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Hartford, CT 06103
Main (860) 275-8200
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Also admitted in Massachusetts
and New York

July 17, 2025

Via Electronic Mail

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **EM-VER-057-241129 – Cellco Partnership d/b/a Verizon Wireless
Wireless Facility – Sound Shore Drive, Greenwich, Connecticut**

Request for Staff Approval of Minor Project Changes

Dear Attorney Bachman:

I write on behalf of Cellco Partnership d/b/a Verizon Wireless (“Cellco”), to request staff approval of a minor change to the facility modifications approved by the Council in EM-VER-057-241129. In EM-VER-057-241129, the Council acknowledged Cellco’s notice to modify its existing telecommunications facility off Sound Shore Drive in Greenwich, including the installation of replacement antennas and remote radio heads on an existing Eversource Energy transmission line power-mount structure.

To complete the approved facility modifications, Cellco must reinforce the existing tower mast, as described in the November 8, 2024 Structural Analysis of Antenna Mast and Tower report prepared by Centek Engineering. This report was submitted with Cellco’s EM-VER-057-241129 filing. To avoid a disruption of service from the existing facility, Cellco intends to temporarily relocate its existing antennas from the tower mast to a lower portion of the transmission line tower structure while it performs the work necessary to reinforce the tower mast. Once the reinforcement work has been completed, Cellco will install the new antennas and remote radio heads onto the tower mast.

Attached to this letter is a set of revised project plans showing the temporary antenna location, a new Structural Analysis of Antenna Mast and Tower report, dated April 10, 2025, confirming that the tower can support the temporary relocation of the Cellco’s antennas and a

32498477-v1

Melanie A. Bachman
July 17, 2025
Page 2

revised Calculated Radio Frequency Emissions Report confirming that the operation of the antennas, at the temporary antenna location will comply with the FCC's safety standards.

Please contact me if you have any questions or need any additional information regarding this request. Thank you in advance for your cooperation.

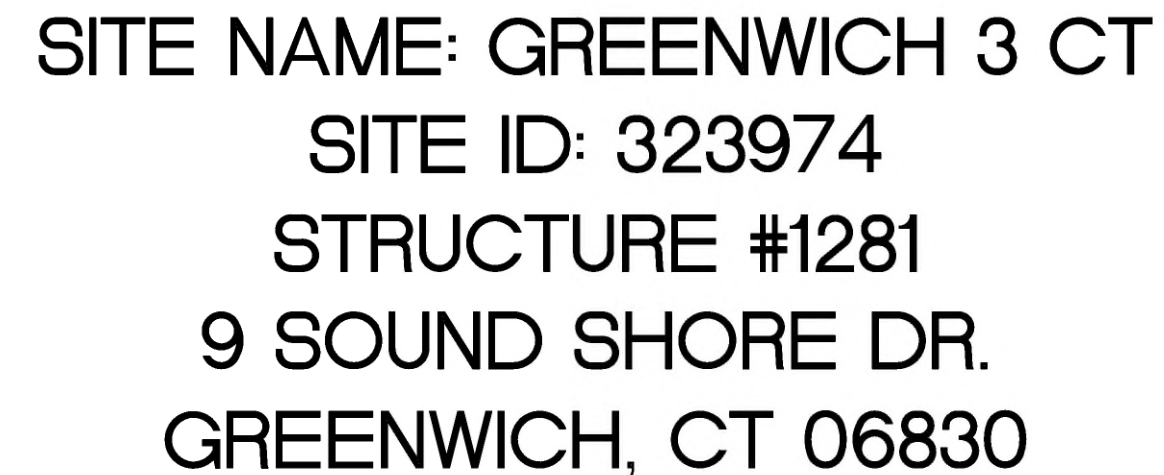
Sincerely,

A handwritten signature in black ink, appearing to read 'Kenneth C. Baldwin', with a stylized, flowing script.

Kenneth C. Baldwin

Copy to:

Alex Tyurin, Verizon Wireless
Rebecca Rafferty, SAI



1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2021 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2022 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "H" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2022 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. 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, AND ALL TRADES AS APPLICABLE 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 VERIZON WIRELESS 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.

FROM:	20 ALEXANDER DRIVE WALLINGFORD, CONNECTICUT	TO:	9 SOUND SHORE DR. GREENWICH, CT 06830
1.	HEAD NORTHWEST.		0.01 MI.
2.	TURN LEFT.		0.06 MI.
3.	TURN RIGHT TOWARD ALEXANDER DR.		0.03 MI.
4.	TURN RIGHT ONTO ALEXANDER DR.		0.26 MI.
5.	TURN RIGHT ONTO BARNES INDUSTRIAL RD S.		0.11 MI.
6.	TURN LEFT ONTO CT-68.		0.37 MI.
7.	TURN RIGHT AND TAKE RAMP TOWARD MERIDEN/CT-5/CT-15.		0.17 MI.
8.	TURN RIGHT ONTO N COLONY RD (US-5 N) TOWARD CT-15.		0.42 MI.
9.	TURN SHARP LEFT AND TAKE RAMP ONTO CT-15 S (WILBUR CROSS PKWY) TOWARD NEW HAVEN.		26.55 MI.
10.	TAKE EXIT 52 TOWARD BRIDGEPORT ONTO CT-8 S.		5.94 MI.
11.	TAKE THE EXIT TOWARD N. Y. CITY ONTO I-95 S (GOVERNOR JOHN DAVIS LODGE TPKE).		25.17 MI.
12.	TAKE EXIT 4 TOWARD INDIAN FIELD RD/COS COB.		0.18 MI.
13.	TURN RIGHT ONTO INDIAN FIELD RD.		0.02 MI.
14.	TURN RIGHT ONTO SOUND SHORE DR.		0.17 MI.
15.	TURN LEFT.		0.02 MI.
16.	TURN LEFT.		0.01 MI.
17.	9 SOUND SHORE DR, GREENWICH, CT 06830-7204		

1. THE PROPOSED TEMP EQUIPMENT INSTALLATION SCOPE OF WORK AT THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY GENERALLY INCLUDES THE FOLLOWING:

A. AT THE EXISTING MONOPOLE MOUNTED ANTENNA SECTORS:

- INSTALL (8) 1-5/8" Ø COAX CABLES
- INSTALL (2) PROPOSED JMA MX08FTT665-02 ANTENNAS
- INSTALL (2) PROPOSED COMMSCOPE NHH-33B-R2B ANTENNAS
- INSTALL (4) PROPOSED COMMSCOPE CBC61923T-DS-43 TRIPLEXERS
- INSTALL (4) PROPOSED SITEPO TAM-2U PIPE MOUNTS

SITE NAME: GREENWICH 3 CT

SITE ADDRESS: 9 SOUND SHORE DR.
GREENWICH, CT 06830

LESSEE/TENANT: CELLCO PARTNERSHIP
d.b.a. VERIZON WIRELESS
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

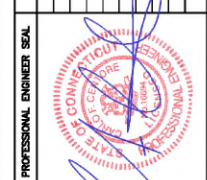
CONTACT PERSON: WALTER CHARCZNSKI (CONSTRUCTION MANAGER)
VERIZON WIRELESS
(860) 306-1806

ENGINEER: CENTEK ENGINEERING, INC.
63-2 NORTH BRANFORD RD.
BRANFORD, CT. 06405
(203) 488-0580

PROJECT COORDINATES: LATITUDE: 41° 01' 46.96"N
LONGITUDE: 73° 35' 54.08"W
GROUND ELEVATION: ±28' AMSL

SITE COORDINATES AND GROUND ELEVATION
REFERENCED FROM GOOGLE EARTH.

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
N-1	NOTES, SPECIFICATIONS, AND INSPECTIONS
RF-1	RF PLUMBING DIAGRAM
C-1	COMPOUND PLAN AND ELEVATION
C-2	ANTENNA SECTOR CONFIGURATION DETAILS
C-3	RF DETAILS
E-1	ELECTRICAL DETAILS AND SPECIFICATIONS

[illegible]

Cellco Partnership d/b/a Verizon Wireless

SITE NAME: GREENWICH 3 CT

SITE ID: 323974

9 SOUND SHORE DR.

GREENWICH, CT 06830

DATE:	2/21/25
SCALE:	AS NOTED
JOB NO.	21007.68

TITLE
SHEET

T-1

Sheet No. 1 of 7

DESIGN BASIS

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

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. 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.

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., FOR VERIZON, DATED 04/10/25.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.
3. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
4. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR ADJACENT TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.
5. PCS MAINT INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.
6. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
7. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
8. NO DRILLING WELDING OR TAPING IS PERMITTED ON EVERSOURCE OWNED EQUIPMENT.

1. ALL STRUCTURAL STEEL IS DESIGNED BY LOAD RESISTANCE FACTOR DESIGN (LRFD).
2. MATERIAL SPECIFICATIONS
 - A. STRUCTURAL STEEL (W SHAPES)----ASTM A992 (FY = 50 KSI)
 - B. STRUCTURAL STEEL (OTHER SHAPES)----ASTM A36 (FY = 36 KSI).
 - C. STRUCTURAL HSS (RECTANGULAR SHAPES)----ASTM A500 GRADE B, (FY = 46 KSI)
 - D. STRUCTURAL HSS' (ROUND SHAPES)----ASTM A500 GRADE B, (FY = 42 KSI)
 - E. PIPE----ASTM A53 GRADE B (FY = 35 KSI)
3. FASTENER SPECIFICATIONS
 - A. CONNECTION BOLTS----ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
 - B. U-BOLTS----ASTM A307
 - C. ANCHOR RODS----ASTM F1554
 - D. WELDING ELECTRODES----ASTM E70XX FOR A36 & A572-GR50 STEELS, ASTM E80XX FOR A572-GR65 STEEL.
4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS MUST INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
5. STRUCTURAL STEEL SHALL BE DETAILLED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
10. ALL STEEL MATERIAL. (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.

11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 14TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION, ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.
17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
19. FABRICATE BEAMS WITH MILL CAMBER UP.
20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

Cellco Partnership d/b/a Verizon Wireless		verizon				PROFESSIONAL ENGINEER SEAL	
SITE NAME: GREENWICH 3 CT		SITE ID: 323974		9 SOUND SHORE DR.		GREENWICH, CT 06830	
DATE: 2/21/25		SCALE: AS NOTED		JOB NO. 21007.68			
NOTES, SPECIFICATIONS, AND INSPECTIONS		N-1		Sheet No. 2 of 7			
CENTEK engineering Confident on Solutions™		(203) 488-0580 (203) 488-8587 Fax 63-2 North Branford Road Branford, CT 06405 www.CentekEng.com		2025 FEB 21 PM 3:05 STATE OF CONNECTICUT CHRISTOPHER J. DISTASIO PE No. 06984 EXPIRATION DATE 12/31/2016			

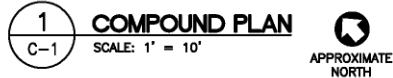
-
- DC signal capable Port
- AISG Cable
- RET DC signal pass for RET
(Port that will control RET)
- Hybriflex cables



ANTENNA MOUNTS

TOWER AND TOWER FOUNDATION

REFER TO THE STRUCTURAL ANALYSIS PREPARED BY CENTEK ENGINEERING
(PROJECT # 21007.68.TEMP) DATED 04/10/25 FOR ADDITIONAL
INFORMATION AND REQUIREMENTS.



2	05/28/25	T.L.	T.U.	CONSTRUCTION DRAWINGS – REVISED PER EVERSOURCE COMMENTS
	05/15/25	T.L.	T.U.	CONSTRUCTION DRAWINGS – REVISED PER APPROVED STRUCTURAL ANALYSIS
0	02/21/25	T.L.	T.U.	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION

PROFESSIONAL ENGINEER SEAL



CENTEK engineering

203) 488-0580
203) 488-8587 Fax
33-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

Cellco Partnership d/b/a Verizon Wireless

SITE NAME: GREENWICH 3 CT

SITE ID: 323974

**9 SOUND SHORE DR.
GREENWICH, CT 06830**

DATE: 2/21/25

SCALE: AS NOTED

JOB NO.	21007.68
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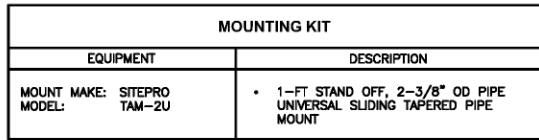
COMPOUND
PLAN AND
ELEVATION

C-1

Sheet No. 4 of 7



C-2 Sheet No. <u>5</u> of <u>7</u>	ANTENNA SECTOR CONFIGURATION DETAILS				JOB NO. 21007.68		SCALE: AS NOTED		DATE: 2/21/25		
	Celco Partnership d/b/a Verizon Wireless SITE NAME: GREENWICH 3 CT SITE ID: 323974 9 SOUND SHORE DR. GREENWICH, CT 06830				CENTEX engineering Committed to Building™ (203) 488-0580 (203) 488-6587 Fax 65-2 North Branford Road Branford, CT 06440 www.CentexEng.com		verizon 		PROFESSIONAL ENGINEER SEAL		

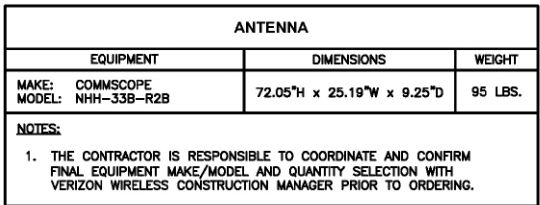


A technical line drawing of a shower enclosure. It features a curved glass door on the left side, which is hinged at the top and bottom. To the right of the door is a fixed glass panel. The enclosure is supported by a metal frame. At the base, there are several small, dark-colored components, likely feet or leveling pads, arranged in a semi-circle. The top of the enclosure is rounded, following the curve of the door.

2
C-3

PROPOSED ANTENNA DETAIL

SCALE: NOT TO SCALE



A 3D rendering of a silver, rectangular electronic component, likely a power amplifier or antenna. The component features a top surface with a grid of mounting holes. On the front face, there are several connectors: two SMA connectors on the left, a larger connector in the center, and another SMA connector on the right. The component is mounted on a base with several screws. The text "EPCOR" and "100W/1000MHz" is visible on the front face.

4 **PROPOSED TRIPLEXER DETAIL**
C-3 SCALE: NOT TO SCALE

[illegible]

Sheet No. 7 of 7

**Structural Analysis of
Antenna Mast and Tower**

*Verizon Site Ref: Greenwich 3
(Temp Equipment)*

*Eversource Structure No. 1281
129' Electric Transmission Lattice Tower*

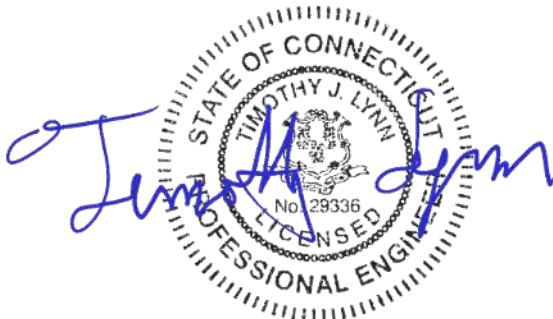
*9 Sound Shore Drive
Greenwich, CT*

CEN TEK Project No. 21007.68.TEMP

~~Date: November 26, 2024~~

Rev 3: April 10, 2025

Max Stress Ratio = 99.8 %



Prepared for:
Verizon Wireless
20 Alexander Drive
Wallingford, CT 06492

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Introduction

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

The loads considered in this analysis consist of the following:

- **SPRINT (Existing to Be Removed):**
Antennas: Three (3) RFS APXVSP18-C panel antennas mounted on an existing 14-ft low profile platform to the powermount with a RAD center elevation of 148-ft above grade.
Coax Cables: Six (6) 1-5/8" Ø coax cables running on the inside of the existing powermount. Twelve (12) 1-5/8" Ø coax cables mounted on Site Pro Super Universal T-Brackets p/n T1200 running on a leg of the existing tower as indicated in section 4 of this report.
- **VERIZON WIRELESS (Existing to Remove):**
Antennas: Three (3) Decibel DB854DG65ESX panel antennas, three (3) Andrew HBXX-6516DS panel antennas, three (3) Andrew SBNHH-1D65B panel antennas mounted on a (3) T-Arms with a RAD center elevation of 139-ft above grade.
Coax Cables: Eighteen (18) 1-5/8" Ø coax cables running on the outside of the powermount as indicated in section 4 of this report
- **VERIZON WIRELESS (Proposed):**
Antennas: Four (4) JMA MX10FRO640-03 panel antennas (139' CL), four (4) JMA MX06FRO660-03 panel antennas (139' CL), four (4) Samsung MT6413-77A panel antennas (140.8' CL), two (2) RO440CC panel antennas (136.5' CL), four (4) Samsung 4439d-25A RRHs, four (4) Samsung 4461d-13A RRHs, four (4) CBRs RRH RT4423-48A and three (3) RVZDC-6627-PF-48 OVP Boxes mounted on one (1) PV-LPPGS-12M-HR2 platform with an elevation of +/- 139-ft above grade.
Coax Cables: Three (3) 1-5/8" hybrid cables running on the outside of the powermount as indicated in section 4 of this report
- **VERIZON WIRELESS (Proposed – Temp Equipment During Construction):**
Antennas: Two (2) JMA MX06FIT665-02 panel antennas, two (2) Commscope NHH-33B-R2B panel antennas and four (4) Commscope CBC61923T-DS-43 triplexers pipe mounted (1 antenna and 1 triplexer each tower leg) with a RAD center elevation of 70-ft above grade.
Coax Cables: Eight (8) 1-5/8" cables - Two (2) running on each tower leg.

Primary assumptions used in the analysis

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

A n a l y s i s

Structural analysis of the existing powermount was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc. The RISA-3D program contains a library of all AISC shapes and corresponding section properties are computed and applied directly within the program. The program's Steel Code Check option was also utilized.

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

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

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

D e s i g n B a s i s

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

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

▪ UTILITY TOWER ANALYSIS

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

Load cases considered:

Load Case 1: NESC Heavy

Wind Pressure.....	4.0 psf
Radial Ice Thickness.....	0.5"
Vertical Overload Capacity Factor.....	1.50
Wind Overload Capacity Factor.....	2.50
Wire Tension Overload Capacity Factor.....	1.65

Load Case 2: NESC Extreme

Wind Speed.....	110 mph ⁽¹⁾
Radial Ice Thickness.....	0"

Note 1: NESC C2-2023, Section 25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

▪ **MAST ASSEMBLY ANALYSIS**

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

Load cases considered:

Load Case 1:

Wind Speed..... 130 mph (2022 CSBC Appendix-P)
 Radial Ice Thickness..... 0"

Load Case 2:

Wind Pressure..... 50 mph wind pressure
 Radial Ice Thickness..... 1.0"

R e s u l t s

▪ **ANTENNA MAST**

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

FWT Powermount	Stress Ratio (% of capacity)	Result
12" Sch. 40 Pipe	34.6%	PASS
L2.5x2.5x1/4 Brace	35.5%	PASS
Connection	74.2%	PASS

▪ **UTILITY TOWER**

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

A maximum usage of **99.8%** occurs in the utility structure under the **NESC Heavy** loading condition.

TOWER SECTION:

The utility structure was determined to be structurally adequate.

Tower Member	Stress Ratio (% of capacity)	Result
Angle 25AP	99.8%	PASS

▪ **FOUNDATION AND ANCHORS**

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

BASE REACTIONS:

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

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	44.79 kips	163.98 kips	185.86 kips
NESC Extreme Wind	43.42 kips	153.28 kips	169.69 kips

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

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Component	Design Check	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	76.0%	PASS

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Check	Design Limit	Proposed Loading	Result
Reinf. Conc. Pier w/ Rock Anchors	Uplift	1.0 FS ⁽²⁾	1.94 FS ⁽²⁾	PASS
	OTM ⁽¹⁾	1.0 FS ⁽²⁾	1.51 FS ⁽²⁾	PASS
	Rock Anchor Tension	153.6 kips	99.8 kips	PASS
	Rock Anchor Compression	153.6 kips	101.2 kips	PASS

Note 1: OTM denote overturning moment.

Note 2: FS denotes Factor of Safety.

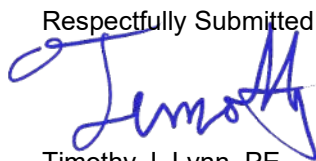
C o n c l u s i o n

This analysis shows that the subject utility tower and antenna mast **are adequate** to support the proposed temporary equipment installation.

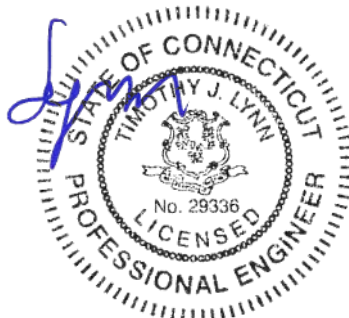
The analysis is based, in part on the information provided to this office by Eversource and Verizon. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
 Structural Engineer



STANDARD CONDITIONS FOR FURNISHING OF
PROFESSIONAL ENGINEERING SERVICES ON
EXISTING STRUCTURES

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

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222.
- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA - 3 D

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS - TOWER

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

Modeling Features:

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

Analysis Features:

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

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

Results Features:

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

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

Introduction

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

ANSI Standard TIA-222-H covering the design of telecommunications structures specifies LRFD design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that it does not exceed code defined percentage of failure strength.

ANSI Standard C2-2023 (National Electrical Safety Code) covering the design of electric transmission metal structures is based upon an ultimate strength/yield stress design approach. This approach applies a multiplier (overload capacity factor) to the loads possible from extreme weather loading conditions, and designs the structure so that it does not exceed its ultimate strength (yield stress).

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

Two extreme weather conditions are considered. The first is an extreme wind condition (hurricane) based upon a 1700-year recurrence for TIA-222-H risk category III and a 100-year recurrence for NESC Grade B. The second is a winter condition combining wind and ice loadings.

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

| Note 1: Prepared from documentation provide from Northeast Utilities.

P C S M a s t

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

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

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

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

The uniform loadings and factors specified for the above components in the table are based upon the National Electrical Safety Code 2023 Edition Extreme Wind (Rule 250C), Combined Ice and Wind (Rule 250B-Heavy) and Combined Extreme Ice and Wind (Rule 250D – as appropriate) 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.

Overhead Transmission Standards

Attachment A Eversource Design Criteria

		Attachment A ES Design Criteria	Basic Wind Speed	Pressure	Height Factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	-----	4	1	1	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	-----	4	1	1	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:		Conductor Loads Provided by ES				
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:		Conductor Loads Provided by ES				
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load 1.25 x Gust Response Factor Apply a 1.25 x Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
		Conductors:		Conductor Loads Provided by ES				
	*Only for structures installed after 2007							

Communication Antennas on Transmission Structures

Eversource

Approved by: CPS (CT/WMA) JCC
(NH/EMA)

Design

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11/19/2018

Overhead Transmission Standards

determined from NESC applied loading conditions (not TIA Loads) on the structure and mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition. With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

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

- a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.
- b) Conductors and related devices and hardware (wire loads will be provided by Eversource).
- c) Electric Transmission Structure

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

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

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

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

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

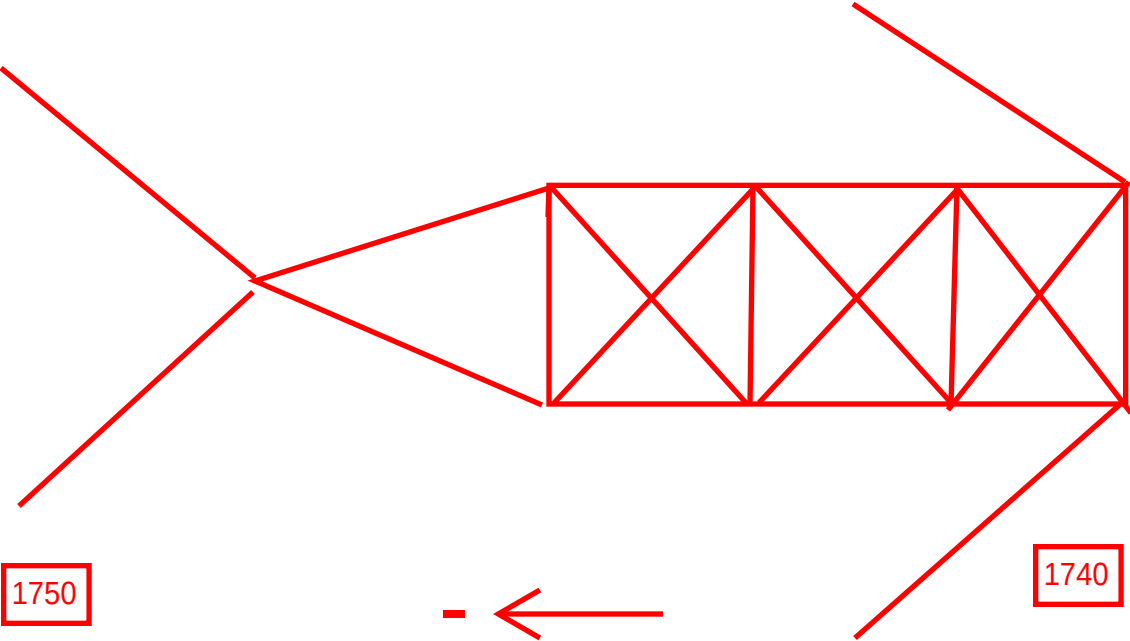
Communication Antennas on Transmission Structures			
Eversource Approved by: CPS (CT/WMA) JCC (NH/EMA)	Design	OTRM 059	Rev. 1 11/19/2018
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Str. No.	LC #	WC #	Load Case Description	Set No.	Phase No.	Structure Loads Vert. (lbs)	Structure Loads Trans. (lbs)	Structure Loads Long. (lbs)
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	11	1	24	-6881	6662
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	12	1	136	-5129	5014
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	13	1	-64	-8360	8022
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	14	1	-91	-5560	5296
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	15	1	15	-4500	4441
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	21	1	173	-5526	5370
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	22	1	219	-4988	4885
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	23	1	98	-6750	6488
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	24	1	1192	-2755	-2465
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	25	1	1456	-2647	-4141
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	31	1	1450	-2857	-2554
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	32	1	1519	-3219	-3994
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	33	1	1097	-3320	-3451
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	41	1	3069	-5279	-8141
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	42	1	2962	-8403	-9006
1281	1	1	RULE 250B NA+ "DESIGN LOAD 1"	43	1	2005	-6704	-8564
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	11	1	24	-7219	6294
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	12	1	136	-5464	4647
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	13	1	-64	-8698	7654
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	14	1	-91	-5810	5021
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	15	1	15	-4786	4131
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	21	1	173	-5895	4962
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	22	1	219	-5360	4474
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	23	1	98	-7120	6080
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	24	1	1192	-2924	-2263
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	25	1	1456	-2879	-3983
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	31	1	1450	-3075	-2287
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	32	1	1519	-3463	-3784
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	33	1	1097	-3544	-3221
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	41	1	3069	-5592	-7930
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	42	1	2962	-8671	-8748
1281	2	1	RULE 250B NA- "DESIGN LOAD 1"	43	1	2005	-6978	-8343
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	11	1	-157	-3839	4195
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	12	1	-100	-3107	3482
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	13	1	-180	-4221	4518
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	14	1	-174	-2835	2925
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	15	1	-130	-2479	2704
1281	3	3	RULE 250C NA+ "DESIGN LOAD 2"	21	1	-98	-3406	3805

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

		AHEAD	BACK
COND	1740		
	1750		
SW	1740		
	1750		

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



NESC 250B NA+

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

CEN TEK COMMENT

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

NESC 250B NA-

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

	<u>NESC 250C NA+</u>		
	1740		1750
	Linnet		OPGW
V	761		580
T	-3677		-4183
L	592		1570
	<u>Top Phase</u>		Top Phase
	Ahead	Back	
V	1648	-98	839
T	-2197	-3406	-5538
L	-3881	3805	2388
	<u>Middle Phase</u>		Middle Phase
	Ahead	Back	
V	1480	-67	870
T	-3368	-3116	-4818
L	-3999	3532	1028
	<u>Bottom Phase</u>		Bottom Phase
	Ahead	Back	
V	1025	-125	513
T	-2775	-3801	-6089
L	-3942	4139	2291

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

	<u>NESC 250C NA-</u>		
	1740		1750
	Linnet		OPGW
V	761		580
T	-4417		-4763
L	365		1458
	<u>Top Phase</u>		Top Phase
	Ahead	Back	
V	1648	-98	839
T	-2785	-4126	-6614
L	-3483	3009	2169
	<u>Middle Phase</u>		Middle Phase
	Ahead	Back	
V	1480	-67	870
T	-3865	-3826	-5921
L	-3521	2746	712
	<u>Bottom Phase</u>		Bottom Phase
	Ahead	Back	
V	1025	-125	513
T	-3276	-4493	-7137
L	-3536	3375	2021

ALL EXISTING SPRINT EQUIPMENT TO BE REMOVED
--

- REPLACE EXISTING MOUNT WITH PERFECT VISION PV-LPPGS-12M-HR2-B MOUNT

☞ VERIZON ANTENNAS
 EL. ±139'-0" AGL
 EL. ±134'-9" ATB

EXISTING 128'-9" TALL
STEEL TRANSMISSION
STRUCTURE NO. 1281

EXISTING 12" SCH. 40 —
(O.D. = 12.75") ASTM
A500 GRADE 42 X 150'-0"
TALL FWT POWERMOUNT

VERIZON (EXISTING TO REMOVE): THREE (3) HBXX-6516DS, THREE (3) ANDREW SBNHH-1D65D AND THREE (3) DECIBEL DB854DG65ESX PANEL ANTENNAS.

VERIZON (PROPOSED): FOUR (4) JMA MX10FRO640 PANEL ANTENNAS, FOUR (4) JMA MX06FRO660-03 PANEL ANTENNAS, FOUR (4) SAMSUNG MT6413-77A PANEL ANTENNAS, TWO (2) RO440CC PANEL ANTENNAS, FOUR (4) SAMSUNG 4439d-25A RRHs, FOUR (4) SAMSUNG 4461d-13A RRHs, FOUR (4) CBRs RT4423-48A RRHs AND THREE (3) OVP BOXES.

VERIZON PROPOSED TEMPORARY ONE (1) JMA MX06FIT665-02 ANTENNA AND ONE (1) CBC61923T-DS-43 TRIPLEXER PIPE MOUNTED TO BETA AND GAMMA TOWER LEGS

VERIZON PROPOSED TEMPORARY ONE
(1) NHH-33B-R2B ANTENNA AND
ONE (1) CBC61923T-DS-43
TRIPLEXER PIPE MOUNTED TO ALPHA
AND DELTA TOWER LEGS

VERIZON THREE (3) 1-5/8"
Ø HYBRID CABLES MOUNTED
TO OUTSIDE OF
POWERMOUNT (PROPOSED)

NOTE: ATB DENOTES ABOVE
TOP OF TOWER BASE

—VERIZON EIGHTEEN (18) 1-5/8" ϕ
COAX CABLES MOUNTED TO OUTSIDE
OF EXIST. POWERMOUNT (TO REMOVE)

- VERIZON PROPOSED TEMPORARY
TWO (2) 1-5/8" Ø COAX
CABLES MOUNTED TO EACH
TOWER LEG (8 TOT.)

T.O. BASE PLATE

- APPROX. FINISHED GRADE

1

TOWER & POWERMOUNT ELEVATION

S-1

SCALE: NOT TO SCALE

VERIZON PROPOSED (3) —
1-5/8" DIA. HYBRID CABLES

EXISTING 12" SCH. 40 (O.D. = 12.75") ASTM A500 GRADE 42 X 150'-0" TALL FWT POWERMOUNT

ABOVE TOP OF TOWER

3

S-1

FEEDLINE PLAN - POWERMOUNT

SCALE: NOT TO SCALE

EXISTING 129' TALL STEEL
TRANSMISSION STRUCTURE
NO. 1281

VERIZON PROPOSED _____
TEMPORARY TWO (2) 1-5/8"
Ø COAX CABLES MOUNTED TO
EACH TOWER LEG (8 TOT.)

EXISTING 12" SCH. 40 (O.D. = 12.75") ASTM A500 GRADE 42 X 150'-0" TALL FWT POWERMOUNT

VERIZON THREE (3) 1-5/8"
Ø HYBRID CABLES MOUNTED
TO OUTSIDE OF
POWERMOUNT (PROPOSED)

2

S-1

FEEDLINE PLAN - TOWER

SCALE: NOT TO SCALE

[illegible]

PROFESSIONAL ENGINEER SEAL

CENTEK engineering

VERIZON WIRELESS

GREENWICH 3
CL&P STRUCTURE 1281

1 SOUND SHORE DRIVE
GREENWICH, CT 06830

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

**TOWER ELEVATION
AND FEEDLINE
PLAN**

SHEET NO.

S-1

Sheet No. 1 of 1

Subject:

Loads on Equipment Structure 1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

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

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

Wind Speeds

Basic Wind Speed

 $V := 130$

mph

(User Input - 2022 CSBC Appendix P)

Basic Wind Speed with Ice

 $V_i := 50$

mph

(User Input per Annex B of TIA-222-H)

Input

Structure Type =

 $Structure_Type := Lattice$

(User Input)

Structure Category =

 $SC := III$

(User Input)

Exposure Category =

 $Exp := C$

(User Input)

Structure Height =

 $h := 129$

ft

(User Input)

Height to Center of Antennas =

 $z_{VZ} := 139$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast8} := 145$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast7} := 130$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast6} := 110$

ft

(User Input)

Mast Based on Max
20-ft Section per
2.6.11.1.3

Height to Center of Mast =

 $z_{Mast5} := 90$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast4} := 70$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast3} := 50$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast2} := 30$

ft

(User Input)

Height to Center of Mast =

 $z_{Mast1} := 10$

ft

(User Input)

Radial Ice Thickness =

 $t_i := 1.00$

in

(User Input per Annex B of TIA-222-G)

Radial Ice Density =

 $Id := 56.00$

pcf

(User Input)

Topographic Factor =

 $K_{zt} := 1.0$

(User Input)

Shielding Factor for Appurtenances =

 $K_a := 0.8$

(User Input)

Ground Elevation Factor =

 $K_e = 0.996$

(User Input)

Gust Response Factor =

 $G_H := 1.35$ (User Input - Section
2.6.9.4 of TIA-222-H)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

$$K_{iz} := \left(\frac{z_{VZ}}{33} \right)^{0.1} = 1.155$$

Velocity Pressure Coefficient Antennas =

Velocity Pressure w/o Ice Antennas =

Velocity Pressure with Ice Antennas =

$$K_{izMast8} := \left(\frac{z_{Mast8}}{33} \right)^{0.1} = 1.16$$

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

$$K_{izMast7} := \left(\frac{z_{Mast7}}{33} \right)^{0.1} = 1.147$$

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

$$K_{izMast6} := \left(\frac{z_{Mast6}}{33} \right)^{0.1} = 1.128$$

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

$$t_{izVZ} := t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.328$$

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

$$qz_{VZ} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{VZ} \cdot V^2 = 49.664$$

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

$$t_{izMast8} := t_i \cdot I_{ice} \cdot K_{izMast8} \cdot K_{zt}^{0.35} = 1.333$$

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

$$qz_{Mast8} := 0.00258 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast8} \cdot V^2 = 50.499$$

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

$$t_{izMast7} := t_i \cdot I_{ice} \cdot K_{izMast7} \cdot K_{zt}^{0.35} = 1.319$$

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

$$qz_{Mast7} := 0.00257 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast7} \cdot V^2 = 49.16$$

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

$$t_{izMast6} := t_i \cdot I_{ice} \cdot K_{izMast6} \cdot K_{zt}^{0.35} = 1.297$$

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

$$qz_{Mast6} := 0.00256 \cdot K_{zt} \cdot K_e \cdot K_d \cdot Kz_{Mast6} \cdot V^2 = 47.276$$

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

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

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

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

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

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

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

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

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

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

Velocity Pressure Coefficient Mast =

Velocity Pressure w/o Ice Mast =

Velocity Pressure with Ice Mast =

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Development of Wind & Ice Load on Mast**Mast Data:**

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

Gravity Loads (without ice)

Weight of the mast =

Self Weight

(Computed internally by Risa-3D)

BLC 1

Gravity Loads (ice only)

Ice Area per Linear Foot =

$$Ai_{mast} := \frac{\pi}{4} \cdot ((D_{mast} + t_{izMast8} \cdot 2)^2 - D_{mast}^2) = 59 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICEmast8} := Id \cdot \frac{Ai_{mast}}{144} = 23 \quad \text{plf}$$

BLC 3

Ice Area per Linear Foot =

$$Ai_{mast} := \frac{\pi}{4} \cdot ((D_{mast} + t_{izMast7} \cdot 2)^2 - D_{mast}^2) = 58.3 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICEmast7} := Id \cdot \frac{Ai_{mast}}{144} = 23 \quad \text{plf}$$

BLC 3

Ice Area per Linear Foot =

$$Ai_{mast} := \frac{\pi}{4} \cdot ((D_{mast} + t_{izMast6} \cdot 2)^2 - D_{mast}^2) = 57.2 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICEmast6} := Id \cdot \frac{Ai_{mast}}{144} = 22 \quad \text{plf}$$

BLC 3

Ice Area per Linear Foot =

$$Ai_{mast} := \frac{\pi}{4} \cdot ((D_{mast} + t_{izMast5} \cdot 2)^2 - D_{mast}^2) = 56 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICEmast5} := Id \cdot \frac{Ai_{mast}}{144} = 22 \quad \text{plf}$$

BLC 3

Ice Area per Linear Foot =

$$Ai_{mast} := \frac{\pi}{4} \cdot ((D_{mast} + t_{izMast4} \cdot 2)^2 - D_{mast}^2) = 54.5 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICEmast4} := Id \cdot \frac{Ai_{mast}}{144} = 21 \quad \text{plf}$$

BLC 3

Ice Area per Linear Foot =

$$Ai_{mast} := \frac{\pi}{4} \cdot ((D_{mast} + t_{izMast3} \cdot 2)^2 - D_{mast}^2) = 52.5 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICEmast3} := Id \cdot \frac{Ai_{mast}}{144} = 20 \quad \text{plf}$$

BLC 3

Ice Area per Linear Foot =

$$A_{i_{mast}} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast2} \cdot 2)^2 - D_{mast}^2 \right) = 49.7 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICE_{mast2}} := l_d \cdot \frac{A_{i_{mast}}}{144} = 19 \quad \text{plf} \quad \text{BLC 3}$$

Ice Area per Linear Foot =

$$A_{i_{mast}} := \frac{\pi}{4} \cdot \left((D_{mast} + t_{izMast1} \cdot 2)^2 - D_{mast}^2 \right) = 44.2 \quad \text{sq in}$$

Weight of Ice on Mast =

$$W_{ICE_{mast1}} := l_d \cdot \frac{A_{i_{mast}}}{144} = 17 \quad \text{plf} \quad \text{BLC 3}$$

Wind Load (with ice)

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast8})}{12} = 1.285 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast8} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 16 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast7})}{12} = 1.282 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast7} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 15 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast6})}{12} = 1.279 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast6} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 14 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast5})}{12} = 1.274 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast5} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 14 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast4})}{12} = 1.269 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast4} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 13 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast3})}{12} = 1.262 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast3} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 12 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast2})}{12} = 1.252 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast2} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 11 \quad \text{plf} \quad \text{BLC 4}$$

Mast Projected Surface Area w/ Ice =

$$A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot t_{izMast1})}{12} = 1.233 \quad \text{sf/ft}$$

Total Mast Wind Force w/ Ice =

$$qz_{ice.Mast1} \cdot G_H \cdot C_{a_{mast}} \cdot A_{ICE_{mast}} = 8 \quad \text{plf} \quad \text{BLC 4}$$

Subject:

Loads on Equipment Structure 1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68**Wind Load (without ice)**

Mast Projected Surface Area =

$$A_{mast} := \frac{D_{mast}}{12} = 1.063$$

sf/ft

Total Mast Wind Force =

$$qZ_{Mast8} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 87$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast7} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 85$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast6} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 81$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast5} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 78$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast4} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 74$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast3} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 69$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast2} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 62$$

plf

BLC 5

Total Mast Wind Force =

$$qZ_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 49$$

plf

BLC 5

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = JMA MX10FRO640

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 71.6$ in (User Input)Antenna Width = $W_{ant} := 19.8$ in (User Input)Antenna Thickness = $T_{ant} := 7.4$ in (User Input)Antenna Weight = $WT_{ant} := 80$ lbs (User Input)Number of Antennas = $N_{ant} := 4$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.6$ Antenna Force Coefficient = $Ca_{ant} = 1.25$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 320$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 6277$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 203$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 814$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 11.6$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 46.3$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 459$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 9.8$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 39.4$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2639$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = JMA MX06FRO660-03

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 71.3$ in (User Input)Antenna Width = $W_{ant} := 15.4$ in (User Input)Antenna Thickness = $T_{ant} := 10.7$ in (User Input)Antenna Weight = $WT_{ant} := 65$ lbs (User Input)Number of Antennas = $N_{ant} := 4$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$ Antenna Force Coefficient = $Ca_{ant} = 1.29$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 260$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 6085$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 197$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 789$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 9.3$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 37.1$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 381$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 7.6$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 30.5$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 2118$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = Samsung MT6413-77A

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 28.9$ in (User Input)Antenna Width = $W_{ant} := 15.75$ in (User Input)Antenna Thickness = $T_{ant} := 5.51$ in (User Input)Antenna Weight = $WT_{ant} := 58$ lbs (User Input)Number of Antennas = $N_{ant} := 4$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.8$ Antenna Force Coefficient = $Ca_{ant} = 1.2$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 232$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2508$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 2235$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 72$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 290$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.1$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 154$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.2$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 12.6$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 814$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = Samsung RO440CC

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 12$ in (User Input)Antenna Width = $W_{ant} := 8.7$ in (User Input)Antenna Thickness = $T_{ant} := 1.5$ in (User Input)Antenna Weight = $WT_{ant} := 3$ lbs (User Input)Number of Antennas = $N_{ant} := 2$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.4$ Antenna Force Coefficient = $Ca_{ant} = 1.2$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 6$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 157$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 535$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 17$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 35$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 1.2$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2.3$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 22$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.7$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 1.5$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 93$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = Samsung RF4439d-25A RRH

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 15$ in (User Input)Antenna Width = $W_{ant} := 15$ in (User Input)Antenna Thickness = $T_{ant} := 10$ in (User Input)Antenna Weight = $WT_{ant} := 75$ lbs (User Input)Number of Antennas = $N_{ant} := 4$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.0$ Antenna Force Coefficient = $Ca_{ant} = 1.2$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 300$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2250$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 1695$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 55$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 220$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 2.2$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.7$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 82$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 6.3$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 402$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = Samsung RF4461d-13A RRH

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 15$ in (User Input)Antenna Width = $W_{ant} := 15$ in (User Input)Antenna Thickness = $T_{ant} := 10.23$ in (User Input)Antenna Weight = $WT_{ant} := 80$ lbs (User Input)Number of Antennas = $N_{ant} := 4$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.0$ Antenna Force Coefficient = $Ca_{ant} = 1.2$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 320$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2302$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 1715$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 56$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 222$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 2.2$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.7$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 82$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 1.6$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 6.3$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 402$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = CBRS RRH RT4423-48A

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 11.8$ in (User Input)Antenna Width = $W_{ant} := 8.7$ in (User Input)Antenna Thickness = $T_{ant} := 5$ in (User Input)Antenna Weight = $WT_{ant} := 20$ lbs (User Input)Number of Antennas = $N_{ant} := 4$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.4$ Antenna Force Coefficient = $Ca_{ant} = 1.2$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 80$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 513$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 743$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 24$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 96$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 1.1$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 4.6$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 43$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.7$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 2.9$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 184$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas**Antenna Data:**

(Verizon)

Antenna Model = Commscope RVZDC-6627-PF-48 OVP Box

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 29.5$ in (User Input)Antenna Width = $W_{ant} := 16.5$ in (User Input)Antenna Thickness = $T_{ant} := 12.6$ in (User Input)Antenna Weight = $WT_{ant} := 32$ lbs (User Input)Number of Antennas = $N_{ant} := 3$ (User Input)Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.8$ Antenna Force Coefficient = $Ca_{ant} = 1.2$ **Gravity Load (without ice)**Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 96$ lbs **BLC 2****Gravity Loads (ice only)**Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6133$ cu inVolume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 3264$ Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 106$ lbsWeight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 317$ lbs **BLC 3****Wind Load (with ice)**Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4.3$ sfAntenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 12.8$ sfTotal Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice,VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 122$ lbs **BLC 4****Wind Load (without ice)**Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 3.4$ sfAntenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 10.1$ sfTotal Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 653$ lbs **BLC 5**

Subject:

Loads on Equipment Structure 1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68**Development of Wind & Ice Load on Antenna Mounts****Mount Data:**

(Verizon)

Mount Type:

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

Mount Shape =

Flat

Mount Projected Surface Area =

 $CaAa := 35.6$ sf (User Input)

Mount Projected Surface Area w/ Ice =

 $CaAa_{ice} := 76.9$ sf (User Input)

Mount Weight =

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

Mount Weight w/ Ice =

 $WT_{mnt,ice} := 3658$ lbs (User Input)**Gravity Loads (without ice)**

Weight of All Mounts =

 $WT_{mnt} = 1810$

lbs

BLC 2**Gravity Loads (ice only)**

Weight of Ice on All Mounts =

 $WT_{mnt,ice} - WT_{mnt} = 1848$

lbs

BLC 3**Wind Load (with ice)**

Total Mount Wind Force =

 $Fi_{mnt} := qz_{ice,VZ} \cdot G_H \cdot CaAa_{ice} = 763$

lbs

BLC 4**Wind Load (without ice)**

Total Mount Wind Force =

 $F_{mnt} := qz_{VZ} \cdot G_H \cdot CaAa = 2387$

lbs

BLC 5

Total Pipe Length =

 $TPL := 8 \cdot ft \cdot 13 + 4 \cdot ft \cdot 2 = 112 \text{ ft}$

Total Equipment Length =

 $TAL := 71.6 \cdot in \cdot 2 + 71.3 \cdot in \cdot 2 + 28.9 \cdot in \cdot 4 + 12 \cdot in \cdot 2 + 11.8 \cdot in \cdot 4 + 29.5 \cdot in \cdot 2 = 44.3 \text{ ft}$

Exposed Pipe Area =

 $ExPA := (TPL - TAL) \cdot 2.375 \cdot in = 13.399 \text{ ft}^2$

CaAa =

 $1.2 \cdot ExPA + 19.5 \cdot ft^2 = 35.6 \text{ ft}^2$

Exposed Pipe Area (with Ice) =

 $ExPA := (TPL - TAL) \cdot (2.375 + 2 \cdot t_{izVZ}) \cdot in = 28.381 \text{ ft}^2$

CaAa (with ice) =

 $1.2 \cdot ExPA + 42.8 \cdot ft^2 = 76.9 \text{ ft}^2$

Weight =

 $1400 \cdot lb + 3.66 \cdot plf \cdot 8 \cdot ft \cdot 13 + 3.66 \cdot plf \cdot 4 \cdot ft \cdot 2 = 1810 \text{ lb}$

Weight (with ice) =

$$2350 \cdot lb + 3.66 \cdot plf \cdot 8 \cdot ft \cdot 13 + 3.66 \cdot plf \cdot 4 \cdot ft \cdot 2 + \left(\frac{\pi}{4} \cdot ((2.375 + 2 \cdot t_{izVZ}) \cdot in)^2 - (2.375 \cdot in)^2 \right) \cdot (96 \cdot in \cdot 13 + 48 \cdot in \cdot 2 + 150 \cdot in \cdot 3) \cdot \left(Id \cdot \frac{lb}{ft^3} \right) = 3658 \text{ lb}$$

Development of Wind & Ice Load on Coax Cables

(Below 139-ft AGL)

Cable Data:

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

Gravity Loads (without ice)

Weight of all cables w/o ice

$$WT_{coax} := Wt_{coax} \cdot N_{coax} = 3$$

plf

BLC 2**Gravity Loads (ice only)**

Ice Area per Linear Foot =

$$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast7})^2 - D_{coax}^2 \right) = 13.7$$

sq in

Ice Weight All Coax per foot =

$$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 16$$

plf

BLC 3

Ice Area per Linear Foot =

$$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast6})^2 - D_{coax}^2 \right) = 13.4$$

sq in

Ice Weight All Coax per foot =

$$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 16$$

plf

BLC 3

Ice Area per Linear Foot =

$$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast5})^2 - D_{coax}^2 \right) = 13$$

sq in

Ice Weight All Coax per foot =

$$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 15$$

plf

BLC 3

Ice Area per Linear Foot =

$$Ai_{coax} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast4})^2 - D_{coax}^2 \right) = 12.5$$

sq in

Ice Weight All Coax per foot =

$$WTi_{coax} := Ne_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 15$$

plf

BLC 3

Ice Area per Linear Foot =

$$A_{i_{coax}} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast3})^2 - D_{coax}^2 \right) = 12 \quad \text{sq in}$$

Ice Weight All Coax per foot =

$$WT_{i_{coax}} := Ne_{coax} \cdot Id \cdot \frac{A_{i_{coax}}}{144} = 14 \quad \text{plf} \quad \text{BLC 3}$$

Ice Area per Linear Foot =

$$A_{i_{coax}} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast2})^2 - D_{coax}^2 \right) = 11.2 \quad \text{sq in}$$

Ice Weight All Coax per foot =

$$WT_{i_{coax}} := Ne_{coax} \cdot Id \cdot \frac{A_{i_{coax}}}{144} = 13 \quad \text{plf} \quad \text{BLC 3}$$

Ice Area per Linear Foot =

$$A_{i_{coax}} := \frac{\pi}{4} \cdot \left((D_{coax} + 2 \cdot t_{izMast1})^2 - D_{coax}^2 \right) = 9.6 \quad \text{sq in}$$

Ice Weight All Coax per foot =

$$WT_{i_{coax}} := Ne_{coax} \cdot Id \cdot \frac{A_{i_{coax}}}{144} = 11 \quad \text{plf} \quad \text{BLC 3}$$

Wind Load (with ice)

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast7})}{12} = 0.4 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast7}} \cdot G_H \cdot A_{ICE_{coax}} = 5 \quad \text{plf} \quad \text{BLC 4}$$

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast6})}{12} = 0.4 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast6}} \cdot G_H \cdot A_{ICE_{coax}} = 4 \quad \text{plf} \quad \text{BLC 4}$$

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast5})}{12} = 0.4 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast5}} \cdot G_H \cdot A_{ICE_{coax}} = 4 \quad \text{plf} \quad \text{BLC 4}$$

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast4})}{12} = 0.4 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast4}} \cdot G_H \cdot A_{ICE_{coax}} = 4 \quad \text{plf} \quad \text{BLC 4}$$

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast3})}{12} = 0.4 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast3}} \cdot G_H \cdot A_{ICE_{coax}} = 4 \quad \text{plf} \quad \text{BLC 4}$$

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast2})}{12} = 0.4 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast2}} \cdot G_H \cdot A_{ICE_{coax}} = 3 \quad \text{plf} \quad \text{BLC 4}$$

Coax projected surface area w/ Ice =

$$A_{ICE_{coax}} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 0.3 \quad \text{sf/ft}$$

Total Coax Wind Force w/ Ice =

$$F_{i_{coax}} := Ca_{coax} \cdot q_{z_{ice.Mast1}} \cdot G_H \cdot A_{ICE_{coax}} = 2 \quad \text{plf} \quad \text{BLC 4}$$

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast7} \cdot G_H \cdot A_{coax} = 13$ plf **BLC 5**

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast6} \cdot G_H \cdot A_{coax} = 13$ plf **BLC 5**

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast5} \cdot G_H \cdot A_{coax} = 12$ plf **BLC 5**

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast4} \cdot G_H \cdot A_{coax} = 11$ plf **BLC 5**

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast3} \cdot G_H \cdot A_{coax} = 11$ plf **BLC 5**

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast2} \cdot G_H \cdot A_{coax} = 10$ plf **BLC 5**

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} \cdot D_{coax})}{12} = 0.2$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 8$ plf **BLC 5**

Development of Wind & Ice Load on Brace Member**Member Data:**

L2x2x3/16

Antenna Shape =

Flat

(User Input)

Height =

 $H_{mem} := 2$

in

(User Input)

Width =

 $W_{mem} := 2$

in

(User Input)

Thickness =

 $t_{mem} := 0.1875$

in

(User Input)

Length =

 $L_{mem} := 18$

in

(User Input)

Member Aspect Ratio =

$$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 9.0$$

Member Force Coefficient =

 $Ca_{mem} = 1.47$ **Gravity Load (without ice)**

Weight of Member =

Self Weight

plf

BLC 1**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := ((H_{mem} + 2 \cdot t_{izMast6}) + (W_{mem} - t_{mem})) \cdot (t_{mem} + 2 \cdot t_{izMast6}) - (H_{mem} + (W_{mem} + t_{mem})) \cdot t_{mem} = 17$$

sq in

Weight of Ice on Member =

$$W_{ICE,mem} := Id \cdot \frac{Ai_{mem}}{144} = 7$$

plf

BLC 3**Wind Load (with ice)**

Member Projected Surface Area w/ Ice =

$$A_{ICE,mem} := \frac{(H_{mem} + 2 \cdot t_{izMast6})}{12} = 0.4$$

sf/ft

Total Member Wind Force w/ Ice =

$$Fi_{mem} := qz_{ice,Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICE,mem} = 5$$

plf

BLC 4**Wind Load (without ice)**

Member Projected Surface Area =

$$A_{mem} := \frac{H_{mem}}{12} = 0.2$$

sf/ft

Total Member Wind Force =

$$F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 15$$

plf

BLC 5

Development of Wind & Ice Load on Brace Member**Member Data:**

L2.5x2.5x3/16

Antenna Shape =

Flat

(User Input)

Height =

 $H_{mem} := 2.5$

in

(User Input)

Width =

 $W_{mem} := 2.5$

in

(User Input)

Thickness =

 $t_{mem} := 0.1875$

in

(User Input)

Length =

 $L_{mem} := 40$

in

(User Input)

Member Aspect Ratio =

$$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 16.0$$

Member Force Coefficient =

 $Ca_{mem} = 1.7$ **Gravity Load (without ice)**

Weight of Member =

Self Weight

plf

BLC 1**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := ((H_{mem} + 2 \cdot t_{izMast6}) + (W_{mem} - t_{mem})) \cdot (t_{mem} + 2 \cdot t_{izMast6}) - (H_{mem} + (W_{mem} + t_{mem})) \cdot t_{mem} = 20$$

sq in

Weight of Ice on Member =

$$W_{ICE,mem} := Id \cdot \frac{Ai_{mem}}{144} = 8$$

plf

BLC 3**Wind Load (with ice)**

Member Projected Surface Area w/ Ice =

$$A_{ICE,mem} := \frac{(H_{mem} + 2 \cdot t_{izMast6})}{12} = 0.4$$

sf/ft

Total Member Wind Force w/ Ice =

$$Fi_{mem} := qz_{ice,Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICE,mem} = 7$$

plf

BLC 4**Wind Load (without ice)**

Member Projected Surface Area =

$$A_{mem} := \frac{H_{mem}}{12} = 0.2$$

sf/ft

Total Member Wind Force =

$$F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 22$$

plf

BLC 5

Development of Wind & Ice Load on Brace Member**Member Data:**

L3x3x3/16

Antenna Shape =

Flat

(User Input)

Height =

 $H_{mem} := 3$

in

(User Input)

Width =

 $W_{mem} := 3$

in

(User Input)

Thickness =

 $t_{mem} := 0.1875$

in

(User Input)

Length =

 $L_{mem} := 96$

in

(User Input)

Member Aspect Ratio =

$$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 32.0$$

Member Force Coefficient =

 $Ca_{mem} = 2$ **Gravity Load (without ice)**

Weight of Member =

Self Weight

plf

BLC 1**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := ((H_{mem} + 2 \cdot t_{izMast6}) + (W_{mem} - t_{mem})) \cdot (t_{mem} + 2 \cdot t_{izMast6}) - (H_{mem} + (W_{mem} + t_{mem})) \cdot t_{mem} = 22$$

sq in

Weight of Ice on Member =

$$W_{ICE,mem} := Id \cdot \frac{Ai_{mem}}{144} = 9$$

plf

BLC 3**Wind Load (with ice)**

Member Projected Surface Area w/ Ice =

$$A_{ICE,mem} := \frac{(H_{mem} + 2 \cdot t_{izMast6})}{12} = 0.5$$

sf/ft

Total Member Wind Force w/ Ice =

$$Fi_{mem} := qz_{ice,Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICE,mem} = 8$$

plf

BLC 4**Wind Load (without ice)**

Member Projected Surface Area =

$$A_{mem} := \frac{H_{mem}}{12} = 0.3$$

sf/ft

Total Member Wind Force =

$$F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 31$$

plf

BLC 5

Development of Wind & Ice Load on Brace Member**Member Data:**

L3.5x3.5x1/4

Antenna Shape =

Flat

(User Input)

Height =

 $H_{mem} := 3.5$

in

(User Input)

Width =

 $W_{mem} := 3.5$

in

(User Input)

Thickness =

 $t_{mem} := 0.25$

in

(User Input)

Length =

 $L_{mem} := 133$

in

(User Input)

Member Aspect Ratio =

$$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 38.0$$

Member Force Coefficient =

 $Ca_{mem} = 2$ **Gravity Load (without ice)**

Weight of Member =

Self Weight

plf

BLC 1**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := ((H_{mem} + 2 \cdot t_{izMast6}) + (W_{mem} - t_{mem})) \cdot (t_{mem} + 2 \cdot t_{izMast6}) - (H_{mem} + (W_{mem} + t_{mem})) \cdot t_{mem} = 25$$

sq in

Weight of Ice on Member =

$$W_{ICE,mem} := Id \cdot \frac{Ai_{mem}}{144} = 10$$

plf

BLC 3**Wind Load (with ice)**

Member Projected Surface Area w/ Ice =

$$A_{ICE,mem} := \frac{(H_{mem} + 2 \cdot t_{izMast6})}{12} = 0.5$$

sf/ft

Total Member Wind Force w/ Ice =

$$Fi_{mem} := qz_{ice,Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICE,mem} = 9$$

plf

BLC 4**Wind Load (without ice)**

Member Projected Surface Area =

$$A_{mem} := \frac{H_{mem}}{12} = 0.3$$

sf/ft

Total Member Wind Force =

$$F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 36$$

plf

BLC 5

Development of Wind & Ice Load on Brace Member**Member Data:**

L4x4x1/4

Antenna Shape =

Flat

(User Input)

Height =

 $H_{mem} := 4$

in

(User Input)

Width =

 $W_{mem} := 4$

in

(User Input)

Thickness =

 $t_{mem} := 0.25$

in

(User Input)

Length =

 $L_{mem} := 159$

in

(User Input)

Member Aspect Ratio =

$$Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 39.8$$

Member Force Coefficient =

 $Ca_{mem} = 2$ **Gravity Load (without ice)**

Weight of Member =

Self Weight

plf

BLC 1**Gravity Loads (ice only)**

Ice Area per Linear foot =

$$Ai_{mem} := ((H_{mem} + 2 \cdot t_{izMast6}) + (W_{mem} - t_{mem})) \cdot (t_{mem} + 2 \cdot t_{izMast6}) - (H_{mem} + (W_{mem} + t_{mem})) \cdot t_{mem} = 27$$

sq in

Weight of Ice on Member =

$$W_{ICE,mem} := Id \cdot \frac{Ai_{mem}}{144} = 11$$

plf

BLC 3**Wind Load (with ice)**

Member Projected Surface Area w/ Ice =

$$A_{ICE,mem} := \frac{(H_{mem} + 2 \cdot t_{izMast6})}{12} = 0.5$$

sf/ft

Total Member Wind Force w/ Ice =

$$Fi_{mem} := qz_{ice,Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICE,mem} = 10$$

plf

BLC 4**Wind Load (without ice)**

Member Projected Surface Area =

$$A_{mem} := \frac{H_{mem}}{12} = 0.3$$

sf/ft

Total Member Wind Force =

$$F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 41$$

plf

BLC 5

Model Settings

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

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

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

Analysis Methodology	PCA Load Contour Method
Parame Beta Factor	0.65

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

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

Code	UBC 1997
------	----------

Model Settings (Continued)

Occupancy Cat	4
Seismic Zone	3
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	No
C _s	0.36
C _v	0.54
T Z (sec)	
T X (sec)	
C _Z	0.035
C _X	0.035
R Z	8.5
R X	8.5
Q _s Z	1
Q _s X	1
ρ Z	1
ρ X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [10^{-6}F^{-1}]	Density [k/ft ³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.2	58	1.1
6	A53 Gr. B	29000	11154	0.3	0.65	0.49	35	1.5	58	1.2
7	A500 Gr. 50	29000	11154	0.3	0.65	0.49	50	1.1	58	1.2

Hot Rolled Steel Section Sets

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

Hot Rolled Steel Design Parameters

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

Member Primary Data

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

Member Primary Data (Continued)

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

Node Coordinates

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

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2						
3	N3						
4	N4						

Node Boundary Conditions (Continued)

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

Member Point Loads (BLC 2 : Weight of Appurtenances)

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

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Y	-0.814	139
2	M1	Y	-0.789	139
3	M1	Y	-0.29	139
4	M1	Y	-0.035	139
5	M1	Y	-0.22	139
6	M1	Y	-0.222	139
7	M1	Y	-0.096	139
8	M1	Y	-0.317	139
9	M1	Y	-1.848	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	0.459	139
2	M1	X	0.381	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
3	M1	X	0.154	139
4	M1	X	0.022	139
5	M1	X	0.082	139
6	M1	X	0.082	139
7	M1	X	0.043	139
8	M1	X	0.122	139
9	M1	X	0.763	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	X	2.639	139
2	M1	X	2.118	139
3	M1	X	0.814	139
4	M1	X	0.093	139
5	M1	X	0.402	139
6	M1	X	0.402	139
7	M1	X	0.184	139
8	M1	X	0.653	139
9	M1	X	2.387	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	0.459	139
2	M1	Z	0.381	139
3	M1	Z	0.154	139
4	M1	Z	0.022	139
5	M1	Z	0.082	139
6	M1	Z	0.082	139
7	M1	Z	0.043	139
8	M1	Z	0.122	139
9	M1	Z	0.763	139

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

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	M1	Z	2.639	139
2	M1	Z	2.118	139
3	M1	Z	0.814	139
4	M1	Z	0.093	139
5	M1	Z	0.402	139
6	M1	Z	0.402	139
7	M1	Z	0.184	139
8	M1	Z	0.653	139
9	M1	Z	2.387	139

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.003	-0.003	0	139

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Y	-0.023	-0.023	140	144
2	M1	Y	-0.023	-0.023	120	140
3	M1	Y	-0.022	-0.022	100	120
4	M1	Y	-0.022	-0.022	80	100
5	M1	Y	-0.021	-0.021	60	80
6	M1	Y	-0.02	-0.02	40	60
7	M1	Y	-0.019	-0.019	20	40
8	M1	Y	-0.017	-0.017	0	20
9	M1	Y	-0.016	-0.016	120	139
10	M1	Y	-0.016	-0.016	100	120
11	M1	Y	-0.015	-0.015	80	100
12	M1	Y	-0.015	-0.015	60	80
13	M1	Y	-0.014	-0.014	40	60
14	M1	Y	-0.013	-0.013	20	40
15	M1	Y	-0.011	-0.011	0	20
16	M18	Y	-0.007	-0.007	0	%100
17	M15	Y	-0.007	-0.007	0	%100
18	M12	Y	-0.007	-0.007	0	%100
19	M16	Y	-0.008	-0.008	0	%100
20	M17	Y	-0.008	-0.008	0	%100
21	M13	Y	-0.008	-0.008	0	%100
22	M14	Y	-0.008	-0.008	0	%100
23	M10	Y	-0.008	-0.008	0	%100
24	M11	Y	-0.008	-0.008	0	%100
25	M4	Y	-0.009	-0.009	0	%100
26	M2	Y	-0.01	-0.01	0	%100
27	M9	Y	-0.01	-0.01	0	%100
28	M5	Y	-0.01	-0.01	0	%100
29	M8	Y	-0.01	-0.01	0	%100
30	M6	Y	-0.011	-0.011	0	%100
31	M3	Y	-0.011	-0.011	0	%100
32	M7	Y	-0.011	-0.011	0	%100
33	M20	Y	-0.008	-0.008	0	%100
34	M21	Y	-0.008	-0.008	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.016	0.016	140	144
2	M1	X	0.015	0.015	120	140
3	M1	X	0.014	0.014	100	120
4	M1	X	0.014	0.014	80	100
5	M1	X	0.013	0.013	60	80
6	M1	X	0.012	0.012	40	60
7	M1	X	0.011	0.011	20	40
8	M1	X	0.008	0.008	0	20
9	M1	X	0.005	0.005	120	139
10	M1	X	0.004	0.004	100	120
11	M1	X	0.004	0.004	80	100
12	M1	X	0.004	0.004	60	80
13	M1	X	0.004	0.004	40	60
14	M1	X	0.003	0.003	20	40
15	M1	X	0.002	0.002	0	20
16	M18	X	0.005	0.005	0	%100
17	M15	X	0.005	0.005	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
18	M12	X	0.005	0.005	0	%100
19	M16	X	0.007	0.007	0	%100
20	M17	X	0.007	0.007	0	%100
21	M13	X	0.007	0.007	0	%100
22	M14	X	0.007	0.007	0	%100
23	M10	X	0.007	0.007	0	%100
24	M11	X	0.007	0.007	0	%100
25	M4	X	0.008	0.008	0	%100
26	M2	X	0.009	0.009	0	%100
27	M5	X	0.009	0.009	0	%100
28	M3	X	0.01	0.01	0	%100
29	M20	X	0.007	0.007	0	%100
30	M21	X	0.007	0.007	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	X	0.087	0.087	140	144
2	M1	X	0.085	0.085	120	140
3	M1	X	0.081	0.081	100	120
4	M1	X	0.078	0.078	80	100
5	M1	X	0.074	0.074	60	80
6	M1	X	0.069	0.069	40	60
7	M1	X	0.062	0.062	20	40
8	M1	X	0.049	0.049	0	20
9	M1	X	0.013	0.013	120	139
10	M1	X	0.013	0.013	100	120
11	M1	X	0.012	0.012	80	100
12	M1	X	0.011	0.011	60	80
13	M1	X	0.011	0.011	40	60
14	M1	X	0.01	0.01	20	40
15	M1	X	0.008	0.008	0	20
16	M18	X	0.015	0.015	0	%100
17	M15	X	0.015	0.015	0	%100
18	M12	X	0.015	0.015	0	%100
19	M16	X	0.022	0.022	0	%100
20	M17	X	0.022	0.022	0	%100
21	M13	X	0.022	0.022	0	%100
22	M14	X	0.022	0.022	0	%100
23	M10	X	0.022	0.022	0	%100
24	M11	X	0.022	0.022	0	%100
25	M4	X	0.031	0.031	0	%100
26	M2	X	0.036	0.036	0	%100
27	M5	X	0.036	0.036	0	%100
28	M3	X	0.041	0.041	0	%100
29	M20	X	0.022	0.022	0	%100
30	M21	X	0.022	0.022	0	%100

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.016	0.016	140	144
2	M1	Z	0.015	0.015	120	140
3	M1	Z	0.014	0.014	100	120
4	M1	Z	0.014	0.014	80	100

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

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

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

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	M1	Z	0.087	0.087	140	144
2	M1	Z	0.085	0.085	120	140
3	M1	Z	0.081	0.081	100	120
4	M1	Z	0.078	0.078	80	100
5	M1	Z	0.074	0.074	60	80
6	M1	Z	0.069	0.069	40	60
7	M1	Z	0.062	0.062	20	40
8	M1	Z	0.049	0.049	0	20
9	M1	Z	0.013	0.013	120	139
10	M1	Z	0.013	0.013	100	120
11	M1	Z	0.012	0.012	80	100
12	M1	Z	0.011	0.011	60	80
13	M1	Z	0.011	0.011	40	60
14	M1	Z	0.01	0.01	20	40
15	M1	Z	0.008	0.008	0	20
16	M16	Z	0.022	0.022	0	%100
17	M17	Z	0.022	0.022	0	%100
18	M13	Z	0.022	0.022	0	%100
19	M14	Z	0.022	0.022	0	%100
20	M10	Z	0.022	0.022	0	%100
21	M11	Z	0.022	0.022	0	%100
22	M8	Z	0.036	0.036	0	%100
23	M9	Z	0.036	0.036	0	%100
24	M6	Z	0.041	0.041	0	%100
25	M7	Z	0.041	0.041	0	%100
26	M20	Z	0.022	0.022	0	%100
27	M21	Z	0.022	0.022	0	%100

Basic Load Cases

	BLC Description	Category	Y Gravity	Point	Distributed
1	Self Weight	None	-1		
2	Weight of Appurtenances	None		9	1
3	Weight of Ice Only	None		9	34
4	(x) TIA Wind with Ice	None		9	30
5	(x) TIA Wind	None		9	30
6	(z) TIA Wind with Ice	None		9	27
7	(z) TIA Wind	None		9	27

Load Combinations

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

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
0	N1	max	0	5	23.952	3	0	1	0	1	0	5	5.802	1
1		min	-1.012	2	10.321	5	-1.011	5	-5.794	4	0	1	0	5
2	N9	max	0	6	0.087	3	0	3	0	6	0	6	0	6
3		min	-0.184	1	0.027	5	-0.597	5	0	1	0	1	0	1
4	N10	max	0	6	0.125	6	0	3	0	6	0	6	0	6
5		min	-0.272	2	0.039	2	-0.524	5	0	1	0	1	0	1
6	N11	max	-0.015	6	0.112	3	-0.014	3	0	6	0	6	0	6
7		min	-0.554	2	0.035	5	-0.252	5	0	1	0	1	0	1
8	N12	max	0.074	5	0.112	6	0.071	2	0	6	0	6	0	6
9		min	-0.554	2	0.035	2	-0.252	5	0	1	0	1	0	1
10	N13	max	0	6	0.054	3	0	3	0	6	0	6	0	6
11		min	-0.125	2	0.013	5	-1.562	4	0	1	0	1	0	1
12	N14	max	0	6	0.094	6	0	3	0	6	0	6	0	6
13		min	-0.199	1	0.029	2	-1.777	4	0	1	0	1	0	1
14	N15	max	-0.064	6	0.082	3	-0.054	6	0	6	0	6	0	6
15		min	-1.708	1	0.025	5	-0.267	1	0	1	0	1	0	1
16	N16	max	0.31	4	0.082	6	0.267	1	0	6	0	6	0	6
17		min	-1.708	1	0.025	2	-0.223	4	0	1	0	1	0	1
18	N17	max	0	6	0.009	6	0	2	0	6	0	6	0	6
19		min	-0.011	1	0.002	2	-2.698	5	0	1	0	1	0	1
20	N18	max	0.602	5	0.02	3	0.83	2	0	6	0	6	0	6
21		min	-1.697	2	0.004	5	-0.338	5	0	1	0	1	0	1
22	N19	max	-0.121	6	0.019	6	-0.072	6	0	6	0	6	0	6
23		min	-1.697	2	0.003	2	-0.83	2	0	1	0	1	0	1
24	N20	max	0	5	0.009	6	0	1	0	6	0	6	0	6
25		min	-0.011	2	0.002	2	-1.579	4	0	1	0	1	0	1
26	N21	max	0.353	4	0.02	3	0.474	1	0	6	0	6	0	6
27		min	-0.984	1	0.004	5	-0.213	4	0	1	0	1	0	1
28	N23	max	0	6	0.007	3	3.765	4	0	6	0	6	0	6
29		min	-0.011	1	-0.006	4	0	3	0	1	0	1	0	1
30	N24	max	2.229	1	0.02	6	0.383	4	0	6	0	6	0	6
31		min	-0.841	4	0.003	2	-1.133	1	0	1	0	1	0	1
32	N22	max	-0.076	6	0.019	6	-0.05	6	0	6	0	6	0	6

Envelope Node Reactions (Continued)

Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC	
33		min	-0.984	1	0.004	2	-0.474	1	0	1	0	1	0	1
34	N25	max	2.229	1	0.021	3	1.133	1	0	6	0	6	0	6
35		min	0.187	6	0.005	5	0.082	6	0	1	0	1	0	1
36	N28	max	-0.16	6	0.021	6	-0.092	6	0	6	0	6	0	6
37		min	-8.256	1	-0.002	1	-4.111	1	0	1	0	1	0	1
38	N26	max	0	1	0.052	4	0.003	1	0	6	0	6	0	6
39		min	0	5	0.01	2	-15.721	4	0	1	0	1	0	1
40	N27	max	0.744	4	0.026	3	4.109	1	0	6	0	6	0	6
41		min	-8.258	1	0.005	5	-0.409	4	0	1	0	1	0	1
42	Totals:	max	0	4	24.897	3	0	2						
43		min	-23.767	1	10.633	5	-23.807	5						

Envelope Node Displacements

Node Label			X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
0	N1	max	0	2	0	5	0	5	0	4	0	1	0	5
1		min	0	5	0	3	0	1	0	1	0	5	0	1
2	N2	max	0.002	2	-0.01	5	0.002	5	0	1	0	1	5.218e-4	1
3		min	0	5	-0.023	3	0	3	-5.185e-4	4	0	5	0	6
4	N3	max	0.005	1	-0.014	5	0.006	4	1.149e-3	4	0	1	0	4
5		min	0	5	-0.034	3	0	3	0	1	0	5	-1.146e-3	1
6	N4	max	0.004	2	-0.026	5	0.003	5	0	1	0	1	1.155e-3	1
7		min	0	5	-0.061	3	0	2	-1.16e-3	4	0	5	0	6
8	N5	max	0.002	1	-0.028	5	0.002	4	6.529e-4	4	0	1	0	5
9		min	0	5	-0.068	3	0	1	0	1	0	5	-6.35e-4	1
10	N6	max	0	6	-0.031	5	0	3	0	3	0	1	1.609e-3	1
11		min	-0.005	1	-0.074	3	-0.004	4	-1.632e-3	4	0	5	0	5
12	N7	max	0.015	1	-0.033	5	0.003	4	6.455e-3	4	0	1	0	6
13		min	0	6	-0.08	3	0	1	0	2	0	5	-6.551e-3	1
14	N8	max	1.879	1	-0.034	5	1.849	4	1.083e-2	4	0	1	0	6
15		min	0	6	-0.082	3	0	2	0	2	0	5	-1.093e-2	1
16	N9	max	0	1	0	5	0	5	3.451e-3	2	2.193e-3	6	5.218e-4	1
17		min	0	6	0	3	0	3	-3.863e-3	6	-7.145e-3	2	0	6
18	N10	max	0	2	0	2	0	5	6.13e-3	6	1.187e-2	2	5.218e-4	1
19		min	0	6	0	6	0	3	-5.927e-3	2	-3.621e-3	6	0	6
20	N11	max	0	2	0	5	0	5	5.748e-4	3	2.587e-3	3	4.065e-3	5
21		min	0	6	0	3	0	3	-1.037e-3	5	-8.411e-3	5	-4.403e-3	3
22	N12	max	0	2	0	2	0	5	5.496e-4	3	8.411e-3	5	4.406e-3	3
23		min	0	5	0	6	0	2	-1.037e-3	5	-2.587e-3	3	-4.065e-3	5
24	N13	max	0	2	0	5	0	4	3.355e-3	2	1.85e-3	6	0	4
25		min	0	6	0	3	0	3	-3.412e-3	6	-6.647e-3	2	-1.146e-3	1
26	N14	max	0	1	0	2	0	4	4.899e-3	6	9.052e-3	2	0	4
27		min	0	6	0	6	0	3	-4.356e-3	2	-2.773e-3	6	-1.146e-3	1
28	N15	max	0	1	0	5	0	1	7.407e-4	4	1.86e-3	3	2.963e-3	5
29		min	0	6	0	3	0	6	-7.873e-6	2	-6.014e-3	5	-3.371e-3	3
30	N16	max	0	1	0	2	0	4	7.407e-4	4	6.014e-3	5	3.36e-3	3
31		min	0	4	0	6	0	1	3.423e-4	2	-1.857e-3	3	-2.963e-3	5
32	N17	max	0	1	0	2	0	5	3.434e-3	6	2.912e-4	2	1.155e-3	1
33		min	0	6	0	6	0	2	1.388e-3	2	-2.971e-5	6	0	6
34	N18	max	0	2	0	5	0	5	-7.047e-4	2	1.061e-4	3	1.36e-4	5
35		min	0	5	0	3	0	2	-1.199e-3	4	-5.879e-4	5	-1.562e-3	3
36	N19	max	0	2	0	2	0	2	6.426e-5	2	5.879e-4	5	1.754e-3	3
37		min	0	6	0	6	0	6	-1.199e-3	4	-3.954e-4	1	-1.36e-4	5
38	N20	max	0	2	0	2	0	4	3.817e-3	6	1.957e-4	2	0	5
39		min	0	5	0	6	0	1	1.542e-3	2	-2.971e-5	6	-6.35e-4	1
40	N21	max	0	1	0	5	0	4	3.272e-4	5	1.095e-4	3	-6.5e-4	5

Envelope Node Displacements (Continued)

Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC	
41		min	0	4	0	3	0	1	-8.281e-4	3	-5.611e-4	5	-1.789e-3	3
42	N22	max	0	1	0	2	0	1	3.272e-4	5	5.611e-4	5	1.835e-3	3
43		min	0	6	0	6	0	6	-9.836e-4	3	-3.763e-4	1	6.5e-4	5
44	N23	max	0	1	0	4	0	3	4.16e-3	6	-6.603e-6	5	1.609e-3	1
45		min	0	6	0	3	0	4	1.676e-3	2	-2.36e-4	1	0	5
46	N24	max	0	4	0	2	0	1	-9.429e-4	2	1.285e-4	3	2.09e-4	5
47		min	0	1	0	6	0	4	-1.653e-3	4	-4.337e-4	5	-1.83e-3	3
48	N25	max	0	6	0	5	0	6	1.871e-4	2	4.337e-4	5	2.068e-3	3
49		min	0	1	0	3	0	1	-1.653e-3	4	-2.904e-4	1	-2.09e-4	5
50	N26	max	0	5	0	2	0	4	4.458e-3	3	8.322e-4	1	0	6
51		min	0	1	0	4	0	1	1.836e-3	5	0	6	-6.551e-3	1
52	N27	max	0	1	0	5	0	4	4.87e-3	5	6.512e-5	3	-2.e-3	2
53		min	0	4	0	3	0	1	-4.32e-4	3	-4.473e-4	5	-3.424e-3	4
54	N28	max	0	1	0	1	0	1	4.637e-3	5	5.6e-4	4	3.89e-3	4
55		min	0	6	0	6	0	6	-3.101e-3	1	-3.358e-4	2	-6.159e-4	2

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

Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
0	M1	12"FWTPOWERMOUNT	0.346	132.583	1	0.064	134.125	1	489.665	551.086	180.952	180.952	1	H1-1b
1	M2	L3.5X3.5X4	0.221	5.125	2	0.011	10.25	z 2	12.016	55.08	2.416	3.731	1.136	H2-1
2	M3	L4X4X4	0.341	6.625	2	0.014	13.25	z 2	10.574	62.532	3.138	4.34	1.136	H2-1
3	M4	L3X3X3	0.219	4.042	2	0.011	8.083	z 2	8.988	35.316	1.32	2.019	1.136	H2-1
4	M5	L3.5X3.5X4	0.262	5.542	2	0.012	11.083	z 2	10.278	55.08	2.416	3.613	1.136	H2-1
5	M6	L4X4X4	0.265	5.923	5	0.012	11.845	z 5	13.23	62.532	3.138	4.585	1.136	H2-1
6	M7	L4X4X4	0.265	5.923	5	0.012	11.845	z 4	13.23	62.532	3.138	4.585	1.136	H2-1
7	M8	L3.5X3.5X4	0.199	4.85	5	0.01	9.7	z 4	13.418	55.08	2.416	3.812	1.136	H2-1
8	M9	L3.5X3.5X4	0.199	4.85	5	0.01	9.7	z 5	13.418	55.08	2.416	3.812	1.136	H2-1
9	M10	L2.5X2.5X3	0.079	1.607	2	0.004	3.354	z 5	20.223	29.192	0.873	1.781	1.136	H2-1
10	M11	L2.5X2.5X3	0.111	1.747	1	0.004	3.354	z 4	20.223	29.192	0.873	1.781	1.136	H2-1
11	M12	L2X2X3	0.117	0.75	4	0.002	1.5	z 1	20.899	23.393	0.558	1.239	1.136	H2-1
12	M13	L2.5X2.5X3	0.051	1.607	2	0.004	3.354	z 4	20.223	29.192	0.873	1.781	1.136	H2-1
13	M14	L2.5X2.5X3	0.071	1.747	1	0.004	3.354	z 4	20.223	29.192	0.873	1.781	1.136	H2-1
14	M15	L2X2X3	0.069	0.75	4	0.002	1.5	z 1	20.899	23.393	0.558	1.239	1.136	H2-1
15	M16	L2.5X2.5X3	0.14	1.782	2	0.004	3.354	z 4	20.223	29.192	0.873	1.781	1.136	H2-1
16	M17	L2.5X2.5X3	0.106	1.642	1	0.004	3.354	z 5	20.223	29.192	0.873	1.781	1.136	H2-1
17	M18	L2X2X3	0.182	0.75	4	0.002	1.5	z 1	20.899	23.393	0.558	1.239	1.136	H2-1
18	M19	6"X3/4"PL	0.108	1.5	4	0	1.5	y 6	101.328	145.8	2.278	18.225	1.136	H1-1b*
19	M20	L2.5X2.5X4	0.249	1.607	2	0.003	3.354	z 4	26.71	38.556	1.114	2.43	1.136	H2-1
20	M21	L2.5X2.5X4	0.355	1.572	2	0.003	3.354	z 5	26.71	38.556	1.114	2.43	1.136	H2-1

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	1	N1	-1.012	13.798	0	0	0	5.802
1	1	N9	-0.184	0.036	0	0	0	0
2	1	N10	-0.272	0.052	0	0	0	0
3	1	N11	-0.554	0.047	-0.071	0	0	0
4	1	N12	-0.554	0.047	0.071	0	0	0
5	1	N13	-0.125	0.018	0	0	0	0
6	1	N14	-0.199	0.038	0	0	0	0
7	1	N15	-1.708	0.034	-0.267	0	0	0
8	1	N16	-1.708	0.033	0.267	0	0	0
9	1	N17	-0.011	0.002	0	0	0	0
10	1	N18	-1.697	0.008	0.83	0	0	0
11	1	N19	-1.697	0.005	-0.83	0	0	0
12	1	N20	-0.011	0.002	0	0	0	0
13	1	N21	-0.984	0.007	0.474	0	0	0
14	1	N23	-0.011	0.002	0	0	0	0
15	1	N24	2.229	0.004	-1.133	0	0	0
16	1	N22	-0.984	0.005	-0.474	0	0	0
17	1	N25	2.229	0.009	1.133	0	0	0
18	1	N28	-8.256	-0.002	-4.111	0	0	0
19	1	N26	0	0.014	0.003	0	0	0
20	1	N27	-8.258	0.018	4.109	0	0	0
21	1	Totals:	-23.767	14.177	0			
22	1	COG (ft):	X: 0	Y: 91.445	Z: -0.056			

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	2	N1	-1.012	10.349	0	0	0	5.802
1	2	N9	-0.184	0.027	0	0	0	0
2	2	N10	-0.272	0.039	0	0	0	0
3	2	N11	-0.554	0.035	-0.071	0	0	0
4	2	N12	-0.554	0.035	0.071	0	0	0
5	2	N13	-0.125	0.013	0	0	0	0
6	2	N14	-0.199	0.029	0	0	0	0
7	2	N15	-1.708	0.025	-0.267	0	0	0
8	2	N16	-1.708	0.025	0.267	0	0	0
9	2	N17	-0.011	0.002	0	0	0	0
10	2	N18	-1.697	0.006	0.83	0	0	0
11	2	N19	-1.697	0.003	-0.83	0	0	0
12	2	N20	-0.011	0.002	0	0	0	0
13	2	N21	-0.983	0.005	0.473	0	0	0
14	2	N23	-0.011	0.002	0	0	0	0
15	2	N24	2.224	0.003	-1.131	0	0	0
16	2	N22	-0.983	0.004	-0.473	0	0	0
17	2	N25	2.224	0.007	1.13	0	0	0
18	2	N28	-8.252	-0.001	-4.109	0	0	0
19	2	N26	0	0.01	0.003	0	0	0
20	2	N27	-8.254	0.014	4.107	0	0	0
21	2	Totals:	-23.767	10.633	0			
22	2	COG (ft):	X: 0	Y: 91.445	Z: -0.056			

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	3	N1	-0.181	23.952	0	0	0	1.055
1	3	N9	-0.046	0.087	0	0	0	0
2	3	N10	-0.066	0.125	0	0	0	0
3	3	N11	-0.113	0.112	-0.014	0	0	0
4	3	N12	-0.113	0.112	0.014	0	0	0
5	3	N13	-0.032	0.054	0	0	0	0
6	3	N14	-0.05	0.094	0	0	0	0
7	3	N15	-0.351	0.082	-0.055	0	0	0
8	3	N16	-0.351	0.082	0.055	0	0	0
9	3	N17	-0.004	0.007	0	0	0	0
10	3	N18	-0.346	0.02	0.167	0	0	0
11	3	N19	-0.346	0.019	-0.167	0	0	0
12	3	N20	-0.004	0.007	0	0	0	0
13	3	N21	-0.217	0.02	0.102	0	0	0
14	3	N23	-0.004	0.007	0	0	0	0
15	3	N24	0.493	0.019	-0.252	0	0	0
16	3	N22	-0.217	0.019	-0.102	0	0	0
17	3	N25	0.493	0.021	0.252	0	0	0
18	3	N28	-1.785	0.018	-0.887	0	0	0
19	3	N26	0	0.014	0	0	0	0
20	3	N27	-1.785	0.026	0.887	0	0	0
21	3	Totals:	-5.026	24.897	0			
22	3	COG (ft):	X: 0	Y: 95.207	Z: -0.071			

Node Reactions

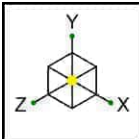
	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	4	N1	0	13.762	-1.011	-5.794	0	0
1	4	N9	0	0.036	-0.597	0	0	0
2	4	N10	0	0.052	-0.524	0	0	0
3	4	N11	-0.074	0.047	-0.252	0	0	0
4	4	N12	0.074	0.047	-0.252	0	0	0
5	4	N13	0	0.018	-1.562	0	0	0
6	4	N14	0	0.039	-1.777	0	0	0
7	4	N15	-0.31	0.034	-0.223	0	0	0
8	4	N16	0.31	0.034	-0.223	0	0	0
9	4	N17	0	0.007	-2.698	0	0	0
10	4	N18	0.602	0.006	-0.338	0	0	0
11	4	N19	-0.602	0.006	-0.338	0	0	0
12	4	N20	0	0.006	-1.579	0	0	0
13	4	N21	0.353	0.006	-0.213	0	0	0
14	4	N23	0	-0.006	3.765	0	0	0
15	4	N24	-0.841	0.007	0.383	0	0	0
16	4	N22	-0.353	0.006	-0.213	0	0	0
17	4	N25	0.841	0.007	0.383	0	0	0
18	4	N28	-0.744	0.007	-0.409	0	0	0
19	4	N26	0	0.052	-15.721	0	0	0
20	4	N27	0.744	0.007	-0.409	0	0	0
21	4	Totals:	0	14.177	-23.807			
22	4	COG (ft):	X: 0	Y: 91.445	Z: -0.056			

Node Reactions

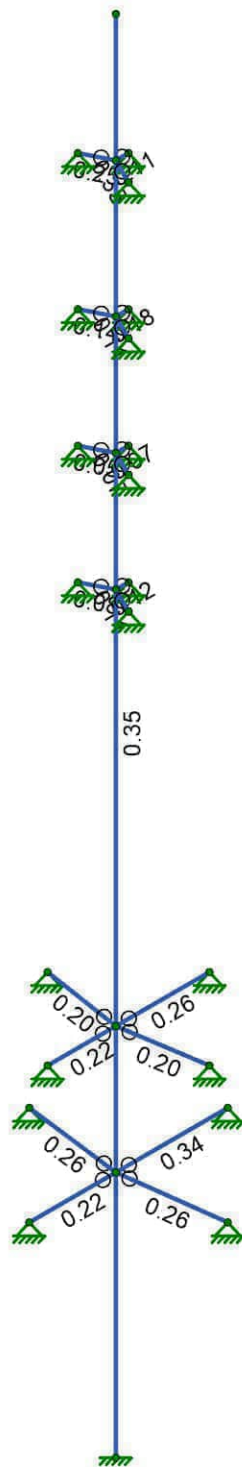
	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	5	N1	0	10.321	-1.011	-5.794	0	0
1	5	N9	0	0.027	-0.597	0	0	0
2	5	N10	0	0.039	-0.524	0	0	0
3	5	N11	-0.074	0.035	-0.252	0	0	0
4	5	N12	0.074	0.035	-0.252	0	0	0
5	5	N13	0	0.013	-1.562	0	0	0
6	5	N14	0	0.029	-1.777	0	0	0
7	5	N15	-0.31	0.025	-0.223	0	0	0
8	5	N16	0.31	0.025	-0.223	0	0	0
9	5	N17	0	0.005	-2.698	0	0	0
10	5	N18	0.602	0.004	-0.338	0	0	0
11	5	N19	-0.602	0.004	-0.338	0	0	0
12	5	N20	0	0.004	-1.577	0	0	0
13	5	N21	0.352	0.004	-0.213	0	0	0
14	5	N23	0	-0.005	3.757	0	0	0
15	5	N24	-0.839	0.005	0.383	0	0	0
16	5	N22	-0.352	0.004	-0.213	0	0	0
17	5	N25	0.839	0.005	0.383	0	0	0
18	5	N28	-0.743	0.005	-0.409	0	0	0
19	5	N26	0	0.039	-15.713	0	0	0
20	5	N27	0.743	0.005	-0.409	0	0	0
21	5	Totals:	0	10.633	-23.807			
22	5	COG (ft):	X: 0	Y: 91.445	Z: -0.056			

Node Reactions

	LC	Node Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
0	6	N1	0	23.938	-0.181	-1.054	0	0
1	6	N9	0	0.087	-0.122	0	0	0
2	6	N10	0	0.125	-0.107	0	0	0
3	6	N11	-0.015	0.112	-0.061	0	0	0
4	6	N12	0.015	0.112	-0.061	0	0	0
5	6	N13	0	0.054	-0.322	0	0	0
6	6	N14	0	0.094	-0.366	0	0	0
7	6	N15	-0.064	0.082	-0.054	0	0	0
8	6	N16	0.064	0.082	-0.054	0	0	0
9	6	N17	0	0.009	-0.542	0	0	0
10	6	N18	0.121	0.019	-0.072	0	0	0
11	6	N19	-0.121	0.019	-0.072	0	0	0
12	6	N20	0	0.009	-0.341	0	0	0
13	6	N21	0.076	0.019	-0.05	0	0	0
14	6	N23	0	0.004	0.839	0	0	0
15	6	N24	-0.187	0.02	0.082	0	0	0
16	6	N22	-0.076	0.019	-0.05	0	0	0
17	6	N25	0.187	0.02	0.082	0	0	0
18	6	N28	-0.16	0.021	-0.092	0	0	0
19	6	N26	0	0.029	-3.392	0	0	0
20	6	N27	0.16	0.021	-0.092	0	0	0
21	6	Totals:	0	24.897	-5.026			
22	6	COG (ft):	X: 0	Y: 95.207	Z: -0.071			

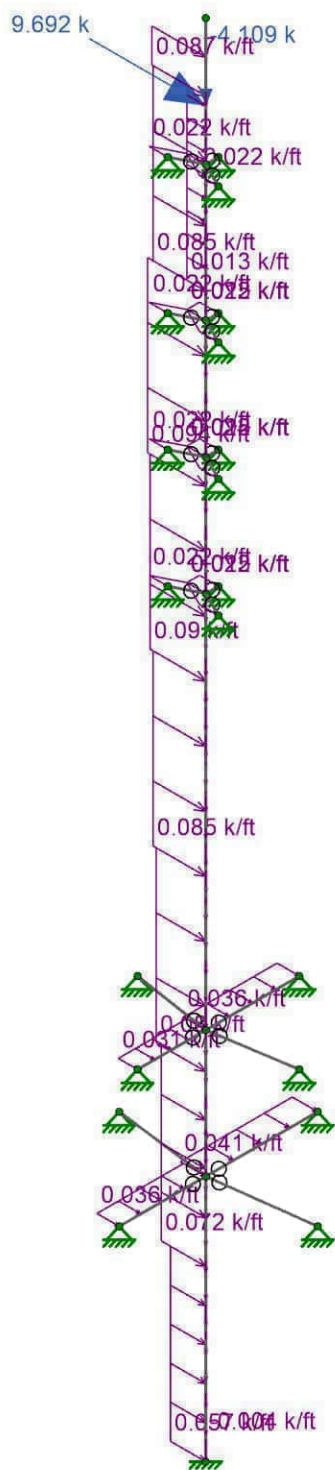
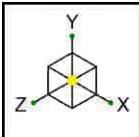


Code Check (Env)	
 	No Calc
 	> 1.0
 	.90-1.0
 	.75-.90
 	.50-.75
 	0.-.50



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

	CEN TEK Engineering, I...	Struct. #1281 - Antenna Mast	
	TJL		
	21007.68 - Greenwich 3		TIA-222 Mast.r3d



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



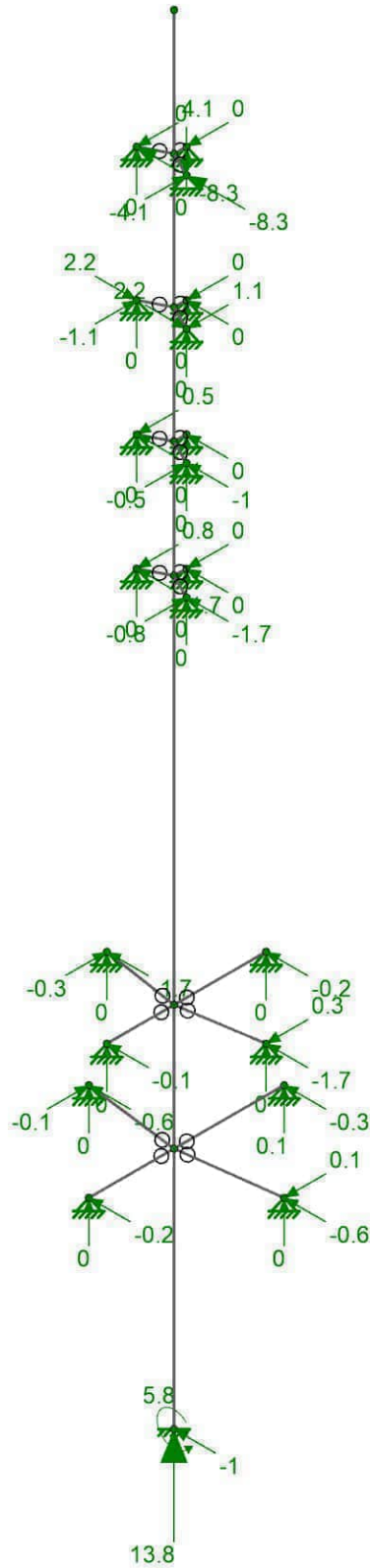
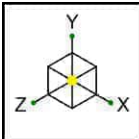
CEN TEK Engineering, I...

TJL

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Struct. #1281 - Antenna Mast

TIA-222 Mast.r3d



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



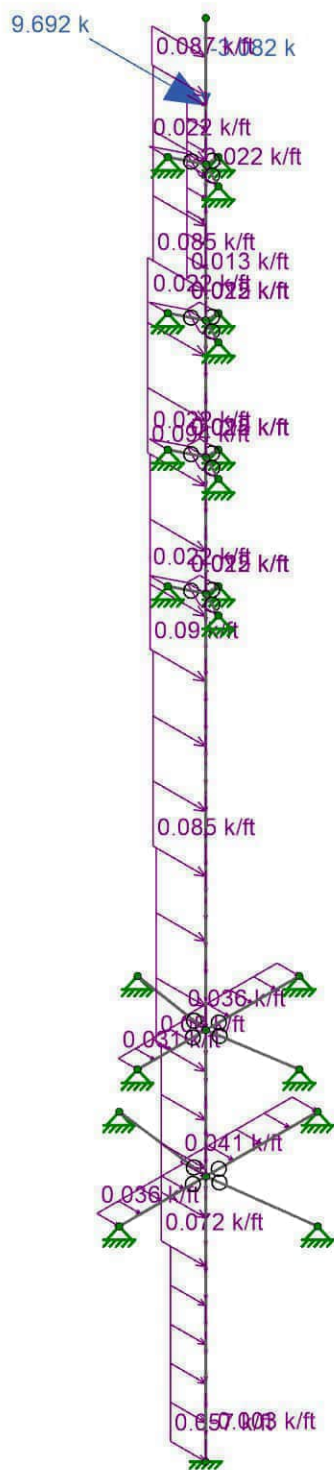
CEN TEK Engineering, Inc.

TJL

21007.68 - Greenwich 3

Struct. #1281 - Antenna Mast

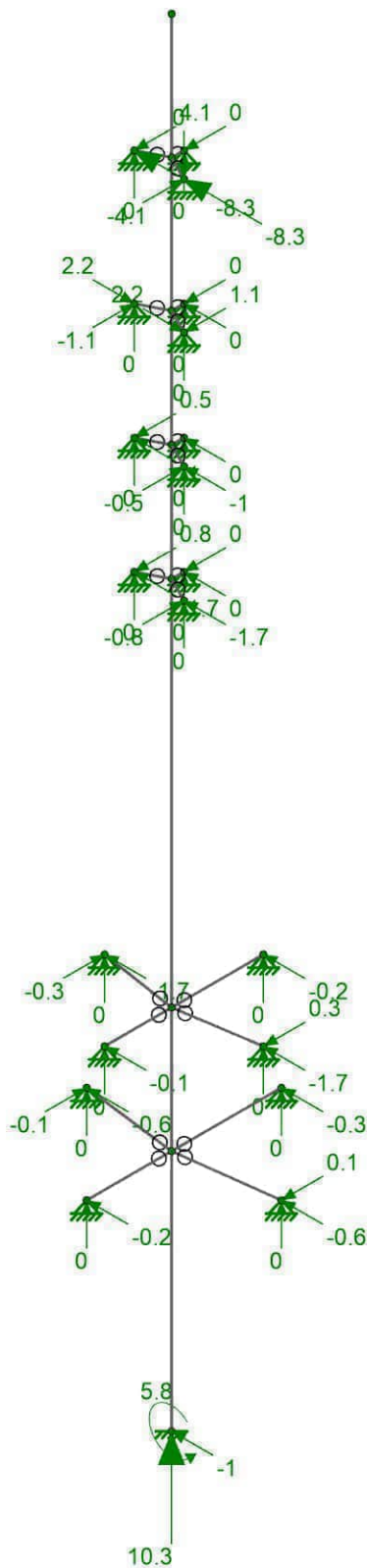
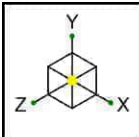
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Results for LC 2, 0.9D + 1.0W (X-direction)
Reaction and Moment Units are kips and kip-ft



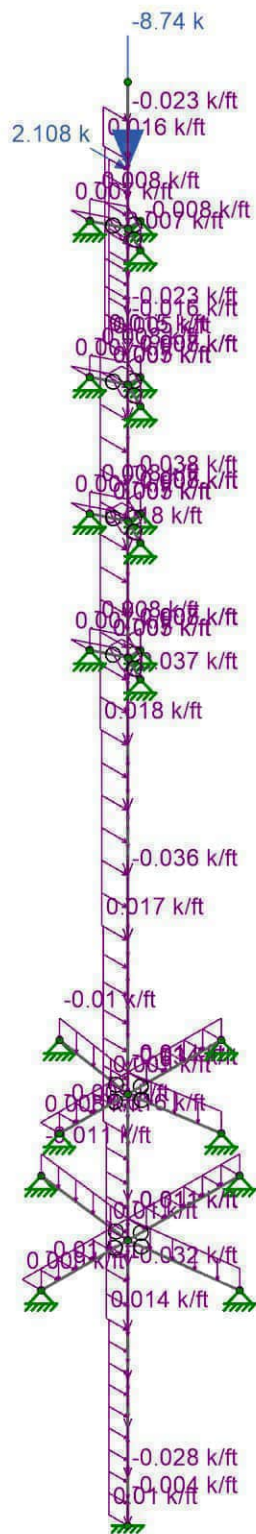
CEN TEK Engineering, I...

TJL

21007.68 - Greenwich 3

Struct. #1281 - Antenna Mast

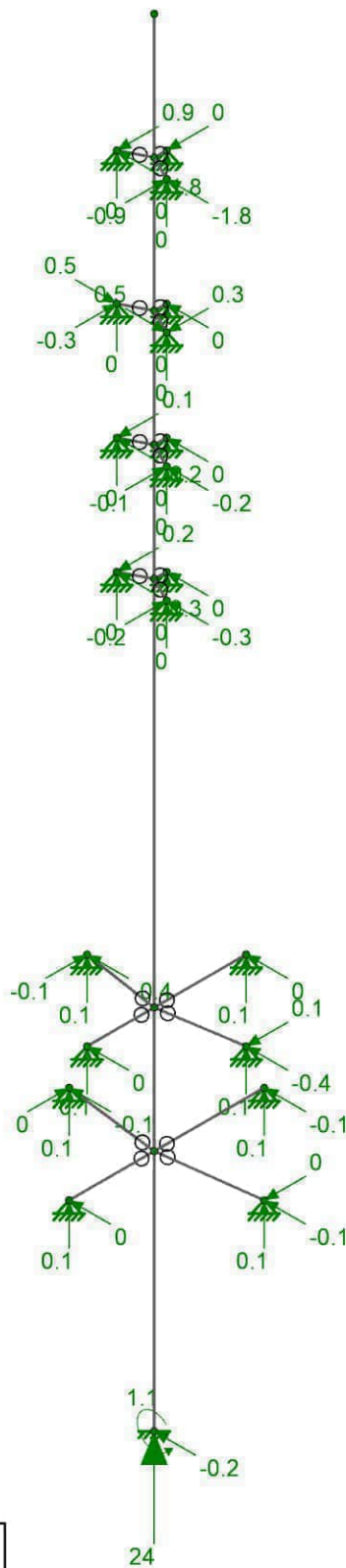
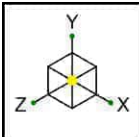
TIA-222 Mast.r3d



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TIA-222 Mast.r3d



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



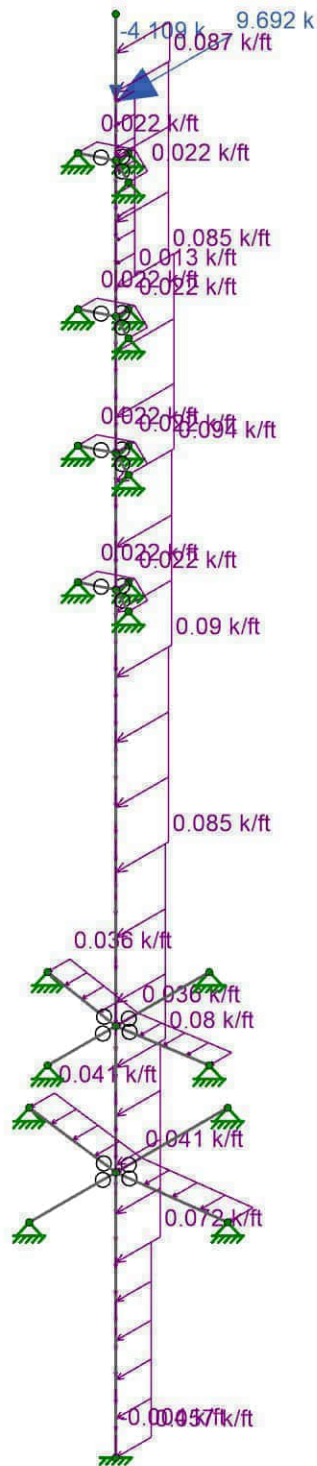
CEN TEK Engineering, I...

TJL

21007.68 - Greenwich 3

Struct. #1281 - Antenna Mast

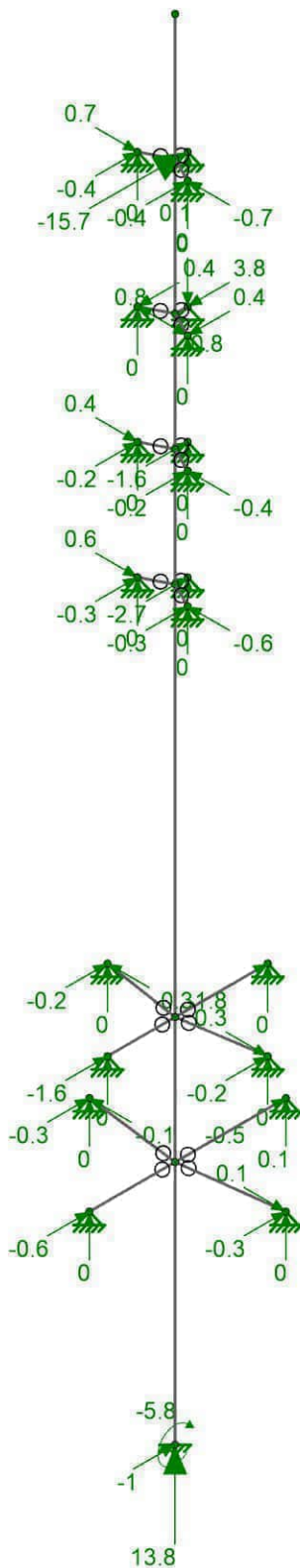
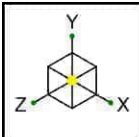
TIA-222 Mast.r3d



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TIA-222 Mast.r3d



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



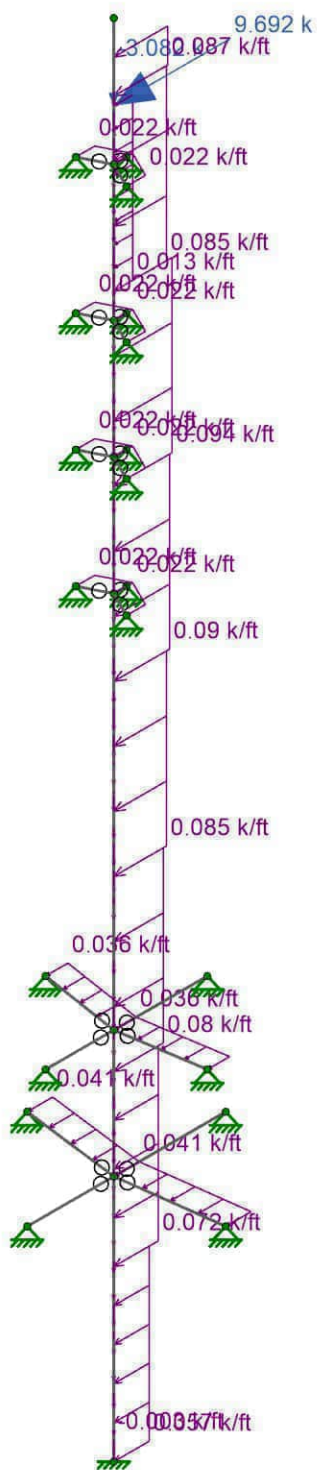
CEN TEK Engineering, I...

TJL

21007.68 - Greenwich 3

Struct. #1281 - Antenna Mast

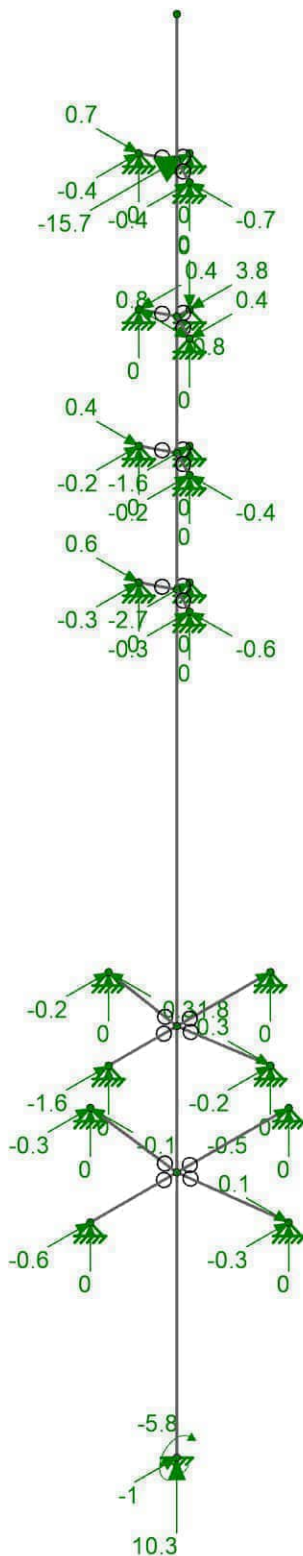
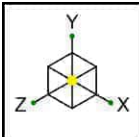
TIA-222 Mast.r3d



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TIA-222 Mast.r3d



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



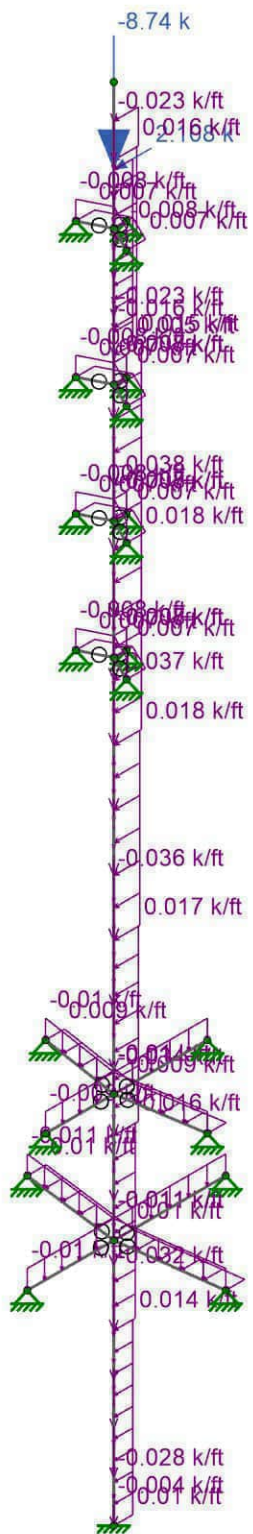
CEN TEK Engineering, I...

TJL

21007.68 - Greenwich 3

Struct. #1281 - Antenna Mast

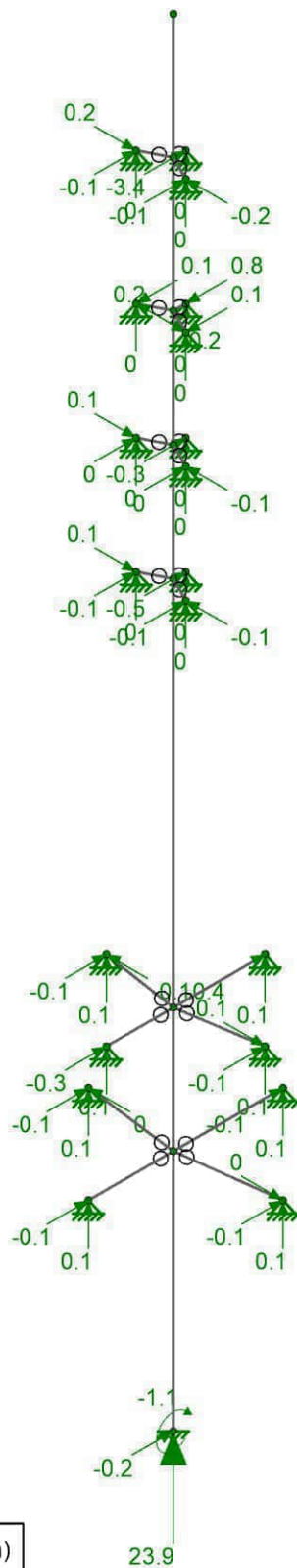
TIA-222 Mast.r3d



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TIA-222 Mast.r3d



IRISA
A KINETIC CHEMISTRY

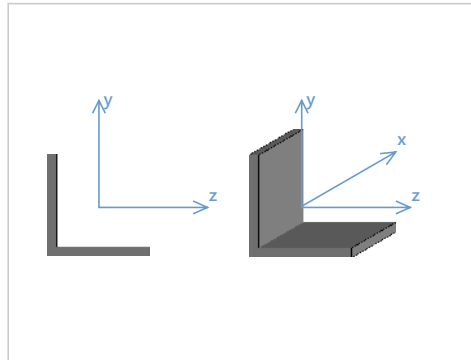
21007.68 - Greenwich 3

TIA-222 Mast.r3d

Detail Report: M18

Load Combination: LC 4: 1.2D + 1.0W (Z-direction)

Code check: 0.182 (axial/bending)



Input Data

Shape:	L2X2X3	I Node:	N6
Member Type:	Beam	J Node:	N23
Length (ft):	1.5	I Release:	BenPIN
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

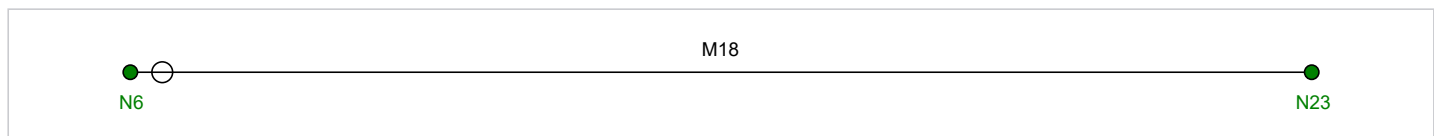
Material:	A36 Gr.36	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.2
G (ksi):	11154	F_y (ksi):	36		
Nu:	0.3	R_y:	1.5		

Shape Properties

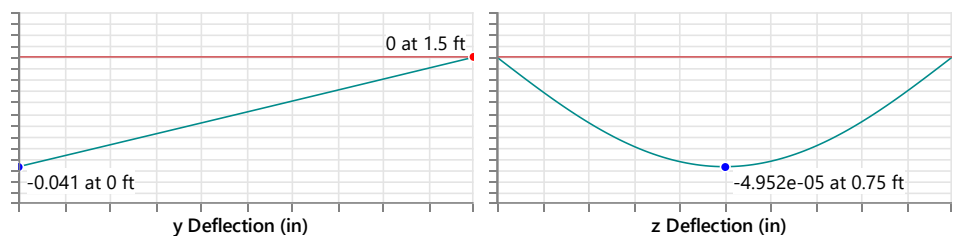
d (in):	2	Area (in²):	0.722	J (in⁴):	0.009
b_f (in):	2	I_{yy} (in⁴):	0.271	r_z (in):	0.389
t (in):	0.188	I_{zz} (in⁴):	0.271	k* (in⁴):	0.438

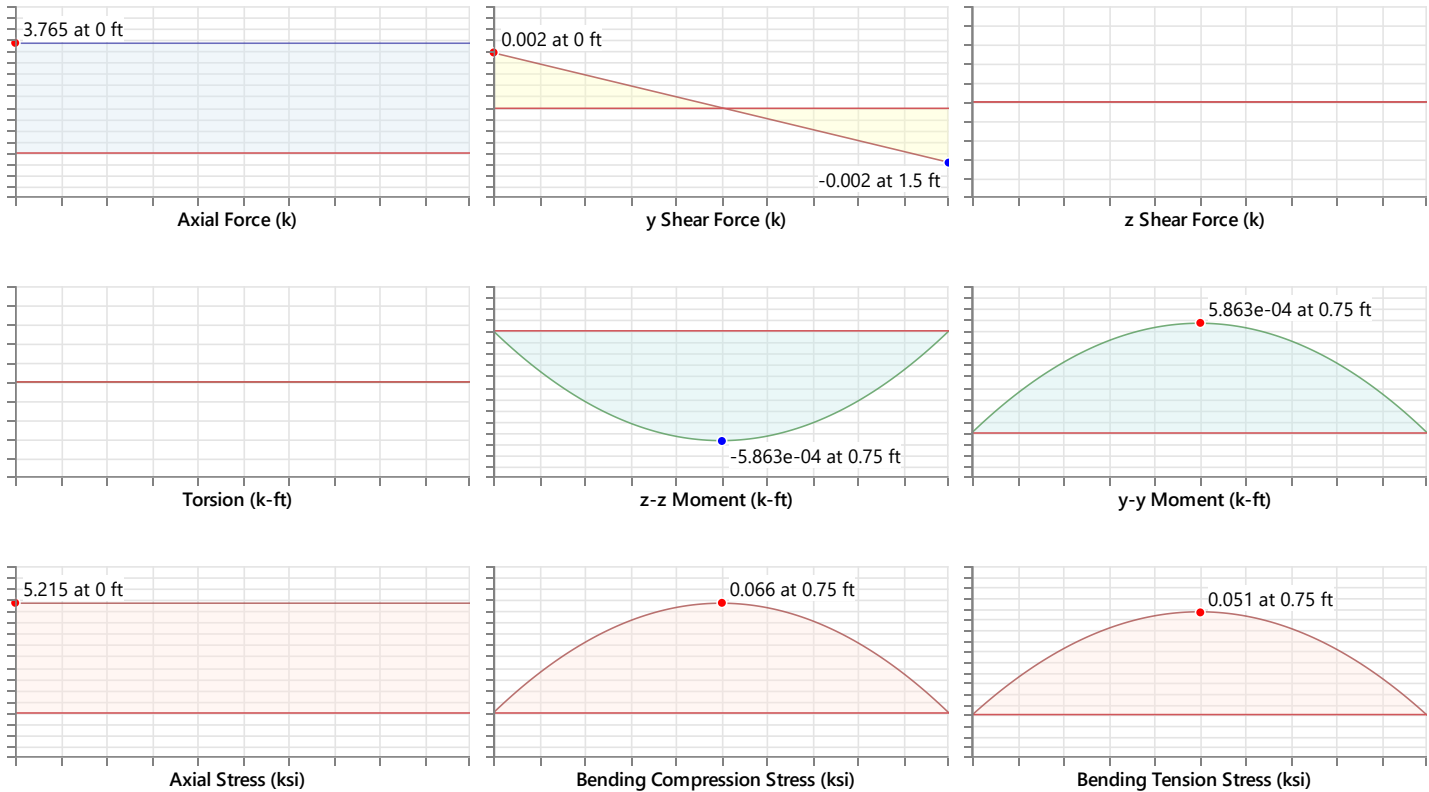
Design Properties

L_{b y-y} (ft):	1.5	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	1.5	K_{z-z}:	1	Max Defl Ratio:	L/10000
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	0
L_{comp bot} (ft):	1.5	z sway:	No	Span:	N/A
L_{torque} (ft):	1.5	Function:	Lateral	τ_b:	1



Diagrams:





AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0 k	23.393 k	-	-
Axial Compression Analysis	3.765 k	20.899 k	-	-
Flexural Analysis (Strong Axis)	0.0005863 k-ft	1.239 k-ft	-	-
Flexural Analysis (Weak Axis)	0.0005863 k-ft	0.558 k-ft	-	-
Shear Analysis (Major Axis y)	0.002 k	7.309 k	0.0003025	PASS
Shear Analysis (Minor Axis z)	0 k	7.309 k	0	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.182	PASS

Subject:

Connection of Powermount to Tower # 1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

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

Powermount Connection to Tower:

Reactions:

 Tension = $Tension := 16.5 \cdot kip$ (Input From Risa-3D LC #4)

 Shear = $Shear := 16.5 \cdot kip$ (Input From Risa-3D LC #1)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

 Bolt Diameter = $D := 0.75 \cdot in$ (User Input)

 Number of Bolts = $N_b := 4$ (User Input)

 Design Tensile Strength = $F_t := 29.8 \cdot kip$ (User Input)

 Design Shear Strength = $F_v := 17.9 \cdot kip$ (User Input)

Plate Data:

 Plate Width = $W_{plt} := 5 \cdot in$ (User Input)

 Plate Thickness = $t_{plt} := 1 \cdot in$ (User Input)

 Distance from Bolt to Collar = $d_{st} := 1.75 \cdot in$ (User Input)

 Yield Strength = $F_y := 36 \cdot ksi$ (User Input)

Weld Data:

 Weld Size = $sw := \frac{5}{16} \cdot in$ (User Input)

 Weld Length = $l_w := 5 \cdot in$ (User Input)

 Number of Welds = $n_w := 2$ (User Input)

 Weld Strength = $F_w := 70 \cdot ksi$ (User Input)

Check Pipe Collar Bolts:

Shear Force =

$$f_v := \frac{Shear}{N_b} = 4.1 \text{ kip}$$

Bolt Shear % of Capacity =

$$\frac{f_v}{F_v} = 23\%$$

Check Bolt Shear =

$$Bolt_Shear := \text{if} \left(\frac{f_v}{F_v} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Bolt_Shear = "OK"

Tension Force =

$$f_t := \frac{Tension}{N_b} = 4.1 \text{ kip}$$

Bolt Tension % of Capacity =

$$\frac{f_t}{F_t} = 13.8\%$$

Check Bolt Tension =

$$Bolt_Tension := \text{if} \left(\frac{f_t}{F_t} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Bolt_Tension = "OK"

Check Pipe Collar Plate:

Design Bending Strength =

$$F_b := 0.9 \cdot F_y = 32.4 \text{ ksi}$$

Plate Section Modulus =

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

Plate Bending Moment =

$$M := \frac{f_t \cdot N_b}{2} \cdot d_{st} = 14.438 \text{ in} \cdot \text{kip}$$

Plate Bending Stress =

$$f_b := \frac{M}{Z_{plt}} = 11.55 \text{ ksi}$$

$$\frac{f_b}{F_b} = 35.6\%$$

$$Plate_Bending := \text{if} (f_b < F_b, \text{"OK"}, \text{"Overstressed"})$$

Plate_Bending = "OK"

Check Pipe Collar Weld:

Design Weld Strength =

$$F_w := 0.45 \cdot F_w = 31.5 \text{ ksi}$$

Weld Section Modulus =

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

Weld Area =

$$A_w := .707 \cdot sw \cdot l_w = 1.105 \text{ in}^2$$

Plate Stress =

$$f_w := \frac{\frac{f_t \cdot N_b}{2}}{A_w \cdot n_w} = 3.734 \text{ ksi}$$

$$Weld := \text{if} (f_w < F_w, \text{"OK"}, \text{"Overstressed"})$$

$$\frac{f_w}{F_w} = 11.9\%$$

Weld = "OK"

Check Pipe Collar to Angle Brace Bolts:Reactions:

Axial Force in Member = $Axial := 9.2 \cdot \text{kip}$ (User Input)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

Bolt Diameter = $D := 0.75 \cdot \text{in}$ (User Input)

Number of Bolts = $N_b := 1$ (User Input)

Design Tensile Strength = $F_t := 29.8 \cdot \text{kip}$ (User Input)

Design Shear Strength = $F_v := 17.9 \cdot \text{kip}$ (User Input)

Shear Force = $f_v := \frac{Axial}{N_b} = 9.2 \text{ kip}$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 51.4\%$

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

Bolt_Shear = "OK"

Check Angle Brace to Tower Bolts:Reactions:

Axial Force in Member = $Axial := 9.2 \cdot \text{kip}$ (User Input)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

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

Number of Bolts = $N_b := 1$ (User Input)

Design Tensile Strength = $F_t := 20.7 \cdot \text{kip}$ (User Input)

Design Shear Strength = $F_v := 12.4 \cdot \text{kip}$ (User Input)

Shear Force = $f_v := \frac{Axial}{N_b} = 9.2 \text{ kip}$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 74.2\%$

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

Bolt_Shear = "OK"

Check Pipe Collar to Plate Brace Bolts:Reactions:

Axial Force in Member = $Axial := 15.7 \cdot kip$ (User Input)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

Bolt Diameter = $D := 0.75 \cdot in$ (User Input)

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

Design Tensile Strength = $F_t := 29.8 \cdot kip$ (User Input)

Design Shear Strength = $F_v := 17.9 \cdot kip$ (User Input)

Shear Force = $f_v := \frac{Axial}{N_b} = 7.9 \cdot kip$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 43.9\%$

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

Bolt_Shear = "OK"

Check Plate Brace to Tower Bolts:Reactions:

Axial Force in Member = $Axial := 15.7 \cdot kip$ (User Input)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

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

Number of Bolts = $N_b := 1$ (User Input)

Design Tensile Strength = $F_t := 20.7 \cdot kip$ (User Input)

Design Shear Strength = $F_v := 24.9 \cdot kip$ (User Input - Double Shear)

Shear Force = $f_v := \frac{Axial}{N_b} = 15.7 \cdot kip$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 63.1\%$

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

Bolt_Shear = "OK"

Subject:

Connection of Powermount to Tower # 1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

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

Check Angle Brace to Tower Bolts:

Reactions:

Axial Force in Member = $Axial := 3.8 \cdot kip$ (User Input)

Bolt Data:

Bolt Type = ASTM A325 (User Input)

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

Number of Bolts = $N_b := 1$ (User Input)

Design Tensile Strength = $F_t := 20.7 \cdot kip$ (User Input)

Design Shear Strength = $F_v := 12.4 \cdot kip$ (User Input)

Shear Force = $f_v := \frac{Axial}{N_b} = 3.8 \cdot kip$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 30.6\%$

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

Bolt_Shear = "OK"

Basic Components

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

Factors for Extreme Wind Calculation

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

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Open Lattice =	$Cd_{OL} := 3.2$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 320$ lbs

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $Wt_{ice,ant1} := W_{ICEant} \cdot N_{ant} = 284$ lbs

Wind Load (NESC Heavy)

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

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

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

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

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

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 268$ lbs

Wind Load (NESC Extreme)

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

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

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

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

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

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 2805$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 260$ lbs

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $Wt_{ice,ant2} := W_{ICEant} \cdot N_{ant} = 275$ lbs

Wind Load (NESC Heavy)

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

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

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

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

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

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot EPA_{tot} = 165$ lbs

Wind Load (NESC Extreme)

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

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

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

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

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

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 1675$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 232$ lbs

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 98$ lbs

Wind Load (NESC Heavy)

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

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

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

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

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

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot EPA_{tot} = 58$ lbs

Wind Load (NESC Extreme)

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

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

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

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

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

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 571$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant4} := WT_{ant} \cdot N_{ant} = 6$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 157$ cu in
 Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 159$ cu in
 Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 5$ lbs
 Weight of Ice on All Antennas = $Wt_{ice,ant4} := W_{ICEant} \cdot N_{ant} = 10$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.88$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 0.23$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.88$
 $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 0.39$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 0.39$
 $EPA_{tot} := 0 \cdot EPA_{A1} + 1 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 0.776$
 Total Antenna Wind Force w/ Ice = $Fi_{ant4} := p \cdot Cd_F \cdot EPA_{tot} = 5$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 0.73$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.13$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.73$
 $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 0.28$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 0.28$
 $EPA_{tot} := 0 \cdot EPA_{A1} + 1 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 0.55$
 Total Antenna Wind Force = $F_{ant4} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 39$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

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

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2250$ cu in
 Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 566$ cu in
 Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 18$ lbs
 Weight of Ice on All Antennas = $Wt_{ice,ants} := W_{ICEant} \cdot N_{ant} = 73$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 1.78$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 1.22$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.78$
 $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 1.36$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 1.36$
 $EPA_{tot} := 2 \cdot EPA_{A1} + 1 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 6.278$
 Total Antenna Wind Force w/ Ice = $Fi_{ants} := p \cdot Cd_F \cdot EPA_{tot} = 40$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 1.56$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 1.04$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.56$
 $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 1.17$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 1.17$
 $EPA_{tot} := 2 \cdot EPA_{A1} + 1 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 5.469$
 Total Antenna Wind Force = $F_{ants} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 389$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant6} := WT_{ant} \cdot N_{ant} = 320$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2302$ cu in
 Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 573$ cu in
 Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 19$ lbs
 Weight of Ice on All Antennas = $Wt_{ice,ant6} := W_{ICEant} \cdot N_{ant} = 74$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 1.78$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 1.25$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.78$
 Antenna Projected Surface Area = $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 1.38$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 1.38$
 $EPA_{tot} := 2 \cdot EPA_{A1} + 1 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 6.316$

Total Antenna Wind Force w/ Ice = $Fi_{ant6} := p \cdot Cd_F \cdot EPA_{tot} = 40$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 1.56$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 1.07$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 1.56$
 Antenna Projected Surface Area = $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 1.19$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 1.19$
 $EPA_{tot} := 2 \cdot EPA_{A1} + 1 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 5.505$

Total Antenna Wind Force = $F_{ant6} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 392$ lbs

Subject:

Load Analysis of Equipment on Structure
#1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21007.68**Development of Wind & Ice Load on Antennas****Antenna Data:**

Antenna Model = CBRS RRH RT4423-48A (Verizon)

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 11.8$ in (User Input)

Antenna Width = $W_{ant} := 8.7$ in (User Input)

Antenna Thickness = $T_{ant} := 5$ in (User Input)

Antenna Weight = $WT_{ant} := 20$ lbs (User Input)

Number of Antennas = $N_{ant} := 4$ (User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant7} := WT_{ant} \cdot N_{ant} = 80$ lbs

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $Wt_{ice,ant7} := W_{ICEant} \cdot N_{ant} = 30$ lbs

Wind Load (NESC Heavy)

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

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

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

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

$EPA_{tot} := 1 \cdot EPA_{A1} + 2 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 2.709$

Total Antenna Wind Force w/ Ice = $Fi_{ant7} := p \cdot Cd_F \cdot EPA_{tot} = 17$ lbs

Wind Load (NESC Extreme)

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

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

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

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

$EPA_{tot} := 1 \cdot EPA_{A1} + 2 \cdot EPA_{A2} + 1 \cdot EPA_{A3} = 2.169$

Total Antenna Wind Force = $F_{ant7} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 155$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

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

Gravity Load (without ice)

Weight of All Antennas = $W_{t_{ants}} := WT_{ant} \cdot N_{ant} = 64$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6133$ cu in
 Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 1126$ cu in
 Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 36$ lbs
 Weight of Ice on All Antennas = $W_{t_{ice,ants}} := W_{ICEant} \cdot N_{ant} = 73$ lbs

Wind Load (NESC Heavy)

Effective Projected Area for One Antenna = $EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 3.71$ $EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 2.88$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.71$
 $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 3.09$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 3.09$
 $EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 9.881$
 Total Antenna Wind Force w/ Ice = $F_{i_{ant8}} := p \cdot Cd_F \cdot EPA_{tot} = 63$ lbs

Wind Load (NESC Extreme)

Effective Projected Area for One Antenna = $EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 3.38$ $EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 2.58$
 $EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 3.38$
 $EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 2.78$
 $EPA_{A3} := EPA_N \cdot \cos(240 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(240 \cdot \text{deg} - \phi)^2 = 2.78$
 $EPA_{tot} := EPA_{A1} + EPA_{A2} + EPA_{A3} = 8.942$
 Total Antenna Wind Force = $F_{ant8} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 637$ lbs

Development of Wind & Ice Load on Platform

Platform Data:

Mount Type =	Perfect Vision PV-LPPGS-12M-HR2-B with (9) 8-ft antenna pipes, (4) pipe to pipes and (2) 4-ft OVP pipes.		
Mount Shape =	Flat		(User Input)
Mount Area =	$CdA_{mnt} := 38.5$	sq ft	(User Input)
Mount Area w/ Ice =	$CdA_{ICEmnt} := 53.7$	sq ft	(User Input)
Mount Weight =	$WT_{mnt} := 1810$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{ICEmnt} := 2322$	lbs	(User Input)

Gravity Load (without ice)

Weight of Mount =	$Wt_{mnt1} := WT_{mnt} = 1810$	lbs
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Gravity Load (ice only)

Weight of Ice on Mount =	$Wt_{ice,mnt1} := (WT_{ICEmnt} - WT_{mnt}) = 512$	lbs
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Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice =	$Fi_{mnt1} := p \cdot Cd_F \cdot CdA_{ICEmnt} = 344$	lbs
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Wind Load (NESC Extreme)

Total Mount Wind Force =	$F_{mnt1} := qz \cdot Cd_F \cdot CdA_{mnt} \cdot m = 2742$	lbs
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Total Pipe Length =	$TPL := 8 \cdot ft \cdot 13 + 4 \cdot ft \cdot 2 = 112 \text{ ft}$
---------------------	--

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

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

CaAa =	$1.3 \cdot ExPA + 1.083 \cdot 19.5 \cdot ft^2 = 38.5 \text{ ft}^2$
--------	--

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

CaAa (with ice) =	$1.3 \cdot ExPA + 1.083 \cdot 26.7 \cdot ft^2 = 53.7 \text{ ft}^2$
-------------------	--

Weight =	$1400 \cdot lb + 3.66 \cdot plf \cdot 8 \cdot ft \cdot 13 + 3.66 \cdot plf \cdot 4 \cdot ft \cdot 2 = 1810 \text{ lb}$
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Weight (with ice) =	$1650 \cdot lb + 3.66 \cdot plf \cdot 8 \cdot ft \cdot 13 + 3.66 \cdot plf \cdot 4 \cdot ft \cdot 2 + \frac{\pi}{4} \cdot (((2.375 + 2 \cdot lr) \cdot in)^2 - (2.375 \cdot in)^2) \cdot (96 \cdot in \cdot 13 + 48 \cdot in \cdot 2 + 150 \cdot in \cdot 3) \cdot \left(Id \cdot \frac{lb}{ft^3} \right) = 2322 \text{ lb}$
---------------------	---

Total Equipment Loads:

Verizon @ 139-ft AGL

NESC Heavy Wind Vertical =

$$NESC_Heavy_Vert := (Wt_{ant1} + Wt_{ice.ant1} + Wt_{ant2} + Wt_{ice.ant2} + Wt_{ant3} + Wt_{ice.ant3} + Wt_{ant4} + Wt_{ice.ant4} + Wt_{ant5} + Wt_{ice.ant5} + Wt_{ant6} + Wt_{ice.ant6} + Wt_{ant7} + Wt_{ice.ant7} + Wt_{ant8} + Wt_{ice.ant8} + Wt_{mnt1} + Wt_{ice.mnt1}) \cdot 1.5$$

$$NESC_Heavy_Vert = 7233$$

NESC Heavy Wind Transverse =

$$(F_{i_{ant1}} + F_{i_{ant2}} + F_{i_{ant3}} + F_{i_{ant4}} + F_{i_{ant5}} + F_{i_{ant6}} + F_{i_{ant7}} + F_{i_{ant8}} + F_{i_{mnt1}}) \cdot 2.5 = 2505$$

NESC Extreme Wind Vertical =

$$(Wt_{ant1} + Wt_{ant2} + Wt_{ant3} + Wt_{ant4} + Wt_{ant5} + Wt_{ant6} + Wt_{ant7} + Wt_{ant8} + Wt_{mnt1}) = 3392$$

NESC Extreme Wind Transverse =

$$(F_{ant1} + F_{ant2} + F_{ant3} + F_{ant4} + F_{ant5} + F_{ant6} + F_{ant7} + F_{ant8} + F_{mnt1}) = 9405$$

Subject:

Coax Cable on Powermount and Tower # 1281

Location:

Greenwich, CT

Rev. 1: 1/28/25

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

Coax Cables

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Subject:

Coax Cable on Powermount and Tower #
1281

Location:

Greenwich, CT

Rev. 1: 1/28/25

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21007.68**Coax Cable on Powermount**

(Below 139-ft AGL)

Distance Between Coax Cable Attach Points =

$$Coax_{Span} := \begin{bmatrix} 6 \\ 8 \\ 15 \\ 14 \\ 29.375 \\ 29.875 \\ 32.5 \end{bmatrix} \cdot ft \quad (User Input)$$

Diameter of Coax Cable =

$$D_{coax} := 1.98 \cdot in \quad (User Input)$$

Weight of Coax Cable =

$$W_{coax} := 1.04 \cdot plf \quad (User Input)$$

Number of Coax Cables =

$$N_{coax} := 3 \quad (User Input - 3 Verizon)$$

Number of Coax Cables Exterior =

$$N_{ex_{coax}} := 3 \quad (User Input)$$

Number of Projected Coax Cables Transverse =

$$NP_{Tcoax} := 1 \quad (User Input)$$

Project Width with Ice =

$$A_{Tice} := (NP_{Tcoax} \cdot D_{coax} + 2 \cdot Ir) = 2.98 \text{ in}$$

Project Width without Ice =

$$A_T := (NP_{Tcoax} \cdot D_{coax}) = 1.98 \text{ in}$$

Ice Area per Liner Ft =

$$A_{ice_{coax}} := \frac{\pi}{4} \cdot ((D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2) = 0.027 \text{ ft}^2$$

Weight of Ice on All Coax Cables =

$$W_{ice} := A_{ice_{coax}} \cdot Id \cdot N_{ex_{coax}} = 4.545 \frac{lb}{ft}$$

Heavy Vertical Load =

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

Heavy Transverse Load =

$$Heavy_{Trans} := (p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW})$$

$$Heavy_{Vert} = \begin{bmatrix} 69 \\ 92 \\ 172 \\ 161 \\ 338 \\ 343 \\ 374 \end{bmatrix} lb \quad Heavy_{Trans} = \begin{bmatrix} 24 \\ 32 \\ 60 \\ 56 \\ 117 \\ 119 \\ 129 \end{bmatrix} lb$$

Extreme Vertical Load =

$$Extreme_{Vert} := ((N_{coax} \cdot W_{coax}) \cdot Coax_{Span} \cdot OF_{EV})$$

Extreme Transverse Load =

$$Extreme_{Trans} := ((qz \cdot psf \cdot A_T \cdot Cd_{coax}) \cdot Coax_{Span} \cdot OF_{EW})$$

$$Extreme_{Vert} = \begin{bmatrix} 19 \\ 25 \\ 47 \\ 44 \\ 92 \\ 93 \\ 101 \end{bmatrix} lb \quad Extreme_{Trans} = \begin{bmatrix} 52 \\ 69 \\ 130 \\ 121 \\ 254 \\ 258 \\ 281 \end{bmatrix} lb$$

Subject:

Coax Cable on Powermount and Tower #
1281

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Rev. 1: 1/28/25

Prepared by: T.J.L Checked by: C.F.C.
Job No. 21007.68**Cables on Powermount**

(139-ft AGL to 149-ft AGL)

Coax Cable Span =

$$Coax_{Span} := 9 \cdot ft \quad (User Input)$$

Diameter of Coax Cable =

$$D_{coax} := 1.98 \cdot in \quad (User Input)$$

Weight of Coax Cable =

$$W_{coax} := 1.04 \cdot plf \quad (User Input)$$

Number of Coax Cables =

$$N_{coax} := 0 \quad (User Input)$$

Number of Coax Cables Exterior =

$$Nex_{coax} := 0 \quad (User Input)$$

Number of Projected Coax Cables Transverse =

$$NP_{Tcoax} := 0 \quad (User Input)$$

Project Width with Ice =

$$A_{Tice} := 0$$

Project Width without Ice =

$$A_T := (NP_{Tcoax} \cdot D_{coax}) = 0 \text{ in}$$

Ice Area per Liner Ft =

$$Ai_{coax} := \frac{\pi}{4} \cdot ((D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2) = 0.027 \text{ ft}^2$$

Weight of Ice on All Coax Cables =

$$W_{ice} := Ai_{coax} \cdot Id \cdot Nex_{coax} = 0 \text{ plf}$$

Heavy Vertical Load =

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

$$Heavy_{Vert} = 0 \text{ lb}$$

Heavy Transverse Load =

$$Heavy_{Trans} := (p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW})$$

$$Heavy_{Trans} = 0 \frac{lb}{ft}$$

Extreme Vertical Load =

$$Extreme_{Vert} := ((N_{coax} \cdot W_{coax}) \cdot Coax_{Span} \cdot OF_{EV})$$

$$Extreme_{Vert} = 0 \text{ lb}$$

Extreme Transverse Load =

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

$$Extreme_{Trans} = 0 \text{ lb}$$

Basic Components

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

Factors for Extreme Wind Calculation

Elevation of CL Equipment =	$TME := 70$	ft	(User Input)
Multiplier Gust Response Factor =	$m := 1$		(User Input - Only for NESC Extreme wind case)
Velocity Pressure Coefficient =	$Kz := 2.01 \cdot \left(\frac{TME}{900} \right)^{\frac{2}{9.5}} = 1.174$		(NESC 2023 Table 250-2)
Turbulence Intensity Constant =	$C_{exp} := 0.2$		(NESC 2023 Table 250-3)
Integral Length Scale of Turbulence Constant =	$L_s := 220$		(NESC 2023 Table 250-3)
Effective Height =	$z_s := 0.67 \cdot TME = 46.9$		(NESC 2023 Table 250-3)
Turbulence Intensity =	$I_z := C_{exp} \cdot \left(\frac{33}{z_s} \right)^{\frac{1}{6}} = 0.189$		(NESC 2023 Table 250-3)
Response Term =	$B_t := \left(\frac{1}{1 + \left(0.56 \cdot \frac{z_s}{L_s} \right)} \right)^{0.5} = 0.945$		(NESC 2023 Table 250-3)
Gust Response Factor =	$G_{rf} := \frac{(1 + (4.61 \cdot I_z \cdot B_t))}{(1 + 6.1 \cdot I_z)} = 0.847$		(NESC 2023 Table 250-3)
Wind Pressure =	$qz := 0.00256 \cdot Kz \cdot V^2 \cdot G_{rf} = 30.8$	psf	(NESC 2023 Section 250.C.1)

Shape Factors

Shape Factor for Round Members =	$Cd_R := 1.3$	(User Input)
Shape Factor for Flat Members =	$Cd_F := 1.6$	(User Input)
Shape Factor for Open Lattice =	$Cd_{OL} := 3.2$	(User Input)
Shape Factor for Coax Cables Attached to Outside of Pole =	$Cd_{coax} := 1.6$	(User Input)

Overload Factors

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	JMA MX06FIT665-02	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 71.3$	in (User Input)
Antenna Width =	$W_{ant} := 12.2$	in (User Input)
Antenna Thickness =	$T_{ant} := 10.7$	in (User Input)
Antenna Weight =	$WT_{ant} := 69$	lbs (User Input)
Number of Antennas =	$N_{ant} := 1$	(User Input - 1 per Leg / 2 Tot.)

Gravity Load (without ice)

Weight of All Antennas =	$Wt_{ant1} := WT_{ant} \cdot N_{ant} = 69$	lbs
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Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 9308$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 1859$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 60$	lbs
Weight of Ice on All Antennas =	$Wt_{ice,ant1} := W_{ICEant} \cdot N_{ant} = 60$	lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice =	$EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 6.63$	$EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 5.8$
	$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 6.63$	
	$EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 6.06$	
Antenna Projected Surface Area w/ Ice =	$EPA_{tot} := EPA_{A1} = 6.628$	
Total Antenna Wind Force w/ Ice =	$Fi_{ant1} := p \cdot Cd_F \cdot EPA_{tot} = 42$	lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna =	$EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 6.04$	$EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 5.3$
	$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 6.04$	
	$EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 5.48$	
Antenna Projected Surface Area =	$EPA_{tot} := EPA_{A1} = 6.041$	
Total Antenna Wind Force =	$F_{ant1} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 298$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope NHH-33B-R2B	
Antenna Shape =	Flat	(User Input)
Antenna Height =	$L_{ant} := 72.047$	in (User Input)
Antenna Width =	$W_{ant} := 25.197$	in (User Input)
Antenna Thickness =	$T_{ant} := 9.252$	in (User Input)
Antenna Weight =	$WT_{ant} := 100$	lbs (User Input)
Number of Antennas =	$N_{ant} := 1$	(User Input - 1 per Leg / 2 Tot.)

Gravity Load (without ice)

Weight of All Antennas =	$Wt_{ant2} := WT_{ant} \cdot N_{ant} = 100$	lbs
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Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \cdot 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 2823$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 91$	lbs
Weight of Ice on All Antennas =	$Wt_{ice,ant2} := W_{ICEant} \cdot N_{ant} = 91$	lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice =	$EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 13.29$	$EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 5.2$
	$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 13.29$	
	$EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 7.22$	
Antenna Projected Surface Area w/ Ice =	$EPA_{tot} := EPA_{A1} = 13.289$	
Total Antenna Wind Force w/ Ice =	$Fi_{ant2} := p \cdot Cd_F \cdot EPA_{tot} = 85$	lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna =	$EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 12.61$	$EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 4.63$
	$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 12.61$	
	$EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 6.62$	
Antenna Projected Surface Area =	$EPA_{tot} := EPA_{A1} = 12.607$	
Total Antenna Wind Force =	$F_{ant2} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 621$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope CBC61923T-DS-43
Antenna Shape =	Flat (User Input)
Antenna Height =	$L_{ant} := 6.929$ in (User Input)
Antenna Width =	$W_{ant} := 7.795$ in (User Input)
Antenna Thickness =	$T_{ant} := 4.173$ in (User Input)
Antenna Weight =	$WT_{ant} := 13$ lbs (User Input)
Number of Antennas =	$N_{ant} := 1$ (User Input - 1 per Leg / 4 Tot.)

Gravity Load (without ice)

Weight of All Antennas =	$Wt_{ant3} := WT_{ant} \cdot N_{ant} = 13$	lbs
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Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 225$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir) - V_{ant} = 135$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$	lbs
Weight of Ice on All Antennas =	$Wt_{ice,ant3} := W_{ICEant} \cdot N_{ant} = 4$	lbs

Wind Load (NESC Heavy)

Surface Area for One Antenna w/ Ice =	$EPA_N := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.48$	$EPA_T := \frac{(L_{ant} + 2 \cdot Ir) \cdot (T_{ant} + 2 \cdot Ir)}{144} = 0.28$
	$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.48$	
	$EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 0.33$	
Antenna Projected Surface Area w/ Ice =	$EPA_{tot} := EPA_{A1} = 0.484$	
Total Antenna Wind Force w/ Ice =	$Fi_{ant3} := p \cdot Cd_F \cdot EPA_{tot} = 3$	lbs

Wind Load (NESC Extreme)

Surface Area for One Antenna =	$EPA_N := \frac{L_{ant} \cdot W_{ant}}{144} = 0.38$	$EPA_T := \frac{L_{ant} \cdot T_{ant}}{144} = 0.2$
	$EPA_{A1} := EPA_N \cdot \cos(\phi)^2 + EPA_T \cdot \sin(\phi)^2 = 0.38$	
	$EPA_{A2} := EPA_N \cdot \cos(120 \cdot \text{deg} - \phi)^2 + EPA_T \cdot \sin(120 \cdot \text{deg} - \phi)^2 = 0.24$	
Antenna Projected Surface Area =	$EPA_{tot} := EPA_{A1} = 0.375$	
Total Antenna Wind Force =	$F_{ant3} := qz \cdot Cd_F \cdot EPA_{tot} \cdot m = 18$	lbs

Development of Wind & Ice Load on Platform

Platform Data:

Mount Type =	SitePro Pipe Mount TAM-2U w/ 6-ft 2 Std. Pipe (Typ. of 1 per leg / 4 tot.)		
Mount Shape =	Flat		(User Input)
Mount Weight =	77	lbs	(User Input)
Pipe Weight =	3.66*6= 22	lbs	(User Input)
Total Mount Weight =	$WT_{mnt} := 99$	lbs	(User Input)
Weight of ice =	$\left(\frac{\pi}{4} \cdot ((2.375 + 2 \cdot lr) \cdot in)^2 - (2.375 \cdot in)^2 \right) \cdot (72 \cdot in \cdot 1) \cdot (ld \cdot pcf) = 11 \text{ lbf}$		
Mount Weight w/ Ice =	$WT_{ICEmnt} := 110$	lbs	(User Input)
Mount Area =	$A_{mnt} := \frac{(2.375) \cdot (72)}{144} = 1.188$	sq ft	(User Input)
Mount Area w/ Ice =	$A_{ICEmnt} := \frac{(2.375 + 2 \cdot lr) \cdot (72)}{144} = 1.688$	sq ft	(User Input)

Gravity Load (without ice)

Weight of Mount =	$Wt_{mnt1} := WT_{mnt} = 99$	lbs
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Gravity Load (ice only)

Weight of Ice on Mount =	$Wt_{ice.mnt1} := (WT_{ICEmnt} - WT_{mnt}) = 11$	lbs
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Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice =	$Fi_{mnt1} := p \cdot Cd_F \cdot A_{ICEmnt} = 11$	lbs
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Wind Load (NESC Extreme)

Total Mount Wind Force =	$F_{mnt1} := qz \cdot Cd_F \cdot A_{mnt} \cdot m = 59$	lbs
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Total Equipment Loads:

Verizon @ 70-ft AGL - Leg B & C

$$\text{NESC Heavy Wind Vertical} = (W_{t_{ant1}} + W_{t_{ice.ant1}} + W_{t_{ant3}} + W_{t_{ice.ant3}} + W_{t_{mnt1}} + W_{t_{ice.mnt1}}) \cdot 1.5 = 385$$

$$\text{NESC Heavy Wind Transverse} = (F_{i_{ant1}} + F_{i_{ant3}} + F_{i_{mnt1}}) \cdot 2.5 = 141$$

$$\text{NESC Extreme Wind Vertical} = (W_{t_{ant1}} + W_{t_{ant3}} + W_{t_{mnt1}}) = 181$$

$$\text{NESC Extreme Wind Transverse} = (F_{ant1} + F_{ant3} + F_{mnt1}) = 375$$

Verizon @ 70-ft AGL - Leg A & B

$$\text{NESC Heavy Wind Vertical} = (W_{t_{ant2}} + W_{t_{ice.ant2}} + W_{t_{ant3}} + W_{t_{ice.ant3}} + W_{t_{mnt1}} + W_{t_{ice.mnt1}}) \cdot 1.5 = 478$$

$$\text{NESC Heavy Wind Transverse} = (F_{i_{ant2}} + F_{i_{ant3}} + F_{i_{mnt1}}) \cdot 2.5 = 247$$

$$\text{NESC Extreme Wind Vertical} = (W_{t_{ant2}} + W_{t_{ant3}} + W_{t_{mnt1}}) = 212$$

$$\text{NESC Extreme Wind Transverse} = (F_{ant2} + F_{ant3} + F_{mnt1}) = 698$$

Subject:

Temp Coax Cable on Tower # 1281

Location:

Greenwich, CT

Rev. 0: 11/26/24

 Prepared by: T.J.L Checked by: C.F.C.
 Job No. 21007.68
Coax Cables
 Heavy Wind Pressure = $p := 4 \cdot psf$ (User Input NESC 2023 Figure 250-1 & Table 250-1)

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

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

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

 Height to Top of Coax Above Grade = $TC := 70$ ft (User Input)

 Multiplier Gust Response Factor = $m := 1$ (User Input - Only for NESC Extreme wind case)

 Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67 \cdot TC}{900} \right)^{\frac{2}{9.5}} = 1.079$ (NESC 2023 Table 250-2)

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

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

 Effective Height = $z_s := 0.67 \cdot TC = 46.9$ (NESC 2023 Table 250-3)

 Turbulence Intensity = $I_z := C_{exp} \cdot \left(\frac{33}{z_s} \right)^{\frac{1}{6}} = 0.189$ (NESC 2023 Table 250-3)

 Response Term = $B_t := \left(\frac{1}{\left(1 + \left(0.56 \cdot \frac{z_s}{L_s} \right) \right)} \right)^{0.5} = 0.945$ (NESC 2023 Table 250-3)

 Gust Response Factor = $G_{rf} := \frac{(1 + (4.61 \cdot I_z \cdot B_t))}{(1 + 6.1 \cdot I_z)} = 0.847$ (NESC 2023 Table 250-3)

 Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot G_{rf} = 28.3$ (NESC 2023 Section 250.C.1)

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

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

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

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

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

Coax Cable on Tower Leg

Distance Between Coax Cable Attach Points =

$$Coax_{Span} := \begin{bmatrix} 13.5 \\ 10.75 \\ 13.25 \\ 32.5 \end{bmatrix} \cdot ft \quad (User Input)$$

Diameter of Coax Cable =

$$D_{coax} := 1.98 \cdot in \quad (User Input)$$

Weight of Coax Cable =

$$W_{coax} := 1.04 \cdot plf \quad (User Input)$$

Number of Coax Cables =

$$N_{coax} := 2 \quad (User Input - 2 per leg / 8 tot.)$$

Number of Coax Cables Exterior =

$$Nex_{coax} := 2 \quad (User Input)$$

Number of Projected Coax Cables Transverse =

$$NP_{Tcoax} := 1 \quad (User Input)$$

Project Width with Ice =

$$A_{Tice} := (NP_{Tcoax} \cdot D_{coax} + 2 \cdot Ir) = 2.98 \text{ in}$$

Project Width without Ice =

$$A_T := (NP_{Tcoax} \cdot D_{coax}) = 1.98 \text{ in}$$

Ice Area per Liner Ft =

$$Ai_{coax} := \frac{\pi}{4} \cdot ((D_{coax} + 2 \cdot Ir)^2 - D_{coax}^2) = 0.027 \text{ ft}^2$$

Weight of Ice on All Coax Cables =

$$W_{ice} := Ai_{coax} \cdot Id \cdot Nex_{coax} = 3.03 \frac{lb}{ft}$$

Heavy Vertical Load =

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

Heavy Transverse Load =

$$Heavy_{Trans} := (p \cdot A_{Tice} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{HW})$$

$$Heavy_{Vert} = \begin{bmatrix} 103 \\ 82 \\ 102 \\ 249 \end{bmatrix} lb$$

$$Heavy_{Trans} = \begin{bmatrix} 54 \\ 43 \\ 53 \\ 129 \end{bmatrix} lb$$

Extreme Vertical Load =

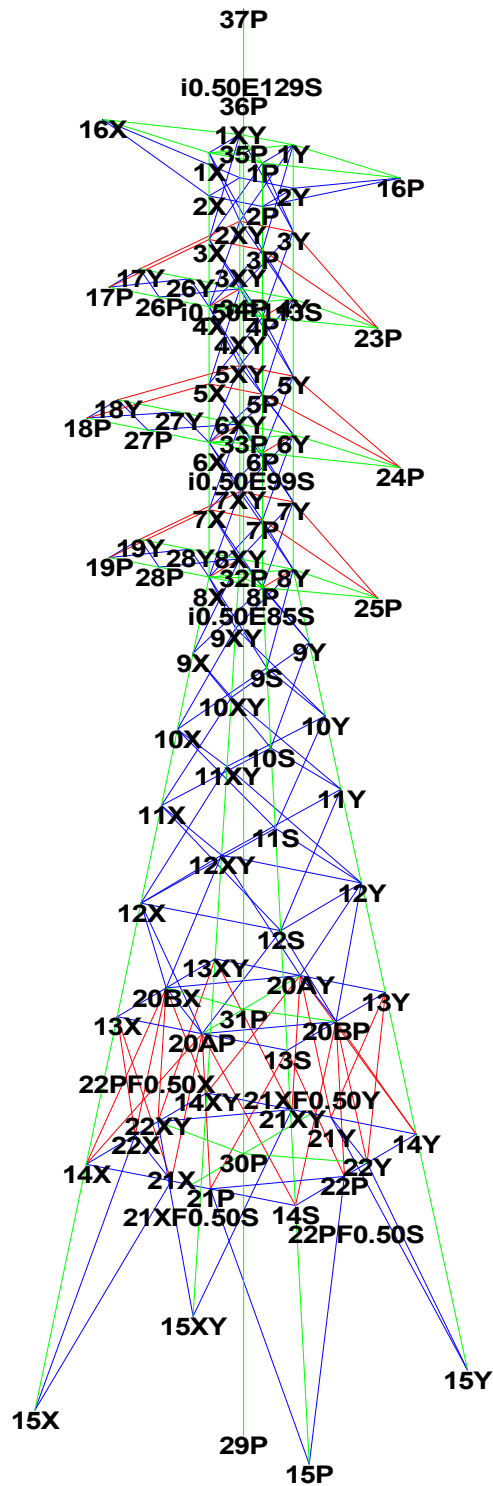
$$Extreme_{Vert} := ((N_{coax} \cdot W_{coax}) \cdot Coax_{Span} \cdot OF_{EV})$$

Extreme Transverse Load =

$$Extreme_{Trans} := ((qz \cdot psf \cdot A_T \cdot Cd_{coax}) \cdot Coax_{Span} \cdot OF_{EW})$$

$$Extreme_{Vert} = \begin{bmatrix} 28 \\ 22 \\ 28 \\ 68 \end{bmatrix} lb$$

$$Extreme_{Trans} = \begin{bmatrix} 101 \\ 80 \\ 99 \\ 243 \end{bmatrix} lb$$



Project Name : 21007.68 - Greenwich, CT
 Project Notes: Structure #1281 / Greenwich 3
 Project File : J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Temp Equipment Install During Construction\Backup Documentation\Rev (2)\PLS Tower
 \CL&P # 1281.tow
 Date run : 10:33:42 AM Monday, March 31, 2025
 by : Tower Version 20.01
 Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

KL/R value of 200.30 exceeds maximum of 200.00 for member "g118P" ??

Problem calculating gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??

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

Unusual number of fixed joints found: 5. Towers normally have from between 1 and 4 fixed joints. ??

The model has 4 warnings. ??

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

Loads from file: J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Temp Equipment Install During Construction\Backup Documentation\Rev (2)\PLS Tower
 \cl&p # 1281.lca

*** Analysis Results:

Maximum element usage is 99.80% for Angle "25AP" in load case "NESC Heavy +"

Maximum insulator usage is 26.15% for Clamp "11" in load case "NESC Heavy +"

Foundation Design Forces For All Load Cases:

Note: loads are factored.

Load Case	Foundation Description	Axial Force (kips)	Shear Force (kips)	Resultant Force (kips)	Bending Moment (ft-k)	Foundation Usage %
NESC Heavy -	15P	124.95	22.57	126.97	7.26	0.00
NESC Heavy -	29P	21.67	1.23	21.71	10.85	0.00
NESC Heavy -	15X	-106.98	25.93	110.08	2.46	0.00
NESC Heavy -	15XY	-91.43	23.89	94.50	4.81	0.00
NESC Heavy -	15Y	137.16	24.15	139.27	6.00	0.00
NESC Extreme -	15P	-2.06	6.98	7.27	4.01	0.00
NESC Extreme -	29P	8.02	1.85	8.23	19.33	0.00
NESC Extreme -	15X	-2.24	1.25	2.57	0.55	0.00
NESC Extreme -	15XY	14.62	2.95	14.92	2.72	0.00
NESC Extreme -	15Y	32.58	5.51	33.04	5.06	0.00
NESC Heavy +	15P	185.86	35.83	189.28	8.07	0.00
NESC Heavy +	29P	21.88	1.22	21.91	14.38	0.00
NESC Heavy +	15X	-163.98	44.79	169.99	6.26	0.00
NESC Heavy +	15XY	-141.83	34.02	145.86	2.59	0.00
NESC Heavy +	15Y	183.46	36.71	187.09	2.72	0.00
NESC Extreme +	15P	156.24	30.79	159.24	6.76	0.00
NESC Extreme +	29P	8.81	1.83	9.00	21.12	0.00
NESC Extreme +	15X	-153.28	43.42	159.31	5.92	0.00
NESC Extreme +	15XY	-130.55	33.79	134.85	1.28	0.00
NESC Extreme +	15Y	169.69	36.06	173.48	2.59	0.00

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy -	15P	-13.33	-18.21	-124.95	22.57	-0.29	7.26	7.26	-0.10	0.00
NESC Heavy -	29P	0.23	1.21	-21.67	1.23	-9.22	5.71	10.85	-4.00	0.00
NESC Heavy -	15X	17.45	-19.18	106.98	25.93	2.02	-1.41	2.46	-0.64	0.00
NESC Heavy -	15XY	-20.31	-12.58	91.43	23.89	-4.41	-1.93	4.81	-0.06	0.00
NESC Heavy -	15Y	19.83	-13.79	-137.16	24.15	-5.95	0.77	6.00	0.03	0.00
NESC Extreme -	15P	2.70	6.43	2.06	6.98	-3.43	2.08	4.01	-0.49	0.00
NESC Extreme -	29P	0.00	1.85	-8.02	1.85	-19.32	0.13	19.33	-1.03	0.00
NESC Extreme -	15X	0.60	1.10	2.24	1.25	-0.04	0.55	0.55	-0.36	0.00
NESC Extreme -	15XY	-1.08	2.75	-14.62	2.95	-1.53	-2.25	2.72	0.31	0.00
NESC Extreme -	15Y	5.30	1.51	-32.58	5.51	-4.89	-1.29	5.06	0.27	0.00
NESC Heavy +	15P	-23.41	-27.13	-185.86	35.83	1.29	7.96	8.07	0.19	0.00
NESC Heavy +	29P	0.24	-1.19	-21.88	1.22	13.07	6.00	14.38	-4.07	0.00
NESC Heavy +	15X	27.63	-35.26	163.98	44.79	6.16	-1.14	6.26	-0.13	0.00
NESC Heavy +	15XY	-28.31	-18.87	141.83	34.02	-2.31	-1.18	2.59	-0.50	0.00
NESC Heavy +	15Y	26.56	-25.34	-183.46	36.71	-2.69	0.40	2.72	-0.52	0.00
NESC Extreme +	15P	-20.72	-22.78	-156.24	30.79	0.53	6.74	6.76	0.46	0.00
NESC Extreme +	29P	0.19	-1.82	-8.81	1.83	20.68	4.27	21.12	-2.08	0.00
NESC Extreme +	15X	27.40	-33.68	153.28	43.42	5.92	0.10	5.92	0.25	0.00
NESC Extreme +	15XY	-25.29	-22.41	130.55	33.79	0.88	-0.93	1.28	-0.45	0.00
NESC Extreme +	15Y	23.73	-27.14	-169.69	36.06	-1.89	-1.77	2.59	-0.43	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.	Residual Perpendicular	Shear To Leg	Residual Horizontal To Leg - Res.	Shear Horizontal To Leg - Long.	Residual Horizontal To Leg - Tran.	Shear Horizontal To Leg - Tran.	Total Long. Force	Total Tran. Force	Total Vert. Force
				(kips)		(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)
NESC Heavy -	15P	14S	14P	126.878		4.953		5.008	-5.006	-0.128	-13.33	-18.21	-124.95
NESC Heavy -	15X	14X	14X	-110.010		3.821		3.894	-1.749	3.480	17.45	-19.18	106.98
NESC Heavy -	15XY	14XY	14XY	-94.248		6.881		6.936	6.885	-0.839	-20.31	-12.58	91.43
NESC Heavy -	15Y	14Y	14Y	139.132		6.276		6.348	0.308	-6.341	19.83	-13.79	-137.16
NESC Extreme -	15P	14S	14P	-3.326		6.468		6.583	-2.400	-6.130	2.70	6.43	2.06
NESC Extreme -	15X	14X	14X	-2.125		1.440		1.450	-0.268	-1.425	0.60	1.10	2.24
NESC Extreme -	15XY	14XY	14XY	14.559		3.259		3.280	3.224	-0.604	-1.08	2.75	-14.62
NESC Extreme -	15Y	14Y	14Y	32.445		6.255		6.310	-0.517	-6.288	5.30	1.51	-32.58
NESC Heavy +	15P	14S	14P	189.243		3.831		3.875	-3.872	-0.151	-23.41	-27.13	-185.86
NESC Heavy +	15X	14X	14X	-169.598		11.548		11.740	-3.557	11.189	27.63	-35.26	163.98
NESC Heavy +	15XY	14XY	14XY	-145.653		7.699		7.740	7.491	-1.946	-28.31	-18.87	141.83
NESC Heavy +	15Y	14Y	14Y	187.085		1.606		1.631	0.371	-1.588	26.56	-25.34	-183.46
NESC Extreme +	15P	14S	14P	159.229		2.197		2.223	-2.218	-0.152	-20.72	-22.78	-156.24
NESC Extreme +	15X	14X	14X	-158.860		11.984		12.205	-4.901	11.177	27.40	-33.68	153.28
NESC Extreme +	15XY	14XY	14XY	-134.676		6.803		6.935	6.130	3.245	-25.29	-22.41	130.55
NESC Extreme +	15Y	14Y	14Y	173.464		2.520		2.525	1.173	2.236	23.73	-27.14	-169.69

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)	CoG X (ft)	CoG Y (ft)	CoG Z (ft)	
1	143.750	84.750	59	188	0.00	6.00	309.150	0.00	28.50	817.275	0.422	-0.362	105.941	Problem calculating

gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??
 2 84.750 -4.250 52 147 6.00 0.00 1226.814 6.00 0.00 1226.814 0.249 0.000 41.192 Problem calculating
 gross area of longitudinal face for section "2": width is zero at elevation 0.00 (ft) which is not the top of the section. ??

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

Group Summary (Compression Portion):

Group	Group	Angle	Angle	Steel	Max	Usage	Max	Comp.	Comp.	Comp.	Comp.	L/r	Comp.	Comp.	RLX	RLY	RLZ	L/r		
KL/r	Length	Curve	No.																	
Label	Desc.	Type		Size	Strength	Usage	Cont-	Use	Control	Force	Control	Capacity	Connect.	Connect.						
Comp.	No.	Of					rol	In	Member		Load		Shear	Bearing						
Member	Bolts							Comp.			Case		Capacity	Capacity						
Comp.					(ksi)	%		%		(kips)		(kips)	(kips)	(kips)						
(ft)																				

121.04	7.000	1	LEG1	SAE	3.5X3.5X0.25	36.0	82.04	Comp	82.04	3Y	-26.920	NESC	Ext	32.813	36.400	54.375	1.000	1.000	1.000	121.04
		2	LEG2	SAE	6X6X0.3125	36.0	74.32	Comp	74.32	5Y	-73.634	NESC	Ext	99.083	109.200	203.906	1.000	1.000	1.000	60.50
60.50	6.050	1	LEG3	SAE	8X8X0.5	36.0	55.00	Comp	55.00	7Y	-137.308	NESC	Hea	249.636	254.800	380.624	1.000	1.000	1.000	52.83
52.83	7.000	1	LEG4	SAE	8X8X0.625	36.0	60.00	Comp	60.00	10Y	-174.723	NESC	Hea	306.646	291.200	543.749	1.000	1.000	1.000	60.12
60.12	7.915	1	LEG5	SAE	8X8X0.75	36.0	55.52	Comp	55.52	13P	-202.106	NESC	Hea	368.010	364.000	815.624	0.500	0.500	0.500	58.18
58.18	15.320	1	X1	SAE	2.5X2.5X0.1875	36.0	89.66	Comp	89.66	15AX	-14.017	NESC	Ext	15.633	33.600	20.391	0.750	0.500	0.500	131.11
128.51	10.817	5	X2	SAU	2.5X2X0.1875	36.0	76.94	Comp	76.94	16AX	-11.004	NESC	Ext	14.303	18.200	20.391	0.750	0.500	0.500	129.55
127.32	9.220	5	X3	SAU	4X3X0.25	36.0	69.70	Comp	69.70	17AX	-27.612	NESC	Hea	39.613	45.500	67.969	0.500	0.750	0.500	100.45
105.33	10.000	2	X4	SAU	3.5X2.5X0.25	36.0	59.98	Comp	59.98	18AX	-19.635	NESC	Hea	32.738	36.400	54.375	0.500	0.750	0.500	104.34
108.25	8.521	2	X5	SAU	4X3.5X0.3125	36.0	69.22	Comp	69.22	19AX	-42.363	NESC	Hea	61.204	63.700	118.945	0.500	0.750	0.500	77.55
88.16	9.220	2	X6	SAU	5X3.5X0.25	36.0	58.87	Comp	58.87	21BY	-26.099	NESC	Hea	44.335	54.600	81.562	0.580	0.580	0.580	95.79
101.84	10.597	2	X7	SAU	4X3X0.25	36.0	49.64	Comp	49.64	22BX	-15.380	NESC	Hea	30.985	36.400	54.375	0.560	0.560	0.560	126.41
124.92	12.246	5	X8	SAU	3.5X3X0.25	36.0	41.60	Comp	41.60	23AX	-9.378	NESC	Hea	22.542	27.300	40.781	0.550	0.550	0.550	147.17
140.74	14.070	5	X9	SAU	5X3X0.25	36.0	52.69	Comp	52.69	24AX	-11.293	NESC	Hea	21.431	27.300	40.781	0.550	0.550	0.550	173.71
160.96	17.450	5	D1	SAU	5X3X0.25	36.0	99.80	Tens	31.91	25AY	-10.785	NESC	Hea	33.799	63.700	95.156	1.000	0.500	0.500	127.63
125.86	14.103	5	D2	SAE	2X2X0.1875	36.0	46.46	Tens	23.66	26AP	-0.957	NESC	Hea	4.044	18.200	20.391	0.500	0.500	0.500	256.65
224.16	16.853	5	D3	SAU	3X2X0.25	36.0	77.86	Tens	58.58	27AXY	-3.761	NESC	Hea	6.420	36.400	54.375	1.000	0.500	0.500	264.74
230.33	19.194	5	D4	SAU	4X3X0.25	36.0	91.38	Comp	91.38	28AY	-10.499	NESC	Hea	11.489	45.500	67.969	0.500	1.000	0.500	205.19

[illegible]

21		H2	SAU	4X3.5X0.25	36.0	55.83	Comp	10.38	37AY	2.833	NESC	Hea	48.519	27.300	40.781	36.250	15.738	3
1.000	0.75																	
22		H3	SAE	3X3X0.1875	36.0	44.34	Comp	2.07	38AP	0.375	NESC	Hea	30.760	18.200	20.391	18.125	9.569	2
1.000	0.75																	
23		H4	SAU	5X3X0.25	36.0	54.35	Comp	41.48	F39C2118X	7.549	NESC	Ext	40.581	18.200	27.187	24.167	2.208	2
1.000	0.75																	
24		H5	SAE	3.5X3.5X0.25	36.0	19.44	Comp	16.42	40P	2.988	NESC	Hea	48.681	18.200	27.187	25.677	13.531	2
1.000	0.75																	
25		X10	SAE	1.75X1.75X0.1875	36.0	0.00		0.00		0.000			0.000	0.000	0.000	0.000	0.000	0
0.000	0																	
26		X11	SAE	2X2X0.1875	36.0	42.45	Comp	31.59	43BX	3.901	NESC	Hea	18.448	18.200	20.391	12.347	4.243	2
1.000	0.75																	
27		X12	SAU	2.5X2X0.1875	36.0	24.48	Comp	20.01	44CY	3.626	NESC	Hea	18.650	18.200	20.391	18.125	9.125	2
1.000	0.75																	
28		H6	SAU	4X3X0.25	36.0	41.45	Tens	41.45	45BP	7.543	NESC	Hea	40.581	18.200	27.187	24.167	6.000	2
1.000	0.75																	
29		D6	SAU	3X2X0.1875	36.0	40.86	Comp	0.00	46Y	0.000			18.529	18.200	20.391	12.755	14.775	2
1.000	0.75																	
30		HGR1	SAU	2.5X2X0.1875	36.0	46.52	Tens	46.52	47P	5.934	NESC	Hea	18.650	18.200	20.391	12.755	13.250	2
1.000	0.75																	
31		HGR2	SAE	3X3X0.1875	36.0	41.66	Tens	41.66	48P	7.550	NESC	Hea	30.760	18.200	20.391	18.125	15.022	2
1.000	0.75																	
32		A1	SAE	3X3X0.25	36.0	64.76	Tens	64.76	50P	11.738	NESC	Hea	36.997	18.200	27.187	18.125	14.073	2
1.590	0.75																	
33		A2	SAU	3.5X3X0.25	36.0	53.76	Comp	45.83	53P	15.073	NESC	Hea	32.886	36.400	54.375	42.647	11.643	4
2.240	0.75																	
34		A#	SAE	4X4X0.25	36.0	54.24	Comp	14.01	52P	6.374	NESC	Hea	46.393	45.500	67.969	48.262	14.073	5
2.710	0.75																	
35		H7	SAU	2.5X2X0.1875	36.0	27.64	Comp	15.52	54X	1.413	NESC	Ext	21.688	9.100	10.195	9.629	6.000	1
1.000	0.75																	
36		H8	DAE	1.75X1.75X0.1875	36.0	59.49	Comp	55.46	36X	8.244	NESC	Hea	31.823	16.800	20.391	14.864	6.000	1
2.000	0.6875																	
Pwmnt	12" Std. Pipe	Pwmnt	Pipe	12" Std.	42.0	5.87	Comp	0.00	g121P	0.000			571.199	0.000	0.000	0.000	9.000	0
0.000	0																	
PMBR1	L2x2x3/16	SAE		2X2X0.1875	36.0	9.26	Comp	0.00	g109P	0.000			18.827	16.800	10.195	10.343	1.500	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g107P g108P ??																
PMBR2	L2.5x2.5x3/16	SAE		2.5X2.5X0.1875	36.0	31.78	Comp	23.93	g111P	2.440	NESC	Ext	25.048	16.800	10.195	11.328	3.354	1
1.000	0.6875																	
PMBR3	L3x3x3/16	SAE		3X3X0.1875	36.0	2.72	Comp	1.17	g114P	0.120	NESC	Ext	31.139	16.800	10.195	11.328	8.068	1
1.000	0.6875																	
PMBR4	L3.5x3.5x1/4	SAE		3.5X3.5X0.25	36.0	10.08	Comp	10.07	g116X	1.369	NESC	Hea	49.187	16.800	13.594	15.104	9.685	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g117P ??																
PMBR5	L4x4x1/4	SAE		4X4X0.25	36.0	7.79	Comp	7.47	g120P	1.015	NESC	Ext	57.287	16.800	13.594	15.104	12.340	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g118P ??																
20a		H1	SAE	1.75X1.75X0.1875	36.0	29.61	Comp	7.64	30BX	0.505	NESC	Hea	15.532	9.100	10.195	6.609	6.000	1
1.000	0.75																	
AngleR	L2x2x1/4	SAE		2X2X0.25	36.0	49.75	Tens	49.75	42Y	4.384	NESC	Ext	24.381	9.100	13.594	8.812	4.243	1
1.000	0.75																	
BraceR	L2.5x2.5x1/4	SAE		2.5X2.5X0.25	36.0	61.53	Comp	60.31	g110X	8.198	NESC	Ext	32.987	16.800	13.594	15.104	3.354	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g110P g110X ??																
Plate	6"x3/4"	PL	Bar	6x3/4	36.0	2.67	Tens	2.67	g106P	0.448	NESC	Hea	129.094	16.800	40.781	45.312	1.501	1
1.000	0.6875																	
6R		X1	SAE	2.5X2.5X0.25	36.0	0.00		0.00		0.000			0.000	0.000	0.000	0.000	0.000	0
0.000	0																	

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy -	64.76	50P	Angle
NESC Extreme -	82.93	28AP	Angle
NESC Heavy +	99.80	25AP	Angle
NESC Extreme +	89.66	15AX	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	15.81	NESC Heavy +	0.0
2	Clamp	18.49	NESC Heavy +	0.0
3	Clamp	20.47	NESC Heavy +	0.0
4	Clamp	15.50	NESC Heavy +	0.0
5	Clamp	25.47	NESC Heavy +	0.0
6	Clamp	14.07	NESC Heavy +	0.0
7	Clamp	22.22	NESC Heavy +	0.0
8	Clamp	18.81	NESC Heavy +	0.0
9	Clamp	22.33	NESC Heavy +	0.0
10	Clamp	18.33	NESC Heavy +	0.0
11	Clamp	26.15	NESC Heavy +	0.0
12	Clamp	5.05	NESC Heavy -	0.0
13	Clamp	6.16	NESC Heavy -	0.0
14	Clamp	5.74	NESC Heavy -	0.0
15	Clamp	2.66	NESC Heavy -	0.0
16	Clamp	2.86	NESC Heavy -	0.0
17	Clamp	2.08	NESC Heavy -	0.0
18	Clamp	20.62	NESC Extreme -	0.0
19	Clamp	0.74	NESC Heavy -	0.0
20	Clamp	2.36	NESC Extreme -	0.0
21	Clamp	1.84	NESC Heavy -	0.0
22	Clamp	2.47	NESC Heavy -	0.0
23	Clamp	2.11	NESC Heavy -	0.0
24	Clamp	3.46	NESC Heavy -	0.0
25	Clamp	2.94	NESC Extreme -	0.0
26	Clamp	2.04	NESC Heavy -	0.0
27	Clamp	2.75	NESC Heavy -	0.0
28	Clamp	2.29	NESC Heavy -	0.0
29	Clamp	3.75	NESC Heavy -	0.0
30	Clamp	2.36	NESC Extreme -	0.0
31	Clamp	2.04	NESC Heavy -	0.0
32	Clamp	2.75	NESC Heavy -	0.0
33	Clamp	2.29	NESC Heavy -	0.0
34	Clamp	3.75	NESC Heavy -	0.0
35	Clamp	2.94	NESC Extreme -	0.0
36	Clamp	1.84	NESC Heavy -	0.0
37	Clamp	2.47	NESC Heavy -	0.0
38	Clamp	2.11	NESC Heavy -	0.0

39 Clamp 3.46 NESC Heavy - 0.0

*** Weight of structure (lbs):

Weight of Angles*Section DLF: 38310.8

Total: 38310.8

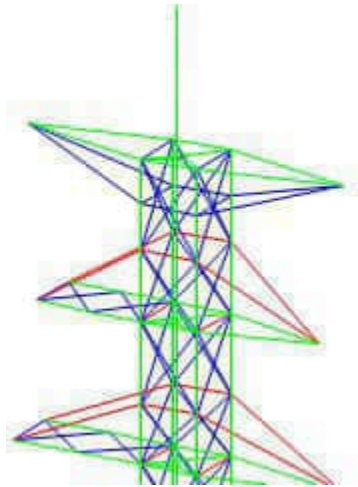
*** End of Report

```
*****
*
* TOWER - Analysis and Design - Copyright Power Line Systems 1986-2024
*
*****
```

```
Project Name : 21007.68 - Greenwich, CT
Project Notes: Structure #1281 / Greenwich 3
Project File : J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Temp Equipment Install During Construction\Backup Documentation\Rev (2)\PLS Tower
\CL&P # 1281.tow
Date run      : 10:33:42 AM Monday, March 31, 2025
by           : Tower Version 20.01
Licensed to  : Centek Engineering Inc
```

Successfully performed nonlinear analysis

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



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

Joints Geometry:

Joint Label	Symmetry Code	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.

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

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

Secondary Joints and Coordinates:

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

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

Steel Material Properties:

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

Bolt Properties:

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

Number Bolts Used By Type:

Bolt Type	Number Bolts
5/8 A394	1230
5/8 A325	38

Angle Properties:

Angle Center of Gravity	Angle Type of	Radius Toe	Angle Size	Long Leg	Short Leg	Thick. (in)	Unit Weight (lbs/ft)	Gross Area (in^2)	w/t Ratio	Radius of Gyration Rx (in)	Radius of Gyration Ry (in)	Radius of Gyration Rz (in)	Angle Section	Wind Width (in)	Short Edge Dist. (in)	Long Edge Dist. (in)	Optimize Cost Factor	Section Modulus (in^3)	Center of Gravity About X-X (in)
0	SAE	0	8X8X0.75	8	8	0.75	38.9	11.44	8.83	2.47	2.47	1.58	Single	8	4	0	1.0000	0	0
0	SAE	0	8X8X0.625	8	8	0.625	32.7	9.61	10.8	2.49	2.49	1.58	Single	8	4	0	1.0000	0	0
0	SAE	0	8X8X0.5	8	8	0.5	26.4	7.75	13.75	2.5	2.5	1.59	Single	8	4	0	1.0000	0	0
0	SAE	0	6X6X0.3125	6	6	0.3125	12.5	3.65	16.6	1.89	1.89	1.2	Single	6	3	0	1.0000	0	0
0	SAE	0	4X4X0.25	4	4	0.25	6.6	1.94	13.5	1.25	1.25	0.795	Single	4	2	0	1.0000	0	0
0	SAE	0	3.5X3.5X0.25	3.5	3.5	0.25	5.8	1.69	11.5	1.09	1.09	0.694	Single	3.5	1.75	0	1.0000	0	0
0	SAE	0	3X3X0.25	3	3	0.25	4.9	1.44	9.75	0.93	0.93	0.592	Single	3	1.5	0	1.0000	0	0
0	SAE	0	3X3X0.1875	3	3	0.1875	3.71	1.09	13.33	0.939	0.939	0.596	Single	3	1.5	0	1.0000	0	0
0	SAE	0	2.5X2.5X0.25	2.5	2.5	0.25	4.1	1.19	7.75	0.769	0.769	0.491	Single	2.5	1.25	0	1.0000	0	0
0	SAE	0	2.5X2.5X0.1875	2.5	2.5	0.1875	3.07	0.902	10.67	0.778	0.778	0.495	Single	2.5	1.25	0	1.0000	0	0
0	SAE	0	2X2X0.25	2	2	0.25	3.19	0.94	5	0.609	0.609	0.391	Single	2	1	0	1.0000	0	0

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

Angle Groups:

Group Label	Group Description	Angle Type	Angle Size	Material Type	Element Type	Group Type	Optimize Group	Allow. Angle Width For Optimize (in)
1	LEG1	SAE	3.5X3.5X0.25	A 36	Beam	Leg	None	0.000
2	LEG2	SAE	6X6X0.3125	A 36	Beam	Leg	None	0.000
3	LEG3	SAE	8X8X0.5	A 36	Beam	Leg	None	0.000
4	LEG4	SAE	8X8X0.625	A 36	Beam	Leg	None	0.000
5	LEG5	SAE	8X8X0.75	A 36	Beam	Leg	None	0.000
6	X1	SAE	2.5X2.5X0.1875	A 36	Truss Crossing	Diagonal	None	0.000
7	X2	SAU	2.5X2X0.1875	A 36	Truss Crossing	Diagonal	None	0.000
8	X3	SAU	4X3X0.25	A 36	Truss Crossing	Diagonal	None	0.000
9	X4	SAU	3.5X2.5X0.25	A 36	Truss Crossing	Diagonal	None	0.000
10	X5	SAU	4X3.5X0.3125	A 36	Truss Crossing	Diagonal	None	0.000
11	X6	SAU	5X3.5X0.25	A 36	Truss Crossing	Diagonal	None	0.000
12	X7	SAU	4X3X0.25	A 36	Truss Crossing	Diagonal	None	0.000
13	X8	SAU	3.5X3X0.25	A 36	Truss Crossing	Diagonal	None	0.000
14	X9	SAU	5X3X0.25	A 36	Truss Crossing	Diagonal	None	0.000
15	D1	SAU	5X3X0.25	A 36	Truss	Other	None	0.000
16	D2	SAE	2X2X0.1875	A 36	T-Only	Other	None	0.000
17	D3	SAU	3X2X0.25	A 36	T-Only	Other	None	0.000
18	D4	SAU	4X3X0.25	A 36	T-Only	Other	None	0.000
19	D5	SAU	3.5X3X0.25	A 36	Truss	Other	None	0.000
20	H1	SAE	1.75X1.75X0.1875	A 36	T-Only	Other	None	0.000
21	H2	SAU	4X3.5X0.25	A 36	Truss	Other	None	0.000
22	H3	SAE	3X3X0.1875	A 36	Truss	Other	None	0.000

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

Aggregate Angle Information:

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

Angle Type	Angle Size	Material Type	Total Length (ft)	Total Surface Area (ft^2)	Total Weight (lbs)
SAE	3.5X3.5X0.25	A 36	212.92	248.41	1234.96
SAE	6X6X0.3125	A 36	56.20	112.40	702.50
SAE	8X8X0.5	A 36	56.00	149.33	1478.40
SAE	8X8X0.625	A 36	94.98	253.29	3105.93
SAE	8X8X0.75	A 36	251.24	669.98	9773.41
SAE	2.5X2.5X0.1875	A 36	106.66	88.88	327.44
SAU	2.5X2X0.1875	A 36	295.39	221.54	812.33
SAU	4X3X0.25	A 36	318.53	371.62	1847.48
SAU	3.5X2.5X0.25	A 36	68.17	68.17	334.01
SAU	4X3.5X0.3125	A 36	147.51	184.39	1135.85
SAU	5X3.5X0.25	A 36	84.78	120.10	593.45
SAU	3.5X3X0.25	A 36	456.32	494.34	2464.10
SAU	5X3X0.25	A 36	346.59	462.12	2287.47
SAE	2X2X0.1875	A 36	190.24	126.82	464.18
SAU	3X2X0.25	A 36	153.55	127.96	629.55
SAE	1.75X1.75X0.1875	A 36	84.00	49.00	178.08
DAE	1.75X1.75X0.1875	A 36	12.00	7.00	50.40
SAU	4X3.5X0.25	A 36	62.95	78.69	390.29
SAE	3X3X0.1875	A 36	145.30	145.30	539.06
SAE	2X2X0.25	A 36	16.97	11.31	54.14
SAU	3X2X0.1875	A 36	59.10	49.25	181.44
SAE	3X3X0.25	A 36	68.29	68.29	334.64
SAE	4X4X0.25	A 36	105.60	140.80	696.94
Pwmnt	Pipe 12" Std.	A500-42	148.00	610.50	7340.80
Bar	6x3/4	A 36	1.50	1.69	22.96

SAE 2.5X2.5X0.25 A 36 6.71 5.59 27.51

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 Adjustment	Joint	Dead Load	Transverse Drag x Area	Longitudinal Drag x Area	Transverse Area Factor	Longitudinal Area Factor	Af Flat	Ar Round	Transverse Drag x Area	Longitudinal Drag x Area	SAPS Angle	SAPS Round
Label	Defining	Load	Drag x Area	Drag x Area	Area Factor	Area Factor	Factor	Factor	Drag x Area	Drag x Area	Drag x Area	Drag x Area
Type												
	Section Bottom	Adjust. Factor	Factor For Face	Factor For Face	(CD From Code)	(CD From Code)	For Face EIA Only	For Face EIA Only	Factor For All	Factor For All	Factor	Factor

None	1	8X	1.000	3.200	3.200	1.000	1.000	0.000	0.000	1.000	1.000	0.000	0.000
None	2	29P	1.050	3.400	3.400	1.000	1.000	0.000	0.000	1.000	1.000	0.000	0.000

Angle Member Connectivity:

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

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

3.5	12P	5		XY-Symmetry	12S	13S	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	12X	5		X-GenXY	12X	13X	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	12XY	5		XY-GenXY	12XY	13XY	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	12Y	5		Y-GenXY	12Y	13Y	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	13P	5		XY-Symmetry	13S	14S	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	13X	5		X-GenXY	13X	14X	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	13XY	5		XY-GenXY	13XY	14XY	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	13Y	5		Y-GenXY	13Y	14Y	1	4	0.5	0.5	0.5	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	14P	5		XY-Symmetry	14S	15P	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	14X	5		X-GenXY	14X	15X	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	14XY	5		XY-GenXY	14XY	15XY	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	14Y	5		Y-GenXY	14Y	15Y	1	4	0.25	0.25	0.25	5/8	A394	20	4	2	Both	1.25	4.75	1.25
3.5	18.25	7.25	0																	
	15AP	6		XY-Symmetry	1P	3X	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15AX	6		X-GenXY	1X	3P	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15AXY	6		XY-GenXY	1XY	3Y	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15AY	6		Y-GenXY	1Y	3XY	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15BP	6		XY-Symmetry	3P	1Y	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15BX	6		X-GenXY	3X	1XY	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15BXY	6		XY-GenXY	3XY	1X	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	15BY	6		Y-GenXY	3Y	1P	2	5	0.75	0.5	0.5	5/8	A325	2	1	1	Long only	0.875	0	1
2.25	0	0	0																	
	16AP	7		XY-Symmetry	3P	4X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.25	0	0	0																	
	16AX	7		X-GenXY	3X	4P	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.25	0	0	0																	
	16AXY	7		XY-GenXY	3XY	4Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.25	0	0	0																	
	16AY	7		Y-GenXY	3Y	4XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.25	0	0	0																	
	16BP	7		XY-Symmetry	4P	3Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.125	0	0	0																	
	16BX	7		X-GenXY	4X	3XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.125	0	0	0																	
	16BXY	7		XY-GenXY	4XY	3X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.125	0	0	0																	
	16BY	7		Y-GenXY	4Y	3P	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1
3.125	0	0	0																	
	17AP	8		XY-Symmetry	4P	5X	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1
2.25	3.625	2.375	0																	
	17AX	8		X-GenXY	4X	5P	2	5	0.5	0.75	0.5	5/8	A394	5	1.74	1	Long only	1	2.75	1
2.25	3.625	2.375	0																	

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

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

2.25	24BXY	14	0	0	0	XY-GenXY	12XY	11X	2	5	0.55	0.55	0.55	5/8	A394	3	1	1 Short only	1.5	0	1
2.25	24BY	14	0	0	0	Y-GenXY	12Y	11S	2	5	0.55	0.55	0.55	5/8	A394	3	1	1 Short only	1.5	0	1
2	25AP	15	0.875	0	0	XY-Symmetry	12S	20AP	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25AX	15	0.875	0	0	X-GenXY	12X	20AP	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25AXY	15	0.875	0	0	XY-GenXY	12XY	20AY	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25AY	15	0.875	0	0	Y-GenXY	12Y	20AY	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25BP	15	0.875	0	0	XY-Symmetry	20BP	12S	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25BX	15	0.875	0	0	X-GenXY	20BX	12X	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25BXY	15	0.875	0	0	XY-GenXY	20BX	12XY	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
2	25BY	15	0.875	0	0	Y-GenXY	20BP	12Y	3	5	1	0.5	0.5	5/8	A394	7	1.71	1 Short only	0.75	2	1.0625
4	26AP	16	0	0	0	XY-Symmetry	21P	13S	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26AX	16	0	0	0	X-GenXY	21X	13X	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26AXY	16	0	0	0	XY-GenXY	21XY	13XY	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26AY	16	0	0	0	Y-GenXY	21Y	13Y	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26BP	16	0	0	0	XY-Symmetry	22P	13S	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26BX	16	0	0	0	X-GenXY	22X	13X	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26BXY	16	0	0	0	XY-GenXY	22XY	13XY	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
4	26BY	16	0	0	0	Y-GenXY	22Y	13Y	2	5	0.5	0.5	0.5	5/8	A394	2	1	1 Long only	1	0	1
2.25	27AP	17	0	0	0	XY-Symmetry	20AP	14S	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27AX	17	0	0	0	X-GenXY	20AP	14X	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27AXY	17	0	0	0	XY-GenXY	20AY	14XY	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27AY	17	0	0	0	Y-GenXY	20AY	14Y	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27BP	17	0	0	0	XY-Symmetry	14S	20BP	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27BX	17	0	0	0	X-GenXY	14X	20BX	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27BXY	17	0	0	0	XY-GenXY	14XY	20BX	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
2.25	27BY	17	0	0	0	Y-GenXY	14Y	20BP	3	5	1	0.5	0.5	5/8	A394	4	1	1 Short only	0.875	0	1
3.5	28AP	18	1.75	0	0	XY-Symmetry	21X	20AP	3	4	0.5	1	0.5	5/8	A394	5	1.26	1 Long only	2.875	1.375	1
3.5	28AX	18	1.75	0	0	X-GenXY	21P	20AP	3	4	0.5	1	0.5	5/8	A394	5	1.26	1 Long only	2.875	1.375	1
3.5	28AXY	18	1.75	0	0	XY-GenXY	21Y	20AY	3	4	0.5	1	0.5	5/8	A394	5	1.26	1 Long only	2.875	1.375	1
3.5	28AY	18	1.75	0	0	Y-GenXY	21XY	20AY	3	4	0.5	1	0.5	5/8	A394	5	1.26	1 Long only	2.875	1.375	1

3.5	28BP	18		XY-Symmetry	20BP	22P	3	4	0.5	1	0.5	5/8	A394	5	1.26	1	Long only	2.875	1.375	1
	5.125	1.75	0																	
	28BX	18		X-GenXY	20BX	22X	3	4	0.5	1	0.5	5/8	A394	5	1.26	1	Long only	2.875	1.375	1
3.5	5.125	1.75	0																	
	28BXY	18		XY-GenXY	20BX	22XY	3	4	0.5	1	0.5	5/8	A394	5	1.26	1	Long only	2.875	1.375	1
3.5	5.125	1.75	0																	
	28BY	18		Y-GenXY	20BP	22Y	3	4	0.5	1	0.5	5/8	A394	5	1.26	1	Long only	2.875	1.375	1
3.5	5.125	1.75	0																	
	29AP	19		XY-Symmetry	21P	15P	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29AX	19		X-GenXY	21X	15X	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29AXY	19		XY-GenXY	21XY	15XY	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29AY	19		Y-GenXY	21Y	15Y	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29BP	19		XY-Symmetry	15P	22P	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29BX	19		X-GenXY	15X	22X	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29BXY	19		XY-GenXY	15XY	22XY	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	29BY	19		Y-GenXY	15Y	22Y	2	5	0.25	0.25	0.25	5/8	A394	5	1	1	Long only	1.5	0	1.0625
1.75	0	0	0																	
	30AP	20a		Y-Symmetry	2X	2P	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	30AY	20a		Y-Gen	2XY	2Y	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	30BP	20a		X-Symmetry	2P	2Y	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	30BX	20a		X-Gen	2X	2XY	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	31P	20		Y-Symmetry	3X	3P	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	31Y	20		Y-Gen	3XY	3Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	32P	20		X-Symmetry	4P	4Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1.0625
0	0	0	0																	
	32X	20		X-Gen	4X	4XY	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1.0625
0	0	0	0																	
	33P	20		Y-Symmetry	5X	5P	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	33Y	20		Y-Gen	5XY	5Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	34P	20		X-Symmetry	6P	6Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1.0625
0	0	0	0																	
	34X	20		X-Gen	6X	6XY	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1.0625
0	0	0	0																	
	35P	20		Y-Symmetry	7X	7P	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	35Y	20		Y-Gen	7XY	7Y	3	4	1	1	1	5/8	A394	1	1	1	Long only	0.75	0	1
0	0	0	0																	
	36P	36		X-Symmetry	8P	8Y	3	4	1	1	1	5/8	A325	1	2	1	Long only	0.75	0	1.0625
0	0	0	0																	
	36X	36		X-Gen	8X	8XY	3	4	1	1	1	5/8	A325	1	2	1	Long only	0.75	0	1.0625
0	0	0	0																	
	37AP	21		Y-Symmetry	12X	12S	3	6	1	0.5	0.5	5/8	A394	3	1	1	Short only	1.75	0	1
2	0	0	0																	
	37AY	21		Y-Gen	12XY	12Y	3	6	1	0.5	0.5	5/8	A394	3	1	1	Short only	1.75	0	1
2	0	0	0																	

2	37BP	21		X-Symmetry	12S	12Y	3	6	1	0.5	0.5	5/8	A394	3	1	1 Short only	1.75	0	1
	0	0	0																
	37BX	21		X-Gen	12X	12XY	3	6	1	0.5	0.5	5/8	A394	3	1	1 Short only	1.75	0	1
2	0	0	0																
	38AP	22		XY-Symmetry	13X	20AP	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38AX	22		X-GenXY	13S	20AP	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38AXY	22		XY-GenXY	13Y	20AY	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38AY	22		Y-GenXY	13XY	20AY	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38BP	22		XY-Symmetry	13S	20BP	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38BX	22		X-GenXY	13X	20BX	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38BXY	22		XY-GenXY	13XY	20BX	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	38BY	22		Y-GenXY	13Y	20BP	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	0	1
3.25	0	0	0																
	39AP	23		XY-Symmetry	14X	21X	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39AX	23		X-GenXY	21P	14S	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39AXY	23		XY-GenXY	14Y	21Y	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39AY	23		Y-GenXY	21XY	14XY	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39BP	23		XY-Symmetry	14S	22P	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39BX	23		X-GenXY	22X	14X	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39BXY	23		XY-GenXY	14XY	22XY	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39BY	23		Y-GenXY	22Y	14Y	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39C1P	23		Y-Symmetry	21X	21XF0.50S	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39C1Y	23		Y-Gen	21XY	21XF0.50Y	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	F39C197P	23		Y-Symmetry	21XF0.50S	21P	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	F39C197Y	23		Y-Gen	21XF0.50Y	21Y	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39C2P	23		X-Symmetry	22P	22PF0.50S	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	39C2X	23		X-Gen	22X	22PF0.50X	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	F39C2118P	23		X-Symmetry	22PF0.50S	22Y	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	F39C2118X	23		X-Gen	22PF0.50X	22XY	3	4	1	2	1	5/8	A394	2	1	1 Short only	1.5	0	1
3.25	0	0	0																
	40P	24		XY-Symmetry	20AP	20BP	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	2.375	1.0625
2.125	2	1.25	0																
	40X	24		X-GenXY	20AP	20BX	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	2.375	1.0625
2.125	2	1.25	0																
	40XY	24		XY-GenXY	20AY	20BX	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	2.375	1.0625
2.125	2	1.25	0																
	40Y	24		Y-GenXY	20AY	20BP	3	6	1	1	1	5/8	A394	2	1	1 Long only	1.5	2.375	1.0625
2.125	2	1.25	0																

2.5	41P	24		XY-Symmetry	21P	22P	3	6	1	1	1 5/8 A394	2	1	1	Long only	2	0	1.0625
	0	0	0															
2.5	41X	24		X-GenXY	21X	22X	3	6	1	1	1 5/8 A394	2	1	1	Long only	2	0	1.0625
	0	0	0															
2.5	41XY	24		XY-GenXY	21XY	22XY	3	6	1	1	1 5/8 A394	2	1	1	Long only	2	0	1.0625
	0	0	0															
2.5	41Y	24		Y-GenXY	21Y	22Y	3	6	1	1	1 5/8 A394	2	1	1	Long only	2	0	1.0625
	0	0	0															
0	42P AngleR	0	0	XY-Symmetry	1X i0.50E129S		2	4	1	1	1 5/8 A394	1	1	1	Long only	0.75	0	1
	0	0	0															
0	42X AngleR	0	0	X-GenXY	1P i0.50E129S		2	4	1	1	1 5/8 A394	1	1	1	Long only	0.75	0	1
	0	0	0															
0	42XY AngleR	0	0	XY-GenXY	i0.50E129S	1Y	2	4	1	1	1 5/8 A394	1	1	1	Long only	0.75	0	1
	0	0	0															
0	42Y AngleR	0	0	Y-GenXY	1XY i0.50E129S		2	4	1	1	1 5/8 A394	1	1	1	Long only	0.75	0	1
	0	0	0															
1.5	43AP	26		XY-Symmetry	4X i0.50E113S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43AX	26		X-GenXY	4P i0.50E113S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43AXY	26		XY-GenXY	i0.50E113S	4Y	2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43AY	26		Y-GenXY	4XY i0.50E113S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43BP	26		XY-Symmetry	6X i0.50E99S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43BX	26		X-GenXY	6P i0.50E99S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43BXY	26		XY-GenXY	i0.50E99S	6Y	2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43BY	26		Y-GenXY	6XY i0.50E99S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43CP	26		XY-Symmetry	8X i0.50E85S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43CX	26		X-GenXY	8P i0.50E85S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43CXY	26		XY-GenXY	i0.50E85S	8Y	2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
1.5	43CY	26		Y-GenXY	8XY i0.50E85S		2	5	1	1	1 5/8 A394	2	1	1	Long only	0.875	0	1
	0	0	0															
4	44P	27		Y-Symmetry	8X	28Y	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44Y	27		Y-Gen	8XY	28P	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44AP	27		Y-Symmetry	28P	19Y	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44AY	27		Y-Gen	28Y	19P	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44BP	27		Y-Symmetry	6X	27Y	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44BY	27		Y-Gen	6XY	27P	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44CP	27		Y-Symmetry	27P	18Y	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44CY	27		Y-Gen	27Y	18P	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44DP	27		Y-Symmetry	4X	26Y	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															
4	44DY	27		Y-Gen	4XY	26P	2	5	0.75	0.5	0.5 5/8 A394	2	1	1	Short only	0.875	0	1
	0	0	0															

4	44EP	27		Y-Symmetry	26P	17Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
4	44EY	27		Y-Gen	26Y	17P	2	5	0.75	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
4	45P	28		None	17P	17Y	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
	0	0	0																
4	45AP	28		None	18P	18Y	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
	0	0	0																
4	45BP	28		None	19P	19Y	3	5	1	1	1	5/8	A394	2	1	1 Short only	1.5	0	1
	0	0	0																
4	46P	29		XY-Symmetry	16P	2P	2	5	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
1.5	0	0	0																
1.5	46X	29		X-GenXY	16X	2X	2	5	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
1.5	46XY	29		XY-GenXY	16X	2XY	2	5	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
1.5	46Y	29		Y-GenXY	16P	2Y	2	5	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
1.5625	47P	30		Y-Symmetry	3X	17P	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.5625	47Y	30		Y-Gen	3XY	17Y	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.75	47AP	30		Y-Symmetry	23P	3P	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
1.75	47AY	30		Y-Gen	23P	3Y	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
2.75	48P	31		Y-Symmetry	5X	18P	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
2.75	48Y	31		Y-Gen	5XY	18Y	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.75	48AP	31		Y-Symmetry	24P	5P	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.75	48AY	31		Y-Gen	24P	5Y	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.5625	49P	30		Y-Symmetry	7X	19P	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
1.5625	49Y	30		Y-Gen	7XY	19Y	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1.0625
	0	0	0																
1.75	49AP	30		Y-Symmetry	25P	7P	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.75	49AY	30		Y-Gen	25P	7Y	3	4	1	0.5	0.5	5/8	A394	2	1	1 Short only	0.875	0	1
	0	0	0																
1.125	50P	32		XY-Symmetry	16P	1P	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1 Long only	0.75	1.875	2.25
	2.125	0.875	0																
1.125	50X	32		X-GenXY	16X	1X	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1 Long only	0.75	1.875	2.25
	2.125	0.875	0																
1.125	50XY	32		XY-GenXY	16X	1XY	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1 Long only	0.75	1.875	2.25
	2.125	0.875	0																
1.125	50Y	32		Y-GenXY	16P	1Y	3	5	0.5	0.5	0.5	5/8	A394	2	1.59	1 Long only	0.75	1.875	2.25
	2.125	0.875	0																
1.25	50AP	32		Y-Symmetry	1X	1P	3	6	1	1	1	5/8	A394	2	1.3	1 Long only	1.1875	2	2
	2.125	0.875	0																
1.25	50AY	32		Y-Gen	1XY	1Y	3	6	1	1	1	5/8	A394	2	1.3	1 Long only	1.1875	2	2
	2.125	0.875	0																
2.25	51P	33		Y-Symmetry	23P	4P	3	5	0.5	0.5	0.5	5/8	A394	4	2.24	1 Short only	0.75	1.75	1
	6.25	0.375	0																
2.25	51Y	33		Y-Gen	23P	4Y	3	5	0.5	0.5	0.5	5/8	A394	4	2.24	1 Short only	0.75	1.75	1
	6.25	0.375	0																
2.25	51AP	33		Y-Symmetry	4X	4P	3	6	1	1	1	5/8	A394	4	1.54	1 Short only	0.75	1.75	1
	6.25	0.375	0																

2.25	51AY	33		Y-Gen	4XY	4Y	3	6	1	1	1 5/8 A394	4	1.54	1 Short only	0.75	1.75	1
3	51BP	33	0	Y-Symmetry	4X	26P	3	5	1	1	1 5/8 A394	3	2.1	1 Short only	0.75	1.5	1
3	51BY	33		Y-Gen	4XY	26Y	3	5	1	1	1 5/8 A394	3	2.1	1 Short only	0.75	1.5	1
3.625	51CP	33	0	Y-Symmetry	26P	17P	3	5	1	1	1 5/8 A394	3	2.1	1 Long only	0.75	1.5	1
3.625	51CY	33		Y-Gen	26Y	17Y	3	5	1	1	1 5/8 A394	3	2.1	1 Long only	0.75	1.5	1
2.25	52P	34	0	Y-Symmetry	24P	6P	3	5	0.5	0.5	0.5 5/8 A394	5	2.71	1 Long only	1	2.625	1
2.25	52Y	34		Y-Gen	24P	6Y	3	5	0.5	0.5	0.5 5/8 A394	5	2.71	1 Long only	1	2.625	1
2.25	52AP	34	0	Y-Symmetry	6X	6P	3	6	1	1	1 5/8 A394	5	1.82	1 Long only	0.5	2.5	1
2	52AY	34		Y-Gen	6XY	6Y	3	6	1	1	1 5/8 A394	5	1.82	1 Long only	0.5	2.5	1
5	52BP	34	0	Y-Symmetry	6X	27P	3	5	1	1	1 5/8 A394	5	2	1 Long only	1	2.5	1.5
5	52BY	34		Y-Gen	6XY	27Y	3	5	1	1	1 5/8 A394	5	2	1 Long only	1	2.5	1.5
2.25	52CP	34	0	Y-Symmetry	27P	18P	3	5	1	1	1 5/8 A394	6	2.66	1 Long only	0.75	2.75	1
2.25	52CY	34		Y-Gen	27Y	18Y	3	5	1	1	1 5/8 A394	6	2.66	1 Long only	0.75	2.75	1
3	53P	33	0	Y-Symmetry	25P	8P	3	5	0.5	0.5	0.5 5/8 A394	4	2.24	1 Short only	0.75	1.5	1
3	53Y	33		Y-Gen	25P	8Y	3	5	0.5	0.5	0.5 5/8 A394	4	2.24	1 Short only	0.75	1.5	1
3	53AP	33	0	Y-Symmetry	8X	8P	3	6	1	1	1 5/8 A394	4	1	1 Short only	0.75	1.5	1
3	53AY	33		Y-Gen	8XY	8Y	3	6	1	1	1 5/8 A394	4	1	1 Short only	0.75	1.5	1
4	53BP	33	0	Y-Symmetry	8X	28P	3	5	1	1	1 5/8 A394	3	2	1 Short only	0.75	1.5 2.6875	
4	53BY	33		Y-Gen	8XY	28Y	3	5	1	1	1 5/8 A394	3	2	1 Short only	0.75	1.5 2.6875	
3.5	53CP	33	0	Y-Symmetry	28P	19P	3	5	1	1	1 5/8 A394	4	2.21	1 Long only	0.75	2.25	1
3.5	53CY	33		Y-Gen	28Y	19Y	3	5	1	1	1 5/8 A394	4	2.21	1 Long only	0.75	2.25	1
0	54P	35	0	X-Symmetry	1P	1Y	3	4	1	1	1 5/8 A394	1	1	1 Long only	1.5	0 1.0625	
0	54X	35		X-Gen	1X	1XY	3	4	1	1	1 5/8 A394	1	1	1 Long only	1.5	0 1.0625	
0	g99P	Pwmnt	0	None	29P	30P	1	4	1	1	1	0	0	0	0	0	0
0	g100P	Pwmnt	0	None	30P	31P	1	4	1	1	1	0	0	0	0	0	0
0	g101P	Pwmnt	0	None	31P	32P	1	4	1	1	1	0	0	0	0	0	0
0	g102P	Pwmnt	0	None	32P	33P	1	4	1	1	1	0	0	0	0	0	0
0	g103P	Pwmnt	0	None	33P	34P	1	4	1	1	1	0	0	0	0	0	0
0	g104P	Pwmnt	0	None	34P	35P	1	4	1	1	1	0	0	0	0	0	0
0	g105P	Pwmnt	0	None	35P	36P	1	4	1	1	1	0	0	0	0	0	0

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

Member Capacities and Overrides:

Member	Group	Design	Comp.	Design	Tension	L/r	Length	L/r	Connection	Connection	Net	Rupture	RTE	End	RTE	Edge	Override
Override	Override	Override	Override	Override	Override	Override	Override	Override	Heuristic	Override	Note						
Warnings																	
Label	Label	Comp.	Control	Tension	Control			Comp.	Shear	Bearing	Section	Tension	Dist.	Dist.	Comp.		
Comp.	Comp.	Tension	Tension	Face	Climbing	Climbing		RL	Beta	Beta							
or Errors																	
Capacity	Control	Capacity	Criterion	Capacity	Criterion			Capacity	Capacity	Capacity	Tension	Capacity	Tension	Tension	Capacity		
				Member	Status	Load		Climb									
Unsup.	Criterion		Criterion	ship							Capacity		Capacity	Capacity			
(kips)	(kips)	(kips)	(kips)	(kips)	(ft)	(kips)	(kips)	(kips)	(deg)	(deg)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)	(kips)

0.000	1P	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	1X	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	1XY	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	1Y	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	2P	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	2X	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	2XY	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	2Y	1	49.257	L/r 47.340 Net Sect	78	4.50	49.257	0.000	0.000	47.340	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	3P	1	32.813	L/r 36.400 Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	3X	1	32.813	L/r 36.400 Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	3XY	1	32.813	L/r 36.400 Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	3Y	1	32.813	L/r 36.400 Shear	121	7.00	32.813	36.400	54.375	47.340	60.417	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	4P	2	91.206	L/r 97.650 Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	4X	2	91.206	L/r 97.650 Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	4XY	2	91.206	L/r 97.650 Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	4Y	2	91.206	L/r 97.650 Net Sect	80	8.00	91.206	0.000	0.000	97.650	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	5P	2	99.083	L/r 97.650 Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	5X	2	99.083	L/r 97.650 Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	5XY	2	99.083	L/r 97.650 Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	5Y	2	99.083	L/r 97.650 Net Sect	60	6.05	99.083	109.200	203.906	97.650	183.656	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	6P	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	6X	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	6XY	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	6Y	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	0.000	0.000	231.750	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	7P	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	180						
0.000	7X	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-270						
0.000	7XY	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	0						
0.000	7Y	3	249.636	L/r 231.750 Net Sect	53	7.00	249.636	254.800	380.624	231.750	395.849	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	-90						
0.000	8P	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
			0.000	Automatic Automatic	0.000		0	226.184						
0.000	8X	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000

0.000		0.000	Automatic Automatic	0.000	0	-136.184								
0.000	8XY	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	8Y	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	9P	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	9X	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	9XY	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	9Y	4	306.646	L/r 286.897 Net Sect	60	7.92	306.646	0.000	0.000	286.897	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	10P	4	291.200	Shear 286.897 Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	10X	4	291.200	Shear 286.897 Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	10XY	4	291.200	Shear 286.897 Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	10Y	4	291.200	Shear 286.897 Net Sect	60	7.92	306.646	291.200	543.749	286.897	494.812	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	11P	5	335.162	L/r 330.839 Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	11X	5	335.162	L/r 330.839 Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	11XY	5	335.162	L/r 330.839 Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	11Y	5	335.162	L/r 330.839 Net Sect	77	10.13	335.162	0.000	0.000	330.839	0.000	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	12P	5	364.000	Shear 330.839 Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	12X	5	364.000	Shear 330.839 Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	12XY	5	364.000	Shear 330.839 Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	12Y	5	364.000	Shear 330.839 Net Sect	45	11.83	385.718	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	13P	5	364.000	Shear 330.839 Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	13X	5	364.000	Shear 330.839 Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	13XY	5	364.000	Shear 330.839 Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	13Y	5	364.000	Shear 330.839 Net Sect	58	15.32	368.010	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	14P	5	364.000	Shear 330.839 Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	14X	5	364.000	Shear 330.839 Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	14XY	5	364.000	Shear 330.839 Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	226.184						
0.000	14Y	5	364.000	Shear 330.839 Net Sect	48	25.53	381.402	364.000	815.624	330.839	672.074	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	-136.184						
0.000	15AP	6	15.633	L/r 18.063 Rupture	131	10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	180						
0.000	15AX	6	15.633	L/r 18.063 Rupture	131	10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	180						
0.000	15AXY	6	15.633	L/r 18.063 Rupture	131	10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000
0.000			0.000	Automatic Automatic	0.000		0	180						
0.000	15AY	6	15.633	L/r 18.063 Rupture	131	10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000

0.000		0.000	Automatic Automatic	0.000	0	180							
15BP	6	15.633	L/r 18.063 Rupture	131 10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
15BX	6	15.633	L/r 18.063 Rupture	131 10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
15BXY	6	15.633	L/r 18.063 Rupture	131 10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
15BY	6	15.633	L/r 18.063 Rupture	131 10.82	15.633	33.600	20.391	25.048	18.063	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
16AP	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "16AP" controlled by					
RDis, not RBsh.													
16AX	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "16AX" controlled by					
RDis, not RBsh.													
16AXY	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "16AXY" controlled by					
RDis, not RBsh.													
16AY	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "16AY" controlled by					
RDis, not RBsh.													
16BP	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "16BP" controlled by					
RDis, not RBsh.													
16BX	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270		Rupture capacity for member "16BX" controlled by					
RDis, not RBsh.													
16BXY	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "16BXY" controlled by					
RDis, not RBsh.													
16BY	7	14.303	L/r 18.125 Rupture	130 9.22	14.303	18.200	20.391	18.650	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270		Rupture capacity for member "16BY" controlled by					
RDis, not RBsh.													
17AP	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
17AX	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
17AXY	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
17AY	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
17BP	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
17BX	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
17BXY	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
17BY	8	39.613	L/r 44.185 Net Sect	100 10.00	39.613	45.500	67.969	44.185	52.912	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
18AP	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "18AP" controlled by					
RDis, not RBsh.													
18AX	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "18AX" controlled by					
RDis, not RBsh.													
18AXY	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "18AXY" controlled by					
RDis, not RBsh.													
18AY	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180		Rupture capacity for member "18AY" controlled by					

RDis, not RBsh.														
18BP	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								Rupture capacity for member "18BP" controlled by
RDis, not RBsh.														
18BX	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	270								Rupture capacity for member "18BX" controlled by
RDis, not RBsh.														
18BXY	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								Rupture capacity for member "18BXY" controlled by
RDis, not RBsh.														
18BY	9	32.738	L/r 36.400 Shear	104 8.52	32.738	36.400	54.375	40.399	42.647	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	270								Rupture capacity for member "18BY" controlled by
RDis, not RBsh.														
19AP	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
19AX	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
19AXY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
19AY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
19BP	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
19BX	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	270								
19BXY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
19BY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	270								
20AP	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
20AX	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
20AXY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
20AY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
20BP	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
20BX	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	270								
20BXY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	180								
20BY	10	61.204	L/r 59.307 Net Sect	78 9.22	61.204	63.700	118.945	59.307	74.976	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	270								
21AP	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	167.706								
21AX	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	186.648								
21AXY	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	167.706								
21AY	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	186.648								
21BP	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	192.294								
21BX	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	263.352								
21BXY	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		
0.000		0.000	Automatic Automatic	0.000	0	192.294								
21BY	11	44.335	L/r 45.178 Net Sect	96 10.60	44.335	54.600	81.562	45.178	46.012	0.000	0.000	0.000		

0.000		0.000	Automatic Automatic	0.000	0	263.352							
	22AP	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	259.492							
	22AX	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	190.508							
	22AXY	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	259.492							
	22AY	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	190.508							
	22BP	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	191.746							
	22BX	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	258.254							
	22BXY	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	191.746							
	22BY	12	30.985	L/r 36.400 Shear	126 12.25	30.985 36.400	54.375	40.581	42.206	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	258.254							
	23AP	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	260.229				Rupture capacity for member "23AP" controlled by			
RDis, not RBsh.													
	23AX	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	189.771				Rupture capacity for member "23AX" controlled by			
RDis, not RBsh.													
	23AXY	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	260.229				Rupture capacity for member "23AXY" controlled by			
RDis, not RBsh.													
	23AY	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	189.771				Rupture capacity for member "23AY" controlled by			
RDis, not RBsh.													
	23BP	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	190.793				Rupture capacity for member "23BP" controlled by			
RDis, not RBsh.													
	23BX	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	259.207				Rupture capacity for member "23BX" controlled by			
RDis, not RBsh.													
	23BXY	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	190.793				Rupture capacity for member "23BXY" controlled by			
RDis, not RBsh.													
	23BY	13	22.542	L/r 27.300 Shear	147 14.07	22.542 27.300	40.781	40.419	38.516	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	259.207				Rupture capacity for member "23BY" controlled by			
RDis, not RBsh.													
	24AP	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	260.094				Rupture capacity for member "24AP" controlled by			
RDis, not RBsh.													
	24AX	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	189.906				Rupture capacity for member "24AX" controlled by			
RDis, not RBsh.													
	24AXY	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	260.094				Rupture capacity for member "24AXY" controlled by			
RDis, not RBsh.													
	24AY	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	189.906				Rupture capacity for member "24AY" controlled by			
RDis, not RBsh.													
	24BP	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	190.974				Rupture capacity for member "24BP" controlled by			
RDis, not RBsh.													
	24BX	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000			Automatic Automatic	0.000	0	259.026				Rupture capacity for member "24BX" controlled by			
RDis, not RBsh.													
	24BXY	14	21.431	L/r 27.300 Shear	174 17.45	21.431 27.300	40.781	40.581	36.250	0.000	0.000	0.000	

0.000		0.000		Automatic Automatic	0.000	0	190.974							Rupture capacity for member "24BXY" controlled by
RDis, not RBsh.	24BY	14	21.431	L/r 27.300 Shear	174 17.45	21.431	27.300	40.781	40.581	36.250	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	259.026							Rupture capacity for member "24BY" controlled by
RDis, not RBsh.	25AP	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	166.048							
	25AX	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	194.307							
	25AXY	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	166.048							
	25AY	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	194.307							
	25BP	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	253.939							
	25BX	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	197.146							
	25BXY	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	253.939							
	25BY	15	33.799	L/r 36.268 Net Sect	128 14.10	33.799	63.700	95.156	36.268	72.037	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	197.146							
	26AP	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	197.873							Rupture capacity for member "26AP" controlled by
RDis, not RBsh.	26AX	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	251.905							Rupture capacity for member "26AX" controlled by
RDis, not RBsh.	26AXY	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	197.873							Rupture capacity for member "26AXY" controlled by
RDis, not RBsh.	26AY	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	251.905							Rupture capacity for member "26AY" controlled by
RDis, not RBsh.	26BP	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	249.946							Rupture capacity for member "26BP" controlled by
RDis, not RBsh.	26BX	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	200.734							Rupture capacity for member "26BX" controlled by
RDis, not RBsh.	26BXY	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	249.946							Rupture capacity for member "26BXY" controlled by
RDis, not RBsh.	26BY	16	4.044	L/r 18.125 Rupture	257 16.85	4.044	18.200	20.391	18.448	18.125	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	200.734							Rupture capacity for member "26BY" controlled by
RDis, not RBsh.	27AP	17	6.420	L/r 24.381 Net Sect	265 19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	194.13							Rupture capacity for member "27AP" controlled by
RDis, not RBsh.	27AX	17	6.420	L/r 24.381 Net Sect	265 19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	256.033							Rupture capacity for member "27AX" controlled by
RDis, not RBsh.	27AXY	17	6.420	L/r 24.381 Net Sect	265 19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	194.13							Rupture capacity for member "27AXY" controlled by
RDis, not RBsh.	27AY	17	6.420	L/r 24.381 Net Sect	265 19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	256.033							Rupture capacity for member "27AY" controlled by
RDis, not RBsh.	27BP	17	6.420	L/r 24.381 Net Sect	265 19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000	
0.000		0.000		Automatic Automatic	0.000	0	191.908							Rupture capacity for member "27BP" controlled by
RDis, not RBsh.														

0.000	27BX	17	6.420	L/r	24.381	Net Sect	265	19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	168.591		Rupture capacity for member "27BX" controlled by				
0.000	27BXY	17	6.420	L/r	24.381	Net Sect	265	19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	191.908		Rupture capacity for member "27BXY" controlled by				
0.000	27BY	17	6.420	L/r	24.381	Net Sect	265	19.19	6.420	36.400	54.375	24.381	48.333	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	168.591		Rupture capacity for member "27BY" controlled by				
0.000	28AP	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	226.044						
0.000	28AX	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	315.01						
0.000	28AXY	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	226.044						
0.000	28AY	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	315.01						
0.000	28BP	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	226.26						
0.000	28BX	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	223.519						
0.000	28BXY	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	312.376						
0.000	28BY	18	11.489	L/r	45.500	Shear	205	15.32	11.489	45.500	67.969	47.101	60.337	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	227.242						
0.000	29AP	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	198.174						
0.000	29AX	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	251.894						
0.000	29AXY	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	198.174						
0.000	29AY	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	251.894						
0.000	29BP	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	195.872						
0.000	29BX	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	164.336						
0.000	29BXY	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	195.872						
0.000	29BY	19	25.652	L/r	44.469	Net Sect	136	28.52	25.652	45.500	67.969	44.469	50.906	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	164.336						
0.000	30AP	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	30AY	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270						
0.000	30BP	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	30BX	20a	9.100	Shear	6.609	Rupture	105	6.00	13.441	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270						
0.000	31P	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	31Y	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270						
0.000	32P	20	4.027	L/r	7.017	Rupture	210	6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	32X	20	4.027	L/r	7.017	Rupture	210	6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270						
0.000	33P	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	33Y	20	4.027	L/r	6.609	Rupture	210	6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000

0.000		0.000	Automatic Automatic	0.000	0	270							
	34P	20	4.027 L/r 7.017 Rupture	210 6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
	34X	20	4.027 L/r 7.017 Rupture	210 6.00	4.027	9.100	10.195	15.532	7.017	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
	35P	20	4.027 L/r 6.609 Rupture	210 6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	180							
	35Y	20	4.027 L/r 6.609 Rupture	210 6.00	4.027	9.100	10.195	15.532	6.609	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
	36P	36	16.800 Shear 14.864 Rupture	134 6.00	19.743	16.800	20.391	31.823	14.864	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
	36X	36	16.800 Shear 14.864 Rupture	134 6.00	19.743	16.800	20.391	31.823	14.864	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	270							
	37AP	21	27.300 Shear 27.300 Shear	149 15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							
RDis, not RBsh.													
	37AY	21	27.300 Shear 27.300 Shear	149 15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	261.566							
RDis, not RBsh.													
	37BP	21	27.300 Shear 27.300 Shear	149 15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.093							
RDis, not RBsh.													
	37BX	21	27.300 Shear 27.300 Shear	149 15.74	27.341	27.300	40.781	48.519	36.250	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	261.907							
RDis, not RBsh.													
	38AP	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							
RDis, not RBsh.													
	38AX	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	261.566							
RDis, not RBsh.													
	38AXY	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							
RDis, not RBsh.													
	38AY	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	261.566							
RDis, not RBsh.													
	38BP	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.093							
RDis, not RBsh.													
	38BX	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	261.907							
RDis, not RBsh.													
	38BXY	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.093							
RDis, not RBsh.													
	38BY	22	11.503 L/r 18.125 Rupture	193 9.57	11.503	18.200	20.391	30.760	18.125	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	261.907							
RDis, not RBsh.													
	39AP	23	18.200 Shear 18.200 Shear	173 9.56	21.560	18.200	27.187	40.581	24.167	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							
RDis, not RBsh.													
	39AX	23	18.200 Shear 18.200 Shear	173 9.56	21.560	18.200	27.187	40.581	24.167	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							
RDis, not RBsh.													
	39AXY	23	18.200 Shear 18.200 Shear	173 9.56	21.560	18.200	27.187	40.581	24.167	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							
RDis, not RBsh.													
	39AY	23	18.200 Shear 18.200 Shear	173 9.56	21.560	18.200	27.187	40.581	24.167	0.000	0.000	0.000	
0.000		0.000	Automatic Automatic	0.000	0	188.434							

RDis, not RBsh. 0.000	39BP	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	173 0.000	9.56 0.000	21.560 0	18.200 188.093	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39BP" controlled by
RDis, not RBsh. 0.000	39BX	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	173 0.000	9.56 0.000	21.560 0	18.200 188.093	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39BX" controlled by
RDis, not RBsh. 0.000	39BXY	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	173 0.000	9.56 0.000	21.560 0	18.200 188.093	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39BXY" controlled by
RDis, not RBsh. 0.000	39BY	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	173 0.000	9.56 0.000	21.560 0	18.200 188.093	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39BY" controlled by
RDis, not RBsh. 0.000	39C1P	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 188.434	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39C1P" controlled by
RDis, not RBsh. 0.000	39C1Y	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 171.566	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39C1Y" controlled by
RDis, not RBsh. 0.000	F39C197P	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 188.434	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "F39C197P" controlled by
RDis, not RBsh. 0.000	F39C197Y	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 171.566	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "F39C197Y" controlled by
RDis, not RBsh. 0.000	39C2P	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 188.093	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39C2P" controlled by
RDis, not RBsh. 0.000	39C2X	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 171.907	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "39C2X" controlled by
RDis, not RBsh. 0.000	F39C2118P	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 188.093	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "F39C2118P" controlled by
RDis, not RBsh. 0.000	F39C2118X	23	18.200 0.000	Shear Automatic	18.200 Automatic	Shear Automatic	62 0.000	2.21 0.000	44.853 0	18.200 171.907	27.187	40.581	24.167	0.000	0.000	0.000	Rupture capacity for member "F39C2118X" controlled by
RDis, not RBsh. 0.000	40P	24	13.386 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.53 0.000	13.386 0	18.200 185.986	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "40P" controlled by
RDis, not RBsh. 0.000	40X	24	13.386 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.53 0.000	13.386 0	18.200 258.158	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "40X" controlled by
RDis, not RBsh. 0.000	40XY	24	13.386 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.53 0.000	13.386 0	18.200 185.986	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "40XY" controlled by
RDis, not RBsh. 0.000	40Y	24	13.386 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.53 0.000	13.386 0	18.200 258.158	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "40Y" controlled by
RDis, not RBsh. 0.000	41P	24	13.399 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.52 0.000	13.399 0	18.200 185.985	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "41P" controlled by
RDis, not RBsh. 0.000	41X	24	13.399 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.52 0.000	13.399 0	18.200 174.015	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "41X" controlled by
RDis, not RBsh. 0.000	41XY	24	13.399 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.52 0.000	13.399 0	18.200 185.985	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "41XY" controlled by
RDis, not RBsh. 0.000	41Y	24	13.399 0.000	L/r Automatic	18.200 Automatic	Shear Automatic	234 0.000	13.52 0.000	13.399 0	18.200 174.015	27.187	48.681	25.677	0.000	0.000	0.000	Rupture capacity for member "41Y" controlled by

RDis, not RBsh.															
0.000	42P AngleR	9.100	Shear	8.812	Rupture	130	4.24	15.869	9.100	13.594	24.381	8.812	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	42X AngleR	9.100	Shear	8.812	Rupture	130	4.24	15.869	9.100	13.594	24.381	8.812	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	42XY AngleR	9.100	Shear	8.812	Rupture	130	4.24	15.869	9.100	13.594	24.381	8.812	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
0.000	42Y AngleR	9.100	Shear	8.812	Rupture	130	4.24	15.869	9.100	13.594	24.381	8.812	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43AP 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43AX 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43AXY 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
0.000	43AY 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43BP 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43BX 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43BXY 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
0.000	43BY 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43CP 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43CX 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	43CXY 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
0.000	43CY 26	12.587	L/r	12.347	Rupture	129	4.24	12.587	18.200	20.391	18.448	12.347	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
0.000	44P 27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
Rupture capacity for member "44P" controlled by															
0.000	44Y 27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
Rupture capacity for member "44Y" controlled by															
0.000	44AP 27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
Rupture capacity for member "44AP" controlled by															
0.000	44AY 27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
Rupture capacity for member "44AY" controlled by															
0.000	44BP 27	14.533	L/r	18.125	Rupture	128	9.13	14.533	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
Rupture capacity for member "44BP" controlled by															
0.000	44BY 27	14.533	L/r	18.125	Rupture	128	9.13	14.533	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
Rupture capacity for member "44BY" controlled by															
0.000	44CP 27	14.533	L/r	18.125	Rupture	128	9.13	14.533	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
Rupture capacity for member "44CP" controlled by															
0.000	44CY 27	14.533	L/r	18.125	Rupture	128	9.13	14.533	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	180						
Rupture capacity for member "44CY" controlled by															
0.000	44DP 27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
		0.000		Automatic	Automatic		0.000	0	270						
Rupture capacity for member "44DP" controlled by															
RDis, not RBsh.															

0.000	44DY	27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "44DY" controlled by		
0.000	44EP	27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "44EP" controlled by		
0.000	44EY	27	16.678	L/r	18.125	Rupture	116	8.22	16.678	18.200	20.391	18.650	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "44EY" controlled by		
0.000	45P	28	18.200	Shear	18.200	Shear	111	6.00	35.407	18.200	27.187	40.581	24.167	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "45P" controlled by		
0.000	45AP	28	18.200	Shear	18.200	Shear	111	6.00	35.407	18.200	27.187	40.581	24.167	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "45AP" controlled by		
0.000	45BP	28	18.200	Shear	18.200	Shear	111	6.00	35.407	18.200	27.187	40.581	24.167	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "45BP" controlled by		
0.000	46P	29	7.736	L/r	12.755	Rupture	202	14.78	7.736	18.200	20.391	18.529	12.755	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	266.198						
0.000	46X	29	7.736	L/r	12.755	Rupture	202	14.78	7.736	18.200	20.391	18.529	12.755	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	183.802						
0.000	46XY	29	7.736	L/r	12.755	Rupture	202	14.78	7.736	18.200	20.391	18.529	12.755	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	266.198						
0.000	46Y	29	7.736	L/r	12.755	Rupture	202	14.78	7.736	18.200	20.391	18.529	12.755	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	183.802						
0.000	47P	30	5.767	L/r	12.755	Rupture	201	13.25	5.767	18.200	20.391	18.650	12.755	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270						
0.000	47Y	30	5.767	L/r	12.755	Rupture	201	13.25	5.767	18.200	20.391	18.650	12.755	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	47AP	30	5.486	L/r	14.386	Rupture	206	13.59	5.486	18.200	20.391	18.650	14.386	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	277.824						
0.000	47AY	30	5.486	L/r	14.386	Rupture	206	13.59	5.486	18.200	20.391	18.650	14.386	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	172.176						
0.000	48P	31	8.465	L/r	18.125	Rupture	192	15.02	8.465	18.200	20.391	30.760	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	270				Rupture capacity for member "48P" controlled by		
0.000	48Y	31	8.465	L/r	18.125	Rupture	192	15.02	8.465	18.200	20.391	30.760	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "48Y" controlled by		
0.000	48AP	31	8.140	L/r	13.978	Rupture	196	15.32	8.140	18.200	20.391	30.760	13.978	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	274.925						
0.000	48AY	31	8.140	L/r	13.978	Rupture	196	15.32	8.140	18.200	20.391	30.760	13.978	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	175.075						
0.000	49P	30	5.767	L/r	13.162	Rupture	201	13.25	5.767	18.200	20.391	18.650	13.162	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270						
0.000	49Y	30	5.767	L/r	13.162	Rupture	201	13.25	5.767	18.200	20.391	18.650	13.162	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	180						
0.000	49AP	30	5.486	L/r	13.978	Rupture	206	13.59	5.486	18.200	20.391	18.650	13.978	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	277.824						
0.000	49AY	30	5.486	L/r	13.978	Rupture	206	13.59	5.486	18.200	20.391	18.650	13.978	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	172.176						
0.000	50P	32	18.200	Shear	18.125	Rupture	143	14.07	21.867	18.200	27.187	36.997	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	270				Rupture capacity for member "50P" controlled by		
0.000	50X	32	18.200	Shear	18.125	Rupture	143	14.07	21.867	18.200	27.187	36.997	18.125	0.000	0.000	0.000
RDis, not RBsh.			0.000	Automatic	Automatic		0.000		0	180				Rupture capacity for member "50X" controlled by		
0.000	50XY	32	18.200	Shear	18.125	Rupture	143	14.07	21.867	18.200	27.187	36.997	18.125	0.000	0.000	0.000
			0.000	Automatic	Automatic		0.000		0	270				Rupture capacity for member "50XY" controlled by		

RDis, not RBsh.	50Y	32	18.200	Shear	18.125	Rupture	143	14.07	21.867	18.200	27.187	36.997	18.125	0.000	0.000	0.000	Rupture capacity for member "50Y" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	50AP	32	18.200	Shear	18.200	Shear	122	6.00	27.975	18.200	27.187	38.758	21.146	0.000	0.000	0.000	Rupture capacity for member "50AP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	50AY	32	18.200	Shear	18.200	Shear	122	6.00	27.975	18.200	27.187	38.758	21.146	0.000	0.000	0.000	Rupture capacity for member "50AY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	51P	33	32.661	L/r	32.886	Net Sect	111	11.64	32.661	36.400	54.375	32.886	42.647	0.000	0.000	0.000	Rupture capacity for member "51P" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	51Y	33	32.661	L/r	32.886	Net Sect	111	11.64	32.661	36.400	54.375	32.886	42.647	0.000	0.000	0.000	Rupture capacity for member "51Y" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	51AP	33	31.965	L/r	36.400	Shear	114	6.00	31.965	36.400	54.375	37.138	42.647	0.000	0.000	0.000	Rupture capacity for member "51AP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	51AY	33	31.965	L/r	36.400	Shear	114	6.00	31.965	36.400	54.375	37.138	42.647	0.000	0.000	0.000	Rupture capacity for member "51AY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	51BP	33	27.300	Shear	27.300	Shear	107	5.62	33.416	27.300	40.781	33.736	31.985	0.000	0.000	0.000	Rupture capacity for member "51BP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	51BY	33	27.300	Shear	27.300	Shear	107	5.62	33.416	27.300	40.781	33.736	31.985	0.000	0.000	0.000	Rupture capacity for member "51BY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	51CP	33	27.300	Shear	27.300	Shear	107	5.63	33.416	27.300	40.781	37.786	31.985	0.000	0.000	0.000	Rupture capacity for member "51CP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	51CY	33	27.300	Shear	27.300	Shear	107	5.63	33.416	27.300	40.781	37.786	31.985	0.000	0.000	0.000	Rupture capacity for member "51CY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	52P	34	41.627	L/r	45.500	Shear	106	14.07	41.627	45.500	67.969	46.393	48.262	0.000	0.000	0.000	
0.000			0.000	Automatic	Automatic		0.000		0	270							
	52Y	34	41.627	L/r	45.500	Shear	106	14.07	41.627	45.500	67.969	46.393	48.262	0.000	0.000	0.000	
0.000			0.000	Automatic	Automatic		0.000		0	180							
	52AP	34	45.317	L/r	35.539	Rupture	91	6.00	45.317	45.500	67.969	51.799	35.539	0.000	0.000	0.000	Rupture capacity for member "52AP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	52AY	34	45.317	L/r	35.539	Rupture	91	6.00	45.317	45.500	67.969	51.799	35.539	0.000	0.000	0.000	Rupture capacity for member "52AY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	52BP	34	42.220	L/r	45.500	Shear	104	6.88	42.220	45.500	67.969	50.706	71.078	0.000	0.000	0.000	Rupture capacity for member "52BP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	52BY	34	42.220	L/r	45.500	Shear	104	6.88	42.220	45.500	67.969	50.706	71.078	0.000	0.000	0.000	Rupture capacity for member "52BY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	52CP	34	42.220	L/r	46.696	Net Sect	104	6.88	42.220	54.600	81.562	46.696	63.970	0.000	0.000	0.000	Rupture capacity for member "52CP" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	52CY	34	42.220	L/r	46.696	Net Sect	104	6.88	42.220	54.600	81.562	46.696	63.970	0.000	0.000	0.000	Rupture capacity for member "52CY" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	180							
RDis, not RBsh.	53P	33	32.661	L/r	32.886	Net Sect	111	11.64	32.661	36.400	54.375	32.886	42.647	0.000	0.000	0.000	Rupture capacity for member "53P" controlled by
0.000			0.000	Automatic	Automatic		0.000		0	270							
RDis, not RBsh.	53Y	33	32.661	L/r	32.886	Net Sect	111	11.64	32.661	36.400	54.375	32.886	42.647	0.000	0.000	0.000	

0.000	0.000	Automatic	Automatic	0.000	0	180									Rupture capacity for member "53Y" controlled by
RDis, not RBsh.															
53AP 33	31.965	L/r	36.400	Shear	114	6.00	31.965	36.400	54.375	40.419	42.647	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									Rupture capacity for member "53AP" controlled by
RDis, not RBsh.															
53AY 33	31.965	L/r	36.400	Shear	114	6.00	31.965	36.400	54.375	40.419	42.647	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	270									Rupture capacity for member "53AY" controlled by
RDis, not RBsh.															
53BP 33	27.300	Shear	27.300	Shear	107	5.62	33.416	27.300	40.781	34.344	31.985	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	270									Rupture capacity for member "53BP" controlled by
RDis, not RBsh.															
53BY 33	27.300	Shear	27.300	Shear	107	5.62	33.416	27.300	40.781	34.344	31.985	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									Rupture capacity for member "53BY" controlled by
RDis, not RBsh.															
53CP 33	33.416	L/r	36.400	Shear	107	5.63	33.416	36.400	54.375	37.118	42.647	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	270									Rupture capacity for member "53CP" controlled by
RDis, not RBsh.															
53CY 33	33.416	L/r	36.400	Shear	107	5.63	33.416	36.400	54.375	37.118	42.647	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									Rupture capacity for member "53CY" controlled by
RDis, not RBsh.															
54P 35	8.154	L/r	9.100	Shear	169	6.00	8.154	9.100	10.195	21.688	9.629	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									Rupture capacity for member "54P" controlled by
RDis, not RBsh.															
54X 35	8.154	L/r	9.100	Shear	169	6.00	8.154	9.100	10.195	21.688	9.629	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	270									Rupture capacity for member "54X" controlled by
RDis, not RBsh.															
g99P Pwmnt	437.242	L/r	571.199	Net Sect	80	29.25	437.242	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g100P Pwmnt	535.971	L/r	571.199	Net Sect	41	15.00	535.971	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g101P Pwmnt	260.146	L/r	571.199	Net Sect	122	44.75	260.146	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g102P Pwmnt	540.511	L/r	571.199	Net Sect	38	14.00	540.511	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g103P Pwmnt	540.511	L/r	571.199	Net Sect	38	14.00	540.511	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g104P Pwmnt	531.117	L/r	571.199	Net Sect	44	16.00	531.117	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g105P Pwmnt	565.563	L/r	571.199	Net Sect	16	6.00	565.563	0.000	0.000	571.199	0.000	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	0									
g106P Plate	16.800	Shear	16.800	Shear	83	1.50	109.423	16.800	40.781	129.094	45.312	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									Rupture capacity for member "g106P" controlled by
RDis, not RBsh.															
g107P PMBR1	10.195	Bearing	10.195	Bearing	46	1.50	20.042	16.800	10.195	18.827	10.343	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									
g108P PMBR1	10.195	Bearing	10.195	Bearing	46	1.50	20.044	16.800	10.195	18.827	10.343	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									
g109P PMBR1	10.195	Bearing	10.195	Bearing	46	1.50	20.044	16.800	10.195	18.827	10.343	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	180									
g110P BraceR	13.594	Bearing	13.594	Bearing	82	3.35	29.101	16.800	13.594	32.987	15.104	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	179.573									Rupture capacity for member "g110P" controlled by
RDis, not RBsh.															
g110X BraceR	13.594	Bearing	13.594	Bearing	82	3.35	29.101	16.800	13.594	32.987	15.104	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	270.427									Rupture capacity for member "g110X" controlled by
RDis, not RBsh.															
g111P PMBR2	10.195	Bearing	10.195	Bearing	81	3.35	22.126	16.800	10.195	25.048	11.328	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	179.573									Rupture capacity for member "g111P" controlled by
RDis, not RBsh.															
g111X PMBR2	10.195	Bearing	10.195	Bearing	81	3.35	22.126	16.800	10.195	25.048	11.328	0.000	0.000	0.000	
0.000	0.000	Automatic	Automatic	0.000	0	270.427									Rupture capacity for member "g111X" controlled by

RDis, not RBsh.	g112P PMBR2	10.195	Bearing	10.195	Bearing	81	3.35	22.127	16.800	10.195	25.048	11.328	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180		Rupture capacity	for member	"g112P"	controlled by	
RDis, not RBsh.	g112X PMBR2	10.195	Bearing	10.195	Bearing	81	3.35	22.127	16.800	10.195	25.048	11.328	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	270		Rupture capacity	for member	"g112X"	controlled by	
RDis, not RBsh.	g113P PMBR2	10.195	Bearing	10.195	Bearing	81	3.35	22.127	16.800	10.195	25.048	11.328	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180		Rupture capacity	for member	"g113P"	controlled by	
RDis, not RBsh.	g113X PMBR2	10.195	Bearing	10.195	Bearing	81	3.35	22.127	16.800	10.195	25.048	11.328	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	270		Rupture capacity	for member	"g113X"	controlled by	
RDis, not RBsh.	g114P PMBR3	10.195	Bearing	10.195	Bearing	162	8.07	11.823	16.800	10.195	31.139	11.328	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	184.24		Rupture capacity	for member	"g114P"	controlled by	
RDis, not RBsh.	g115P PMBR4	13.207	L/r	13.594	Bearing	191	11.07	13.207	16.800	13.594	49.187	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	184.24		Rupture capacity	for member	"g115P"	controlled by	
RDis, not RBsh.	g116P PMBR4	13.594	Bearing	13.594	Bearing	167	9.68	17.249	16.800	13.594	49.187	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	194.546		Rupture capacity	for member	"g116P"	controlled by	
RDis, not RBsh.	g116X PMBR4	13.594	Bearing	13.594	Bearing	167	9.68	17.249	16.800	13.594	49.187	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	166.125		Rupture capacity	for member	"g116X"	controlled by	
RDis, not RBsh.	g117P PMBR4	13.594	Bearing	13.594	Bearing	178	10.27	15.339	16.800	13.594	49.187	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180		Rupture capacity	for member	"g117P"	controlled by	
RDis, not RBsh.	g118P PMBR5	13.594	Bearing	13.594	Bearing	200	13.27	13.840	16.800	13.594	57.287	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	180		KL/R value of 200.30 exceeds maximum of 200.00				
for member "g118P"	??														
	g120P PMBR5	13.594	Bearing	13.594	Bearing	186	12.34	16.004	16.800	13.594	57.287	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	177.227		Rupture capacity	for member	"g120P"	controlled by	
RDis, not RBsh.	g120X PMBR5	13.594	Bearing	13.594	Bearing	186	12.34	16.004	16.800	13.594	57.287	15.104	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	182.273		Rupture capacity	for member	"g120X"	controlled by	
RDis, not RBsh.	g121P Pwmnt	558.517	L/r	571.199	Net Sect	25	9.00	558.517	0.000	0.000	571.199	0.000	0.000	0.000	0.000
0.000		0.000	Automatic	Automatic		0.000		0	0						

The model contains 335 angle members.

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

Joint Label	Dead Load (kips)	X-Drag Area (ft^2)	Y-Drag Area (ft^2)
1P	0.117	5.752	4.127
2P	0.0615	3.558	2.426
3P	0.117	7.249	6.224
4P	0.218	10.789	8.992
5P	0.222	10.953	9.482
6P	0.326	12.528	10.018
7P	0.352	11.891	10.866
8P	0.438	14.553	13.193
15P	0.651	16.233	16.233
16P	0.114	7.054	2.102
17P	0.0621	2.786	2.354
18P	0.0805	3.740	2.381

19P	0.0621	2.786	2.354
20AP	0.39	20.837	17.520
20BP	0.403	17.907	21.056
21P	0.22	11.891	8.870
22P	0.22	8.870	11.891
23P	0.1	6.042	2.462
24P	0.15	8.339	2.688
25P	0.1	6.042	2.462
26P	0.053	2.813	1.250
27P	0.0705	3.724	1.250
28P	0.053	2.813	1.250
29P	0.725	15.539	15.539
30P	1.25	27.431	28.453
31P	1.59	34.533	34.802
32P	1.47	31.836	31.648
33P	0.707	15.500	15.312
34P	0.756	16.567	16.375
35P	0.571	12.325	12.375
36P	0.372	7.969	7.969
37P	0.223	4.781	4.781
1X	0.117	5.752	4.127
1XY	0.11	5.439	3.970
1Y	0.11	5.439	3.970
2X	0.0615	3.558	2.426
2XY	0.0615	3.558	2.426
2Y	0.0615	3.558	2.426
3X	0.116	7.249	6.160
3XY	0.116	7.249	6.160
3Y	0.117	7.249	6.224
4X	0.213	10.554	9.179
4XY	0.208	10.242	9.023
4Y	0.213	10.476	8.835
5X	0.222	10.953	9.394
5XY	0.222	10.953	9.394
5Y	0.222	10.953	9.482
6X	0.315	12.098	10.143
6XY	0.31	11.786	9.986
6Y	0.321	12.216	9.861
7X	0.351	11.891	10.802
7XY	0.351	11.891	10.802
7Y	0.352	11.891	10.866
8X	0.433	14.318	13.381
8XY	0.427	14.006	13.224
8Y	0.432	14.240	13.037
15X	0.651	16.233	16.233
15XY	0.651	16.233	16.233
15Y	0.651	16.233	16.233
16X	0.114	7.054	2.102
17Y	0.0621	2.786	2.354
18Y	0.0805	3.740	2.381
19Y	0.0621	2.786	2.354
20AY	0.407	20.837	18.125
20BX	0.403	17.907	21.056
21X	0.22	11.891	8.870
21XY	0.22	11.891	8.870
21Y	0.22	11.891	8.870
22X	0.22	8.870	11.891
22XY	0.261	10.831	12.509
22Y	0.261	10.831	12.509
26Y	0.053	2.813	1.250

27Y	0.0705	3.724	1.250
28Y	0.053	2.813	1.250
9S	0.404	12.387	12.387
10S	0.406	11.747	11.747
11S	0.518	14.852	14.852
12S	0.733	20.933	20.933
13S	0.605	12.807	12.807
14S	0.936	19.747	19.747
i0.50E129S	0.0385	1.012	1.375
i0.50E113S	0.0225	1.004	1.125
i0.50E99S	0.0225	1.000	1.125
i0.50E85S	0.0225	1.000	1.125
21XF0.50S	0.0444	0.920	1.498
22PF0.50S	0.0146	0.000	0.920
9X	0.404	12.387	12.387
9XY	0.404	12.387	12.387
9Y	0.404	12.387	12.387
10X	0.406	11.747	11.747
10XY	0.406	11.747	11.747
10Y	0.406	11.747	11.747
11X	0.518	14.852	14.852
11XY	0.518	14.852	14.852
11Y	0.518	14.852	14.852
12X	0.733	20.933	20.933
12XY	0.733	20.933	20.933
12Y	0.733	20.933	20.933
13X	0.605	12.807	12.807
13XY	0.605	12.807	12.807
13Y	0.605	12.807	12.807
14X	0.936	19.747	19.747
14XY	0.936	19.747	19.747
14Y	0.936	19.747	19.747
21XF0.50Y	0.0584	0.920	2.212
22PF0.50X	0.0146	0.000	0.920
Total	37	1148.254	1068.534

Unadjusted Dead Load and Drag Areas by Section:

Section Label	Unfactored Dead Load (kips)	X-Drag Area All (ft^2)	Y-Drag Area All (ft^2)	X-Drag Area Face (ft^2)	Y-Drag Area Face (ft^2)
1	10.937	420.113	337.810	139.781	139.112
2	26.071	728.141	730.724	227.007	321.570
Total	37.007	1148.254	1068.534	366.789	460.682

Angle Member Weights and Surface Areas by Section:

Section Label	Unfactored Weight (kips)	Factored Weight (kips)	Unfactored Surface Area (ft^2)	Factored Surface Area (ft^2)
1	10.937	10.937	1715.817	1715.817
2	26.071	27.374	3034.480	3186.204
Total	37.007	38.311	4750.297	4902.021

Section Joint Information:

Section	Joint	Joint
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Label	Label	Elevation (ft)
1	1P	128.800
1	2P	124.300
1	1X	128.800
1	2X	124.300
1	1XY	128.800
1	2XY	124.300
1	1Y	128.800
1	2Y	124.300
1	3P	119.800
1	3X	119.800
1	3XY	119.800
1	3Y	119.800
1	4P	112.800
1	4X	112.800
1	4XY	112.800
1	4Y	112.800
1	5P	104.800
1	5X	104.800
1	5XY	104.800
1	5Y	104.800
1	6P	98.750
1	6X	98.750
1	6XY	98.750
1	6Y	98.750
1	7P	91.750
1	7X	91.750
1	7XY	91.750
1	7Y	91.750
1	8P	84.750
1	8X	84.750
1	8XY	84.750
1	8Y	84.750
1	i0.50E129S	128.800
1	i0.50E113S	112.800
1	i0.50E99S	98.750
1	i0.50E85S	84.750
1	28Y	84.750
1	28P	84.750
1	19Y	84.750
1	19P	84.750
1	27Y	98.750
1	27P	98.750
1	18Y	98.750
1	18P	98.750
1	26Y	112.800
1	26P	112.800
1	17Y	112.800
1	17P	112.800
1	16P	128.800
1	16X	128.800
1	23P	112.800
1	24P	98.750
1	25P	84.750
1	32P	84.750
1	33P	98.750
1	34P	112.750
1	35P	128.750

1	36P	134.750
1	37P	143.750
2	8P	84.750
2	9S	77.000
2	8X	84.750
2	9X	77.000
2	8XY	84.750
2	9XY	77.000
2	8Y	84.750
2	9Y	77.000
2	10S	69.250
2	10X	69.250
2	10XY	69.250
2	10Y	69.250
2	11S	61.500
2	11X	61.500
2	11XY	61.500
2	11Y	61.500
2	12S	51.580
2	12X	51.580
2	12XY	51.580
2	12Y	51.580
2	13S	40.000
2	13X	40.000
2	13XY	40.000
2	13Y	40.000
2	14S	25.000
2	14X	25.000
2	14XY	25.000
2	14Y	25.000
2	15P	0.000
2	15X	0.000
2	15XY	0.000
2	15Y	0.000
2	20AP	40.000
2	20AY	40.000
2	20BP	40.000
2	20BX	40.000
2	21P	25.000
2	21X	25.000
2	21XY	25.000
2	21Y	25.000
2	22P	25.000
2	22X	25.000
2	22XY	25.000
2	22Y	25.000
2	21XF0.50S	25.000
2	21XF0.50Y	25.000
2	22PF0.50S	25.000
2	22PF0.50X	25.000
2	29P	-4.250
2	30P	25.000
2	31P	40.000
2	32P	84.750

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Top	Face Width (ft)	Tran. Bot	Face Width (ft)	Tran. Gross Area (ft^2)	Long. Top	Face Width (ft)	Long. Bot	Face Width (ft)	Long. Gross Area (ft^2)	CoG X (ft)	CoG Y (ft)	CoG Z (ft)
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1 143.750 84.750 59 188 0.00 6.00 309.150 0.00 28.50 817.275 0.422 -0.362 105.941 Problem calculating
gross area of longitudinal face for section "1": width is zero at elevation 134.75 (ft) which is not the top of the section. ??
2 84.750 -4.250 52 147 6.00 0.00 1226.814 6.00 0.00 1226.814 0.249 0.000 41.192 Problem calculating
gross area of longitudinal face for section "2": width is zero at elevation 0.00 (ft) which is not the top of the section. ??

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*** Insulator Data

Clamp Properties:

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

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
1	16X	C-EX1	No Limit
2	16P	C-EX1	No Limit
3	17P	C-EX1	No Limit
4	17Y	C-EX1	No Limit
5	18P	C-EX1	No Limit
6	18Y	C-EX1	No Limit
7	19P	C-EX1	No Limit
8	19Y	C-EX1	No Limit
9	23P	C-EX1	No Limit
10	24P	C-EX1	No Limit
11	25P	C-EX1	No Limit
12	30P	C-EX1	No Limit
13	31P	C-EX1	No Limit
14	32P	C-EX1	No Limit
15	33P	C-EX1	No Limit
16	34P	C-EX1	No Limit
17	35P	C-EX1	No Limit
18	36P	C-EX1	No Limit
19	37P	C-EX1	No Limit
20	10S	C-EX1	No Limit
21	11S	C-EX1	No Limit
22	12S	C-EX1	No Limit
23	13S	C-EX1	No Limit
24	14S	C-EX1	No Limit
25	10X	C-EX1	No Limit
26	11X	C-EX1	No Limit
27	12X	C-EX1	No Limit
28	13X	C-EX1	No Limit
29	14X	C-EX1	No Limit
30	10XY	C-EX1	No Limit
31	11XY	C-EX1	No Limit
32	12XY	C-EX1	No Limit
33	13XY	C-EX1	No Limit
34	14XY	C-EX1	No Limit
35	10Y	C-EX1	No Limit
36	11Y	C-EX1	No Limit

37	12Y	C-EX1	No Limit
38	13Y	C-EX1	No Limit
39	14Y	C-EX1	No Limit

*** Loads Data

Loads from file: J:\Jobs\2100700.WI\68_Greenwich 3 CT\05_Structural\Temp Equipment Install During Construction\Backup Documentation\Rev (2)\PLS Tower\cl&p # 1281.lca

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

Loading Method Parameters:

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

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

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

Vector Load Cases:

Load Case	Dead	Wind	SF for	SF for	SF for	SF for	SF For	SF For	Point	Wind/Ice	Trans.	Longit.	Ice	Ice
Temperature	Joint													
Description	Load	Area	Steel	Poles	Guys	Insuls.	Hardware	Found.	Climbing	Loads	Model	Wind	Wind Thick.	Density
Displ.	Factor	Factor	Tubular	Arms	and						Pressure	Pressure	(in)	(lbs/ft^3)
			and Towers	Cables							(psf)	(psf)		(deg
F)														
NESC Heavy - 0.0	1.5000	2.5000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	39 loads	Wind on Face	-4	0	0.000	0.000
NESC Extreme - 0.0	1.0000	1.0000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	39 loads	NESC 2023	-31	0	0.000	0.000
NESC Heavy + 0.0	1.5000	2.5000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	39 loads	Wind on Face	4	0	0.000	0.000
NESC Extreme + 0.0	1.0000	1.0000	1.00000	1.0000	1.0000	0.0000	1.0000	0.0000	39 loads	NESC 2023	31	0	0.000	0.000

Point Loads for Load Case "NESC Heavy -":

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

24P	1655	8348	-1020	Conductor
25P	1033	11680	-4571	Conductor
36P	7233	-2505	0	Verizon Antennas
36P	69	-24	0	Coax Cable on Powermount
35P	92	-32	0	Coax Cable on Powermount
34P	172	-60	0	Coax Cable on Powermount
33P	161	-56	0	Coax Cable on Powermount
32P	338	-117	0	Coax Cable on Powermount
31P	343	-119	0	Coax Cable on Powermount
30P	374	-129	0	Coax Cable on Powermount
10S	385	-141	0	Temp Verizon Antenna
10X	478	-247	0	Temp Verizon Antenna
10XY	385	-141	0	Temp Verizon Antenna
10Y	478	-247	0	Temp Verizon Antenna
11S	103	-54	0	Temp Verizon coax
12S	82	-43	0	Temp Verizon coax
13S	102	-53	0	Temp Verizon coax
14S	249	-129	0	Temp Verizon coax
11X	103	-54	0	Temp Verizon coax
12X	82	-43	0	Temp Verizon coax
13X	102	-53	0	Temp Verizon coax
14X	249	-129	0	Temp Verizon coax
11XY	103	-54	0	Temp Verizon coax
12XY	82	-43	0	Temp Verizon coax
13XY	102	-53	0	Temp Verizon coax
14XY	249	-129	0	Temp Verizon coax
11Y	103	-54	0	Temp Verizon coax
12Y	82	-43	0	Temp Verizon coax
13Y	102	-53	0	Temp Verizon coax
14Y	249	-129	0	Temp Verizon coax

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

Section Label	Z of Top	Z of Bottom	Ave. Elev. Above Ground	Res. Adj. Wind Pres.	Tran Adj. Wind Pres.	Tran Drag Coef	Tran Wind Load	Long Adj. Wind Pres.	Long Drag Coef	Long Wind Load	Ice Weight	Total Weight
	(ft)	(ft)	(ft)	(psf)	(psf)		(lbs)	(psf)		(lbs)	(lbs)	(lbs)
1	143.75	84.75	114.25	10.00	-10.00	3.200	-4451.6	0.00	3.200	0.0	0	16405
2	84.75	-4.25	40.25	10.00	-10.00	3.400	-10933.4	0.00	3.400	0.0	0	41061

Point Loads for Load Case "NESC Extreme -":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16X	761	3677	-592	Shield Wire
16P	580	4183	-1570	Shield Wire
19Y	-125	3801	-4139	Conductor - Back
19P	1025	2775	3942	Conductor - Ahead
18Y	-67	3116	-3532	Conductor - Back
18P	1480	3368	3999	Conductor - Ahead
17Y	-98	3406	-3805	Conductor - Back
17P	1648	2197	3881	Conductor - Ahead
23P	839	5538	-2388	Conductor
24P	870	4818	-1028	Conductor
25P	513	6089	-2291	Conductor

36P	3392	-9405	0	Verizon Antennas
36P	19	-52	0	Coax Cable on Powermount
35P	25	-69	0	Coax Cable on Powermount
34P	47	-130	0	Coax Cable on Powermount
33P	44	-121	0	Coax Cable on Powermount
32P	92	-254	0	Coax Cable on Powermount
31P	93	-258	0	Coax Cable on Powermount
30P	101	-281	0	Coax Cable on Powermount
10S	181	-375	0	Temp Verizon Antenna
10X	212	-698	0	Temp Verizon Antenna
10XY	181	-375	0	Temp Verizon Antenna
10Y	212	-698	0	Temp Verizon Antenna
11S	28	-101	0	Temp Verizon coax
12S	22	-80	0	Temp Verizon coax
13S	28	-99	0	Temp Verizon coax
14S	68	-243	0	Temp Verizon coax
11X	28	-101	0	Temp Verizon coax
12X	22	-80	0	Temp Verizon coax
13X	28	-99	0	Temp Verizon coax
14X	68	-243	0	Temp Verizon coax
11XY	28	-101	0	Temp Verizon coax
12XY	22	-80	0	Temp Verizon coax
13XY	28	-99	0	Temp Verizon coax
14XY	68	-243	0	Temp Verizon coax
11Y	28	-101	0	Temp Verizon coax
12Y	22	-80	0	Temp Verizon coax
13Y	28	-99	0	Temp Verizon coax
14Y	68	-243	0	Temp Verizon coax

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

Section	Z	Z	Ave.	Res.	Tran	Tran	Tran	Tran	Tran	Tran	Tran	Tran	Long	Long	Long	Long	Long	Long	Long	Long	Long	Ice
Total	Label	of	of	Elev.	Adj.	Adj.	Angle	Round	Gross	Soli-	Angle	Round	Wind	Adj.	Angle	Round	Gross	Soli-	Angle	Round	Wind	Weight
Weight		Top	Bottom	Above	Wind	Wind	Face	Face	Area	dity	Drag	Drag	Load	Wind	Face	Face	Area	dity	Drag	Drag	Load	
		(ft)	(ft)	Ground	Pres.	Pres.	Area	Area	(ft^2)	Ratio	Coef	Coef	(lbs)	(psf)	(ft^2)	(ft^2)	(ft^2)	Ratio	Coef	Coef	(lbs)	(lbs)

10937	1	143.75	84.75	114.25	32.52	-32.52	76.42	62.69	309.15	0.450	3.200	2.000	-12028.4	0.00	139.78	0.00	817.27	0.171	3.200	2.000	0.0	0
27374	2	84.75	-4.25	40.25	32.52	-32.52	227.01	94.56	1226.81	0.262	3.200	2.000	-29769.0	0.00	227.01	0.00	1226.81	0.185	3.200	2.000	0.0	0

Point Loads for Load Case "NESC Heavy +":

Joint	Vertical	Transverse	Longitudinal	Load
Label	Load	Load	Load	Comment
	(lbs)	(lbs)	(lbs)	

16X	1471	7665	-148	Shield Wire
16P	1101	8734	-2758	Shield Wire
19Y	98	7120	-6080	Conductor - Back
19P	2005	6978	8343	Conductor - Ahead
18Y	219	5360	-4474	Conductor - Back
18P	2962	8671	8748	Conductor - Ahead
17Y	173	5895	-4962	Conductor - Back

17P	3069	5592	7930	Conductor - Ahead
23P	1474	10294	-4007	Conductor
24P	1655	8927	-863	Conductor
25P	1033	12242	-4433	Conductor
36P	7233	2505	0	Verizon Antennas
36P	69	24	0	Coax Cable on Powermount
35P	92	32	0	Coax Cable on Powermount
34P	172	60	0	Coax Cable on Powermount
33P	161	56	0	Coax Cable on Powermount
32P	338	117	0	Coax Cable on Powermount
31P	343	119	0	Coax Cable on Powermount
30P	374	129	0	Coax Cable on Powermount
10S	385	141	0	Temp Verizon Antenna
10X	478	247	0	Temp Verizon Antenna
10XY	385	141	0	Temp Verizon Antenna
10Y	478	247	0	Temp Verizon Antenna
11S	103	54	0	Temp Verizon coax
12S	82	43	0	Temp Verizon coax
13S	102	53	0	Temp Verizon coax
14S	249	129	0	Temp Verizon coax
11X	103	54	0	Temp Verizon coax
12X	82	43	0	Temp Verizon coax
13X	102	53	0	Temp Verizon coax
14X	249	129	0	Temp Verizon coax
11XY	103	54	0	Temp Verizon coax
12XY	82	43	0	Temp Verizon coax
13XY	102	53	0	Temp Verizon coax
14XY	249	129	0	Temp Verizon coax
11Y	103	54	0	Temp Verizon coax
12Y	82	43	0	Temp Verizon coax
13Y	102	53	0	Temp Verizon coax
14Y	249	129	0	Temp Verizon coax

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

Section Label	Z of Top	Z of Bottom	Ave. Elev. Above Ground	Res. Adj. Pres.	Tran Adj. Pres.	Tran Wind Coef	Tran Wind Load	Long Adj. Wind Pres.	Long Drag Wind Coef	Long Wind Load	Ice Weight	Total Weight
	(ft)	(ft)	(ft)	(psf)	(psf)		(lbs)	(psf)		(lbs)	(lbs)	(lbs)
1	143.75	84.75	114.25	10.00	10.00	3.200	4451.6	0.00	3.200	0.0	0	16405
2	84.75	-4.25	40.25	10.00	10.00	3.400	10933.4	0.00	3.400	0.0	0	41061

Point Loads for Load Case "NESC Extreme +":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
16X	761	4417	-365	Shield Wire
16P	580	4763	-1458	Shield Wire
19Y	-125	4493	-3375	Conductor - Back
19P	1025	3276	3536	Conductor - Ahead
18Y	-67	3826	-2746	Conductor - Back
18P	1480	3865	3521	Conductor - Ahead
17Y	-98	4126	-3009	Conductor - Back
17P	1648	2785	3483	Conductor - Ahead
23P	839	6614	-2169	Conductor

24P	870	5921	-712	Conductor
25P	513	7137	-2021	Conductor
36P	3392	9405	0	Verizon Antennas
36P	19	52	0	Coax Cable on Powermount
35P	25	69	0	Coax Cable on Powermount
34P	47	130	0	Coax Cable on Powermount
33P	44	121	0	Coax Cable on Powermount
32P	92	254	0	Coax Cable on Powermount
31P	93	258	0	Coax Cable on Powermount
30P	101	281	0	Coax Cable on Powermount
10S	181	375	0	Temp Verizon Antenna
10X	212	698	0	Temp Verizon Antenna
10XY	181	375	0	Temp Verizon Antenna
10Y	212	698	0	Temp Verizon Antenna
11S	28	101	0	Temp Verizon coax
12S	22	80	0	Temp Verizon coax
13S	28	99	0	Temp Verizon coax
14S	68	243	0	Temp Verizon coax
11X	28	101	0	Temp Verizon coax
12X	22	80	0	Temp Verizon coax
13X	28	99	0	Temp Verizon coax
14X	68	243	0	Temp Verizon coax
11XY	28	101	0	Temp Verizon coax
12XY	22	80	0	Temp Verizon coax
13XY	28	99	0	Temp Verizon coax
14XY	68	243	0	Temp Verizon coax
11Y	28	101	0	Temp Verizon coax
12Y	22	80	0	Temp Verizon coax
13Y	28	99	0	Temp Verizon coax
14Y	68	243	0	Temp Verizon coax

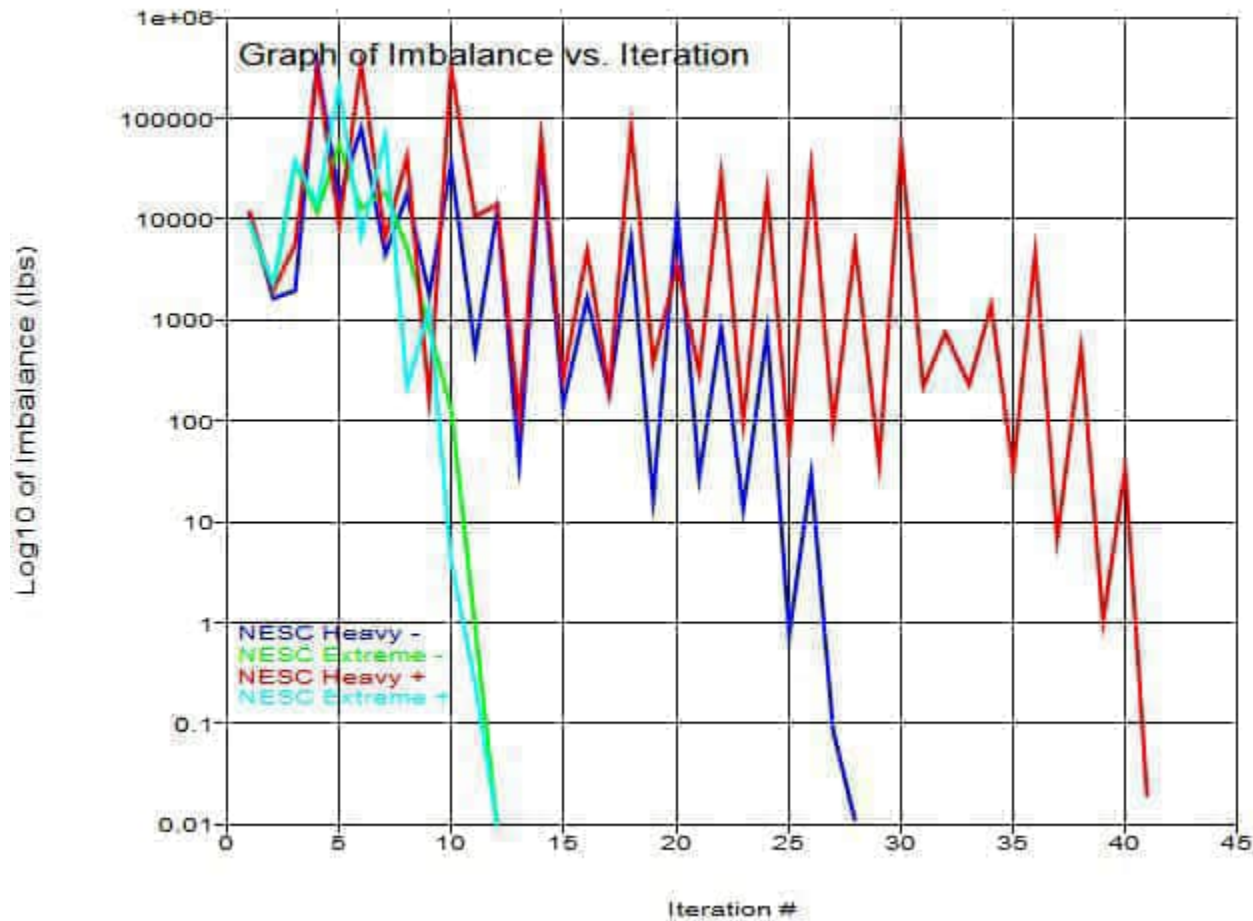
Section Load Case Information (Code) for "NESC Extreme +":

Section	Z	Z	Ave.	Res.	Tran	Tran	Tran	Tran	Tran	Tran	Tran	Tran	Long	Long	Long	Long	Long	Long	Long	Long	Ice	
Total																						
Label	of	of	Elev.	Adj.	Adj.	Angle	Round	Gross	Soli-	Angle	Round	Wind	Adj.	Angle	Round	Gross	Soli-	Angle	Round	Wind	Weight	
Weight	Top	Bottom	Above	Wind	Wind	Face	Face	Area	dity	Drag	Drag	Load	Wind	Face	Face	Area	dity	Drag	Drag	Load		
	(ft)	(ft)	(ft)	(psf)	(psf)	(ft^2)	(ft^2)	(ft^2)	Ratio	Coef	Coef	(lbs)	(psf)	(ft^2)	(ft^2)	(ft^2)	Ratio	Coef	Coef	(lbs)	(lbs)	
(lbs)																						

10937	1	143.75	84.75	114.25	32.52	32.52	76.42	62.69	309.15	0.450	3.200	2.000	12028.4	0.00	139.78	0.00	817.27	0.171	3.200	2.000	0.0	0
27374	2	84.75	-4.25	40.25	32.52	32.52	227.01	94.56	1226.81	0.262	3.200	2.000	29769.0	0.00	227.01	0.00	1226.81	0.185	3.200	2.000	0.0	0

*** Analysis Results:

Maximum element usage is 99.80% for Angle "25AP" in load case "NESC Heavy +"
Maximum insulator usage is 26.15% for Clamp "11" in load case "NESC Heavy +"



Angle Forces For All Load Cases:

Positive for tension - negative for compression

Group	Angle	Max. Usage	Max. Tens.	Max. Comp.	LC 1	LC 2	LC 3	LC 4
Label	Label	For All LC	For All LC	For All LC	(kips)	(kips)	(kips)	(kips)
		%	(kips)	(kips)				
1	1P	21.66	4.036	-10.667	-3.802	4.036	-8.596	-10.667
1	1X	22.91	10.845	-3.972	4.066	-3.972	8.832	10.845
1	1XY	18.63	8.819	-4.305	2.424	-4.305	6.747	8.819
1	1Y	20.21	3.051	-9.956	-4.078	3.051	-8.229	-9.956

1	2P	22.44	3.631	-11.053	-4.246	3.631	-9.037	-11.053
1	2X	21.76	10.303	-4.480	3.348	-4.480	8.101	10.303
1	2XY	17.11	8.098	-5.111	1.371	-5.111	5.739	8.098
1	2Y	21.61	2.327	-10.644	-5.017	2.327	-9.138	-10.644
1	3P	78.11	10.102	-25.630	-8.356	10.102	-20.013	-25.630
1	3X	68.13	24.798	-10.836	7.729	-10.836	19.063	24.798
1	3XY	60.37	21.975	-11.971	5.114	-11.971	16.314	21.975
1	3Y	82.04	6.457	-26.920	-12.854	6.457	-23.447	-26.920
2	4P	48.29	12.906	-44.040	-20.199	12.906	-39.118	-44.040
2	4X	46.29	45.201	-10.299	22.758	-10.299	40.653	45.201
2	4XY	40.46	39.514	-16.477	14.184	-16.477	32.864	39.514
2	4Y	52.40	6.160	-47.793	-27.338	6.160	-44.641	-47.793
2	5P	65.25	13.482	-64.647	-35.422	13.482	-61.886	-64.647
2	5X	69.21	67.587	-8.130	39.508	-8.130	64.313	67.587
2	5XY	61.24	59.798	-19.553	27.409	-19.553	54.287	59.798
2	5Y	74.32	2.489	-73.634	-48.736	2.489	-73.484	-73.634
3	6P	37.32	11.638	-93.167	-58.156	11.638	-93.167	-89.551
3	6X	41.81	96.906	-1.135	64.537	-1.135	96.906	95.930
3	6XY	36.57	84.743	-18.202	49.147	-18.202	84.743	84.551
3	6Y	42.73	0.000	-106.680	-74.176	-4.695	-106.680	-102.477
3	7P	50.92	7.670	-127.116	-84.127	7.670	-127.116	-115.040
3	7X	54.42	126.115	0.000	86.539	5.178	126.115	122.350
3	7XY	50.25	116.465	-15.301	72.688	-15.301	116.465	108.736
3	7Y	55.00	0.000	-137.308	-97.476	-11.856	-137.308	-129.241
4	8P	49.04	2.425	-150.365	-103.257	2.425	-150.365	-130.368
4	8X	51.40	147.479	0.000	105.092	14.166	147.479	138.739
4	8XY	48.17	138.190	-11.816	89.797	-11.816	138.190	122.131
4	8Y	52.37	0.000	-160.603	-117.808	-21.941	-160.603	-147.069
4	9P	53.03	0.000	-162.630	-115.502	-4.418	-162.630	-137.016
4	9X	55.53	159.308	0.000	115.915	20.339	159.308	146.242
4	9XY	51.94	149.026	-7.564	100.278	-7.564	149.026	127.274
4	9Y	56.84	0.000	-174.297	-130.129	-29.458	-174.297	-155.610
4	10P	56.62	0.000	-164.874	-118.906	-7.924	-164.874	-136.673
4	10X	54.34	155.899	0.000	114.921	22.132	155.899	141.992
4	10XY	51.47	147.652	-5.984	99.804	-5.984	147.652	124.157
4	10Y	60.00	0.000	-174.723	-132.792	-32.410	-174.723	-153.788
5	11P	49.38	0.000	-165.491	-120.084	-9.252	-165.491	-137.140
5	11X	48.20	159.457	0.000	116.884	22.423	159.457	144.953
5	11XY	45.17	149.429	-5.493	102.171	-5.493	149.429	125.566
5	11Y	52.82	0.000	-177.045	-133.191	-32.942	-177.045	-155.407
5	12P	55.41	0.000	-201.692	-143.667	-6.979	-201.692	-162.414
5	12X	37.49	124.027	0.000	98.202	20.897	124.027	118.065
5	12XY	42.53	140.715	-16.755	78.729	-16.755	140.715	117.691
5	12Y	51.30	0.000	-186.739	-161.132	-39.596	-186.739	-161.327
5	13P	55.52	0.000	-202.106	-144.635	-12.907	-202.106	-165.013
5	13X	35.87	118.685	0.000	92.673	5.557	118.685	108.941
5	13XY	39.53	130.796	-20.141	74.309	-20.141	130.796	107.787
5	13Y	51.62	0.000	-187.891	-162.379	-47.417	-187.891	-169.217
5	14P	54.39	0.000	-197.972	-138.828	-17.175	-197.972	-165.516
5	14X	40.19	132.968	0.000	96.317	5.024	132.968	118.195
5	14XY	40.14	132.790	-22.149	77.281	-22.149	132.790	111.441
5	14Y	52.00	0.000	-189.295	-154.874	-45.110	-189.295	-169.716
6	15AP	82.78	14.952	-3.778	8.019	-3.778	14.094	14.952
6	15AX	89.66	5.044	-14.017	-6.151	5.044	-12.444	-14.017
6	15AXY	52.18	3.126	-8.157	-1.990	3.126	-5.575	-8.157
6	15AY	43.38	7.835	-3.749	1.451	-3.749	5.132	7.835
6	15BP	25.52	4.610	-0.204	3.294	-0.204	4.610	3.941
6	15BX	17.82	1.797	-2.786	-1.174	1.797	-2.786	-2.765
6	15BXY	8.92	1.610	-0.721	0.887	-0.721	1.610	0.958
6	15BY	24.68	0.000	-3.858	-3.489	-1.163	-3.858	-2.335

7	16AP	63.07	11.431	-4.448	4.374	-4.448	9.402	11.431
7	16AX	76.94	5.212	-11.004	-3.626	5.212	-8.902	-11.004
7	16AXY	60.12	3.110	-8.599	-2.391	3.110	-6.048	-8.599
7	16AY	41.00	7.430	-4.571	0.798	-4.571	4.585	7.430
7	16BP	15.81	2.866	0.000	2.866	1.408	2.860	1.437
7	16BX	7.25	0.597	-1.037	-0.548	0.597	-1.037	-0.430
7	16BXY	14.09	2.553	-1.739	0.986	-1.739	2.505	2.553
7	16BY	34.35	0.000	-4.913	-3.932	-0.750	-4.913	-3.932
8	17AP	66.41	29.342	0.000	23.948	5.514	29.342	20.790
8	17AX	69.70	0.000	-27.612	-21.777	-3.607	-27.612	-19.356
8	17AXY	28.70	0.079	-11.368	-3.749	0.079	-7.532	-11.368
8	17AY	22.44	9.915	-1.847	2.435	-1.847	6.358	9.915
8	17BP	21.13	9.335	0.000	9.285	4.231	9.335	4.018
8	17BX	17.29	0.000	-6.850	-6.345	-0.874	-6.850	-1.457
8	17BXY	18.91	8.357	-1.068	6.396	-1.068	8.357	4.117
8	17BY	29.39	0.000	-11.643	-10.295	-2.933	-11.643	-7.055
9	18AP	54.93	19.996	0.000	15.401	2.730	19.996	15.723
9	18AX	59.98	0.000	-19.635	-14.566	-1.078	-19.635	-14.713
9	18AXY	33.01	0.000	-10.806	-4.733	-0.183	-8.394	-10.806
9	18AY	26.87	9.782	-1.304	4.423	-1.304	8.227	9.782
9	18BP	21.36	7.775	0.000	7.047	2.308	7.775	4.543
9	18BX	18.79	0.728	-6.150	-4.912	0.728	-6.150	-2.431
9	18BXY	18.91	6.885	0.000	6.025	0.575	6.885	2.302
9	18BY	27.47	0.000	-8.992	-8.700	-3.896	-8.992	-4.610
10	19AP	68.63	40.700	0.000	33.680	8.156	40.700	27.304
10	19AX	69.22	0.000	-42.363	-34.833	-7.376	-42.363	-27.172
10	19AXY	25.35	0.000	-15.513	-4.793	-1.218	-9.910	-15.513
10	19AY	24.33	14.429	-0.266	4.537	-0.266	9.745	14.429
10	19BP	28.74	17.044	0.000	15.760	5.652	17.044	8.802
10	19BX	27.29	0.000	-16.704	-14.743	-1.688	-16.704	-6.127
10	19BXY	20.46	12.133	0.000	11.351	1.064	12.133	2.256
10	19BY	18.92	0.000	-11.583	-11.583	-4.806	-11.470	-4.354
10	20AP	66.70	39.555	0.000	32.812	8.484	39.555	26.886
10	20AX	62.52	0.000	-38.265	-30.660	-5.366	-38.265	-25.038
10	20AXY	27.11	0.000	-16.591	-6.793	-2.087	-12.037	-16.591
10	20AY	23.15	13.731	-1.675	3.579	-1.675	9.231	13.731
10	20BP	14.41	8.547	0.000	8.547	4.738	7.312	0.812
10	20BX	15.13	1.037	-9.257	-9.257	-1.324	-8.791	1.037
10	20BXY	34.23	20.304	0.000	17.139	1.609	20.304	9.492
10	20BY	33.68	0.000	-20.616	-18.368	-6.037	-20.616	-12.211
11	21AP	48.15	21.751	0.000	21.751	10.258	20.703	5.685
11	21AX	48.27	0.000	-21.400	-21.400	-9.427	-20.510	-4.668
11	21AXY	29.15	13.170	-2.024	10.818	-2.024	13.170	6.222
11	21AY	36.04	0.100	-15.978	-12.553	0.100	-15.978	-8.692
11	21BP	22.69	10.252	-1.735	10.252	3.670	8.793	-1.735
11	21BX	25.36	1.648	-11.241	-11.241	-4.250	-9.499	1.648
11	21BXY	58.65	26.495	0.000	22.614	3.952	26.495	14.060
11	21BY	58.87	0.000	-26.099	-22.312	-4.664	-26.099	-14.264
12	22AP	37.20	13.543	0.000	13.543	5.711	12.418	2.754
12	22AX	46.82	0.000	-14.508	-14.275	-6.199	-14.508	-4.548
12	22AXY	28.19	10.261	-0.097	8.213	-0.097	10.261	5.125
12	22AY	31.86	0.082	-9.872	-8.400	0.082	-9.872	-4.446
12	22BP	39.65	14.432	0.000	12.593	2.871	14.432	6.921
12	22BX	49.64	0.000	-15.380	-13.577	-2.763	-15.380	-7.261
12	22BXY	24.49	8.914	0.000	8.914	2.764	8.491	0.983
12	22BY	29.05	0.000	-9.001	-9.001	-2.573	-8.750	-1.329
13	23AP	41.52	11.336	0.000	10.457	3.290	11.336	4.796
13	23AX	41.60	0.000	-9.378	-9.348	-3.053	-9.378	-3.146
13	23AXY	26.15	7.139	0.000	7.139	1.481	6.383	2.057
13	23AY	33.25	0.000	-7.494	-5.870	-0.853	-7.494	-2.448

13	23BP	31.13	8.498	0.000	8.243	1.837	8.498	2.684
13	23BX	34.25	0.000	-7.719	-7.614	-2.160	-7.719	-2.075
13	23BXY	35.89	9.799	0.000	8.846	1.875	9.799	3.972
13	23BY	38.48	0.000	-8.674	-7.771	-2.193	-8.674	-3.434
14	24AP	26.29	7.178	0.000	7.178	1.805	6.662	2.429
14	24AX	52.69	0.000	-11.293	-8.957	-2.096	-11.293	-5.705
14	24AXY	20.26	5.531	0.000	4.260	0.660	5.531	1.048
14	24AY	31.50	0.000	-6.751	-6.751	-2.582	-5.459	-1.187
14	24BP	19.07	5.207	0.000	4.730	1.712	5.207	1.319
14	24BX	36.72	0.000	-7.869	-7.209	-1.650	-7.869	-2.885
14	24BXY	25.30	6.908	0.000	6.675	1.712	6.908	2.189
14	24BY	40.30	0.000	-8.636	-8.200	-1.655	-8.636	-3.505
15	25AP	99.80	36.193	0.000	19.173	1.465	36.193	25.992
15	25AX	41.18	14.937	-0.492	2.526	-0.492	14.937	14.444
15	25AXY	63.73	23.114	-1.827	23.114	14.316	0.608	-1.827
15	25AY	31.91	8.542	-10.785	8.542	7.947	-10.785	-2.362
15	25BP	15.06	4.626	-5.092	4.626	-5.092	1.491	0.706
15	25BX	69.01	25.029	0.000	18.256	1.827	25.029	16.697
15	25BXY	31.04	11.258	-2.002	3.467	-2.002	9.291	11.258
15	25BY	57.41	20.820	-1.304	20.820	-1.304	18.986	7.327
16	26AP	23.66	3.582	-0.957	-0.261	3.582	-0.957	1.866
16	26AX	46.46	8.421	-0.928	-0.284	8.421	-0.928	2.898
16	26AXY	28.88	5.234	0.000	0.000	0.540	5.234	4.490
16	26AY	25.29	4.584	-0.277	0.000	-0.277	0.000	4.584
16	26BP	12.32	2.233	0.000	0.000	2.233	0.000	0.124
16	26BX	42.51	7.704	0.000	5.174	7.704	5.613	6.454
16	26BXY	31.55	5.719	0.000	3.478	2.401	4.443	5.719
16	26BY	44.99	8.155	-0.143	-0.048	8.155	-0.143	3.237
17	27AP	31.31	0.000	-2.010	0.000	-2.010	0.000	0.000
17	27AX	77.86	18.982	0.000	9.264	0.000	18.982	11.729
17	27AXY	58.58	1.575	-3.761	0.000	0.000	-3.761	1.575
17	27AY	47.08	11.479	0.000	11.479	3.510	0.338	0.000
17	27BP	42.24	9.398	-2.712	9.398	-2.712	7.309	0.000
17	27BX	38.79	1.068	-2.491	-2.491	0.000	1.068	0.494
17	27BXY	34.91	8.512	-1.863	5.897	-1.863	8.512	3.712
17	27BY	0.00	0.000	0.000	0.000	0.000	0.000	0.000
18	28AP	82.93	27.188	-9.528	10.176	-9.528	27.188	24.073
18	28AX	25.16	11.449	0.000	0.000	11.449	0.000	0.000
18	28AXY	74.28	16.745	-8.534	16.745	15.344	4.037	-8.534
18	28AY	91.38	3.233	-10.499	0.000	0.000	-10.499	3.233
18	28BP	29.05	13.220	0.000	13.220	4.761	10.718	6.239
18	28BX	50.28	7.995	-5.777	0.135	-5.777	4.861	7.995
18	28BXY	34.34	15.624	0.000	14.720	6.586	15.624	11.535
18	28BY	74.11	0.000	-8.515	0.000	-8.515	0.000	0.000
19	29AP	34.79	15.471	-1.247	-0.628	15.471	-1.247	1.124
19	29AX	65.45	29.106	-2.858	10.714	-2.858	29.106	28.950
19	29AXY	26.66	7.310	-6.839	-0.402	-0.240	-6.839	7.310
19	29AY	41.22	18.330	-5.671	18.330	16.043	4.094	-5.671
19	29BP	32.32	14.374	0.000	14.374	6.728	11.578	6.178
19	29BX	32.92	14.641	0.000	4.932	0.418	10.749	14.641
19	29BXY	48.30	21.477	0.000	19.521	8.921	21.477	17.780
19	29BY	8.37	2.330	-2.148	-0.565	-2.148	-0.687	2.330
20a	30AP	16.62	0.000	-1.512	-1.424	-0.801	-1.512	-0.839
20a	30AY	29.61	0.000	-2.694	-2.694	-1.743	-2.652	-1.547
20a	30BP	7.59	0.502	0.000	0.445	0.202	0.502	0.397
20a	30BX	7.64	0.505	0.000	0.505	0.418	0.410	0.148
20	31P	41.68	2.755	0.000	2.755	1.951	2.470	1.311
20	31Y	18.17	1.201	0.000	1.161	0.518	1.201	1.020
20	32P	13.70	0.961	-0.391	0.396	-0.391	0.882	0.961
20	32X	19.78	0.617	-0.797	0.024	0.617	-0.514	-0.797

20	33P	38.75	2.561	0.000	2.561	1.354	2.444	1.256
20	33Y	42.41	2.803	0.000	2.803	1.717	2.622	1.664
20	34P	3.58	0.251	-0.093	0.160	-0.093	0.251	0.144
20	34X	7.50	0.527	-0.041	0.527	0.424	0.293	-0.041
20	35P	17.18	1.135	0.000	1.135	0.208	1.119	0.295
20	35Y	29.21	1.930	0.000	1.930	1.589	1.697	1.389
36	36P	59.49	0.000	-9.994	-7.166	-0.556	-9.994	-8.948
36	36X	55.46	8.244	0.000	5.802	0.025	8.244	7.642
21	37AP	55.83	0.000	-15.240	-6.242	-0.164	-15.240	-11.845
21	37AY	33.91	2.833	-9.258	-9.258	-6.400	2.833	1.490
21	37BP	23.94	2.206	-6.536	-6.536	2.206	-4.727	-0.971
21	37BX	42.22	0.083	-11.526	-7.388	0.083	-11.526	-9.352
22	38AP	39.48	0.375	-4.541	0.375	-4.541	-0.231	-2.721
22	38AX	26.95	0.000	-3.100	-0.571	-3.100	-0.417	-1.361
22	38AXY	20.96	0.000	-2.411	-0.547	-0.884	-0.332	-2.411
22	38AY	32.50	0.000	-3.738	-0.760	-0.502	-3.738	-3.554
22	38BP	13.54	0.000	-1.557	-0.537	-1.557	-0.732	-0.869
22	38BX	43.20	0.000	-4.970	-3.068	-4.970	-3.244	-3.820
22	38BXY	30.32	0.000	-3.487	-2.341	-1.679	-2.842	-3.487
22	38BY	44.34	0.000	-5.101	-1.300	-5.101	-1.298	-3.104
23	39AP	54.35	0.979	-9.892	-4.040	0.979	-9.892	-6.052
23	39AX	5.85	1.064	-0.210	-0.210	0.544	0.109	1.064
23	39AXY	33.00	0.837	-6.006	-6.006	-2.207	-0.362	0.837
23	39AY	8.86	1.014	-1.613	0.318	1.014	0.408	-1.613
23	39BP	25.51	1.571	-4.642	-4.642	1.571	-3.711	0.293
23	39BX	5.90	0.896	-1.074	0.896	0.180	-1.074	-0.319
23	39BXY	23.63	1.153	-4.301	-2.857	1.153	-4.301	-1.731
23	39BY	3.06	0.557	0.000	0.375	0.244	0.430	0.557
23	39C1P	31.92	5.809	-0.928	-0.681	5.809	-0.928	4.032
23	39C1Y	14.07	2.560	0.000	0.081	1.662	0.973	2.560
23	F39C197P	35.13	6.394	-0.950	-0.671	6.394	-0.950	3.455
23	F39C197Y	12.39	2.254	0.000	0.083	2.254	0.952	1.953
23	39C2P	23.43	4.265	0.000	0.089	4.265	0.082	2.765
23	39C2X	41.38	7.532	0.000	5.413	5.059	5.443	7.532
23	F39C2118P	23.54	4.284	0.000	0.089	4.284	0.082	2.794
23	F39C2118X	41.48	7.549	0.000	5.414	5.079	5.444	7.549
24	40P	19.44	2.988	-2.602	-0.786	-2.602	2.988	1.740
24	40X	19.38	2.679	-2.594	0.879	2.679	-2.594	-1.534
24	40XY	7.54	1.047	-1.009	1.047	-0.156	0.704	-1.009
24	40Y	12.26	0.725	-1.641	-1.247	0.017	-1.641	0.725
24	41P	7.59	0.613	-1.017	-0.077	-1.017	-0.079	0.613
24	41X	6.38	0.695	-0.855	-0.015	0.695	-0.304	-0.855
24	41XY	1.55	0.000	-0.208	-0.072	-0.083	-0.100	-0.208
24	41Y	1.14	0.000	-0.153	-0.051	-0.153	-0.016	-0.076
AngleR	42P	41.91	3.210	-3.814	-0.122	3.210	-2.513	-3.814
AngleR	42X	49.69	4.379	-2.968	0.206	-2.968	2.645	4.379
AngleR	42XY	44.89	3.411	-4.085	0.212	3.411	-2.226	-4.085
AngleR	42Y	49.75	4.384	-3.054	0.506	-3.054	2.928	4.384
26	43AP	22.43	0.281	-2.824	-2.824	-1.803	-2.461	0.281
26	43AX	23.22	2.867	-0.226	2.867	1.786	2.500	-0.226
26	43AXY	28.60	0.000	-3.599	-3.599	-1.982	-3.296	-0.284
26	43AY	21.12	2.608	-0.423	2.608	1.572	2.158	-0.423
26	43BP	32.15	0.000	-4.046	-3.566	-0.847	-4.046	-1.317
26	43BX	31.59	3.901	0.000	3.539	0.792	3.901	1.052
26	43BXY	38.99	0.000	-4.908	-4.421	-1.013	-4.908	-1.795
26	43BY	28.04	3.462	0.000	3.060	0.412	3.462	1.041
26	43CP	37.19	0.000	-4.681	-3.960	-1.020	-4.681	-1.596
26	43CX	31.45	3.884	0.000	3.206	0.501	3.884	0.972
26	43CXY	42.45	0.000	-5.343	-4.482	-0.916	-5.343	-2.079
26	43CY	29.43	3.634	0.000	3.016	0.380	3.634	0.999

27	44P	8.79	0.223	-1.465	-1.465	-0.066	-1.405	0.223
27	44Y	10.08	1.826	-0.326	1.498	-0.326	1.826	0.472
27	44AP	11.18	0.310	-1.864	-1.537	0.310	-1.864	-0.483
27	44AY	8.23	1.492	-0.205	1.492	0.060	1.441	-0.205
27	44BP	24.48	0.000	-3.558	-3.419	-0.447	-3.558	-0.764
27	44BY	16.71	3.028	0.000	2.919	0.250	3.028	0.423
27	44CP	21.77	0.000	-3.164	-3.044	-0.285	-3.164	-0.480
27	44CY	20.01	3.626	0.000	3.483	0.454	3.626	0.775
27	44DP	15.17	0.000	-2.530	-2.318	-0.144	-2.530	-0.661
27	44DY	9.37	1.698	-0.042	1.613	-0.042	1.698	0.040
27	44EP	10.43	0.028	-1.739	-1.650	0.028	-1.739	-0.056
27	44EY	14.10	2.556	0.000	2.348	0.157	2.556	0.657
28	45P	35.72	6.500	0.000	6.500	3.773	6.148	3.025
28	45AP	37.52	6.828	0.000	6.828	3.713	6.487	3.041
28	45BP	41.45	7.543	0.000	7.543	3.906	7.365	3.702
29	46P	14.95	0.000	-1.157	-1.157	-0.724	-1.146	-0.667
29	46X	27.26	0.000	-2.109	-2.059	-1.062	-2.109	-1.186
29	46XY	40.86	0.000	-3.161	-3.161	-2.038	-3.016	-1.770
29	46Y	35.95	0.000	-2.781	-2.781	-1.773	-2.686	-1.659
30	47P	46.52	5.934	0.000	5.934	3.562	5.898	3.531
30	47Y	3.82	0.487	0.000	0.487	0.265	0.451	0.203
30	47AP	17.75	2.554	0.000	2.365	2.554	1.675	0.590
30	47AY	9.97	1.225	-0.547	0.625	-0.547	1.225	1.215
31	48P	41.66	7.550	0.000	7.550	4.254	7.497	4.192
31	48Y	4.86	0.882	0.000	0.882	0.423	0.852	0.374
31	48AP	10.23	1.430	-0.077	0.308	1.430	-0.077	0.615
31	48AY	32.75	4.578	0.000	4.267	1.232	4.578	1.883
30	49P	30.03	3.953	0.000	3.953	2.394	3.930	2.372
30	49Y	2.62	0.345	0.000	0.345	0.206	0.332	0.184
30	49AP	8.55	1.195	-0.448	-0.063	1.195	-0.448	0.364
30	49AY	18.17	2.539	0.000	2.204	0.148	2.539	0.865
32	50P	64.76	11.738	0.000	11.738	6.381	11.734	6.509
32	50X	10.33	0.596	-1.880	-1.195	0.596	-1.880	-0.462
32	50XY	8.04	0.000	-1.464	-1.094	-1.198	-1.171	-1.464
32	50Y	5.02	0.910	0.000	0.572	0.074	0.910	0.809
32	50AP	22.81	4.151	0.000	4.151	2.835	3.967	2.807
32	50AY	2.86	0.000	-0.521	-0.340	-0.521	-0.307	-0.364
33	51P	34.66	11.397	0.000	10.740	5.165	11.397	7.148
33	51Y	9.67	0.000	-3.157	-3.157	-1.356	-3.155	-1.614
33	51AP	8.55	0.000	-2.732	-2.732	-0.497	-2.717	-0.262
33	51AY	4.98	0.000	-1.592	-0.422	-1.010	-0.646	-1.592
33	51BP	53.76	0.000	-14.677	-14.014	-4.858	-14.677	-6.704
33	51BY	13.87	0.000	-3.788	-1.639	-3.049	-1.738	-3.788
33	51CP	45.15	0.000	-12.326	-11.781	-5.110	-12.326	-6.433
33	51CY	19.10	0.000	-5.214	-4.828	-3.459	-5.214	-4.483
34	52P	14.01	6.374	0.000	6.119	3.414	6.374	4.144
34	52Y	4.21	0.000	-1.753	-1.753	-1.133	-1.346	-0.158
34	52AP	17.50	0.000	-7.929	-7.929	-2.638	-7.928	-2.714
34	52AY	5.55	1.971	-0.407	1.971	-0.189	1.848	-0.407
34	52BP	54.24	0.000	-22.900	-22.283	-7.587	-22.900	-9.368
34	52BY	7.28	1.691	-3.073	1.691	-2.213	1.538	-3.073
34	52CP	43.19	0.000	-18.234	-17.790	-7.388	-18.234	-8.482
34	52CY	9.54	0.000	-4.027	-3.506	-3.096	-3.872	-4.027
33	53P	45.83	15.073	0.000	14.737	6.430	15.073	7.332
33	53Y	13.57	0.000	-4.431	-4.431	-1.483	-4.141	-0.774
33	53AP	2.92	1.063	-0.365	0.040	1.063	-0.365	0.341
33	53AY	10.08	0.000	-3.222	-3.222	-2.713	-2.972	-2.455
33	53BP	50.59	0.000	-13.811	-13.030	-3.997	-13.811	-6.202
33	53BY	18.45	0.000	-5.037	-3.977	-3.704	-4.298	-5.037
33	53CP	33.78	0.000	-11.287	-10.954	-4.636	-11.287	-5.344

33	53CY	18.68	0.000	-6.243	-5.999	-3.994	-6.243	-4.539
35	54P	27.64	0.510	-2.254	-2.039	-2.254	-1.144	0.510
35	54X	15.52	1.413	-1.187	0.579	1.413	-0.203	-1.187
Pwmnt	g99P	4.74	0.000	-20.735	-20.527	-7.487	-20.735	-8.284
Pwmnt	g100P	3.38	0.000	-18.132	-18.022	-6.600	-18.132	-7.399
Pwmnt	g101P	5.87	0.000	-15.260	-15.144	-5.970	-15.260	-6.750
Pwmnt	g102P	2.28	0.000	-12.318	-12.240	-4.920	-12.318	-5.477
Pwmnt	g103P	2.00	0.000	-10.811	-10.775	-4.467	-10.811	-4.798
Pwmnt	g104P	1.74	0.000	-9.242	-9.229	-4.026	-9.242	-4.165
Pwmnt	g105P	1.45	0.000	-8.212	-8.212	-3.697	-8.151	-3.585
Plate	g106P	2.67	0.448	-0.191	0.448	0.080	0.402	-0.191
PMBR1	g107P	8.16	0.000	-0.832	-0.731	-0.281	-0.832	-0.547
PMBR1	g108P	9.26	0.000	-0.945	-0.945	-0.386	-0.920	-0.347
PMBR1	g109P	6.23	0.000	-0.636	-0.493	-0.007	-0.636	-0.320
BraceR	g110P	58.41	7.649	-7.940	-2.081	-7.940	2.963	7.649
BraceR	g110X	61.53	8.198	-8.364	3.134	8.198	-2.321	-8.364
PMBR2	g111P	31.78	2.440	-3.240	-0.167	2.440	-1.436	-3.240
PMBR2	g111X	29.79	2.256	-3.037	-1.267	-3.037	-0.122	2.256
PMBR2	g112P	19.36	0.405	-1.974	-1.974	-1.471	-0.935	0.405
PMBR2	g112X	16.43	0.637	-1.675	-0.509	0.637	-1.675	-1.475
PMBR2	g113P	6.45	0.382	-0.657	-0.657	-0.232	0.382	0.272
PMBR2	g113X	9.96	0.209	-1.016	0.175	0.209	-1.016	-0.550
PMBR3	g114P	2.72	0.120	-0.277	-0.277	0.120	-0.154	-0.009
PMBR4	g115P	3.96	0.538	-0.057	-0.057	0.023	0.538	0.182
PMBR4	g116P	10.08	1.067	-1.370	-0.889	-1.370	0.562	1.067
PMBR4	g116X	10.07	1.369	-1.157	1.369	1.148	-1.073	-1.157
PMBR4	g117P	1.63	0.064	-0.222	0.064	-0.204	-0.021	-0.222
PMBR5	g118P	0.35	0.000	-0.047	-0.001	-0.034	-0.016	-0.047
PMBR5	g120P	7.64	1.015	-1.038	0.527	1.015	-0.522	-1.038
PMBR5	g120X	7.79	0.943	-1.059	-0.040	-1.059	-0.070	0.943
Pwmnt	g121P	0.06	0.000	-0.336	-0.336	-0.183	-0.332	-0.181

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	-0.06891	0.4882	-0.0326	-0.4452	0.0556	0.8185	2.931	3.488	128.8
2P	-0.07006	0.4551	-0.03213	-0.4863	-0.0475	0.7868	2.93	3.455	124.3
3P	-0.06208	0.4116	-0.03153	-0.5413	-0.0667	0.7546	2.938	3.412	119.8
4P	-0.05974	0.3551	-0.0301	-0.4573	-0.0405	0.7042	2.94	3.355	112.8
5P	-0.05327	0.2906	-0.02831	-0.4499	-0.0017	0.6373	2.947	3.291	104.8
6P	-0.05304	0.2458	-0.02612	-0.3991	-0.0374	0.5871	2.947	3.246	98.72
7P	-0.04795	0.1979	-0.02415	-0.3803	-0.0006	0.5378	2.952	3.198	91.73
8P	-0.04973	0.155	-0.02139	-0.3113	-0.0129	0.4886	2.95	3.155	84.73
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.2648	0.4475	-0.1468	-0.4873	0.0307	0.8251	-0.2648	17.2	128.7
17P	0.1642	0.3606	0.09296	-0.4255	0.0418	0.7539	3.164	-13.89	112.9
18P	0.178	0.2532	0.09122	-0.3715	0.0562	0.6852	3.178	-16.5	98.84
19P	0.1116	0.159	0.06859	-0.3760	0.0468	0.5443	3.112	-14.09	84.82
20AP	-0.04018	0.05098	-0.01384	-0.1187	0.1344	0.3778	9.528	0.05098	39.99
20BP	-0.09535	-0.004839	-0.02995	-0.1825	-0.0342	0.3722	-0.09535	9.563	39.97
21P	-0.0535	0.01494	-0.0004598	0.0000	0.0000	0.0000	11.72	2.223	25
22P	-0.0775	-0.009208	-0.03217	0.0000	0.0000	0.0000	2.131	11.76	24.97
23P	-0.2101	0.3164	-0.1209	-0.4669	-0.0026	0.7988	-0.2101	14.57	112.7
24P	-0.2107	0.2116	-0.1267	-0.4375	0.0041	0.6928	-0.2107	16.96	98.62
25P	-0.1631	0.1279	-0.08561	-0.3539	0.0218	0.6202	-0.1631	14.38	84.66
26P	0.08965	0.3585	0.0527	-0.3812	0.0425	0.7692	3.09	-8.267	112.9
27P	0.09471	0.2504	0.04916	-0.3105	0.0571	0.7114	3.095	-9.625	98.8
28P	0.05779	0.1573	0.03409	-0.3036	0.0476	0.5559	3.058	-8.468	84.78
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.02687	-0.01992	-0.001541	-0.0306	-0.0675	0.1647	1.473	-0.01992	25
31P	-0.03996	0.003774	-0.002251	-0.1179	-0.0241	0.2504	1.46	0.003774	40
32P	-0.02237	0.1415	-0.004185	-0.3094	0.0223	0.4683	1.478	0.1415	84.75
33P	-0.02078	0.23	-0.004899	-0.4012	0.0030	0.5264	1.479	0.23	98.75
34P	-0.02238	0.3366	-0.005688	-0.4796	-0.0074	0.5686	1.478	0.3366	112.7
35P	-0.02743	0.4671	-0.006595	-0.3818	-0.0150	0.5923	1.473	0.4671	128.7
36P	-0.02938	0.5026	-0.006825	-0.3165	-0.0151	0.5923	1.471	0.5026	134.7
37P	-0.03225	0.5515	-0.006967	-0.3098	-0.0151	0.5923	1.468	0.5515	143.7
1X	0.0129	0.4883	0.01581	-0.4151	0.0164	0.7994	3.013	-2.512	128.8
1XY	0.0133	0.4071	0.01481	-0.4326	0.0483	0.7695	-2.987	-2.593	128.8
1Y	-0.06783	0.4063	-0.03373	-0.4477	0.0501	0.7802	-3.068	3.406	128.8
2X	0.01127	0.4563	0.01555	-0.4939	0.0122	0.7774	3.011	-2.544	124.3
2XY	0.01168	0.3732	0.01472	-0.4690	-0.0168	0.7497	-2.988	-2.627	124.3
2Y	-0.06962	0.3715	-0.03322	-0.4646	-0.0163	0.7542	-3.07	3.372	124.3
3X	0.0134	0.4113	0.01547	-0.5496	-0.0315	0.7558	3.013	-2.589	119.8
3XY	0.01579	0.3337	0.01477	-0.4956	-0.0290	0.7295	-2.984	-2.666	119.8
3Y	-0.06433	0.3334	-0.03259	-0.4844	-0.0687	0.7281	-3.064	3.333	119.8
4X	0.01519	0.3561	0.01458	-0.4496	0.0413	0.7211	3.015	-2.644	112.8
4XY	0.01568	0.2792	0.01425	-0.4236	-0.0073	0.6978	-2.984	-2.721	112.8
4Y	-0.05938	0.2785	-0.03054	-0.4256	0.0023	0.6863	-3.059	3.279	112.8
5X	0.01202	0.2902	0.01313	-0.4434	-0.0007	0.6591	3.012	-2.71	104.8
5XY	0.01614	0.22	0.0134	-0.4101	0.0354	0.6422	-2.984	-2.78	104.8
5Y	-0.05718	0.2204	-0.02826	-0.4115	-0.0404	0.6272	-3.057	3.22	104.8
6X	0.01227	0.2471	0.01103	-0.3965	0.0556	0.6116	3.012	-2.753	98.76
6XY	0.01247	0.1792	0.01197	-0.3583	0.0090	0.6004	-2.988	-2.821	98.76
6Y	-0.05272	0.1789	-0.02533	-0.3586	0.0104	0.5820	-3.053	3.179	98.72
7X	0.006003	0.1978	0.009195	-0.3867	0.0287	0.5550	3.006	-2.802	91.76

7XY	0.01135	0.1367	0.01057	-0.3310	0.0444	0.5540	-2.989	-2.863	91.76
7Y	-0.0533	0.1369	-0.02289	-0.3359	-0.0224	0.5385	-3.053	3.137	91.73
8X	0.004714	0.1553	0.006629	-0.3064	0.0473	0.4982	3.005	-2.845	84.76
8XY	0.004	0.1	0.008405	-0.2580	0.0452	0.5076	-2.996	-2.9	84.76
8Y	-0.04827	0.09932	-0.01976	-0.2556	-0.0057	0.4949	-3.048	3.099	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.1993	0.4497	0.112	-0.3956	0.0241	0.7712	0.1993	-16.3	128.9
17Y	0.1639	0.2813	0.1007	-0.4991	-0.0079	0.7663	-2.836	-13.97	112.9
18Y	0.1776	0.1807	0.1046	-0.4623	0.0082	0.7088	-2.822	-16.57	98.85
19Y	0.111	0.1019	0.06702	-0.3703	0.0442	0.5473	-2.889	-14.15	84.82
20AY	-0.03977	-0.05959	-0.006927	-0.1180	-0.0253	0.3667	-9.608	-0.05959	39.99
20BX	0.01535	-0.004548	0.01034	-0.0608	-0.0325	0.3712	0.01535	-9.573	40.01
21X	-0.2067	0.02496	-0.03675	0.0000	0.0000	0.0000	11.56	-2.183	24.96
21XY	0.0008524	-0.05085	0.02644	0.0000	0.0000	0.0000	-11.77	-2.259	25.03
21Y	-0.005576	-0.05865	-0.01711	0.0000	0.0000	0.0000	-11.78	2.149	24.98
22X	0.01515	-0.1916	0.03892	0.0000	0.0000	0.0000	2.223	-11.96	25.04
22XY	0.01766	-0.03397	0.009652	-0.0918	-0.0483	0.2429	-2.19	-11.8	25.01
22Y	-0.04027	-0.02417	0.01731	0.1652	-0.0053	0.0155	-2.248	11.75	25.02
26Y	0.08869	0.28	0.05398	-0.4300	-0.0070	0.7665	-2.911	-8.345	112.9
27Y	0.09272	0.1796	0.05268	-0.3743	0.0093	0.7047	-2.907	-9.695	98.8
28Y	0.05703	0.1008	0.03328	-0.2914	0.0450	0.5532	-2.943	-8.524	84.78
9S	-0.05359	0.1263	-0.02313	-0.2519	-0.0152	0.4421	4.084	4.264	76.98
10S	-0.06429	0.1031	-0.02472	-0.2034	0.0019	0.3966	5.211	5.378	69.23
11S	-0.06951	0.08559	-0.02458	-0.1655	0.0012	0.3470	6.343	6.498	61.48
12S	-0.08434	0.06731	-0.02567	-0.1259	0.0434	0.2988	7.785	7.936	51.55
13S	-0.09568	0.05064	-0.02453	-0.1395	-0.0195	0.2175	9.473	9.619	39.98
14S	-0.07833	0.01485	-0.02036	-0.1244	-0.1872	0.1048	11.69	11.79	24.98
i0.50E129S	-0.02744	0.4473	-0.0106	-0.4634	-0.0318	0.7711	-0.02744	0.4473	128.8
i0.50E113S	-0.02221	0.3173	-0.006171	-0.4418	-0.0298	0.7784	-0.02221	0.3173	112.8
i0.50E99S	-0.02062	0.2128	-0.005395	-0.3703	-0.0230	0.6816	-0.02062	0.2128	98.74
i0.50E85S	-0.02226	0.1269	-0.004472	-0.2738	-0.0148	0.5596	-0.02226	0.1269	84.75
21XF0.50S	-0.02731	0.01697	-0.0908	-0.0331	0.7800	0.2267	11.74	0.01697	24.91
22PF0.50S	-0.0621	-0.0167	-0.2924	0.0000	0.0000	0.0000	-0.0621	11.75	24.71
9X	0.004604	0.1265	0.007845	-0.2506	0.0633	0.4477	4.142	-4.011	77.01
9XY	0.009934	0.06055	0.01083	-0.1855	0.0399	0.4491	-4.128	-4.077	77.01
9Y	-0.0595	0.0613	-0.02017	-0.1897	0.0010	0.4389	-4.197	4.199	76.98
10X	0.008692	0.1037	0.008465	-0.2110	0.0404	0.4006	5.284	-5.171	69.26
10XY	0.01009	0.02901	0.01259	-0.1632	0.0536	0.3949	-5.265	-5.246	69.26
10Y	-0.06416	0.02805	-0.02052	-0.1566	0.0031	0.3872	-5.339	5.303	69.23
11X	0.009527	0.0849	0.008037	-0.1600	0.0506	0.3503	6.422	-6.328	61.51
11XY	0.01249	0.0005117	0.01358	-0.1265	0.0286	0.3445	-6.4	-6.412	61.51
11Y	-0.07462	0.002194	-0.01888	-0.1302	0.0143	0.3377	-6.487	6.415	61.48
12X	0.01208	0.06951	0.007038	-0.1249	0.0305	0.2970	7.881	-7.799	51.59
12XY	0.01459	-0.02694	0.01415	-0.1235	0.0342	0.2899	-7.854	-7.896	51.59
12Y	-0.08207	-0.03005	-0.01831	-0.1349	0.0365	0.2901	-7.951	7.839	51.56
13X	0.01427	0.05104	0.006508	-0.1217	0.0303	0.2257	9.583	-9.518	40.01
13XY	0.01622	-0.05917	0.01582	-0.0595	0.0164	0.2209	-9.552	-9.628	40.02
13Y	-0.09479	-0.05992	-0.01492	-0.0637	-0.0798	0.2026	-9.663	9.509	39.99
14X	0.01272	0.02827	0.00527	-0.1060	0.0464	0.1326	11.78	-11.74	25.01
14XY	0.01816	-0.05088	0.01082	0.1427	0.0340	0.1082	-11.75	-11.82	25.01
14Y	-0.04021	-0.05974	-0.01515	0.1231	-0.2368	0.0756	-11.81	11.71	24.98
21XF0.50Y	-0.02627	-0.05604	-0.1225	-0.0286	-0.7494	0.1512	-11.8	-0.05604	24.88
22PF0.50X	0.01621	-0.1192	0.01961	0.0000	0.0000	0.0000	0.01621	-11.89	25.02

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

Joint Label	X Force	X Usage	Y Force	Y Usage	H-Shear Usage	Z Comp. Force	Uplift Usage	Result. Force	Result. Usage	X X-M. Moment	X X-M. Usage	Y Y-M. Moment	Y Y-M. Usage	H-Bend-M Usage	Z Z-M. Moment	Z Z-M. Usage	Max. Usage
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	(kips)	% (kips)	%	%	(kips)	%	%	(kips)	% (ft-k)	% (ft-k)	%	%	(ft-k)	%	%	(ft-k)	%	%
15P	-13.33	0.0	-18.21	0.0	0.0	-124.95	0.0	0.0	126.97	0.0	-0.29	0.0	7.3	0.0	0.0	-0.10	0.0	0.0
29P	0.23	0.0	1.21	0.0	0.0	-21.67	0.0	0.0	21.71	0.0	-9.22	0.0	5.7	0.0	0.0	-4.00	0.0	0.0
15X	17.45	0.0	-19.18	0.0	0.0	106.98	0.0	0.0	110.08	0.0	2.02	0.0	-1.4	0.0	0.0	-0.64	0.0	0.0
15XY	-20.31	0.0	-12.58	0.0	0.0	91.43	0.0	0.0	94.50	0.0	-4.41	0.0	-1.9	0.0	0.0	-0.06	0.0	0.0
15Y	19.83	0.0	-13.79	0.0	0.0	-137.16	0.0	0.0	139.27	0.0	-5.95	0.0	0.8	0.0	0.0	0.03	0.0	0.0

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

Joint X Label	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	-0.1760	0.0000	-0.0000	0.1760	-0.0689	0.4882	-0.0326
2P	0.0000	0.0000	-0.0923	-0.0000	0.0000	0.0923	-0.0701	0.4551	-0.0321
3P	0.0000	0.0000	-0.1754	0.0000	0.0000	0.1754	-0.0621	0.4116	-0.0315
4P	0.0000	0.0000	-0.3270	-0.0000	-0.0000	0.3270	-0.0597	0.3551	-0.0301
5P	0.0000	0.0000	-0.3335	-0.0000	-0.0000	0.3335	-0.0533	0.2906	-0.0283
6P	0.0000	0.0000	-0.4888	-0.0000	-0.0000	0.4888	-0.0530	0.2458	-0.0261
7P	0.0000	0.0000	-0.5277	0.0000	-0.0000	0.5277	-0.0479	0.1979	-0.0241
8P	0.0000	0.0000	-0.6716	-0.0000	-0.0000	0.6716	-0.0497	0.1550	-0.0214
15P	0.0000	0.0000	-1.0248	13.3348	18.2131	-123.9273	0.0000	0.0000	0.0000
16P	-2.8310	8.3150	-1.2725	2.8310	-8.3150	1.2725	-0.2648	0.4475	-0.1468
17P	8.1410	5.2237	-3.1622	-8.1410	-5.2237	3.1622	0.1642	0.3606	0.0930
18P	9.0060	8.3468	-3.0828	-9.0060	-8.3468	3.0828	0.1780	0.2532	0.0912
19P	8.5640	6.6487	-2.0982	-8.5640	-6.6487	2.0982	0.1116	0.1590	0.0686
20AP	0.0000	0.0000	-0.6136	0.0000	-0.0000	0.6136	-0.0402	0.0510	-0.0138
20BP	0.0000	0.0000	-0.6343	-0.0000	0.0000	0.6343	-0.0954	-0.0048	-0.0299
21P	0.0000	0.0000	-0.3466	0.0000	-0.0000	0.3466	-0.0535	0.0149	-0.0005
22P	0.0000	0.0000	-0.3466	-0.0000	-0.0000	0.3466	-0.0775	-0.0092	-0.0322
23P	-4.1080	9.7380	-1.6243	4.1080	-9.7380	1.6243	-0.2101	0.3164	-0.1209
24P	-1.0200	8.3480	-1.8796	1.0200	-8.3480	1.8796	-0.2107	0.2116	-0.1267
25P	-4.5710	11.6800	-1.1833	4.5710	-11.6800	1.1833	-0.1631	0.1279	-0.0856
26P	0.0000	0.0000	-0.0795	-0.0000	0.0000	0.0795	0.0897	0.3585	0.0527
27P	0.0000	0.0000	-0.1057	-0.0000	-0.0000	0.1057	0.0947	0.2504	0.0492
28P	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.0578	0.1573	0.0341
29P	0.0000	-0.5283	-1.1425	-0.2258	-0.6827	-20.5279	0.0000	0.0000	0.0000
30P	0.0000	-0.9283	-2.3466	0.0000	0.9283	2.3466	-0.0269	-0.0199	-0.0015
31P	0.0000	-1.1982	-2.8394	-0.0000	1.1982	2.8394	-0.0400	0.0038	-0.0023
32P	0.0000	-1.1633	-2.6249	-0.0000	1.1633	2.6249	-0.0224	0.1415	-0.0042
33P	0.0000	-0.5320	-1.2208	0.0000	0.5320	1.2208	-0.0208	0.2300	-0.0049
34P	0.0000	-0.5790	-1.3062	0.0000	0.5790	1.3062	-0.0224	0.3366	-0.0057
35P	0.0000	-0.4230	-0.9483	0.0000	0.4230	0.9483	-0.0274	0.4671	-0.0066
36P	0.0000	-2.7840	-7.8600	-0.0000	2.7840	7.8600	-0.0294	0.5026	-0.0068
37P	0.0000	-0.1530	-0.3348	-0.0000	0.1530	0.3348	-0.0322	0.5515	-0.0070
1X	0.0000	-0.0741	-0.1760	0.0000	0.0741	0.1760	0.0129	0.4883	0.0158
1XY	0.0000	-0.0691	-0.1657	0.0000	0.0691	0.1657	0.0133	0.4071	0.0148
1Y	0.0000	0.0000	-0.1657	0.0000	-0.0000	0.1657	-0.0678	0.4063	-0.0337
2X	0.0000	-0.0776	-0.0923	0.0000	0.0776	0.0923	0.0113	0.4563	0.0155
2XY	0.0000	-0.0776	-0.0923	-0.0000	0.0776	0.0923	0.0117	0.3732	0.0147
2Y	0.0000	0.0000	-0.0923	-0.0000	0.0000	0.0923	-0.0696	0.3715	-0.0332
3X	0.0000	-0.1111	-0.1747	-0.0000	0.1111	0.1747	0.0134	0.4113	0.0155
3XY	0.0000	-0.1111	-0.1747	-0.0000	0.1111	0.1747	0.0158	0.3337	0.0148
3Y	0.0000	0.0000	-0.1754	0.0000	-0.0000	0.1754	-0.0643	0.3334	-0.0326
4X	0.0000	-0.1531	-0.3196	0.0000	0.1531	0.3196	0.0152	0.3561	0.0146
4XY	0.0000	-0.1481	-0.3118	-0.0000	0.1481	0.3118	0.0157	0.2792	0.0143
4Y	0.0000	0.0000	-0.3192	-0.0000	-0.0000	0.3192	-0.0594	0.2785	-0.0305
5X	0.0000	-0.1813	-0.3327	-0.0000	0.1813	0.3327	0.0120	0.2902	0.0131

5XY	0.0000	-0.1813	-0.3327	0.0000	0.1813	0.3327	0.0161	0.2200	0.0134
5Y	0.0000	0.0000	-0.3335	-0.0000	-0.0000	0.3335	-0.0572	0.2204	-0.0283
6X	0.0000	-0.1636	-0.4720	0.0000	0.1636	0.4720	0.0123	0.2471	0.0110
6XY	0.0000	-0.1636	-0.4643	-0.0000	0.1636	0.4643	0.0125	0.1792	0.0120
6Y	0.0000	0.0000	-0.4811	-0.0000	-0.0000	0.4811	-0.0527	0.1789	-0.0253
7X	0.0000	-0.1963	-0.5270	-0.0000	0.1963	0.5270	0.0060	0.1978	0.0092
7XY	0.0000	-0.1963	-0.5270	0.0000	0.1963	0.5270	0.0114	0.1367	0.0106
7Y	0.0000	0.0000	-0.5277	-0.0000	-0.0000	0.5277	-0.0533	0.1369	-0.0229
8X	0.0000	-0.2126	-0.6642	0.0000	0.2126	0.6642	0.0047	0.1553	0.0066
8XY	0.0000	-0.2126	-0.6565	0.0000	0.2126	0.6565	0.0040	0.1000	0.0084
8Y	0.0000	0.0000	-0.6639	0.0000	0.0000	0.6639	-0.0483	0.0993	-0.0198
15X	0.0000	-0.4266	-1.0248	-17.4514	19.6090	108.0027	0.0000	0.0000	0.0000
15XY	0.0000	-0.4266	-1.0248	20.3055	13.0085	92.4550	0.0000	0.0000	0.0000
15Y	0.0000	0.0000	-1.0248	-19.8251	13.7927	-136.1392	0.0000	0.0000	0.0000
16X	-0.3000	7.0797	-1.6425	0.3000	-7.0797	1.6425	0.1993	0.4497	0.1120
17Y	-5.3700	5.4707	-0.2662	5.3700	-5.4707	0.2662	0.1639	0.2813	0.1007
18Y	-4.8850	4.9318	-0.3398	4.8850	-4.9318	0.3398	0.1776	0.1807	0.1046
19Y	-6.4880	6.6947	-0.1912	6.4880	-6.6947	0.1912	0.1110	0.1019	0.0670
20AY	0.0000	0.0000	-0.6406	0.0000	0.0000	0.6406	-0.0398	-0.0596	-0.0069
20BX	0.0000	-0.6136	-0.6343	0.0000	0.6136	0.6343	0.0154	-0.0045	0.0103
21X	0.0000	0.0000	-0.3466	0.0000	0.0000	0.3466	-0.2067	0.0250	-0.0368
21XY	0.0000	0.0000	-0.3466	0.0000	-0.0000	0.3466	0.0009	-0.0509	0.0264
21Y	0.0000	0.0000	-0.3466	-0.0000	-0.0000	0.3466	-0.0056	-0.0587	-0.0171
22X	0.0000	-0.3569	-0.3466	-0.0000	0.3569	0.3466	0.0151	-0.1916	0.0389
22XY	0.0000	-0.3569	-0.4107	-0.0000	0.3569	0.4107	0.0177	-0.0340	0.0097
22Y	0.0000	0.0000	-0.4107	0.0000	0.0000	0.4107	-0.0403	-0.0242	0.0173
26Y	0.0000	0.0000	-0.0795	0.0000	-0.0000	0.0795	0.0887	0.2800	0.0540
27Y	0.0000	0.0000	-0.1057	0.0000	0.0000	0.1057	0.0927	0.1796	0.0527
28Y	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.0570	0.1008	0.0333
9S	0.0000	0.0000	-0.6364	0.0000	0.0000	0.6364	-0.0536	0.1263	-0.0231
10S	0.0000	-0.1410	-1.0242	-0.0000	0.1410	1.0242	-0.0643	0.1031	-0.0247
11S	0.0000	-0.0540	-0.9182	0.0000	0.0540	0.9182	-0.0695	0.0856	-0.0246
12S	0.0000	-0.0430	-1.2363	-0.0000	0.0430	1.2363	-0.0843	0.0673	-0.0257
13S	0.0000	-0.0530	-1.0543	0.0000	0.0530	1.0543	-0.0957	0.0506	-0.0245
14S	0.0000	-0.1290	-1.7238	-0.0000	0.1290	1.7238	-0.0783	0.0149	-0.0204
i0.50E129S	0.0000	-0.0120	-0.0578	-0.0000	0.0120	0.0578	-0.0274	0.4473	-0.0106
i0.50E113S	0.0000	-0.0040	-0.0338	0.0000	0.0040	0.0338	-0.0222	0.3173	-0.0062
i0.50E99S	0.0000	0.0000	-0.0338	0.0000	0.0000	0.0338	-0.0206	0.2128	-0.0054
i0.50E85S	0.0000	0.0000	-0.0338	0.0000	-0.0000	0.0338	-0.0223	0.1269	-0.0045
21XF0.50S	0.0000	0.0000	-0.0699	0.0000	0.0000	0.0699	-0.0273	0.0170	-0.0908
22PF0.50S	0.0000	0.0000	-0.0230	-0.0000	-0.0000	0.0230	-0.0621	-0.0167	-0.2924
9X	0.0000	-0.3213	-0.6364	-0.0000	0.3213	0.6364	0.0046	0.1265	0.0078
9XY	0.0000	-0.3213	-0.6364	-0.0000	0.3213	0.6364	0.0099	0.0605	0.0108
9Y	0.0000	0.0000	-0.6364	-0.0000	-0.0000	0.6364	-0.0595	0.0613	-0.0202
10X	0.0000	-0.5632	-1.1172	-0.0000	0.5632	1.1172	0.0087	0.1037	0.0085
10XY	0.0000	-0.4572	-1.0242	-0.0000	0.4572	1.0242	0.0101	0.0290	0.0126
10Y	0.0000	-0.2470	-1.1172	0.0000	0.2470	1.1172	-0.0642	0.0281	-0.0205
11X	0.0000	-0.4491	-0.9182	-0.0000	0.4491	0.9182	0.0095	0.0849	0.0080
11XY	0.0000	-0.4491	-0.9182	0.0000	0.4491	0.9182	0.0125	0.0005	0.0136
11Y	0.0000	-0.0540	-0.9182	-0.0000	0.0540	0.9182	-0.0746	0.0022	-0.0189
12X	0.0000	-0.6008	-1.2363	0.0000	0.6008	1.2363	0.0121	0.0695	0.0070
12XY	0.0000	-0.6008	-1.2363	-0.0000	0.6008	1.2363	0.0146	-0.0269	0.0141
12Y	0.0000	-0.0430	-1.2363	0.0000	0.0430	1.2363	-0.0821	-0.0300	-0.0183
13X	0.0000	-0.4455	-1.0543	0.0000	0.4455	1.0543	0.0143	0.0510	0.0065
13XY	0.0000	-0.4455	-1.0543	0.0000	0.4455	1.0543	0.0162	-0.0592	0.0158
13Y	0.0000	-0.0530	-1.0543	-0.0000	0.0530	1.0543	-0.0948	-0.0599	-0.0149
14X	0.0000	-0.7360	-1.7238	-0.0000	0.7360	1.7238	0.0127	0.0283	0.0053
14XY	0.0000	-0.7360	-1.7238	0.0000	0.7360	1.7238	0.0182	-0.0509	0.0108
14Y	0.0000	-0.1290	-1.7238	0.0000	0.1290	1.7238	-0.0402	-0.0597	-0.0151
21XF0.50Y	0.0000	0.0000	-0.0919	-0.0000	-0.0000	0.0919	-0.0263	-0.0560	-0.1225

22PF0.50X 0.0000 -0.0313 -0.0230 0.0000 0.0313 0.0230 0.0162 -0.1192 0.0196

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	7.274	50.00	50.00	14.55	0.00	0.00	0.00	14.55
2	8.875	50.00	50.00	17.75	0.00	0.00	0.00	17.75
3	10.177	50.00	50.00	20.35	0.00	0.00	0.00	20.35
4	7.670	50.00	50.00	15.34	0.00	0.00	0.00	15.34
5	12.660	50.00	50.00	25.32	0.00	0.00	0.00	25.32
6	6.950	50.00	50.00	13.90	0.00	0.00	0.00	13.90
7	11.043	50.00	50.00	22.09	0.00	0.00	0.00	22.09
8	9.325	50.00	50.00	18.65	0.00	0.00	0.00	18.65
9	10.693	50.00	50.00	21.39	0.00	0.00	0.00	21.39
10	8.618	50.00	50.00	17.24	0.00	0.00	0.00	17.24
11	12.598	50.00	50.00	25.20	0.00	0.00	0.00	25.20
12	2.523	50.00	50.00	5.05	0.00	0.00	0.00	5.05
13	3.082	50.00	50.00	6.16	0.00	0.00	0.00	6.16
14	2.871	50.00	50.00	5.74	0.00	0.00	0.00	5.74
15	1.332	50.00	50.00	2.66	0.00	0.00	0.00	2.66
16	1.429	50.00	50.00	2.86	0.00	0.00	0.00	2.86
17	1.038	50.00	50.00	2.08	0.00	0.00	0.00	2.08
18	8.338	50.00	50.00	16.68	0.00	0.00	0.00	16.68
19	0.368	50.00	50.00	0.74	0.00	0.00	0.00	0.74
20	1.034	50.00	50.00	2.07	0.00	0.00	0.00	2.07
21	0.920	50.00	50.00	1.84	0.00	0.00	0.00	1.84
22	1.237	50.00	50.00	2.47	0.00	0.00	0.00	2.47
23	1.056	50.00	50.00	2.11	0.00	0.00	0.00	2.11
24	1.729	50.00	50.00	3.46	0.00	0.00	0.00	3.46
25	1.251	50.00	50.00	2.50	0.00	0.00	0.00	2.50
26	1.022	50.00	50.00	2.04	0.00	0.00	0.00	2.04
27	1.375	50.00	50.00	2.75	0.00	0.00	0.00	2.75
28	1.145	50.00	50.00	2.29	0.00	0.00	0.00	2.29
29	1.874	50.00	50.00	3.75	0.00	0.00	0.00	3.75
30	1.122	50.00	50.00	2.24	0.00	0.00	0.00	2.24
31	1.022	50.00	50.00	2.04	0.00	0.00	0.00	2.04
32	1.375	50.00	50.00	2.75	0.00	0.00	0.00	2.75
33	1.145	50.00	50.00	2.29	0.00	0.00	0.00	2.29
34	1.874	50.00	50.00	3.75	0.00	0.00	0.00	3.75
35	1.144	50.00	50.00	2.29	0.00	0.00	0.00	2.29
36	0.920	50.00	50.00	1.84	0.00	0.00	0.00	1.84
37	1.237	50.00	50.00	2.47	0.00	0.00	0.00	2.47
38	1.056	50.00	50.00	2.11	0.00	0.00	0.00	2.11
39	1.729	50.00	50.00	3.46	0.00	0.00	0.00	3.46

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	-0.06597	0.02835	-0.0001426	-0.0099	-0.0082	0.1983	2.934	3.028	128.8
2P	-0.06357	0.0293	-0.0005124	0.0448	-0.0612	0.1924	2.936	3.029	124.3
3P	-0.05707	0.03439	-0.0008382	0.0595	-0.0873	0.1865	2.943	3.034	119.8
4P	-0.0485	0.03639	-0.002276	-0.0252	-0.0549	0.1772	2.951	3.036	112.8
5P	-0.0407	0.03129	-0.003245	-0.0446	-0.0608	0.1620	2.959	3.031	104.8
6P	-0.03428	0.02599	-0.00401	-0.0591	-0.0529	0.1504	2.966	3.026	98.75
7P	-0.02818	0.01845	-0.004366	-0.0620	-0.0471	0.1377	2.972	3.018	91.75
8P	-0.02272	0.01068	-0.004599	-0.0700	-0.0416	0.1250	2.977	3.011	84.75
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.1113	0.02059	-0.007317	-0.0236	-0.0123	0.1891	-0.1113	16.77	128.8
17P	0.007715	0.03779	-0.01195	-0.0187	-0.0557	0.1882	3.008	-14.21	112.8
18P	0.02377	0.02819	0.00174	-0.0884	-0.0391	0.1689	3.024	-16.72	98.75
19P	0.01702	0.01167	0.009356	-0.1481	-0.0243	0.1278	3.017	-14.24	84.76
20AP	-0.0007396	-0.02182	-0.000696	-0.1011	-0.0015	0.1050	9.567	-0.02182	40
20BP	-0.01449	-0.03662	-0.008888	-0.0232	0.0112	0.0911	-0.01449	9.531	39.99
21P	0.1345	-0.02921	0.01503	0.0000	0.0000	0.0000	11.9	2.179	25.02
22P	-0.01652	-0.1831	-0.03148	0.0000	0.0000	0.0000	2.191	11.59	24.97
23P	-0.08862	0.02699	-0.002001	0.0325	-0.0519	0.2182	-0.08862	14.28	112.8
24P	-0.07567	0.01776	-0.01828	-0.0484	-0.0442	0.1835	-0.07567	16.77	98.73
25P	-0.05341	0.004152	-0.0178	-0.0573	-0.0293	0.1701	-0.05341	14.25	84.73
26P	-0.01095	0.03713	-0.01006	0.0961	-0.0553	0.1940	2.989	-8.588	112.8
27P	0.003149	0.02726	-0.004147	0.0303	-0.0387	0.1778	3.003	-9.848	98.75
28P	0.004199	0.01107	-0.0007757	-0.0126	-0.0240	0.1363	3.004	-8.614	84.75
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.0008738	-0.05453	-0.0006061	0.0122	-0.0034	0.0423	1.499	-0.05453	25
31P	-0.0007599	-0.03468	-0.0008702	-0.1011	-0.0011	0.0639	1.499	-0.03468	40
32P	-0.01573	0.007164	-0.00157	-0.0594	-0.0370	0.1190	1.484	0.007164	84.75
33P	-0.0261	0.02182	-0.001756	-0.0422	-0.0479	0.1341	1.474	0.02182	98.75
34P	-0.03906	0.03211	-0.001924	-0.0795	-0.0576	0.1451	1.461	0.03211	112.7
35P	-0.05589	0.02247	-0.002099	0.3531	-0.0615	0.1512	1.444	0.02247	128.7
36P	-0.0622	-0.02905	-0.00238	0.5586	-0.0616	0.1514	1.438	-0.02905	134.7
37P	-0.07165	-0.1178	-0.002827	0.5676	-0.0616	0.1514	1.428	-0.1178	143.7
1X	-0.04663	0.02797	-0.002618	-0.0058	-0.0610	0.1841	2.953	-2.972	128.8
1XY	-0.04697	0.01074	-0.008487	0.0054	-0.0224	0.1704	-3.047	-2.989	128.8
1Y	-0.06537	0.01063	-0.006506	0.0104	-0.0069	0.1794	-3.065	3.011	128.8
2X	-0.04372	0.0296	-0.002252	0.0441	-0.0666	0.1827	2.956	-2.97	124.3
2XY	-0.04383	0.0118	-0.008091	0.0310	-0.0553	0.1708	-3.044	-2.988	124.3
2Y	-0.0636	0.01118	-0.006786	0.0298	-0.0783	0.1773	-3.064	3.011	124.3
3X	-0.0357	0.03378	-0.001832	0.0495	-0.0909	0.1813	2.964	-2.966	119.8
3XY	-0.03858	0.01516	-0.007617	0.0385	-0.0772	0.1712	-3.039	-2.985	119.8
3Y	-0.05481	0.01531	-0.006989	0.0477	-0.0973	0.1752	-3.055	3.015	119.8
4X	-0.02971	0.03648	-0.0002809	-0.0091	-0.0556	0.1792	2.97	-2.964	112.8
4XY	-0.02988	0.01685	-0.005902	-0.0059	-0.0456	0.1717	-3.03	-2.983	112.8
4Y	-0.04834	0.01668	-0.007908	-0.0143	-0.0621	0.1719	-3.048	3.017	112.8
5X	-0.02166	0.03087	0.0005035	-0.0465	-0.0468	0.1650	2.978	-2.969	104.8
5XY	-0.02346	0.01303	-0.004653	-0.0353	-0.0543	0.1600	-3.023	-2.987	104.8
5Y	-0.03933	0.01358	-0.008368	-0.0350	-0.0556	0.1585	-3.039	3.014	104.8
6X	-0.0176	0.0263	0.0009712	-0.0519	-0.0389	0.1543	2.982	-2.974	98.75
6XY	-0.01772	0.00912	-0.003532	-0.0457	-0.0413	0.1511	-3.018	-2.991	98.75
6Y	-0.03422	0.009075	-0.008507	-0.0457	-0.0485	0.1484	-3.034	3.009	98.74
7X	-0.01279	0.0184	0.001013	-0.0683	-0.0365	0.1387	2.987	-2.982	91.75

7XY	-0.0132	0.002705	-0.00296	-0.0511	-0.0360	0.1410	-3.013	-2.997	91.75
7Y	-0.02812	0.003214	-0.008355	-0.0539	-0.0494	0.1372	-3.028	3.003	91.74
8X	-0.009038	0.01055	0.0008568	-0.0616	-0.0241	0.1232	2.991	-2.989	84.75
8XY	-0.009025	-0.00324	-0.00248	-0.0538	-0.0273	0.1308	-3.009	-3.003	84.75
8Y	-0.02261	-0.003618	-0.00798	-0.0511	-0.0382	0.1260	-3.023	2.996	84.74
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	-0.008719	0.01955	-0.01174	0.0357	-0.0495	0.1498	-0.008719	-16.73	128.8
17Y	0.007286	0.01772	-0.01188	-0.0634	-0.0459	0.1912	-2.993	-14.23	112.8
18Y	0.02334	0.009837	0.002279	-0.1192	-0.0416	0.1790	-2.977	-16.74	98.75
19Y	0.01656	-0.002246	0.004845	-0.1425	-0.0275	0.1349	-2.983	-14.25	84.75
20AY	-0.0007507	-0.05035	-0.009395	-0.1010	-0.0658	0.0896	-9.569	-0.05035	39.99
20BX	0.01296	-0.03655	0.004433	0.0001	-0.0168	0.0909	0.01296	-9.605	40
21X	-0.2287	-0.01082	-0.03098	0.0000	0.0000	0.0000	11.54	-2.219	24.97
21XY	0.05227	-0.0285	0.007168	0.0000	0.0000	0.0000	-11.72	-2.237	25.01
21Y	-0.001581	-0.04838	-0.01388	0.0000	0.0000	0.0000	-11.77	2.16	24.99
22X	0.003233	-0.2373	0.0357	0.0000	0.0000	0.0000	2.211	-12.01	25.04
22XY	0.01947	-0.06115	0.005005	-0.0432	0.0140	0.1278	-2.189	-11.83	25.01
22Y	0.00341	-0.05343	-0.01125	-0.0737	-0.0305	-0.0518	-2.205	11.72	24.99
26Y	-0.01154	0.01726	-0.01399	0.0630	-0.0455	0.1931	-3.012	-8.608	112.8
27Y	0.002062	0.00942	-0.007089	0.0049	-0.0412	0.1741	-2.998	-9.866	98.74
28Y	0.003511	-0.002765	-0.004732	-0.0070	-0.0272	0.1291	-2.996	-8.628	84.75
9S	-0.01987	0.003021	-0.00537	-0.0704	-0.0334	0.1117	4.118	4.141	76.99
10S	-0.01806	-0.003434	-0.005921	-0.0600	-0.0262	0.0998	5.257	5.272	69.24
11S	-0.01664	-0.009426	-0.00636	-0.0526	-0.0218	0.0871	6.396	6.403	61.49
12S	-0.01536	-0.01542	-0.006761	-0.0423	-0.0182	0.0733	7.853	7.853	51.57
13S	-0.01498	-0.02277	-0.007528	-0.0546	0.0020	0.0560	9.554	9.546	39.99
14S	-0.01751	-0.03034	-0.008399	0.0213	-0.0231	0.0395	11.75	11.74	24.99
i0.50E129S	-0.0561	0.01917	-0.009081	0.0302	-0.0693	0.1688	-0.0561	0.01917	128.8
i0.50E113S	-0.03912	0.02651	-0.004719	-0.0276	-0.0964	0.2125	-0.03912	0.02651	112.8
i0.50E99S	-0.02606	0.01756	-0.004418	-0.0465	-0.0888	0.1699	-0.02606	0.01756	98.75
i0.50E85S	-0.01572	0.003552	-0.004007	-0.0528	-0.0803	0.1400	-0.01572	0.003552	84.75
21XF0.50S	-0.001313	-0.023	-0.08518	0.0117	0.7091	0.2425	11.77	-0.023	24.91
22PF0.50S	-0.01154	-0.266	-0.1573	0.0000	0.0000	0.0000	-0.01154	11.5	24.84
9X	-0.003961	0.003594	0.002217	-0.0705	-0.0180	0.1078	4.134	-4.134	77
9XY	-0.003755	-0.01381	-0.00135	-0.0534	-0.0163	0.1169	-4.141	-4.151	77
9Y	-0.0204	-0.01267	-0.008992	-0.0549	-0.0310	0.1149	-4.158	4.125	76.99
10X	0.0004278	-0.003509	0.003319	-0.0608	-0.0147	0.0956	5.276	-5.279	69.25
10XY	0.0005527	-0.02217	-0.0005304	-0.0512	-0.0146	0.1041	-5.275	-5.297	69.25
10Y	-0.01837	-0.02267	-0.009894	-0.0464	-0.0273	0.1014	-5.294	5.252	69.24
11X	0.00403	-0.009086	0.004027	-0.0483	-0.0120	0.0839	6.417	-6.422	61.5
11XY	0.004382	-0.03138	0.0004404	-0.0412	-0.0126	0.0901	-6.408	-6.444	61.5
11Y	-0.01693	-0.02975	-0.0102	-0.0433	-0.0202	0.0892	-6.43	6.383	61.49
12X	0.008481	-0.01534	0.004903	-0.0486	-0.0167	0.0701	7.877	-7.884	51.58
12XY	0.008475	-0.03923	0.001166	-0.0483	-0.0101	0.0775	-7.86	-7.908	51.58
12Y	-0.016	-0.04117	-0.01098	-0.0499	-0.0130	0.0773	-7.885	7.828	51.57
13X	0.01144	-0.02044	0.005326	0.0014	0.0235	0.0548	9.58	-9.589	40.01
13XY	0.01348	-0.05018	0.002655	0.0077	-0.0239	0.0557	-9.555	-9.619	40
13Y	-0.01294	-0.05062	-0.01137	-0.0262	-0.0507	0.0521	-9.582	9.518	39.99
14X	0.000466	-0.008171	0.001661	0.0462	0.0406	0.0371	11.77	-11.78	25
14XY	0.01933	-0.02861	-0.0004025	0.1154	0.0167	0.0140	-11.75	-11.8	25
14Y	0.00337	-0.04875	-0.01125	0.0843	-0.0413	0.0164	-11.77	11.72	24.99
21XF0.50Y	0.0007939	-0.03974	-0.21	0.0132	-1.3536	-0.1165	-11.77	-0.03974	24.79
22PF0.50X	0.007168	-0.2738	-0.09434	0.0000	0.0000	0.0000	0.007168	-12.04	24.91

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

Joint	X	X	Y	Y	H-Shear	Z	Comp.	Uplift	Result.	Result.	X	X-M.	Y	Y-M.	H-Bend-M	Z	Z-M.	Max.
Label	Force	Usage	Force	Usage	Usage	Force	Usage	Usage	Force	Usage	Moment	Usage	Moment	Usage	Usage	Moment	Usage	Usage

	(kips)	% (kips)		%	% (kips)		%	% (kips)		%	% (ft-k)		%	% (ft-k)		%	% (ft-k)		%	%
15P	2.70	0.0	6.43	0.0	0.0	2.06	0.0	0.0	7.27	0.0	-3.43	0.0	2.1	0.0	0.0	-0.49	0.0	0.0	0.0	0.0
29P	0.00	0.0	1.85	0.0	0.0	-8.02	0.0	0.0	8.23	0.0	-19.32	0.0	0.1	0.0	0.0	-1.03	0.0	0.0	0.0	0.0
15X	0.60	0.0	1.10	0.0	0.0	2.24	0.0	0.0	2.57	0.0	-0.04	0.0	0.6	0.0	0.0	-0.36	0.0	0.0	0.0	0.0
15XY	-1.08	0.0	2.75	0.0	0.0	-14.62	0.0	0.0	14.92	0.0	-1.53	0.0	-2.3	0.0	0.0	0.31	0.0	0.0	0.0	0.0
15Y	5.30	0.0	1.51	0.0	0.0	-32.58	0.0	0.0	33.04	0.0	-4.89	0.0	-1.3	0.0	0.0	0.27	0.0	0.0	0.0	0.0

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

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0660	0.0283	-0.0001
2P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0636	0.0293	-0.0005
3P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0571	0.0344	-0.0008
4P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0485	0.0364	-0.0023
5P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0407	0.0313	-0.0032
6P	0.0000	-0.2039	-0.1854	-0.0000	0.2039	0.1854	-0.0343	0.0260	-0.0040
7P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0282	0.0185	-0.0044
8P	0.0000	-0.7764	-0.7118	0.0000	0.7764	0.7118	-0.0227	0.0107	-0.0046
15P	0.0000	-0.5725	-0.5264	-2.7023	-5.8592	2.5828	0.0000	0.0000	0.0000
16P	-1.5700	3.9791	-0.7654	1.5700	-3.9791	0.7654	-0.1113	0.0206	-0.0073
17P	3.8810	1.9931	-1.8334	-3.8810	-1.9931	1.8334	0.0077	0.0378	-0.0119
18P	3.9990	3.1641	-1.6654	-3.9990	-3.1641	1.6654	0.0238	0.0282	0.0017
19P	3.9420	2.5711	-1.2104	-3.9420	-2.5711	1.2104	0.0170	0.0117	0.0094
20AP	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0007	-0.0218	-0.0007
20BP	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0145	-0.0366	-0.0089
21P	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.1345	-0.0292	0.0150
22P	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0165	-0.1831	-0.0315
23P	-2.3880	5.3341	-1.0244	2.3880	-5.3341	1.0244	-0.0886	0.0270	-0.0020
24P	-1.0280	4.6141	-1.0554	1.0280	-4.6141	1.0554	-0.0757	0.0178	-0.0183
25P	-2.2910	5.8851	-0.6984	2.2910	-5.8851	0.6984	-0.0534	0.0042	-0.0178
26P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0110	0.0371	-0.0101
27P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	0.0031	0.0273	-0.0041
28P	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	0.0042	0.0111	-0.0008
29P	0.0000	-0.5725	-0.5264	-0.0011	-1.2811	-7.4892	0.0000	0.0000	0.0000
30P	0.0000	-0.8535	-0.6274	0.0000	0.8535	0.6274	-0.0009	-0.0545	-0.0006
31P	0.0000	-0.8305	-0.6194	-0.0000	0.8305	0.6194	-0.0008	-0.0347	-0.0009
32P	0.0000	-1.0304	-0.8038	0.0000	1.0304	0.8038	-0.0157	0.0072	-0.0016
33P	0.0000	-0.3249	-0.2294	0.0000	0.3249	0.2294	-0.0261	0.0218	-0.0018
34P	0.0000	-0.3339	-0.2324	-0.0000	0.3339	0.2324	-0.0391	0.0321	-0.0019
35P	0.0000	-0.2729	-0.2104	0.0000	0.2729	0.2104	-0.0559	0.0225	-0.0021
36P	0.0000	-9.6609	-3.5964	-0.0000	9.6609	3.5964	-0.0622	-0.0291	-0.0024
37P	0.0000	-0.2039	-0.1854	-0.0000	0.2039	0.1854	-0.0717	-0.1178	-0.0028
1X	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0466	0.0280	-0.0026
1XY	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0470	0.0107	-0.0085
1Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0654	0.0106	-0.0065
2X	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0437	0.0296	-0.0023
2XY	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0438	0.0118	-0.0081
2Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0636	0.0112	-0.0068
3X	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0357	0.0338	-0.0018
3XY	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0386	0.0152	-0.0076
3Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0548	0.0153	-0.0070
4X	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0297	0.0365	-0.0003
4XY	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0299	0.0168	-0.0059
4Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0483	0.0167	-0.0079
5X	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0217	0.0309	0.0005

5XY	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0235	0.0130	-0.0047
5Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0393	0.0136	-0.0084
6X	0.0000	-0.2039	-0.1854	-0.0000	0.2039	0.1854	-0.0176	0.0263	0.0010
6XY	0.0000	-0.2039	-0.1854	-0.0000	0.2039	0.1854	-0.0177	0.0091	-0.0035
6Y	0.0000	-0.2039	-0.1854	-0.0000	0.2039	0.1854	-0.0342	0.0091	-0.0085
7X	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0128	0.0184	0.0010
7XY	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0132	0.0027	-0.0030
7Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0281	0.0032	-0.0084
8X	0.0000	-0.7764	-0.7118	0.0000	0.7764	0.7118	-0.0090	0.0106	0.0009
8XY	0.0000	-0.7764	-0.7118	0.0000	0.7764	0.7118	-0.0090	-0.0032	-0.0025
8Y	0.0000	-0.7764	-0.7118	0.0000	0.7764	0.7118	-0.0226	-0.0036	-0.0080
15X	0.0000	-0.5725	-0.5264	-0.5977	-0.5230	2.7699	0.0000	0.0000	0.0000
15XY	0.0000	-0.5725	-0.5264	1.0778	-2.1780	-14.0973	0.0000	0.0000	0.0000
15Y	0.0000	-0.5725	-0.5264	-5.2998	-0.9337	-32.0539	0.0000	0.0000	0.0000
16X	-0.5920	3.4731	-0.9464	0.5920	-3.4731	0.9464	-0.0087	0.0196	-0.0117
17Y	-3.8050	3.2021	-0.0874	3.8050	-3.2021	0.0874	0.0073	0.0177	-0.0119
18Y	-3.5320	2.9121	-0.1184	3.5320	-2.9121	0.1184	0.0233	0.0098	0.0023
19Y	-4.1390	3.5971	-0.0604	4.1390	-3.5971	0.0604	0.0166	-0.0022	0.0048
20AY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0008	-0.0503	-0.0094
20BX	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0130	-0.0365	0.0044
21X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.2287	-0.0108	-0.0310
21XY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0523	-0.0285	0.0072
21Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0016	-0.0484	-0.0139
22X	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0032	-0.2373	0.0357
22XY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0195	-0.0612	0.0050
22Y	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	0.0034	-0.0534	-0.0113
26Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0115	0.0173	-0.0140
27Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	0.0021	0.0094	-0.0071
28Y	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	0.0035	-0.0028	-0.0047
9S	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0199	0.0030	-0.0054
10S	0.0000	-0.9475	-0.7074	0.0000	0.9475	0.7074	-0.0181	-0.0034	-0.0059
11S	0.0000	-0.6735	-0.5544	0.0000	0.6735	0.5544	-0.0166	-0.0094	-0.0064
12S	0.0000	-0.6525	-0.5484	0.0000	0.6525	0.5484	-0.0154	-0.0154	-0.0068
13S	0.0000	-0.6715	-0.5544	0.0000	0.6715	0.5544	-0.0150	-0.0228	-0.0075
14S	0.0000	-0.8155	-0.5944	0.0000	0.8155	0.5944	-0.0175	-0.0303	-0.0084
i0.50E129S	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0561	0.0192	-0.0091
i0.50E113S	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0391	0.0265	-0.0047
i0.50E99S	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0261	0.0176	-0.0044
i0.50E85S	0.0000	-0.2039	-0.1854	0.0000	0.2039	0.1854	-0.0157	0.0036	-0.0040
21XF0.50S	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	-0.0013	-0.0230	-0.0852
22PF0.50S	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0115	-0.2660	-0.1573
9X	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0040	0.0036	0.0022
9XY	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0038	-0.0138	-0.0013
9Y	0.0000	-0.5725	-0.5264	0.0000	0.5725	0.5264	-0.0204	-0.0127	-0.0090
10X	0.0000	-1.2705	-0.7384	0.0000	1.2705	0.7384	0.0004	-0.0035	0.0033
10XY	0.0000	-0.9475	-0.7074	0.0000	0.9475	0.7074	0.0006	-0.0222	-0.0005
10Y	0.0000	-1.2705	-0.7384	0.0000	1.2705	0.7384	-0.0184	-0.0227	-0.0099
11X	0.0000	-0.6735	-0.5544	0.0000	0.6735	0.5544	0.0040	-0.0091	0.0040
11XY	0.0000	-0.6735	-0.5544	0.0000	0.6735	0.5544	0.0044	-0.0314	0.0004
11Y	0.0000	-0.6735	-0.5544	0.0000	0.6735	0.5544	-0.0169	-0.0297	-0.0102
12X	0.0000	-0.6525	-0.5484	0.0000	0.6525	0.5484	0.0085	-0.0153	0.0049
12XY	0.0000	-0.6525	-0.5484	0.0000	0.6525	0.5484	0.0085	-0.0392	0.0012
12Y	0.0000	-0.6525	-0.5484	0.0000	0.6525	0.5484	-0.0160	-0.0412	-0.0110
13X	0.0000	-0.6715	-0.5544	0.0000	0.6715	0.5544	0.0114	-0.0204	0.0053
13XY	0.0000	-0.6715	-0.5544	0.0000	0.6715	0.5544	0.0135	-0.0502	0.0027
13Y	0.0000	-0.6715	-0.5544	0.0000	0.6715	0.5544	-0.0129	-0.0506	-0.0114
14X	0.0000	-0.8155	-0.5944	-0.0000	0.8155	0.5944	0.0005	-0.0082	0.0017
14XY	0.0000	-0.8155	-0.5944	0.0000	0.8155	0.5944	0.0193	-0.0286	-0.0004
14Y	0.0000	-0.8155	-0.5944	-0.0000	0.8155	0.5944	0.0034	-0.0488	-0.0112
21XF0.50Y	0.0000	-0.5725	-0.5264	-0.0000	0.5725	0.5264	0.0008	-0.0397	-0.2100

22PF0.50X 0.0000 -0.5725 -0.5264 -0.0000 0.5725 0.5264 0.0072 -0.2738 -0.0943

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

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Tens. (kips)	Force In Tens. (kips)	-----Original-----							-----Alternate-----				
					-----Supported-----							-----Unsupported-----				
					L/R	RLX	RLY	RLZ	L/R	KL/R	Curve No.	L/R	RLOUT	L/R	KL/R	Curve No.
					Cap. (kips)							Cap. (kips)				
15BP	15BY	Long only	-0.20	-1.16	15.63	0.750	0.500	0.500	131.11	128.51	5	11.66	1.000	166.84	148.81	6
15BY	15BP	Long only	-1.16	-0.20	15.63	0.750	0.500	0.500	131.11	128.51	5	11.66	1.000	166.84	148.81	6
17AY	17AXY	Long only	-1.85	0.08	39.61	0.500	0.750	0.500	100.45	105.33	2	29.26	1.000	133.93	128.57	6
17BX	17BXY	Long only	-0.87	-1.07	39.61	0.500	0.750	0.500	100.45	105.33	2	29.26	1.000	133.93	128.57	6
17BXY	17BX	Long only	-1.07	-0.87	39.61	0.500	0.750	0.500	100.45	105.33	2	29.26	1.000	133.93	128.57	6
18AXY	18AY	Long only	-0.18	-1.30	32.74	0.500	0.750	0.500	104.34	108.25	2	23.74	1.000	139.11	131.75	6
18AY	18AXY	Long only	-1.30	-0.18	32.74	0.500	0.750	0.500	104.34	108.25	2	23.74	1.000	139.11	131.75	6
19AXY	19AY	Long only	-1.22	-0.27	61.20	0.500	0.750	0.500	77.55	88.16	2	49.22	1.000	103.40	111.70	3
19AY	19AXY	Long only	-0.27	-1.22	61.20	0.500	0.750	0.500	77.55	88.16	2	49.22	1.000	103.40	111.70	3
20AXY	20AY	Long only	-2.09	-1.67	61.20	0.500	0.750	0.500	77.55	88.16	2	49.22	1.000	103.40	111.70	3
20AY	20AXY	Long only	-1.67	-2.09	61.20	0.500	0.750	0.500	77.55	88.16	2	49.22	1.000	103.40	111.70	3
21AXY	21AY	Short only	-2.02	0.10	44.33	0.580	0.580	0.580	95.79	101.84	2	42.37	1.000	95.79	107.89	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	3.648	50.00	50.00	7.30	0.00	0.00	0.00	7.30
2	4.346	50.00	50.00	8.69	0.00	0.00	0.00	8.69
3	4.732	50.00	50.00	9.46	0.00	0.00	0.00	9.46
4	4.974	50.00	50.00	9.95	0.00	0.00	0.00	9.95
5	5.364	50.00	50.00	10.73	0.00	0.00	0.00	10.73
6	4.579	50.00	50.00	9.16	0.00	0.00	0.00	9.16
7	4.860	50.00	50.00	9.72	0.00	0.00	0.00	9.72
8	5.484	50.00	50.00	10.97	0.00	0.00	0.00	10.97
9	5.933	50.00	50.00	11.87	0.00	0.00	0.00	11.87
10	4.844	50.00	50.00	9.69	0.00	0.00	0.00	9.69
11	6.354	50.00	50.00	12.71	0.00	0.00	0.00	12.71
12	1.059	50.00	50.00	2.12	0.00	0.00	0.00	2.12
13	1.036	50.00	50.00	2.07	0.00	0.00	0.00	2.07
14	1.307	50.00	50.00	2.61	0.00	0.00	0.00	2.61
15	0.398	50.00	50.00	0.80	0.00	0.00	0.00	0.80
16	0.407	50.00	50.00	0.81	0.00	0.00	0.00	0.81
17	0.345	50.00	50.00	0.69	0.00	0.00	0.00	0.69
18	10.309	50.00	50.00	20.62	0.00	0.00	0.00	20.62
19	0.276	50.00	50.00	0.55	0.00	0.00	0.00	0.55
20	1.182	50.00	50.00	2.36	0.00	0.00	0.00	2.36
21	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
22	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
23	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
24	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02
25	1.469	50.00	50.00	2.94	0.00	0.00	0.00	2.94
26	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
27	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70

28	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
29	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02
30	1.182	50.00	50.00	2.36	0.00	0.00	0.00	2.36
31	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
32	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
33	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
34	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02
35	1.469	50.00	50.00	2.94	0.00	0.00	0.00	2.94
36	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
37	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
38	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
39	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02

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	-0.04394	0.6703	-0.04553	-0.6254	0.0714	0.8722	2.956	3.67	128.8
2P	-0.04654	0.6221	-0.04448	-0.7127	-0.0318	0.8352	2.953	3.622	124.3
3P	-0.03891	0.5589	-0.0432	-0.7828	-0.0426	0.7970	2.961	3.559	119.8
4P	-0.0405	0.4788	-0.03989	-0.6188	-0.0290	0.7373	2.959	3.479	112.8
5P	-0.03549	0.393	-0.03647	-0.5896	0.0329	0.6633	2.965	3.393	104.8
6P	-0.03891	0.335	-0.03265	-0.5057	-0.0250	0.6083	2.961	3.335	98.72
7P	-0.03493	0.2748	-0.02949	-0.4740	0.0251	0.5560	2.965	3.275	91.72
8P	-0.04071	0.2224	-0.02533	-0.3658	0.0073	0.5039	2.959	3.222	84.72
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.2549	0.6257	-0.2041	-0.6818	0.0451	0.8914	-0.2549	17.38	128.6
17P	0.1937	0.4851	0.1385	-0.6527	0.0835	0.7854	3.194	-13.76	112.9
18P	0.2009	0.343	0.1261	-0.5189	0.0920	0.7096	3.201	-16.41	98.88
19P	0.1263	0.2267	0.0865	-0.4756	0.0692	0.5654	3.126	-14.02	84.84
20AP	-0.04427	0.1121	-0.0224	-0.0570	0.2278	0.3649	9.524	0.1121	39.98
20BP	-0.1007	0.05648	-0.02718	-0.1853	-0.0496	0.3808	-0.1007	9.624	39.97
21P	-0.07378	0.04706	0.01302	0.0000	0.0000	0.0000	11.7	2.255	25.01
22P	-0.08424	0.03646	-0.03109	0.0000	0.0000	0.0000	2.124	11.81	24.97
23P	-0.1978	0.438	-0.1673	-0.6739	0.0222	0.8340	-0.1978	14.69	112.6
24P	-0.2027	0.2993	-0.1621	-0.5712	0.0266	0.7194	-0.2027	17.05	98.59
25P	-0.1574	0.1944	-0.1039	-0.4445	0.0412	0.6385	-0.1574	14.44	84.65
26P	0.1159	0.4826	0.07672	-0.5864	0.0847	0.8042	3.116	-8.142	112.9
27P	0.1145	0.34	0.067	-0.4427	0.0932	0.7393	3.115	-9.535	98.82
28P	0.07046	0.2249	0.0427	-0.3893	0.0701	0.5746	3.07	-8.4	84.79
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.02845	0.05044	-0.001595	-0.0887	-0.0707	0.1681	1.472	0.05044	25
31P	-0.04407	0.06579	-0.002301	-0.0558	-0.0289	0.2576	1.456	0.06579	40
32P	-0.0124	0.2086	-0.004271	-0.3743	0.0471	0.4877	1.488	0.2086	84.75
33P	-0.005434	0.3189	-0.005145	-0.5226	0.0266	0.5489	1.495	0.3189	98.74
34P	-0.001387	0.4592	-0.006232	-0.6084	0.0186	0.5935	1.499	0.4592	112.7
35P	0.0002275	0.6484	-0.007726	-0.7962	0.0123	0.6193	1.5	0.6484	128.7
36P	0.0005629	0.7366	-0.008498	-0.8652	0.0123	0.6193	1.501	0.7366	134.7
37P	0.001019	0.8732	-0.009543	-0.8722	0.0123	0.6193	1.501	0.8732	143.7
1X	0.04327	0.6707	0.02384	-0.5841	0.0597	0.8532	3.043	-2.329	128.8
1XY	0.04397	0.5828	0.02548	-0.6238	0.0821	0.8262	-2.956	-2.417	128.8
1Y	-0.043	0.5817	-0.04367	-0.6391	0.0642	0.8359	-3.043	3.582	128.8
2X	0.03973	0.6236	0.02328	-0.7225	0.0533	0.8253	3.04	-2.376	124.3
2XY	0.04027	0.5336	0.02513	-0.6774	0.0023	0.8000	-2.96	-2.466	124.3
2Y	-0.04603	0.5317	-0.04263	-0.6730	0.0232	0.8037	-3.046	3.532	124.3
3X	0.03812	0.5589	0.023	-0.7902	0.0079	0.7982	3.038	-2.441	119.8
3XY	0.04352	0.4769	0.02496	-0.7097	0.0017	0.7729	-2.956	-2.523	119.8
3Y	-0.04405	0.4763	-0.04145	-0.6988	-0.0371	0.7718	-3.044	3.476	119.8
4X	0.03795	0.48	0.02072	-0.6095	0.0839	0.7543	3.038	-2.52	112.8
4XY	0.03866	0.3997	0.02306	-0.5809	0.0080	0.7303	-2.961	-2.6	112.8
4Y	-0.04026	0.3988	-0.03767	-0.5838	0.0405	0.7203	-3.04	3.399	112.8
5X	0.02974	0.3928	0.01813	-0.5835	0.0174	0.6863	3.03	-2.607	104.8
5XY	0.03691	0.3197	0.02097	-0.5473	0.0748	0.6682	-2.963	-2.68	104.8
5Y	-0.04241	0.3198	-0.03391	-0.5480	-0.0282	0.6555	-3.042	3.32	104.8
6X	0.02878	0.3364	0.01471	-0.5028	0.0918	0.6337	3.029	-2.664	98.76
6XY	0.0291	0.2659	0.01812	-0.4617	0.0259	0.6220	-2.971	-2.734	98.77
6Y	-0.03859	0.2655	-0.02946	-0.4633	0.0425	0.6056	-3.039	3.265	98.72
7X	0.01829	0.2749	0.01197	-0.4792	0.0506	0.5742	3.018	-2.725	91.76

7XY	0.02631	0.2115	0.01569	-0.4219	0.0734	0.5723	-2.974	-2.789	91.77
7Y	-0.04298	0.2115	-0.02593	-0.4250	-0.0045	0.5603	-3.043	3.211	91.72
8X	0.01569	0.2228	0.00824	-0.3637	0.0700	0.5143	3.016	-2.777	84.76
8XY	0.01459	0.1655	0.01222	-0.3076	0.0695	0.5226	-2.985	-2.834	84.76
8Y	-0.03876	0.1648	-0.0215	-0.3106	0.0133	0.5149	-3.039	3.165	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.2456	0.6295	0.1677	-0.5952	0.0647	0.8419	0.2456	-16.12	129
17Y	0.1935	0.4023	0.1475	-0.7114	0.0068	0.8031	-2.806	-13.85	112.9
18Y	0.2006	0.2678	0.1416	-0.6043	0.0249	0.7365	-2.799	-16.48	98.89
19Y	0.1257	0.1677	0.08694	-0.4706	0.0680	0.5651	-2.874	-14.08	84.84
20AY	-0.044	0.0007629	0.003842	-0.0563	0.0616	0.3761	-9.612	0.0007629	40
20BX	0.0122	0.05703	0.005997	-0.0531	-0.0292	0.3766	0.0122	-9.511	40.01
21X	0.07642	0.07395	-0.007203	0.0000	0.0000	0.0000	11.85	-2.134	24.99
21XY	-0.04199	-0.01522	0.009261	0.0000	0.0000	0.0000	-11.81	-2.223	25.01
21Y	0.02484	-0.01771	-0.0101	0.0000	0.0000	0.0000	-11.75	2.19	24.99
22X	0.01027	0.1407	-0.007879	0.0000	0.0000	0.0000	2.218	-11.63	24.99
22XY	0.01108	0.03818	0.003951	-0.0344	-0.0875	0.2043	-2.197	-11.73	25
22Y	-0.0401	0.04671	0.0275	0.2556	0.0386	0.0011	-2.248	11.82	25.03
26Y	0.1148	0.4007	0.08036	-0.6275	0.0079	0.7999	-2.885	-8.224	112.9
27Y	0.1124	0.2664	0.07308	-0.5061	0.0261	0.7321	-2.888	-9.609	98.82
28Y	0.06981	0.1664	0.04385	-0.3774	0.0690	0.5763	-2.93	-8.459	84.79
9S	-0.04583	0.189	-0.02655	-0.2795	-0.0025	0.4580	4.092	4.327	76.97
10S	-0.06019	0.1628	-0.02773	-0.2117	0.0220	0.4141	5.215	5.438	69.22
11S	-0.06738	0.1455	-0.02653	-0.1721	0.0131	0.3614	6.345	6.558	61.47
12S	-0.08581	0.1259	-0.0269	-0.1140	0.0633	0.3145	7.783	7.995	51.55
13S	-0.1011	0.1118	-0.02386	-0.1750	-0.0063	0.2224	9.467	9.68	39.98
14S	-0.08488	0.04701	-0.02131	-0.2545	-0.1954	0.0897	11.69	11.82	24.98
i0.50E129S	0.0002618	0.6263	-0.01161	-0.6666	-0.0103	0.8316	0.0002618	0.6263	128.8
i0.50E113S	-0.001196	0.4395	-0.006225	-0.5951	-0.0098	0.8075	-0.001196	0.4395	112.8
i0.50E99S	-0.005258	0.3007	-0.005029	-0.4759	-0.0066	0.7126	-0.005258	0.3007	98.74
i0.50E85S	-0.01227	0.1932	-0.004003	-0.3287	0.0022	0.5852	-0.01227	0.1932	84.75
21XF0.50S	-0.0309	0.06045	-0.2256	-0.0942	1.9091	0.0029	11.74	0.06045	24.77
22PF0.50S	-0.06632	0.04162	-0.3118	0.0000	0.0000	0.0000	-0.06632	11.81	24.69
9X	0.01164	0.189	0.008402	-0.2723	0.0913	0.4652	4.149	-3.949	77.01
9XY	0.01918	0.1216	0.01412	-0.2093	0.0551	0.4606	-4.118	-4.016	77.01
9Y	-0.0541	0.1217	-0.02078	-0.2043	0.0236	0.4524	-4.192	4.259	76.98
10X	0.01404	0.1642	0.007816	-0.2286	0.0576	0.4176	5.289	-5.111	69.26
10XY	0.01599	0.08702	0.01541	-0.1650	0.0773	0.4007	-5.259	-5.188	69.27
10Y	-0.06028	0.08688	-0.01985	-0.1703	0.0177	0.3986	-5.335	5.362	69.23
11X	0.01227	0.1435	0.006095	-0.1599	0.0751	0.3659	6.425	-6.269	61.51
11XY	0.01614	0.05933	0.01522	-0.1289	0.0425	0.3507	-6.397	-6.353	61.52
11Y	-0.0738	0.05885	-0.01685	-0.1251	0.0357	0.3465	-6.487	6.472	61.48
12X	0.01171	0.1308	0.002909	-0.1101	0.0508	0.3122	7.881	-7.738	51.58
12XY	0.0155	0.03004	0.015	-0.1096	0.0513	0.2921	-7.853	-7.839	51.59
12Y	-0.0841	0.03055	-0.01393	-0.1094	0.0564	0.2947	-7.953	7.899	51.57
13X	0.01106	0.1124	0.001019	-0.1382	0.0405	0.2342	9.58	-9.456	40
13XY	0.01323	0.002068	0.01434	-0.0780	0.0358	0.2260	-9.555	-9.567	40.01
13Y	-0.1002	0.0004853	-0.009132	-0.0919	-0.0815	0.2110	-9.669	9.569	39.99
14X	0.009865	0.07586	0.0006498	-0.2098	0.0395	0.1262	11.78	-11.69	25
14XY	0.01196	-0.01514	0.0109	0.0168	0.0333	0.1301	-11.76	-11.79	25.01
14Y	-0.03988	-0.018	-0.0117	0.0149	-0.2574	0.0914	-11.81	11.75	24.99
21XF0.50Y	-0.02813	-0.01645	-0.06419	-0.0880	-0.3706	0.3485	-11.8	-0.01645	24.94
22PF0.50X	0.01052	0.09577	-0.006619	0.0000	0.0000	0.0000	0.01052	-11.67	24.99

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

Joint	X	X	Y	Y	H-Shear	Z	Comp.	Uplift	Result.	Result.	X	X-M.	Y	Y-M.	H-Bend-M	Z	Z-M.	Max.
Label	Force	Usage	Force	Usage	Usage	Force	Usage	Usage	Force	Usage	Moment	Usage	Moment	Usage	Usage	Moment	Usage	Usage

	(kips)	%	(kips)	%	(kips)	%	(kips)	%	(ft-k)	%	(ft-k)	%	(ft-k)	%	(ft-k)	%	(ft-k)	%
15P	-23.41	0.0	-27.13	0.0	0.0	-185.86	0.0	0.0	189.28	0.0	1.29	0.0	8.0	0.0	0.0	0.19	0.0	0.0
29P	0.24	0.0	-1.19	0.0	0.0	-21.88	0.0	0.0	21.91	0.0	13.07	0.0	6.0	0.0	0.0	-4.07	0.0	0.0
15X	27.63	0.0	-35.26	0.0	0.0	163.98	0.0	0.0	169.99	0.0	6.16	0.0	-1.1	0.0	0.0	-0.13	0.0	0.0
15XY	-28.31	0.0	-18.87	0.0	0.0	141.83	0.0	0.0	145.86	0.0	-2.31	0.0	-1.2	0.0	0.0	-0.50	0.0	0.0
15Y	26.56	0.0	-25.34	0.0	0.0	-183.46	0.0	0.0	187.09	0.0	-2.69	0.0	0.4	0.0	0.0	-0.52	0.0	0.0

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

Joint X Label	External Y Load (kips)	External Z Load (kips)	External X Load (kips)	Member Y Force (kips)	Member Z Force (kips)	Member X Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0000	-0.1760	-0.0000	0.0000	0.1760	-0.0439	0.6703	-0.0455
2P	0.0000	0.0000	-0.0923	-0.0000	-0.0000	0.0923	-0.0465	0.6221	-0.0445
3P	0.0000	0.0000	-0.1754	0.0000	-0.0000	0.1754	-0.0389	0.5589	-0.0432
4P	0.0000	0.0000	-0.3270	-0.0000	0.0000	0.3270	-0.0405	0.4788	-0.0399
5P	0.0000	0.0000	-0.3335	-0.0000	0.0000	0.3335	-0.0355	0.3930	-0.0365
6P	0.0000	0.0000	-0.4888	-0.0000	-0.0000	0.4888	-0.0389	0.3350	-0.0327
7P	0.0000	0.0000	-0.5277	0.0000	-0.0000	0.5277	-0.0349	0.2748	-0.0295
8P	0.0000	0.0000	-0.6716	-0.0000	0.0000	0.6716	-0.0407	0.2224	-0.0253
15P	0.0000	0.0000	-1.0248	23.4094	27.1298	-184.8343	0.0000	0.0000	0.0000
16P	-2.7580	8.7340	-1.2725	2.7580	-8.7340	1.2725	-0.2549	0.6257	-0.2041
17P	7.9300	5.6473	-3.1622	-7.9300	-5.6473	3.1622	0.1937	0.4851	0.1385
18P	8.7480	8.7272	-3.0828	-8.7480	-8.7272	3.0828	0.2009	0.3430	0.1261
19P	8.3430	7.0333	-2.0982	-8.3430	-7.0333	2.0982	0.1263	0.2267	0.0865
20AP	0.0000	0.0000	-0.6136	0.0000	-0.0000	0.6136	-0.0443	0.1121	-0.0224
20BP	0.0000	0.0000	-0.6343	0.0000	0.0000	0.6343	-0.1007	0.0565	-0.0272
21P	0.0000	0.0000	-0.3466	0.0000	-0.0000	0.3466	-0.0738	0.0471	0.0130
22P	0.0000	0.0000	-0.3466	-0.0000	0.0000	0.3466	-0.0842	0.0365	-0.0311
23P	-4.0070	10.2940	-1.6243	4.0070	-10.2940	1.6243	-0.1978	0.4380	-0.1673
24P	-0.8630	8.9270	-1.8796	0.8630	-8.9270	1.8796	-0.2027	0.2993	-0.1621
25P	-4.4330	12.2420	-1.1833	4.4330	-12.2420	1.1833	-0.1574	0.1944	-0.1039
26P	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.1159	0.4826	0.0767
27P	0.0000	0.0000	-0.1057	-0.0000	-0.0000	0.1057	0.1145	0.3400	0.0670
28P	0.0000	0.0000	-0.0795	-0.0000	0.0000	0.0795	0.0705	0.2249	0.0427
29P	0.0000	0.5283	-1.1425	-0.2391	0.6663	-20.7366	0.0000	0.0000	0.0000
30P	0.0000	0.9283	-2.3466	0.0000	-0.9283	2.3466	-0.0285	0.0504	-0.0016
31P	0.0000	1.1982	-2.8394	-0.0000	-1.1982	2.8394	-0.0441	0.0658	-0.0023
32P	0.0000	1.1633	-2.6249	0.0000	-1.1633	2.6249	-0.0124	0.2086	-0.0043
33P	0.0000	0.5320	-1.2208	-0.0000	-0.5320	1.2208	-0.0054	0.3189	-0.0051
34P	0.0000	0.5790	-1.3062	-0.0000	-0.5790	1.3062	-0.0014	0.4592	-0.0062
35P	0.0000	0.4230	-0.9483	-0.0000	-0.4230	0.9483	0.0002	0.6484	-0.0077
36P	0.0000	2.7840	-7.8600	0.0000	-2.7840	7.8600	0.0006	0.7366	-0.0085
37P	0.0000	0.1530	-0.3348	0.0000	-0.1530	0.3348	0.0010	0.8732	-0.0095
1X	0.0000	0.0741	-0.1760	-0.0000	-0.0741	0.1760	0.0433	0.6707	0.0238
1XY	0.0000	0.0691	-0.1657	-0.0000	-0.0691	0.1657	0.0440	0.5828	0.0255
1Y	0.0000	0.0000	-0.1657	0.0000	0.0000	0.1657	-0.0430	0.5817	-0.0437
2X	0.0000	0.0776	-0.0923	-0.0000	-0.0776	0.0923	0.0397	0.6236	0.0233
2XY	0.0000	0.0776	-0.0923	0.0000	-0.0776	0.0923	0.0403	0.5336	0.0251
2Y	0.0000	0.0000	-0.0923	-0.0000	-0.0000	0.0923	-0.0460	0.5317	-0.0426
3X	0.0000	0.1111	-0.1747	0.0000	-0.1111	0.1747	0.0381	0.5589	0.0230
3XY	0.0000	0.1111	-0.1747	0.0000	-0.1111	0.1747	0.0435	0.4769	0.0250
3Y	0.0000	0.0000	-0.1754	0.0000	-0.0000	0.1754	-0.0441	0.4763	-0.0415
4X	0.0000	0.1531	-0.3196	0.0000	-0.1531	0.3196	0.0379	0.4800	0.0207
4XY	0.0000	0.1481	-0.3118	-0.0000	-0.1481	0.3118	0.0387	0.3997	0.0231
4Y	0.0000	0.0000	-0.3192	0.0000	0.0000	0.3192	-0.0403	0.3988	-0.0377
5X	0.0000	0.1813	-0.3327	0.0000	-0.1813	0.3327	0.0297	0.3928	0.0181

5XY	0.0000	0.1813	-0.3327	-0.0000	-0.1813	0.3327	0.0369	0.3197	0.0210
5Y	0.0000	0.0000	-0.3335	0.0000	0.0000	0.3335	-0.0424	0.3198	-0.0339
6X	0.0000	0.1636	-0.4720	-0.0000	-0.1636	0.4720	0.0288	0.3364	0.0147
6XY	0.0000	0.1636	-0.4643	-0.0000	-0.1636	0.4643	0.0291	0.2659	0.0181
6Y	0.0000	0.0000	-0.4811	0.0000	0.0000	0.4811	-0.0386	0.2655	-0.0295
7X	0.0000	0.1963	-0.5270	0.0000	-0.1963	0.5270	0.0183	0.2749	0.0120
7XY	0.0000	0.1963	-0.5270	0.0000	-0.1963	0.5270	0.0263	0.2115	0.0157
7Y	0.0000	0.0000	-0.5277	0.0000	0.0000	0.5277	-0.0430	0.2115	-0.0259
8X	0.0000	0.2126	-0.6642	0.0000	-0.2126	0.6642	0.0157	0.2228	0.0082
8XY	0.0000	0.2126	-0.6565	-0.0000	-0.2126	0.6565	0.0146	0.1655	0.0122
8Y	0.0000	0.0000	-0.6639	-0.0000	0.0000	0.6639	-0.0388	0.1648	-0.0215
15X	0.0000	0.4266	-1.0248	-27.6275	34.8322	165.0081	0.0000	0.0000	0.0000
15XY	0.0000	0.4266	-1.0248	28.3102	18.4464	142.8574	0.0000	0.0000	0.0000
15Y	0.0000	0.0000	-1.0248	-26.5570	25.3407	-182.4313	0.0000	0.0000	0.0000
16X	-0.1480	7.7323	-1.6425	0.1480	-7.7323	1.6425	0.2456	0.6295	0.1677
17Y	-4.9620	5.9503	-0.2662	4.9620	-5.9503	0.2662	0.1935	0.4023	0.1475
18Y	-4.4740	5.4162	-0.3398	4.4740	-5.4162	0.3398	0.2006	0.2678	0.1416
19Y	-6.0800	7.1753	-0.1912	6.0800	-7.1753	0.1912	0.1257	0.1677	0.0869
20AY	0.0000	0.0000	-0.6406	-0.0000	-0.0000	0.6406	-0.0440	0.0008	0.0038
20BX	0.0000	0.6136	-0.6343	-0.0000	-0.6136	0.6343	0.0122	0.0570	0.0060
21X	0.0000	0.0000	-0.3466	-0.0000	0.0000	0.3466	0.0764	0.0739	-0.0072
21XY	0.0000	0.0000	-0.3466	0.0000	0.0000	0.3466	-0.0420	-0.0152	0.0093
21Y	0.0000	0.0000	-0.3466	-0.0000	-0.0000	0.3466	0.0248	-0.0177	-0.0101
22X	0.0000	0.3569	-0.3466	0.0000	-0.3569	0.3466	0.0103	0.1407	-0.0079
22XY	0.0000	0.3569	-0.4107	-0.0000	-0.3569	0.4107	0.0111	0.0382	0.0040
22Y	0.0000	0.0000	-0.4107	0.0000	0.0000	0.4107	-0.0401	0.0467	0.0275
26Y	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.1148	0.4007	0.0804
27Y	0.0000	0.0000	-0.1057	-0.0000	-0.0000	0.1057	0.1124	0.2664	0.0731
28Y	0.0000	0.0000	-0.0795	-0.0000	-0.0000	0.0795	0.0698	0.1664	0.0439
9S	0.0000	0.0000	-0.6364	0.0000	-0.0000	0.6364	-0.0458	0.1890	-0.0266
10S	0.0000	0.1410	-1.0242	0.0000	-0.1410	1.0242	-0.0602	0.1628	-0.0277
11S	0.0000	0.0540	-0.9182	0.0000	-0.0540	0.9182	-0.0674	0.1455	-0.0265
12S	0.0000	0.0430	-1.2363	0.0000	-0.0430	1.2363	-0.0858	0.1259	-0.0269
13S	0.0000	0.0530	-1.0543	-0.0000	-0.0530	1.0543	-0.1011	0.1118	-0.0239
14S	0.0000	0.1290	-1.7238	-0.0000	-0.1290	1.7238	-0.0849	0.0470	-0.0213
i0.50E129S	0.0000	0.0120	-0.0578	-0.0000	-0.0120	0.0578	0.0003	0.6263	-0.0116
i0.50E113S	0.0000	0.0040	-0.0338	-0.0000	-0.0040	0.0338	-0.0012	0.4395	-0.0062
i0.50E99S	0.0000	0.0000	-0.0338	-0.0000	0.0000	0.0338	-0.0053	0.3007	-0.0050
i0.50E85S	0.0000	0.0000	-0.0338	-0.0000	-0.0000	0.0338	-0.0123	0.1932	-0.0040
21XF0.50S	0.0000	0.0000	-0.0699	-0.0000	0.0000	0.0699	-0.0309	0.0605	-0.2256
22PF0.50S	0.0000	0.0000	-0.0230	-0.0000	-0.0000	0.0230	-0.0663	0.0416	-0.3118
9X	0.0000	0.3213	-0.6364	-0.0000	-0.3213	0.6364	0.0116	0.1890	0.0084
9XY	0.0000	0.3213	-0.6364	0.0000	-0.3213	0.6364	0.0192	0.1216	0.0141
9Y	0.0000	0.0000	-0.6364	-0.0000	-0.0000	0.6364	-0.0541	0.1217	-0.0208
10X	0.0000	0.5632	-1.1172	0.0000	-0.5632	1.1172	0.0140	0.1642	0.0078
10XY	0.0000	0.4572	-1.0242	0.0000	-0.4572	1.0242	0.0160	0.0870	0.0154
10Y	0.0000	0.2470	-1.1172	0.0000	-0.2470	1.1172	-0.0603	0.0869	-0.0199
11X	0.0000	0.4491	-0.9182	0.0000	-0.4491	0.9182	0.0123	0.1435	0.0061
11XY	0.0000	0.4491	-0.9182	0.0000	-0.4491	0.9182	0.0161	0.0593	0.0152
11Y	0.0000	0.0540	-0.9182	0.0000	-0.0540	0.9182	-0.0738	0.0589	-0.0169
12X	0.0000	0.6008	-1.2363	0.0000	-0.6008	1.2363	0.0117	0.1308	0.0029
12XY	0.0000	0.6008	-1.2363	0.0000	-0.6008	1.2363	0.0155	0.0300	0.0150
12Y	0.0000	0.0430	-1.2363	0.0000	-0.0430	1.2363	-0.0841	0.0305	-0.0139
13X	0.0000	0.4455	-1.0543	0.0000	-0.4455	1.0543	0.0111	0.1124	0.0010
13XY	0.0000	0.4455	-1.0543	0.0000	-0.4455	1.0543	0.0132	0.0021	0.0143
13Y	0.0000	0.0530	-1.0543	0.0000	-0.0530	1.0543	-0.1002	0.0005	-0.0091
14X	0.0000	0.7360	-1.7238	-0.0000	-0.7360	1.7238	0.0099	0.0759	0.0006
14XY	0.0000	0.7360	-1.7238	0.0000	-0.7360	1.7238	0.0120	-0.0151	0.0109
14Y	0.0000	0.1290	-1.7238	-0.0000	-0.1290	1.7238	-0.0399	-0.0180	-0.0117
21XF0.50Y	0.0000	0.0000	-0.0919	-0.0000	-0.0000	0.0919	-0.0281	-0.0165	-0.0642

22PF0.50X 0.0000 0.0313 -0.0230 -0.0000 -0.0313 0.0230 0.0105 0.0958 -0.0066

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	7.906	50.00	50.00	15.81	0.00	0.00	0.00	15.81
2	9.247	50.00	50.00	18.49	0.00	0.00	0.00	18.49
3	10.236	50.00	50.00	20.47	0.00	0.00	0.00	20.47
4	7.752	50.00	50.00	15.50	0.00	0.00	0.00	15.50
5	12.736	50.00	50.00	25.47	0.00	0.00	0.00	25.47
6	7.033	50.00	50.00	14.07	0.00	0.00	0.00	14.07
7	11.112	50.00	50.00	22.22	0.00	0.00	0.00	22.22
8	9.407	50.00	50.00	18.81	0.00	0.00	0.00	18.81
9	11.165	50.00	50.00	22.33	0.00	0.00	0.00	22.33
10	9.163	50.00	50.00	18.33	0.00	0.00	0.00	18.33
11	13.074	50.00	50.00	26.15	0.00	0.00	0.00	26.15
12	2.523	50.00	50.00	5.05	0.00	0.00	0.00	5.05
13	3.082	50.00	50.00	6.16	0.00	0.00	0.00	6.16
14	2.871	50.00	50.00	5.74	0.00	0.00	0.00	5.74
15	1.332	50.00	50.00	2.66	0.00	0.00	0.00	2.66
16	1.429	50.00	50.00	2.86	0.00	0.00	0.00	2.86
17	1.038	50.00	50.00	2.08	0.00	0.00	0.00	2.08
18	8.338	50.00	50.00	16.68	0.00	0.00	0.00	16.68
19	0.368	50.00	50.00	0.74	0.00	0.00	0.00	0.74
20	1.034	50.00	50.00	2.07	0.00	0.00	0.00	2.07
21	0.920	50.00	50.00	1.84	0.00	0.00	0.00	1.84
22	1.237	50.00	50.00	2.47	0.00	0.00	0.00	2.47
23	1.056	50.00	50.00	2.11	0.00	0.00	0.00	2.11
24	1.729	50.00	50.00	3.46	0.00	0.00	0.00	3.46
25	1.251	50.00	50.00	2.50	0.00	0.00	0.00	2.50
26	1.022	50.00	50.00	2.04	0.00	0.00	0.00	2.04
27	1.375	50.00	50.00	2.75	0.00	0.00	0.00	2.75
28	1.145	50.00	50.00	2.29	0.00	0.00	0.00	2.29
29	1.874	50.00	50.00	3.75	0.00	0.00	0.00	3.75
30	1.122	50.00	50.00	2.24	0.00	0.00	0.00	2.24
31	1.022	50.00	50.00	2.04	0.00	0.00	0.00	2.04
32	1.375	50.00	50.00	2.75	0.00	0.00	0.00	2.75
33	1.145	50.00	50.00	2.29	0.00	0.00	0.00	2.29
34	1.874	50.00	50.00	3.75	0.00	0.00	0.00	3.75
35	1.144	50.00	50.00	2.29	0.00	0.00	0.00	2.29
36	0.920	50.00	50.00	1.84	0.00	0.00	0.00	1.84
37	1.237	50.00	50.00	2.47	0.00	0.00	0.00	2.47
38	1.056	50.00	50.00	2.11	0.00	0.00	0.00	2.11
39	1.729	50.00	50.00	3.46	0.00	0.00	0.00	3.46

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	-0.03919	0.591	-0.0411	-0.5888	0.0143	0.4267	2.961	3.591	128.8
2P	-0.03954	0.5446	-0.03988	-0.6989	-0.0493	0.4059	2.96	3.545	124.3
3P	-0.03189	0.4825	-0.03843	-0.7673	-0.0510	0.3841	2.968	3.482	119.8
4P	-0.03245	0.4059	-0.03435	-0.5683	-0.0468	0.3501	2.968	3.406	112.8
5P	-0.02587	0.329	-0.03064	-0.5197	0.0152	0.3158	2.974	3.329	104.8
6P	-0.02822	0.2784	-0.02674	-0.4350	-0.0373	0.2905	2.972	3.278	98.72
7P	-0.02317	0.2273	-0.02376	-0.3976	0.0071	0.2682	2.977	3.227	91.73
8P	-0.02727	0.1839	-0.02004	-0.2934	0.0001	0.2460	2.973	3.184	84.73
15P	0	0	0	0.0000	0.0000	0.0000	15.44	15.44	0
16P	-0.1461	0.5687	-0.1897	-0.6300	0.0071	0.4565	-0.1461	17.32	128.6
17P	0.07477	0.4088	0.1412	-0.7614	0.0431	0.3498	3.075	-13.84	112.9
18P	0.08134	0.2817	0.1226	-0.5748	0.0415	0.3153	3.081	-16.47	98.87
19P	0.053	0.1858	0.07709	-0.4981	0.0196	0.2666	3.053	-14.06	84.83
20AP	-0.02761	0.09323	-0.01585	0.0123	0.1634	0.2120	9.54	0.09323	39.98
20BP	-0.05956	0.06186	-0.01938	-0.1646	-0.0384	0.2224	-0.05956	9.63	39.98
21P	-0.3104	0.039	-0.02608	0.0000	0.0000	0.0000	11.46	2.247	24.97
22P	-0.05963	0.2835	0.01282	0.0000	0.0000	0.0000	2.148	12.05	25.01
23P	-0.1064	0.3871	-0.1583	-0.6582	-0.0019	0.3885	-0.1064	14.64	112.6
24P	-0.1053	0.2619	-0.1427	-0.5074	0.0009	0.3358	-0.1053	17.01	98.61
25P	-0.08313	0.1706	-0.08873	-0.3860	0.0120	0.3056	-0.08313	14.42	84.66
26P	0.03998	0.4074	0.07221	-0.5872	0.0443	0.3622	3.04	-8.218	112.9
27P	0.0428	0.2803	0.05971	-0.4225	0.0425	0.3322	3.043	-9.595	98.81
28P	0.02677	0.1849	0.03378	-0.3271	0.0204	0.2680	3.027	-8.44	84.78
29P	0	0	0	0.0000	0.0000	0.0000	1.5	0	-4.25
30P	-0.01964	0.06774	-0.0006994	-0.0686	-0.0466	0.0859	1.48	0.06774	25
31P	-0.02756	0.06718	-0.000983	0.0127	-0.0102	0.1308	1.472	0.06718	40
32P	-0.01295	0.177	-0.001886	-0.3135	0.0135	0.2362	1.487	0.177	84.75
33P	-0.0124	0.2708	-0.002395	-0.4638	-0.0012	0.2624	1.488	0.2708	98.75
34P	-0.01402	0.396	-0.003125	-0.5182	-0.0070	0.2817	1.486	0.396	112.7
35P	-0.01758	0.5809	-0.004362	-0.9965	-0.0090	0.2938	1.482	0.5809	128.7
36P	-0.01913	0.6998	-0.005596	-1.2028	-0.0090	0.2937	1.481	0.6998	134.7
37P	-0.02151	0.8897	-0.007603	-1.2119	-0.0090	0.2937	1.478	0.8897	143.7
1X	0.003209	0.5912	0.02613	-0.5474	0.0424	0.4116	3.003	-2.409	128.8
1XY	0.003675	0.5469	0.02501	-0.5999	0.0579	0.4068	-2.996	-2.453	128.8
1Y	-0.03916	0.5464	-0.04154	-0.5966	0.0206	0.4142	-3.039	3.546	128.8
2X	0.001902	0.5454	0.02537	-0.7072	0.0232	0.3946	3.002	-2.455	124.3
2XY	0.002024	0.5	0.02445	-0.6608	-0.0343	0.3889	-2.998	-2.5	124.3
2Y	-0.0395	0.499	-0.04038	-0.6603	0.0095	0.3946	-3.039	3.499	124.3
3X	0.001045	0.4824	0.02486	-0.7751	-0.0116	0.3780	3.001	-2.518	119.8
3XY	0.00742	0.4435	0.02406	-0.7067	-0.0237	0.3698	-2.993	-2.556	119.8
3Y	-0.03869	0.4434	-0.03906	-0.6980	-0.0368	0.3755	-3.039	3.443	119.8
4X	0.004334	0.4063	0.02174	-0.5444	0.0445	0.3513	3.004	-2.594	112.8
4XY	0.004713	0.3694	0.02131	-0.5371	-0.0306	0.3402	-2.995	-2.631	112.8
4Y	-0.03265	0.3688	-0.03481	-0.5469	0.0252	0.3447	-3.033	3.369	112.8
5X	0.0005862	0.3289	0.0187	-0.5234	-0.0224	0.3204	3.001	-2.671	104.8
5XY	0.00805	0.2949	0.01868	-0.5052	0.0357	0.3126	-2.992	-2.705	104.8
5Y	-0.03367	0.2951	-0.03086	-0.5041	-0.0455	0.3146	-3.034	3.295	104.8
6X	0.003655	0.2789	0.01504	-0.4261	0.0423	0.2963	3.004	-2.721	98.77
6XY	0.003759	0.2461	0.01546	-0.4144	-0.0165	0.2923	-2.996	-2.754	98.77
6Y	-0.02818	0.2458	-0.02645	-0.4159	0.0232	0.2911	-3.028	3.246	98.72
7X	-0.001352	0.2273	0.01224	-0.4028	0.0038	0.2707	2.999	-2.773	91.76

7XY	0.00611	0.1971	0.01299	-0.3789	0.0252	0.2733	-2.994	-2.803	91.76
7Y	-0.03098	0.1973	-0.02309	-0.3799	-0.0176	0.2725	-3.031	3.197	91.73
8X	0.001152	0.184	0.008567	-0.2887	0.0206	0.2450	3.001	-2.816	84.76
8XY	-5.938e-05	0.1564	0.009729	-0.2707	0.0225	0.2543	-3	-2.844	84.76
8Y	-0.02571	0.1559	-0.01894	-0.2728	0.0012	0.2537	-3.026	3.156	84.73
15X	0	0	0	0.0000	0.0000	0.0000	15.44	-15.44	0
15XY	0	0	0	0.0000	0.0000	0.0000	-15.44	-15.44	0
15Y	0	0	0	0.0000	0.0000	0.0000	-15.44	15.44	0
16X	0.104	0.5704	0.1644	-0.5822	0.0474	0.4234	0.104	-16.18	129
17Y	0.07452	0.3713	0.1417	-0.7662	-0.0318	0.3662	-2.925	-13.88	112.9
18Y	0.08107	0.2476	0.1273	-0.5996	-0.0174	0.3334	-2.919	-16.5	98.88
19Y	0.05261	0.1579	0.07634	-0.4909	0.0215	0.2629	-2.947	-14.09	84.83
20AY	-0.02753	0.02968	0.0002635	0.0126	0.0148	0.2257	-9.596	0.02968	40
20BX	0.00431	0.06203	0.003826	-0.0503	-0.0005	0.2210	0.00431	-9.506	40
21X	0.1055	0.06716	0.0004653	0.0000	0.0000	0.0000	11.88	-2.141	25
21XY	-0.03697	0.01481	0.002816	0.0000	0.0000	0.0000	-11.81	-2.193	25
21Y	0.06243	-0.002487	-0.01464	0.0000	0.0000	0.0000	-11.71	2.206	24.99
22X	0.0006408	0.1736	-0.01521	0.0000	0.0000	0.0000	2.209	-11.6	24.98
22XY	0.007425	0.05949	5.757e-05	0.0002	-0.0681	0.1541	-2.201	-11.71	25
22Y	-0.01128	0.07058	0.0179	0.1684	0.0282	-0.1044	-2.219	11.84	25.02
26Y	0.03891	0.3702	0.07206	-0.5935	-0.0308	0.3572	-2.961	-8.255	112.9
27Y	0.04134	0.2467	0.06148	-0.4456	-0.0165	0.3270	-2.959	-9.628	98.81
28Y	0.02646	0.1571	0.03376	-0.3188	0.0223	0.2729	-2.974	-8.468	84.78
9S	-0.02775	0.1558	-0.02042	-0.2066	-0.0069	0.2280	4.11	4.293	76.98
10S	-0.03656	0.1345	-0.02082	-0.1535	0.0169	0.2093	5.239	5.41	69.23
11S	-0.03989	0.1203	-0.01941	-0.1239	0.0065	0.1824	6.373	6.533	61.48
12S	-0.05068	0.1045	-0.01902	-0.0770	0.0343	0.1607	7.818	7.973	51.56
13S	-0.05987	0.09276	-0.01618	-0.1422	0.0271	0.1120	9.509	9.661	39.98
14S	-0.06282	0.03596	-0.01706	-0.2095	-0.0951	0.0359	11.71	11.81	24.98
i0.50E129S	-0.01777	0.569	-0.01216	-0.6499	-0.0302	0.4159	-0.01777	0.569	128.8
i0.50E113S	-0.01403	0.3878	-0.005249	-0.5459	-0.0647	0.3576	-0.01403	0.3878	112.8
i0.50E99S	-0.01234	0.2623	-0.004204	-0.4205	-0.0637	0.3309	-0.01234	0.2623	98.75
i0.50E85S	-0.01291	0.1694	-0.00356	-0.2790	-0.0552	0.2866	-0.01291	0.1694	84.75
21XF0.50S	-0.02043	0.06019	-0.1243	-0.0700	1.0569	-0.1048	11.75	0.06019	24.88
22PF0.50S	-0.04676	0.4039	-0.1937	0.0000	0.0000	0.0000	-0.04676	12.17	24.81
9X	-0.00116	0.1559	0.008383	-0.1986	0.0415	0.2252	4.136	-3.982	77.01
9XY	0.005523	0.1214	0.01058	-0.1841	0.0090	0.2215	-4.132	-4.016	77.01
9Y	-0.03512	0.1219	-0.01821	-0.1787	0.0198	0.2204	-4.173	4.259	76.98
10X	0.002483	0.1355	0.007698	-0.1661	0.0154	0.2042	5.278	-5.14	69.26
10XY	0.003889	0.09461	0.01111	-0.1454	0.0338	0.1897	-5.271	-5.181	69.26
10Y	-0.03701	0.09473	-0.01735	-0.1478	0.0091	0.1925	-5.312	5.37	69.23
11X	0.002043	0.1188	0.005979	-0.1123	0.0376	0.1791	6.415	-6.294	61.51
11XY	0.005399	0.07321	0.01045	-0.1115	0.0084	0.1663	-6.407	-6.34	61.51
11Y	-0.04504	0.07327	-0.01483	-0.1098	0.0270	0.1674	-6.458	6.486	61.49
12X	0.002739	0.1082	0.003124	-0.0763	0.0188	0.1547	7.872	-7.761	51.58
12XY	0.005646	0.05164	0.009688	-0.0921	0.0222	0.1370	-7.863	-7.817	51.59
12Y	-0.0503	0.05198	-0.01232	-0.0867	0.0384	0.1418	-7.919	7.921	51.57
13X	0.003102	0.09412	0.0009545	-0.0861	0.0263	0.1142	9.572	-9.474	40
13XY	0.00542	0.03082	0.008511	-0.0644	0.0060	0.1069	-9.563	-9.538	40.01
13Y	-0.05856	0.0289	-0.008593	-0.1102	-0.0744	0.1010	-9.627	9.598	39.99
14X	-2.61e-06	0.06876	-0.0008962	-0.1615	0.0209	0.0549	11.77	-11.7	25
14XY	0.007826	0.01519	0.005377	-0.0368	0.0101	0.0654	-11.76	-11.76	25.01
14Y	-0.01105	-0.00263	-0.01211	-0.0578	-0.1654	0.0444	-11.78	11.77	24.99
21XF0.50Y	-0.01809	0.006126	-0.193	-0.0670	-1.2222	0.3545	-11.79	0.006126	24.81
22PF0.50X	0.001599	0.2003	-0.08466	0.0000	0.0000	0.0000	0.001599	-11.57	24.92

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

Joint	X	X	Y	Y	H-Shear	Z	Comp.	Uplift	Result.	Result.	X	X-M.	Y	Y-M.	H-Bend-M	Z	Z-M.	Max.
Label	Force	Usage	Force	Usage	Usage	Force	Usage	Usage	Force	Usage	Moment	Usage	Moment	Usage	Usage	Moment	Usage	Usage

	(kips)	%	(kips)	%	(kips)	%	(kips)	%	(ft-k)	%	(ft-k)	%	(ft-k)	%				
15P	-20.72	0.0	-22.78	0.0	0.0	-156.24	0.0	0.0	159.24	0.0	0.53	0.0	6.7	0.0	0.0	0.46	0.0	0.0
29P	0.19	0.0	-1.82	0.0	0.0	-8.81	0.0	0.0	9.00	0.0	20.68	0.0	4.3	0.0	0.0	-2.08	0.0	0.0
15X	27.40	0.0	-33.68	0.0	0.0	153.28	0.0	0.0	159.31	0.0	5.92	0.0	0.1	0.0	0.0	0.25	0.0	0.0
15XY	-25.29	0.0	-22.41	0.0	0.0	130.55	0.0	0.0	134.85	0.0	0.88	0.0	-0.9	0.0	0.0	-0.45	0.0	0.0
15Y	23.73	0.0	-27.14	0.0	0.0	-169.69	0.0	0.0	173.48	0.0	-1.89	0.0	-1.8	0.0	0.0	-0.43	0.0	0.0

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

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0392	0.5910	-0.0411
2P	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0395	0.5446	-0.0399
3P	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0319	0.4825	-0.0384
4P	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0324	0.4059	-0.0343
5P	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0259	0.3290	-0.0306
6P	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0282	0.2784	-0.0267
7P	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0232	0.2273	-0.0238
8P	0.0000	0.7764	-0.7118	-0.0000	-0.7764	0.7118	-0.0273	0.1839	-0.0200
15P	0.0000	0.5725	-0.5264	20.7159	22.2087	-155.7128	0.0000	0.0000	0.0000
16P	-1.4580	4.9669	-0.7654	1.4580	-4.9669	0.7654	-0.1461	0.5687	-0.1897
17P	3.4830	2.9889	-1.8334	-3.4830	-2.9889	1.8334	0.0748	0.4088	0.1412
18P	3.5210	4.0689	-1.6654	-3.5210	-4.0689	1.6654	0.0813	0.2817	0.1226
19P	3.5360	3.4799	-1.2104	-3.5360	-3.4799	1.2104	0.0530	0.1858	0.0771
20AP	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0276	0.0932	-0.0159
20BP	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0596	0.0619	-0.0194
21P	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.3104	0.0390	-0.0261
22P	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0596	0.2835	0.0128
23P	-2.1690	6.8179	-1.0244	2.1690	-6.8179	1.0244	-0.1064	0.3871	-0.1583
24P	-0.7120	6.1249	-1.0554	0.7120	-6.1249	1.0554	-0.1053	0.2619	-0.1427
25P	-2.0210	7.3409	-0.6984	2.0210	-7.3409	0.6984	-0.0831	0.1706	-0.0887
26P	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0400	0.4074	0.0722
27P	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0428	0.2803	0.0597
28P	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0268	0.1849	0.0338
29P	0.0000	0.5725	-0.5264	-0.1873	1.2469	-8.2875	0.0000	0.0000	0.0000
30P	0.0000	0.8535	-0.6274	0.0000	-0.8535	0.6274	-0.0196	0.0677	-0.0007
31P	0.0000	0.8305	-0.6194	-0.0000	-0.8305	0.6194	-0.0276	0.0672	-0.0010
32P	0.0000	1.0304	-0.8038	-0.0000	-1.0304	0.8038	-0.0130	0.1770	-0.0019
33P	0.0000	0.3249	-0.2294	0.0000	-0.3249	0.2294	-0.0124	0.2708	-0.0024
34P	0.0000	0.3339	-0.2324	-0.0000	-0.3339	0.2324	-0.0140	0.3960	-0.0031
35P	0.0000	0.2729	-0.2104	-0.0000	-0.2729	0.2104	-0.0176	0.5809	-0.0044
36P	0.0000	9.6609	-3.5964	0.0000	-9.6609	3.5964	-0.0191	0.6998	-0.0056
37P	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0215	0.8897	-0.0076
1X	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0032	0.5912	0.0261
1XY	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0037	0.5469	0.0250
1Y	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0392	0.5464	-0.0415
2X	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0019	0.5454	0.0254
2XY	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0020	0.5000	0.0244
2Y	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0395	0.4990	-0.0404
3X	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0010	0.4824	0.0249
3XY	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0074	0.4435	0.0241
3Y	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0387	0.4434	-0.0391
4X	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0043	0.4063	0.0217
4XY	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0047	0.3694	0.0213
4Y	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0327	0.3688	-0.0348
5X	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0006	0.3289	0.0187

5XY	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0081	0.2949	0.0187
5Y	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0337	0.2951	-0.0309
6X	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0037	0.2789	0.0150
6XY	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0038	0.2461	0.0155
6Y	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0282	0.2458	-0.0264
7X	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0014	0.2273	0.0122
7XY	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	0.0061	0.1971	0.0130
7Y	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0310	0.1973	-0.0231
8X	0.0000	0.7764	-0.7118	-0.0000	-0.7764	0.7118	0.0012	0.1840	0.0086
8XY	0.0000	0.7764	-0.7118	0.0000	-0.7764	0.7118	-0.0001	0.1564	0.0097
8Y	0.0000	0.7764	-0.7118	0.0000	-0.7764	0.7118	-0.0257	0.1559	-0.0189
15X	0.0000	0.5725	-0.5264	-27.4003	33.1043	153.8080	0.0000	0.0000	0.0000
15XY	0.0000	0.5725	-0.5264	25.2916	21.8345	131.0718	0.0000	0.0000	0.0000
15Y	0.0000	0.5725	-0.5264	-23.7349	26.5716	-169.1672	0.0000	0.0000	0.0000
16X	-0.3650	4.6209	-0.9464	0.3650	-4.6209	0.9464	0.1040	0.5704	0.1644
17Y	-3.0090	4.3299	-0.0874	3.0090	-4.3299	0.0874	0.0745	0.3713	0.1417
18Y	-2.7460	4.0299	-0.1184	2.7460	-4.0299	0.1184	0.0811	0.2476	0.1273
19Y	-3.3750	4.6969	-0.0604	3.3750	-4.6969	0.0604	0.0526	0.1579	0.0763
20AY	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0275	0.0297	0.0003
20BX	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0043	0.0620	0.0038
21X	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	0.1055	0.0672	0.0005
21XY	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0370	0.0148	0.0028
21Y	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0624	-0.0025	-0.0146
22X	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0006	0.1736	-0.0152
22XY	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0074	0.0595	0.0001
22Y	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0113	0.0706	0.0179
26Y	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0389	0.3702	0.0721
27Y	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0413	0.2467	0.0615
28Y	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	0.0265	0.1571	0.0338
9S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0277	0.1558	-0.0204
10S	0.0000	0.9475	-0.7074	0.0000	-0.9475	0.7074	-0.0366	0.1345	-0.0208
11S	0.0000	0.6735	-0.5544	0.0000	-0.6735	0.5544	-0.0399	0.1203	-0.0194
12S	0.0000	0.6525	-0.5484	-0.0000	-0.6525	0.5484	-0.0507	0.1045	-0.0190
13S	0.0000	0.6715	-0.5544	-0.0000	-0.6715	0.5544	-0.0599	0.0928	-0.0162
14S	0.0000	0.8155	-0.5944	0.0000	-0.8155	0.5944	-0.0628	0.0360	-0.0171
i0.50E129S	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0178	0.5690	-0.0122
i0.50E113S	0.0000	0.2039	-0.1854	-0.0000	-0.2039	0.1854	-0.0140	0.3878	-0.0052
i0.50E99S	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0123	0.2623	-0.0042
i0.50E85S	0.0000	0.2039	-0.1854	0.0000	-0.2039	0.1854	-0.0129	0.1694	-0.0036
21XF0.50S	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0204	0.0602	-0.1243
22PF0.50S	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0468	0.4039	-0.1937
9X	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	-0.0012	0.1559	0.0084
9XY	0.0000	0.5725	-0.5264	0.0000	-0.5725	0.5264	0.0055	0.1214	0.0106
9Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0351	0.1219	-0.0182
10X	0.0000	1.2705	-0.7384	0.0000	-1.2705	0.7384	0.0025	0.1355	0.0077
10XY	0.0000	0.9475	-0.7074	-0.0000	-0.9475	0.7074	0.0039	0.0946	0.0111
10Y	0.0000	1.2705	-0.7384	-0.0000	-1.2705	0.7384	-0.0370	0.0947	-0.0174
11X	0.0000	0.6735	-0.5544	-0.0000	-0.6735	0.5544	0.0020	0.1188	0.0060
11XY	0.0000	0.6735	-0.5544	-0.0000	-0.6735	0.5544	0.0054	0.0732	0.0105
11Y	0.0000	0.6735	-0.5544	-0.0000	-0.6735	0.5544	-0.0450	0.0733	-0.0148
12X	0.0000	0.6525	-0.5484	0.0000	-0.6525	0.5484	0.0027	0.1082	0.0031
12XY	0.0000	0.6525	-0.5484	-0.0000	-0.6525	0.5484	0.0056	0.0516	0.0097
12Y	0.0000	0.6525	-0.5484	-0.0000	-0.6525	0.5484	-0.0503	0.0520	-0.0123
13X	0.0000	0.6715	-0.5544	0.0000	-0.6715	0.5544	0.0031	0.0941	0.0010
13XY	0.0000	0.6715	-0.5544	-0.0000	-0.6715	0.5544	0.0054	0.0308	0.0085
13Y	0.0000	0.6715	-0.5544	-0.0000	-0.6715	0.5544	-0.0586	0.0289	-0.0086
14X	0.0000	0.8155	-0.5944	-0.0000	-0.8155	0.5944	-0.0000	0.0688	-0.0009
14XY	0.0000	0.8155	-0.5944	-0.0000	-0.8155	0.5944	0.0078	0.0152	0.0054
14Y	0.0000	0.8155	-0.5944	0.0000	-0.8155	0.5944	-0.0111	-0.0026	-0.0121
21XF0.50Y	0.0000	0.5725	-0.5264	-0.0000	-0.5725	0.5264	-0.0181	0.0061	-0.1930

22PF0.50X 0.0000 0.5725 -0.5264 0.0000 -0.5725 0.5264 0.0016 0.2003 -0.0847

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-----							-----Alternate-----				
					-----Supported-----							-----Unsupported-----				
					L/R	RLX	RLY	RLZ	L/R	KL/R	Curve	L/R	RLOUT	L/R	KL/R	Curve
					Cap. (kips)							Cap. (kips)				
20BY	20BP	Long only	-12.21	0.81	61.20	0.500	0.750	0.500	77.55	88.16	2	49.22	1.000	103.40	111.70	3
21BP	21BY	Short only	-1.73	-14.26	44.33	0.580	0.580	0.580	95.79	101.84	2	42.37	1.000	95.79	107.89	3
21BY	21BP	Short only	-14.26	-1.73	44.33	0.580	0.580	0.580	95.79	101.84	2	42.37	1.000	95.79	107.89	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Holding Usage %	Input Hardware Capacity (kips)	Factored Hardware Capacity (kips)	Hardware Usage %	Max. Usage %
1	4.731	50.00	50.00	9.46	0.00	0.00	0.00	9.46
2	5.233	50.00	50.00	10.47	0.00	0.00	0.00	10.47
3	4.942	50.00	50.00	9.88	0.00	0.00	0.00	9.88
4	5.273	50.00	50.00	10.55	0.00	0.00	0.00	10.55
5	5.633	50.00	50.00	11.27	0.00	0.00	0.00	11.27
6	4.878	50.00	50.00	9.76	0.00	0.00	0.00	9.76
7	5.107	50.00	50.00	10.21	0.00	0.00	0.00	10.21
8	5.784	50.00	50.00	11.57	0.00	0.00	0.00	11.57
9	7.228	50.00	50.00	14.46	0.00	0.00	0.00	14.46
10	6.256	50.00	50.00	12.51	0.00	0.00	0.00	12.51
11	7.646	50.00	50.00	15.29	0.00	0.00	0.00	15.29
12	1.059	50.00	50.00	2.12	0.00	0.00	0.00	2.12
13	1.036	50.00	50.00	2.07	0.00	0.00	0.00	2.07
14	1.307	50.00	50.00	2.61	0.00	0.00	0.00	2.61
15	0.398	50.00	50.00	0.80	0.00	0.00	0.00	0.80
16	0.407	50.00	50.00	0.81	0.00	0.00	0.00	0.81
17	0.345	50.00	50.00	0.69	0.00	0.00	0.00	0.69
18	10.309	50.00	50.00	20.62	0.00	0.00	0.00	20.62
19	0.276	50.00	50.00	0.55	0.00	0.00	0.00	0.55
20	1.182	50.00	50.00	2.36	0.00	0.00	0.00	2.36
21	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
22	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
23	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
24	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02
25	1.469	50.00	50.00	2.94	0.00	0.00	0.00	2.94
26	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
27	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
28	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
29	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02
30	1.182	50.00	50.00	2.36	0.00	0.00	0.00	2.36
31	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74
32	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
33	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
34	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02
35	1.469	50.00	50.00	2.94	0.00	0.00	0.00	2.94
36	0.872	50.00	50.00	1.74	0.00	0.00	0.00	1.74

37	0.852	50.00	50.00	1.70	0.00	0.00	0.00	1.70
38	0.871	50.00	50.00	1.74	0.00	0.00	0.00	1.74
39	1.009	50.00	50.00	2.02	0.00	0.00	0.00	2.02

*** 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	Angle	Angle	Steel	Max Usage	Max	Comp.	Comp.	Comp.	L/r	Comp.	Comp.	RLX	RLY	RLZ	L/r		
KL/r	Curve	No.															
Label	Desc.	Type	Size	Strength	Usage	Cont-	Use	Control	Force	Control	Capacity	Connect.	Connect.				
Comp.	No.	Of				rol	In	Member		Load		Shear	Bearing				
Member	Bolts						Comp.			Case		Capacity	Capacity				
Comp.				(ksi)	%		%		(kips)		(kips)	(kips)	(kips)				
(ft)																	
1	LEG1	SAE	3.5X3.5X0.25	36.0	82.04	Comp	82.04	3Y	-26.920	NESC Ext	32.813	36.400	54.375	1.000	1.000	1.000	121.04
121.04	7.000	4															
2	LEG2	SAE	6X6X0.3125	36.0	74.32	Comp	74.32	5Y	-73.634	NESC Ext	99.083	109.200	203.906	1.000	1.000	1.000	60.50
60.50	6.050	1															
3	LEG3	SAE	8X8X0.5	36.0	55.00	Comp	55.00	7Y	-137.308	NESC Hea	249.636	254.800	380.624	1.000	1.000	1.000	52.83
52.83	7.000	1															
4	LEG4	SAE	8X8X0.625	36.0	60.00	Comp	60.00	10Y	-174.723	NESC Hea	306.646	291.200	543.749	1.000	1.000	1.000	60.12
60.12	7.915	1															
5	LEG5	SAE	8X8X0.75	36.0	55.52	Comp	55.52	13P	-202.106	NESC Hea	368.010	364.000	815.624	0.500	0.500	0.500	58.18
58.18	15.320	1															
6	X1	SAE	2.5X2.5X0.1875	36.0	89.66	Comp	89.66	15AX	-14.017	NESC Ext	15.633	33.600	20.391	0.750	0.500	0.500	131.11
128.51	10.817	5															
7	X2	SAU	2.5X2X0.1875	36.0	76.94	Comp	76.94	16AX	-11.004	NESC Ext	14.303	18.200	20.391	0.750	0.500	0.500	129.55
127.32	9.220	5															
8	X3	SAU	4X3X0.25	36.0	69.70	Comp	69.70	17AX	-27.612	NESC Hea	39.613	45.500	67.969	0.500	0.750	0.500	100.45
105.33	10.000	2															
9	X4	SAU	3.5X2.5X0.25	36.0	59.98	Comp	59.98	18AX	-19.635	NESC Hea	32.738	36.400	54.375	0.500	0.750	0.500	104.34
108.25	8.521	2															
10	X5	SAU	4X3.5X0.3125	36.0	69.22	Comp	69.22	19AX	-42.363	NESC Hea	61.204	63.700	118.945	0.500	0.750	0.500	77.55
88.16	9.220	2															
11	X6	SAU	5X3.5X0.25	36.0	58.87	Comp	58.87	21BY	-26.099	NESC Hea	44.335	54.600	81.562	0.580	0.580	0.580	95.79
101.84	10.597	2															
12	X7	SAU	4X3X0.25	36.0	49.64	Comp	49.64	22BX	-15.380	NESC Hea	30.985	36.400	54.375	0.560	0.560	0.560	126.41
124.92	12.246	5															
13	X8	SAU	3.5X3X0.25	36.0	41.60	Comp	41.60	23AX	-9.378	NESC Hea	22.542	27.300	40.781	0.550	0.550	0.550	147.17
140.74	14.070	5															
14	X9	SAU	5X3X0.25	36.0	52.69	Comp	52.69	24AX	-11.293	NESC Hea	21.431	27.300	40.781	0.550	0.550	0.550	173.71
160.96	17.450	5															
15	D1	SAU	5X3X0.25	36.0	99.80	Tens	31.91	25AY	-10.785	NESC Hea	33.799	63.700	95.156	1.000	0.500	0.500	127.63
125.86	14.103	5															
16	D2	SAE	2X2X0.1875	36.0	46.46	Tens	23.66	26AP	-0.957	NESC Hea	4.044	18.200	20.391	0.500	0.500	0.500	256.65
224.16	16.853	5															
17	D3	SAU	3X2X0.25	36.0	77.86	Tens	58.58	27AXY	-3.761	NESC Hea	6.420	36.400	54.375	1.000	0.500	0.500	264.74
230.33	19.194	5															
18	D4	SAU	4X3X0.25	36.0	91.38	Comp	91.38	28AY	-10.499	NESC Hea	11.489	45.500	67.969	0.500	1.000	0.500	205.19
205.19	15.321	4															
19	D5	SAU	3.5X3X0.25	36.0	65.45	Tens	26.66	29AXY	-6.839	NESC Hea	25.652	45.500	67.969	0.250	0.250	0.250	135.61

131.93	28.523	5	5																	
20		H1	SAE	1.75X1.75X0.1875	36.0	42.41	Tens	19.78	32X	-0.797	NESC	Ext	4.027	9.100	10.195	1.000	1.000	1.000	209.91	
209.91	6.000	4	1																	
21		H2	SAU	4X3.5X0.25	36.0	55.83	Comp	55.83	37AP	-15.240	NESC	Hea	27.341	27.300	40.781	1.000	0.500	0.500	148.70	
137.65	15.738	6	3																	
22		H3	SAE	3X3X0.1875	36.0	44.34	Comp	44.34	38BY	-5.101	NESC	Ext	11.503	18.200	20.391	1.000	1.000	1.000	192.66	
164.68	9.569	6	2																	
23		H4	SAU	5X3X0.25	36.0	54.35	Comp	54.35	39AP	-9.892	NESC	Hea	21.560	18.200	27.187	1.000	1.000	1.000	173.07	
160.48	9.562	5	2																	
24		H5	SAE	3.5X3.5X0.25	36.0	19.44	Comp	19.44	40P	-2.602	NESC	Ext	13.386	18.200	27.187	1.000	1.000	1.000	233.97	
190.09	13.531	6	2																	
25		X10	SAE	1.75X1.75X0.1875	36.0	0.00		0.00		0.000			0.000	0.000	0.000	0.000	0.000	0.000	0.00	
0.00	0.000	0	0																	
26		X11	SAE	2X2X0.1875	36.0	42.45	Comp	42.45	43CXY	-5.343	NESC	Hea	12.587	18.200	20.391	1.000	1.000	1.000	129.22	
127.06	4.243	5	2																	
27		X12	SAU	2.5X2X0.1875	36.0	24.48	Comp	24.48	44BP	-3.558	NESC	Hea	14.533	18.200	20.391	0.750	0.500	0.500	128.22	
126.30	9.125	5	2																	
28		H6	SAU	4X3X0.25	36.0	41.45	Tens	0.00	45BP	0.000			35.407	18.200	27.187	1.000	1.000	1.000	110.60	
115.30	6.000	3	2																	
29		D6	SAU	3X2X0.1875	36.0	40.86	Comp	40.86	46XY	-3.161	NESC	Hea	7.736	18.200	20.391	1.000	0.500	0.500	201.94	
182.48	14.775	5	2																	
30		HGR1	SAU	2.5X2X0.1875	36.0	46.52	Tens	9.97	47AY	-0.547	NESC	Ext	5.486	18.200	20.391	1.000	0.500	0.500	205.58	
205.58	13.585	4	2																	
31		HGR2	SAE	3X3X0.1875	36.0	41.66	Tens	0.95	48AP	-0.077	NESC	Hea	8.140	18.200	20.391	1.000	0.500	0.500	195.77	
195.77	15.319	4	2																	
32		A1	SAE	3X3X0.25	36.0	64.76	Tens	10.33	50X	-1.880	NESC	Hea	21.867	18.200	27.187	0.500	0.500	0.500	142.64	
137.29	14.073	5	2																	
33		A2	SAU	3.5X3X0.25	36.0	53.76	Comp	53.76	51BP	-14.677	NESC	Hea	33.416	27.300	40.781	1.000	1.000	1.000	106.97	
113.49	5.625	3	3																	
34		A#	SAE	4X4X0.25	36.0	54.24	Comp	54.24	52BP	-22.900	NESC	Hea	42.220	45.500	67.969	1.000	1.000	1.000	103.77	
111.89	6.875	3	5																	
35		H7	SAU	2.5X2X0.1875	36.0	27.64	Comp	27.64	54P	-2.254	NESC	Ext	8.154	9.100	10.195	1.000	1.000	1.000	168.62	
168.62	6.000	4	1																	
36		H8	DAE	1.75X1.75X0.1875	36.0	59.49	Comp	59.49	36P	-9.994	NESC	Hea	19.743	16.800	20.391	1.000	1.000	1.000	134.08	
134.08	6.000	4	1																	
Pwmnt	12" Std. Pipe	Pwmnt	Pipe	12" Std.	42.0	5.87	Comp	5.87	g101P	-15.260	NESC	Hea	260.146	0.000	0.000	1.000	1.000	1.000	122.32	
122.32	44.750	4	0																	
PMBR1	L2x2x3/16	SAE	2X2X0.1875	36.0	9.26	Comp	9.26	g108P	-0.945	NESC	Hea	20.044	16.800	10.195	1.000	1.000	1.000	45.69		
82.84	1.500	3	1	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g107P g108P ??																
PMBR2	L2.5x2.5x3/16	SAE	2.5X2.5X0.1875	36.0	31.78	Comp	31.78	g111P	-3.240	NESC	Ext	22.126	16.800	10.195	1.000	1.000	1.000	81.32		
100.66	3.354	3	1																	
PMBR3	L3x3x3/16	SAE	3X3X0.1875	36.0	2.72	Comp	2.72	g114P	-0.277	NESC	Hea	11.823	16.800	10.195	1.000	1.000	1.000	162.44		
162.44	8.068	4	1																	
PMBR4	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	36.0	10.08	Comp	10.08	g116P	-1.370	NESC	Ext	17.249	16.800	13.594	1.000	1.000	1.000	167.46		
167.46	9.685	4	1	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g117P ??																
PMBR5	L4x4x1/4	SAE	4X4X0.25	36.0	7.79	Comp	7.79	g120X	-1.059	NESC	Ext	16.004	16.800	13.594	1.000	1.000	1.000	186.27		
186.27	12.340	4	1	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g118P ??																
20a		H1	SAE	1.75X1.75X0.1875	36.0	29.61	Comp	29.61	30AY	-2.694	NESC	Hea	13.441	9.100	10.195	0.500	0.500	0.500	104.96	
112.48	6.000	3	1																	
AngleR	L2x2x1/4	SAE	2X2X0.25	36.0	49.75	Tens	44.89	42XY	-4.085	NESC	Ext	15.869	9.100	13.594	1.000	1.000	1.000	130.21		
130.21	4.243	4	1																	
BraceR	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	61.53	Comp	61.53	g110X	-8.364	NESC	Ext	29.101	16.800	13.594	1.000	1.000	1.000	81.98		
100.99	3.354	3	1	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g110P g110X ??																
Plate	6"x3/4" PL	Bar	6x3/4	36.0	2.67	Tens	1.14	g106P	-0.191	NESC	Ext	109.423	16.800	40.781	1.000	1.000	1.000	83.19		
101.59	1.501	3	1																	

6R	X1	SAE	2.5X2.5X0.25	36.0	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00
0.00	0.000	0	0												

Group Summary (Tension Portion):

Group No.	Hole Label Of Diameter	Group Desc.	Angle Type	Angle Size	Steel Strength	Max Usage	Max Usage Cont-	Max Use In	Tension Control Member	Tension Force	Tension Control	Net Section Capacity	Tension Connect. Shear	Tension Connect. Bearing	Tension Connect. Rupture	Length Tens. Member	No. Of Bolts
					(ksi)	%		Tens. %		(kips)	Case	(kips)	Capacity (kips)	Capacity (kips)	Capacity (kips)	(ft)	Tens.

1		LEG1	SAE	3.5X3.5X0.25	36.0	82.04	Comp	68.13	3X	24.798	NESC Ext	47.340	36.400	54.375	60.417	7.000	4
2.000	0.75																
2		LEG2	SAE	6X6X0.3125	36.0	74.32	Comp	69.21	5X	67.587	NESC Ext	97.650	109.200	203.906	183.656	6.050	12
4.000	0.75																
3		LEG3	SAE	8X8X0.5	36.0	55.00	Comp	54.42	7X	126.115	NESC Hea	231.750	254.800	380.624	395.849	7.000	14
3.500	0.75																
4		LEG4	SAE	8X8X0.625	36.0	60.00	Comp	55.53	9X	159.308	NESC Hea	286.897	0.000	0.000	0.000	7.915	0
3.500	0.75																
5		LEG5	SAE	8X8X0.75	36.0	55.52	Comp	48.20	11X	159.457	NESC Hea	330.839	0.000	0.000	0.000	10.131	0
4.000	0.75																
6		X1	SAE	2.5X2.5X0.1875	36.0	89.66	Comp	82.78	15AP	14.952	NESC Ext	25.048	33.600	20.391	18.063	10.817	2
1.000	0.6875																
7		X2	SAU	2.5X2X0.1875	36.0	76.94	Comp	63.07	16AP	11.431	NESC Ext	18.650	18.200	20.391	18.125	9.220	2
1.000	0.75																
8		X3	SAU	4X3X0.25	36.0	69.70	Comp	66.41	17AP	29.342	NESC Hea	44.185	45.500	67.969	52.912	10.000	5
1.740	0.75																
9		X4	SAU	3.5X2.5X0.25	36.0	59.98	Comp	54.93	18AP	19.996	NESC Hea	40.399	36.400	54.375	42.647	8.521	4
1.030	0.75																
10		X5	SAU	4X3.5X0.3125	36.0	69.22	Comp	68.63	19AP	40.700	NESC Hea	59.307	63.700	118.945	74.976	9.220	7
1.790	0.75																
11		X6	SAU	5X3.5X0.25	36.0	58.87	Comp	58.65	21BXY	26.495	NESC Hea	45.178	54.600	81.562	46.012	10.597	6
1.550	0.75																
12		X7	SAU	4X3X0.25	36.0	49.64	Comp	39.65	22BP	14.432	NESC Hea	40.581	36.400	54.375	42.206	12.246	4
1.000	0.75																
13		X8	SAU	3.5X3X0.25	36.0	41.60	Comp	41.52	23AP	11.336	NESC Hea	40.419	27.300	40.781	38.516	14.070	3
1.000	0.75																
14		X9	SAU	5X3X0.25	36.0	52.69	Comp	26.29	24AP	7.178	NESC Hea	40.581	27.300	40.781	36.250	17.450	3
1.000	0.75																
15		D1	SAU	5X3X0.25	36.0	99.80	Tens	99.80	25AP	36.193	NESC Hea	36.268	63.700	95.156	72.037	14.103	7
1.710	0.75																
16		D2	SAE	2X2X0.1875	36.0	46.46	Tens	46.46	26AX	8.421	NESC Ext	18.448	18.200	20.391	18.125	16.853	2
1.000	0.75																
17		D3	SAU	3X2X0.25	36.0	77.86	Tens	77.86	27AX	18.982	NESC Hea	24.381	36.400	54.375	48.333	19.194	4
1.000	0.75																
18		D4	SAU	4X3X0.25	36.0	91.38	Comp	59.75	28AP	27.188	NESC Hea	47.101	45.500	67.969	60.337	15.321	5
1.260	0.75																
19		D5	SAU	3.5X3X0.25	36.0	65.45	Tens	65.45	29AX	29.106	NESC Hea	44.469	45.500	67.969	50.906	28.523	5
1.000	0.75																
20		H1	SAE	1.75X1.75X0.1875	36.0	42.41	Tens	42.41	33Y	2.803	NESC Hea	15.532	9.100	10.195	6.609	6.000	1
1.000	0.75																
21		H2	SAU	4X3.5X0.25	36.0	55.83	Comp	10.38	37AY	2.833	NESC Hea	48.519	27.300	40.781	36.250	15.738	3
1.000	0.75																

22		H3	SAE	3X3X0.1875	36.0	44.34	Comp	2.07	38AP	0.375	NESC	Hea	30.760	18.200	20.391	18.125	9.569	2
1.000	0.75																	
23		H4	SAU	5X3X0.25	36.0	54.35	Comp	41.48	F39C2118X	7.549	NESC	Ext	40.581	18.200	27.187	24.167	2.208	2
1.000	0.75																	
24		H5	SAE	3.5X3.5X0.25	36.0	19.44	Comp	16.42	40P	2.988	NESC	Hea	48.681	18.200	27.187	25.677	13.531	2
1.000	0.75																	
25		X10	SAE	1.75X1.75X0.1875	36.0	0.00		0.00		0.000			0.000	0.000	0.000	0.000	0.000	0
0.000	0																	
26		X11	SAE	2X2X0.1875	36.0	42.45	Comp	31.59	43BX	3.901	NESC	Hea	18.448	18.200	20.391	12.347	4.243	2
1.000	0.75																	
27		X12	SAU	2.5X2X0.1875	36.0	24.48	Comp	20.01	44CY	3.626	NESC	Hea	18.650	18.200	20.391	18.125	9.125	2
1.000	0.75																	
28		H6	SAU	4X3X0.25	36.0	41.45	Tens	41.45	45BP	7.543	NESC	Hea	40.581	18.200	27.187	24.167	6.000	2
1.000	0.75																	
29		D6	SAU	3X2X0.1875	36.0	40.86	Comp	0.00	46Y	0.000			18.529	18.200	20.391	12.755	14.775	2
1.000	0.75																	
30		HGR1	SAU	2.5X2X0.1875	36.0	46.52	Tens	46.52	47P	5.934	NESC	Hea	18.650	18.200	20.391	12.755	13.250	2
1.000	0.75																	
31		HGR2	SAE	3X3X0.1875	36.0	41.66	Tens	41.66	48P	7.550	NESC	Hea	30.760	18.200	20.391	18.125	15.022	2
1.000	0.75																	
32		A1	SAE	3X3X0.25	36.0	64.76	Tens	64.76	50P	11.738	NESC	Hea	36.997	18.200	27.187	18.125	14.073	2
1.590	0.75																	
33		A2	SAU	3.5X3X0.25	36.0	53.76	Comp	45.83	53P	15.073	NESC	Hea	32.886	36.400	54.375	42.647	11.643	4
2.240	0.75																	
34		A#	SAE	4X4X0.25	36.0	54.24	Comp	14.01	52P	6.374	NESC	Hea	46.393	45.500	67.969	48.262	14.073	5
2.710	0.75																	
35		H7	SAU	2.5X2X0.1875	36.0	27.64	Comp	15.52	54X	1.413	NESC	Ext	21.688	9.100	10.195	9.629	6.000	1
1.000	0.75																	
36		H8	DAE	1.75X1.75X0.1875	36.0	59.49	Comp	55.46	36X	8.244	NESC	Hea	31.823	16.800	20.391	14.864	6.000	1
2.000	0.6875																	
Pwmnt	12"	Std.	Pipe	Pwmnt	Pipe	12"	Std.											
0.000	0																	
PMBR1	L2x2x3/16	SAE		2X2X0.1875	36.0	9.26	Comp	0.00	g109P	0.000			18.827	16.800	10.195	10.343	1.500	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g107P g108P ??																
PMBR2	L2.5x2.5x3/16	SAE		2.5X2.5X0.1875	36.0	31.78	Comp	23.93	g111P	2.440	NESC	Ext	25.048	16.800	10.195	11.328	3.354	1
1.000	0.6875																	
PMBR3	L3x3x3/16	SAE		3X3X0.1875	36.0	2.72	Comp	1.17	g114P	0.120	NESC	Ext	31.139	16.800	10.195	11.328	8.068	1
1.000	0.6875																	
PMBR4	L3.5x3.5x1/4	SAE		3.5X3.5X0.25	36.0	10.08	Comp	10.07	g116X	1.369	NESC	Hea	49.187	16.800	13.594	15.104	9.685	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g117P ??																
PMBR5	L4x4x1/4	SAE		4X4X0.25	36.0	7.79	Comp	7.47	g120P	1.015	NESC	Ext	57.287	16.800	13.594	15.104	12.340	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g118P ??																
20a		H1	SAE	1.75X1.75X0.1875	36.0	29.61	Comp	7.64	30BX	0.505	NESC	Hea	15.532	9.100	10.195	6.609	6.000	1
1.000	0.75																	
AngleR	L2x2x1/4	SAE		2X2X0.25	36.0	49.75	Tens	49.75	42Y	4.384	NESC	Ext	24.381	9.100	13.594	8.812	4.243	1
1.000	0.75																	
BraceR	L2.5x2.5x1/4	SAE		2.5X2.5X0.25	36.0	61.53	Comp	60.31	g110X	8.198	NESC	Ext	32.987	16.800	13.594	15.104	3.354	1
1.000	0.6875	A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g110P g110X ??																
Plate	6"x3/4"	PL	Bar	6x3/4	36.0	2.67	Tens	2.67	g106P	0.448	NESC	Hea	129.094	16.800	40.781	45.312	1.501	1
1.000	0.6875																	
6R		X1	SAE	2.5X2.5X0.25	36.0	0.00		0.00		0.000			0.000	0.000	0.000	0.000	0.000	0
0.000	0																	

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy -	64.76	50P	Angle
NESC Extreme -	82.93	28AP	Angle
NESC Heavy +	99.80	25AP	Angle
NESC Extreme +	89.66	15AX	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	15.81	NESC Heavy +	0.0
2	Clamp	18.49	NESC Heavy +	0.0
3	Clamp	20.47	NESC Heavy +	0.0
4	Clamp	15.50	NESC Heavy +	0.0
5	Clamp	25.47	NESC Heavy +	0.0
6	Clamp	14.07	NESC Heavy +	0.0
7	Clamp	22.22	NESC Heavy +	0.0
8	Clamp	18.81	NESC Heavy +	0.0
9	Clamp	22.33	NESC Heavy +	0.0
10	Clamp	18.33	NESC Heavy +	0.0
11	Clamp	26.15	NESC Heavy +	0.0
12	Clamp	5.05	NESC Heavy -	0.0
13	Clamp	6.16	NESC Heavy -	0.0
14	Clamp	5.74	NESC Heavy -	0.0
15	Clamp	2.66	NESC Heavy -	0.0
16	Clamp	2.86	NESC Heavy -	0.0
17	Clamp	2.08	NESC Heavy -	0.0
18	Clamp	20.62	NESC Extreme -	0.0
19	Clamp	0.74	NESC Heavy -	0.0
20	Clamp	2.36	NESC Extreme -	0.0
21	Clamp	1.84	NESC Heavy -	0.0
22	Clamp	2.47	NESC Heavy -	0.0
23	Clamp	2.11	NESC Heavy -	0.0
24	Clamp	3.46	NESC Heavy -	0.0
25	Clamp	2.94	NESC Extreme -	0.0
26	Clamp	2.04	NESC Heavy -	0.0
27	Clamp	2.75	NESC Heavy -	0.0
28	Clamp	2.29	NESC Heavy -	0.0
29	Clamp	3.75	NESC Heavy -	0.0
30	Clamp	2.36	NESC Extreme -	0.0
31	Clamp	2.04	NESC Heavy -	0.0
32	Clamp	2.75	NESC Heavy -	0.0
33	Clamp	2.29	NESC Heavy -	0.0
34	Clamp	3.75	NESC Heavy -	0.0
35	Clamp	2.94	NESC Extreme -	0.0
36	Clamp	1.84	NESC Heavy -	0.0
37	Clamp	2.47	NESC Heavy -	0.0
38	Clamp	2.11	NESC Heavy -	0.0
39	Clamp	3.46	NESC Heavy -	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy -	1	Clamp	16X	-0.300	7.080	1.642	7.274
NESC Heavy -	2	Clamp	16P	-2.831	8.315	1.272	8.875
NESC Heavy -	3	Clamp	17P	8.141	5.224	3.162	10.177
NESC Heavy -	4	Clamp	17Y	-5.370	5.471	0.266	7.670
NESC Heavy -	5	Clamp	18P	9.006	8.347	3.083	12.660
NESC Heavy -	6	Clamp	18Y	-4.885	4.932	0.340	6.950
NESC Heavy -	7	Clamp	19P	8.564	6.649	2.098	11.043
NESC Heavy -	8	Clamp	19Y	-6.488	6.695	0.191	9.325
NESC Heavy -	9	Clamp	23P	-4.108	9.738	1.624	10.693
NESC Heavy -	10	Clamp	24P	-1.020	8.348	1.880	8.618
NESC Heavy -	11	Clamp	25P	-4.571	11.680	1.183	12.598
NESC Heavy -	12	Clamp	30P	0.000	-0.928	2.347	2.523
NESC Heavy -	13	Clamp	31P	0.000	-1.198	2.839	3.082
NESC Heavy -	14	Clamp	32P	0.000	-1.163	2.625	2.871
NESC Heavy -	15	Clamp	33P	0.000	-0.532	1.221	1.332
NESC Heavy -	16	Clamp	34P	0.000	-0.579	1.306	1.429
NESC Heavy -	17	Clamp	35P	0.000	-0.423	0.948	1.038
NESC Heavy -	18	Clamp	36P	0.000	-2.784	7.860	8.338
NESC Heavy -	19	Clamp	37P	0.000	-0.153	0.335	0.368
NESC Heavy -	20	Clamp	10S	0.000	-0.141	1.024	1.034
NESC Heavy -	21	Clamp	11S	0.000	-0.054	0.918	0.920
NESC Heavy -	22	Clamp	12S	0.000	-0.043	1.236	1.237
NESC Heavy -	23	Clamp	13S	0.000	-0.053	1.054	1.056
NESC Heavy -	24	Clamp	14S	0.000	-0.129	1.724	1.729
NESC Heavy -	25	Clamp	10X	0.000	-0.563	1.117	1.251
NESC Heavy -	26	Clamp	11X	0.000	-0.449	0.918	1.022
NESC Heavy -	27	Clamp	12X	0.000	-0.601	1.236	1.375
NESC Heavy -	28	Clamp	13X	0.000	-0.445	1.054	1.145
NESC Heavy -	29	Clamp	14X	0.000	-0.736	1.724	1.874
NESC Heavy -	30	Clamp	10XY	0.000	-0.457	1.024	1.122
NESC Heavy -	31	Clamp	11XY	0.000	-0.449	0.918	1.022
NESC Heavy -	32	Clamp	12XY	0.000	-0.601	1.236	1.375
NESC Heavy -	33	Clamp	13XY	0.000	-0.445	1.054	1.145
NESC Heavy -	34	Clamp	14XY	0.000	-0.736	1.724	1.874
NESC Heavy -	35	Clamp	10Y	0.000	-0.247	1.117	1.144
NESC Heavy -	36	Clamp	11Y	0.000	-0.054	0.918	0.920
NESC Heavy -	37	Clamp	12Y	0.000	-0.043	1.236	1.237
NESC Heavy -	38	Clamp	13Y	0.000	-0.053	1.054	1.056
NESC Heavy -	39	Clamp	14Y	0.000	-0.129	1.724	1.729
NESC Extreme -	1	Clamp	16X	-0.592	3.473	0.946	3.648
NESC Extreme -	2	Clamp	16P	-1.570	3.979	0.765	4.346
NESC Extreme -	3	Clamp	17P	3.881	1.993	1.833	4.732
NESC Extreme -	4	Clamp	17Y	-3.805	3.202	0.087	4.974
NESC Extreme -	5	Clamp	18P	3.999	3.164	1.665	5.364
NESC Extreme -	6	Clamp	18Y	-3.532	2.912	0.118	4.579
NESC Extreme -	7	Clamp	19P	3.942	2.571	1.210	4.860
NESC Extreme -	8	Clamp	19Y	-4.139	3.597	0.060	5.484
NESC Extreme -	9	Clamp	23P	-2.388	5.334	1.024	5.933
NESC Extreme -	10	Clamp	24P	-1.028	4.614	1.055	4.844
NESC Extreme -	11	Clamp	25P	-2.291	5.885	0.698	6.354
NESC Extreme -	12	Clamp	30P	0.000	-0.853	0.627	1.059
NESC Extreme -	13	Clamp	31P	0.000	-0.830	0.619	1.036
NESC Extreme -	14	Clamp	32P	0.000	-1.030	0.804	1.307

NESC Extreme -	15	Clamp	33P	0.000	-0.325	0.229	0.398
NESC Extreme -	16	Clamp	34P	0.000	-0.334	0.232	0.407
NESC Extreme -	17	Clamp	35P	0.000	-0.273	0.210	0.345
NESC Extreme -	18	Clamp	36P	0.000	-9.661	3.596	10.309
NESC Extreme -	19	Clamp	37P	0.000	-0.204	0.185	0.276
NESC Extreme -	20	Clamp	10S	0.000	-0.947	0.707	1.182
NESC Extreme -	21	Clamp	11S	0.000	-0.673	0.554	0.872
NESC Extreme -	22	Clamp	12S	0.000	-0.652	0.548	0.852
NESC Extreme -	23	Clamp	13S	0.000	-0.671	0.554	0.871
NESC Extreme -	24	Clamp	14S	0.000	-0.815	0.594	1.009
NESC Extreme -	25	Clamp	10X	0.000	-1.270	0.738	1.469
NESC Extreme -	26	Clamp	11X	0.000	-0.673	0.554	0.872
NESC Extreme -	27	Clamp	12X	0.000	-0.652	0.548	0.852
NESC Extreme -	28	Clamp	13X	0.000	-0.671	0.554	0.871
NESC Extreme -	29	Clamp	14X	0.000	-0.815	0.594	1.009
NESC Extreme -	30	Clamp	10XY	0.000	-0.947	0.707	1.182
NESC Extreme -	31	Clamp	11XY	0.000	-0.673	0.554	0.872
NESC Extreme -	32	Clamp	12XY	0.000	-0.652	0.548	0.852
NESC Extreme -	33	Clamp	13XY	0.000	-0.671	0.554	0.871
NESC Extreme -	34	Clamp	14XY	0.000	-0.815	0.594	1.009
NESC Extreme -	35	Clamp	10Y	0.000	-1.270	0.738	1.469
NESC Extreme -	36	Clamp	11Y	0.000	-0.673	0.554	0.872
NESC Extreme -	37	Clamp	12Y	0.000	-0.652	0.548	0.852
NESC Extreme -	38	Clamp	13Y	0.000	-0.671	0.554	0.871
NESC Extreme -	39	Clamp	14Y	0.000	-0.815	0.594	1.009
NESC Heavy +	1	Clamp	16X	-0.148	7.732	1.642	7.906
NESC Heavy +	2	Clamp	16P	-2.758	8.734	1.272	9.247
NESC Heavy +	3	Clamp	17P	7.930	5.647	3.162	10.236
NESC Heavy +	4	Clamp	17Y	-4.962	5.950	0.266	7.752
NESC Heavy +	5	Clamp	18P	8.748	8.727	3.083	12.736
NESC Heavy +	6	Clamp	18Y	-4.474	5.416	0.340	7.033
NESC Heavy +	7	Clamp	19P	8.343	7.033	2.098	11.112
NESC Heavy +	8	Clamp	19Y	-6.080	7.175	0.191	9.407
NESC Heavy +	9	Clamp	23P	-4.007	10.294	1.624	11.165
NESC Heavy +	10	Clamp	24P	-0.863	8.927	1.880	9.163
NESC Heavy +	11	Clamp	25P	-4.433	12.242	1.183	13.074
NESC Heavy +	12	Clamp	30P	0.000	0.928	2.347	2.523
NESC Heavy +	13	Clamp	31P	0.000	1.198	2.839	3.082
NESC Heavy +	14	Clamp	32P	0.000	1.163	2.625	2.871
NESC Heavy +	15	Clamp	33P	0.000	0.532	1.221	1.332
NESC Heavy +	16	Clamp	34P	0.000	0.579	1.306	1.429
NESC Heavy +	17	Clamp	35P	0.000	0.423	0.948	1.038
NESC Heavy +	18	Clamp	36P	0.000	2.784	7.860	8.338
NESC Heavy +	19	Clamp	37P	0.000	0.153	0.335	0.368
NESC Heavy +	20	Clamp	10S	0.000	0.141	1.024	1.034
NESC Heavy +	21	Clamp	11S	0.000	0.054	0.918	0.920
NESC Heavy +	22	Clamp	12S	0.000	0.043	1.236	1.237
NESC Heavy +	23	Clamp	13S	0.000	0.053	1.054	1.056
NESC Heavy +	24	Clamp	14S	0.000	0.129	1.724	1.729
NESC Heavy +	25	Clamp	10X	0.000	0.563	1.117	1.251
NESC Heavy +	26	Clamp	11X	0.000	0.449	0.918	1.022
NESC Heavy +	27	Clamp	12X	0.000	0.601	1.236	1.375
NESC Heavy +	28	Clamp	13X	0.000	0.445	1.054	1.145
NESC Heavy +	29	Clamp	14X	0.000	0.736	1.724	1.874
NESC Heavy +	30	Clamp	10XY	0.000	0.457	1.024	1.122
NESC Heavy +	31	Clamp	11XY	0.000	0.449	0.918	1.022
NESC Heavy +	32	Clamp	12XY	0.000	0.601	1.236	1.375
NESC Heavy +	33	Clamp	13XY	0.000	0.445	1.054	1.145
NESC Heavy +	34	Clamp	14XY	0.000	0.736	1.724	1.874
NESC Heavy +	35	Clamp	10Y	0.000	0.247	1.117	1.144

NESC Heavy +	36	Clamp	11Y	0.000	0.054	0.918	0.920
NESC Heavy +	37	Clamp	12Y	0.000	0.043	1.236	1.237
NESC Heavy +	38	Clamp	13Y	0.000	0.053	1.054	1.056
NESC Heavy +	39	Clamp	14Y	0.000	0.129	1.724	1.729
NESC Extreme +	1	Clamp	16X	-0.365	4.621	0.946	4.731
NESC Extreme +	2	Clamp	16P	-1.458	4.967	0.765	5.233
NESC Extreme +	3	Clamp	17P	3.483	2.989	1.833	4.942
NESC Extreme +	4	Clamp	17Y	-3.009	4.330	0.087	5.273
NESC Extreme +	5	Clamp	18P	3.521	4.069	1.665	5.633
NESC Extreme +	6	Clamp	18Y	-2.746	4.030	0.118	4.878
NESC Extreme +	7	Clamp	19P	3.536	3.480	1.210	5.107
NESC Extreme +	8	Clamp	19Y	-3.375	4.697	0.060	5.784
NESC Extreme +	9	Clamp	23P	-2.169	6.818	1.024	7.228
NESC Extreme +	10	Clamp	24P	-0.712	6.125	1.055	6.256
NESC Extreme +	11	Clamp	25P	-2.021	7.341	0.698	7.646
NESC Extreme +	12	Clamp	30P	0.000	0.853	0.627	1.059
NESC Extreme +	13	Clamp	31P	0.000	0.830	0.619	1.036
NESC Extreme +	14	Clamp	32P	0.000	1.030	0.804	1.307
NESC Extreme +	15	Clamp	33P	0.000	0.325	0.229	0.398
NESC Extreme +	16	Clamp	34P	0.000	0.334	0.232	0.407
NESC Extreme +	17	Clamp	35P	0.000	0.273	0.210	0.345
NESC Extreme +	18	Clamp	36P	0.000	9.661	3.596	10.309
NESC Extreme +	19	Clamp	37P	0.000	0.204	0.185	0.276
NESC Extreme +	20	Clamp	10S	0.000	0.947	0.707	1.182
NESC Extreme +	21	Clamp	11S	0.000	0.673	0.554	0.872
NESC Extreme +	22	Clamp	12S	0.000	0.652	0.548	0.852
NESC Extreme +	23	Clamp	13S	0.000	0.671	0.554	0.871
NESC Extreme +	24	Clamp	14S	0.000	0.815	0.594	1.009
NESC Extreme +	25	Clamp	10X	0.000	1.270	0.738	1.469
NESC Extreme +	26	Clamp	11X	0.000	0.673	0.554	0.872
NESC Extreme +	27	Clamp	12X	0.000	0.652	0.548	0.852
NESC Extreme +	28	Clamp	13X	0.000	0.671	0.554	0.871
NESC Extreme +	29	Clamp	14X	0.000	0.815	0.594	1.009
NESC Extreme +	30	Clamp	10XY	0.000	0.947	0.707	1.182
NESC Extreme +	31	Clamp	11XY	0.000	0.673	0.554	0.872
NESC Extreme +	32	Clamp	12XY	0.000	0.652	0.548	0.852
NESC Extreme +	33	Clamp	13XY	0.000	0.671	0.554	0.871
NESC Extreme +	34	Clamp	14XY	0.000	0.815	0.594	1.009
NESC Extreme +	35	Clamp	10Y	0.000	1.270	0.738	1.469
NESC Extreme +	36	Clamp	11Y	0.000	0.673	0.554	0.872
NESC Extreme +	37	Clamp	12Y	0.000	0.652	0.548	0.852
NESC Extreme +	38	Clamp	13Y	0.000	0.671	0.554	0.871
NESC Extreme +	39	Clamp	14Y	0.000	0.815	0.594	1.009

Overturning Moments For User-Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy -	77.944	-3.862	27.912	8041.017	423.503	-326.055
NESC Extreme -	28.160	-7.523	12.609	2851.936	786.467	-84.570
NESC Heavy +	92.412	-2.704	27.912	9468.678	302.752	-337.735
NESC Extreme +	66.031	-5.315	12.609	6866.493	558.364	-120.269

*** Weight of structure (lbs):

Weight of Angles*Section DLF: 38310.8

Total: 38310.8

*** End of Report

Subject:

Anchor Bolt Analysis for Tower #1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68**Tower Anchor Bolt Analysis****Max Leg Reactions:**Uplift = $Uplift := 164 \cdot kips$ (User Input)Shear = $Shear := 44.8 \cdot kips$ (User Input)Compression = $Compression := 185.9 \cdot kips$ (User Input)**Anchor Bolt Data:**

Use ASTM A36 (Assumed Conservative Value - Actual Grade Unknown)

Number of Anchor Bolts = $N := 4$ (User Input)Bolt Ultimate Strength = $F_u := 58 \cdot ksi$ (User Input)Bolt Yield Strength = $F_y := 36 \cdot ksi$ (User Input)Diameter of Bolts = $D := 2.0 \cdot in$ (User Input)Threads per Inch = $n := 4.5$ (User Input)Coefficient of Friction = $\mu := 0.55$ (User Input)**Anchor Bolt Area:**Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.142 \text{ in}^2$ Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 2.498 \text{ in}^2$ (AISC 13th Ed. pg. 7-83)

Subject:

Anchor Bolt Analysis for Tower #1281

Location:

Greenwich, CT

Rev. 2: 3/31/25

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68**Check Tensile Force:**

Maximum Tensile Force (Gross Area) =

$$F_{gross.area} := 1.0 \cdot (0.33 \cdot A_g \cdot F_u) = 60.1 \text{ kips}$$

Maximum Tensile Force (Net Area) =

$$F_{net.area} := 1.0 \cdot (0.60 \cdot A_n \cdot F_y) = 54 \text{ kips}$$

Allowable Tension =

$$AllowableTension := \begin{cases} F_{gross.area} & \text{if } F_{gross.area} < F_{net.area} \\ F_{net.area} & \text{if } F_{net.area} < F_{gross.area} \end{cases}$$

Applied Tension =

$$AllowableTension = 54 \text{ kips}$$

$$MaxTension := \frac{Uplift}{N} = 41 \text{ kips}$$

$$\frac{MaxTension}{F_{net.area}} = 76.0\%$$

$$Condition1 := \text{if} \left(\frac{MaxTension}{F_{net.area}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition1 = "OK"

Check Anchor Bolt Area:Based on the ASCE 10-15 Design of
Latticed Steel Transmission Structures

Required Area =

$$A_{s1} := \frac{Uplift}{F_y} + \frac{Shear}{\mu \cdot .85 \cdot F_y} = 7.2 \text{ in}^2$$

$$A_{s2} := \left(\frac{Shear - (0.3 \cdot Compression)}{\mu \cdot .85 \cdot F_y} \right) = -0.652 \text{ in}^2$$

Provided Area =

$$A_{sprovided} := A_n \cdot N = 10 \text{ in}^2$$

$$Condition2 := \text{if} \left(\frac{A_{s1}}{A_{sprovided}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition2 = "OK"

$$Condition3 := \text{if} \left(\frac{A_{s2}}{A_{sprovided}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

Condition3 = "OK"

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

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

(Max Pier Height)

Input Data:Tower Data

Shear (Compression Leg) =

$$Shear_{comp} := 36.7 \cdot 1.1 \cdot kip = 40.4 \text{ kip}$$

(User Input from PLS Tower)

Shear (Uplift Leg) =

$$Shear_{up} := 44.8 \cdot 1.1 \cdot kip = 49.3 \text{ kip}$$

(User Input from PLS Tower)

Compression =

$$Comp := 185.9 \cdot 1.1 \cdot kip = 204.5 \text{ kip}$$

(User Input from PLS Tower)

Uplift =

$$Uplift := 164 \cdot 1.1 \cdot kip = 180.4 \text{ kip}$$

(User Input from PLS Tower)

Tower Height =

$$H_t := 129 \cdot ft$$

(User Input)

Footing Data:

Depth to Bottom of Footing =

$$D_f := 9 \cdot ft$$

(User Input)

Length of Pier =

$$L_p := 14.5 \cdot ft$$

(User Input)

Extension of Pier Above Grade =

$$L_{pag} := 5.5 \cdot ft$$

(User Input)

Width of Pier =

$$W_p := 5 \cdot ft$$

(User Input)

Depth of Soil =

$$D_{soil} := 9 \cdot ft$$

(User Input)

Depth of Rock =

$$D_{rock} := 12 \cdot ft$$

(User Input)

Material Properties:

Concrete Compressive Strength =

$$f_c := 3500 \cdot psi$$

(User Input)

Steel Reinforcement Yield Strength =

$$f_y := 60000 \cdot psi$$

(User Input)

Anchor Bolt Yield Strength =

$$f_{ya} := 36000 \cdot psi$$

(User Input)

Internal Friction Angle of Soil =

$$\phi_s := 30 \cdot deg$$

(User Input)

Soil Bearing Capacity =

$$q_s := 9000 \cdot psf$$

(User Input)

Rock Bearing Capacity =

$$q_{rock} := 50000 \cdot psf$$

(User Input)

Unit Weight of Soil =

$$\gamma_{soil} := 100 \cdot pcf$$

(User Input)

Unit Weight of Concrete =

$$\gamma_{conc} := 150 \cdot pcf$$

(User Input)

Unit Weight of Rock =

$$\gamma_{rock} := 160 \cdot pcf$$

(User Input)

Foundation Buoyancy =

$$Bouyancy := 0$$

(User Input)

(Yes=1 / No=0)

Depth to Neglect =

$$n := 4 \cdot ft$$

(User Input)

Cohesion of Clay Type Soil =

$$c := 0 \cdot ksf$$

(User Input)

(Use 0 for Sandy Soil)

Seismic Zone Factor =

$$Z := 2$$

(User Input)

(UBC-1997 Fig 23-2)

Coefficient of Friction Between Concrete =

$$\mu := 0.45$$

(User Input)

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

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

ASTM A615 Grade 60

Bolt Ultimate Strength =

$$F_u := 90 \cdot \text{ksi} \quad (\text{User Input})$$

Bolt Yield Strength =

$$F_y := 60 \cdot \text{ksi} \quad (\text{User Input})$$

Anchor Diameter =

$$d_{ra1} := 1.128 \cdot \text{in} \quad (\text{User Input}) \quad (1 \# 9 \text{ and } 1 \# 11 \text{ per Rock Group})$$

Anchor Diameter =

$$d_{ra2} := 1.41 \cdot \text{in} \quad (\text{User Input})$$

Hole Diameter =

$$d_{Hole} := 4 \cdot \text{in} \quad (\text{User Input})$$

Grout Strength =

$$\tau := 120 \cdot \text{psi} \quad (\text{User Input})$$

Distance to Rock Anchor Group 1 =

$$D_{a1} := 24 \cdot \text{in} \quad (\text{User Input})$$

Number of Rock Anchors in Group 1 =

$$N_{a1} := 6 \quad (\text{User Input})$$

Total Number of Rock Bolts =

$$N_{tot} := 8 \quad (\text{User Input})$$

Rock Anchor Out to Out Spacing =

$$S_a := 48 \cdot \text{in} \quad (\text{User Input})$$

Check Uplift:

Effective Depth of Soil Used =

$$D_{soil,eff} := \text{if } (D_{soil} - n \geq 0, D_{soil} - n, 0) = 5 \text{ ft}$$

Adjusted Concrete Unit Weight =

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

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if } (Bouyancy = 1, \gamma_{soil} - 62.4 \cdot \text{pcf}, \gamma_{soil}) = 100 \text{ pcf}$$

Weight of Concrete =

$$WT_c := (W_p^2 \cdot L_p) \cdot \gamma_c = 54.375 \text{ kip}$$

Base Area 1 of Resisting Pyramid =

$$B_1 := (D_{a1} \cdot 2)^2 = 16 \text{ ft}^2$$

Base Area 2 of Resisting Pyramid =

$$B_2 := (\tan(\Phi_s) \cdot (D_{rock}) \cdot 2 + D_{a1} \cdot 2)^2 = 318.9 \text{ ft}^2$$

Base Area 3 of Resisting Pyramid =

$$B_3 := (\tan(\Phi_s) \cdot (D_{rock} + D_{soil}) \cdot 2 + D_{a1} \cdot 2)^2 = 798 \text{ ft}^2$$

Weight of Soil =

$$WT_{soil} := \left(\frac{D_{soil}}{3} \cdot (B_2 + B_3 + \sqrt{B_2 \cdot B_3}) - W_p^2 \cdot D_{soil} \right) \cdot \gamma_s = 463.878 \text{ kip}$$

Weight of Rock =

$$WT_{rock} := \left(\frac{D_{rock}}{3} \cdot (B_1 + B_2 + \sqrt{B_1 \cdot B_2}) \right) \cdot \gamma_{rock} = 260.017 \text{ kip}$$

Total Resistance =

$$WT_{tot} := WT_c + WT_{rock} + WT_{soil} = 778.3 \text{ kip}$$

Factor of Safety Actual =

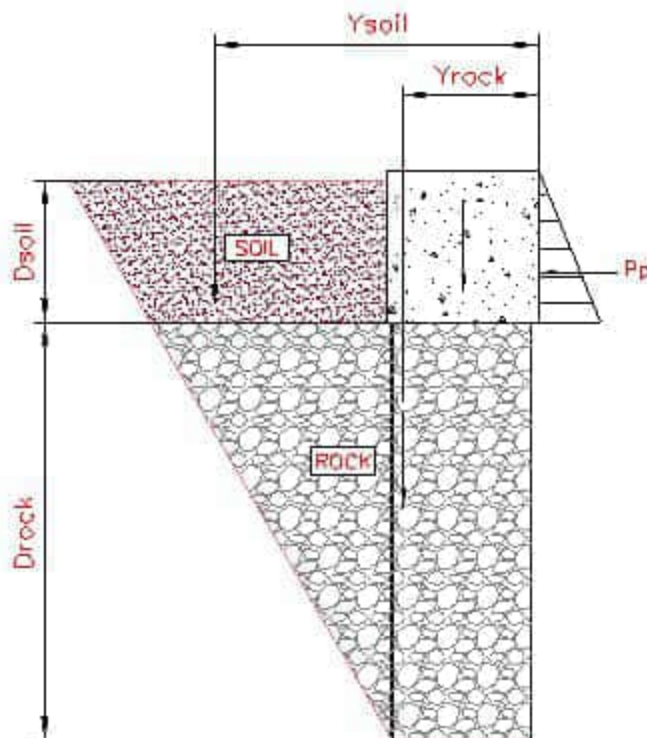
$$FS := \frac{WT_{tot}}{Uplift} = 4.31$$

Factor of Safety Required =

$$FS_{req} := 1.0$$

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

$$Uplift_Check = \text{"Okay"}$$

**Check Overturning:**

$$\text{Volume 1} = V1 := \left(\frac{1}{2} \cdot \tan(\phi_s) \cdot D_{\text{soil}}^2 \cdot (S_a + 2 \cdot \tan(\phi_s) \cdot D_{\text{rock}}) + \frac{D_{\text{soil}}}{3} \cdot (\tan(\phi_s) \cdot D_{\text{soil}})^2 \cdot 2 \right) = 579.531 \text{ ft}^3$$

$$\text{Volume 2} = V2 := (S_a + \tan(\phi_s) \cdot D_{\text{rock}}) \cdot (S_a + 2 \cdot \tan(\phi_s) \cdot D_{\text{rock}}) \cdot D_{\text{soil}} + \frac{1}{2} \cdot \tan(\phi_s) \cdot D_{\text{soil}}^2 \cdot 2 \cdot (S_a + \tan(\phi_s) \cdot D_{\text{rock}}) - W_p^2 \cdot D_{\text{soil}} = 2042 \text{ ft}^3$$

$$\text{Distance to Centroid 1} = Y1 := S_a + \tan(\phi_s) \cdot D_{\text{rock}} + \frac{1}{3} \cdot \tan(\phi_s) \cdot D_{\text{soil}} = 12.66 \text{ ft}$$

$$\text{Distance to Centroid 2} = Y2 := \frac{1}{2} \cdot (S_a + \tan(\phi_s) \cdot D_{\text{rock}}) = 5.464 \text{ ft}$$

Distance from Front Rock Anchor to Centroid of Soil =

$$Y_{\text{soil}} := \text{if} \left(V1 + V2 > 0, \frac{V1 \cdot Y1 + V2 \cdot Y2}{V1 + V2}, 0 \right) = 7.05 \text{ ft}$$

$$\text{Volume 3} = V3 := \left(\frac{1}{2} \cdot \tan(\phi_s) \cdot D_{\text{rock}}^2 \cdot S_a + \frac{D_{\text{rock}}}{3} \cdot (\tan(\phi_s) \cdot D_{\text{rock}})^2 \cdot 2 \right) = 550.277 \text{ ft}^3$$

$$\text{Volume 4} = V4 := \left(S_a \cdot D_{\text{rock}} + \frac{1}{2} \cdot \tan(\phi_s) \cdot D_{\text{rock}}^2 \cdot 2 \right) \cdot S_a = 524.554 \text{ ft}^3$$

$$\text{Distance to Centroid 3} = Y3 := S_a + \frac{1}{3} \cdot \tan(\phi_s) \cdot D_{\text{rock}} = 6.309 \text{ ft}$$

$$\text{Distance to Centroid 4} = Y4 := \frac{S_a}{2} = 2 \text{ ft}$$

Distance from Front Rock Anchor to Centroid of Rock =

$$Y_{\text{rock}} := \frac{(V3 \cdot Y3 + V4 \cdot Y4)}{(V3 + V4)} = 4.21 \text{ ft}$$

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

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

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Passive Pressure =

$$P_{top} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 1.2 \text{ ksf}$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_{soil} + c \cdot 2 \cdot \sqrt{K_p} = 2.7 \text{ ksf}$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.95 \text{ ksf}$$

$$A_p := W_p \cdot (D_{soil,eff}) = 25 \text{ ft}^2$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 48.75 \text{ kip}$$

Passive Pressure Resistance to Overturning =

$$PP_R := \min(Shear_{up}, (S_u)) = 48.75 \text{ kip}$$

Weight of Concrete Pad =

$$WT_c := (W_p^2 \cdot L_p) \cdot \gamma_c = 54.375 \text{ kip}$$

Total Weight of Soil =

$$WT_{Stot} := (V1 + V2) \cdot \gamma_s = 262.2 \text{ kip}$$

Total Weight of Rock =

$$WT_{Rtot} := (V3 + V4) \cdot \gamma_{rock} = 172 \text{ kip}$$

Resisting Moment =

$$M_r := (WT_c) \cdot \frac{S_a}{2} + PP_R \cdot \frac{(D_{soil,eff})}{3} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 2763 \text{ kip} \cdot \text{ft}$$

Overturning Moment =

$$M_{ot} := Uplift \cdot \frac{S_a}{2} + Shear_{up} \cdot L_p = 1075 \text{ kip} \cdot \text{ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 2.57$$

Factor of Safety Required =

$$FS_{req} := 1.0$$

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

$$OverTurning_Moment_Check = \text{"Okay"}$$

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68**Check Rock Anchors:**Orthogonal

Polar Moment of Inertia =

$$I_p := (D_{a1})^2 \cdot N_{a1} = 3456 \text{ in}^2$$

Gross Area of Bolt Group =

$$A_g := \frac{\pi}{4} \cdot (d_{ra1})^2 + d_{ra2})^2 = 2.561 \text{ in}^2$$

Maximum Tension Force =

$$T_{Max} := \frac{Uplift}{N_{atot}} + \frac{Shear_{up} \cdot L_p \cdot D_{a1}}{I_p} - \frac{WT_c}{N_{atot}} = 75.3 \text{ kip}$$

Check Steel Strength:

Design Tension =

$$T_{design} := A_g \cdot F_y = 153.6 \text{ kip}$$

$$\frac{T_{Max}}{T_{design}} = 49\%$$

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

Condition1 = "OK"

Check Bond Strength:

Bond Strength =

$$Bond_Strength := d_{Hole} \cdot \pi \cdot (D_{rock}) \cdot \tau = 217 \text{ kip}$$

$$\frac{T_{Max}}{Bond_Strength} = 34.7\%$$

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

Condition2 = "OK"

Maximum Compressive Force =

$$C_{max} := \frac{Comp + WT_c}{N_{atot}} + \frac{Shear_{comp} \cdot L_p \cdot D_{a1}}{I_p} = 81.1 \text{ kip}$$

Check Steel Strength:

Design Compression =

$$C_{design} := A_g \cdot F_y = 153.6 \text{ kip}$$

Rock Anchors Fully
Braced by Grout
Fcr = Fy

$$\frac{C_{max}}{C_{design}} = 52.8\%$$

$$Condition1 := \text{if}(C_{max} < C_{design}, \text{"OK"}, \text{"NG"})$$

Condition1 = "OK"

Bond Strength =

$$Bond_Strength := d_{Hole} \cdot \pi \cdot (D_{rock}) \cdot \tau = 217 \text{ kip}$$

$$\frac{C_{max}}{Bond_Strength} = 37.4\%$$

$$Condition2 := \text{if}(C_{max} < Bond_Strength, \text{"OK"}, \text{"NG"})$$

Condition2 = "OK"

Distance to Rock Anchor Group 2 =

$$D_{a2} := 17 \cdot \text{in}$$

Distance to Rock Anchor Group 3 =

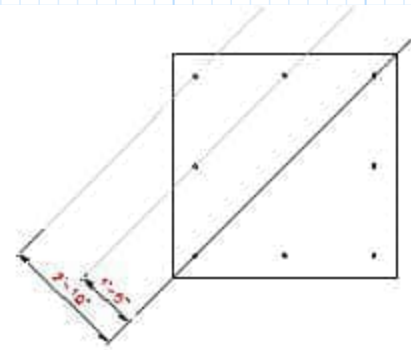
$$D_{a3} := 34 \cdot \text{in}$$

Number of Rock Anchors in Group 2 =

$$N_{a2} := 4$$

Number of Rock Anchors in Group 3 =

$$N_{a3} := 2$$



Polar Moment of Inertia =

$$I_p := (D_{a2}^2 \cdot N_{a2} + D_{a3}^2 \cdot N_{a3}) = 3468 \text{ in}^2$$

Maximum Tension Force =

$$T_{Max} := \frac{\text{Uplift}}{N_{atot}} + \frac{\text{Shear}_{up} \cdot L_p \cdot D_{a3}}{I_p} - \frac{WT_c}{N_{atot}} = 99.8 \text{ kip}$$

Check Steel Strength:

$$\frac{T_{Max}}{T_{desgin}} = 65\%$$

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

Condition1 = "OK"

Check Bond Strength:

$$\frac{T_{Max}}{\text{Bond_Strength}} = 46\%$$

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

Condition2 = "OK"

Maximum Compressive Force =

$$C_{max} := \frac{\text{Comp} + WT_c}{N_{atot}} + \frac{\text{Shear}_{comp} \cdot L_p \cdot D_{a3}}{I_p} = 101.2 \text{ kip}$$

Check Steel Strength:

$$\frac{C_{max}}{C_{design}} = 65.9\%$$

$$\text{Condition1} := \text{if}(C_{max} < C_{design}, \text{"OK"}, \text{"NG"})$$

Condition1 = "OK"

Check Bond Strength:

$$\frac{C_{max}}{\text{Bond_Strength}} = 46.6\%$$

$$\text{Condition2} := \text{if}(C_{max} < \text{Bond_Strength}, \text{"OK"}, \text{"NG"})$$

Condition2 = "OK"

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

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

(Min Pier Height)

Input Data:Tower Data

Shear (Compression Leg) =

$$Shear_{comp} := 36.7 \cdot 1.1 \cdot kip = 40.4 \text{ kip}$$

(User Input from PLS Tower)

Shear (Uplift Leg) =

$$Shear_{up} := 44.8 \cdot 1.1 \cdot kip = 49.3 \text{ kip}$$

(User Input from PLS Tower)

Compression =

$$Comp := 185.9 \cdot 1.1 \cdot kip = 204.5 \text{ kip}$$

(User Input from PLS Tower)

Uplift =

$$Uplift := 164 \cdot 1.1 \cdot kip = 180.4 \text{ kip}$$

(User Input from PLS Tower)

Tower Height =

$$H_t := 129 \cdot ft$$

(User Input)

Footing Data:

Depth to Bottom of Footing =

$$D_f := 2 \cdot ft$$

(User Input)

Length of Pier =

$$L_p := 6 \cdot ft$$

(User Input)

Extension of Pier Above Grade =

$$L_{pag} := 4 \cdot ft$$

(User Input)

Width of Pier =

$$W_p := 5 \cdot ft$$

(User Input)

Depth of Soil =

$$D_{soil} := 2 \cdot ft$$

(User Input)

Depth of Rock =

$$D_{rock} := 12 \cdot ft$$

(User Input)

Material Properties:

Concrete Compressive Strength =

$$f_c := 3500 \cdot psi$$

(User Input)

Steel Reinforcement Yield Strength =

$$f_y := 60000 \cdot psi$$

(User Input)

Anchor Bolt Yield Strength =

$$f_{ya} := 36000 \cdot psi$$

(User Input)

Internal Friction Angle of Soil =

$$\phi_s := 30 \cdot deg$$

(User Input)

Soil Bearing Capacity =

$$q_s := 9000 \cdot psf$$

(User Input)

Rock Bearing Capacity =

$$q_{rock} := 50000 \cdot psf$$

(User Input)

Unit Weight of Soil =

$$\gamma_{soil} := 100 \cdot pcf$$

(User Input)

Unit Weight of Concrete =

$$\gamma_{conc} := 150 \cdot pcf$$

(User Input)

Unit Weight of Rock =

$$\gamma_{rock} := 160 \cdot pcf$$

(User Input)

Foundation Buoyancy =

$$Bouyancy := 0$$

(User Input)

(Yes=1 / No=0)

Depth to Neglect =

$$n := 4 \cdot ft$$

(User Input)

Cohesion of Clay Type Soil =

$$c := 0 \cdot ksf$$

(User Input)

(Use 0 for Sandy Soil)

Seismic Zone Factor =

$$Z := 2$$

(User Input)

(UBC-1997 Fig 23-2)

Coefficient of Friction Between Concrete =

$$\mu := 0.45$$

(User Input)

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

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

ASTM A615 Grade 60

Bolt Ultimate Strength =

$$F_u := 90 \cdot \text{ksi} \quad (\text{User Input})$$

Bolt Yield Strength =

$$F_y := 60 \cdot \text{ksi} \quad (\text{User Input})$$

Anchor Diameter =

$$d_{ra1} := 1.128 \cdot \text{in} \quad (\text{User Input})$$

(1 # 9 and 1 # 11
per Rock Group)

Anchor Diameter =

$$d_{ra2} := 1.41 \cdot \text{in} \quad (\text{User Input})$$

Hole Diameter =

$$d_{hole} := 4 \cdot \text{in} \quad (\text{User Input})$$

Grout Strength =

$$\tau := 120 \cdot \text{psi} \quad (\text{User Input})$$

Distance to Rock Anchor Group 1 =

$$D_{a1} := 24 \cdot \text{in} \quad (\text{User Input})$$

Number of Rock Anchors in Group 1 =

$$N_{a1} := 6 \quad (\text{User Input})$$

Total Number of Rock Bolts =

$$N_{tot} := 8 \quad (\text{User Input})$$

Rock Anchor Out to Out Spacing =

$$S_a := 48 \cdot \text{in} \quad (\text{User Input})$$

Check Uplift:

Effective Depth of Soil Used =

$$D_{soil,eff} := \text{if} (D_{soil} - n \geq 0, D_{soil} - n, 0) = 0$$

Adjusted Concrete Unit Weight =

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

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if} (Bouyancy = 1, \gamma_{soil} - 62.4 \cdot \text{pcf}, \gamma_{soil}) = 100 \text{ pcf}$$

Weight of Concrete =

$$WT_c := (W_p^2 \cdot L_p) \cdot \gamma_c = 22.5 \text{ kip}$$

Base Area 1 of Resisting Pyramid =

$$B_1 := (D_{a1} \cdot 2)^2 = 16 \text{ ft}^2$$

Base Area 2 of Resisting Pyramid =

$$B_2 := (\tan(\Phi_s) \cdot (D_{rock}) \cdot 2 + D_{a1} \cdot 2)^2 = 318.9 \text{ ft}^2$$

Base Area 3 of Resisting Pyramid =

$$B_3 := (\tan(\Phi_s) \cdot (D_{rock} + D_{soil}) \cdot 2 + D_{a1} \cdot 2)^2 = 406.7 \text{ ft}^2$$

Weight of Soil =

$$WT_{soil} := \left(\frac{D_{soil}}{3} \cdot (B_2 + B_3 + \sqrt{B_2 \cdot B_3}) - W_p^2 \cdot D_{soil} \right) \cdot \gamma_s = 67.373 \text{ kip}$$

Weight of Rock =

$$WT_{rock} := \left(\frac{D_{rock}}{3} \cdot (B_1 + B_2 + \sqrt{B_1 \cdot B_2}) \right) \cdot \gamma_{rock} = 260.017 \text{ kip}$$

Total Resistance =

$$WT_{tot} := WT_c + WT_{rock} + WT_{soil} = 349.9 \text{ kip}$$

Factor of Safety Actual =

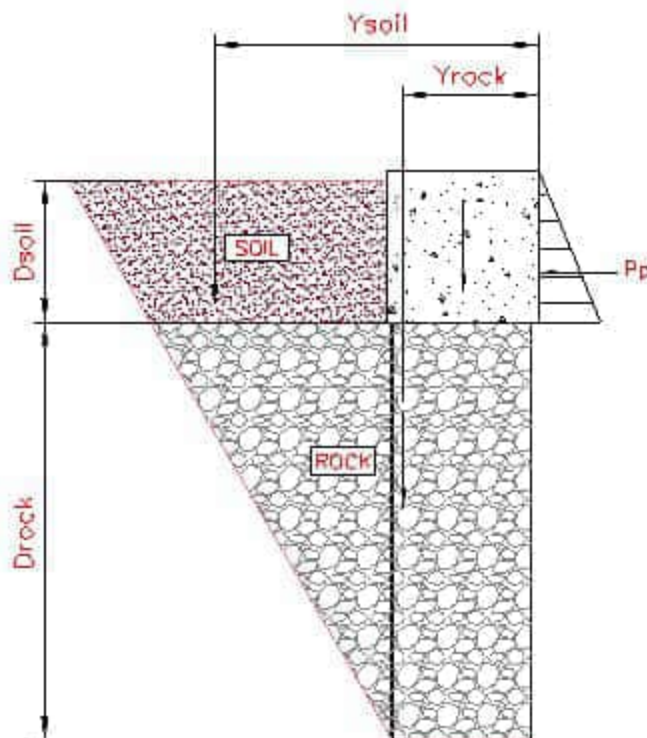
$$FS := \frac{WT_{tot}}{Uplift} = 1.94$$

Factor of Safety Required =

$$FS_{req} := 1.0$$

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

$$Uplift_Check = \text{"Okay"}$$

**Check Overturning:**

$$V1 := \left(\frac{1}{2} \cdot \tan(\phi_s) \cdot D_{soil}^2 \cdot (S_a + 2 \cdot \tan(\phi_s) \cdot D_{rock}) + \frac{D_{soil}}{3} \cdot (\tan(\phi_s) \cdot D_{soil})^2 \cdot 2 \right) = 22.397 \text{ ft}^3$$

$$V2 := (S_a + \tan(\phi_s) \cdot D_{rock}) \cdot (S_a + 2 \cdot \tan(\phi_s) \cdot D_{rock}) \cdot D_{soil} + \frac{1}{2} \cdot \tan(\phi_s) \cdot D_{soil}^2 \cdot 2 \cdot (S_a + \tan(\phi_s) \cdot D_{rock}) - W_p^2 \cdot D_{soil} = 366 \text{ ft}^3$$

$$\text{Distance to Centroid 1} = Y1 := S_a + \tan(\phi_s) \cdot D_{rock} + \frac{1}{3} \cdot \tan(\phi_s) \cdot D_{soil} = 11.313 \text{ ft}$$

$$\text{Distance to Centroid 2} = Y2 := \frac{1}{2} \cdot (S_a + \tan(\phi_s) \cdot D_{rock}) = 5.464 \text{ ft}$$

Distance from Front Rock Anchor to Centroid of Soil =

$$Y_{soil} := \text{if} \left(V1 + V2 > 0, \frac{V1 \cdot Y1 + V2 \cdot Y2}{V1 + V2}, 0 \right) = 5.8 \text{ ft}$$

Volume 3 =

$$V3 := \left(\frac{1}{2} \cdot \tan(\phi_s) \cdot D_{rock}^2 \cdot S_a + \frac{D_{rock}}{3} \cdot (\tan(\phi_s) \cdot D_{rock})^2 \cdot 2 \right) = 550.277 \text{ ft}^3$$

Volume 4 =

$$V4 := \left(S_a \cdot D_{rock} + \frac{1}{2} \cdot \tan(\phi_s) \cdot D_{rock}^2 \cdot 2 \right) \cdot S_a = 524.554 \text{ ft}^3$$

Distance to Centroid 3 =

$$Y3 := S_a + \frac{1}{3} \cdot \tan(\phi_s) \cdot D_{rock} = 6.309 \text{ ft}$$

Distance to Centroid 4 =

$$Y4 := \frac{S_a}{2} = 2 \text{ ft}$$

Distance from Front Rock Anchor to Centroid of Rock =

$$Y_{rock} := \frac{(V3 \cdot Y3 + V4 \cdot Y4)}{(V3 + V4)} = 4.21 \text{ ft}$$

Subject:

Foundation Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

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

Coefficient of Lateral Soil Pressure =

$$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$$

Passive Pressure =

$$P_{top} := 0$$

$$P_{bot} := 0$$

$$P_{ave} := 0$$

$$A_p := W_p \cdot (D_{soil,eff}) = 0 \text{ ft}$$

Ultimate Shear =

$$S_u := 0 \cdot \text{kip}$$

Passive Pressure Resistance to Overturning =

$$PP_R := \min(Shear_{up}, (S_u)) = 0 \text{ lbf}$$

Weight of Concrete Pad =

$$WT_c := (W_p^2 \cdot L_p) \cdot \gamma_c = 22.5 \text{ kip}$$

Total Weight of Soil =

$$WT_{Stot} := (V1 + V2) \cdot \gamma_s = 38.8 \text{ kip}$$

Total Weight of Rock =

$$WT_{Rtot} := (V3 + V4) \cdot \gamma_{rock} = 172 \text{ kip}$$

Resisting Moment =

$$M_r := (WT_c) \cdot \frac{S_a}{2} + WT_{Stot} \cdot Y_{soil} + WT_{Rtot} \cdot Y_{rock} = 993 \text{ kip} \cdot \text{ft}$$

Overturning Moment =

$$M_{ot} := Uplift \cdot \frac{S_a}{2} + Shear_{up} \cdot L_p = 656 \text{ kip} \cdot \text{ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 1.51$$

Factor of Safety Required =

$$FS_{req} := 1.0$$

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

$$OverTurning_Moment_Check = \text{"Okay"}$$

Check Rock Anchors:Orthogonal

Polar Moment of Inertia =

$$I_p := (D_{a1})^2 \cdot N_{a1} = 3456 \text{ in}^2$$

Gross Area of Bolt Group =

$$A_g := \frac{\pi}{4} \cdot (d_{ra1})^2 + d_{ra2})^2 = 2.561 \text{ in}^2$$

Maximum Tension Force =

$$T_{Max} := \frac{Uplift}{N_{atot}} + \frac{Shear_{up} \cdot L_p \cdot D_{a1}}{I_p} - \frac{WT_c}{N_{atot}} = 44.4 \text{ kip}$$

Check Steel Strength:

Design Tension =

$$T_{design} := A_g \cdot F_y = 153.6 \text{ kip}$$

$$\frac{T_{Max}}{T_{design}} = 28.9\%$$

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

Condition1 = "OK"

Check Bond Strength:

Bond Strength =

$$Bond_Strength := d_{Hole} \cdot \pi \cdot (D_{rock}) \cdot \tau = 217 \text{ kip}$$

$$\frac{T_{Max}}{Bond_Strength} = 20.4\%$$

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

Condition2 = "OK"

Maximum Compressive Force =

$$C_{max} := \frac{Comp + WT_c}{N_{atot}} + \frac{Shear_{comp} \cdot L_p \cdot D_{a1}}{I_p} = 48.6 \text{ kip}$$

Check Steel Strength:

Design Compression =

$$C_{design} := A_g \cdot F_y = 153.6 \text{ kip}$$

 Rock Anchors Fully
 Braced by Grout
 $F_{cr} = F_y$

$$\frac{C_{max}}{C_{design}} = 31.6\%$$

$$Condition1 := \text{if}(C_{max} < C_{design}, \text{"OK"}, \text{"NG"})$$

Condition1 = "OK"

Bond Strength =

$$Bond_Strength := d_{Hole} \cdot \pi \cdot (D_{rock}) \cdot \tau = 217 \text{ kip}$$

$$\frac{C_{max}}{Bond_Strength} = 22.4\%$$

$$Condition2 := \text{if}(C_{max} < Bond_Strength, \text{"OK"}, \text{"NG"})$$

Condition2 = "OK"

Distance to Rock Anchor Group 2 =

$$D_{a2} := 17 \cdot \text{in}$$

Distance to Rock Anchor Group 3 =

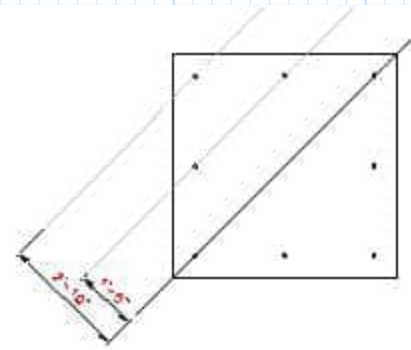
$$D_{a3} := 34 \cdot \text{in}$$

Number of Rock Anchors in Group 2 =

$$N_{a2} := 4$$

Number of Rock Anchors in Group 3 =

$$N_{a3} := 2$$



Polar Moment of Inertia =

$$I_p := (D_{a2}^2 \cdot N_{a2} + D_{a3}^2 \cdot N_{a3}) = 3468 \text{ in}^2$$

Maximum Tension Force =

$$T_{Max} := \frac{\text{Uplift}}{N_{atot}} + \frac{\text{Shear}_{up} \cdot L_p \cdot D_{a3}}{I_p} - \frac{WT_c}{N_{atot}} = 54.5 \text{ kip}$$

Check Steel Strength:

$$\frac{T_{Max}}{T_{desgin}} = 35.5\%$$

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

Condition1 = "OK"

Check Bond Strength:

$$\frac{T_{Max}}{\text{Bond_Strength}} = 25.1\%$$

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

Condition2 = "OK"

Maximum Compressive Force =

$$C_{max} := \frac{\text{Comp} + WT_c}{N_{atot}} + \frac{\text{Shear}_{comp} \cdot L_p \cdot D_{a3}}{I_p} = 56.9 \text{ kip}$$

Check Steel Strength:

$$\frac{C_{max}}{C_{design}} = 37\%$$

$$\text{Condition1} := \text{if}(C_{max} < C_{design}, \text{"OK"}, \text{"NG"})$$

Condition1 = "OK"

Check Bond Strength:

$$\frac{C_{max}}{\text{Bond_Strength}} = 26.2\%$$

$$\text{Condition2} := \text{if}(C_{max} < \text{Bond_Strength}, \text{"OK"}, \text{"NG"})$$

Condition2 = "OK"

Subject:

Local Member Stress Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

 Prepared by: T.J.L. Checked by: C.F.C.
 Job No. 21007.68.TEMP
Maximum Forces in Member:**Leg 1**

Compression Force =

 $Compression := 174.7 \cdot kip$

(User Input from PLS-Tower)

Tension Force =

 $Tension := 155.9 \cdot kip$

(User Input from PLS-Tower)

Moment =

 $M_x := 0.01 \cdot ft \cdot kip$

(User Input)

Moment =

 $M_y := 1.03 \cdot ft \cdot kip$

(User Input)

Member Properties:

Member Type =

L8x8x5/8

Member Width =

 $w := 8 \cdot in$

(User Input)

Member Thickness =

 $t := 0.625 \cdot in$

(User Input)

Member Area =

 $A := 9.69 \cdot in^2$

(User Input)

Moment of Inertia =

 $I_x := 59.6 \cdot in^4$

(User Input)

Moment of Inertia =

 $I_y := 59.6 \cdot in^4$

(User Input)

Section Modulus x-dir =

 $S_x := 10.33 \cdot in^3$

(User Input)

Section Modulus y-dir =

 $S_y := 10.33 \cdot in^3$

(User Input)

Unbraced Length =

 $L := 7.92 \cdot ft$

(User Input)

Effective Length Coefficient =

 $K := 1$

(User Input)

Radius of Gyration =

 $r_x := 2.48 \cdot in$

(User Input)

Radius of Gyration =

 $r_y := 2.48 \cdot in$

(User Input)

Yield Stress =

 $F_y := 36 \cdot ksi$

(User Input)

Modulus of Elasticity =

 $E := 29000 \cdot ksi$

(User Input)

 $k_{des} := 1.25 \cdot in$

Calculate Design Compression Stress:

Width Thickness Ratio =

$$w_t := \frac{w - k_{des}}{t} = 10.8$$

Yield Stress =

$$F_y := \begin{cases} \left\| \begin{array}{l} \text{if } w_t < \frac{80}{\sqrt{f_y}} \\ F_y \end{array} \right\| & \text{if } \frac{80}{\sqrt{f_y}} \leq w_t \leq \frac{144}{\sqrt{f_y}} \\ \left\| \begin{array}{l} \left(1.677 - 0.677 \cdot \frac{w_t}{\left(\frac{80}{\sqrt{f_y}} \right)} \right) \cdot F_y \end{array} \right\| & \text{if } w_t > \frac{144}{\sqrt{f_y}} \\ \left\| \begin{array}{l} \frac{0.0332 \cdot \pi^2 \cdot E}{(w_t)^2} \end{array} \right\| \end{cases} = 36 \text{ ksi}$$

Column Slenderness Ratio =

Design Axial Compressive Stress =

$$C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 126.099$$

$$F_a := \begin{cases} \left\| \begin{array}{l} \text{if } \frac{K \cdot L}{r_x} \leq C_c \\ \left(1 - 0.5 \cdot \left(\frac{K \cdot L}{C_c \cdot r_x} \right)^2 \right) \cdot F_y \end{array} \right\| & \text{if } \frac{K \cdot L}{r_x} > C_c \\ \left\| \begin{array}{l} \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x} \right)^2} \end{array} \right\| \end{cases} = 34.3 \text{ ksi}$$

Calculate Allowable Bending Moment:

$$b := w - \frac{t}{2} = 7.688 \text{ in}$$

Elastic Critical Moment =

$$M_e := \frac{(0.66 \cdot E \cdot b^4 \cdot t)}{(K \cdot L)^2} \cdot \left(\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1 \right) = 10862.5 \text{ kip} \cdot \text{in}$$

Moment Causing Compressive Yield =

$$M_{xc} := F_y \cdot S_x = 371.88 \text{ in} \cdot \text{kip}$$

Moment Causing Compressive Yield =

$$M_{yc} := F_y \cdot S_y = 371.88 \text{ kip} \cdot \text{in}$$

Lateral Buckling Moment =

$$M_b := \begin{pmatrix} \left\| \begin{array}{l} \text{if } M_e \leq 0.5 \cdot M_{yc} \\ M_e \\ \text{if } M_e > 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) \end{array} \right\| \end{pmatrix} = 368.7 \text{ kip} \cdot \text{in}$$

Allowable Moment =

$$M_a := \begin{pmatrix} \left\| \begin{array}{l} \text{if } M_{yc} \leq M_b \\ M_{yc} \\ M_b \end{array} \right\| \end{pmatrix} = 368.7 \text{ kip} \cdot \text{in}$$

Check Combined Axial Compression and Bending:

Bending Coefficient =

$$C_m := 1 \quad (\text{for restrained ends})$$

Applied Axial Compression =

$$P := \text{Compression} = 174.7 \text{ kip}$$

Design Axial Compression =

$$P_a := F_a \cdot A = 332.7 \text{ kip}$$

Axial Compression at Yield =

$$P_y := F_y \cdot A = 348.84 \text{ kip}$$

Euler Buckling Load =

$$P_{ex} := \frac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 1888.6 \text{ kip}$$

Euler Buckling Load =

$$P_{ey} := \frac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 1888.6 \text{ kip}$$

$$\text{Condition1} := \text{if} \left(\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) = 0.562$$

Condition1 = "OK"

$$\text{Condition2} := \text{if} \left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} = 0.534$$

Condition2 = "OK"

Subject:

Local Member Stress Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

 Prepared by: T.J.L. Checked by: C.F.C.
 Job No. 21007.68.TEMP
Maximum Forces in Member:**Leg 2**

Compression Force =

$$Compression := 177.1 \cdot kip$$

(User Input from PLS-Tower)

Tension Force =

$$Tension := 159.5 \cdot kip$$

(User Input from PLS-Tower)

Moment =

$$M_x := .007 \cdot ft \cdot kip$$

(User Input)

Moment =

$$M_y := 0.67 \cdot ft \cdot kip$$

(User Input)

Member Properties:

Member Type =

L8x8x3/4

Member Width =

$$w := 8 \cdot in$$

(User Input)

Member Thickness =

$$t := 0.75 \cdot in$$

(User Input)

Member Area =

$$A := 11.5 \cdot in^2$$

(User Input)

Moment of Inertia =

$$I_x := 69.9 \cdot in^4$$

(User Input)

Moment of Inertia =

$$I_y := 69.9 \cdot in^4$$

(User Input)

Section Modulus x-dir =

$$S_x := 12.21 \cdot in^3$$

(User Input)

Section Modulus y-dir =

$$S_y := 12.21 \cdot in^3$$

(User Input)

Unbraced Length =

$$L := 10.13 \cdot ft$$

(User Input)

Effective Length Coefficient =

$$K := 1$$

(User Input)

Radius of Gyration =

$$r_x := 2.47 \cdot in$$

(User Input)

Radius of Gyration =

$$r_y := 2.47 \cdot in$$

(User Input)

Yield Stress =

$$F_y := 36 \cdot ksi$$

(User Input)

Modulus of Elasticity =

$$E := 29000 \cdot ksi$$

(User Input)

$$k_{des} := 1.375 \cdot in$$

Calculate Design Compression Stress:

Width Thickness Ratio =

$$w_t := \frac{w - k_{des}}{t} = 8.833$$

Yield Stress =

$$F_y := \left(\left\| \begin{array}{l} \text{if } w_t < \frac{80}{\sqrt{f_y}} \\ \left\| F_y \right\| \\ \text{if } \frac{80}{\sqrt{f_y}} \leq w_t \leq \frac{144}{\sqrt{f_y}} \\ \left\| \left(1.677 - 0.677 \cdot \frac{w_t}{\left(\frac{80}{\sqrt{f_y}} \right)} \right) \cdot F_y \right\| \\ \text{if } w_t > \frac{144}{\sqrt{f_y}} \\ \left\| \frac{0.0332 \cdot \pi^2 \cdot E}{(w_t)^2} \right\| \end{array} \right\| \right) = 36 \text{ ksi}$$

Column Slenderness Ratio =

$$C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 126.099$$

Design Axial Compressive Stress =

$$F_a := \left(\left\| \begin{array}{l} \text{if } \frac{K \cdot L}{r_x} \leq C_c \\ \left\| \left(1 - 0.5 \cdot \left(\frac{K \cdot L}{r_x} \right)^2 \right) \cdot F_y \right\| \\ \text{if } \frac{K \cdot L}{r_x} > C_c \\ \left\| \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x} \right)^2} \right\| \end{array} \right\| \right) = 33.3 \text{ ksi}$$

Calculate Allowable Bending Moment:

$$b := w - \frac{t}{2} = 7.625 \text{ in}$$

Elastic Critical Moment =

$$M_e := \frac{(0.66 \cdot E \cdot b^4 \cdot t)}{(K \cdot L)^2} \cdot \left(\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1 \right) = 8963.8 \text{ kip} \cdot \text{in}$$

Moment Causing Compressive Yield =

$$M_{xc} := F_y \cdot S_x = 439.56 \text{ in} \cdot \text{kip}$$

Moment Causing Compressive Yield =

$$M_{yc} := F_y \cdot S_y = 439.56 \text{ kip} \cdot \text{in}$$

Lateral Buckling Moment =

$$M_b := \left(\left\| \begin{array}{l} \text{if } M_e \leq 0.5 \cdot M_{yc} \\ M_e \\ \text{if } M_e > 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e} \right) \end{array} \right\| \right) = 434.2 \text{ kip} \cdot \text{in}$$

Allowable Moment =

$$M_a := \left(\left\| \begin{array}{l} \text{if } M_{yc} \leq M_b \\ M_{yc} \\ M_b \end{array} \right\| \right) = 434.2 \text{ kip} \cdot \text{in}$$

Check Combined Axial Compression and Bending:

Bending Coefficient =

$$C_m := 1 \quad (\text{for restrained ends})$$

Applied Axial Compression =

$$P := \text{Compression} = 177.1 \text{ kip}$$

Design Axial Compression =

$$P_a := F_a \cdot A = 382.5 \text{ kip}$$

Axial Compression at Yield =

$$P_y := F_y \cdot A = 414 \text{ kip}$$

Euler Buckling Load =

$$P_{ex} := \frac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 1353.9 \text{ kip}$$

Euler Buckling Load =

$$P_{ey} := \frac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 1353.9 \text{ kip}$$

$$\text{Condition1} := \text{if} \left(\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) = 0.484$$

Condition1 = "OK"

$$\text{Condition2} := \text{if} \left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} = 0.446$$

Condition2 = "OK"

Subject:

Local Member Stress Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

 Prepared by: T.J.L. Checked by: C.F.C.
 Job No. 21007.68.TEMP
Maximum Forces in Member:**Leg 3**

Compression Force =

$$Compression := 201.7 \cdot \text{kip}$$

(User Input from PLS-Tower)

Tension Force =

$$Tension := 140.7 \cdot \text{kip}$$

(User Input from PLS-Tower)

Moment =

$$M_x := .005 \cdot \text{ft} \cdot \text{kip}$$

(User Input)

Moment =

$$M_y := 0.486 \cdot \text{ft} \cdot \text{kip}$$

(User Input)

Member Properties:

Member Type =

L8x8x3/4

Member Width =

$$w := 8 \cdot \text{in}$$

(User Input)

Member Thickness =

$$t := 0.75 \cdot \text{in}$$

(User Input)

Member Area =

$$A := 11.5 \cdot \text{in}^2$$

(User Input)

Moment of Inertia =

$$I_x := 69.9 \cdot \text{in}^4$$

(User Input)

Moment of Inertia =

$$I_y := 69.9 \cdot \text{in}^4$$

(User Input)

Section Modulus x-dir =

$$S_x := 12.21 \cdot \text{in}^3$$

(User Input)

Section Modulus y-dir =

$$S_y := 12.21 \cdot \text{in}^3$$

(User Input)

Unbraced Length =

$$L := 7.4 \cdot \text{ft}$$

(User Input)

Effective Length Coefficient =

$$K := 1$$

(User Input)

Radius of Gyration =

$$r_x := 2.47 \cdot \text{in}$$

(User Input)

Radius of Gyration =

$$r_y := 2.47 \cdot \text{in}$$

(User Input)

Yield Stress =

$$F_y := 36 \cdot \text{ksi}$$

(User Input)

Modulus of Elasticity =

$$E := 29000 \cdot \text{ksi}$$

(User Input)

$$k_{des} := 1.375 \cdot \text{in}$$

Calculate Design Compression Stress:

Width Thickness Ratio =

$$w_t := \frac{w - k_{des}}{t} = 8.833$$

Yield Stress =

$$F_y := \left(\left\| \begin{array}{l} \text{if } w_t < \frac{80}{\sqrt{f_y}} \\ \left\| F_y \right\| \\ \text{if } \frac{80}{\sqrt{f_y}} \leq w_t \leq \frac{144}{\sqrt{f_y}} \\ \left\| \left(1.677 - 0.677 \cdot \frac{w_t}{\left(\frac{80}{\sqrt{f_y}} \right)} \right) \cdot F_y \right\| \\ \text{if } w_t > \frac{144}{\sqrt{f_y}} \\ \left\| \frac{0.0332 \cdot \pi^2 \cdot E}{(w_t)^2} \right\| \end{array} \right\| \right) = 36 \text{ ksi}$$

Column Slenderness Ratio =

$$C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 126.099$$

Design Axial Compressive Stress =

$$F_a := \left(\left\| \begin{array}{l} \text{if } \frac{K \cdot L}{r_x} \leq C_c \\ \left\| \left(1 - 0.5 \cdot \left(\frac{K \cdot L}{r_x} \right)^2 \right) \cdot F_y \right\| \\ \text{if } \frac{K \cdot L}{r_x} > C_c \\ \left\| \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x} \right)^2} \right\| \end{array} \right\| \right) = 34.5 \text{ ksi}$$

Calculate Allowable Bending Moment:

$$b := w - \frac{t}{2} = 7.625 \text{ in}$$

Elastic Critical Moment =

$$M_e := \frac{(0.66 \cdot E \cdot b^4 \cdot t)}{(K \cdot L)^2} \cdot \left(\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1 \right) = 14992.1 \text{ kip} \cdot \text{in}$$

Moment Causing Compressive Yield =

$$M_{xc} := F_y \cdot S_x = 439.56 \text{ in} \cdot \text{kip}$$

Moment Causing Compressive Yield =

$$M_{yc} := F_y \cdot S_y = 439.56 \text{ kip} \cdot \text{in}$$

Lateral Buckling Moment =

$$M_b := \left(\left\| \begin{array}{l} \text{if } M_e \leq 0.5 \cdot M_{yc} \\ M_e \\ \text{if } M_e > 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e} \right) \end{array} \right\| \right) = 436.3 \text{ kip} \cdot \text{in}$$

Allowable Moment =

$$M_a := \left(\left\| \begin{array}{l} \text{if } M_{yc} \leq M_b \\ M_{yc} \\ M_b \end{array} \right\| \right) = 436.3 \text{ kip} \cdot \text{in}$$

Check Combined Axial Compression and Bending:

Bending Coefficient =

$$C_m := 1 \quad (\text{for restrained ends})$$

Applied Axial Compression =

$$P := \text{Compression} = 201.7 \text{ kip}$$

Design Axial Compression =

$$P_a := F_a \cdot A = 397.2 \text{ kip}$$

Axial Compression at Yield =

$$P_y := F_y \cdot A = 414 \text{ kip}$$

Euler Buckling Load =

$$P_{ex} := \frac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 2537.2 \text{ kip}$$

Euler Buckling Load =

$$P_{ey} := \frac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 2537.2 \text{ kip}$$

$$\text{Condition1} := \text{if} \left(\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) = 0.522$$

Condition1 = "OK"

$$\text{Condition2} := \text{if} \left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} = 0.501$$

Condition2 = "OK"

Subject:

Local Member Stress Analysis

CEN TEK engineeringCentered on Solutions™ www.centekeing.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Location:

Greenwich, CT

Rev. 3: 4/10/25

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 21007.68.TEMP**Maximum Forces in Member:****Leg 4**

Compression Force =

 $Compression := 202.1 \cdot kip$

(User Input from PLS-Tower)

Tension Force =

 $Tension := 130.8 \cdot kip$

(User Input from PLS-Tower)

Moment =

 $M_x := 0.029 \cdot ft \cdot kip$

(User Input)

Moment =

 $M_y := 2.77 \cdot ft \cdot kip$

(User Input)

Member Properties:

Member Type =

L8x8x3/4

Member Width =

 $w := 8 \cdot in$

(User Input)

Member Thickness =

 $t := 0.75 \cdot in$

(User Input)

Member Area =

 $A := 11.5 \cdot in^2$

(User Input)

Moment of Inertia =

 $I_x := 69.9 \cdot in^4$

(User Input)

Moment of Inertia =

 $I_y := 69.9 \cdot in^4$

(User Input)

Section Modulus x-dir =

 $S_x := 12.21 \cdot in^3$

(User Input)

Section Modulus y-dir =

 $S_y := 12.21 \cdot in^3$

(User Input)

Unbraced Length =

 $L := 7.64 \cdot ft$

(User Input)

Effective Length Coefficient =

 $K := 1$

(User Input)

Radius of Gyration =

 $r_x := 2.47 \cdot in$

(User Input)

Radius of Gyration =

 $r_y := 2.47 \cdot in$

(User Input)

Yield Stress =

 $F_y := 36 \cdot ksi$

(User Input)

Modulus of Elasticity =

 $E := 29000 \cdot ksi$

(User Input)

 $k_{des} := 1.375 \cdot in$

Calculate Design Compression Stress:

Width Thickness Ratio =

$$w_{-t} := \frac{w - k_{des}}{t} = 8.833$$

Yield Stress =

$$F_y := \left(\left\| \begin{array}{l} \text{if } w_{-t} < \frac{80}{\sqrt{f_y}} \\ \left\| F_y \right. \\ \text{if } \frac{80}{\sqrt{f_y}} \leq w_{-t} \leq \frac{144}{\sqrt{f_y}} \\ \left\| \left(1.677 - 0.677 \cdot \frac{w_{-t}}{\left(\frac{80}{\sqrt{f_y}} \right)} \right) \cdot F_y \\ \text{if } w_{-t} > \frac{144}{\sqrt{f_y}} \\ \left\| \frac{0.0332 \cdot \pi^2 \cdot E}{(w_{-t})^2} \right. \end{array} \right\| \right) = 36 \text{ ksi}$$

Column Slenderness Ratio =

$$C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 126.099$$

Design Axial Compressive Stress =

$$F_a := \left(\left\| \begin{array}{l} \text{if } \frac{K \cdot L}{r_x} \leq C_c \\ \left\| \left(1 - 0.5 \cdot \left(\frac{\frac{K \cdot L}{r_x}}{C_c} \right)^2 \right) \cdot F_y \\ \text{if } \frac{K \cdot L}{r_x} > C_c \\ \left\| \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x} \right)^2} \right. \end{array} \right\| \right) = 34.4 \text{ ksi}$$

Calculate Allowable Bending Moment:

$$b := w - \frac{t}{2} = 7.625 \text{ in}$$

Elastic Critical Moment =

$$M_e := \frac{(0.66 \cdot E \cdot b^4 \cdot t)}{(K \cdot L)^2} \cdot \left(\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1 \right) = 14204.6 \text{ kip} \cdot \text{in}$$

Moment Causing Compressive Yield =

$$M_{xc} := F_y \cdot S_x = 439.56 \text{ in} \cdot \text{kip}$$

Moment Causing Compressive Yield =

$$M_{yc} := F_y \cdot S_y = 439.56 \text{ kip} \cdot \text{in}$$

Lateral Buckling Moment =

$$M_b := \begin{cases} \text{if } M_e \leq 0.5 \cdot M_{yc} \\ M_e \\ \text{if } M_e > 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) \end{cases} = 436.2 \text{ kip} \cdot \text{in}$$

Allowable Moment =

$$M_a := \begin{cases} \text{if } M_{yc} \leq M_b \\ M_{yc} \\ M_b \end{cases} = 436.2 \text{ kip} \cdot \text{in}$$

Check Combined Axial Compression and Bending:

Bending Coefficient =

$$C_m := 1 \quad (\text{for restrained ends})$$

Applied Axial Compression =

$$P := \text{Compression} = 202.1 \text{ kip}$$

Design Axial Compression =

$$P_a := F_a \cdot A = 396.1 \text{ kip}$$

Axial Compression at Yield =

$$P_y := F_y \cdot A = 414 \text{ kip}$$

Euler Buckling Load =

$$P_{ex} := \frac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 2380.3 \text{ kip}$$

Euler Buckling Load =

$$P_{ey} := \frac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 2380.3 \text{ kip}$$

$$\text{Condition1} := \text{if} \left(\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) = 0.594$$

Condition1 = "OK"

$$\text{Condition2} := \text{if} \left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} = 0.565$$

Condition2 = "OK"

Subject:

Local Member Stress Analysis

Location:

Greenwich, CT

Rev. 3: 4/10/25

 Prepared by: T.J.L. Checked by: C.F.C.
 Job No. 21007.68.TEMP
Maximum Forces in Member:**Leg 5**

Compression Force =

 $Compression := 198 \cdot \text{kip}$

(User Input from PLS-Tower)

Tension Force =

 $Tension := 133 \cdot \text{kip}$

(User Input from PLS-Tower)

Moment =

 $M_x := 0.029 \cdot \text{ft} \cdot \text{kip}$

(User Input)

Moment =

 $M_y := 2.77 \cdot \text{ft} \cdot \text{kip}$

(User Input)

Member Properties:

Member Type =

L8x8x3/4

Member Width =

 $w := 8 \cdot \text{in}$

(User Input)

Member Thickness =

 $t := 0.75 \cdot \text{in}$

(User Input)

Member Area =

 $A := 11.5 \cdot \text{in}^2$

(User Input)

Moment of Inertia =

 $I_x := 69.9 \cdot \text{in}^4$

(User Input)

Moment of Inertia =

 $I_y := 69.9 \cdot \text{in}^4$

(User Input)

Section Modulus x-dir =

 $S_x := 12.21 \cdot \text{in}^3$

(User Input)

Section Modulus y-dir =

 $S_y := 12.21 \cdot \text{in}^3$

(User Input)

Unbraced Length =

 $L := 6.38 \cdot \text{ft}$

(User Input)

Effective Length Coefficient =

 $K := 1$

(User Input)

Radius of Gyration =

 $r_x := 2.47 \cdot \text{in}$

(User Input)

Radius of Gyration =

 $r_y := 2.47 \cdot \text{in}$

(User Input)

Yield Stress =

 $F_y := 36 \cdot \text{ksi}$

(User Input)

Modulus of Elasticity =

 $E := 29000 \cdot \text{ksi}$

(User Input)

 $k_{des} := 1.375 \cdot \text{in}$

Calculate Design Compression Stress:

Width Thickness Ratio =

$$w_t := \frac{w - k_{des}}{t} = 8.833$$

Yield Stress =

$$F_y := \left(\left\| \begin{array}{l} \text{if } w_t < \frac{80}{\sqrt{f_y}} \\ \left\| F_y \right\| \\ \text{if } \frac{80}{\sqrt{f_y}} \leq w_t \leq \frac{144}{\sqrt{f_y}} \\ \left\| \left(1.677 - 0.677 \cdot \frac{w_t}{\left(\frac{80}{\sqrt{f_y}} \right)} \right) \cdot F_y \right\| \\ \text{if } w_t > \frac{144}{\sqrt{f_y}} \\ \left\| \frac{0.0332 \cdot \pi^2 \cdot E}{(w_t)^2} \right\| \end{array} \right\| \right) = 36 \text{ ksi}$$

Column Slenderness Ratio =

$$C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 126.099$$

Design Axial Compressive Stress =

$$F_a := \left(\left\| \begin{array}{l} \text{if } \frac{K \cdot L}{r_x} \leq C_c \\ \left\| \left(1 - 0.5 \cdot \left(\frac{K \cdot L}{r_x} \right)^2 \right) \cdot F_y \right\| \\ \text{if } \frac{K \cdot L}{r_x} > C_c \\ \left\| \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r_x} \right)^2} \right\| \end{array} \right\| \right) = 34.9 \text{ ksi}$$

Calculate Allowable Bending Moment:

$$b := w - \frac{t}{2} = 7.625 \text{ in}$$

Elastic Critical Moment =

$$M_e := \frac{(0.66 \cdot E \cdot b^4 \cdot t)}{(K \cdot L)^2} \cdot \left(\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1 \right) = 19354.8 \text{ kip} \cdot \text{in}$$

Moment Causing Compressive Yield =

$$M_{xc} := F_y \cdot S_x = 439.56 \text{ in} \cdot \text{kip}$$

Moment Causing Compressive Yield =

$$M_{yc} := F_y \cdot S_y = 439.56 \text{ kip} \cdot \text{in}$$

Lateral Buckling Moment =

$$M_b := \begin{pmatrix} \left| \begin{array}{l} \text{if } M_e \leq 0.5 \cdot M_{yc} \\ M_e \\ \text{if } M_e > 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) \end{array} \right| \end{pmatrix} = 437.1 \text{ kip} \cdot \text{in}$$

Allowable Moment =

$$M_a := \begin{pmatrix} \left| \begin{array}{l} \text{if } M_{yc} \leq M_b \\ M_{yc} \\ M_b \end{array} \right| \end{pmatrix} = 437.1 \text{ kip} \cdot \text{in}$$

Check Combined Axial Compression and Bending:

Bending Coefficient =

$$C_m := 1 \quad (\text{for restrained ends})$$

Applied Axial Compression =

$$P := \text{Compression} = 198 \text{ kip}$$

Design Axial Compression =

$$P_a := F_a \cdot A = 401.5 \text{ kip}$$

Axial Compression at Yield =

$$P_y := F_y \cdot A = 414 \text{ kip}$$

Euler Buckling Load =

$$P_{ex} := \frac{\pi^2 \cdot E \cdot I_x}{(K \cdot L)^2} = 3413.3 \text{ kip}$$

Euler Buckling Load =

$$P_{ey} := \frac{\pi^2 \cdot E \cdot I_y}{(K \cdot L)^2} = 3413.3 \text{ kip}$$

$$\text{Condition1} := \text{if} \left(\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

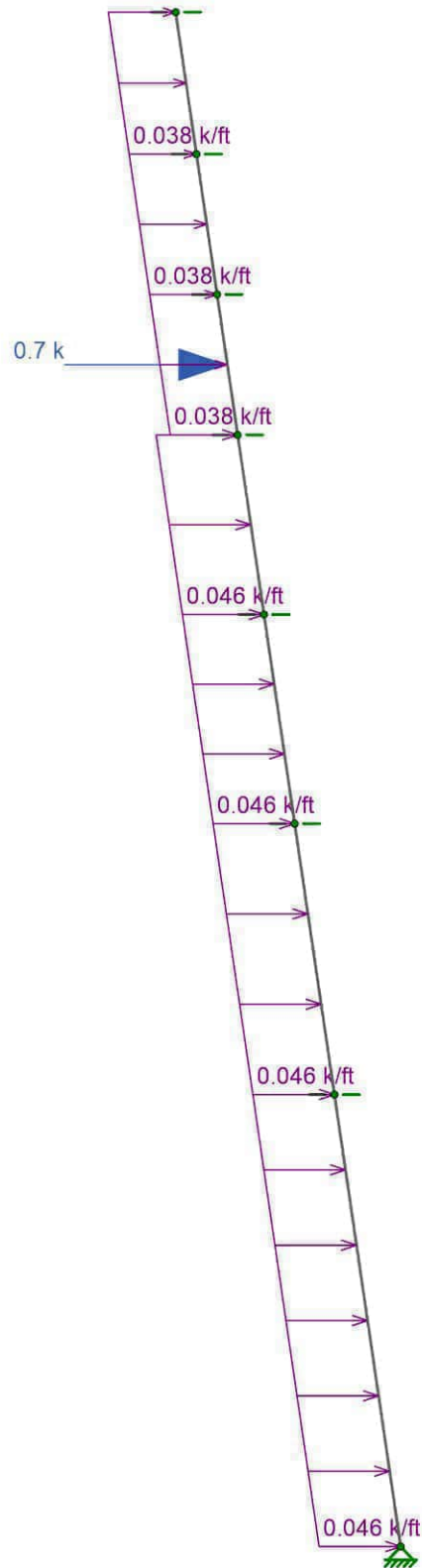
$$\frac{P}{P_a} + \frac{C_m \cdot M_x}{M_{xc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ex}}} \right) + \frac{C_m \cdot M_y}{M_{yc}} \cdot \left(\frac{1}{1 - \frac{P}{P_{ey}}} \right) = 0.574$$

Condition1 = "OK"

$$\text{Condition2} := \text{if} \left(\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} \leq 1.00, \text{"OK"}, \text{"Overstressed"} \right)$$

$$\frac{P}{P_y} + \frac{M_x}{M_{xc}} + \frac{M_y}{M_{yc}} = 0.555$$

Condition2 = "OK"



Loads: BLC 5, x-dir NESC Extreme Wind on Anten



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TJL

21007.68/ Verizon Green...

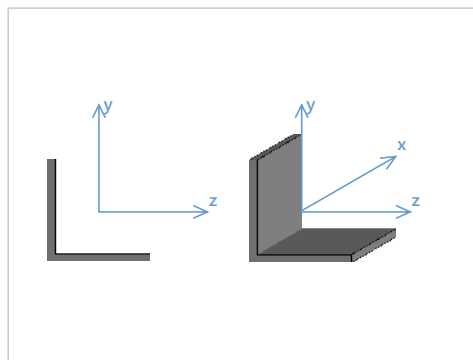
Structure #1281 - Coax Load on Leg

Moment Diagram.r3d

Detail Report: Leg1

Load Combination: LC 2: x-dir NESC
 Extreme Wind on
 Antenna Frame

Code check: 0.033 (axial/bending)



Input Data

Shape:	L8X8X10	I Node:	N6
Member Type:	Column	J Node:	N7
Length (ft):	7.92	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

Material:	A36 Gr.36	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.2
G (ksi):	11154	F_y (ksi):	36		
Nu:	0.3	R_y:	1.5		

Shape Properties

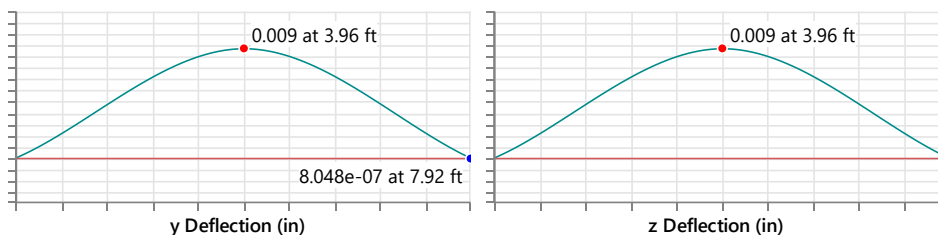
d (in):	8	Area (in²):	9.69	J (in⁴):	1.3
b_f (in):	8	I_{yy} (in⁴):	59.6	r_z (in):	1.58
t (in):	0.625	I_{zz} (in⁴):	59.6	k[*] (in⁴):	1.25

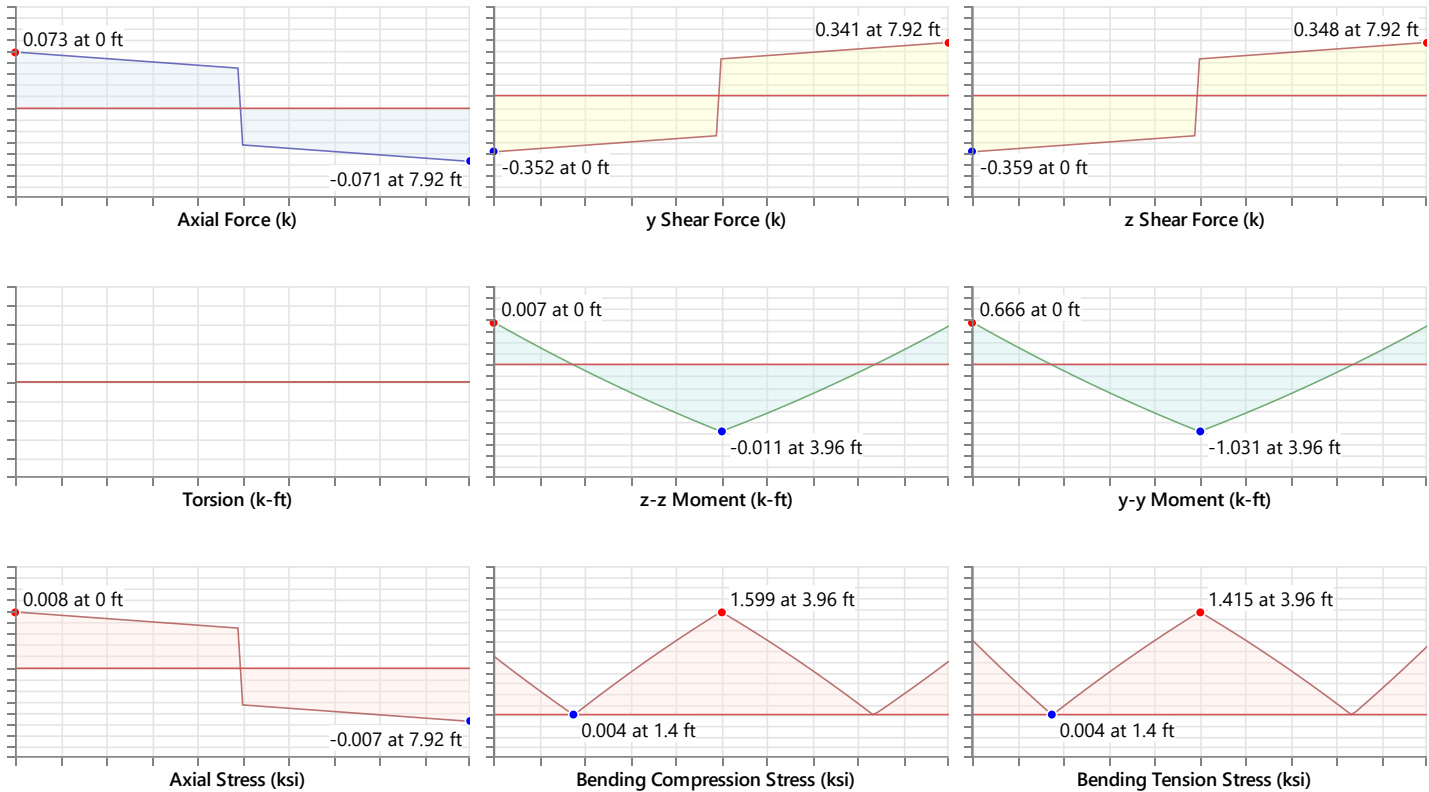
Design Properties

L_b y-y (ft):	7.92	K_{y-y}:	1	Seismic DR:	None
L_b z-z (ft):	7.92	K_{z-z}:	1	Max Defl Ratio:	L/10000
L_{comp} top:	L _{byy}	y sway:	No	Max Defl Location:	0
L_{comp} bot (ft):	7.92	z sway:	No	Span:	N/A
L_{torque} (ft):	7.92	Function:	Lateral	τ_b:	1



Diagrams:





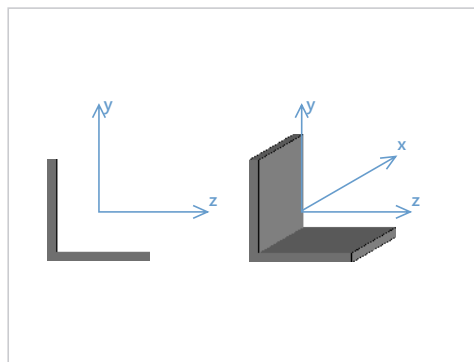
AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0.049 k	313.956 k	-	-
Axial Compression Analysis	0 k	259.504 k	-	-
Flexural Analysis (Strong Axis)	0.011 k-ft	68.022 k-ft	-	-
Flexural Analysis (Weak Axis)	1.031 k-ft	31.346 k-ft	-	-
Shear Analysis (Major Axis y)	0.352 k	97.2 k	0.004	PASS
Shear Analysis (Minor Axis z)	0.359 k	97.2 k	0.004	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.033	PASS

Detail Report: Leg2

Load Combination: LC 2: x-dir NES
 Extreme Wind on
 Antenna Frame

Code check: 0.019 (axial/bending)



Input Data

Shape:	L8X8X12	I Node:	N5
Member Type:	Column	J Node:	N6
Length (ft):	10.13	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

Material:	A36 Gr.36	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.2
G (ksi):	11154	F_y (ksi):	36		
Nu:	0.3	R_y:	1.5		

Shape Properties

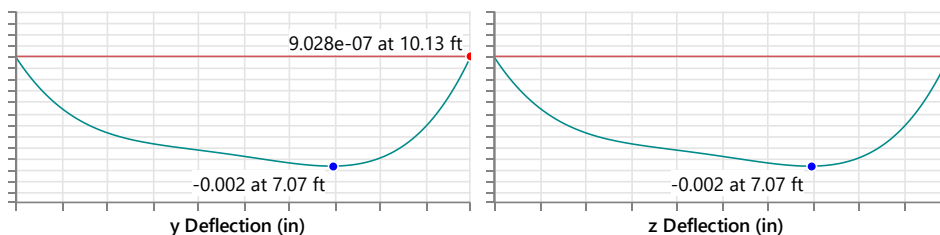
d (in):	8	Area (in²):	11.5	J (in⁴):	2.21
b_f (in):	8	I_{yy} (in⁴):	69.9	r_z (in):	1.57
t (in):	0.75	I_{zz} (in⁴):	69.9	k* (in⁴):	1.38

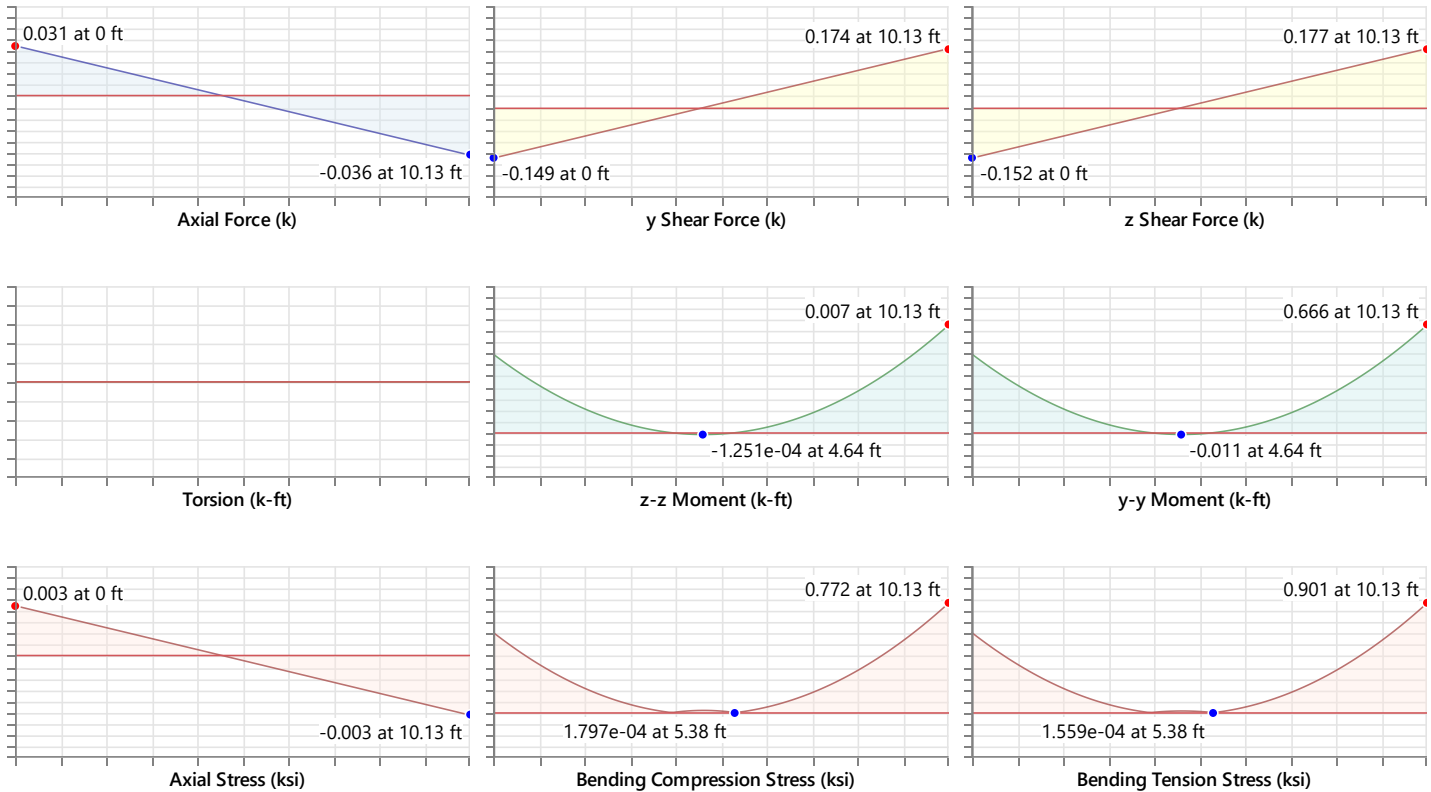
Design Properties

L_b y-y (ft):	10.13	K_{y-y}:	1	Seismic DR:	None
L_b z-z (ft):	10.13	K_{z-z}:	1	Max Defl Ratio:	L/10000
L_{comp} top:	L _{byy}	y sway:	No	Max Defl Location:	0
L_{comp} bot (ft):	10.13	z sway:	No	Span:	N/A
L_{torque} (ft):	10.13	Function:	Lateral	τ_b:	1



Diagrams:





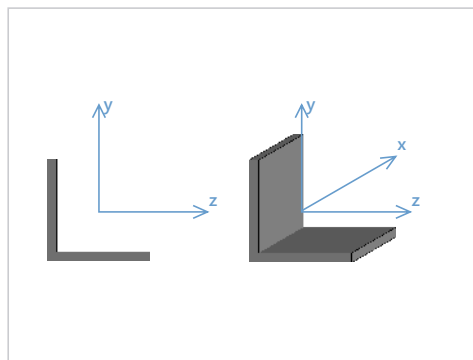
AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0.036 k	372.6 k	-	-
Axial Compression Analysis	0 k	271.757 k	-	-
Flexural Analysis (Strong Axis)	0.007 k-ft	79.687 k-ft	-	-
Flexural Analysis (Weak Axis)	0.666 k-ft	35.919 k-ft	-	-
Shear Analysis (Major Axis y)	0.174 k	116.64 k	0.001	PASS
Shear Analysis (Minor Axis z)	0.177 k	116.64 k	0.002	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.019	PASS

Detail Report: Leg3

Load Combination: LC 2: x-dir NESC
 Extreme Wind on
 Antenna Frame

Code check: 0.014 (axial/bending)



Input Data

Shape:	L8X8X12	I Node:	N4
Member Type:	Column	J Node:	N5
Length (ft):	11.8	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

Material:	A36 Gr.36	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.2
G (ksi):	11154	F_y (ksi):	36		
Nu:	0.3	R_y:	1.5		

Shape Properties

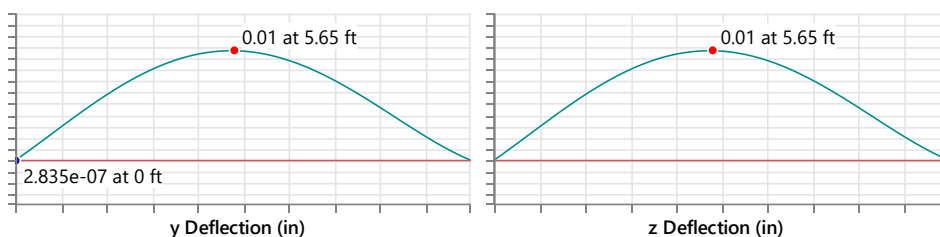
d (in):	8	Area (in²):	11.5	J (in⁴):	2.21
b_f (in):	8	I_{yy} (in⁴):	69.9	r_z (in):	1.57
t (in):	0.75	I_{zz} (in⁴):	69.9	k[*] (in⁴):	1.38

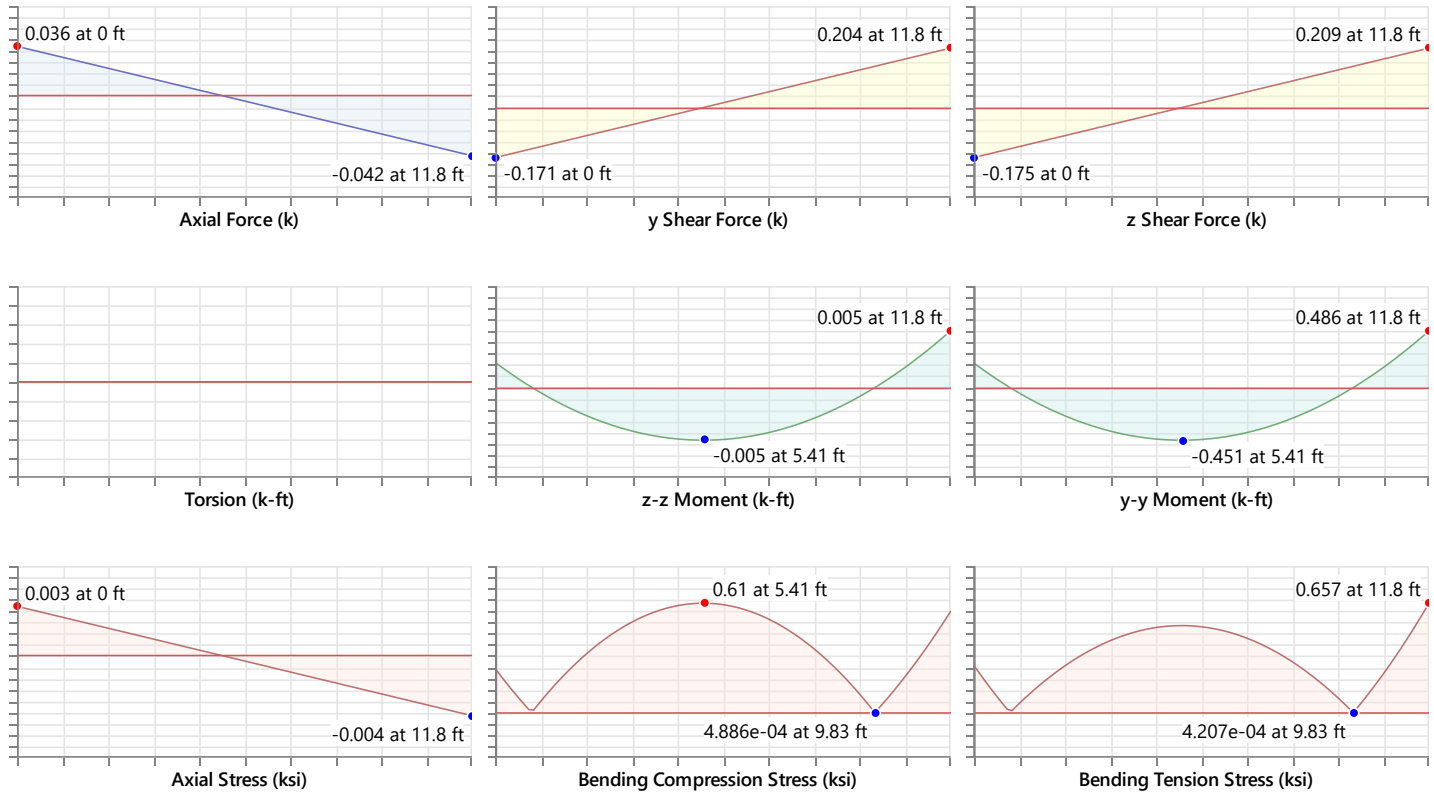
Design Properties

L_b y-y (ft):	11.8	K_{y-y}:	1	Seismic DR:	None
L_b z-z (ft):	11.8	K_{z-z}:	1	Max Defl Ratio:	L/10000
L_{comp} top:	L _{byy}	y sway:	No	Max Defl Location:	0
L_{comp} bot (ft):	11.8	z sway:	No	Span:	N/A
L_{torque} (ft):	11.8	Function:	Lateral	τ_b:	1



Diagrams:





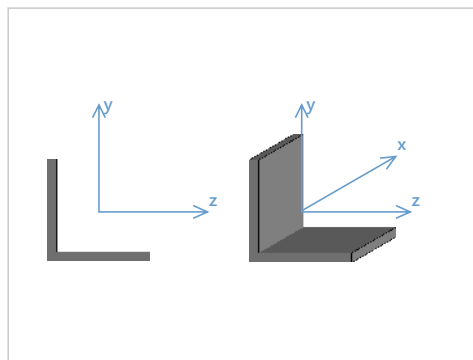
AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0.042 k	372.6 k	-	-
Axial Compression Analysis	0 k	242.808 k	-	-
Flexural Analysis (Strong Axis)	0.005 k-ft	76.68 k-ft	-	-
Flexural Analysis (Weak Axis)	0.486 k-ft	35.919 k-ft	-	-
Shear Analysis (Major Axis y)	0.204 k	116.64 k	0.002	PASS
Shear Analysis (Minor Axis z)	0.209 k	116.64 k	0.002	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.014	PASS

Detail Report: Leg4

Load Combination: LC 2: x-dir NESCE
 Extreme Wind on
 Antenna Frame

Code check: 0.078 (axial/bending)



Input Data

Shape:	L8X8X12	I Node:	N3
Member Type:	Column	J Node:	N4
Length (ft):	15.28	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

Material:	A36 Gr.36	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.2
G (ksi):	11154	F_y (ksi):	36		
Nu:	0.3	R_y:	1.5		

Shape Properties

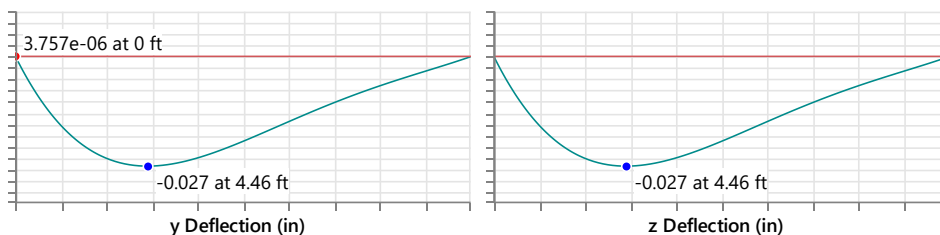
d (in):	8	Area (in²):	11.5	J (in⁴):	2.21
b_f (in):	8	I_{yy} (in⁴):	69.9	r_z (in):	1.57
t (in):	0.75	I_{zz} (in⁴):	69.9	k* (in⁴):	1.38

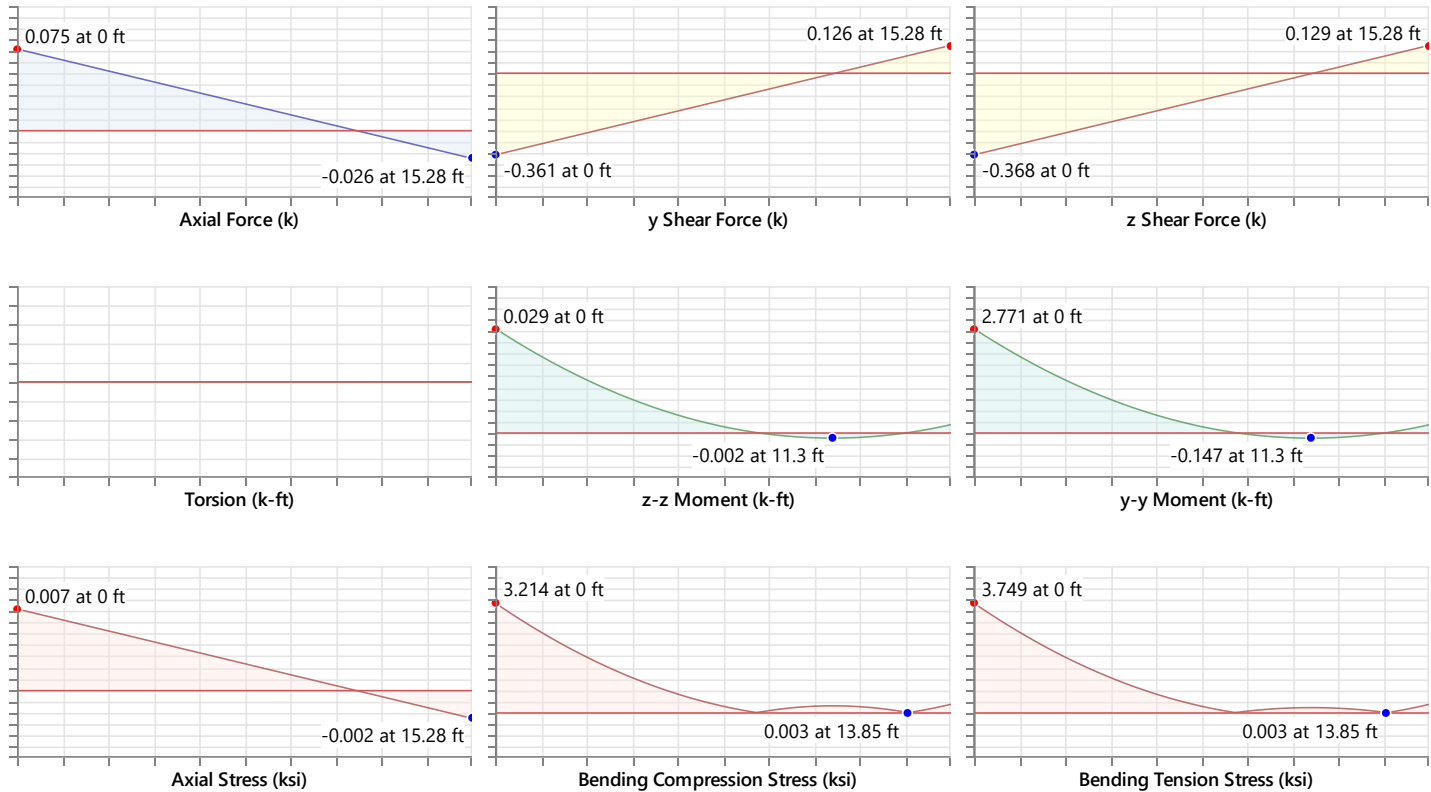
Design Properties

L_{b y-y} (ft):	15.28	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	15.28	K_{z-z}:	1	Max Defl Ratio:	L/6812
L_{comp top}:	L _{byy}	y sway:	No	Max Defl Location:	4.457
L_{comp bot} (ft):	15.28	z sway:	No	Span:	N/A
L_{torque} (ft):	15.28	Function:	Lateral	τ_b:	1



Diagrams:





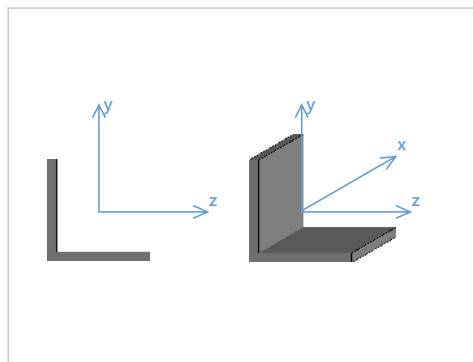
AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0 k	372.6 k	-	-
Axial Compression Analysis	0.075 k	181.716 k	-	-
Flexural Analysis (Strong Axis)	0.029 k-ft	74.564 k-ft	-	-
Flexural Analysis (Weak Axis)	2.771 k-ft	35.919 k-ft	-	-
Shear Analysis (Major Axis y)	0.361 k	116.64 k	0.003	PASS
Shear Analysis (Minor Axis z)	0.368 k	116.64 k	0.003	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.078	PASS

Detail Report: Leg5

Load Combination: LC 2: x-dir NESC
 Extreme Wind on
 Antenna Frame

Code check: 0.078 (axial/bending)



Input Data

Shape:	L8X8X12	I Node:	N13
Member Type:	Column	J Node:	N3
Length (ft):	25.5	I Release:	Fixed
Material Type:	Hot Rolled Steel	J Release:	Fixed
Design Rule:	Typical	I Offset:	N/A
Internal Sections:	97	J Offset:	N/A
Design Code:	AISC 15th (360-16): LRFD	T/C Only:	Both Way

Material Properties

Material:	A36 Gr.36	Therm. Coeff. (/1E5 F):	0.65	F_u (ksi):	58
E (ksi):	29000	Density (k/ft³):	0.49	R_t:	1.2
G (ksi):	11154	F_y (ksi):	36		
Nu:	0.3	R_y:	1.5		

Shape Properties

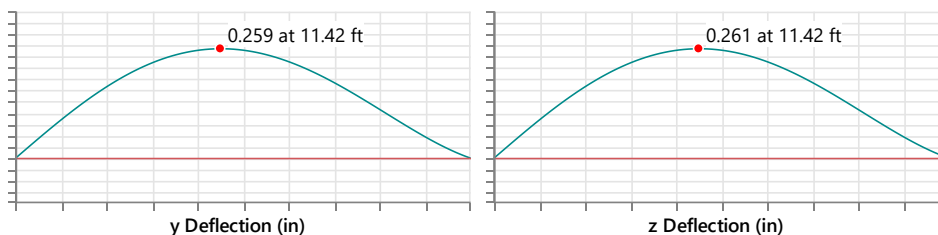
d (in):	8	Area (in²):	11.5	J (in⁴):	2.21
b_f (in):	8	I_{yy} (in⁴):	69.9	r_z (in):	1.57
t (in):	0.75	I_{zz} (in⁴):	69.9	k* (in⁴):	1.38

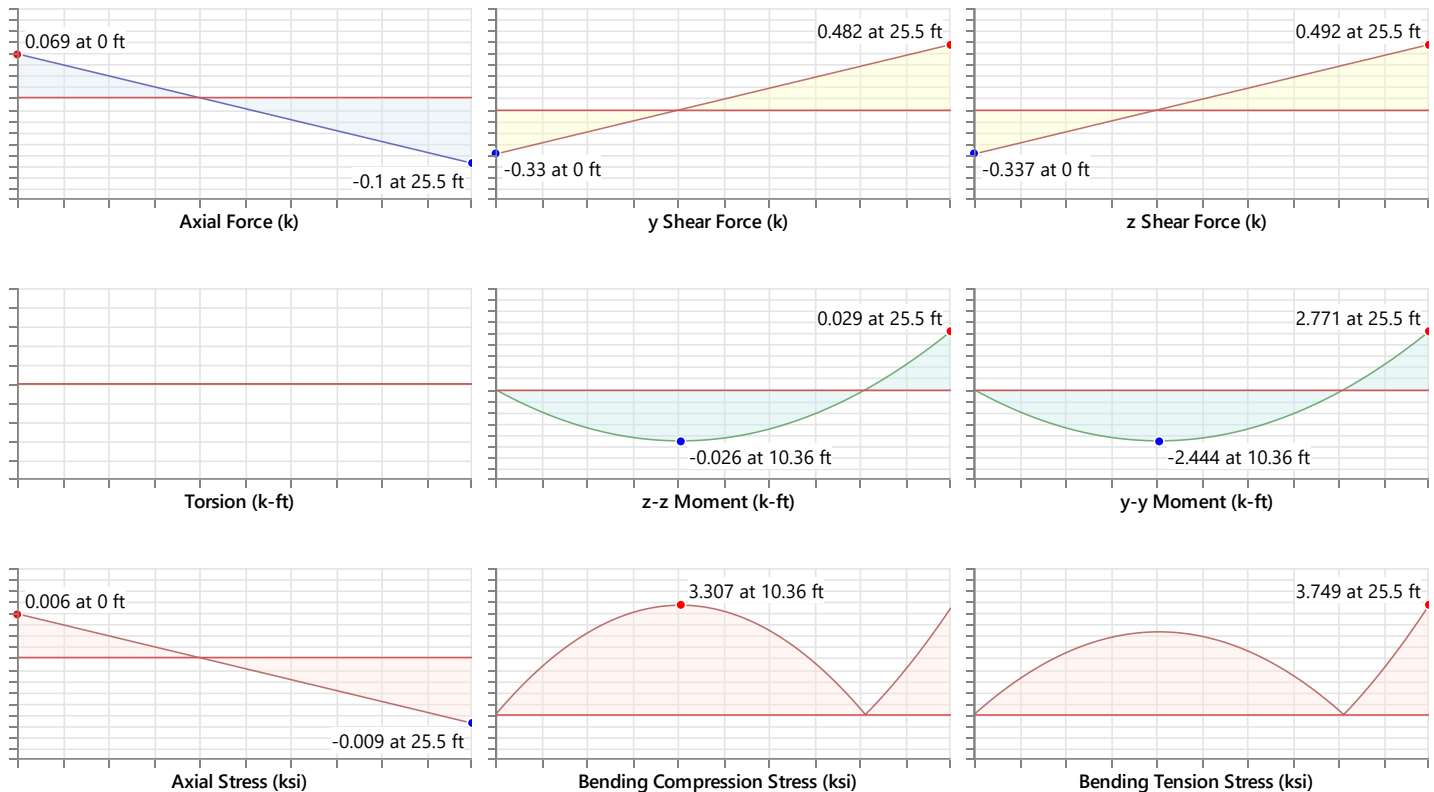
Design Properties

L_{b y-y} (ft):	25.5	K_{y-y}:	1	Seismic DR:	None
L_{b z-z} (ft):	25.5	K_{z-z}:	1	Max Defl Ratio:	L/1174
L_{comp top}:	L _{b y-y}	y sway:	No	Max Defl Location:	11.422
L_{comp bot} (ft):	25.5	z sway:	No	Span:	N/A
L_{torque} (ft):	25.5	Function:	Lateral	τ_b:	1



Diagrams:





AISC 15th (360-16): LRFD Code Check

Limit State	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-
Applied Loading - Shear + Torsion	-	-	-	-
Axial Tension Analysis	0.1 k	372.6 k	-	-
Axial Compression Analysis	0 k	68.39 k	-	-
Flexural Analysis (Strong Axis)	0.029 k-ft	65.404 k-ft	-	-
Flexural Analysis (Weak Axis)	2.771 k-ft	35.919 k-ft	-	-
Shear Analysis (Major Axis y)	0.482 k	116.64 k	0.004	PASS
Shear Analysis (Minor Axis z)	0.492 k	116.64 k	0.004	PASS
Bending & Axial Interaction Check (UC Bending Max)	-	-	0.078	PASS

To: Andrew Leone <ALeone@structureconsulting.net>

Cc: Edward Onessimo <eonessimo@saigrp.com>; Alejandro Restrepo <Alejandro.Restrepo@verizonwireless.com>; Tyurin, Aleksey <alex.tyurin@verizonwireless.com>; John E Gavaletz <John.Gavaletz@verizonwireless.com>; Magali Black <mblack@saigrp.com>; Sawyer, Stephen <stephen.sawyer@verizonwireless.com>

Subject: Re: [E] RE: CDs for RF/EE/CX Re-approval: Greenwich 3 CT 15444631

All set!

On Thu, Nov 21, 2024 at 10:59 AM Andrew Leone <ALeone@structureconsulting.net> wrote:

Adam will make this revision.

Adam,

Can you revise RFDS here to show the following:

- Added:
 - (3) 6x12 hybrids
 - (3) 6 OVPs
- Removed:
 - None
- Retained:
 - None

Thanks,
Andrew

From: Edward Onessimo <eonessimo@saigrp.com>

Sent: Thursday, November 21, 2024 10:52 AM

To: Alejandro Restrepo <Alejandro.Restrepo@verizonwireless.com>

Cc: Andrew Leone <ALeone@structureconsulting.net>; Tyurin, Aleksey <alex.tyurin@verizonwireless.com>; John E Gavaletz <John.Gavaletz@verizonwireless.com>; Magali Black <mblack@saigrp.com>; Sawyer, Stephen <stephen.sawyer@verizonwireless.com>

Subject: RE: [E] RE: CDs for RF/EE/CX Re-approval: Greenwich 3 CT 15444631

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Alejandro,
Can you please make that change in Shiva's absence?

Best Regards,
Edward
(617) 691-7022

From: Sawyer, Stephen <stephen.sawyer@verizonwireless.com>
Sent: Thursday, November 21, 2024 10:43 AM
To: Edward Onessimo <eonessimo@saigrp.com>
Cc: Andrew Leone <ALeone@structureconsulting.net>; Alejandro Restrepo <Alejandro.Restrepo@verizonwireless.com>; Tyurin, Aleksey <alex.tyurin@verizonwireless.com>; John E Gavaletz <John.Gavaletz@verizonwireless.com>; Magali Black <mblack@saigrp.com>
Subject: Re: [E] RE: CDs for RF/EE/CX Re-approval: Greenwich 3 CT 15444631

Ed,
Can we have the RFDS updated to show the correct hybrid and OVP count?

On Tue, Nov 19, 2024 at 3:58 PM Edward Onessimo <eonessimo@saigrp.com> wrote:

Still need approval please.

Best Regards,
Edward
(617) 691-7022

From: Andrew Leone <ALeone@structureconsulting.net>
Sent: Tuesday, November 19, 2024 3:53 PM
To: Edward Onessimo <eonessimo@saigrp.com>; Sawyer, Stephen <stephen.sawyer@verizonwireless.com>
Cc: Alejandro Restrepo <Alejandro.Restrepo@verizonwireless.com>; Tyurin, Aleksey <alex.tyurin@verizonwireless.com>; John E



NORTHEAST > North East > New England > Wallingford-2 > GREENWICH 3 CT

GADASU, SHIVA - shiva.gadasu@verizonwireless.com - 20240617_152101

Project Details		Location Information	
Carrier Aggregation	N	Site Id	323974
Ecip	N	Search Ring#	
Project Name	850 ADD	E-NodeB ID#	065159
Project Alt Name	GREENWICH 3 CT - 4TH SECTOR850LTECBRSLSUB6 ADD	PSLC#	469290
Project Id	15444631	Switch Name	Wallingford-2
Designed Sector Carrier 4G	20	Tower Type	
Designed Sector Carrier 5G	8	Site Type	MACRO
Additional Sector Carrier 4G	0	Street Address	9 Sound Shore Drive
Additional Sector Carrier 5G	0	City	Greenwich
Suffix	Rev13_06.17.2024	State	CT
FP Solution Type & Tech Type	MODIFICATION;5G_850;4G_CBR5;5G_L-S ub6;4G_Radio Swap	Zip Code	06830
		County	Fairfield
		Latitude	41.029711/ 41° 1' 46.960"
		Longitude	-73.59835/ 73° 35' 54.060"

Project Scope

4th sector add, Antenna, RRH swap
Sectors 01 & 02 will use (1) 12 OVP and (2) 6x12 Hybrids and Sectors 03 & 04 will use the remaining same

Rev13_06.17.2024 : Corrected duplicates in Non-Antenna Summary
Rev12_05.30.2024
Rev11_02.13.2024 : Revised to update (3) 6OVP and (3) 6x12 Hybrids as per RE comments, added RET naming
Rev10_10.09.2023 : Updated Cband to 4 sectors, updated Lowband RRH and Cband to Gen2,
Rev9_02.23.2023 : Adding Filters on lowband to avoid 850MHz Eversource interference.
Rev8_02.17.2023 : Revised to remove CDMA diplexers as it is decommissioned
Rev7_03.29.2022: Revised to update CLs on CBR5, LSub6 Beta and Gamma sectors as per latest CD, changed RRHs to ORAN models and

Project Scope

added 850NR carrier

Rev6_07.12.2021 : Revised to add OVP/Hybrids, added plumbing, Corrected CDMA antenna qty

Rev5_05.12.2021 : revised to add 4th sector and fully upgrade the site

Rev4_03.02.2020 : Revised to mount RRHs in shelter with new multiband Triplexers and new Hexport antennas. Plumbing attached

Rev3_02.27.2020 : Revised to delete OVP/Hybrid/700/AWS TRDU's reference from Removed non-antenna summary section, proposed to remove unused coax and any diplexers/SBT from shelter/tower

Rev2_20190917 : reverted back the design to Ant/RRH swap only, no CBRS

Rev1_20190212 : Initial design

Antenna Summary

Added Antenna

700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Center line	Tip Height	Azimuth	Install Type	Quantit
					5G	Samsung	MT6413-77A	140.8	142	10(A),110(B),240(C),315(D)	PHYSICAL	4
LTE	5G,LTE	LTE	LTE			JMA	MX06FRO660-03	139	142	110(2),240(3),110(183),240(184)	PHYSICAL	4
LTE	5G,LTE	LTE	LTE	LTE		JMA	MX10FRO640-03	139	142	10(1),315(4),10(19),315(22),10(182),315(185)	PHYSICAL	4
				LTE		Samsung	R0440CC_3550Mhz	136.5	136.9	110(20),240(21)	PHYSICAL	2

Removed Antenna

700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Center line	Tip Height	Azimuth	Install Type	Quantit
						DECIBEL PRODUCTS	DB854DG65ESX	139	142	350(1)(A),120(2)(B),240(3)(C)	SPARE	3
			LTE			ANDREW	HBXX-6516DS-A2M	139	141.1	350(1),120(2),240(3)	PHYSICAL	3
LTE	LTE	LTE				ANDREW	SBNHH-1D65B	139	142	350(1),120(2),240(3)	PHYSICAL	3

Retained Antenna

700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Center line	Tip Height	Azimuth	Install Type	Quantit
-----	-----	------	-----	------	--------	------	-------	-------------	------------	---------	--------------	---------

Added: 14	Removed: 9	Retained: 0
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Non Antenna Summary

Added Non Antenna

Equipment Type	Locatio	700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Install Type	Quantity
OVP	Tower	LTE	LTE,5G	LTE	LTE		5G	ovp	12 OVP	PHYSICAL	2
Hybrid Cable	Tower	LTE	LTE,5G	LTE	LTE		5G	N/A	6x12 Hybriflex LI	PHYSICAL	4
RRU	Tower			LTE	LTE			Samsung	B2/B66A RRH ORAN (RF4439d-25A)	PHYSICAL	4
Mount	Tower							JMA	JMA Mount	PHYSICAL	4
RRU	Tower						5G	Samsung	MT6413-77A	PHYSICAL	0
RRU	Tower	LTE	5G,LTE					Samsung	RF4461d-13A	PHYSICAL	4
RRU	Tower					LTE		Samsung	RT4423-48A	PHYSICAL	4

Removed Non Antenna

Equipment Type	Locatio	700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Install Type	Quantity
RRU	Shelter			LTE	LTE			Samsung	B2/B66A RRH ORAN (RF4439d-25A)	PHYSICAL	3
RRU	Shelter	LTE	LTE					Samsung	B5/B13 RRH ORAN (RF4440d-13A)	PHYSICAL	3
Coaxial Cables	Tower							N/A	N/A	PHYSICAL	18

Retained Non Antenna

Equipment Type	Locatio	700	850	1900	AWS	CBRS	L-Sub6	Make	Model	Install Type	Quantity
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Added: 22	Removed: 24	Retained: 0
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Services							
700 LTE	0000 (8804185)			5GLS (8809112)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	5230	5230	5230	5230	5230	5230	5230
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	4	4	2	4	6	2
Tip Height	142	142	142	142	142	142	142
Regulatory Power	81.48 (W/MHz) ERP	81.48 (W/MHz) ERP	81.48 (W/MHz) ERP	120.44 (W/MHz) ERP	70.89 (W/MHz) ERP	70.89 (W/MHz) ERP	120.44 (W/MHz) ERP
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	46.0 dBm	46.0 dBm	46.0 dBm	46.0 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	RF4461d-13A	RF4461d-13A	RF4461d-13A	RF4461d-13A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844214	19844222	19844228	19931400	19931403	19931406	19931409
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	10	10	10	10	10	10	10
Ant. Dimensions H x W x D(inch)	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	40.51	40.51	40.51	76.3	60.0	60.0	76.3

Services							
850 LTE	0000 (8804185)			5GLS (8809112)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	2450	2450	2450	2450	2450	2450	2450
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	4	6	2	10	10	2
Tip Height	142	142	142	142	142	142	142
Regulatory Power	160.62 (W/MHz) ERPSPD	160.62 (W/MHz) ERPSPD	160.62 (W/MHz) ERPSPD	391.58 (W/MHz) ERPSPD	283.54 (W/MHz) ERPSPD	283.54 (W/MHz) ERPSPD	391.58 (W/MHz) ERPSPD
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	44.6 dBm	46.0 dBm	46.0 dBm	44.6 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	RF4461d-13A	RF4461d-13A	RF4461d-13A	RF4461d-13A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844234	19844235	19844237	19931416	19931417	19931418	19931419
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	10	10	10	10	10	10	10
Ant. Dimensions H x W x D(inch)	72.0 x 11.88 x 7.08	72.0 x 11.88 x 7.08	72.0 x 11.88 x 7.08	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	40.51	40.51	40.51	76.3	60.0	60.0	76.3

Services					
850 NR	0000 (8804185)	5GLS (8809112)			
Sector		0182	0183	0184	0185
Azimuth		10	110	240	315
Cell/Enodeb-Id		0659451	0659451	0659451	0659451
Antenna Model		MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make		JMA	JMA	JMA	JMA
Centerline		139	139	139	139
DLEARFCN		2450	2450	2450	2450
Mech Down-tilt		0	0	0	0
Elect Down-tilt		2	10	10	2
Tip Height		142	142	142	142
Regulatory Power		391.58 (W/MHz) ERPSPD	283.54 (W/MHz) ERPSPD	283.54 (W/MHz) ERPSPD	391.58 (W/MHz) ERPSPD
Transmitter Max Power		44.6 dBm	46.0 dBm	46.0 dBm	44.6 dBm
TMA Make					
TMA Model					
RRU Make		Samsung	Samsung	Samsung	Samsung
RRU Model		RF4461d-13A	RF4461d-13A	RF4461d-13A	RF4461d-13A
Number of Tx,Rx		4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count		0	0	0	0
Position					
Transmitter Id		19931416	19931417	19931418	19931419
Source		VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth		10	10	10	10
Ant. Dimensions H x W x D(inch)		71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)		76.3	60.0	60.0	76.3

Services							
1900 LTE	0000 (8804185)			5GLS (8809112)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	1100	1100	1100	1100	1100	1100	1100
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	1	0	0	0	2	2	0
Tip Height	142	142	142	142	142	142	142
Regulatory Power	145.15 (W/MHz) EIRP	145.15 (W/MHz) EIRP	145.15 (W/MHz) EIRP	139.55 (W/MHz) EIRP	133.21 (W/MHz) EIRP	133.21 (W/MHz) EIRP	139.55 (W/MHz) EIRP
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	46.0 dBm	46.0 dBm	46.0 dBm	46.0 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844217	19844224	19844229	19931401	19931404	19931407	19931410
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	20	20	20	20	20	20	20
Ant. Dimensions H x W x D(inch)	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	40.51	40.51	40.51	76.3	60.0	60.0	76.3

Services							
AWS LTE	0000 (8804185)			5GLS (8809112)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	HBXX-6516DS-A2M	HBXX-6516DS-A2M	HBXX-6516DS-A2M	MX10FRO640-03	MX06FRO660-03	MX06FRO660-03	MX10FRO640-03
Antenna Make	ANDREW	ANDREW	ANDREW	JMA	JMA	JMA	JMA
Centerline	139	139	139	139	139	139	139
DLEARFCN	2050	2050	2050	2050	2050	2050	2050
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	1	2	0	0	2	2	0
Tip Height	141.1	141.1	141.1	142	142	142	142
Regulatory Power	119.05 (W/MHz) EIRP	119.05 (W/MHz) EIRP	119.05 (W/MHz) EIRP	175.68 (W/MHz) EIRP	142.73 (W/MHz) EIRP	142.73 (W/MHz) EIRP	175.68 (W/MHz) EIRP
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	46.0 dBm	46.0 dBm	46.0 dBm	46.0 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count	0	0	0	0	0	0	0
Position							
Transmitter Id	19844220	19844226	19844231	19931402	19931405	19931408	19931411
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	20	20	20	20	20	20	20
Ant. Dimensions H x W x D(inch)	50.9 x 12.0 x 6.49	50.9 x 12.0 x 6.49	50.9 x 12.0 x 6.49	71.65 x 19.69 x 7.48	71.3 x 15.4 x 10.7	71.3 x 15.4 x 10.7	71.65 x 19.69 x 7.48
Weight(lb)	30.53	30.53	30.53	76.3	60.0	60.0	76.3

Services					
CBRS LTE	0000 (8804185)	5GLS (8809112)			
Sector		19	20	21	22
Azimuth		10	110	240	315
Cell/Enodeb-Id		065159	065159	065159	065159
Antenna Model		MX10FRO640-03	R0440CC_3550Mh	R0440CC_3550Mh	MX10FRO640-03
Antenna Make		JMA	Samsung	Samsung	JMA
Centerline		139	136.5	136.5	139
DLEARFCN		55343, 55541, 55943, 56141	55343, 55541, 55943, 56141	55343, 55541, 55943, 56141	55343, 55541, 55943, 56141
Mech Down-tilt		0	0	0	0
Elect Down-tilt		2	9	9	2
Tip Height		142	136.9	136.9	142
Regulatory Power		8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD	4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD	4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD, 4.88 (W/MHz) EIRPSD	8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD, 8.45 (W/MHz) EIRPSD
Transmitter Max Power		37.02 dBm	37.02 dBm	37.02 dBm	37.02 dBm
TMA Make					
TMA Model					
RRU Make		Samsung	Samsung	Samsung	Samsung
RRU Model		RT4423-48A	RT4423-48A	RT4423-48A	RT4423-48A
Number of Tx,Rx		4 , 4	4 , 4	4 , 4	4 , 4
Operational Port Count		0	0	0	0
Position					
Transmitter Id		19931412	19931413	19931414	19931415
Source		VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth		20, 20, 20, 20	20, 20, 20, 20	20, 20, 20, 20	20, 20, 20, 20
Ant. Dimensions H x W x D(inch)		71.65 x 19.69 x 7.48	8.7 x 12.0 x 1.5	8.7 x 12.0 x 1.5	71.65 x 19.69 x 7.48
Weight(lb)		76.3	3.3	3.3	76.3

Services					
CBAND NR	0000 (8804185)	5GLS (8809112)			
Sector		0182	0183	0184	0185
Azimuth		10	110	240	315
Cell/Enodeb-Id		0659451	0659451	0659451	0659451
Antenna Model		MT6413-77A	MT6413-77A	MT6413-77A	MT6413-77A
Antenna Make		Samsung	Samsung	Samsung	Samsung
Centerline		140.8	140.8	140.8	140.8
DLEARFCN		650006, 655324	650006, 655324	650006, 655324	650006, 655324
Mech Down-tilt		0	0	0	0
Elect Down-tilt		3	3	3	3
Tip Height		142	142	142	142
Regulatory Power		869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP	869.87 (W/MHz) EIRP, 364.17 (W/MHz) EIRP
Transmitter Max Power		52.02 dBm	52.02 dBm	52.02 dBm	52.02 dBm
TMA Make					
TMA Model					
RRU Make		Samsung	Samsung	Samsung	Samsung
RRU Model		MT6413-77A	MT6413-77A	MT6413-77A	MT6413-77A
Number of Tx,Rx		2 , 2	2 , 2	2 , 2	2 , 2
Operational Port Count		64	64	64	64
Position		3	3	3	3
Transmitter Id		19931420	19931421	19931422	19931423
Source		VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth		100, 60	100, 60	100, 60	100, 60
Ant. Dimensions H x W x D(inch)		29.53 x 15.75 x 5.51	29.53 x 15.75 x 5.51	29.53 x 15.75 x 5.51	29.53 x 15.75 x 5.51
Weight(lb)		55.1	55.1	55.1	55.1

Callsigns Per Antenna

Sector	Make	Model	Ant CL Height AG	Ant Tip Height	Azimuth	Elect Down-tilt	Mech Down-tilt	Gain	Bandwidth	Regulator y Power	700	850	1900	2100	28 GHz	31 GHz	39 GHz	LSub-6	CBRS
01	JMA	MX10FRO640-03	139	142	10	2	0	14.45	40	120.44	WQJQ689								
02	JMA	MX06FRO660-03	139	142	110	4	0	12.05	57.1	70.89	WQJQ689								
03	JMA	MX06FRO660-03	139	142	240	6	0	12.15	57.4	70.89	WQJQ689								
04	JMA	MX10FRO640-03	139	142	315	2	0	14.45	40	120.44	WQJQ689								
01	JMA	MX10FRO640-03	139	142	10	2	0	14.95	40	391.58		KNKA363							
0182	JMA	MX10FRO640-03	139	142	10	2	0	14.95	40	391.58		KNKA363							
0183	JMA	MX06FRO660-03	139	142	110	10	0	12.05	50.4	283.54		KNKA363							
0184	JMA	MX06FRO660-03	139	142	240	10	0	12.05	50.4	283.54		KNKA363							
0185	JMA	MX10FRO640-03	139	142	315	2	0	14.95	40	391.58		KNKA363							
02	JMA	MX06FRO660-03	139	142	110	10	0	12.05	50.4	283.54		KNKA363							
03	JMA	MX06FRO660-03	139	142	240	10	0	12.05	50.4	283.54		KNKA363							
04	JMA	MX10FRO640-03	139	142	315	2	0	14.95	40	391.58		KNKA363							
01	JMA	MX10FRO640-03	139	142	10	0	0	15.95	40	139.55			KNLF644,KNLH264,WQBT539						
02	JMA	MX06FRO660-03	139	142	110	2	0	15.75	57	133.21			KNLF644,KNLH264,WQBT539						
03	JMA	MX06FRO660-03	139	142	240	2	0	15.75	57	133.21			KNLF644,KNLH264,WQBT539						
04	JMA	MX10FRO640-03	139	142	315	0	0	15.95	40	139.55			KNLF644,KNLH264,WQBT539						
01	JMA	MX10FRO640-03	139	142	10	0	0	16.95	40	175.68				WQGA906,WQGB279					
02	JMA	MX06FRO660-03	139	142	110	2	0	16.05	50.4	142.73				WQGA906,WQGB279					
03	JMA	MX06FRO660-03	139	142	240	2	0	16.05	50.4	142.73				WQGA906,WQGB279					
04	JMA	MX10FRO640-03	139	142	315	0	0	16.95	40	175.68				WQGA906,WQGB279					
0182	Samsung	MT6413-77A	140.8	142	10	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	
0183	Samsung	MT6413-77A	140.8	142	110	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	

0184	Samsung	MT6413-77A	140.8	142	240	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	
0185	Samsung	MT6413-77A	140.8	142	315	3	0	23.35	105	869.87								WRNE581,WRNE582,WRNE583,WRNE584,WRNE585	
0182	Samsung	MT6413-77A	140.8	142	10	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
0183	Samsung	MT6413-77A	140.8	142	110	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
0184	Samsung	MT6413-77A	140.8	142	240	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
0185	Samsung	MT6413-77A	140.8	142	315	3	0	23.35	105	364.17								WRNE585,WRNE586,WRNE587,WRNE58	
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
19	JMA	MX10FRO640-03	139	142	10	2	0	12.75	40	8.45									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
20	Samsung	R0440CC_3550Mhz	136.5	136.9	110	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
21	Samsung	R0440CC_3550Mhz	136.5	136.9	240	9	0	10.37	68	4.88									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									
22	JMA	MX10FRO640-03	139	142	315	2	0	12.75	40	8.45									

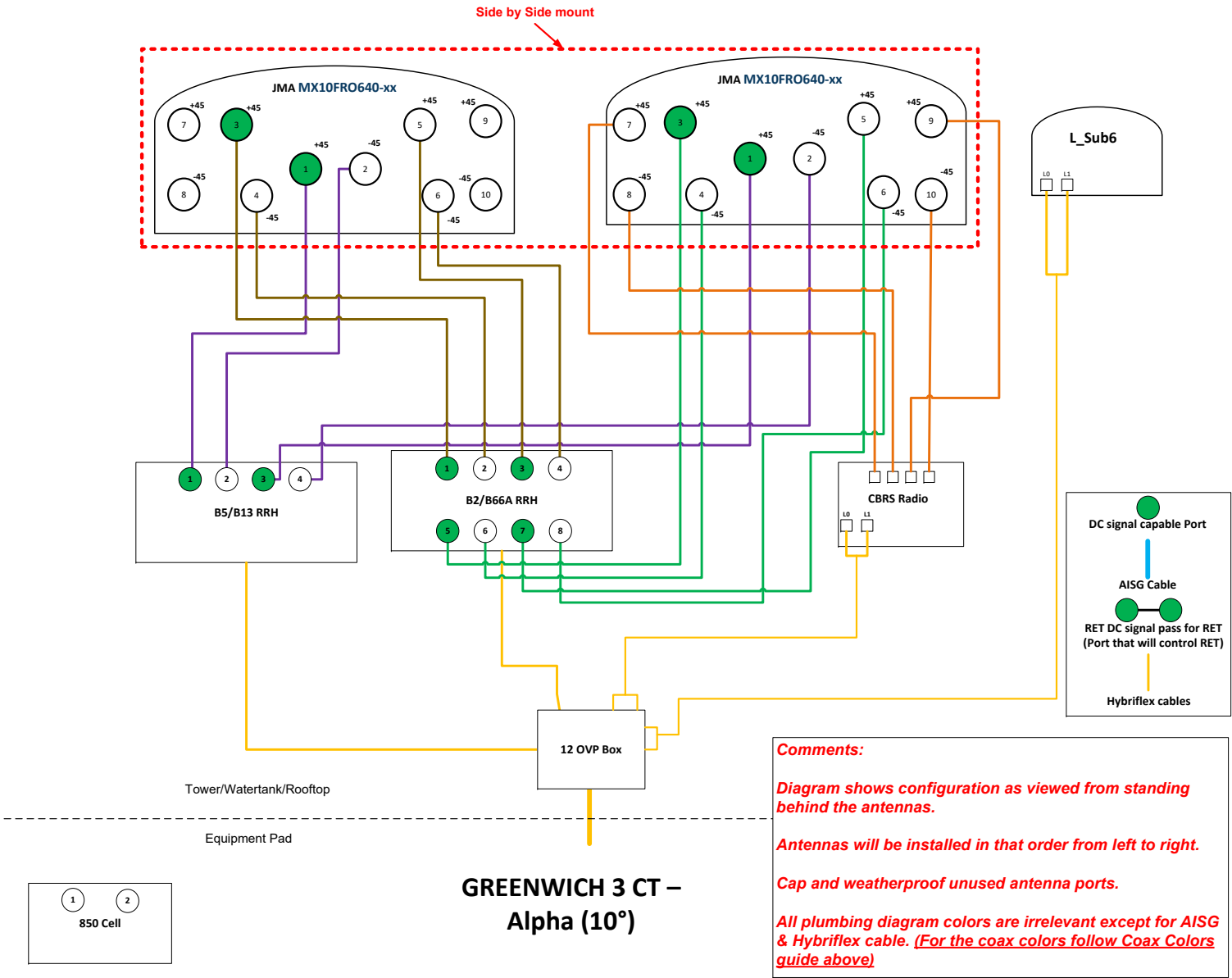
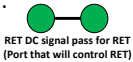
Callsigns																			
Callsign	Market	Radio Code	Market #	Block	State	County	License Name	Wholly Owner	Total MHZ	Freq Range 1	Freq Range 2	Freq Range 3	Freq Range 4	Regulator y Power	Threshold (W)	POPs/Sq. mil	Status	Action	Approve for Insvc
WQJQ689	Northeast	WU	REA001	C	CT	9001	Cellco Partnersh ip	Yes	22.000	746.000 - 757.000/.000	776.000 - 787.000/.000	746.000 - 757.000/.000	776.000 - 787.000/.000	120.44	1000	1532.14	proposed	added	1
KNKA363	Bridgepor t-Stamford-Norwalk-Danbury, CT	CL	CMA042	A	CT	9001	Cellco Partnersh ip	Yes	25.000	824.000 - 835.000/845.000 - 846.500	869.000 - 880.000/890.000 - 891.500	824.000 - 835.000/845.000 - 846.500	869.000 - 880.000/890.000 - 891.500	391.58	400	1532.14	proposed	added	1
WQBT539	New York, NY	CW	BTA321	C	CT	9001	Cellco Partnersh ip	Yes	10.000	1895.000 1900.000/.000 - .000	1975.000 1980.000/.000 - .000	1895.000 1900.000/.000 - .000	1975.000 1980.000/.000 - .000	139.55	1640	1532.14	proposed	added	1
KNLF644	New York, NY	CW	BTA321	C	CT	9001	AirTouch Cellular	Yes	20.000	1900.000 1910.000/.000 - .000	1980.000 1990.000/.000 - .000	1900.000 1910.000/.000 - .000	1980.000 1990.000/.000 - .000	139.55	1640	1532.14	proposed	added	1
KNLH264	New York, NY	CW	BTA321	F	CT	9001	Cellco Partnersh ip	Yes	10.000	1890.000 1895.000/.000 - .000	1970.000 1975.000/.000 - .000	1890.000 1895.000/.000 - .000	1970.000 1975.000/.000 - .000	139.55	1640	1532.14	proposed	added	1
CBRS_CALL SIGN	UNLICENSE	3.5 GHz	UNLICENSE	UNLICENSE	CT	UNLICENSE	UNLICENSE	UNLICENSE	UNLICENSE	UNLICENSE D - UNLICENSE D/UNLICENSE D - UNLICENSE	UNLICENSE D - UNLICENSE D/UNLICENSE D - UNLICENSE	- / -	- / -	8.45		1532.14	proposed	added	
WRLD511	D09001 - Fairfield , CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WRLD510	D09001 - Fairfield , CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WRLD509	D09001 - Fairfield , CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WRLD512	D09001 - Fairfield , CT	PL	D09001	0	CT	9001	Verizon Wireless Network Procurement LP	Yes	100.000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	3550.000 3650.000/.000 - .000	.000 - .000/.000 - .000	8.45	501	1532.14	proposed	added	1
WQGB279	Bridgepor t-Stamford-Norwalk-Danbury, CT	AW	CMA042	A	CT	9001	Cellco Partnersh ip	Yes	20.000	1710.000 1720.000/.000 - .000	2110.000 2120.000/.000 - .000	1710.000 1720.000/.000 - .000	2110.000 2120.000/.000 - .000	175.68	1640	1532.14	proposed	added	1

WRNE581	New York, NY	PM	PEA001	A1	CT	9001	Cellco Partnersh ip	Yes	20.000	3700.000 3720.000/ .000 - .000	.000 - .000/.000 - .000	3700.000 3720.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE582	New York, NY	PM	PEA001	A2	CT	9001	Cellco Partnersh ip	Yes	20.000	3720.000 3740.000/ .000 - .000	.000 - .000/.000 - .000	3720.000 3740.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE583	New York, NY	PM	PEA001	A3	CT	9001	Cellco Partnersh ip	Yes	20.000	3740.000 3760.000/ .000 - .000	.000 - .000/.000 - .000	3740.000 3760.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE584	New York, NY	PM	PEA001	A4	CT	9001	Cellco Partnersh ip	Yes	20.000	3760.000 3780.000/ .000 - .000	.000 - .000/.000 - .000	3760.000 3780.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WRNE585	New York, NY	PM	PEA001	A5	CT	9001	Cellco Partnersh ip	Yes	20.000	3780.000 3800.000/ .000 - .000	.000 - .000/.000 - .000	3780.000 3800.000/ .000 - .000	.000 - .000/.000 - .000	869.87	1640	1532.14	proposed	added	1
WQGA906	New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-	AW	BEA010	B	CT	9001	Cellco Partnersh ip	Yes	20.000	1720.000 1730.000/ .000 - .000	2120.000 2130.000/ .000 - .000	1720.000 1730.000/ .000 - .000	2120.000 2130.000/ .000 - .000	175.68	1640	1532.14	proposed	added	1
WRNE586	New York, NY	PM	PEA001	B1	CT	9001	Cellco Partnersh ip	Yes	20.000	3800.000 3820.000/ .000 - .000	.000 - .000/.000 - .000	3800.000 3820.000/ .000 - .000	.000 - .000/.000 - .000	364.17	1640	1532.14	proposed	added	1
WRNE587	New York, NY	PM	PEA001	B2	CT	9001	Cellco Partnersh ip	Yes	20.000	3820.000 3840.000/ .000 - .000	.000 - .000/.000 - .000	3820.000 3840.000/ .000 - .000	.000 - .000/.000 - .000	364.17	1640	1532.14	proposed	added	1
WRNE588	New York, NY	PM	PEA001	B3	CT	9001	Cellco Partnersh ip	Yes	20.000	3840.000 3860.000/ .000 - .000	.000 - .000/.000 - .000	3840.000 3860.000/ .000 - .000	.000 - .000/.000 - .000	364.17	1640	1532.14	proposed	added	1

Sector	Antenna Desc	Base Station ID	Sector ID
Alpha	700-850	065159_1_16	065159_1,065159_1_6
Alpha	AWS	065159_1_2	065159_1_2
Alpha	PCS	065159_1_4	065159_1_4
Alpha	CBRS	065159_19	065159_19,EXCLUDE
Beta	700	065159_2	065159_2
Beta	850	065159_2_6	065159_2_6
Beta	AWS	065159_2_2	065159_2_2
Beta	PCS	065159_2_4	065159_2_4
Beta	CBRS	065159_20	065159_20,EXCLUDE
Gamma	700	065159_3	065159_3
Gamma	850	065159_3_6	065159_3_6
Gamma	AWS	065159_3_2	065159_3_2
Gamma	PCS	065159_3_4	065159_3_4
Gamma	CBRS	065159_21	065159_21,EXCLUDE
Delta	700-850	065159_4_16	065159_4,065159_4_6
Delta			
Delta	AWS	065159_4_2	065159_4_2
Delta	PCS	065159_4_4	065159_4_4
Delta	CBRS	065159_22	065159_22,EXCLUDE



- Port 1 & 2 are for low band (698-896 MHz).
- Port 3,4,5, & 6 are for Mid band (1695-2360 MHz).
- Port 7,8,9,10 are for CBRS (3400-4200 MHz)
- Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for Mid band/CBRS.
- AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.
- Not all SBT ports are needed to control RET, only green port connection to green port will control RET.



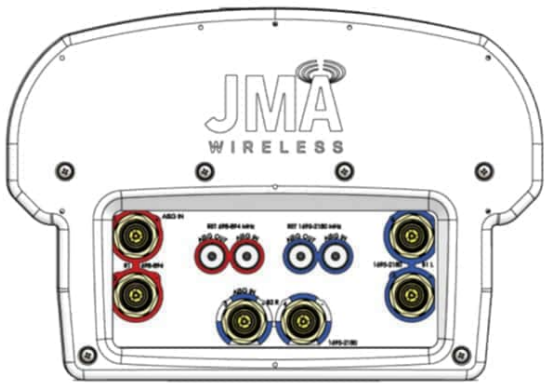
Comments:

Diagram shows configuration as viewed from standing behind the antennas.

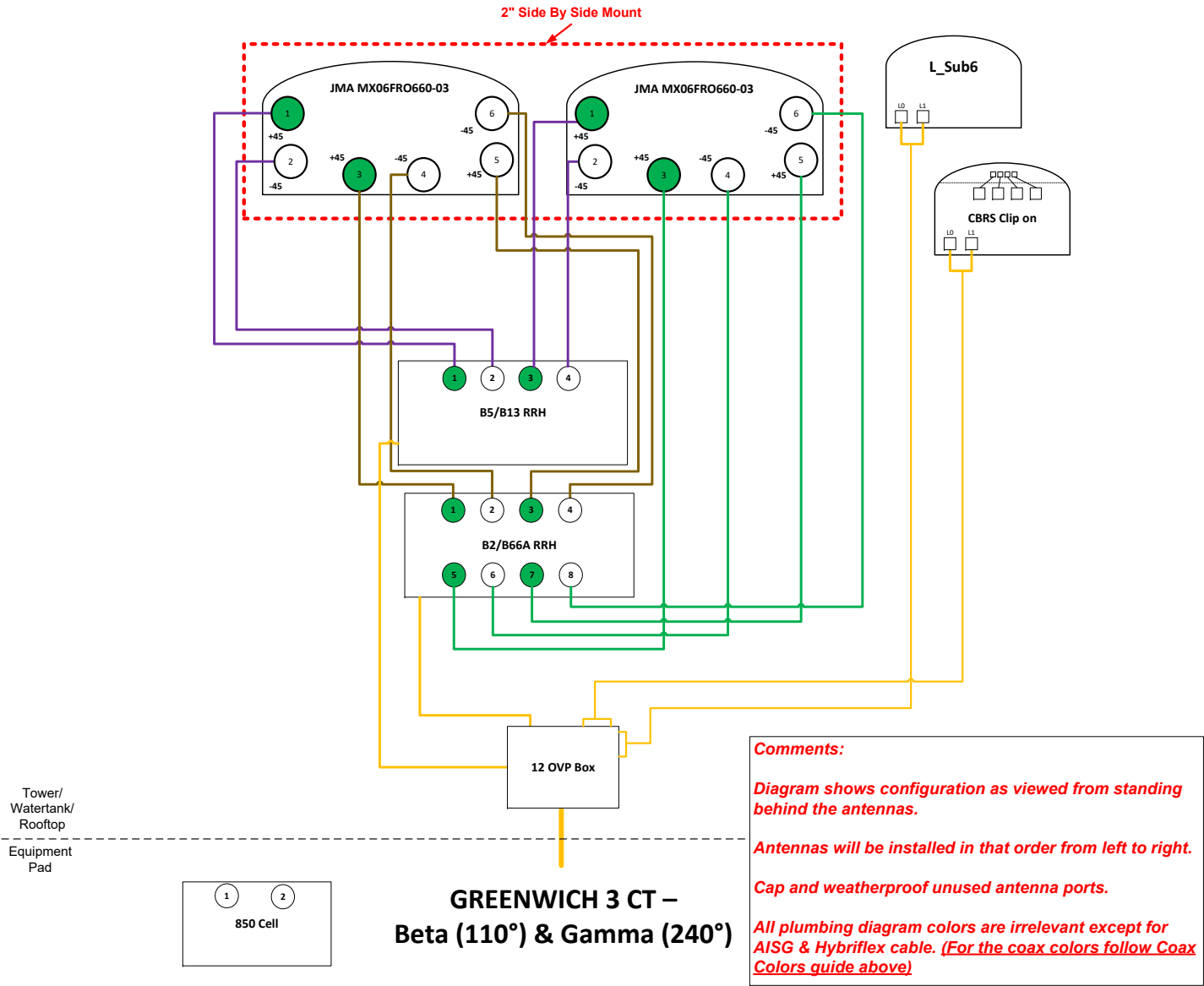
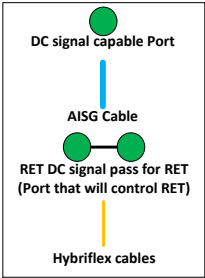
Antennas will be installed in that order from left to right.

Cap and weatherproof unused antenna ports.

All plumbing diagram colors are irrelevant except for AISG & Hybriflex cable. (For the coax colors follow Coax Colors guide above)

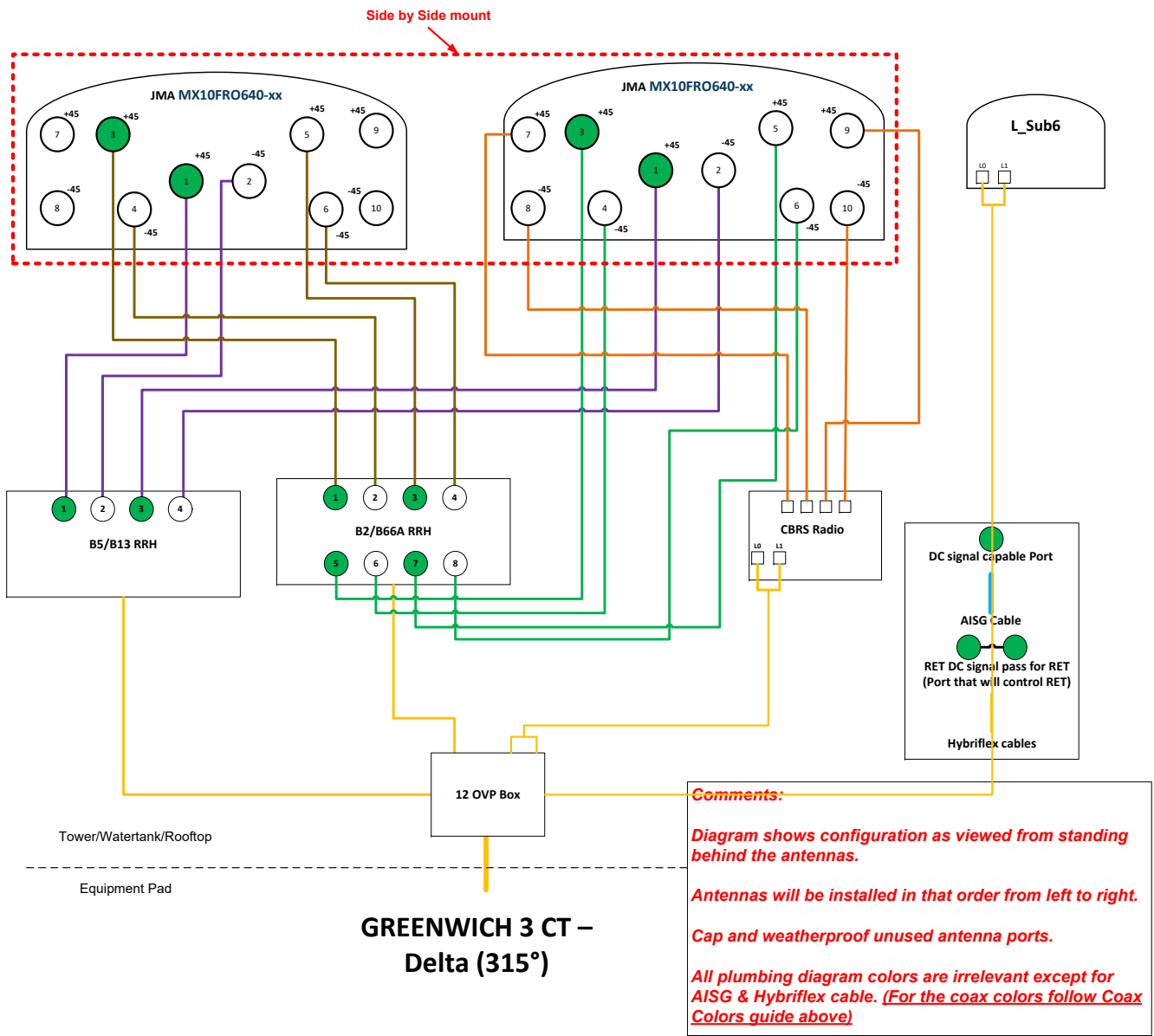
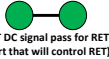


- Port 1 & 2 are for low band (698-896 MHz).
- Port 3,4,5, & 6 are for high band (1695-2360 MHz).
- Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for high band.
- AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.
- Not all SBT ports are needed to control RET, only green port connection to green port will control RET.





- Port 1 & 2 are for low band (698-896 MHz).
- Port 3,4,5, & 6 are for Mid band (1695-2360 MHz).
- Port 7,8,9,10 are for CBR5 (3400-4200 MHz)
- Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for Mid band/CBR5.
- AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.
- Not all SBT ports are needed to control RET, only green port connection to green port will control RET.



MX10FRO640-xx

NWAV™ X-Pol Ten-Port Antenna

X-Pol Ten-Port 6 ft, 40° Fast Roll Off, with Smart Bias Ts, 698-4200 MHz:

2 ports 698-894 MHz, 4 ports 1695-2180 MHz, and 4 ports 3400-4200 MHz

- Fast Roll Off (FRO™) azimuth beam pattern improves Intra- and Inter-cell SINR
- Excellent passive intermodulation (PIM) performance reduces harmful interference.
- Fully integrated (iRETs) with independent RET control for low band and mid band
- FET configured with internal RET for high band & ease of future network optimization.
- SON-Ready array spacing supports beamforming capabilities
- Suitable for 3G, 4G, and 5G interface technologies
- Integrated Smart Bias-Ts reduce leasing costs



NWAV™

Fast Roll-Off antennas increase data throughput without compromising coverage

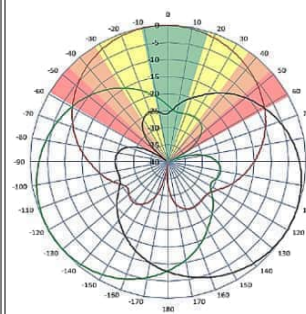
The horizontal beam produced by Fast Roll-Off (FRO) technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors.

Non-FRO antenna

Large traditional antenna pattern overlap creates harmful interference.

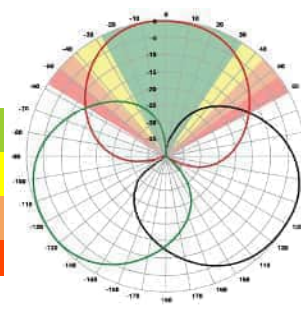
JMA's FRO antenna pattern minimizes overlap, thereby minimizing interference.

JMA FRO antenna



LTE throughput	SINR	Speed (bps/Hz)	Speed increase	CQI
Excellent	>18	>4.5	333+%	8-10
Good	15-18	3.3-4.5	277%	6-7
Fair	10-15	2-3.3	160%	4-6
Poor	<10	<2	0%	1-3

The LTE radio automatically selects the best throughput based on measured SINR.



Electrical specification (minimum/maximum)	Ports 1, 2		Ports 3, 4, 5, 6		
Frequency bands, MHz	698-798	824-894	1695-1880	1850-1990	1920-2180
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	16.3	17.2	19.3	20.1	20.4
Horizontal beamwidth (HBW), degrees ¹	42	37	40	39	37
Front-to-back ratio, co-polar power @180°± 30°, dB	>25.0	>25.0	>28.0	>28.0	>28.0
X-Pol discrimination (CPR) at boresight, dB	>18.0	>15.0	>18	>18	>15
Vertical beamwidth (VBW), degrees ¹	13.1	11.8	6.0	5.7	5.3
Electrical downtilt (EDT) range, degrees	2-14		0-9		
First upper side lobe (USLS) suppression, dB ¹	≤-15.0	≤-15.0	≤-16.0	≤-16.0	≤-16.0
Cross-polar isolation, port-to-port, dB ¹	25	25	25	25	25
Max VSWR / return loss, dB	1.5:1 / -14.0		1.5:1 / -14.0		
Max passive intermodulation (PIM), 2x20W carrier, dBc	-153		-153		
Max input power per any port, watts	300		250		
Total composite power all ports (1-10), watts	1500				

¹ Typical value over frequency and tilt

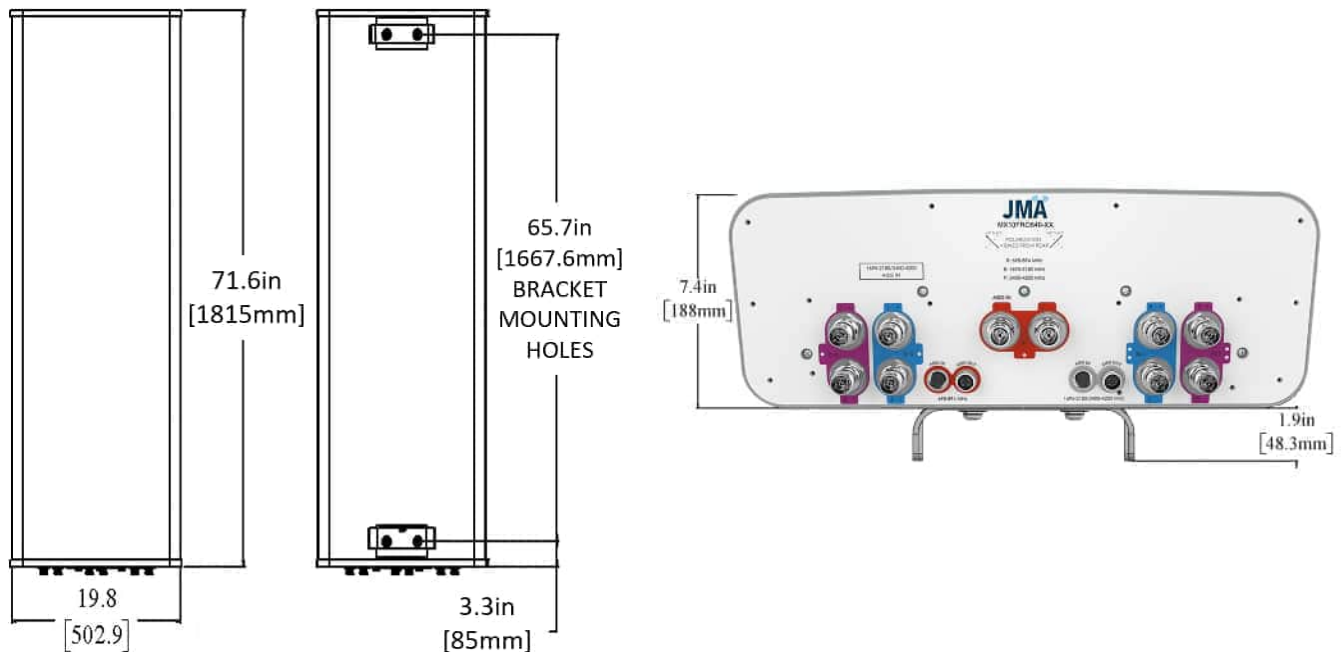
Mechanical specifications

Dimensions height/width/depth, inches (mm)	71.6/ 19.8/ 7.4 (1815/ 503/ 188)
Shipping dimensions length/width/height, inches (mm)	76.2/ 23.8/ 14.5(1935/ 605/ 368)
No. of RF input ports, connector type, and location	10 x 4.3-10 female, bottom
RF connector torque	96 lbf-in (10.85 N·m or 8 lbf-ft)
Net antenna weight, lb (kg)	76.3 (35)
Shipping weight, lb (kg)	115.9 (53)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	20.3 (9.2)
Range of mechanical up/down tilt	-2° to 12°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral, and rear wind loading @ 150 km/h, lbf (N)	183.3 (815), 40.7 (181), 276.8 (1231)
Equivalent flat plate @ 100 mph and Cd=2, sq ft	3.69

Front view

Back view

Bottom view



MX06FRO660-03

NWAV™ X-Pol Hex-Port Antenna

X-Pol Hex-Port 6 ft 60° Fast Roll Off antenna with independent tilt on 700 & 850 MHz:

2 ports 698-798, 824-894 MHz and 4 ports 1695-2180 MHz

- Fast Roll Off (FRO™) azimuth beam pattern improves Intra- and Inter-cell SINR
- Compatible with dual band 700/850 MHz radios with independent low band EDT without external diplexers
- Fully integrated (iRETs) with independent RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM air interface technologies
- Integrated Smart Bias-Ts reduce leasing costs



NWAV™

Fast Roll-Off antennas increase data throughput without compromising coverage

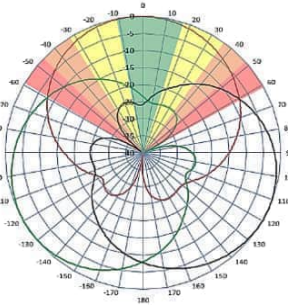
The horizontal beam produced by Fast Roll-Off (FRO) technology increases the Signal to Interference & Noise Ratio (SINR) by eliminating overlap between sectors.

Non-FRO antenna

Large traditional antenna pattern overlap creates harmful interference.

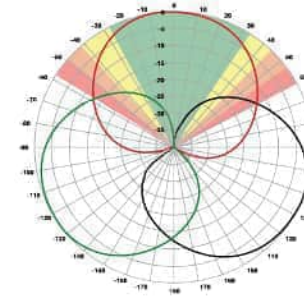
JMA's FRO antenna pattern minimizes overlap, thereby minimizing interference.

JMA FRO antenna



LTE throughput	SINR	Speed (bps/Hz)	Speed increase	CQI
Excellent	>18	>4.5	333+%	8-10
Good	15-18	3.3-4.5	277%	6-7
Fair	10-15	2-3.3	160%	4-6
Poor	<10	<2	0%	1-3

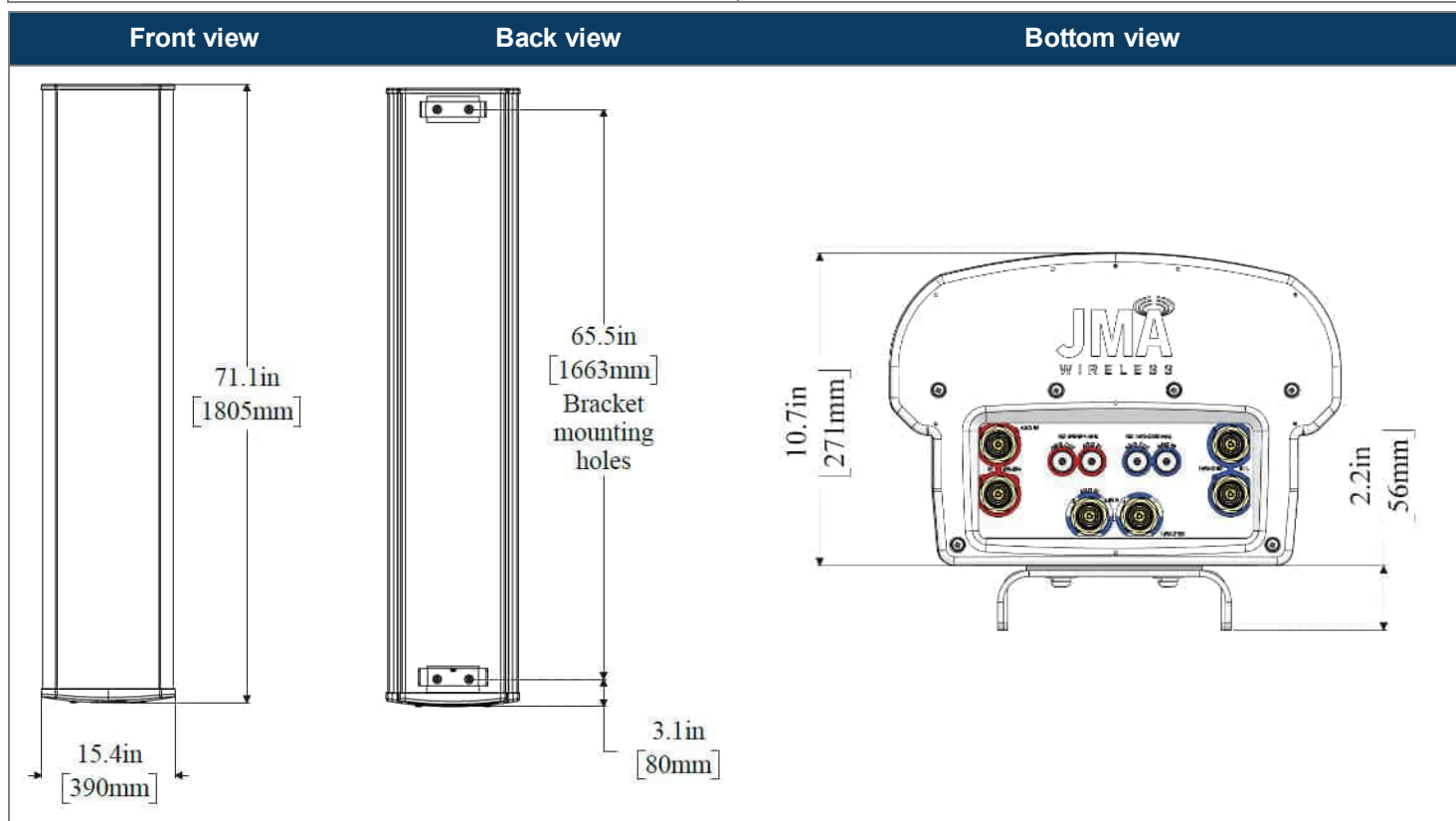
The LTE radio automatically selects the best throughput based on measured SINR.



Electrical specification (minimum/maximum)	Ports 1, 2		Ports 3, 4, 5, 6		
Frequency bands, MHz	698-798	824-894	1695-1880	1850-1990	1920-2180
Polarization	± 45°		± 45°		
Average gain over all tilts, dBi	14.4	14.0	17.6	18.0	18.2
Horizontal beamwidth (HBW), degrees	60.5	53.0	55.0	55.0	55.5
Front-to-back ratio, co-polar power @180°± 30°, dB	>24	>24.0	>25.0	>25.0	>25.0
X-Pol discrimination (CPR) at boresight, dB	>15.0	>14.2	>18	>18	>15
Sector power ratio, percent	<3.5	<3.0	<3.7	<3.8	<3.6
Vertical beamwidth (VBW), degrees ¹	13.1	11.8	6.0	5.5	5.5
Electrical downtilt (EDT) range, degrees	2-14	2-14	0-9		
First upper side lobe (USLS) suppression, dB ¹	≤-15.0	≤-16.5	≤-16.0	≤-16.0	≤-16.0
Cross-polar isolation, port-to-port, dB ¹	25	25	25	25	25
Max VSWR / return loss, dB	1.5:1 / -14.0		1.5:1 / -14.0		
Max passive intermodulation (PIM), 2x20W carrier, dBc	-153		-153		
Max input power per any port, watts	300		250		
Total composite power all ports, watts	1500				

¹ Typical value over frequency and tilt

Mechanical specifications	
Dimensions height/width/depth, inches (mm)	71.3/ 15.4/ 10.7 (1811/ 392/ 273)
Shipping dimensions length/width/height, inches (mm)	82/ 20/ 15 (2083/ 508/ 381)
No. of RF input ports, connector type, and location	6 x 4.3-10 female, bottom
RF connector torque	96 lbf·in (10.85 N·m or 8 lbf·ft)
Net antenna weight, lb (kg)	60 (27.0)
Shipping weight, lb (kg)	90 (41.0)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	18 (8.18)
Range of mechanical up/down tilt	-2° to 14°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral, and rear wind loading @ 150 km/h, lbf (N)	154 (685), 73 (325), 158 (703)
Equivalent flat plate @ 100 mph and Cd=2, sq ft	2.6



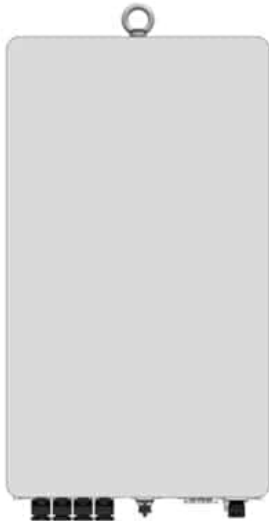
Ordering information	
Antenna model	Description
MX06FRO660-03	6F X-Pol HEX FRO 60° independent tilt 700/850 RET, 4.3-10 & SBT
Optional accessories	
AISG cables	M/F cables for AISG connections
PCU-1000 RET controller	Stand-alone controller for RET control and configurations

C-band 64T64R

SAMSUNG

Gen 2

Gen 2: Higher conducted power radio with reduced size/volume/weight vs Gen 1 and also SOC embedded for flexibility to support new features



※ Preliminary Design: External appearance and mechanical design can be subject to change

Gen 2. 64T64R C-band MMU Dimensions	
Size (WxHxD)	400 x 734 x 140 mm (15.75 x 28.90 x 5.51 inch)
Weight	26kg (57.3 lb)

Item	Gen 2 64T64R (MT6413-77A)
Air Technology	NR n77/TDD
Frequency	3700 – 3980 MHz
IBW	200 MHz
OBW	200 MHz
Carrier Bandwidth	20(HW ready)/40/60/80/100 MHz
# of Carriers	2 carriers
Layer	DL : 16L, UL : 16RX (8L)
RF Chain	64T64R
Antenna Configuration	4V16H with 192 AE
EIRP	80.5 dBm @320W (55 dBm + 25.5 dBi)
Conductive Power	320W
Spectrum Analyzer	TX/RX support
RX Sensitivity	Typical -97.8dBm @(1Rx, 18.36MHz with 30kHz,51RBs)
Modulation	DL 256QAM support, (DL 1024QAM with 1~2dB power back-off)
Function Split	DL/UL option 7-2x
Input Power	-48 VDC (-38 VDC to -57 VDC)
Power Consumption	1,287W (100% load, room temp.)
Size (WHD)	400 x 734 x 140 mm (15.75 x 28.90 x 5.51 inch)
Volume	41.1L
Weight	26kg (57.3 lb)
Operating Temperature	-40°C - 55°C (w/o solar load)
Cooling	Natural convection
Unwanted Emission	3GPP 38.104
	FCC 47 CFR 27.53 : < -13dBm/MHz
	< -40 dBm/MHz @ above 4 GHz
	< -50 dBm /MHz @ 4,040 ~ 4,050 MHz, < -60 dBm /MHz @ above 4,050 MHz
Optic Interface	15km, 4 ports (25Gbps x 4), SFP28, single mode, Bi-di (Option: Duplex)
Mounting Options	Pole, wall
NB-IoT	Not support
External Alarm	4RX
Fronthaul Interface	eCPRI

CBRS Clip-on Antenna for 4T4R RU

SAMSUNG

GEN-2 CLIP ON



Item		Specification
Frequency range (MHz)		3,550~3,700
Polarization		Dual, Slant $\pm 45^\circ$
Impedance (Ω)		50 Ω
Return loss		< 1.5:1(14 dB)
Port to Port Isolation (dB)		> 25
Gain(dBi)		12.5 $\pm$ 0.5
Horizontal 3dB beam width (°)		65 $\pm$ 5
Vertical 3dB beam width (°)		17 $\pm$ 3
Fixed Electrical Tilt (°)		8 $\pm$ 2°
Front to back ratio (dB) 180° $\pm$ 30°		$\geq$ 25
Cross polar ratio	dB@ Boresight	> 18
	dB@ $\pm 30^\circ$	> 10
	dB@ $\pm 60^\circ$	> 8
Max Power/Port(Watt)		200
PIM		< -145 dBc @ 2x5Watts
Size (WHD)		220 x 303.5 x 37 mm, (8.7 x 12 x 1.5 inch)
Volume		Less than 2.5L
Weight (W/o Solar Shield & finger guard)		3.3 lb (1.5kg)
Operating Temperature		-40°C (-40°F) ~ 55°C (131°F)
Dust and water ingress		IP55
RF Connector (Bottom side)		2.2-5 Male
* Notes :		
1. Fixed Electrical Tilt angle is the angle between the antenna mechanical boresight and the half-power beam axis in the elevation cut.		
2. Specifications maybe not applicable if enclosure(or shroud) is added, Need make further analysis based on specific scenario		

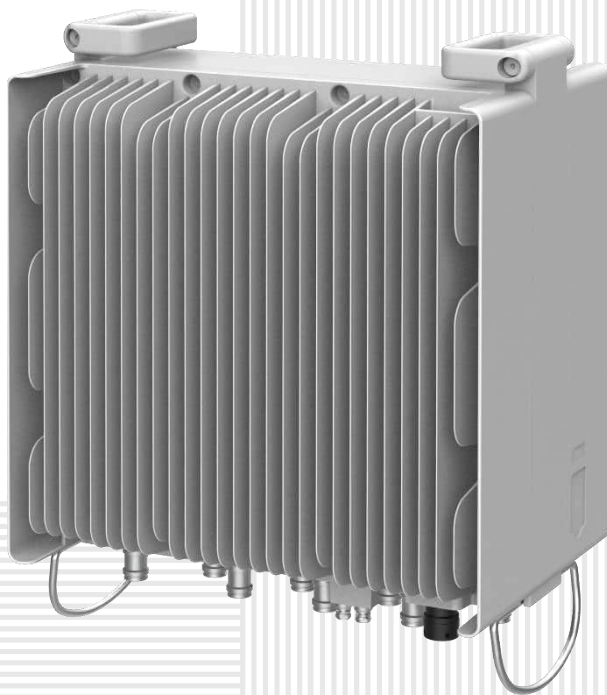
SAMSUNG

AWS/PCS MACRO RADIO

DUAL-BAND AND HIGH POWER
FOR MACRO COVERAGE

Samsung's future proof dual-band radio is designed to help effectively increase the coverage areas in wireless networks. This AWS/PCS 4T4R dual-band radio has 4Tx/4Rx to 2Tx/2Rx RF chains options and a total output power of 320W, making it ideal for macro sites.

Model Code RF4439d-25A



Homepage
samsungnetworks.com

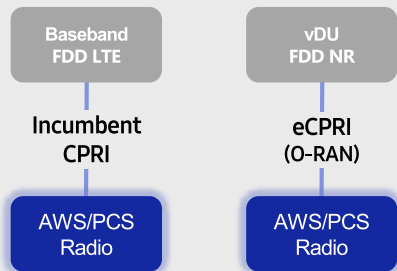


Youtube
www.youtube.com/samsung5g

Points of Differentiation

Continuous Migration

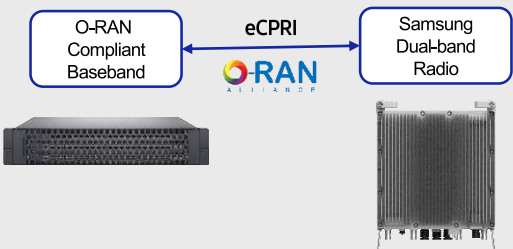
Samsung's AWS/PCS macro radio can support each incumbent CPRI interface as well as advanced eCPRI interfaces. This feature provides installable options for both legacy LTE networks and added NR networks.



O-RAN Compliant

A standardized O-RAN radio can help in implementing cost-effective networks, which are capable of sending more data without compromising additional investments.

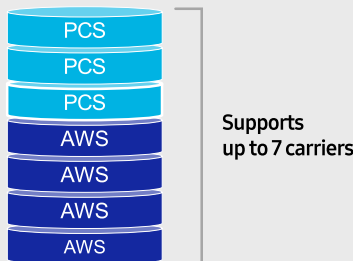
Samsung's state-of-the-art O-RAN technology will help accelerate the effort toward constructing a solid O-RAN ecosystem.



Optimum Spectrum Utilization

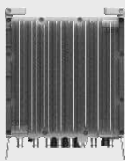
The number of required carriers varies according to site (region). Supporting many carriers is essential for using all frequencies that the operator has available.

The new AWS/PCS dual-band radio can support up to 3 carriers in the PCS (1.9GHz) band and 4 carriers in the AWS (2.1GHz) band, respectively.



Brand New Features in a Compact Size

Samsung's AWS/PCS macro radio offers several features, such as dual connectivity for baseband for both CDU and vDU, O-RAN capability, more carriers and an enlarged PCS spectrum, combined into an incumbent radio volume of 36.8L.



- 2 FH connectivity
- O-RAN capability
- More carriers and spectrum

Same as an incumbent radio volume

Technical Specifications

Item	Specification
Tech	LTE / NR
Brand	B25(PCS), B66(AWS)
Frequency Band	DL: 1930 – 1995MHz, UL: 1850 – 1915MHz DL: 2110 – 2200MHz, UL: 1710 – 1780MHz
RF Power	(B25) 4 × 40W or 2 × 60W (B66) 4 × 60W or 2 × 80W
IBW/OBW	(B25) 65MHz / 30MHz (B66) DL 90MHz, UL 70MHz / 60MHz
Installation	Pole, Wall
Size/ Weight	14.96 x 14.96 x 10.04inch (36.8L) / 74.7lb

700/850 4T4R Macro 320W ORU - New Filter (RF4461d-13A)

SAMSUNG

Specifications



* 5MHz supporting in B13(700MHz) depends on 3GPP std. and UE capability.
External filters in interferer and victim sides for Mexican boarder to support 5MHz service need to be considered
** Finger guard is not needed.

Item	Specification	
Air Interface	LTE, NR(HW resource ready)	
Band	Band13 (700MHz)	Band5 (850MHz)
Frequency	DL: 746~756MHz	DL: 869~894MHz
	UL: 777~787MHz	UL: 824~849MHz
IBW	10MHz	25MHz
OBW	10MHz	25MHz
Carrier Bandwidth	LTE/NR 5*/10MHz	LTE 5/10MHz NR 5/10/15/20MHz
# of carriers	2C*	3C
Total # of carriers	4C + B13 (SDL) 1C	
RF Chain	4T4R/2T4R/2T2R/1T2R	
	2T2R+2T2R bi-sector	
RF Output Power	Total : 320W	
	4 x 40W or 2 x 60W	4 x 40W or 2 x 60W
Spectrum Analyzer	TX/RX Support	
RX Sensitivity	Typ. -104.5dBm @1Rx (25RBs 5MHz)	
Modulation	256QAM support, (1024QAM with 1~2dB power back-off)	
Input Power	-48VDC (-38VDC to -57VDC)	
Power Consumption	1,165 Watt @ 100% RF load, room temperature	
Size (WHD)	380 x 380 x 260 mm (14.96 x 14.96 x 10.23 inch)	
Volume	37.5 L	
Weight (W/o Solar Shield & finger guard)	35.9 kg (79.1 lb)	
Operating Temperature	-40°C (-40°F) ~ 55°C (131°F) (Without solar load)	
Cooling	Natural convection	
Unwanted Emission	3GPP 36.104	3GPP 36.104
	FCC 47 CFR 27.53 c), f)	FCC 47 CFR 22.917
	-	-69 dBm/100 kHz per path @ .896 ~901MHz
CPRI Cascade	Not supported	
Optic Interface	20km, 2 ports (9.8Gbps x 2), SFP+, single mode, Duplex (Option: Bi-di)	
RET & TMA Interface	AISG 3.0	
Bias-T	4 ports (2 ports per band)	
Mounting Options	Pole, wall	
NB-IoT	2GB+21B or 41B	2SA+2GB or 2GB+21B or 4GB
PIM Cancellation	Support	
# of antenna port	4	
External Alarm	4	
Fronthaul Interface	Opt. 8 CPRI / Opt. 7-2x selectable (not simultaneous support)	
CPRI compression	Not Support	

SAMSUNG

Samsung Micro Radio

CBRS(N48)
4T4R Micro Radio

Samsung's CBRS 4T4R Micro Radio provides mobile operators with a cost-effective solution to fill coverage gaps encountered when Macro Radios are in use.

Model Code RT4423-48A(DC)
RT4423-48B(AC)

57196



Homepage
[samsungnetworks.com](https://www.samsungnetworks.com)

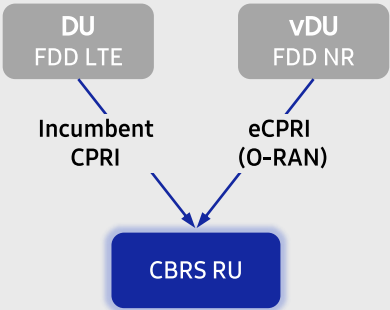


Youtube
www.youtube.com/samsung5g

Points of Differentiation

Dual Personality

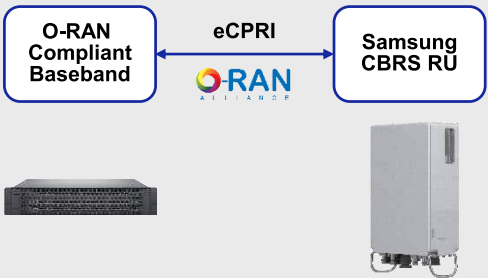
The new CBRS Radio supports existing CPRI and advanced eCPRI interfaces providing installation options for both legacy LTE and NR network equipment.



O-RAN Compliant

A standardized O-RAN radio supports implementing cost-effective networks capable of enhanced data throughput without compromising existing or new network investments.

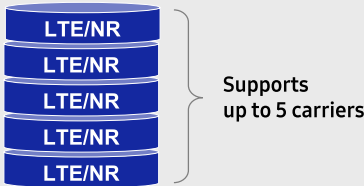
Samsung O-RAN products ensure state-of-the-art O-RAN technology will accelerate efforts for creating solid O-RAN ecosystems.



High Capacity

The number of carriers required varies according to site(region). Supporting multiple carriers is essential to customers as they seek to utilize all frequencies available to them.

The new CBRS radio can support up to 5 carriers which is an increase of 3 carriers over the capacity of the previous CBRS product.



Compact and Easy Installation

New CBRS RU is compact in its design with a volume of 6L and weighing only about 7kg.

This compact design allows for various installation options including, tower, rooftop, pole, wall and shroud.

A clip on antenna is available providing flexibility to installation requirements.



Technical Specifications

Item	Specification
Tech	LTE / NR
Band	B48, n48 / TDD
Frequency Band	3,550 – 3,700 MHz
RF Power	20 W (5 W x 4 Ports)
IBW/OBW	150MHz / 100MHz
Installation	Pole, Wall, Side by side (max 3 radio)
Size/ Weight	[Radio] w/o Clip-on antenna : 8.7 x 11.8 x 3.6 inch, 5.97L, 7kg w/ Clip-on antenna : 8.7 x 11.8 x 5.0 inch, 8.42L, 8.5kg *AC and DC type have same size and weight [Bracket Weight] Tilting & Swivel (EP97-02038A) : 2.51kg Fixed (EP97-02037A) : 1.31kg Side by side (EP97-02089A) : 8.0kg

DC Surge Protection for RRH/Integrated Antenna Radio Head **RVZDC-6627-PF-48**

Tower / Base / Rooftop

Raycap's flexible Tower, Base Stations and Rooftop protection and Distribution products provide protection for up to 12 Remote Radio Heads/Integrated Antennas. The solutions mitigate the risk of damage due to lightning and provide high levels of availability and reliability to radio equipment.



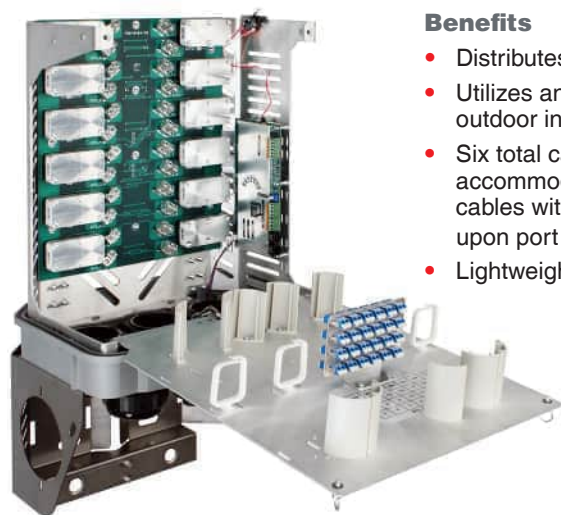
Mounting Bracket Included

Features

- Designed for distribution to 12 RRH circuits, DC power and fiber optics.
- Alarms for moisture detection and intrusion
- Digital Voltmeter with twelve (12) position switch to monitor each DC circuit
- Power alarms for wiring anomalies and power disruptions
- Employs the Strikesorb® 30-V1-2CFV Surge Protective Device (SPD) specifically designed for the Remote Radio Head (RRH) installation environment and certified for use in DC applications and at low DC operating voltages (48V)
- The Strikesorb 30-V1-2CFV is a Class I SPD certified by VDE per the IEC 61643-11 standard as suitable for installation in areas where direct lightning exposure is expected. Strikesorb 30-V1-2CFV is able to withstand direct lightning currents of up to 12.5kA (10/350) and induced surge currents of up to 60kA (8/20)
- Provides very low let through / clamping voltage - unique for a Class I product - as it does not employ spark gaps or other switching elements. Strikesorb offers unique protection levels to the RRH equipment as well as the Base Band Units
- RS485 communication link uses two (2) twisted pair (+ground) wires per hybrid cable, and communicates all voltage, boost system and alarm data
- Patent pending design

Benefits

- Distributes DC up to 12 Remote Radio Heads and connects up to 24 LC fiber pairs
- Utilizes an IP 67 rated enclosure, also rated to NEBS and UL, allowing for indoor or outdoor installation on a roof or tower top
- Six total cable ports for cable access with custom configurable UL rated glands that accommodate varying diameters of hybrid (combined power and fiber optic) or standard cables with diameters up to 2" (will fit most standard 1 5/8" coax class cables), depending upon port configuration
- Lightweight aerodynamic design provides maximum flexibility for tower top installation



Strikesorb
30-V1-2CFV

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G02-01-033 190108

DC Surge Protection for RRH/Integrated Antenna Radio Head **RVZDC-6627-PF-48**

Tower / Base / Rooftop

Electrical

Model Numbers	RVZDC-6627-PF-48
Nominal Operating Voltage	48 VDC
Nominal Discharge Current [I_n]	20kA 8/20 μ s
Maximum Surge Current [I_{max}]	60kA 8/20 μ s
Maximum Impulse (Lightning) Current per IEC 61643-11	12.5 kA 10/350 μ s
Maximum Continuous Operating Voltage [U_c]	75 VDC
Maximum System Operating Voltage	-70 VDC
Voltage Protection Rating (VPR) per UL 1449 4th Edition	330V
Protection Class as per IEC 61643-11	Class I
Power Alarm	cross polarity, short circuit, or power outage
Intrusion Sensor	microswitch
Moisture Sensor	infrared moisture detector
Strikesorb Module Type	30-V1-2CFV Strikesorb modules installed to protect 12 Remote Radio Heads
Power Boost Ready	RS485 twisted pair connection available

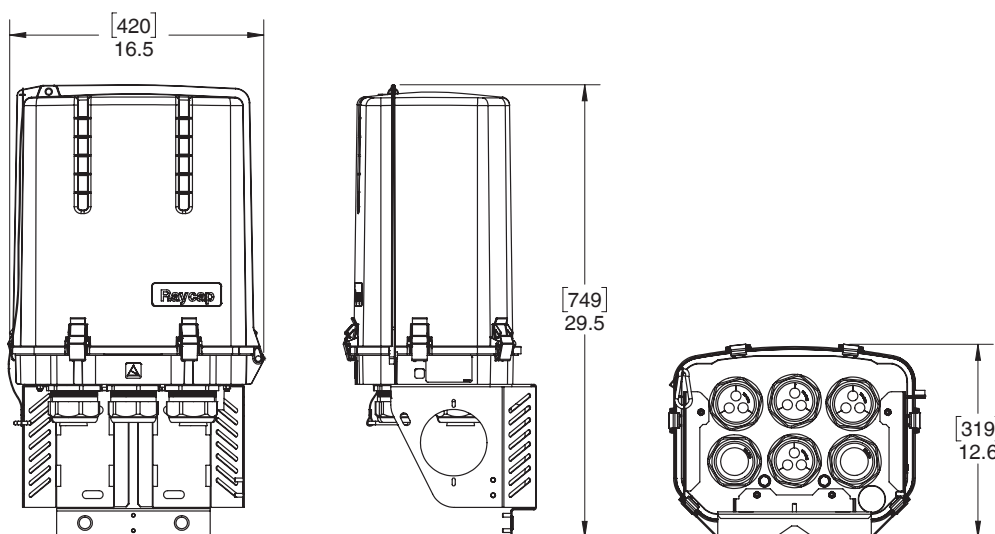
Mechanical

Suppression Connection Method	Compression lug, #14 - #2 AWG (2 mm ² - 33 mm ²)
Fiber Connection Method	LC-LC Single mode
Pressure Equalizing Vent	Gore™ Vent
Environmental Rating	IP 67
Operating Temperature	-40° C to +80° C
UV Resistant	Yes
Dimensions (L x W x H)	12.6" x 16.5" x 29.5" [319mm x 420mm 749mm]
Weight	System: 32 lbs (14.51 kg)
Combined Wind Loading	150mph (sustained); 185 lbs (823 N)

Standards Compliance

Strikesorb modules are compliant to the following Surge Protective Device (SPD) Standards	
Standards	UL 1449 4 th Edition, IEC 61643-11:2011, EN 61643-11:2012, IEEE C62.11, IEEE C62.41.2, IEEE C62.45 NEBS certified to: GR-63-CORE Issue 4, GR-1089-CORE Issue 6, GR-3108-CORE Issue 3, GR-487-CORE Issue 4, GR-950-CORE Issue 1

Product Diagram



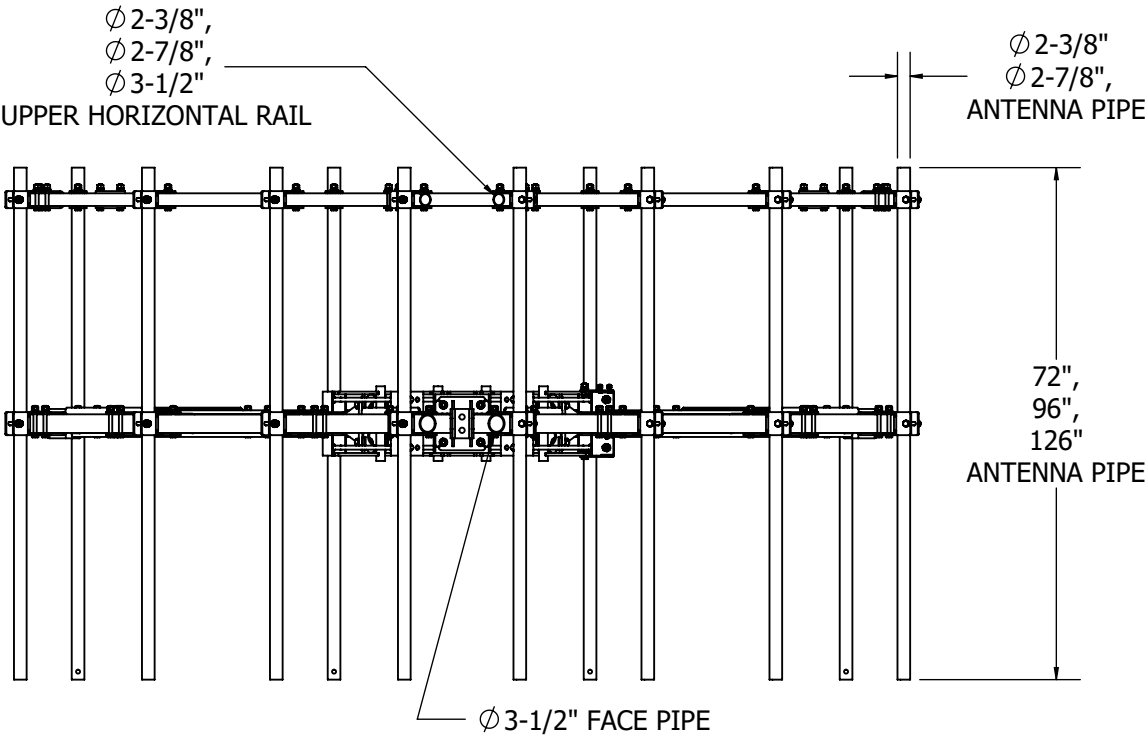
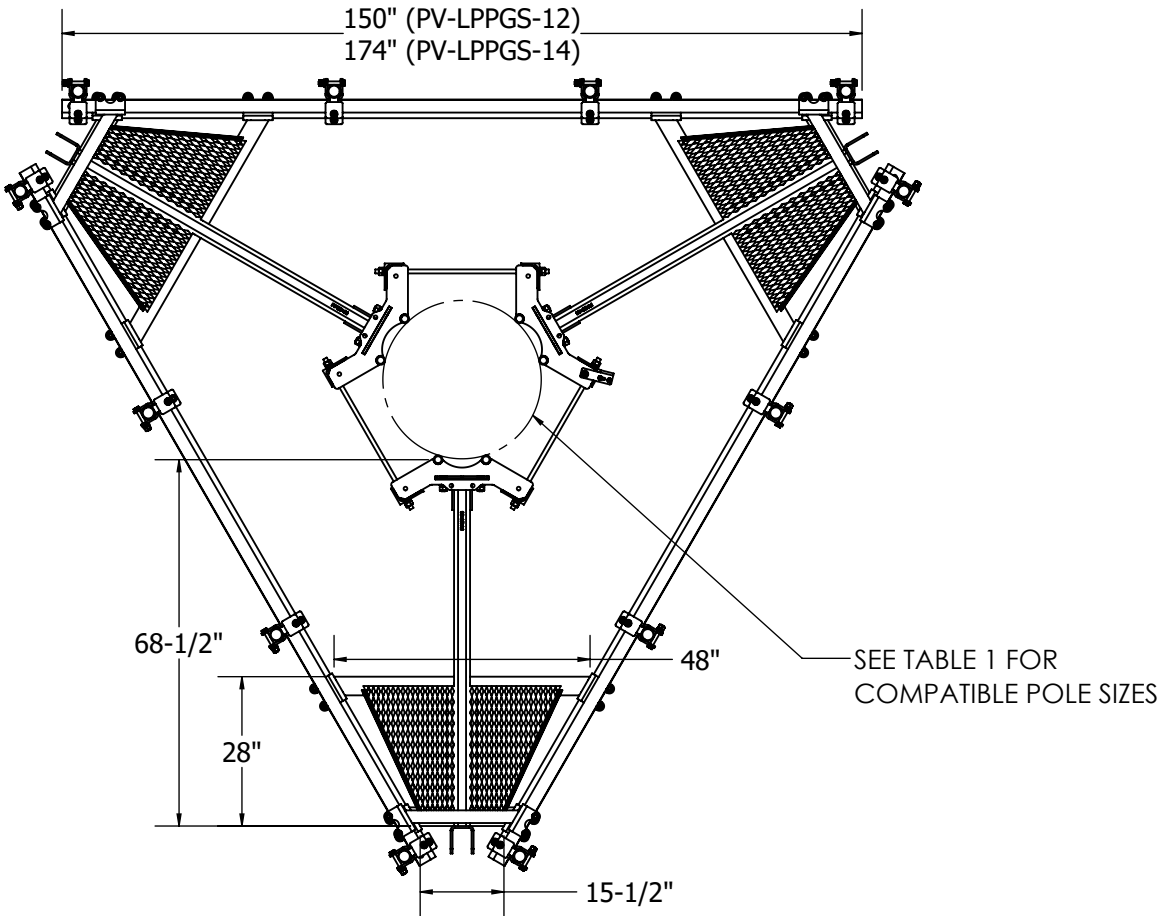
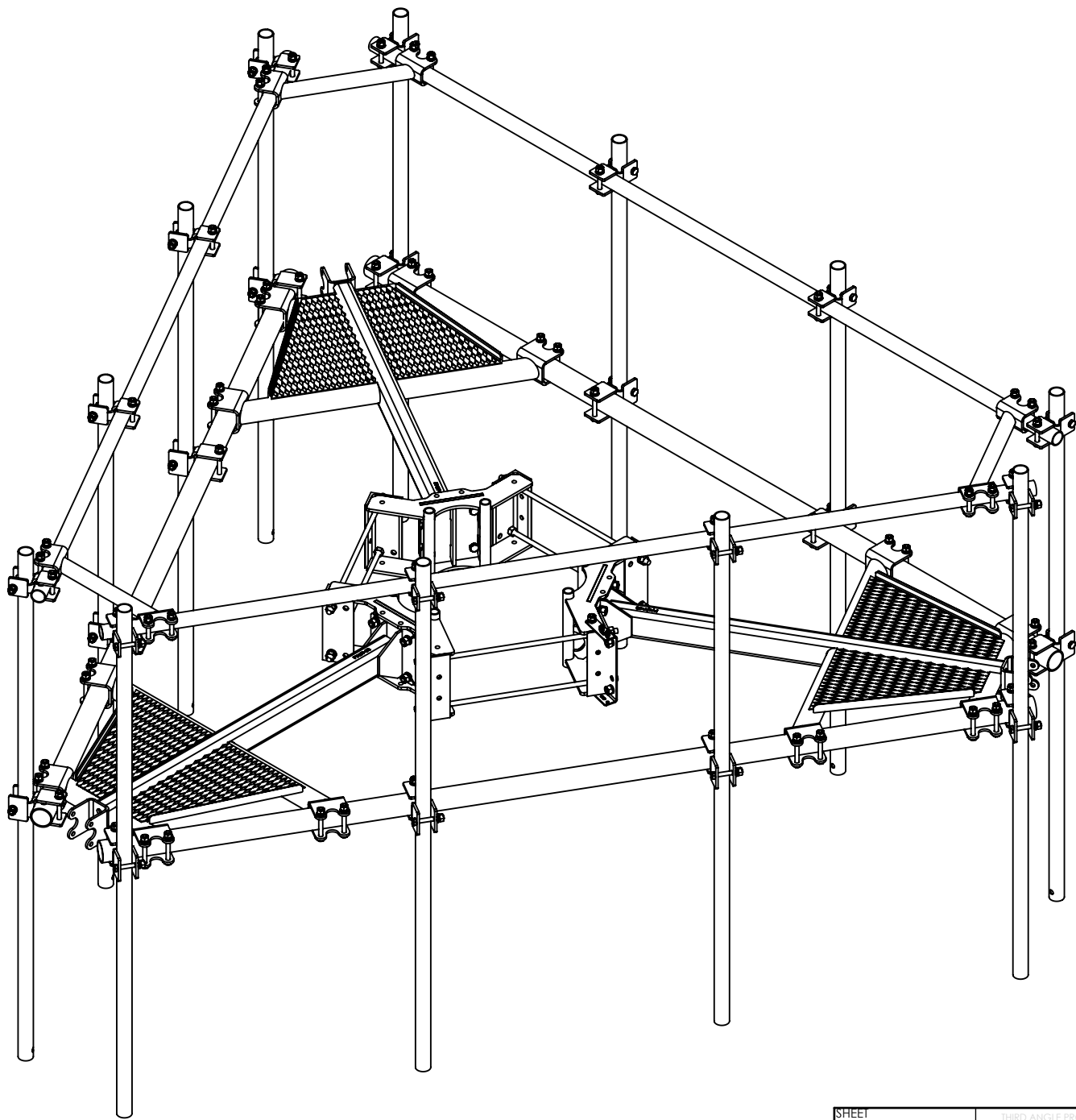
AWG=American Wire Gauge

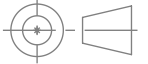



G02-01-033 190108

PV-LPPGS
MONOPOLE GUARDIAN MOUNT

SEE SHEET 2 - TABLE 1 FOR FULL CONFIGURATION DETAILS



SHEET 1 OF 17	THIRD ANGLE PROJECTION 	CATEGORY 02_Monopole	11	BOM TABLES UPDATED - BASE KITS	12/29/22	
		SERIES 01_Triangular	10	ADDED SEPARATE EPA & WEIGHTS TABLE	2/10/22	
6/23/2023	SCALE 1:36	TYPE PV-LPPGS_GUARDIAN	9	ACC1 REPLACE ACC2, PV-CMX-CG-BO REPLACE 115-242	3/16/21	MONOPOLE GUARDIAN MOUNT DOCUMENT NUMBER LPPGS-ENG-01-R11
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ±1/4°, BEND ±2° ALL OTHERS: ±1/16"		BY DJN	8	KKGS UPDATE	2/2/21	
		CHECKED SJS	7	ADDED ALL THREAD NOTE TO COLLARS REPLACED PKBK WITH PV-KKRS	11/11/20	REV 11
		STATUS APPROVED	REV	DESCRIPTION	DATE	

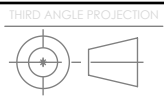
WEIGHTS & EPA

Table 3: Weight & EPA												
Part Number	Weight [lbs] per Radial Ice Thickness [in]						(EPA)A [sqft] per Radial Ice Thickness [in]					
	0	0.5	1	1.5	2	2.5	0	0.5	1	1.5	2	2.5
PV-LPPGS-12M-B	1210	1390	1600	1850	2150	3720	14.4	19.2	24.4	29.9	35.9	63.9
PV-LPPGS-14M-B	1480	1690	1950	2250	2590	4430	19.1	24.8	31.0	37.6	44.7	77.7
PV-LPPGS-14L-B	1500	1690	1920	2190	2510	4220	14.9	19.8	25.1	30.8	37.0	65.5
PV-LPPGS-12M-HR2-B	1400	1650	1970	2350	2800	5250	19.5	26.7	34.5	42.8	51.8	93.4
PV-LPPGS-12M-HR25-B	1500	1760	2090	2480	2940	5440	20.6	27.9	35.7	44.1	53.2	95.0
PV-LPPGS-12M-HR3-B	1580	1860	2200	2610	3080	5650	22.0	29.3	37.2	45.7	54.8	96.9
PV-LPPGS-14M-HR2-B	1700	2000	2370	2810	3330	6170	24.8	33.2	42.3	52.0	62.3	110.0
PV-LPPGS-14M-HR25-B	1800	2120	2500	2960	3500	6390	26.0	34.5	43.7	53.4	63.8	111.8
PV-LPPGS-14M-HR3-B	1900	2230	2630	3110	3660	6630	27.6	36.1	45.3	55.1	65.6	113.8
PV-LPPGS-14L-HR2-B	1710	1990	2340	2760	3250	5970	21.0	28.8	37.1	46.0	55.5	99.2
PV-LPPGS-14L-HR25-B	1820	2110	2470	2910	3420	6190	22.3	30.1	38.5	47.5	57.0	101.0
PV-LPPGS-14L-HR3-B	1910	2220	2600	3050	3580	6420	23.8	31.7	40.2	49.2	58.8	103.1
PV-LPPGS-12M-HR2-AP1	1930	2350	2890	3570	4360	8800	21.5	30.3	40.2	51.1	63.0	120.9
PV-LPPGS-12M-HR25-AP1	2030	2470	3020	3710	4520	9000	22.5	31.3	41.2	52.1	64.0	122.0
PV-LPPGS-12M-HR3-AP1	2120	2570	3150	3850	4670	9220	24.0	32.9	42.9	53.9	66.0	124.4
PV-LPPGS-14M-HR2-AP1	2220	2690	3290	4020	4890	9720	26.8	36.9	48.0	60.2	73.5	137.5
PV-LPPGS-14M-HR25-AP1	2340	2820	3440	4190	5070	9950	27.9	38.0	49.1	61.4	74.7	138.8
PV-LPPGS-14M-HR3-AP1	2440	2940	3580	4350	5250	10200	29.6	39.8	51.0	63.4	76.8	141.4
PV-LPPGS-14L-HR2-AP1	2230	2680	3260	3970	4810	9510	23.1	32.4	42.8	54.2	66.7	126.8
PV-LPPGS-14L-HR25-AP1	2350	2810	3410	4130	4990	9750	24.2	33.6	44.0	55.4	67.9	128.0
PV-LPPGS-14L-HR3-AP1	2450	2930	3540	4290	5160	9990	25.9	35.4	45.9	57.4	70.0	130.6
PV-LPPGS-12M-HR2-AP3	2160	2610	3180	3880	4710	9260	21.8	30.6	40.6	51.5	63.5	121.7
PV-LPPGS-12M-HR25-AP3	2260	2730	3310	4020	4860	9460	22.7	31.6	41.6	52.6	64.5	122.8
PV-LPPGS-12M-HR3-AP3	2360	2840	3440	4170	5020	9680	24.2	33.3	43.3	54.4	66.5	125.2
PV-LPPGS-14M-HR2-AP3	2460	2960	3590	4350	5250	10190	27.1	37.2	48.4	60.7	74.0	138.3
PV-LPPGS-14M-HR25-AP3	2570	3080	3720	4500	5420	10410	28.2	38.3	49.5	61.8	75.2	139.6
PV-LPPGS-14M-HR3-AP3	2670	3200	3870	4660	5590	10660	29.9	40.1	51.4	63.8	77.3	142.1
PV-LPPGS-14L-HR2-AP3	2480	2950	3560	4300	5170	9990	23.3	32.8	43.2	54.7	67.2	127.5
PV-LPPGS-14L-HR25-AP3	2580	3070	3690	4450	5330	10200	24.4	33.9	44.4	55.9	68.4	128.8
PV-LPPGS-14L-HR3-AP3	2690	3200	3840	4610	5520	10460	25.9	35.4	45.9	57.4	70.0	130.6
PV-LPPGS-12M-TKB3-AP4	3180	3810	4610	5580	6730	13010	31.1	43.5	57.2	72.5	89.1	170.2
PV-LPPGS-14M-TKB3-AP4	3720	4400	5260	6300	7520	14210	36.8	50.3	65.4	81.9	100.0	187.1
PV-LPPGS-14L-TKB3-AP4	3750	4410	5240	6260	7450	14020	33.0	45.9	60.2	76.0	93.1	176.4

Table 4: KKGS Weight & EPA													
Part Number	Weight [lbs] per Radial Ice Thickness [in]							(EPA)A [sqft] per Radial Ice Thickness [in]					
	0	0.5	1	1.5	2	2.5		0	0.5	1	1.5	2	2.5
PV-LPPGS-12M-HR2-K-B	1710	1990	2340	2760	3260	5970		22.5	30.8	39.6	49.1	59.3	106.2
PV-LPPGS-12M-HR25-K-B	1810	2100	2460	2890	3400	6170		23.6	31.9	40.9	50.4	60.6	107.9
PV-LPPGS-12M-HR3-K-B	1890	2190	2570	3020	3550	6370		25.0	33.4	42.4	52.0	62.3	109.7
PV-LPPGS-14M-HR2-K-B	2010	2330	2740	3230	3800	6900		27.8	37.3	47.4	58.3	69.8	122.8
PV-LPPGS-14M-HR25-K-B	2110	2450	2870	3370	3960	7120		29.1	38.6	48.8	59.7	71.3	124.6
PV-LPPGS-14M-HR3-K-B	2210	2570	3000	3520	4120	7350		30.6	40.2	50.5	61.4	73.1	126.7
PV-LPPGS-14L-HR2-K-B	2020	2330	2710	3170	3710	6690		24.1	32.9	42.3	52.3	63.0	112.1
PV-LPPGS-14L-HR25-K-B	2130	2450	2850	3320	3880	6920		25.3	34.2	43.6	53.8	64.5	113.9
PV-LPPGS-14L-HR3-K-B	2220	2560	2970	3470	4040	7150		26.9	35.8	45.3	55.5	66.3	115.9
PV-LPPGS-12M-HR2-K-AP1	2240	2690	3270	3980	4820	9520		24.6	34.4	45.3	57.4	70.5	133.7
PV-LPPGS-12M-HR25-K-AP1	2340	2800	3400	4120	4980	9730		25.5	35.4	46.4	58.4	71.5	134.9
PV-LPPGS-12M-HR3-K-AP1	2430	2940	3580	4370	5290	10380		28.9	39.4	51.0	63.7	77.5	143.4
PV-LPPGS-14M-HR2-K-AP1	2530	3020	3660	4440	5350	10440		29.9	40.9	53.2	66.5	81.0	150.4
PV-LPPGS-14M-HR25-K-AP1	2650	3160	3810	4600	5530	10670		31.0	42.1	54.3	67.7	82.2	151.6
PV-LPPGS-14M-HR3-K-AP1	2750	3280	3950	4760	5710	10920		32.7	43.9	56.2	69.7	84.3	154.2
PV-LPPGS-14L-HR2-K-AP1	2540	3020	3630	4380	5270	10240		26.1	36.5	48.0	60.5	74.2	139.6
PV-LPPGS-14L-HR25-K-AP1	2660	3150	3780	4540	5450	10470		27.2	37.7	49.1	61.7	75.4	140.9
PV-LPPGS-12M-HR2-K-AP3	2760	3070	3510	4080	4790	8930		24.8	34.7	45.7	57.8	71.0	134.5
PV-LPPGS-12M-HR25-K-AP3	2470	2790	3240	3830	4540	8730		25.8	35.7	46.7	58.9	72.0	135.6
PV-LPPGS-12M-HR3-K-AP3	2570	3080	3720	4480	5380	10310		27.3	37.3	48.5	60.7	74.0	138.0
PV-LPPGS-14M-HR2-K-AP3	2770	3300	3960	4770	5710	10920		30.1	41.3	53.5	67.0	81.5	151.1
PV-LPPGS-14M-HR25-K-AP3	2880	3420	4100	4920	5880	11130		31.2	42.4	54.7	68.1	82.7	152.4
PV-LPPGS-14M-HR3-K-AP3	2980	3540	4240	5080	6050	11380		32.9	44.2	56.6	70.1	84.8	155.0
PV-LPPGS-14L-HR2-K-AP3	2790	3290	3930	4710	5630	10710		26.4	36.8	48.4	61.0	74.7	140.4
PV-LPPGS-14L-HR25-K-AP3	2890	3410	4070	4860	5790	10930		27.5	38.0	49.5	62.2	75.9	141.6
PV-LPPGS-14L-HR3-K-AP3	3000	3540	4210	5030	5980	11190		28.9	39.4	51.0	63.7	77.5	143.4

* (EPA)A INCLUDES ALL STRUCTURAL MEMBERS INCLUDING CROSSOVER CONNECTIONS. IF DESIRED ADD ANTENNA PIPE PER TABLE BELOW.
t THESE MOUNTS ARE NOT CLASSIFIED TO TIA-5053 STANDARD

Antenna Pipe Additional EPA (Each)		
Size	(EPA)A (ft2)	(EPA)A 1/2" Radial Ice (ft2)
2-3/8" x 96"	1.5	2.2
2-7/8" x 96"	1.8	2.5
2-7/8" x 126"	2.4	3.3

SHEET	THIRD ANGLE PROJECTION	CATEGORY	11	BOM TABLES UPDATED - BASE KITS	12/29/22		
4 OF 17		SERIES	10	ADDED SEPARATE EPA & WEIGHTS TABLE	2/10/22		
6/23/2023	SCALE 1:48	TYPE	9	ACC1 REPLACE ACC2. PV-CMX-CG-BO REPLACE 115-242	3/16/21	MONOPOLE GUARDIAN MOUNT	
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ±1/4°, BEND ±2° ALL OTHERS: ±1/16"		BY	8	KKGS UPDATE	2/2/21		
		CHECKED	7	ADDED ALL THREAD NOTE TO COLLARS REPLACED PKBK WITH PV-KKRS	11/11/20	DOCUMENT NUMBER LPPGS-ENG-01-R11	
		STATUS	REV	DESCRIPTION	DATE		
							11

C:\PVMSteel\Catalog\SW Working Files\Engineering Details\



NORTHEAST > North East > New England > Wallingford-2 > GREENWICH 3 CT
GADASU, SHIVA - shiva.gadasu@verizonwireless.com - 20241022_145923

Project Details		Location Information	
Carrier Aggregation	N	Site Id	323974
Ecip	N	Search Ring#	
Project Name	RAD Center Change GREENWICH 3 CT - Temp install	E-NodeB ID#	065159
Project Alt Name	GREENWICH 3 CT - Temp install	PSLC#	0
Project Id	17407877	Switch Name	Wallingford-2
Designed Sector Carrier 4G	16	Tower Type	
Designed Sector Carrier 5G	0	Site Type	MACRO
Additional Sector Carrier 4G	0	Street Address	9 Sound Shore Drive
Additional Sector Carrier 5G	0	City	Greenwich
Suffix	Rev0_10.22.2024	State	CT
FP Solution Type & Tech Type	MODIFICATION;4G_Centerline Change	Zip Code	06830
		County	Fairfield
		Latitude	41.029711/ 41° 1' 46.960"
		Longitude	-73.59835/ 73° 35' 54.060"

Project Scope
This is a temporary setup to install 4 antennas below the Power lines at 70.0' while the mount gets replaced at the original platform location above the power lines to maintain service in the interim. Rev0_10.22.2024 : Initial Design

Antenna Summary

Added Antenna

700	850	1900	AWS	Make	Model	Centerline	Tip Height	Azimuth	Install Type	Quantity
LTE	LTE	LTE	LTE	JMA Wireless	MX06FIT665-02E	70	73	110(B),240(C)	PHYSICAL	2
LTE	LTE	LTE	LTE	COMMSCOPE	NHH-33B-R2B	70	73	10(A),315(D)	PHYSICAL	2

Removed Antenna

700	850	1900	AWS	Make	Model	Centerline	Tip Height	Azimuth	Install Type	Quantity
				DECIBEL PRODUCTS	DB854DG65ESX	139	142	350(1)(A),120(2)(B),240(3)(C)	SPARE	3
			LTE	ANDREW	HBXX-6516DS-A2M	139	141.1	350(1),120(2),240(3)	PHYSICAL	3
LTE	LTE	LTE		ANDREW	SBNHH-1D65B	139	142	350(1),120(2),240(3)	PHYSICAL	3

Retained Antenna

700	850	1900	AWS	Make	Model	Centerline	Tip Height	Azimuth	Install Type	Quantity
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Added: 4	Removed: 9	Retained: 0
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Non Antenna Summary

Added Non Antenna

Equipment Type	Location	700	850	1900	AWS	Make	Model	Install Type	Quantity
Coaxial Cables	Tower					STANDARD COAX	1-5/8" COAX	PHYSICAL	8
RRU	Shelter			LTE	LTE	Samsung	B2/B66A RRH ORAN (RF4439d-25A)	PHYSICAL	1
Triplexer	Tower	LTE	LTE	LTE	LTE	COMMSCOPE TECHNOLOGIES LLC	CBC61923T-DS-43	PHYSICAL	4
Triplexer	Shelter	LTE	LTE	LTE	LTE	COMMSCOPE TECHNOLOGIES LLC	CBC61923T-DS-43	PHYSICAL	4
RRU	Shelter	LTE	LTE			Samsung	RF4461d-13A	PHYSICAL	1

Removed Non Antenna

Equipment Type	Location	700	850	1900	AWS	Make	Model	Install Type	Quantity
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Retained Non Antenna

Equipment Type	Location	700	850	1900	AWS	Make	Model	Install Type	Quantity
RRU	Shelter			LTE	LTE	Samsung	B2/B66A RRH ORAN (RF4439d-25A)	PHYSICAL	3
RRU	Shelter	LTE	LTE			Samsung	B5/B13 RRH ORAN (RF4440d-13A)	PHYSICAL	3
In-Band	Shelter		LTE			Kaelus	BSF0020F3V1-1	PHYSICAL	3

Added: 18	Removed: 0	Retained: 9
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Services							
700 LTE	0000 (8804185)			0002 (9035637)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	NHH-33B-R2B	MX06FIT665-02E	MX06FIT665-02E	NHH-33B-R2B
Antenna Make	ANDREW	ANDREW	ANDREW	COMMSCOPE	JMA Wireless	JMA Wireless	COMMSCOPE
Centerline	139	139	139	70	70	70	70
DLEARFCN	5230	5230	5230	5230	5230	5230	5230
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	4	4	2	0	0	2
Tip Height	142	142	142	73	73	73	73
Regulatory Power	81.48	81.48	81.48	186.53	99.71	99.71	186.53
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	RF4461d-13A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2
Operational Port Count	0	0	0	0	0	0	0
Position				1	1	1	1
Transmitter Id	19844214	19844222	19844228	22639315	22639318	22639321	22639324
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	10	10	10	10	10	10	10
Ant. Dimensions H x W x D(inch)	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.0 x 11.88 x 7.08	72.0 x 25.19 x 9.29	72.0 x 12.2 x 7.5	72.0 x 12.2 x 7.5	72.0 x 25.19 x 9.29
Weight(lb)	40.51	40.51	50.59	94.6	40.0	40.0	94.6

Services							
850 LTE	0000 (8804185)			0002 (9035637)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	NHH-33B-R2B	MX06FIT665-02E	MX06FIT665-02E	NHH-33B-R2B
Antenna Make	ANDREW	ANDREW	ANDREW	COMMSCOPE	JMA Wireless	JMA Wireless	COMMSCOPE
Centerline	139	139	139	70	70	70	70
DLEARFCN	2450	2450	2450	2450	2450	2450	2450
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	4	4	2	0	0	2
Tip Height	142	142	142	73	73	73	73
Regulatory Power	160.62	160.62	160.62	446.47	217.16	217.16	446.47
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	B5/B13 RRH ORAN (RF4440d-13A)	RF4461d-13A
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2
Operational Port Count	0	0	0	0	0	0	0
Position				1	1	1	1
Transmitter Id	19844234	19844235	19844237	22639374	22639375	22639376	22639377
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	10	10	10	10	10	10	10
Ant. Dimensions H x W x D(inch)	72.0 x 11.88 x 7.08	72.0 x 11.88 x 7.08	72.0 x 11.88 x 7.08	72.0 x 25.19 x 9.29	72.0 x 12.2 x 7.5	72.0 x 12.2 x 7.5	72.0 x 25.19 x 9.29
Weight(lb)	40.51	40.51	40.51	94.6	40.0	40.0	94.6

Services							
1900 LTE	0000 (8804185)			0002 (9035637)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	SBNHH-1D65B	SBNHH-1D65B	SBNHH-1D65B	NHH-33B-R2B	MX06FIT665-02E	MX06FIT665-02E	NHH-33B-R2B
Antenna Make	ANDREW	ANDREW	ANDREW	COMMSCOPE	JMA Wireless	JMA Wireless	COMMSCOPE
Centerline	139	139	139	70	70	70	70
DLEARFCN	1100	1100	1100	1100	1100	1100	1100
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	0	0	2	0	0	2
Tip Height	142	142	142	73	73	73	73
Regulatory Power	145.15	145.15	145.15	237.59	138.59	138.59	237.59
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2
Operational Port Count	0	0	0	0	0	0	0
Position				1	1	1	1
Transmitter Id	19844217	19844224	19844229	22639316	22639319	22639322	22639325
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	20	20	20	20	20	20	20
Ant. Dimensions H x W x D(inch)	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.59 x 11.88 x 7.08	72.0 x 25.19 x 9.29	72.0 x 12.2 x 7.5	72.0 x 12.2 x 7.5	72.0 x 25.19 x 9.29
Weight(lb)	40.51	40.51	40.51	94.6	40.0	40.0	94.6

Services							
AWS LTE	0000 (8804185)			0002 (9035637)			
Sector	01	02	03	01	02	03	04
Azimuth	350	120	240	10	110	240	315
Cell/Enodeb-Id	065159	065159	065159	065159	065159	065159	065159
Antenna Model	HBXX-6516DS-A2M	HBXX-6516DS-A2M	HBXX-6516DS-A2M	NHH-33B-R2B	MX06FIT665-02E	MX06FIT665-02E	NHH-33B-R2B
Antenna Make	ANDREW	ANDREW	ANDREW	COMMSCOPE	JMA Wireless	JMA Wireless	COMMSCOPE
Centerline	139	139	139	70	70	70	70
DLEARFCN	2050	2050	2050	2050	2050	2050	2050
Mech Down-tilt	0	0	0	0	0	0	0
Elect Down-tilt	0	2	0	2	0	0	2
Tip Height	141.1	141.1	141.1	73	73	73	73
Regulatory Power	119.05	119.05	119.05	279.72	157.3	157.3	279.72
Transmitter Max Power	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm	47.8 dBm
TMA Make							
TMA Model							
RRU Make	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung	Samsung
RRU Model	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)	B2/B66A RRH ORAN (RF4439d-25A)
Number of Tx,Rx	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2	2 , 2
Operational Port Count	0	0	0	0	0	0	0
Position				1	1	1	1
Transmitter Id	19844220	19844226	19844231	22639317	22639320	22639323	22639326
Source	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP	VZNPP
Bandwidth	20	20	20	20	20	20	20
Ant. Dimensions H x W x D(inch)	50.9 x 12.0 x 6.49	50.9 x 12.0 x 6.49	50.9 x 12.0 x 6.49	72.0 x 25.19 x 9.29	72.0 x 12.2 x 7.5	72.0 x 12.2 x 7.5	72.0 x 25.19 x 9.29
Weight(lb)	30.53	30.53	30.53	94.6	40.0	40.0	94.6

Callsigns Per Antenna																			
Sector	Make	Model	Ant CL Height AG	Ant Tip Height	Azimuth	Elect Down-tilt	Mech Down-tilt	Gain	Bandwidth	Regulator y Power	700	850	1900	2100	28 GHz	31 GHz	39 GHz	LSub-6	CBRS
01	COMMSCOPE	NHH-33B-R2	70	73	10	2	0	15.24	36	186.53	WQJQ689								
02	JMA Wireless	MX06FIT665 -02E	70	73	110	0	0	12.55	67.2	99.71	WQJQ689								
03	JMA Wireless	MX06FIT665 -02E	70	73	240	0	0	12.55	67.2	99.71	WQJQ689								
04	COMMSCOPE	NHH-33B-R2	70	73	315	2	0	15.24	36	186.53	WQJQ689								
01	COMMSCOPE	NHH-33B-R2	70	73	10	2	0	16.1	32.5	446.47		KNKA363							
02	JMA Wireless	MX06FIT665 -02E	70	73	110	0	0	13.05	66	217.16		KNKA363							
03	JMA Wireless	MX06FIT665 -02E	70	73	240	0	0	13.05	66	217.16		KNKA363							
04	COMMSCOPE	NHH-33B-R2	70	73	315	2	0	16.1	32.5	446.47		KNKA363							
01	COMMSCOPE	NHH-33B-R2	70	73	10	2	0	17.57	33.75	237.59			KNLF644,KN LH264,WQBT 539						
02	JMA Wireless	MX06FIT665 -02E	70	73	110	0	0	15.65	66.9	138.59			KNLF644,KN LH264,WQBT 539						
03	JMA Wireless	MX06FIT665 -02E	70	73	240	0	0	15.65	66.9	138.59			KNLF644,KN LH264,WQBT 539						
04	COMMSCOPE	NHH-33B-R2	70	73	315	2	0	17.57	33.75	237.59			KNLF644,KN LH264,WQBT 539						
01	COMMSCOPE	NHH-33B-R2	70	73	10	2	0	18.17	32.75	279.72				WQGA906,WQ GB279					
02	JMA Wireless	MX06FIT665 -02E	70	73	110	0	0	16.25	64.5	157.3				WQGA906,WQ GB279					
03	JMA Wireless	MX06FIT665 -02E	70	73	240	0	0	16.25	64.5	157.3				WQGA906,WQ GB279					
04	COMMSCOPE	NHH-33B-R2	70	73	315	2	0	18.17	32.75	279.72				WQGA906,WQ GB279					

Callsigns																			
Callsign	Market	Radio Code	Market #	Block	State	County	License Name	Wholly Owner	Total MHZ	Freq Range 1	Freq Range 2	Freq Range 3	Freq Range 4	Regulatory Power	Threshold (W)	POPs/Sq. mil	Status	Action	Approve for Insvc
WQJQ689	Northeast	WU	REA001	C	CT	9001	Cellco Partnerships	Yes	22.000	746.000 - 757.000/.000	776.000 - 787.000/.000	746.000 - 757.000/.000	776.000 - 787.000/.000	186.53	1000	1532.14	proposed	added	1
KNKA363	Bridgeport-Stamford-Norwalk-Danbury, CT	CL	CMA042	A	CT	9001	Cellco Partnerships	Yes	25.000	824.000 - 835.000/845.000 - 846.500	869.000 - 880.000/890.000 - 891.500	824.000 - 835.000/845.000 - 846.500	869.000 - 880.000/890.000 - 891.500	446.47	1000	1532.14	proposed	added	1
KNLF644	New York, NY	CW	BTA321	C	CT	9001	AirTouch Cellular	Yes	20.000	1900.000 - 1910.000/.000	1980.000 - 1990.000/.000	1900.000 - 1910.000/.000	1980.000 - 1990.000/.000	237.59	1640	1532.14	proposed	added	1
WQBT539	New York, NY	CW	BTA321	C	CT	9001	Cellco Partnerships	Yes	10.000	1895.000 - 1900.000/.000	1975.000 - 1980.000/.000	1895.000 - 1900.000/.000	1975.000 - 1980.000/.000	237.59	1640	1532.14	proposed	added	1
KNLH264	New York, NY	CW	BTA321	F	CT	9001	Cellco Partnerships	Yes	10.000	1890.000 - 1895.000/.000	1970.000 - 1975.000/.000	1890.000 - 1895.000/.000	1970.000 - 1975.000/.000	237.59	1640	1532.14	proposed	added	1
WQGB279	Bridgeport-Stamford-Norwalk-Danbury, CT	AW	CMA042	A	CT	9001	Cellco Partnerships	Yes	20.000	1710.000 - 1720.000/.000	2110.000 - 2120.000/.000	1710.000 - 1720.000/.000	2110.000 - 2120.000/.000	279.72	1640	1532.14	proposed	added	1
WQGA906	New York-No. New Jer.-Long Island, NY-NJ-CT-PA-MA-	AW	BEA010	B	CT	9001	Cellco Partnerships	Yes	20.000	1720.000 - 1730.000/.000	2120.000 - 2130.000/.000	1720.000 - 1730.000/.000	2120.000 - 2130.000/.000	279.72	1640	1532.14	proposed	added	1

- Port 1 & 2 are for low band (698-896 MHz).
- Port 3,4,5, & 6 are for high band (1695-2360 MHz).
- Antenna Smart Bias Tee (SBT) is through port 1 for low band and port 3 for high band.
- AISG cable is only needed when drawn in the diagrams below, if it is not drawn then SBT is enough to control all RET motors.
- Not all SBT ports are needed to control RET, only green port connection to green port will control RET.

RET DC signal pass for RET
(Port that will control RET)

DC signal capable Port

AISG Cable

RET DC signal pass for RET
(Port that will control RET)

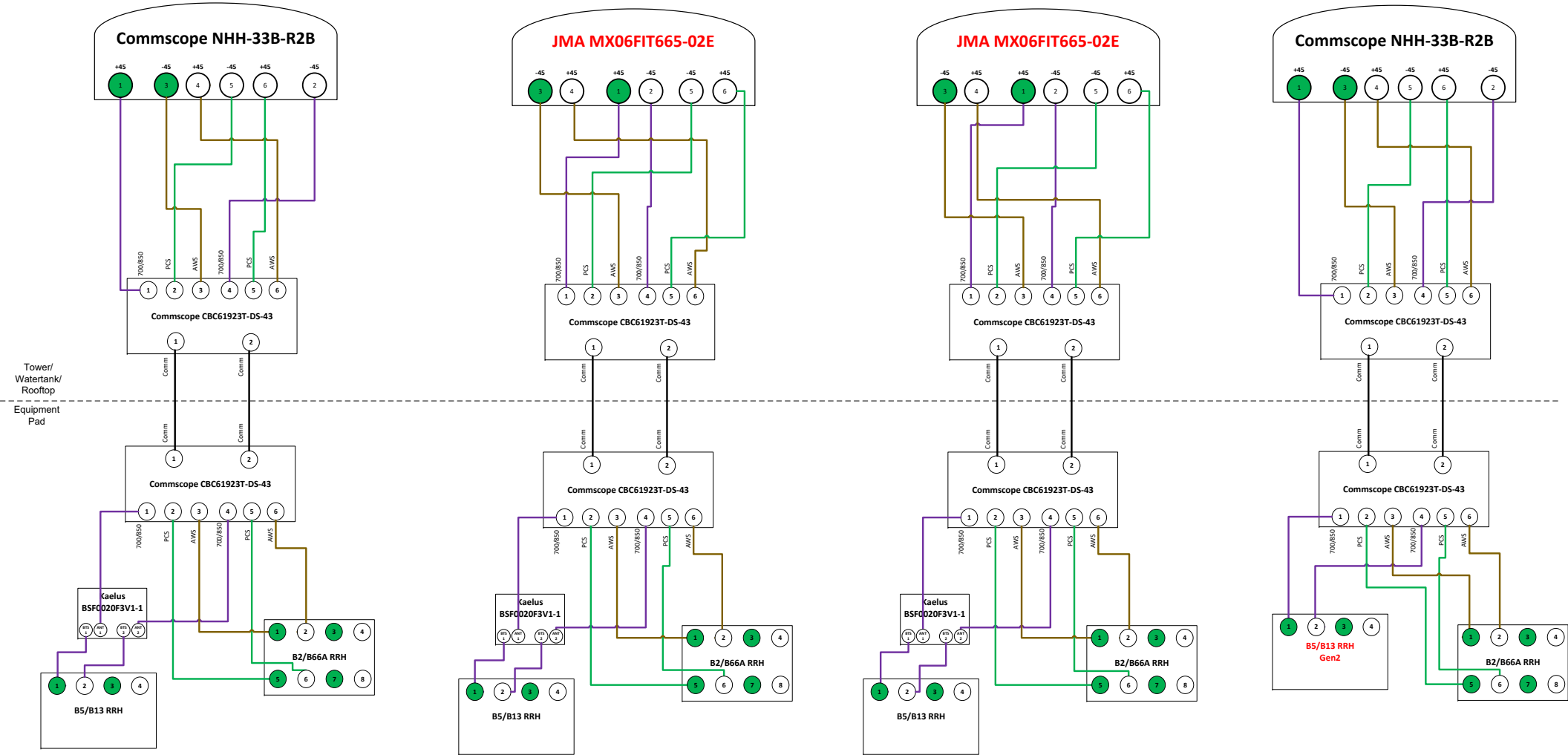
Hybriflex cables

Az 10°

Az 110°

Az 240°

Az 315°

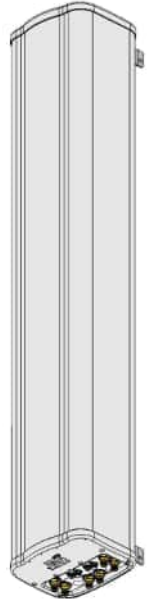


MX06FIT665-02

NWA^W™ X-Pol Antenna | Hex-Port | 6 ft | 65°

X-Pol, Hex-Port 6 ft 65° Form In Tighter with Smart Bias T *(2) 698–894 MHz & (4) 1695–2180 MHz*

- Excellent Passive Intermodulation (PIM) performance reduces harmful interference
- Fully integrated (iRETs) with *independent* RET control for low and high bands for ease of network optimization
- SON-Ready array spacing supports beamforming capabilities
- Suitable for LTE/CDMA/PCS/UMTS/GSM Air interface technologies
- Integrated Smart BIAS-Ts reduces leasing costs
- Optimized width for reduced wind loading

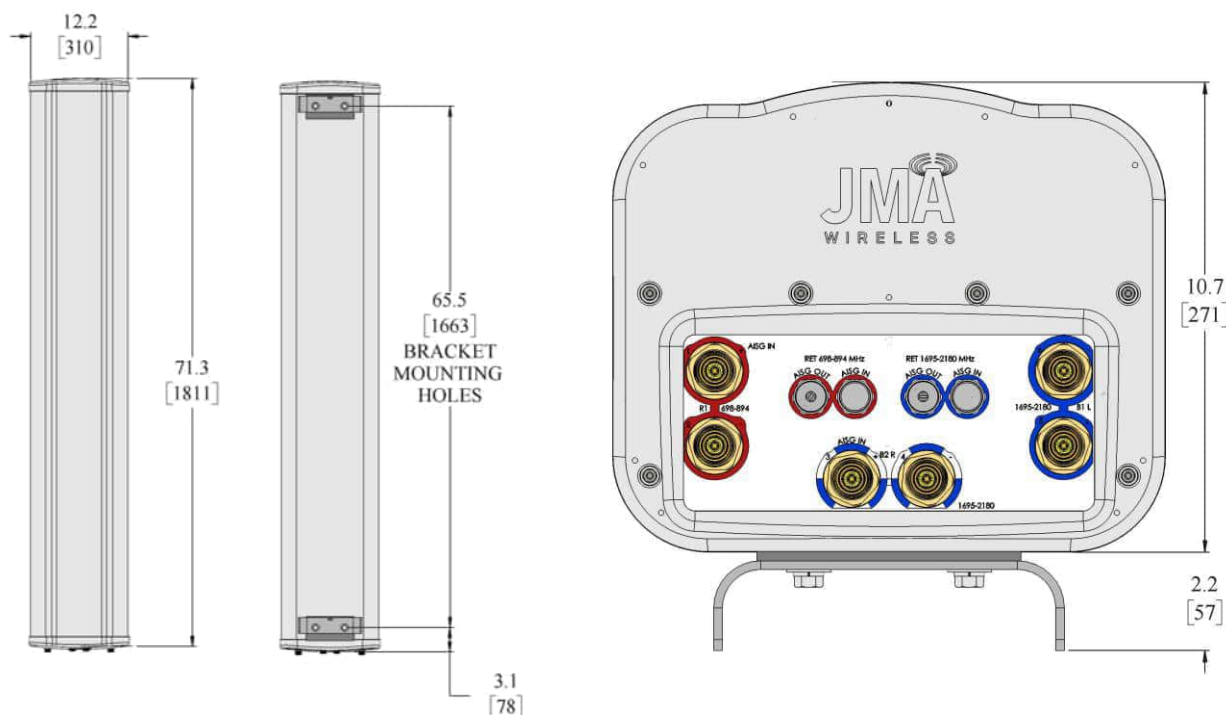

nWA^W
technology

Electrical Specification (Minimum/ Maximum)	Ports 1,2		Ports 3,4,5,6		
Frequency bands, MHz	698–798	824–894	1695–1880	1850–1990	1920–2180
Polarization	± 45 ⁰		± 45 ⁰		
Average gain over all tilts, dBi	14.4	14.8	17.8	18.1	18.2
Horizontal beamwidth (HBW), degrees ¹	66.0	57.0	63.0	63.0	58.0
Front-to-back ratio, co-polar power @180 ⁰ ± 30 ⁰ , dB	>22	>22.0	>25.0	>25.0	>25.0
X-Pol discrimination (CPR) at boresight, dB	>17.0	>15.6	>23	>18	>18
Sector power ratio, percent ¹	<5.0	<3.0	<4.6	<3.8	<5.0
Vertical beamwidth, (VBW), degrees ¹	13.5	12.0	6.0	5.5	5.4
Electrical downtilt (EDT) range, degrees	2-14	2-14	0-9		
First upper side lobe (USLS) suppression, dB ¹	≤ -17.0	≤ -16.0	≤ -17.0	≤ -16.0	≤ -16.0
Minimum cross-polar isolation, port-to-port, dB	25	25	25	25	25
Maximum VSWR/ return loss, dB	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0	1.5/ -14.0
Maximum passive Intermodulation (PIM), 2x 20W carrier, dBc	-153	-153	-153		
Maximum input power per any port, watts	300		250		
Total composite power all ports, watts	1500				

¹ Typical value over frequency and tilt

Mechanical Specifications

Dimensions height/ width/ depth, inches (mm)	71.3/ 12.2/ 10.7 (1811/ 310/ 271)
Shipping dimensions length/ width/ height, inches (mm)	82/ 20/ 15 (2083/ 508/ 381)
No. of RF input ports, connector type & location	6 x 4.3-10 female, bottom
RF connector torque	96 in- lb (10.85 N-M or 8 ft-lbs)
Net antenna weight, lb (kg)	51 (23.18)
Shipping weight, lb (kg)	91 (41.36)
Antenna mounting and downtilt kit included with antenna	91900318
Net weight of the mounting and downtilt kit, lb (kg)	18 (8.18)
Range of mechanical up/ down tilt	-2° to 12°
Rated wind survival speed, mph (km/h)	150 (241)
Frontal, lateral & rear wind loading @ 150 km/h, lbf (N)	87 (386), 68 (301), 109 (485)
Equivalent flat plate @100 mph and Cd=2, sq. ft.	1.42



Ordering Information

Antenna Model	Description
MX06FIT665-02	6F X- Pol HEX FIT 65° 2-14°/ 0-9° RET, 4.3-10 & SBT
Optional Accessories	
992100-CA030-SC	Optional AISG jumper cable, M/F, 3.0 meters
PCU-1000	Primary control unit, USB

NHH-33B-R2B



6-port sector antenna, 2x 698–896 and 4x 1695–2360 MHz, 33° HPBW, 2x RETs and 2x SBTs

- Narrow beamwidth capacity antenna for higher level of densification and enhanced data throughput
- Internal SBT on low and high band allow remote RET control from the radio over the RF jumper cable
- Separate RS-485 RET input/output for low and high band
- One LB RET and one HB RET. Both high bands are controlled by one RET to ensure same tilt level for 4x Rx or 4x MIMO

General Specifications

Antenna Type	Sector
Band	Multiband
Color	Light gray
Grounding Type	RF connector body grounded to reflector and mounting bracket
Performance Note	Outdoor usage Wind loading figures are validated by wind tunnel measurements described in white paper WP-112534-EN
Radome Material	Fiberglass, UV resistant
Radiator Material	Aluminum Low loss circuit board
Reflector Material	Aluminum
RF Connector Interface	4.3-10 Female
RF Connector Location	Bottom
RF Connector Quantity, high band	4
RF Connector Quantity, low band	2
RF Connector Quantity, total	6

Remote Electrical Tilt (RET) Information

RET Interface	8-pin DIN Female 8-pin DIN Male
RET Interface, quantity	2 female 2 male
Input Voltage	10–30 Vdc
Internal Bias Tee	Port 1 Port 3
Internal RET	High band (1) Low band (1)
Power Consumption, idle state, maximum	1 W

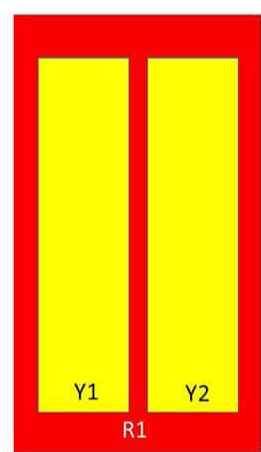
NHH-33B-R2B

Power Consumption, normal conditions, maximum	10 W
Protocol	3GPP/AISG 2.0 (Single RET)

Dimensions

Width	640 mm 25.197 in
Depth	235 mm 9.252 in
Length	1830 mm 72.047 in
Net Weight, without mounting kit	43 kg 94.799 lb

Array Layout



Array	Freq (MHz)	Conns	RET (SRET)	AISG RET UID
R1	698-896	1-2	1	ANxxxxxxxxxxxxxxxxx1
Y1	1695-2360	3-4	2	ANxxxxxxxxxxxxxxxxx2
Y2	1695-2360	5-6		

(Sizes of colored boxes are not true depictions of array sizes)

Port Configuration

CBC61923T-DS-43 | E14F10P58

Twin Triplexer, 555-894/PCS/AWS+WCS, dc Sense,4.3-10

- BTS-to-feeder and feeder-to-antenna application
- New 4.3-10 connectors for improved PIM performance and size reduction
- DC Load Sense in Feeder-to-Antenna applications
- Automatic dc switching with dc sense
- Convertible mounting brackets

Product Classification

Product Type Triplexer

General Specifications

Product Family CBC61923

Color Gray

Common Port Label COMMON

Modularity 2-Twin

Mounting Pole | Wall

Mounting Pipe Hardware Band clamps (2)

RF Connector Interface 4.3-10 Female

RF Connector Interface Body Style Long neck

Dimensions

Height 176 mm | 6.929 in

Width 198 mm | 7.795 in

Depth 106 mm | 4.173 in

Ground Screw Diameter 6 mm | 0.236 in

Mounting Pipe Diameter Range 40–160 mm

Electrical Specifications

Impedance 50 ohm

License Band, Band Pass AWS 1700 | CEL 850 | LMR 750 | PCS 1900 | USA 600 | USA 700 | USA 750 | WCS 2300

Electrical Specifications, Common Port

Composite Power, RMS 250 W

Logic Table

Combining Mode Operation (Ground Based)				
RF Ports Input Voltage				
555 to 894 MHz	PCS	AWS/WCS	COMMON	DC/AISG Path Selection
$7 \leq V \leq 30$	<7	<7	<7	555 to 894 MHz to COMMON "ON"
<7	$7 \leq V \leq 30$	<7	<7	PCS to COMMON "ON"
<7	<7	$7 \leq V \leq 30$	<7	AWS/WCS to COMMON "ON"
$7 \leq V \leq 30$	$7 \leq V \leq 30$	<7	<7	555 to 894 MHz to COMMON "ON"
$7 \leq V \leq 30$	<7	$7 \leq V \leq 30$	<7	AWS/WCS to COMMON "ON"
<7	$7 \leq V \leq 30$	$7 \leq V \leq 30$	<7	AWS/WCS to COMMON "ON"
$7 \leq V \leq 30$	$7 \leq V \leq 30$	$7 \leq V \leq 30$	<7	AWS/WCS to COMMON "ON"

Splitting Mode Operation (Tower Top)				
RF Ports Impedance DC (Load sensing)				
555 to 894 MHz	PCS	AWS/WCS	COMMON	DC/AISG Path Selection
open/load	short	short	$7 \leq V \leq 30$	COMMON to 555-894 "ON"
short	open/load	short	$7 \leq V \leq 30$	COMMON to PCS "ON"
short	short	open/load	$7 \leq V \leq 30$	COMMON to AWS/WCS "ON"
open/load	open/load	short	$7 \leq V \leq 30$	COMMON to 555-894 "ON" COMMON to PCS "ON"
open/load	short	open/load	$7 \leq V \leq 30$	COMMON to 555-894 "ON" COMMON to AWS/WCS "ON"
short	open/load	open/load	$7 \leq V \leq 30$	COMMON to PCS "ON" COMMON to AWS/WCS "ON"
open/load	open/load	open/load	$7 \leq V \leq 30$	ALL ports ON
short	short	short	$7 \leq V \leq 30$	ALL ports OFF

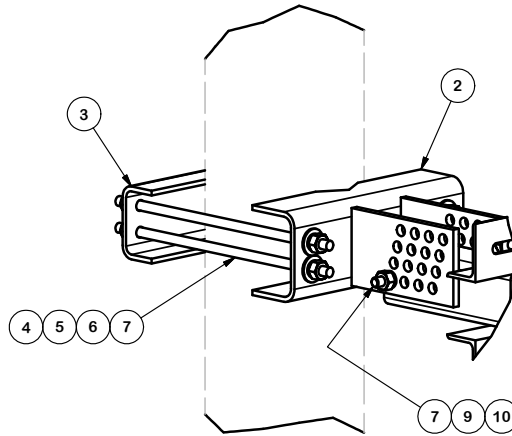
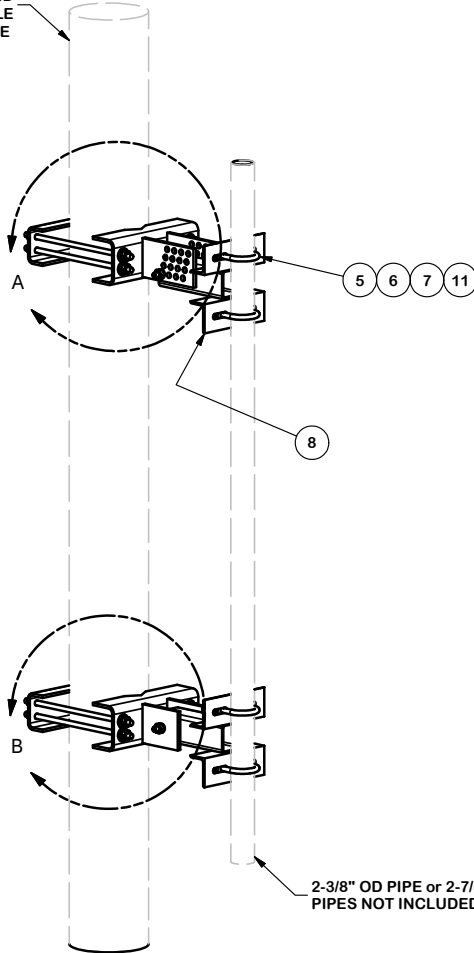
Environmental Specifications

Operating Temperature	-40 °C to +65 °C (-40 °F to +149 °F)
Corrosion Test Method	IEC 60068-2-11, 30 days
Ingress Protection Test Method	IEC 60529:2001, IP67

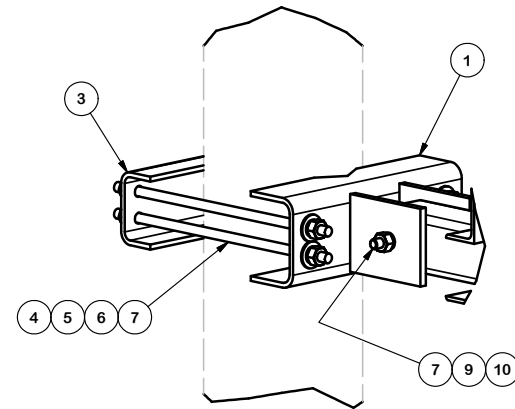
Packaging and Weights

Included	Mounting hardware
Mounting Hardware Weight	0.5 kg 1.102 lb
Volume	3.7 L
Weight, without mounting hardware	5.3 kg 11.684 lb

TOWER LEG
1" TO 8" DIA. ROUND
1-1/2" TO 8" 60° ANGLE
1-1/2" TO 6" 90° ANGLE



DETAIL A
UPPER MOUNTING BRACKET



DETAIL B
LOWER MOUNTING BRACKET

PARTS LIST					
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT. NET WT.
1	1	CFS	LOWER GATE FOOT WELDMENT		12.72 12.72
2	1	CFM	UPPER GATE FOOT WELDMENT		13.90 13.90
3	2	GBB	GATE BACKING BAR		4.53 9.06
4	8	G12R-15	1/2" x 15" GALV. THREADED ROD		0.84 6.69
4	8	G12R-12	1/2" x 12" GALV. THREADED ROD		0.67 5.35
5	24	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07 1.72
6	24	G12FW	1/2" HDG USS FLATWASHER		0.03 0.82
7	26	G12LW	1/2" HDG LOCKWASHER		0.01 0.36
8	2	X-UAPM	UNIVERSAL ANGLE TUBE 9"		9.31 18.62
9	2	A12NUT	1/2" HDG A325 HEX NUT		0.07 0.14
10	2	A1205	1/2" x 5" A325 HDG BOLT		0.34 0.69
11	4	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" GALV. U-BOLT		0.66 2.63
11	4	X-UB1300	1/2" X 3" X 5" X 2" GALV U-BOLT		0.70 2.79
				TOTAL WT. #	76.94

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
BENDS ARE $\pm 1/2$ DEGREE
ALL OTHER MACHINING ($\pm 0.030"$)
ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION

1' STAND-OFF, 2-3/8" AND 2-7/8" OD PIPE
UNIVERSAL SLIDING TAPERED PIPE MOUNT

CPD NO. 4711	DRAWN BY RH18 3/22/2010	ENG. APPROVAL
CLASS 81	SUB 01	DRAWING USAGE CUSTOMER
		CHECKED BY BMC 4/22/2010

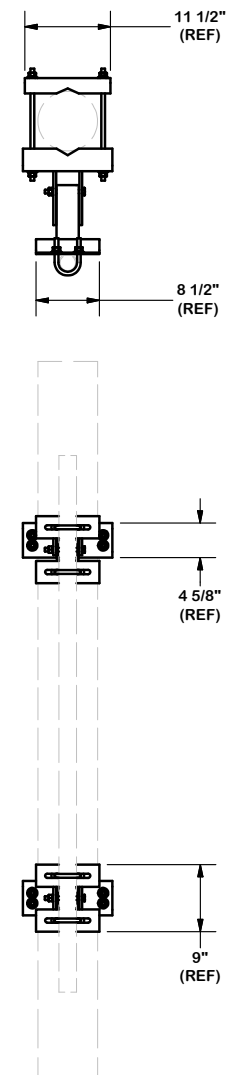
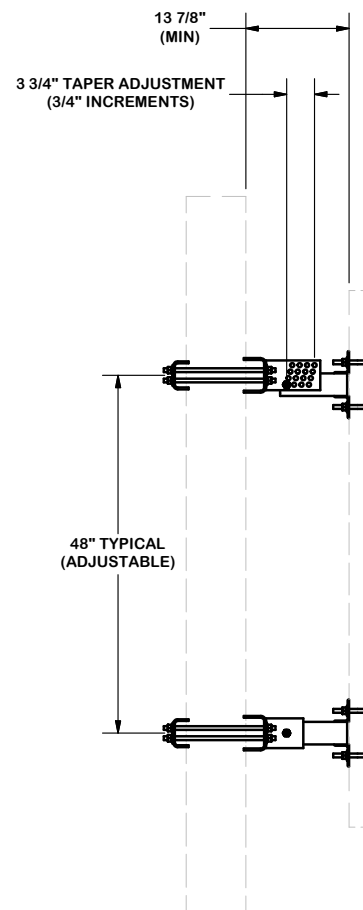
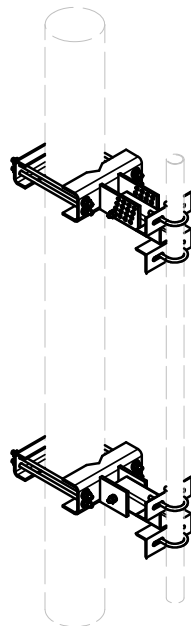


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PART NO. TAM-2U
DWG. NO. TAM-2U



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CPD NO.	DRAWN BY	ENG. APPROVAL
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Engineering
 Support Team:
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Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

PART NO.
TAM-2U
DWG. NO.
TAM-2U



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Calculated Radio Frequency Emissions Report



Greenwich 3 CT

9 Sound Shore Drive, Greenwich, CT

July 15, 2025

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1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed temporary installation of a Verizon antenna array to be mounted at 70' AGL (above ground level) on the transmission tower located at 9 Sound Shore Drive in Greenwich, CT. This temporary antenna installation will allow Verizon to maintain wireless service in the area while its existing antenna mount above the transmission tower is reinforced, during which time those antennas will be turned down. The coordinates of the tower are 41° 01' 47" N, 73° 35' 54.1" W.

Verizon is proposing the following for its temporary installation:

- 1) Install 4 multi-band antennas at 70' AGL on the tower to maintain its commercial 4G LTE service
- 2) Deactivate its existing antennas above the tower at ~139' AGL to accommodate reinforcement of the antenna mount.

This report considers the proposed temporary antenna configuration for Verizon¹ as well as existing antenna configuration for Sprint² to derive the resulting % MPE of its proposed modification.

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/cm²). The general population exposure limits for the various frequency ranges are defined in the documents referenced in Attachment A 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 of this report 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.

¹ As referenced to Verizon's Radio Frequency Design Sheet dated 06/18/2025.

² As referenced to Sprint's Connecticut Siting Council Notice of Exempt Modification – 9 Sound Shore Drive, Greenwich, Connecticut, dated 10/31/2019

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:

$$\text{Power Density} = \left(\frac{\text{GRF}^2 \times 1.64 \times \text{ERP}}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

ERP = 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

Off Beam Loss is determined by the selected antenna patterns

Ground reflection factor (GRF) of 1.6

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. 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 final installations.

The percent of MPE values presented in this report reflect levels that one may encounter from one sector of a carrier's antennas. Most carriers use 3 or 4 sectors per site with azimuths approximately 90 or 120 degrees apart, respectively; therefore, one could not be standing in the main beam of all sectors at the same time. In cases where antenna models are not uniform across all sectors, the antenna model with the highest gain was used for the calculations. This results in a conservative or "worst case" assumption for percent of MPE calculations.

4. Antenna Inventory

Table 1 below outlines Verizon's proposed temporary antenna configuration for the site. The associated antenna model data and antenna patterns for these specific antenna models are included in Attachments C.

Operator	Sector / Azimuth	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Tilt	Length (ft)	Antenna Centerline Height (ft)
Verizon	Alpha / 10°	700	160	17.6	9182.7	NHH-33B-R2B	37	0	6	70
		850	160	18.3	10794.7		32			
		1900	160	20.2	16742.3		39			
		2100	240	20.8	28840.6		34			
	Beta / 110°	700	160	14.6	4610.5	MX06FIT665-02E	67	0	6	70
		850	160	14.9	4933.0		65			
		1900	160	18.3	10794.7		64			
		2100	240	18.4	16595.9		62			
	Gamma / 240°	700	160	14.6	4610.5	MX06FIT665-02	67	0	6	70
		850	160	14.9	4933.0		65			
		1900	160	18.3	10794.7		64			
		2100	240	18.4	16595.9		62			
	Delta / 315°	700	160	17.6	9183	NHH-33B-R2B 02E	37	0	6	70
		850	160	18.3	10795		32			
		1900	160	20.2	16742		39			
		2100	240	20.8	28841		34			

Table 1: Proposed Antenna Inventory^{3 4}

³ Antenna heights are in reference to Verizon's Radio Frequency Design Sheet dated 06/15/2025.

⁴ Transmit power assumes 0 dB of cable loss.

5. Calculation Results

The calculated power density results are shown in Figure 1 below. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the site. In addition to the other worst-case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas was completed using a local maximum off beam antenna gain (within ± 5 degrees of the true mathematical angle) to incorporate a realistic worst-case scenario.

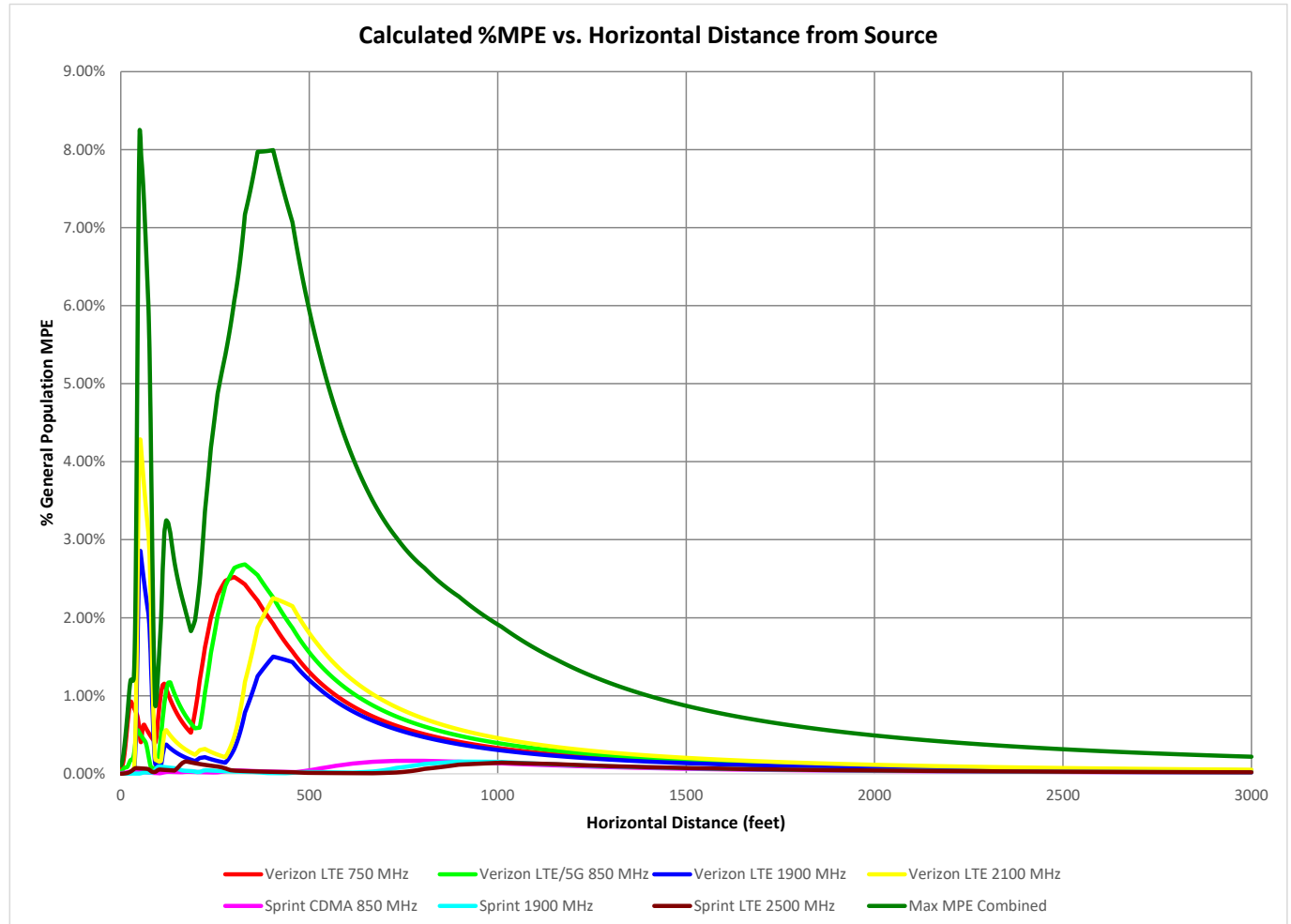


Figure 1: Graph of General Population % MPE vs. Distance

The highest percent of MPE (8.25% of the General Population limit) is calculated to occur at a horizontal distance of 50 feet from antennas. Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 1300 feet and beyond, one would now be in the main beam of the antenna pattern and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

Table 2 below lists percent of MPE values as well as the associated parameters that were included in the calculations. The highest percent of MPE value was calculated to occur at a horizontal distance of 50 feet from the site (reference Figure 1).

As stated in Section 3, all calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. Additionally, a six foot height offset was considered in this analysis to account for the height of a person standing at ground level. As a result, the calculated % MPE levels are more conservative (higher) than the actual signal levels will be from the temporary installation. The results presented in Figure 1 and Table 2 assume level ground elevation from the base of the site out to the horizontal distances calculated.

Carrier	Number of Transmitters	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm ²)	Limit (mW/cm ²)	% MPE
Sprint 1900 MHz	1	160.0	148.0	50	0.000031	1.000	0.00%
Sprint CDMA 850 MHz	1	100.0	148.0	50	0.000130	0.567	0.02%
Sprint LTE 2500 MHz	1	160.0	148.0	50	0.000696	1.000	0.07%
Verizon LTE 1900 MHz	1	160.0	70.0	50	0.028496	1.000	2.85%
Verizon LTE 2100 MHz	1	240.0	70.0	50	0.042744	1.000	4.27%
Verizon LTE 750 MHz	1	160.0	70.0	50	0.002570	0.500	0.51%
Verizon LTE/5G 850 MHz	1	160.0	70.0	50	0.002943	0.567	0.52%
						Total	8.25%

Table 2: Maximum Percent of General Population Exposure Values^{5 6}

⁵ Frequencies listed are representative of the operating band and are not the specific operating frequency.

⁶ 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.

6. Conclusion

The above analysis verifies that RF exposure levels from the site with Verizon's proposed antenna configuration will be well below the maximum permissible levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum cumulative percent of MPE in consideration of all transmitters is calculated to be **8.25%** of the FCC limit (General Population/Uncontrolled). This maximum cumulative percent of MPE value is calculated to occur 50 feet away from the site.

7. 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.



Report Prepared By:

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July 15, 2025
Date



Reviewed/Approved By:

Keith Vellante
Director – RF Services
C Squared Systems, LLC

July 16, 2025
Date

Attachment A: References

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

IEEE C95.1-2019, IEEE Standard Safety Levels With Respect to Human Exposure to Electric, Magnetic, and Electromagnetic Fields, 0 Hz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2021, IEEE Recommended Practice for Measurements and Computations of Electric, Magnetic, and Electromagnetic Fields with Respect to Human Exposure to Such Fields, 0 Hz-300 GHz IEEE-SA Standards Board

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

(A) Limits for Occupational/Controlled Exposure⁷

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 Exposure⁸

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 3: FCC Limits for Maximum Permissible Exposure

⁷ 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.

⁸ 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.

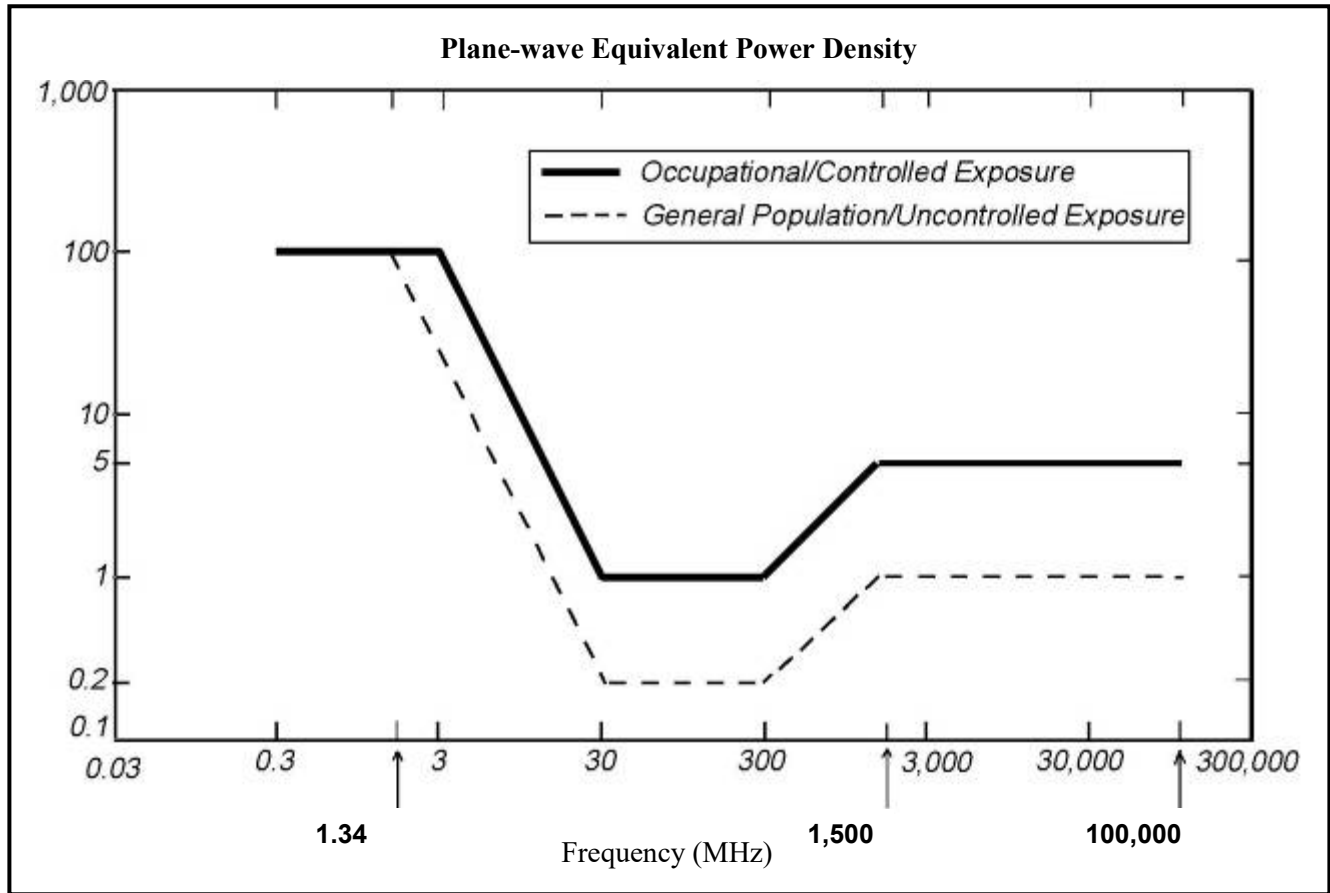
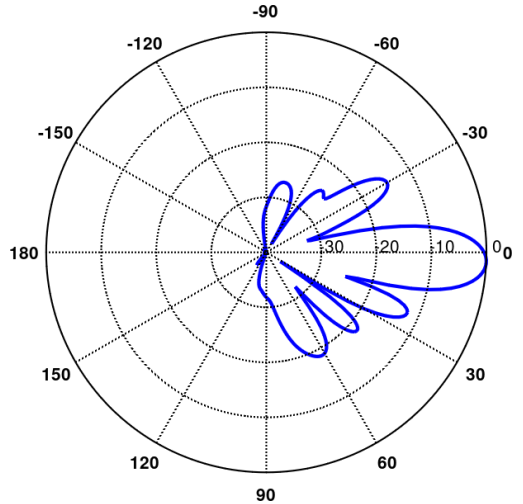
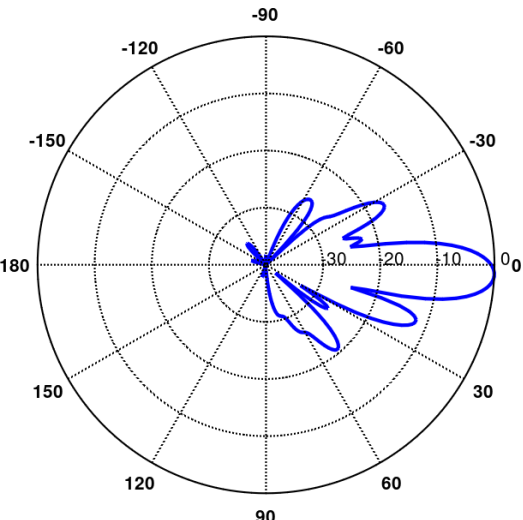
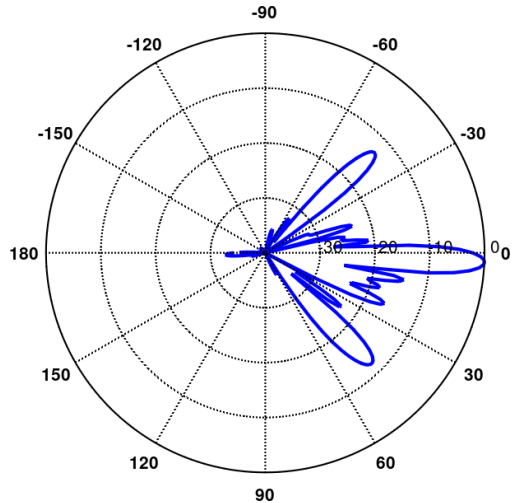


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

Attachment C: Verizon Antenna Model Data Sheets and Electrical Patterns

700 MHz Manufacturer: CommScope Model #: NHH-33B-R2B Frequency Band: 698-806 MHz Gain: 17.6 dBi Electrical Down-Tilt: 2° Vertical Beamwidth: 12.7° Horizontal Beamwidth: 37° Polarization: ±45° Dimensions (L x W x D): 72" x 25.2" x 9.3"	
850 MHz Manufacturer: CommScope Model #: NHH-33B-R2B Frequency Band: 806-896 MHz Gain: 20.2 dBi Electrical Down-Tilt: 2° Vertical Beamwidth: 5.4° Horizontal Beamwidth: 32° Polarization: ±45° Dimensions (L x W x D): 72" x 25.2" x 9.3"	
1900 MHz Manufacturer: CommScope Model #: NHH-33B-R2B Frequency Band: 1850-1990 MHz Gain: 20.8 dBi Electrical Down-Tilt: 2° Vertical Beamwidth: 5.6° Horizontal Beamwidth: 35° Polarization: ±45° Dimensions (L x W x D): 72" x 12.2" x 7.5"	

2100 MHz

Manufacturer: CommScope
 Model #: NHH-33B-R2B
 Frequency Band: 1920-2200 MHz
 Gain: 18.4 dBi
 Electrical Down-Tilt: 2°
 Vertical Beamwidth: 5.1°
 Horizontal Beamwidth: 34°
 Polarization: ±45°
 Dimensions (L x W x D): 72" x 12.2" x 7.5"

