STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

December 21, 2012

Matthew Bandle
Nexlink Global Services
Suite A, Building 2
800 Marshall Phelps Road
Windsor, CT 06095

RE: **EM-AT&T-077-121023** – AT&T Mobility notice of intent to modify an existing telecommunications facility located at 190 Olcott Street, Manchester, Connecticut.

Dear Mr. Bandle:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Prior to antenna installation, the reinforcements identified in the Structural Analysis prepared by Centek Engineering dated September 7, 2012, and stamped by Carlo Centore shall be implemented; and
- Not more than 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the tower and foundation do not exceed 100 percent of the post-construction structural rating.
- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not more than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated October 22, 2012. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General

Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

LRoberts

Linda Roberts
Executive Director

LR/CDM/cm

c: The Honorable Leo V. Diana, Mayor, Town of Manchester
James Davis, Zoning Enforcement Officer, Town of Manchester

C Squared Systems, LLC
65 Dartmouth Drive, Unit A3
Auburn, NH 03032
(603) 644-2800
support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT1209

(Manchester-Olcott)

190 Olcott St., Manchester, CT 06040

October 22, 2012

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the mast extension tower located at 190 Olcott St. in Manchester, CT. The coordinates of the tower are 41° 46' 20.57" N, 72° 33' 23.2" W.

AT&T is proposing the following modifications:

1) Remove six dual-band (850/1900) antennas (two per sector),
2) Install nine multi-band (700/850/1900/2100 MHz) antennas for their LTE, GSM, and UMTS networks (three per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter (mW/cm^2). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment B of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment B contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left(\frac{1.6^2 \times EIRP}{4\pi \times R^2} \right) \text{x Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance = $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

These calculations assume that the antennas are operating at 100 percent capacity and power, and that all channels are transmitting simultaneously. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the finished modifications.

4. Calculation Results

Table 1 below outlines the power density information for the site. Because the proposed AT&T antennas are directional in nature, the majority of the RF power is focused out towards the horizon. As a result, there will be less RF power directed below the antennas relative to the horizon, and consequently lower power density levels around the base of the tower. Please refer to Attachment C for the vertical patterns of the proposed AT&T antennas. The calculated results for AT&T in Table 1 include a nominal 10 dB off-beam pattern loss to account for the lower relative gain below the antennas.

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Cingular	*165*	*880*	*2*	*296*	*0.0078*	*0.5867*	*1.33%*
Cingular	*165*	*1930*	*2*	*427*	*0.0113*	*1.0000*	*1.13%*
AT&T UMTS	165	880	2	982	0.0026	0.5867	0.44%
AT&T UMTS	165	1900	2	1355	0.0036	1.0000	0.36%
AT&T LTE	165	734	1	1313	0.0017	0.4893	0.35%
AT&T GSM	165	880	1	491	0.0006	0.5867	0.11%
AT&T GSM	165	1900	4	813	0.0043	1.0000	0.43%
						Total	**1.69%**

Table 1: Carrier Information[1 2 3]

[1] The existing CSC filing for Cingular should be removed and replaced with the updated AT&T technologies and values provided in Table 1. The power density information for carriers other than AT&T was taken directly from the CSC database dated 7/26/2012. Please note that %MPE values listed are rounded to two decimal points. The total %MPE listed is a summation of each unrounded contribution. Therefore, summing each rounded value may not reflect the total value listed in the table.

[2] In the case where antenna models are not uniform across all 3 sectors for the same frequency band, the antenna model with the highest gain was used for the calculations to present a worse-case scenario.

[3] Antenna height listed for AT&T is in reference to the Centek Engineering, Inc. Structural Analysis dated September 7, 2012.

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **1.69% of the FCC limit**.

As noted previously, obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. As a result, the predicted signal levels are more conservative (higher) than the actual signal levels will be from the finished modifications.

6. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.

Daniel L. Goulet
C Squared Systems, LLC

October 22, 2012
Date

Attachment A: References

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

ANSI C95.1-1982, American National Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300 kHz to 100 GHz. IEEE-SA Standards Board

IEEE Std C95.3-1991 (Reaff 1997), IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave. IEEE-SA Standards Board

Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits for Occupational/Controlled Exposure[4]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

(B) Limits for General Population/Uncontrolled Exposure[5]

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz * Plane-wave equivalent power density

Table 2: FCC Limits for Maximum Permissible Exposure (MPE)

[4] Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

[5] General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

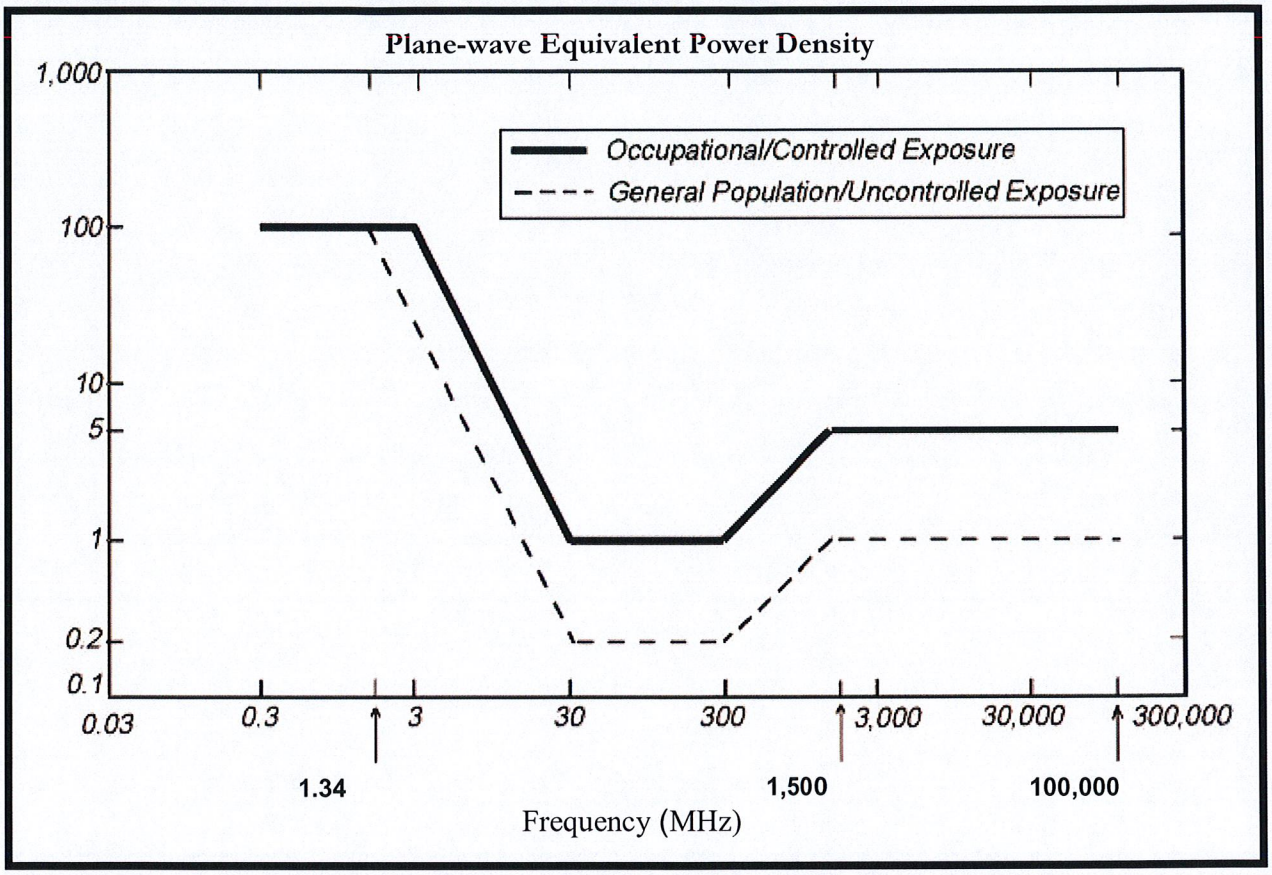
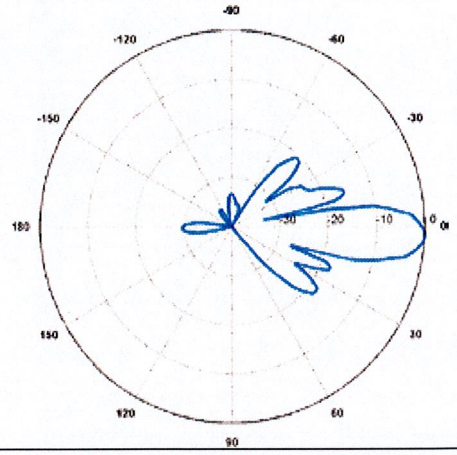


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: AT&T Antenna Data Sheets and Electrical Patterns

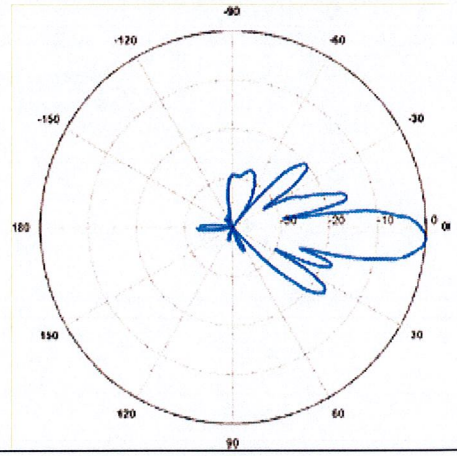
700 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	698-806 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	12.3°
Horizontal Beamwidth:	65°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



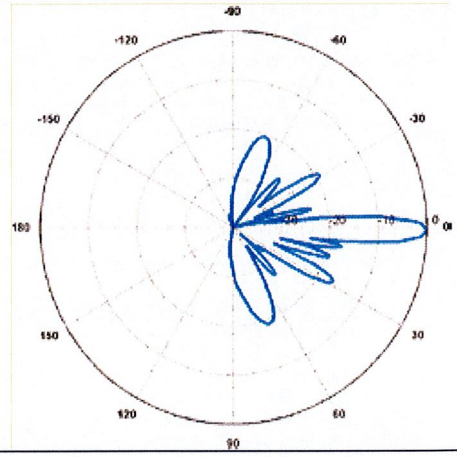
850 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	824-894 MHz
Gain:	13.9 dBd
Vertical Beamwidth:	11.5°
Horizontal Beamwidth:	63°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



1900 MHz

Manufacturer:	KMW
Model #:	AM-X-CD-16-65-00T-RET
Frequency Band:	1850-1900 MHz
Gain:	15.3 dBd
Vertical Beamwidth:	6°
Horizontal Beamwidth:	67°
Polarization:	Dual Slant ± 45°
Size L x W x D:	72.0" x 11.8" x 5.9"



Northeast
Utilities
System

107 Selden Street, Berlin, CT
06037

Northeast Utilities Service
Company
P.O. Box 270
Hartford, CT 06141-0270
(203) 665-5000

November 14, 2011

Mr. Mark Roberts
For:
AT&T Wireless.
500 Enterprise Drive
Rocky Hill, CT 06067

RE: AT&T Antenna Site, CT-1209, 190 Olcott St, Manchester CT, CL&P structure 20003.

Dear Mr. Roberts:

Based on our reviews of the site drawings, the structural and foundation analysis provided by Centek Engineering and, along with a third party review performed by Paul J Ford we have reviewed for acceptance this modification.

Since there are no outstanding structural issues to resolve at this time please contact Mr. Green (860-665-6926) to resolve any lease issues; once the lease amendment is secured you may contact Mr. John Landry directly (860-665-5425) to begin these arrangements.

Sincerely,

Robert Gray
Transmission Line Engineering

ref: 10035390.CT1209.CDREV1.10.09.12.pdf
12014.CO4 - CT1209 - Rev3 9.12.12.pdf

EM-AT&T-077-121023

10/22/12

VIA HandDelivery

Ms. Linda Roberts, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RECEIVED
OCT 23 2012
CONNECTICUT
SITING COUNCIL

RE: AT&T Mobility - Notice of Exempt Modification
190 Olcott Street Manchester CT 06040

Dear Ms. Roberts:

This letter and attachments are submitted on behalf of AT&T Mobility ("AT&T"). AT&T is enhancing the capabilities of its wireless system in Connecticut by implementing LTE technology. In order to do so, AT&T will modify antenna and equipment configurations at a number of existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section I6-50j-73, a copy of this letter and attachments is being sent to the Connecticut Light and Power.

AT&T plans to modify the existing facility on 190 Olcott Street in Manchester CT, owned by Connecticut Light and Power (coordinates 41-46-20.57 N, 72-33-23.2 W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to AT&T's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C. S.A. Section | 6-50j-l 2(b)(2).

1. The height of the overall structure will be unaffected. The proposed work consists of Removal and replacement of Six (6) existing panels and the installation of an additional Three (3) antennas. For a Total of Nine(9)antennas. Additionally, Six(6) RRUs will be installed as well as a Surge arrestor.

2. The proposed changes will not extend the site boundaries. AT&T will install additional equipment in the existing equipment shelter. Thus, there will no effect on the site compound.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed change will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environment as calculated for a mixed frequency site. As indicated in the attached power density calculations, AT&T's operations at the site will result in a power density of 1.69%; the combined site operations will result in a total power density of 1.69%.

Please feel free to call me with any questions or concerns regarding this matter.
Thank you for your consideration.

Respectfully submitted,

AT&T Mobility
Matthew Bandle, Consultant
MBandle@nexlinkgs.com
508-642-8801

Cc: Leo V. Diana, Manchester Mayor, 41 Center Street P.O. Box 191 Manchester, CT 06045-0191

CENTEK engineering

Centered on Solutions℠

Structural Analysis of PCS Mast and CL&P Tower

AT&T Mobility Site Ref: CT1209

CL&P Structure No. 20003

155' Electric Transmission Lattice Tower

190 Olcott Street
Manchester, CT

CENTEK Project No. 12014.CO4

~~Date: March 13, 2012~~

~~Rev 1: May 14, 2012~~

~~Rev 2: August 2, 2012~~

Rev 3: September 7, 2012

STATE OF CONNECTICUT
CARLO F. CENTOLA
No. 36894
LICENSED
PROFESSIONAL ENGINEER

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

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

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Introduction

The purpose of this report is to analyze the existing PCS mast and 155' CL&P tower located at 190 Olcott St., in Manchester, CT for the proposed antenna and equipment upgrade by AT&T Mobility.

The proposed loads consist of the following:

- AT&T MOBILITY (Existing to Remain):

  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg of the existing tower.

  PCS Mast: 12" Sch. 40 (O.D. = 12.8") x 47-ft long pipe mast conforming to ASTM A53 Grade B, F_y = 35 ksi.

- AT&T MOBILITY (Existing to Remove):

  Antennas: Six (6) CSS XDU01416-80 panel antennas and twelve (12) ADC Cleargain dual band 800/1900 TMA's mounted on a 12-ft low profile platform with a RAD center elevation of 165-ft above grade.

- **AT&T MOBILITY (Proposed):**

  Antennas: Nine (9) KMW AM-X-CD-16-65-00T-RET panel antennas and nine CCI DTMABP7819VG12A TMA's mounted on a 12-ft low profile platform with a RAD center elevation of 165-ft above grade.

  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg of the existing tower.

Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9th edition for design of the PCS Mast and antenna supporting elements.
- ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", defines allowable steel stresses for evaluation of the CL&P utility tower.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- PCS 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.
- All welds conform to the requirements of AWS D1.1.
- PCS 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.

Analysis

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

The existing mast consisting of a 12" sch. 40 pipe conforming to ASTM A53 Grade B (Fy = 35ksi) connected at two 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. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the CL&P tower structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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

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

Design Basis

Our analysis was performed in accordance with EIA-222-F-1996, ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", NESC C2-2007 and Northeast Utilities Design Criteria.

The CL&P 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 NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 10-97, "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 C2-2007, 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 NU Design Criteria Table, TIA/EIA-222-F, and AISC-ASD standards.

Load cases considered:

Load Case 1:
Wind Speed..... 85 mph [(2)]
Radial Ice Thickness..... 0"

Load Case 2:
Wind Pressure..... 75% of 85 mph wind pressure
Radial Ice Thickness..... 0.5"

Note 2: Per NU Mast Design Criteria Exception 1.

Results

- MAST ASSEMBLY

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

PCS Mast Assembly	Stress Ratio (% of capacity)	Result
12" Sch. 40 Pipe	98.3%[(1)]	**PASS**
C12x20.7	95.2%[(1)]	**PASS**
Mast Connection to CL&P Tower	28.3%[(2)]	**PASS**

Note 1 – 1/3 increase in allowable stress used per OTRM 059.
Note 2 – 1/3 increase in allowable stress not used per OTRM 059.

- UTILITY TOWER

This analysis finds that the subject utility structure is adequate to support the existing pcs mast and related appurtenances. The tower stresses meet the requirements set forth by the ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

With the proposed tower reinforcements detailed in Section 4 of this report a maximum usage of **93.22%** occurs in the utility tower under the **NESC Heavy** loading condition.

TOWER SECTION:

The utility tower was found to be within allowable limits.

Tower Member	Stress Ratio (% of capacity)	Result
Angle g42P	93.22%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of four (4) 4-ft square tapering to 6-ft square x 9.5-ft long reinforced concrete piers and four (4) 12-ft square x 1.75-ft thick reinforced concrete pads. The base of the tower is connected to the foundation by four (4) 1-1/2" ∅ ASTM A36 and four (4) 1" ∅ ASTM A193 Gr. B7 anchor bolts per leg Foundation information was obtained from NUSCO drawing # 01165-60003.

Review of the foundation design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

BASE REACTIONS:

From PLS-Tower analysis of CL&P tower based on NESC/NU prescribed loads.

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	34.28 kips	113.94 kips	157.57 kips
NESC Extreme Wind	46.65 kips	169.61 kips	193.76 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.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	91.7%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinf. Conc. Pad & Pier	Uplift	1.0 FS (1)	1.68 FS (1)	**PASS**
	Overturning	1.0 FS (1)	1.38 FS (1)	**PASS**
	Bearing	4.0 ksf	3.56 ksf	**PASS**

Note 1: FS denotes Factor of Safety
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

Conclusions and Recommendations

This analysis shows that the subject utility tower **with the proposed reinforcements outlined below and detailed in Section 4 of this report is adequate** to support the proposed AT&T equipment upgrade.

- Replacement of the twenty-four (24) L2x2x3/16 diagonals with L2x2x5/16 diagonals.
- Replacement of eight (8) L3x3x1/4 diagonals with L3x3x3/8 diagonals.
- Installation of four (4) L3x3x1/4 secondary horizontals.

The analysis is based, in part on the information provided to this office by Northeast Utilities and AT&T Mobility. 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:

Carlo F. Centore, PE
Principal ~ Structural Engineer

STATE OF CONNECTICUT
CARLO F. CENTORE
No.16694
LICENSED
PROFESSIONAL ENGINEER

Prepared by:

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

PCS Mast

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/EIA-222 (Rev. F) with two exceptions:

1. An 85 mph extreme wind speed shall be used for locations in all counties throughout the NU system.
2. The allowable stress increase of TIA Section 3.1.1.1 is allowed for the mast section, but is disallowed for the mast to structure connection design.

   The combined wind and ice condition shall consider ½" radial ice in combination with the wind load (0.75 Wi) as specified in TIA section 2.3.16.

ELECTRIC TRANSMISSION TOWER

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

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

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

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

Northeast Utilities
Overhead Transmission Standards

Attachment A

NU 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 (.75WI)	TIA	TIA	TIA Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with Antennas below top of Tower/Pole (on two faces)	-----	4	1.00	1.00	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor loads provided by NU					
High Wind Condtion	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA Section 3.1.1.1 disallowed for connection design	TIA
High Wind Condtion	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condtion	NESC Extreme Wind	Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condtion	NESC Extreme Wind	Conductors:	Conductor loads provided by NU					
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load 1.25 x Gust Response Factor Height above ground level based on top of Mast/Antenna					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Conditon*		Tower/Pole Analysis with Antennas below top of Tower/Pole	Use NESC C2-2007, Section 25, Rule 250D: Extreme Ice with Wind Loading 4PSF Wind Load Height above ground level based on top of Tower/Pole					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Conditon*		Conductors:	Conductor loads provided by NU					
NESC Extreme Ice with Wind Conditon*		* Only for Structures Installed after 2007						

2) STEP 2 - The electric transmission structure analysis and evaluation shall be performed in accordance with NESC requirements and shall include the mast and antenna loads determined from NESC applied loading conditions (not TIA/EIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The structure shall be analyzed using yield stress theory in accordance with Attachment A, "NU 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 NU).

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

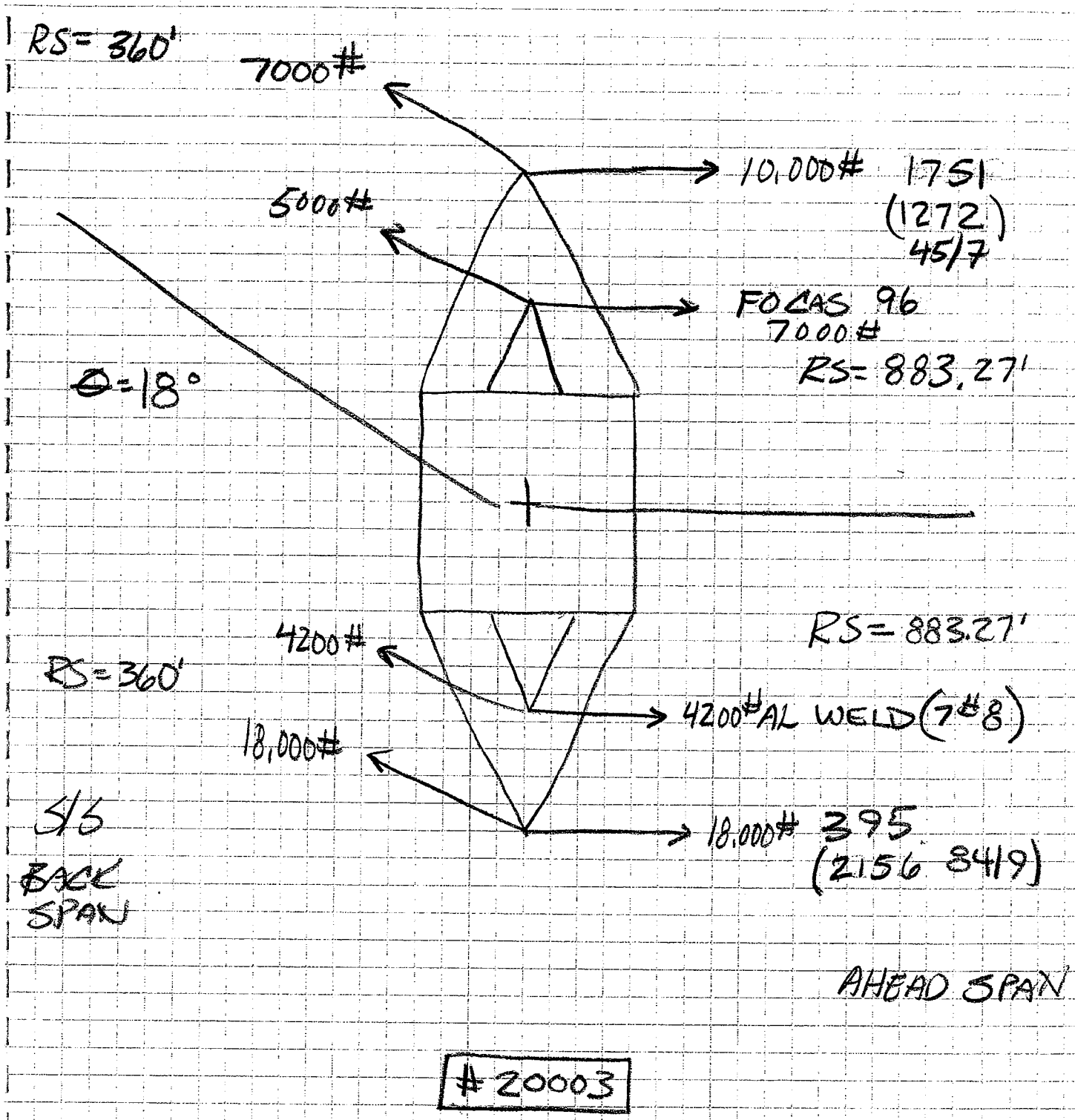
Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.3

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

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

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

If the electric transmission structure is not sufficient to support the additional loadings of the wireless communication mast, reinforcement will be required to upgrade the strength of the overstressed members. Any reinforcement design will be reviewed by NU TL&CE to determine the feasibility of construction and its impact on the use of the structure as a transmission structure.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4200#
RS=360'
4200# AL WELD (7#8)
18,000#
5/5
18,000# 395
(2156 8419)
BACK SPAN
AHEAD SPAN

#20003

Northeast Utilities System

Job :	Spec. Number	Page	of
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	Checked by	Date	12/19/11
		Date	

INPUT DATA

TOWER ID: 20003

Structure Height (ft) : 75

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ○ Suspension ◉ Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*3/8 AW*	*3/8 AW*
DESCRIPTION =	3/8	3/8
STRANDING =	7 #8 Al Weld	7 #8 Al Weld
DIAMETER =	0.385 in	0.385 in
WEIGHT =	0.262 lb/ft	0.262 lb/ft

Conductor Properties:

		BACK	AHEAD		
	NAME =	*BLUEBIRD*	*BLUEBIRD*		
Number of Conductors per phase	1	2156.000	2156.000	1	Number of Conductors per phase
		84/19 ACSR	84/19 ACSR		
	DIAMETER =	1.762 in	1.762 in		
	WEIGHT =	2.507 lb/ft	2.507 lb/ft		

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	4,200 ✓	18,000 ✓	4,200 ✓	18,000 ✓
EXTREME WIND =	3,368 ✓	13,978 ✓	3,453 ✓	18,464 ✓
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	2,438 ✓	8,834 ✓	1,114 ✓	9,957 ✓

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	9	AHEAD:	9	**18**
WIND SPAN (ft) =	BACK:	180	AHEAD:	442	**622**
WEIGHT SPAN (ft) =	BACK:	(51)	AHEAD:	694	**642**

Northeast Utilities System

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		Sheet	of
Description:	Computed by	Date	12/19/11
	Checked by	Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 20003

Wind Span =	622	ft
Weight Span =	642	ft
Total Angle =	18	degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	STRAIN

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	2,886 lb	0 lb	783 lb	1,292 lb	6,845 lb	-62 lb
Conductor =	10,723 lb	0 lb	4,371 lb	5,060 lb	29,334 lb	0 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,659 lb	84 lb	168 lb
Conductor =	7,786 lb	4,431 lb	2,011 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	168 lb
Conductor =	#VALUE!	#VALUE!	2,011 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,275 lb
Conductor =	#VALUE!	#VALUE!	4,217 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	522 lb
Conductor =	#VALUE!	#VALUE!	2,914 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	556 lb	1,308 lb	168 lb
Conductor =	2,940 lb	1,109 lb	2,011 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	556 lb	1,308 lb	168 lb
Conductor =	2,940 lb	1,109 lb	2,011 lb

Northeast Utilities System

Job :	Spec. Number	Page	of
Description:	Computed by	Sheet	of
	Checked by	Date	12/19/11
		Date	

NOTE: All loads include required overload factors (OLF's).

LC 1		HORIZONTAL	LONGITUDINAL	VERTICAL
NESC Heavy	shield - back	1291.840843	6844.6802	-62.15986663
	shield - ahead	1593.770843	-6844.6802	844.7553892
	SHIELD - SUM	**2885.611685**	**0**	**782.5955225**
	conductor - back	5060.403612	29334.34372	0.444834946
	conductor - ahead	5662.519612	-29334.34372	4370.968194
	CONDUCTOR - SUM	**10722.92322**	**0**	**4371.413029**
LC 2		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Extreme Wind	shield - back	698.3888656	3326.534331	-13.359654
	shield - ahead	960.958022	-3410.48784	181.5583
	SHIELD - SUM	**1659.346888**	**-83.95350895**	**168.198646**
	conductor - back	2971.612352	13805.90762	72.06779
	conductor - ahead	4814.202463	-18236.67752	1938.6045
	CONDUCTOR - SUM	**7785.814815**	**-4430.769896**	**2010.67229**
LC 3		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Long. Wind	shield - back	#VALUE!	#VALUE!	-13.359654
	shield - ahead	#VALUE!	#VALUE!	181.5583
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**168.198646**
	conductor - back	#VALUE!	#VALUE!	72.06779
	conductor - ahead	#VALUE!	#VALUE!	1938.6045
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**2010.67229**
LC 4		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
RULE 250D	shield - back	#VALUE!	#VALUE!	-101.2492722
	shield - ahead	#VALUE!	#VALUE!	1375.982173
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**1274.732901**
	conductor - back	#VALUE!	#VALUE!	-103.2037808
	conductor - ahead	#VALUE!	#VALUE!	4320.553047
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**4217.349266**
LC 5		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
NESC w/o OLF's	shield - back	#VALUE!	#VALUE!	-41.43991109
	shield - ahead	#VALUE!	#VALUE!	563.1702594
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**521.7303484**
	conductor - back	#VALUE!	#VALUE!	0.296556631
	conductor - ahead	#VALUE!	#VALUE!	2913.978796
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**2914.275353**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Raking	shield - back	381.3872258	2407.984174	-13.359654
	shield - ahead	174.2679941	-1100.284811	181.5583
	SHIELD - SUM	**555.6552198**	**1307.699363**	**168.198646**
	conductor - back	1381.942064	8725.238801	72.06779
	conductor - ahead	1557.617968	-9834.412807	1938.6045
	CONDUCTOR - SUM	**2939.560033**	**-1109.174006**	**2010.67229**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
60 DEG F NO WIND	shield - back	381.3872258	2407.984174	-13.359654
	shield - ahead	174.2679941	-1100.284811	181.5583
	SHIELD - SUM	**555.6552198**	**1307.699363**	**168.198646**
	conductor - back	1381.942064	8725.238801	72.06779
	conductor - ahead	1557.617968	-9834.412807	1938.6045
	CONDUCTOR - SUM	**2939.560033**	**-1109.174006**	**2010.67229**

Northeast Utilities System

Job :	Spec. Number	Page	of
		Sheet	of
Description:	Computed by	Date	12/19/11
	Checked by	Date	

INPUT DATA

TOWER ID: 20003

Structure Height (ft) : 75

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ○ Suspension ◉ Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*OPGW-120*	*OPGW-120*
DESCRIPTION =	6-Groove	6-Groove
STRANDING =	10/9 FOCAS	10/9 FOCAS
DIAMETER =	0.738 in	0.738 in
WEIGHT =	0.518 lb/ft	0.518 lb/ft

Conductor Properties:

		BACK	AHEAD		
	NAME =	*BITTERN*	*BITTERN*		
Number of Conductors per phase	1	1272.000	1272.000	1	Number of Conductors per phase
		45/7 ACSR	45/7 ACSR		
	DIAMETER =	1.345 in	1.345 in		
	WEIGHT =	1.432 lb/ft	1.432 lb/ft		

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	5,000	7,000	7,000	10,000
EXTREME WIND =	4,405	6,779	7,046	11,130
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,826	2,947	2,487	4,661

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	9	AHEAD:	9	**18**
WIND SPAN (ft) =	BACK:	180	AHEAD:	442	**622**
WEIGHT SPAN (ft) =	BACK:	(51)	AHEAD:	694	**642**

Northeast Utilities System

Job :	Spec. Number	Page	of
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Description:	Computed by	Date	12/19/11
	Checked by	Date	

WIRE LOADING AT ATTACHMENTS

TOWER ID: 20003

Wind Span =	622	ft
Weight Span =	642	ft
Total Angle =	18	degrees

Broken Wire Span =	AHEAD SPAN
Type of Insulator Attachment =	STRAIN

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	3,998 lb	3,259 lb	1,241 lb	1,551 lb	8,148 lb	-99 lb
Conductor =	5,603 lb	4,889 lb	3,086 lb	2,159 lb	11,408 lb	103 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	2,927 lb	2,608 lb	333 lb
Conductor =	4,871 lb	4,297 lb	1,320 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	333 lb
Conductor =	#VALUE!	#VALUE!	1,320 lb

4. NESC RULE 250D Extreme Ice & Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,721 lb
Conductor =	#VALUE!	#VALUE!	3,194 lb

5. NESC RULE 250B w/o OLF's

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	827 lb
Conductor =	#VALUE!	#VALUE!	2,057 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	675 lb	653 lb	333 lb
Conductor =	1,190 lb	1,693 lb	1,320 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	675 lb	653 lb	333 lb
Conductor =	1,190 lb	1,693 lb	1,320 lb

Northeast Utilities System

Job :	Spec. Number	Page	of
Description:	Computed by	Sheet	of
	Checked by	Date	12/19/11
		Date	

NOTE: All loads include required overload factors (OLF's).

LC 1		HORIZONTAL	LONGITUDINAL	VERTICAL
NESC Heavy	shield - back	1551.284337	8148.42881	-98.57125623
	shield - ahead	2446.402071	-11407.80033	1339.587815
	SHIELD - SUM	**3997.686408**	**-3259.371524**	**1241.016559**
	conductor - back	2158.568071	11407.80033	102.5772645
	conductor - ahead	3444.128673	-16296.85762	2982.983873
	CONDUCTOR - SUM	**5602.696744**	**-4889.057286**	**3085.561138**
LC 2		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Extreme Wind	shield - back	1017.872986	4350.76714	-26.43354
	shield - ahead	1908.842131	-6959.252048	359.233
	SHIELD - SUM	**2926.715117**	**-2608.484908**	**332.79946**
	conductor - back	1659.667043	6695.539261	126.92504
	conductor - ahead	3211.147544	-10992.97123	1193.092
	CONDUCTOR - SUM	**4870.814588**	**-4297.43197**	**1320.01704**
LC 3		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Long. Wind	shield - back	#VALUE!	#VALUE!	-26.43354
	shield - ahead	#VALUE!	#VALUE!	359.233
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**332.79946**
	conductor - back	#VALUE!	#VALUE!	126.92504
	conductor - ahead	#VALUE!	#VALUE!	1193.092
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**1320.01704**
LC 4		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
RULE 250D	shield - back	#VALUE!	#VALUE!	-136.7239057
	shield - ahead	#VALUE!	#VALUE!	1858.084041
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**1721.360135**
	conductor - back	#VALUE!	#VALUE!	-21.88445801
	conductor - ahead	#VALUE!	#VALUE!	3215.419785
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**3193.535327**
LC 5		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
NESC w/o OLF's	shield - back	#VALUE!	#VALUE!	-65.71417082
	shield - ahead	#VALUE!	#VALUE!	893.0585433
	SHIELD - SUM	**#VALUE!**	**#VALUE!**	**827.3443724**
	conductor - back	#VALUE!	#VALUE!	68.38484302
	conductor - ahead	#VALUE!	#VALUE!	1988.655915
	CONDUCTOR - SUM	**#VALUE!**	**#VALUE!**	**2057.040758**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
Raking	shield - back	285.6493332	1803.51891	-26.43354
	shield - ahead	389.0525146	-2456.380903	359.233
	SHIELD - SUM	**674.7018477**	**-652.8619931**	**332.79946**
	conductor - back	461.0123685	2910.71754	126.92504
	conductor - ahead	729.1410416	-4603.615356	1193.092
	CONDUCTOR - SUM	**1190.15341**	**-1692.897816**	**1320.01704**
LC 6		**HORIZONTAL**	**LONGITUDINAL**	**VERTICAL**
60 DEG F NO WIND	shield - back	285.6493332	1803.51891	-26.43354
	shield - ahead	389.0525146	-2456.380903	359.233
	SHIELD - SUM	**674.7018477**	**-652.8619931**	**332.79946**
	conductor - back	461.0123685	2910.71754	126.92504
	conductor - ahead	729.1410416	-4603.615356	1193.092
	CONDUCTOR - SUM	**1190.15341**	**-1692.897816**	**1320.01704**

DESIGN BASIS:

1. GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.

2. DESIGN CRITERIA

WIND LOAD: (PCS MAST)
BASIC WIND SPEED (V) =85 MPH (FASTEST MILE); BASED ON TIA/EIA-222F AND NU MAST DESIGN CRITERIA EXCEPTION 1.

WIND LOAD: (UTILITY POLE & FOUNDATION)
BASIC WIND SPEED (V) =110 MPH (3-SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.

2. 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.

3. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.

4. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.

5. THE CONTRACTOR SHALL LIMIT THE DURATION OF THE FOUNDATION REINFORCEMENT WORK. THE EXISTING CAISSON WITHIN THE SHOWN LIMITS IS STABLE FOR WIND SPEEDS LESS THAN 50MPH WITHOUT ICE LOADING. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.

6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.

7. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.

8. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.

9. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.

10. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES.

11. 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 WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

12. 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.

13. NO DRILLING WELDING OR TAPING ON CL&P OWNED EQUIPMENT

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CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	9/7/12	TJL	CFC	ISSUED FOR CONSTRUCTION
2	8/2/12	TJL	CFC	ISSUED FOR CONSTRUCTION
1	5/19/12	TJL	CFC	ISSUED FOR CONSTRUCTION
A	3/13/12	TJL	CFC	ISSUED FOR NU REVIEW

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JOB NO.	12014.C04

NOTES

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STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   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 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. 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.

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

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

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

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

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

8. 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.

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

10. 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 E70XX 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" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

11. 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.

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

13. 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.

14. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.

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

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

17. FABRICATE BEAMS WITH MILL CAMBER UP.

18. 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.

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

20. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.

21. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	9/7/12	TJL	CFC	ISSUED FOR CONSTRUCTION
2	8/6/12	TJL	CFC	ISSUED FOR CONSTRUCTION
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DATE:	3/12/12
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JOB NO.	12014.C04

NOTES

SHEET NO.
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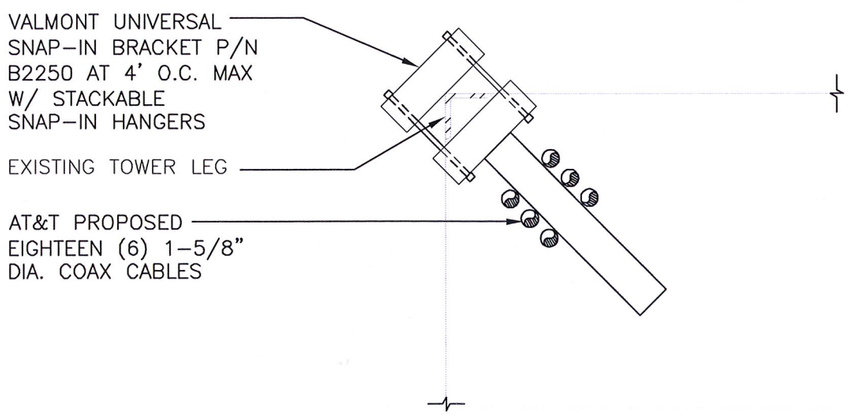
Sheet No. 2 of 4

TOWER REINFORCEMENT NOTES

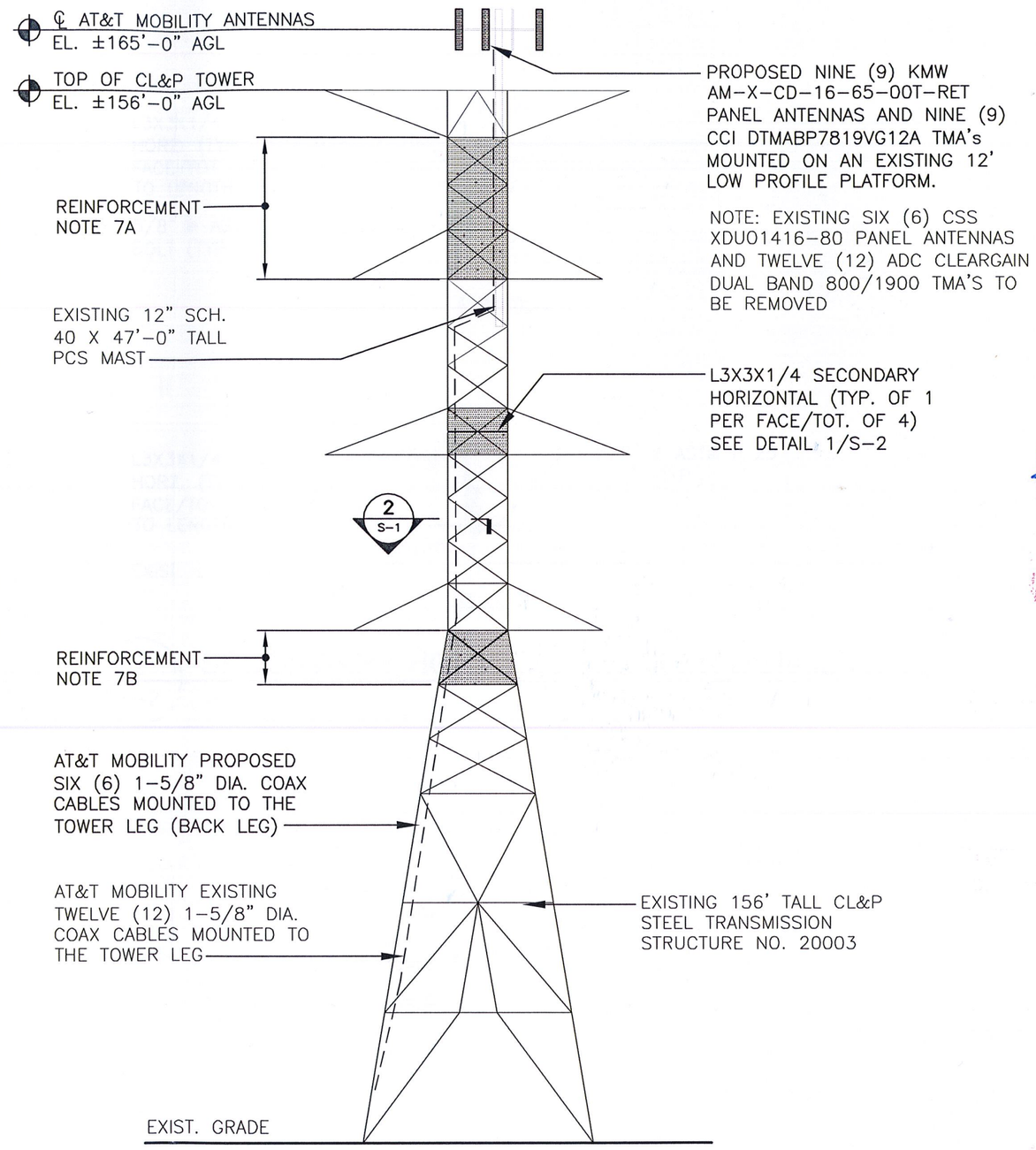
1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR AT&T MOBILITY, DATED 9/7/12.
2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DRAWINGS PREPARED BY LEHIGH STRUCTURAL STEEL CO., CONTRACT #L539, DATED NOVEMBER 6, 1965.
3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.
4. ALL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.
5. ALL REPLACEMENT MEMBERS SHALL BE INSTALLED WITH 5/8"ø A325-N BOLTS.
6. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD.
7. THE FOLLOWING MEMBERS ARE SCHEDULED FOR REPLACEMENT, REFER TO 1/S-1 FOR LOCATION:

   A. REPLACE EXISTING L2X2X3/16 DIAGONALS WITH L2X2X5/16 DIAGONALS (TOTAL OF 25 PIECES). CONTRACTOR TO DEVELOP SHOP DRAWINGS FOR ERECTION & PIECE FABRICATION FROM THE ORIGINAL TOWER DRAWINGS PREPARED BY LEHIGH STRUCTURAL STEEL COMPANY, CONTRACT NO. L539, SHEET NO. 9F. PIECE MARKS F112 THRU F121 ARE SCHEDULED FOR REPLACEMENT.

   B. REPLACE EXISTING L3X3X1/4 DIAGONALS WITH L3X3X3/8 DIAGONALS (TOTAL OF 8 PIECES). CONTRACTOR TO DEVELOP SHOP DRAWINGS FOR ERECTION & PIECE FABRICATION FROM THE ORIGINAL TOWER DRAWINGS PREPARED BY LEHIGH STRUCTURAL STEEL COMPANY, CONTRACT NO. L539, SHEET NO. 6F. PIECE MARKS F62 THRU F65 ARE SCHEDULED FOR REPLACEMENT.



2 / S-1 COAX CABLE DETAIL
SCALE: 3/4" = 1'-0"



1 / S-1 TOWER & MAST ELEVATION
SCALE: NOT TO SCALE

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CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	9/7/12	TJL	CFC	ISSUED FOR CONSTRUCTION
2	8/24/12	TJL	CFC	ISSUED FOR CONSTRUCTION
1	5/19/12	TJL	CFC	ISSUED FOR CONSTRUCTION
A	4/13/12	TJL	CFC	ISSUED FOR NU REVIEW

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DATE:	3/12/12
SCALE:	AS SHOWN
JOB NO.	12014.C04

TOWER ELEVATION AND REINFORCEMENT

SHEET NO.
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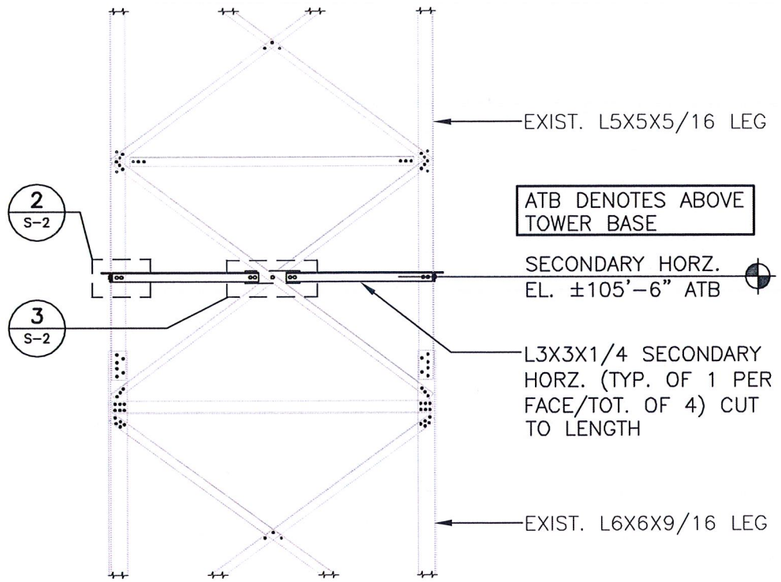
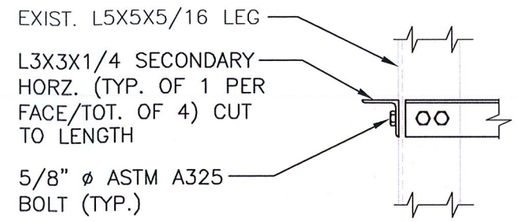
Sheet No. 3 of 4

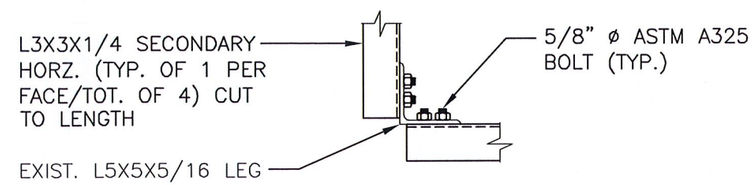


1 / S-2 SECONDARY HORZ. REINFORCEMENT

SCALE: 1/4" = 1'-0"



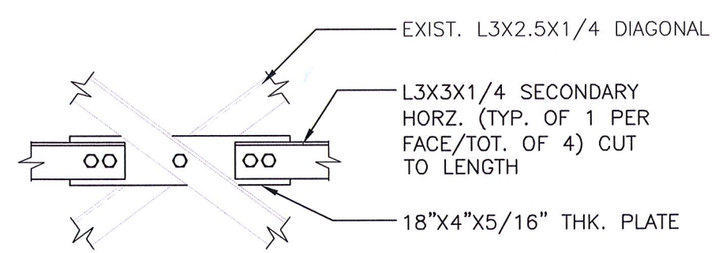
ELEVATION



PLAN

2 / S-2 SECONDARY HORZ. CONNECTION DETAILS

SCALE: 1" = 1'-0"



ELEVATION

3 / S-2 SECONDARY HORZ. CONNECTION DETAILS

SCALE: 1" = 1'-0"

DESIGNED BY:	TJL
DRAWN BY:	TJL
CHK'D BY:	CFC

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	9/7/12	TJL	CFC	ISSUED FOR CONSTRUCTION
2	8/2/12	TJL	CFC	ISSUED FOR CONSTRUCTION
1	5/19/12	TJL	CFC	ISSUED FOR CONSTRUCTION
A	3/13/12	TJL	CFC	ISSUED FOR NU REVIEW

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DATE:	3/12/12
SCALE:	AS SHOWN
JOB NO.	12014.C04

REINFORCEMENT DETAILS

SHEET NO.
S-2
Sheet No. 4 of 4

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA/EIA

Wind Speeds

Basic Wind Speed	$V := 85$	mph	(User Input per NU Mast Design Criteria Exception 1)
Basic Wind Speed with Ice	$V_i := 74$	mph	(User Input per TIA/EIA-222-F Section 2.3.16)

Heights above ground level, z

Mast Section 1	$z_{mast1} := 158.5$	ft	(User Input)
Mast Section 2	$z_{mast2} := 135$	ft	(User Input)
Antenna	$z_{ant} := 165$	ft	(User Input)
Platform	$z_{plt} := 165$	ft	(User Input)
Coax	$z_{coax} := 143$	ft	(User Input)
Brace Member 1	$z_{mem1} := 148$	ft	(User Input)
Brace Member 2	$z_{mem2} := 121$	ft	(User Input)

Exposure Coefficients, kz

(per TIA/EIA-222-F Section 2.3.3)

Mast Section 1 $$Kz_{mast1} := \left(\frac{z_{mast1}}{33}\right)^{\frac{2}{7}} = 1.566$$

Mast Section 2 $$Kz_{mast2} := \left(\frac{z_{mast2}}{33}\right)^{\frac{2}{7}} = 1.496$$

Antenna $$Kz_{ant} := \left(\frac{z_{ant}}{33}\right)^{\frac{2}{7}} = 1.584$$

Platform $$Kz_{plt} := \left(\frac{z_{plt}}{33}\right)^{\frac{2}{7}} = 1.584$$

Coax $$Kz_{coax} := \left(\frac{z_{coax}}{33}\right)^{\frac{2}{7}} = 1.52$$

Brace Member 1 $$Kz_{mem1} := \left(\frac{z_{mem1}}{33}\right)^{\frac{2}{7}} = 1.535$$

Brace Member 2 $$Kz_{mem2} := \left(\frac{z_{mem2}}{33}\right)^{\frac{2}{7}} = 1.45$$

Velocity Pressure without ice, qz (per TIA/EIA-222-F Section 2.3.3)

Mast Section 1 $qz_{mast1} := 0.00256 \cdot Kz_{mast1} \cdot V^2 = 28.96$

Mast Section 2 $qz_{mast2} := 0.00256 \cdot Kz_{mast2} \cdot V^2 = 27.662$

Antenna $qz_{ant} := 0.00256 \cdot Kz_{ant} \cdot V^2 = 29.294$

Platform $qz_{plt} := 0.00256 \cdot Kz_{plt} \cdot V^2 = 29.294$

Coax $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 28.121$

Brace Member 1 $qz_{mem1} := 0.00256 \cdot Kz_{mem1} \cdot V^2 = 28.398$

Brace Member 2 $qz_{mem2} := 0.00256 \cdot Kz_{mem2} \cdot V^2 = 26.81$

Velocity Pressure with ice, qzICE (per TIA/EIA-222-F Section 2.3.3)

Mast Section 1 $qzICE_{mast1} := 0.00256 \cdot Kz_{mast1} \cdot V_i^2 = 21.949$

Mast Section 2 $qzICE_{mast2} := 0.00256 \cdot Kz_{mast2} \cdot V_i^2 = 20.966$

Antenna $qzICE_{ant} := 0.00256 \cdot Kz_{ant} \cdot V_i^2 = 22.203$

Platform $qzICE_{plt} := 0.00256 \cdot Kz_{plt} \cdot V_i^2 = 22.203$

Coax $qzICE_{coax} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 21.313$

Brace Member 1 $qzICE_{mem1} := 0.00256 \cdot Kz_{mem1} \cdot V_i^2 = 21.524$

Brace Member 2 $qzICE_{mem2} := 0.00256 \cdot Kz_{mem2} \cdot V_i^2 = 20.32$

TIA/EIA Common Factors:

Gust Response Factor =	$G_H := 1.69$		(User Input per TIA/EIA-222-F Section 2.3.4)
Gust Response Factor Multiplier =	$m := 1.25$		(User Input per TIA/EIA-222-F Section 2.3.4.4)
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input per TIA/EIA-222-F Section 2.3.1)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)

Development of Wind & Ice Load on Mast (per TIA/EIA-222-F-1996 Criteria)

Mast Data: (12" Sch. 40)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.8$	in	(User Input)
Total Mast Length =	$L_{mast} := 47$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)

Velocity Coefficient = $C := \sqrt{Kz_{mast2}} \cdot V \cdot \frac{D_{mast}}{12} = 111$

Powermount Force Coefficient = $CF_{mast} = 0.59$ (per TIA/EIA-222-F Table 1)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.067$ sf/ft

Total Mast Section 1 Wind Force = $qz_{mast1} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 31$ plf **BLC 5,7**

Total Mast Section 2 Wind Force = $qz_{mast2} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 29$ plf **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.15$ sf/ft

Total Mast Section 1 Wind Force w/ Ice = $qzICE_{mast1} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 25$ plf **BLC 4,6**

Total Mast Section 2 Wind Force w/ Ice = $qzICE_{mast2} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 24$ plf **BLC 4,6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

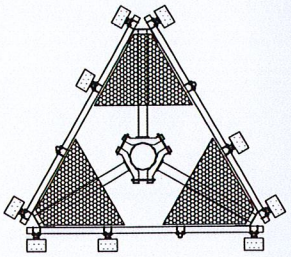
Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 20.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$ plf **BLC 3**

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model =	KMW AM-X-CD-16-65-00T-RET		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 49$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 9$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$		
Antenna Force Coefficient =	$Ca_{ant} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)



Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 53.1$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 3680$	lbs	BLC 5,7

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 58.4$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 3068$	lbs	BLC 4,6

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 441$	lbs	BLC 2

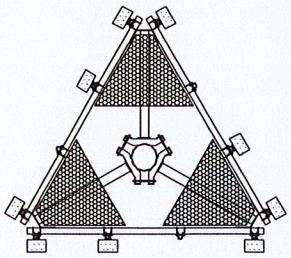
Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1435$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 46$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 418$	lbs	BLC 3

Development of Wind & Ice Load on Antennas (per TIA/EIA-222-F-1996 Criteria)

Antenna Data:

Antenna Model =	CCI DTMABP7819VG12A TMA		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 14.25$	in	(User Input)
Antenna Width =	$W_{ant} := 11.46$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.17$	in	(User Input)
Antenna Weight =	$WT_{ant} := 20$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 9$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.2$		
Antenna Force Coefficient =	$Ca_{ant} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)



Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.1$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 10.2$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 707$	lbs	BLC 5,7

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 1.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 11.9$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qzICE_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 624$	lbs	BLC 4,6

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 180$	lbs	BLC 2

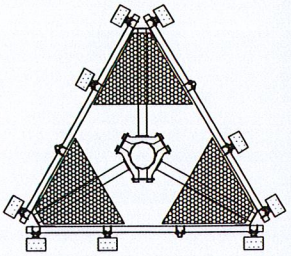
Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 681$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 301$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 10$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 88$	lbs	BLC 3

Development of Wind & Ice Load on Platform (per TIA/EIA-222-F-1996 Criteria)

Platform Data:

Platform Model =	Site Pro 12'-6" Low Profile Platform (RMSP-496)		
Platform Shape =	Flat		(User Input)
Platform Area =	$CaA_{plt} := 17.3$	sq ft	(User Input)
Platform Area w/ Ice =	$CaA_{ICE.plt} := 23.4$	sq ft	(User Input)
Platform Weight =	$WT_{plt} := 1520$	lbs	(User Input)
Platform Weight w/ Ice =	$WT_{ICE.plt} := 2000$	lbs	(User Input)



Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Platform Wind Force = $F_{plt} := qz_{plt} \cdot G_H \cdot CaA_{plt} = 856$ lbs **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Total Platform Wind Force w/ Ice = $Fi_{plt} := qzICE_{plt} \cdot G_H \cdot CaA_{ICE.plt} = 878$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 1520$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{ICE.plt} - WT_{plt} = 480$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables — per TIA/EIA-222-F-96 Criteria

Coax Cable Data: (Below top of CL&P Tower)

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 30$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 6$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 181.8$

Coax Cable Force Factor Coefficient = $Ca_{coax} = 1.2$ TIA/EIA-222-F-96 Table 3

Wind Load (without ice) — per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 1$ sfft

Total Coax Wind Force = $F_{coax} := qz_{coax} \cdot G_H \cdot Ca_{coax} \cdot A_{coax} = 56$ plf **BLC 5,7**

Wind Load (with ice) — per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 1.1$ sfft

Total Coax Wind Force w/ Ice = $Fi_{coax} := qzICE_{coax} \cdot G_H \cdot Ca_{coax} \cdot AICE_{coax} = 46$ plf **BLC 4,6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

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

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

Development of Wind & Ice Load on Coax Cables — per TIA/EIA-222-F-96 Criteria

Coax Cable Data: (Above top of CL&P Tower)

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 10$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 9$		(User Input)
Coax aspect ratio,	$Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 60.6$		
Coax Cable Force Factor Coefficient =	$Ca_{coax} = 1.2$	TIA/EIA-222-F-96 Table 3	

Wind Load (without ice) — per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area =	$A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 1.5$	sfft	
Total Coax Wind Force =	$F_{coax} := qz_{coax} \cdot G_H \cdot Ca_{coax} \cdot A_{coax} = 85$	plf	BLC 5,7

Wind Load (with ice) — per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice =	$AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 1.6$	sfft	
Total Coax Wind Force w/ Ice =	$Fi_{coax} := qzICE_{coax} \cdot G_H \cdot Ca_{coax} \cdot AICE_{coax} = 68$	plf	BLC 4,6

Gravity Loads (without ice)

Weight of all cables w/o ice	$WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$	plf	BLC 2

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + Ir \cdot 2)^2 - D_{coax}^2\right]$	sq in	
Ice Weight All Coax per foot =	$WTi_{coax} := Id \cdot \left(N_{coax} \cdot \frac{Ai_{coax}}{144}\right) = 27$	plf	BLC 3

Development of Wind & Ice Load on Brace Member (per TIA/EIA-222-F-1996 Criteria)

Member Data: L3x3x1/4

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 3$ in (User Input)

Thickness = $t_{mem} := 0.25$ in (User Input)

Length = $L_{mem} := 36$ in (User Input)

Cross Sectional Area of Member = $Ac_{mem} := 1.44$ sq in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{H_{mem}}{L_{mem}} = 0.1$

Member Force Coefficient = $Ca_{mem} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

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

Total Member Wind Force = $F_{mem} := qz_{mem1} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 17$ plf **BLC 5,7**

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.3$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{mem1} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 17$ plf **BLC 4,6**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := (H_{mem} + 2 \cdot Ir) \cdot (t_{mem} + 2 \cdot Ir) + (H_{mem} - t_{mem}) \cdot (t_{mem} + 2 \cdot Ir) - Ac_{mem} = 7 \quad \text{sq in}$$

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

Development of Wind & Ice Load on Brace Member (per TIA/EIA-222-F-1996 Criteria)

Member Data: L3x3x1/4

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 3$ in (User Input)

Thickness = $t_{mem} := 0.25$ in (User Input)

Length = $L_{mem} := 36$ in (User Input)

Cross Sectional Area of Member = $Ac_{mem} := 1.44$ sq in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{H_{mem}}{L_{mem}} = 0.1$

Member Force Coefficient = $Ca_{mem} = 1.4$ (per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

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

Total Member Wind Force = $F_{mem} := qz_{mem2} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 16$ plf BLC 5,7

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.3$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qzICE_{mem2} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 16$ plf BLC 4,6

Gravity Load (without ice)

Weight of Member = Self Weight lbs BLC 1

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := (H_{mem} + 2 \cdot Ir) \cdot (t_{mem} + 2 \cdot Ir) + (H_{mem} - t_{mem}) \cdot (t_{mem} + 2 \cdot Ir) - Ac_{mem} = 7 \quad \text{sq in}$$

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

Development of Wind & Ice Load on Brace Member (per TIA/EIA-222-F-1996 Criteria)

Member Data: C12x20.7

Antenna Shape =	Flat		(User Input)
Height =	$H_{mem} := 12$	in	(User Input)
Flange Width =	$b_f := 2.94$	in	(User Input)
Flange Thickness =	$t_f := 0.501$	in	(User Input)
Web Thickness =	$t_w := 0.282$	in	(User Input)
Length =	$L_{mem} := 105$	in	(User Input)
Cross Sectional Area of Member =	$Ac_{mem} := 6.08$	sq in	(User Input)
Member Aspect Ratio =	$Ar_{mem} := \frac{H_{mem}}{L_{mem}} = 0.1$		
Member Force Coefficient =	$Ca_{mem} = 1.4$		(per TIA/EIA-222-F-1996 Table 3)

Wind Load (without ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area =	$A_{mem} := \frac{H_{mem}}{12} = 1$	sf/ft	
Total Member Wind Force =	$F_{mem} := qz_{mem2} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 63$	plf	BLC 5,7

Wind Load (with ice) (per TIA/EIA-222-F-1996 Section 2.3.2)

Member Projected Surface Area w/ Ice =	$A_{ICEmem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 1.1$	sf/ft	
Total Member Wind Force w/ Ice =	$Fi_{mem} := qzICE_{mem2} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 52$	plf	BLC 4,6

Gravity Load (without ice)

Weight of Member =	Self Weight	lbs	BLC 1

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := (b_f + 2 \cdot Ir) \cdot (t_f + 2 \cdot Ir) \cdot 2 + (H_{mem} - t_f - 2 \cdot Ir) \cdot (t_w + 2 \cdot Ir) - Ac_{mem} = 19 \quad \text{sq in}$$

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

CENTEK engineering, INC.	Subject:	Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast
Consulting Engineers		Tabulated Load Cases
63-2 North Branford Road		
Branford, CT 06405	Location:	Manchester, CT
Ph. 203-488-0580 / Fax. 203-488-8587	Date: 3/9/12	Prepared by: T.J.L. Checked by: C.F.C. Job No. 12014.CO4

Load Case	Description
1	Self Weight (Mast)
2	Weight of Appurtenances
3	Weight of Ice Only on PCS Structure
4	(x) TIA/EIA Wind with Ice on PCS Structure
5	(x) TIA/EIA Wind on PCS Structure
6	(z) TIA/EIA Wind with Ice on PCS Structure
7	(z) TIA/EIA Wind on PCS Structure

Footnotes:
(1) PCS Structure includes: Mast and Appurtenances

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Subject: **Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only Load Combinations Table**

Location: **Manchester, CT**

Date: 3/9/12 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12014.CO4

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	(x) TIA/EIA Wind + Ice on PCS Structure		1		1	1	2	1	3	1	4	1		
2	(x) TIA/EIA Wind on PCS Structure		1		1	1	2	1	5	1				
3	(z) TIA/EIA Wind + Ice on PCS Structure		1		1	1	2	1	3	1	6	1		
4	(z) TIA/EIA Wind on PCS Structure		1		1	1	2	1	7	1				

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: Mast and Appurtenances

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Include Warping	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y
Global Member Orientation Plane	XZ

Hot Rolled Steel Code	AISC 9th: ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05/08: ASD
Aluminum Code	AA ADM1-05: ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections	Yes
Bad Framing Warnings	No
Unused Force Warnings	Yes

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ct Exp. X	.75
Ct Exp. Z	.75
Ca	.36
Cv	.54
Nv	1
SD1	1
SDS	1
S1	1
Occupancy Code	4
Seismic Zone	3
Use Group	I
Use Gravity Self Wt in Diaphragm Mass	Yes
Use Deck Self Wt in Diaphragm Mass	Yes
Use Lateral Self Wt in Diaphragm Mass	Yes
Seismic Detailing Code	None
Om X	1
Om Z	1
Rho X	1
Rho Z	1

Hot Rolled Steel Properties

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

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	y sw..	z sw..	Function
1	M1	Mast	47	Segment	Segment										Lateral
2	M2	Brace 2	9	Segment	Segment										Lateral
3	M3	Brace 2	9	Segment	Segment										Lateral
4	M4	Brace 1	9												Lateral
5	M5	Brace 1	9												Lateral
6	M6	Brace 1	6.906												Lateral
7	M7	Brace 1	5.293												Lateral
8	M8	Brace 1	5.276												Lateral
9	M9	Brace 1	6.893												Lateral
10	M10	Brace 1	9	Segment	Segment										Lateral
11	M11	Brace 1	8.421												Lateral
12	M12	Brace 1	9.646												Lateral
13	M13	Brace 1	5.863												Lateral
14	M14	Brace 1	3.497												Lateral
15	M15	Brace 2	9	Segment	Segment										Lateral
16	M16	Brace 2	9	Segment	Segment										Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE 12.0	Beam	Pipe	A53 Gr. B	Typical	13.6	262	262	523
2	Brace 1	L3X3X4	Beam	Pipe	A36 Gr.36	Typical	1.44	1.24	1.24	.032
3	Brace 2	C12X20.7	Beam	Pipe	A36 Gr.36	Typical	6.09	3.88	129	.37

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N3			Mast	Beam	Pipe	A53 Gr. B	Typical
2	M2	N10	N11			Brace 2	Beam	Pipe	A36 Gr.36	Typical
3	M3	N8	N9			Brace 2	Beam	Pipe	A36 Gr.36	Typical
4	M4	N8	N10			Brace 1	Beam	Pipe	A36 Gr.36	Typical
5	M5	N9	N11			Brace 1	Beam	Pipe	A36 Gr.36	Typical
6	M6	N12	N14			Brace 1	Beam	Pipe	A36 Gr.36	Typical
7	M7	N16	N13			Brace 1	Beam	Pipe	A36 Gr.36	Typical
8	M8	N13	N17			Brace 1	Beam	Pipe	A36 Gr.36	Typical
9	M9	N15	N12			Brace 1	Beam	Pipe	A36 Gr.36	Typical
10	M10	N12	N13			Brace 1	Beam	Pipe	A36 Gr.36	Typical
11	M11	N2	N5			Brace 1	Beam	Pipe	A36 Gr.36	Typical
12	M12	N2	N4			Brace 1	Beam	Pipe	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
13	M13	N2	N6			Brace 1	Beam	Pipe	A36 Gr.36	Typical
14	M14	N2	N7			Brace 1	Beam	Pipe	A36 Gr.36	Typical
15	M15	N17	N16			Brace 2	Beam	Pipe	A36 Gr.36	Typical
16	M16	N14	N15			Brace 2	Beam	Pipe	A36 Gr.36	Typical
17	M17	N18	N19			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	28	0	0	
3	N3	0	47	0	0	
4	N4	-7.76	28	5.73	0	
5	N5	-7.76	28	-3.27	0	
6	N6	1.24	28	5.73	0	
7	N7	1.24	28	-3.27	0	
8	N8	-7.76	0	5.73	0	
9	N9	-7.76	0	-3.27	0	
10	N10	1.24	0	5.73	0	
11	N11	1.24	0	-3.27	0	
12	N12	-3.25	0	5.73	0	
13	N13	-3.25	0	-3.27	0	
14	N14	-7.76	0	.5	0	
15	N15	1.24	0	.5	0	
16	N16	-7.76	0	-.5	0	
17	N17	1.24	0	-.5	0	
18	N18	0	0	.5	0	
19	N19	0	0	-.5	0	
20	N20	-3.25	0	.5	0	
21	N21	-3.25	0	-.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N4	Reaction	Reaction	Reaction				
2	N5	Reaction	Reaction	Reaction				
3	N6	Reaction	Reaction	Reaction				
4	N7	Reaction	Reaction	Reaction				
5	N8	Reaction	Reaction	Reaction				
6	N9	Reaction	Reaction	Reaction				
7	N10	Reaction	Reaction	Reaction				
8	N11	Reaction	Reaction	Reaction				

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
No Data to Print ...			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.441	45
2	M1	Y	-.18	45
3	M1	Y	-1.52	45

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.418	45
2	M1	Y	-.088	45
3	M1	Y	-.48	45

Member Point Loads (BLC 4 : (x) TIA/EIA Wind with Ice on P)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	3.068	45
2	M1	X	.624	45
3	M1	X	.878	45

Member Point Loads (BLC 5 : (x) TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	3.68	45
2	M1	X	.707	45
3	M1	X	.856	45

Member Point Loads (BLC 6 : (z) TIA/EIA Wind with Ice on P)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	3.068	45
2	M1	Z	.624	45
3	M1	Z	.878	45

Member Point Loads (BLC 7 : (z) TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	3.68	45
2	M1	Z	.707	45
3	M1	Z	.856	45

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	30
2	M1	Y	-.019	-.019	30	42

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.018	-.018	0	30
3	M1	Y	-.027	-.027	30	42
4	M12	Y	-.003	-.003	0	0
5	M11	Y	-.003	-.003	0	0
6	M14	Y	-.003	-.003	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
7	M13	Y	-.003	-.003	0	0
8	M9	Y	-.003	-.003	0	0
9	M4	Y	-.003	-.003	0	0
10	M10	Y	-.003	-.003	0	0
11	M6	Y	-.003	-.003	0	0
12	M7	Y	-.003	-.003	0	0
13	M5	Y	-.003	-.003	0	0
14	M8	Y	-.003	-.003	0	0
15	M3	Y	-.007	-.007	0	0
16	M16	Y	-.007	-.007	0	0
17	M15	Y	-.007	-.007	0	0
18	M2	Y	-.007	-.007	0	0

Member Distributed Loads (BLC 4 : (x) TIA/EIA Wind with Ice on P)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.024	.024	0	30
2	M1	X	.025	.025	30	0
3	M1	X	.046	.046	0	30
4	M1	X	.068	.068	30	42
5	M11	X	.017	.017	0	0
6	M12	X	.017	.017	0	0
7	M13	X	.017	.017	0	0
8	M14	X	.017	.017	0	0
9	M3	X	.052	.052	0	0

Member Distributed Loads (BLC 5 : (x) TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.029	.029	0	30
2	M1	X	.031	.031	30	0
3	M1	X	.056	.056	0	30
4	M1	X	.085	.085	30	42
5	M11	X	.017	.017	0	0
6	M12	X	.017	.017	0	0
7	M13	X	.017	.017	0	0
8	M14	X	.017	.017	0	0
9	M3	X	.063	.063	0	0

Member Distributed Loads (BLC 6 : (z) TIA/EIA Wind with Ice on P)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.024	.024	0	30
2	M1	Z	.025	.025	30	0
3	M1	Z	.046	.046	0	30
4	M1	Z	.068	.068	30	42
5	M11	Z	.017	.017	0	0
6	M12	Z	.017	.017	0	0
7	M13	Z	.017	.017	0	0
8	M14	Z	.017	.017	0	0
9	M5	Z	.016	.016	0	0

Member Distributed Loads (BLC 7 : (z) TIA/EIA Wind on PCS Struct)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]

Member Distributed Loads (BLC 7 : (z) TIA/EIA Wind on PCS Struct) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.029	0	30
2	M1	Z	.031	.031	30	0
3	M1	Z	.056	.056	0	30
4	M1	Z	.085	.085	30	42
5	M11	Z	.017	.017	0	0
6	M12	Z	.017	.017	0	0
7	M13	Z	.017	.017	0	0
8	M14	Z	.017	.017	0	0
9	M5	Z	.016	.016	0	0

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Gravity	Joint	Point	Distrib...	Area(M...	Surfac...
1	Self Weight (Powermount)	None		-1						
2	Weight of Appurtenances	None					3	2		
3	Weight of Ice Only on PCS Struct	None					3	18		
4	(x) TIA/EIA Wind with Ice on P	None					3	9		
5	(x) TIA/EIA Wind on PCS Struct	None					3	9		
6	(z) TIA/EIA Wind with Ice on P	None					3	9		
7	(z) TIA/EIA Wind on PCS Struct	None					3	9		

Load Combinations

	Description	So...	PDelta	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	(x) TIA/EIA Wind + Ice on PC...	Yes			1	1	2	1	3	1	4	1								
2	(x) TIA/EIA Wind on PCS Str...	Yes			1	1	2	1	5	1										
3	(z) TIA/EIA Wind + Ice on PC...	Yes			1	1	2	1	3	1	6	1								
4	(z) TIA/EIA Wind on PCS Str...	Yes			1	1	2	1	7	1										

Envelope Member Section Forces

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
1	M1	1	max	7.238	3	.032	4	3.283	4	0	1	-.197	2	.885	4
2			min	4.971	4	-3.654	2	.007	2	0	1	-22.256	4	-32.634	2
3		2	max	6.248	3	.032	4	4.282	4	0	1	22.19	4	16.167	2
4			min	4.286	4	-4.653	2	.007	2	0	1	-.399	1	.503	3
5		3	max	5.258	3	.032	4	5.281	4	0	1	78.371	4	76.704	2
6			min	3.602	4	-5.651	2	.007	2	0	1	-.11	1	.139	3
7		4	max	4.075	1	6.181	2	0	1	0	1	55.196	4	55.196	2
8			min	2.813	2	0	3	-6.181	4	0	1	0	1	0	3
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1
11	M2	1	max	-.131	2	1.295	1	.048	4	.002	2	-.016	1	0	3
12			min	-1.267	4	-.614	4	.011	1	-.013	3	-.029	4	0	2
13		2	max	-.131	2	1.233	1	.048	4	.002	2	.08	4	1.433	4
14			min	-1.267	4	-.66	4	.011	1	-.013	3	.009	1	-2.844	1
15		3	max	-.131	2	1.17	1	.048	4	.002	2	.188	4	2.971	4
16			min	-1.267	4	-.707	4	.011	1	-.013	3	.034	1	-5.547	1
17		4	max	2.21	4	-.627	2	.129	4	.032	3	.041	2	-1.463	2
18			min	.004	2	-6.432	3	-.021	2	-.004	2	-.293	4	-14.543	3
19		5	max	2.21	4	-.673	2	.129	4	.032	3	-.004	4	0	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
20			min	.004	2	-6.495	3	-.021	2	-.004	2	-.007	3	0	2
21	M3	1	max	.092	2	1.744	1	.017	4	.013	1	.021	2	0	4
22			min	.069	3	.364	4	-.129	2	.003	4	-.005	4	0	1
23		2	max	.092	2	1.691	2	.017	4	.013	1	.034	4	-.767	4
24			min	.069	3	.318	4	.011	1	.003	4	-.11	2	-3.857	2
25		3	max	.092	2	1.644	2	.154	2	.013	1	.077	2	-1.429	4
26			min	.069	3	.271	4	.015	3	.003	4	.065	3	-7.608	2
27		4	max	.041	1	-.584	4	.068	4	-.01	2	.027	2	-1.368	4
28			min	-.12	4	-2.933	2	-.086	2	-.036	3	-.112	4	-6.652	2
29		5	max	.041	1	-.631	4	.068	4	-.01	2	.042	4	0	2
30			min	-.12	4	-2.98	2	.046	1	-.036	3	-.006	2	0	3
31	M4	1	max	.625	2	.072	1	-.002	4	0	1	.001	4	.01	3
32			min	.257	3	.013	4	-.026	1	0	4	-.021	1	-.01	2
33		2	max	.625	2	.054	1	-.002	4	0	1	.036	1	-.009	4
34			min	.257	3	.002	4	-.026	1	0	4	.011	4	-.145	1
35		3	max	.625	2	.036	1	-.002	4	0	1	.066	1	-.007	4
36			min	.257	3	-.009	4	-.026	1	0	4	.002	4	-.258	1
37		4	max	-.258	3	-.003	4	.027	1	0	3	.039	1	-.021	4
38			min	-.628	2	-.053	1	-.006	4	0	2	-.002	4	-.147	1
39		5	max	-.258	3	-.014	4	.027	1	0	3	-.012	2	-.006	1
40			min	-.628	2	-.07	1	-.006	4	0	2	-.027	3	-.017	4
41	M5	1	max	.991	2	.088	3	-.019	2	0	2	.005	4	.055	4
42			min	-.241	4	.045	2	-.076	3	0	3	-.015	1	.003	2
43		2	max	.991	2	.07	3	-.019	2	0	2	.037	3	-.09	2
44			min	-.241	4	.034	2	-.04	3	0	3	.022	2	-.164	3
45		3	max	.991	2	.055	4	0	4	0	2	.1	3	-.166	2
46			min	-.241	4	.023	2	-.024	1	0	3	.037	2	-.296	3
47		4	max	.242	4	-.031	2	.032	3	0	2	.037	1	-.091	2
48			min	-.995	2	-.07	3	.022	2	0	3	.022	4	-.177	3
49		5	max	.242	4	-.042	2	.068	3	0	2	.007	2	.028	3
50			min	-.995	2	-.087	3	.022	2	0	3	-.017	3	.001	2
51	M6	1	max	-.224	3	.027	3	0	1	0	4	0	1	0	1
52			min	-.876	2	.017	4	0	2	0	1	0	1	0	1
53		2	max	-.224	3	.014	3	0	1	0	4	.025	3	-.015	4
54			min	-.876	2	.008	4	0	2	0	1	.015	2	-.025	3
55		3	max	-.224	3	0	1	0	1	0	4	.033	3	-.021	4
56			min	-.876	2	0	1	0	1	0	1	.021	2	-.033	3
57		4	max	-.224	3	-.008	2	0	1	0	4	.025	3	-.015	4
58			min	-.876	2	-.014	1	0	2	0	1	.015	2	-.025	3
59		5	max	-.224	3	-.017	2	0	1	0	4	0	1	0	1
60			min	-.876	2	-.027	1	0	2	0	1	0	1	0	1
61	M7	1	max	.022	4	.021	1	0	4	0	2	0	1	0	1
62			min	-1.141	2	.013	4	0	2	0	3	0	1	0	1
63		2	max	.022	4	.01	1	0	3	0	2	.015	1	-.009	4
64			min	-1.141	2	.006	4	0	2	0	3	.009	2	-.015	1
65		3	max	.022	4	0	1	0	1	0	2	.02	1	-.012	4
66			min	-1.141	2	0	1	0	1	0	3	.012	2	-.02	1
67		4	max	.022	4	-.006	2	0	3	0	2	.015	1	-.009	4
68			min	-1.141	2	-.01	3	0	2	0	3	.009	2	-.015	1
69		5	max	.022	4	-.013	2	0	3	0	2	0	1	0	1
70			min	-1.141	2	-.021	3	0	2	0	3	0	1	0	1
71	M8	1	max	1.193	2	.021	1	0	1	0	4	0	1	0	1
72			min	-.502	4	.013	4	0	3	0	2	0	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
73		2	max	1.193	2	.01	1	0	1	0	4	.015	1	-.009	2
74			min	-.502	4	.006	4	0	3	0	2	.009	4	-.015	3
75		3	max	1.193	2	0	1	0	1	0	4	.019	1	-.012	2
76			min	-.502	4	0	1	0	1	0	2	.012	4	-.019	3
77		4	max	1.193	2	-.006	2	0	1	0	4	.015	1	-.009	2
78			min	-.502	4	-.01	3	0	3	0	2	.009	4	-.015	3
79		5	max	1.193	2	-.013	2	0	1	0	4	0	1	0	1
80			min	-.502	4	-.021	3	0	3	0	2	0	1	0	1
81	M9	1	max	1.049	2	.027	3	0	4	0	2	0	1	0	1
82			min	.519	3	.017	4	0	1	0	3	0	1	0	1
83		2	max	1.049	2	.014	3	0	4	0	2	.025	3	-.015	4
84			min	.519	3	.008	4	0	1	0	3	.015	4	-.025	3
85		3	max	1.049	2	0	1	0	1	0	2	.033	3	-.021	4
86			min	.519	3	0	1	0	1	0	3	.021	4	-.033	3
87		4	max	1.049	2	-.008	2	0	4	0	2	.025	3	-.015	4
88			min	.519	3	-.014	1	0	1	0	3	.015	4	-.025	3
89		5	max	1.049	2	-.017	2	0	4	0	2	0	1	0	1
90			min	.519	3	-.027	1	0	1	0	3	0	1	0	1
91	M10	1	max	-.09	1	.016	1	.034	4	0	2	0	1	0	1
92			min	-.232	4	-.051	4	-.002	2	0	3	0	1	0	1
93		2	max	-.09	1	.003	2	.034	4	0	2	.012	1	.144	4
94			min	-.232	4	-.062	4	-.002	2	0	3	-.036	4	-.017	2
95		3	max	-.09	1	-.008	2	.034	4	0	2	.005	2	.305	4
96			min	-.232	4	-.076	3	-.002	2	0	3	-.091	4	-.017	2
97		4	max	.259	4	.012	1	.037	4	0	3	.063	4	.013	1
98			min	-.07	2	-.071	4	-.005	1	0	2	.004	1	-.181	4
99		5	max	.259	4	-.006	1	.037	4	0	3	0	1	0	1
100			min	-.07	2	-.082	4	-.005	1	0	2	0	1	0	1
101	M11	1	max	-1.948	3	.033	3	.066	3	0	1	0	1	0	1
102			min	-7.53	2	.021	2	-.028	2	0	1	0	1	0	1
103		2	max	-1.962	3	.017	3	.033	4	0	1	.111	3	.051	4
104			min	-7.563	2	.01	2	-.014	2	0	1	-.008	2	-.068	1
105		3	max	-1.975	3	0	1	0	1	0	1	.148	3	.067	4
106			min	-7.596	2	0	1	0	1	0	1	-.011	2	-.091	1
107		4	max	-1.989	3	-.01	4	.014	1	0	1	.111	3	.051	4
108			min	-7.629	2	-.017	1	-.033	3	0	1	-.008	2	-.068	1
109		5	max	-2.003	3	-.021	4	.028	1	0	1	0	1	0	1
110			min	-7.662	2	-.033	1	-.066	3	0	1	0	1	0	1
111	M12	1	max	.98	4	.038	3	.066	3	0	1	0	1	0	1
112			min	-4.819	2	.024	2	.049	2	0	1	0	1	0	1
113		2	max	1.005	4	.019	3	.033	3	0	1	.133	3	.054	4
114			min	-4.852	2	.012	2	.024	2	0	1	.093	2	.014	1
115		3	max	1.029	4	0	1	0	1	0	1	.177	3	.072	4
116			min	-4.885	2	0	1	0	1	0	1	.123	2	.018	1
117		4	max	1.053	4	-.012	4	-.024	1	0	1	.133	3	.054	4
118			min	-4.918	2	-.019	1	-.033	4	0	1	.093	2	.014	1
119		5	max	1.078	4	-.024	4	-.049	1	0	1	0	1	0	1
120			min	-4.951	2	-.038	1	-.066	4	0	1	0	1	0	1
121	M13	1	max	5.07	4	.023	3	.049	2	0	1	0	1	0	1
122			min	3.359	1	.014	2	-.011	4	0	1	0	1	0	1
123		2	max	5.094	4	.012	3	.024	2	0	1	.056	1	.027	2
124			min	3.365	1	.007	2	-.005	4	0	1	.003	4	-.026	3
125		3	max	5.118	4	0	1	0	1	0	1	.074	1	.036	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[k]	LC	y Shear[k]	LC	z Shear[k]	LC	Torque[k-ft]	LC	y-y Momen...	LC	z-z Momen...	LC
126			min	3.37	1	0	1	0	1	0	1	.004	4	-.035	3
127		4	max	5.143	4	-.007	4	.005	3	0	1	.056	1	.027	2
128			min	3.375	1	-.012	1	-.024	1	0	1	.003	4	-.026	3
129		5	max	5.167	4	-.014	4	.011	3	0	1	0	1	0	1
130			min	3.38	1	-.023	1	-.049	1	0	1	0	1	0	1
131	M14	1	max	4.13	2	.014	3	-.011	4	0	1	0	1	0	1
132			min	-6.762	4	.009	4	-.028	2	0	1	0	1	0	1
133		2	max	4.135	2	.007	3	-.005	4	0	1	.002	3	-.009	4
134			min	-6.776	4	.004	4	-.014	2	0	1	-.009	2	-.019	1
135		3	max	4.141	2	0	1	0	1	0	1	.002	3	-.012	4
136			min	-6.79	4	0	1	0	1	0	1	-.012	2	-.026	1
137		4	max	4.146	2	-.004	2	.014	1	0	1	.002	3	-.009	4
138			min	-6.804	4	-.007	1	.005	3	0	1	-.009	2	-.019	1
139		5	max	4.151	2	-.009	2	.028	1	0	1	0	1	0	1
140			min	-6.818	4	-.014	1	.011	3	0	1	0	1	0	1
141	M15	1	max	-.345	3	23.415	4	.045	2	-.002	2	.812	4	.045	4
142			min	-1.021	2	.576	2	-1.439	4	-.158	4	-.037	2	-.003	1
143		2	max	.91	2	-1.024	4	.253	4	.02	4	-.02	1	-4.555	4
144			min	-1.305	4	-2.149	2	.016	1	0	1	-.255	4	-14.884	2
145		3	max	.973	2	-.443	4	.016	2	.032	4	.04	4	-2.207	4
146			min	-.447	4	-2.173	2	.003	3	.004	2	-.022	2	-9.995	2
147		4	max	.973	2	-.49	4	.016	2	.032	4	.048	4	-1.157	4
148			min	-.447	4	-2.219	2	.003	3	.004	2	.013	1	-5.054	2
149		5	max	.973	2	-.537	4	.016	2	.032	4	.055	4	-.001	4
150			min	-.447	4	-2.266	2	.003	3	.004	2	.047	1	-.013	1
151	M16	1	max	.953	2	2.235	2	.009	3	.029	4	.028	2	-.01	2
152			min	.485	3	.242	4	-.008	2	0	1	-.072	4	-.039	3
153		2	max	.953	2	2.188	2	.009	3	.029	4	.01	2	-.529	4
154			min	.485	3	.195	4	-.008	2	0	1	-.054	4	-4.986	2
155		3	max	.953	2	2.142	2	.009	3	.029	4	-.003	1	-.916	4
156			min	.485	3	.149	4	-.008	2	0	1	-.035	4	-9.857	2
157		4	max	1.408	4	2.059	2	.25	4	.024	4	.255	4	.233	4
158			min	.876	1	-.538	4	.024	1	0	2	.021	1	-14.543	2
159		5	max	.538	4	18.836	4	-.012	2	.002	1	-.016	2	.002	2
160			min	-.711	2	-1.036	1	-1.341	4	-.148	4	-.73	4	-.077	3
161	M17	1	max	-.036	2	2.941	1	1.723	2	22.51	4	.048	2	.172	4
162			min	-1.591	4	-19.421	4	.766	3	14.808	1	-.425	4	0	1
163		2	max	-.036	2	2.941	1	1.723	2	22.51	4	.479	2	5.027	4
164			min	-1.591	4	-19.421	4	.766	3	14.808	1	-.208	4	-.736	1
165		3	max	1.692	4	-2.679	2	.902	4	23.395	4	.909	2	-1.344	2
166			min	-.041	1	-24.392	4	-1.931	2	-16.351	2	.009	3	-12.374	4
167		4	max	1.692	4	-2.679	2	.902	4	23.395	4	.427	2	-.674	2
168			min	-.029	2	-24.392	4	-1.931	2	-16.351	2	.208	3	-6.276	4
169		5	max	1.692	4	-2.679	2	.902	4	23.395	4	.461	4	-.004	2
170			min	-.029	2	-24.392	4	-1.931	2	-16.351	2	-.056	2	-.178	4

Envelope Member Section Stresses

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
1	M1	1	max	.532	3	.005	4	.483	4	9.529	2	.258	4	-.058	2	6.498	4
2			min	.366	4	-.537	2	.001	2	-.258	4	-9.529	2	-6.498	4	.058	2
3		2	max	.459	3	.005	4	.63	4	-.147	3	4.721	2	6.479	4	.117	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
4			min	.315	4	-.684	2	.001	2	-4.721	2	.147	3	-.117	1	-6.479	4
5		3	max	.387	3	.005	4	.777	4	-.041	3	22.396	2	22.883	4	.032	1
6			min	.265	4	-.831	2	.001	2	-22.396	2	.041	3	-.032	1	-22.883	4
7		4	max	.3	1	.909	2	0	1	0	3	16.116	2	16.116	4	0	1
8			min	.207	2	0	3	-.909	4	-16.116	2	0	3	0	1	-16.116	4
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
11	M2	1	max	-.022	2	.383	1	.016	4	0	2	0	3	-.108	1	.062	4
12			min	-.208	4	-.181	4	.004	1	0	3	0	2	-.201	4	.034	1
13		2	max	-.022	2	.364	1	.016	4	1.587	1	.8	4	.553	4	-.02	1
14			min	-.208	4	-.195	4	.004	1	-.8	4	-1.587	1	.064	1	-.172	4
15		3	max	-.022	2	.346	1	.016	4	3.096	1	1.658	4	1.307	4	-.074	1
16			min	-.208	4	-.209	4	.004	1	-1.658	4	-3.096	1	.237	1	-.406	4
17		4	max	.363	4	-.185	2	.044	4	8.117	3	-.817	2	.287	2	.633	4
18			min	0	2	-1.901	3	-.007	2	.817	2	-8.117	3	-2.036	4	-.089	2
19		5	max	.363	4	-.199	2	.044	4	0	2	0	3	-.029	4	.016	3
20			min	0	2	-1.919	3	-.007	2	0	3	0	2	-.052	3	.009	4
21	M3	1	max	.015	2	.515	1	.006	4	0	1	0	4	.148	2	.011	4
22			min	.011	3	.108	4	-.044	2	0	4	0	1	-.037	4	-.046	2
23		2	max	.015	2	.5	2	.006	4	2.153	2	-.428	4	.235	4	.238	2
24			min	.011	3	.094	4	.004	1	.428	4	-2.153	2	-.765	2	-.073	4
25		3	max	.015	2	.486	2	.052	2	4.247	2	-.797	4	.536	2	-.14	3
26			min	.011	3	.08	4	.005	3	.797	4	-4.247	2	.449	3	-.167	2
27		4	max	.007	1	-.173	4	.023	4	3.713	2	-.763	4	.188	2	.241	4
28			min	-.02	4	-.867	2	-.029	2	.763	4	-3.713	2	-.774	4	-.059	2
29		5	max	.007	1	-.186	4	.023	4	0	3	0	2	.294	4	.013	2
30			min	-.02	4	-.881	2	.016	1	0	2	0	3	-.042	2	-.091	4
31	M4	1	max	.434	2	.114	1	-.003	4	.126	2	.126	3	.036	4	.605	1
32			min	.179	3	.021	4	-.042	1	-.126	3	-.126	2	-.518	1	-.042	4
33		2	max	.434	2	.086	1	-.003	4	1.785	1	-.117	4	.881	1	-.303	4
34			min	.179	3	.004	4	-.042	1	.117	4	-1.785	1	.259	4	-1.031	1
35		3	max	.434	2	.058	1	-.003	4	3.185	1	-.091	4	1.595	1	-.066	4
36			min	.179	3	-.014	4	-.042	1	.091	4	-3.185	1	.057	4	-1.866	1
37		4	max	-.179	3	-.004	4	.043	1	1.81	1	-.258	4	.947	1	.058	4
38			min	-.436	2	-.084	1	-.009	4	.258	4	-1.81	1	-.05	4	-1.108	1
39		5	max	-.179	3	-.022	4	.043	1	.21	4	-.076	1	-.281	2	.759	3
40			min	-.436	2	-.113	1	-.009	4	.076	1	-.21	4	-.649	3	.328	2
41	M5	1	max	.688	2	.141	3	-.03	2	-.037	2	.675	4	.126	4	.419	1
42			min	-.167	4	.072	2	-.121	3	-.675	4	.037	2	-.358	1	-.148	4
43		2	max	.688	2	.113	3	-.03	2	2.022	3	-1.112	2	.893	3	-.614	2
44			min	-.167	4	.055	2	-.063	3	1.112	2	-2.022	3	.525	2	-1.045	3
45		3	max	.688	2	.088	4	-.001	4	3.652	3	-2.045	2	2.433	3	-1.058	2
46			min	-.167	4	.037	2	-.038	1	2.045	2	-3.652	3	.905	2	-2.846	3
47		4	max	.168	4	-.05	2	.052	3	2.189	3	-1.126	2	.903	1	-.614	4
48			min	-.691	2	-.111	3	.035	2	1.126	2	-2.189	3	.525	4	-1.057	1
49		5	max	.168	4	-.067	2	.109	3	-.015	2	.343	3	.18	2	.488	3
50			min	-.691	2	-.14	3	.035	2	-.343	3	.015	2	-.417	3	-.211	2
51	M6	1	max	-.155	3	.044	3	0	1	0	1	0	1	0	1	0	1
52			min	-.608	2	.027	4	0	1	0	1	0	1	0	1	0	1
53		2	max	-.155	3	.022	3	0	1	.308	3	-.191	4	.605	3	-.439	2
54			min	-.608	2	.014	4	0	1	.191	4	-.308	3	.375	2	-.708	3
55		3	max	-.155	3	0	1	0	1	.411	3	-.255	4	.806	3	-.585	2
56			min	-.608	2	0	1	0	1	.255	4	-.411	3	.5	2	-.943	3

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
57		4	max	-.155	3	-.014	2	0	1	.308	3	-.191	4	.605	3	-.439	2
58			min	-.608	2	-.022	1	0	1	.191	4	-.308	3	.375	2	-.708	3
59		5	max	-.155	3	-.027	2	0	1	0	1	0	1	0	1	0	1
60			min	-.608	2	-.044	1	0	1	0	1	0	1	0	1	0	1
61	M7	1	max	.015	4	.033	1	0	1	0	1	0	1	0	1	0	1
62			min	-.793	2	.021	4	0	1	0	1	0	1	0	1	0	1
63		2	max	.015	4	.017	1	0	1	.181	1	-.112	4	.355	1	-.258	2
64			min	-.793	2	.01	4	0	1	.112	4	-.181	1	.22	2	-.416	1
65		3	max	.015	4	0	1	0	1	.242	1	-.15	4	.474	1	-.344	2
66			min	-.793	2	0	1	0	1	.15	4	-.242	1	.294	2	-.554	1
67		4	max	.015	4	-.01	2	0	1	.181	1	-.112	4	.355	1	-.258	2
68			min	-.793	2	-.017	3	0	1	.112	4	-.181	1	.22	2	-.416	1
69		5	max	.015	4	-.021	2	0	1	0	1	0	1	0	1	0	1
70			min	-.793	2	-.033	3	0	1	0	1	0	1	0	1	0	1
71	M8	1	max	.829	2	.033	1	0	1	0	1	0	1	0	1	0	1
72			min	-.349	4	.021	4	0	1	0	1	0	1	0	1	0	1
73		2	max	.829	2	.017	1	0	1	.18	3	-.112	2	.353	1	-.256	4
74			min	-.349	4	.01	4	0	1	.112	2	-.18	3	.219	4	-.413	1
75		3	max	.829	2	0	1	0	1	.24	3	-.149	2	.471	1	-.341	4
76			min	-.349	4	0	1	0	1	.149	2	-.24	3	.292	4	-.551	1
77		4	max	.829	2	-.01	2	0	1	.18	3	-.112	2	.353	1	-.256	4
78			min	-.349	4	-.017	3	0	1	.112	2	-.18	3	.219	4	-.413	1
79		5	max	.829	2	-.021	2	0	1	0	1	0	1	0	1	0	1
80			min	-.349	4	-.033	1	0	1	0	1	0	1	0	1	0	1
81	M9	1	max	.728	2	.044	3	0	1	0	1	0	1	0	1	0	1
82			min	.36	3	.027	4	0	1	0	1	0	1	0	1	0	1
83		2	max	.728	2	.022	3	0	1	.307	3	-.191	4	.603	3	-.437	4
84			min	.36	3	.014	4	0	1	.191	4	-.307	3	.374	4	-.705	3
85		3	max	.728	2	0	1	0	1	.41	3	-.254	4	.803	3	-.583	4
86			min	.36	3	0	1	0	1	.254	4	-.41	3	.498	4	-.94	3
87		4	max	.728	2	-.014	2	0	1	.307	3	-.191	4	.603	3	-.437	4
88			min	.36	3	-.022	1	0	1	.191	4	-.307	3	.374	4	-.705	3
89		5	max	.728	2	-.027	2	0	1	0	1	0	1	0	1	0	1
90			min	.36	3	-.044	1	0	1	0	1	0	1	0	1	0	1
91	M10	1	max	-.062	1	.026	1	.054	4	0	1	0	1	0	1	0	1
92			min	-.161	4	-.082	4	-.003	2	0	1	0	1	0	1	0	1
93		2	max	-.062	1	.006	2	.054	4	.214	2	1.773	4	.302	1	1.034	4
94			min	-.161	4	-.099	4	-.003	2	-1.773	4	-.214	2	-.884	4	-.353	1
95		3	max	-.062	1	-.012	2	.054	4	.212	2	3.762	4	.122	2	2.564	4
96			min	-.161	4	-.122	3	-.003	2	-3.762	4	-.212	2	-2.192	4	-.142	2
97		4	max	.18	4	.018	1	.06	4	2.237	4	.157	1	1.517	4	-.12	1
98			min	-.048	2	-.114	4	-.009	1	-.157	1	-2.237	4	.103	1	-1.775	4
99		5	max	.18	4	-.01	1	.06	4	0	1	0	1	0	1	0	1
100			min	-.048	2	-.131	4	-.009	1	0	1	0	1	0	1	0	1
101	M11	1	max	-1.353	3	.053	3	.106	3	0	1	0	1	0	1	0	1
102			min	-5.229	2	.033	2	-.044	2	0	1	0	1	0	1	0	1
103		2	max	-1.362	3	.027	3	.053	4	.842	1	.625	4	2.682	3	.227	2
104			min	-5.252	2	.017	2	-.022	2	-.625	4	-.842	1	-.194	2	-3.138	3
105		3	max	-1.372	3	0	1	0	1	1.122	1	.833	4	3.577	3	.302	2
106			min	-5.275	2	0	1	0	1	-.833	4	-1.122	1	-.258	2	-4.184	3
107		4	max	-1.381	3	-.017	4	.022	1	.842	1	.625	4	2.682	3	.227	2
108			min	-5.298	2	-.027	1	-.053	3	-.625	4	-.842	1	-.194	2	-3.138	3
109		5	max	-1.391	3	-.033	4	.044	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
110			min	-5.321	2	-.053	1	-.106	3	0	1	0	1	0	1	0	1
111	M12	1	max	.681	4	.061	3	.106	3	0	1	0	1	0	1	0	1
112			min	-3.347	2	.038	2	.078	2	0	1	0	1	0	1	0	1
113		2	max	.698	4	.03	3	.053	3	-.167	1	.669	4	3.223	3	-2.621	2
114			min	-3.37	2	.019	2	.039	2	-.669	4	.167	1	2.24	2	-3.77	3
115		3	max	.715	4	0	1	0	1	-.223	1	.891	4	4.297	3	-3.494	2
116			min	-3.392	2	0	1	0	1	-.891	4	.223	1	2.987	2	-5.027	3
117		4	max	.731	4	-.019	4	-.039	1	-.167	1	.669	4	3.223	3	-2.621	2
118			min	-3.415	2	-.03	1	-.053	4	-.669	4	.167	1	2.24	2	-3.77	3
119		5	max	.748	4	-.038	4	-.078	1	0	1	0	1	0	1	0	1
120			min	-3.438	2	-.061	1	-.106	4	0	1	0	1	0	1	0	1
121	M13	1	max	3.521	4	.037	3	.078	2	0	1	0	1	0	1	0	1
122			min	2.333	1	.023	2	-.017	4	0	1	0	1	0	1	0	1
123		2	max	3.537	4	.019	3	.039	2	.323	3	.33	2	1.353	1	-.084	4
124			min	2.336	1	.011	2	-.008	4	-.33	2	-.323	3	.072	4	-1.582	1
125		3	max	3.554	4	0	1	0	1	.431	3	.44	2	1.803	1	-.112	4
126			min	2.34	1	0	1	0	1	-.44	2	-.431	3	.096	4	-2.11	1
127		4	max	3.571	4	-.011	4	.008	3	.323	3	.33	2	1.353	1	-.084	4
128			min	2.344	1	-.019	1	-.039	1	-.33	2	-.323	3	.072	4	-1.582	1
129		5	max	3.588	4	-.023	4	.017	3	0	1	0	1	0	1	0	1
130			min	2.347	1	-.037	1	-.078	1	0	1	0	1	0	1	0	1
131	M14	1	max	2.868	2	.022	3	-.017	4	0	1	0	1	0	1	0	1
132			min	-4.696	4	.014	4	-.044	2	0	1	0	1	0	1	0	1
133		2	max	2.872	2	.011	3	-.008	4	.238	1	-.109	4	.037	3	.253	2
134			min	-4.706	4	.007	4	-.022	2	.109	4	-.238	1	-.216	2	-.043	3
135		3	max	2.876	2	0	1	0	1	.318	1	-.146	4	.049	3	.337	2
136			min	-4.715	4	0	1	0	1	.146	4	-.318	1	-.288	2	-.057	3
137		4	max	2.879	2	-.007	2	.022	1	.238	1	-.109	4	.037	3	.253	2
138			min	-4.725	4	-.011	1	.008	3	.109	4	-.238	1	-.216	2	-.043	3
139		5	max	2.883	2	-.014	2	.044	1	0	1	0	1	0	1	0	1
140			min	-4.735	4	-.022	1	.017	3	0	1	0	1	0	1	0	1
141	M15	1	max	-.057	3	6.919	4	.015	2	.002	1	.025	4	5.639	4	.08	2
142			min	-.168	2	.17	2	-.488	4	-.025	4	-.002	1	-.259	2	-1.754	4
143		2	max	.149	2	-.303	4	.086	4	8.307	2	-2.542	4	-.138	1	.552	4
144			min	-.214	4	-.635	2	.005	1	2.542	4	-8.307	2	-1.773	4	.043	1
145		3	max	.16	2	-.131	4	.006	2	5.579	2	-1.232	4	.277	4	.048	2
146			min	-.073	4	-.642	2	.001	3	1.232	4	-5.579	2	-.154	2	-.086	4
147		4	max	.16	2	-.145	4	.006	2	2.821	2	-.646	4	.33	4	-.028	1
148			min	-.073	4	-.656	2	.001	3	.646	4	-2.821	2	.091	1	-.103	4
149		5	max	.16	2	-.159	4	.006	2	.007	1	0	4	.382	4	-.1	1
150			min	-.073	4	-.67	2	.001	3	0	4	-.007	1	.323	1	-.119	4
151	M16	1	max	.156	2	.66	2	.003	3	.022	3	-.005	2	.197	2	.156	4
152			min	.08	3	.072	4	-.003	2	.005	2	-.022	3	-.502	4	-.061	2
153		2	max	.156	2	.647	2	.003	3	2.783	2	-.295	4	.071	2	.116	4
154			min	.08	3	.058	4	-.003	2	.295	4	-2.783	2	-.372	4	-.022	2
155		3	max	.156	2	.633	2	.003	3	5.501	2	-.511	4	-.019	1	.075	4
156			min	.08	3	.044	4	-.003	2	.511	4	-5.501	2	-.242	4	.006	1
157		4	max	.231	4	.609	2	.085	4	8.117	2	.13	4	1.772	4	-.044	1
158			min	.144	1	-.159	4	.008	1	-.13	4	-8.117	2	.143	1	-.551	4
159		5	max	.088	4	5.566	4	-.004	2	.043	3	.001	2	-.113	2	1.576	4
160			min	-.117	2	-.306	1	-.455	4	-.001	2	-.043	3	-5.066	4	.035	2
161	M17	1	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
162			min	0	4	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Member Section Stresses (Continued)

	Member	Sec		Axial[ksi]	LC	y Shear[...	LC	z Shear[...	LC	y-Top[ksi]	LC	y-Bot[ksi]	LC	z-Top[ksi]	LC	z-Bot[ksi]	LC
163		2	max	0	2	0	1	0	1	0	1	0	1	0	1	0	1
164			min	0	4	0	1	0	1	0	1	0	1	0	1	0	1
165		3	max	0	4	0	1	0	1	0	1	0	1	0	1	0	1
166			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
167		4	max	0	4	0	1	0	1	0	1	0	1	0	1	0	1
168			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1
169		5	max	0	4	0	1	0	1	0	1	0	1	0	1	0	1
170			min	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N4	max	.828	4	.038	1	2.902	2	0	1	0	1	0	1
2		min	-4.012	2	.024	2	-.693	4	0	1	0	1	0	1
3	N5	max	-1.82	3	.033	3	-.839	3	0	1	0	1	0	1
4		min	-7.072	2	.021	2	-2.95	2	0	1	0	1	0	1
5	N6	max	-.763	1	.023	1	-3.294	1	0	1	0	1	0	1
6		min	-1.083	4	.014	4	-5.052	4	0	1	0	1	0	1
7	N7	max	2.407	4	.014	1	3.872	2	0	1	0	1	0	1
8		min	-1.498	2	.009	2	-6.379	4	0	1	0	1	0	1
9	N8	max	.496	2	1.816	1	-.084	3	0	1	0	1	0	1
10		min	.272	3	.377	4	-.107	2	0	1	0	1	0	1
11	N9	max	.934	2	3.027	1	.017	1	0	1	0	1	0	1
12		min	-.309	4	.708	4	-.193	4	0	1	0	1	0	1
13	N10	max	.641	2	1.365	1	1.273	4	0	1	0	1	0	1
14		min	.301	3	-.6	4	.105	1	0	1	0	1	0	1
15	N11	max	1.016	2	6.582	3	2.146	4	0	1	0	1	0	1
16		min	-.371	4	.715	2	-.017	2	0	1	0	1	0	1
17	Totals:	max	0	4	8.751	3	0	2						
18		min	-10.373	2	6.036	2	-9.95	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	3	-.017	4	0	2	1.303e-4	1	-3.289e-5	1	1.736e-3	2
2		min	-.004	2	-.047	1	-.01	4	-3.59e-3	4	-2.719e-4	4	1.459e-4	3
3	N2	max	.019	2	-.02	4	.008	4	1.489e-2	4	-3.289e-5	1	-8.417e-5	3
4		min	.002	3	-.052	1	.002	1	-5.214e-5	1	-2.719e-4	4	-1.399e-2	2
5	N3	max	5.773	2	-.022	4	5.968	4	3.065e-2	4	-3.289e-5	1	-8.417e-5	3
6		min	.021	3	-.054	1	-.01	1	-5.214e-5	1	-2.719e-4	4	-2.975e-2	2
7	N4	max	0	2	0	2	0	4	7.785e-3	4	-3.121e-3	2	-7.189e-3	1
8		min	0	4	0	1	0	2	3.578e-3	1	-4.304e-3	3	-9.704e-3	4
9	N5	max	0	2	0	2	0	2	1.354e-2	4	6.167e-4	2	3.117e-3	4
10		min	0	3	0	3	0	3	-4.814e-3	2	-3.186e-3	3	-2.883e-3	1
11	N6	max	0	4	0	4	0	4	2.237e-4	4	2.545e-5	4	3.086e-3	4
12		min	0	1	0	1	0	1	-4.142e-3	2	-1.324e-3	1	-1.309e-2	2
13	N7	max	0	2	0	2	0	4	5.394e-3	2	5.859e-4	2	-3.989e-3	3
14		min	0	4	0	1	0	2	2.369e-3	4	1.241e-4	3	-1.194e-2	2
15	N8	max	0	3	0	4	0	2	-1.484e-4	4	1.097e-4	4	-2.437e-4	4
16		min	0	2	0	1	0	3	-7.582e-4	2	-1.473e-4	2	-2.128e-3	1
17	N9	max	0	4	0	4	0	4	9.014e-4	2	5.494e-5	4	-1.335e-3	2
18		min	0	2	0	1	0	1	1.78e-4	4	-6.274e-5	2	-2.475e-3	3

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
19	N10	max	0	3	0	4	0	1	-2.9e-5	4	2.181e-4	4	2.194e-3	1
20		min	0	2	0	1	0	4	-5.643e-4	1	6.847e-5	1	3.937e-5	4
21	N11	max	0	4	0	2	0	2	1.078e-3	3	2.475e-4	4	2.347e-3	3
22		min	0	2	0	3	0	4	1.939e-4	2	-1.304e-4	2	1.539e-3	2
23	N12	max	0	3	-.006	4	0	2	-4.951e-5	4	1.755e-5	2	5.192e-5	4
24		min	0	2	-.08	1	0	4	-8.054e-4	1	-8.14e-5	4	-1.867e-5	2
25	N13	max	0	4	-.051	2	0	2	9.43e-4	1	4.755e-5	2	3.916e-5	3
26		min	-.001	2	-.093	3	0	4	4.043e-4	4	-7.348e-5	4	-4.527e-5	2
27	N14	max	-.001	3	-.006	4	0	2	1.376e-4	1	5.144e-5	2	4.832e-5	4
28		min	-.004	2	-.032	2	0	3	2.428e-5	4	-1.59e-4	4	-9.296e-4	1
29	N15	max	-.002	3	-.007	2	0	2	9.198e-5	1	-1.962e-5	2	1.743e-3	2
30		min	-.004	2	-.025	3	0	4	-3.71e-4	4	-4.331e-4	4	-4.062e-4	4
31	N16	max	0	4	-.006	4	0	4	4.642e-4	2	-6.616e-5	1	-5.398e-4	4
32		min	-.003	2	-.028	2	0	1	8.759e-5	4	-1.307e-4	4	-9.629e-4	1
33	N17	max	.001	4	-.006	2	0	2	3.395e-4	1	-4.598e-5	1	1.752e-3	2
34		min	-.004	2	-.032	3	0	4	-1.516e-4	4	-3.984e-4	4	8.011e-4	3
35	N18	max	-.002	3	.005	4	0	2	1.303e-4	1	-3.289e-5	1	1.736e-3	2
36		min	-.004	2	-.048	1	-.01	4	-3.59e-3	4	-2.719e-4	4	1.459e-4	3
37	N19	max	.001	4	-.032	2	0	2	1.303e-4	1	-3.289e-5	1	1.736e-3	2
38		min	-.004	2	-.051	3	-.01	4	-3.59e-3	4	-2.719e-4	4	1.459e-4	3
39	N20	max	-.002	3	-.002	4	0	2	2.068e-4	1	1.503e-4	4	1.373e-4	4
40		min	-.004	2	-.071	1	0	4	-2.245e-3	4	-8.582e-6	1	-8.417e-5	1
41	N21	max	0	4	-.032	4	0	2	1.53e-4	2	1.435e-4	4	4.06e-5	2
42		min	-.003	2	-.068	1	0	4	-2.475e-3	4	9.189e-6	1	-4.41e-4	3

Envelope AISC ASD Steel Code Checks

	Mem...	Shape	Code Check	Loc[ft]	LC	She...	Loc[ft]	...	...	Fa [...	Ft [ksi]	Fb y-y [ksi]	Fb ...	...	C...	C...	AS...
1	M1	PIPE_12.0	.983	27.906	4	.055	28.396		2	20....	27.93	30.723	30....	...	.85	.6..	H1-2
2	M2	C12X20.7	.417	6.188	3	.321	5.25	y	4	27....	28.728	35.91	28....	...	.2..	.85	H1-2
3	M3	C12X20.7	.207	5.156	2	.052	6.281	y	1	20....	28.728	35.91	28....	...	.85	.85	H1-2
4	M4	L3X3X4	.073	0	2	.007	9	y	1	5.968	28.728	- Code check based o...					H1-1
5	M5	L3X3X4	.115	0	2	.008	9	y	3	5.968	28.728	- Code check based o...					H1-1
6	M6	L3X3X4	.021	0	2	.002	6.906	y	1	10....	28.728	- Code check based o...					H2-1
7	M7	L3X3X4	.028	0	2	.002	0	y	1	16....	28.728	- Code check based o...					H2-1
8	M8	L3X3X4	.052	0	2	.003	0	y	1	16....	28.728	- Code check based o...					H1-1
9	M9	L3X3X4	.072	0	2	.003	0	y	1	10....	28.728	- Code check based o...					H1-1
10	M10	L3X3X4	.008	6.281	4	.074	5.344	z	4	23....	28.728	- Code check based o...					H1-1
11	M11	L3X3X4	.185	8.421	2	.006	0	z	3	6.817	28.728	- Code check based o...					H2-1
12	M12	L3X3X4	.144	9.646	4	.006	9.646	z	4	5.195	28.728	- Code check based o...					H1-1
13	M13	L3X3X4	.258	5.863	4	.004	0	z	2	13....	28.728	- Code check based o...					H1-1
14	M14	L3X3X4	.165	3.497	4	.002	0	z	2	21....	28.728	- Code check based o...					H2-1
15	M15	C12X20.7	.812	1.219	4	.415	1.219	y	4	27....	28.728	35.91	28....	...	.2..	.85	H2-1
16	M16	C12X20.7	.952	7.781	4	.342	7.781	y	4	27....	28.728	35.91	18....	1	.2..	.85	H1-2

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N4	-3.452	.038	2.488	0	0	0
2	1	N5	-6.08	.033	-2.532	0	0	0
3	1	N6	-.763	.023	-3.294	0	0	0
4	1	N7	-1.286	.014	3.312	0	0	0
5	1	N8	.449	1.816	-.101	0	0	0
6	1	N9	.825	3.027	.017	0	0	0
7	1	N10	.568	1.365	.105	0	0	0
8	1	N11	.893	2.434	.004	0	0	0
9	1	Totals:	-8.845	8.751	0			
10	1	COG (ft):	X: -.581	Y: 27.439	Z: .143			

Joint Reactions

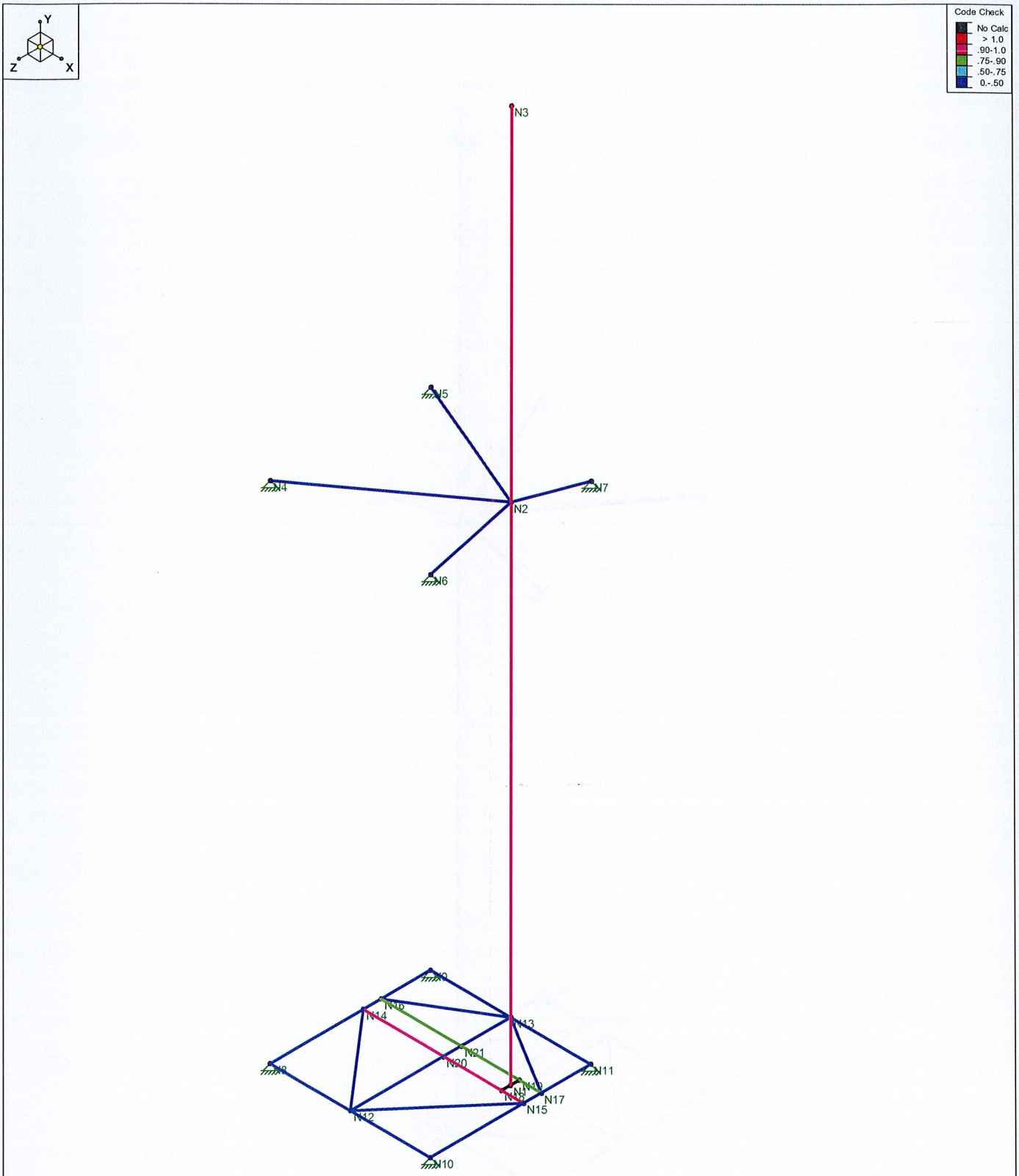
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N4	-4.012	.024	2.902	0	0	0
2	2	N5	-7.072	.021	-2.95	0	0	0
3	2	N6	-.879	.014	-3.831	0	0	0
4	2	N7	-1.498	.009	3.872	0	0	0
5	2	N8	.496	1.785	-.107	0	0	0
6	2	N9	.934	3.025	.016	0	0	0
7	2	N10	.641	.444	.116	0	0	0
8	2	N11	1.016	.715	-.017	0	0	0
9	2	Totals:	-10.373	6.036	0			
10	2	COG (ft):	X: -.591	Y: 27.307	Z: .142			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N4	.712	.038	-.608	0	0	0
2	3	N5	-1.82	.033	-.839	0	0	0
3	3	N6	-.93	.023	-4.347	0	0	0
4	3	N7	2.069	.014	-5.486	0	0	0
5	3	N8	.272	.592	-.084	0	0	0
6	3	N9	-.277	1.011	-.173	0	0	0
7	3	N10	.301	.457	1.119	0	0	0
8	3	N11	-.328	6.582	1.896	0	0	0
9	3	Totals:	0	8.751	-8.521			
10	3	COG (ft):	X: -.581	Y: 27.439	Z: .143			

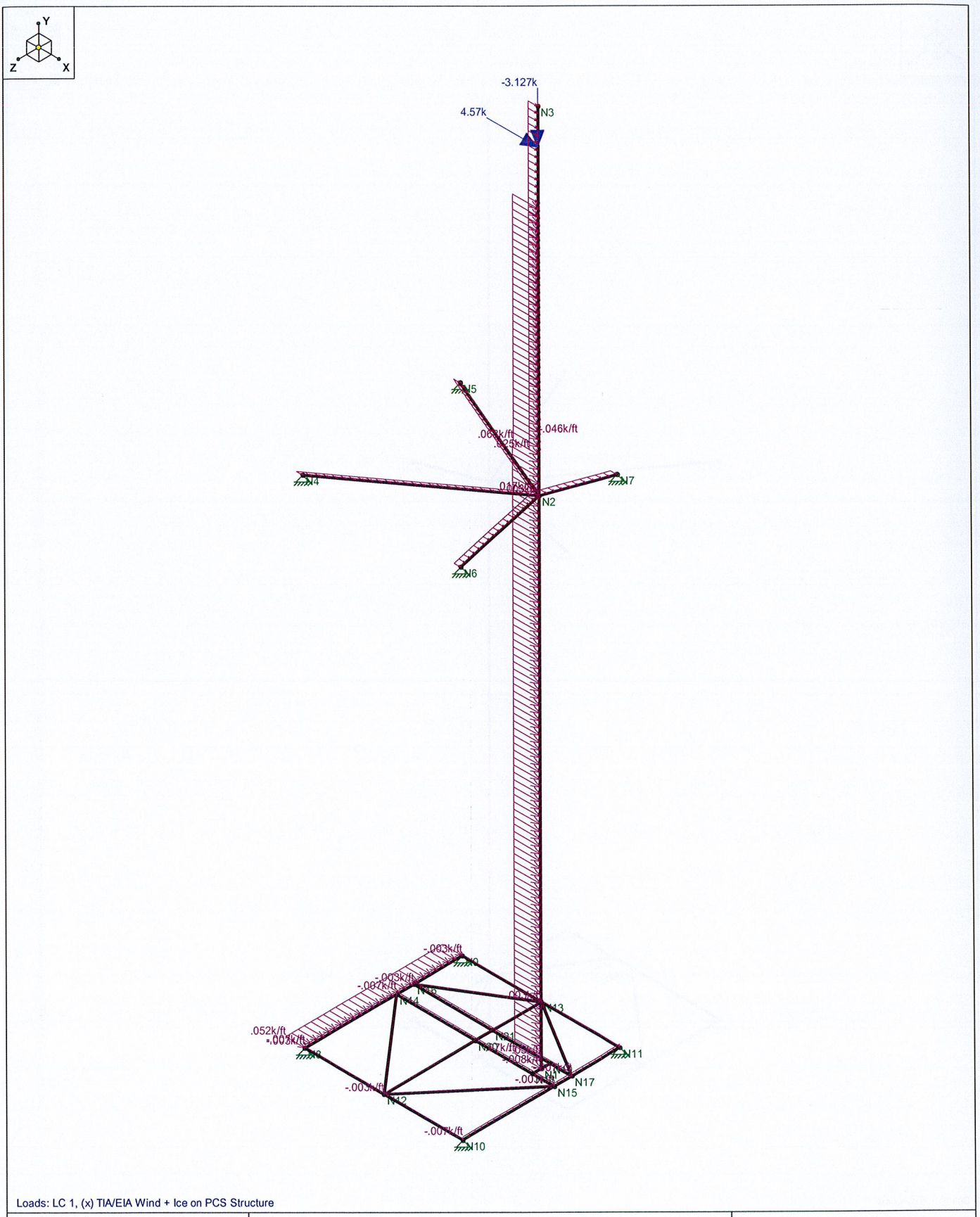
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N4	.828	.024	-.693	0	0	0
2	4	N5	-2.121	.021	-.965	0	0	0
3	4	N6	-1.083	.014	-5.052	0	0	0
4	4	N7	2.407	.009	-6.379	0	0	0
5	4	N8	.308	.377	-.087	0	0	0
6	4	N9	-.309	.708	-.193	0	0	0
7	4	N10	.34	-.6	1.273	0	0	0
8	4	N11	-.371	5.484	2.146	0	0	0
9	4	Totals:	0	6.036	-9.95			
10	4	COG (ft):	X: -.591	Y: 27.307	Z: .142			



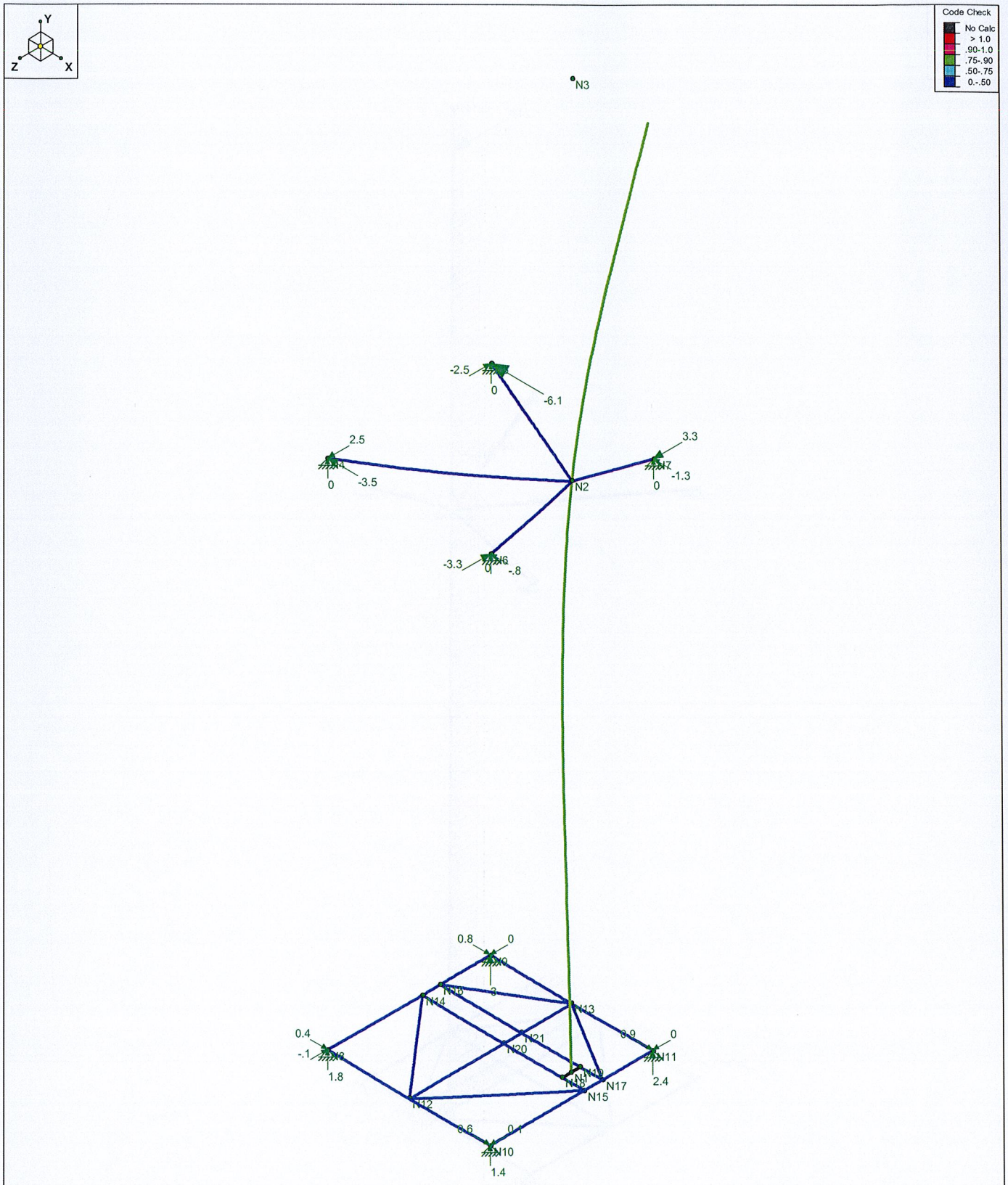
Solution: Envelope

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:29 AM
12014.CO4 - CT1209	Unity Check	EIA-TIA Mast Analysis.r3d



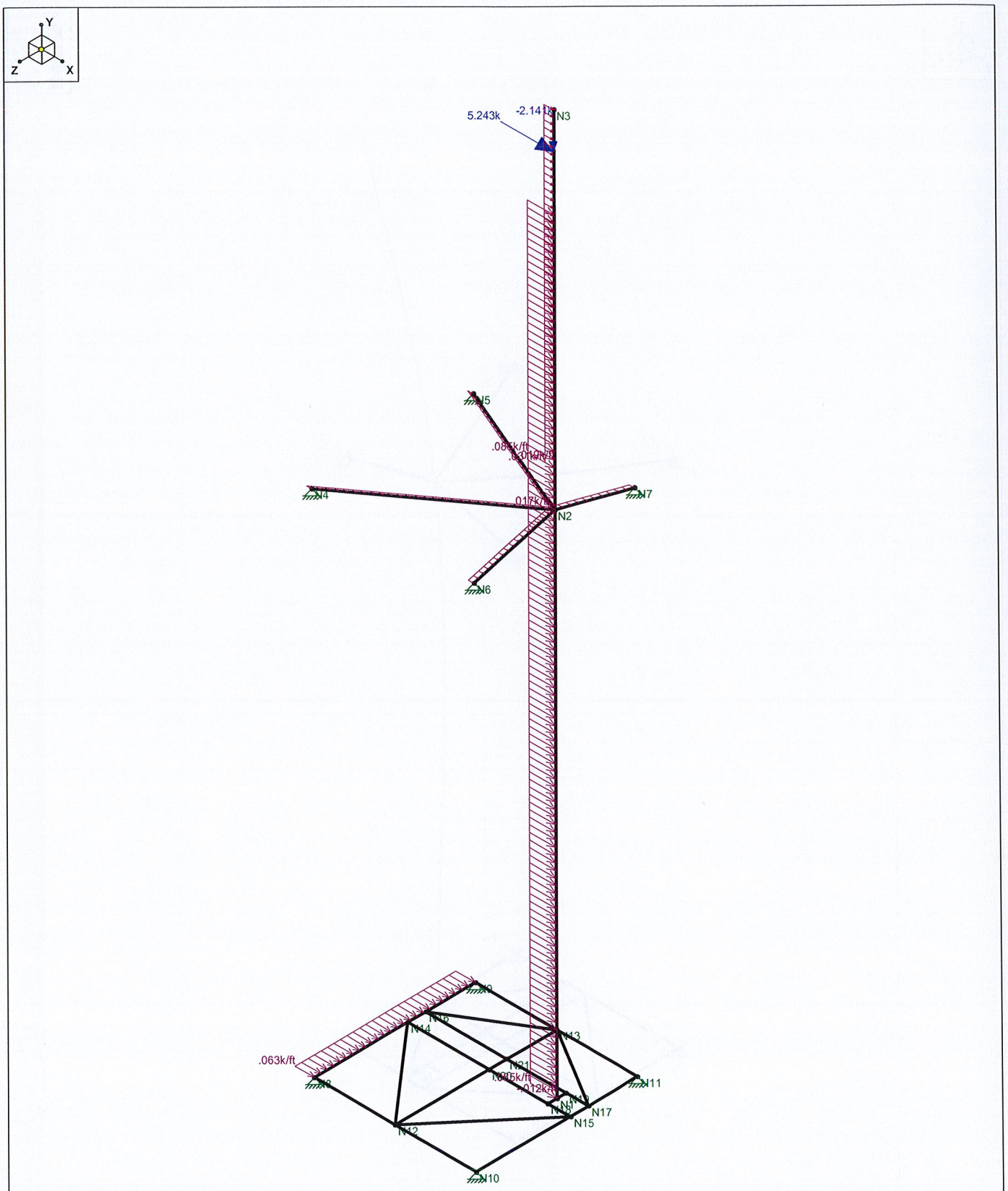
Loads: LC 1, (x) TIA/EIA Wind + Ice on PCS Structure

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:30 AM
12014.CO4 - CT1209	LC # 1 Loads	EIA-TIA Mast Analysis.r3d



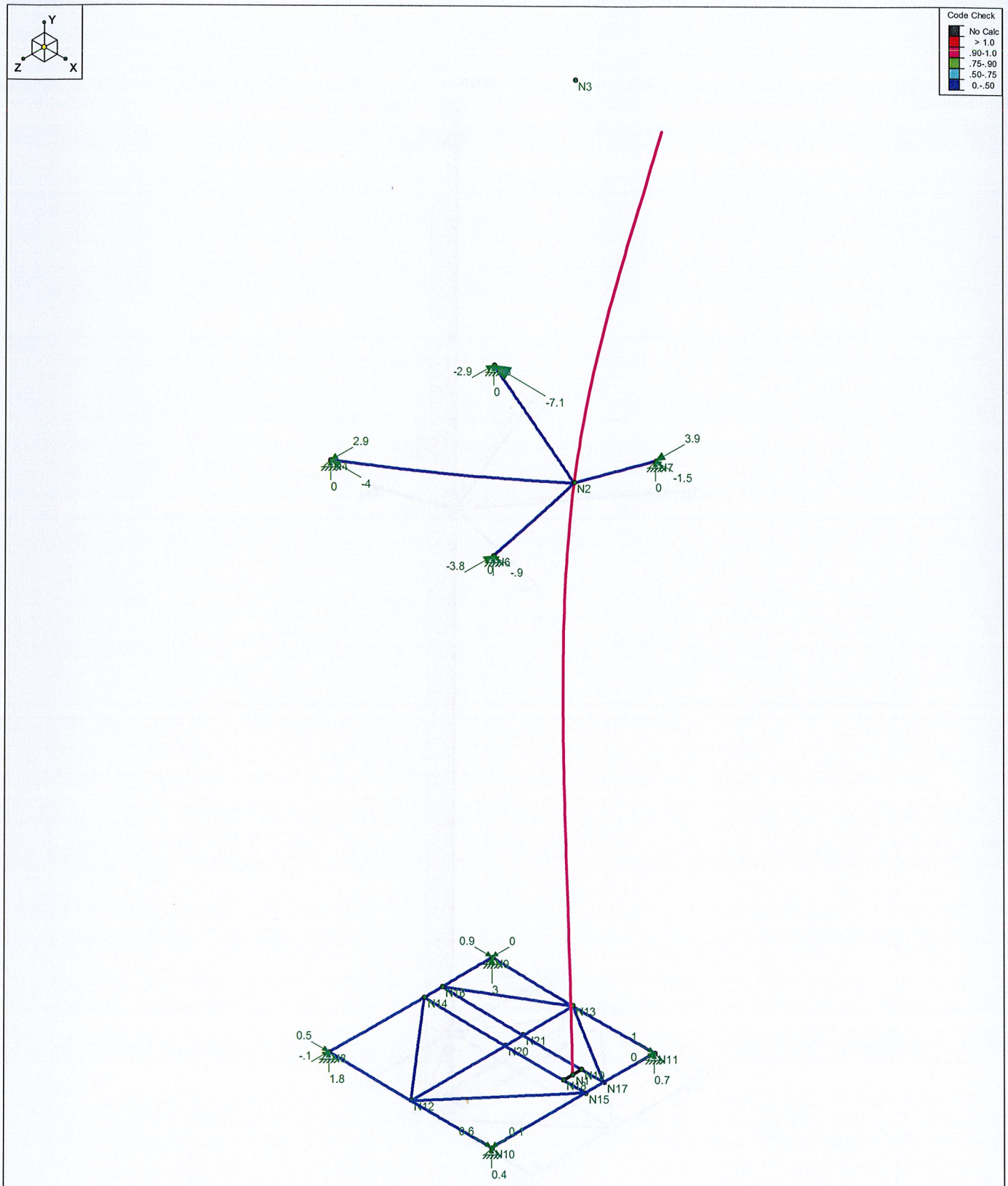
Results for LC 1, (x) TIA/EIA Wind + Ice on PCS Structure
Z-moment Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:32 AM
12014.CO4 - CT1209	LC # 1 Reactions and Deflected Shape	EIA-TIA Mast Analysis.r3d



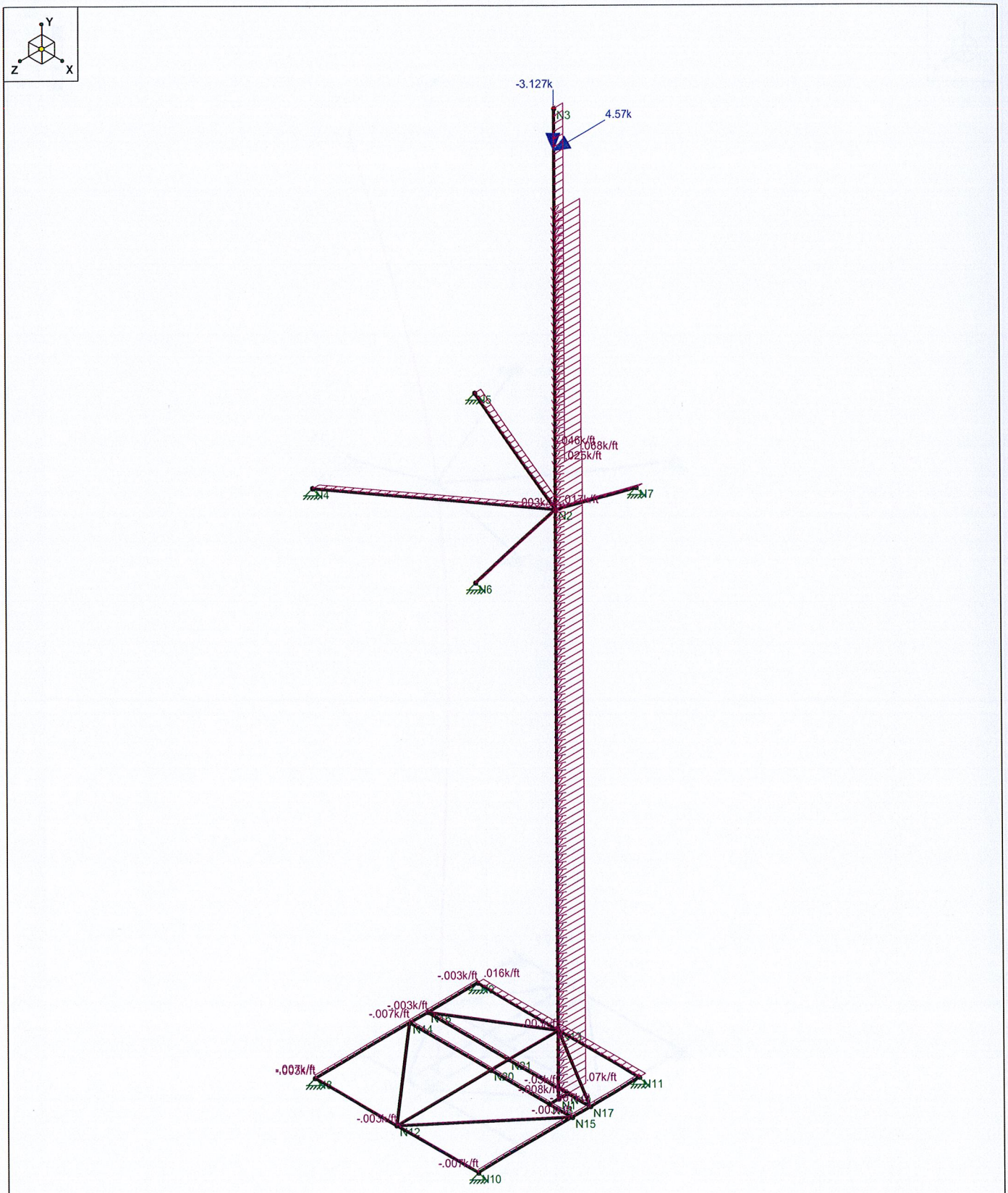
Loads: LC 2, (x) TIA/EIA Wind on PCS Structure

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:30 AM
12014.CO4 - CT1209	LC # 2 Loads	EIA-TIA Mast Analysis.r3d



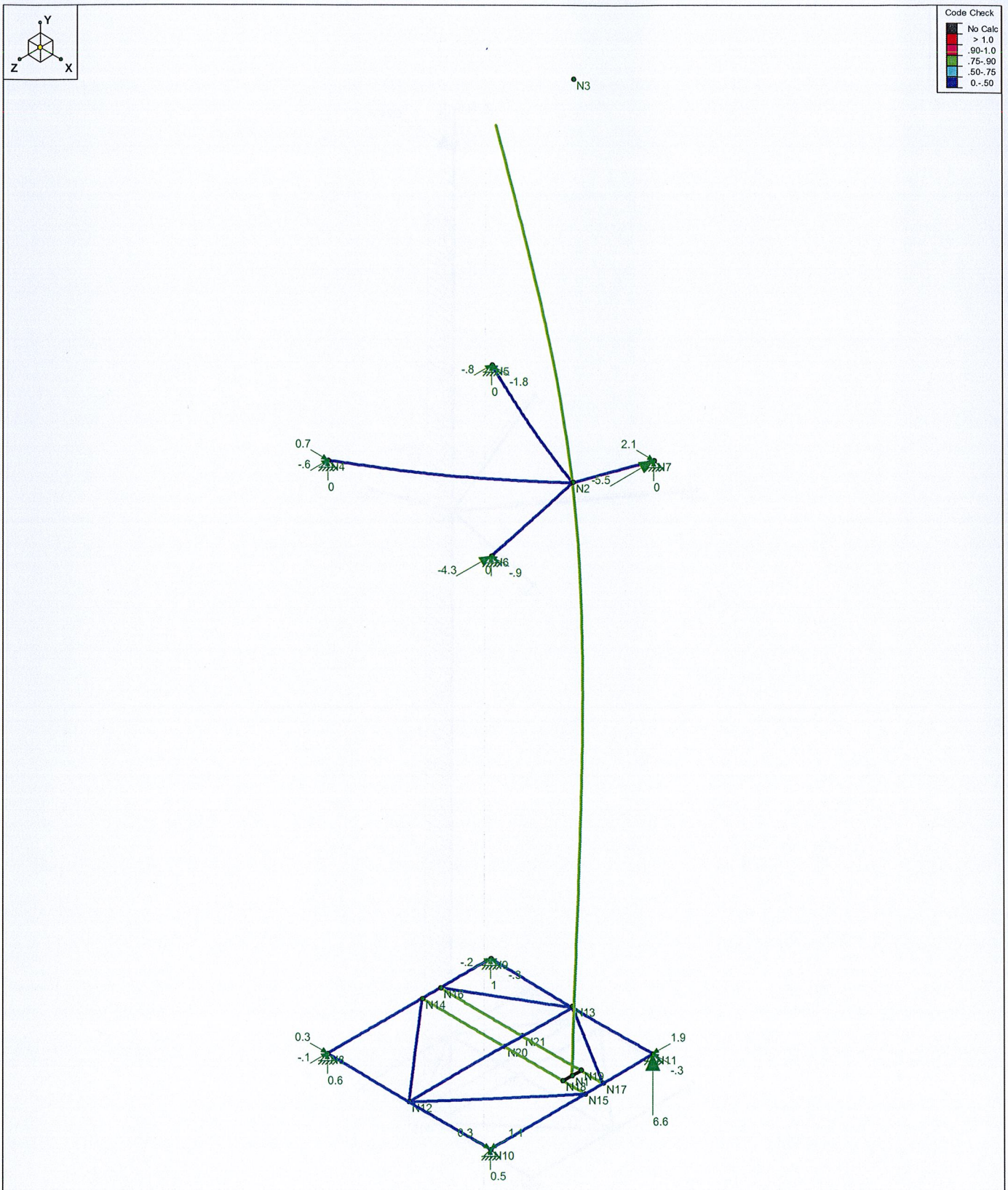
Results for LC 2, (x) TIA/EIA Wind on PCS Structure
Z-moment Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:32 AM
12014.CO4 - CT1209	LC # 2 Reactions and Deflected Shape	EIA-TIA Mast Analysis.r3d



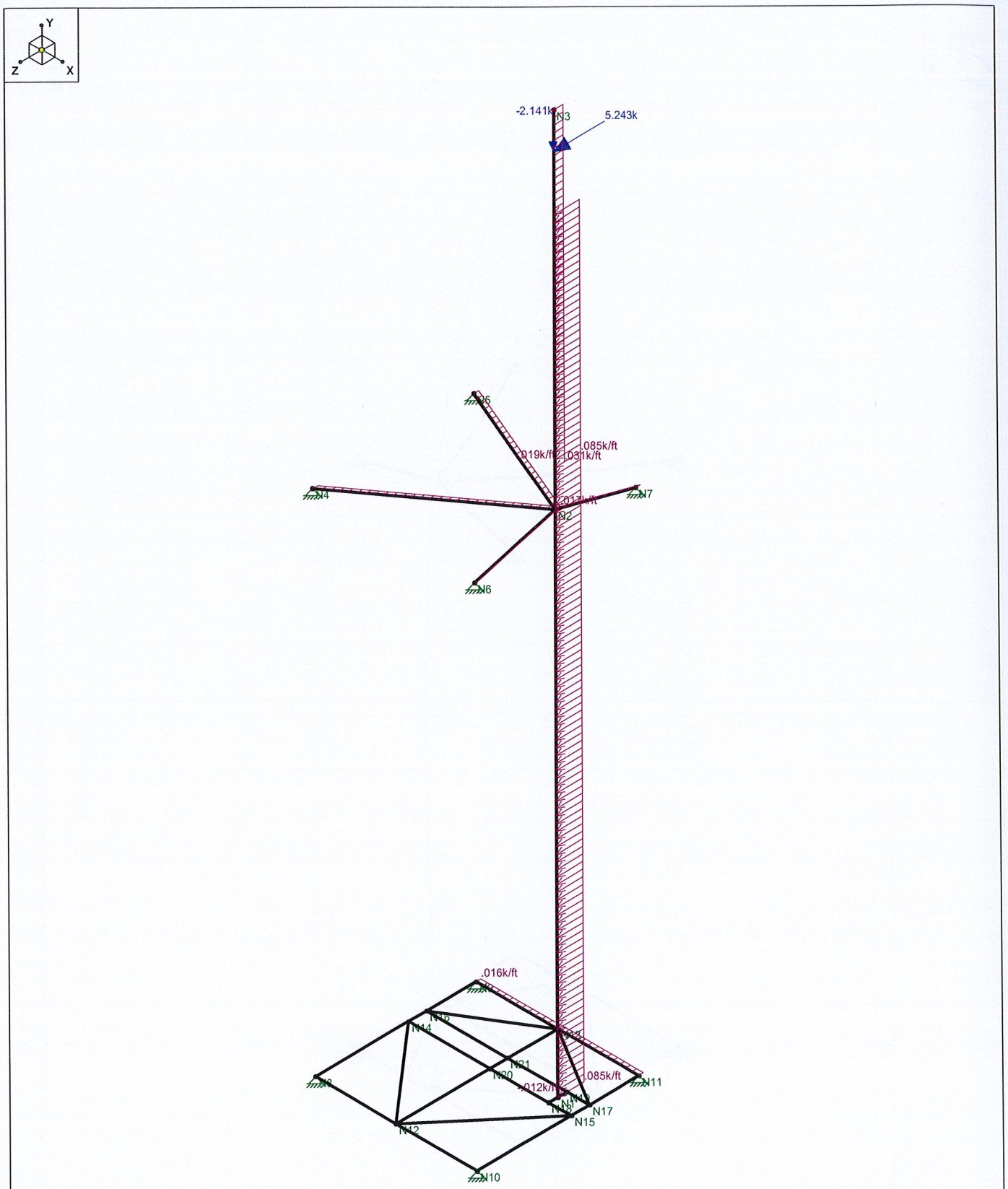
Loads: LC 3, (z) TIA/EIA Wind + Ice on PCS Structur

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:30 AM
12014.CO4 - CT1209	LC # 3 Loads	EIA-TIA Mast Analysis.r3d



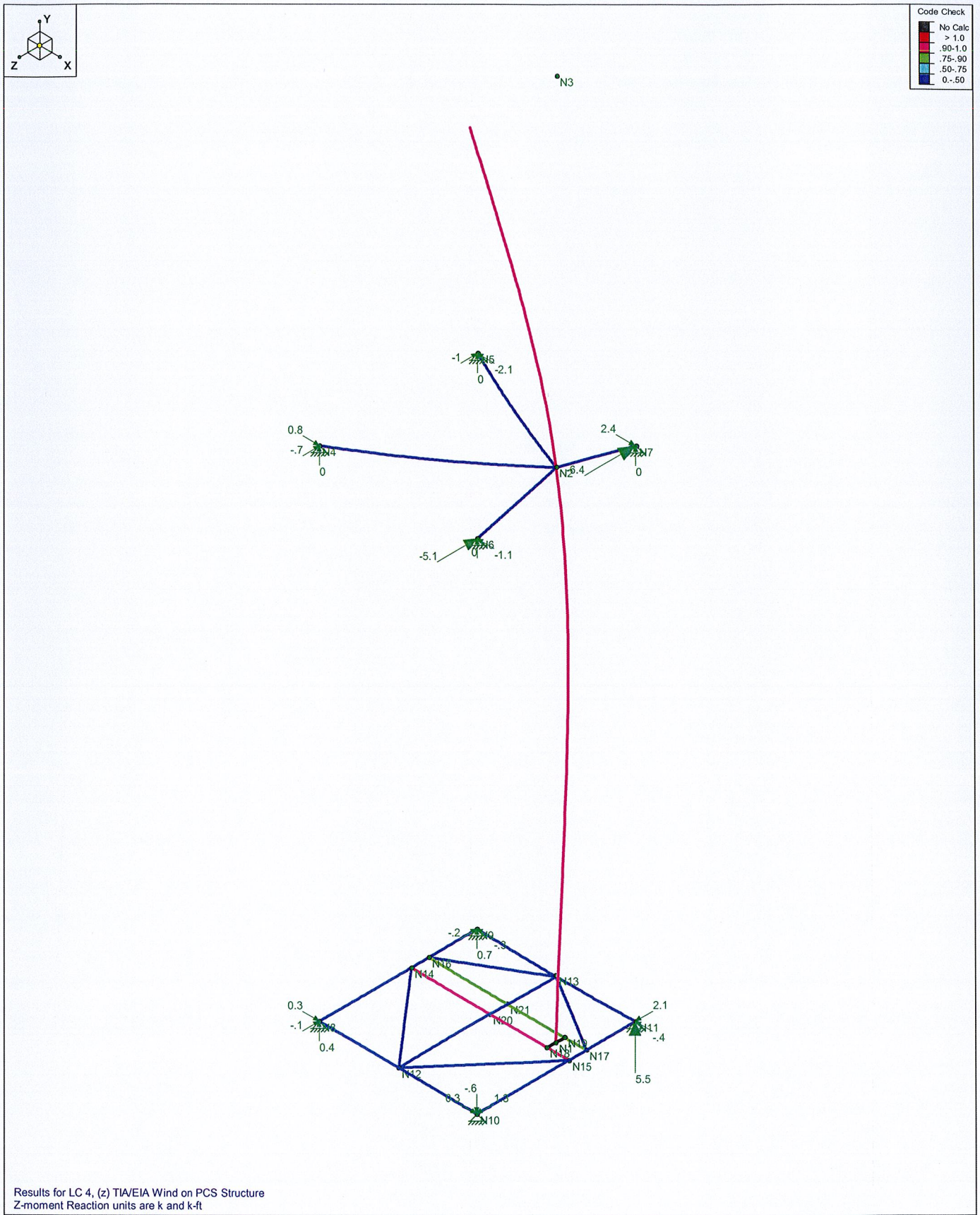
Results for LC 3, (z) TIA/EIA Wind + Ice on PCS Structur
Z-moment Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:33 AM
12014.CO4 - CT1209	LC # 3 Reactions and Deflected Shape	EIA-TIA Mast Analysis.r3d



Loads: LC 4, (z) TIA/EIA Wind on PCS Structure

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:31 AM
12014.CO4 - CT1209	LC # 4 Loads	EIA-TIA Mast Analysis.r3d



Results for LC 4, (z) TIA/EIA Wind on PCS Structure
Z-moment Reaction units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	CL&P # 20003 - Mast	May 14, 2012 at 9:33 AM
12014.CO4 - CT1209	LC # 4 Reactions and Deflected Shape	EIA-TIA Mast Analysis.r3d

Mast Connection to CL&P Tower:

Check Pipe Collar Bolts:

Reactions:

Shear = $Shear := 4.01 \cdot k + 7.07 \cdot k + 0.88 \cdot k + 1.5 \cdot k = 13.46 \cdot kips$
(Input From Risa-3D LC #2) (Sum of the forces in brace members)

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) (6 Botls Total Only 4 Used)

Allowable Tensile Strength = $F_t := 19.9 \cdot kips$ (User Input)

Allowable Shear Strength = $F_v := 11.9 \cdot kips$ (User Input)

Shear Force = $f_v := \frac{Shear}{N_b} = 3.4 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 28.28 \cdot \%$

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

Bolt_Shear = "OK"

Check Pipe Collar:

Reactions:

Maximum Bolt Force = $P := \frac{Shear}{N_b} = 3.4 kips$

Plate Data:

Plate Yield Strength = $Fy_{bp} := 36 \cdot ksi$ (User Input)

Plate Thickness = $t_p := 0.875 \cdot in$ (User Input)

Plate Width = $t_w := 5 \cdot in$ (User Input)

Distance Between Brace Plates = $d_p := 4 \cdot in$ (User Input)

Maximum Moment in Plate = $M := P \cdot \frac{d_p}{8} = 1.683 k \cdot in$

Maximum Bending Stress in Plate = $f_{bp} := \frac{6 \cdot M}{\left(t_w \cdot t_p^2\right)} = 2.6 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.75 \cdot Fy_{bp} = 27 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 9.8 \cdot \%$

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

Plate_Bending = "Ok"

Check Angle Brace Bolts:

Reactions:

Vertical = $Vertical := .02 \cdot kips$ (Input From Risa-3D LC #2)

Horizontal x-dir = $Horizontal_x := 7 \cdot kips$ (Input From Risa-3D LC #2)

Horizontal z-dir = $Horizontal_z := 2.92 \cdot kips$ (Input From Risa-3D LC #2)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

Bolt Diameter = $D := 0.625 \cdot in$ (User Input)

Number of Bolts = $N_b := 2$ (User Input)

Allowable Tensile Strength = $F_t := 13.8 \cdot kips$ (User Input)

Allowable Shear Strength = $F_v := 8.3 \cdot kips$ (User Input)

Shear Force = $f_v := \frac{\sqrt{Horizontal_z^2 + Vertical^2}}{N_b} = 1.5 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 17.59 \cdot \%$

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

$Bolt\_Shear = "OK"$

Tension Force = $f_t := \frac{Horizontal_x}{N_b} = 3.5 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 25.36 \cdot \%$

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

$Bolt\_Tension = "OK"$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2007 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	mph	(User Input NESC 2007 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade =	$TME := 165$	ft	(User Input)
Multiplier Gust Response Factor =	$m := 1.25$		(User Input - Only for NESC Extreme wind case)
NESC Factor =	$kv := 1.43$		(User Input from NESC 2007 Table 250-3 equation)
Importance Factor =	$I := 1.0$		(User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.406$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.291$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.78$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.829$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 36.1$ psf (NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.45$	(User Input)

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

Development of Wind & Ice Load on Mast

Mast Data: (12" Sch. 40)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.8$	in	(User Input)
Mast Length =	$L_{mast} := 47$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.067$ sf/ft

Total Mast Wind Force (Above Top of Tower) = $qz \cdot Cd_R \cdot A_{mast} \cdot m = 63$ plf **BLC 5**

Total Mast Wind Force (Below Top of Tower) = $qz \cdot Cd_R \cdot A_{mast} = 50$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.15$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_R \cdot AICE_{mast} = 6$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

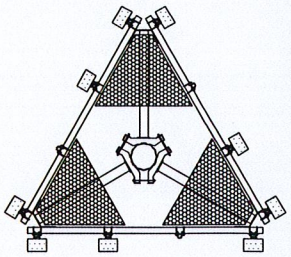
Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 20.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	KMW AMX-CD-16-65-00T-RET		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 49$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 9$		(User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 53.1$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 3833$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 58.4$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 374$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 441$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1435$ cu in

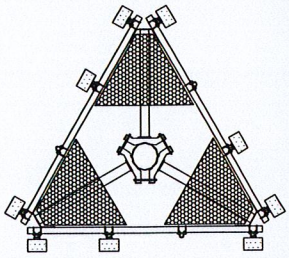
Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 46$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 418$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	CCI DTMABP7819VG12A TMA		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 14.25$	in	(User Input)
Antenna Width =	$W_{ant} := 11.46$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.17$	in	(User Input)
Antenna Weight =	$WT_{ant} := 20$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 9$		(User Input)



Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.1$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 10.2$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 737$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 1.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 11.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 76$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 180$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 681$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 301$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 10$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 88$ lbs **BLC 3**

Development of Wind & Ice Load on Platform

Platform Data:

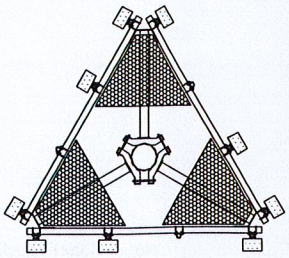
Platform Model = Site Pro 12'-6" Low Profile Platform (RMSP-496)

Platform Area = $A_{plt} := 14$ sq ft (User Input)

Platform Area w/ Ice = $A_{ICEplt} := 19.5$ sq ft (User Input)

Platform Weight = $WT_{plt} := 1520$ lbs (User Input)

Platform Weight w/ Ice = $WT_{ICEplt} := 2000$ lbs (User Input)



Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt} := qz \cdot Cd_F \cdot A_{plt} \cdot m = 1011$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt} := p \cdot Cd_F \cdot A_{ICEplt} = 125$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 1520$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 480$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 30$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 6$		(User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 1$ sf/ft

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 52$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 1.1$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 6$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Load (ice only)

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

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

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 10$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 9$		(User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 1.5$ sf/ft

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 97$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 1.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 9$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := Id \cdot \left(N_{coax} \cdot \frac{Ai_{coax}}{144}\right) = 27$ plf **BLC 3**

Development of Wind & Ice Load on Brace Member

Member Data: L3x3x1/4

Antenna Shape =	Flat		(User Input)
Height =	$H_{mem} := 3$	in	(User Input)
Thickness =	$t_{mem} := 0.25$	in	(User Input)
Length =	$L_{mem} := 36$	in	(User Input)
Cross Sectional Area of Member =	$Ac_{mem} := 1.44$	sq in	(User Input)

Wind Load (NESC Extreme)

Member projected surface area = $A_{mem} := \frac{H_{mem}}{12} = 0.3$ sf/ft

Total Member Wind Force = $F_{mem} := qz \cdot Cd_F \cdot A_{mem} = 14$ plf **BLC 5**

Wind Load (NESC Heavy)

Member projected surface area w/ Ice = $AICE_{mem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 0.3$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := p \cdot Cd_F \cdot AICE_{mem} = 2$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Load (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := (H_{mem} + 2 \cdot Ir) \cdot (t_{mem} + 2 \cdot Ir) + (H_{mem} - t_{mem}) \cdot (t_{mem} + 2 \cdot Ir) - Ac_{mem} = 7 \quad \text{sq in}$$

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

Development of Wind & Ice Load on Brace Member

Member Data: C12x20.7

Antenna Shape =	Flat		(User Input)
Height =	$H_{mem} := 12$	in	(User Input)
Flange Width =	$b_f := 2.94$	in	(User Input)
Flange Thickness =	$t_f := 0.501$	in	(User Input)
Web Thickness =	$t_w := 0.282$	in	(User Input)
Length =	$L_{mem} := 105$	in	(User Input)
Cross Sectional Area of Member =	$Ac_{mem} := 6.08$	sq in	(User Input)

Wind Load (NESC Extreme)

Member projected surface area = $A_{mem} := \frac{H_{mem}}{12} = 1$ sf/ft

Total Member Wind Force = $F_{mem} := qz \cdot Cd_F \cdot A_{mem} = 58$ plf **BLC 5**

Wind Load (NESC Heavy)

Member projected surface area w/ Ice = $AICE_{mem} := \frac{(H_{mem} + 2 \cdot Ir)}{12} = 1.1$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := p \cdot Cd_F \cdot AICE_{mem} = 7$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Load (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := (b_f + 2 \cdot Ir) \cdot (t_f + 2 \cdot Ir) \cdot 2 + (H_{mem} - t_f - 2 \cdot Ir) \cdot (t_w + 2 \cdot Ir) - Ac_{mem} = 19 \quad \text{sq in}$$

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

CENTEK engineering, INC.
Consulting Engineers
63-2 North Branford Road
Branford, CT 06405
Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Structure Reactions Applied to CL&P Tower Tabulated Load Cases**

Location: **Manchester, CT**

Date:3/7/12 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12014.CO4

Load Case	Description
1	Self Weight (PCS Mast)
2	Weight of Appurtenances
3	Weight of Ice Only on PCS Structure (1)
4	NESC Heavy Wind on PCS Structure(1)
5	NESC Extreme Wind on PCS Structure(1)

Footnotes:
(1) PCS Structure includes: Mast and Appurtenances

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Ph. 203-488-0580 / Fax. 203-488-8587

Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining PCS Structure Reactions Applied to CL&P Tower Load Combinations Table**

Location: **Manchester, CT**

Date: 3/7/12 Prepared by: T.J.L. Checked by: C.F.C. Job No. 12014.CO4

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	NESC Heavy Wind on PCS Structure		1		1	1.5	2	1.5	3	1.5	4	2.5		
2	NESC Extreme Wind on PCS Structure		1		1	1	2	1	5	1				

Footnotes:
(1) BLC = Basic Load Case
(2) PCS Structure includes: Mast and Appurtenances

Global

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation	Yes
Include Warping	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Vertical Axis	Y
Global Member Orientation Plane	XZ

Hot Rolled Steel Code	AISC 9th: ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-97: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-02
Masonry Code	ACI 530-05/08: ASD
Aluminum Code	AA ADM1-05: ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	PCA Load Contour
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections	Yes
Bad Framing Warnings	No
Unused Force Warnings	Yes

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Ct X	.035
Ct Z	.035
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	8.5
R Z	8.5
Ct Exp. X	.75
Ct Exp. Z	.75
Ca	.36
Cv	.54
Nv	1
SD1	1
SDS	1
S1	1
Occupancy Code	4
Seismic Zone	3
Use Group	I
Use Gravity Self Wt in Diaphragm Mass	Yes
Use Deck Self Wt in Diaphragm Mass	Yes
Use Lateral Self Wt in Diaphragm Mass	Yes
Seismic Detailing Code	None
Om X	1
Om Z	1
Rho X	1
Rho Z	1

Hot Rolled Steel Properties

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

Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	y sw...	z sw...	Function
1	M1	Mast	47	Segment	Segment										Lateral
2	M3	Brace 2	9	Segment	Segment										Lateral
3	M4	Brace 2	9	Segment	Segment										Lateral
4	M5	Brace 1	9												Lateral
5	M6	Brace 1	9												Lateral
6	M7	Brace 1	6.906												Lateral
7	M8	Brace 1	5.293												Lateral
8	M9	Brace 1	5.276												Lateral
9	M10	Brace 1	6.893												Lateral
10	M11	Brace 1	9	Segment	Segment										Lateral
11	M12	Brace 1	8.421												Lateral
12	M13	Brace 1	9.646												Lateral
13	M14	Brace 1	5.863												Lateral
14	M15	Brace 1	3.497												Lateral
15	M16	Brace 2	9	Segment	Segment										Lateral
16	M16A	Brace 2	9	Segment	Segment										Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE 12.0	Beam	Pipe	A53 Gr. B	Typical	13.6	262	262	523
2	Brace 1	L3X3X4	Beam	Pipe	A36 Gr.36	Typical	1.44	1.24	1.24	.032
3	Brace 2	C12X20.7	Beam	Pipe	A36 Gr.36	Typical	6.09	3.88	129	.37

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N1	N3			Mast	Beam	Pipe	A53 Gr. B	Typical
2	M3	N10	N11			Brace 2	Beam	Pipe	A36 Gr.36	Typical
3	M4	N8	N9			Brace 2	Beam	Pipe	A36 Gr.36	Typical
4	M5	N8	N10			Brace 1	Beam	Pipe	A36 Gr.36	Typical
5	M6	N9	N11			Brace 1	Beam	Pipe	A36 Gr.36	Typical
6	M7	N12	N14			Brace 1	Beam	Pipe	A36 Gr.36	Typical
7	M8	N16	N13			Brace 1	Beam	Pipe	A36 Gr.36	Typical
8	M9	N13	N17			Brace 1	Beam	Pipe	A36 Gr.36	Typical
9	M10	N15	N12			Brace 1	Beam	Pipe	A36 Gr.36	Typical
10	M11	N12	N13			Brace 1	Beam	Pipe	A36 Gr.36	Typical
11	M12	N2	N5			Brace 1	Beam	Pipe	A36 Gr.36	Typical
12	M13	N2	N4			Brace 1	Beam	Pipe	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
13	M14	N2	N6			Brace 1	Beam	Pipe	A36 Gr.36	Typical
14	M15	N2	N7			Brace 1	Beam	Pipe	A36 Gr.36	Typical
15	M16	N17	N16			Brace 2	Beam	Pipe	A36 Gr.36	Typical
16	M16A	N14	N15			Brace 2	Beam	Pipe	A36 Gr.36	Typical
17	M17	N18	N19			RIGID	None	None	RIGID	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	28	0	0	
3	N3	0	47	0	0	
4	N4	-7.76	28	5.73	0	
5	N5	-7.76	28	-3.27	0	
6	N6	1.24	28	5.73	0	
7	N7	1.24	28	-3.27	0	
8	N8	-7.76	0	5.73	0	
9	N9	-7.76	0	-3.27	0	
10	N10	1.24	0	5.73	0	
11	N11	1.24	0	-3.27	0	
12	N12	-3.25	0	5.73	0	
13	N13	-3.25	0	-3.27	0	
14	N14	-7.76	0	.5	0	
15	N15	1.24	0	.5	0	
16	N16	-7.76	0	-.5	0	
17	N17	1.24	0	-.5	0	
18	N18	0	0	.5	0	
19	N19	0	0	-.5	0	
20	N20	-3.25	0	.5	0	
21	N21	-3.25	0	-.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N4	Reaction	Reaction	Reaction				
2	N6	Reaction	Reaction	Reaction				
3	N5	Reaction	Reaction	Reaction				
4	N7	Reaction	Reaction	Reaction				
5	N8	Reaction	Reaction	Reaction				
6	N10	Reaction	Reaction	Reaction				
7	N9	Reaction	Reaction	Reaction				
8	N11	Reaction	Reaction	Reaction				

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(k,k-ft), (in,rad), (k*s^2/f...
No Data to Print ...			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.441	45
2	M1	Y	-.18	45
3	M1	Y	-1.52	45

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.418	45
2	M1	Y	-.088	45
3	M1	Y	-.48	45

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.374	45
2	M1	X	.076	45
3	M1	X	.125	45

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	3.833	45
2	M1	X	.737	45
3	M1	X	1.011	45

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.012	-.012	0	30
2	M1	Y	-.019	-.019	30	42

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

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.018	-.018	0	30
3	M1	Y	-.027	-.027	30	42
4	M12	Y	-.003	-.003	0	0
5	M13	Y	-.003	-.003	0	0
6	M14	Y	-.003	-.003	0	0
7	M15	Y	-.003	-.003	0	0
8	M6	Y	-.003	-.003	0	0
9	M8	Y	-.003	-.003	0	0
10	M9	Y	-.003	-.003	0	0
11	M11	Y	-.003	-.003	0	0
12	M7	Y	-.003	-.003	0	0
13	M10	Y	-.003	-.003	0	0
14	M5	Y	-.003	-.003	0	0
15	M4	Y	-.007	-.007	0	0
16	M16A	Y	-.007	-.007	0	0
17	M16	Y	-.007	-.007	0	0
18	M3	Y	-.007	-.007	0	0

Member Distributed Loads (BLC 4 : NESC Heavy Wind on PCS Str)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.006	.006	0	0
2	M1	X	.006	.006	0	30
3	M1	X	.009	.009	30	42
4	M12	X	.002	.002	0	0
5	M13	X	.002	.002	0	0
6	M14	X	.002	.002	0	0
7	M15	X	.002	.002	0	0
8	M4	X	.007	.007	0	0

Member Distributed Loads (BLC 5 : NESC Extreme Wind on PCS S)

	Member Label	Direction	Start Magnitude[k/ft,deg]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.05	.05	0	35
2	M1	X	.063	.063	35	47
3	M1	X	.052	.052	0	30
4	M1	X	.097	.097	30	42
5	M13	X	.014	.014	0	0
6	M12	X	.014	.014	0	0
7	M14	X	.014	.014	0	0
8	M15	X	.014	.014	0	0
9	M4	X	.058	.058	0	0

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Gravity	Joint	Point	Distrib...	Area(M...	Surfac...
1	Self Weight (PCS Mast)	None		-1						
2	Weight of Appurtenances	None					3	2		
3	Weight of Ice Only on PCS Struct	None					3	18		
4	NESC Heavy Wind on PCS Str	None					3	8		
5	NESC Extreme Wind on PCS S	None					3	9		

Load Combinations

	Description	So...	PDelta	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind on Power..	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind on Pow..	Yes			1	1	2	1	5	1										
3	Self Weight				1	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N4	max	-1.168	1	.057	1	3.287	2	0	1	0	1	0	1
2		min	-4.519	2	.024	2	.845	1	0	1	0	1	0	1
3	N6	max	-.262	1	.035	1	-1.142	1	0	1	0	1	0	1
4		min	-.98	2	.014	2	-4.338	2	0	1	0	1	0	1
5	N5	max	-2.076	1	.05	1	-.866	1	0	1	0	1	0	1
6		min	-7.987	2	.021	2	-3.341	2	0	1	0	1	0	1
7	N7	max	-.426	1	.021	1	4.387	2	0	1	0	1	0	1
8		min	-1.688	2	.009	2	1.101	1	0	1	0	1	0	1
9	N8	max	.578	2	1.922	2	-.044	1	0	1	0	1	0	1
10		min	.129	1	1.36	1	-.121	2	0	1	0	1	0	1
11	N10	max	.712	2	3.332	1	.129	2	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

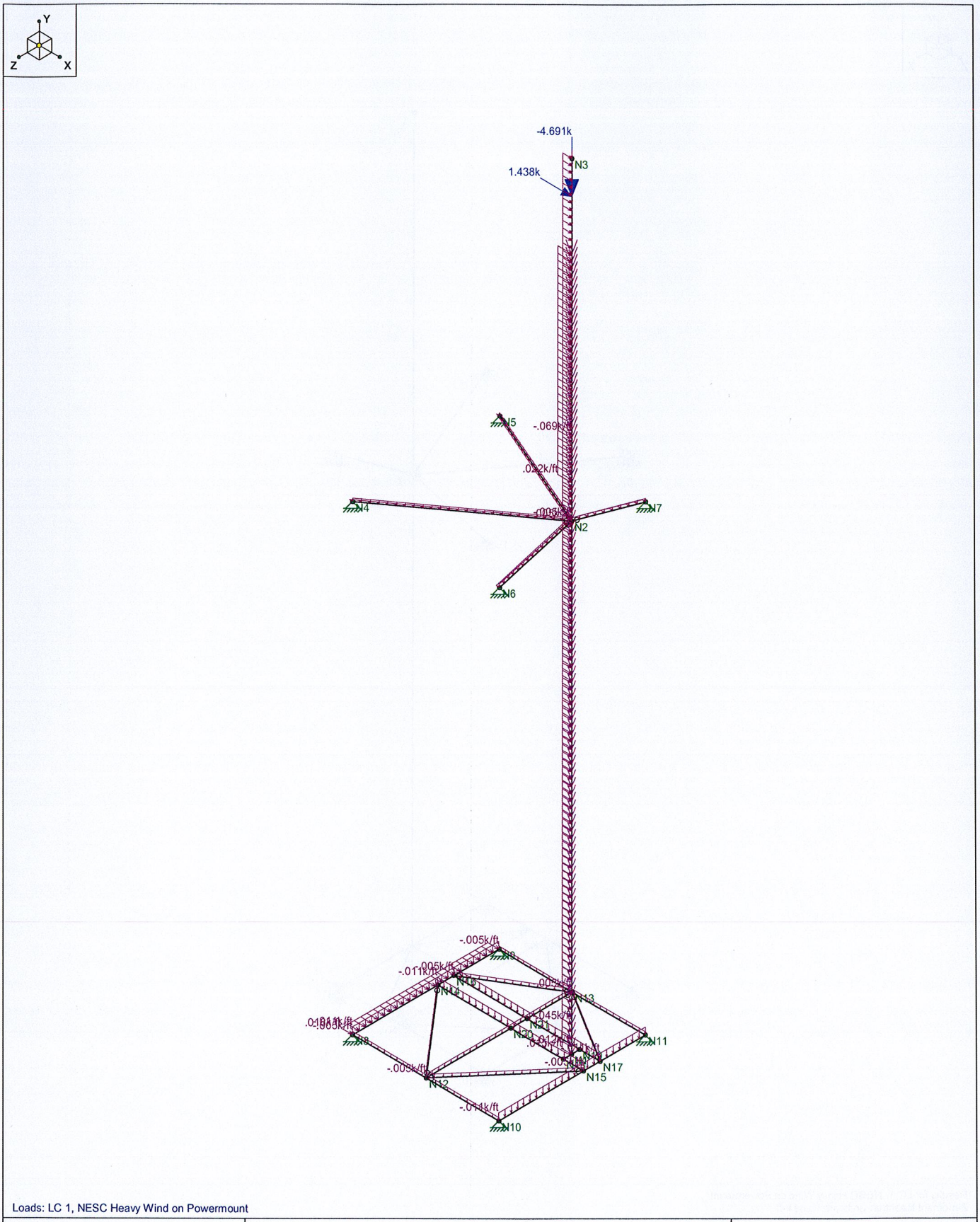
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
12		min	.169	1	.314	2	.038	1	0	1	0	1	0	1
13	N9	max	1.045	2	3.267	2	.015	2	0	1	0	1	0	1
14		min	.227	1	2.137	1	.014	1	0	1	0	1	0	1
15	N11	max	1.121	2	6.135	1	.054	1	0	1	0	1	0	1
16		min	.249	1	.465	2	-.019	2	0	1	0	1	0	1
17	Totals:	max	-3.157	1	13.126	1	0	1						
18		min	-11.717	2	6.036	2	0	2						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N4	-1.168	.057	.845	0	0	0
2	1	N6	-.262	.035	-1.142	0	0	0
3	1	N5	-2.076	.05	-.866	0	0	0
4	1	N7	-.426	.021	1.101	0	0	0
5	1	N8	.129	1.36	-.044	0	0	0
6	1	N10	.169	3.332	.038	0	0	0
7	1	N9	.227	2.137	.014	0	0	0
8	1	N11	.249	6.135	.054	0	0	0
9	1	Totals:	-3.157	13.126	0			
10	1	COG (ft):	X: -.581	Y: 27.439	Z: .143			

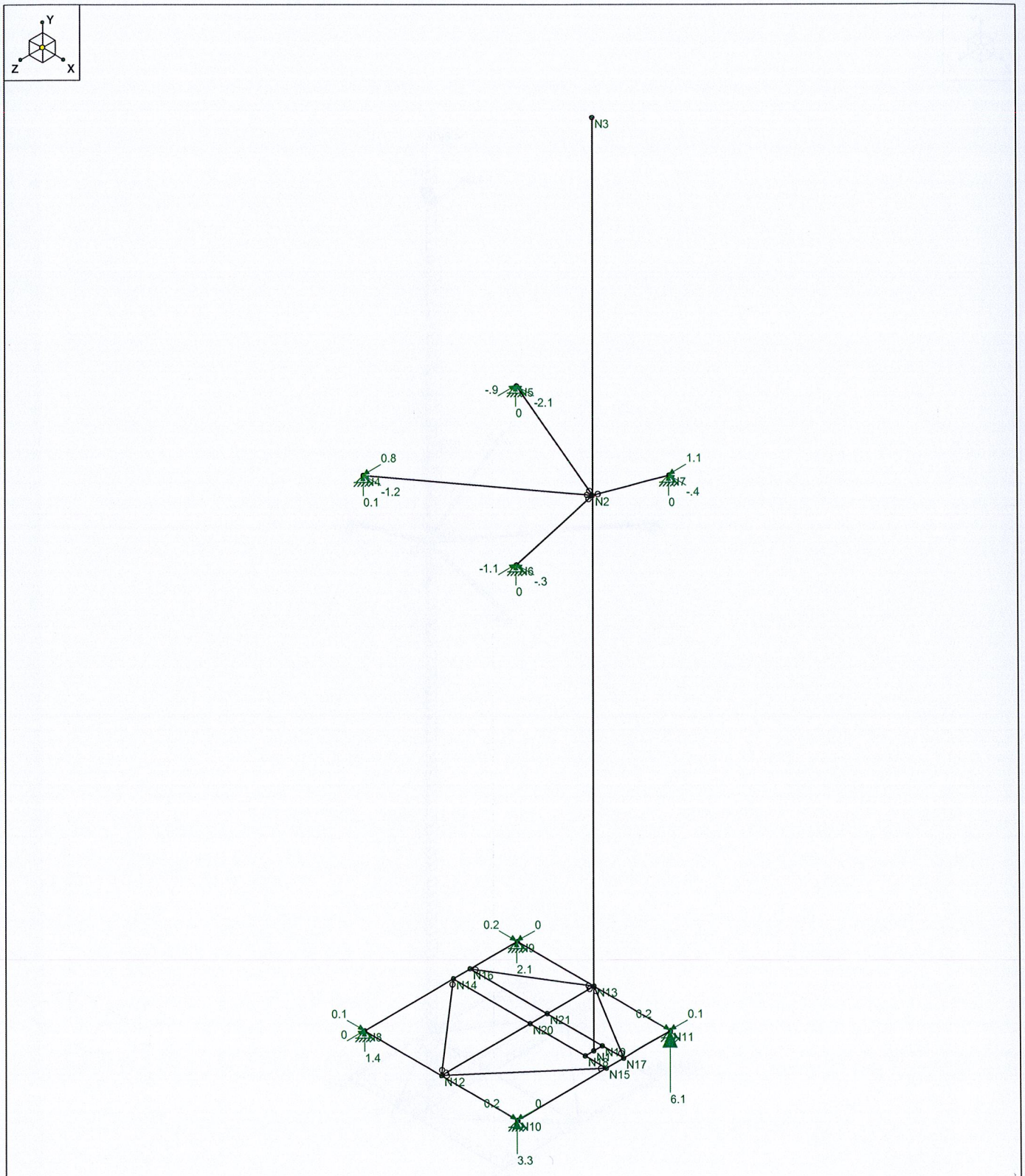
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N4	-4.519	.024	3.287	0	0	0
2	2	N6	-.98	.014	-4.338	0	0	0
3	2	N5	-7.987	.021	-3.341	0	0	0
4	2	N7	-1.688	.009	4.387	0	0	0
5	2	N8	.578	1.922	-.121	0	0	0
6	2	N10	.712	.314	.129	0	0	0
7	2	N9	1.045	3.267	.015	0	0	0
8	2	N11	1.121	.465	-.019	0	0	0
9	2	Totals:	-11.717	6.036	0			
10	2	COG (ft):	X: -.591	Y: 27.307	Z: .142			



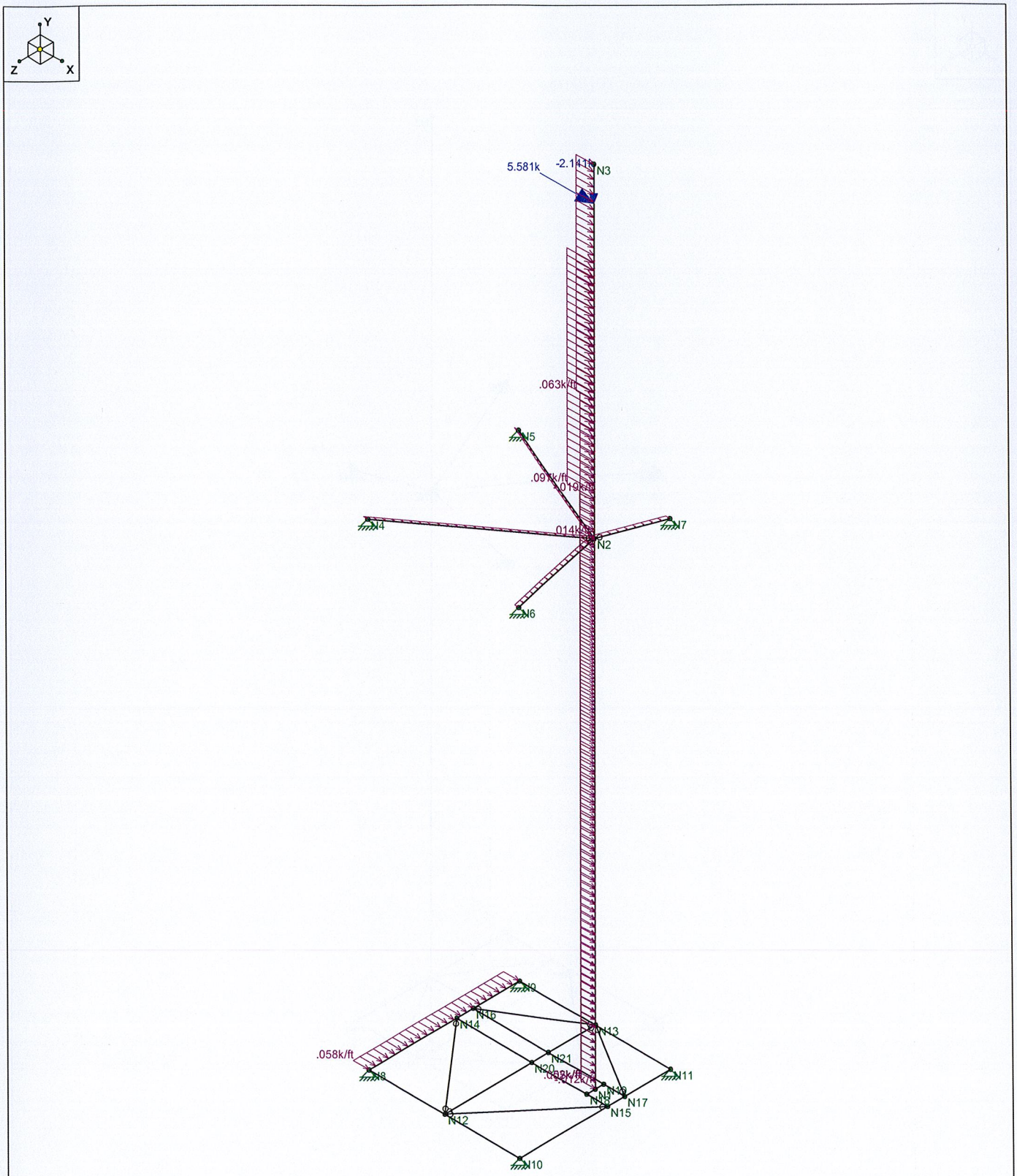
Loads: LC 1, NESC Heavy Wind on Powermount

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 20003	May 14, 2012 at 10:23 AM
12014.CO4 - CT1209	LC # 1 Loads	NESC Mast Analysis.r3d



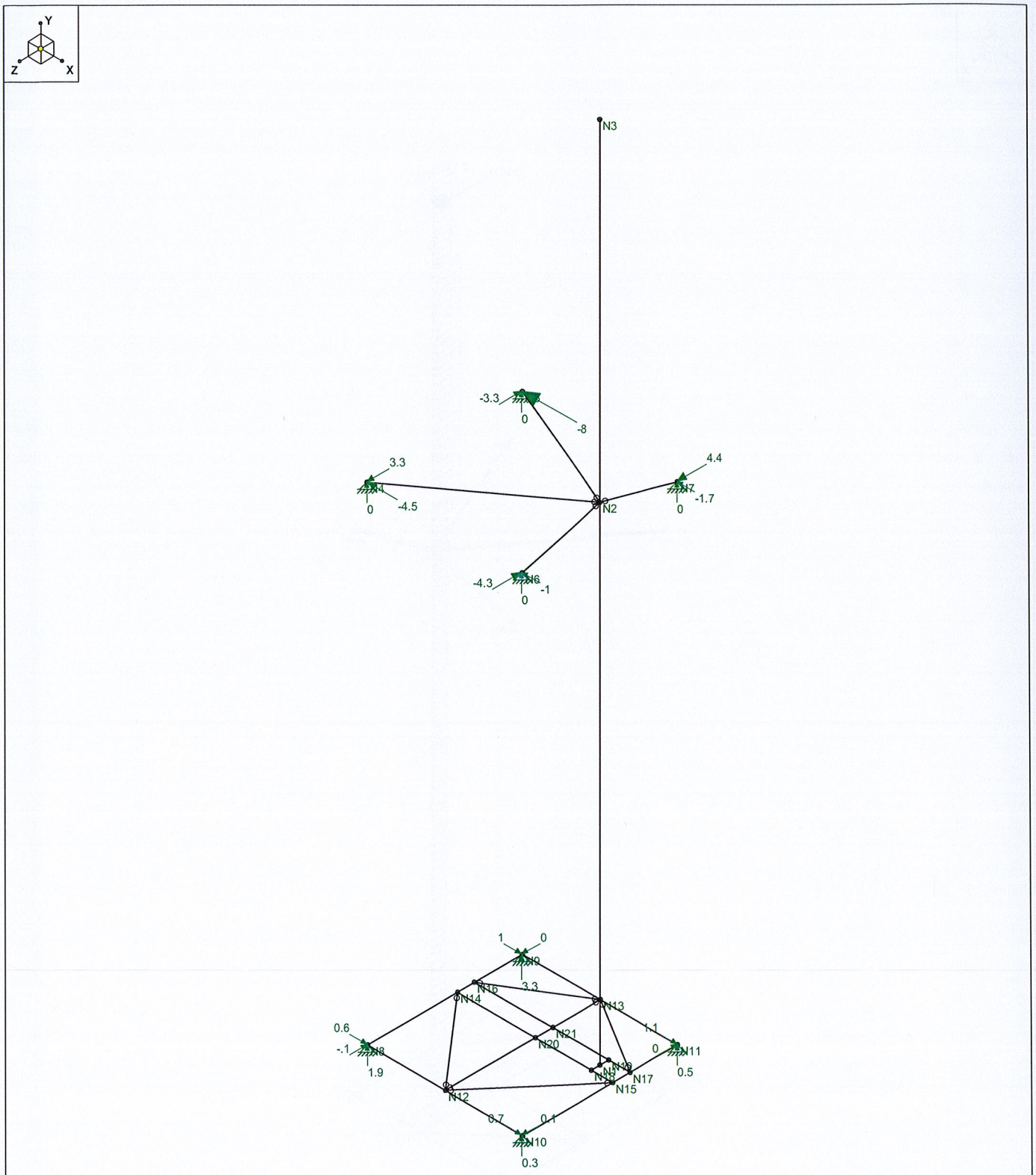
Results for LC 1, NESC Heavy Wind on Powermount
Z-moment Reaction units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 20003	May 14, 2012 at 10:24 AM
12014.CO4 - CT1209	LC # 1 Reactions	NESC Mast Analysis.r3d



Loads: LC 2, NESC Extreme Wind on Powermount

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 20003	May 14, 2012 at 10:23 AM
12014.CO4 - CT1209	LC # 2 Loads	NESC Mast Analysis.r3d



Results for LC 2, NESC Extreme Wind on Powermount
Z-moment Reaction units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	CL&P Tower # 20003	May 14, 2012 at 10:24 AM
12014.CO4 - CT1209	LC # 2 Reactions	NESC Mast Analysis.r3d

Coax Cable on CL&P Tower

Distance Between Coax Cable Attach Points =

Coaxial Cable Span $Coax_{Span} := \begin{pmatrix} 6 \\ 13 \\ 13 \\ 13 \\ 16 \\ 16 \\ 16 \\ 27 \end{pmatrix} \cdot ft$ *(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 Projected Coax Cables = $NP_{coax} := 4$ *(User Input)*

Extreme Wind Pressure = $qz := 36.1 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.45$ *(User Input)*

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

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

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

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

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 7.92 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 8.92 \cdot in$

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 = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 18.179 \cdot plf$

Heavy Wind Vertical Load =

$$Heavy\_WInd_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HWV}\right]}$$

Heavy Wind Transverse Load =

$$Heavy\_Wind_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HWT}\right)}$$

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 276 \\ 598 \\ 598 \\ 598 \\ 736 \\ 736 \\ 736 \\ 1242 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 65 \\ 140 \\ 140 \\ 140 \\ 172 \\ 172 \\ 172 \\ 291 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

$$Extreme\_Wind_{Trans} := \overrightarrow{\left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EWT}\right]}$$

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 75 \\ 162 \\ 162 \\ 162 \\ 200 \\ 200 \\ 200 \\ 337 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 207 \\ 449 \\ 449 \\ 449 \\ 553 \\ 553 \\ 553 \\ 933 \end{pmatrix} lb$$

Coax Cable on CL&P Tower

Distance Between Coax Cable Attach Points =

Coaxial Cable Span $Coax_{Span} := \begin{pmatrix} 10 \\ 14 \\ 13 \\ 13 \\ 13 \\ 13 \\ 16 \\ 16 \\ 16 \\ 27 \end{pmatrix} \cdot ft$ *(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 = $N_{coax} := 6$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 3$ *(User Input)*

Extreme Wind Pressure = $qz := 36.1 \cdot psf$ *(User Input)*

Heavy Wind Pressure = $p := 4 \cdot psf$ *(User Input)*

Radial Ice Thickness = $Ir := 0.5 \cdot in$ *(User Input)*

Radial Ice Density = $Id := 56 \cdot pcf$ *(User Input)*

Shape Factor = $Cd_{coax} := 1.45$ *(User Input)*

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

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

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

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

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 5.94 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 6.94 \cdot in$

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 = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 9.09 \cdot plf$

Heavy Wind Vertical Load =

$$Heavy\_WInd_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice}\right) \cdot Coax_{Span} \cdot OF_{HWV}\right]}$$

Heavy Wind Transverse Load =

$$Heavy\_Wind_{Trans} := \overrightarrow{\left(p \cdot A_{ice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HWT}\right)}$$

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 230 \\ 322 \\ 299 \\ 299 \\ 299 \\ 299 \\ 368 \\ 368 \\ 368 \\ 621 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 84 \\ 117 \\ 109 \\ 109 \\ 109 \\ 109 \\ 134 \\ 134 \\ 134 \\ 226 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

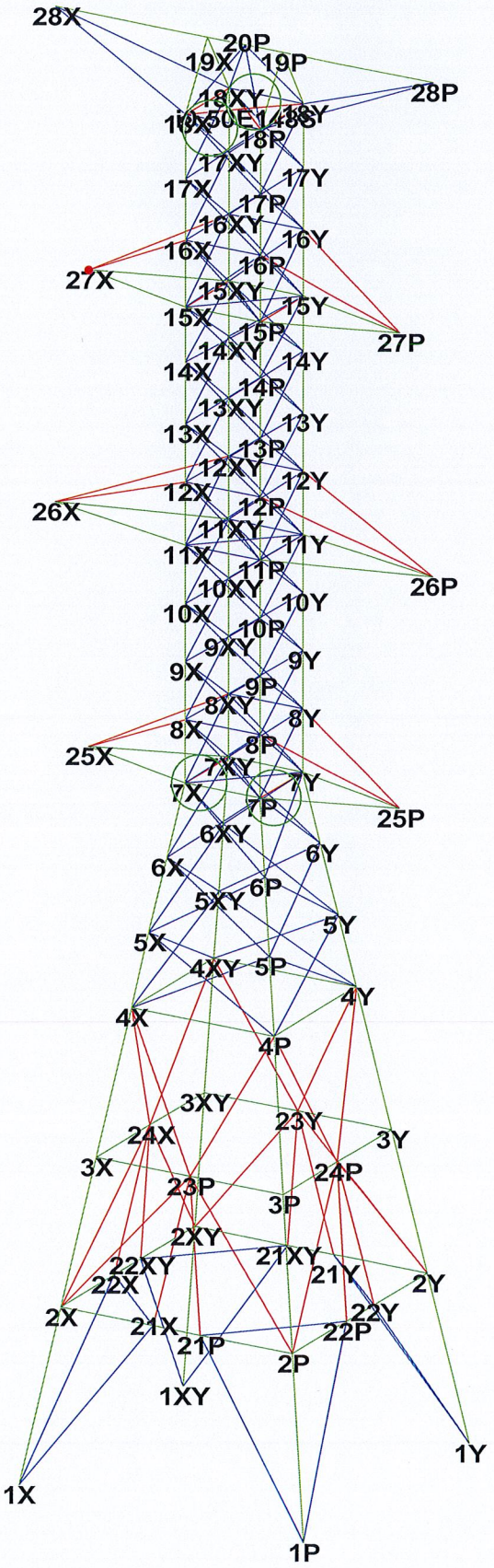
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

$$Extreme\_Wind_{Trans} := \overrightarrow{\left[\left(qz \cdot A \cdot Cd_{coax}\right) \cdot Coax_{Span} \cdot OF_{EWT}\right]}$$

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 62 \\ 87 \\ 81 \\ 81 \\ 81 \\ 81 \\ 100 \\ 100 \\ 100 \\ 168 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 259 \\ 363 \\ 337 \\ 337 \\ 337 \\ 337 \\ 415 \\ 415 \\ 415 \\ 700 \end{pmatrix} lb$$

entek Engineering Inc, Project: "cl&p tower #20003"
ower Version 11.11, 10:49:45 AM Friday, September 07, 2012
Undeformed geometry displayed



Project Name : 12014.CO4 - Manchester, CT
Project Notes: CL&P Structure # 20003/ AT&T CT1209
Project File : J:\Jobs\1201400.WI\CO.04 - CT1209 - 190 Olcott St, Manchester, CT\Rev (3)\Calcs\PLS Tower\cl&p tower #20003.tow
Date run : 10:48:08 AM Friday, September 07, 2012
by : Tower Version 11.11
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

KL/R value of 167.55 exceeds maximum of 150.00 for member "g1P" ??
KL/R value of 167.55 exceeds maximum of 150.00 for member "g1X" ??
KL/R value of 167.55 exceeds maximum of 150.00 for member "g1XY" ??
KL/R value of 167.55 exceeds maximum of 150.00 for member "g1Y" ??
Member "g8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19P" ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19X" ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19XY" ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19Y" ??

Member "g20P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will

be checked. ??
Member "g28X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

Member "g36X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54P" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54X" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54XY" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54Y" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55P" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55X" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55XY" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55Y" ??
Member "g56P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g56Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
KL/R value of 203.59 exceeds maximum of 200.00 for member "g61P" ??
KL/R value of 203.59 exceeds maximum of 200.00 for member "g61X" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66P" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66X" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66XY" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66Y" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67P" ??

KL/R value of 247.71 exceeds maximum of 200.00 for member "g67X" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67XY" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67Y" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76P" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76X" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76XY" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76Y" ??
Member "g77P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g77X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g77XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g77Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g78P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g78Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g80P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g80Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g82P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g82Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g89P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g89Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
The following members have the same origin joint label '18X' and end joint label '18P'
Member label 'g56P', member number 149 ??
Member label 'g89P', member number 193 ??
The following members have the same origin joint label '18XY' and end joint label '18Y'
Member label 'g56Y', member number 150 ??
Member label 'g89Y', member number 194 ??
The following members have the same origin joint label '7P' and end joint label '7Y'
Member label 'g63P', member number 163 ??
Member label 'g90X', member number 196 ??
The following members have the same origin joint label '7X' and end joint label '7XY'
Member label 'g63X', member number 164 ??
Member label 'g90P', member number 195 ??
The model has 168 warnings. ??

Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None

Loads from file: j:\jobs\1201400.wi\co.04 - ct1209 - 190 olcott st, manchester, ct\rev (3)\calcs\pls tower\cl&p # 20003.lca

*** Analysis Results:

Maximum element usage is 93.22% for Angle "g42P" in load case "NESC Heavy"
Maximum insulator usage is 23.58% for Clamp "6" in load case "NESC Heavy"

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)	Vert. Moment (ft-k)	Bending Moment (ft-k)	Found. Usage %
NESC Heavy	1P	-27.08	-21.02	157.57	34.28	-3.29	-4.81	-0.97	5.83	0.00
NESC Heavy	1X	15.24	-9.05	-54.36	17.72	-3.02	1.34	0.92	3.30	0.00
NESC Heavy	1XY	-19.28	-24.63	-113.94	31.28	1.93	1.01	-0.50	2.18	0.00
NESC Heavy	1Y	13.19	-17.36	101.43	21.80	1.73	-5.83	0.00	6.08	0.00
NESC Extreme	1P	-33.06	-32.91	193.76	46.65	-1.20	-0.45	0.98	1.28	0.00
NESC Extreme	1X	19.18	-14.55	-80.28	24.08	-0.62	0.62	0.74	0.88	0.00
NESC Extreme	1XY	-32.92	-31.29	-169.61	45.42	-0.14	0.48	-0.59	0.50	0.00
NESC Extreme	1Y	17.92	-18.13	104.56	25.49	-0.20	-0.46	-0.82	0.50	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	1P	2P	g18X	161.153	5.604	5.671	0.398	-5.657	-27.08	-21.02	157.57
NESC Heavy	1X	2X	g18P	-56.863	5.959	6.037	-6.035	-0.152	15.24	-9.05	-54.36
NESC Heavy	1XY	2XY	g18Y	-118.036	5.270	5.343	-0.016	5.343	-19.28	-24.63	-113.94
NESC Heavy	1Y	2Y	g18XY	103.672	3.941	3.990	3.986	0.182	13.19	-17.36	101.43
NESC Extreme	1P	2P	g18X	199.297	0.264	0.270	0.248	0.107	-33.06	-32.91	193.76
NESC Extreme	1X	2X	g18P	-83.631	5.569	5.672	-5.590	0.960	19.18	-14.55	-80.28
NESC Extreme	1XY	2XY	g18Y	-175.519	4.799	4.927	4.205	2.568	-32.92	-31.29	-169.61
NESC Extreme	1Y	2Y	g18XY	107.620	0.470	0.481	-0.213	0.432	17.92	-18.13	104.56

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (ft-k)	Longitudinal Moment (ft-k)	Resultant Moment (ft-k)
NESC Heavy	7335.330	1986.477	7599.550
NESC Extreme	9411.136	3064.795	9897.599

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)
1	155.000	75.000	60	208	0.00	9.00	688.500	45.34	37.34	1173.817
2	75.000	35.000	24	60	9.00	22.50	631.192	9.00	22.50	631.192
3	35.000	19.000	20	36	22.50	27.90	403.200	22.50	27.90	403.200
4	19.000	0.000	16	12	27.90	34.33	591.223	27.90	34.33	591.223

*** 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 %	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 Comp. Member (ft)	Curve No.	No. Of Bolts Comp.	
Leg1	L3x3x3/16	SAE	3X3X0.1875	36.0	1.80	1.80	g1Y	-0.199	NESC Ext	11.113	44.600	40.781	1.000	1.000	1.000	167.55	167.55	8.322	4	4	
Leg2	L4x4x1/4	SAE	4X4X0.25	36.0	65.68	65.68	g4X	-28.358	NESC Ext	43.178	44.600	54.375	1.000	1.000	1.000	109.89	109.89	7.280	1	4	
Leg3	L5x5x5/16	SAE	5X5X0.3125	50.0	78.39	78.39	g7X	-80.584	NESC Ext	102.806	0.000	0.000	1.000	1.000	1.000	76.66	76.66	6.350	1	0	
Leg4	L6x6x9/16	SAE	6X6X0.5625	50.0	78.00	78.00	g12X	-196.689	NESC Ext	252.165	312.200	856.405	1.000	1.000	1.000	70.27	70.27	6.910	1	28	
Leg5	L8x8x1/2	SAE	8X8X0.5	50.0	84.62	84.62	g18X	-198.320	NESC Ext	234.356	312.200	761.249	0.600	0.600	0.600	88.47	88.47	19.537	1	28	
Diag1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	87.35	87.35	g19P	-7.095	NESC Ext	8.122	33.600	27.187	1.000	1.000	1.000	231.21	204.78	9.460	5	2	
Diag2	L2x2x5/16	SAE	2X2X0.3125	36.0	86.56	86.56	g20XY	-10.820	NESC Ext	12.501	33.600	33.984	0.750	0.500	0.500	175.41	162.26	11.402	5	2	
Diag3	L3X2.5X1/4	SAU	3X2.5X0.25	36.0	65.84	65.84	g28XY	-15.559	NESC Hea	23.631	33.450	40.781	0.750	0.500	0.500	127.77	125.96	11.244	5	3	
Diag4	L4X3X1/4	SAU	4X3X0.25	36.0	68.67	62.92	g36XY	-24.721	NESC Hea	39.288	55.750	67.969	0.750	0.500	0.500	101.52	106.14	11.015	2	5	
Diag5	L3X3X1/4	SAE	3X3X0.25	36.0	89.59	89.59	g46P	-11.756	NESC Hea	13.122	22.300	27.187	0.771	0.542	0.542	195.05	177.23	17.754	5	2	
Diag6	L2.5x2x1/4	SAU	2.5X2X0.25	36.0	89.11	5.80	g48Y	-0.299	NESC Ext	5.156	33.450	40.781	1.000	0.500	0.500	280.79	242.56	18.345	5	3	
Diag7	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	85.78	56.23	g50X	-1.036	NESC Hea	1.843	22.300	20.391	0.500	1.000	0.500	427.97	354.71	21.398	5	2	
Diag8	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	36.0	72.44	0.00	g53Y	0.000		1.310	22.300	20.391	1.000	0.500	0.500	368.00	368.00	16.468	4	2	
Diag9	L3x2.5x1/4	SAU	3X2.5X0.25	36.0	40.08	27.31	g55P	-1.502	NESC Hea	5.499	33.450	40.781	1.000	0.500	0.500	305.13	261.11	24.029	5	3	
Horz1	L3X3X3/16	SAE	3X3X0.1875	36.0	23.30	15.50	g56P	-1.946	NESC Hea	12.554	22.300	20.391	1.000	1.000	1.000	181.21	157.64	9.000	6	2	
Horz2	L2X2X3/16	SAE	2X2X0.1875	36.0	37.82	0.00	g57P	0.000		2.705	33.450	30.586	1.000	1.000	1.000	274.11	274.11	9.000	4	3	
Horz3	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	45.08	9.43	g59P	-0.537	NESC Ext	5.696	22.300	20.391	1.000	1.000	1.000	252.93	201.75	9.000	6	2	
Horz4	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	36.0	61.96	61.96	g65X	-9.687	NESC Ext	15.634	22.300	27.187	1.000	0.500	0.500	188.89	162.37	17.126	6	2	
Horz5	**L3.5X3.5X1/4**	**SAE**	**3.5X3.5X0.25**	**36.0**	**39.38**	**39.38**	**g68X**	**-7.028**	**NESC Hea**	**17.846**	**22.300**	**27.187**	**1.000**	**1.000**	**1.000**	**192.58**	**164.64**	**11.138**	**6**	**2**	**A**
potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g69P g69Y g71P ??																					
Horz6	L2.5X2X5/16	SAU	2.5X2X0.3125	36.0	12.27	0.00	g61X	0.000		9.046	22.300	33.984	1.000	1.000	1.000	255.92	203.59	9.000	6	2	
Inner1	L3x3x1/4	SAE	2X2X0.1875	36.0	74.50	74.50	g72X	-2.471	NESC Ext	3.316	11.150	10.195	2.000	1.000	1.000	247.54	247.54	6.364	4	1	
Inner2	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	73.09	73.09	g75P	-6.233	NESC Hea	8.528	22.300	20.391	0.750	0.500	0.500	178.85	164.88	12.728	5	2	
Inner3	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	36.0	22.80	22.80	g74P	-2.755	NESC Hea	12.085	22.300	20.391	0.750	0.500	0.500	154.28	146.16	12.728	5	2	
TopCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	29.57	29.57	g77Y	-11.872	NESC Hea	40.145	55.750	67.969	0.500	0.500	0.500	112.21	116.10	14.867	3	5	
TopArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	44.83	11.02	g83P	-0.907	NESC Ext	8.230	33.450	30.586	0.670	0.330	0.330	167.84	167.84	16.554	4	3	
MdCrArm1	L4X4X1/4	SAE	4X4X0.25	50.0	29.67	29.67	g79Y	-14.220	NESC Hea	47.928	66.900	81.562	0.330	0.330	0.330	93.24	106.62	18.719	3	6	
MidArmBr	2.5x2x1/4	SAU	2.5X2X0.25	36.0	46.94	10.83	g84P	-0.785	NESC Ext	7.246	33.450	40.781	0.670	0.330	0.330	204.63	204.63	19.954	4	3	
BotCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	34.03	34.03	g81Y	-13.660	NESC Hea	40.145	55.750	67.969	0.500	0.500	0.500	112.21	116.10	14.867	3	5	
BotArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	58.32	5.07	g85P	-0.426	NESC Ext	8.391	33.450	30.586	0.670	0.330	0.330	166.22	166.22	16.395	4	3	
ShArmBr	L4x3x1/4	SAU	4X3X0.25	36.0	67.00	67.00	g86P	-9.232	NESC Hea	13.780	22.300	27.187	1.000	0.500	0.500	187.36	187.36	19.985	4	2	
ShieldAr	4ST10	ST	ST4x10	36.0	17.77	3.76	g87P	-1.010	NESC Ext	26.876	44.600	107.880	1.000	1.000	1.000	194.68	176.95	18.170	5	4	
Mast	12" Sch. 40	Pwmnt	Pipe 12" Std.	35.0	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	
M1	L3x3x1/4	SAE	3X3X0.25	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	
M2	C12x20.7	CHA	12X20.7	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	
Diag10	L3X3X3/8	SAE	3X3X0.375	36.0	93.22	93.22	g42P	-20.788	NESC Hea	28.743	22.300	40.781	0.784	0.567	0.567	152.69	144.95	13.173	5	2	
MdCrArm2	L4X4X1/4	SAE	4X4X0.25	36.0	18.87	18.87	g80P	-6.225	NESC Hea	32.984	66.900	81.562	1.000	1.000	1.000	135.85	129.75	9.000	6	6	
Inner4	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	22.48	22.48	g76Y	-0.917	NESC Ext	4.081	11.150	10.195	1.000	0.500	0.500	238.35	238.35	15.751	4	1	
Horz7	**L3X3X3/16**	**SAE**	**3X3X0.1875**	**36.0**	**33.81**	**33.81**	**g66Y**	**-1.719**	**NESC Ext**	**5.085**	**22.300**	**20.391**	**2.000**	**1.000**	**1.000**	**287.54**	**247.71**	**11.250**	**5**	**2**	**A**
potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g67P g67X g67XY g67Y ??																					
M3	L3x3x1/4	SAE	3X3X0.25	36.0	17.52	17.52	g89P	-2.571	NESC Hea	14.670	33.600	27.187	1.000	1.000	1.000	182.43	167.61	9.000	5	2	
M4	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	45.08	0.00	g90P	0.000		4.733	33.600	20.391	1.000	1.000	1.000	252.93	221.33	9.000	5	2	

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	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 Tens.	No. Of Holes	Hole Diameter (in)
Leg1	L3x3x3/16	SAE	3X3X0.1875	36.0	1.80	0.00	g1Y	0.000		28.845	44.600	40.781	31.719	8.322	4	2.240	0.6875
Leg2	L4x4x1/4	SAE	4X4X0.25	36.0	65.68	62.97	g4Y	28.083	NESC Ext	57.465	44.600	54.375	60.417	7.280	4	2.000	0.6875
Leg3	L5x5x5/16	SAE	5X5X0.3125	50.0	78.39	75.53	g8Y	86.603	NESC Ext	114.654	133.800	203.906	213.235	6.910	12	3.430	0.6875
Leg4	L6x6x9/16	SAE	6X6X0.5625	50.0	78.00	76.41	g12Y	186.569	NESC Ext	244.156	312.200	856.405	895.587	6.910	28	4.000	0.6875
Leg5	L8x8x1/2	SAE	8X8X0.5	50.0	84.62	59.37	g15Y	185.345	NESC Ext	318.750	312.200	761.249	845.832	8.219	28	4.000	0.6875
Diag1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	87.35	25.68	g19X	6.982	NESC Ext	32.987	33.600	27.187	27.187	9.460	2	1.000	0.6875
Diag2	L2x2x5/16	SAE	2X2X0.3125	36.0	86.56	42.42	g24Y	11.213	NESC Ext	30.299	33.600	33.984	26.432	11.576	2	1.000	0.6875

Diag3	L3X2.5X1/4	SAU	3X2.5X0.25	36.0	65.84	52.21	g32Y	16.561NESC	Ext	32.825	33.450	40.781	31.719	11.347	3	1.000	0.6875
Diag4	L4X3X1/4	SAU	4X3X0.25	36.0	68.67	68.67	g40Y	25.003NESC	Hea	36.409	55.750	67.969	48.866	11.347	5	1.840	0.6875
Diag5	L3X3X1/4	SAE	3X3X0.25	36.0	89.59	70.09	g45P	14.821NESC	Hea	41.087	22.300	27.187	21.146	15.414	2	1.000	0.6875
Diag6	L2.5x2x1/4	SAU	2.5X2X0.25	36.0	89.11	89.11	g48X	22.034NESC	Hea	24.725	33.450	40.781	29.016	18.345	3	1.000	0.6875
Diag7	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	85.78	85.78	g50P	13.604NESC	Hea	22.067	22.300	20.391	15.859	21.398	2	1.000	0.6875
Diag8	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	36.0	72.44	72.44	g53X	10.426NESC	Hea	15.911	22.300	20.391	14.393	16.468	2	1.000	0.6875
Diag9	L3x2.5x1/4	SAU	3X2.5X0.25	36.0	40.08	40.08	g55X	12.530NESC	Hea	32.825	33.450	40.781	31.266	24.029	3	1.000	0.6875
Horz1	L3X3X3/16	SAE	3X3X0.1875	36.0	23.30	23.30	g60P	5.542NESC	Hea	31.139	33.450	30.586	23.789	9.000	3	1.000	0.6875
Horz2	L2X2X3/16	SAE	2X2X0.1875	36.0	37.82	37.82	g57P	7.121NESC	Ext	18.827	33.450	30.586	23.789	9.000	3	1.000	0.6875
Horz3	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	45.08	45.08	g63X	9.192NESC	Ext	22.067	22.300	20.391	26.654	9.000	2	1.000	0.6875
Horz4	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	36.0	61.96	13.94	g65P	2.948NESC	Ext	32.987	22.300	27.187	21.146	17.126	2	1.000	0.6875
Horz5	**L3.5X3.5X1/4**	**SAE**	**3.5X3.5X0.25**	**36.0**	**39.38**	**3.56**	**g71X**	**1.552NESC**	**Ext**	**43.618**	**0.000**	**0.000**	**0.000**	**5.625**	**0**	**2.000**	**0.6875 A potentially**
damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g69P g69Y g71P ??																	
Horz6	L2.5X2X5/16	SAU	2.5X2X0.3125	36.0	12.27	12.27	g61X	2.736NESC	Hea	35.483	22.300	33.984	44.424	9.000	2	1.000	0.6875
Inner1	L3x3x1/4	SAE	2X2X0.1875	36.0	74.50	2.01	ig72P90P	0.159NESC	Ext	18.827	11.150	10.195	7.896	6.364	1	1.000	0.6875
Inner2	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	73.09	21.78	g73X	2.963NESC	Hea	19.030	22.300	20.391	13.605	12.728	2	1.000	0.6875
Inner3	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	36.0	22.80	13.00	g74X	1.988NESC	Hea	25.048	22.300	20.391	15.293	12.728	2	1.000	0.6875
TopCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	29.57	15.21	g77XY	7.800NESC	Ext	51.273	55.750	67.969	52.865	14.867	5	2.080	0.6875
TopArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	44.83	44.83	g83Y	6.659NESC	Hea	14.853	33.450	30.586	23.789	16.554	3	2.000	0.6875
MdCrArm1	L4X4X1/4	SAE	4X4X0.25	50.0	29.67	11.91	g79XY	7.553NESC	Hea	71.831	66.900	81.562	63.437	18.719	6	2.000	0.6875
MidArmBr	2.5x2x1/4	SAU	2.5X2X0.25	36.0	46.94	46.94	g84Y	8.992NESC	Hea	19.156	33.450	40.781	31.719	19.954	3	2.000	0.6875
BotCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	34.03	15.31	g81XY	7.920NESC	Hea	51.718	55.750	67.969	52.865	14.867	5	2.000	0.6875
BotArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	58.32	58.32	g85Y	8.663NESC	Hea	14.853	33.450	30.586	23.789	16.395	3	2.000	0.6875
ShArmBr	L4x3x1/4	SAU	4X3X0.25	36.0	67.00	23.87	g86Y	5.048NESC	Ext	41.087	22.300	27.187	21.146	19.985	2	1.000	0.6875
ShieldAr	4ST10	ST	ST4x10	36.0	17.77	17.77	g87X	7.927NESC	Hea	84.207	44.600	107.880	83.907	18.170	4	2.000	0.6875
Mast	12" Sch. 40	Pwmnt	Pipe 12" Std.	35.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
M1	L3x3x1/4	SAE	3X3X0.25	36.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
M2	C12x20.7	CHA	12X20.7	36.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
Diag10	L3X3X3/8	SAE	3X3X0.375	36.0	93.22	60.22	g43XY	19.100NESC	Hea	60.011	33.600	40.781	31.719	13.173	2	1.000	0.6875
MdCrArm2	L4X4X1/4	SAE	4X4X0.25	36.0	18.87	1.37	g80Y	0.589NESC	Ext	43.026	66.900	81.562	63.437	9.000	6	3.561	0.6875
Inner4	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	22.48	8.20	g76XY	0.647NESC	Ext	19.030	11.150	10.195	7.896	15.751	1	1.000	0.6875
Horz7	**L3X3X3/16**	**SAE**	**3X3X0.1875**	**36.0**	**33.81**	**4.45**	**g66XY**	**0.706NESC**	**Ext**	**31.139**	**22.300**	**20.391**	**15.859**	**11.250**	**2**	**1.000**	**0.6875 A potentially**
damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g67P g67X g67XY g67Y ??																	
M3	L3x3x1/4	SAE	3X3X0.25	36.0	17.52	3.54	g89Y	0.749NESC	Hea	36.131	33.600	27.187	21.146	9.000	2	1.890	0.6875
M4	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	45.08	45.08	g90P	9.192NESC	Ext	22.067	33.600	20.391	20.391	9.000	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	93.22	g42P	Angle
NESC Extreme	87.35	g19P	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	10.77	NESC Heavy	0.0
2	Clamp	6.34	NESC Heavy	0.0
3	Clamp	16.27	NESC Heavy	0.0
4	Clamp	23.52	NESC Heavy	0.0
5	Clamp	16.34	NESC Heavy	0.0
6	Clamp	23.58	NESC Heavy	0.0
7	Clamp	16.27	NESC Heavy	0.0
8	Clamp	23.51	NESC Heavy	0.0
10	Clamp	4.44	NESC Extreme	0.0
11	Clamp	1.99	NESC Heavy	0.0

12	Clamp	2.12	NESC Heavy	0.0
13	Clamp	2.28	NESC Heavy	0.0
14	Clamp	2.90	NESC Heavy	0.0
15	Clamp	3.57	NESC Heavy	0.0
16	Clamp	3.40	NESC Heavy	0.0
17	Clamp	5.07	NESC Heavy	0.0
18	Clamp	0.69	NESC Extreme	0.0
19	Clamp	7.17	NESC Heavy	0.0
20	Clamp	0.69	NESC Extreme	0.0
21	Clamp	0.80	NESC Heavy	0.0
22	Clamp	0.94	NESC Heavy	0.0
23	Clamp	1.28	NESC Heavy	0.0
24	Clamp	1.86	NESC Heavy	0.0
25	Clamp	1.73	NESC Heavy	0.0
26	Clamp	2.33	NESC Heavy	0.0
27	Clamp	0.69	NESC Extreme	0.0
28	Clamp	0.69	NESC Extreme	0.0
29	Clamp	0.69	NESC Extreme	0.0
30	Clamp	0.69	NESC Extreme	0.0
31	Clamp	9.04	NESC Extreme	0.0
32	Clamp	11.62	NESC Extreme	0.0
33	Clamp	18.30	NESC Extreme	0.0
34	Clamp	9.62	NESC Extreme	0.0
35	Clamp	7.18	NESC Extreme	0.0
36	Clamp	12.77	NESC Heavy	0.0
38	Clamp	1.40	NESC Extreme	0.0
40	Clamp	1.41	NESC Heavy	0.0
41	Clamp	1.55	NESC Heavy	0.0
42	Clamp	1.70	NESC Heavy	0.0
43	Clamp	2.18	NESC Heavy	0.0
44	Clamp	2.86	NESC Heavy	0.0
45	Clamp	2.68	NESC Heavy	0.0
46	Clamp	3.86	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Angles*Section DLF:	29457.3
Total:	29457.3

*** End of Report

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*******************************************************************************
*                                                                             *
* TOWER - Analysis and Design -  Copyright Power Line Systems, Inc. 1986-2011 *
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Project Name : 12014.CO4 - Manchester, CT
Project Notes: CL&P Structure # 20003/ AT&T CT1209
Project File : J:\Jobs\1201400.WI\CO.04 - CT1209 - 190 Olcott St, Manchester, CT\Rev (3)\Calcs\PLS Tower\cl&p tower #20003.tow
Date run : 10:48:07 AM Friday, September 07, 2012
by : Tower Version 11.11
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

KL/R value of 167.55 exceeds maximum of 150.00 for member "g1P" ??
KL/R value of 167.55 exceeds maximum of 150.00 for member "g1X" ??
KL/R value of 167.55 exceeds maximum of 150.00 for member "g1XY" ??
KL/R value of 167.55 exceeds maximum of 150.00 for member "g1Y" ??
Member "g8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g18P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

Member "g18Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19P" ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19X" ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19XY" ??
KL/R value of 204.78 exceeds maximum of 200.00 for member "g19Y" ??
Member "g20P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g24P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g25Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g27X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will

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Member "g27XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g29XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g30Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g31Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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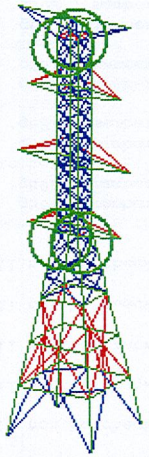
Member "g35XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g36Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g37Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g38Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g39Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g40Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g41Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54P" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54X" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54XY" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g54Y" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55P" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55X" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55XY" ??
KL/R value of 261.11 exceeds maximum of 200.00 for member "g55Y" ??
Member "g56P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g56Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
KL/R value of 203.59 exceeds maximum of 200.00 for member "g61P" ??

KL/R value of 203.59 exceeds maximum of 200.00 for member "g61X" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66P" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66X" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66XY" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g66Y" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67P" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67X" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67XY" ??
KL/R value of 247.71 exceeds maximum of 200.00 for member "g67Y" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76P" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76X" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76XY" ??
KL/R value of 238.35 exceeds maximum of 200.00 for member "g76Y" ??
Member "g77P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g77X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g77XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g77Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g78P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g78Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g79Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g80P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g80Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g81Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g82P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g82Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g89P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g89Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

The following members have the same origin joint label '18X' and end joint label '18P'
Member label 'g56P', member number 149 ??
Member label 'g89P', member number 193 ??
The following members have the same origin joint label '18XY' and end joint label '18Y'
Member label 'g56Y', member number 150 ??
Member label 'g89Y', member number 194 ??
The following members have the same origin joint label '7P' and end joint label '7Y'
Member label 'g63P', member number 163 ??
Member label 'g90X', member number 196 ??
The following members have the same origin joint label '7X' and end joint label '7XY'
Member label 'g63X', member number 164 ??
Member label 'g90P', member number 195 ??

The model has 168 warnings. ??



Nonlinear convergence parameters: Use Standard Parameters
Member check option: ASCE 10
Connection rupture check: ASCE 10
Crossing diagonal check: ASCE 10 [Alternate Unsupported RLOUT = 1]
Included angle check: None

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	17.17	17.17	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
2P	XY-Symmetry	13.95	13.95	19	Free	Free	Free	Free	Free	Free
3P	XY-Symmetry	11.25	11.25	35	Free	Free	Free	Free	Free	Free
4P	XY-Symmetry	8.563	8.563	51	Free	Free	Free	Free	Free	Free
5P	XY-Symmetry	7.23	7.23	59	Free	Free	Free	Free	Free	Free
6P	XY-Symmetry	5.875	5.875	67	Free	Free	Free	Free	Free	Free
7P	XY-Symmetry	4.5	4.5	75	Free	Free	Free	Free	Free	Free
8P	XY-Symmetry	4.5	4.5	81.91	Free	Free	Free	Free	Free	Free
9P	XY-Symmetry	4.5	4.5	88.26	Free	Free	Free	Free	Free	Free
10P	XY-Symmetry	4.5	4.5	94.61	Free	Free	Free	Free	Free	Free
11P	XY-Symmetry	4.5	4.5	101	Free	Free	Free	Free	Free	Free
12P	XY-Symmetry	4.5	4.5	107.9	Free	Free	Free	Free	Free	Free
13P	XY-Symmetry	4.5	4.5	114.3	Free	Free	Free	Free	Free	Free
14P	XY-Symmetry	4.5	4.5	121	Free	Free	Free	Free	Free	Free
15P	XY-Symmetry	4.5	4.5	127	Free	Free	Free	Free	Free	Free
16P	XY-Symmetry	4.5	4.5	134.3	Free	Free	Free	Free	Free	Free
17P	XY-Symmetry	4.5	4.5	141	Free	Free	Free	Free	Free	Free
18P	XY-Symmetry	4.5	4.5	148	Free	Free	Free	Free	Free	Free
19P	X-Symmetry	0	4.5	155	Free	Free	Free	Free	Free	Free
20P	None	0	0	155	Free	Free	Free	Free	Free	Free
21P	XY-Symmetry	13.95	2.813	19	Free	Free	Free	Free	Free	Free
22P	XY-Symmetry	2.813	13.95	19	Free	Free	Free	Free	Free	Free
23P	Y-Symmetry	11.25	0	35	Free	Free	Free	Free	Free	Free
24P	X-Symmetry	0	11.25	35	Free	Free	Free	Free	Free	Free
25P	X-Symmetry	0	18.67	75	Free	Free	Free	Free	Free	Free
26P	X-Symmetry	0	22.67	101	Free	Free	Free	Free	Free	Free
27P	X-Symmetry	0	18.67	127	Free	Free	Free	Free	Free	Free

28P	X-Symmetry	0	22.67	155	Free	Free	Free	Free	Free	Free
1X	X-GenXY	17.17	-17.17	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
1XY	XY-GenXY	-17.17	-17.17	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
1Y	Y-GenXY	-17.17	17.17	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
2X	X-GenXY	13.95	-13.95	19	Free	Free	Free	Free	Free	Free
2XY	XY-GenXY	-13.95	-13.95	19	Free	Free	Free	Free	Free	Free
2Y	Y-GenXY	-13.95	13.95	19	Free	Free	Free	Free	Free	Free
3X	X-GenXY	11.25	-11.25	35	Free	Free	Free	Free	Free	Free
3XY	XY-GenXY	-11.25	-11.25	35	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	-11.25	11.25	35	Free	Free	Free	Free	Free	Free
4X	X-GenXY	8.563	-8.563	51	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	-8.563	-8.563	51	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	-8.563	8.563	51	Free	Free	Free	Free	Free	Free
5X	X-GenXY	7.23	-7.23	59	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	-7.23	-7.23	59	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	-7.23	7.23	59	Free	Free	Free	Free	Free	Free
6X	X-GenXY	5.875	-5.875	67	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	-5.875	-5.875	67	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	-5.875	5.875	67	Free	Free	Free	Free	Free	Free
7X	X-GenXY	4.5	-4.5	75	Free	Free	Free	Free	Free	Free
7XY	XY-GenXY	-4.5	-4.5	75	Free	Free	Free	Free	Free	Free
7Y	Y-GenXY	-4.5	4.5	75	Free	Free	Free	Free	Free	Free
8X	X-GenXY	4.5	-4.5	81.91	Free	Free	Free	Free	Free	Free
8XY	XY-GenXY	-4.5	-4.5	81.91	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	-4.5	4.5	81.91	Free	Free	Free	Free	Free	Free
9X	X-GenXY	4.5	-4.5	88.26	Free	Free	Free	Free	Free	Free
9XY	XY-GenXY	-4.5	-4.5	88.26	Free	Free	Free	Free	Free	Free
9Y	Y-GenXY	-4.5	4.5	88.26	Free	Free	Free	Free	Free	Free
10X	X-GenXY	4.5	-4.5	94.61	Free	Free	Free	Free	Free	Free
10XY	XY-GenXY	-4.5	-4.5	94.61	Free	Free	Free	Free	Free	Free
10Y	Y-GenXY	-4.5	4.5	94.61	Free	Free	Free	Free	Free	Free
11X	X-GenXY	4.5	-4.5	101	Free	Free	Free	Free	Free	Free
11XY	XY-GenXY	-4.5	-4.5	101	Free	Free	Free	Free	Free	Free
11Y	Y-GenXY	-4.5	4.5	101	Free	Free	Free	Free	Free	Free
12X	X-GenXY	4.5	-4.5	107.9	Free	Free	Free	Free	Free	Free
12XY	XY-GenXY	-4.5	-4.5	107.9	Free	Free	Free	Free	Free	Free
12Y	Y-GenXY	-4.5	4.5	107.9	Free	Free	Free	Free	Free	Free
13X	X-GenXY	4.5	-4.5	114.3	Free	Free	Free	Free	Free	Free
13XY	XY-GenXY	-4.5	-4.5	114.3	Free	Free	Free	Free	Free	Free
13Y	Y-GenXY	-4.5	4.5	114.3	Free	Free	Free	Free	Free	Free
14X	X-GenXY	4.5	-4.5	121	Free	Free	Free	Free	Free	Free
14XY	XY-GenXY	-4.5	-4.5	121	Free	Free	Free	Free	Free	Free
14Y	Y-GenXY	-4.5	4.5	121	Free	Free	Free	Free	Free	Free
15X	X-GenXY	4.5	-4.5	127	Free	Free	Free	Free	Free	Free
15XY	XY-GenXY	-4.5	-4.5	127	Free	Free	Free	Free	Free	Free
15Y	Y-GenXY	-4.5	4.5	127	Free	Free	Free	Free	Free	Free
16X	X-GenXY	4.5	-4.5	134.3	Free	Free	Free	Free	Free	Free
16XY	XY-GenXY	-4.5	-4.5	134.3	Free	Free	Free	Free	Free	Free
16Y	Y-GenXY	-4.5	4.5	134.3	Free	Free	Free	Free	Free	Free
17X	X-GenXY	4.5	-4.5	141	Free	Free	Free	Free	Free	Free
17XY	XY-GenXY	-4.5	-4.5	141	Free	Free	Free	Free	Free	Free
17Y	Y-GenXY	-4.5	4.5	141	Free	Free	Free	Free	Free	Free
18X	X-GenXY	4.5	-4.5	148	Free	Free	Free	Free	Free	Free
18XY	XY-GenXY	-4.5	-4.5	148	Free	Free	Free	Free	Free	Free
18Y	Y-GenXY	-4.5	4.5	148	Free	Free	Free	Free	Free	Free
19X	X-Gen	0	-4.5	155	Free	Free	Free	Free	Free	Free
21X	X-GenXY	13.95	-2.813	19	Free	Free	Free	Free	Free	Free
21XY	XY-GenXY	-13.95	-2.813	19	Free	Free	Free	Free	Free	Free
21Y	Y-GenXY	-13.95	2.813	19	Free	Free	Free	Free	Free	Free
22X	X-GenXY	2.813	-13.95	19	Free	Free	Free	Free	Free	Free
22XY	XY-GenXY	-2.813	-13.95	19	Free	Free	Free	Free	Free	Free
22Y	Y-GenXY	-2.813	13.95	19	Free	Free	Free	Free	Free	Free
23Y	Y-Gen	-11.25	0	35	Free	Free	Free	Free	Free	Free
24X	X-Gen	0	-11.25	35	Free	Free	Free	Free	Free	Free
25X	X-Gen	0	-18.67	75	Free	Free	Free	Free	Free	Free
26X	X-Gen	0	-22.67	101	Free	Free	Free	Free	Free	Free
27X	X-Gen	0	-18.67	127	Free	Free	Free	Free	Free	Free

28X	X-Gen	0	-22.67	155	Free	Free	Free	Free	Free	Free

Secondary Joints:

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.
i0.50E148S	None	18P	18XY	0.5	0	Free	Free	Free	Free	Free	Free

The model contains 95 primary and 1 secondary joints for a total of 96 joints.

Steel Material Properties:

Steel Material Label	Modulus of Elasticity (ksi)	Yield Stress Fy (ksi)	Ultimate Stress Fu (ksi)	Member Stress All. Hyp. 1 (ksi)	Member Stress All. Hyp. 2 (ksi)	Member Rupture Hyp. 1 (ksi)	Member Rupture Hyp. 2 (ksi)	Member Bearing Hyp. 1 (ksi)	Member Bearing Hyp. 2 (ksi)
A 36	2.9e+004	36	58	0	0	0	0	0	0
A36 Mod 50	2.9e+004	50	58	0	0	0	0	0	0
A53-GrB	2.9e+004	35	60	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)
5/8 A394 TYPE0 N	0.625	0.6875	11.15	1.125	1.5	0	0
5/8 A325	0.625	0.6875	16.8	1.25	1.5	0	0

Number Bolts Used By Type:

Bolt Type	Number Bolts
5/8 A394 TYPE0 N	1270
5/8 A325	72

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)	Number of Angles	Wind Width (in)	Short Edge Dist. (in)	Long Edge Dist. (in)	Optimize Cost Factor	Section Modulus (in^3)
SAE	8X8X0.5	8	8	0.5	26.4	7.75	13.75	2.5	2.5	1.59	1	8	4	0	1.0000	0
SAE	6X6X0.5625	6	6	0.5625	21.9	6.43	8.78	1.85	1.85	1.18	1	6	3	0	1.0000	0
SAE	5X5X0.3125	5	5	0.3125	10.3	3.03	13.4	1.57	1.57	0.994	1	5	2.5	0	1.0000	0
SAE	4X4X0.25	4	4	0.25	6.6	1.94	13.5	1.25	1.25	0.795	1	4	2	0	1.0000	0
SAE	3.5X3.5X0.25	3.5	3.5	0.25	5.8	1.69	11.5	1.09	1.09	0.694	1	3.5	1.75	0	1.0000	0
SAE	3X3X0.375	3	3	0.375	7.2	2.11	6.17	0.913	0.913	0.587	1	3	1.5	0	1.0000	0
SAE	3X3X0.25	3	3	0.25	4.9	1.44	9.75	0.93	0.93	0.592	1	3	1.5	0	1.0000	0
SAE	3X3X0.1875	3	3	0.1875	3.71	1.09	13.33	0.939	0.939	0.596	1	3	1.5	0	1.0000	0
SAE	2.5X2.5X0.25	2.5	2.5	0.25	4.1	1.19	7.75	0.769	0.769	0.491	1	2.5	1.25	0	1.0000	0
SAE	2.5X2.5X0.1875	2.5	2.5	0.1875	3.07	0.902	10.67	0.778	0.778	0.495	1	2.5	1.25	0	1.0000	0
SAE	2X2X0.3125	2	2	0.3125	3.92	1.15	3.8	0.601	0.601	0.39	1	2	1	0	1.0000	0
SAE	2X2X0.1875	2	2	0.1875	2.44	0.71	8	0.617	0.617	0.394	1	2	1	0	1.0000	0
SAE	1.75X1.75X0.1875	1.75	1.75	0.1875	2.12	0.62	6	0.537	0.537	0.343	1	1.75	0.875	0	1.0000	0
SAU	4X3X0.25	4	3	0.25	5.8	1.69	13.25	1.28	0.896	0.651	1	4	1.5	0	1.0000	0
SAU	3.5X2.5X0.25	3.5	2.5	0.25	4.9	1.44	11.25	1.12	0.735	0.544	1	3.5	1.25	0	1.0000	0
SAU	3X2.5X0.25	3	2.5	0.25	4.5	1.31	9.5	0.945	0.753	0.528	1	3	1.25	0	1.0000	0
SAU	2.5X2X0.3125	2.5	2	0.3125	4.5	1.31	6	0.776	0.584	0.422	1	2.5	1	0	1.0000	0
SAU	2.5X2X0.25	2.5	2	0.25	3.62	1.06	7.75	0.784	0.592	0.424	1	2.5	1	0	1.0000	0

SAU	2.5X2X0.1875	2.5	2	0.1875	2.75	0.81	10.67	0.793	0.6	0.427	1	2.5	1	0	1.0000	0
Pwmnt	Pipe 12" Std.	12.75	12	0	49.6	13.6	1	4.39	4.39	4.39	1	12.75	0	0	0.0000	0
ST	ST4x10	5.268	4.07	0.248	10	2.94	16.4	1.12	1.2	1.12	2	4	0	0	0.0000	0
CHA	12X20.7	12	2.94	0.282	20.7	6.08	24	4.61	0.797	0.797	1	12	0	0	1.0000	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)
Leg1	L3x3x3/16	SAE	3X3X0.1875	A 36	Beam	Leg	None	0.000
Leg2	L4x4x1/4	SAE	4X4X0.25	A 36	Beam	Leg	None	0.000
Leg3	L5x5x5/16	SAE	5X5X0.3125	A36 Mod 50	Beam	Leg	None	0.000
Leg4	L6x6x9/16	SAE	6X6X0.5625	A36 Mod 50	Beam	Leg	None	0.000
Leg5	L8x8x1/2	SAE	8X8X0.5	A36 Mod 50	Beam	Leg	None	0.000
Diag1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	A 36	Truss	Other	None	0.000
Diag2	L2x2x5/16	SAE	2X2X0.3125	A 36	Truss	Crossing Diagonal	None	0.000
Diag3	L3X2.5X1/4	SAU	3X2.5X0.25	A 36	Truss	Crossing Diagonal	None	0.000
Diag4	L4X3X1/4	SAU	4X3X0.25	A 36	Truss	Crossing Diagonal	None	0.000
Diag5	L3X3X1/4	SAE	3X3X0.25	A 36	Truss	Crossing Diagonal	None	0.000
Diag6	L2.5x2x1/4	SAU	2.5X2X0.25	A 36	T-Only	Other	None	0.000
Diag7	L2.5x2x3/16	SAU	2.5X2X0.1875	A 36	T-Only	Other	None	0.000
Diag8	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	A 36	T-Only	Other	None	0.000
Diag9	L3x2.5x1/4	SAU	3X2.5X0.25	A 36	Truss	Other	None	0.000
Horz1	L3X3X3/16	SAE	3X3X0.1875	A 36	Truss	Other	None	0.000
Horz2	L2X2X3/16	SAE	2X2X0.1875	A 36	T-Only	Other	None	0.000
Horz3	L2.5X2X3/16	SAU	2.5X2X0.1875	A 36	T-Only	Other	None	0.000
Horz4	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	A 36	Beam	Other	None	0.000
Horz5	L3.5X3.5X1/4	SAE	3.5X3.5X0.25	A 36	Beam	Other	None	0.000
Horz6	L2.5X2X5/16	SAU	2.5X2X0.3125	A 36	Truss	Other	None	0.000
Inner1	L3x3x1/4	SAE	2X2X0.1875	A 36	T-Only Beam	Other	None	0.000
Inner2	L2.5X2X3/16	SAU	2.5X2X0.1875	A 36	Truss	Crossing Diagonal	None	0.000
Inner3	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	A 36	Truss	Crossing Diagonal	None	0.000
TopCrArm	L4X4X1/4	SAE	4X4X0.25	A 36	Beam	Other	None	0.000
TopArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	A 36	T-Only	Other	None	0.000
MdCrArm1	L4X4X1/4	SAE	4X4X0.25	A36 Mod 50	Beam	Other	None	0.000
MidArmBr	2.5x2x1/4	SAU	2.5X2X0.25	A 36	T-Only	Other	None	0.000
BotCrArm	L4X4X1/4	SAE	4X4X0.25	A 36	Beam	Other	None	0.000
BotArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	A 36	T-Only	Other	None	0.000
ShArmBr	L4x3x1/4	SAU	4X3X0.25	A 36	Truss	Other	None	0.000
ShieldAr	4ST10	ST	ST4x10	A 36	Beam	Other	None	0.000
Mast	12" Sch. 40	Pwmnt	Pipe 12" Std.	A53-GrB	Beam	Other	None	0.000
M1	L3x3x1/4	SAE	3X3X0.25	A 36	Truss	Other	None	0.000
M2	C12x20.7	CHA	12X20.7	A 36	Truss	Other	None	0.000
Diag10	L3X3X3/8	SAE	3X3X0.375	A 36	Truss	Crossing Diagonal	None	0.000
MdCrArm2	L4X4X1/4	SAE	4X4X0.25	A 36	Truss	Other	None	0.000
Inner4	L2.5X2X3/16	SAU	2.5X2X0.1875	A 36	Truss	Other	None	0.000
Horz7	L3X3X3/16	SAE	3X3X0.1875	A 36	Beam	Other	None	0.000
M3	L3x3x1/4	SAE	3X3X0.25	A 36	Truss	Other	None	0.000
M4	L2.5x2x3/16	SAU	2.5X2X0.1875	A 36	T-Only	Other	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	3X3X0.1875	A 36	195.29	195.29	724.51
SAE	4X4X0.25	A 36	256.94	342.59	1695.80
SAE	5X5X0.3125	A36 Mod 50	104.00	173.33	1071.20
SAE	6X6X0.5625	A36 Mod 50	104.00	208.00	2277.60

SAE	8X8X0.5	A36 Mod 50	308.44	822.50	8142.80
SAE	2.5X2.5X0.25	A 36	37.84	31.53	155.15
SAE	2X2X0.3125	A 36	273.68	182.45	1072.81
SAU	3X2.5X0.25	A 36	547.61	501.98	2464.24
SAU	4X3X0.25	A 36	435.25	507.79	2524.45
SAE	3X3X0.375	A 36	105.39	105.39	758.77
SAE	3X3X0.25	A 36	283.34	283.34	1388.36
SAU	2.5X2X0.25	A 36	226.58	169.93	820.20
SAU	2.5X2X0.1875	A 36	470.90	353.17	1294.97
SAE	1.75X1.75X0.1875	A 36	131.75	76.85	279.30
SAE	2X2X0.1875	A 36	43.46	28.97	106.03
SAU	2.5X2X0.3125	A 36	18.00	13.50	81.00
SAU	3.5X2.5X0.25	A 36	68.50	68.50	335.67
SAE	3.5X3.5X0.25	A 36	111.60	130.20	647.28
SAE	2.5X2.5X0.1875	A 36	25.46	21.21	78.15
SAE	4X4X0.25	A36 Mod 50	74.88	99.83	494.18
ST	ST4x10	A 36	45.34	70.56	453.40

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 Bottom	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 Factor For Face EIA Only	Ar Round Factor 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	Force Solid Face
1	7P	1.000	3.200	3.200	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	None
2	3P	1.100	3.200	3.200	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	None
3	2P	1.350	3.200	3.200	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000	None
4	1P	1.230	3.200	3.200	1.000	1.000	0.000	0.000	0.000	0.000	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)	Rest. Coef.
g1P	Leg1		XY-Symmetry	19X	18X	1	4	1	1	1	5/8 A394 TYPE0 N	4	2.24	1	Both	1	1.75	0.875	2.5	0
g1X	Leg1		X-GenXY	19P	18P	1	4	1	1	1	5/8 A394 TYPE0 N	4	2.24	1	Both	1	1.75	0.875	2.5	0
g1XY	Leg1		XY-GenXY	19P	18Y	1	4	1	1	1	5/8 A394 TYPE0 N	4	2.24	1	Both	1	1.75	0.875	2.5	0
g1Y	Leg1		Y-GenXY	19X	18XY	1	4	1	1	1	5/8 A394 TYPE0 N	4	2.24	1	Both	1	1.75	0.875	2.5	0
g2P	Leg2		XY-Symmetry	18X	17X	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g2X	Leg2		X-GenXY	18P	17P	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g2XY	Leg2		XY-GenXY	18Y	17Y	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g2Y	Leg2		Y-GenXY	18XY	17XY	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g3P	Leg2		XY-Symmetry	17X	16X	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g3X	Leg2		X-GenXY	17P	16P	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g3XY	Leg2		XY-GenXY	17Y	16Y	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g3Y	Leg2		Y-GenXY	17XY	16XY	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g4P	Leg2		XY-Symmetry	16X	15X	1	4	1	1	1	5/8 A394 TYPE0 N	4	2	1	Both	2.25	0	1.25	6	0
g4X	Leg2		X-GenXY	16P	15P	1	4	1	1	1	5/8 A394 TYPE0 N	4	2	1	Both	2.25	0	1.25	6	0
g4XY	Leg2		XY-GenXY	16Y	15Y	1	4	1	1	1	5/8 A394 TYPE0 N	4	2	1	Both	2.25	0	1.25	6	0
g4Y	Leg2		Y-GenXY	16XY	15XY	1	4	1	1	1	5/8 A394 TYPE0 N	4	2	1	Both	2.25	0	1.25	6	0
g5P	Leg3		XY-Symmetry	15X	14X	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g5X	Leg3		X-GenXY	15P	14P	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g5XY	Leg3		XY-GenXY	15Y	14Y	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g5Y	Leg3		Y-GenXY	15XY	14XY	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g6P	Leg3		XY-Symmetry	14X	13X	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g6X	Leg3		X-GenXY	14P	13P	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g6XY	Leg3		XY-GenXY	14Y	13Y	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g6Y	Leg3		Y-GenXY	14XY	13XY	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g7P	Leg3		XY-Symmetry	13X	12X	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g7X	Leg3		X-GenXY	13P	12P	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0
g7XY	Leg3		XY-GenXY	13Y	12Y	1	4	1	1	1	5/8 A394 TYPE0 N	0	0	0		0	0	0	0	0

g7Y	Leg3	Y-GenXY	13XY	12XY	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g8P	Leg3	XY-Symmetry	12X	11X	1	4	0.5	0.5	0.5	5/8	A394	TYPE0	N	12	3.43	1		Both	1	3	1.25	3.125	0
g8X	Leg3	X-GenXY	12P	11P	1	4	0.5	0.5	0.5	5/8	A394	TYPE0	N	12	3.43	1		Both	1	3	1.25	3.125	0
g8XY	Leg3	XY-GenXY	12Y	11Y	1	4	0.5	0.5	0.5	5/8	A394	TYPE0	N	12	3.43	1		Both	1	3	1.25	3.125	0
g8Y	Leg3	Y-GenXY	12XY	11XY	1	4	0.5	0.5	0.5	5/8	A394	TYPE0	N	12	3.43	1		Both	1	3	1.25	3.125	0
g9P	Leg4	XY-Symmetry	11X	10X	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g9X	Leg4	X-GenXY	11P	10P	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g9XY	Leg4	XY-GenXY	11Y	10Y	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g9Y	Leg4	Y-GenXY	11XY	10XY	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g10P	Leg4	XY-Symmetry	10X	9X	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g10X	Leg4	X-GenXY	10P	9P	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g10XY	Leg4	XY-GenXY	10Y	9Y	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g10Y	Leg4	Y-GenXY	10XY	9XY	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g11P	Leg4	XY-Symmetry	9X	8X	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g11X	Leg4	X-GenXY	9P	8P	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g11XY	Leg4	XY-GenXY	9Y	8Y	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g11Y	Leg4	Y-GenXY	9XY	8XY	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g12P	Leg4	XY-Symmetry	8X	7X	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1	4	1.25	2	0
g12X	Leg4	X-GenXY	8P	7P	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1	4	1.25	2	0
g12XY	Leg4	XY-GenXY	8Y	7Y	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1	4	1.25	2	0
g12Y	Leg4	Y-GenXY	8XY	7XY	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1	4	1.25	2	0
g13P	Leg5	XY-Symmetry	7X	6X	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g13X	Leg5	X-GenXY	7P	6P	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g13XY	Leg5	XY-GenXY	7Y	6Y	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g13Y	Leg5	Y-GenXY	7XY	6XY	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g14P	Leg5	XY-Symmetry	6X	5X	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g14X	Leg5	X-GenXY	6P	5P	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g14XY	Leg5	XY-GenXY	6Y	5Y	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g14Y	Leg5	Y-GenXY	6XY	5XY	1	4	1	1	1	5/8	A394	TYPE0	N	0	0	0			0	0	0	0	0
g15P	Leg5	XY-Symmetry	5X	4X	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g15X	Leg5	X-GenXY	5P	4P	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g15XY	Leg5	XY-GenXY	5Y	4Y	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g15Y	Leg5	Y-GenXY	5XY	4XY	1	4	1	1	1	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g16P	Leg5	XY-Symmetry	4X	3X	1	4	0.59	0.59	0.59	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g16X	Leg5	X-GenXY	4P	3P	1	4	0.59	0.59	0.59	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g16XY	Leg5	XY-GenXY	4Y	3Y	1	4	0.59	0.59	0.59	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g16Y	Leg5	Y-GenXY	4XY	3XY	1	4	0.59	0.59	0.59	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g17P	Leg5	XY-Symmetry	3X	2X	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g17X	Leg5	X-GenXY	3P	2P	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g17XY	Leg5	XY-GenXY	3Y	2Y	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g17Y	Leg5	Y-GenXY	3XY	2XY	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g18P	Leg5	XY-Symmetry	2X	1X	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g18X	Leg5	X-GenXY	2P	1P	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g18XY	Leg5	XY-GenXY	2Y	1Y	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g18Y	Leg5	Y-GenXY	2XY	1XY	1	4	0.6	0.6	0.6	5/8	A394	TYPE0	N	28	4	1		Both	1.4375	4.4375	1.25	2	0
g19P	Diag1	XY-Symmetry	20P	18P	2	5	1	1	1		5/8	A325		2	1	1	Short	only	1.125	0	1.125	6.1875	0
g19X	Diag1	X-GenXY	20P	18X	2	5	1	1	1		5/8	A325		2	1	1	Short	only	1.125	0	1.125	6.1875	0
g19XY	Diag1	XY-GenXY	20P	18XY	2	5	1	1	1		5/8	A325		2	1	1	Short	only	1.125	0	1.125	6.1875	0
g19Y	Diag1	Y-GenXY	20P	18Y	2	5	1	1	1		5/8	A325		2	1	1	Short	only	1.125	0	1.125	6.1875	0
g20P	Diag2	XY-Symmetry	18P	17X	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1	0.875	3.625	0
g20X	Diag2	X-GenXY	18X	17P	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1	0.875	3.625	0
g20XY	Diag2	XY-GenXY	18XY	17Y	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1	0.875	3.625	0
g20Y	Diag2	Y-GenXY	18Y	17XY	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1	0.875	3.625	0
g21P	Diag2	XY-Symmetry	18P	17Y	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g21X	Diag2	X-GenXY	18X	17XY	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g21XY	Diag2	XY-GenXY	18XY	17X	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g21Y	Diag2	Y-GenXY	18Y	17P	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g22P	Diag2	XY-Symmetry	17P	16X	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g22X	Diag2	X-GenXY	17X	16P	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g22XY	Diag2	XY-GenXY	17XY	16Y	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g22Y	Diag2	Y-GenXY	17Y	16XY	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g23P	Diag2	XY-Symmetry	17P	16Y	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g23X	Diag2	X-GenXY	17X	16XY	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g23XY	Diag2	XY-GenXY	17XY	16X	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g23Y	Diag2	Y-GenXY	17Y	16P	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g24P	Diag2	XY-Symmetry	16P	15X	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0
g24X	Diag2	X-GenXY	16X	15P	2	5	0.75	0.5	0.5		5/8	A325		2	1	1	Short	only	0.75	1.75	0.875	3.625	0

g24XY	Diag2	XY-GenXY	16XY	15Y	2	5	0.75	0.5	0.5		5/8	A325	2	1	1	Short only	0.75	1.75	0.875	3.625	0
g24Y	Diag2	Y-GenXY	16Y	15XY	2	5	0.75	0.5	0.5		5/8	A325	2	1	1	Short only	0.75	1.75	0.875	3.625	0
g25P	Diag2	XY-Symmetry	16P	15Y	2	5	0.75	0.5	0.5		5/8	A325	2	1	1	Short only	0.75	1.75	0.875	3.625	0
g25X	Diag2	X-GenXY	16X	15XY	2	5	0.75	0.5	0.5		5/8	A325	2	1	1	Short only	0.75	1.75	0.875	3.625	0
g25XY	Diag2	XY-GenXY	16XY	15X	2	5	0.75	0.5	0.5		5/8	A325	2	1	1	Short only	0.75	1.75	0.875	3.625	0
g25Y	Diag2	Y-GenXY	16Y	15P	2	5	0.75	0.5	0.5		5/8	A325	2	1	1	Short only	0.75	1.75	0.875	3.625	0
g26P	Diag3	XY-Symmetry	15P	14X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g26X	Diag3	X-GenXY	15X	14P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g26XY	Diag3	XY-GenXY	15XY	14Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g26Y	Diag3	Y-GenXY	15Y	14XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g27P	Diag3	XY-Symmetry	15P	14Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g27X	Diag3	X-GenXY	15X	14XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g27XY	Diag3	XY-GenXY	15XY	14X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g27Y	Diag3	Y-GenXY	15Y	14P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g28P	Diag3	XY-Symmetry	14P	13X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g28X	Diag3	X-GenXY	14X	13P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g28XY	Diag3	XY-GenXY	14XY	13Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g28Y	Diag3	Y-GenXY	14Y	13XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g29P	Diag3	XY-Symmetry	14P	13Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g29X	Diag3	X-GenXY	14X	13XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g29XY	Diag3	XY-GenXY	14XY	13X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g29Y	Diag3	Y-GenXY	14Y	13P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g30P	Diag3	XY-Symmetry	13P	12X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g30X	Diag3	X-GenXY	13X	12P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g30XY	Diag3	XY-GenXY	13XY	12Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g30Y	Diag3	Y-GenXY	13Y	12XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g31P	Diag3	XY-Symmetry	13P	12Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g31X	Diag3	X-GenXY	13X	12XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g31XY	Diag3	XY-GenXY	13XY	12X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g31Y	Diag3	Y-GenXY	13Y	12P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g32P	Diag3	XY-Symmetry	12P	11X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g32X	Diag3	X-GenXY	12X	11P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g32XY	Diag3	XY-GenXY	12XY	11Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g32Y	Diag3	Y-GenXY	12Y	11XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g33P	Diag3	XY-Symmetry	12P	11Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g33X	Diag3	X-GenXY	12X	11XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g33XY	Diag3	XY-GenXY	12XY	11X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g33Y	Diag3	Y-GenXY	12Y	11P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	3	1	1	Short only	0.75	1.5	0.875	3.0625	0
g34P	Diag4	XY-Symmetry	11P	10X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g34X	Diag4	X-GenXY	11X	10P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g34XY	Diag4	XY-GenXY	11XY	10Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g34Y	Diag4	Y-GenXY	11Y	10XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g35P	Diag4	XY-Symmetry	11P	10Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g35X	Diag4	X-GenXY	11X	10XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g35XY	Diag4	XY-GenXY	11XY	10X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g35Y	Diag4	Y-GenXY	11Y	10P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g36P	Diag4	XY-Symmetry	10P	9X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g36X	Diag4	X-GenXY	10X	9P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g36XY	Diag4	XY-GenXY	10XY	9Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g36Y	Diag4	Y-GenXY	10Y	9XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g37P	Diag4	XY-Symmetry	10P	9Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g37X	Diag4	X-GenXY	10X	9XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g37XY	Diag4	XY-GenXY	10XY	9X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g37Y	Diag4	Y-GenXY	10Y	9P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g38P	Diag4	XY-Symmetry	9P	8X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g38X	Diag4	X-GenXY	9X	8P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g38XY	Diag4	XY-GenXY	9XY	8Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g38Y	Diag4	Y-GenXY	9Y	8XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g39P	Diag4	XY-Symmetry	9P	8Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g39X	Diag4	X-GenXY	9X	8XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g39XY	Diag4	XY-GenXY	9XY	8X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g39Y	Diag4	Y-GenXY	9Y	8P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g40P	Diag4	XY-Symmetry	8P	7X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g40X	Diag4	X-GenXY	8X	7P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g40XY	Diag4	XY-GenXY	8XY	7Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g40Y	Diag4	Y-GenXY	8Y	7XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0
g41P	Diag4	XY-Symmetry	8P	7Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0 N	5	1.84	1	Short only	0.6875	2	0.875	1.6875	0

g41X	Diag4	X-GenXY	8X	7XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	5	1.84	1	Short	only	0.6875	2	0.875	1.6875	0
g41XY	Diag4	XY-GenXY	8XY	7X	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	5	1.84	1	Short	only	0.6875	2	0.875	1.6875	0
g41Y	Diag4	Y-GenXY	8Y	7P	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	5	1.84	1	Short	only	0.6875	2	0.875	1.6875	0
g42P	Diag10	XY-Symmetry	7P	6X	2	5	0.784	0.567	0.567	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g42X	Diag10	X-GenXY	7X	6P	2	5	0.784	0.567	0.567	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g42XY	Diag10	XY-GenXY	7XY	6Y	2	5	0.784	0.567	0.567	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g42Y	Diag10	Y-GenXY	7Y	6XY	2	5	0.784	0.567	0.567	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g43P	Diag10	XY-Symmetry	7P	6Y	2	5	0.784	0.567	0.567			5/8	A325	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g43X	Diag10	X-GenXY	7X	6XY	2	5	0.784	0.567	0.567			5/8	A325	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g43XY	Diag10	XY-GenXY	7XY	6X	2	5	0.784	0.567	0.567			5/8	A325	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g43Y	Diag10	Y-GenXY	7Y	6P	2	5	0.784	0.567	0.567			5/8	A325	2	1	1	Short	only	1.5	0	0.875	3.4375	0
g44P	Diag5	XY-Symmetry	6P	5X	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g44X	Diag5	X-GenXY	6X	5P	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g44XY	Diag5	XY-GenXY	6XY	5Y	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g44Y	Diag5	Y-GenXY	6Y	5XY	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g45P	Diag5	XY-Symmetry	6P	5Y	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g45X	Diag5	X-GenXY	6X	5XY	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g45XY	Diag5	XY-GenXY	6XY	5X	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g45Y	Diag5	Y-GenXY	6Y	5P	2	5	0.777	0.553	0.553	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.25	0
g46P	Diag5	XY-Symmetry	5P	4X	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g46X	Diag5	X-GenXY	5X	4P	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g46XY	Diag5	XY-GenXY	5XY	4Y	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g46Y	Diag5	Y-GenXY	5Y	4XY	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g47P	Diag5	XY-Symmetry	5P	4Y	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g47X	Diag5	X-GenXY	5X	4XY	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g47XY	Diag5	XY-GenXY	5XY	4X	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g47Y	Diag5	Y-GenXY	5Y	4P	2	5	0.771	0.542	0.542	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3.1875	0
g48P	Diag6	XY-Symmetry	4P	23P	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g48X	Diag6	X-GenXY	4X	23P	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g48XY	Diag6	XY-GenXY	4XY	23Y	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g48Y	Diag6	Y-GenXY	4Y	23Y	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g49P	Diag6	XY-Symmetry	4P	24P	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g49X	Diag6	X-GenXY	4X	24X	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g49XY	Diag6	XY-GenXY	4XY	24X	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g49Y	Diag6	Y-GenXY	4Y	24P	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	1.75	0
g50P	Diag7	XY-Symmetry	23P	2P	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g50X	Diag7	X-GenXY	23P	2X	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g50XY	Diag7	XY-GenXY	23Y	2XY	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g50Y	Diag7	Y-GenXY	23Y	2Y	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g51P	Diag7	XY-Symmetry	24P	2P	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g51X	Diag7	X-GenXY	24X	2X	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g51XY	Diag7	XY-GenXY	24X	2XY	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g51Y	Diag7	Y-GenXY	24P	2Y	3	5	0.5	1	0.5	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	0.875	1.75	0
g52P	Diag8	XY-Symmetry	21P	23P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g52X	Diag8	X-GenXY	21X	23P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g52XY	Diag8	XY-GenXY	21XY	23Y	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g52Y	Diag8	Y-GenXY	21Y	23Y	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g53P	Diag8	XY-Symmetry	22P	24P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g53X	Diag8	X-GenXY	22X	24X	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g53XY	Diag8	XY-GenXY	22XY	24X	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g53Y	Diag8	Y-GenXY	22Y	24P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	0.875	0	0.9375	1.75	0
g54P	Diag9	XY-Symmetry	21P	1P	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g54X	Diag9	X-GenXY	21X	1X	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g54XY	Diag9	XY-GenXY	21XY	1XY	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g54Y	Diag9	Y-GenXY	21Y	1Y	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g55P	Diag9	XY-Symmetry	22P	1P	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g55X	Diag9	X-GenXY	22X	1X	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g55XY	Diag9	XY-GenXY	22XY	1XY	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g55Y	Diag9	Y-GenXY	22Y	1Y	3	5	1	0.5	0.5	5/8	A394	TYPE0	N	3	1	1	Short	only	1.25	0	0.875	1.75	0
g56P	Horz1	Y-Symmetry	18X	18P	3	6	1	1	1	5/8	A394	TYPE0	N	2	1.84	1	Short	only	0.75	2	0.875	1.5	0
g56Y	Horz1	Y-Gen	18XY	18Y	3	6	1	1	1	5/8	A394	TYPE0	N	2	1.84	1	Short	only	0.75	2	0.875	1.5	0
g57P	Horz2	X-Symmetry	18P	18Y	3	4	1	1	1	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	2.9375	0
g57X	Horz2	X-Gen	18X	18XY	3	4	1	1	1	5/8	A394	TYPE0	N	3	1	1	Short	only	1	0	0.875	2.9375	0
g58P	Horz1	Y-Symmetry	16X	16P	3	4	1	1	1	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	2	0
g58Y	Horz1	Y-Gen	16XY	16Y	3	4	1	1	1	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	2	0
g59P	Horz3	X-Symmetry	15P	15Y	3	6	1	1	1	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	3.9375	2	0
g59X	Horz3	X-Gen	15X	15XY	3	6	1	1	1	5/8	A394	TYPE0	N	2	1	1	Long	only	1.25	0	3.9375	2	0

g60P	Horz1	Y-Symmetry	12X	12P	3	4	1	1	1	5/8	A394	TYPE0	N	3	1	1	Short only	1.5	0	0.875	1.75	0
g60Y	Horz1	Y-Gen	12XY	12Y	3	4	1	1	1	5/8	A394	TYPE0	N	3	1	1	Short only	1.5	0	0.875	1.75	0
g61P	Horz6	X-Symmetry	11P	11Y	3	6	1	1	1	5/8	A394	TYPE0	N	2	1	1	Long only	1.25	0	4.625	2	0
g61X	Horz6	X-Gen	11X	11XY	3	6	1	1	1	5/8	A394	TYPE0	N	2	1	1	Long only	1.25	0	4.625	2	0
g62P	Horz1	Y-Symmetry	8X	8P	3	4	1	1	1	5/8	A394	TYPE0	N	3	1	1	Short only	1.5	0	0.875	1.75	0
g62Y	Horz1	Y-Gen	8XY	8Y	3	4	1	1	1	5/8	A394	TYPE0	N	3	1	1	Short only	1.5	0	0.875	1.75	0
g63P	Horz3	X-Symmetry	7P	7Y	3	6	1	1	1	5/8	A394	TYPE0	N	2	1	1	Long only	1.25	0	4.5	4	0
g63X	Horz3	X-Gen	7X	7XY	3	6	1	1	1	5/8	A394	TYPE0	N	2	1	1	Long only	1.25	0	4.5	4	0
g64P	Horz4	Y-Symmetry	4X	4P	3	6	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1.25	0	0.875	3	0
g64Y	Horz4	Y-Gen	4XY	4Y	3	6	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1.25	0	0.875	3	0
g65P	Horz4	X-Symmetry	4P	4Y	3	6	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1.25	0	0.875	3	0
g65X	Horz4	X-Gen	4X	4XY	3	6	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1.25	0	0.875	3	0
g66P	Horz7	XY-Symmetry	3X	23P	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g66X	Horz7	X-GenXY	3P	23P	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g66XY	Horz7	XY-GenXY	3Y	23Y	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g66Y	Horz7	Y-GenXY	3XY	23Y	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g67P	Horz7	XY-Symmetry	3P	24P	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g67X	Horz7	X-GenXY	3X	24X	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g67XY	Horz7	XY-GenXY	3XY	24X	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g67Y	Horz7	Y-GenXY	3Y	24P	3	5	2	1	1	5/8	A394	TYPE0	N	2	1	1	Short only	1.5	0	0.875	3	0
g68P	Horz5	XY-Symmetry	2X	21X	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g68X	Horz5	X-GenXY	2P	21P	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g68XY	Horz5	XY-GenXY	2Y	21Y	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g68Y	Horz5	Y-GenXY	2XY	21XY	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g69P	Horz5	XY-Symmetry	2P	22P	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g69X	Horz5	X-GenXY	2X	22X	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g69XY	Horz5	XY-GenXY	2XY	22XY	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g69Y	Horz5	Y-GenXY	2Y	22Y	3	6	1	1	1	5/8	A394	TYPE0	N	2	2	1	Short only	1.75	0	0.875	3	0
g70P	Horz5	Y-Symmetry	21X	21P	3	6	1	1	1	5/8	A394	TYPE0	N	0	2	1	Short only	0	0	0	0	0
g70Y	Horz5	Y-Gen	21XY	21Y	3	6	1	1	1	5/8	A394	TYPE0	N	0	2	1	Short only	0	0	0	0	0
g71P	Horz5	X-Symmetry	22P	22Y	3	6	1	1	1	5/8	A394	TYPE0	N	0	2	1	Short only	0	0	0	0	0
g71X	Horz5	X-Gen	22X	22XY	3	6	1	1	1	5/8	A394	TYPE0	N	0	2	1	Short only	0	0	0	0	0
g72P	Inner1	X-Symmetry	18P	i0.50E148S	2	4	2	1	1	5/8	A394	TYPE0	N	1	1	1	Short only	1	0	0.875	0	0
g72X	Inner1	X-Gen	18X	i0.50E148S	2	4	2	1	1	5/8	A394	TYPE0	N	1	1	1	Short only	1	0	0.875	0	0
g73P	Inner2	X-Symmetry	15P	15XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1	0	0.875	1.5625	0
g73X	Inner2	X-Gen	15X	15Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1	0	0.875	1.5625	0
g74P	Inner3	X-Symmetry	11P	11XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1.25	0	0.875	1.5625	0
g74X	Inner3	X-Gen	11X	11Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1.25	0	0.875	1.5625	0
g75P	Inner2	X-Symmetry	7P	7XY	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1	0	0.875	1.5625	0
g75X	Inner2	X-Gen	7X	7Y	2	5	0.75	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short only	1	0	0.875	1.5625	0
g76P	Inner4	XY-Symmetry	21X	22X	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	1	1	1	Short only	1	0	0.875	0	0
g76X	Inner4	X-GenXY	21P	22P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	1	1	1	Short only	1	0	0.875	0	0
g76XY	Inner4	XY-GenXY	21Y	22Y	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	1	1	1	Short only	1	0	0.875	0	0
g76Y	Inner4	Y-GenXY	21XY	22XY	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	1	1	1	Short only	1	0	0.875	0	0
g77P	TopCrArm	XY-Symmetry	27X	15X	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2.08	1	Short only	0.75	2.75	0.875	2.25	0
g77X	TopCrArm	X-GenXY	27P	15P	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2.08	1	Short only	0.75	2.75	0.875	2.25	0
g77XY	TopCrArm	XY-GenXY	27P	15Y	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2.08	1	Short only	0.75	2.75	0.875	2.25	0
g77Y	TopCrArm	Y-GenXY	27X	15XY	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2.08	1	Short only	0.75	2.75	0.875	2.25	0
g78P	TopCrArm	Y-Symmetry	15X	15P	3	6	1	1	1	5/8	A394	TYPE0	N	5	3.728	1	Short only	0.75	2.75	0.875	2.25	0
g78Y	TopCrArm	Y-Gen	15XY	15Y	3	6	1	1	1	5/8	A394	TYPE0	N	5	3.728	1	Short only	0.75	2.75	0.875	2.25	0
g79P	MdCrArm1	XY-Symmetry	26X	11X	3	5	0.33	0.33	0.33	5/8	A394	TYPE0	N	6	2	1	Short only	1	3	0.875	1.5	0
g79X	MdCrArm1	X-GenXY	26P	11P	3	5	0.33	0.33	0.33	5/8	A394	TYPE0	N	6	2	1	Short only	1	3	0.875	1.5	0
g79XY	MdCrArm1	XY-GenXY	26P	11Y	3	5	0.33	0.33	0.33	5/8	A394	TYPE0	N	6	2	1	Short only	1	3	0.875	1.5	0
g79Y	MdCrArm1	Y-GenXY	26X	11XY	3	5	0.33	0.33	0.33	5/8	A394	TYPE0	N	6	2	1	Short only	1	3	0.875	1.5	0
g80P	MdCrArm2	Y-Symmetry	11X	11P	3	6	1	1	1	5/8	A394	TYPE0	N	6	3.561	1	Short only	1	3	0.875	1.5	0
g80Y	MdCrArm2	Y-Gen	11XY	11Y	3	6	1	1	1	5/8	A394	TYPE0	N	6	3.561	1	Short only	1	3	0.875	1.5	0
g81P	BotCrArm	XY-Symmetry	25X	7X	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2	1	Short only	1	2.75	0.875	2	0
g81X	BotCrArm	X-GenXY	25P	7P	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2	1	Short only	1	2.75	0.875	2	0
g81XY	BotCrArm	XY-GenXY	25P	7Y	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2	1	Short only	1	2.75	0.875	2	0
g81Y	BotCrArm	Y-GenXY	25X	7XY	3	5	0.5	0.5	0.5	5/8	A394	TYPE0	N	5	2	1	Short only	1	2.75	0.875	2	0
g82P	BotCrArm	Y-Symmetry	7X	7P	3	6	1	1	1	5/8	A394	TYPE0	N	5	3.404	1	Short only	1	2.75	0.875	2	0
g82Y	BotCrArm	Y-Gen	7XY	7Y	3	6	1	1	1	5/8	A394	TYPE0	N	5	3.404	1	Short only	1	2.75	0.875	2	0
g83P	TopArmBr	XY-Symmetry	27X	16X	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short only	0.875	0	0.875	2	0
g83X	TopArmBr	X-GenXY	27P	16P	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short only	0.875	0	0.875	2	0
g83XY	TopArmBr	XY-GenXY	27P	16Y	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short only	0.875	0	0.875	2	0
g83Y	TopArmBr	Y-GenXY	27X	16XY	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short only	0.875	0	0.875	2	0
g84P	MidArmBr	XY-Symmetry	26X	12X	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short only	0.875	0	0.875	2	0

g84X	MidArmBr	X-GenXY	26P	12P	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g84XY	MidArmBr	XY-GenXY	26P	12Y	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g84Y	MidArmBr	Y-GenXY	26X	12XY	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g85P	BotArmBr	XY-Symmetry	25X	8X	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g85X	BotArmBr	X-GenXY	25P	8P	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g85XY	BotArmBr	XY-GenXY	25P	8Y	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g85Y	BotArmBr	Y-GenXY	25X	8XY	2	4	0.67	0.33	0.33	5/8	A394	TYPE0	N	3	2	1	Short	only	0.875	0	0.875	2	0
g86P	ShArmBr	XY-Symmetry	18P	28P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3	0
g86X	ShArmBr	X-GenXY	18X	28X	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3	0
g86XY	ShArmBr	XY-GenXY	18XY	28X	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3	0
g86Y	ShArmBr	Y-GenXY	18Y	28P	3	4	1	0.5	0.5	5/8	A394	TYPE0	N	2	1	1	Short	only	1.5	0	0.875	3	0
g87P	ShieldAr	X-Symmetry	28X	19X	3	5	1	1	1	5/8	A394	TYPE0	N	4	2	1	Long	only	1.25	0	0.875	4	0
g87X	ShieldAr	X-Gen	28P	19P	3	5	1	1	1	5/8	A394	TYPE0	N	4	2	1	Long	only	1.25	0	0.875	4	0
g88P	ShieldAr	X-Symmetry	19X	20P	3	6	1	1	1	5/8	A394	TYPE0	N	4	2	1	Long	only	1.25	0	0.875	4	0
g88X	ShieldAr	X-Gen	19P	20P	3	6	1	1	1	5/8	A394	TYPE0	N	4	2	1	Long	only	1.25	0	0.875	4	0
g89P	M3	Y-Symmetry	18X	18P	3	5	1	1	1		5/8	A325		2	1.89	1	Short	only	2	0.75	0.875	1.5	0
g89Y	M3	Y-Gen	18XY	18Y	3	5	1	1	1		5/8	A325		2	1.89	1	Short	only	2	0.75	0.875	1.5	0
g90P	M4	X-Symmetry	7X	7XY	3	5	1	1	1		5/8	A325		2	1	1	Long	only	1.25	0	1.125	4	0
g90X	M4	X-Gen	7P	7Y	3	5	1	1	1		5/8	A325		2	1	1	Long	only	1.25	0	1.125	4	0
ig72P90P	Inner1	X-Symmetry	i0.50E148S	18XY	2	4	1	1	1	5/8	A394	TYPE0	N	1	1	1	Short	only	1	0	0.875	0	0
ig72P90X	Inner1	X-Gen	i0.50E148S	18Y	2	4	1	1	1	5/8	A394	TYPE0	N	1	1	1	Short	only	1	0	0.875	0	0

Member Capacities and Overrides:

Member Label	Group Label	Design Comp. Capacity (kips)	Comp. Control Criterion	Design Tension Capacity (kips)	Tension Control Criterion	L/r	Length (ft)	L/r Comp. Capacity (kips)	Connection Shear Capacity (kips)	Connection Bearing Capacity (kips)	Net Section Tension Capacity (kips)	Rupture Tension Capacity (kips)	RTE End Dist. Tension Capacity (kips)	RTE Edge Dist. Tension Capacity (kips)	Override Comp. Capacity (kips)	Override Comp. Unsup. (kips)	Override Comp. Control Criterion	Override Tension Capacity (kips)	Warnings Override Tension or Errors Control Criterion	Face Member ship
g1P	Leg1	11.113	L/r	28.845	Net Sect	168	8.32	11.113	44.600	40.781	28.845	31.719	0.000	0.000	0.000	0.000		0.000	KL/R value of 167.55 exceeds maximum of 150.00 for member "g1P" ??	Automatic
g1X	Leg1	11.113	L/r	28.845	Net Sect	168	8.32	11.113	44.600	40.781	28.845	31.719	0.000	0.000	0.000	0.000		0.000	KL/R value of 167.55 exceeds maximum of 150.00 for member "g1X" ??	Automatic
g1XY	Leg1	11.113	L/r	28.845	Net Sect	168	8.32	11.113	44.600	40.781	28.845	31.719	0.000	0.000	0.000	0.000		0.000	KL/R value of 167.55 exceeds maximum of 150.00 for member "g1XY" ??	Automatic
g1Y	Leg1	11.113	L/r	28.845	Net Sect	168	8.32	11.113	44.600	40.781	28.845	31.719	0.000	0.000	0.000	0.000		0.000	KL/R value of 167.55 exceeds maximum of 150.00 for member "g1Y" ??	Automatic
g2P	Leg2	45.145	L/r	69.840	Net Sect	106	7.00	45.145	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g2X	Leg2	45.145	L/r	69.840	Net Sect	106	7.00	45.145	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g2XY	Leg2	45.145	L/r	69.840	Net Sect	106	7.00	45.145	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g2Y	Leg2	45.145	L/r	69.840	Net Sect	106	7.00	45.145	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g3P	Leg2	47.035	L/r	69.840	Net Sect	101	6.72	47.035	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g3X	Leg2	47.035	L/r	69.840	Net Sect	101	6.72	47.035	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g3XY	Leg2	47.035	L/r	69.840	Net Sect	101	6.72	47.035	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic
g3Y	Leg2	47.035	L/r	69.840	Net Sect	101	6.72	47.035	0.000	0.000	69.840	0.000	0.000	0.000	0.000	0.000		0.000		Automatic

g4P	Leg2	43.178	L/r	44.600	Shear	110	7.28	43.178	44.600	54.375	57.465	60.417	0.000	0.000	0.000	0.000		0.000
Automatic																		
g4X	Leg2	43.178	L/r	44.600	Shear	110	7.28	43.178	44.600	54.375	57.465	60.417	0.000	0.000	0.000	0.000		0.000
Automatic																		
g4XY	Leg2	43.178	L/r	44.600	Shear	110	7.28	43.178	44.600	54.375	57.465	60.417	0.000	0.000	0.000	0.000		0.000
Automatic																		
g4Y	Leg2	43.178	L/r	44.600	Shear	110	7.28	43.178	44.600	54.375	57.465	60.417	0.000	0.000	0.000	0.000		0.000
Automatic																		
g5P	Leg3	105.998	L/r	151.500	Net Sect	72	6.00	105.998	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g5X	Leg3	105.998	L/r	151.500	Net Sect	72	6.00	105.998	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g5XY	Leg3	105.998	L/r	151.500	Net Sect	72	6.00	105.998	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g5Y	Leg3	105.998	L/r	151.500	Net Sect	72	6.00	105.998	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g6P	Leg3	99.035	L/r	151.500	Net Sect	81	6.74	99.035	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g6X	Leg3	99.035	L/r	151.500	Net Sect	81	6.74	99.035	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g6XY	Leg3	99.035	L/r	151.500	Net Sect	81	6.74	99.035	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g6Y	Leg3	99.035	L/r	151.500	Net Sect	81	6.74	99.035	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g7P	Leg3	102.806	L/r	151.500	Net Sect	77	6.35	102.806	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g7X	Leg3	102.806	L/r	151.500	Net Sect	77	6.35	102.806	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g7XY	Leg3	102.806	L/r	151.500	Net Sect	77	6.35	102.806	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g7Y	Leg3	102.806	L/r	151.500	Net Sect	77	6.35	102.806	0.000	0.000	151.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g8P	**Leg3**	**123.770**	**L/r**	**114.654**	**Net Sect**	**42**	**6.91**	**123.770**	**133.800**	**203.906**	**114.654**	**213.235**	**0.000**	**0.000**	**0.000**	**0.000**		**0.000**
Automatic Member "g8P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g8X	**Leg3**	**123.770**	**L/r**	**114.654**	**Net Sect**	**42**	**6.91**	**123.770**	**133.800**	**203.906**	**114.654**	**213.235**	**0.000**	**0.000**	**0.000**	**0.000**		**0.000**
Automatic Member "g8X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g8XY	**Leg3**	**123.770**	**L/r**	**114.654**	**Net Sect**	**42**	**6.91**	**123.770**	**133.800**	**203.906**	**114.654**	**213.235**	**0.000**	**0.000**	**0.000**	**0.000**		**0.000**
Automatic Member "g8XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g8Y	**Leg3**	**123.770**	**L/r**	**114.654**	**Net Sect**	**42**	**6.91**	**123.770**	**133.800**	**203.906**	**114.654**	**213.235**	**0.000**	**0.000**	**0.000**	**0.000**		**0.000**
Automatic Member "g8Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g9P	Leg4	262.208	L/r	321.500	Net Sect	65	6.39	262.208	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g9X	Leg4	262.208	L/r	321.500	Net Sect	65	6.39	262.208	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g9XY	Leg4	262.208	L/r	321.500	Net Sect	65	6.39	262.208	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g9Y	Leg4	262.208	L/r	321.500	Net Sect	65	6.39	262.208	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g10P	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g10X	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g10XY	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g10Y	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g11P	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g11X	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g11XY	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		

g11Y	Leg4	262.948	L/r	321.500	Net Sect	65	6.35	262.948	0.000	0.000	321.500	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g12P	Leg4	252.165	L/r	244.156	Net Sect	70	6.91	252.165	312.200	856.405	244.156	895.587	0.000	0.000	0.000	0.000		0.000
Automatic Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g12X	Leg4	252.165	L/r	244.156	Net Sect	70	6.91	252.165	312.200	856.405	244.156	895.587	0.000	0.000	0.000	0.000		0.000
Automatic Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g12XY	Leg4	252.165	L/r	244.156	Net Sect	70	6.91	252.165	312.200	856.405	244.156	895.587	0.000	0.000	0.000	0.000		0.000
Automatic Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g12Y	Leg4	252.165	L/r	244.156	Net Sect	70	6.91	252.165	312.200	856.405	244.156	895.587	0.000	0.000	0.000	0.000		0.000
Automatic Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g13P	Leg5	283.332	L/r	387.499	Net Sect	62	8.23	283.332	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g13X	Leg5	283.332	L/r	387.499	Net Sect	62	8.23	283.332	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g13XY	Leg5	283.332	L/r	387.499	Net Sect	62	8.23	283.332	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g13Y	Leg5	283.332	L/r	387.499	Net Sect	62	8.23	283.332	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g14P	Leg5	283.409	L/r	387.499	Net Sect	62	8.23	283.409	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g14X	Leg5	283.409	L/r	387.499	Net Sect	62	8.23	283.409	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g14XY	Leg5	283.409	L/r	387.499	Net Sect	62	8.23	283.409	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g14Y	Leg5	283.409	L/r	387.499	Net Sect	62	8.23	283.409	0.000	0.000	387.499	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g15P	Leg5	283.492	L/r	312.200	Shear	62	8.22	283.492	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g15P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g15X	Leg5	283.492	L/r	312.200	Shear	62	8.22	283.492	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g15X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g15XY	Leg5	283.492	L/r	312.200	Shear	62	8.22	283.492	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g15XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g15Y	Leg5	283.492	L/r	312.200	Shear	62	8.22	283.492	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g15Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g16P	Leg5	264.792	L/r	312.200	Shear	73	16.45	264.792	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g16P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g16X	Leg5	264.792	L/r	312.200	Shear	73	16.45	264.792	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g16X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g16XY	Leg5	264.792	L/r	312.200	Shear	73	16.45	264.792	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g16XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g16Y	Leg5	264.792	L/r	312.200	Shear	73	16.45	264.792	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g16Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g17P	Leg5	262.493	L/r	312.200	Shear	74	16.45	262.493	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g17P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g17X	Leg5	262.493	L/r	312.200	Shear	74	16.45	262.493	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g17X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g17XY	Leg5	262.493	L/r	312.200	Shear	74	16.45	262.493	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g17XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g17Y	Leg5	262.493	L/r	312.200	Shear	74	16.45	262.493	312.200	761.249	318.750	845.832	0.000	0.000	0.000	0.000		0.000
Automatic Member "g17Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing																		

distances will be checked. ??
g18P Leg5 234.356 L/r 312.200 Shear 88 19.54 234.356 312.200 761.249 318.750 845.832 0.000 0.000 0.000 0.000 0.000
Automatic Member "g18P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g18X Leg5 234.356 L/r 312.200 Shear 88 19.54 234.356 312.200 761.249 318.750 845.832 0.000 0.000 0.000 0.000 0.000
Automatic Member "g18X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g18XY Leg5 234.356 L/r 312.200 Shear 88 19.54 234.356 312.200 761.249 318.750 845.832 0.000 0.000 0.000 0.000 0.000
Automatic Member "g18XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g18Y Leg5 234.356 L/r 312.200 Shear 88 19.54 234.356 312.200 761.249 318.750 845.832 0.000 0.000 0.000 0.000 0.000
Automatic Member "g18Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g19P Diag1 8.122 L/r 27.187 Bearing 231 9.46 8.122 33.600 27.187 32.987 27.187 0.000 0.000 0.000 0.000 0.000
Automatic KL/R value of 204.78 exceeds maximum of 200.00 for member "g19P" ??
g19X Diag1 8.122 L/r 27.187 Bearing 231 9.46 8.122 33.600 27.187 32.987 27.187 0.000 0.000 0.000 0.000 0.000
Automatic KL/R value of 204.78 exceeds maximum of 200.00 for member "g19X" ??
g19XY Diag1 8.122 L/r 27.187 Bearing 231 9.46 8.122 33.600 27.187 32.987 27.187 0.000 0.000 0.000 0.000 0.000
Automatic KL/R value of 204.78 exceeds maximum of 200.00 for member "g19XY" ??
g19Y Diag1 8.122 L/r 27.187 Bearing 231 9.46 8.122 33.600 27.187 32.987 27.187 0.000 0.000 0.000 0.000 0.000
Automatic KL/R value of 204.78 exceeds maximum of 200.00 for member "g19Y" ??
g20P Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g20P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g20X Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g20X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g20XY Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g20XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g20Y Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g20Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g21P Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g21P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g21X Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g21X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g21XY Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g21XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g21Y Diag2 12.501 L/r 26.432 Rupture 175 11.40 12.501 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g21Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g22P Diag2 12.814 L/r 26.432 Rupture 173 11.23 12.814 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g22X Diag2 12.814 L/r 26.432 Rupture 173 11.23 12.814 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g22XY Diag2 12.814 L/r 26.432 Rupture 173 11.23 12.814 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g22Y Diag2 12.814 L/r 26.432 Rupture 173 11.23 12.814 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g23P Diag2 12.814 L/r 26.432 Rupture 173 11.23 12.814 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000
Automatic Member "g23P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g23X Diag2 12.814 L/r 26.432 Rupture 173 11.23 12.814 33.600 33.984 30.299 26.432 0.000 0.000 0.000 0.000 0.000

Automatic Member "g23X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g23XY	Diag2	12.814	L/r	26.432	Rupture	173	11.23	12.814	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g23XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g23Y	Diag2	12.814	L/r	26.432	Rupture	173	11.23	12.814	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g23Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g24P	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g24P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g24X	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g24X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g24XY	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g24XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g24Y	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g24Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g25P	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g25P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g25X	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g25X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g25XY	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g25XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g25Y	Diag2	12.193	L/r	26.432	Rupture	178	11.58	12.193	33.600	33.984	30.299	26.432	0.000	0.000	0.000	0.000	0.000

Automatic Member "g25Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g26P	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g26P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g26X	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g26X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g26XY	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g26XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g26Y	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g26Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g27P	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g27P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g27X	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g27X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g27XY	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g27XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g27Y	Diag3	24.993	L/r	31.719	Rupture	123	10.82	24.993	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g27Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g28P	Diag3	23.631	L/r	31.719	Rupture	128	11.24	23.631	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g28P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g28X	Diag3	23.631	L/r	31.719	Rupture	128	11.24	23.631	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g28X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g28XY	Diag3	23.631	L/r	31.719	Rupture	128	11.24	23.631	33.450	40.781	32.825	31.719	0.000	0.000	0.000	0.000	0.000

Automatic Member "g28XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

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     g28Y    Diag3   23.631       L/r   31.719   Rupture  128  11.24   23.631     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g28Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g29P    Diag3   23.631       L/r   31.719   Rupture  128  11.24   23.631     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g29P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g29X    Diag3   23.631       L/r   31.719   Rupture  128  11.24   23.631     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g29X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g29XY    Diag3   23.631       L/r   31.719   Rupture  128  11.24   23.631     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic Member "g29XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g29Y    Diag3   23.631       L/r   31.719   Rupture  128  11.24   23.631     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g29Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g30P    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g30P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g30X    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g30X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g30XY    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic Member "g30XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g30Y    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g30Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g31P    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g31P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g31X    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g31X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g31XY    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic Member "g31XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g31Y    Diag3   24.367       L/r   31.719   Rupture  125  11.01   24.367     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g31Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g32P    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g32P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g32X    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g32X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g32XY    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic Member "g32XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g32Y    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g32Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g33P    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g33P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g33X    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g33X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g33XY    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic Member "g33XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g33Y    Diag3   23.301       L/r   31.719   Rupture  129  11.35   23.301     33.450     40.781   32.825   31.719    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g33Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
     g34P    Diag4   39.224       L/r   36.409  Net Sect  102  11.04   39.224     55.750     67.969   36.409   48.866    0.000    0.000    0.000    0.000              0.000
Automatic  Member "g34P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
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distances will be checked. ??
g34X Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g34X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g34XY Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g34XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g34Y Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g34Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g35P Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g35P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g35X Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g35X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g35XY Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g35XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g35Y Diag4 39.224 L/r 36.409 Net Sect 102 11.04 39.224 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g35Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g36P Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g36P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g36X Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g36X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g36XY Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g36XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g36Y Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g36Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g37P Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g37P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g37X Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g37X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g37XY Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g37XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g37Y Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g37Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g38P Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g38P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g38X Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g38X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g38XY Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g38XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g38Y Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g38Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g39P Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g39P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g39X Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000
Automatic Member "g39X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g39XY Diag4 39.288 L/r 36.409 Net Sect 102 11.01 39.288 55.750 67.969 36.409 48.866 0.000 0.000 0.000 0.000 0.000

Automatic Member "g39XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g39Y	Diag4	39.288	L/r	36.409	Net Sect	102	11.01	39.288	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g39Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g40P	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g40P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g40X	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g40X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g40XY	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g40XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g40Y	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g40Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g41P	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g41P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g41X	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g41X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g41XY	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g41XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g41Y	Diag4	38.346	L/r	36.409	Net Sect	105	11.35	38.346	55.750	67.969	36.409	48.866	0.000	0.000	0.000	0.000		0.000

Automatic Member "g41Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g42P	Diag10	22.300	Shear	22.300	Shear	153	13.17	28.743	22.300	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g42X	Diag10	22.300	Shear	22.300	Shear	153	13.17	28.743	22.300	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g42XY	Diag10	22.300	Shear	22.300	Shear	153	13.17	28.743	22.300	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g42Y	Diag10	22.300	Shear	22.300	Shear	153	13.17	28.743	22.300	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g43P	Diag10	28.743	L/r	31.719	Rupture	153	13.17	28.743	33.600	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g43X	Diag10	28.743	L/r	31.719	Rupture	153	13.17	28.743	33.600	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g43XY	Diag10	28.743	L/r	31.719	Rupture	153	13.17	28.743	33.600	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g43Y	Diag10	28.743	L/r	31.719	Rupture	153	13.17	28.743	33.600	40.781	60.011	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g44P	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g44X	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g44XY	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g44Y	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g45P	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g45X	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g45XY	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g45Y	Diag5	16.048	L/r	21.146	Rupture	173	15.41	16.048	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g46P	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g46X	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g46XY	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000

Automatic																	
g46Y	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000	0.000
Automatic																	
g47P	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000	0.000
Automatic																	
g47X	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000	0.000
Automatic																	
g47XY	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000	0.000
Automatic																	
g47Y	Diag5	13.122	L/r	21.146	Rupture	195	17.75	13.122	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000	0.000
Automatic																	
g48P	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g48X	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g48XY	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g48Y	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g49P	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g49X	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g49XY	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g49Y	Diag6	5.156	L/r	24.725	Net Sect	281	18.35	5.156	33.450	40.781	24.725	29.016	0.000	0.000	0.000	0.000	0.000
Automatic																	
g50P	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g50X	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g50XY	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g50Y	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g51P	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g51X	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g51XY	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g51Y	Diag7	1.843	L/r	15.859	Rupture	428	21.40	1.843	22.300	20.391	22.067	15.859	0.000	0.000	0.000	0.000	0.000
Automatic																	
g52P	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g52X	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g52XY	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g52Y	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g53P	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g53X	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g53XY	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g53Y	Diag8	1.310	L/r	14.393	Rupture	368	16.47	1.310	22.300	20.391	15.911	14.393	0.000	0.000	0.000	0.000	0.000
Automatic																	
g54P	**Diag9**	**5.499**	**L/r**	**31.266**	**Rupture**	**305**	**24.03**	**5.499**	**33.450**	**40.781**	**32.825**	**31.266**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Automatic															**KL/R value of 261.11 exceeds maximum of**		
200.00 for member "g54P" ??																	
g54X	**Diag9**	**5.499**	**L/r**	**31.266**	**Rupture**	**305**	**24.03**	**5.499**	**33.450**	**40.781**	**32.825**	**31.266**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
Automatic															**KL/R value of 261.11 exceeds maximum of**		
200.00 for member "g54X" ??																	
g54XY	**Diag9**	**5.499**	**L/r**	**31.266**	**Rupture**	**305**	**24.03**	**5.499**	**33.450**	**40.781**	**32.825**	**31.266**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

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Automatic                                                                                          KL/R value of 261.11 exceeds maximum of
200.00 for member "g54XY"  ??
   g54Y   Diag9    5.499     L/r   31.266  Rupture  305  24.03    5.499    33.450    40.781  32.825  31.266   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 261.11 exceeds maximum of
200.00 for member "g54Y"  ??
   g55P   Diag9    5.499     L/r   31.266  Rupture  305  24.03    5.499    33.450    40.781  32.825  31.266   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 261.11 exceeds maximum of
200.00 for member "g55P"  ??
   g55X   Diag9    5.499     L/r   31.266  Rupture  305  24.03    5.499    33.450    40.781  32.825  31.266   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 261.11 exceeds maximum of
200.00 for member "g55X"  ??
  g55XY   Diag9    5.499     L/r   31.266  Rupture  305  24.03    5.499    33.450    40.781  32.825  31.266   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 261.11 exceeds maximum of
200.00 for member "g55XY"  ??
   g55Y   Diag9    5.499     L/r   31.266  Rupture  305  24.03    5.499    33.450    40.781  32.825  31.266   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 261.11 exceeds maximum of
200.00 for member "g55Y"  ??
   g56P   Horz1   12.554     L/r   15.859  Rupture  181   9.00   12.554    22.300    20.391  27.631  15.859   0.000   0.000   0.000   0.000        0.000
Automatic  Member "g56P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
   g56Y   Horz1   12.554     L/r   15.859  Rupture  181   9.00   12.554    22.300    20.391  27.631  15.859   0.000   0.000   0.000   0.000        0.000
Automatic  Member "g56Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
   g57P   Horz2    2.705     L/r   18.827  Net Sect 274   9.00    2.705    33.450    30.586  18.827  23.789   0.000   0.000   0.000   0.000        0.000
Automatic
   g57X   Horz2    2.705     L/r   18.827  Net Sect 274   9.00    2.705    33.450    30.586  18.827  23.789   0.000   0.000   0.000   0.000        0.000
Automatic
   g58P   Horz1    9.501     L/r   15.859  Rupture  181   9.00    9.501    22.300    20.391  31.139  15.859   0.000   0.000   0.000   0.000        0.000
Automatic
   g58Y   Horz1    9.501     L/r   15.859  Rupture  181   9.00    9.501    22.300    20.391  31.139  15.859   0.000   0.000   0.000   0.000        0.000
Automatic
   g59P   Horz3    5.696     L/r   20.391  Bearing  253   9.00    5.696    22.300    20.391  22.067  26.654   0.000   0.000   0.000   0.000        0.000
Automatic
   g59X   Horz3    5.696     L/r   20.391  Bearing  253   9.00    5.696    22.300    20.391  22.067  26.654   0.000   0.000   0.000   0.000        0.000
Automatic
   g60P   Horz1    9.501     L/r   23.789  Rupture  181   9.00    9.501    33.450    30.586  31.139  23.789   0.000   0.000   0.000   0.000        0.000
Automatic
   g60Y   Horz1    9.501     L/r   23.789  Rupture  181   9.00    9.501    33.450    30.586  31.139  23.789   0.000   0.000   0.000   0.000        0.000
Automatic
   g61P   Horz6    9.046     L/r   22.300    Shear  256   9.00    9.046    22.300    33.984  35.483  44.424   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 203.59 exceeds maximum of
200.00 for member "g61P"  ??
   g61X   Horz6    9.046     L/r   22.300    Shear  256   9.00    9.046    22.300    33.984  35.483  44.424   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 203.59 exceeds maximum of
200.00 for member "g61X"  ??
   g62P   Horz1    9.501     L/r   23.789  Rupture  181   9.00    9.501    33.450    30.586  31.139  23.789   0.000   0.000   0.000   0.000        0.000
Automatic
   g62Y   Horz1    9.501     L/r   23.789  Rupture  181   9.00    9.501    33.450    30.586  31.139  23.789   0.000   0.000   0.000   0.000        0.000
Automatic
   g63P   Horz3    5.696     L/r   20.391  Bearing  253   9.00    5.696    22.300    20.391  22.067  26.654   0.000   0.000   0.000   0.000        0.000
Automatic
   g63X   Horz3    5.696     L/r   20.391  Bearing  253   9.00    5.696    22.300    20.391  22.067  26.654   0.000   0.000   0.000   0.000        0.000
Automatic
   g64P   Horz4   15.634     L/r   21.146  Rupture  189  17.13   15.634    22.300    27.187  32.987  21.146   0.000   0.000   0.000   0.000        0.000
Automatic
   g64Y   Horz4   15.634     L/r   21.146  Rupture  189  17.13   15.634    22.300    27.187  32.987  21.146   0.000   0.000   0.000   0.000        0.000
Automatic
   g65P   Horz4   15.634     L/r   21.146  Rupture  189  17.13   15.634    22.300    27.187  32.987  21.146   0.000   0.000   0.000   0.000        0.000
Automatic
   g65X   Horz4   15.634     L/r   21.146  Rupture  189  17.13   15.634    22.300    27.187  32.987  21.146   0.000   0.000   0.000   0.000        0.000
Automatic
   g66P   Horz7    5.085     L/r   15.859  Rupture  288  11.25    5.085    22.300    20.391  31.139  15.859   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 247.71 exceeds maximum of
200.00 for member "g66P"  ??
   g66X   Horz7    5.085     L/r   15.859  Rupture  288  11.25    5.085    22.300    20.391  31.139  15.859   0.000   0.000   0.000   0.000        0.000
Automatic                                                                                          KL/R value of 247.71 exceeds maximum of
```

200.00 for member "g66X" ??																		
g66XY	Horz7	5.085	L/r	15.859	Rupture	288	11.25	5.085	22.300	20.391	31.139	15.859	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 247.71 exceeds maximum of	
200.00 for member "g66XY" ??																		
g66Y	Horz7	5.085	L/r	15.859	Rupture	288	11.25	5.085	22.300	20.391	31.139	15.859	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 247.71 exceeds maximum of	
200.00 for member "g66Y" ??																		
g67P	Horz7	5.085	L/r	15.859	Rupture	288	11.25	5.085	22.300	20.391	31.139	15.859	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 247.71 exceeds maximum of	
200.00 for member "g67P" ??																		
g67X	Horz7	5.085	L/r	15.859	Rupture	288	11.25	5.085	22.300	20.391	31.139	15.859	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 247.71 exceeds maximum of	
200.00 for member "g67X" ??																		
g67XY	Horz7	5.085	L/r	15.859	Rupture	288	11.25	5.085	22.300	20.391	31.139	15.859	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 247.71 exceeds maximum of	
200.00 for member "g67XY" ??																		
g67Y	Horz7	5.085	L/r	15.859	Rupture	288	11.25	5.085	22.300	20.391	31.139	15.859	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 247.71 exceeds maximum of	
200.00 for member "g67Y" ??																		
g68P	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g68X	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g68XY	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g68Y	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g69P	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g69X	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g69XY	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g69Y	Horz5	17.846	L/r	21.146	Rupture	193	11.14	17.846	22.300	27.187	43.618	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g70P	Horz5	38.264	L/r	43.618	Net Sect	97	5.63	38.264	0.000	0.000	43.618	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g70Y	Horz5	38.264	L/r	43.618	Net Sect	97	5.63	38.264	0.000	0.000	43.618	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g71P	Horz5	38.264	L/r	43.618	Net Sect	97	5.63	38.264	0.000	0.000	43.618	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g71X	Horz5	38.264	L/r	43.618	Net Sect	97	5.63	38.264	0.000	0.000	43.618	0.000	0.000	0.000	0.000	0.000		0.000
Automatic																		
g72P	Inner1	3.316	L/r	7.896	Rupture	248	6.36	3.316	11.150	10.195	18.827	7.896	0.000	0.000	0.000	0.000		0.000
Automatic																		
g72X	Inner1	3.316	L/r	7.896	Rupture	248	6.36	3.316	11.150	10.195	18.827	7.896	0.000	0.000	0.000	0.000		0.000
Automatic																		
g73P	Inner2	8.528	L/r	13.605	Rupture	179	12.73	8.528	22.300	20.391	19.030	13.605	0.000	0.000	0.000	0.000		0.000
Automatic																		
g73X	Inner2	8.528	L/r	13.605	Rupture	179	12.73	8.528	22.300	20.391	19.030	13.605	0.000	0.000	0.000	0.000		0.000
Automatic																		
g74P	Inner3	12.085	L/r	15.293	Rupture	154	12.73	12.085	22.300	20.391	25.048	15.293	0.000	0.000	0.000	0.000		0.000
Automatic																		
g74X	Inner3	12.085	L/r	15.293	Rupture	154	12.73	12.085	22.300	20.391	25.048	15.293	0.000	0.000	0.000	0.000		0.000
Automatic																		
g75P	Inner2	8.528	L/r	13.605	Rupture	179	12.73	8.528	22.300	20.391	19.030	13.605	0.000	0.000	0.000	0.000		0.000
Automatic																		
g75X	Inner2	8.528	L/r	13.605	Rupture	179	12.73	8.528	22.300	20.391	19.030	13.605	0.000	0.000	0.000	0.000		0.000
Automatic																		
g76P	Inner4	4.081	L/r	7.896	Rupture	238	15.75	4.081	11.150	10.195	19.030	7.896	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 238.35 exceeds maximum of	
200.00 for member "g76P" ??																		
g76X	Inner4	4.081	L/r	7.896	Rupture	238	15.75	4.081	11.150	10.195	19.030	7.896	0.000	0.000	0.000	0.000		0.000
Automatic																	KL/R value of 238.35 exceeds maximum of	
200.00 for member "g76X" ??																		
g76XY	Inner4	4.081	L/r	7.896	Rupture	238	15.75	4.081	11.150	10.195	19.030	7.896	0.000	0.000	0.000	0.000		0.000

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Automatic                                                                                                    KL/R value of 238.35 exceeds maximum of
200.00 for member "g76XY"  ??
    g76Y   Inner4    4.081       L/r    7.896   Rupture  238  15.75    4.081      11.150     10.195  19.030     7.896    0.000    0.000    0.000    0.000          0.000
Automatic                                                                                                    KL/R value of 238.35 exceeds maximum of
200.00 for member "g76Y"  ??
    g77P TopCrArm   40.145       L/r   51.273  Net Sect  112  14.87   40.145      55.750     67.969  51.273    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g77P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g77X TopCrArm   40.145       L/r   51.273  Net Sect  112  14.87   40.145      55.750     67.969  51.273    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g77X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
   g77XY TopCrArm   40.145       L/r   51.273  Net Sect  112  14.87   40.145      55.750     67.969  51.273    52.865    0.000    0.000    0.000    0.000          0.000
Automatic Member "g77XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g77Y TopCrArm   40.145       L/r   51.273  Net Sect  112  14.87   40.145      55.750     67.969  51.273    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g77Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g78P TopCrArm   32.984       L/r   42.096  Net Sect  136   9.00   32.984      55.750     67.969  42.096    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g78P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g78Y TopCrArm   32.984       L/r   42.096  Net Sect  136   9.00   32.984      55.750     67.969  42.096    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g78Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g79P MdCrArm1   47.928       L/r   63.437   Rupture   93  18.72   47.928      66.900     81.562  71.831    63.437    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g79P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g79X MdCrArm1   47.928       L/r   63.437   Rupture   93  18.72   47.928      66.900     81.562  71.831    63.437    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g79X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
   g79XY MdCrArm1   47.928       L/r   63.437   Rupture   93  18.72   47.928      66.900     81.562  71.831    63.437    0.000    0.000    0.000    0.000          0.000
Automatic Member "g79XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g79Y MdCrArm1   47.928       L/r   63.437   Rupture   93  18.72   47.928      66.900     81.562  71.831    63.437    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g79Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g80P MdCrArm2   32.984       L/r   43.026  Net Sect  136   9.00   32.984      66.900     81.562  43.026    63.437    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g80P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g80Y MdCrArm2   32.984       L/r   43.026  Net Sect  136   9.00   32.984      66.900     81.562  43.026    63.437    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g80Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g81P BotCrArm   40.145       L/r   51.718  Net Sect  112  14.87   40.145      55.750     67.969  51.718    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g81P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g81X BotCrArm   40.145       L/r   51.718  Net Sect  112  14.87   40.145      55.750     67.969  51.718    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g81X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
   g81XY BotCrArm   40.145       L/r   51.718  Net Sect  112  14.87   40.145      55.750     67.969  51.718    52.865    0.000    0.000    0.000    0.000          0.000
Automatic Member "g81XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g81Y BotCrArm   40.145       L/r   51.718  Net Sect  112  14.87   40.145      55.750     67.969  51.718    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g81Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g82P BotCrArm   32.984       L/r   43.900  Net Sect  136   9.00   32.984      55.750     67.969  43.900    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g82P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g82Y BotCrArm   32.984       L/r   43.900  Net Sect  136   9.00   32.984      55.750     67.969  43.900    52.865    0.000    0.000    0.000    0.000          0.000
Automatic  Member "g82Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing
distances will be checked.  ??
    g83P TopArmBr    8.230       L/r   14.853  Net Sect  168  16.55    8.230      33.450     30.586  14.853    23.789    0.000    0.000    0.000    0.000          0.000
Automatic
    g83X TopArmBr    8.230       L/r   14.853  Net Sect  168  16.55    8.230      33.450     30.586  14.853    23.789    0.000    0.000    0.000    0.000          0.000
Automatic
   g83XY TopArmBr    8.230       L/r   14.853  Net Sect  168  16.55    8.230      33.450     30.586  14.853    23.789    0.000    0.000    0.000    0.000          0.000
Automatic
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g83Y	TopArmBr	8.230	L/r	14.853	Net Sect	168	16.55	8.230	33.450	30.586	14.853	23.789	0.000	0.000	0.000	0.000		0.000
Automatic																		
g84P	MidArmBr	7.246	L/r	19.156	Net Sect	205	19.95	7.246	33.450	40.781	19.156	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g84X	MidArmBr	7.246	L/r	19.156	Net Sect	205	19.95	7.246	33.450	40.781	19.156	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g84XY	MidArmBr	7.246	L/r	19.156	Net Sect	205	19.95	7.246	33.450	40.781	19.156	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g84Y	MidArmBr	7.246	L/r	19.156	Net Sect	205	19.95	7.246	33.450	40.781	19.156	31.719	0.000	0.000	0.000	0.000		0.000
Automatic																		
g85P	BotArmBr	8.391	L/r	14.853	Net Sect	166	16.39	8.391	33.450	30.586	14.853	23.789	0.000	0.000	0.000	0.000		0.000
Automatic																		
g85X	BotArmBr	8.391	L/r	14.853	Net Sect	166	16.39	8.391	33.450	30.586	14.853	23.789	0.000	0.000	0.000	0.000		0.000
Automatic																		
g85XY	BotArmBr	8.391	L/r	14.853	Net Sect	166	16.39	8.391	33.450	30.586	14.853	23.789	0.000	0.000	0.000	0.000		0.000
Automatic																		
g85Y	BotArmBr	8.391	L/r	14.853	Net Sect	166	16.39	8.391	33.450	30.586	14.853	23.789	0.000	0.000	0.000	0.000		0.000
Automatic																		
g86P	ShArmBr	13.780	L/r	21.146	Rupture	187	19.98	13.780	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g86X	ShArmBr	13.780	L/r	21.146	Rupture	187	19.98	13.780	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g86XY	ShArmBr	13.780	L/r	21.146	Rupture	187	19.98	13.780	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g86Y	ShArmBr	13.780	L/r	21.146	Rupture	187	19.98	13.780	22.300	27.187	41.087	21.146	0.000	0.000	0.000	0.000		0.000
Automatic																		
g87P	ShieldAr	26.876	L/r	44.600	Shear	195	18.17	26.876	44.600	107.880	84.207	83.907	0.000	0.000	0.000	0.000		0.000
Automatic																		
g87X	ShieldAr	26.876	L/r	44.600	Shear	195	18.17	26.876	44.600	107.880	84.207	83.907	0.000	0.000	0.000	0.000		0.000
Automatic																		
g88P	ShieldAr	44.600	Shear	44.600	Shear	48	4.50	72.578	44.600	107.880	84.207	83.907	0.000	0.000	0.000	0.000		0.000
Automatic																		
g88X	ShieldAr	44.600	Shear	44.600	Shear	48	4.50	72.578	44.600	107.880	84.207	83.907	0.000	0.000	0.000	0.000		0.000
Automatic																		
g89P	**M3**	**14.670**	**L/r**	**21.146**	**Rupture**	**182**	**9.00**	**14.670**	**33.600**	**27.187**	**36.131**	**21.146**	**0.000**	**0.000**	**0.000**	**0.000**		**0.000**
Automatic Member "g89P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g89Y	**M3**	**14.670**	**L/r**	**21.146**	**Rupture**	**182**	**9.00**	**14.670**	**33.600**	**27.187**	**36.131**	**21.146**	**0.000**	**0.000**	**0.000**	**0.000**		**0.000**
Automatic Member "g89Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??																		
g90P	M4	4.733	L/r	20.391	Bearing	253	9.00	4.733	33.600	20.391	22.067	20.391	0.000	0.000	0.000	0.000		0.000
Automatic																		
g90X	M4	4.733	L/r	20.391	Bearing	253	9.00	4.733	33.600	20.391	22.067	20.391	0.000	0.000	0.000	0.000		0.000
Automatic																		
ig72P90P	Inner1	5.409	L/r	7.896	Rupture	194	6.36	5.409	11.150	10.195	18.827	7.896	0.000	0.000	0.000	0.000		0.000
Automatic																		
ig72P90X	Inner1	5.409	L/r	7.896	Rupture	194	6.36	5.409	11.150	10.195	18.827	7.896	0.000	0.000	0.000	0.000		0.000
Automatic																		

The model contains 316 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	0.366	11.809	11.809
2P	0.598	17.358	17.358
3P	0.476	12.223	12.223
4P	0.563	17.416	17.416
5P	0.38	11.568	11.568
6P	0.388	10.996	10.996
7P	0.466	14.928	13.691
8P	0.314	12.019	10.111
9P	0.267	8.963	8.963

10P	0.267	8.984	8.984
11P	0.352	13.690	10.849
12P	0.222	10.365	8.074
13P	0.168	7.146	7.146
14P	0.165	7.004	7.004
15P	0.258	10.936	8.762
16P	0.175	8.185	6.292
17P	0.134	5.316	5.316
18P	0.218	10.312	7.119
19P	0.144	5.528	2.080
20P	0.123	4.967	3.467
21P	0.142	7.766	4.752
22P	0.142	4.752	7.766
23P	0.202	13.385	9.127
24P	0.202	9.127	13.385
25P	0.143	8.008	3.218
26P	0.196	10.107	3.218
27P	0.144	8.042	3.283
28P	0.207	9.519	2.774
1X	0.366	11.809	11.809
1XY	0.366	11.809	11.809
1Y	0.366	11.809	11.809
2X	0.598	17.358	17.358
2XY	0.598	17.358	17.358
2Y	0.598	17.358	17.358
3X	0.476	12.223	12.223
3XY	0.476	12.223	12.223
3Y	0.476	12.223	12.223
4X	0.563	17.416	17.416
4XY	0.563	17.416	17.416
4Y	0.563	17.416	17.416
5X	0.38	11.568	11.568
5XY	0.38	11.568	11.568
5Y	0.38	11.568	11.568
6X	0.388	10.996	10.996
6XY	0.388	10.996	10.996
6Y	0.388	10.996	10.996
7X	0.466	14.928	13.691
7XY	0.466	14.928	13.691
7Y	0.466	14.928	13.691
8X	0.314	12.019	10.111
8XY	0.314	12.019	10.111
8Y	0.314	12.019	10.111
9X	0.267	8.963	8.963
9XY	0.267	8.963	8.963
9Y	0.267	8.963	8.963
10X	0.267	8.984	8.984
10XY	0.267	8.984	8.984
10Y	0.267	8.984	8.984
11X	0.352	13.690	10.849
11XY	0.352	13.690	10.849
11Y	0.352	13.690	10.849
12X	0.222	10.365	8.074
12XY	0.222	10.365	8.074
12Y	0.222	10.365	8.074
13X	0.168	7.146	7.146
13XY	0.168	7.146	7.146
13Y	0.168	7.146	7.146
14X	0.165	7.004	7.004
14XY	0.165	7.004	7.004
14Y	0.165	7.004	7.004
15X	0.258	10.936	8.762
15XY	0.258	10.936	8.762
15Y	0.258	10.936	8.762
16X	0.175	8.185	6.292
16XY	0.175	8.185	6.292
16Y	0.175	8.185	6.292

17X	0.134	5.316	5.316
17XY	0.134	5.316	5.316
17Y	0.134	5.316	5.316
18X	0.218	10.312	7.119
18XY	0.218	10.312	7.119
18Y	0.218	10.312	7.119
19X	0.144	5.528	2.080
21X	0.142	7.766	4.752
21XY	0.142	7.766	4.752
21Y	0.142	7.766	4.752
22X	0.142	4.752	7.766
22XY	0.142	4.752	7.766
22Y	0.142	4.752	7.766
23Y	0.202	13.385	9.127
24X	0.202	9.127	13.385
25X	0.143	8.008	3.218
26X	0.196	10.107	3.218
27X	0.144	8.042	3.283
28X	0.207	9.519	2.774
i0.50E148S	0.0311	1.500	1.500
Total	26.9	980.842	863.933

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	13.028	538.833	421.924	232.515	151.376
2	7.602	228.558	228.558	95.348	95.348
3	3.308	118.979	118.979	43.355	43.355
4	2.928	94.471	94.471	37.600	37.600
Total	26.866	980.842	863.933	408.819	327.680

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	13.028	13.028	2366.218	2366.218
2	7.602	8.363	1077.948	1185.743
3	3.308	4.465	558.154	753.508
4	2.928	3.602	384.610	473.070
Total	26.866	29.457	4386.929	4778.538

Section Joint Information:

Section Label	Joint Label	Joint Elevation (ft)
1	19X	155.000
1	18X	148.000
1	19P	155.000
1	18P	148.000
1	18Y	148.000
1	18XY	148.000
1	17X	141.000
1	17P	141.000
1	17Y	141.000
1	17XY	141.000
1	16X	134.280
1	16P	134.280
1	16Y	134.280
1	16XY	134.280

1	15X	127.000
1	15P	127.000
1	15Y	127.000
1	15XY	127.000
1	14X	121.000
1	14P	121.000
1	14Y	121.000
1	14XY	121.000
1	13X	114.260
1	13P	114.260
1	13Y	114.260
1	13XY	114.260
1	12X	107.910
1	12P	107.910
1	12Y	107.910
1	12XY	107.910
1	11X	101.000
1	11P	101.000
1	11Y	101.000
1	11XY	101.000
1	10X	94.610
1	10P	94.610
1	10Y	94.610
1	10XY	94.610
1	9X	88.260
1	9P	88.260
1	9Y	88.260
1	9XY	88.260
1	8X	81.910
1	8P	81.910
1	8Y	81.910
1	8XY	81.910
1	7X	75.000
1	7P	75.000
1	7Y	75.000
1	7XY	75.000
1	20P	155.000
1	i0.50E148S	148.000
1	27X	127.000
1	27P	127.000
1	26X	101.000
1	26P	101.000
1	25X	75.000
1	25P	75.000
1	28P	155.000
1	28X	155.000
2	7X	75.000
2	6X	67.000
2	7P	75.000
2	6P	67.000
2	7Y	75.000
2	6Y	67.000
2	7XY	75.000
2	6XY	67.000
2	5X	59.000
2	5P	59.000
2	5Y	59.000
2	5XY	59.000
2	4X	51.000
2	4P	51.000
2	4Y	51.000
2	4XY	51.000
2	3X	35.000
2	3P	35.000
2	3Y	35.000
2	3XY	35.000
2	23P	35.000

2	23Y	35.000
2	24P	35.000
2	24X	35.000
3	3X	35.000
3	2X	19.000
3	3P	35.000
3	2P	19.000
3	3Y	35.000
3	2Y	19.000
3	3XY	35.000
3	2XY	19.000
3	23P	35.000
3	23Y	35.000
3	24P	35.000
3	24X	35.000
3	21P	19.000
3	21X	19.000
3	21XY	19.000
3	21Y	19.000
3	22P	19.000
3	22X	19.000
3	22XY	19.000
3	22Y	19.000
4	2X	19.000
4	1X	0.000
4	2P	19.000
4	1P	0.000
4	2Y	19.000
4	1Y	0.000
4	2XY	19.000
4	1XY	0.000
4	21P	19.000
4	21X	19.000
4	21XY	19.000
4	21Y	19.000
4	22P	19.000
4	22X	19.000
4	22XY	19.000
4	22Y	19.000

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)
1	155.000	75.000	60	208	0.00	9.00	688.500	45.34	37.34	1173.817
2	75.000	35.000	24	60	9.00	22.50	631.192	9.00	22.50	631.192
3	35.000	19.000	20	36	22.50	27.90	403.200	22.50	27.90	403.200
4	19.000	0.000	16	12	27.90	34.33	591.223	27.90	34.33	591.223

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
C-EX1		5e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift)

			(lbs)
1	28P	C-EX1	No Limit
2	28X	C-EX1	No Uplift
3	27P	C-EX1	No Uplift
4	27X	C-EX1	No Uplift
5	26P	C-EX1	No Uplift
6	26X	C-EX1	No Uplift
7	25P	C-EX1	No Uplift
8	25X	C-EX1	No Uplift
10	14X	C-EX1	No Limit
11	12X	C-EX1	No Limit
12	10X	C-EX1	No Limit
13	8X	C-EX1	No Limit
14	6X	C-EX1	No Limit
15	4X	C-EX1	No Limit
16	3X	C-EX1	No Limit
17	2X	C-EX1	No Limit
18	16P	C-EX1	No Limit
19	14P	C-EX1	No Limit
20	12P	C-EX1	No Limit
21	10P	C-EX1	No Limit
22	8P	C-EX1	No Limit
23	6P	C-EX1	No Limit
24	4P	C-EX1	No Limit
25	3P	C-EX1	No Limit
26	2P	C-EX1	No Limit
27	17P	C-EX1	No Limit
28	17X	C-EX1	No Limit
29	17XY	C-EX1	No Limit
30	17Y	C-EX1	No Limit
31	18P	C-EX1	No Limit
32	18X	C-EX1	No Limit
33	18XY	C-EX1	No Limit
34	18Y	C-EX1	No Limit
35	14XY	C-EX1	No Limit
36	14Y	C-EX1	No Limit
38	16XY	C-EX1	No Limit
40	12XY	C-EX1	No Limit
41	10XY	C-EX1	No Limit
42	8XY	C-EX1	No Limit
43	6XY	C-EX1	No Limit
44	4XY	C-EX1	No Limit
45	3XY	C-EX1	No Limit
46	2XY	C-EX1	No Limit

*** Loads Data

Loads from file: j:\jobs\1201400.wi\co.04 - ct1209 - 190 olcott st, manchester, ct\rev (3)\calcs\pls tower\cl&p # 20003.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)	155.00 (ft)	
Structure height	155.00 (ft)	
Structure height above ground	155.00 (ft)	
Tower Shape	Rectangular	

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 Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Joint Displ.
NESC Heavy	1.5000	2.5000	1.00000	1.0000	1.0000	1.0000	34 loads	Wind on Face	4	0	0.000	56.000	0.0	
NESC Extreme	1.0000	1.0000	1.00000	1.0000	1.0000	1.0000	34 loads	NESC 2007	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
28X	783	2886	0	(3/8 AW) Shield Wire
28P	1241	3998	3259	(OPGW-120) Conductor Wire
27X	4371	10723	0	(Bluebird) Connductor Wire
27P	3086	5603	4889	(Bittern) Conductor Wire
26X	4371	10723	0	(Bluebird) Connductor Wire
26P	3086	5603	4889	(Bittern) Conductor Wire
25X	4371	10723	0	(Bluebird) Connductor Wire
25P	3086	5603	4889	(Bittern) Conductor Wire
14X	276	65	0	AT&T Coax Cables
12X	598	140	0	AT&T Coax Cables
10X	598	140	0	AT&T Coax Cables
8X	598	140	0	AT&T Coax Cables
6X	736	172	0	AT&T Coax Cables
4X	736	172	0	AT&T Coax Cables
3X	736	172	0	AT&T Coax Cables
2X	1242	291	0	AT&T Coax Cables
18X	57	1168	-845	AT&T Mast Connection
18XY	50	2076	866	AT&T Mast Connection
18P	35	262	1142	AT&T Mast Connection
18Y	21	426	-1101	AT&T Mast Connection
14X	1360	-129	44	AT&T Mast Connection
14XY	2137	-227	-14	AT&T Mast Connection
14P	3332	-169	-38	AT&T Mast Connection
14Y	6135	-249	-54	AT&T Mast Connection
18XY	230	84	0	AT&T Coax Cables
16XY	322	117	0	AT&T Coax Cables
14XY	299	109	0	AT&T Coax Cables
12XY	299	109	0	AT&T Coax Cables
10XY	299	109	0	AT&T Coax Cables

8XY	299	109	0	AT&T Coax Cables
6XY	368	134	0	AT&T Coax Cables
4XY	368	134	0	AT&T Coax Cables
3XY	368	134	0	AT&T Coax Cables
2XY	621	226	0	AT&T Coax Cables

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	155.00	75.00	115.00	10.00	10.00	3.200	4844.0	0.00	3.200	0.0	0	19541
2	75.00	35.00	55.00	10.00	10.00	3.200	3051.1	0.00	3.200	0.0	0	12544
3	35.00	19.00	27.00	10.00	10.00	3.200	1387.4	0.00	3.200	0.0	0	6698
4	19.00	0.00	9.50	10.00	10.00	3.200	1203.2	0.00	3.200	0.0	0	5402

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
28X	168	1659	84	(3/8 AW) Shield Wire
28P	333	2927	2608	(OPGW-120) Conductor Wire
27X	2011	7786	4431	(Bluebird) Connductor Wire
27P	1320	4871	4297	(Bittern) Conductor Wire
26X	2011	7786	4431	(Bluebird) Connductor Wire
26P	1320	4871	4297	(Bittern) Conductor Wire
25X	2011	7786	4431	(Bluebird) Connductor Wire
25P	1320	4871	4297	(Bittern) Conductor Wire
14X	75	207	0	AT&T Coax Cables
12X	162	449	0	AT&T Coax Cables
10X	162	449	0	AT&T Coax Cables
8X	162	449	0	AT&T Coax Cables
6X	200	553	0	AT&T Coax Cables
4X	200	553	0	AT&T Coax Cables
3X	200	553	0	AT&T Coax Cables
2X	337	933	0	AT&T Coax Cables
18X	24	4519	-3287	AT&T Mast Connection
18XY	21	7987	3341	AT&T Mast Connection
18P	14	980	4338	AT&T Mast Connection
18Y	9	1688	-4387	AT&T Mast Connection
14X	1922	-578	121	AT&T Mast Connection
14XY	3267	-1045	-15	AT&T Mast Connection
14P	314	-712	-129	AT&T Mast Connection
14Y	465	-1121	19	AT&T Mast Connection
18XY	62	259	0	AT&T Coax Cables
16XY	87	363	0	AT&T Coax Cables
14XY	81	337	0	AT&T Coax Cables
12XY	81	337	0	AT&T Coax Cables
10XY	81	337	0	AT&T Coax Cables
8XY	81	337	0	AT&T Coax Cables
6XY	100	415	0	AT&T Coax Cables
4XY	100	415	0	AT&T Coax Cables
3XY	100	415	0	AT&T Coax Cables
2XY	168	700	0	AT&T Coax Cables

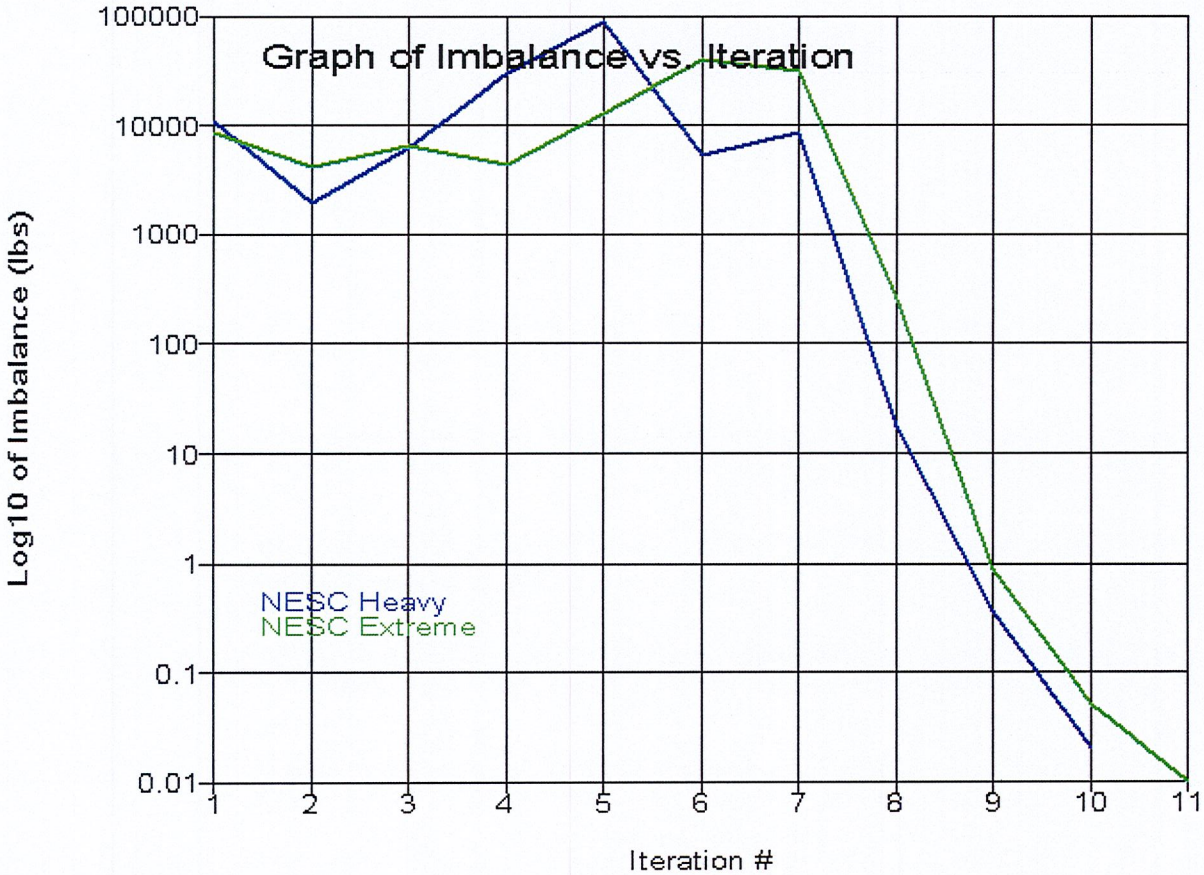
Section Load Case Information (Code) for "NESC Extreme":

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 Gross Area	Tran Soli-dity Ratio	Tran Angle Drag Coef	Tran Wind Load	Long Adj. Wind Pres.	Long Angle Face Area	Long Gross Area	Long Soli-dity Ratio	Long Angle Drag Coef	Long Wind Load	Ice Weight	Total Weight

	(ft)	(ft)	(ft)	(psf)	(psf)	(ft^2)	(ft^2)			(lbs)	(psf)	(ft^2)	(ft^2)			(lbs)	(lbs)	(lbs)
1	155.00	75.00	115.00	32.95	32.95	151.38	688.50	0.220	3.200	15961.5	0.00	232.51	1173.82	0.198	3.200	0.0	0	13028
2	75.00	35.00	55.00	32.95	32.95	95.35	631.19	0.151	3.200	10053.8	0.00	95.35	631.19	0.151	3.200	0.0	0	8363
3	35.00	19.00	27.00	32.95	32.95	43.36	403.20	0.108	3.200	4571.5	0.00	43.36	403.20	0.108	3.200	0.0	0	4465
4	19.00	0.00	9.50	32.95	32.95	37.60	591.22	0.064	3.200	3964.7	0.00	37.60	591.22	0.064	3.200	0.0	0	3602

*** Analysis Results:

Maximum element usage is 93.22% for Angle "g42P" in load case "NESC Heavy"
Maximum insulator usage is 23.58% for Clamp "6" 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)
Leg1	g1P	1.46	0.000	-0.163	-0.144	-0.163
Leg1	g1X	1.68	0.000	-0.187	-0.187	-0.175
Leg1	g1XY	0.97	0.000	-0.108	-0.108	-0.099
Leg1	g1Y	1.80	0.000	-0.199	-0.173	-0.199
Leg2	g2P	14.75	10.300	0.000	6.795	10.300
Leg2	g2X	26.00	0.000	-11.739	-10.742	-11.739

Leg2	g2XY	6.99	0.000	-3.157	-2.167	-3.157
Leg2	g2Y	11.39	7.952	0.000	5.227	7.952
Leg2	g3P	15.37	10.734	0.000	4.962	10.734
Leg2	g3X	42.59	0.000	-20.033	-15.596	-20.033
Leg2	g3XY	28.77	0.000	-13.534	-7.241	-13.534
Leg2	g3Y	20.53	14.338	0.000	8.871	14.338
Leg2	g4P	52.15	23.261	0.000	9.160	23.261
Leg2	g4X	65.68	0.000	-28.358	-19.785	-28.358
Leg2	g4XY	55.78	0.000	-24.085	-12.803	-24.085
Leg2	g4Y	62.97	28.083	0.000	15.270	28.083
Leg3	g5P	18.48	27.992	0.000	10.187	27.992
Leg3	g5X	41.24	0.000	-43.709	-30.421	-43.709
Leg3	g5XY	32.04	0.000	-33.960	-19.085	-33.960
Leg3	g5Y	26.90	40.756	0.000	22.578	40.756
Leg3	g6P	22.38	33.910	0.000	14.998	33.910
Leg3	g6X	61.88	0.000	-61.280	-46.548	-61.280
Leg3	g6XY	43.01	0.000	-42.591	-31.332	-42.591
Leg3	g6Y	36.32	55.025	0.000	32.881	55.025
Leg3	g7P	29.91	45.317	0.000	23.736	45.317
Leg3	g7X	78.39	0.000	-80.584	-61.307	-80.584
Leg3	g7XY	53.75	0.000	-55.257	-41.069	-55.257
Leg3	g7Y	48.49	73.459	0.000	46.310	73.459
Leg3	g8P	48.20	55.262	0.000	29.754	55.262
Leg3	g8X	77.31	0.000	-95.690	-72.998	-95.690
Leg3	g8XY	52.42	0.000	-64.880	-48.207	-64.880
Leg3	g8Y	75.53	86.603	0.000	54.434	86.603
Leg4	g9P	20.52	65.957	0.000	37.866	65.957
Leg4	g9X	47.25	0.000	-123.895	-94.751	-123.895
Leg4	g9XY	29.56	0.000	-77.505	-59.638	-77.505
Leg4	g9Y	34.85	112.028	0.000	72.226	112.028
Leg4	g10P	23.49	75.525	0.000	46.617	75.525
Leg4	g10X	56.40	0.000	-148.314	-114.204	-148.314
Leg4	g10XY	32.84	0.000	-86.351	-69.880	-86.351
Leg4	g10Y	43.05	138.394	0.000	92.439	138.394
Leg4	g11P	28.62	92.008	0.000	60.956	92.008
Leg4	g11X	68.82	0.000	-180.956	-139.451	-180.956
Leg4	g11XY	40.73	0.000	-107.109	-88.105	-107.109
Leg4	g11Y	52.31	168.167	0.000	115.880	168.167
Leg4	g12P	41.81	102.088	0.000	69.801	102.088
Leg4	g12X	78.00	0.000	-196.689	-153.720	-196.689
Leg4	g12XY	45.25	0.000	-114.113	-94.945	-114.113
Leg4	g12Y	76.41	186.569	0.000	128.209	186.569
Leg5	g13P	26.59	103.029	0.000	73.334	103.029
Leg5	g13X	73.65	0.000	-208.669	-164.072	-208.669
Leg5	g13XY	40.10	0.000	-113.612	-97.653	-113.612
Leg5	g13Y	51.39	199.127	0.000	137.831	199.127
Leg5	g14P	25.39	98.372	0.000	70.401	98.372
Leg5	g14X	76.57	0.000	-216.997	-173.627	-216.997
Leg5	g14XY	41.82	0.000	-118.522	-107.029	-118.522
Leg5	g14Y	50.81	196.903	0.000	136.227	196.903
Leg5	g15P	29.31	91.501	0.000	67.022	91.501
Leg5	g15X	70.99	0.000	-201.257	-161.625	-201.257
Leg5	g15XY	37.74	0.000	-106.983	-99.389	-106.983
Leg5	g15Y	59.37	185.345	0.000	129.361	185.345
Leg5	g16P	21.39	66.781	0.000	42.973	66.781
Leg5	g16X	76.97	0.000	-203.815	-178.085	-203.815
Leg5	g16XY	43.58	0.000	-115.387	-115.387	-107.620
Leg5	g16Y	51.82	161.771	0.000	106.751	161.771
Leg5	g17P	21.16	66.049	0.000	41.447	66.049
Leg5	g17X	77.89	0.000	-204.462	-179.103	-204.462
Leg5	g17XY	44.33	0.000	-116.374	-116.374	-108.179
Leg5	g17Y	51.56	160.962	0.000	105.397	160.962
Leg5	g18P	23.02	71.866	0.000	46.855	71.866
Leg5	g18X	84.62	0.000	-198.320	-169.577	-198.320
Leg5	g18XY	46.81	0.000	-109.698	-109.698	-106.580
Leg5	g18Y	52.25	163.130	0.000	109.670	163.130
Diag1	g19P	87.35	0.000	-7.095	-6.940	-7.095

Diag1	g19X	25.68	6.982	0.000	6.843	6.982
Diag1	g19XY	6.31	1.612	-0.512	1.612	-0.512
Diag1	g19Y	21.46	0.353	-1.743	-1.743	0.353
Diag2	g20P	13.65	3.608	-0.369	-0.369	3.608
Diag2	g20X	29.77	0.000	-3.722	-0.831	-3.722
Diag2	g20XY	86.56	0.000	-10.820	-7.393	-10.820
Diag2	g20Y	40.17	10.618	0.000	6.528	10.618
Diag2	g21P	12.81	3.386	0.000	3.386	2.634
Diag2	g21X	58.31	0.000	-5.536	-3.575	-5.536
Diag2	g21XY	36.66	0.000	-3.480	-1.234	-3.480
Diag2	g21Y	24.05	0.000	-3.007	-3.007	-2.750
Diag2	g22P	15.23	4.026	0.000	0.824	4.026
Diag2	g22X	30.18	0.217	-3.867	0.217	-3.867
Diag2	g22XY	83.96	0.000	-10.758	-6.568	-10.758
Diag2	g22Y	41.78	11.043	0.000	7.314	11.043
Diag2	g23P	11.40	3.014	0.000	3.014	2.840
Diag2	g23X	11.03	2.915	0.000	0.868	2.915
Diag2	g23XY	18.68	4.938	0.000	3.171	4.938
Diag2	g23Y	25.64	0.000	-3.286	-3.286	-2.462
Diag2	g24P	15.56	4.112	-1.113	-1.113	4.112
Diag2	g24X	56.37	0.000	-6.873	-1.616	-6.873
Diag2	g24XY	70.56	0.000	-8.603	-5.167	-8.603
Diag2	g24Y	42.42	11.213	0.000	6.780	11.213
Diag2	g25P	8.40	2.221	0.000	2.221	2.022
Diag2	g25X	45.50	0.000	-4.222	-4.123	-4.222
Diag2	g25XY	47.63	0.000	-4.419	-2.818	-4.419
Diag2	g25Y	38.06	0.000	-4.640	-4.640	-3.859
Diag3	g26P	26.47	8.396	0.000	2.541	8.396
Diag3	g26X	40.11	0.000	-10.025	-3.464	-10.025
Diag3	g26XY	56.38	0.000	-14.092	-14.003	-14.092
Diag3	g26Y	46.70	14.811	0.000	14.623	14.811
Diag3	g27P	27.83	8.826	0.000	8.826	6.660
Diag3	g27X	14.08	0.805	-3.518	-3.518	0.805
Diag3	g27XY	10.14	3.215	-1.141	3.215	-1.141
Diag3	g27Y	29.74	0.000	-7.433	-7.433	-4.976
Diag3	g28P	30.90	9.801	0.000	3.282	9.801
Diag3	g28X	37.23	0.000	-8.798	-3.004	-8.798
Diag3	g28XY	65.84	0.000	-15.559	-15.559	-15.073
Diag3	g28Y	45.06	14.293	0.000	14.293	13.616
Diag3	g29P	23.86	7.567	0.000	7.567	4.732
Diag3	g29X	12.00	1.933	-2.835	-2.835	1.933
Diag3	g29XY	13.12	4.162	-0.250	4.162	-0.250
Diag3	g29Y	39.44	0.000	-9.320	-9.320	-7.272
Diag3	g30P	28.14	8.925	0.000	3.031	8.925
Diag3	g30X	40.60	0.000	-9.894	-3.287	-9.894
Diag3	g30XY	57.60	0.000	-14.036	-14.036	-13.623
Diag3	g30Y	48.27	15.312	0.000	15.312	15.061
Diag3	g31P	29.40	9.326	0.000	9.326	7.480
Diag3	g31X	18.73	0.000	-4.564	-4.564	-0.350
Diag3	g31XY	11.97	2.211	-2.568	2.211	-2.568
Diag3	g31Y	29.52	0.000	-7.193	-7.193	-4.244
Diag3	g32P	22.82	7.237	0.000	0.537	7.237
Diag3	g32X	60.46	0.000	-14.089	-5.944	-14.089
Diag3	g32XY	52.00	0.000	-12.115	-12.115	-11.231
Diag3	g32Y	52.21	16.561	0.000	14.986	16.561
Diag3	g33P	19.02	6.034	0.000	6.034	3.905
Diag3	g33X	12.48	3.590	-2.907	-2.907	3.590
Diag3	g33XY	8.72	2.766	-0.872	2.766	-0.872
Diag3	g33Y	49.68	0.000	-11.575	-11.575	-9.433
Diag4	g34P	35.61	12.965	0.000	3.292	12.965
Diag4	g34X	40.34	0.000	-15.823	-5.740	-15.823
Diag4	g34XY	61.70	0.000	-24.201	-24.201	-18.849
Diag4	g34Y	65.89	23.990	0.000	23.990	19.710
Diag4	g35P	41.09	14.962	0.000	14.962	10.640
Diag4	g35X	14.54	3.639	-5.702	-5.702	3.639
Diag4	g35XY	14.41	5.247	-4.260	5.247	-4.260
Diag4	g35Y	29.57	0.000	-11.597	-11.597	-6.032

Diag4	g36P	43.23	15.742	0.000	5.241	15.742
Diag4	g36X	35.89	0.000	-14.101	-4.169	-14.101
Diag4	g36XY	62.92	0.000	-24.721	-24.721	-20.491
Diag4	g36Y	65.72	23.927	0.000	23.927	19.047
Diag4	g37P	28.57	10.404	0.000	10.404	4.290
Diag4	g37X	15.31	5.576	-4.164	-4.164	5.576
Diag4	g37XY	18.66	6.795	-2.319	6.795	-2.319
Diag4	g37Y	41.17	0.000	-16.174	-16.174	-12.359
Diag4	g38P	40.41	14.714	0.000	4.606	14.714
Diag4	g38X	40.90	0.000	-16.070	-5.252	-16.070
Diag4	g38XY	61.29	0.000	-24.079	-24.079	-19.719
Diag4	g38Y	68.60	24.976	0.000	24.976	20.878
Diag4	g39P	49.89	18.163	0.000	18.163	15.078
Diag4	g39X	21.06	0.498	-8.276	-8.276	0.498
Diag4	g39XY	20.78	2.468	-7.689	2.468	-7.689
Diag4	g39Y	21.41	0.000	-8.412	-8.412	-1.482
Diag4	g40P	30.63	11.153	0.000	2.461	11.153
Diag4	g40X	54.09	0.000	-20.742	-9.653	-20.742
Diag4	g40XY	50.51	0.000	-19.370	-19.370	-14.743
Diag4	g40Y	68.67	25.003	0.000	25.003	24.546
Diag4	g41P	11.71	4.262	-2.280	4.262	-2.280
Diag4	g41X	28.77	10.474	-1.389	-1.389	10.474
Diag4	g41XY	20.96	7.633	0.000	7.633	0.377
Diag4	g41Y	61.98	0.000	-22.517	-22.517	-20.278
Diag10	g42P	93.22	0.000	-20.788	-20.788	-15.947
Diag10	g42X	59.52	13.272	0.000	13.272	8.594
Diag10	g42XY	46.74	10.423	-6.430	-6.430	10.423
Diag10	g42Y	29.33	6.539	-6.462	6.539	-6.462
Diag10	g43P	60.39	0.000	-15.645	-2.867	-15.645
Diag10	g43X	24.36	4.905	-7.003	-7.003	4.905
Diag10	g43XY	60.22	19.100	0.000	19.100	11.727
Diag10	g43Y	87.89	0.000	-22.770	-22.770	-17.259
Diag5	g44P	60.46	0.000	-9.703	-9.703	-6.068
Diag5	g44X	65.92	13.939	0.000	13.939	10.001
Diag5	g44XY	32.30	4.002	-5.183	-5.183	4.002
Diag5	g44Y	44.06	4.688	-7.071	4.688	-7.071
Diag5	g45P	70.09	14.821	0.000	14.821	10.126
Diag5	g45X	79.33	0.000	-12.731	-12.731	-6.831
Diag5	g45XY	28.87	6.105	-1.923	6.105	-1.923
Diag5	g45Y	41.80	8.839	0.000	0.300	8.839
Diag5	g46P	89.59	0.000	-11.756	-11.756	-7.658
Diag5	g46X	36.64	7.747	0.000	7.747	4.540
Diag5	g46XY	39.71	3.765	-5.210	-5.210	3.765
Diag5	g46Y	20.47	4.131	-2.686	4.131	-2.686
Diag5	g47P	39.11	1.165	-4.606	1.165	-4.606
Diag5	g47X	47.52	0.000	-6.235	-6.235	-0.136
Diag5	g47XY	40.26	8.514	0.000	8.514	3.236
Diag5	g47Y	88.38	0.000	-10.408	-10.408	-5.992
Diag6	g48P	0.00	0.000	0.000	0.000	0.000
Diag6	g48X	89.11	22.034	0.000	22.034	12.336
Diag6	g48XY	29.81	7.371	0.000	1.924	7.371
Diag6	g48Y	58.47	14.456	-0.299	14.456	-0.299
Diag6	g49P	64.65	15.985	0.000	15.985	1.568
Diag6	g49X	49.62	12.268	0.000	1.133	12.268
Diag6	g49XY	84.53	20.901	0.000	20.901	17.179
Diag6	g49Y	0.36	0.088	0.000	0.088	0.000
Diag7	g50P	85.78	13.604	0.000	13.604	8.497
Diag7	g50X	56.23	2.127	-1.036	-1.036	2.127
Diag7	g50XY	50.42	7.996	-0.135	7.996	-0.135
Diag7	g50Y	11.30	1.792	0.000	0.000	1.792
Diag7	g51P	0.00	0.000	0.000	0.000	0.000
Diag7	g51X	71.49	11.337	0.000	11.337	6.503
Diag7	g51XY	23.86	3.785	0.000	0.000	3.785
Diag7	g51Y	65.58	10.400	0.000	10.400	0.971
Diag8	g52P	67.28	9.684	0.000	9.684	0.505
Diag8	g52X	12.34	1.776	0.000	0.000	1.776
Diag8	g52XY	56.96	8.198	0.000	8.198	4.480

Diag8	g52Y	0.19	0.027	0.000	0.000	0.027
Diag8	g53P	0.00	0.000	0.000	0.000	0.000
Diag8	g53X	72.44	10.426	0.000	10.426	10.093
Diag8	g53XY	55.37	7.969	0.000	0.345	7.969
Diag8	g53Y	42.58	6.128	0.000	6.128	0.000
Diag9	g54P	37.49	11.720	0.000	11.720	0.056
Diag9	g54X	10.76	1.576	-0.592	-0.592	1.576
Diag9	g54XY	32.20	10.068	0.000	10.068	4.922
Diag9	g54Y	13.57	0.000	-0.747	-0.747	-0.524
Diag9	g55P	27.31	0.000	-1.502	-1.502	-0.861
Diag9	g55X	40.08	12.530	0.000	12.530	11.852
Diag9	g55XY	29.45	9.206	0.000	0.028	9.206
Diag9	g55Y	26.46	8.274	-0.354	8.274	-0.354
Horz1	g56P	15.50	0.000	-1.946	-1.946	-1.750
Horz1	g56Y	3.57	0.567	-0.075	0.567	-0.075
Horz2	g57P	37.82	7.121	0.000	3.919	7.121
Horz2	g57X	0.00	0.000	0.000	0.000	0.000
Horz1	g58P	21.32	3.381	0.000	3.381	1.046
Horz1	g58Y	22.22	3.524	0.000	3.524	2.035
Horz3	g59P	9.43	0.284	-0.537	0.284	-0.537
Horz3	g59X	26.16	5.333	0.000	5.333	4.629
Horz1	g60P	23.30	5.542	0.000	5.542	2.328
Horz1	g60Y	19.87	4.727	0.000	4.727	2.139
Horz6	g61P	8.66	1.931	0.000	1.931	1.037
Horz6	g61X	12.27	2.736	0.000	2.736	0.329
Horz1	g62P	22.00	5.233	0.000	5.233	3.457
Horz1	g62Y	9.34	2.222	-0.639	2.222	-0.639
Horz3	g63P	0.00	0.000	0.000	0.000	0.000
Horz3	g63X	45.08	9.192	0.000	7.495	9.192
Horz4	g64P	38.35	0.000	-5.996	-5.996	-3.314
Horz4	g64Y	31.61	0.000	-4.942	-4.942	-2.802
Horz4	g65P	13.94	2.948	-1.792	-1.792	2.948
Horz4	g65X	61.96	0.000	-9.687	-7.417	-9.687
Horz7	g66P	19.94	0.000	-1.014	-0.166	-1.014
Horz7	g66X	20.96	0.162	-1.066	-1.066	0.162
Horz7	g66XY	5.08	0.706	-0.258	-0.258	0.706
Horz7	g66Y	33.81	0.000	-1.719	-1.017	-1.719
Horz7	g67P	2.94	0.025	-0.149	0.025	-0.149
Horz7	g67X	5.30	0.000	-0.270	-0.270	-0.138
Horz7	g67XY	7.21	0.000	-0.366	-0.366	-0.278
Horz7	g67Y	8.26	0.000	-0.420	-0.420	-0.050
Horz5	g68P	16.38	0.000	-2.923	-1.380	-2.923
Horz5	g68X	39.38	0.000	-7.028	-7.028	-4.015
Horz5	g68XY	4.09	0.000	-0.730	-0.483	-0.730
Horz5	g68Y	28.16	0.000	-5.026	-5.026	-1.161
Horz5	g69P	2.18	0.000	-0.388	-0.388	-0.380
Horz5	g69X	34.80	0.000	-6.209	-6.209	-3.298
Horz5	g69XY	10.83	0.000	-1.933	-0.186	-1.933
Horz5	g69Y	30.73	0.000	-5.485	-5.485	-0.818
Horz5	g70P	8.54	0.000	-3.266	-1.826	-3.266
Horz5	g70Y	2.05	0.000	-0.785	-0.785	-0.109
Horz5	g71P	3.74	0.000	-1.432	-1.432	-0.572
Horz5	g71X	3.56	1.552	-0.600	-0.600	1.552
Inner1	g72P	0.00	0.000	0.000	0.000	0.000
Inner1	g72X	74.50	0.000	-2.471	-1.007	-2.471
Inner2	g73P	26.37	0.000	-2.249	-2.249	-0.338
Inner2	g73X	21.78	2.963	0.000	2.963	1.318
Inner3	g74P	22.80	0.000	-2.755	-2.755	-0.138
Inner3	g74X	13.00	1.988	-0.406	1.988	-0.406
Inner2	g75P	73.09	0.000	-6.233	-6.233	-5.341
Inner2	g75X	51.29	0.000	-4.374	-1.633	-4.374
Inner4	g76P	17.58	0.000	-0.717	-0.132	-0.717
Inner4	g76X	5.79	0.457	-0.224	-0.224	0.457
Inner4	g76XY	8.20	0.647	0.000	0.200	0.647
Inner4	g76Y	22.48	0.000	-0.917	-0.525	-0.917
TopCrArm	g77P	26.70	0.000	-10.720	-8.654	-10.720
TopCrArm	g77X	19.45	0.000	-7.809	-7.809	-5.299

TopCrArm	g77XY	15.21	7.800	0.000	7.218	7.800
TopCrArm	g77Y	29.57	0.000	-11.872	-11.872	-2.054
TopCrArm	g78P	20.19	0.000	-6.660	-6.660	-6.188
TopCrArm	g78Y	10.22	1.085	-3.372	-3.372	1.085
MdCrArm1	g79P	26.33	0.000	-12.619	-9.358	-12.619
MdCrArm1	g79X	22.23	0.000	-10.655	-10.655	-6.103
MdCrArm1	g79XY	11.91	7.553	0.000	7.553	7.492
MdCrArm1	g79Y	29.67	0.000	-14.220	-14.220	-1.476
MdCrArm2	g80P	18.87	0.000	-6.225	-6.225	-4.953
MdCrArm2	g80Y	12.08	0.589	-3.984	-3.984	0.589
BotCrArm	g81P	27.77	0.000	-11.149	-7.484	-11.149
BotCrArm	g81X	22.28	0.000	-8.946	-8.946	-4.334
BotCrArm	g81XY	15.31	7.920	0.000	7.920	6.610
BotCrArm	g81Y	34.03	0.000	-13.660	-13.660	-2.017
BotCrArm	g82P	22.36	0.000	-7.376	-7.376	-6.663
BotCrArm	g82Y	14.28	6.269	0.000	0.460	6.269
TopArmBr	g83P	23.54	3.496	-0.907	3.496	-0.907
TopArmBr	g83X	21.33	3.168	0.000	3.168	1.061
TopArmBr	g83XY	27.92	4.148	0.000	4.148	2.202
TopArmBr	g83Y	44.83	6.659	0.000	6.659	5.671
MidArmBr	g84P	22.00	4.215	-0.785	4.215	-0.785
MidArmBr	g84X	19.84	3.801	-0.137	3.801	-0.137
MidArmBr	g84XY	30.02	5.752	0.000	5.752	4.337
MidArmBr	g84Y	46.94	8.992	0.000	8.992	6.928
BotArmBr	g85P	14.12	2.097	-0.426	2.097	-0.426
BotArmBr	g85X	29.22	4.339	-0.026	4.339	-0.026
BotArmBr	g85XY	23.54	3.497	0.000	3.342	3.497
BotArmBr	g85Y	58.32	8.663	0.000	8.663	5.600
ShArmBr	g86P	67.00	0.000	-9.232	-9.232	-6.434
ShArmBr	g86X	10.42	0.000	-1.435	-1.435	-0.682
ShArmBr	g86XY	11.53	0.000	-1.588	-1.588	-0.331
ShArmBr	g86Y	23.87	5.048	0.000	4.979	5.048
ShieldAr	g87P	3.76	0.000	-1.010	-0.238	-1.010
ShieldAr	g87X	17.77	7.927	0.000	7.927	4.475
ShieldAr	g88P	2.88	0.000	-1.286	-0.234	-1.286
ShieldAr	g88X	17.75	7.916	0.000	7.916	4.728
M3	g89P	17.52	0.000	-2.571	-2.571	-2.312
M3	g89Y	3.54	0.749	-0.100	0.749	-0.100
M4	g90P	45.08	9.192	0.000	7.495	9.192
M4	g90X	0.00	0.000	0.000	0.000	0.000
Inner1	ig72P90P	2.01	0.159	-0.021	-0.021	0.159
Inner1	ig72P90X	48.78	0.000	-2.638	-0.994	-2.638

Moments for Angles Modeled as Beams For All Load Cases

Load Case	Angle Label	Torsion (ft-lbs)	Origin X Moment (ft-lbs)	Origin Y Moment (ft-lbs)	End X Moment (ft-lbs)	End Y Moment (ft-lbs)	X Shear (lbs)	Y Shear (lbs)
NESC Heavy	g1P	17.65	191.79	38.23	266.81	25.69	55.11	7.65
NESC Heavy	g1X	10.62	-10.22	46.80	-21.89	62.43	-3.85	13.13
NESC Heavy	g1XY	-18.86	-12.02	-12.10	-7.41	1.82	-2.33	-1.24
NESC Heavy	g1Y	-17.64	193.57	-3.86	255.35	10.88	53.95	0.87
NESC Heavy	g2P	-42.59	42.41	-262.30	-0.78	-526.92	5.99	-112.73
NESC Heavy	g2X	-31.56	20.91	55.00	-27.98	91.17	-1.02	20.88
NESC Heavy	g2XY	1.61	-35.56	-46.08	-59.35	-67.62	-13.56	-16.24
NESC Heavy	g2Y	-1.07	14.18	242.95	29.96	527.49	6.30	110.05
NESC Heavy	g3P	-42.44	0.67	526.92	-89.37	478.28	-13.24	149.56
NESC Heavy	g3X	-31.57	27.99	-91.17	10.75	-79.57	5.77	-25.41
NESC Heavy	g3XY	1.62	59.34	67.61	10.69	109.61	10.42	26.38
NESC Heavy	g3Y	-1.12	-29.96	-527.50	-95.31	-494.11	-18.64	-152.00
NESC Heavy	g4P	-42.52	89.44	-478.31	66.68	-420.15	21.48	-123.39
NESC Heavy	g4X	-31.55	-10.76	79.56	-100.33	95.92	-15.27	24.11
NESC Heavy	g4XY	1.60	-10.68	-109.59	-56.65	-147.21	-9.25	-35.28
NESC Heavy	g4Y	-0.99	95.30	494.11	38.99	505.39	18.44	137.26
NESC Heavy	g5P	-106.54	-226.52	430.14	-335.29	591.07	-93.68	170.15

NESC	Heavy	g5X	-108.46	195.76	-60.66	100.08	-174.56	49.34	-39.21
NESC	Heavy	g5XY	-119.48	-96.28	196.43	-15.58	261.26	-18.67	76.30
NESC	Heavy	g5Y	-131.13	-409.16	-597.89	-349.43	-582.40	-126.33	-196.70
NESC	Heavy	g6P	-106.66	335.38	-591.04	52.77	-594.99	57.63	-175.93
NESC	Heavy	g6X	-108.43	-100.11	174.55	-317.77	316.20	-62.06	72.82
NESC	Heavy	g6XY	-119.53	15.62	-261.29	-311.71	-273.91	-43.92	-79.47
NESC	Heavy	g6Y	-131.00	349.33	582.48	95.63	688.78	65.91	188.55
NESC	Heavy	g7P	-106.38	-52.86	594.99	-412.63	723.03	-73.35	207.47
NESC	Heavy	g7X	-108.51	317.82	-316.14	46.47	-395.03	57.45	-112.07
NESC	Heavy	g7XY	-119.35	311.67	273.98	-45.25	487.90	41.93	120.03
NESC	Heavy	g7Y	-131.31	-95.49	-688.76	-470.53	-700.27	-89.01	-218.68
NESC	Heavy	g8P	-106.67	412.75	-722.95	112.42	-713.23	76.04	-207.76
NESC	Heavy	g8X	-108.30	-46.52	395.06	-541.42	663.33	-85.22	153.24
NESC	Heavy	g8XY	-119.57	45.33	-487.86	-261.32	-655.75	-31.21	-165.62
NESC	Heavy	g8Y	-130.86	470.41	700.40	137.38	911.08	87.80	233.08
NESC	Heavy	g9P	-207.08	-173.09	718.16	-946.22	1437.47	-175.22	337.22
NESC	Heavy	g9X	-253.95	726.47	-629.99	233.72	-1496.33	150.45	-332.91
NESC	Heavy	g9XY	-283.03	321.18	670.08	-88.89	1720.19	36.22	374.18
NESC	Heavy	g9Y	-294.58	-289.00	-951.01	-774.06	-1283.30	-166.19	-349.59
NESC	Heavy	g10P	-207.57	946.38	-1437.35	-60.42	-1753.12	139.59	-502.31
NESC	Heavy	g10X	-253.48	-233.89	1496.32	-1134.46	2923.94	-215.84	696.45
NESC	Heavy	g10XY	-283.59	89.13	-1720.16	-917.87	-2621.40	-130.34	-684.04
NESC	Heavy	g10Y	-294.04	773.91	1283.46	-183.36	2071.39	92.78	528.05
NESC	Heavy	g11P	-206.82	60.26	1753.16	-719.13	2492.96	-103.88	668.42
NESC	Heavy	g11X	-254.40	1134.83	-2923.76	548.70	-4140.00	265.63	-1113.19
NESC	Heavy	g11XY	-282.21	917.54	2621.62	-44.75	4100.71	137.17	1059.13
NESC	Heavy	g11Y	-294.77	183.68	-2071.31	-417.23	-2451.71	-36.55	-711.88
NESC	Heavy	g12P	-208.48	719.43	-2492.78	-1426.79	-2447.12	-102.18	-714.71
NESC	Heavy	g12X	-251.27	-549.20	4140.08	-2994.83	6032.20	-513.75	1473.10
NESC	Heavy	g12XY	-285.37	45.41	-4100.51	-2152.73	-4478.29	-304.75	-1242.32
NESC	Heavy	g12Y	-292.42	416.91	2452.01	-2621.03	3302.68	-319.04	832.01
NESC	Heavy	g13P	-154.14	2889.79	525.14	1358.03	3679.65	515.71	510.59
NESC	Heavy	g13X	-684.60	-6653.29	1691.92	-3090.42	3946.89	-1184.73	685.13
NESC	Heavy	g13XY	-551.94	-4774.93	-1837.48	-2695.93	-4096.80	-907.53	-721.31
NESC	Heavy	g13Y	-981.52	4223.05	-819.85	2033.27	-1646.16	759.66	-299.08
NESC	Heavy	g14P	-168.25	-1357.77	-3679.16	-1442.16	-1318.08	-340.23	-607.31
NESC	Heavy	g14X	-695.21	3091.57	-3944.10	987.13	-2213.17	496.40	-748.97
NESC	Heavy	g14XY	-540.56	2694.95	4099.01	1451.15	1270.30	504.15	653.12
NESC	Heavy	g14Y	-974.73	-2034.00	1649.24	-2788.69	332.43	-585.94	240.39
NESC	Heavy	g15P	-161.64	1442.19	1318.84	-2563.26	3948.80	-136.44	640.66
NESC	Heavy	g15X	-688.50	-987.25	2215.23	4274.43	3971.62	399.87	753.67
NESC	Heavy	g15XY	-544.81	-1451.09	-1268.50	-237.12	-534.49	-205.45	-219.48
NESC	Heavy	g15Y	-976.36	2788.70	-327.70	814.95	186.31	438.17	-17.09
NESC	Heavy	g16P	-170.22	2716.84	-4154.16	1979.71	-1528.76	285.57	-345.46
NESC	Heavy	g16X	-763.77	-4436.32	-4151.70	-3627.89	-856.71	-490.67	-305.17
NESC	Heavy	g16XY	-636.87	253.78	453.12	1636.48	1187.60	114.90	99.96
NESC	Heavy	g16Y	-1158.55	-794.39	-281.44	-989.98	96.54	-108.47	-11.39
NESC	Heavy	g17P	-777.24	-1889.10	1422.14	-1511.87	1951.19	-206.92	204.88
NESC	Heavy	g17X	-800.74	3660.04	481.58	656.03	3308.27	262.24	230.65
NESC	Heavy	g17XY	-741.97	-1501.89	-1253.43	1308.22	1688.54	-11.95	26.59
NESC	Heavy	g17Y	-607.54	1157.95	-93.49	336.96	520.58	90.79	25.98
NESC	Heavy	g18P	-1615.37	1315.90	-1951.61	1183.43	-2782.44	128.50	-242.00
NESC	Heavy	g18X	-381.82	-1416.60	-2616.03	1068.57	-5796.75	-17.53	-430.88
NESC	Heavy	g18XY	-1245.37	-1163.72	-1106.20	-2898.02	-5194.45	-207.14	-323.13
NESC	Heavy	g18Y	0.29	-77.27	-370.24	-649.74	-2140.18	-37.19	-128.43
NESC	Heavy	g64P	-1.31	226.41	23.14	202.09	55.66	25.02	4.60
NESC	Heavy	g64Y	8.31	0.58	104.95	-29.71	62.89	-1.70	9.80
NESC	Heavy	g65P	22.30	-5.97	64.08	20.25	44.11	0.84	6.32
NESC	Heavy	g65X	20.61	-31.91	39.42	-40.53	93.99	-4.22	7.80
NESC	Heavy	g66P	13.65	15.21	-147.98	-101.94	-157.29	-7.72	-27.13
NESC	Heavy	g66X	13.78	-207.23	275.98	-101.97	157.26	-27.47	38.52
NESC	Heavy	g66XY	11.01	98.03	11.56	68.92	-64.51	14.84	-4.71
NESC	Heavy	g66Y	10.94	53.36	255.75	68.92	64.52	10.87	28.46
NESC	Heavy	g67P	22.49	260.05	-147.27	178.11	-158.91	38.92	-27.24
NESC	Heavy	g67X	22.32	104.42	759.83	165.42	856.10	24.11	143.61
NESC	Heavy	g67XY	22.32	195.25	-792.22	165.84	-856.01	31.97	-146.54
NESC	Heavy	g67Y	22.58	79.04	106.60	178.03	158.99	22.87	23.58

NESC Heavy	g68P	60.44	-308.39	316.83	-505.85	217.13	-73.07	48.04
NESC Heavy	g68X	60.49	-97.74	-324.81	207.86	-386.76	9.81	-63.94
NESC Heavy	g68XY	59.66	-415.28	42.47	-690.46	-356.35	-99.35	-28.05
NESC Heavy	g68Y	59.27	218.49	-536.36	535.86	-867.10	67.57	-126.13
NESC Heavy	g69P	32.10	-1006.70	-241.04	-1984.89	-246.11	-268.63	-43.54
NESC Heavy	g69X	31.19	58.33	499.93	193.27	614.50	22.65	100.05
NESC Heavy	g69XY	31.45	121.05	-89.68	-47.99	14.87	6.56	-6.71
NESC Heavy	g69Y	31.31	645.85	313.72	1767.60	217.80	216.74	47.55
NESC Heavy	g70P	60.56	505.71	-217.42	207.59	386.90	126.89	30.09
NESC Heavy	g70Y	59.78	-535.33	867.39	-690.63	356.00	-217.88	217.63
NESC Heavy	g71P	31.18	1984.98	245.50	1767.69	-217.15	667.14	4.86
NESC Heavy	g71X	31.40	-193.47	-614.42	-48.01	-14.90	-42.93	-111.88
NESC Heavy	g72P	-2.98	49.83	6.74	41.07	14.21	14.30	3.30
NESC Heavy	g72X	4.80	11.16	43.56	43.52	58.47	8.60	16.03
NESC Heavy	g77P	-17.20	17.50	24.44	-101.60	74.26	-5.66	6.64
NESC Heavy	g77X	9.82	-23.58	8.53	-133.18	94.58	-10.54	6.94
NESC Heavy	g77XY	-21.63	13.60	-8.52	-42.74	67.11	-1.96	3.94
NESC Heavy	g77Y	3.94	-24.23	-24.43	-180.53	35.04	-13.77	0.72
NESC Heavy	g78P	4.29	-57.72	-10.20	-34.47	-17.71	-10.24	-3.10
NESC Heavy	g78Y	41.60	-196.93	95.11	-200.20	53.96	-44.12	16.58
NESC Heavy	g79P	-9.77	23.40	-9.39	-60.01	100.68	-1.96	4.88
NESC Heavy	g79X	12.20	-37.38	-5.33	-187.58	145.29	-12.02	7.48
NESC Heavy	g79XY	-28.23	27.36	5.34	-54.69	163.75	-1.47	9.03
NESC Heavy	g79Y	-2.28	-25.25	9.40	-156.92	163.40	-9.74	9.23
NESC Heavy	g81P	0.26	25.42	-15.94	57.42	40.77	5.57	1.67
NESC Heavy	g81X	26.80	-36.93	54.25	-249.99	185.62	-19.29	16.15
NESC Heavy	g81XY	-43.19	14.75	-54.24	-118.73	106.50	-7.00	3.50
NESC Heavy	g81Y	-14.88	-20.61	15.94	-25.17	182.28	-3.09	13.33
NESC Heavy	g82P	0.08	175.16	-220.72	185.88	-176.52	40.12	-44.14
NESC Heavy	g82Y	62.32	-15.73	670.25	-71.98	582.74	-9.67	139.23
NESC Heavy	g87P	0.00	0.00	0.00	23.02	35.43	1.27	1.95
NESC Heavy	g87X	-0.00	0.00	0.00	-70.53	113.91	-3.88	6.27
NESC Heavy	g88P	1.80	-39.30	-54.03	6.20	-6.24	-7.35	-13.39
NESC Heavy	g88X	1.80	104.09	-125.75	6.13	6.24	24.49	-26.55
NESC Heavy	ig72P90P	-1.01	-41.95	-38.45	-18.53	-19.68	-9.50	-9.14
NESC Heavy	ig72P90X	3.92	-45.51	-34.21	-58.59	-18.45	-16.36	-8.27
NESC Extreme	g1P	21.37	312.81	17.94	431.07	-13.56	89.39	0.47
NESC Extreme	g1X	21.11	-5.11	51.29	-15.90	71.51	-2.51	14.76
NESC Extreme	g1XY	-26.57	-4.83	-10.05	-2.22	-4.99	-0.85	-1.81
NESC Extreme	g1Y	-16.53	312.52	17.66	418.00	46.06	87.78	7.70
NESC Extreme	g2P	-49.19	104.66	-333.44	-13.30	-763.78	13.13	-156.72
NESC Extreme	g2X	-30.54	-76.12	158.42	-49.28	216.71	-17.93	53.60
NESC Extreme	g2XY	13.44	-135.03	-148.86	-74.80	-192.11	-29.98	-48.71
NESC Extreme	g2Y	6.56	75.93	314.70	20.54	758.99	13.79	153.36
NESC Extreme	g3P	-48.91	13.11	763.80	-66.15	674.86	-7.96	214.04
NESC Extreme	g3X	-30.55	49.31	-216.70	-8.81	-219.00	6.04	-64.86
NESC Extreme	g3XY	13.46	74.81	192.11	-27.64	235.74	7.03	63.68
NESC Extreme	g3Y	6.39	-20.57	-758.99	-79.38	-678.53	-14.88	-213.86
NESC Extreme	g4P	-49.11	66.28	-674.83	-18.27	-611.64	6.66	-176.64
NESC Extreme	g4X	-30.46	8.79	219.02	-131.85	244.77	-16.93	63.73
NESC Extreme	g4XY	13.36	27.63	-235.74	-89.48	-277.90	-8.51	-70.58
NESC Extreme	g4Y	6.68	79.40	678.53	-82.62	607.78	-0.43	176.60
NESC Extreme	g5P	-41.54	-161.88	633.59	-320.16	716.62	-80.34	224.95
NESC Extreme	g5X	-7.65	108.41	-237.15	-78.26	-401.87	5.03	-106.56
NESC Extreme	g5XY	-68.30	-98.98	319.22	-204.19	477.29	-50.58	132.79
NESC Extreme	g5Y	-49.72	-173.72	-654.42	-285.29	-659.45	-76.44	-218.89
NESC Extreme	g6P	-41.82	320.20	-716.59	-137.02	-686.33	27.19	-208.07
NESC Extreme	g6X	-7.49	78.25	401.87	-259.50	609.32	-26.91	150.13
NESC Extreme	g6XY	-68.48	204.24	-477.25	-275.09	-525.41	-10.49	-148.85
NESC Extreme	g6Y	-49.46	285.25	659.49	-90.28	785.83	28.87	214.30
NESC Extreme	g7P	-41.34	136.98	686.36	-347.44	864.60	-33.16	244.11
NESC Extreme	g7X	-7.79	259.51	-609.32	-145.86	-721.67	17.92	-209.80
NESC Extreme	g7XY	-68.07	275.05	525.49	-219.42	789.47	8.72	207.20
NESC Extreme	g7Y	-49.92	90.35	-785.79	-376.33	-790.53	-44.96	-248.05
NESC Extreme	g8P	-41.89	347.51	-864.55	-116.48	-903.90	33.44	-255.77
NESC Extreme	g8X	-7.19	145.85	721.68	-525.56	1123.70	-55.02	267.35
NESC Extreme	g8XY	-68.63	219.51	-789.39	-293.84	-960.40	-10.71	-253.43

NESC Extreme	g8Y	-49.20	376.28	790.60	-281.97	1002.17	13.59	259.18
NESC Extreme	g9P	-37.20	113.13	913.35	-864.71	1725.23	-117.60	412.77
NESC Extreme	g9X	33.24	660.40	-1108.28	-119.77	-2250.43	84.64	-525.97
NESC Extreme	g9XY	-210.28	364.17	970.24	-541.70	2514.72	-27.95	545.57
NESC Extreme	g9Y	-60.60	291.32	-1005.96	-489.83	-1436.61	-31.02	-382.03
NESC Extreme	g10P	-38.07	864.75	-1725.19	-530.86	-2065.50	52.58	-596.72
NESC Extreme	g10X	34.34	119.80	2250.41	-1104.16	4211.82	-155.10	1018.50
NESC Extreme	g10XY	-211.59	541.99	-2514.55	-843.36	-3736.19	-47.25	-984.88
NESC Extreme	g10Y	-59.83	489.80	1436.65	-765.78	2515.06	-43.47	621.84
NESC Extreme	g11P	-36.74	530.82	2065.54	-592.61	3126.70	-9.76	817.27
NESC Extreme	g11X	32.57	1104.09	-4211.85	396.43	-5722.69	236.48	-1566.02
NESC Extreme	g11XY	-209.21	843.00	3736.40	-287.22	5670.91	87.23	1482.30
NESC Extreme	g11Y	-60.92	765.86	-2515.00	21.44	-3097.70	123.93	-883.09
NESC Extreme	g12P	-39.67	592.69	-3126.65	-2222.73	-3062.06	-235.73	-895.15
NESC Extreme	g12X	39.12	-396.35	5722.66	-4200.45	7909.49	-665.85	1974.95
NESC Extreme	g12XY	-215.15	287.92	-5670.65	-2828.41	-5956.59	-367.50	-1683.88
NESC Extreme	g12Y	-57.28	-21.53	3097.77	-3891.19	4699.45	-565.75	1127.20
NESC Extreme	g13P	352.34	3930.53	534.06	1867.40	4342.81	704.12	592.00
NESC Extreme	g13X	306.38	-8862.33	2459.78	-4697.66	5057.37	-1648.37	914.10
NESC Extreme	g13XY	-792.39	-6437.13	-2284.15	-3849.71	-6358.68	-1249.43	-1050.72
NESC Extreme	g13Y	-621.94	6306.11	-533.23	2893.35	-2387.80	1116.60	-354.24
NESC Extreme	g14P	334.84	-1868.16	-4343.87	-1869.13	-1441.72	-454.17	-702.91
NESC Extreme	g14X	294.35	4697.04	-5058.66	3033.78	-3001.17	940.56	-980.83
NESC Extreme	g14XY	-776.71	3847.39	6362.02	2586.31	2141.62	782.28	1034.53
NESC Extreme	g14Y	-611.23	-2894.07	2389.69	-3474.02	765.02	-773.50	382.87
NESC Extreme	g15P	342.11	1869.04	1440.12	-1875.60	3194.47	-0.65	563.74
NESC Extreme	g15X	302.64	-3033.64	3000.48	2056.47	4116.98	-118.83	866.66
NESC Extreme	g15XY	-783.31	-2586.12	-2139.44	-327.81	-639.66	-354.63	-338.32
NESC Extreme	g15Y	-614.94	3474.05	-761.88	897.90	-349.02	531.52	-134.98
NESC Extreme	g16P	404.90	2025.20	-3310.02	1083.39	-805.90	188.93	-250.27
NESC Extreme	g16X	446.64	-2199.10	-4237.60	-1344.74	-1354.82	-215.77	-340.30
NESC Extreme	g16XY	-1013.19	287.38	613.65	1606.62	-108.98	115.24	30.92
NESC Extreme	g16Y	-797.29	-853.75	335.55	-1526.55	-526.35	-144.58	-11.76
NESC Extreme	g17P	-261.12	-947.80	730.14	-303.58	830.09	-76.08	94.81
NESC Extreme	g17X	-908.43	1124.52	949.02	1092.45	474.65	134.84	86.76
NESC Extreme	g17XY	374.04	-1775.70	263.36	-508.87	-675.78	-138.99	-25.06
NESC Extreme	g17Y	-128.15	1706.15	591.41	-233.34	200.52	89.47	48.11
NESC Extreme	g18P	-924.24	270.24	-937.36	-3.88	-678.57	13.71	-82.68
NESC Extreme	g18X	-1228.30	-1468.71	-409.14	-526.12	-905.22	-102.05	-67.42
NESC Extreme	g18XY	749.94	418.31	784.73	-467.91	-371.14	-2.58	21.23
NESC Extreme	g18Y	521.23	366.58	-65.32	438.49	-377.76	41.15	-22.69
NESC Extreme	g64P	-1.93	185.47	-50.90	193.55	-84.64	22.13	-7.91
NESC Extreme	g64Y	3.35	62.47	117.26	61.47	144.12	7.24	15.26
NESC Extreme	g65P	12.40	7.44	-18.42	4.41	83.62	0.70	3.81
NESC Extreme	g65X	9.90	15.54	21.35	-6.87	62.78	0.51	4.91
NESC Extreme	g66P	14.64	27.15	-292.73	-80.63	-202.42	-4.77	-44.01
NESC Extreme	g66X	14.56	-201.76	48.22	-80.69	202.40	-25.09	22.28
NESC Extreme	g66XY	-0.60	-10.07	36.47	38.28	-192.00	2.51	-13.82
NESC Extreme	g66Y	-0.60	74.34	353.16	38.28	191.99	10.01	48.46
NESC Extreme	g67P	11.87	-112.79	1363.43	-200.31	1529.93	-27.71	257.20
NESC Extreme	g67X	12.04	167.77	956.66	195.65	1060.09	32.39	179.25
NESC Extreme	g67XY	12.10	192.75	-1019.89	195.92	-1060.04	34.46	-184.90
NESC Extreme	g67Y	11.71	-240.51	-1421.47	-199.96	-1529.97	-39.27	-262.34
NESC Extreme	g68P	22.22	-59.12	498.01	-121.86	950.82	-16.18	130.10
NESC Extreme	g68X	21.58	-166.24	312.61	-19.19	856.15	-16.59	104.95
NESC Extreme	g68XY	13.26	-77.96	-453.93	35.30	-1080.96	-3.88	-137.82
NESC Extreme	g68Y	12.28	79.93	-613.26	-29.58	-1149.32	4.48	-158.26
NESC Extreme	g69P	0.26	-387.44	-16.34	-571.78	169.30	-86.13	13.73
NESC Extreme	g69X	-0.36	33.89	172.55	85.99	313.16	10.76	43.61
NESC Extreme	g69XY	-0.34	95.31	-49.80	17.64	-17.60	10.14	-6.05
NESC Extreme	g69Y	0.53	-38.83	62.22	267.58	-27.57	20.54	3.11
NESC Extreme	g70P	21.92	121.66	-950.85	-19.01	-856.15	18.19	-321.26
NESC Extreme	g70Y	12.78	29.71	1149.31	35.16	1080.97	11.58	396.49
NESC Extreme	g71P	0.75	571.78	-169.30	267.58	27.57	149.22	-25.20
NESC Extreme	g71X	-0.33	-85.99	-313.16	17.64	17.60	-12.15	-52.54
NESC Extreme	g72P	-3.57	205.22	9.62	193.88	23.71	62.80	5.26
NESC Extreme	g72X	4.95	142.97	74.42	195.10	96.15	53.14	26.78

NESC Extreme	g77P	0.23	3.84	18.04	-24.63	11.92	-1.40	2.02
NESC Extreme	g77X	12.86	-21.44	8.13	-112.74	48.28	-9.02	3.80
NESC Extreme	g77XY	-22.88	10.10	-8.12	-40.48	39.03	-2.05	2.08
NESC Extreme	g77Y	-2.41	-3.01	-18.04	-41.49	-24.98	-2.99	-2.89
NESC Extreme	g78P	-14.25	-156.68	-19.34	-134.80	-71.19	-32.39	-10.06
NESC Extreme	g78Y	31.80	-217.54	81.14	-233.97	42.69	-50.16	13.77
NESC Extreme	g79P	8.35	-3.05	-1.79	-5.48	-4.14	-0.46	-0.32
NESC Extreme	g79X	17.42	-23.45	-44.48	-134.57	-41.23	-8.44	-4.57
NESC Extreme	g79XY	-26.34	12.60	44.49	-65.93	142.35	-2.86	9.98
NESC Extreme	g79Y	-5.97	6.59	1.79	8.09	10.74	0.78	0.67
NESC Extreme	g81P	28.04	4.14	23.82	111.82	4.42	7.80	1.89
NESC Extreme	g81X	33.89	-20.53	-38.23	-232.99	-108.52	-17.06	-9.85
NESC Extreme	g81XY	-39.53	-2.77	38.23	-174.04	242.50	-11.91	18.87
NESC Extreme	g81Y	-25.28	12.81	-23.83	152.27	-15.39	11.10	-2.63
NESC Extreme	g82P	-33.09	133.00	-508.18	195.97	-740.68	36.61	-138.77
NESC Extreme	g82Y	45.43	151.69	683.65	109.92	860.61	29.15	171.55
NESC Extreme	g87P	-0.00	0.00	0.00	32.15	47.54	1.77	2.62
NESC Extreme	g87X	0.00	0.00	0.00	-41.99	114.14	-2.31	6.28
NESC Extreme	g88P	-0.29	-11.84	-70.91	1.72	-1.36	-2.25	-16.06
NESC Extreme	g88X	-0.29	67.78	-131.85	1.72	1.36	15.44	-29.00
NESC Extreme	ig72P90P	-1.77	-193.96	-65.78	-147.81	-45.35	-53.70	-17.47
NESC Extreme	ig72P90X	4.82	-196.99	-54.04	-212.30	-33.09	-64.33	-13.67

*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 10

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	0	0	0.0000	0.0000	0.0000	17.17	17.17	0
2P	0.05978	-0.02313	-0.009056	0.0341	0.2357	-0.0127	14.01	13.93	18.99
3P	0.0996	-0.01741	-0.01489	0.0589	0.0556	-0.1422	11.35	11.23	34.99
4P	0.09355	-0.02622	-0.03079	-0.0628	-0.0100	-0.2724	8.657	8.537	50.97
5P	0.08984	0.002093	-0.03281	-0.1744	0.0583	-0.3243	7.32	7.232	58.97
6P	0.09113	0.03378	-0.03382	-0.1605	0.0007	-0.3763	5.966	5.909	66.97
7P	0.07869	0.07168	-0.03573	-0.2514	0.0320	-0.4311	4.579	4.572	74.96
8P	0.09733	0.1115	-0.04156	-0.3601	0.1173	-0.4605	4.597	4.611	81.87
9P	0.1025	0.1514	-0.04644	-0.3845	0.0676	-0.4873	4.603	4.651	88.21
10P	0.1172	0.1968	-0.05051	-0.4210	0.1265	-0.5147	4.617	4.697	94.56
11P	0.1282	0.244	-0.05394	-0.4416	0.0909	-0.5417	4.628	4.744	100.9
12P	0.1449	0.3024	-0.05995	-0.5064	0.1269	-0.5789	4.645	4.802	107.9
13P	0.1576	0.3593	-0.06465	-0.5394	0.1177	-0.6129	4.658	4.859	114.2
14P	0.1747	0.4251	-0.06856	-0.5671	0.1362	-0.6492	4.675	4.925	120.9
15P	0.1888	0.4842	-0.07094	-0.5782	0.1233	-0.6813	4.689	4.984	126.9
16P	0.2073	0.56	-0.07392	-0.6087	0.1292	-0.7093	4.707	5.06	134.2
17P	0.2228	0.6312	-0.07618	-0.6141	0.1330	-0.7352	4.723	5.131	140.9
18P	0.242	0.7069	-0.07795	-0.6300	0.1451	-0.7622	4.742	5.207	147.9
19P	0.259	0.8484	-0.06858	-0.6648	0.1308	-0.7438	0.259	5.348	154.9
20P	0.2017	0.8486	-0.01715	-0.6478	0.1301	-0.7239	0.2017	0.8486	155
21P	0.07092	-0.02151	0.004986	-0.2070	0.1113	-0.0609	14.02	2.791	19
22P	0.05997	-0.03274	0.0384	-0.0311	-0.5362	-0.0162	2.872	13.92	19.04
23P	0.02867	-0.01678	0.007762	-0.1166	-0.0034	-0.3398	11.28	-0.01678	35.01
24P	0.09963	-0.004293	-0.04128	-0.0386	-0.0810	-0.1619	0.09963	11.25	34.96
25P	0.2042	0.1082	-0.1238	-0.4082	0.0340	-0.5225	0.2042	18.78	74.88
26P	0.3279	0.2879	-0.2201	-0.5769	0.0864	-0.6736	0.3279	22.96	100.8
27P	0.368	0.5369	-0.2201	-0.6569	0.1174	-0.7409	0.368	19.21	126.8
28P	0.5091	0.847	-0.2905	-0.7144	0.1306	-0.8133	0.5091	23.52	154.7
1X	0	0	0	0.0000	0.0000	0.0000	17.17	-17.17	0
1XY	0	0	0	0.0000	0.0000	0.0000	-17.17	-17.17	0
1Y	0	0	0	0.0000	0.0000	0.0000	-17.17	17.17	0
2X	-0.01273	-0.02072	0.005526	0.0671	-0.0777	-0.2233	13.94	-13.97	19.01
2XY	-0.011	0.02512	0.007395	-0.0931	-0.0466	0.0237	-13.96	-13.92	19.01
2Y	0.06211	0.02343	-0.01648	-0.1214	0.2624	-0.1260	-13.89	13.97	18.98
3X	-0.01986	-0.01662	0.006746	0.0786	-0.0633	-0.3242	11.23	-11.27	35.01
3XY	-0.01857	0.05133	0.01216	-0.1132	-0.0107	-0.0575	-11.27	-11.2	35.01
3Y	0.09992	0.05053	-0.02711	-0.1356	0.0838	-0.2492	-11.15	11.3	34.97
4X	-0.01538	-0.02337	0.01186	-0.0300	-0.0040	-0.3743	8.548	-8.586	51.01
4XY	-0.012	0.08379	0.0136	-0.1311	-0.0153	-0.2033	-8.575	-8.479	51.01
4Y	0.09463	0.08137	-0.02975	-0.1719	0.0254	-0.3350	-8.468	8.644	50.97
5X	-0.007224	0.0005137	0.01172	-0.1405	-0.0296	-0.3987	7.223	-7.229	59.01
5XY	-0.00702	0.09844	0.01517	-0.1660	0.0171	-0.2659	-7.237	-7.132	59.02
5Y	0.08904	0.09876	-0.02967	-0.1862	-0.0019	-0.3723	-7.141	7.329	58.97
6X	-0.002546	0.03201	0.009764	-0.1792	0.0067	-0.4223	5.872	-5.843	67.01
6XY	0.004793	0.1197	0.01466	-0.2109	-0.0017	-0.3180	-5.87	-5.755	67.01
6Y	0.08055	0.118	-0.02903	-0.2170	0.0721	-0.3896	-5.794	5.993	66.97
7X	0.01395	0.0732	0.008161	-0.2560	0.0318	-0.4498	4.514	-4.427	75.01
7XY	0.01136	0.1445	0.01443	-0.2722	0.0120	-0.3733	-4.489	-4.356	75.01
7Y	0.08677	0.1441	-0.02934	-0.2959	0.0805	-0.4103	-4.413	4.644	74.97
8X	0.0138	0.1105	0.01065	-0.3518	0.0347	-0.4740	4.514	-4.389	81.92
8XY	0.02081	0.1874	0.01904	-0.4076	0.0509	-0.4074	-4.479	-4.313	81.93
8Y	0.08811	0.1876	-0.03299	-0.3941	0.0643	-0.4433	-4.412	4.688	81.88
9X	0.02302	0.1517	0.01258	-0.3835	0.0653	-0.4963	4.523	-4.348	88.27
9XY	0.02257	0.2342	0.02282	-0.4324	0.0355	-0.4387	-4.477	-4.266	88.28
9Y	0.1043	0.2326	-0.03617	-0.4332	0.1253	-0.4737	-4.396	4.733	88.22
10X	0.02754	0.1958	0.01401	-0.4250	0.0527	-0.5183	4.528	-4.304	94.62
10XY	0.03143	0.2837	0.02577	-0.4715	0.0681	-0.4703	-4.469	-4.216	94.64
10Y	0.1134	0.2834	-0.03876	-0.4748	0.0887	-0.5037	-4.387	4.783	94.57

11X	0.03734	0.2457	0.01511	-0.4566	0.0827	-0.5407	4.537	-4.254	101
11XY	0.03717	0.3382	0.02801	-0.4916	0.0546	-0.5018	-4.463	-4.162	101
11Y	0.1282	0.3368	-0.04104	-0.4914	0.1322	-0.5344	-4.372	4.837	101
12X	0.04428	0.3017	0.01722	-0.4961	0.0844	-0.5772	4.544	-4.198	107.9
12XY	0.05059	0.3983	0.03201	-0.5352	0.0827	-0.5467	-4.449	-4.102	107.9
12Y	0.1406	0.3989	-0.04513	-0.5319	0.1105	-0.5750	-4.359	4.899	107.9
13X	0.05831	0.36	0.01865	-0.5395	0.1003	-0.6107	4.558	-4.14	114.3
13XY	0.05751	0.4614	0.03504	-0.5806	0.0818	-0.5880	-4.442	-4.039	114.3
13Y	0.1569	0.4593	-0.0484	-0.5748	0.1368	-0.6127	-4.343	4.959	114.2
14X	0.06802	0.4245	0.01949	-0.5758	0.1002	-0.6463	4.568	-4.075	121
14XY	0.0723	0.5303	0.0372	-0.6130	0.0958	-0.6318	-4.428	-3.97	121
14Y	0.1727	0.5299	-0.05119	-0.6169	0.1357	-0.6525	-4.327	5.03	120.9
15X	0.08253	0.4863	0.01985	-0.5880	0.1187	-0.6781	4.583	-4.014	127
15XY	0.08117	0.5955	0.03838	-0.6061	0.0974	-0.6707	-4.419	-3.904	127
15Y	0.1894	0.5939	-0.05286	-0.6076	0.1430	-0.6881	-4.311	5.094	126.9
16X	0.09357	0.5603	0.02065	-0.5955	0.1387	-0.7160	4.594	-3.94	134.3
16XY	0.102	0.6725	0.03992	-0.6253	0.1015	-0.6716	-4.398	-3.828	134.3
16Y	0.2058	0.6724	-0.05496	-0.6234	0.1303	-0.6865	-4.294	5.172	134.2
17X	0.1165	0.6319	0.02082	-0.6241	0.1237	-0.7506	4.616	-3.868	141
17XY	0.1091	0.7478	0.04055	-0.6458	0.1123	-0.6726	-4.391	-3.752	141
17Y	0.2238	0.7457	-0.05625	-0.6386	0.1437	-0.6853	-4.276	5.246	140.9
18X	0.1224	0.7088	0.02124	-0.6395	0.0370	-0.7860	4.622	-3.791	148
18XY	0.1346	0.8257	0.04072	-0.6395	0.2057	-0.6746	-4.365	-3.674	148
18Y	0.2411	0.8247	-0.05699	-0.6465	0.1368	-0.6838	-4.259	5.325	147.9
19X	0.1448	0.8493	0.03409	-0.6557	0.1293	-0.7311	0.1448	-3.651	155
21X	0.05202	-0.02124	0.02428	-0.0885	0.0473	-0.3018	14	-2.834	19.02
21XY	-0.0262	0.02396	-0.005643	0.1569	0.0750	-0.2376	-13.98	-2.789	18.99
21Y	0.01522	0.02368	0.01469	0.0947	0.1382	-0.4411	-13.93	2.836	19.01
22X	-0.01113	0.04244	-0.005622	0.0036	0.0289	-0.1329	2.801	-13.91	18.99
22XY	-0.01106	0.03962	0.001623	-0.0287	0.0869	0.1060	-2.824	-13.91	19
22Y	0.06074	-0.02199	-0.04315	-0.0609	-0.6230	-0.2007	-2.752	13.93	18.96
23Y	0.04145	0.05078	-0.01421	-0.0873	0.0358	-0.3760	-11.21	0.05078	34.99
24X	-0.01893	0.1195	-0.01035	-0.0171	0.0389	-0.1639	-0.01893	-11.13	34.99
25X	-0.1021	0.1129	0.07925	-0.2774	0.0381	-0.4894	-0.1021	-18.56	75.08
26X	-0.1526	0.2976	0.1526	-0.3805	0.0853	-0.6374	-0.1526	-22.37	101.2
27X	-0.09109	0.5458	0.1612	-0.4997	0.1220	-0.7128	-0.09109	-18.12	127.2
28X	-0.09117	0.8521	0.246	-0.6719	0.1293	-0.7527	-0.09117	-21.82	155.2
i0.50E148S	0.1872	0.772	-0.02473	-0.5912	0.1427	-0.7370	0.1872	0.772	148

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y 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 %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
1P	-27.08	0.0	-21.02	0.0	157.57	0.0	0.0	161.25	0.0	-3.29	0.0	-4.8	0.0	-0.97	0.0	0.0
1X	15.24	0.0	-9.05	0.0	-54.36	0.0	0.0	57.17	0.0	-3.02	0.0	1.3	0.0	0.92	0.0	0.0
1XY	-19.28	0.0	-24.63	0.0	-113.94	0.0	0.0	118.15	0.0	1.93	0.0	1.0	0.0	-0.50	0.0	0.0
1Y	13.19	0.0	-17.36	0.0	101.43	0.0	0.0	103.75	0.0	1.73	0.0	-5.8	0.0	0.00	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	-0.6753	27.0767	21.0214	-156.8898	0.0000	0.0000	0.0000
2P	0.0000	0.0000	-1.1655	0.0000	-0.0000	1.1655	0.0598	-0.0231	-0.0091
3P	0.0000	0.0000	-0.8667	0.0000	-0.0000	0.8667	0.0996	-0.0174	-0.0149
4P	0.0000	0.0000	-0.9288	-0.0000	0.0000	0.9288	0.0936	-0.0262	-0.0308
5P	0.0000	0.0000	-0.6263	0.0000	0.0000	0.6263	0.0898	0.0021	-0.0328
6P	0.0000	0.0000	-0.6396	-0.0000	-0.0000	0.6396	0.0911	0.0338	-0.0338
7P	0.0000	0.0000	-0.7295	-0.0000	0.0000	0.7295	0.0787	0.0717	-0.0357
8P	0.0000	0.0000	-0.4712	-0.0000	-0.0000	0.4712	0.0973	0.1115	-0.0416
9P	0.0000	0.0000	-0.4003	-0.0000	0.0000	0.4003	0.1025	0.1514	-0.0464

10P	0.0000	0.0000	-0.4011	0.0000	0.0000	0.4011	0.1172	0.1968	-0.0505
11P	0.0000	0.0000	-0.5278	0.0000	0.0000	0.5278	0.1282	0.2440	-0.0539
12P	0.0000	0.0000	-0.3326	0.0000	0.0000	0.3326	0.1449	0.3024	-0.0599
13P	0.0000	0.0000	-0.2514	0.0000	0.0000	0.2514	0.1576	0.3593	-0.0646
14P	-0.0380	-0.1690	-3.5793	0.0380	0.1690	3.5793	0.1747	0.4251	-0.0686
15P	0.0000	0.0000	-0.3864	0.0000	0.0000	0.3864	0.1888	0.4842	-0.0709
16P	0.0000	0.0000	-0.2626	0.0000	0.0000	0.2626	0.2073	0.5600	-0.0739
17P	0.0000	0.0000	-0.2010	0.0000	0.0000	0.2010	0.2228	0.6312	-0.0762
18P	1.1420	0.2620	-0.3621	-1.1420	-0.2620	0.3621	0.2420	0.7069	-0.0780
19P	0.0000	0.0000	-0.2163	0.0000	0.0000	0.2164	0.2590	0.8484	-0.0686
20P	0.0000	0.0000	-0.1839	-0.0000	0.0000	0.1839	0.2017	0.8486	-0.0171
21P	0.0000	0.0000	-0.2774	-0.0000	-0.0000	0.2774	0.0709	-0.0215	0.0050
22P	0.0000	0.0000	-0.2774	0.0000	0.0000	0.2774	0.0600	-0.0327	0.0384
23P	0.0000	0.0000	-0.3683	0.0000	-0.0000	0.3683	0.0287	-0.0168	0.0078
24P	0.0000	0.0000	-0.3683	0.0000	-0.0000	0.3683	0.0996	-0.0043	-0.0413
25P	4.8890	5.6030	-3.3008	-4.8890	-5.6030	3.3008	0.2042	0.1082	-0.1238
26P	4.8890	5.6030	-3.3797	-4.8890	-5.6030	3.3797	0.3279	0.2879	-0.2201
27P	4.8890	5.6030	-3.3015	-4.8890	-5.6030	3.3015	0.3680	0.5369	-0.2201
28P	3.2590	3.9980	-1.5511	-3.2590	-3.9980	1.5511	0.5091	0.8470	-0.2905
1X	0.0000	0.3008	-0.6753	-15.2386	8.7507	55.0326	0.0000	0.0000	0.0000
1XY	0.0000	0.3008	-0.6753	19.2756	24.3334	114.6138	0.0000	0.0000	0.0000
1Y	0.0000	0.0000	-0.6753	-13.1878	17.3555	-100.7562	0.0000	0.0000	0.0000
2X	0.0000	0.7924	-2.4075	-0.0000	-0.7924	2.4075	-0.0127	-0.0207	0.0055
2XY	0.0000	0.7274	-1.7865	-0.0000	-0.7274	1.7865	-0.0110	0.0251	0.0074
2Y	0.0000	0.0000	-1.1655	0.0000	-0.0000	1.1655	0.0621	0.0234	-0.0165
3X	0.0000	0.5631	-1.6027	0.0000	-0.5631	1.6027	-0.0199	-0.0166	0.0067
3XY	0.0000	0.5251	-1.2347	-0.0000	-0.5251	1.2347	-0.0186	0.0513	0.0122
3Y	0.0000	0.0000	-0.8667	-0.0000	-0.0000	0.8667	0.0999	0.0505	-0.0271
4X	0.0000	0.6428	-1.6648	-0.0000	-0.6428	1.6648	-0.0154	-0.0234	0.0119
4XY	0.0000	0.6048	-1.2968	-0.0000	-0.6048	1.2968	-0.0120	0.0838	0.0136
4Y	0.0000	0.0000	-0.9288	-0.0000	0.0000	0.9288	0.0946	0.0814	-0.0297
5X	0.0000	0.3053	-0.6263	-0.0000	-0.3053	0.6263	-0.0072	0.0005	0.0117
5XY	0.0000	0.3053	-0.6263	-0.0000	-0.3053	0.6263	-0.0070	0.0984	0.0152
5Y	0.0000	0.0000	-0.6263	-0.0000	-0.0000	0.6263	0.0890	0.0988	-0.0297
6X	0.0000	0.4590	-1.3756	-0.0000	-0.4590	1.3756	-0.0025	0.0320	0.0098
6XY	0.0000	0.4210	-1.0076	-0.0000	-0.4210	1.0076	0.0048	0.1197	0.0147
6Y	0.0000	0.0000	-0.6396	-0.0000	0.0000	0.6396	0.0806	0.1180	-0.0290
7X	0.0000	0.2788	-0.7295	-0.0000	-0.2788	0.7295	0.0139	0.0732	0.0082
7XY	0.0000	0.2788	-0.7295	-0.0000	-0.2788	0.7295	0.0114	0.1445	0.0144
7Y	0.0000	0.0000	-0.7295	0.0000	-0.0000	0.7295	0.0868	0.1441	-0.0293
8X	0.0000	0.3928	-1.0692	-0.0000	-0.3928	1.0692	0.0138	0.1105	0.0106
8XY	0.0000	0.3618	-0.7702	-0.0000	-0.3618	0.7702	0.0208	0.1874	0.0190
8Y	0.0000	0.0000	-0.4712	-0.0000	0.0000	0.4712	0.0881	0.1876	-0.0330
9X	0.0000	0.2191	-0.4003	-0.0000	-0.2191	0.4003	0.0230	0.1517	0.0126
9XY	0.0000	0.2191	-0.4003	-0.0000	-0.2191	0.4003	0.0226	0.2342	0.0228
9Y	0.0000	0.0000	-0.4003	-0.0000	0.0000	0.4003	0.1043	0.2326	-0.0362
10X	0.0000	0.3595	-0.9991	-0.0000	-0.3595	0.9991	0.0275	0.1958	0.0140
10XY	0.0000	0.3285	-0.7001	0.0000	-0.3285	0.7001	0.0314	0.2837	0.0258
10Y	0.0000	0.0000	-0.4011	-0.0000	0.0000	0.4011	0.1134	0.2834	-0.0388
11X	0.0000	0.2254	-0.5278	0.0000	-0.2254	0.5278	0.0373	0.2457	0.0151
11XY	0.0000	0.2254	-0.5278	0.0000	-0.2254	0.5278	0.0372	0.3382	0.0280
11Y	0.0000	0.0000	-0.5278	0.0000	-0.0000	0.5278	0.1282	0.3368	-0.0410
12X	0.0000	0.3453	-0.9306	-0.0000	-0.3453	0.9306	0.0443	0.3017	0.0172
12XY	0.0000	0.3143	-0.6316	0.0000	-0.3143	0.6316	0.0506	0.3983	0.0320
12Y	0.0000	0.0000	-0.3326	-0.0000	0.0000	0.3326	0.1406	0.3989	-0.0451
13X	0.0000	0.1763	-0.2514	0.0000	-0.1763	0.2514	0.0583	0.3600	0.0187
13XY	0.0000	0.1763	-0.2514	0.0000	-0.1763	0.2514	0.0575	0.4614	0.0350
13Y	0.0000	0.0000	-0.2514	-0.0000	0.0000	0.2514	0.1569	0.4593	-0.0484
14X	0.0440	0.1092	-1.8833	-0.0440	-0.1092	1.8833	0.0680	0.4245	0.0195
14XY	-0.0140	0.0552	-2.6833	0.0140	-0.0552	2.6833	0.0723	0.5303	0.0372
14Y	-0.0540	-0.2490	-6.3823	0.0540	0.2490	6.3823	0.1727	0.5299	-0.0512
15X	0.0000	0.1770	-0.3864	0.0000	-0.1770	0.3864	0.0825	0.4863	0.0198
15XY	0.0000	0.1770	-0.3864	0.0000	-0.1770	0.3864	0.0812	0.5955	0.0384
15Y	0.0000	0.0000	-0.3864	0.0000	-0.0000	0.3864	0.1894	0.5939	-0.0529
16X	0.0000	0.1640	-0.2626	0.0000	-0.1640	0.2626	0.0936	0.5603	0.0206
16XY	0.0000	0.2810	-0.5846	0.0000	-0.2810	0.5846	0.1020	0.6725	0.0399
16Y	0.0000	0.0000	-0.2626	-0.0000	0.0000	0.2626	0.2058	0.6724	-0.0550

17X	0.0000	0.1335	-0.2010	0.0000	-0.1335	0.2010	0.1165	0.6319	0.0208
17XY	0.0000	0.1335	-0.2010	0.0000	-0.1335	0.2010	0.1091	0.7478	0.0406
17Y	0.0000	0.0000	-0.2010	-0.0000	0.0000	0.2010	0.2238	0.7457	-0.0562
18X	-0.8450	1.3041	-0.3841	0.8450	-1.3041	0.3841	0.1224	0.7088	0.0212
18XY	0.8660	2.2961	-0.6071	-0.8660	-2.2961	0.6071	0.1346	0.8257	0.0407
18Y	-1.1010	0.4260	-0.3481	1.1010	-0.4260	0.3481	0.2411	0.8247	-0.0570
19X	0.0000	0.0000	-0.2163	0.0000	0.0000	0.2163	0.1448	0.8493	0.0341
21X	0.0000	0.0000	-0.2774	-0.0000	-0.0000	0.2774	0.0520	-0.0212	0.0243
21XY	0.0000	0.0000	-0.2774	0.0000	-0.0000	0.2774	-0.0262	0.0240	-0.0056
21Y	0.0000	0.0000	-0.2774	0.0000	-0.0000	0.2774	0.0152	0.0237	0.0147
22X	0.0000	0.2114	-0.2774	0.0000	-0.2114	0.2774	-0.0111	0.0424	-0.0056
22XY	0.0000	0.2114	-0.2774	-0.0000	-0.2114	0.2774	-0.0111	0.0396	0.0016
22Y	0.0000	0.0000	-0.2774	-0.0000	-0.0000	0.2774	0.0607	-0.0220	-0.0432
23Y	0.0000	0.0000	-0.3683	0.0000	-0.0000	0.3683	0.0415	0.0508	-0.0142
24X	0.0000	0.4283	-0.3683	0.0000	-0.4283	0.3683	-0.0189	0.1195	-0.0104
25X	0.0000	10.8260	-4.5858	0.0000	-10.8260	4.5858	-0.1021	0.1129	0.0793
26X	0.0000	10.8260	-4.6647	0.0000	-10.8260	4.6647	-0.1526	0.2976	0.1526
27X	0.0000	10.8281	-4.5865	0.0000	-10.8281	4.5865	-0.0911	0.5458	0.1612
28X	0.0000	2.9748	-1.0931	0.0000	-2.9748	1.0931	-0.0912	0.8521	0.2460
i0.50E148S	0.0000	0.0000	-0.0466	0.0000	0.0000	0.0466	0.1872	0.7720	-0.0247

Crossing Diagonal Check for Load Case "NESC Heavy" (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.
g20P	g20X	Short only	-0.37	-0.83	12.50	0.750	0.500	0.500	175.41	162.26	5	9.49	1.000	227.66	186.21	6
g20X	g20P	Short only	-0.83	-0.37	12.50	0.750	0.500	0.500	175.41	162.26	5	9.49	1.000	227.66	186.21	6
g21X	g21XY	Short only	-3.58	-1.23	12.50	0.750	0.500	0.500	175.41	162.26	5	9.49	1.000	227.66	186.21	6
g21XY	g21X	Short only	-1.23	-3.58	12.50	0.750	0.500	0.500	175.41	162.26	5	9.49	1.000	227.66	186.21	6
g24P	g24X	Short only	-1.11	-1.62	12.19	0.750	0.500	0.500	178.09	164.30	5	9.28	1.000	231.13	188.35	6
g24X	g24P	Short only	-1.62	-1.11	12.19	0.750	0.500	0.500	178.09	164.30	5	9.28	1.000	231.13	188.35	6
g25X	g25XY	Short only	-4.12	-2.82	12.19	0.750	0.500	0.500	178.09	164.30	5	9.28	1.000	231.13	188.35	6
g25XY	g25X	Short only	-2.82	-4.12	12.19	0.750	0.500	0.500	178.09	164.30	5	9.28	1.000	231.13	188.35	6
g32X	g32P	Short only	-5.94	0.54	23.30	0.750	0.500	0.500	128.94	126.85	5	20.63	1.000	144.09	134.81	6
g41Y	g41P	Short only	-22.52	4.26	38.35	0.750	0.500	0.500	104.58	108.43	2	36.33	1.000	106.38	113.19	3
g43P	g43Y	Short only	-2.87	-22.77	28.74	0.784	0.567	0.567	152.69	144.95	5	25.91	1.000	173.14	152.68	6
g43Y	g43P	Short only	-22.77	-2.87	28.74	0.784	0.567	0.567	152.69	144.95	5	25.91	1.000	173.14	152.68	6
g47Y	g47P	Short only	-10.41	1.16	13.12	0.771	0.542	0.542	195.05	177.23	5	11.78	1.000	229.08	187.08	6

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	5.386	50.00	50.00	10.77
2	3.169	50.00	50.00	6.34
3	8.136	50.00	50.00	16.27
4	11.759	50.00	50.00	23.52
5	8.168	50.00	50.00	16.34
6	11.788	50.00	50.00	23.58
7	8.136	50.00	50.00	16.27
8	11.757	50.00	50.00	23.51
10	1.887	50.00	50.00	3.77
11	0.993	50.00	50.00	1.99
12	1.062	50.00	50.00	2.12
13	1.139	50.00	50.00	2.28
14	1.450	50.00	50.00	2.90
15	1.785	50.00	50.00	3.57

16	1.699	50.00	50.00	3.40
17	2.535	50.00	50.00	5.07
18	0.263	50.00	50.00	0.53
19	3.584	50.00	50.00	7.17
20	0.333	50.00	50.00	0.67
21	0.401	50.00	50.00	0.80
22	0.471	50.00	50.00	0.94
23	0.640	50.00	50.00	1.28
24	0.929	50.00	50.00	1.86
25	0.867	50.00	50.00	1.73
26	1.165	50.00	50.00	2.33
27	0.201	50.00	50.00	0.40
28	0.241	50.00	50.00	0.48
29	0.241	50.00	50.00	0.48
30	0.201	50.00	50.00	0.40
31	1.226	50.00	50.00	2.45
32	1.601	50.00	50.00	3.20
33	2.528	50.00	50.00	5.06
34	1.231	50.00	50.00	2.46
35	2.684	50.00	50.00	5.37
36	6.387	50.00	50.00	12.77
38	0.649	50.00	50.00	1.30
40	0.705	50.00	50.00	1.41
41	0.773	50.00	50.00	1.55
42	0.851	50.00	50.00	1.70
43	1.092	50.00	50.00	2.18
44	1.431	50.00	50.00	2.86
45	1.342	50.00	50.00	2.68
46	1.929	50.00	50.00	3.86

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 11

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	0	0	0.0000	0.0000	0.0000	17.17	17.17	0
2P	0.01114	-0.001804	-0.01615	0.0116	0.0881	-0.1715	13.96	13.95	18.98
3P	0.03352	0.008759	-0.02599	0.0473	0.1214	-0.2772	11.28	11.26	34.97
4P	0.05033	0.01436	-0.03756	-0.0872	0.0461	-0.2547	8.613	8.577	50.96
5P	0.05354	0.04363	-0.03976	-0.1954	0.1118	-0.2424	7.284	7.274	58.96
6P	0.06682	0.07822	-0.0399	-0.2045	0.0462	-0.2358	5.942	5.953	66.96
7P	0.06217	0.1195	-0.04157	-0.3220	0.0714	-0.2321	4.562	4.62	74.96
8P	0.08934	0.1726	-0.04912	-0.4915	0.1698	-0.2276	4.589	4.673	81.86
9P	0.09724	0.2275	-0.05552	-0.5208	0.1079	-0.2236	4.597	4.727	88.2
10P	0.1189	0.2886	-0.0609	-0.5707	0.1886	-0.2205	4.619	4.789	94.55
11P	0.1349	0.3535	-0.0655	-0.6031	0.1415	-0.2164	4.635	4.854	100.9
12P	0.1604	0.4324	-0.07352	-0.6913	0.1948	-0.2191	4.66	4.932	107.8
13P	0.1785	0.5113	-0.07986	-0.7404	0.1814	-0.2212	4.679	5.011	114.2
14P	0.2044	0.6012	-0.08521	-0.7836	0.2082	-0.2239	4.704	5.101	120.9
15P	0.2242	0.6842	-0.0888	-0.8050	0.1894	-0.2259	4.724	5.184	126.9
16P	0.253	0.7901	-0.0933	-0.8530	0.1984	-0.2529	4.753	5.29	134.2
17P	0.2744	0.8908	-0.09648	-0.8714	0.1978	-0.2779	4.774	5.391	140.9
18P	0.3032	0.9972	-0.09881	-0.8625	0.2169	-0.3043	4.803	5.497	147.9
19P	0.3274	1.132	-0.08464	-0.9201	0.2035	-0.2606	0.3274	5.632	154.9
20P	0.3083	1.133	-0.01292	-0.9086	0.2039	-0.2405	0.3083	1.133	155
21P	-0.0104	-0.000862	-0.002371	-0.1040	0.0446	0.2575	13.94	2.812	19
22P	0.01129	0.02121	0.01141	0.0111	-0.0574	-0.0251	2.824	13.97	19.01
23P	-0.009252	0.008813	-3.631e-006	-0.1540	0.0597	-0.0201	11.24	0.008813	35
24P	0.03513	0.1938	0.0007041	-0.0059	-0.0237	0.0001	0.03513	11.44	35
25P	0.1092	0.1328	-0.1427	-0.4820	0.0860	-0.1825	0.1092	18.8	74.86
26P	0.1995	0.3661	-0.2696	-0.7075	0.1570	-0.2187	0.1995	23.04	100.7
27P	0.2844	0.7004	-0.286	-0.8730	0.1922	-0.2534	0.2844	19.37	126.7
28P	0.4237	1.131	-0.3831	-0.9498	0.2025	-0.3302	0.4237	23.8	154.6
1X	0	0	0	0.0000	0.0000	0.0000	17.17	-17.17	0
1XY	0	0	0	0.0000	0.0000	0.0000	-17.17	-17.17	0
1Y	0	0	0	0.0000	0.0000	0.0000	-17.17	17.17	0
2X	-0.004225	0.0003317	0.005652	0.0014	-0.0236	-0.1376	13.95	-13.95	19.01
2XY	-0.003152	0.003219	0.01457	0.0034	-0.0025	0.0798	-13.95	-13.95	19.01
2Y	0.01158	0.002516	-0.01107	0.0087	0.0631	0.1243	-13.94	13.95	18.99
3X	-0.0009593	0.009181	0.009677	0.0255	-0.0037	-0.1706	11.25	-11.24	35.01
3XY	0.0005973	0.0155	0.02397	-0.0786	0.0481	0.0685	-11.25	-11.23	35.02
3Y	0.03659	0.01501	-0.02134	-0.0580	0.0431	0.1806	-11.21	11.27	34.98
4X	0.01123	0.01585	0.01562	-0.0980	0.0559	-0.1490	8.574	-8.547	51.02
4XY	0.01525	0.05415	0.02714	-0.1465	0.0260	-0.0192	-8.548	-8.509	51.03
4Y	0.04917	0.05289	-0.02524	-0.1478	0.0427	0.0649	-8.514	8.616	50.97
5X	0.02165	0.04207	0.01637	-0.1947	0.0249	-0.1376	7.252	-7.188	59.02
5XY	0.02183	0.07651	0.02925	-0.1899	0.0706	-0.0592	-7.208	-7.153	59.03
5Y	0.05386	0.07645	-0.02615	-0.1694	-0.0128	0.0090	-7.176	7.306	58.97
6X	0.02746	0.07577	0.01528	-0.2463	0.0766	-0.1337	5.902	-5.799	67.02
6XY	0.03699	0.1067	0.0289	-0.2331	0.0473	-0.0872	-5.838	-5.768	67.03
6Y	0.05218	0.1037	-0.02575	-0.2259	0.0870	-0.0151	-5.823	5.979	66.97
7X	0.04739	0.1208	0.0147	-0.3485	0.1084	-0.1338	4.547	-4.379	75.01
7XY	0.04391	0.1422	0.02904	-0.3287	0.0685	-0.1147	-4.456	-4.358	75.03
7Y	0.07311	0.143	-0.027	-0.3462	0.1189	-0.0400	-4.427	4.643	74.97
8X	0.05516	0.1719	0.01829	-0.4742	0.1116	-0.1383	4.555	-4.328	81.93
8XY	0.06377	0.1958	0.03572	-0.5014	0.1404	-0.1214	-4.436	-4.304	81.95
8Y	0.07621	0.1954	-0.03143	-0.4853	0.1063	-0.0648	-4.424	4.695	81.88
9X	0.07411	0.227	0.02116	-0.5202	0.1553	-0.1425	4.574	-4.273	88.28
9XY	0.07383	0.2525	0.04119	-0.5320	0.1166	-0.1277	-4.426	-4.247	88.3
9Y	0.09981	0.2512	-0.03537	-0.5316	0.1857	-0.0877	-4.4	4.751	88.22
10X	0.0878	0.2876	0.02343	-0.5775	0.1414	-0.1463	4.588	-4.212	94.63
10XY	0.09245	0.3146	0.04557	-0.5835	0.1609	-0.1344	-4.408	-4.185	94.66
10Y	0.113	0.3134	-0.03863	-0.5886	0.1357	-0.1096	-4.387	4.813	94.57

11X	0.1077	0.3548	0.0253	-0.6179	0.1751	-0.1505	4.608	-4.145	101
11XY	0.1077	0.3816	0.04904	-0.6158	0.1432	-0.1406	-4.392	-4.118	101
11Y	0.1347	0.3812	-0.04168	-0.6259	0.1996	-0.1328	-4.365	4.881	101
12X	0.1241	0.4324	0.02919	-0.6789	0.1701	-0.1646	4.624	-4.068	107.9
12XY	0.1318	0.4608	0.05535	-0.7023	0.1713	-0.1575	-4.368	-4.039	108
12Y	0.1531	0.4608	-0.04726	-0.6935	0.1772	-0.1558	-4.347	4.961	107.9
13X	0.148	0.5113	0.03193	-0.7375	0.1918	-0.1777	4.648	-3.989	114.3
13XY	0.1476	0.5424	0.06012	-0.7588	0.1709	-0.1730	-4.352	-3.958	114.3
13Y	0.1779	0.5406	-0.05181	-0.7532	0.2093	-0.1774	-4.322	5.041	114.2
14X	0.1677	0.6009	0.03391	-0.7961	0.1959	-0.1915	4.668	-3.899	121
14XY	0.1728	0.6339	0.06367	-0.8070	0.1873	-0.1896	-4.327	-3.866	121.1
14Y	0.2001	0.6328	-0.05574	-0.8147	0.2033	-0.2000	-4.3	5.133	120.9
15X	0.1919	0.6861	0.03517	-0.8142	0.2054	-0.2039	4.692	-3.814	127
15XY	0.1902	0.7199	0.06581	-0.8197	0.1867	-0.2043	-4.31	-3.78	127.1
15Y	0.2245	0.7192	-0.05873	-0.8267	0.2215	-0.2205	-4.275	5.219	126.9
16X	0.211	0.7909	0.0374	-0.8429	0.2271	-0.2478	4.711	-3.709	134.3
16XY	0.2221	0.8276	0.06858	-0.8751	0.1628	-0.1978	-4.278	-3.672	134.3
16Y	0.2483	0.8271	-0.06269	-0.8668	0.2072	-0.2083	-4.252	5.327	134.2
17X	0.246	0.8912	0.03784	-0.8681	0.1992	-0.2874	4.746	-3.609	141
17XY	0.234	0.9319	0.06947	-0.8936	0.1882	-0.1929	-4.266	-3.568	141.1
17Y	0.2762	0.9303	-0.06516	-0.8990	0.2211	-0.1973	-4.224	5.43	140.9
18X	0.2556	0.9989	0.03829	-0.9076	0.0581	-0.3272	4.756	-3.501	148
18XY	0.2735	1.041	0.06949	-0.9113	0.3342	-0.1895	-4.227	-3.459	148.1
18Y	0.3002	1.04	-0.06645	-0.8793	0.2068	-0.1857	-4.2	5.54	147.9
19X	0.2894	1.133	0.05857	-0.9110	0.2039	-0.2510	0.2894	-3.367	155.1
21X	0.0249	-0.0003705	0.005741	-0.0480	0.0221	0.2198	13.97	-2.813	19.01
21XY	-0.0227	0.002934	0.005549	-0.0832	0.0223	-0.3432	-13.97	-2.81	19.01
21Y	0.02698	0.002696	-0.00297	-0.0810	0.0354	-0.3704	-13.92	2.815	19
22X	-0.003438	0.02873	0.001998	0.0022	0.0175	-0.0266	2.809	-13.92	19
22XY	-0.003612	0.02293	0.006197	0.0026	0.0588	0.1052	-2.816	-13.93	19.01
22Y	0.01138	0.01889	-0.005695	0.0102	-0.1786	0.0534	-2.801	13.97	18.99
23Y	0.0432	0.01477	-0.003572	-0.1388	0.0451	-0.1998	-11.21	0.01477	35
24X	-0.0001859	0.1358	-0.006347	-0.0263	0.0433	0.0016	-0.0001859	-11.11	34.99
25X	0.01607	0.1343	0.1226	-0.4354	0.0829	-0.1203	0.01607	-18.54	75.12
26X	0.0619	0.3717	0.2342	-0.6204	0.1561	-0.1485	0.0619	-22.3	101.2
27X	0.1423	0.7066	0.2494	-0.7954	0.1990	-0.1997	0.1423	-17.96	127.2
28X	0.2047	1.136	0.3525	-0.9336	0.2035	-0.2799	0.2047	-21.53	155.4
i0.50E148S	0.2861	1.027	-0.041	-0.8137	0.2125	-0.2567	0.2861	1.027	148

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	Z Force (kips)	Z Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
1P	-33.06	0.0	-32.91	0.0	193.76	0.0	0.0	199.30	0.0	-1.20	0.0	-0.5	0.0	0.98	0.0	0.0
1X	19.18	0.0	-14.55	0.0	-80.28	0.0	0.0	83.82	0.0	-0.62	0.0	0.6	0.0	0.74	0.0	0.0
1XY	-32.92	0.0	-31.29	0.0	-169.61	0.0	0.0	175.58	0.0	-0.14	0.0	0.5	0.0	-0.59	0.0	0.0
1Y	17.92	0.0	-18.13	0.0	104.56	0.0	0.0	107.62	0.0	-0.20	0.0	-0.5	0.0	-0.82	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	0.2478	-0.2251	33.0550	32.6663	-193.5356	0.0000	0.0000	0.0000
2P	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	0.0111	-0.0018	-0.0161
3P	0.0000	0.6475	-0.5717	-0.0000	-0.6475	0.5717	0.0335	0.0088	-0.0260
4P	0.0000	0.4189	-0.3484	-0.0000	-0.4189	0.3484	0.0503	0.0144	-0.0376
5P	0.0000	0.4189	-0.3484	0.0000	-0.4189	0.3484	0.0535	0.0436	-0.0398
6P	0.0000	0.4189	-0.3484	0.0000	-0.4189	0.3484	0.0668	0.0782	-0.0399
7P	0.0000	0.6849	-0.5656	0.0000	-0.6849	0.5656	0.0622	0.1195	-0.0416
8P	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.0893	0.1726	-0.0491
9P	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.0972	0.2275	-0.0555

10P	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1189	0.2886	-0.0609
11P	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.1349	0.3535	-0.0655
12P	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1604	0.4324	-0.0735
13P	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1785	0.5113	-0.0799
14P	-0.1290	-0.4460	-0.5311	0.1290	0.4460	0.5311	0.2044	0.6012	-0.0852
15P	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.2242	0.6842	-0.0888
16P	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2530	0.7901	-0.0933
17P	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2744	0.8908	-0.0965
18P	4.3380	1.2460	-0.2311	-4.3380	-1.2460	0.2311	0.3032	0.9972	-0.0988
19P	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.3274	1.1323	-0.0846
20P	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.3083	1.1327	-0.0129
21P	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	-0.0104	-0.0009	-0.0024
22P	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	0.0113	0.0212	0.0114
23P	0.0000	0.6475	-0.5717	-0.0000	-0.6475	0.5717	-0.0093	0.0088	-0.0000
24P	0.0000	0.6475	-0.5717	-0.0000	-0.6475	0.5717	0.0351	0.1938	0.0007
25P	4.2970	5.1370	-1.5371	-4.2970	-5.1370	1.5371	0.1092	0.1328	-0.1427
26P	4.2970	5.1370	-1.5371	-4.2970	-5.1370	1.5371	0.1995	0.3661	-0.2696
27P	4.2970	5.1370	-1.5371	-4.2970	-5.1370	1.5371	0.2844	0.7004	-0.2860
28P	2.6080	3.1930	-0.5501	-2.6080	-3.1930	0.5501	0.4237	1.1306	-0.3831
1X	0.0000	0.2478	-0.2251	-19.1836	14.3053	80.5085	0.0000	0.0000	0.0000
1XY	0.0000	0.2478	-0.2251	32.9221	31.0376	169.8340	0.0000	0.0000	0.0000
1Y	0.0000	0.2478	-0.2251	-17.9166	17.8871	-104.3328	0.0000	0.0000	0.0000
2X	0.0000	1.4094	-0.7854	-0.0000	-1.4094	0.7854	-0.0042	0.0003	0.0057
2XY	0.0000	1.1764	-0.6164	-0.0000	-1.1764	0.6164	-0.0032	0.0032	0.0146
2Y	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	0.0116	0.0025	-0.0111
3X	0.0000	1.2005	-0.7717	-0.0000	-1.2005	0.7717	-0.0010	0.0092	0.0097
3XY	0.0000	1.0625	-0.6717	-0.0000	-1.0625	0.6717	0.0006	0.0155	0.0240
3Y	0.0000	0.6475	-0.5717	-0.0000	-0.6475	0.5717	0.0366	0.0150	-0.0213
4X	0.0000	0.9719	-0.5484	-0.0000	-0.9719	0.5484	0.0112	0.0158	0.0156
4XY	0.0000	0.8339	-0.4484	0.0000	-0.8339	0.4484	0.0152	0.0541	0.0271
4Y	0.0000	0.4189	-0.3484	-0.0000	-0.4189	0.3484	0.0492	0.0529	-0.0252
5X	0.0000	0.4189	-0.3484	0.0000	-0.4189	0.3484	0.0216	0.0421	0.0164
5XY	0.0000	0.4189	-0.3484	-0.0000	-0.4189	0.3484	0.0218	0.0765	0.0292
5Y	0.0000	0.4189	-0.3484	-0.0000	-0.4189	0.3484	0.0539	0.0764	-0.0261
6X	0.0000	0.9719	-0.5484	-0.0000	-0.9719	0.5484	0.0275	0.0758	0.0153
6XY	0.0000	0.8339	-0.4484	-0.0000	-0.8339	0.4484	0.0370	0.1067	0.0289
6Y	0.0000	0.4189	-0.3484	-0.0000	-0.4189	0.3484	0.0522	0.1037	-0.0258
7X	0.0000	0.6849	-0.5656	0.0000	-0.6849	0.5656	0.0474	0.1208	0.0147
7XY	0.0000	0.6849	-0.5656	0.0000	-0.6849	0.5656	0.0439	0.1422	0.0290
7Y	0.0000	0.6849	-0.5656	0.0000	-0.6849	0.5656	0.0731	0.1430	-0.0270
8X	0.0000	0.7150	-0.3791	0.0000	-0.7150	0.3791	0.0552	0.1719	0.0183
8XY	0.0000	0.6030	-0.2981	0.0000	-0.6030	0.2981	0.0638	0.1958	0.0357
8Y	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.0762	0.1954	-0.0314
9X	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.0741	0.2270	0.0212
9XY	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.0738	0.2525	0.0412
9Y	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.0998	0.2512	-0.0354
10X	0.0000	0.7150	-0.3791	-0.0000	-0.7150	0.3791	0.0878	0.2876	0.0234
10XY	0.0000	0.6030	-0.2981	-0.0000	-0.6030	0.2981	0.0924	0.3146	0.0456
10Y	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1130	0.3134	-0.0386
11X	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.1077	0.3548	0.0253
11XY	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.1077	0.3816	0.0490
11Y	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.1347	0.3812	-0.0417
12X	0.0000	0.7150	-0.3791	-0.0000	-0.7150	0.3791	0.1241	0.4324	0.0292
12XY	0.0000	0.6030	-0.2981	-0.0000	-0.6030	0.2981	0.1318	0.4608	0.0554
12Y	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1531	0.4608	-0.0473
13X	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1480	0.5113	0.0319
13XY	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1476	0.5424	0.0601
13Y	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.1779	0.5406	-0.0518
14X	0.1210	-0.1050	-2.2141	-0.1210	0.1050	2.2141	0.1677	0.6009	0.0339
14XY	-0.0150	-0.4420	-3.5651	0.0150	0.4420	3.5651	0.1728	0.6339	0.0637
14Y	0.0190	-0.8550	-0.6821	-0.0190	0.8550	0.6821	0.2001	0.6328	-0.0557
15X	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.1919	0.6861	0.0352
15XY	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.1902	0.7199	0.0658
15Y	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.2245	0.7192	-0.0587
16X	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2110	0.7909	0.0374
16XY	0.0000	0.6290	-0.3041	-0.0000	-0.6290	0.3041	0.2221	0.8276	0.0686
16Y	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2483	0.8271	-0.0627

17X	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2460	0.8912	0.0378
17XY	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2340	0.9319	0.0695
17Y	0.0000	0.2660	-0.2171	-0.0000	-0.2660	0.2171	0.2762	0.9303	-0.0652
18X	-3.2870	4.7850	-0.2411	3.2870	-4.7850	0.2411	0.2556	0.9989	0.0383
18XY	3.3410	8.5120	-0.3001	-3.3410	-8.5120	0.3001	0.2735	1.0414	0.0695
18Y	-4.3870	1.9540	-0.2261	4.3870	-1.9540	0.2261	0.3002	1.0403	-0.0665
19X	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.2894	1.1334	0.0586
21X	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	0.0249	-0.0004	0.0057
21XY	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	-0.0227	0.0029	0.0055
21Y	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	0.0270	0.0027	-0.0030
22X	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	-0.0034	0.0287	0.0020
22XY	0.0000	0.4764	-0.4484	0.0000	-0.4764	0.4484	-0.0036	0.0229	0.0062
22Y	0.0000	0.4764	-0.4484	-0.0000	-0.4764	0.4484	0.0114	0.0189	-0.0057
23Y	0.0000	0.6475	-0.5717	-0.0000	-0.6475	0.5717	0.0432	0.0148	-0.0036
24X	0.0000	0.6475	-0.5717	-0.0000	-0.6475	0.5717	-0.0002	0.1358	-0.0063
25X	4.4310	8.0520	-2.2281	-4.4310	-8.0520	2.2281	0.0161	0.1343	0.1226
26X	4.4310	8.0520	-2.2281	-4.4310	-8.0520	2.2281	0.0619	0.3717	0.2342
27X	4.4310	8.0520	-2.2281	-4.4310	-8.0520	2.2281	0.1423	0.7066	0.2494
28X	0.0840	1.9250	-0.3851	-0.0840	-1.9250	0.3851	0.2047	1.1362	0.3525
i0.50E148S	0.0000	0.2660	-0.2171	0.0000	-0.2660	0.2171	0.2861	1.0274	-0.0410

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.
g21X	g21XY	Short only	-5.54	-3.48	12.50	0.750	0.500	0.500	175.41	162.26	5	9.49	1.000	227.66	186.21	6
g21XY	g21X	Short only	-3.48	-5.54	12.50	0.750	0.500	0.500	175.41	162.26	5	9.49	1.000	227.66	186.21	6
g25X	g25XY	Short only	-4.22	-4.42	12.19	0.750	0.500	0.500	178.09	164.30	5	9.28	1.000	231.13	188.35	6
g25XY	g25X	Short only	-4.42	-4.22	12.19	0.750	0.500	0.500	178.09	164.30	5	9.28	1.000	231.13	188.35	6
g31X	g31XY	Short only	-0.35	-2.57	24.37	0.750	0.500	0.500	125.17	123.98	5	21.45	1.000	139.87	132.22	6
g31XY	g31X	Short only	-2.57	-0.35	24.37	0.750	0.500	0.500	125.17	123.98	5	21.45	1.000	139.87	132.22	6
g39XY	g39X	Short only	-7.69	0.50	39.29	0.750	0.500	0.500	101.52	106.14	2	37.00	1.000	103.26	111.63	3
g41P	g41Y	Short only	-2.28	-20.28	38.35	0.750	0.500	0.500	104.58	108.43	2	36.33	1.000	106.38	113.19	3
g41Y	g41P	Short only	-20.28	-2.28	38.35	0.750	0.500	0.500	104.58	108.43	2	36.33	1.000	106.38	113.19	3
g43P	g43Y	Short only	-15.64	-17.26	28.74	0.784	0.567	0.567	152.69	144.95	5	25.91	1.000	173.14	152.68	6
g43Y	g43P	Short only	-17.26	-15.64	28.74	0.784	0.567	0.567	152.69	144.95	5	25.91	1.000	173.14	152.68	6
g45X	g45XY	Short only	-6.83	-1.92	16.05	0.777	0.553	0.553	172.78	160.26	5	14.51	1.000	198.88	168.51	6
g45XY	g45X	Short only	-1.92	-6.83	16.05	0.777	0.553	0.553	172.78	160.26	5	14.51	1.000	198.88	168.51	6
g47P	g47Y	Short only	-4.61	-5.99	13.12	0.771	0.542	0.542	195.05	177.23	5	11.78	1.000	229.08	187.08	6
g47Y	g47P	Short only	-5.99	-4.61	13.12	0.771	0.542	0.542	195.05	177.23	5	11.78	1.000	229.08	187.08	6
g74P	g74X	Short only	-0.14	-0.41	12.09	0.750	0.500	0.500	154.28	146.16	5	9.26	1.000	196.32	166.94	6
g74X	g74P	Short only	-0.41	-0.14	12.09	0.750	0.500	0.500	154.28	146.16	5	9.26	1.000	196.32	166.94	6

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	4.159	50.00	50.00	8.32
2	1.965	50.00	50.00	3.93
3	6.871	50.00	50.00	13.74
4	9.457	50.00	50.00	18.91
5	6.871	50.00	50.00	13.74
6	9.457	50.00	50.00	18.91
7	6.871	50.00	50.00	13.74
8	9.457	50.00	50.00	18.91
10	2.220	50.00	50.00	4.44
11	0.809	50.00	50.00	1.62

12	0.809	50.00	50.00	1.62
13	0.809	50.00	50.00	1.62
14	1.116	50.00	50.00	2.23
15	1.116	50.00	50.00	2.23
16	1.427	50.00	50.00	2.85
17	1.613	50.00	50.00	3.23
18	0.343	50.00	50.00	0.69
19	0.705	50.00	50.00	1.41
20	0.343	50.00	50.00	0.69
21	0.343	50.00	50.00	0.69
22	0.343	50.00	50.00	0.69
23	0.545	50.00	50.00	1.09
24	0.545	50.00	50.00	1.09
25	0.864	50.00	50.00	1.73
26	0.654	50.00	50.00	1.31
27	0.343	50.00	50.00	0.69
28	0.343	50.00	50.00	0.69
29	0.343	50.00	50.00	0.69
30	0.343	50.00	50.00	0.69
31	4.519	50.00	50.00	9.04
32	5.810	50.00	50.00	11.62
33	9.149	50.00	50.00	18.30
34	4.808	50.00	50.00	9.62
35	3.592	50.00	50.00	7.18
36	1.094	50.00	50.00	2.19
38	0.699	50.00	50.00	1.40
40	0.673	50.00	50.00	1.35
41	0.673	50.00	50.00	1.35
42	0.673	50.00	50.00	1.35
43	0.947	50.00	50.00	1.89
44	0.947	50.00	50.00	1.89
45	1.257	50.00	50.00	2.51
46	1.328	50.00	50.00	2.66

*** 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 %	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 Comp. Member (ft)	Curve No.	No. Of Bolts Comp.
Leg1	L3x3x3/16	SAE	3X3X0.1875	36.0	1.80	1.80	g1Y	-0.199	NESC Ext	11.113	44.600	40.781	1.000	1.000	1.000	167.55	167.55	8.322	4	4
Leg2	L4x4x1/4	SAE	4X4X0.25	36.0	65.68	65.68	g4X	-28.358	NESC Ext	43.178	44.600	54.375	1.000	1.000	1.000	109.89	109.89	7.280	1	4
Leg3	L5x5x5/16	SAE	5X5X0.3125	50.0	78.39	78.39	g7X	-80.584	NESC Ext	102.806	0.000	0.000	1.000	1.000	1.000	76.66	76.66	6.350	1	0
Leg4	L6x6x9/16	SAE	6X6X0.5625	50.0	78.00	78.00	g12X	-196.689	NESC Ext	252.165	312.200	856.405	1.000	1.000	1.000	70.27	70.27	6.910	1	28
Leg5	L8x8x1/2	SAE	8X8X0.5	50.0	84.62	84.62	g18X	-198.320	NESC Ext	234.356	312.200	761.249	0.600	0.600	0.600	88.47	88.47	19.537	1	28
Diag1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	87.35	87.35	g19P	-7.095	NESC Ext	8.122	33.600	27.187	1.000	1.000	1.000	231.21	204.78	9.460	5	2
Diag2	L2x2x5/16	SAE	2X2X0.3125	36.0	86.56	86.56	g20XY	-10.820	NESC Ext	12.501	33.600	33.984	0.750	0.500	0.500	175.41	162.26	11.402	5	2
Diag3	L3X2.5X1/4	SAU	3X2.5X0.25	36.0	65.84	65.84	g28XY	-15.559	NESC Hea	23.631	33.450	40.781	0.750	0.500	0.500	127.77	125.96	11.244	5	3
Diag4	L4X3X1/4	SAU	4X3X0.25	36.0	68.67	62.92	g36XY	-24.721	NESC Hea	39.288	55.750	67.969	0.750	0.500	0.500	101.52	106.14	11.015	2	5
Diag5	L3X3X1/4	SAE	3X3X0.25	36.0	89.59	89.59	g46P	-11.756	NESC Hea	13.122	22.300	27.187	0.771	0.542	0.542	195.05	177.23	17.754	5	2
Diag6	L2.5x2x1/4	SAU	2.5X2X0.25	36.0	89.11	5.80	g48Y	-0.299	NESC Ext	5.156	33.450	40.781	1.000	0.500	0.500	280.79	242.56	18.345	5	3
Diag7	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	85.78	56.23	g50X	-1.036	NESC Hea	1.843	22.300	20.391	0.500	1.000	0.500	427.97	354.71	21.398	5	2
Diag8	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	36.0	72.44	0.00	g53Y	0.000		1.310	22.300	20.391	1.000	0.500	0.500	368.00	368.00	16.468	4	2
Diag9	L3x2.5x1/4	SAU	3X2.5X0.25	36.0	40.08	27.31	g55P	-1.502	NESC Hea	5.499	33.450	40.781	1.000	0.500	0.500	305.13	261.11	24.029	5	3
Horz1	L3X3X3/16	SAE	3X3X0.1875	36.0	23.30	15.50	g56P	-1.946	NESC Hea	12.554	22.300	20.391	1.000	1.000	1.000	181.21	157.64	9.000	6	2
Horz2	L2X2X3/16	SAE	2X2X0.1875	36.0	37.82	0.00	g57P	0.000		2.705	33.450	30.586	1.000	1.000	1.000	274.11	274.11	9.000	4	3
Horz3	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	45.08	9.43	g59P	-0.537	NESC Ext	5.696	22.300	20.391	1.000	1.000	1.000	252.93	201.75	9.000	6	2
Horz4	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	36.0	61.96	61.96	g65X	-9.687	NESC Ext	15.634	22.300	27.187	1.000	0.500	0.500	188.89	162.37	17.126	6	2
Horz5	**L3.5X3.5X1/4**	**SAE**	**3.5X3.5X0.25**	**36.0**	**39.38**	**39.38**	**g68X**	**-7.028**	**NESC Hea**	**17.846**	**22.300**	**27.187**	**1.000**	**1.000**	**1.000**	**192.58**	**164.64**	**11.138**	**6**	**2 A**
potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g69P g69Y g71P ??																				
Horz6	L2.5X2X5/16	SAU	2.5X2X0.3125	36.0	12.27	0.00	g61X	0.000		9.046	22.300	33.984	1.000	1.000	1.000	255.92	203.59	9.000	6	2
Inner1	L3x3x1/4	SAE	2X2X0.1875	36.0	74.50	74.50	g72X	-2.471	NESC Ext	3.316	11.150	10.195	2.000	1.000	1.000	247.54	247.54	6.364	4	1
Inner2	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	73.09	73.09	g75P	-6.233	NESC Hea	8.528	22.300	20.391	0.750	0.500	0.500	178.85	164.88	12.728	5	2
Inner3	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	36.0	22.80	22.80	g74P	-2.755	NESC Hea	12.085	22.300	20.391	0.750	0.500	0.500	154.28	146.16	12.728	5	2
TopCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	29.57	29.57	g77Y	-11.872	NESC Hea	40.145	55.750	67.969	0.500	0.500	0.500	112.21	116.10	14.867	3	5
TopArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	44.83	11.02	g83P	-0.907	NESC Ext	8.230	33.450	30.586	0.670	0.330	0.330	167.84	167.84	16.554	4	3
MdCrArm1	L4X4X1/4	SAE	4X4X0.25	50.0	29.67	29.67	g79Y	-14.220	NESC Hea	47.928	66.900	81.562	0.330	0.330	0.330	93.24	106.62	18.719	3	6
MidArmBr	2.5x2x1/4	SAU	2.5X2X0.25	36.0	46.94	10.83	g84P	-0.785	NESC Ext	7.246	33.450	40.781	0.670	0.330	0.330	204.63	204.63	19.954	4	3
BotCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	34.03	34.03	g81Y	-13.660	NESC Hea	40.145	55.750	67.969	0.500	0.500	0.500	112.21	116.10	14.867	3	5
BotArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	58.32	5.07	g85P	-0.426	NESC Ext	8.391	33.450	30.586	0.670	0.330	0.330	166.22	166.22	16.395	4	3
ShArmBr	L4x3x1/4	SAU	4X3X0.25	36.0	67.00	67.00	g86P	-9.232	NESC Hea	13.780	22.300	27.187	1.000	0.500	0.500	187.36	187.36	19.985	4	2
ShieldAr	4ST10	ST	ST4x10	36.0	17.77	3.76	g87P	-1.010	NESC Ext	26.876	44.600	107.880	1.000	1.000	1.000	194.68	176.95	18.170	5	4
Mast	12" Sch. 40	Pwmnt	Pipe 12" Std.	35.0	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
M1	L3x3x1/4	SAE	3X3X0.25	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
M2	C12x20.7	CHA	12X20.7	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
Diag10	L3X3X3/8	SAE	3X3X0.375	36.0	93.22	93.22	g42P	-20.788	NESC Hea	28.743	22.300	40.781	0.784	0.567	0.567	152.69	144.95	13.173	5	2
MdCrArm2	L4X4X1/4	SAE	4X4X0.25	36.0	18.87	18.87	g80P	-6.225	NESC Hea	32.984	66.900	81.562	1.000	1.000	1.000	135.85	129.75	9.000	6	6
Inner4	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	22.48	22.48	g76Y	-0.917	NESC Ext	4.081	11.150	10.195	1.000	0.500	0.500	238.35	238.35	15.751	4	1
Horz7	**L3X3X3/16**	**SAE**	**3X3X0.1875**	**36.0**	**33.81**	**33.81**	**g66Y**	**-1.719**	**NESC Ext**	**5.085**	**22.300**	**20.391**	**2.000**	**1.000**	**1.000**	**287.54**	**247.71**	**11.250**	**5**	**2 A**
potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g67P g67X g67XY g67Y ??																				
M3	L3x3x1/4	SAE	3X3X0.25	36.0	17.52	17.52	g89P	-2.571	NESC Hea	14.670	33.600	27.187	1.000	1.000	1.000	182.43	167.61	9.000	5	2
M4	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	45.08	0.00	g90P	0.000		4.733	33.600	20.391	1.000	1.000	1.000	252.93	221.33	9.000	5	2

Group Summary (Tension Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength	Max Usage	Max Use In Tens.	Tension Control Member	Tension Force	Tension Control Load Case	Net Section Capacity	Tension Connect. Shear Capacity	Tension Connect. Bearing Capacity	Tension Connect. Rupture Capacity	Length Tens. Member	No. Of Bolts Tens.	No. Of Holes	Hole Diameter

				(ksi)	%	%		(kips)		(kips)	(kips)	(kips)	(kips)	(ft)		(in)	
Leg1	L3x3x3/16	SAE	3X3X0.1875	36.0	1.80	0.00	g1Y	0.000		28.845	44.600	40.781	31.719	8.322	4	2.240	0.6875
Leg2	L4x4x1/4	SAE	4X4X0.25	36.0	65.68	62.97	g4Y	28.083	NESC Ext	57.465	44.600	54.375	60.417	7.280	4	2.000	0.6875
Leg3	L5x5x5/16	SAE	5X5X0.3125	50.0	78.39	75.53	g8Y	86.603	NESC Ext	114.654	133.800	203.906	213.235	6.910	12	3.430	0.6875
Leg4	L6x6x9/16	SAE	6X6X0.5625	50.0	78.00	76.41	g12Y	186.569	NESC Ext	244.156	312.200	856.405	895.587	6.910	28	4.000	0.6875
Leg5	L8x8x1/2	SAE	8X8X0.5	50.0	84.62	59.37	g15Y	185.345	NESC Ext	318.750	312.200	761.249	845.832	8.219	28	4.000	0.6875
Diag1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	87.35	25.68	g19X	6.982	NESC Ext	32.987	33.600	27.187	27.187	9.460	2	1.000	0.6875
Diag2	L2x2x5/16	SAE	2X2X0.3125	36.0	86.56	42.42	g24Y	11.213	NESC Ext	30.299	33.600	33.984	26.432	11.576	2	1.000	0.6875
Diag3	L3X2.5X1/4	SAU	3X2.5X0.25	36.0	65.84	52.21	g32Y	16.561	NESC Ext	32.825	33.450	40.781	31.719	11.347	3	1.000	0.6875
Diag4	L4X3X1/4	SAU	4X3X0.25	36.0	68.67	68.67	g40Y	25.003	NESC Hea	36.409	55.750	67.969	48.866	11.347	5	1.840	0.6875
Diag5	L3X3X1/4	SAE	3X3X0.25	36.0	89.59	70.09	g45P	14.821	NESC Hea	41.087	22.300	27.187	21.146	15.414	2	1.000	0.6875
Diag6	L2.5x2x1/4	SAU	2.5X2X0.25	36.0	89.11	89.11	g48X	22.034	NESC Hea	24.725	33.450	40.781	29.016	18.345	3	1.000	0.6875
Diag7	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	85.78	85.78	g50P	13.604	NESC Hea	22.067	22.300	20.391	15.859	21.398	2	1.000	0.6875
Diag8	L1.75x1.75x3/16	SAE	1.75X1.75X0.1875	36.0	72.44	72.44	g53X	10.426	NESC Hea	15.911	22.300	20.391	14.393	16.468	2	1.000	0.6875
Diag9	L3x2.5x1/4	SAU	3X2.5X0.25	36.0	40.08	40.08	g55X	12.530	NESC Hea	32.825	33.450	40.781	31.266	24.029	3	1.000	0.6875
Horz1	L3X3X3/16	SAE	3X3X0.1875	36.0	23.30	23.30	g60P	5.542	NESC Hea	31.139	33.450	30.586	23.789	9.000	3	1.000	0.6875
Horz2	L2X2X3/16	SAE	2X2X0.1875	36.0	37.82	37.82	g57P	7.121	NESC Ext	18.827	33.450	30.586	23.789	9.000	3	1.000	0.6875
Horz3	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	45.08	45.08	g63X	9.192	NESC Ext	22.067	22.300	20.391	26.654	9.000	2	1.000	0.6875
Horz4	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	36.0	61.96	13.94	g65P	2.948	NESC Ext	32.987	22.300	27.187	21.146	17.126	2	1.000	0.6875
Horz5	**L3.5X3.5X1/4**	**SAE**	**3.5X3.5X0.25**	**36.0**	**39.38**	**3.56**	**g71X**	**1.552**	**NESC Ext**	**43.618**	**0.000**	**0.000**	**0.000**	**5.625**	**0**	**2.000**	**0.6875 A potentially**
damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g69P g69Y g71P ??																	
Horz6	L2.5X2X5/16	SAU	2.5X2X0.3125	36.0	12.27	12.27	g61X	2.736	NESC Hea	35.483	22.300	33.984	44.424	9.000	2	1.000	0.6875
Inner1	L3x3x1/4	SAE	2X2X0.1875	36.0	74.50	2.01	ig72P90P	0.159	NESC Ext	18.827	11.150	10.195	7.896	6.364	1	1.000	0.6875
Inner2	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	73.09	21.78	g73X	2.963	NESC Hea	19.030	22.300	20.391	13.605	12.728	2	1.000	0.6875
Inner3	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	36.0	22.80	13.00	g74X	1.988	NESC Hea	25.048	22.300	20.391	15.293	12.728	2	1.000	0.6875
TopCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	29.57	15.21	g77XY	7.800	NESC Ext	51.273	55.750	67.969	52.865	14.867	5	2.080	0.6875
TopArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	44.83	44.83	g83Y	6.659	NESC Hea	14.853	33.450	30.586	23.789	16.554	3	2.000	0.6875
MdCrArm1	L4X4X1/4	SAE	4X4X0.25	50.0	29.67	11.91	g79XY	7.553	NESC Hea	71.831	66.900	81.562	63.437	18.719	6	2.000	0.6875
MidArmBr	2.5x2x1/4	SAU	2.5X2X0.25	36.0	46.94	46.94	g84Y	8.992	NESC Hea	19.156	33.450	40.781	31.719	19.954	3	2.000	0.6875
BotCrArm	L4X4X1/4	SAE	4X4X0.25	36.0	34.03	15.31	g81XY	7.920	NESC Hea	51.718	55.750	67.969	52.865	14.867	5	2.000	0.6875
BotArmBr	2.5x2x3/16	SAU	2.5X2X0.1875	36.0	58.32	58.32	g85Y	8.663	NESC Hea	14.853	33.450	30.586	23.789	16.395	3	2.000	0.6875
ShArmBr	L4x3x1/4	SAU	4X3X0.25	36.0	67.00	23.87	g86Y	5.048	NESC Ext	41.087	22.300	27.187	21.146	19.985	2	1.000	0.6875
ShieldAr	4ST10	ST	ST4x10	36.0	17.77	17.77	g87X	7.927	NESC Hea	84.207	44.600	107.880	83.907	18.170	4	2.000	0.6875
Mast	12" Sch. 40	Pwmnt	Pipe 12" Std.	35.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
M1	L3x3x1/4	SAE	3X3X0.25	36.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
M2	C12x20.7	CHA	12X20.7	36.0	0.00	0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
Diag10	L3X3X3/8	SAE	3X3X0.375	36.0	93.22	60.22	g43XY	19.100	NESC Hea	60.011	33.600	40.781	31.719	13.173	2	1.000	0.6875
MdCrArm2	L4X4X1/4	SAE	4X4X0.25	36.0	18.87	1.37	g80Y	0.589	NESC Ext	43.026	66.900	81.562	63.437	9.000	6	3.561	0.6875
Inner4	L2.5X2X3/16	SAU	2.5X2X0.1875	36.0	22.48	8.20	g76XY	0.647	NESC Ext	19.030	11.150	10.195	7.896	15.751	1	1.000	0.6875
Horz7	**L3X3X3/16**	**SAE**	**3X3X0.1875**	**36.0**	**33.81**	**4.45**	**g66XY**	**0.706**	**NESC Ext**	**31.139**	**22.300**	**20.391**	**15.859**	**11.250**	**2**	**1.000**	**0.6875 A potentially**
damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g67P g67X g67XY g67Y ??																	
M3	L3x3x1/4	SAE	3X3X0.25	36.0	17.52	3.54	g89Y	0.749	NESC Hea	36.131	33.600	27.187	21.146	9.000	2	1.890	0.6875
M4	L2.5x2x3/16	SAU	2.5X2X0.1875	36.0	45.08	45.08	g90P	9.192	NESC Ext	22.067	33.600	20.391	20.391	9.000	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	93.22	g42P	Angle
NESC Extreme	87.35	g19P	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	10.77	NESC Heavy	0.0

2	Clamp	6.34	NESC Heavy	0.0
3	Clamp	16.27	NESC Heavy	0.0
4	Clamp	23.52	NESC Heavy	0.0
5	Clamp	16.34	NESC Heavy	0.0
6	Clamp	23.58	NESC Heavy	0.0
7	Clamp	16.27	NESC Heavy	0.0
8	Clamp	23.51	NESC Heavy	0.0
10	Clamp	4.44	NESC Extreme	0.0
11	Clamp	1.99	NESC Heavy	0.0
12	Clamp	2.12	NESC Heavy	0.0
13	Clamp	2.28	NESC Heavy	0.0
14	Clamp	2.90	NESC Heavy	0.0
15	Clamp	3.57	NESC Heavy	0.0
16	Clamp	3.40	NESC Heavy	0.0
17	Clamp	5.07	NESC Heavy	0.0
18	Clamp	0.69	NESC Extreme	0.0
19	Clamp	7.17	NESC Heavy	0.0
20	Clamp	0.69	NESC Extreme	0.0
21	Clamp	0.80	NESC Heavy	0.0
22	Clamp	0.94	NESC Heavy	0.0
23	Clamp	1.28	NESC Heavy	0.0
24	Clamp	1.86	NESC Heavy	0.0
25	Clamp	1.73	NESC Heavy	0.0
26	Clamp	2.33	NESC Heavy	0.0
27	Clamp	0.69	NESC Extreme	0.0
28	Clamp	0.69	NESC Extreme	0.0
29	Clamp	0.69	NESC Extreme	0.0
30	Clamp	0.69	NESC Extreme	0.0
31	Clamp	9.04	NESC Extreme	0.0
32	Clamp	11.62	NESC Extreme	0.0
33	Clamp	18.30	NESC Extreme	0.0
34	Clamp	9.62	NESC Extreme	0.0
35	Clamp	7.18	NESC Extreme	0.0
36	Clamp	12.77	NESC Heavy	0.0
38	Clamp	1.40	NESC Extreme	0.0
40	Clamp	1.41	NESC Heavy	0.0
41	Clamp	1.55	NESC Heavy	0.0
42	Clamp	1.70	NESC Heavy	0.0
43	Clamp	2.18	NESC Heavy	0.0
44	Clamp	2.86	NESC Heavy	0.0
45	Clamp	2.68	NESC Heavy	0.0
46	Clamp	3.86	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	28P	3.259	3.998	1.551	5.386
NESC Heavy	2	Clamp	28X	0.000	2.975	1.093	3.169
NESC Heavy	3	Clamp	27P	4.889	5.603	3.301	8.136
NESC Heavy	4	Clamp	27X	0.000	10.828	4.586	11.759
NESC Heavy	5	Clamp	26P	4.889	5.603	3.380	8.168
NESC Heavy	6	Clamp	26X	0.000	10.826	4.665	11.788
NESC Heavy	7	Clamp	25P	4.889	5.603	3.301	8.136
NESC Heavy	8	Clamp	25X	0.000	10.826	4.586	11.757
NESC Heavy	10	Clamp	14X	0.044	0.109	1.883	1.887
NESC Heavy	11	Clamp	12X	0.000	0.345	0.931	0.993
NESC Heavy	12	Clamp	10X	0.000	0.360	0.999	1.062
NESC Heavy	13	Clamp	8X	0.000	0.393	1.069	1.139
NESC Heavy	14	Clamp	6X	0.000	0.459	1.376	1.450
NESC Heavy	15	Clamp	4X	0.000	0.643	1.665	1.785
NESC Heavy	16	Clamp	3X	0.000	0.563	1.603	1.699
NESC Heavy	17	Clamp	2X	0.000	0.792	2.407	2.535
NESC Heavy	18	Clamp	16P	0.000	0.000	0.263	0.263

NESC Heavy	19	Clamp	14P	-0.038	-0.169	3.579	3.584
NESC Heavy	20	Clamp	12P	0.000	0.000	0.333	0.333
NESC Heavy	21	Clamp	10P	0.000	0.000	0.401	0.401
NESC Heavy	22	Clamp	8P	0.000	0.000	0.471	0.471
NESC Heavy	23	Clamp	6P	0.000	0.000	0.640	0.640
NESC Heavy	24	Clamp	4P	0.000	0.000	0.929	0.929
NESC Heavy	25	Clamp	3P	0.000	0.000	0.867	0.867
NESC Heavy	26	Clamp	2P	0.000	0.000	1.165	1.165
NESC Heavy	27	Clamp	17P	0.000	0.000	0.201	0.201
NESC Heavy	28	Clamp	17X	0.000	0.134	0.201	0.241
NESC Heavy	29	Clamp	17XY	0.000	0.134	0.201	0.241
NESC Heavy	30	Clamp	17Y	0.000	0.000	0.201	0.201
NESC Heavy	31	Clamp	18P	1.142	0.262	0.362	1.226
NESC Heavy	32	Clamp	18X	-0.845	1.304	0.384	1.601
NESC Heavy	33	Clamp	18XY	0.866	2.296	0.607	2.528
NESC Heavy	34	Clamp	18Y	-1.101	0.426	0.348	1.231
NESC Heavy	35	Clamp	14XY	-0.014	0.055	2.683	2.684
NESC Heavy	36	Clamp	14Y	-0.054	-0.249	6.382	6.387
NESC Heavy	38	Clamp	16XY	0.000	0.281	0.585	0.649
NESC Heavy	40	Clamp	12XY	0.000	0.314	0.632	0.705
NESC Heavy	41	Clamp	10XY	0.000	0.329	0.700	0.773
NESC Heavy	42	Clamp	8XY	0.000	0.362	0.770	0.851
NESC Heavy	43	Clamp	6XY	0.000	0.421	1.008	1.092
NESC Heavy	44	Clamp	4XY	0.000	0.605	1.297	1.431
NESC Heavy	45	Clamp	3XY	0.000	0.525	1.235	1.342
NESC Heavy	46	Clamp	2XY	0.000	0.727	1.786	1.929
NESC Extreme	1	Clamp	28P	2.608	3.193	0.550	4.159
NESC Extreme	2	Clamp	28X	0.084	1.925	0.385	1.965
NESC Extreme	3	Clamp	27P	4.297	5.137	1.537	6.871
NESC Extreme	4	Clamp	27X	4.431	8.052	2.228	9.457
NESC Extreme	5	Clamp	26P	4.297	5.137	1.537	6.871
NESC Extreme	6	Clamp	26X	4.431	8.052	2.228	9.457
NESC Extreme	7	Clamp	25P	4.297	5.137	1.537	6.871
NESC Extreme	8	Clamp	25X	4.431	8.052	2.228	9.457
NESC Extreme	10	Clamp	14X	0.121	-0.105	2.214	2.220
NESC Extreme	11	Clamp	12X	0.000	0.715	0.379	0.809
NESC Extreme	12	Clamp	10X	0.000	0.715	0.379	0.809
NESC Extreme	13	Clamp	8X	0.000	0.715	0.379	0.809
NESC Extreme	14	Clamp	6X	0.000	0.972	0.548	1.116
NESC Extreme	15	Clamp	4X	0.000	0.972	0.548	1.116
NESC Extreme	16	Clamp	3X	0.000	1.200	0.772	1.427
NESC Extreme	17	Clamp	2X	0.000	1.409	0.785	1.613
NESC Extreme	18	Clamp	16P	0.000	0.266	0.217	0.343
NESC Extreme	19	Clamp	14P	-0.129	-0.446	0.531	0.705
NESC Extreme	20	Clamp	12P	0.000	0.266	0.217	0.343
NESC Extreme	21	Clamp	10P	0.000	0.266	0.217	0.343
NESC Extreme	22	Clamp	8P	0.000	0.266	0.217	0.343
NESC Extreme	23	Clamp	6P	0.000	0.419	0.348	0.545
NESC Extreme	24	Clamp	4P	0.000	0.419	0.348	0.545
NESC Extreme	25	Clamp	3P	0.000	0.647	0.572	0.864
NESC Extreme	26	Clamp	2P	0.000	0.476	0.448	0.654
NESC Extreme	27	Clamp	17P	0.000	0.266	0.217	0.343
NESC Extreme	28	Clamp	17X	0.000	0.266	0.217	0.343
NESC Extreme	29	Clamp	17XY	0.000	0.266	0.217	0.343
NESC Extreme	30	Clamp	17Y	0.000	0.266	0.217	0.343
NESC Extreme	31	Clamp	18P	4.338	1.246	0.231	4.519
NESC Extreme	32	Clamp	18X	-3.287	4.785	0.241	5.810
NESC Extreme	33	Clamp	18XY	3.341	8.512	0.300	9.149
NESC Extreme	34	Clamp	18Y	-4.387	1.954	0.226	4.808
NESC Extreme	35	Clamp	14XY	-0.015	-0.442	3.565	3.592
NESC Extreme	36	Clamp	14Y	0.019	-0.855	0.682	1.094
NESC Extreme	38	Clamp	16XY	0.000	0.629	0.304	0.699
NESC Extreme	40	Clamp	12XY	0.000	0.603	0.298	0.673
NESC Extreme	41	Clamp	10XY	0.000	0.603	0.298	0.673
NESC Extreme	42	Clamp	8XY	0.000	0.603	0.298	0.673
NESC Extreme	43	Clamp	6XY	0.000	0.834	0.448	0.947
NESC Extreme	44	Clamp	4XY	0.000	0.834	0.448	0.947

NESC Extreme	45	Clamp	3XY	0.000	1.062	0.672	1.257
NESC Extreme	46	Clamp	2XY	0.000	1.176	0.616	1.328

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)
NESC Heavy	61.577	17.926	46.515	6567.117	1991.736
NESC Extreme	62.336	28.877	18.969	6851.995	3060.726

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 29457.3
Total: 29457.3

*** End of Report

Tower Anchor Bolt Analysis

Max Leg Reactions:

Uplift =	$Uplift := 170 \cdot kips$	(User Input)
Shear =	$Shear := 47 \cdot kips$	(User Input)
Compression =	$Compression := 194 \cdot kips$	(User Input)

Original/Existing Anchor Bolt Data:

ASTM A36

Number of Anchor Bolts =	$N_1 := 4$	(User Input)
Bolt Ultimate Strength =	$F_{u.1} := 58ksi$	(User Input)
Bolt Yield Strength =	$F_{y.1} := 36ksi$	(User Input)
Diameter of Bolts =	$D_1 := 1.5in$	(User Input)
Threads per Inch =	$n_1 := 6$	(User Input)
Coefficient of Friction =	$\mu_1 := 0.55$	(User Input)
Embedment =	$E_1 := 6 \cdot ft$	(User Input)

Outer Anchor Bolt Data: **(Added 10/15/04 per PJF job no. 34804-19 drawing S-1)**

ASTM A193 Gr B7 w/ G5 Epoxy Adhesive

Number of Anchor Bolts =	$N_2 := 4$	(User Input)	
Bolt Ultimate Strength =	$F_{u.2} := 125ksi$	(User Input)	
Bolt Yield Strength =	$F_{y.2} := 105ksi$	(User Input)	
Diameter of Bolts =	$D_2 := 1.0in$	(User Input)	
Threads per Inch =	$n_2 := 8$	(User Input)	
Ultimate Tension Force for G5 Epoxy =	$F_{t.G5} := 48.7 \cdot kips$	(User Input)	Based on 3000 psi concrete)
Anchor Plate Thickness =	$t := 2.5 \cdot in$	(User Input)	
Anchor Plate Yield Strength =	$F_y := 36 \cdot ksi$	(User Input)	

Existing Base Plate Data:

Plate Yield Strength =	$F_{ybp} := 36ksi$	(User Input)
Base Plate Thickness =	$t_{bp} := 1.875in$	(User Input)
Base Plate Width =	$W_{bp} := 14in$	(User Input)
Distance from Bolt Center to Leg =	$b_d := 4.5 \cdot in$	(User Input)
Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_w := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := 0.4375 \cdot in$	(User Input)
Weld Area =	$A_w := 9.89 \cdot in^2$	(User Input)
Grout Strength =	$f_c := 3000 \cdot psi$	(User Input)

Reinforcement Plate Data:

Plate Yield Strength = $F_{yrp} := 36ksi$ (User Input)

Plate Thickness = $t_{rp} := 2.5in$ (User Input)

Plate Width = $W_{rp} := 7in$ (User Input)

Reinforcement Shim Plate Data:

Plate Length = $l_{rsp} := 9in$ (User Input)

Plate Width = $W_{rsp} := 2.5in$ (User Input)

Anchor Bolt Area:

Net Area of Bolt 1 = $A_{n.1} := \frac{\pi}{4} \cdot \left(D_1 - \frac{0.9743 \cdot in}{n_1}\right)^2 = 1.405 \cdot in^2$ (AISC 13th Ed. pg. 7-83)

Net Area of Bolt 2 = $A_{n.2} := \frac{\pi}{4} \cdot \left(D_2 - \frac{0.9743 \cdot in}{n_2}\right)^2 = 0.606 \cdot in^2$ (AISC 13th Ed. pg. 7-83)

Check ASTM A36 Anchor Bolts:

Tension Strength 1 = $F_{t.1} := A_{n.1} \cdot F_{y.1} = 50.6 \cdot kips$

Shear Strength 1 = $F_{v.1} := A_{n.1} \cdot F_{y.1} \cdot 0.85 \cdot \mu_1 = 23.7 \cdot kips$

Shear per Bolt = $V := \frac{Shear}{N_1} = 11.75 \cdot kips$ (Shear Force only Resisted by Original Anchor Bolts)

Tension per Bolt = $T := \frac{Uplift}{N_1 + N_2} = 21.25 \cdot kips$

Check Combined Tension and Shear = $\frac{T}{F_{t.1}} + \frac{V}{F_{v.1}} = 0.917$ ASCE 10-97 EQ. (7.4-2)

$Condition1 := if\left(\frac{T}{F_{t.1}} + \frac{V}{F_{v.1}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Combined Compression and Shear = $\frac{Shear - 0.3 \cdot Compression}{F_{v.1}} = -0.474$ ASCE 10-97 EQ. (7.4-4)

$Condition2 := if\left(\frac{Shear - 0.3 \cdot Compression}{F_{v.1}} \le 1.00, "OK", "Overstressed"\right)$

Condition2 = "OK"

Check Anchor Embedment = $12 \cdot D_1 \cdot \sqrt{\frac{F_{u.1}}{58 \cdot ksi}} = 1.5ft$ ASCE 10-97 EQ. (7.5.2.1)

$Condition3 := if\left(12 \cdot D_1 \cdot \sqrt{\frac{F_{u.1}}{58 \cdot ksi}} \le E_1, "OK", "Overstressed"\right)$

Condition3 = "OK"

Base Plate to Leg Weld Check =

Weld Stress = $f_w := \frac{Uplift}{A_w} + \frac{Shear}{A_w} = 21.94 \cdot ksi$

$Condition4 := if(f_w < F_w, "OK", "Overstressed")$

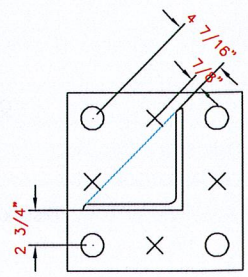
Condition4 = "OK"

Check Base Plate:

Distance from Bolt Center to Leg = $b_{d1} := 2.75 \cdot in$ (User Input)

Distance from Bolt Center to Leg = $b_{d2} := 4.4375 \cdot in$ (User Input)

Distance from Bolt Center to Leg = $b_{d3} := 0.875 \cdot in$ (User Input)



Base Plate Area = $A_{bp} := W_{bp}^2 = 196 \cdot in^2$

Base Plate Section Modulus = $S_{bp} := \frac{W_{bp} \cdot t_{bp}^2}{6} = 8.203 \cdot in^3$

Compression Force in Plate = $\frac{Compression}{A_{bp}} = 0.99 \cdot ksi$

$Condition5 := if\left(\frac{Compression}{A_{bp}} \le F_{ybp}, "OK", "NG"\right)$

Condition5 = "OK"

Bending Force in Plate =

Maximum Bending Moment = $M_{max} := \begin{cases} (3 \cdot T \cdot b_{d1}) & \text{if } 3 \cdot T \cdot b_{d1} > T \cdot b_{d2} + 2 \cdot T \cdot b_{d3} \\ (T \cdot b_{d2} + 2 \cdot T \cdot b_{d3}) & \text{otherwise} \end{cases} = 175.313 \cdot k \cdot in$

$Condition6 := if\left(\frac{M_{max}}{S_{bp}} \le F_{ybp}, "OK", "NG"\right)$

Condition6 = "OK"

Check Grout:

Compression Force on Grout = $\frac{Compression}{A_{bp}} = 0.99 \cdot ksi$

$Condition7 := if\left(\frac{Compression}{A_{bp}} \le f_c, "OK", "NG"\right)$

Condition7 = "OK"

Check Concrete:

Strength Reduction Factor = $\phi_c := 0.65$

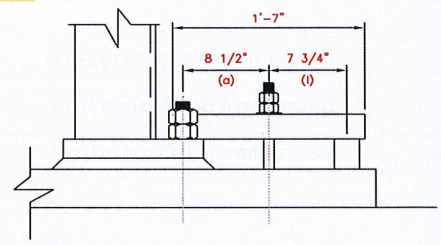
Concrete Bearing Capacity = $P_b := \phi_c \cdot 0.85 \cdot f_c = 1658\,psi$

Compression Force on Concrete = $\frac{Compression}{A_{bp}} = 0.99 \cdot ksi$

$Condition8 := if\left(\frac{Compression}{A_{bp}} \le P_b, "OK", "NG"\right)$

Condition8 = "OK"

Check ASTM A193 Gr B7 Bolts:



Distance Between Supports = $l := 7.75 \cdot in$

Distance From Load to First Support = $a := 8.5 \cdot in$

Tension Strength 2 = $F_{t.2} := \begin{cases} A_{n.2} \cdot F_{y.2} & \text{if } A_{n.2} \cdot F_{y.2} < F_{t.G5} \\ F_{t.G5} & \text{otherwise} \end{cases} = 48.7 \cdot kips$

Tension per Bolt = $T_2 := \frac{T}{l} \cdot (l + a) = 44.556 \cdot kips$

Check Tension on ASTM A193 Gr B7 Bolts = $\frac{T_2}{F_{t.2}} = 0.915$

$Condition9 := if\left(\frac{T_2}{F_{t.2}} \le 1.00, "OK", "Overstressed"\right)$

Condition9 = "OK"

Check Existing Reinforcement Plate:

Plate Section Modulus = $S_{rp} := \frac{W_{rp} \cdot t_{rp}^2}{6} = 7.292 \cdot in^3$

Bending Force in Plate From Tension on Bolts = $M_{max} := T \cdot a = 180.625 \cdot in \cdot k$

Bending Stress in Plate From Tension on Bolts = $f_{ybp} := \frac{M_{max}}{S_{rp}} = 24.771 \cdot ksi$

$Condition10 := if\left(\frac{M_{max}}{S_{rp}} \le F_{ybp}, "OK", "NG"\right)$

Condition10 = "OK"

Check Concrete:

Compression Force on Concrete = $\frac{T \cdot \frac{a}{l}}{W_{rsp} \cdot l_{rsp}} = 1.036 \cdot ksi$

$Condition11 := if\left(\frac{Compression}{A_{bp}} \le P_b, "OK", "NG"\right)$

Condition11 = "OK"

Foundation Analysis

Input Data:

Max. Reactions at Tower Leg:

Shear =	$Shear := 47 \cdot 1.1 \cdot kips = 51.7 \cdot kips$	(User Input)
Compression =	$Comp := 194 \cdot 1.1 \cdot kips = 213.4 \cdot kips$	(User Input)
Uplift =	$Uplift := 170 \cdot 1.1 \cdot kips = 187 \cdot kips$	(User Input)

Tower Properties:

Tower Height =	$H_t := 155 \cdot ft$	(User Input)

Foundation Properties: (Refer to NUSCO drawing 01165-60003 dated 11-3-65)

Pier Height =	$P_H := 9.5 \cdot ft$	(User Input)
Pier Width Top =	$P_{w1} := 4 \cdot ft$	(User Input)
Pier Width Botttom =	$P_{w2} := 6 \cdot ft$	(User Input)
Pier Projection Above Grade =	$P_P := 0.5 \cdot ft$	(User Input)
Pad Width =	$Pd_w := 12 \cdot ft$	(User Input)
Pad Thickness =	$Pd_t := 1.25 \cdot ft$	(User Input)

Subgrade Properties:

Concrete Unit Weight =	$\gamma c := 150 \cdot pcf$	(User Input)
Water Unit Weight =	$\gamma w := 62.4 \cdot pcf$	(User Input)
Soil Unit Weight =	$\gamma s := 100 \cdot pcf$	(User Input)
Uplift Angle =	$\phi := 30.0 \cdot deg$	(User Input)
Soil Bearing Capacity =	$BC_{soil} := 4000 \cdot psf$	(User Input)
Coefficient of Friction =	$\mu := 0.45$	(User Input)
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\phi)}{1 - \sin(\phi)} = 3$	

Calculated Data:

Volume of the Concrete Pad = $V_{pad} := Pd_w^2 \cdot Pd_t = 180 \cdot ft^3$

Volume of the Concrete Pier = $V_{pier} := \frac{(P_H)}{3} \cdot \left(P_{w1}^2 + P_{w2}^2 + \sqrt{P_{w1}^2 \cdot P_{w2}^2}\right) = 240.67 \cdot ft^3$

Resisting Pyramid Base 1 = $B_1 := Pd_w^2 = 144 ft^2$

Resisting Pyramid Base 2 = $B_2 := \left[2 \cdot \tan(\phi) \cdot (P_H - P_P) + Pd_w\right]^2 = 501 ft^2$

Volume of Soil = $V_{soil} := \left[\frac{(P_H - P_P)}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right] - V_{pier} = 2502 \cdot ft^3$

Total Volume of Concrete = $V_{Conc} := V_{pad} + V_{pier} = 421 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 63.1 \cdot kips$

Mass of Soil = $Mass_{Soil} := V_{soil} \cdot \gamma s = 250 \cdot kips$

Total Mass = $Mass_{tot} := Mass_{Conc} + Mass_{Soil} = 313 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{Mass_{tot}}{Uplift} = 1.68$

$Uplift\_Check := if\left(\frac{Mass_{tot}}{Uplift} \geq F_S, \text{"OK"}, \text{"Overstressed"}\right)$

Uplift_Check = "OK"

Check Bearing:

Cross Sectional Area of Pad = $A_{pad} := Pd_w^2 = 144 ft^2$

Section Modulus of Pad = $S_{pad} := \frac{(Pd_w)^3}{6} = 288 \cdot ft^3$

Residual Mass of Concrete = $Mass_{Concr} := V_{Conc} \cdot (\gamma c - \gamma s) = 21 \cdot kips$

$Bearing := \frac{Comp + Mass_{Concr}}{A_{pad}} + \frac{\left[Shear \cdot (P_H + Pd_t)\right]}{S_{pad}} = 3.56 \cdot ksf$

$Bearing\_Check := if\left(Bearing \leq BC_{soil}, \text{"OK"}, \text{"No Good"}\right)$

Bearing_Check = "OK"

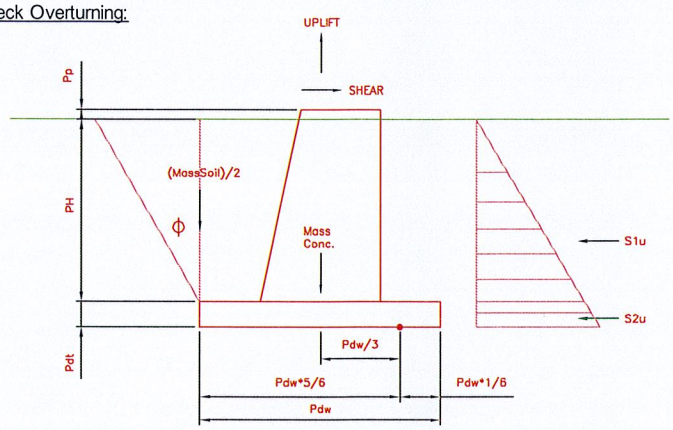
Check Sliding:

Sliding Resistance = $S_R := \mu \cdot (Mass_{Conc} + Comp) = 124.425 \cdot kips$

$Sliding\_Check := if\left(Shear \leq S_R, \text{"OK"}, \text{"No Good"}\right)$

Sliding_Check = "OK"

Check Overturning:



Passive Pressure (on pier) =

$P1_{top} := K_p \cdot \gamma s \cdot 0 = 0 \cdot ksf$

$P1_{bot} := K_p \cdot \gamma s \cdot (P_H - P_P) = 2.7 \cdot ksf$

$P1_{ave} := \frac{P1_{top} + P1_{bot}}{2} = 1.35 \cdot ksf$

$A_1 := P_H \cdot \left[\frac{(P_{w1} + P_{w2})}{2}\right] = 47.5 ft^2$

Ultimate Shear =

$S1_u := P1_{ave} \cdot A_1 = 64.125 \cdot kip$

Passive Pressure (on pad) =

$P2_{top} := K_p \cdot \gamma s \cdot (P_H - P_P) = 2.7 \cdot ksf$

$P2_{bot} := K_p \cdot \gamma s \cdot (P_H + Pd_t - P_P) = 3.075 \cdot ksf$

$P2_{ave} := \frac{P2_{top} + P2_{bot}}{2} = 2.888 \cdot ksf$

$A_2 := Pd_t \cdot Pd_w = 15 ft^2$

Ultimate Shear =

$S2_u := P2_{ave} \cdot A_2 = 43.313 \cdot kip$

Overturning Moment =

$OM := Uplift \cdot \frac{Pd_w}{3} + Shear \cdot (P_H + Pd_t) = 1303.8 \cdot k \cdot ft$

Resisting Moment =

$$RM := Mass_{Conc} \cdot \left(\frac{Pd_w}{3}\right) + \frac{Mass_{Soil}}{2} \cdot \left(\frac{5 \cdot Pd_w}{6}\right) + S1_u \cdot \left[Pd_t + \frac{1}{3} \cdot (P_H - P_P)\right] + S2_u \cdot \left(\frac{1}{3} \cdot Pd_t\right) = 1793.8 \cdot k \cdot ft$$

$ActualFS := \frac{RM}{OM} = 1.38$

$Overturning\_Check := if\left(\frac{RM}{OM} \geq F_S, \text{"OK"}, \text{"No Good"}\right)$

Overturning_Check = "OK"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CT1209	DATE:	3/19/2012 15:10	RF DESIGN ENG:	Evan Thibodeau	RF PERF ENG:
ISSUE:	Preliminary	Approved? (Y/N)	N	RF DESIGN PHONE:	(603) 320-8556	RF PERF PHONE:
REVISION:	V01	RF MANAGER:	Walter Saddig	RF DESIGN EMAIL:	et2267@att.com	RF PERF EMAIL:
INITIATIVE / PROJECT:	LTE Wave 3 Prelim					TRIDENT:
						GSM FREQUENCY:
						UMTS FREQUENCY:
						LTE FREQUENCY:
						I-PLAN JOB # 1:
						I-PLAN JOB # 2:
						I-PLAN JOB # 3:
						I-PLAN JOB # 4:

Section 2 - LOCATION INFORMATION

USID:	59439	FA LOCATION CODE:	10035390	LOCATION NAME:	Manchester-Olcott	ORACLE PRJT # 1:
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CT	ORACLE PRJT # 2:
ADDRESS:	190 OLCOTT STREET	CITY:	MANCHESTER	STATE:	CT	ORACLE PRJT # 3:
ZIP CODE:		COUNTY:	HARTFORD	MSA/RSA:	32	ORACLE PRJT # 4:
LATITUDE (D-M-S):	41° 46' 20.57"	LONGITUDE (D-M-S):	-72° 33' 23.21"	LAT (DEC. DEG.):	41.772381	SEARCH RING NAME:
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	TBD					SEARCH RING ID:
						BTA:
						LONG (DEC. DEG.):
						BORDER CELL WITH CONT
						AM STUDY REQ'D (Y/N):
						FREQ COORD:

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED:	TBD	CGSA LOSS:	TBD	PCS REDUCED - UPS ZIP:	TBD
CGSA - MINOR FILING NEEDED:	TBD	CGSA EXT AGMT NEEDED:	TBD	PCS POPS REDUCED:	TBD
CGSA - MAJOR FILING NEEDED:	TBD	CGSA SCORECARD UPDATED:	TBD		

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	TBD	GROUND ELEVATION (ft):	89'	STRUCTURE TYPE:	Power Pole Mount	MKT LOCATION 850 MHZ CALL SIGN(S):
ADDITIONAL REGULATORY?:	TBD	HEIGHT OVERALL (ft):	TBD	FCC ASR NUMBER:	TBD	MKT LOCATION 1900 MHZ CALL SIGN(S):
SUB-LEASE RIGHTS?:	TBD	STRUCTURE HEIGHT (ft):	TBD			MKT LOCATION 700 MHZ CALL SIGN(S):
LIGHTING TYPE:	TBD					MKT LOCATION AWS MHZ CALL SIGN(S):

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:
ALPHA			TBD	TBD	TBD	TBD
BETA			TBD	TBD	TBD	TBD
GAMMA			TBD	TBD	TBD	TBD
DELTA						
EPSILON						
PSI						

Section 6 - RBS GENERAL INFORMATION

4-DIGIT SITE ID:	1209	COW OR TOY?:	NO	CELLULAR NETWORK:	GO
CELL SITE TYPE:	SECTORIZED	SITE TYPE:	MACRO	OPS DISTRICT:	CT-N
BTS LOCATION ID:	TBD	ORIGINATING CO:	ATT	RF DISTRICT:	Middle

Section 7 - RBS SPECIFIC INFORMATION

	GSM RBSs	UMTS 1ST CARRIER RBSs	UMTS 2ND CARRIER RBSs	UMTS 3RD CARRIER RBSs	UMTS 4TH CARRIER RBSs
MSC	MCT01	TBD	TBD	N/A	
BSC/RNC	BCT09	MDTWCTNIRNC001	MDTWCTNIRNC001	N/A	
LAC	05009	5997	5997	N/A	
RAC	TBD	255	255	N/A	
EQUIPMENT VENDOR	NOKIA	ERICSSON	ERICSSON	N/A	
EQUIPMENT TYPE	TBD	RBS3206	RBS3206	N/A	
LOCATION	TBD	TBD	TBD	N/A	
CABINET LOCATION					

Section 8 - RBS INDIVIDUAL INFORMATION

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
CELL ID/BCF	184D1209	184P1209	CTV1209	CTV1209	N/A	N/A	N/A	N/A		
CTS COMMON ID	184D1209	184P1209	CTV1209	CTU1209	N/A	N/A	N/A	N/A		

Section 9 - SOFT SECTOR ID

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	184G12091	184P12091	CTV12091	CTU12097	N/A	N/A	N/A	N/A		
BETA	184G12092	184P12092	CTV12092	CTU12098	N/A	N/A	N/A	N/A		
GAMMA	184G12093	184P12093	CTV12093	CTU12099	N/A	N/A	N/A	N/A		
DELTA										
EPSILON										
PSI										

Section 10 - CID/SAC

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	12091	12091	12091	12097	N/A	N/A	N/A	N/A		
BETA	12092	12092	12092	12098	N/A	N/A	N/A	N/A		
GAMMA	12093	12093	12093	12099	N/A	N/A	N/A	N/A		
DELTA										
EPSILON										
PSI										

Section 11 - CURRENT RADIO COUNTS (Existing)

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)	4	2	6	6	N/A	N/A	N/A	N/A		
BETA	4	2	6	6	N/A	N/A	N/A	N/A		
GAMMA	4	2	6	6	N/A	N/A	N/A	N/A		
DELTA										
EPSILON										
PSI										

Section 12 - CURRENT BASE BAND CONFIGURATION (Existing)

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet
# T1s	3	TBD	TBD	TBD	
LINK PROFILE	TBD	TBD	TBD	TBD	
RF Combining					
Fiber or Ethernet?	TBD	TBD	TBD	TBD	
Tx Board Model					
Tx Board QTY					
RAX/ECU Board Model					
RAX/ECU Board QTY					
BBU Board Model					
BBU Board QTY					
RRU - Type(Qty-Model)					
Fiber Jumper					
DC Cable					
DC/Fiber Dem. Box					
Bundled Fiber Cable					
Bundled DC Cable					

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS
ALPHA (OR OMNI)										
BETA										
GAMMA										
DELTA										
EPSILON										
PSI										

Section 14 - NEW/PROPOSED BASE BAND CONFIGURATION

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet
# T1s					
LINK PROFILE					
RF Combining					
Fiber or Ethernet?					
Tx Board Model					
Tx Board QTY					
RAX/ECU Board Model					
RAX/ECU Board QTY					
BBU Board Model					
BBU Board QTY					
RRU - Type(Qty-Model)					
Fiber Jumper					
DC Cable					
DC/Fiber Dem. Box					
Bundled Fiber Cable					
Bundled DC Cable					

Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI)

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx	TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850	GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A	N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS	1 5/8" - RFS
Feeder Length (feet)	195 '	195 '					195 '	195 '
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	XDUO1416						XDUO1416	
ANTENNA VENDOR	CSS ANTENNA INC, (410)344-1010						CSS ANTENNA INC, (410)344-1010	
ANTENNA SIZE (H x W x D)	50.5 x 14.6 x 7.1						50.5 x 14.6 x 7.1	
ANTENNA WEIGHT	23						23	
ANTENNA GAIN								
AZIMUTH	143 °						143 °	
RADIATION CENTER (feet)	165 '						165 '	
ANTENNA TIP HEIGHT	167 '						167 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 °	0 °					4 °	0 °
MECHANICAL DOWNTILT	0 °						0 °	
FEEDER AMOUNT	2						2	
Antenna RET Motor (QTY/MODEL)	N/A						N/A	
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)	N/A						N/A	
TMA/LNA (TYPE/MODEL)	2 / ADC / CG-1900W800-FULL-DIN						2 / ADC / CG-1900W800-FULL-DIN	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	ADC BiasT						ADC BiasT	
PDU FOR TMAS (QTY/MODEL) usually per site	ADC / CG-PDU-SmPWR						ADC / CG-PDU-SmPWR	
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901						0 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)	N/A						N/A	
DUPLEXER (QTY/MODEL)	N/A						N/A	
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A
Additional Component1	ADC						ADC	
Additional Component2	N/A						N/A	
Additional Component3	N/A						N/A	
MAGNETIC DECLINATION	-14 °						-14 °	
HATCHPLATE POWER (Watts)	TBD	TBD					TBD	TBD
ERP (Watts)	TBD	TBD					TBD	TBD
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx	TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850	GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A	N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS	1 5/8" - RFS
Feeder Length (feet)	195 '	195 '					195 '	195 '
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	XDUO1416						XDUO1416	
ANTENNA VENDOR	CSS ANTENNA INC, (410)344-1010						CSS ANTENNA INC, (410)344-1010	
ANTENNA SIZE (H x W x D)	50.5 x 14.6 x 7.1						50.5 x 14.6 x 7.1	
ANTENNA WEIGHT	23						23	
ANTENNA GAIN								
AZIMUTH	263 °						263 °	
RADIATION CENTER (feet)	165 '						165 '	
ANTENNA TIP HEIGHT	167 '						167 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 °	0 °					4 °	0 °
MECHANICAL DOWNTILT	8 °						8 °	
FEEDER AMOUNT	2						2	
Antenna RET Motor (QTY/MODEL)	N/A						N/A	
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)	N/A						N/A	
TMA/LNA (TYPE/MODEL)	2 / ADC / CG-1900W800-FULL-DIN						2 / ADC / CG-1900W800-FULL-DIN	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	ADC BiasT						ADC BiasT	
PDU FOR TMAS (QTY/MODEL) usually per site	ADC / CG-PDU-SmPWR						ADC / CG-PDU-SmPWR	
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901						0 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)	N/A						N/A	
DUPLEXER (QTY/MODEL)	N/A						N/A	
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A
Additional Component1	ADC						ADC	
Additional Component2	N/A						N/A	
Additional Component3								
MAGNETIC DECLINATION	-14 °						-14 °	
HATCHPLATE POWER (Watts)	TBD	TBD					TBD	TBD
ERP (Watts)	TBD	TBD					TBD	TBD
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx	TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850	GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A	N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS	1 5/8" - RFS
Feeder Length (feet)	195 '	195 '					195 '	195 '
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	XDUO1416						XDUO1416	
ANTENNA VENDOR	CSS ANTENNA INC, (410)344-1010						CSS ANTENNA INC, (410)344-1010	
ANTENNA SIZE (H x W x D)	50.5 x 14.6 x 7.1						50.5 x 14.6 x 7.1	
ANTENNA WEIGHT	23						23	
ANTENNA GAIN								
AZIMUTH	23 °						23 °	
RADIATION CENTER (feet)	165 '						165 '	
ANTENNA TIP HEIGHT	167 '						167 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 °	0 °					4 °	0 °
MECHANICAL DOWNTILT	8 °						8 °	
FEEDER AMOUNT	2						2	
Antenna RET Motor (QTY/MODEL)	N/A						N/A	
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)	N/A						N/A	
TMA/LNA (TYPE/MODEL)	2 / ADC / CG-1900W800-FULL-DIN						2 / ADC / CG-1900W800-FULL-DIN	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	ADC BiasT						ADC BiasT	
PDU FOR TMAS (QTY/MODEL) usually per site	ADC / CG-PDU-SmPWR						ADC / CG-PDU-SmPWR	
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901						0 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)	N/A						N/A	
DUPLEXER (QTY/MODEL)	N/A						N/A	
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A
Additional Component1	ADC						ADC	
Additional Component2	N/A						N/A	
Additional Component3								
MAGNETIC DECLINATION	-14 °						-14 °	
HATCHPLATE POWER (Watts)	TBD	TBD					TBD	TBD
ERP (Watts)	TBD	TBD					TBD	TBD
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15D - CURRENT SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - ALPHA (OR OMNI)

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx			TxRx-Rx	N/A	TxRx-TxRx	TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900			LTE / 700	N/A	GSM / 850	GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A			BOTTOM	BOTTOM	N/A	N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS	1 5/8" - RFS
Feeder Length (feet)	195 '	195 '					195 '	195 '
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				AM-X-CD-16-65-00T-RET		AM-X-CD-16-65-00T-RET	
ANTENNA VENDOR	KMW				KMW		KMW	
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9				72.0 x 11.8 x 5.9		72.0 x 11.8 x 5.9	
ANTENNA WEIGHT	48.5				48.5		48.5	
ANTENNA GAIN	15.5 dBi	17.1 dBi					15.5 dBi	17.1 dBi
AZIMUTH	180 °				60 °		180 °	
RADIATION CENTER (feet)	165 '				165 '		165 '	
ANTENNA TIP HEIGHT	168 '				168 '		168 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 °	0 °			TBD	TBD	4 °	0 °
MECHANICAL DOWNTILT	0 °				0 °		0 °	
FEEDER AMOUNT	2				1 Optic Fiber & 2 DC cables		2	
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment				N/A / KMW / Built-in RET Equipment		N/A / KMW / Built-in RET Equipment	
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)	N/A						N/A	
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A				1 / CCI / DTMABP7819VG12A		1 / CCI / DTMABP7819VG12A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A	
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA)						LGP 12104 (1900 AND 850 Bypass TMA)	
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901				0 + 1 / CM1007-DBPXBC-003		0 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)	N/A						N/A	
DUPLEXER (QTY/MODEL)	N/A						N/A	
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A
Additional Component1	N/A						N/A	
Additional Component2	N/A						N/A	
Additional Component3	N/A						N/A	
MAGNETIC DECLINATION	-14 °				-14 °		-14 °	
HATCHPLATE POWER (Watts)	TBD	TBD					TBD	TBD
ERP (Watts)	TBD	TBD					TBD	TBD
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx			TxRx-Rx	N/A	TxRx-TxRx	TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900			LTE / 700	N/A	GSM / 850	GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A			BOTTOM	BOTTOM	N/A	N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS	1 5/8" - RFS
Feeder Length (feet)	195 '	195 '					195 '	195 '
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				AM-X-CD-16-65-00T-RET		AM-X-CD-16-65-00T-RET	
ANTENNA VENDOR	KMW				KMW		KMW	
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9				72.0 x 11.8 x 5.9		72.0 x 11.8 x 5.9	
ANTENNA WEIGHT	48.5				48.5		48.5	
ANTENNA GAIN	15.5 dBi	17.1 dBi					15.5 dBi	17.1 dBi
AZIMUTH	310 °				180 °		310 °	
RADIATION CENTER (feet)	165 '				165 '		165 '	
ANTENNA TIP HEIGHT	168 '				168 '		168 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 °	0 °			TBD	TBD	4 °	0 °
MECHANICAL DOWNTILT	8 °				0 °		8 °	
FEEDER AMOUNT	2				1 Optic Fiber & 2 DC cables		2	
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment				N/A / KMW / Built-in RET Equipment		N/A / KMW / Built-in RET Equipment	
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)	N/A						N/A	
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A				1 / CCI / DTMABP7819VG12A		1 / CCI / DTMABP7819VG12A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A	
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA)						LGP 12104 (1900 AND 850 Bypass TMA)	
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901				0 + 1 / CM1007-DBPXBC-003		0 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)	N/A						N/A	
DUPLEXER (QTY/MODEL)	N/A						N/A	
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A
Additional Component1	N/A						N/A	
Additional Component2	N/A						N/A	
Additional Component3								
MAGNETIC DECLINATION	-14 °				-14 °		-14 °	
HATCHPLATE POWER (Watts)	TBD	TBD					TBD	TBD
ERP (Watts)	TBD	TBD					TBD	TBD
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx			TxRx-Rx	N/A	TxRx-TxRx	TxRx-TxRx
TECHNOLOGY	UMTS / 850	UMTS / 1900			LTE / 700	N/A	GSM / 850	GSM / 1900
RRH LOCATION (Top/Bottom/None)	N/A	N/A			BOTTOM	BOTTOM	N/A	N/A
FEEDERS TYPE	1 5/8" - RFS	1 5/8" - RFS					1 5/8" - RFS	1 5/8" - RFS
Feeder Length (feet)	195 '	195 '					195 '	195 '
ANTENNA ATOLL								
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET				AM-X-CD-16-65-00T-RET		AM-X-CD-16-65-00T-RET	
ANTENNA VENDOR	KMW				KMW		KMW	
ANTENNA SIZE (H x W x D)	72.0 x 11.8 x 5.9				72.0 x 11.8 x 5.9		72.0 x 11.8 x 5.9	
ANTENNA WEIGHT	48.5				48.5		48.5	
ANTENNA GAIN	15.5 dBi	17.1 dBi					15.5 dBi	17.1 dBi
AZIMUTH	60 °				310 °		60 °	
RADIATION CENTER (feet)	165 '				165 '		165 '	
ANTENNA TIP HEIGHT	168 '				168 '		168 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 °	0 °			TBD	TBD	4 °	0 °
MECHANICAL DOWNTILT	8 °				0 °		8 °	
FEEDER AMOUNT	2				1 Optic Fiber & 2 DC cables		2	
Antenna RET Motor (QTY/MODEL)	N/A / KMW / Built-in RET Equipment				N/A / KMW / Built-in RET Equipment		N/A / KMW / Built-in RET Equipment	
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)	N/A						N/A	
TMA/LNA (TYPE/MODEL)	1 / CCI / DTMABP7819VG12A				1 / CCI / DTMABP7819VG12A		1 / CCI / DTMABP7819VG12A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A	
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA)						LGP 12104 (1900 AND 850 Bypass TMA)	
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901				0 + 1 / CM1007-DBPXBC-003		0 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)	N/A						N/A	
DUPLEXER (QTY/MODEL)	N/A						N/A	
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A
Additional Component1	N/A						N/A	
Additional Component2	N/A						N/A	
Additional Component3								
MAGNETIC DECLINATION	-14 °				-14 °		-14 °	
HATCHPLATE POWER (Watts)	TBD	TBD					TBD	TBD
ERP (Watts)	TBD	TBD					TBD	TBD
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16D - NEW/PROPOSED SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16E - NEW/PROPOSED SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

Section 16F - NEW/PROPOSED SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?								
TECHNOLOGY								
RRH LOCATION (Top/Bottom/None)								
FEEDERS TYPE								
Feeder Length (feet)								
ANTENNA ATOLL								
ANTENNA MAKE - MODEL								
ANTENNA VENDOR								
ANTENNA SIZE (H x W x D)								
ANTENNA WEIGHT								
ANTENNA GAIN								
AZIMUTH								
RADIATION CENTER (feet)								
ANTENNA TIP HEIGHT								
ELECTRICAL TILT (700/850/1900/AWS)								
MECHANICAL DOWNTILT								
FEEDER AMOUNT								
Antenna RET Motor (QTY/MODEL)								
Antenna RET Splitter (QTY/MODEL)								
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)								
Antenna RET Surge Arrestor (QTY/MODEL)								
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site								
DC BLOCK (QTY/MODEL)								
TMA/LNA (TYPE/MODEL)								
CURRENT INJECTORS FOR TMA (QTY/MODEL)								
PDU FOR TMAS (QTY/MODEL) usually per site								
SURGE ARRESTOR (QTY/MODEL)								
DIPLEXER (QTY/MODEL)								
HYBRID COMBINER (QTY/MODEL)								
DUPLEXER (QTY/MODEL)								
FILTER (QTY/MODEL)								
RXAIT KIT MODULE?								
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)								
SCPA/MCPA MODULE?								
Additional Component1								
Additional Component2								
Additional Component3								
MAGNETIC DECLINATION								
HATCHPLATE POWER (Watts)								
ERP (Watts)								
Local Market Note1								
Local Market Note2								
Local Market Note3								

AM-X-CD-16-65-00T-RET(6' 65˚ Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65˚ / V12˚

1710 ~ 2170MHz, X-pol., H65˚ / V6.0˚

Electrical Specification

Frequency Range	698~894MHz	1710~2170MHz
Impedance	50Ω	
Polarization	Dual, Slant ±45˚	
Gain	15.5dBi / 13.35dBd @ 698-806MHz 16.0dBi / 13.85dBd @ 824-894MHz	17.3dBi / 15.15dBd @ 1710-1755MHz 17.4dBi / 15.25dBd @ 1850-1900MHz 17.1dBi / 14.95dBd @ 2110-2155MHz
Beamwidth – Horizontal	65˚ @ 698-806MHz 63˚ @ 824-894MHz	65˚ @ 1710-1755MHz 67˚ @ 1850-1900MHz 69˚ @ 2110-2155MHz
Beamwidth – Vertical	12.3˚ @ 698-806MHz 11.5˚ @ 824-894MHz	6.5˚ @ 1710-1755MHz 6.0˚ @ 1850-1900MHz 5.7˚ @ 2110-2155MHz
VSWR	≤1.5:1	
Front-to-Back Ratio	≥27 dB	
Electrical Downtilt Range	2˚ ~ 16˚	0˚ ~ 10˚
Isolation Between Ports	≥30 dB	
Isolation Between Ports of Different Frequency Elements	≥35 dB	
Cross Pole Discrimination	10.0 dB @ ±60˚ 15.0 dBi @ 0˚	
First Upper Side Lobe Suppression	16dB	
Side Lobe Suppression	> 16 dB @ 0-6˚ Tilt > 18 dB @ 7-12˚ Tilt (Up to 10˚ from Boresight)	> 16 dB @ 0-6˚ Tilt > 18 dB @ 7-10˚ Tilt (Up to 10˚ from Boresight)
Passive Intermodulation	≤ -150 dBc @ 2x20w	
Input Maximum CW Power	500 W	300 W
Environmental Compliance	IP65 for Radome IP67 for Connectors	
RET Motor Configuration	Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0	AISG 1.1 and 2.0	

Mechanical Specification

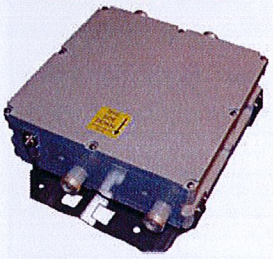
Dimension (W×D×H)	11.8×5.9×72 inches (300×150×1829mm)
Weight (Without clamp)	48.5 lbs (22.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	1891 N

300

Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information



CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Diplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Model
DTMABP7819VG12A

Contents:

General Info and Technical Description	1
Electrical & Mechanical Specs (AISG TMA)	2
Block Diagram & Outline Drawing (AISG TMA)	3

Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

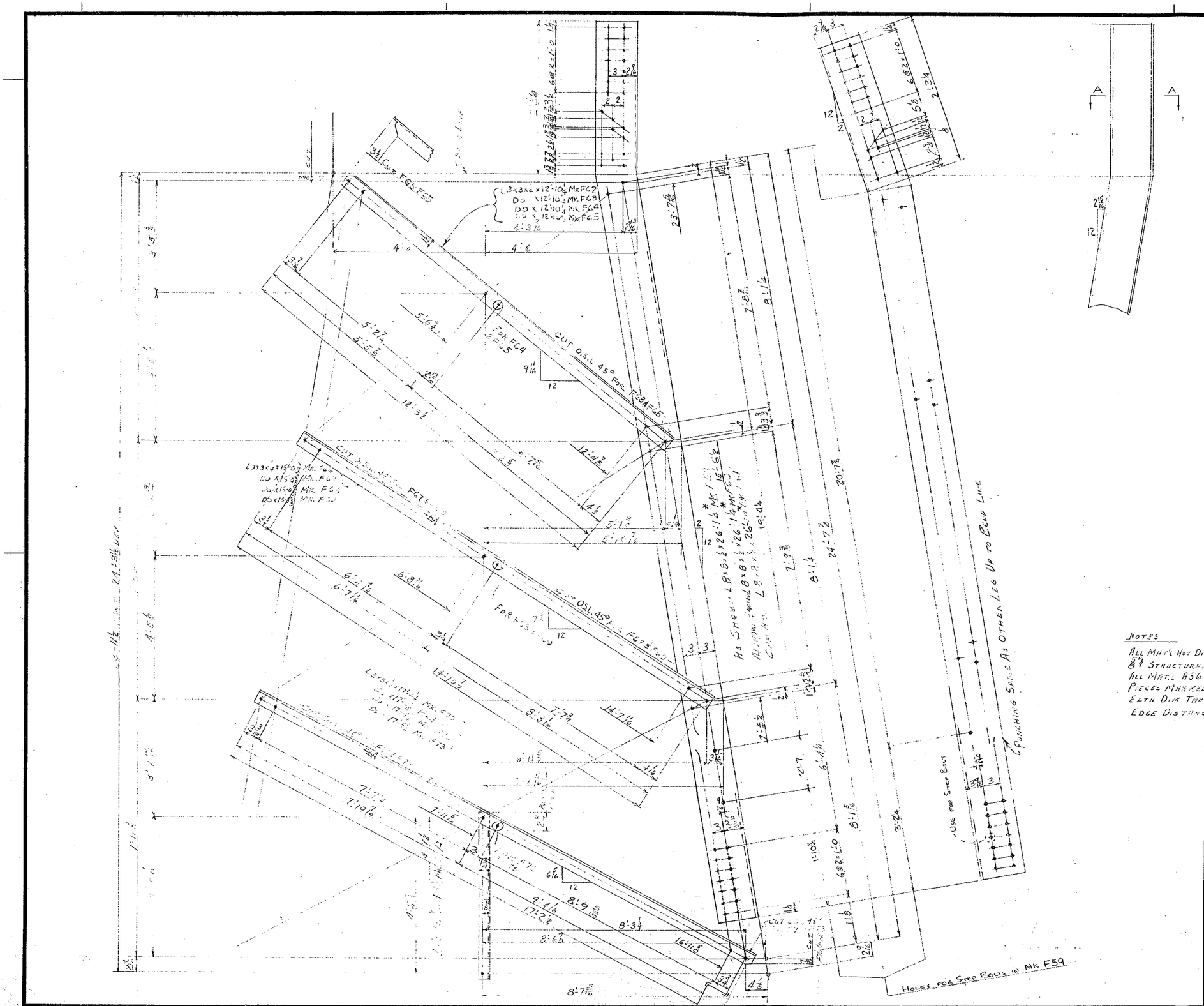
The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are diplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

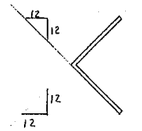
An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications

Description	Typical Specifications
Electrical Specifications	
700 Band & Cellular Frequency Range	698 to 894 MHz
PCS Receive Frequency Range	1850 – 1910 MHz
PCS Transmit Frequency Range	1930 - 1990 MHz
PCS Amplifier Gain	6 to 12 dB Adjustable in 0.25 dB steps via AISG
PCS Gain Variation	±1.0 dB
PCS System Noise Figure	1.4 dB (@ +25°C),1.6 dB (@ +65°C), At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C)
PCS Input Third Order Intercept Point	+12 dBm Min @ Max. Gain
Input/Output Return Loss	18 dB Min. all ports, 15 dB Min. Bypass Mode
Insertion Loss	
700 Band & Cellular Passband	< 0.2 dB, 0.1 dB typical
PCS Transmit Passband	0.4 dB Typical
PCS Transmit Passband Ripple	±0.2 dB
PCS Bypass Mode, Rx Passband	1.6 dB (@ +25°C),1.8 dB (@ +65°C), At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C)
PCS Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
700 Band & Cellular Path Rejection	70 dB @ 1850 - 1990 MHz
PCS Path Rejection	80 dB @ 698 - 894 MHz
Continuous Average Power	200 Watts max
Peak Envelope Power	2 kW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-112 dBm Min. (2 x +43 dBm tones)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	≤ 2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female (Long Neck) x 6, AISG x 1
Dimensions (Body Only)	10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)
Dimensions (with Bracket)	14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)
Weight (w/o Bracket)	19.18 Lbs. (8.7 Kg)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40° C to +65°C
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
Enclosure	IP65 (Unit Body), IP68 (Connector)
MTBF	>500,000 hours

All specifications are subject to change. The latest specifications are available at www.cciproducts.com





REQD FOR ONE TWR BODY		
NO REQD	DESCRIPTION	MARK
* 1	POST L	F59
* 1	"	F60
* 2	" OPP HD	F61
3	DIAGONALS	F62
3	DO	F63
1	DO	F64
1	DO	F65
3	DO	F66
3	DO	F67
1	DO	F68
1	DO	F69
3	DO	F70
3	DO	F71
1	DO	F72
1	DO	F73
4	HANGERS	F74

NOTES

ALL MAT'L HOT DIP GALV.
5/8" STRUCTURAL BOLTS ASTM -A394 11/16" HOLES
ALL MAT'L A36 EXCEPT PIECES MARKED THUS *
PIECES MARKED THUS * TO BE V50 STEEL
ELTN DIM TAKEN FROM END OF STEEL
EDGE DISTANCE 7/8" UNLESS NOTED

CONTRACT	ORDER No.	DATE
L539	38015	~
L505	B11000	~

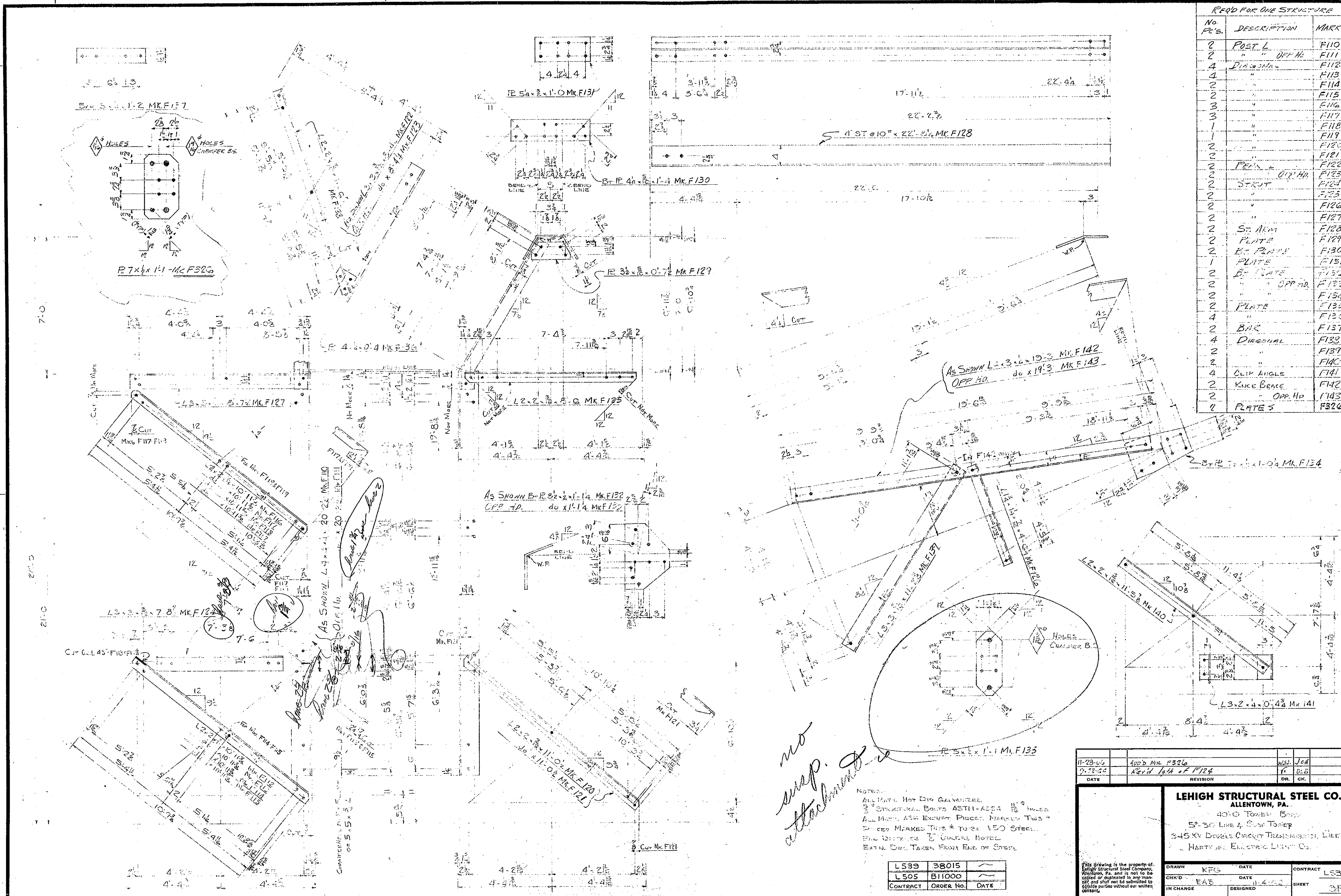
DATE	REVISION	DR.	CK.

LEHIGH STRUCTURAL STEEL CO.
ALLENTOWN, PA.

5°30 LINE 4 SUSPENSION TOWER
345 KV DOUBLE CIRCUIT TRANSMISSION LINE
HARTFORD ELECTRIC LIGHT CO.

DRAWN PDC	DATE 9/19/65	CONTRACT L539	
CHK'D E.A.K.	DATE 11-1-65	SHEET 6F	
IN CHARGE	DESIGNED		

235



No. Pc's.	Description	Mark
2	Post L	F110
2	" " Opp Hd	F111
4	Diagonal	F112
4	"	F113
2	"	F114
2	"	F115
3	"	F116
3	"	F117
1	"	F118
1	"	F119
2	"	F120
2	"	F121
2	Peak L	F122
2	" " Opp Hd	F123
2	Strut	F124
2	"	F125
2	"	F126
2	"	F127
2	St. Arm	F128
2	Plate	F129
2	Bt. Plate	F130
1	Plate	F131
2	Bt. Plate	F132
2	" " Opp Hd	F133
2	" "	F134
2	Plate	F135
4	"	F136
2	Bar	F137
4	Diagonal	F138
2	"	F139
2	"	F140
4	Clip Angle	F141
2	Knee Brace	F142
2	" Opp. Hd	F143
2	Plates	F326

Caption above table: Req'd for One Structure

Notes:
All Mat'l Hot Dip Galvanized.
3/4" Structural Bolts ASTM-A394 13/16" Holes
All Mat'l A36 Except Pieces Marked Thus *
Pieces Marked Thus * to be 150 Steel.
Fill Distance 7/8" Unless Noted.
Extn. Dim. Taken From End of Steel.

Contract	Order No.	Date
L539	38015	~
L505	B11000	~

Date		Revision	Dr.	Ck.
11-28-66		Add'd Mk F326	WSL	JCH
9-22-66		Rev'd lgth of F124		DLB

LEHIGH STRUCTURAL STEEL CO.
ALLENTOWN, PA.
40'-0 Tower Body
5°-30' Line & Susp Tower
345 KV Double Circuit Transmission Line
Hartford Electric Light Co.

This drawing is the property of Lehigh Structural Steel Company, Allentown, Pa. and is not to be copied or duplicated in any manner and shall not be submitted to outside parties without our written consent.

Drawn: KFG Date:
Chk'd: EAB Date: 11-4-6?
In Charge: Designed:
Contract: L539
Sheet: 3F

2350

WIRELESS COMMUNICATIONS FACILITY

CT1209
MANCHESTER - OLCOTT
CL&P STRUCTURE 20003
190 OLCOTT STREET
MANCHESTER, CT 06040

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2005 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. 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 WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. 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.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

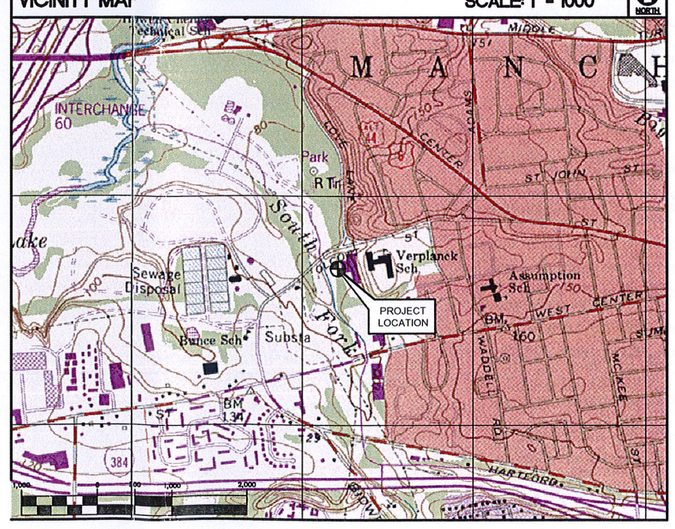
FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

TO: 190 OLCOTT STREET
MANCHESTER, CT 06040

1.	Depart Enterprise Dr toward Capitol Blvd	0.4 mi
2.	Turn left onto Capitol Blvd	0.2 mi
3.	Turn left onto West St	0.2 mi
4.	Take ramp left for I-91 North	7.8 mi
5.	At exit 29, take ramp right for CT-15 North / US-5 North toward E. Hartford / Boston	0.6 mi
6.	Keep straight onto CT-15 North	1.5 mi
7.	Keep straight onto I-84 East / US-6 East	2.9 mi
8.	At exit 60, take ramp right for US-44 / US-6 toward Manchester	0.4 mi
9.	Turn right onto US-6 / US-44 / Middle Tpke W	0.3 mi
10.	Keep right to stay on US-6 East / US-44 East / Center St	0.3 mi
11.	Turn right onto Love Ln	0.5 mi
12.	Turn right onto Olcott St	95 ft
	Arrive at 190 Olcott St, Manchester, CT 06040	

VICINITY MAP

SCALE: 1" = 1000'



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK GENERALLY CONSISTS OF THE REPLACEMENT OF ALL (6) EXISTING PANEL ANTENNAS AND THE INSTALLATION OF ONE (1) LTE ANTENNA PER SECTOR FOR A TOTAL OF (3) LTE ANTENNAS & (9) TOTAL ANTENNAS MOUNTED ON THE EXISTING AT&T LOW-PROFILE PLATFORM. AN LTE BASEBAND EQUIPMENT UNIT (RBS) WILL BE INSTALLED WITHIN THE EXISTING AT&T EQUIPMENT SHELTER.
2. ADDITIONALLY, (2) REMOTE RADIO UNITS (RRUs) PER SECTOR WILL BE INSTALLED. SURGE ARRESTORS WILL BE INSTALLED AT BOTH AT&T RRU AND EQUIPMENT LOCATIONS. REFER TO THESE ACCOMPANYING DRAWINGS FOR FURTHER INFORMATION.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT1209
AT&T SITE NAME:	MANCHESTER – OLCOTT
SITE ADDRESS:	190 OLCOTT STREET MANCHESTER, CT 06040
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-46'-20.57"N LONGITUDE: 72°-33'-23.2"W GROUND ELEVATION: ±115'AMSL

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
N-1	NOTES AND SPECIFICATIONS	1
C-1	PLANS, ELEVATION AND DETAIL	1
C-2	LTE EQUIPMENT DETAILS	1
E-1	ELECTRICAL DETAILS AND NOTES	1
E-2	ELECTRICAL DETAILS	1

DESIGNED BY:			FLO
DRAWN BY:			DEB
CHK'D BY:			CFC
1	10/8/12	HMR	DEB	CONSTRUCTION
0	5/30/12	TJL	DEB	CONSTRUCTION – CLIENT REVIEW
REV.	DATE	DRAWN BY	CHK'D BY	

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT
CARLO F. CENTOFANTI
No. 18394
LICENSED PROFESSIONAL ENGINEER

at&t

NEXLINK WIRELESS SERVICES

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

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT1209
MANCHESTER - OLCOTT
CL&P STRUCTURE NO. 20003
190 OLCOTT STREET
MANCHESTER, CT 06040

DATE:	10/3/12
SCALE:	AS NOTED
JOB NO.	11118.C069

TITLE SHEET

T-1

Sheet No. 1 of 6

STRUCTURAL SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD (PCS MAST): BASIC WIND SPEED (V) = 85 MPH (BASED ON EIA/TIA-222-F-96 AND NU MAST DESIGN CRITERIA EXCEPTION 1.
- WIND LOAD (UTILITY POLE & FOUNDATION): BASIC WIND SPEED (V) = 110 MPH (3 SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.
- BASIC WIND SPEED (OTHER STRUCTURE): 110 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

GENERAL NOTES

1. 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.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   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 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. 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.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. 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.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. 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 E70XX 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" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
11. 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.
12. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
13. 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.
14. CONNECTIONS SHALL CONFORM TO ALL REQUIREMENTS OF THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR SHELTERS", LATEST EDITION, AND THE "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", LATEST EDITION.
15. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
16. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
17. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
18. FABRICATE BEAMS WITH MILL CAMBER UP.
19. 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.
20. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
21. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
22. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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DRAWN BY:	FLO
CHK'D BY:	CFC

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1	10/9/12	HMR	DEB	CONSTRUCTION
0	5/30/12	TJL	DEB	CONSTRUCTION - CLIENT REVIEW

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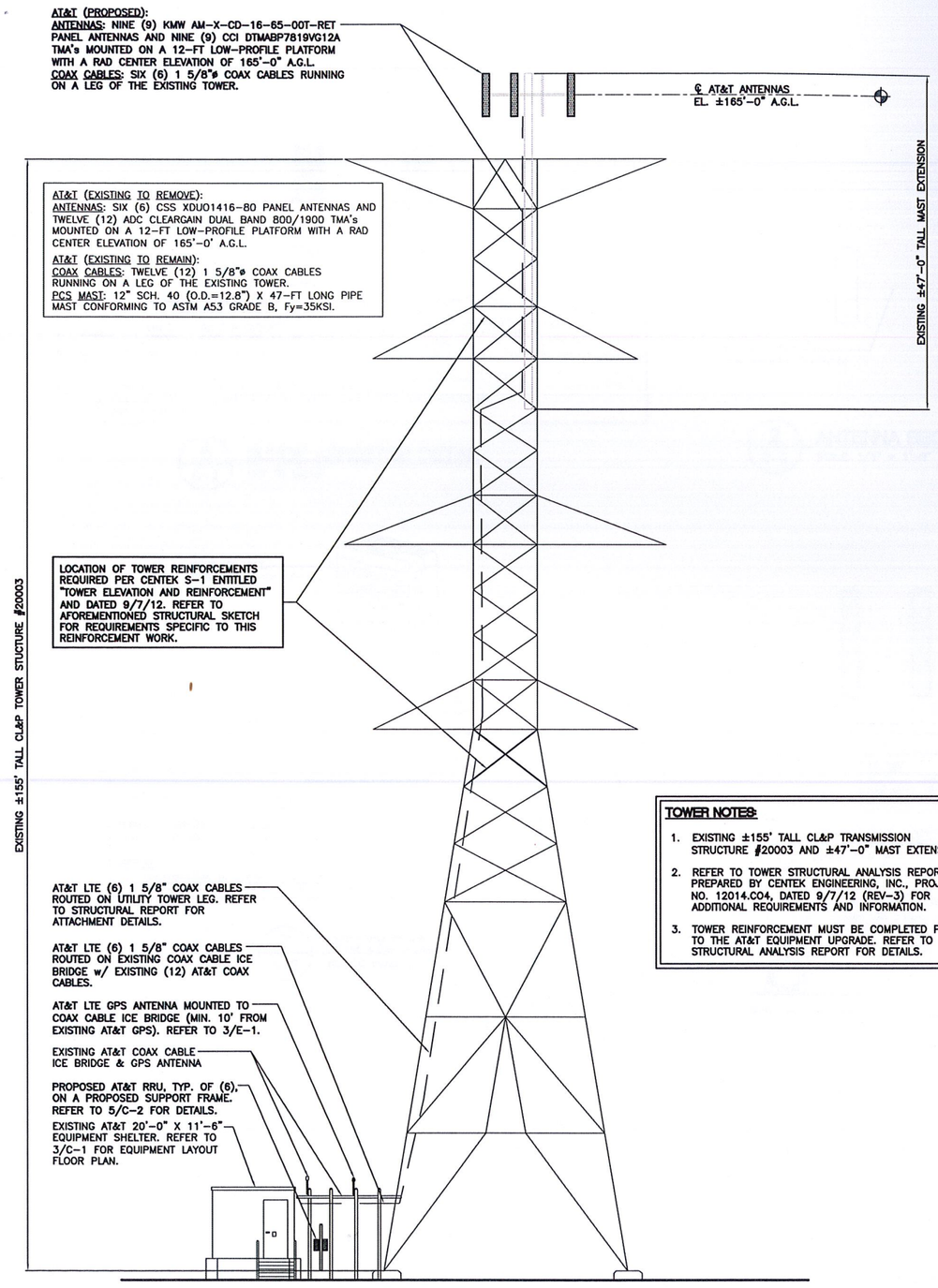
NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 6



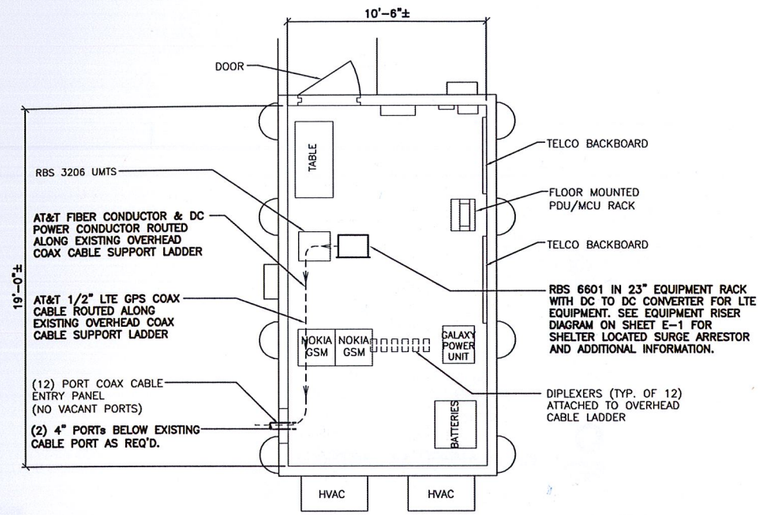
TOWER NOTES:

1. EXISTING ±155' TALL CL&P TRANSMISSION STRUCTURE #20003 AND ±47'-0" MAST EXTENSION.
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 12014.C04, DATED 9/7/12 (REV-3) FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
3. TOWER REINFORCEMENT MUST BE COMPLETED PRIOR TO THE AT&T EQUIPMENT UPGRADE. REFER TO STRUCTURAL ANALYSIS REPORT FOR DETAILS.

2 / C-1 NORTH ELEVATION

SCALE: 1" = 10'-0"

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

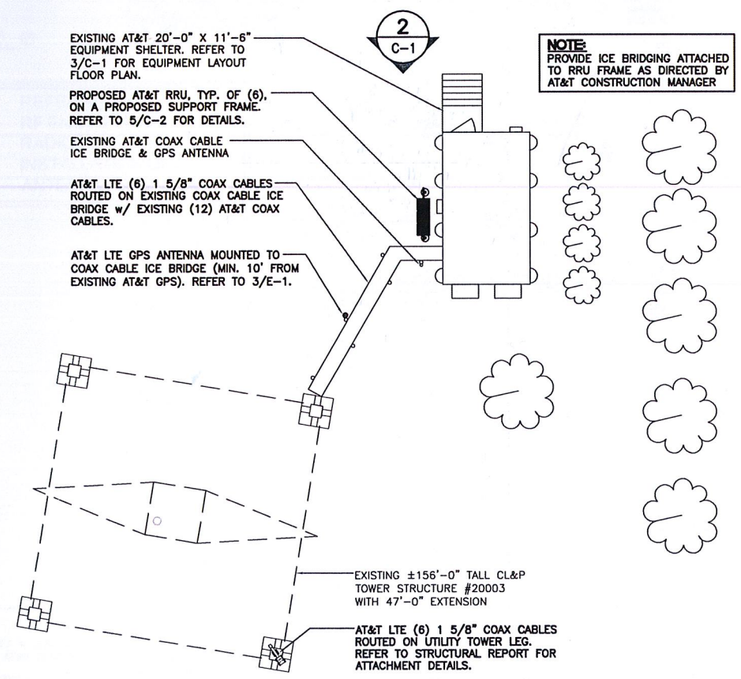


3 / C-1 EQUIPMENT BUILDING FLOOR PLAN

SCALE: 1/4" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE
4 0 2 4 8 16
(IN FEET)
1 inch = 4 ft.



NOTE:
PROVIDE ICE BRIDGING ATTACHED TO RRU FRAME AS DIRECTED BY AT&T CONSTRUCTION MANAGER

1 / C-1 COMPOUND PLAN

SCALE: 1" = 10'-0"

APPROX. NORTH

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

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CHK'D BY:	CFC

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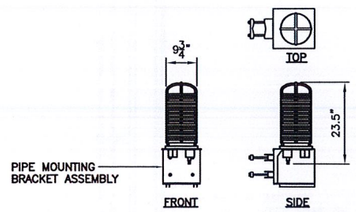
PLANS, ELEVATION AND DETAIL

C-1

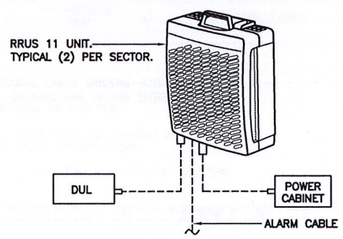
Sheet No. 3 of 6



SURGE ARRESTOR				
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
TOWER	MAKE: RAYCAP (SQUID) MODEL: DC6-48-60-18-8F	(1) PER SITE	**TOWER, ADJACENT TO AT&T ANTENNAS AND RRUs.**	20 LBS. (WITHOUT MOUNT)

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

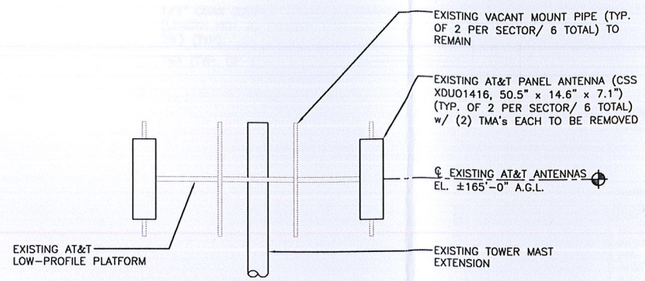
6 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



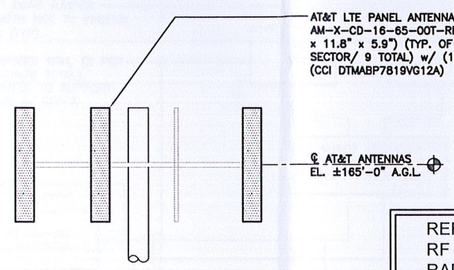
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 11	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

7 / C-2 RRU DETAIL
NOT TO SCALE

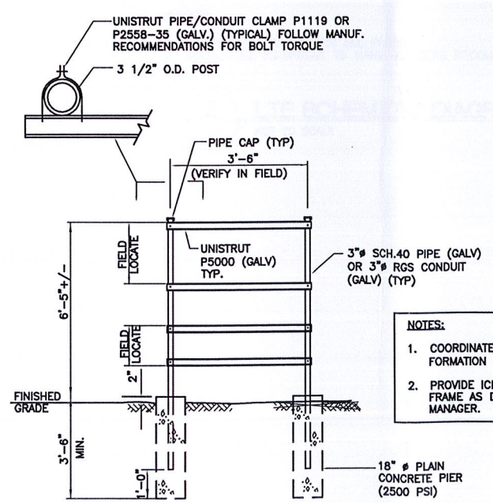


2 / C-2 ANTENNA SECTOR ELEVATION - EXISTING
SCALE: 1/4" = 1'-0"



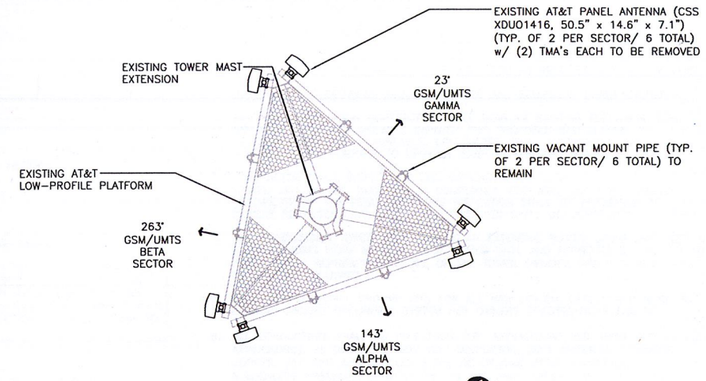
NOTE:
REPLACE EXISTING MOUNT PIPE AS REQUIRED TO ACCOMMODATE LTE ANTENNA LENGTH.

4 / C-2 ANTENNA SECTOR ELEVATION - PROPOSED
SCALE: 1/4" = 1'-0"



NOTES:
1. COORDINATE RRU & SURGE ARRESTOR FORMATION W/ AT&T CONSTRUCTION MANAGER.
2. PROVIDE ICE BRIDGING ATTACHED TO RRU FRAME AS DIRECTED BY AT&T CONSTRUCTION MANAGER.

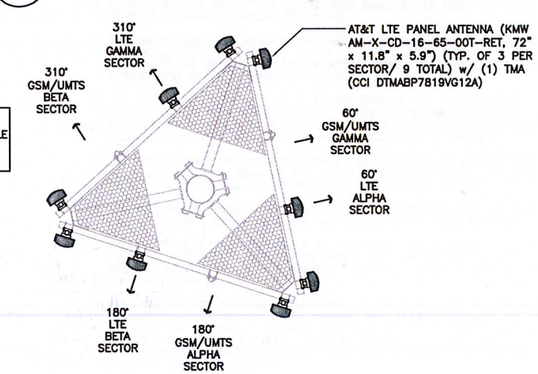
5 / C-2 EQUIPMENT MOUNTING FRAME DETAIL
NOT TO SCALE



1 / C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"

NOTE:
ROTATE EXISTING LOW PROFILE PLATFORM TO ACCOMMODATE LTE ANTENNA AZIMUTHS.

REFER TO FINAL AT&T RF ENGINEER'S RF RADIO PLAN PRIOR TO INSTALLATION OF ANTENNAS AND COAX



3 / C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"

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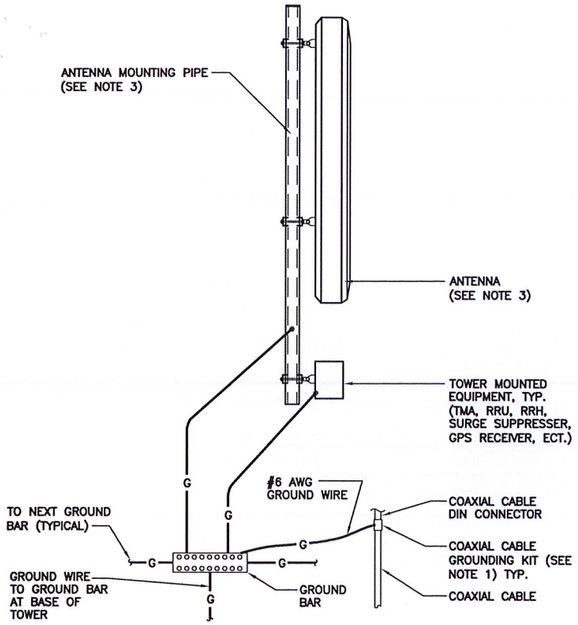
LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 6

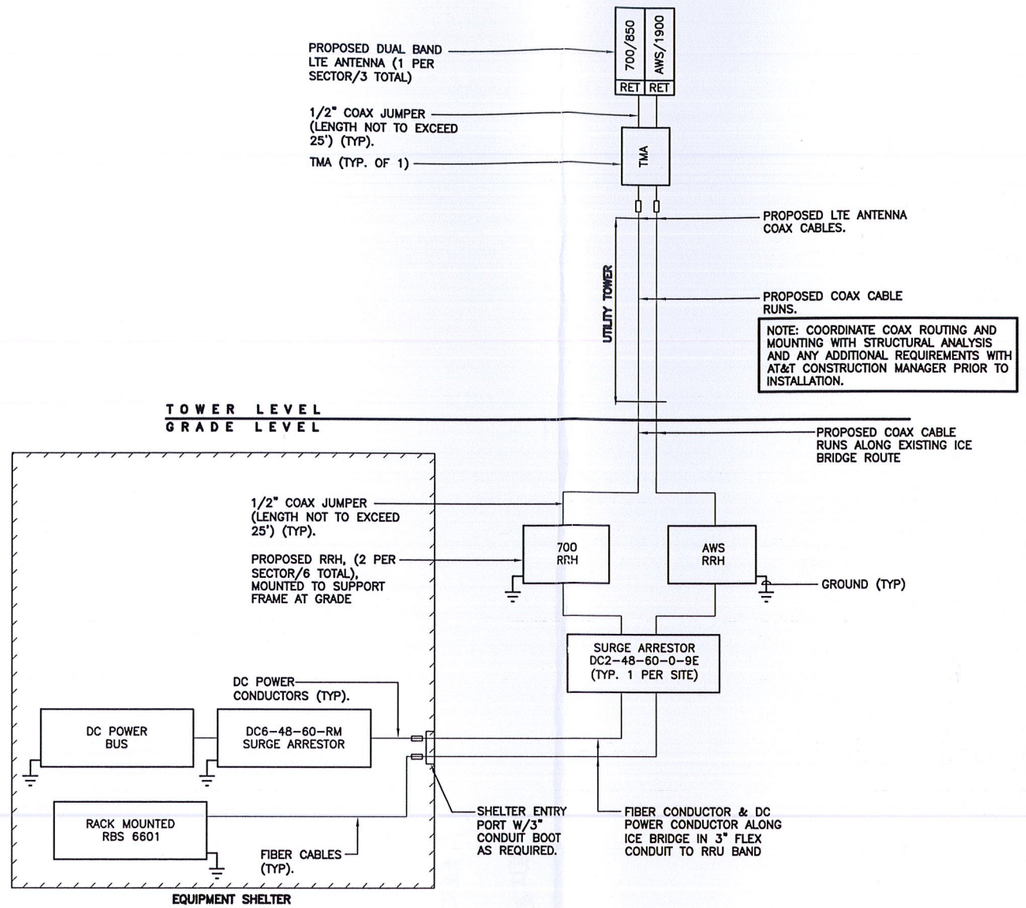


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

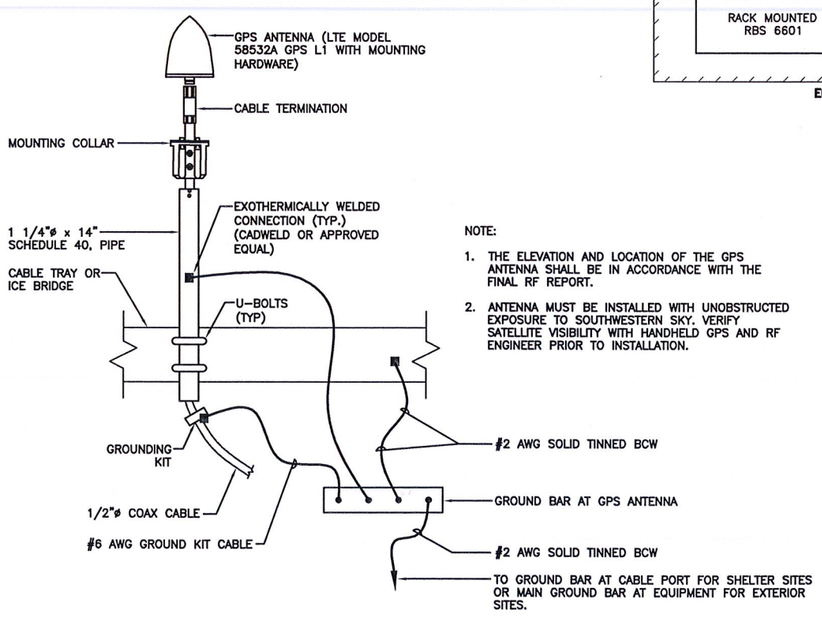


NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURERS RECOMMENDATIONS.

2 / E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE



NOTE:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. ANTENNA MUST BE INSTALLED WITH UNOBSTRUCTED EXPOSURE TO SOUTHWESTERN SKY. VERIFY SATELLITE VISIBILITY WITH HANDHELD GPS AND RF ENGINEER PRIOR TO INSTALLATION.

3 / E-1 GPS MOUNTED TO CABLE TRAY / ICE BRIDGE

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

DESIGNED BY:	CKD
DRAWN BY:	TJB
CHK'D BY:	CKD

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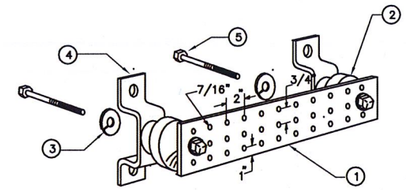
ELECTRICAL DETAILS AND NOTES

E-1

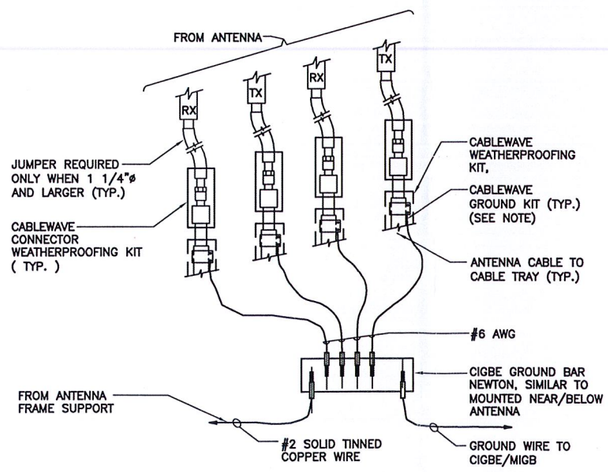
Sheet No. 5 of 6



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

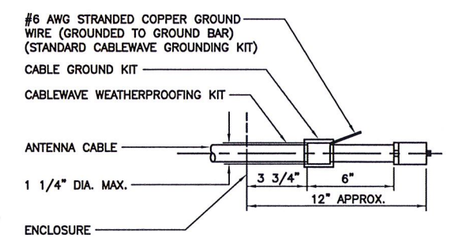
2 / E-2 **GROUND BAR DETAIL**
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

3 / E-2 **CONNECTION OF GROUND WIRES TO GROUND BAR**
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 / E-2 **ANTENNA CABLE GROUNDING DETAIL**
NOT TO SCALE

DESIGNED BY:	CKD
DRAWN BY:	TJB
CHK'D BY:	CKD

REV.	DATE	DRAWN BY	CHK'D BY	
0	10/9/12	HMR	DEB	CONSTRUCTION
1	5/30/12	TJL	DEB	CONSTRUCTION – CLIENT REVIEW

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DATE:	10/3/12
SCALE:	AS NOTED
JOB NO.	11118.C069

ELECTRICAL DETAILS

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