflex cable. (For the coax colors follow Coax Colors guide above)

MX10FRO640-xx

NWAV™ X-Pol Ten-Port Antenna

X-Pol Ten-Port 6 ft, 40° Fast Roll Off, with Smart Bias Ts, 698-4200 MHz:

2 ports 698-894 MHz, 4 ports 1695-2180 MHz, and 4 ports 3400-4200 MHz

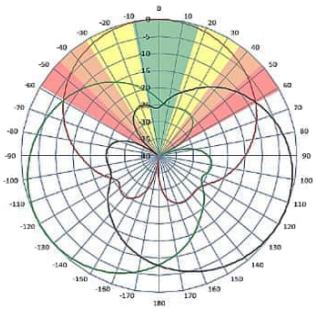
- Fast Roll Off (FRO™) azimuth beam pattern improves Intra- and Inter-cell SINR
- Excellent passive intermodulation (PIM) performance reduces harmful interference.
- Fully integrated (iRETs) with independent RET control for low band and mid band
- FET configured with internal RET for high band & ease of future network optimization.
- SON-Ready array spacing supports beamforming capabilities
- Suitable for 3G, 4G, and 5G interface technologies
- Integrated Smart Bias-Ts reduce leasing costs

nWAV

Fast Roll-Off antennas increase data throughput without compromising coverage

The horizontal beam produced by Fast Roll-Off (FRO) technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors .

Non-FRO antenna



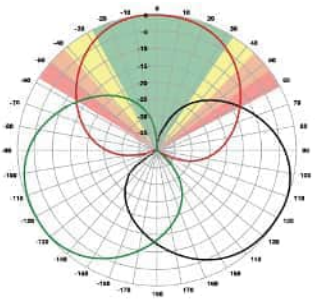
Large traditional antenna pattern overlap creates harmful interference.

JMA's FRO antenna pattern minimizes overlap, thereby minimizing interference.

LTE throughput	SINR	Speed (bps/Hz)	Speed increase	CQI
Excellent	>18	>4.5	333+%	8-10
Good	15-18	3.3-4.5	277%	6-7
Fair	10-15	2-3.3	160%	4-6
Poor	<10	<2	0%	1-3

The LTE radio automatically selects the best throughput based on measured SINR.

JMA FRO antenna



Electrical specification (minimum/maximum)	Ports 1, 2		Ports 3, 4, 5, 6		
Frequency bands, MHz	698-798	824-894	1695-1880	1850-1990	1920-2180
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	16.3	17.2	19.3	20.1	20.4
Horizontal beamwidth (HBW), degrees[1]	42	37	40	39	37
Front-to-back ratio, co-polar power @180°± 30°, dB	>25.0	>25.0	>28.0	>28.0	>28.0
X-Pol discrimination (CPR) at boresight, dB	>18.0	>15.0	>18	>18	>15
Vertical beamwidth (VBW), degrees[1]	13.1	11.8	6.0	5.7	5.3
Electrical downtilt (EDT) range, degrees	2-14		0-9		
First upper side lobe (USLS) suppression, dB[1]	≤-15.0	≤-15.0	≤-16.0	≤-16.0	≤-16.0
Cross-polar isolation, port-to-port, dB[1]	25	25	25	25	25
Max VSWR / return loss, dB	1.5:1 / -14.0		1.5:1 / -14.0		
Max passive intermodulation (PIM), 2x20W carrier, dBc	-153		-153		
Max input power per any port, watts	300		250		
Total composite power all ports (1-10), watts	1500				

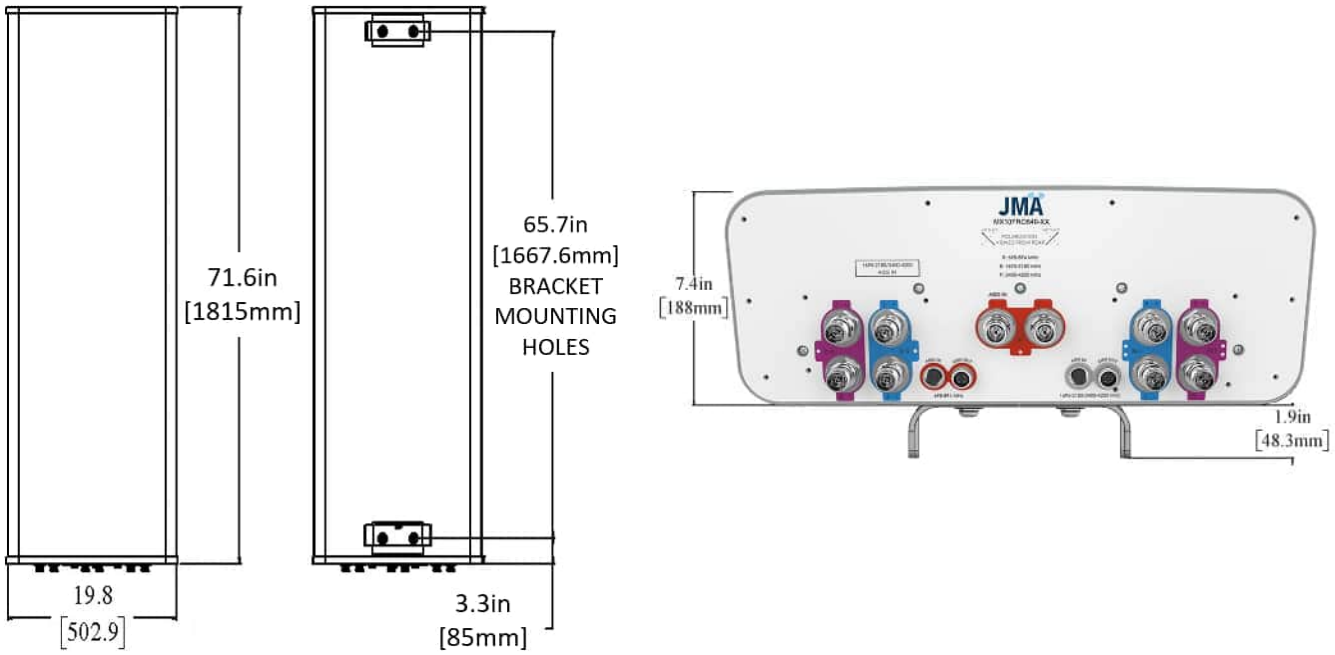
[1] Typical value over frequency and tilt

MX10FRO640-xx

NWAV™ X-Pol Ten-Port Antenna

Mechanical specifications	
Dimensions height/width/depth, inches (mm)	71.6/ 19.8/ 7.4 (1815/ 503/ 188)
Shipping dimensions length/width/height, inches (mm)	76.2/ 23.8/ 14.5(1935/ 605/ 368)
No. of RF input ports, connector type, and location	10 x 4.3-10 female, bottom
RF connector torque	96 lbf·in (10.85 N·m or 8 lbf·ft)
Net antenna weight, lb (kg)	76.3 (35)
Shipping weight, lb (kg)	115.9 (53)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	20.3 (9.2)
Range of mechanical up/down tilt	-2° to 12°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral, and rear wind loading @ 150 km/h, lbf (N)	183.3 (815), 40.7 (181), 276.8 (1231)
Equivalent flat plate @ 100 mph and Cd=2, sq ft	3.69

Front view | **Back view** | **Bottom view**



MX06FRO660-03

NWAV™ X-Pol Hex-Port Antenna

X-Pol Hex-Port 6 ft 60° Fast Roll Off antenna with independent tilt on 700 & 850 MHz:

2 ports 698-798, 824-894 MHz and 4 ports 1695-2180 MHz

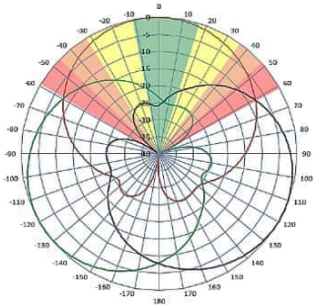
- Fast Roll Off (FRO™) azimuth beam pattern improves Intra- and Inter-cell SINR
- Compatible with dual band 700/850 MHz radios with independent low band EDT without external diplexers
- Fully integrated (iRETs) with independent RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM air interface technologies
- Integrated Smart Bias-Ts reduce leasing costs

nWAV

Fast Roll-Off antennas increase data throughput without compromising coverage

The horizontal beam produced by Fast Roll-Off (FRO) technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors .

Non-FRO antenna



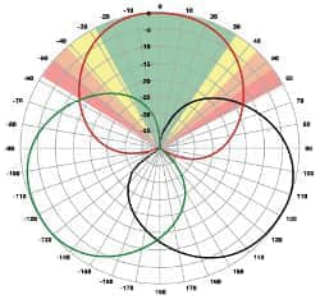
Large traditional antenna pattern overlap creates harmful interference.

JMA's FRO antenna pattern minimizes overlap, thereby minimizing interference.

LTE throughput	SINR	Speed (bps/Hz)	Speed increase	CQI
Excellent	>18	>4.5	333+%	8-10
Good	15-18	3.3-4.5	277%	6-7
Fair	10-15	2-3.3	160%	4-6
Poor	<10	<2	0%	1-3

The LTE radio automatically selects the best throughput based on measured SINR.

JMA FRO antenna



Electrical specification (minimum/maximum)	Ports 1, 2		Ports 3, 4, 5, 6		
Frequency bands, MHz	698-798	824-894	1695-1880	1850-1990	1920-2180
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	14.4	14.0	17.6	18.0	18.2
Horizontal beamwidth (HBW), degrees	60.5	53.0	55.0	55.0	55.5
Front-to-back ratio, co-polar power @180°± 30°, dB	>24	>24.0	>25.0	>25.0	>25.0
X-Pol discrimination (CPR) at boresight, dB	>15.0	>14.2	>18	>18	>15
Sector power ratio, percent	<3.5	<3.0	<3.7	<3.8	<3.6
Vertical beamwidth (VBW), degrees[1]	13.1	11.8	6.0	5.5	5.5
Electrical downtilt (EDT) range, degrees	2-14	2-14	0-9		
First upper side lobe (USLS) suppression, dB[1]	≤-15.0	≤-16.5	≤-16.0	≤-16.0	≤-16.0
Cross-polar isolation, port-to-port, dB[1]	25	25	25	25	25
Max VSWR / return loss, dB	1.5:1 / -14.0		1.5:1 / -14.0		
Max passive intermodulation (PIM), 2x20W carrier, dBc	-153		-153		
Max input power per any port, watts	300		250		
Total composite power all ports, watts	1500				

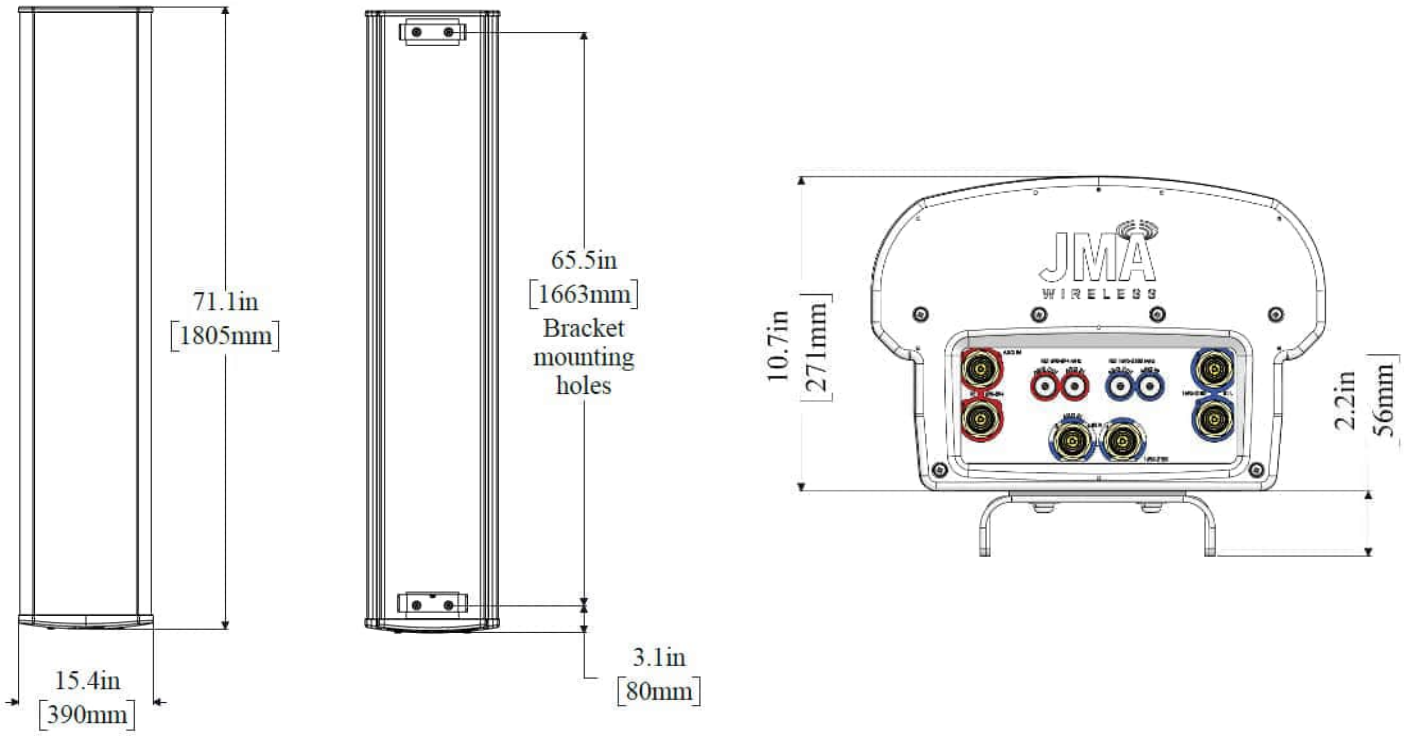
[1] Typical value over frequency and tilt

MX06FRO660-03

NWAV™ X-Pol Hex-Port Antenna

Mechanical specifications	
Dimensions height/width/depth, inches (mm)	71.3/ 15.4/ 10.7 (1811/ 392/ 273)
Shipping dimensions length/width/height, inches (mm)	82/ 20/ 15 (2083/ 508/ 381)
No. of RF input ports, connector type, and location	6 x 4.3-10 female, bottom
RF connector torque	96 lbf·in (10.85 N·m or 8 lbf·ft)
Net antenna weight, lb (kg)	60 (27.0)
Shipping weight, lb (kg)	90 (41.0)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	18 (8.18)
Range of mechanical up/down tilt	-2° to 14°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral, and rear wind loading @ 150 km/h, lbf (N)	154 (685), 73 (325), 158 (703)
Equivalent flat plate @ 100 mph and Cd=2, sq ft	2.6

Front view | **Back view** | **Bottom view**



Ordering information	
Antenna model	**Description**
MX06FRO660-03	6F X-Pol HEX FRO 60° independent tilt 700/850 RET, 4.3-10 & SBT
Optional accessories	
AISG cables	M/F cables for AISG connections
PCU-1000 RET controller	Stand-alone controller for RET control and configurations

C-band 64T64R

SAMSUNG

Gen 2

Gen 2 : Higher conducted power radio with reduced size/volume/weight vs Gen 1 and also SOC embedded for flexibility to support new features

※ Preliminary Design: External appearance and mechanical design can be subject to change

Gen 2. 64T64R C-band MMU Dimensions	
Size (WxHxD)	**400 x 734 x 140 mm (15.75 x 28.90 x 5.51 inch)**
Weight	**26kg (57.3 lb)**

Item	Gen 2 64T64R (MT6413-77A)
Air Technology	NR n77/TDD
Frequency	3700 – 3980 MHz
IBW	200 MHz
OBW	200 MHz
Carrier Bandwidth	20(HW ready)/40/60/80/100 MHz
# of Carriers	2 carriers
Layer	DL : 16L, UL : 16RX (8L)
RF Chain	64T64R
Antenna Configuration	4V16H with 192 AE
EIRP	80.5 dBm @320W (55 dBm + 25.5 dBi)
Conductive Power	320W
Spectrum Analyzer	TX/RX support
RX Sensitivity	Typical -97.8dBm @(1Rx, 18.36MHz with 30kHz,51RBs)
Modulation	DL 256QAM support, (DL 1024QAM with 1~2dB power back-off)
Function Split	DL/UL option 7-2x
Input Power	-48 VDC (-38 VDC to -57 VDC)
Power Consumption	1,287W (100% load, room temp.)
Size (WHD)	**400 x 734 x 140 mm (15.75 x 28.90 x 5.51 inch)**
Volume	**41.1L**
Weight	**26kg (57.3 lb)**
Operating Temperature	-40℃ - 55℃ (w/o solar load)
Cooling	Natural convection
Unwanted Emission	3GPP 38.104 FCC 47 CFR 27.53 : < -13dBm/MHz < -40 dBm/MHz @ above 4 GHz <-50 dBm /MHz @ 4,040 ~ 4,050 MHz, <-60 dBm /MHz @ above 4,050 MHz
Optic Interface	15km, 4 ports (25Gbps x 4), SFP28, single mode, Bi-di (Option: Duplex)
Mounting Options	Pole, wall
NB-IoT	Not support
External Alarm	4RX
Fronthaul Interface	eCPRI

CBRS Clip-on Antenna for 4T4R RU

SAMSUNG

GEN-2 CLIP ON

Item		Specification
Frequency range (MHz)		3,550~3,700
Polarization		Dual, Slant ±45°
Impedance (Ω)		50Ω
Return loss		< 1.5:1(14 dB)
Port to Port Isolation (dB)		> 25
Gain(dBi)		12.5 ±0.5
Horizontal 3dB beam width (°)		65 ±5
Vertical 3dB beam width (°)		17 ±3
Fixed Electrical Tilt (°)		8 ±2°
Front to back ratio (dB) 180° ±30°		≥ 25
Cross polar ratio	dB@ Boresight	> 18
	dB@ ±30°	> 10
	dB@ ±60°	> 8
Max Power/Port(Watt)		200
PIM		<-145 dBc @ 2x5Watts
Size (WHD)		220 x 303.5 x 37 mm, (8.7 x 12 x 1.5 inch)
Volume		Less than 2.5L
Weight (W/o Solar Shield & finger guard)		3.3 lb (1.5kg)
Operating Temperature		-40°C (-40°F) ~ 55°C (131°F)
Dust and water ingress		IP55
RF Connector (Bottom side)		2.2-5 Male

* Notes :
1. Fixed Electrical Tilt angle is the angle between the antenna mechanical boresight and the half-power beam axis in the elevation cut.
2. Specifications maybe not applicable if enclosure(or shroud) is added, Need make further analysis based on specific scenario

SAMSUNG

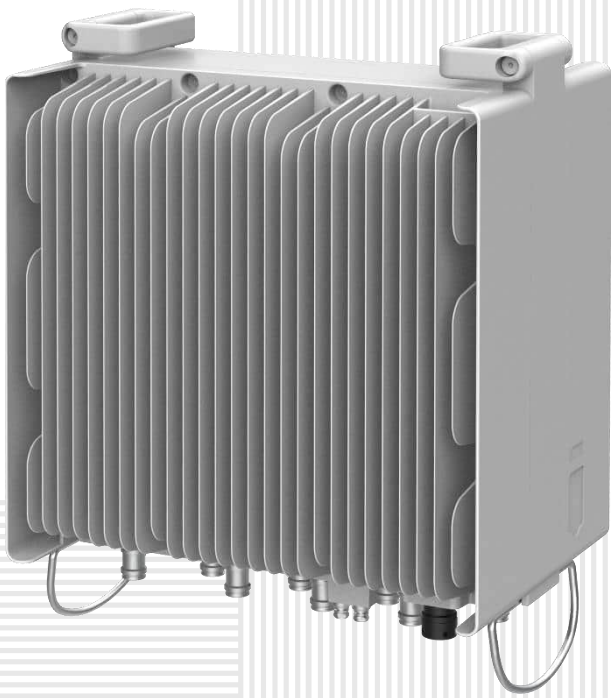
AWS/PCS MACRO RADIO

DUAL-BAND AND HIGH POWER FOR MACRO COVERAGE

Samsung's future proof dual-band radio is designed to help effectively increase the coverage areas in wireless networks. This AWS/PCS 4T4R dual-band radio has 4Tx/4Rx to 2Tx/2Rx RF chains options and a total output power of 320W, making it ideal for macro sites.

57196

Model Code	RF4439d-25A



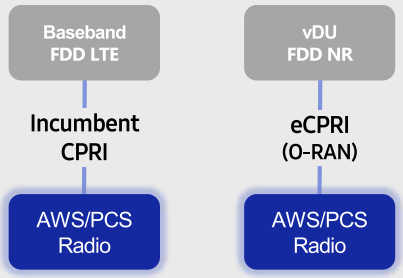
Homepage
samsungnetworks.com

Youtube
www.youtube.com/samsung5g

Points of Differentiation

Continuous Migration

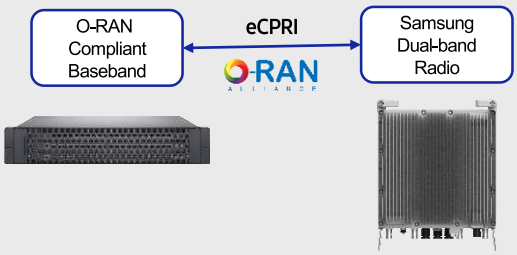
Samsung's AWS/PCS macro radio can support each incumbent CPRI interface as well as advanced eCPRI interfaces. This feature provides installable options for both legacy LTE networks and added NR networks.



O-RAN Compliant

A standardized O-RAN radio can help in implementing cost-effective networks, which are capable of sending more data without compromising additional investments.

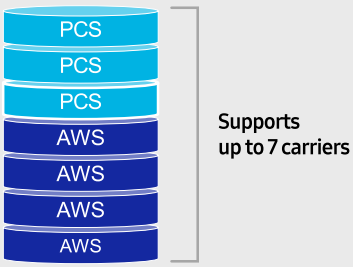
Samsung's state-of-the-art O-RAN technology will help accelerate the effort toward constructing a solid O-RAN ecosystem.



Optimum Spectrum Utilization

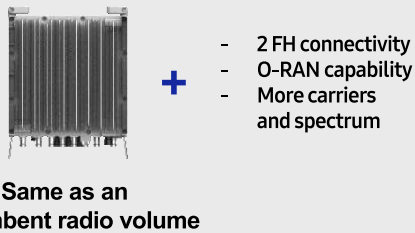
The number of required carriers varies according to site (region). Supporting many carriers is essential for using all frequencies that the operator has available.

The new AWS/PCS dual-band radio can support up to 3 carriers in the PCS (1.9GHz) band and 4 carriers in the AWS (2.1GHz) band, respectively.



Brand New Features in a Compact Size

Samsung's AWS/PCS macro radio offers several features, such as dual connectivity for baseband for both CDU and vDU, O-RAN capability, more carriers and an enlarged PCS spectrum, combined into an incumbent radio volume of 36.8L.



Technical Specifications

Item	Specification
Tech	LTE / NR
Brand	B25(PCS), B66(AWS)
Frequency Band	DL: 1930 – 1995MHz, UL: 1850 – 1915MHz DL: 2110 – 2200MHz, UL: 1710 – 1780MHz
RF Power	(B25) 4 × 40W or 2 × 60W (B66) 4 × 60W or 2 × 80W
IBW/OBW	(B25) 65MHz / 30MHz (B66) DL 90MHz, UL 70MHz / 60MHz
Installation	Pole, Wall
Size/ Weight	14.96 x 14.96 x 10.04inch (36.8L) / 74.7lb

700/850 4T4R Macro 320W ORU - New Filter (RF4461d-13A)

SAMSUNG

Specifications

Item	Specification	
Air Interface	LTE, NR(HW resource ready)	
Band	Band13 (700MHz)	Band5 (850MHz)
Frequency	DL: 746~756MHz	DL: 869~894MHz
	UL: 777~787MHz	UL: 824~849MHz
IBW	10MHz	25MHz
OBW	10MHz	25MHz
Carrier Bandwidth	LTE/NR 5*/10MHz	LTE 5/10MHz NR 5/10/15/20MHz
# of carriers	2C*	3C
Total # of carriers	4C + B13 (SDL) 1C	
RF Chain	4T4R/2T4R/2T2R/1T2R 2T2R+2T2R bi-sector	
RF Output Power	Total : 320W	
	4 x 40W or 2 x 60W	4 x 40W or 2 x 60W
Spectrum Analyzer	TX/RX Support	
RX Sensitivity	Typ. -104.5dBm @1Rx (25RBs 5MHz)	
Modulation	256QAM support, (1024QAM with 1~2dB power back-off)	
Input Power	-48VDC (-38VDC to -57VDC)	
Power Consumption	1,165 Watt @ 100% RF load, room temperature	
Size (WHD)	380 x 380 x 260 mm (14.96 x 14.96 x 10.23 inch)	
Volume	37.5 L	
Weight (W/o Solar Shield & finger guard)	35.9 kg (79.1 lb)	
Operating Temperature	-40℃ (-40℉) ~ 55℃ (131℉) (Without solar load)	
Cooling	Natural convection	
Unwanted Emission	3GPP 36.104	3GPP 36.104
	FCC 47 CFR 27.53 c), f)	FCC 47 CFR 22.917
	-	-69 dBm/100 kHz per path @ 896 ~901MHz
CPRI Cascade	Not supported	
Optic Interface	20km, 2 ports (9.8Gbps x 2), SFP+, single mode, Duplex (Option: Bi-di)	
RET & TMA Interface	AISG 3.0	
Bias-T	4 ports (2 ports per band)	
Mounting Options	Pole, wall	
NB-IoT	2GB+2IB or 4IB	2SA+2GB or 2GB+2IB or 4GB
PIM Cancellation	Support	
# of antenna port	4	
External Alarm	4	
Fronthaul Interface	Opt. 8 CPRI / Opt. 7-2x selectable (not simultaneous support)	
CPRI compression	Not Support	

* 5MHz supporting in B13(700MHz) depends on 3GPP std. and UE capability.
External filters in interferer and victim sides for Mexican boarder to support 5MHz service need to be considered
** Finger guard is not needed.

SAMSUNG

Samsung Micro Radio

CBRS(N48)
4T4R Micro Radio

Samsung's CBRS 4T4R Micro Radio provides mobile operators with a cost-effective solution to fill coverage gaps encountered when Macro Radios are in use.

Model Code	RT4423-48A(DC) RT4423-48B(AC)

57196

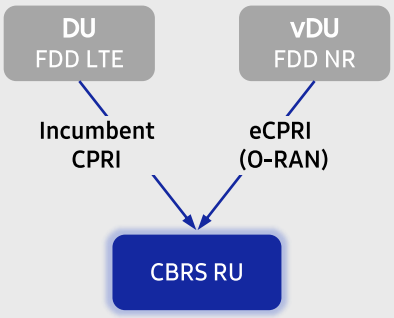
Homepage
samsungnetworks.com

Youtube
www.youtube.com/samsung5g

Points of Differentiation

Dual Personality

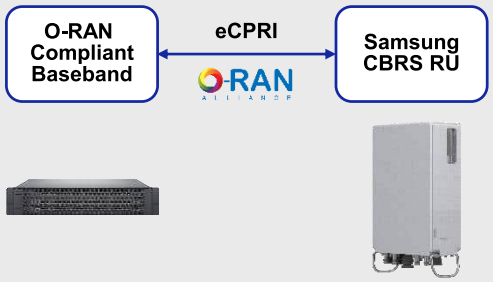
The new CBRS Radio supports existing CPRI and advanced eCPRI interfaces providing installation options for both legacy LTE and NR network equipment.



O-RAN Compliant

A standardized O-RAN radio supports implementing cost-effective networks capable of enhanced data throughput without compromising existing or new network investments.

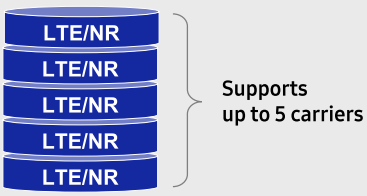
Samsung O-RAN products ensure state-of-the-art O-RAN technology will accelerate efforts for creating solid O-RAN ecosystems.



High Capacity

The number of carriers required varies according to site(region). Supporting multiple carriers is essential to customers as they seek to utilize all frequencies available to them.

The new CBRS radio can support up to 5 carriers which is and increase of 3 carriers over the capacity of the previous CBRS product.



Compact and Easy Installation

New CBRS RU is compact in it's design with a volume of 6L and weighing only about 7kg.

This compact design allows for various installation options including, tower, rooftop, pole, wall and shroud.

A clip on antenna is available providing flexibility to installation requirements.

w/o Clip-on antenna

w/Clip-on antenna

Technical Specifications

Item	Specification
Tech	LTE / NR
Band	B48, n48 / TDD
Frequency Band	3,550 – 3,700 MHz
RF Power	20 W (5 W x 4 Ports)
IBW/OBW	150MHz / 100MHz
Installation	Pole, Wall, Side by side (max 3 radio)
Size/ Weight	[Radio] w/o Clip-on antenna : 8.7 x 11.8 x 3.6 inch, 5.97L, 7kg w/ Clip-on antenna : 8.7 x 11.8 x 5.0 inch, 8.42L, 8.5kg *AC and DC type have same size and weight [Bracket Weight] Tilting & Swivel (EP97-02038A) : 2.51kg Fixed (EP97-02037A) : 1.31kg Side by side (EP97-02089A) : 8.0kg

TALLEY®
You Connect the World. We Make it Easy.®

DC Surge Protection for RRH/Integrated Antenna Radio Head

RVZDC-6627-PF-48

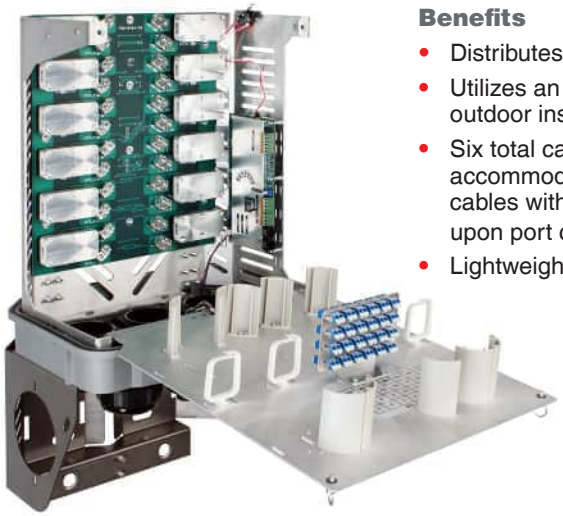
Tower / Base / Rooftop

Raycap's flexible Tower, Base Stations and Rooftop protection and Distribution products provide protection for up to 12 Remote Radio Heads/Integrated Antennas. The solutions mitigate the risk of damage due to lightning and provide high levels of availability and reliability to radio equipment.

Mounting Bracket Included

Features

- Designed for distribution to 12 RRH circuits, DC power and fiber optics.
- Alarms for moisture detection and intrusion
- Digital Voltmeter with twelve (12) position switch to monitor each DC circuit
- Power alarms for wiring anomalies and power disruptions
- Employs the Strikesorb® 30-V1-2CFV Surge Protective Device (SPD) specifically designed for the Remote Radio Head (RRH) installation environment and certified for use in DC applications and at low DC operating voltages (48V)
- The Strikesorb 30-V1-2CFV is a Class I SPD certified by VDE per the IEC 61643-11 standard as suitable for installation in areas where direct lightning exposure is expected. Strikesorb 30-V1-2CFV is able to withstand direct lightning currents of up to 12.5kA (10/350) and induced surge currents of up to 60kA (8/20)
- Provides very low let through / clamping voltage - unique for a Class I product - as it does not employ spark gaps or other switching elements. Strikesorb offers unique protection levels to the RRH equipment as well as the Base Band Units
- RS485 communication link uses two (2) twisted pair (+ground) wires per hybrid cable, and communicates all voltage, boost system and alarm data
- Patent pending design



Benefits

- Distributes DC up to 12 Remote Radio Heads and connects up to 24 LC fiber pairs
- Utilizes an IP 67 rated enclosure, also rated to NEBS and UL, allowing for indoor or outdoor installation on a roof or tower top
- Six total cable ports for cable access with custom configurable UL rated glands that accommodate varying diameters of hybrid (combined power and fiber optic) or standard cables with diameters up to 2" (will fit most standard $1^{5}/_{8}$" coax class cables), depending upon port configuration
- Lightweight aerodynamic design provides maximum flexibility for tower top installation

Strikesorb 30-V1-2CFV

G02-01-033 190108

TALLEY®
You Connect the World. We Make it Easy.®

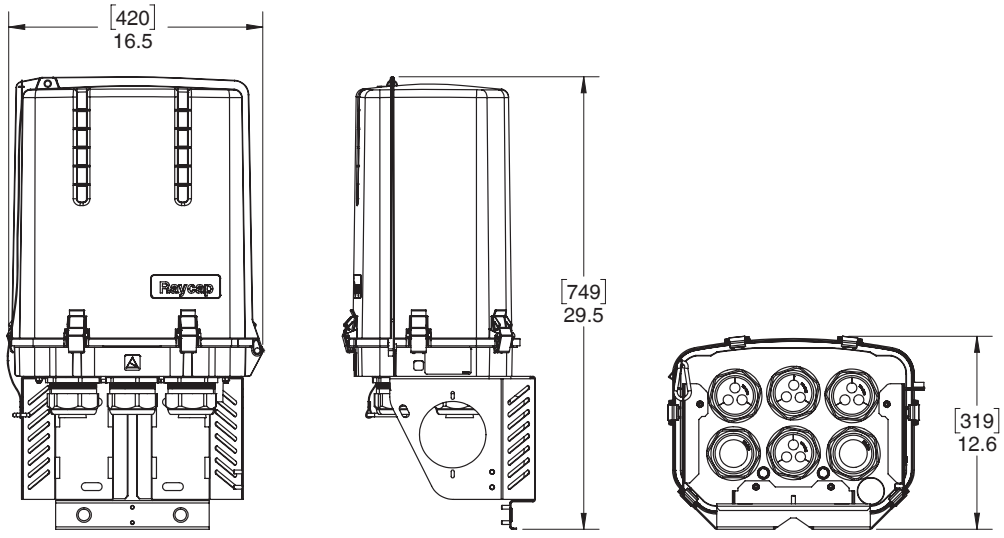
DC Surge Protection for RRH/Integrated Antenna Radio Head
RVZDC-6627-PF-48

Tower / Base / Rooftop

Electrical	
Model Numbers	**RVZDC-6627-PF-48**
Nominal Operating Voltage	48 VDC
Nominal Discharge Current [I_n]	20 kA 8/20 µs
Maximum Surge Current [I_{max}]	60 kA 8/20 µs
Maximum Impulse (Lightning) Current per IEC 61643-11	12.5 kA 10/350 µs
Maximum Continuous Operating Voltage [U_c]	75 VDC
Maximum System Operating Voltage	-70 VDC
Voltage Protection Rating (VPR) per UL 1449 4th Edition	330V
Protection Class as per IEC 61643-11	Class I
Power Alarm	cross polarity, short circuit, or power outage
Intrusion Sensor	microswitch
Moisture Sensor	infrared moisture detector
Strikesorb Module Type	30-V1-2CFV Strikesorb modules installed to protect 12 Remote Radio Heads
Power Boost Ready	RS485 twisted pair connection available
Mechanical	
Suppression Connection Method	Compression lug, #14 - #2 AWG (2 mm^2 - 33 mm^2)
Fiber Connection Method	LC-LC Single mode
Pressure Equalizing Vent	Gore™ Vent
Environmental Rating	IP 67
Operating Temperature	-40° C to +80° C
UV Resistant	Yes
Dimensions (L x W x H)	12.6" x 16.5" x 29.5" [319mm x 420mm 749mm]
Weight	System: 32 lbs (14.51 kg)
Combined Wind Loading	150mph (sustained): 185 lbs (823 N)
Standards Compliance	
Strikesorb modules are compliant to the following Surge Protective Device (SPD) Standards	
Standards	UL 1449 4th Edition, IEC 61643-11:2011, EN 61643-11:2012, IEEE C62.11, IEEE C62.41.2, IEEE C62.45 NEBS certified to: GR-63-CORE Issue 4, GR-1089-CORE Issue 6, GR-3108-CORE Issue 3, GR-487-CORE Issue 4, GR-950-CORE Issue 1

Product Diagram

[mm]
inches



AWG=American Wire Gauge

G02-01-033 190108

Colliers Engineering & Design, Architecture,
Landscaping Architecture, Surveying, CT,
P.C.
1055 Washington Boulevard
Stamford, CT 06901
203.324.0800
peter.albano@collierseng.com

New/Replacement Antenna Mount Analysis Report and PMI Requirements

Mount Analysis-R

SMART Tool Project #: 10253694
Colliers Engineering & Design Project #: 21781145

October 15, 2024

Site Information	*Site ID:*	*5000384555-VZW / GREENWICH 3 CT*
	Site Name:	*GREENWICH 3 CT*
	Carrier Name:	*Verizon Wireless*
	Address:	*9 Sound Shore Drive* *Greenwich, Connecticut 06830* *Fairfield County*
	Latitude:	*41.029711°*
	Longitude:	*-73.598350°*
Structure Information	*Tower Type:*	*148-Ft Monopole*
	Mount Type:	*12.50-Ft Platform*

FUZE ID # 15444631

Analysis Results

Platform: **69.3%** **Pass w/ Mount Replacement***
(1) Perfect Vision, P/N: PV-LPPGS-12M-HR2-B

***Antennas and equipment to be installed in compliance with PMI Requirements of this mount analysis.**

******Contractor PMI Requirements***:
Included at the end of this MA report
Available & Submitted via portal at https://pmi.vzwsmart.com
For additional questions and support, please reach out to:
pmisupport@colliersengineering.com

Report Prepared By: Frank Centone

Digitally signed by Dejian Xu
Date: 2024.10.15 10:05:09-04'00'

MDG #: **5000384555**
Site Name: **GREENWICH 3 CT**
Fuze ID #: **15444631**
Colliers Engineering & Design Project #: **21781145**

PMI INSTRUCTIONS:

Contractor shall verify existing monopole diameter to be 12". **Escalate any discrepancies to EOR immediately as it may render the results of this analysis invalid and require additional modifications**.

Contractor shall remove existing mount and associated hardware. Contractor shall restore any degradation in galvanization on tower due to removed mount and protect with two (2) coats of Zinga or Zinc Kote.

Contractor shall install the proposed Perfect Vision, P/N: PV-LPPGS-12M-HR2-B mount in accordance with manufacturer specifications and the Mount Sketch. Contact EOR if these documents are not available.

Contractor shall install (9) 96" long PIPE 2 SCH40 mount pipes per mount. Refer to placement diagrams and Mount Replacement Sketch. Contact EOR if these documents are not available.

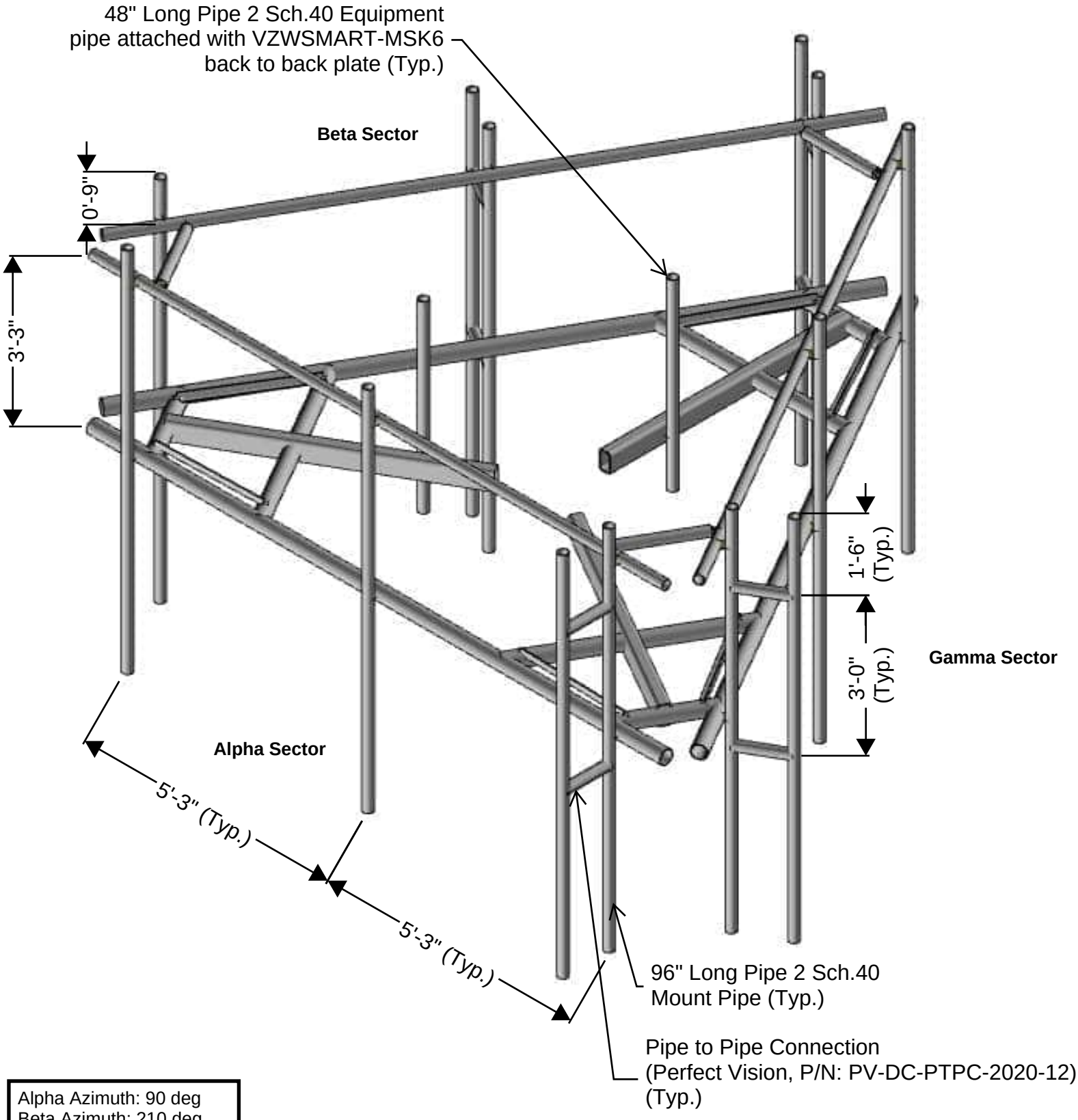
Contractor shall install (4) 96" long PIPE 2 SCH40 on pipe to pipe connections, Refer to the Mount Sketch.

Contractor shall install (2) new 48" long PIPE 2 SCH 40 OVP pipes on the standoff arms. Refer to the Mount Sketch

Contractor shall install the proposed radio units on new Rosenberger D215RRU/D218RRUDSM (or EOR approved equivalent) RRU mounting kits in the location shown in the placement diagrams.

Contractor shall inspect climbing facilities and safety climb and ensure they are in good condition. Contractor shall install safety climb wire rope guides in locations where wire rope is contacting the mount or mount-to-tower connection steel. Wire brush clean any observed corrosion and protect with two (2) coats of Zinga or Zinc Kote. Contractor shall provide photos of wire rope guide installation as part of PMI documents. Contact EOR if additional guidance is required

MOUNT SKETCH



Alpha Azimuth: 90 deg
Beta Azimuth: 210 deg
Gamma Azimuth: 330 deg

MOUNT ISOMETRIC VIEW
N.T.S

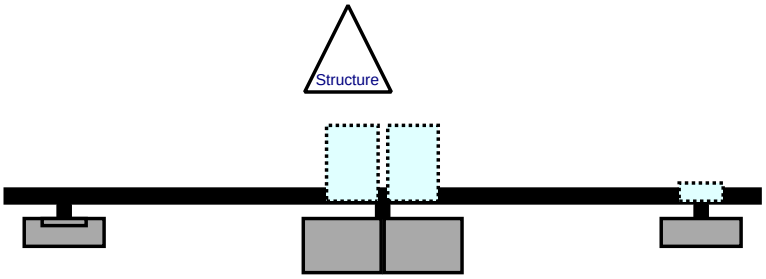
Structure: 5000384555-VZW - GREENWICH 3 CT

Sector: **A** 10/14/2024

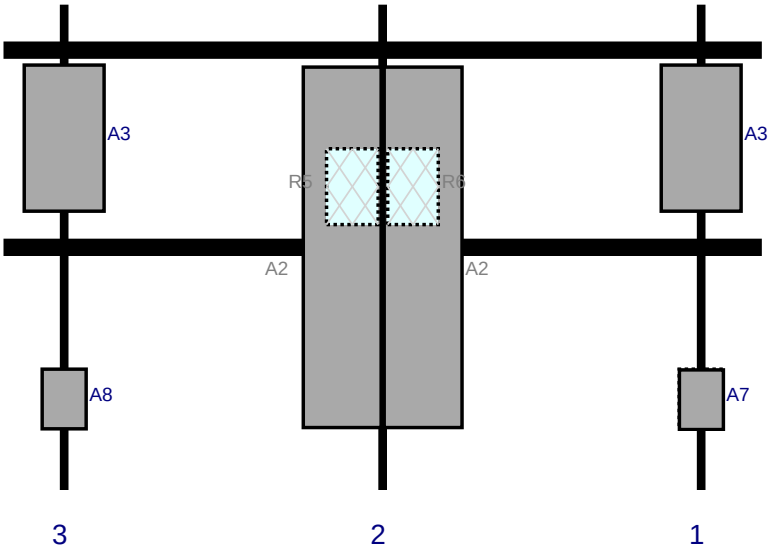
Structure Type: Monopole 10253694

Mount Elev: 139.00 Page: 1

Plan View

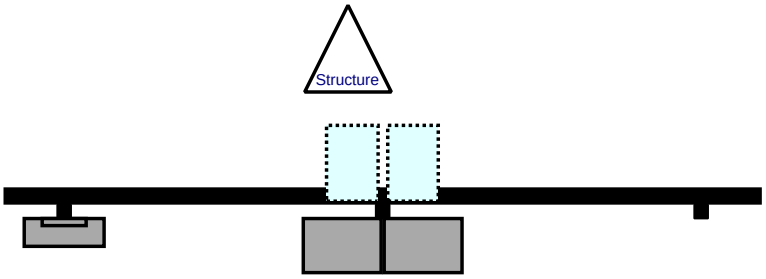


Front View - Looking at Structure

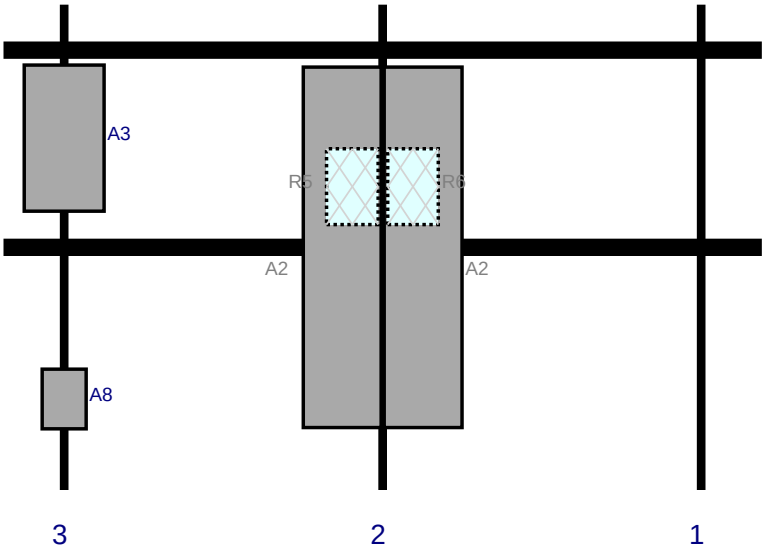


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A3	MT6413-77A	28.9	15.8	138	1	a	Front	26.4	0	Added	
A7	RT4423-48A	11.8	8.7	138	1	a	Front	78	0	Added	
A2	MX06FRO660-03	71.3	15.4	75	2	a	Front	48	-8	Added	
A2	MX06FRO660-03	71.3	15.4	75	2	b	Front	48	8	Added	
R5	RF4461d-13A	15	10.2	75	2	a	Behind	36	-6	Added	
R6	RF4439d-25A	15	10	75	2	a	Behind	36	6	Added	
A3	MT6413-77A	28.9	15.8	12	3	a	Front	26.4	0	Added	
A8	R0440CC w/ RT4423-48A	11.8	8.7	12	3	a	Front	78	0	Added	
OVP1	RVZDC-6627-PF-48	29.5	16.5		Member					Added	

Plan View

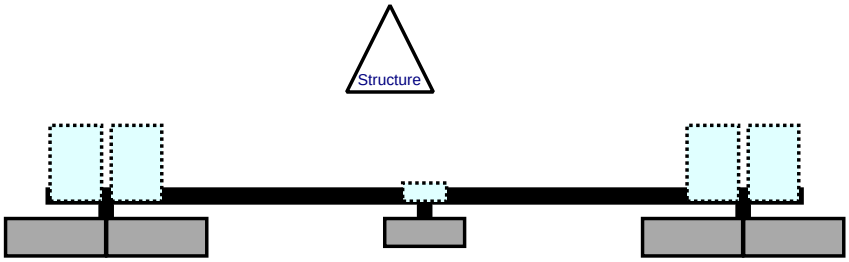


Front View - Looking at Structure

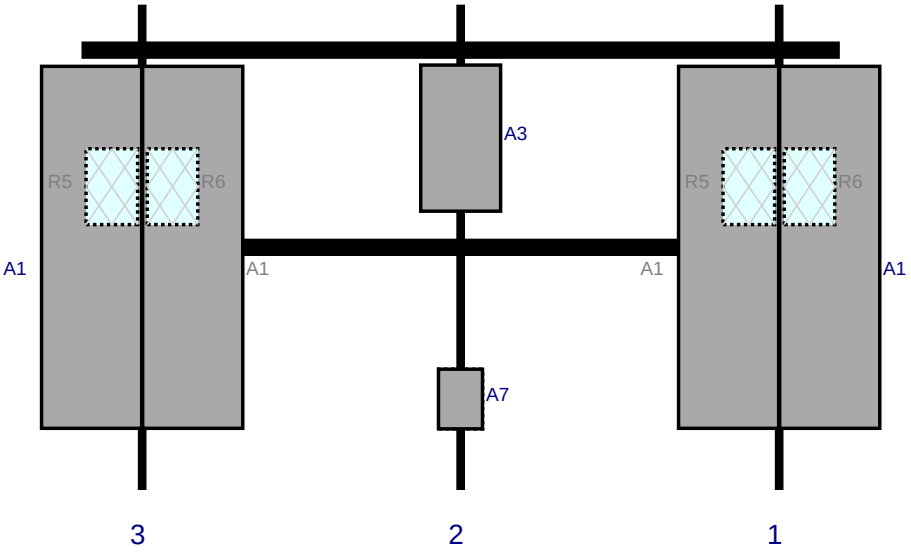


Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A2	MX06FRO660-03	71.3	15.4	75	2	a	Front	48	-8	Added	
A2	MX06FRO660-03	71.3	15.4	75	2	b	Front	48	8	Added	
R5	RF4461d-13A	15	10.2	75	2	a	Behind	36	-6	Added	
R6	RF4439d-25A	15	10	75	2	a	Behind	36	6	Added	
A3	MT6413-77A	28.9	15.8	12	3	a	Front	26.4	0	Added	
A8	R0440CC w/ RT4423-48A	11.8	8.7	12	3	a	Front	78	0	Added	
OVP	RVZDC-6627-PF-48	29.5	16.5		Member					None	

Plan View



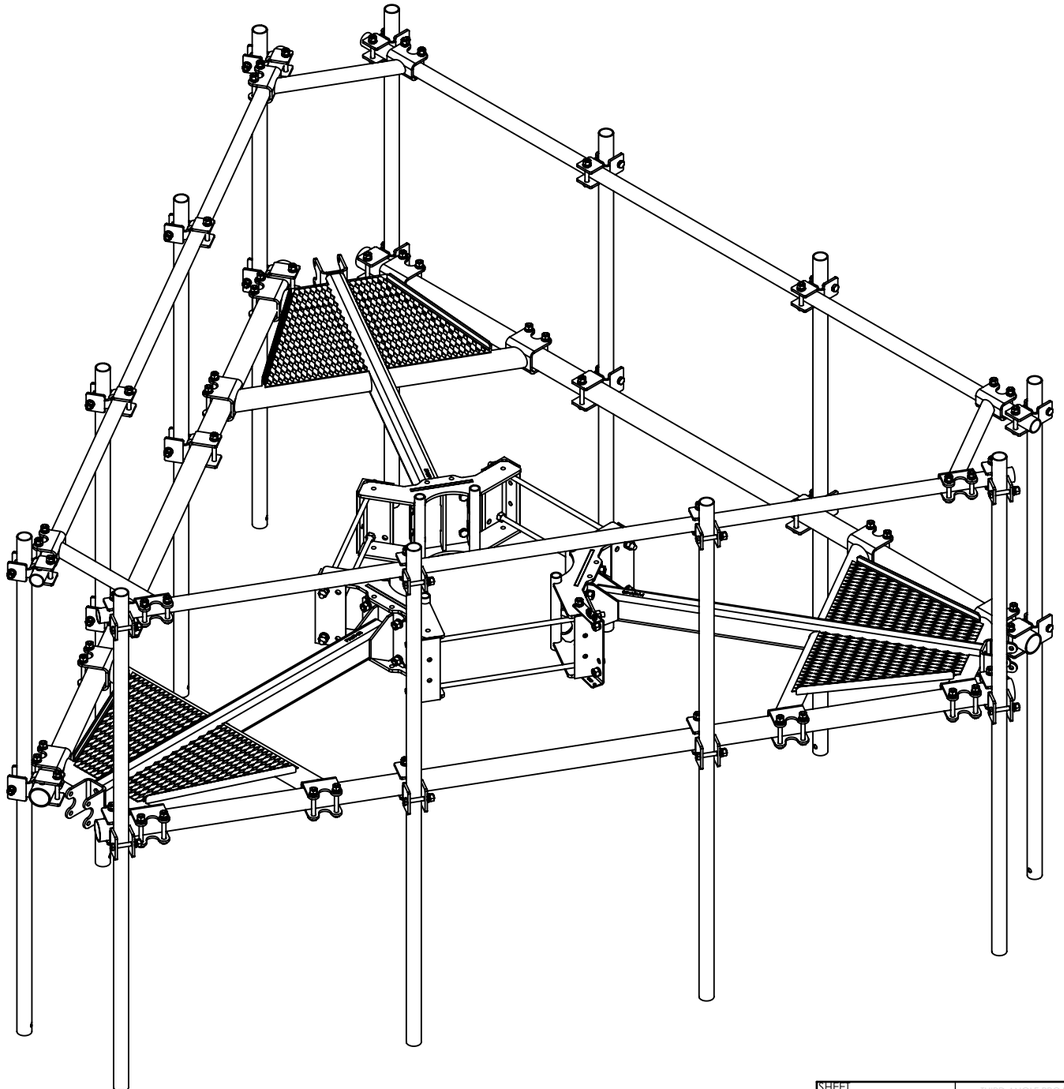
Front View - Looking at Structure

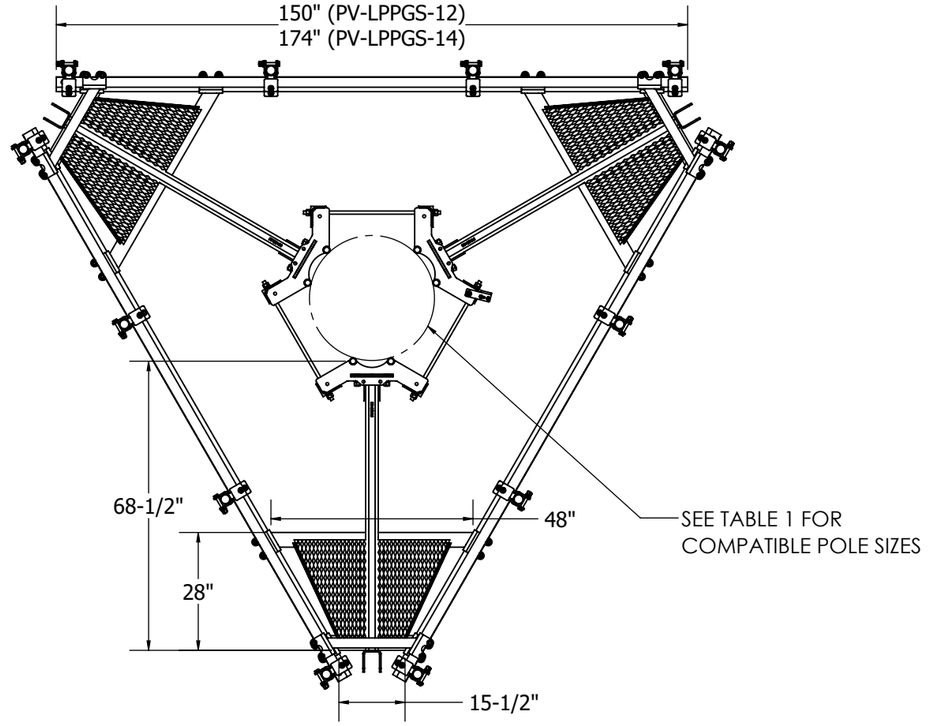


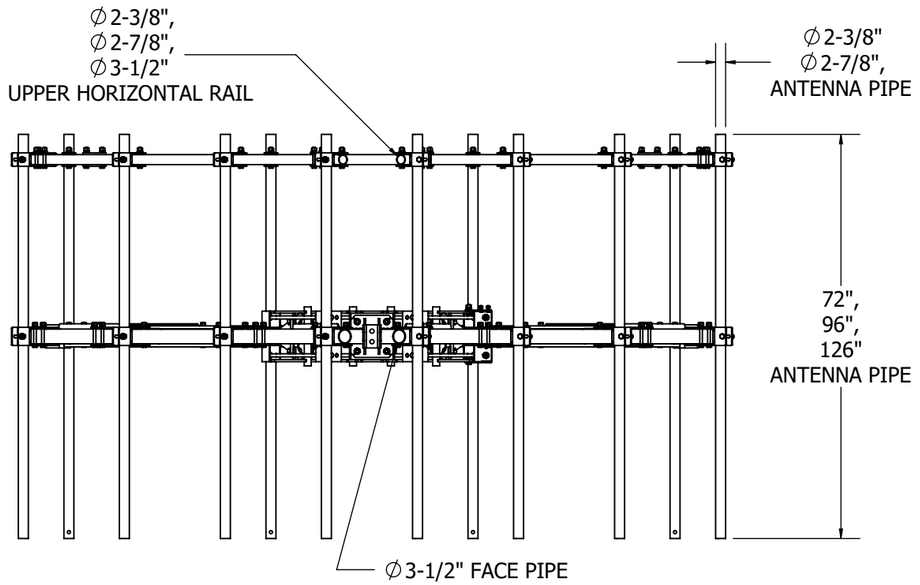
Ref#	Model	Height (in)	Width (in)	H Dist Frm L.	Pipe #	Pipe Pos V	Ant Pos	C. Ant Frm T.	Ant H Off	Status	Validation
A1	MX10FRO640-03	71.6	19.8	138	1	a	Front	48	10	Added	
A1	MX10FRO640-03	71.6	19.8	138	1	b	Front	48	-10	Added	
R5	RF4461d-13A	15	10.2	138	1	a	Behind	36	-6	Added	
R6	RF4439d-25A	15	10	138	1	a	Behind	36	6	Added	
A3	MT6413-77A	28.9	15.8	75	2	a	Front	26.4	0	Added	
A7	RT4423-48A	11.8	8.7	75	2	a	Front	78	0	Added	
A1	MX10FRO640-03	71.6	19.8	12	3	a	Front	48	10	Added	
A1	MX10FRO640-03	71.6	19.8	12	3	b	Front	48	-10	Added	
R5	RF4461d-13A	15	10.2	12	3	a	Behind	36	-6	Added	
R6	RF4439d-25A	15	10	12	3	a	Behind	36	6	Added	

PV-LPPGS
MONOPOLE GUARDIAN MOUNT

SEE SHEET 2 - TABLE 1 FOR FULL CONFIGURATION DETAILS







SHEET 1 OF 17	THIRD ANGLE PROJECTION	CATEGORY 02_Monopole	11	BOM TABLES UPDATED - BASE KITS	12/29/22
		SERIES 01_Triangular	10	ADDED SEPARATE EPA & WEIGHTS TABLE	2/10/22
6/23/2023	SCALE 1:36	TYPE PV-LPPGS_GUARDIAN	9	ACC1 REPLACE ACC2, PV-CMX-CG-BO REPLACE 115-242	3/16/21
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ±1/4°, BEND ±2° ALL OTHERS: ±1/16"		BY DJN	8	KKGS UPDATE	2/2/21
		CHECKED SJS	7	ADDED ALL THREAD NOTE TO COLLARS REPLACED PKBK WITH PV-KKRS	11/11/20
		STATUS APPROVED	REV	DESCRIPTION	DATE

PERFECTVISION®

MONOPOLE GUARDIAN MOUNT

DOCUMENT NUMBER LPPGS-ENG-01-R11

REV 11

C:_PVMSteel\Catalog\SW Working Files\Engineering Details\

PART NUMBERS

Table 1: Configurations

Part Number	Description	Weight (lbs)	Included Parts																												
			PV-RM1045-GS	PV-RM3060-GS	PV-LPP-GS-B	PV--LPP-GS-EXT	PV-LPP-GS-HK	PV-LPP-GS-HR238	PV-LPP-GS-HR278	PV-LPP-GS-HR312	PV-LPP-GS-TKB	PV-XP-DC-2020	PV-XP-DC-2025	PV-XP-DC-2030	PV-XP-DC-2525	PV-XP-DC-2530	PIPE-238X96	PIPE-238X150	PIPE-238X174	PIPE-278X96	PIPE-278X126	PIPE-278X150	PIPE-278X174	PIPE-312X150	PIPE-312X174	PV-SCRB-RMGS	PV-CMX-CG-BO	PV-LPP-GS-ACC2
PV-LPPGS-12M-B[t]	12'6" Face, 10"-40" OD Pole	1210	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-
PV-LPPGS-14M-B[t]	14'6" Face, 13"-44" OD Pole	1480	1	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
PV-LPPGS-14L-B[t]	14'6" Face, 35"-60" OD Pole	1495	-	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-
PV-LPPGS-12M-HR2-B	12'6" Face, 10"-40" OD Pole, 2-3/8" OD Horizontal Rail, No Antenna Pipe	1400	1	-	1	-	1	1	-	-	-	-	-	-	-	-	3	-	-	-	-	-	3	-	-	-	-
PV-LPPGS-12M-HR25-B	12'6" Face, 10"-40" OD Pole, 2-7/8" OD Horizontal Rail, No Antenna Pipe	1495	1	-	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
PV-LPPGS-12M-HR3-B	12'6" Face, 10"-40" OD Pole, 3-1/2" OD Horizontal Rail, No Antenna Pipe	1575	1	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
PV-LPPGS-14M-HR2-B	14'6" Face, 13"-44" OD Pole, 2-3/8" OD Horizontal Rail, No Antenna Pipe	1695	1	-	1	1	1	1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3	-	-	-	-
PV-LPPGS-14M-HR25-B	14'6" Face, 13"-44" OD Pole, 2-7/8" OD Horizontal Rail, No Antenna Pipe	1800	1	-	1	1	1	-	1	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
PV-LPPGS-14M-HR3-B	14'6" Face, 13"-44" OD Pole, 3-1/2" OD Horizontal Rail, No Antenna Pipe	1895	1	-	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
PV-LPPGS-14L-HR2-B	14'6" Face, 35"-60" OD Pole, 2-3/8" OD Horizontal Rail, No Antenna Pipe	1710	-	1	1	-	1	1	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3	-	-	-	-
PV-LPPGS-14L-HR25-B	14'6" Face, 35"-60" OD Pole, 2-7/8" OD Horizontal Rail, No Antenna Pipe	1820	-	1	1	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-	-	-	-
PV-LPPGS-14L-HR3-B	14'6" Face, 35"-60" OD Pole, 3-1/2" OD Horizontal Rail, No Antenna Pipe	1910	-	1	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
PV-LPPGS-12M-HR2-AP1	12'6" Face, 10"-40" OD Pole, 2-3/8" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	1925	1	-	1	-	1	1	-	-	-	12	-	12	-	-	12	3	-	-	-	-	-	3	-	1	1	3
PV-LPPGS-12M-HR25-AP1	12'6" Face, 10"-40" OD Pole, 2-7/8" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2030	1	-	1	-	1	-	1	-	-	-	12	12	-	-	12	-	-	-	-	3	-	3	-	1	1	3
PV-LPPGS-12M-HR3-AP1	12'6" Face, 10"-40" OD Pole, 3-1/2" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2120	1	-	1	-	1	-	-	1	-	-	-	24	-	-	12	-	-	-	-	-	-	6	-	1	1	3
PV-LPPGS-14M-HR2-AP1	14'6" Face, 13"-44" OD Pole, 2-3/8" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2215	1	-	1	1	1	1	-	-	-	12	-	12	-	-	12	-	3	-	-	-	-	-	3	1	1	3
PV-LPPGS-14M-HR25-AP1	14'6" Face, 13"-44" OD Pole, 2-7/8" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2335	1	-	1	1	1	-	1	-	-	-	12	12	-	-	12	-	-	-	-	3	-	3	1	1	3
PV-LPPGS-14M-HR3-AP1	14'6" Face, 13"-44" OD Pole, 3-1/2" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2440	1	-	1	1	1	-	-	1	-	-	-	24	-	-	12	-	-	-	-	-	-	6	1	1	3
PV-LPPGS-14L-HR2-AP1	14'6" Face, 35"-60" OD Pole, 2-3/8" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2230	-	1	1	-	1	1	-	-	12	-	12	-	-	12	-	3	-	-	-	-	-	3	1	1	3
PV-LPPGS-14L-HR25-AP1	14'6" Face, 35"-60" OD Pole, 2-7/8" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2350	-	1	1	-	1	-	1	-	-	-	12	12	-	-	12	-	-	-	-	3	-	3	1	1	3
PV-LPPGS-14L-HR3-AP1	14'6" Face, 35"-60" OD Pole, 3-1/2" OD Horizontal Rail, (12) 2-3/8" x 96" Pipe	2450	-	1	1	-	1	-	-	1	-	-	-	24	-	-	12	-	-	-	-	-	-	6	1	1	3
PV-LPPGS-12M-HR2-AP3	12'6" Face, 10"-40" OD Pole, 2-3/8" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2155	1	-	1	-	1	1	-	-	-	12	-	-	12	-	3	-	12	-	-	-	3	-	1	1	3
PV-LPPGS-12M-HR25-AP3	12'6" Face, 10"-40" OD Pole, 2-7/8" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2260	1	-	1	-	1	-	1	-	-	-	-	-	12	12	-	-	-	12	-	3	-	3	-	1	1	3
PV-LPPGS-12M-HR3-AP3	12'6" Face, 10"-40" OD Pole, 3-1/2" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2355	1	-	1	-	1	-	-	1	-	-	-	-	-	24	-	-	-	12	-	-	-	6	-	1	1	3
PV-LPPGS-14M-HR2-AP3	14'6" Face, 13"-44" OD Pole, 2-3/8" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2460	1	-	1	1	1	1	-	-	-	12	-	-	12	-	-	3	12	-	-	-	-	3	1	1	3
PV-LPPGS-14M-HR25-AP3	14'6" Face, 13"-44" OD Pole, 2-7/8" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2565	1	-	1	1	1	-	1	-	-	-	-	-	12	12	-	-	-	12	-	-	3	-	3	1	1	3
PV-LPPGS-14M-HR3-AP3	14'6" Face, 13"-44" OD Pole, 3-1/2" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2670	1	-	1	1	1	-	-	1	-	-	-	-	-	24	-	-	-	12	-	-	-	6	1	1	3
PV-LPPGS-14L-HR2-AP3	14'6" Face, 35"-60" OD Pole, 2-3/8" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2475	-	1	1	-	1	1	-	-	-	12	-	-	12	-	-	3	12	-	-	-	-	3	1	1	3
PV-LPPGS-14L-HR25-AP3	14'6" Face, 35"-60" OD Pole, 2-7/8" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2580	-	1	1	-	1	-	1	-	-	-	-	-	12	12	-	-	-	12	-	-	3	-	3	1	1	3
PV-LPPGS-14L-HR3-AP3	14'6" Face, 35"-60" OD Pole, 3-1/2" OD Horizontal Rail, (12) 2-7/8" x 96" Pipe	2690	-	1	1	-	1	-	-	1	-	-	-	-	-	24	-	-	-	12	-	-	-	6	1	1	3
PV-LPPGS-12M-TKB3-AP4	12'6" Face, 10"-40" OD Pole, 3-1/2" OD Horizontal Rail with Brace Kit, (12) 2-7/8" x 126" Pipe	3180	2	-	1	-	1	-	-	1	1	-	-	-	-	24	-	-	-	-	12	-	-	6	-	2	2	3
PV-LPPGS-14M-TKB3-AP4	14'6" Face, 13"-44"" OD Pole, 3-1/2" OD Horizontal Rail with Brace Kit, (12) 2-7/8" x 126" Pipe	3715	2	-	1	2	1	-	-	1	1	-	-	-	-	24	-	-	-	-	12	-	-	-	6	2	2	3
PV-LPPGS-14L-TKB3-AP4	14'6" Face, 35"-60" OD Pole, 3-1/2" OD Horizontal Rail with Brace Kit, (12) 2-7/8" x 126" Pipe	3745	-	2	1	-	1	-	-	1	1	-	-	-	-	24	-	-	-	-	12	-	-	-	6	2	2	3

SEE PAGE 4 FOR RELATED WEIGHTS & EPA

-AP# Antenna Pipe Breakdown	
Part Number Suffix	**Included Antenna PIpe**
-AP1	(12) PIPE-238X96 [∅2-3/8" X 96" Length]
-AP3	(12) PIPE-278X96 [∅2-7/8" X 96" Length]
-AP4	(12) PIPE-278X126 [∅2-7/8" X 126" Length]