May 17, 2017

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

Regarding:	Notice of Exempt Modification – Swap of 3 Antennas, Removing (3) TMAs, Addition of (6) TMAs and addition of associated lines
Property Address:	102 Cathy Drive, Southington, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T" Site: CT1109)

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 81 foot utility tower ("tower") at the above-referenced address, latitude 41.59886111, longitude -72.8524444. AT&T's facility consists of three (6) wireless telecommunications antennas at 91 feet. The tower is controlled and owned by Eversource Energy. Assessor's information is attached hereto.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas, removing (3) TMAs, adding (6) TMAs, and adding associated lines. The centerline height of said antennas is and will remain at 91 feet.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Town Manager of the Town of Southington, the Chief Building Official of the Town of Southington, and the Zoning Enforcement Officer of the Town of Southington. A copy of this letter is also being sent to Eversource Energy, the owner of the structure that AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's antennas and associated lines will be installed at 91 foot level of the 81 foot utility tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.

16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com

4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation is attached.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Centek Engineering Dated April 13, 2017).

For the foregoing reasons AT&T respectfully requests that the proposed swap of 3 antennas, removal of (3) TMAs, the addition of (6) TMAs, and addition of associated lines be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Nicole Caplan
Site Acquisition Specialist
Empire Telecom

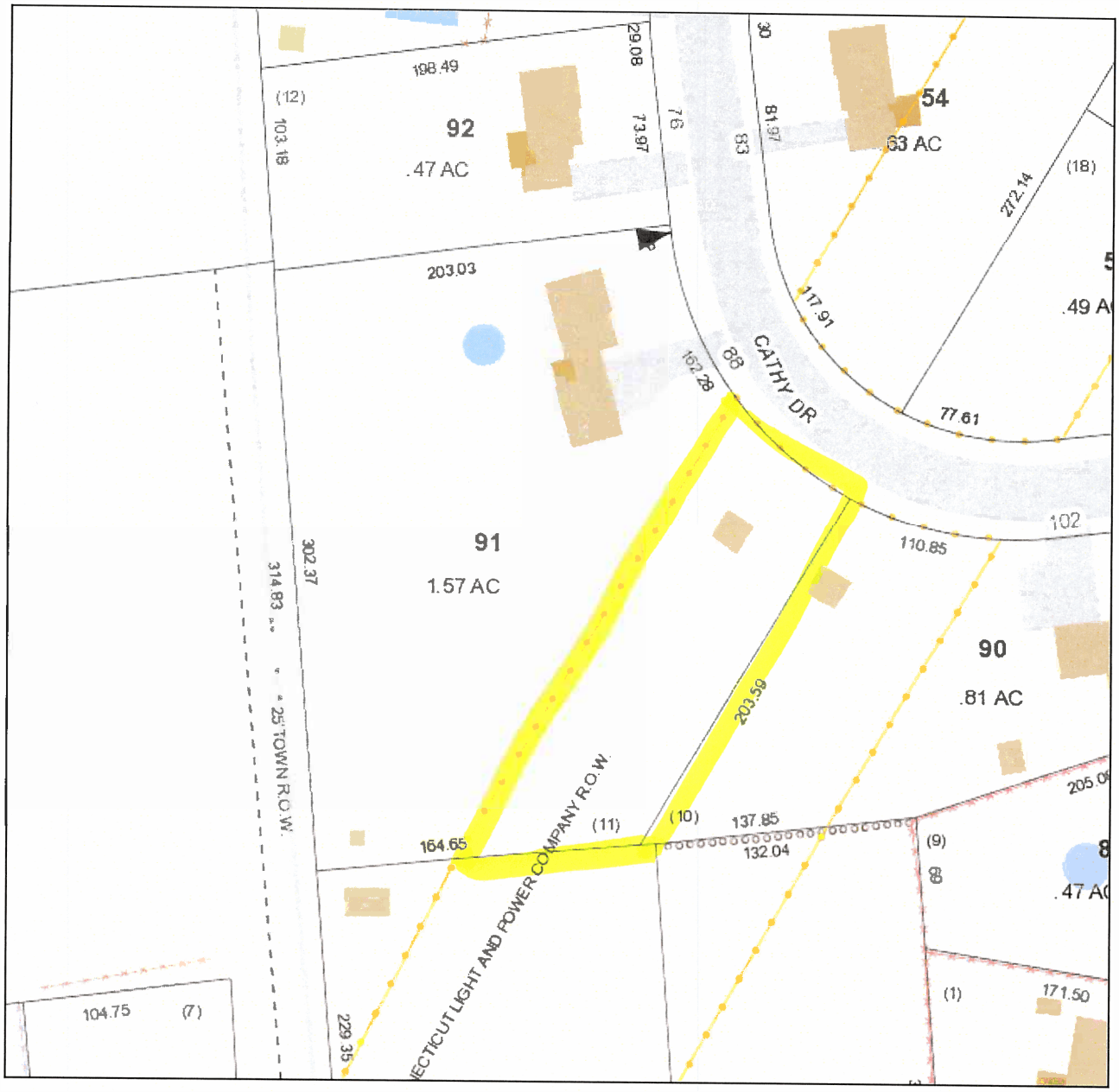
CC: Garry Brumback, Town Manager, Town of Southington
John Smigel, Chief Building Official, Town of Southington
Matthew A. Reimondo, Zoning Enforcement Officer, Town of Southington
Eversource Energy, c/o Joel Szarkowicz

16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com

Town of Southington

Geographic Information System (GIS)

Date Printed: 5/2/2017



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of Southington and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 80 feet

0 80 Feet

N
W E
S

WIRELESS COMMUNICATIONS FACILITY
CT1109 - LTE 2C
SOUTHINGTON-CATHYDRIVE NU
EVERSOURCE UTILITY STRUCT. NO.: 4119
CATHY DRIVE
SOUTHINGTON, CT 06489

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT

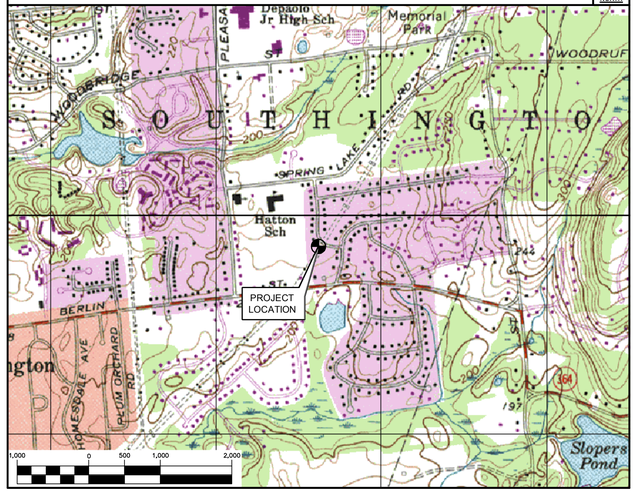
TO: CATHY DRIVE, SOUTHINGTON, CONNECTICUT

1.	DEPART ENTERPRISE DR TOWARD CAPITOL BLVD	0.4 MI
1.	TURN LEFT ONTO CAPITOL BLVD	0.2 MI
2.	TURN LEFT ONTO WEST ST	0.3 MI
3.	TAKE RAMP LEFT FOR I-91 SOUTH	1.7 MI
4.	AT EXIT 22N, TAKE RAMP RIGHT FOR CT-9 NORTH TOWARD NEW BRITAIN	3.1 MI
5.	AT EXIT 22, TAKE RAMP RIGHT TOWARD NEW HAVEN	0.2 MI
6.	TURN RIGHT ONTO FRONTAGE RD	0.1 MI
7.	TURN RIGHT ONTO CT-372 / WORTHINGTON RIDGE	0.1 MI
8.	KEEP STRAIGHT ONTO WORTHINGTON RIDGE	0.5 MI
9.	TURN RIGHT ONTO HUDSON ST	0.4 MI
10.	ROAD NAME CHANGES TO NORTON RD	2.1 MI
11.	TURN LEFT ONTO CT-71 / CHAMBERLAIN HWY	0.6 MI
12.	TURN RIGHT ONTO CT-364 / SOUTHINGTON RD	2.6 MI
13.	TURN RIGHT TO STAY ON CT-364 / EAST ST	0.2 MI
14.	KEEP LEFT TO STAY ON CT-364 / BERLIN ST	0.5 MI
15.	TURN RIGHT ONTO ARLINGTON DR	0.1 MI
16.	TURN LEFT ONTO CATHY DR	0.1 MI
17.	ARRIVE AT NEAR TRANSMISSION LINE CROSSING ON CATHY DR, SOUTHINGTON, CT 06489	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   - A. REMOVE AND REPLACE EXISTING POSITION 4 ANTENNA FOR PROPOSED TWELVE-PORT ANTENNA, (1) PER SECTOR.
   - B. REMOVE AND REPLACE (3) EXISTING TMA'S BEHIND POSITION 4 ANTENNA AND INSTALL (6) NEW TMA'S, (2) PER SECTOR.
   - C. INSTALL (6) NEW RRUS-12'S WITHIN EXISTING COMPOUND
   - D. REMOVE (6) EXISTING DIPLEXERS WITHIN EXISTING COMPOUND
   - E. INSTALL (12) NEW PENTAPLEXERS WITHIN EXISTING COMPOUND
   - F. REMOVE AND REPLACE EXISTING DC6 SURGE ARRESTOR BOX WITHIN EXISTING COMPOUND FOR (1) DC12 BOX
   - G. EXISTING TOWER FOUNDATION, TYP. OF (4) TO BE REINFORCED

PROJECT INFORMATION

AT&T SITE NUMBER:	CT1109
AT&T SITE NAME:	SOUTHINGTON-CATHYDRIVE NU
SITE ADDRESS:	EVERSOURCE UTILITY STRUCT. NO.: 4119 CATHY DRIVE SOUTHINGTON, CT 06489
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-35'-55.9"N LONGITUDE: 72°-51'-8.8"W GROUND ELEVATION: ±215' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES AND SPECIFICATIONS	0
C-1	PLANS AND ELEVATION	0
C-2	LTE 2C ANTENNA DETAILS	0
C-3	LTE 2C EQUIPMENT DETAILS	0
E-1	LTE SCHEMATIC DIAGRAM AND NOTES	0
E-2	LTE WIRING DIAGRAM	0
E-3	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/08/17	KAW/JR	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT · CRAIG A. GAUDIOSO · 24933 · REGISTERED PROFESSIONAL ENGINEER

at&t

EMPIRE telecom

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
CT1109 - LTE 2C
CATHY DRIVE
SOUTHINGTON, CT 06489

DATE: 01/16/17
SCALE: AS NOTED
JOB NO. 17004.04

TITLE SHEET

T-1

Sheet No. 1 of 8

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CT STATE BUILDING CODE.

1. DESIGN CRITERIA:
   ANTENNA MAST
   - WIND LOAD: PER ANSI/TIA 222 G (ANTENNA MOUNTS): 97 MPH (3 SECOND GUST).

   TRANSMISSION TOWER
   - WIND LOAD: PER NESC C2-2012 SECTION 25 RULE 250C (TOWER & FOUNDATION) 110 MPH (3 SECOND GUST)
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. 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.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. 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.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

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

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. 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.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. 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.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. 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.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:
   A. SHERWIN WILLIAMS POLANE-B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.
2. COAXIAL CABLES:
   A. ONE COAT OF DTM BONDING PRIMER (2-5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5-5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI-SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH-PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON-PETROLEUM-BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

CONCRETE CONSTRUCTION

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 – STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL BE AIR ENTRAINED AND SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

   ALL CONCRETE 4,000 PSI

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
5. CONCRETE COVER OVER REINFORCING SHALL BE 3 INCHES.
6. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
7. ALL REINFORCEMENT SHALL BE CONTINUOUS. SPLICES WILL NOT BE ALLOWED.
8. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
9. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1 % CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
10. TOP OF FOOTING SURFACES SHALL RECEIVE A UNIFORM FLOAT FINISH. CURE FOOTING SURFACE WITH SONNEBORN KURE-N-SEAL WB OR APPROVED EQUAL, APPLIED AS RECOMMENDED BY MANUFACTURER.
11. PREPARATION OF SURFACES WHERE NEW CONCRETE WILL INTERFACE WITH EXISTING CAISSON:
    THE PERIMETER OF THE EXISTING CAISSON SHALL BE THOROUGHLY CLEANED OF ALL DIRT AND DELETERIOUS MATERIALS PRIOR TO APPLICATION OF BONDING AGENT. CONTRACTOR SHALL NOTIFY NORTHEAST UTILITIES 24 HOURS IN ADVANCE OF CLEANING.

    SIKADUR 32, HI-MOD OR ENGINEER APPROVED EQUAL SHALL BE APPLIED, IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, TO ALL INTERFACING SURFACES BEFORE CONCRETE IS PLACED.

    CAULK JOINT BETWEEN EXISTING CONCRETE PIER AND NEW CONCRETE WITH SIKAFLEX 1-A BY SIKA CORP. OR ENGINEER APRROVED EQUAL.

    SUBMIT MANUFACTURER'S PRODUCT SPECIFICATION DATA AND INSTALLATION INSTRUCTIONS FOR REVIEW AND APPROVAL BY OWNER.
12. NEW CONCRETE FOOTING SHALL BE ALLOWED TO CURE AT LEAST 14 DAYS BEFORE WIRELESS ANTENNA MOUNT, ANTENNAS, AND CABLES ARE INSTALLED.
13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, APPROVED AND PAID BY THE OWNER. THE INSPECTOR SHALL OBSERVE THE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.
15. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE OWNER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

FOUNDATION PLAN NOTES:

1. TOWER FOUNDATION SHALL BE CHECKED AND/OR TEMPORARY SHORING SHALL BE PROVIDED TO ENSURE TOWER STABILITY DURING CONSTRUCTION. LIMIT EXCAVATION CONSTRUCTION TO ONE TOWER LEG AT A TIME. CONSTRUCTION SHALL BE CONDUCTED IN WIND SPEEDS LESS THAN 15 MPH AND IN LOW ICE ACCUMULATION PERIODS.
2. CONTRACTOR SHALL USE EXTREME CAUTION DURING EXCAVATION OF EXISTING FOUNDATION STRUCTURE. IMPLEMENT HAND DIGGING WHERE PRACTICABLE.
3. PROTECT EXISTING TOWER GROUND WIRE(S) FROM DAMAGE DUE TO NEW CONSTRUCTION. CONTRACTOR SHALL NOTIFY NU IF GROUNDING SYSTEM BECOMES DAMAGED OR DISCONNECTED.
4. NOTIFY NU REPRESENTATIVE TO BE PRESENT UPON COMPLETION OF REBAR PLACEMENT.

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NOTES AND SPECIFICATIONS

N-1

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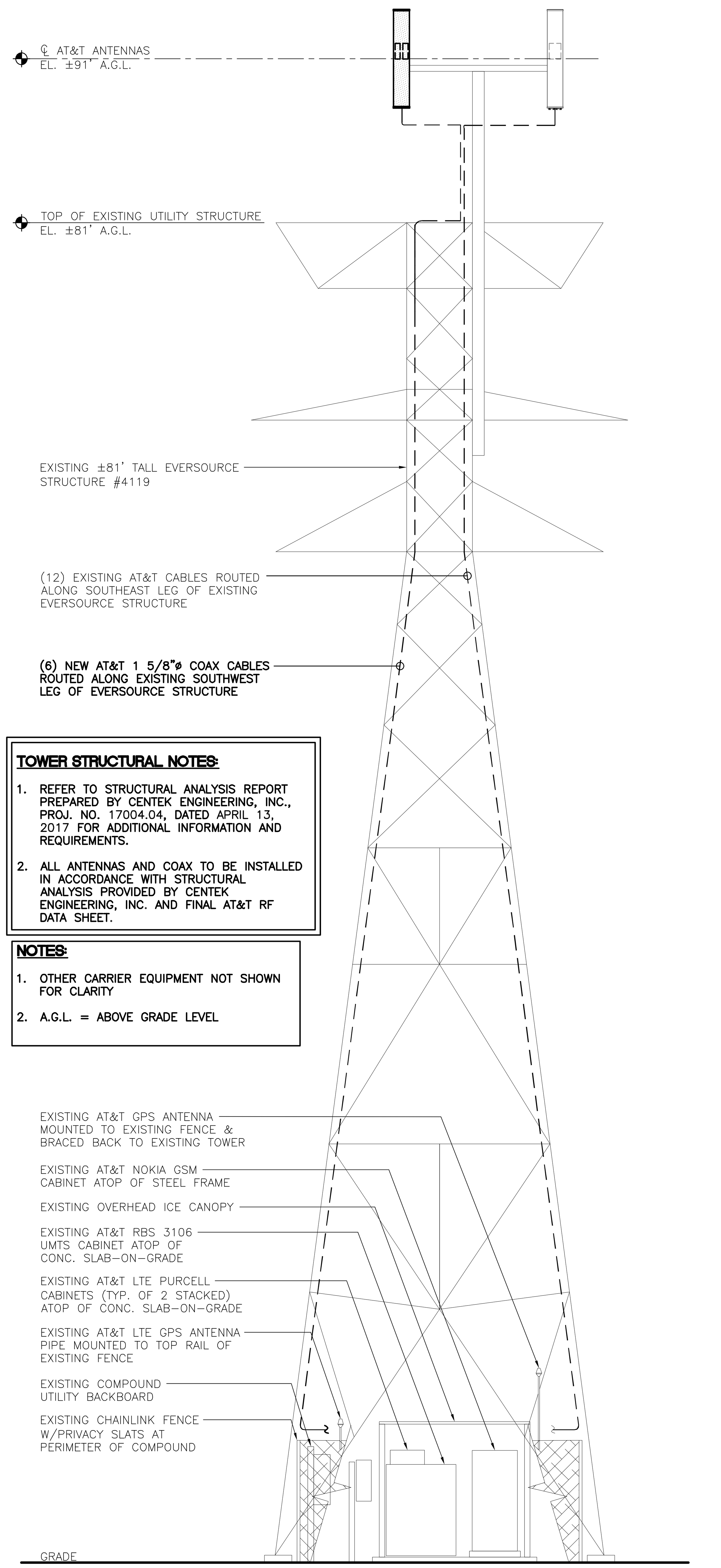


TOWER STRUCTURAL NOTES:

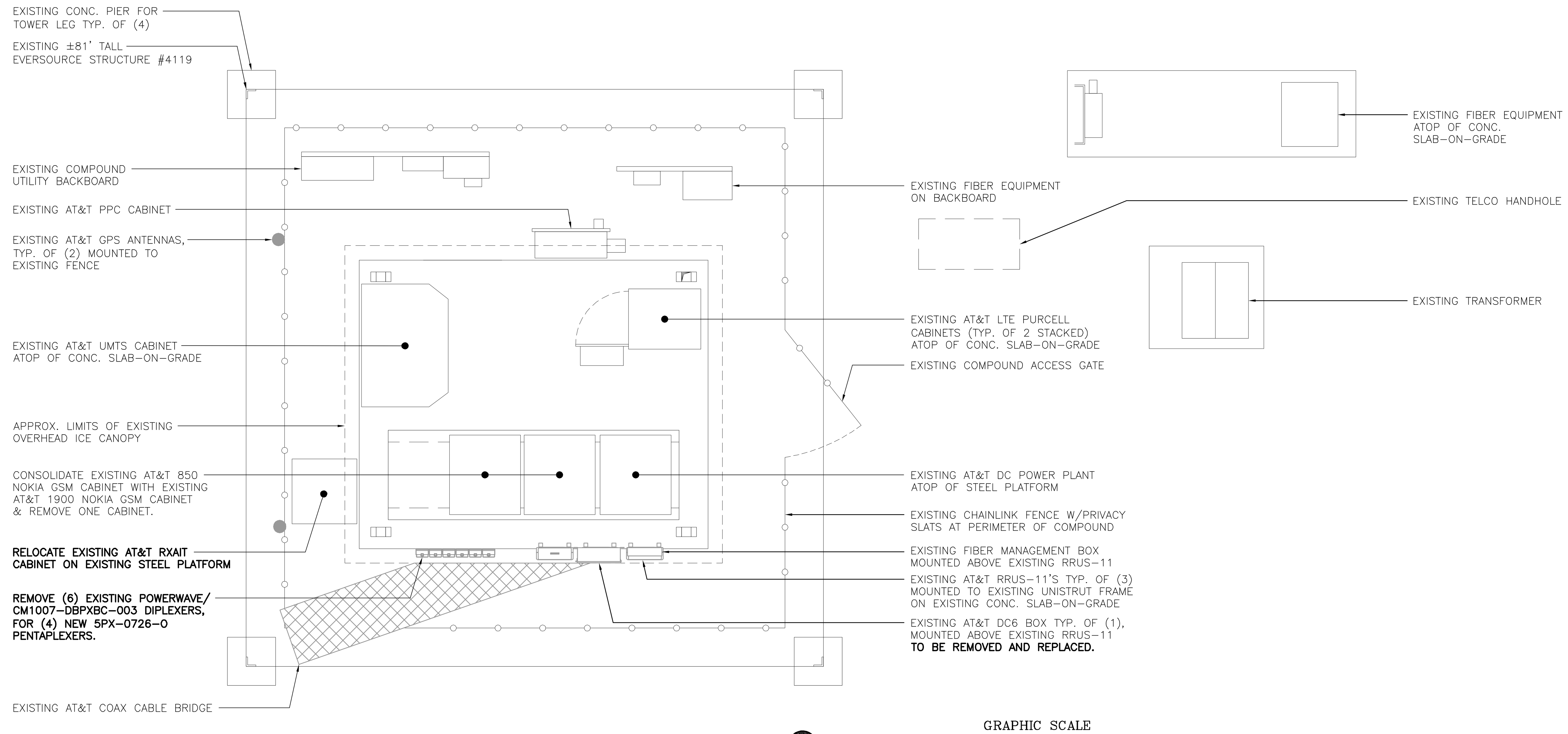
1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJ. NO. 17004.04, DATED APRIL 13, 2017 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CENTEK ENGINEERING, INC. AND FINAL AT&T RF DATA SHEET.

NOTES:

1. OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
2. A.G.L. = ABOVE GRADE LEVEL

3 / C-1 **SOUTH ELEVATION**
SCALE: 1" = 5'

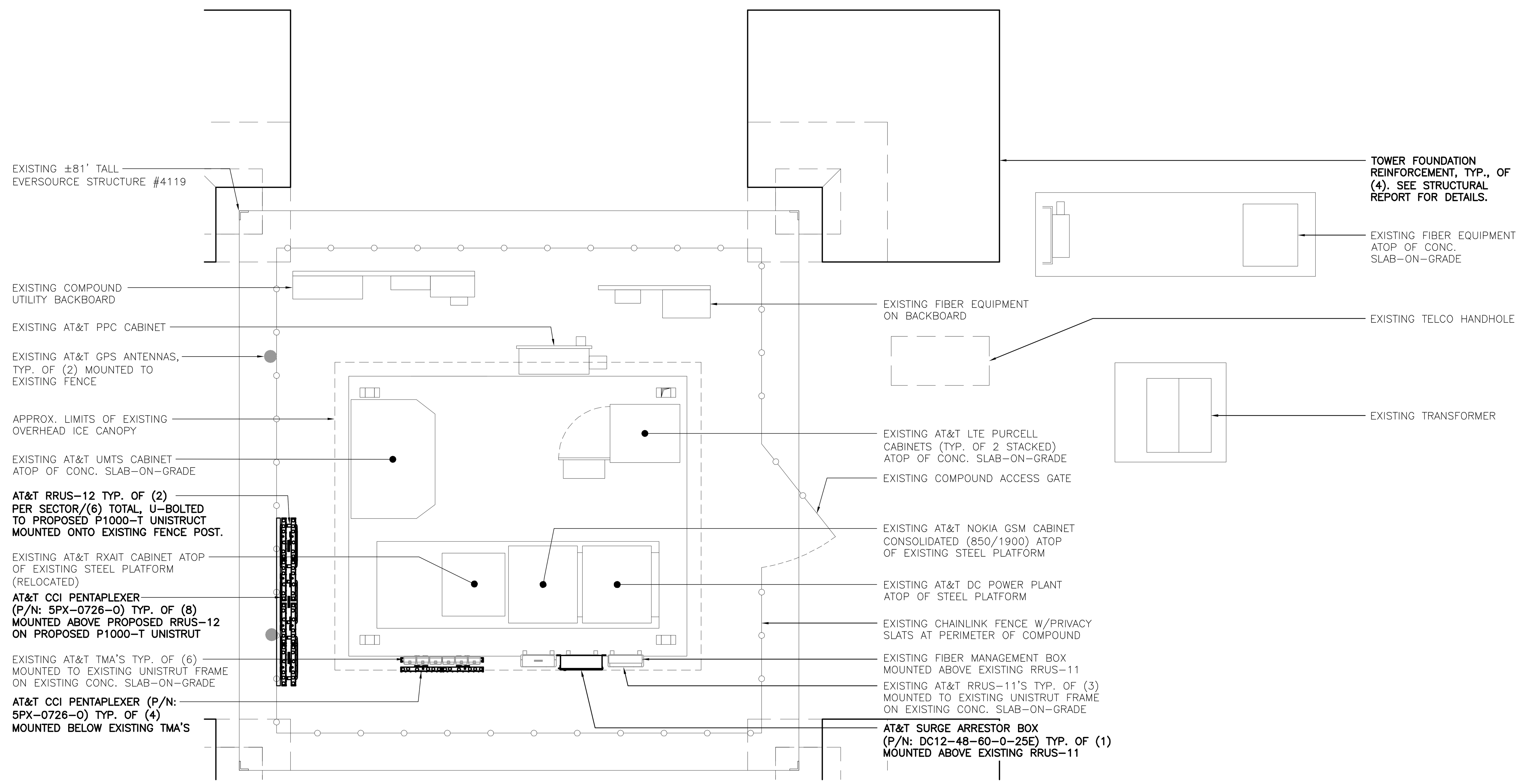
GRAPHIC SCALE 5 0 2.5 5 10 20 (IN FEET) 1 inch = 5 ft.



1 / C-1 **EXISTING COMPOUND PLAN**
SCALE: 3/8" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE 8 0 4 8 16 32 (IN FEET) 1 inch = 4 ft.



NOTE: AT&T ICE BRIDGE ARE NOT SHOWN FOR CLARITY.

2 / C-1 **PROPOSED COMPOUND PLAN**
SCALE: 3/8" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE 8 0 4 8 16 32 (IN FEET) 1 inch = 4 ft.

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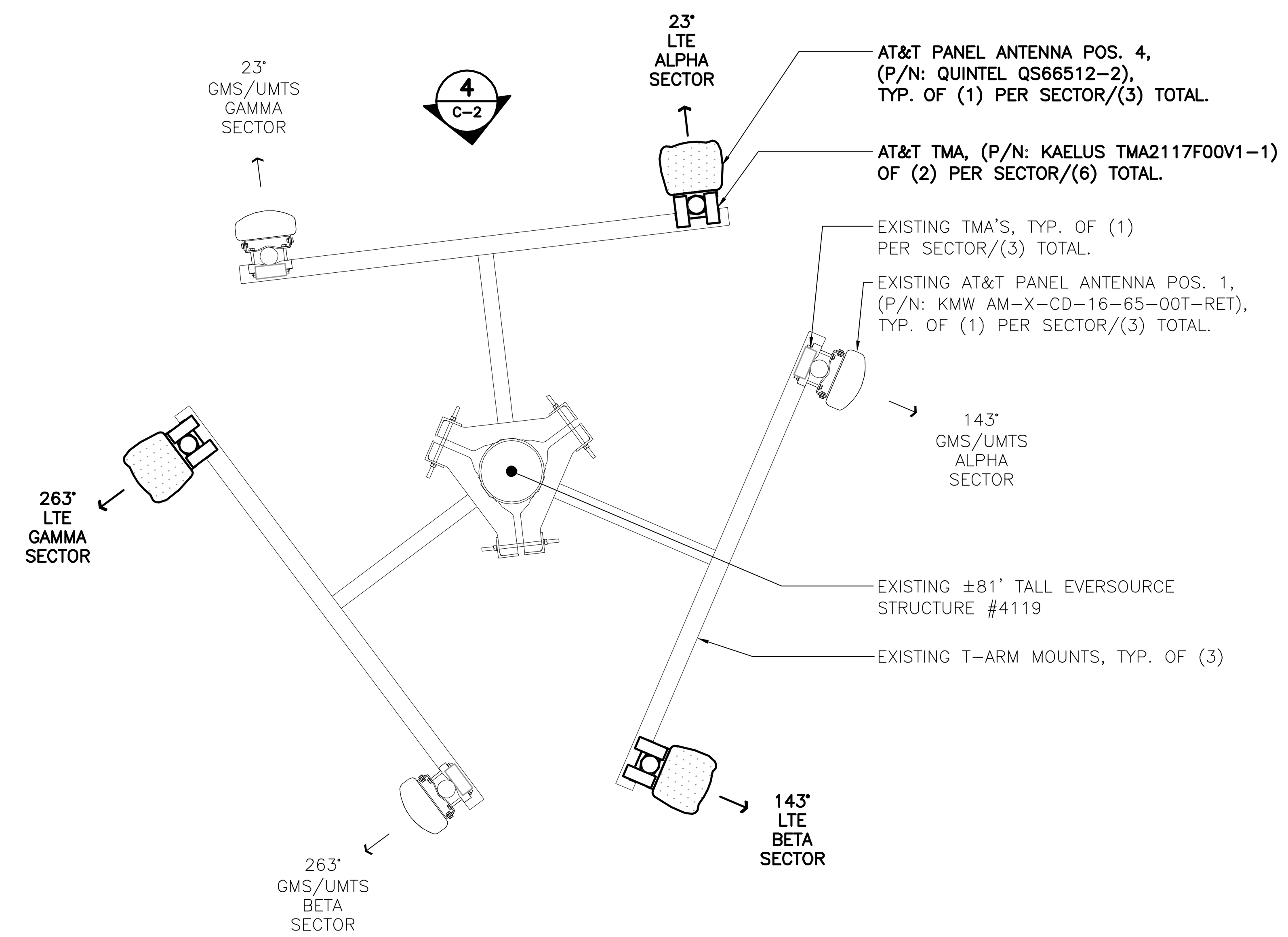
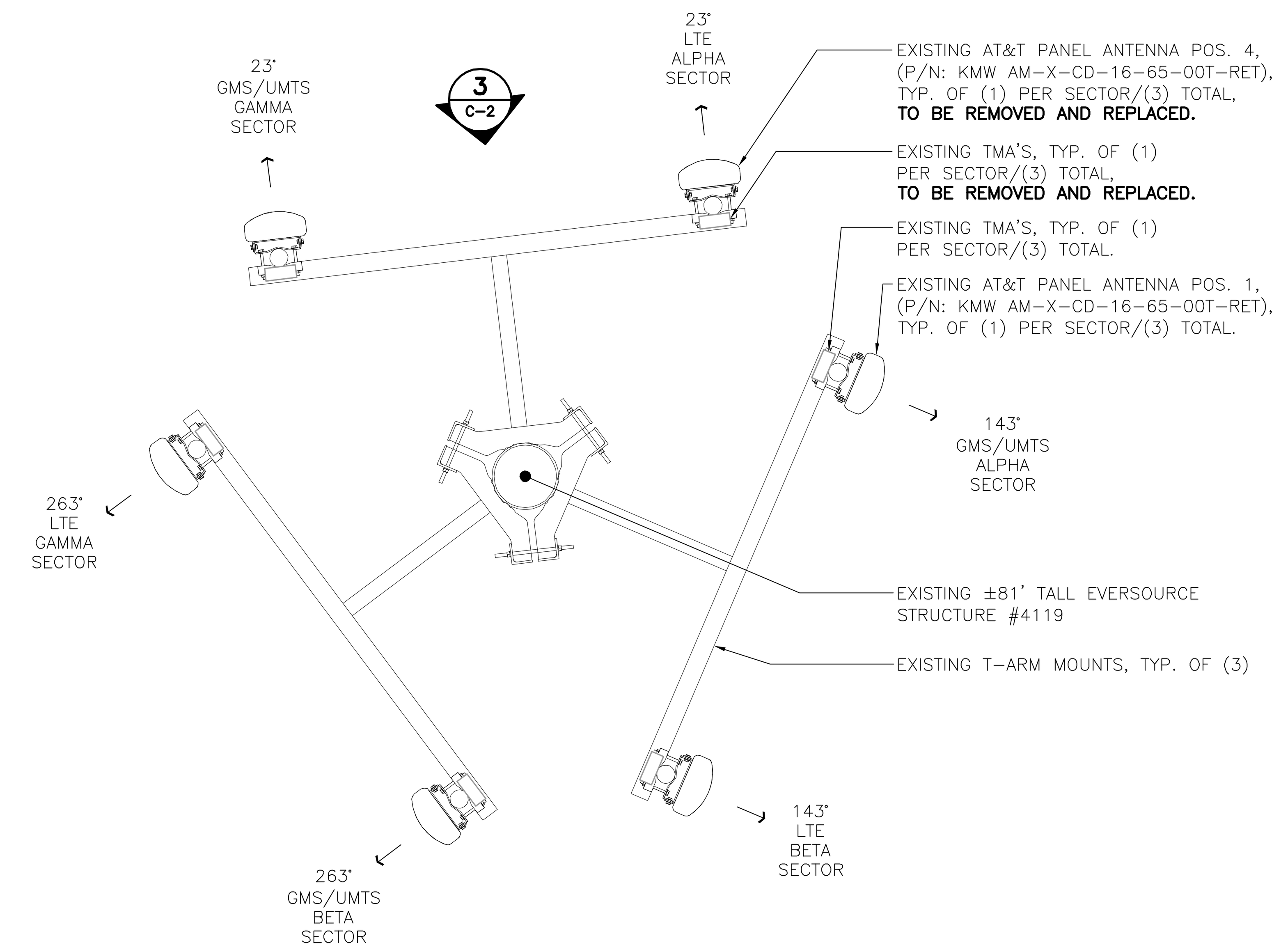
PLANS AND ELEVATION

C-1

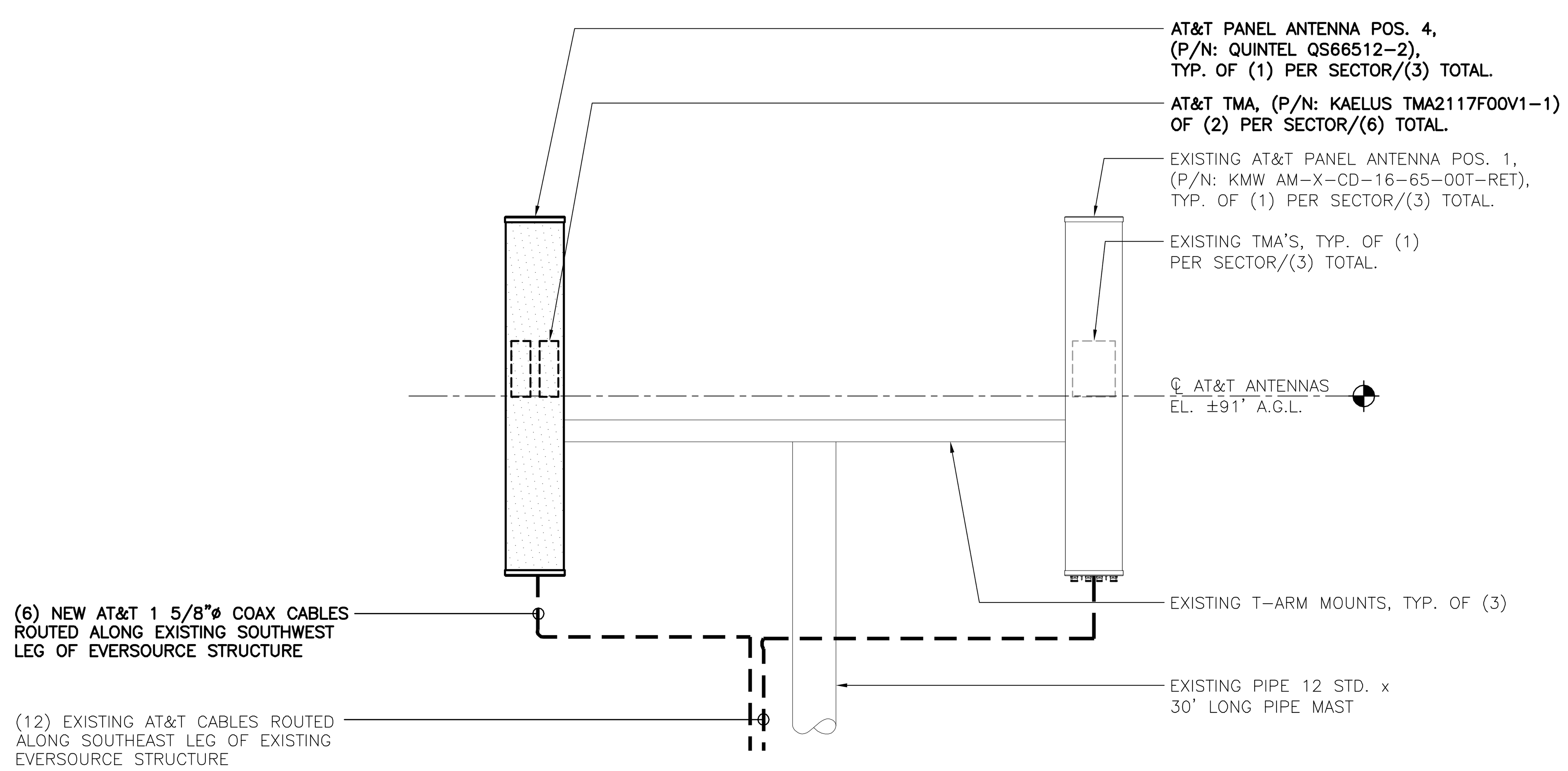
Sheet No. 3 of 8



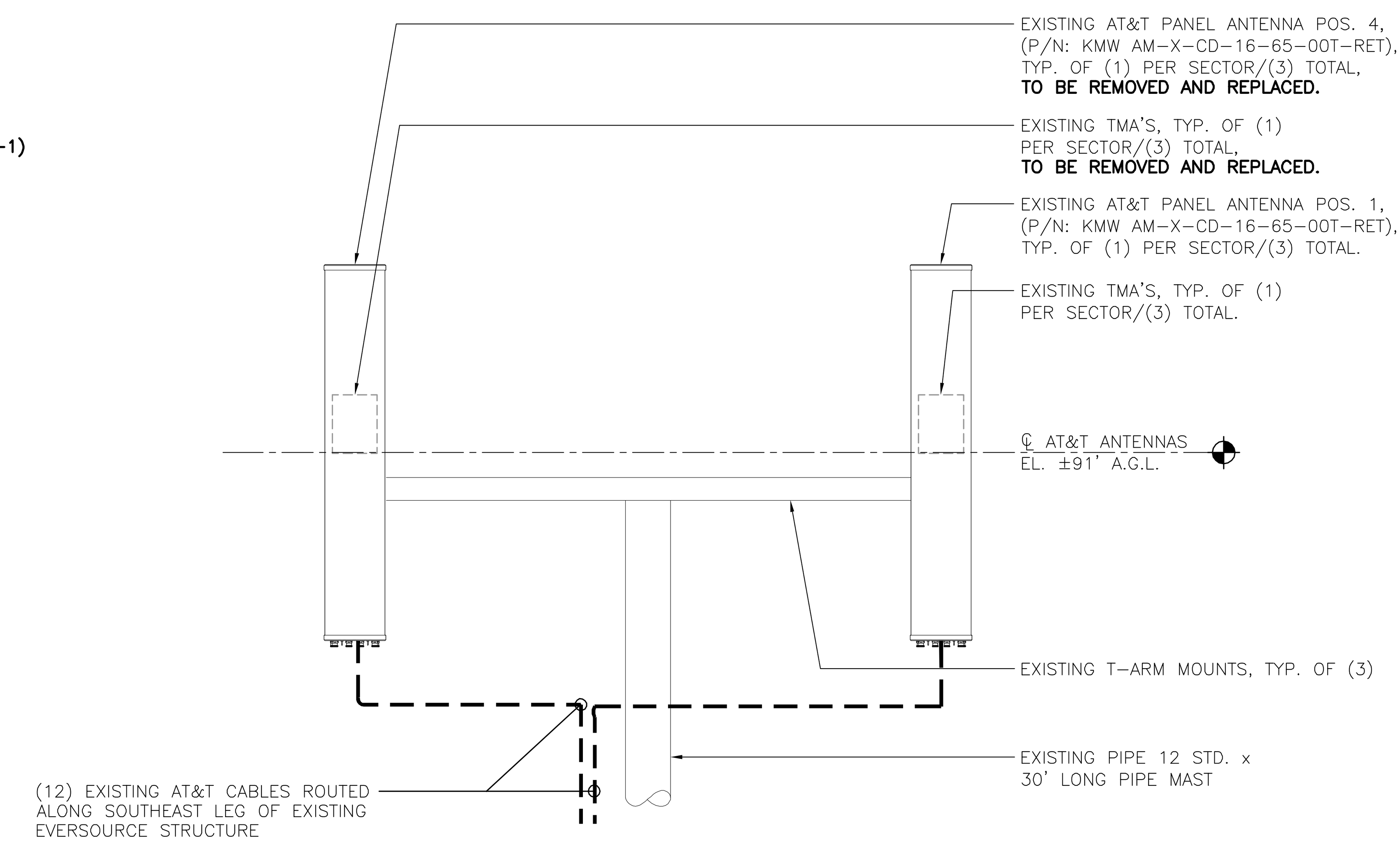
2 C-2 **PROPOSED ANTENNA PLAN**
SCALE: 1/2" = 1'-0"



1 C-2 **EXISTING ANTENNA PLAN**
SCALE: 1/2" = 1'-0"



4 C-2 **PROPOSED ANTENNA ELEVATION**
SCALE: 1/2" = 1'-0"



3 C-2 **EXISTING ANTENNA ELEVATION**
SCALE: 1/2" = 1'-0"

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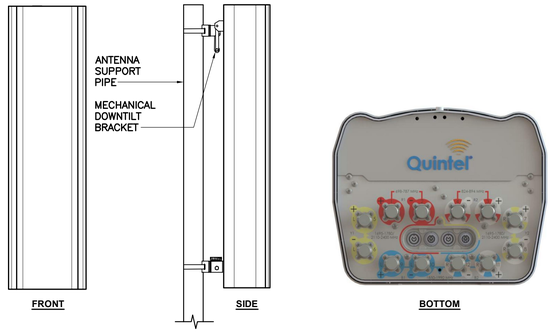
LTE 2C
ANTENNA
DETAILS

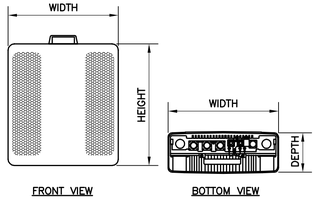
C-2

Sheet No. 4 of 8



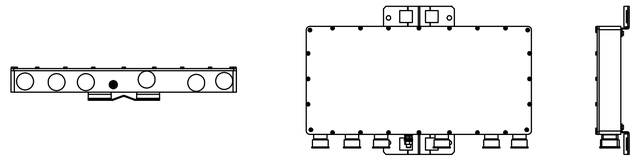
ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: QUINTEL MODEL: QS66512-2	72.0"H x 12.0"W x 9.6"D	111.0-LBS

1 C-3 PROPOSED ANTENNA DETAIL
SCALE: 1/2" = 1'-0"



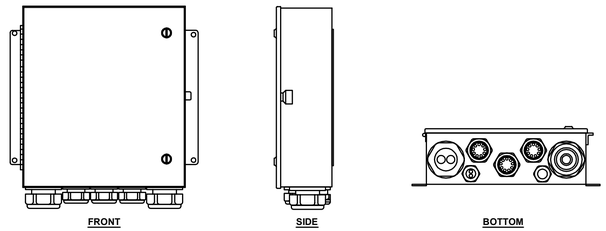
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 12	20.4"L x 18.5"W x 7.5"D	50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.			

2 C-3 ERICSSON RRUS 12 DETAIL
SCALE: 1" = 1'-0"



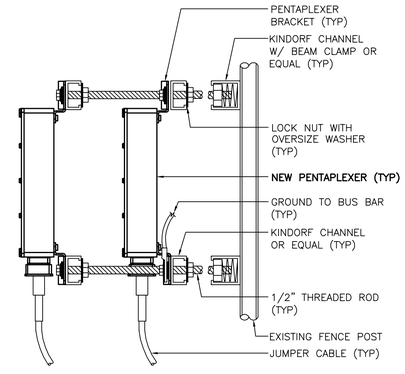
PENTAPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: CCI MODEL: 5PX-0726-O	11.44"H x 17.44"W x 1.95"D	15.6 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.		

3 C-3 PENTAPLEXER DETAIL
SCALE: NONE

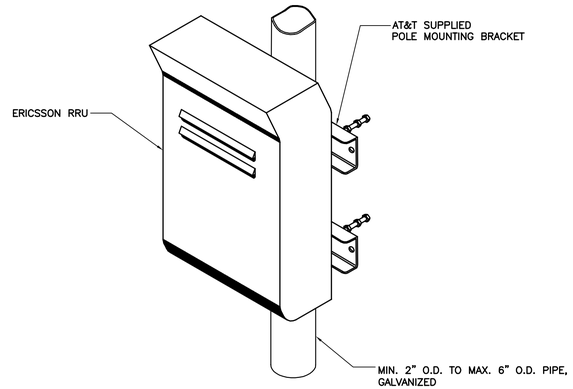


SURGE ARRESTOR			
ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
MAKE: RAYCAP MODEL: DC12-48-60-0-25E	ONE (1)	WITHIN EXISTING COMPOUND	56.3 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING. 2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.			

4 C-3 SURGE ARRESTOR DETAIL
NOT TO SCALE



5 C-3 TYPICAL PENTAPLEXER MOUNTING DETAILS
SCALE: NTS

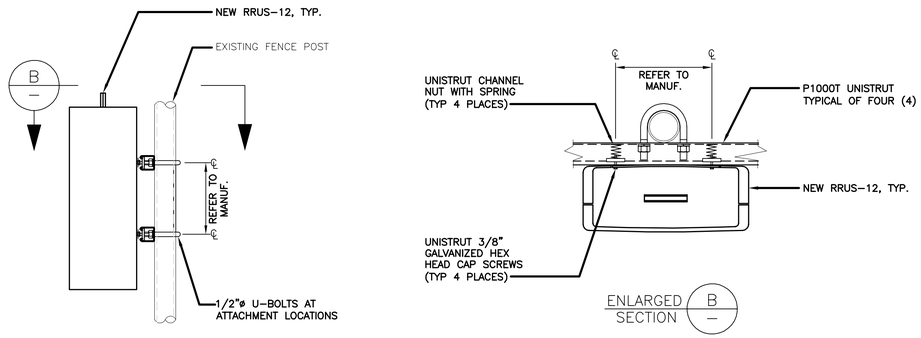


ISOMETRIC VIEW

NOTES:

1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

6 C-3 TYPICAL RRUS MOUNTING DETAILS
SCALE: NTS



7 C-3 TYPICAL RRU MOUNTING DETAILS
SCALE: NTS

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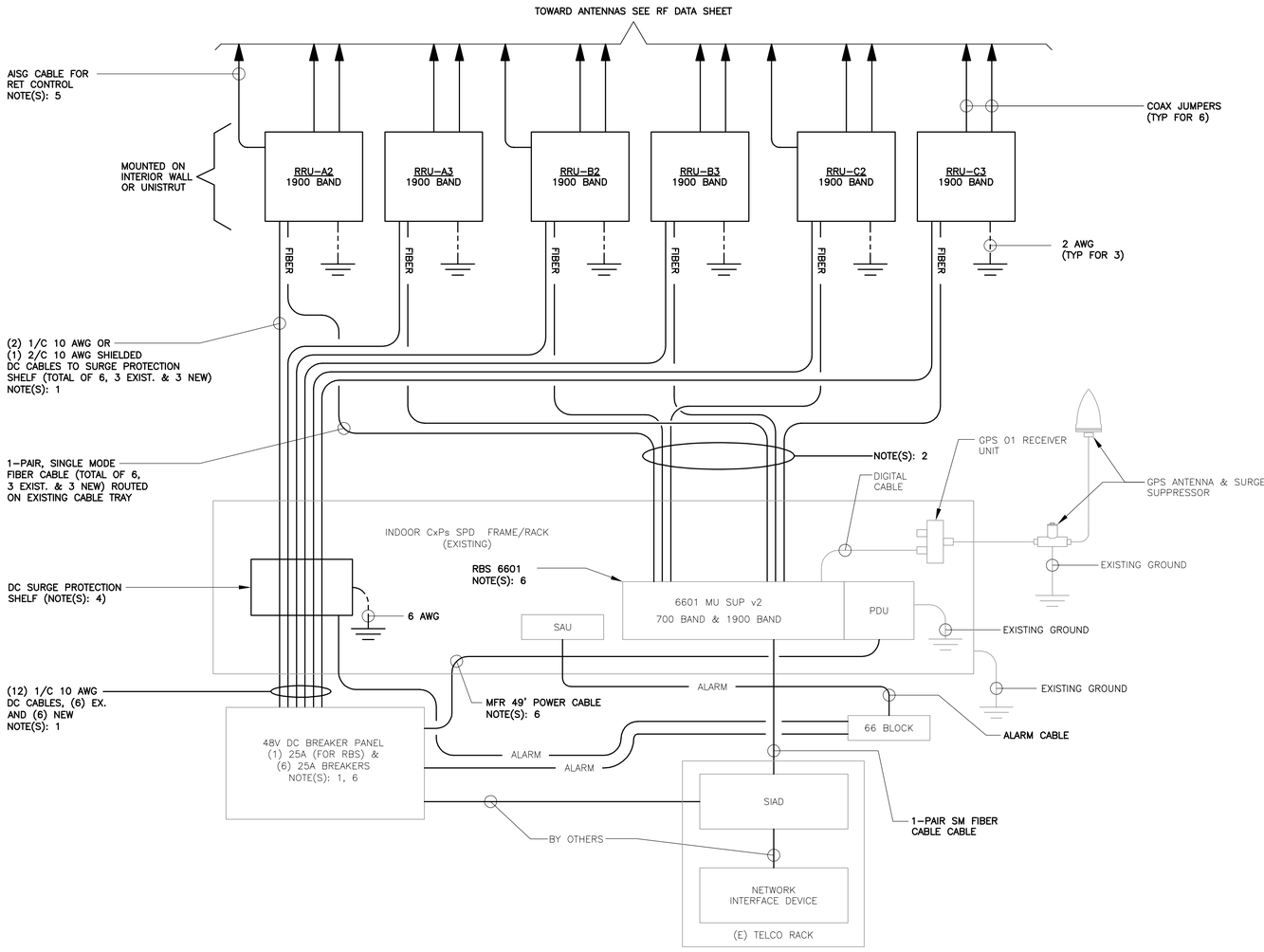
LTE 2C EQUIPMENT DETAILS

C-3



1 E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE

LTE SCHEMATIC DIAGRAM NOTES:

1. BREAKERS TO BE TAGGED AND LOCKED OUT. A 20A (MIN.) OR 30A (MAX.) BREAKER FOR RRUs MAY BE SUBSTITUTED FOR THE RECOMMENDED 25A BREAKER. SIZE 12 CONDUCTORS MAY BE USED ONLY WITH 20A BREAKERS.
2. COIL EXTRA LENGTH OF FIBER CABLE(S) ON SUSPENDED CABLE LADDER, TYPICAL.
3. SINGLE-CONDUCTOR DC POWER CABLES SHALL BE TELCOFLEX® OR KS24194®, COPPER, UL LISTED RHH NON-HALOGEN, LOW SMOKE WITH BRAIDED COVER, TYPE TC (1/0 AND LARGER). UNLESS OTHERWISE NOTED, STRANDING SHALL BE CLASS B (TYPE III) FOR CABLES SIZES 14, 12 & 10 AWG AND CLASS I (TYPE IV) FOR SIZES 8 AWG AND LARGER. CABLES SHALL BE COLOR CODED RED FOR +24V, BLUE FOR -48V AND GRAY FOR 24V AND 48V RETURN CONDUCTORS. MULTI-CONDUCTOR DC POWER CABLES SHALL BE COPPER, CLASS B STRANDING WITH FLAME RETARDANT PVC JACKET, TYPE TC, UL LISTED FOR 90°C DRY/ 75°C WET INSTALLATION.
4. INSTALL DC SURGE PROTECTION SHELF AS REQUIRED. DC SURGE SHELF SHALL BE RAYCAP DCx-48-60-RM.
5. RET CONTROL FROM THE RRU IS AN OPTIONAL METHOD OF CONNECTION. REFER TO RF DATA SHEET FOR APPLICABILITY.
6. RBS 6601 VARIANT 2 REQUIRES A 25A BREAKER AND 10 AWG (MIN.) CONDUCTORS. REPLACE EXISTING 15A OR 20A BREAKERS AND 12 AWG CONDUCTORS WHEN UPGRADING AN EXISTING RBS 6601 VARIANT 1.

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

   THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

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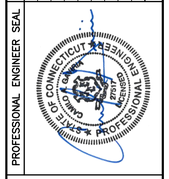

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AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

SOUTHINGTON-CATHYDRIVE NU

CT1109 - LTE 2C

CATHY DRIVE

SOUTHINGTON, CT 06489

DATE: 01/16/17

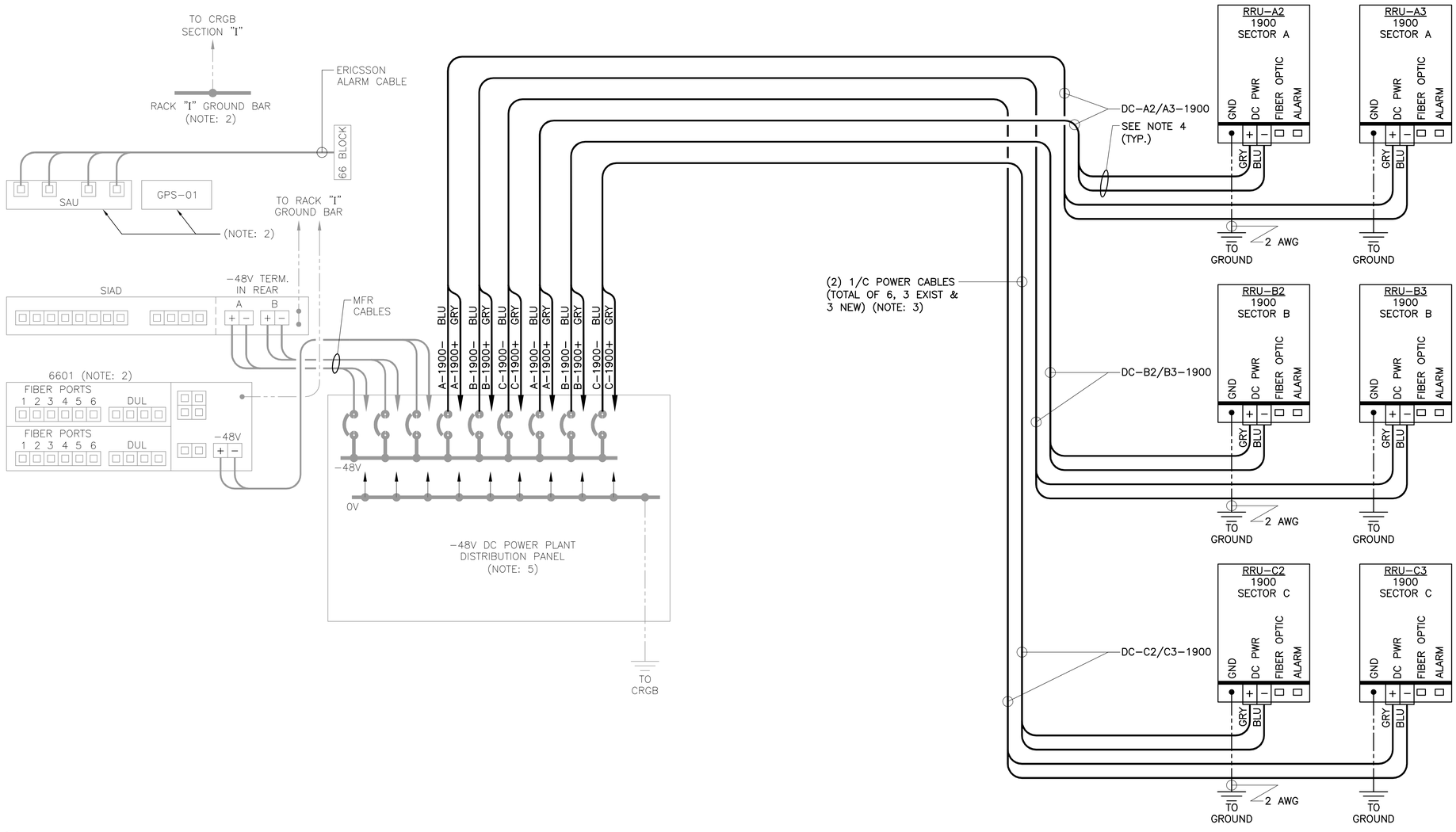
SCALE: AS NOTED

JOB NO. 17004.04

LTE SCHEMATIC DIAGRAM AND NOTES

E-1

Sheet No. 6 of 8



1 E-2 LTE WIRING DIAGRAM

NOT TO SCALE

LTE WIRING DIAGRAM NOTES:

1. LABEL THE DC POWER CABLES AT BOTH ENDS OF EVERY WIRE AND IN ANY PULL BOX IF USED. LABEL SHALL BE DURABLE, SELF ADHESIVE, WRAPPED LONGITUDINALLY ALONG THE CABLE AND STATE THE SECTOR, FREQUENCY BAND AND POLARITY; I.E. "A-1900+". CABLE AND WIRE LABELS SHOWN ARE REPRESENTATIVE AND MAY BE MODIFIED AS DIRECTED BY AT&T.
2. INSTALL ON BASEBAND EQUIPMENT RACK.
3. MAXIMUM CABLE LENGTH IS 49 FEET WITHOUT SURGE PROTECTION AT RRU. INCREASE CONDUCTOR SIZE TO 10 OR 8 AWG WHERE BREAKER RATING IS GREATER THAN 20A.
4. CABLE GROUND WIRE AND SHIELD DRAIN WIRE TO BE LEFT UN-TERMINATED AT RRU AND DC POWER PLANT.
5. SEE LTE SCHEMATIC DIAGRAM DETAIL 1/E-1 FOR BREAKER RATING.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/08/17	KAWJR	CAG	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

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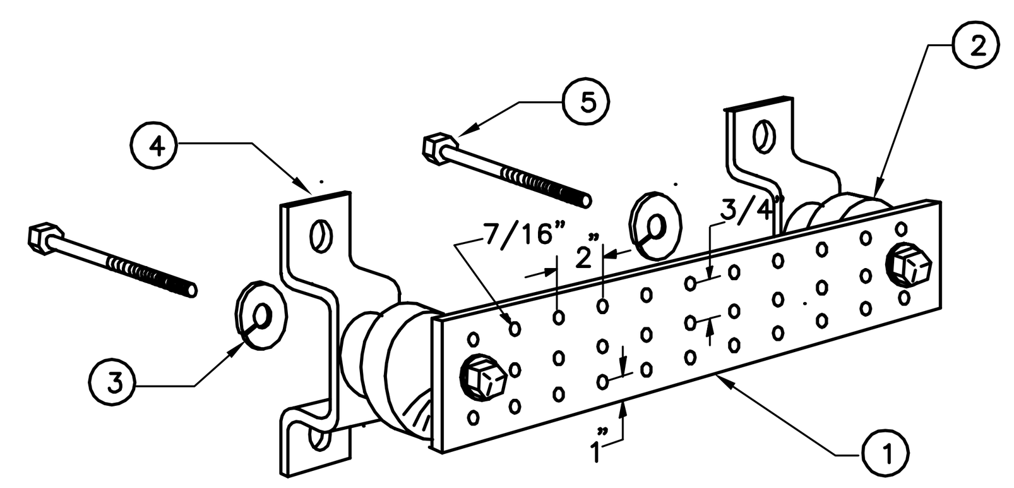
LTE WIRING DIAGRAM

E-2

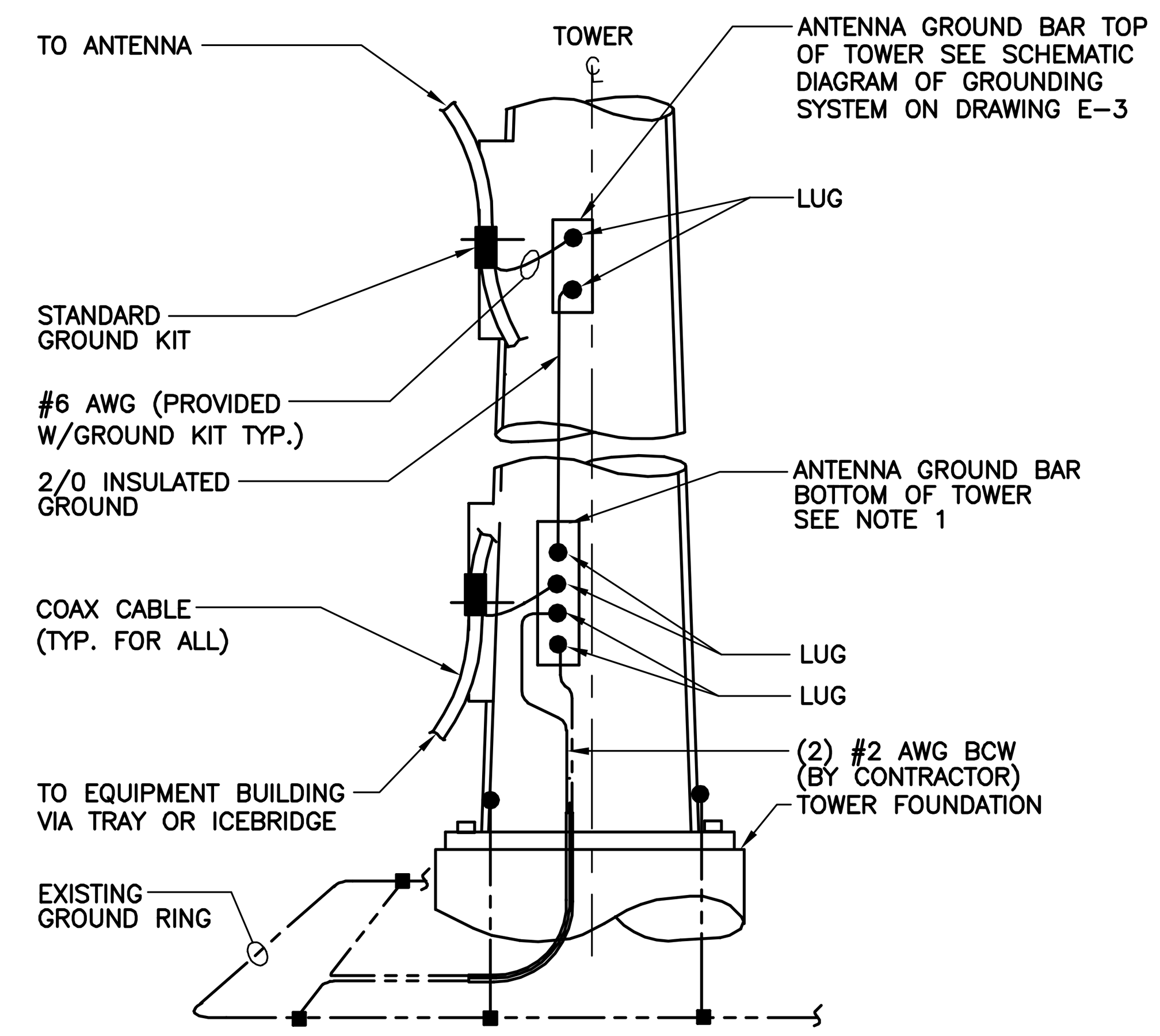
Sheet No. 7 of 8



LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061–4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A–6056.
5. STAINLESS STEEL SECURITY SCREWS.

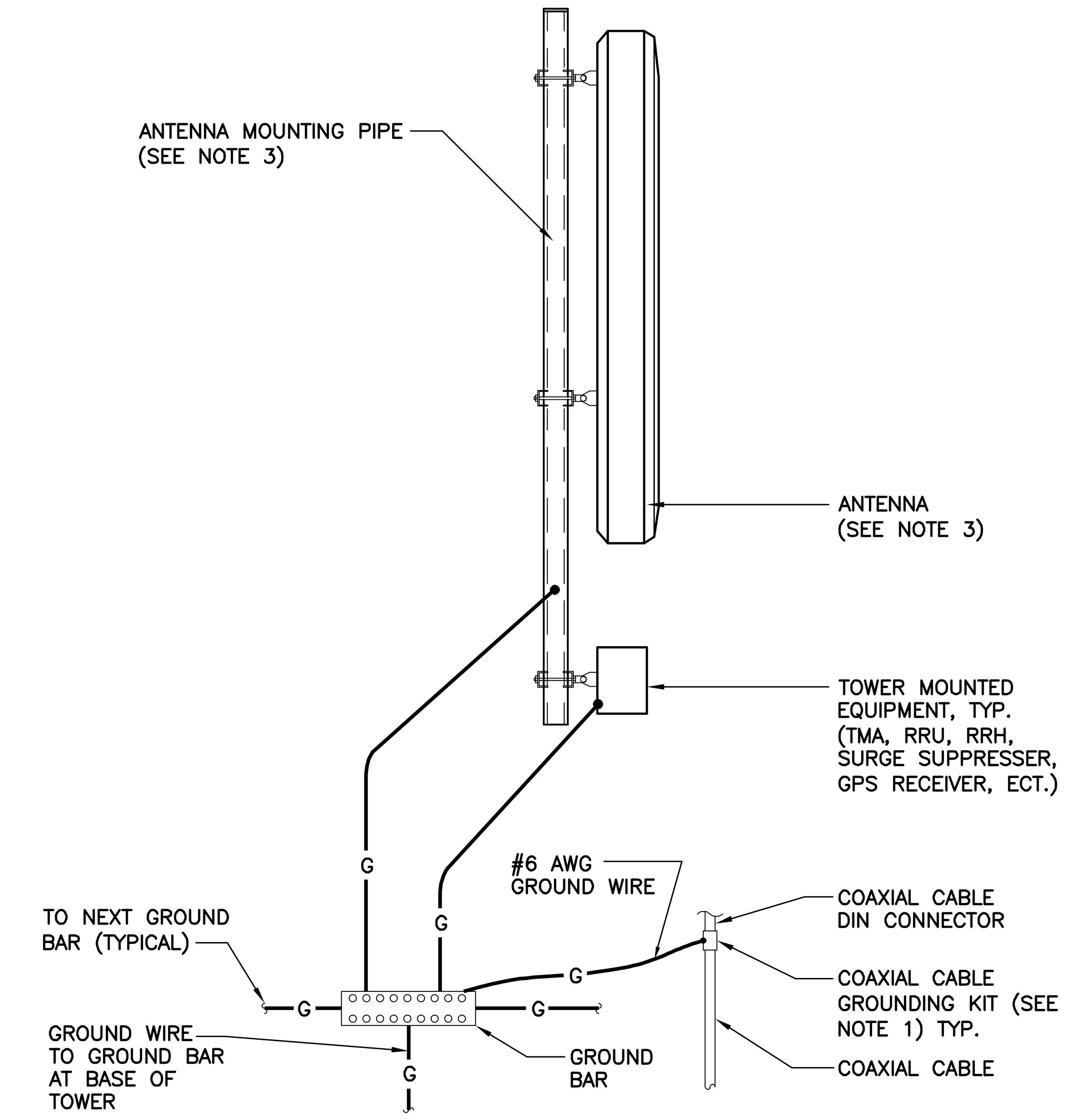
3 (E-3) GROUND BAR DETAIL
NOT TO SCALE



NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

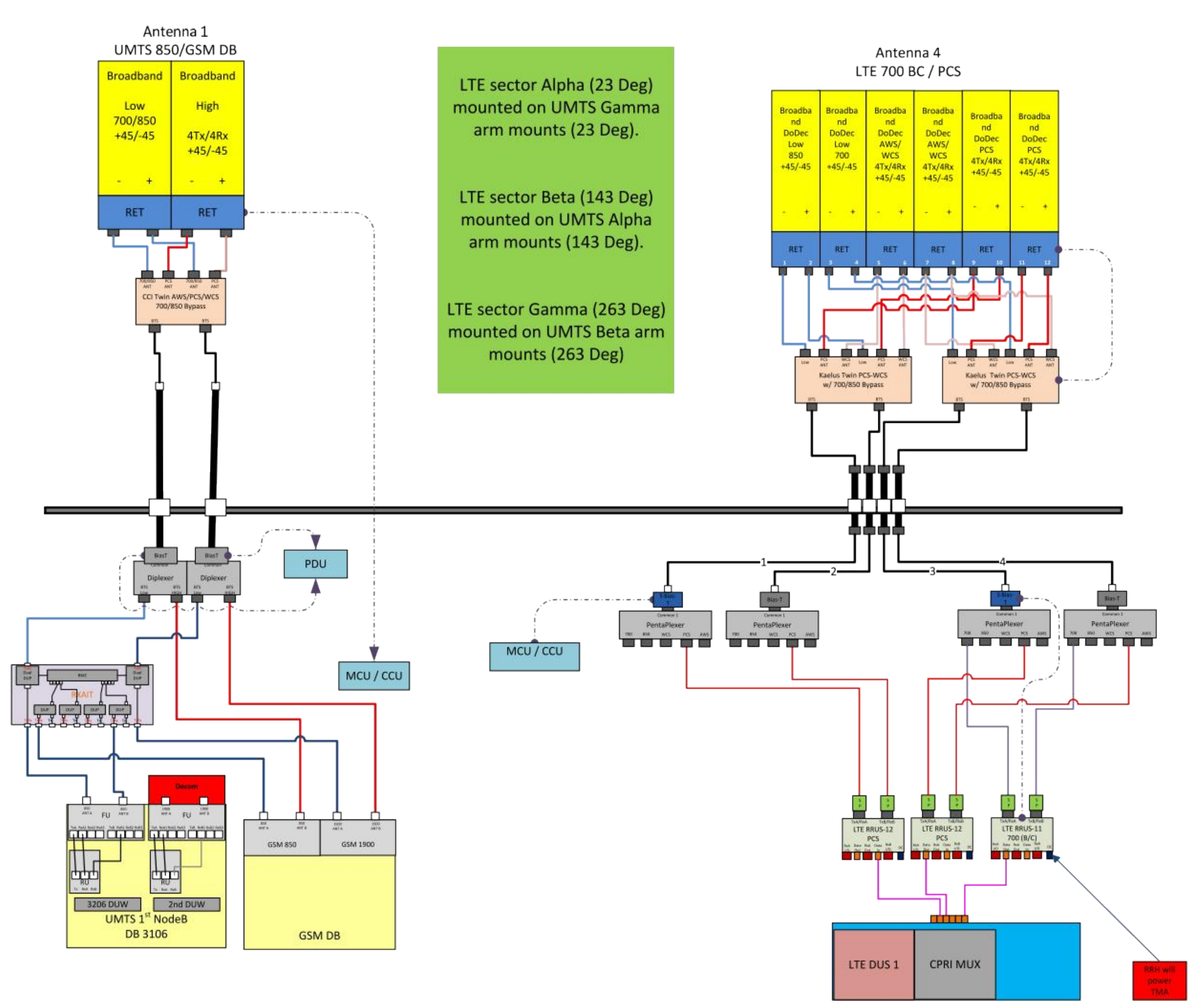
2 (E-3) ANTENNA CABLE GROUNDING - TOWER
NOT TO SCALE



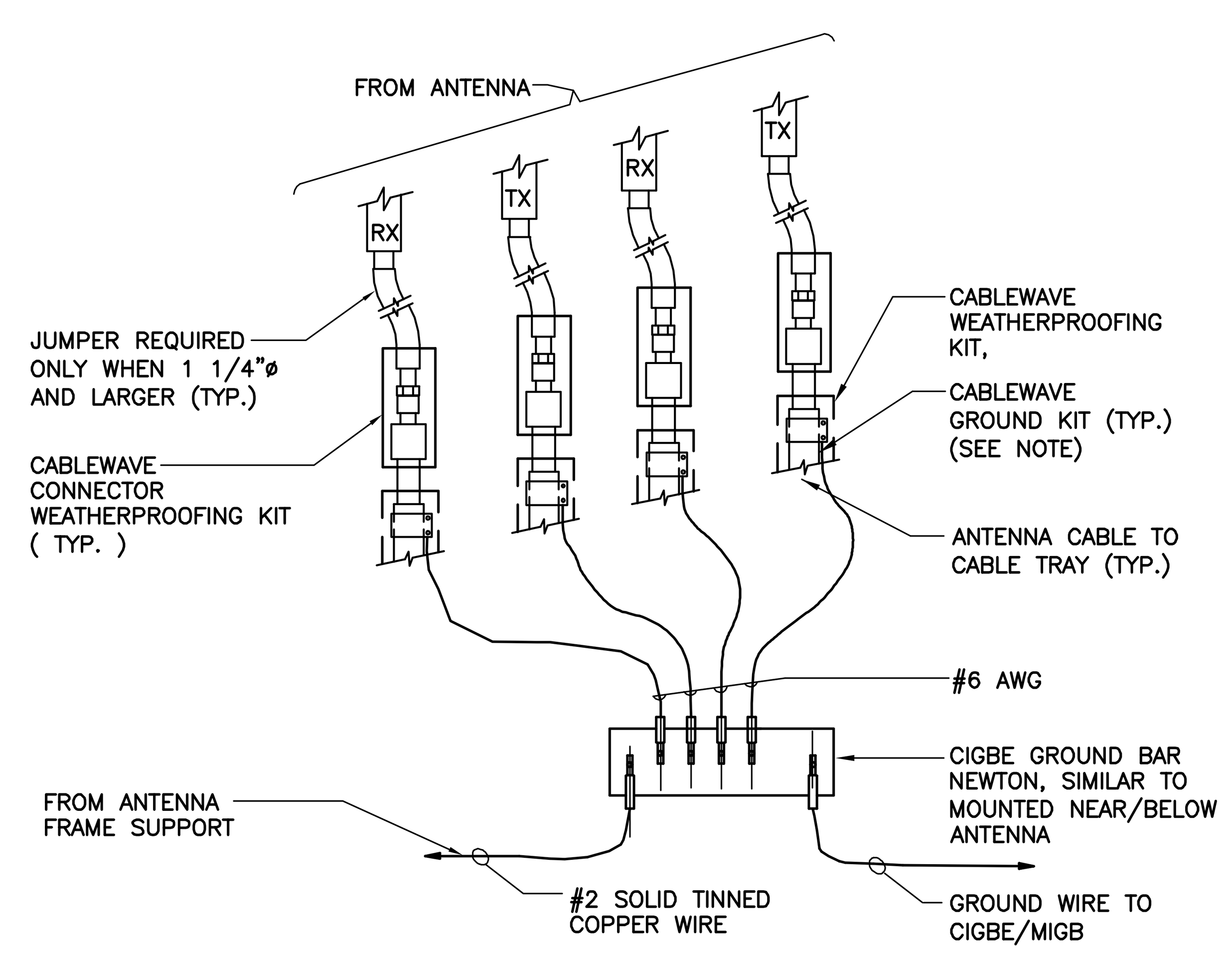
NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 (E-3) TYPICAL ANTENNA GROUNDING DETAIL
NOT TO SCALE



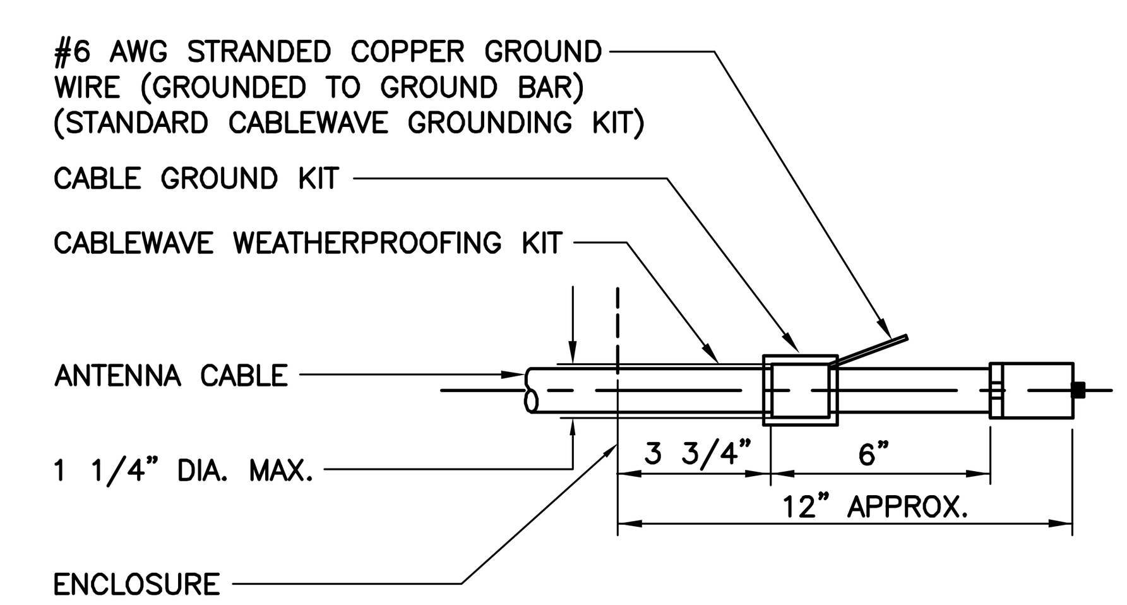
6 (E-3) RFDS PLUMBING DIAGRAM
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

5 (E-3) CONNECTION OF GROUND WIRES TO GROUND BAR
NOT TO SCALE



NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 (E-3) ANTENNA CABLE GROUNDING DETAIL
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/08/17	KAWJR	CAG	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

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TYPICAL ELECTRICAL DETAILS

E-3

CENTEK engineering

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Structural Analysis of Antenna Mast and Tower

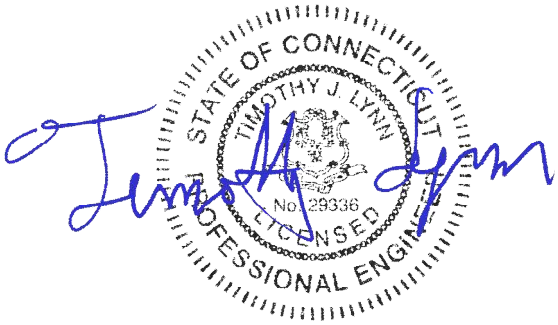
AT&T Site Ref: CT1109

Eversource Structure No. 4119
81' Electric Transmission Lattice Tower

Cathy Drive
Southington, CT

CENTEK Project No. 17004.04

~~Date: January 27, 2017~~
Rev 1: April 13, 2017



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

Table of Contents

Introduction

The purpose of this report is to analyze the existing antenna mast and 81' utility tower located on Cathy Drive in Southington, CT for the proposed antenna and equipment upgrade by AT&T.

The existing and proposed loads consist of the following:

- AT&T (Existing to Remain):
  Antennas: Three (3) KMW AM-X-CD-16-65-00T panel antennas and three (3) CCI DTMABP7819VG12A TMAs mounted on a T-Arm array with a RAD center elevation of 91-ft above tower base.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on a leg of the existing tower.
- AT&T (Existing to Remove):
  Antennas: Three (3) KMW AM-X-CD-16-65-00T panel antennas and three (3) CCI DTMABP7819VG12A TMAs mounted on a T-Arm array with a RAD center elevation of 91-ft above tower base.
- **AT&T (Proposed):**
  Antennas: Three (3) Quintel QS66512-2 panel antennas and six (6) Kaelus TMA2117F00V1-1 TMAs mounted on a T-Arm array with a RAD center elevation of 91-ft above tower base.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on a leg of the existing tower.

Primary assumptions used in the analysis

- ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", defines 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.
- All welds conform to the requirements of AWS D1.1.
- 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.

A n a l y s i s

Structural analysis of the existing antenna mast was independently completed using the current version of RISA-3D computer program licensed to CENTEK Engineering, Inc. The 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 antenna mast consisting of a 12" Sch.40 x 30'-0" long pipe conforming to ASTM A53 Grade B (Fy = 35ksi) connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA-222-G standard. Section 5 of this report details these gravity and lateral wind loads. Load cases and combinations used in RISA-3D for TIA/EIA loading are listed in report Section 6.

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

The existing 81-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 antenna mast 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-G, ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", NESC C2-2007 and Northeast Utilities Design Criteria.

- UTILITY TOWER ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility structure to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the NU Design Criteria Table, NESC C2-2007 ~ Construction Grade B, and ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures".

  Load cases considered:

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

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

  Note 1: NESC C2-2007, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

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

  Load cases considered:

  Load Case 1:
  Wind Speed……... 97 mph (2016 CSBC Appendix-N)
  Radial Ice Thickness…..…….. 0”

  Load Case 2:
  Wind Pressure..…….. 50 mph wind pressure
  Radial Ice Thickness…..…….. 1.00”

R e s u l t s

- ANTENNA MAST

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

Component	Design Limit	Stress Ratio (percentage of capacity)	Result
12” Sch 40 Pipe	Bending	46.9%	**PASS**
Connection to Tower	Shear	15.7%	**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. 10-97, “Design of Latticed Steel Transmission Structures”, for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 8 of this report. The analysis results are summarized as follows:

  A maximum usage of **81.86%** occurs in the utility structure under the **NESC Extreme** loading condition.

  TOWER SECTION:

  The utility structure was found to be within allowable limits.

Tower Member	Stress Ratio (% of capacity)	Result
Angle g17X	81.86%	**PASS**

- FOUNDATION AND ANCHORS

  The existing foundation consists of four (4) 1-ft 8-in square tapering to 2-ft 4-in square x 5.25-ft long reinforced concrete piers and four (4) 5-ft square x 2-ft thick reinforced concrete pads. The base of the tower is connected to the foundation by one (1) anchor stub angle per leg. Foundation information was obtained from Northeast Utilities drawing 01064-60003.

BASE REACTIONS:

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

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	8.61 kips	15.43 kips	33.69 kips
NESC Extreme Wind	14.61 kips	48.40 kips	56.82 kips

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

FOUNDATION:

The existing foundations were found to be structurally **inadequate**. Reinforcement of the existing foundation with 9-ft square by 5-ft thick reinforced concrete mats at each tower leg is required.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Conc. Pad & Pier	Uplift	1.0 FS (1)	1.25 FS (1)	**PASS**

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

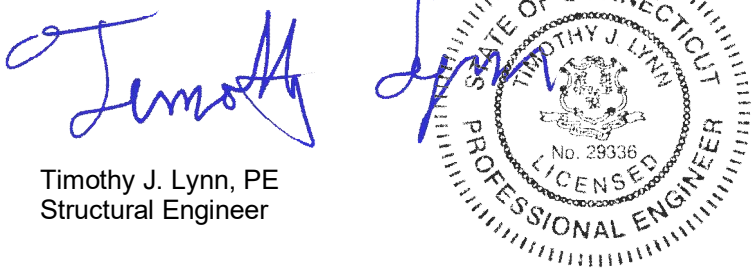
C o n c l u s i o n

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

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

Modeling Features:

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

Analysis Features:

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

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

Results Features:

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

Tool for interactive angle member sizing and bolt quantity determination.

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

Introduction

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

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

P C S M a s t

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

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

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

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

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

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

Attachment A

NU Design Criteria

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

Shape Factor Criteria shall be per TIA Shape Factors.

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

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

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

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

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

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

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

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

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

Northeast Utilities System

Job :		Page	of
Description:	Spec. Number	Sheet	of
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INPUT DATA

TOWER ID: 4199

Structure Height (ft) : 81

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ○ Suspension ◉ Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

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

Conductor Properties:

	BACK	AHEAD	
NAME =	*DOVE*	*DOVE*	
Number of Conductors per phase: 1	556	556	1 Number of Conductors per phase
	26/7 ACSR	26/7 ACSR	
DIAMETER =	0.927 in	0.927 in	
WEIGHT =	0.765 lb/ft	0.765 lb/ft	

Insulator Weight = 0 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	6,000	6,000	6,000	6,000
EXTREME WIND =	5,969	6,438	5,969	6,438
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	2,065	2,241	2,065	2,241

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	348	AHEAD:	348	**696**
WEIGHT SPAN (ft) =	BACK:	345	AHEAD:	345	**690**

Northeast Utilities System

Job :
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Date

WIRE LOADING AT ATTACHMENTS

TOWER ID: 4199

Wind Span =	696	ft
Weight Span =	690	ft
Total Angle =	0	degrees

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

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	1,008 lb	0 lb	1,333 lb	504 lb	9,900 lb	666 lb
Conductor =	1,118 lb	0 lb	1,710 lb	559 lb	9,900 lb	855 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	1,214 lb	0 lb	357 lb
Conductor =	1,524 lb	0 lb	528 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	357 lb
Conductor =	#VALUE!	#VALUE!	528 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,849 lb
Conductor =	#VALUE!	#VALUE!	2,181 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	889 lb
Conductor =	#VALUE!	#VALUE!	1,140 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	357 lb
Conductor =	0 lb	0 lb	528 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	357 lb
Conductor =	0 lb	0 lb	528 lb

Northeast Utilities System

Job :
Description:

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INPUT DATA

TOWER ID: 4199

Structure Height (ft) : 81

Wind Zone : Central CT (green)

Wind Speed : 110 mph

Tower Type : ○ Suspension ◉ Strain

Extreme Wind Model : PCS Addition

Shield Wire Properties:

	BACK	AHEAD
NAME =	*11/32 CW*	*11/32 CW*
DESCRIPTION =	11/32	11/32
STRANDING =	7 #9 Cu Weld	7 #9 Cu Weld
DIAMETER =	0.343 in	0.343 in
WEIGHT =	0.257 lb/ft	0.257 lb/ft

Conductor Properties:

	BACK	AHEAD	
NAME =	*DOVE*	*DOVE*	
Number of Conductors per phase: 1	556	556	1 Number of Conductors per phase
	26/7 ACSR	26/7 ACSR	
DIAMETER =	0.927 in	0.927 in	
WEIGHT =	0.765 lb/ft	0.765 lb/ft	

Insulator Weight = 0 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,600	6,000	3,600	6,000
EXTREME WIND =	2,804	6,438	2,804	6,438
LONG. WIND =	na	na	na	na
250D COMBINED =	na	na	na	na
NESC W/O OLF =	na	na	na	na
60 DEG F NO WIND =	1,071	2,241	1,071	2,241

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	0	AHEAD:	0	**0**
WIND SPAN (ft) =	BACK:	348	AHEAD:	348	**696**
WEIGHT SPAN (ft) =	BACK:	345	AHEAD:	345	**690**

Northeast Utilities System

Job :
Description:

Spec. Number
Computed by
Checked by

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Date 2/28/11
Date

WIRE LOADING AT ATTACHMENTS

TOWER ID: 4199

Wind Span =	696	ft
Weight Span =	690	ft
Total Angle =	0	degrees

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

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	779 lb	0 lb	808 lb	389 lb	5,940 lb	404 lb
Conductor =	1,118 lb	0 lb	1,710 lb	559 lb	9,900 lb	855 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	564 lb	0 lb	177 lb
Conductor =	1,524 lb	0 lb	528 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	177 lb
Conductor =	#VALUE!	#VALUE!	528 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,330 lb
Conductor =	#VALUE!	#VALUE!	2,181 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	539 lb
Conductor =	#VALUE!	#VALUE!	1,140 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	177 lb
Conductor =	0 lb	0 lb	528 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	0 lb	0 lb	177 lb
Conductor =	0 lb	0 lb	528 lb

at&t

EVERSOURCE

FOUNDATION REINFORCEMENT DESIGN

STRUCT. NO. 4119
CATHY DRIVE
SOUTHINGTON, CT 06489

VICINITY MAP

NORTH

PROJECT SUMMARY

SITE ADDRESS:	CATHY DRIVE SOUTHINGTON, CT 06489
PROJECT COORDINATES:	LAT: 41°–35'–55.90N LON: 72°–51'–08.70W ELEV:±219' AMSL
STRUCT NO:	4119
EVERSOURCE CONTACT:	ROBERT GRAY 860.665.3175
AT&T SITE REF.:	CT1109
AT&T CONTACT:	MELISSA CHAMBERS 978.408.7066
ANTENNA CL HEIGHT:	91'–0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	CARLO F. CENTORE, PE 203.488.0580 ext. 122

SHEET INDEX

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TITLE SHEET

SHEET NO.
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DESIGN BASIS

1. GOVERNING CODE: 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CT STATE SUPPLEMENT.

2. TIA–222–G, ASCE–48–05 – "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES", NESC C2–2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN WIND SPEED (V) = 97 MPH (2016 CSBC: APPENDIX 'N')

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

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR AT&T, DATED 4/13/17.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DOCUMENTS PREPARED BY AMERICAN BRIDGE CO. ORDER NO. J6125, DATED AUGUST 22, 1949. FOUNDATION INFORMATION WAS OBTAINED FROM THE ORIGINAL DESIGN DOCUMENTS PREPARED BY NORTHEAST UTILITIES SERVICE CO., DWG. NO. 01064–60003, DATED JANUARY 14, 1952.

3. THE CONTRACTOR SHALL LIMIT THE FOUNDATION REINFORCEMENT WORK TO ONE TOWER LEG AT A TIME. CONSTRUCTION SHALL BE CONDUCTED IN WIND SPEEDS LESS THAN 15 MPH AND IN LOW ICE ACCUMULATION PERIODS. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.

4. THE TOWER STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE & SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, UNDERPINNING, TEMPORARY ANCHORS, GUYING, BARRICADES, ETC. AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY. MAINTAIN EXISTING SITE OPERATIONS AND COORDINATE WORK WITH TOWER OWNER.

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

6. 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.

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

8. FOUNDATION REINFORCEMENTS 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.

9. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH THE TOWER FOUNDATION REINFORCEMENT WORK.

10. 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.

11. 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.

12. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

SITE NOTES

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. ALL RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED OFF SITE AND BE LEGALLY DISPOSED, AT NO ADDITIONAL COST.

4. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE EQUIPMENT AND TOWER AREAS.

5. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

6. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

7. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.

8. 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.

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DESIGN BASIS AND GENERAL NOTES

SHEET NO.
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Sheet No. 2 of 7

EARTHWORK NOTES

1. COMPACTED GRAVEL FILL SHALL BE FURNISHED AND PLACED AS A FOUNDATION FOR STRUCTURES, WHERE SHOWN ON THE CONTRACT DRAWINGS OR DIRECTED BY THE ENGINEER.

2. CRUSHED STONE FILL SHALL BE PLACED IN 12" MAX. LIFTS AND CONSOLIDATED USING A HAND OPERATED VIBRATORY PLATE COMPACTOR WITH A MINIMUM OF 2 PASSES OF COMPACTOR PER LIFT.

3. COMPACTED GRAVEL FILL TO BE WELL GRADED BANK RUN GRAVEL MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1 ½"	100
No. 4	40–70
No. 100	5–20
No. 200	4–8

4. CRUSHED STONE TO BE UNIFORMLY GRADED, CLEAN, HARD PROCESS AGGREGATE MEETING THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE DESIGNATION	% PASSING
1"	100
¾"	90–100
½"	0–15
⅜"	0–5

5. SELECT BACKFILL FOR FOUNDATION WALLS SHALL BE FREE OF ORGANIC MATERIAL, TOPSOIL, DEBRIS AND BOULDERS LARGER THAN 6".

6. GRAVEL AND GRANULAR FILL SHALL BE INSTALLED IN 10" MAX. LIFTS. COMPACTED TO 95% MIN. AT MAX. DRY DENSITY.

7. NON WOVEN GEOTEXTILE FOR SEPARATION PURPOSES SHALL BE MIRAFI 140N, OR ENGINEER APPROVED EQUAL.

FOUNDATION CONSTRUCTION NOTES

1. ALL FOOTINGS SHALL BE PLACED ON SUITABLE, COMPACTED SOIL HAVING ADEQUATE BEARING CAPACITY AND FREE OF ORGANIC CONTENT, CLAY, OR OTHER UNSUITABLE MATERIAL. ADDITIONAL EXCAVATION MAY BE REQUIRED BELOW FOOTING ELEVATIONS INDICATED IF UNSUITABLE MATERIAL IS ENCOUNTERED.

2. SUBGRADE PREPARATION: IF UNSUITABLE SOIL IS ENCOUNTERED, REMOVE ALL UNSUITABLE MATERIALS FROM BELOW PROPOSED STRUCTURE FOUNDATIONS AND COMPACT EXPOSED SOIL SURFACES. PLACE AND COMPACT APPROVED GRAVEL FILL. PLACEMENT OF ALL COMPACTED FILL MUST BE UNDER SUPERVISION OF AN APPROVED TESTING LABORATORY. FILL SHALL BE COMPACTED IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557–70 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167–66 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL. BUT NOT LESS THAN ONE (1) PER LAYER, TO INSURE COMPACTION TO 95% OF MAX. DRY DENSITY.

3. ALL SOIL SURROUNDING AND UNDER ALL FOOTINGS SHALL BE KEPT REASONABLY DRY AND PROTECTED FROM FREEZING AND FROST ACTION DURING THE COURSE OF CONSTRUCTION.

4. WHERE GROUNDWATER IS ENCOUNTERED, DEWATERING SHALL BE ACCOMPLISHED CONTINUOUSLY AND COMPLETELY DURING FOUNDATION CONSTRUCTION. PROVIDE CRUSHED STONE AS REQUIRED TO STABILIZE FOOTING SUBGRADE.

5. ALL FOOTINGS ARE TO REST ON FIRM SOIL, REGARDLESS OF ELEVATIONS SHOWN ON THE DRAWINGS, BUT IN NO CASE MAY FOOTING ELEVATIONS BE HIGHER THAN INDICATED ON THE FOUNDATION PLAN, UNLESS SPECIFICALLY DIRECTED BY THE ENGINEER.

6. FOUNDATION WATERPROOFING AND DAMPPROOFING SHALL COMPLY WITH BUILDING CODE REQUIREMENTS UNLESS A MORE SUBSTANTIAL SYSTEM IS INDICATED OR SPECIFIED.

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EARTHWORK AND FOUNDATION CONSTRUCTION NOTES

SHEET NO.
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CONCRETE CONSTRUCTION

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

   ACI 211 – STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.

   ACI 301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.

   ACI 302 – GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION

   ACI 304 – RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.

   ACI 306.1 – STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING

   ACI 318 – BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.

2. CONCRETE SHALL BE AIR ENTRAINED AND SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:

   ALL CONCRETE 4,000 PSI

3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.

4. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".

5. CONCRETE COVER OVER REINFORCING SHALL BE 3 INCHES.

6. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.

7. ALL REINFORCEMENT SHALL BE CONTINUOUS. SPLICES WILL NOT BE ALLOWED.

8. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.

9. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1 % CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.

10. TOP OF FOOTING SURFACES SHALL RECEIVE A UNIFORM FLOAT FINISH. CURE FOOTING SURFACE WITH SONNEBORN KURE–N–SEAL WB OR APPROVED EQUAL, APPLIED AS RECOMMENDED BY MANUFACTURER.

11. PREPARATION OF SURFACES WHERE NEW CONCRETE WILL INTERFACE WITH EXISTING CAISSON:
    THE PERIMETER OF THE EXISTING CAISSON SHALL BE THOROUGHLY CLEANED OF ALL DIRT AND DELETERIOUS MATERIALS PRIOR TO APPLICATION OF BONDING AGENT. CONTRACTOR SHALL NOTIFY NORTHEAST UTILITIES 24 HOURS IN ADVANCE OF CLEANING.

    SIKADUR 32, HI–MOD OR ENGINEER APPROVED EQUAL SHALL BE APPLIED, IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, TO ALL INTERFACING SURFACES BEFORE CONCRETE IS PLACED.

    CAULK JOINT BETWEEN EXISTING CONCRETE PIER AND NEW CONCRETE WITH SIKAFLEX 1–A BY SIKA CORP. OR ENGINEER APRROVED EQUAL.

    SUBMIT MANUFACTURER'S PRODUCT SPECIFICATION DATA AND INSTALLATION INSTRUCTIONS FOR REVIEW AND APPROVAL BY OWNER.

12. NEW CONCRETE FOOTING SHALL BE ALLOWED TO CURE AT LEAST 14 DAYS BEFORE WIRELESS ANTENNA MOUNT, ANTENNAS, AND CABLES ARE INSTALLED.

13. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, APPROVED AND PAID BY THE OWNER. THE INSPECTOR SHALL OBSERVE THE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.

14. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	4/13/17	TJL	CFC	ISSUED FOR CONSTRUCTION
0	1/27/17	TJL	CFC	ISSUED FOR REVIEW

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DATE:	1/27/17
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JOB NO.	17004.04

CONCRETE CONSTRUCTION NOTES

SHEET NO.
N-3
Sheet No. 4 of 7

MODIFICATION INSPECTION REPORT REQUIREMENTS

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

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

GENERAL

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

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

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

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

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

MODIFICATION INSPECTOR (MI)

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

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

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

GENERAL CONTRACTOR (GC)

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

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

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

CORRECTION OF FAILING MODIFICATION INSPECTION

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

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

REQUIRED PHOTOGRAPHS

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

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

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MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
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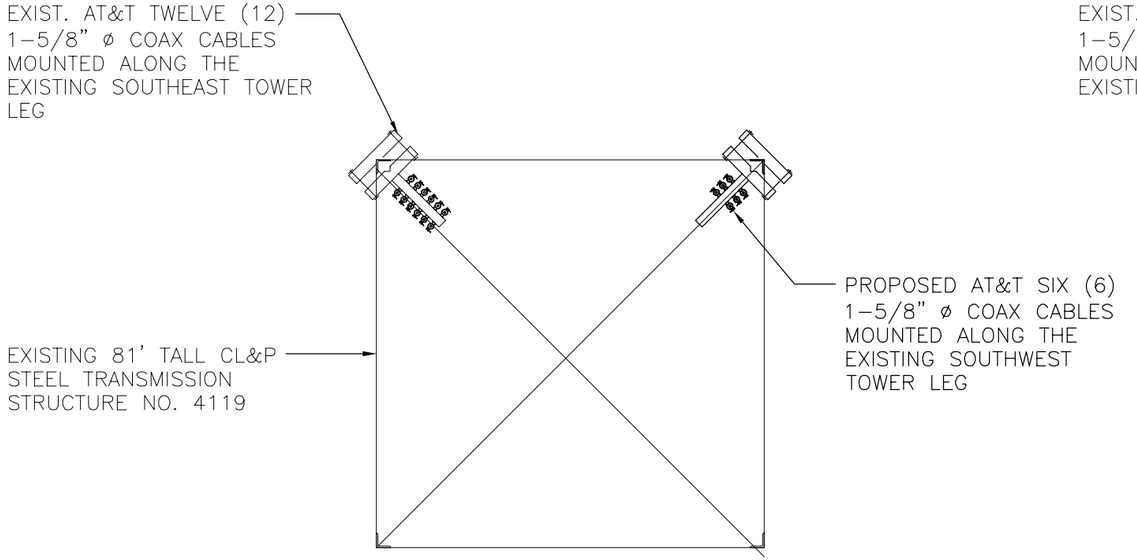
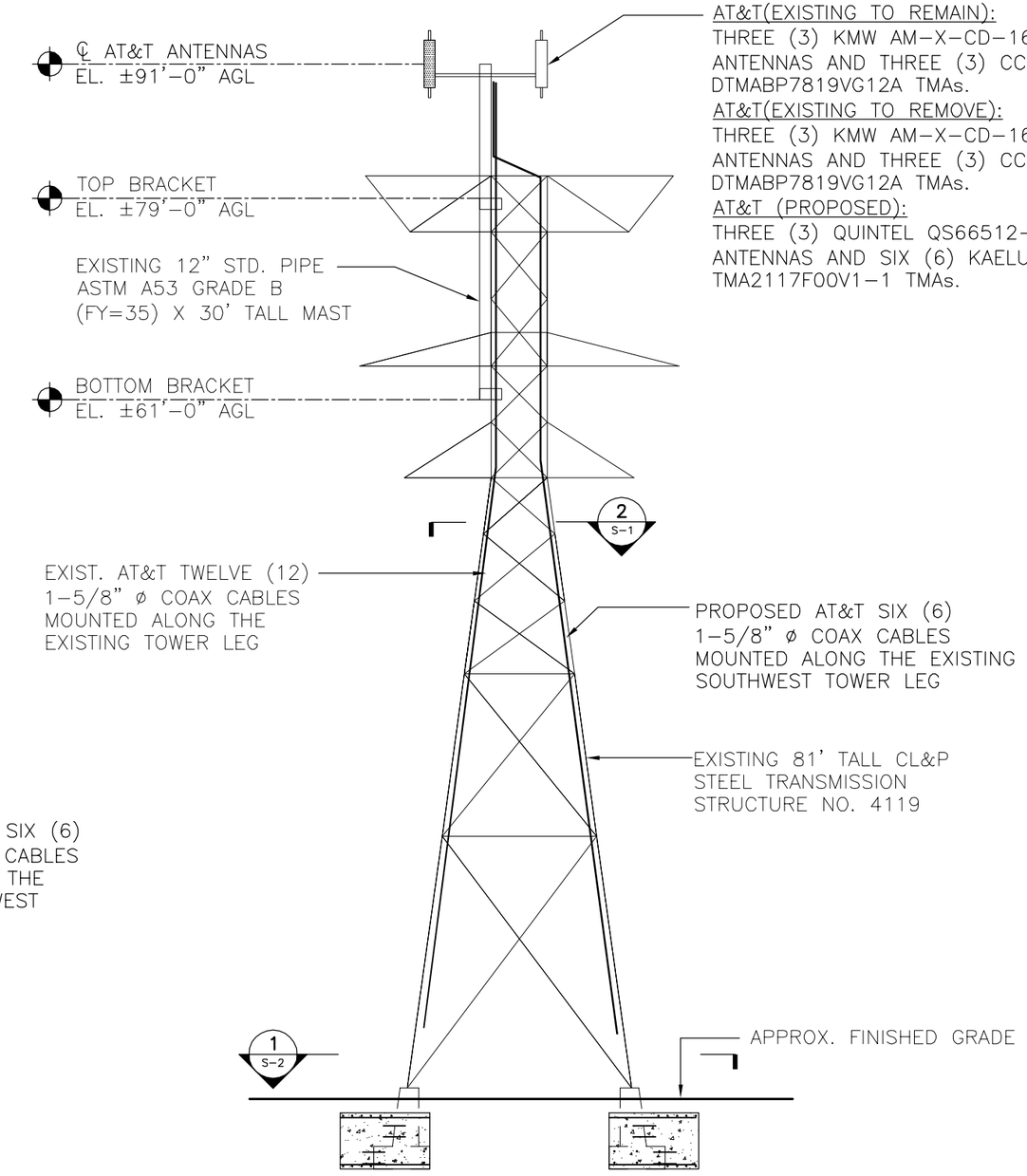


2 S-1 COAX CABLE PLAN TOWER

SCALE: 3/4" = 1'-0"



1 S-1 TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

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TOWER
ELEVATION AND
FEEDLINE PLAN

SHEET NO.
S-1
Sheet No. 6 of 7

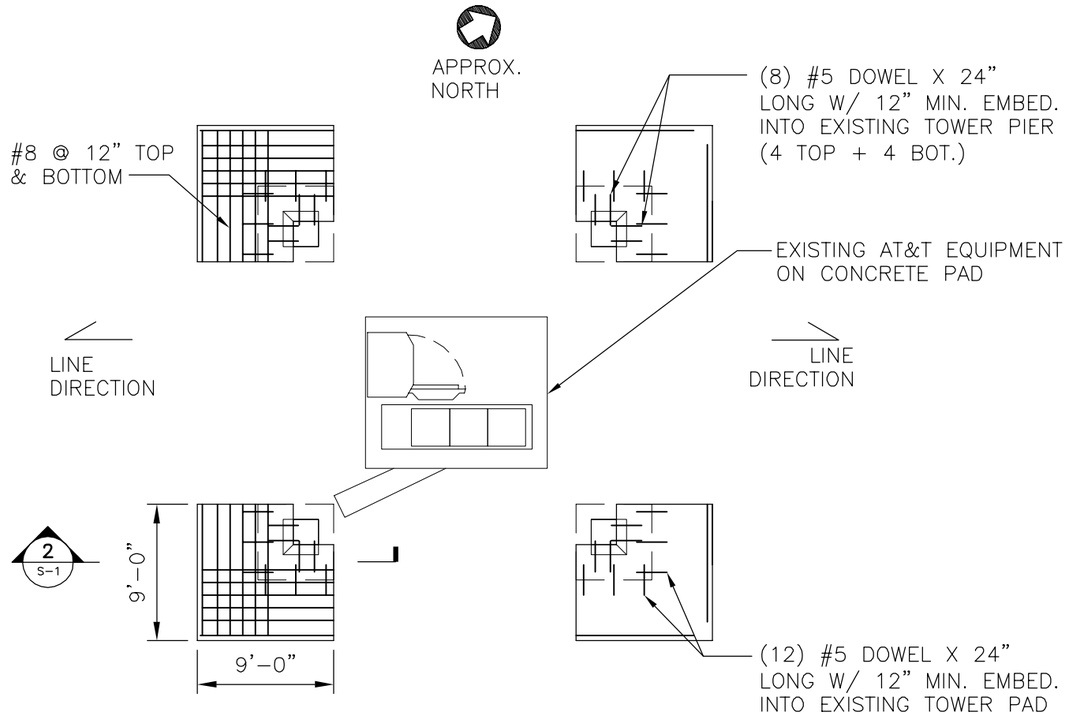
FOUNDATION PLAN NOTES:

1. THE CONTRACTOR SHALL LIMIT THE FOUNDATION REINFORCEMENT WORK TO ONE TOWER LEG AT A TIME. CONSTRUCTION SHALL BE CONDUCTED IN WIND SPEEDS LESS THAN 15 MPH AND IN LOW ICE ACCUMULATION PERIODS. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.

2. CONTRACTOR SHALL USE EXTREME CAUTION DURING EXCAVATION OF EXISTING FOUNDATION STRUCTURE. IMPLEMENT HAND DIGGING WHERE PRACTICABLE.

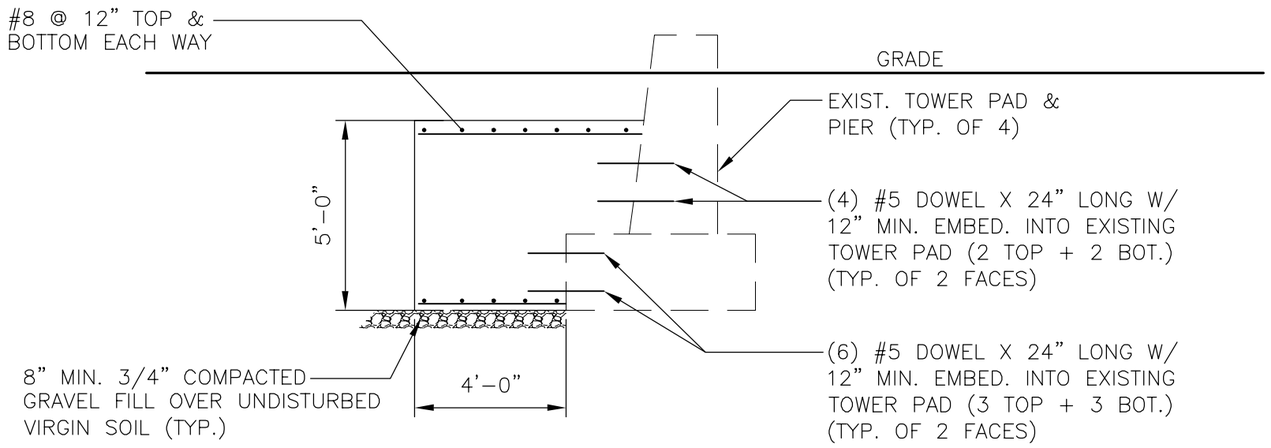
3. PROTECT EXISTING TOWER GROUND WIRE(S) FROM DAMAGE DUE TO NEW CONSTRUCTION. CONTRACTOR SHALL NOTIFY NU IF GROUNDING SYSTEM BECOMES DAMAGED OR DISCONNECTED.

4. NOTIFY NU REPRESENTATIVE TO BE PRESENT UPON COMPLETION OF REBAR PLACEMENT.



1 S-1 **FOUNATION PLAN**

SCALE: 1/10" = 1'-0"



2 S-1 **FOUNDATION SECTION**

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

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FOUNDATION REINFORCEMENT DETAILS

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Subject:	Loads on AT&T Equipmnet Structure #4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

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

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Lattice$ (User Input)

Structure Category = $SC := III$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 81$ ft (User Input)

Height to Center of Antennas = $z_{AT\&T} := 91$ 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)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H := 1.35$ (User Input)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

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

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

$$K_{iz} := \left(\frac{z_{AT\&T}}{33}\right)^{0.1} = 1.107$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.767$$

Velocity Pressure Coefficient =

$$Kz_{AT\&T} := 2.01\left(\left(\frac{z_{AT\&T}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.241$$

Velocity Pressure w/o Ice =

$$qz_{AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot K_{zt} \cdot V^2 \cdot I_{Wind} = 29.213$$

Velocity Pressure with Ice =

$$qz_{ice.AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot K_{zt} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 6.75$$

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Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Development of Wind & Ice Load on Mast

Mast Data: (Pipe 12" SCH. 40) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 12.75$ in (User Input)

Mast Length = $L_{mast} := 30$ ft (User Input)

Mast Thickness = $t_{mast} := 0.375$ in (User Input)

Mast Aspect Ratio = $Ar_{mast} := \frac{12 L_{mast}}{D_{mast}} = 28.2$

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

Wind Load (without ice)

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

Total Mast Wind Force = $qz_{AT\&T} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 50$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{iz})}{12} = 1.524$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.AT\&T} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 17$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + t_{iz} \cdot 2)^2 - D_{mast}^2\right] = 134.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 52$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	KMW AM-X-CD-16-65-00T			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 72$	in	(User Input)	
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 5.9$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 48.5$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$			
Antenna Force Coefficient =	$Ca_{ant} = 1.36$			

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 949$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 9.3$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 28$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 347$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 146$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 336$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 1007$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Quintel QS66512-2			
Antenna Shape =	Flat		(User Input)	
Antenna Height =	$L_{ant} := 72$	in	(User Input)	
Antenna Width =	$W_{ant} := 12$	in	(User Input)	
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)	
Antenna Weight =	$WT_{ant} := 111$	lbs	(User Input)	
Number of Antennas =	$N_{ant} := 3$		(User Input)	
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.0$			
Antenna Force Coefficient =	$Ca_{ant} = 1.36$			

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 18$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 962$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 9.4$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 28.3$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 350$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 333$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 398$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 1194$	lbs	**BLC 3**

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Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Development of Wind & Ice Load on TMAs

TMA Data:

TMA Model =	CCI DTMABP7819VG12A		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 14.25$	in	(User Input)
TMA Width =	$W_{TMA} := 11.46$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.17$	in	(User Input)
TMA Weight =	$WT_{TMA} := 19.2$	lbs	(User Input)
Number of TMAs =	$N_{TMA} := 3$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1.2$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.1$	sf	
TMA Projected Surface Area =	$A_{TMA} := SA_{TMA} \cdot N_{TMA} = 3.4$	sf	
Total TMA Wind Force =	$F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{TMA} = 161$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One TMA w/ Ice =	$SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 2.3$	sf	
TMA Projected Surface Area w/ Ice =	$A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 7$	sf	
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{ICETMA} = 77$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 58$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 681$	cu in	
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 2581$	cu in	
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 84$	lbs	
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 251$	lbs	**BLC 3**

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

Subject:	Loads on AT&T Equipmnet Structure #4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Development of Wind & Ice Load on TMAs

TMA Data:

TMA Model =	Kaelus TMA2117F00V1-1		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 8.46$	in	(User Input)
TMA Width =	$W_{TMA} := 11.81$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.21$	in	(User Input)
TMA Weight =	$WT_{TMA} := 17.6$	lbs	(User Input)
Number of TMAs =	$N_{TMA} := 6$		(User Input)
TMA Aspect Ratio =	$Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 0.7$		
TMA Force Coefficient =	$Ca_{TMA} = 1.2$		

Wind Load (without ice)

Surface Area for One TMA =	$SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.7$	sf	
TMA Projected Surface Area =	$A_{TMA} := SA_{TMA} \cdot N_{TMA} = 4.2$	sf	
Total TMA Wind Force =	$F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{TMA} = 197$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One TMA w/ Ice =	$SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot t_{iz}) \cdot (W_{TMA} + 2 \cdot t_{iz})}{144} = 1.7$	sf	
TMA Projected Surface Area w/ Ice =	$A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 10.1$	sf	
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot A_{ICETMA} = 111$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 106$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 421$	cu in	
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 2 \cdot t_{iz})(W_{TMA} + 2 \cdot t_{iz}) \cdot (T_{TMA} + 2 \cdot t_{iz}) - V_{TMA} = 1944$	cu in	
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 63$	lbs	
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 378$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	T-Arm Array			
Mount Shape =	Flat			
Mount Projected Surface Area =	$CaAa := 15$	sf	(User Input)	
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 20$	sf	(User Input)	
Mount Weight =	$WT_{mnt} := 750$	lbs	(User Input)	
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1000$	lbs	(User Input)	

Wind Load (without ice)

Total Platform Wind Force =	$F_{plt} := qz_{AT\&T} \cdot G_H \cdot CaAa = 592$	lbs	**BLC 5,7**

Wind Load (with ice)

Total Platform Wind Force w/ Ice =	$Fi_{plt} := qz_{ice.AT\&T} \cdot G_H \cdot CaAa_{ice} = 182$	lbs	**BLC 4,6**

Gravity Load (without ice)

Weight of Platform =	$WT_{mnt} = 750$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform =	$WT_{mnt.ice} - WT_{mnt} = 250$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 10$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 6$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 60.6$

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

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{AT\&T} \cdot G_H \cdot A_{coax} = 47$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{iz})}{12} = 1.5$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.AT\&T} \cdot G_H \cdot AICE_{coax} = 16$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{iz})^2 - D_{coax}^2\right] = 41.3$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 289$ plf **BLC 3**

CENTEK engineering, INC.	Subject:	Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only		
Consulting Engineers		Tabulated Load Cases		
63-2 North Branford Road	Location:	Southington, CT		
Branford, CT 06405				
Ph. 203-488-0580 / Fax. 203-488-8587	Date: 1/26/17	Prepared by: T.J.L.	Checked by: C.F.C.	Job No. 17004.04

Load Case	Description
1	Self Weight (Mast)
2	Weight of Appurtenances
3	Weight of Ice Only
4	TIA Wind with Ice
5	TIA Wind

Footnotes:

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

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

Location: **Southington, CT**

Date: 1/26/17 Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.2D + 1.6W		1	Y	1	1.2	2	1.2	5	1.6				
2	0.9D + 1.6W		1	Y	1	0.9	2	0.9	5	1.6				
3	1.2D + 1.0Di + 1.0Wi		1	Y	1	1.2	2	1.2	3	1.0	4	1.0		

Footnotes:
BLC = Basic Load Case
D = Dead Load
Di = Dead Load of Ice
W = Wind Load
W = Wind Load w/ Ice

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0	Beam	Pipe	A53 Gr. B	Typical	13.7	262	262	523

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	30			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	BOTCON...	TOPMAST			Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	BOTCONNECTION	0	0	0	0	
2	TOPCONNECTION	0	18	0	0	
3	TOPMAST	0	30	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	BOTCONNECTION	Reaction	Reaction	Reaction		Fixed	
2	TOPCONNECTION	Reaction		Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.146	30
2	M1	Y	-.333	30
3	M1	Y	-.058	30
4	M1	Y	-.106	30
5	M1	Y	-.75	30

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-1.007	30
2	M1	Y	-1.194	30
3	M1	Y	-.251	30
4	M1	Y	-.378	30
5	M1	Y	-.25	30

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.347	30
2	M1	X	.35	30
3	M1	X	.077	30
4	M1	X	.111	30

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M1	X	.182	30

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.949	30
2	M1	X	.962	30
3	M1	X	.161	30
4	M1	X	.197	30
5	M1	X	.592	30

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	20	30

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.052	-.052	0	0
2	M1	Y	-.289	-.289	20	30

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.017	.017	0	0
2	M1	X	.016	.016	20	30

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.05	.05	0	0
2	M1	X	.047	.047	20	30

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Self Weight	None		-1						
2	Weight of Appurtenan...	None					5	1		
3	Weight of Ice Only	None					5	2		
4	TIA Wind with Ice	None					5	2		
5	TIA Wind	None					5	2		

Load Combinations

	Description	Sol...	PD...	SR...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...	BLC	Fact...
1	1.2D + 1.6...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTCONNECT...	max	2.966	1	11.108	3	0	1	0	1	NC	NC	0	1
2		min	.705	3	2.683	2	0	1	0	1	NC	NC	0	1
3	TOPCONNECT...	max	-2.442	3	0	1	0	1	0	1	0	1	0	1
4		min	-10.695	1	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-1.737	3	11.108	3	0	1						
6		min	-7.73	2	2.683	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	BOTCONNECT...	max	0	3	0	2	0	1	0	1	0	1	4.209e-03	1
2		min	0	1	0	3	0	1	0	1	0	1	9.891e-04	3
3	TOPCONNECT...	max	0	1	-.002	2	0	1	0	1	0	1	-2.108e-03	3
4		min	0	3	-.007	3	0	1	0	1	0	1	-9.015e-03	1
5	TOPMAST	max	2.177	1	-.002	2	0	1	0	1	0	1	-4.194e-03	3
6		min	.509	3	-.01	3	0	1	0	1	0	1	-1.793e-02	1

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M1	PIPE_12.0	.469	18.1...	1	.049	18.1...		1	305.067	431.55	140.963	140.963	1...	H1-1b

Joint Reactions

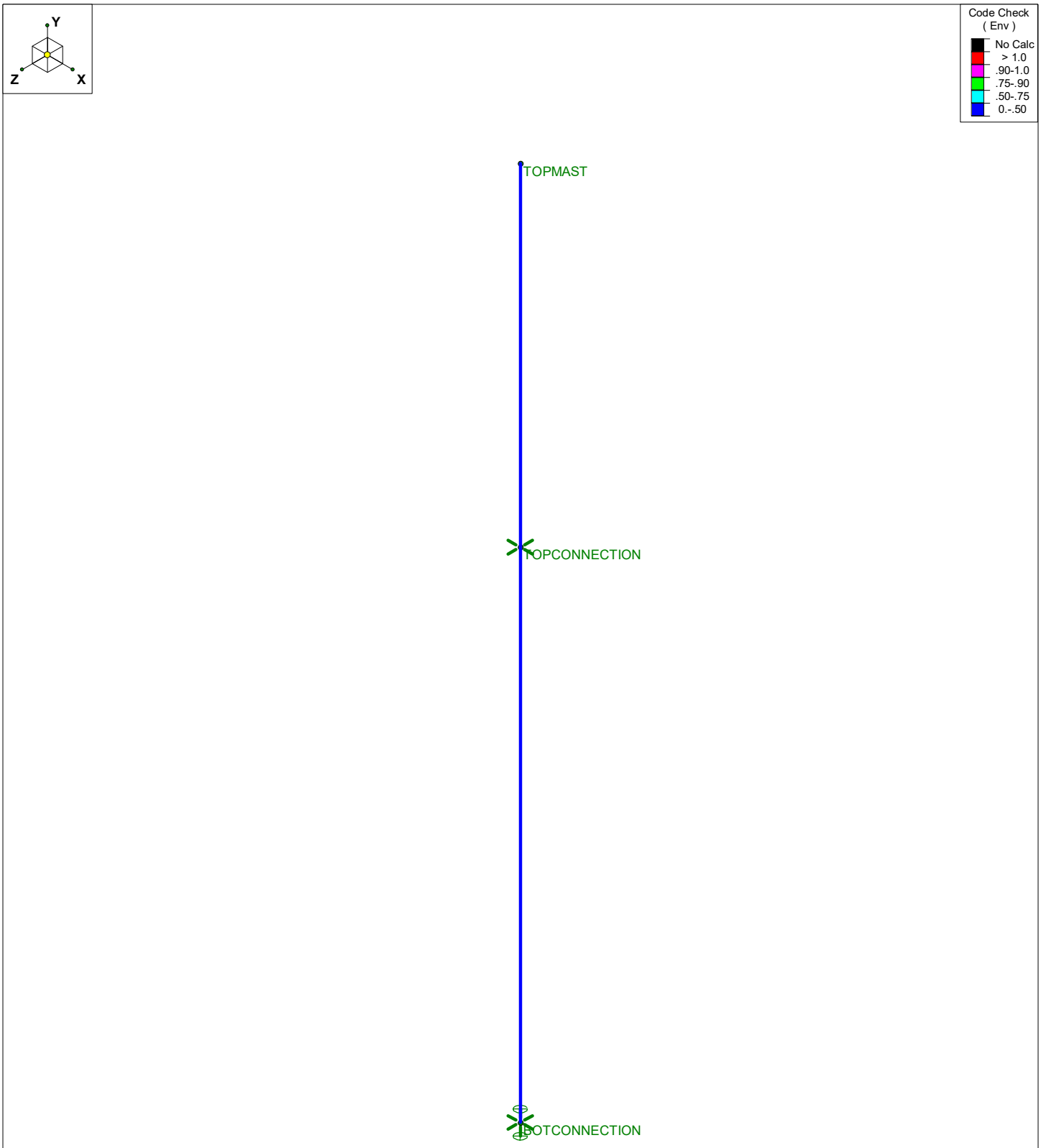
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	2.966	3.578	0	0	NC	0
2	1	TOPCONNECTION	-10.695	0	0	0	0	0
3	1	Totals:	-7.73	3.578	0			
4	1	COG (ft):	X: 0	Y: 22.645	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	2.96	2.683	0	0	NC	0
2	2	TOPCONNECTION	-10.69	0	0	0	0	0
3	2	Totals:	-7.73	2.683	0			
4	2	COG (ft):	X: 0	Y: 22.645	Z: 0			

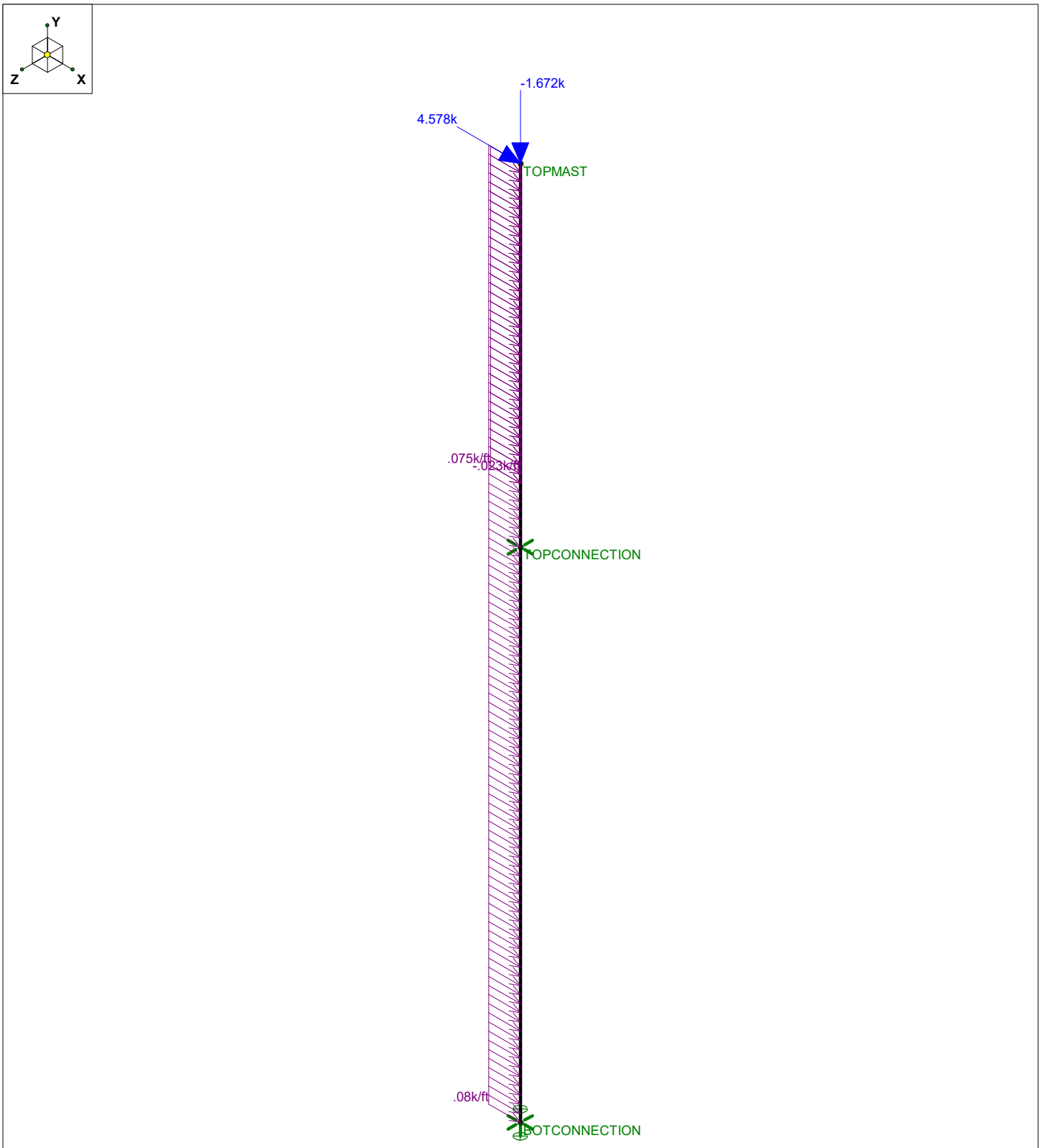
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTCONNECTION	.705	11.108	0	0	NC	0
2	3	TOPCONNECTION	-2.442	0	0	0	0	0
3	3	Totals:	-1.737	11.108	0			
4	3	COG (ft):	X: 0	Y: 24.224	Z: 0			



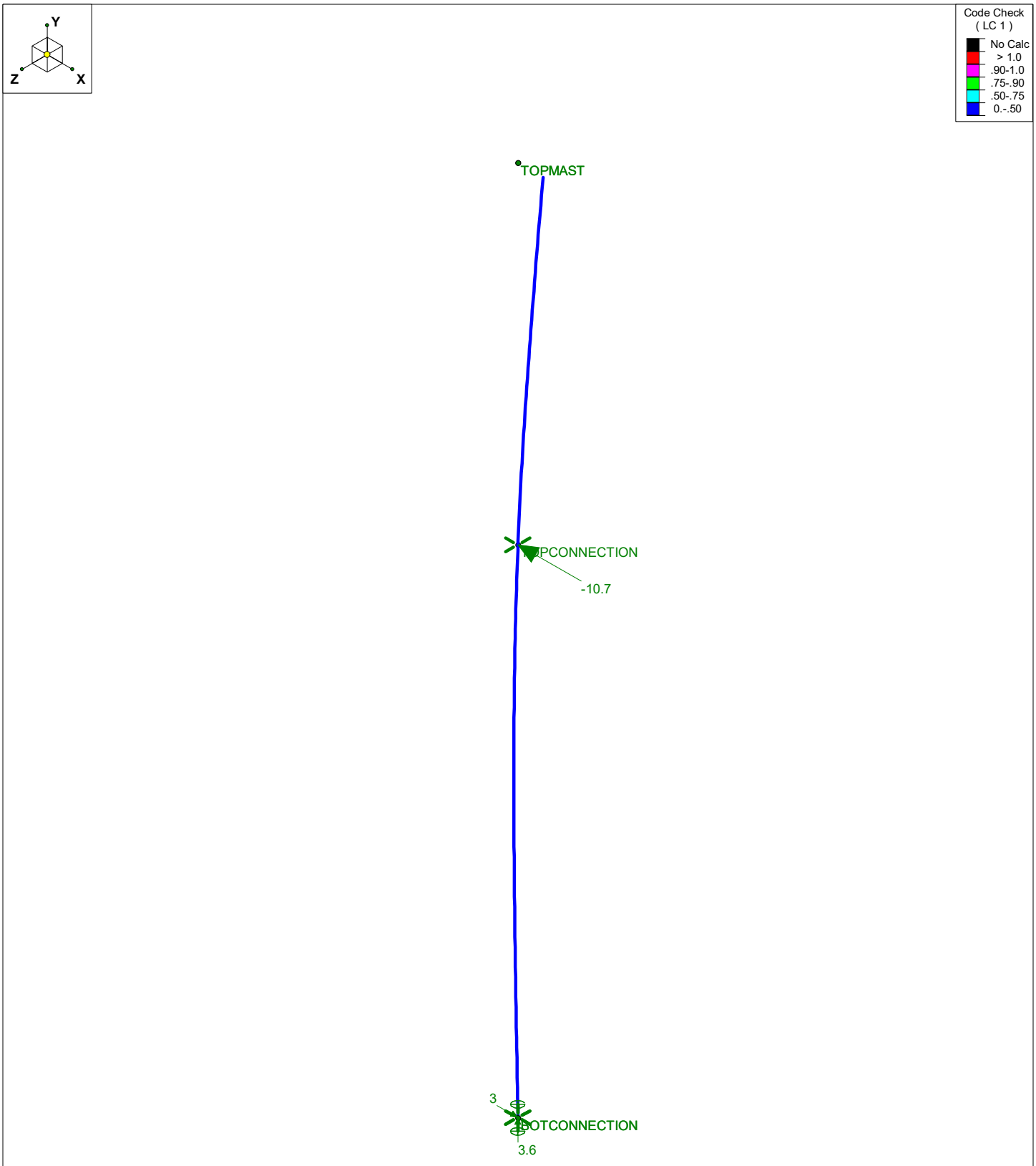
Envelope Only Solution

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:20 PM
17004.04/AT&T CT1109	Unity Check	TIA.r3d



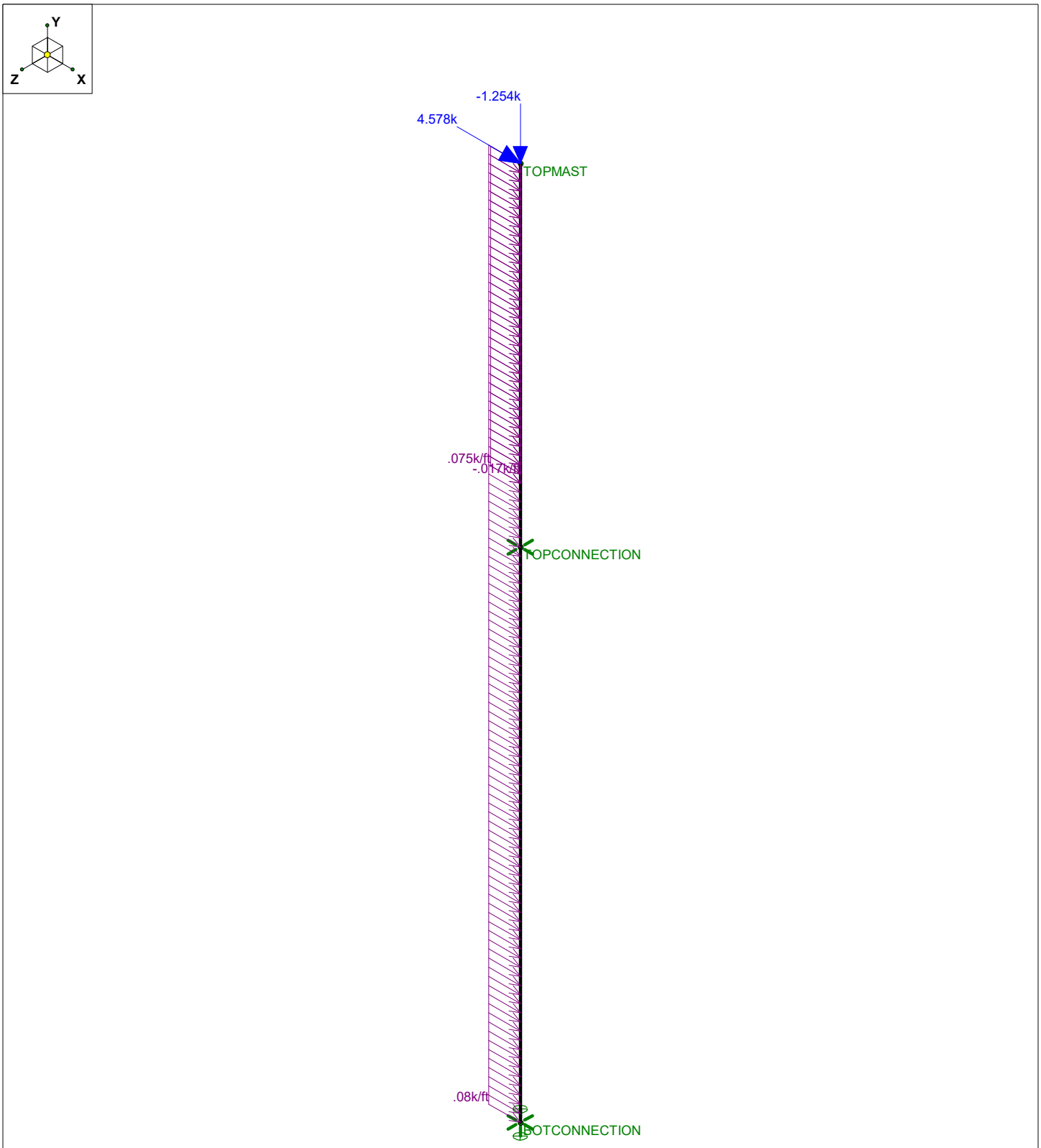
Loads: LC 1, 1.2D + 1.6W (X-direction)

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:21 PM
17004.04/AT&T CT1109	LC #1 Loads	TIA.r3d



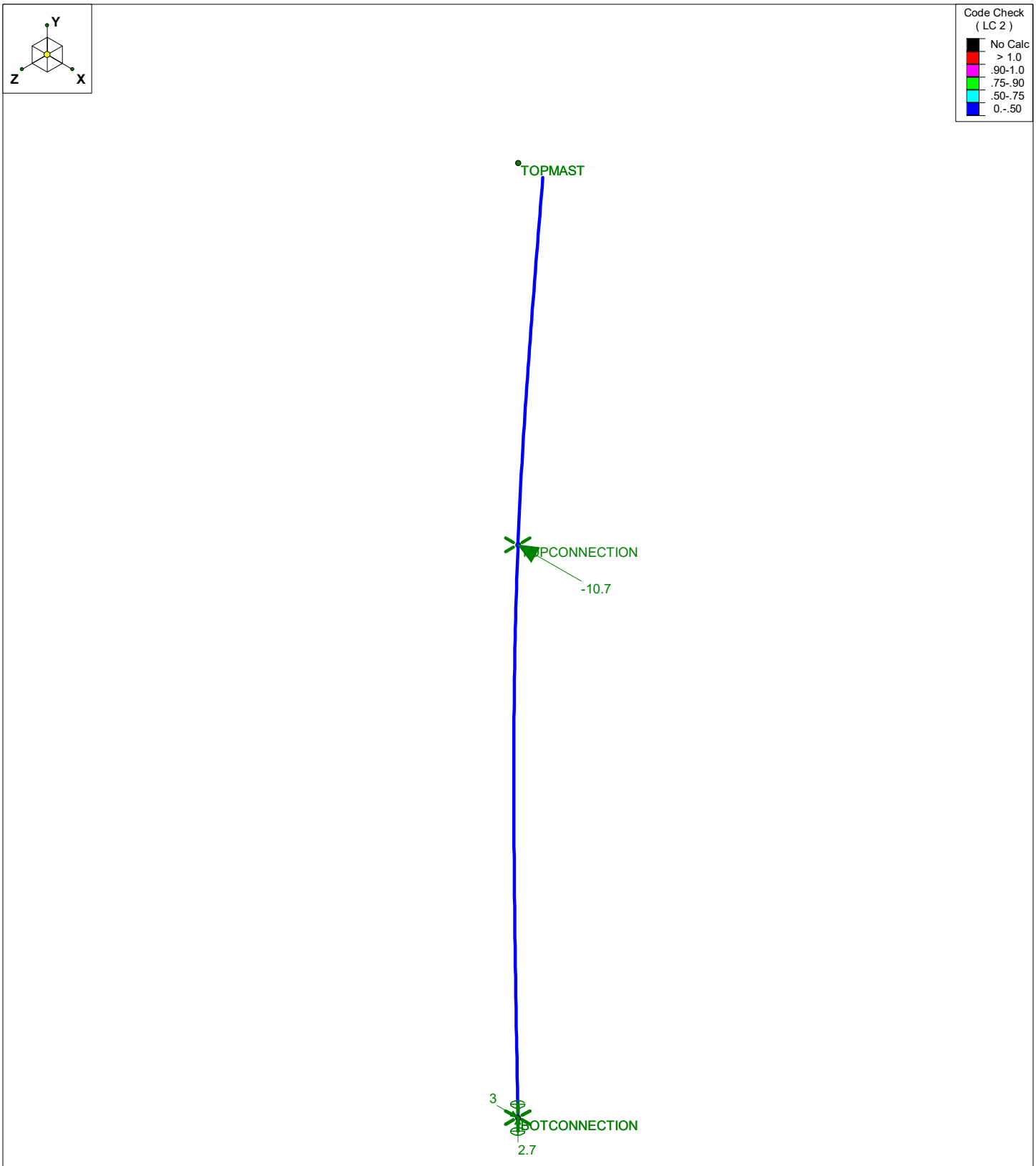
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:22 PM
17004.04/AT&T CT1109	LC #1 Reactions and Deflected Shape	TIA.r3d



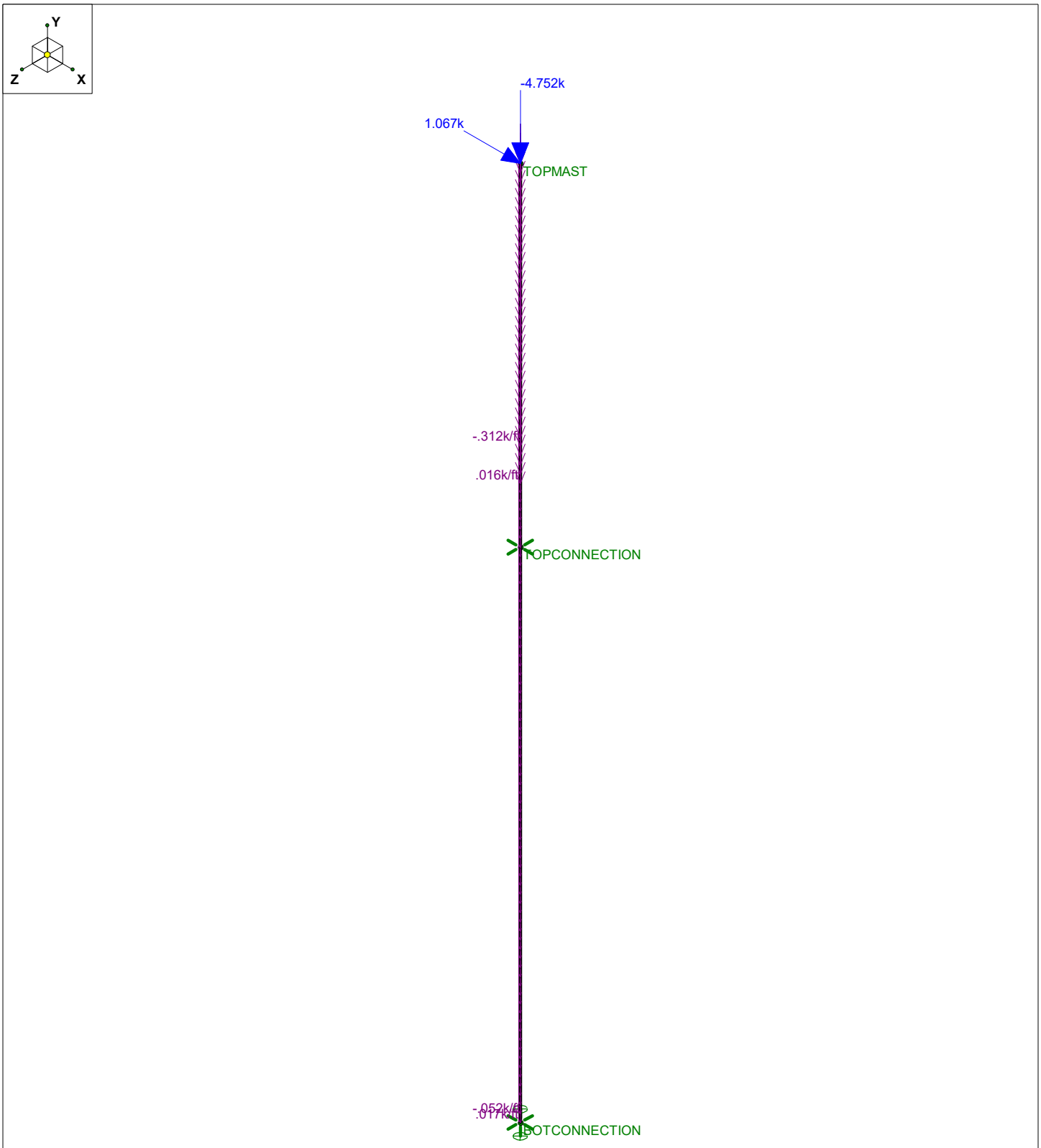
Loads: LC 2, 0.9D + 1.6W (X-direction)

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:21 PM
17004.04/AT&T CT1109	LC #2 Loads	TIA.r3d



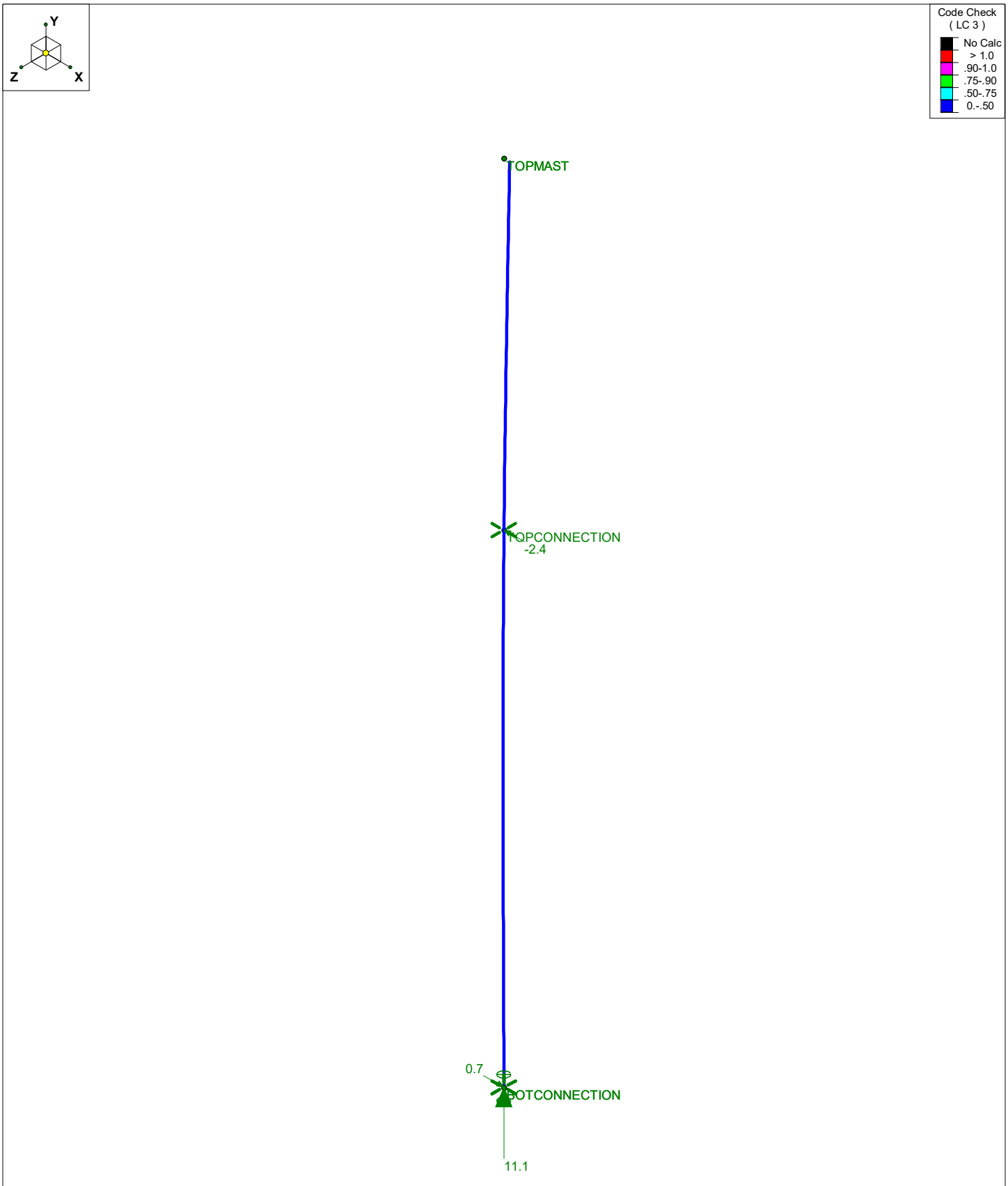
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:29 PM
17004.04/AT&T CT1109	LC #2 Reactions and Deflected Shape	TIA.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:21 PM
17004.04/AT&T CT1109	LC #3 Loads	TIA.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	Structure #4119 Mast	Apr 13, 2017 at 2:29 PM
17004.04/AT&T CT1109	LC #3 Reactions and Deflected Shape	TIA.r3d

CENTEK engineering
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Subject:	Mast Connection to Tower #4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Mast Top Connection:

Maximum Design Reactions at Brace:

Vertical =	Vert := 0·kips	(User Input)
Horizontal =	Horz := 10.7·kips	(User Input)
Moment =	Moment := 0	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 10.75 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 13.5 \cdot in$	(User Input)
Bolt Area =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442 \cdot in^2$	

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt =

$$f_v := \frac{Vert}{n_b \cdot a_b} = 0 \cdot ksi$$

$$Condition1 := if\left(f_v < \phi \cdot F_{nv}, "OK", "Overstressed"\right)$$

Condition1 = "OK"

$$\frac{f_v}{\left(\phi \cdot F_{nv}\right)} = 0 \cdot \%$$

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Tension Force Each Bolt =

$$F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 1.783 \cdot kips$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{tension.bolt}}{a_b} = 4 \cdot ksi$$

$$Condition2 := if\left(f_t < \phi \cdot F'_{nt}, "OK", "Overstressed"\right)$$

Condition2 = "OK"

$$\frac{f_t}{\left(\phi \cdot F'_{nt}\right)} = 6 \cdot \%$$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt =

$$f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 4.037 \cdot ksi$$

$$Condition3 := if\left(f_v < \phi \cdot F_{nv}, "OK", "Overstressed"\right)$$

Condition3 = "OK"

$$\frac{f_v}{\left(\phi \cdot F_{nv}\right)} = 10 \cdot \%$$

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Tension Force per Bolt =

$$F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 2.84 \cdot kips$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{tension.conn}}{a_b} = 6.429 \cdot ksi$$

$$Condition4 := if\left(f_t < \phi \cdot F'_{nt}, "OK", "Overstressed"\right)$$

Condition4 = "OK"

$$\frac{f_t}{\left(\phi \cdot F'_{nt}\right)} = 9.5 \cdot \%$$

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Subject:	Mast Connection to Tower #4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical =	Vert := 11.2·kips	(User Input)
Horizontal =	Horz := 0.7·kips	(User Input)
Moment =	Moment := 0·ft·kips	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 12$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 17.875 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 13.5 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 1 =	$S_{vert1} := 2 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 2 =	$S_{vert2} := 4.75 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 3 =	$S_{vert3} := 7.5 \cdot in$	(User Input)
Bolt Polar Moment of Inertia =	$I_p := 4 \cdot S_{vert1}^2 + 4 \cdot S_{vert2}^2 + 4 \cdot S_{vert3}^2 = 331.25 \cdot in^2$	
Bolt Area =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442 \cdot in^2$	

Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt =

$$f_v := \frac{Vert}{n_b \cdot a_b} = 2.113 \cdot ksi$$

$$Condition1 := if\left(f_v < \phi \cdot F_{nv}, "OK", "Overstressed"\right)$$

$$\frac{f_v}{\left(\phi \cdot F_{nv}\right)} = 5.2 \cdot \%$$

Condition1 = "OK"

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Tension Force Each Bolt =

$$F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment) \cdot S_{vert3}}{I_p} = 4.591 \cdot kips$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{tension.bolt}}{a_b} = 10.4 \cdot ksi$$

$$Condition2 := if\left(f_t < \phi \cdot F'_{nt}, "OK", "Overstressed"\right)$$

$$\frac{f_t}{\left(\phi \cdot F'_{nt}\right)} = 15.4 \cdot \%$$

Condition2 = "OK"

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt =

$$f_v := \frac{\sqrt{\left(\frac{Vert}{n_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b}\right)^2 + \left(\frac{Horz}{n_b}\right)^2}}{a_b} = 2.117 \cdot ksi$$

$$Condition3 := if\left(f_v < \phi \cdot F_{nv}, "OK", "Overstressed"\right)$$

$$\frac{f_v}{\left(\phi \cdot F_{nv}\right)} = 5.2 \cdot \%$$

Condition3 = "OK"

Tensile Stress Adjusted for Shear =

$$F'_{nt} := \begin{cases} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{cases} = 90 \cdot ksi$$

Tension Force per Bolt =

$$F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{(Vert \cdot e) \cdot S_{vert3}}{I_p} = 4.687 \cdot kips$$

Tension Stress Each Bolt =

$$f_t := \frac{F_{tension.conn}}{a_b} = 10.61 \cdot ksi$$

$$Condition4 := if\left(f_t < \phi \cdot F'_{nt}, "OK", "Overstressed"\right)$$

$$\frac{f_t}{\left(\phi \cdot F'_{nt}\right)} = 15.7 \cdot \%$$

Condition4 = "OK"

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Subject:	Load Analysis of AT&T Equipment on Structure #4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L Checked by: C.F.C. Job No. 17004.04

Basic Components

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

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade =	TME := 91	ft	(User Input)
Multiplier Gust Response Factor =	m := 1.25		(User Input - Only for NESC Extreme wind case)
NESC Factor =	kv := 1.43		(User Input from NESC 2007 Table 250-3 equation)
Importance Factor =	I := 1.0		(User Input from NESC 2007 Section 250.C.2)
Velocity Pressure Coefficient =	$Kz := 2.01\cdot\left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.241$		(NESC 2007 Table 250-2)
Exposure Factor =	$Es := 0.346\left[\frac{33}{(0.67\cdot TME)}\right]^{\frac{1}{7}} = 0.317$		(NESC 2007 Table 250-3)
Response Term =	$Bs := \frac{1}{\left(1 + 0.375\cdot\frac{TME}{220}\right)} = 0.866$		(NESC 2007 Table 250-3)
Gust Response Factor =	$Grf := \frac{\left[1 + \left(2.7\cdot Es\cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.878$		(NESC 2007 Table 250-3)
Wind Pressure =	$qz := 0.00256\cdot Kz\cdot V^2\cdot Grf\cdot I = 33.8$	psf	(NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

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

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

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Location:	Southington, CT
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Development of Wind & Ice Load on Mast

Mast Data: (Pipe 12.0" SCH. 40)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)
Mast Length =	$L_{mast} := 30$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.375$	in	(User Input)

Wind Load (NESC Extreme)

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

Total Mast Wind Force (Above NU Structure) =	$qz \cdot Cd_R \cdot A_{mast} \cdot m = 58$	plf	**BLC 5**
Total Mast Wind Force (Below NU Structure) =	$qz \cdot Cd_R \cdot A_{mast} = 47$	plf	**BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.146$

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

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^2\right] = 20.8$ sq in

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

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Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	KMW AM-X-CD-16-65-00T		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 48.5$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.9$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1195$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.5$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 125$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 146$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5013$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1435$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 46$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 139$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Quintel QS66512-2		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 12$	in	(User Input)
Antenna Thickness =	$T_{ant} := 9.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 111$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 18$	sf	
Total Antenna Wind Force =	$F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1215$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.6$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 127$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 333$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1765$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 57$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 172$	lbs	**BLC 3**

Development of Wind & Ice Load on TMAs

TMA Data:

TMA Model =	CCI DTMABP7819VG12A		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 14.25$	in	(User Input)
TMA Width =	$W_{TMA} := 11.46$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.17$	in	(User Input)
TMA Weight =	$WT_{TMA} := 19.2$	lbs	(User Input)
Number of TMAs =	$N_{TMA} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMAs Simultaneously

Surface Area for One TMA =	$SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.1$	sf	
TMA Projected Surface Area =	$A_{TMA} := SA_{TMA} \cdot N_{TMA} = 3.4$	sf	
Total TMA Wind Force =	$F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 230$	lbs	**BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMAs Simultaneously

Surface Area for One TMA w/ Ice =	$SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.3$	sf	
TMA Projected Surface Area w/ Ice =	$A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 4$	sf	
Total TMA Wind Force w/ Ice =	$Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 25$	lbs	**BLC 4**

Gravity Load (without ice)

Weight of All TMAs =	$WT_{TMA} \cdot N_{TMA} = 58$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each TMA =	$V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 681$	cu in	
Volume of Ice on Each TMA =	$V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1) \cdot (T_{TMA} + 1) - V_{TMA} = 301$	cu in	
Weight of Ice on Each TMA =	$W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 10$	lbs	
Weight of Ice on All TMAs =	$W_{ICETMA} \cdot N_{TMA} = 29$	lbs	**BLC 3**

Development of Wind & Ice Load on TMAs

TMA Data:

TMA Model =	Kaelus		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 8.46$	in	(User Input)
TMA Width =	$W_{TMA} := 11.81$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.21$	in	(User Input)
TMA Weight =	$WT_{TMA} := 17.6$	lbs	(User Input)
Number of TMAs =	$N_{TMA} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMAs Simultaneously

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

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 2.1$ sf

Total TMA Wind Force = $F_{TMA} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 141$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMAs Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 0.8$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 2.5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := p \cdot Cd_F \cdot A_{ICETMA} = 16$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All TMAs = $WT_{TMA} \cdot N_{TMA} = 53$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 421$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1) \cdot (T_{TMA} + 1) - V_{TMA} = 211$ cu in

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

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 20$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	T-Arm Array		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 15$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 20$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 750$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1000$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts =	$Wt_{mnt2} := WT_{mnt} = 750$	lbs	BLC 2

Gravity Load (ice only)

Weight of Ice on All Mounts =	$Wt_{ice.mnt2} := WT_{mnt.ice} - WT_{mnt} = 250$	lbs	BLC 3

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice =	$Fi_{mnt2} := p \cdot CdAa_{ice} = 80$	lbs	BLC 4

Wind Load (NESC Extreme)

Total Mount Wind Force =	$F_{mnt2} := qz \cdot CdAa \cdot m = 633$	lbs	BLC 5

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 10$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 6$		(User Input)

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 61$ plf **BLC 5**

Wind Load (NESC Heavy)

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

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

Gravity Loads (without ice)

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

Gravity Load (ice only)

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

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

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Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Reactions Applied to Utility Pole**
Tabulated Load Cases
Location: **Southington, CT**
Date: 1/26/17 Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

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

Footnotes:

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Subject: **Analysis of NESC Heavy Wind and NESC Extreme Wind for Obtaining Reactions Applied to Utility Pole Load Combinations Table**

Location: **Southington, CT**

Date: 1/26/17 Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

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

Footnotes:
(1) BLC = Basic Load Case

Global

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

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

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

Global, Continued

Seismic Code	UBC 1997
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	No
Ct Z	.035
Ct X	.035
T Z (sec)	Not Entered
T X (sec)	Not Entered
R Z	8.5
R X	8.5
Ca	.36
Cv	.54
Nv	1
Occupancy Category	4
Seismic Zone	3
Seismic Detailing Code	ASCE 7-05
Om Z	1
Om X	1
Rho Z	1
Rho X	1

Footing Overturning Safety Factor	1.5
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	0
Footing Concrete f'c (ksi)	3
Footing Concrete Ec (ksi)	4000
Lamda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	3.5
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Design Parameters

	Label	Shape	Leng...	Lbyy[ft]	Lbzz[ft]	Lcomp ...	Lcomp ...	Kyy	Kzz	Cm...	Cm...	Cb	y s...	z s...	Functi...
1	M1	Mast	30												Lateral

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0	Beam	Pipe	A53 Gr. B	Typical	13.7	262	262	523

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design R...
1	M1	BOTCO...	TOPMA...			Mast	Beam	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From ...
1	BOTCONNECTION	0	0	0	0	
2	TOPCONNECTION	0	18	0	0	
3	TOPMAST	0	30	0	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	BOTCONNECTION	Reaction	Reaction	Reaction		Fixed		
2	TOPCONNECTION	Reaction		Reaction				

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.146	30
2	M1	Y	-.333	30
3	M1	Y	-.058	30
4	M1	Y	-.053	30
5	M1	Y	-.75	30

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.139	30
2	M1	Y	-.172	30
3	M1	Y	-.029	30
4	M1	Y	-.02	30
5	M1	Y	-.25	30

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.125	30
2	M1	X	.127	30
3	M1	X	.025	30
4	M1	X	.016	30

Member Point Loads (BLC 4 : NESC Heavy Wind) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M1	X	.08	30

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.195	30
2	M1	X	1.215	30
3	M1	X	.23	30
4	M1	X	.141	30
5	M1	X	.633	30

Joint Loads and Enforced Displacements

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

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.019	-.019	20	30

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

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.027	-.027	20	30

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.006	.006	0	0
2	M1	X	.006	.006	20	30

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F]	End Magnitude[k/ft,F]	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.047	.047	0	20
2	M1	X	.058	.058	20	30
3	M1	X	.061	.061	20	30

Basic Load Cases

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

Load Combinations

	Description	Sol...	PDelta	SR..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
1	NESC Heavy Wind	Yes			1	1.5	2	1.5	3	1.5	4	2.5								
2	NESC Extreme Wind	Yes			1	1	2	1	5	1										

Envelope Joint Reactions

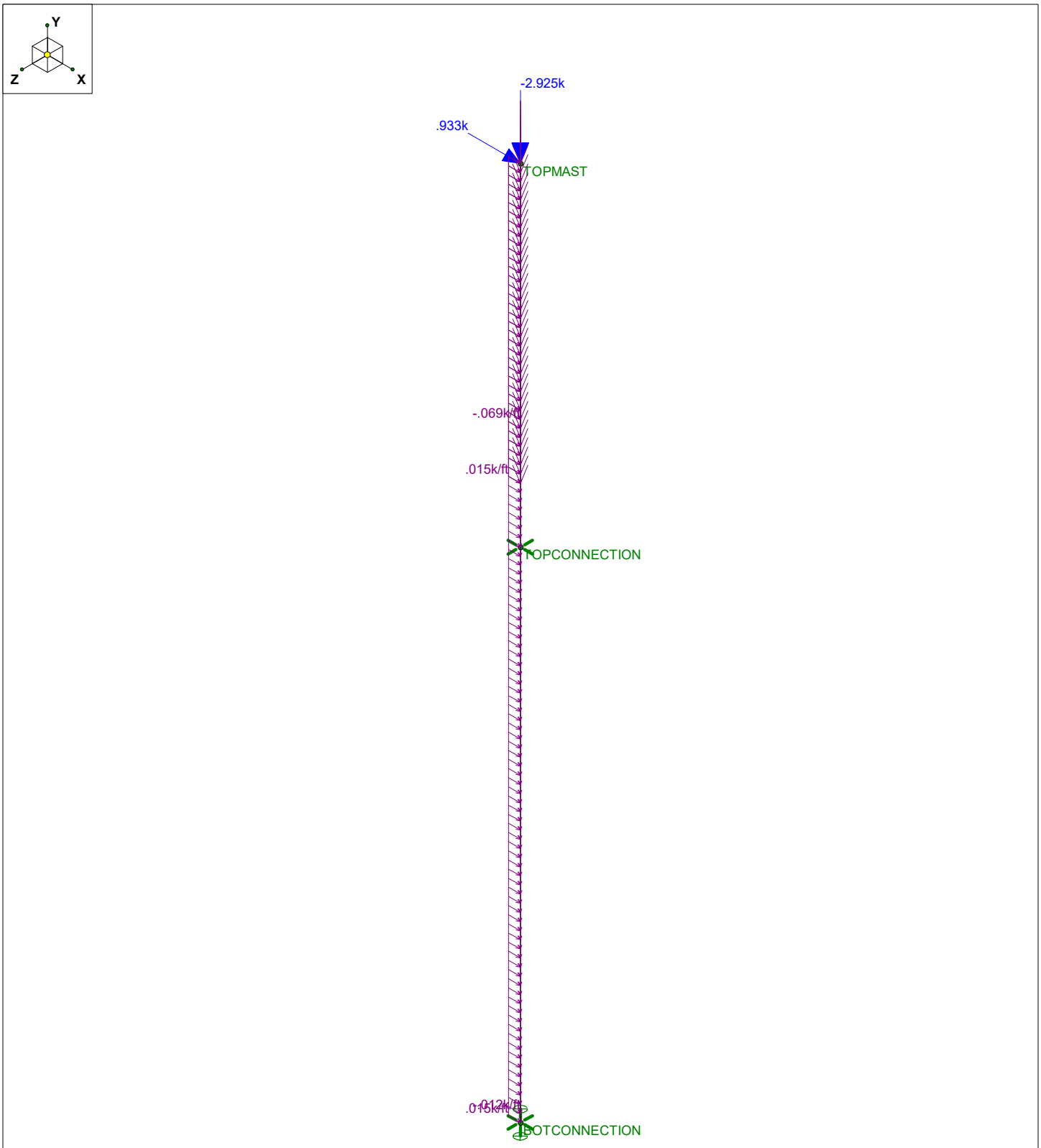
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTCONNE...	max	2.321	2	6.073	1	0	1	0	1	NC	NC	0	1
2		min	.605	1	2.929	2	0	1	0	1	NC	NC	0	1
3	TOPCONNE...	max	-2.137	1	0	1	0	1	0	1	0	1	0	1
4		min	-7.865	2	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-1.532	1	6.073	1	0	1						
6		min	-5.544	2	2.929	2	0	1						

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	.605	6.073	0	0	NC	0
2	1	TOPCONNECTION	-2.137	0	0	0	0	0
3	1	Totals:	-1.532	6.073	0			
4	1	COG (ft):	X: 0	Y: 23.361	Z: 0			

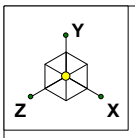
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	2.321	2.929	0	0	NC	0
2	2	TOPCONNECTION	-7.865	0	0	0	0	0
3	2	Totals:	-5.544	2.929	0			
4	2	COG (ft):	X: 0	Y: 22.512	Z: 0			



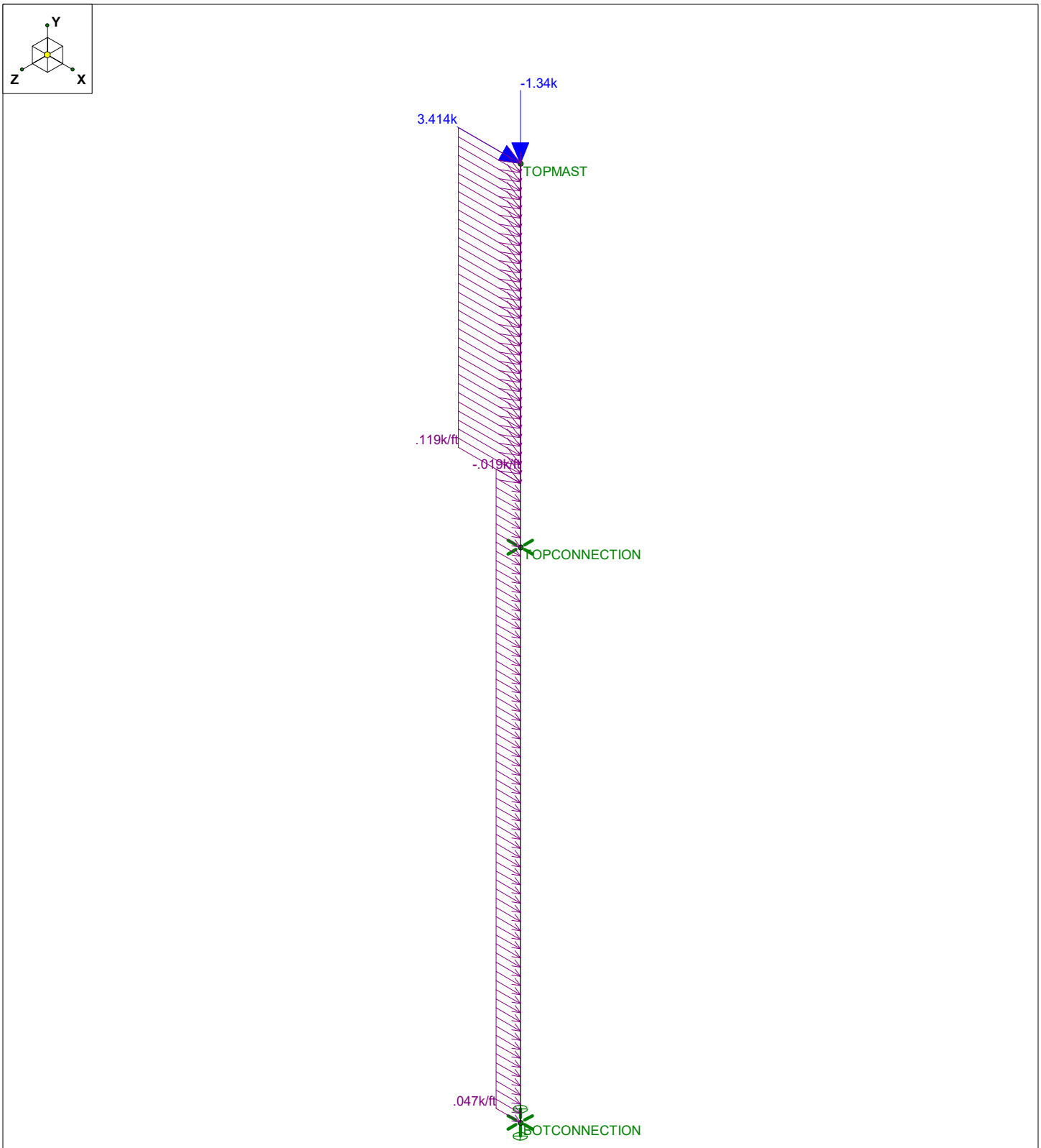
Loads: LC 1, NESC Heavy Wind

CENTEK Engineering, Inc.		
tjl, cfc	Structure #4119 Mast	Jan 26, 2017 at 12:56 PM
17004.04/AT&T CT1109	LC #1 Loads	NESC.r3d



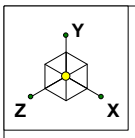
Results for LC 1, NESC Heavy Wind
Z-direction Reaction Units are k and k-ft

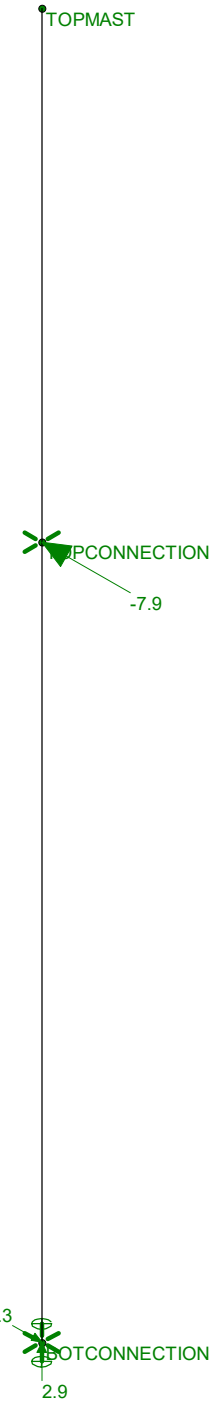
CENTEK Engineering, Inc.		
tjl, cfc	Structure #4119 Mast	Jan 26, 2017 at 12:57 PM
17004.04/AT&T CT1109	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind

CENTEK Engineering, Inc.		
tjl, cfc	Structure #4119 Mast	Jan 26, 2017 at 12:56 PM
17004.04/AT&T CT1109	LC #2 Loads	NESC.r3d





Results for LC 2, NESC Extreme Wind
Z-direction Reaction Units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	Structure #4119 Mast	Jan 26, 2017 at 1:00 PM
17004.04/AT&T CT1109	LC #2 Reactions	NESC.r3d

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

Subject:	Coax Cable on Tower # 4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L Checked by: C.F.C. Job No. 17004.04

Coax Cable on CL&P Tower

SouthEast Leg

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{pmatrix} 2.5 \\ 5.5 \\ 6 \\ 5.5 \\ 5 \\ 5 \\ 5.5 \\ 6.25 \\ 10.5 \\ 29.75 \end{pmatrix} \cdot ft$ *(User Input)*

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

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

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

Number of Projected Coax Cables = $NP_{coax} := 6$ *(User Input)*

Extreme Wind Pressure = $qz := 33.8 \cdot psf$ *(User Input)*

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

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

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

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

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 12.88 \cdot in$

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 11.88 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 18.179 \cdot plf$

Heavy Vertical Load =

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

Heavy Transverse Load =

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

$Heavy_{Vert}$ =

	0
0	115
1	253
2	276
3	253
4	230
5	230
6	253
7	287
8	483
9	1368

lb

$Heavy_{Trans}$ =

	0
0	43
1	94
2	103
3	94
4	86
5	86
6	94
7	107
8	180
9	511

lb

Extreme Vertical Load =

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

Extreme Transverse Load =

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

$Extreme_{Vert}$ =

	0
0	31
1	69
2	75
3	69
4	62
5	62
6	69
7	78
8	131
9	371

lb

$Extreme_{Trans}$ =

	0
0	134
1	294
2	321
3	294
4	268
5	268
6	294
7	335
8	562
9	1593

lb

Coax Cable on CL&P Tower

SouthWest Leg

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{pmatrix} 2.5 \\ 5.5 \\ 6 \\ 5.5 \\ 5 \\ 5 \\ 5.5 \\ 6.25 \\ 10.5 \\ 29.75 \end{pmatrix} \cdot ft$ *(User Input)*

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

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

Number of Coax Cables = $N_{coax} := 6$ *(User Input)*

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

Extreme Wind Pressure = $qz := 33.8 \cdot psf$ *(User Input)*

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

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

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

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

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

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

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 9.09 \cdot plf$

Heavy Vertical Load =

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

Heavy Transverse Load =

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

$Heavy_{Vert}$ =

	0
0	57
1	126
2	138
3	126
4	115
5	115
6	126
7	144
8	241
9	684

lb

$Heavy_{Trans}$ =

	0
0	23
1	51
2	56
3	51
4	46
5	46
6	51
7	58
8	97
9	275

lb

Extreme Vertical Load =

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

Extreme Transverse Load =

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

$Extreme_{Vert}$ =

	0
0	16
1	34
2	37
3	34
4	31
5	31
6	34
7	39
8	66
9	186

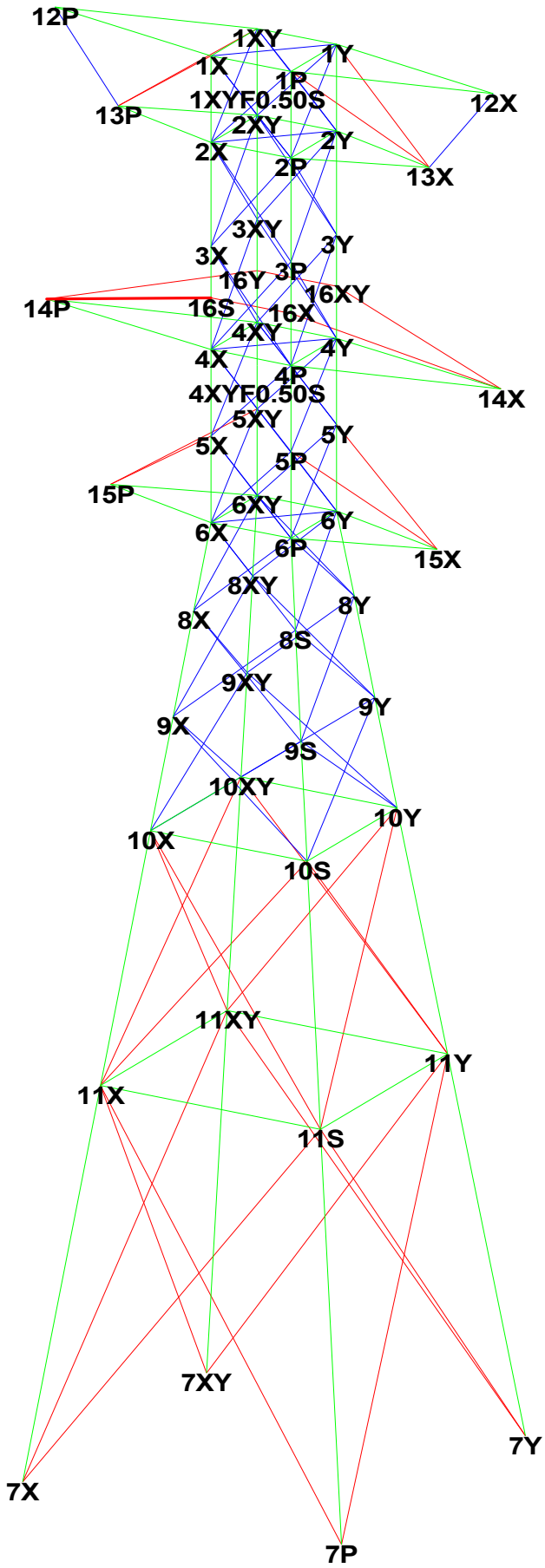
lb

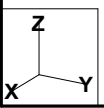
$Extreme_{Trans}$ =

	0
0	67
1	147
2	161
3	147
4	134
5	134
6	147
7	167
8	281
9	796

lb

Centek Engineering Inc, Project: "cl&p # 4119"
Tower Version 12.50, 2:24:51 PM Thursday, January 26, 2017
Undeformed geometry displayed





Project Name : 17004.04 - Southington, CT
Project Notes: Structure #4119 / AT&T CT1109
Project File : J:\Jobs\1700400.WI\04_Southington-Cathydrive NU CT1109\04_Structural\Backup Documentation\Calcs\PLS Tower\cl&p # 4119.tow
Date run : 3:27:25 PM Thursday, January 26, 2017
by : Tower Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "g14P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g14X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g14XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g14Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g18Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g19P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g19X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g19XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g19Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge

and spacing distances will be checked. ??
Member "g24X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g27Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge

and spacing distances will be checked. ??
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Member "g34P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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Member "g35Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
The model has 64 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\1700400.wi\04_southington-cathydrive nu ct1109\04_structural\backup documentation\calcs\pls tower\cl&p # 4119.lca

*** Analysis Results:

Maximum element usage is 81.86% for Angle "g17X" in load case "NESC Extreme"
Maximum insulator usage is 16.01% for Clamp "19" in load case "NESC Extreme"

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	7P	-6.17	-4.92	-30.80	7.89	0.02	-0.01	0.02	0.00	0.00
NESC Heavy	7X	2.95	-2.31	15.43	3.75	0.02	-0.00	0.02	0.01	0.00
NESC Heavy	7XY	-2.93	-2.55	14.21	3.88	0.05	-0.00	0.05	-0.00	0.00
NESC Heavy	7Y	6.15	-6.02	-33.69	8.61	0.04	-0.01	0.04	-0.00	0.00
NESC Extreme	7P	-7.06	-8.19	-51.76	10.81	0.04	-0.15	0.15	0.02	0.00
NESC Extreme	7X	8.91	-6.73	44.85	11.17	0.03	0.01	0.04	0.04	0.00
NESC Extreme	7XY	-9.01	-11.50	48.40	14.61	0.25	0.01	0.25	0.01	0.00
NESC Extreme	7Y	7.16	-8.08	-56.82	10.80	0.23	-0.17	0.28	-0.01	0.00

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

Load Case	Support Joint	Origin Joint	Member Leg Dir.	Leg Force In (kips)	Residual Shear Perpendicular To Leg (kips)	Residual Shear Horizontal To Leg - Res. (kips)	Residual Shear Horizontal To Leg - Long. (kips)	Residual Shear Horizontal To Leg - Tran. (kips)	Total Long. Force (kips)	Total Tran. Force (kips)	Total Vert. Force (kips)

NESC Heavy	7P	11S	g19X	31.731	2.018	2.049	1.933	0.678	-6.17	-4.92	-30.80
NESC Heavy	7X	11X	g19P	-15.862	0.834	0.845	-0.823	0.191	2.95	-2.31	15.43
NESC Heavy	7XY	11XY	g19Y	-14.689	1.116	1.136	0.970	0.592	-2.93	-2.55	14.21
NESC Heavy	7Y	11Y	g19XY	34.711	2.013	2.051	-1.514	1.383	6.15	-6.02	-33.69
NESC Extreme	7P	11S	g19X	52.862	1.058	1.067	-0.062	1.065	-7.06	-8.19	-51.76
NESC Extreme	7X	11X	g19P	-46.135	2.761	2.797	-2.740	0.562	8.91	-6.73	44.85
NESC Extreme	7XY	11XY	g19Y	-50.280	5.290	5.378	2.348	4.838	-9.01	-11.50	48.40
NESC Extreme	7Y	11Y	g19XY	57.827	0.710	0.712	0.661	0.265	7.16	-8.08	-56.82

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (ft-k)	Longitudinal Moment (ft-k)	Resultant Moment (ft-k)
NESC Heavy	941.345	-41.116	942.243
NESC Extreme	2018.192	-15.068	2018.248

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)
1	81.500	37.000	50	162	5.00	9.82	264.644	27.50	9.82	431.144
2	37.000	0.000	12	28	9.82	20.00	551.606	9.82	20.00	551.606

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

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Max Comp. Cont-rol	Comp. Use %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/R Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/R	KL/R Comp.	Length (ft)	Curve No.	No. Of Member Bolts
LEG1	**L4X4X1/4**	**SAE**	**4X4X0.25**	**33.0**	**71.03**	**Comp**	**71.03**	**g14XY**	**-38.006**	**NESC Ext**	**53.509**	**109.200**	**168.750**	**1.000**	**1.000**	**1.000**	**75.47**	**75.47**	**5.000**	**1**	**12**
A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g4P g5P g6Y g12P g13P ??																					
LEG2	L4X4X5/16	SAE	4X4X0.3125	33.0	81.86	Comp	81.86	g17X	-45.974	NESC Ext	56.161	91.000	175.781	1.000	1.000	1.000	100.46	100.46	6.622	1	10
LEG3	L4X4X3/8	SAE	4X4X0.375	33.0	69.00	Comp	69.00	g19XY	-58.744	NESC Ext	85.135	91.000	210.937	0.167	0.167	0.167	58.29	58.29	22.922	1	10
XBR1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	27.91	Comp	27.91	g20Y	-3.227	NESC Ext	11.559	18.200	21.094	0.750	0.500	0.500	123.69	122.85	7.071	5	2
XBR2	L3X2X3/16	SAU	3X2X0.1875	33.0	44.84	Comp	44.84	g24Y	-7.746	NESC Ext	17.275	27.300	31.641	0.500	0.750	0.500	120.57	120.47	7.810	5	3
XBR3	L2X2X3/16	SAE	2X2X0.1875	33.0	35.79	Cross	35.79	g31Y	-3.866	NESC Ext	10.802	18.200	21.094	1.000	0.559	0.559	147.90				

137.16 7.604 6 2
XBR4 L2.5X2X3/16 SAU 2.5X2X0.1875 33.0 31.21 Cross 31.21 g35Y -2.174NESC Ext 6.967 18.200 21.094 0.550 1.000 0.550 221.50
182.42 11.075 6 2
XBR5 L1.75X1.75X1/4 SAE 1.75X1.75X0.25 33.0 65.98 Comp 65.98 g36Y -4.186NESC Ext 6.345 18.200 28.125 0.500 0.250 0.250 213.33
191.16 18.808 5 2
HORZ1 L2.5X2X3/16 SAU 2.5X2X0.1875 33.0 49.53 Comp 49.53 g41X -4.507NESC Ext 10.506 9.100 10.547 1.000 0.500 0.500 148.55
148.55 9.817 4 1
HORZ2 L3X2.5X1/4 SAU 3X2.5X0.25 33.0 70.36 Comp 70.36 g43X -6.403NESC Ext 15.230 9.100 14.062 0.500 0.500 0.500 156.90
156.90 13.807 4 1
ARM1 L3X2.5X1/4 SAU 3X2.5X0.25 33.0 15.06 Comp 15.06 g46Y -3.745NESC Hea 24.877 27.300 42.187 0.500 1.000 0.500 122.21
121.36 7.669 6 3 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45Y g47Y ??
ARM2 L3.5X2.5X1/4 SAU 3.5X2.5X0.25 33.0 28.83 Comp 28.83 g48Y -4.270NESC Hea 14.810 27.300 42.187 0.500 1.000 0.500 196.13
166.82 12.013 6 3
M1 L1.75X1.75X3/16 SAE 1.75X1.75X0.1875 33.0 43.18 Comp 43.18 g55P -2.504NESC Ext 5.799 9.100 10.547 1.000 1.000 1.000 174.93
174.93 5.000 4 1
M2 L1.75X1.75X3/16 SAE 1.75X1.75X0.1875 33.0 11.97 Comp 11.97 g57X -1.089NESC Ext 11.437 9.100 10.547 0.750 0.500 0.500 123.69
123.69 7.071 4 1
M3 L2.5X2.5X3/16 SAE 2.5X2.5X0.1875 33.0 20.12 Comp 20.12 g60P -1.831NESC Hea 10.714 9.100 10.547 1.000 1.000 1.000 155.23
155.23 6.403 4 1
M4 BAR 1.75X1/4 Bar 1-3/4x1/4 33.0 47.96 Tens 2.46 g63XY -0.015NESC Ext 0.595 9.100 14.062 1.000 1.000 1.000 458.68
458.68 9.556 4 1
XBR6 L1.75X1.75X3/16 SAE 1.75X1.75X0.1875 33.0 81.50 Comp 81.50 g39Y -4.043NESC Hea 4.961 18.200 21.094 0.333 0.167 0.167 210.68
189.14 28.312 5 2

Group Summary (Tension Portion):

Group No.	Group Label	Angle Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Cont-rol	Max Tension Use In Tens. %	Tension Control Member	Tension Force (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. Shear Capacity (kips)	Tension Connect. Bearing Capacity (kips)	Tension Connect. Rupture Capacity (kips)	Length Tens. Member (ft)	No. Of Bolts	Hole Diameter (in)
LEG1	**L4X4X1/4**	**SAE**	**4X4X0.25**	**33.0**	**71.03**	**Comp**	**65.14**	**g14P**	**34.316NESC Ext**	**52.676**	**109.200**	**168.750**	**220.588**	**5.000**	**12**	**0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g4P g5P g6Y g12P g13P ??**
LEG2	L4X4X5/16	SAE	4X4X0.3125	33.0	81.86	Comp	73.99	g16P	42.913NESC Ext	58.001	0.000	0.000	0.000	6.113	0	0.6875
LEG3	L4X4X3/8	SAE	4X4X0.375	33.0	69.00	Comp	53.32	g19P	41.252NESC Ext	77.364	91.000	210.937	193.014	22.922	10	0.6875
XBR1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	27.91	Comp	14.16	g20XY	2.065NESC Ext	14.585	18.200	21.094	16.189	7.071	2	0.6875
XBR2	L3X2X3/16	SAU	3X2X0.1875	33.0	44.84	Comp	40.40	g26XY	9.252NESC Ext	22.901	27.300	31.641	28.125	7.071	3	0.6875
XBR3	L2X2X3/16	SAE	2X2X0.1875	33.0	35.79	Cross	22.90	g31XY	3.007NESC Ext	17.258	18.200	21.094	13.131	7.604	2	0.6875
XBR4	L2.5X2X3/16	SAU	2.5X2X0.1875	33.0	31.21	Cross	15.53	g33P	2.827NESC Ext	20.228	18.200	21.094	18.750	9.410	2	0.6875
XBR5	L1.75X1.75X1/4	SAE	1.75X1.75X0.25	33.0	65.98	Comp	35.10	g37XY	5.800NESC Ext	18.952	18.200	28.125	16.523	18.808	2	0.6875
HORZ1	L2.5X2X3/16	SAU	2.5X2X0.1875	33.0	49.53	Comp	36.49	g41P	2.816NESC Hea	17.444	9.100	10.547	7.717	9.817	1	0.6875
HORZ2	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	70.36	Comp	46.17	g43P	4.202NESC Hea	30.090	9.100	14.062	12.500	13.807	1	

1.000 0.6875
ARM1 L3X2.5X1/4 SAU 3X2.5X0.25 33.0 15.06 Comp 5.93 g45P 2.563NESC Hea 43.230 0.000 0.000 0.000 5.000 0
1.000 0 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45Y
g47Y ??
ARM2 L3.5X2.5X1/4 SAU 3.5X2.5X0.25 33.0 28.83 Comp 0.00 g49Y 0.000 47.520 0.000 0.000 0.000 5.000 0
1.000 0
M1 L1.75X1.75X3/16 SAE 1.75X1.75X0.1875 33.0 43.18 Comp 36.83 g55X 2.842NESC Ext 14.585 9.100 10.547 7.717 5.000 1
1.000 0.6875
M2 L1.75X1.75X3/16 SAE 1.75X1.75X0.1875 33.0 11.97 Comp 9.12 g57P 0.704NESC Ext 14.585 9.100 10.547 7.717 7.071 1
1.000 0.6875
M3 L2.5X2.5X3/16 SAE 2.5X2.5X0.1875 33.0 20.12 Comp 0.00 g60X 0.000 22.961 9.100 10.547 9.375 6.403 1
1.000 0.6875
M4 BAR 1.75X1/4 Bar 1-3/4x1/4 33.0 47.96 Tens 47.96 g62Y 3.784NESC Hea 7.889 9.100 14.062 12.500 12.382 1
1.000 0.6875
XBR6 L1.75X1.75X3/16 SAE 1.75X1.75X0.1875 33.0 81.50 Comp 67.31 g38XY 8.886NESC Ext 14.585 18.200 21.094 13.201 28.312 2
1.000 0.6875

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	81.50	g39Y	Angle
NESC Extreme	81.86	g17X	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	3.53	NESC Heavy	0.0
2	Clamp	2.38	NESC Heavy	0.0
3	Clamp	4.32	NESC Heavy	0.0
4	Clamp	4.24	NESC Heavy	0.0
5	Clamp	4.34	NESC Heavy	0.0
6	Clamp	4.30	NESC Heavy	0.0
7	Clamp	4.28	NESC Heavy	0.0
8	Clamp	4.23	NESC Heavy	0.0
9	Clamp	0.59	NESC Extreme	0.0
10	Clamp	0.92	NESC Extreme	0.0
11	Clamp	0.98	NESC Extreme	0.0
12	Clamp	0.94	NESC Heavy	0.0
13	Clamp	0.87	NESC Extreme	0.0
14	Clamp	0.91	NESC Heavy	0.0
15	Clamp	0.92	NESC Extreme	0.0
16	Clamp	1.02	NESC Heavy	0.0
17	Clamp	2.34	NESC Extreme	0.0
18	Clamp	4.29	NESC Heavy	0.0
19	Clamp	16.01	NESC Extreme	0.0
20	Clamp	12.25	NESC Heavy	0.0
21	Clamp	0.46	NESC Extreme	0.0
22	Clamp	0.62	NESC Extreme	0.0

23	Clamp	0.65	NESC Extreme	0.0
24	Clamp	0.64	NESC Heavy	0.0
25	Clamp	0.59	NESC Extreme	0.0
26	Clamp	0.60	NESC Heavy	0.0
27	Clamp	0.62	NESC Extreme	0.0
28	Clamp	0.66	NESC Extreme	0.0
29	Clamp	1.78	NESC Extreme	0.0
30	Clamp	2.61	NESC Heavy	0.0

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 7165.3
Total: 7165.3

*** End of Report

```
*****************************************************************************
*                                                                           *
* TOWER - Analysis and Design -  Copyright Power Line Systems, Inc. 1986-2011 *
*                                                                           *
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Project Name : 17004.04 - Southington, CT
Project Notes: Structure #4119 / AT&T CT1109
Project File : J:\Jobs\1700400.WI\04_Southington-Cathydrive NU CT1109\04_Structural\Backup Documentation\Calcs\PLS Tower\cl&p # 4119.tow
Date run     : 3:27:24 PM Thursday, January 26, 2017
by           : Tower Version 12.50
Licensed to  : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "g14P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g14X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
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Member "g18Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g19P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g19X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g19XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g19Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g23P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
and spacing distances will be checked. ??
Member "g23X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge
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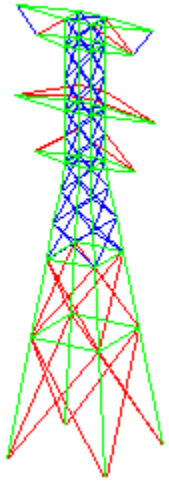
and spacing distances will be checked. ??
Member "g23XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g24Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g25Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g26Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g27Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g28Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g29Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g32XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge

and spacing distances will be checked. ??
Member "g32Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g33Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g34Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g35Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
The model has 64 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

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	2.5	2.5	81.5	Free	Free	Free	Free	Free	Free
2P	XY-Symmetry	2.5	2.5	76.5	Free	Free	Free	Free	Free	Free
3P	XY-Symmetry	2.5	2.5	70.5	Free	Free	Free	Free	Free	Free
4P	XY-Symmetry	2.5	2.5	64.5	Free	Free	Free	Free	Free	Free
5P	XY-Symmetry	2.5	2.5	59.5	Free	Free	Free	Free	Free	Free
6P	XY-Symmetry	2.5	2.5	54.5	Free	Free	Free	Free	Free	Free
7P	XY-Symmetry	10	10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
12P	X-Symmetry	0	-13.75	81.5	Free	Free	Free	Free	Free	Free
13P	X-Symmetry	0	-9.75	76.5	Free	Free	Free	Free	Free	Free
14P	X-Symmetry	0	-14.25	64.5	Free	Free	Free	Free	Free	Free
15P	X-Symmetry	0	-10.25	54.5	Free	Free	Free	Free	Free	Free
1X	X-GenXY	2.5	-2.5	81.5	Free	Free	Free	Free	Free	Free
1XY	XY-GenXY	-2.5	-2.5	81.5	Free	Free	Free	Free	Free	Free
1Y	Y-GenXY	-2.5	2.5	81.5	Free	Free	Free	Free	Free	Free
2X	X-GenXY	2.5	-2.5	76.5	Free	Free	Free	Free	Free	Free
2XY	XY-GenXY	-2.5	-2.5	76.5	Free	Free	Free	Free	Free	Free
2Y	Y-GenXY	-2.5	2.5	76.5	Free	Free	Free	Free	Free	Free
3X	X-GenXY	2.5	-2.5	70.5	Free	Free	Free	Free	Free	Free
3XY	XY-GenXY	-2.5	-2.5	70.5	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	-2.5	2.5	70.5	Free	Free	Free	Free	Free	Free
4X	X-GenXY	2.5	-2.5	64.5	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	-2.5	-2.5	64.5	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	-2.5	2.5	64.5	Free	Free	Free	Free	Free	Free
5X	X-GenXY	2.5	-2.5	59.5	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	-2.5	-2.5	59.5	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	-2.5	2.5	59.5	Free	Free	Free	Free	Free	Free
6X	X-GenXY	2.5	-2.5	54.5	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	-2.5	-2.5	54.5	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	-2.5	2.5	54.5	Free	Free	Free	Free	Free	Free
7X	X-GenXY	10	-10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7XY	XY-GenXY	-10	-10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7Y	Y-GenXY	-10	10	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
12X	X-Gen	0	13.75	81.5	Free	Free	Free	Free	Free	Free
13X	X-Gen	0	9.75	76.5	Free	Free	Free	Free	Free	Free
14X	X-Gen	0	14.25	64.5	Free	Free	Free	Free	Free	Free
15X	X-Gen	0	10.25	54.5	Free	Free	Free	Free	Free	Free

Secondary Joints:

Joint Label	Symmetry Code	Origin Joint	End Joint	Fraction	Elevation (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
8S	XY-Symmetry	6P	7P	0	49.5	Free	Free	Free	Free	Free	Free
9S	XY-Symmetry	6P	7P	0	43.5	Free	Free	Free	Free	Free	Free
10S	XY-Symmetry	6P	7P	0	37	Free	Free	Free	Free	Free	Free
11S	XY-Symmetry	6P	7P	0	22.5	Free	Free	Free	Free	Free	Free
16S	XY-Symmetry	3X	4X	0.5	0	Free	Free	Free	Free	Free	Free
1XYF0.50S	None	1XY	2XY	0.5	0	Free	Free	Free	Free	Free	Free
4XYF0.50S	None	4XY	5XY	0.5	0	Free	Free	Free	Free	Free	Free
8X	X-GenXY	6P	7P	0	49.5	Free	Free	Free	Free	Free	Free

8XY	XY-GenXY	6P	7P	0	49.5	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	6P	7P	0	49.5	Free	Free	Free	Free	Free	Free
9X	X-GenXY	6P	7P	0	43.5	Free	Free	Free	Free	Free	Free
9XY	XY-GenXY	6P	7P	0	43.5	Free	Free	Free	Free	Free	Free
9Y	Y-GenXY	6P	7P	0	43.5	Free	Free	Free	Free	Free	Free
10X	X-GenXY	6P	7P	0	37	Free	Free	Free	Free	Free	Free
10XY	XY-GenXY	6P	7P	0	37	Free	Free	Free	Free	Free	Free
10Y	Y-GenXY	6P	7P	0	37	Free	Free	Free	Free	Free	Free
11X	X-GenXY	6P	7P	0	22.5	Free	Free	Free	Free	Free	Free
11XY	XY-GenXY	6P	7P	0	22.5	Free	Free	Free	Free	Free	Free
11Y	Y-GenXY	6P	7P	0	22.5	Free	Free	Free	Free	Free	Free
16X	X-GenXY	3X	4X	0.5	0	Free	Free	Free	Free	Free	Free
16XY	XY-GenXY	3X	4X	0.5	0	Free	Free	Free	Free	Free	Free
16Y	Y-GenXY	3X	4X	0.5	0	Free	Free	Free	Free	Free	Free

The model contains 36 primary and 22 secondary joints for a total of 58 joints.

Steel Material Properties:

Steel Material Label	Modulus of Elasticity (ksi)	Yield Stress Fy (ksi)	Ultimate Stress Fu (ksi)	Member All. Stress Hyp. 1 (ksi)	Member All. Stress Hyp. 2 (ksi)	Member Rupture Hyp. 1 (ksi)	Member Rupture Hyp. 2 (ksi)	Member Bearing Hyp. 1 (ksi)	Member Bearing Hyp. 2 (ksi)
A7	2.9e+004	33	60	0	0	0	0	0	0

Bolt Properties:

Bolt Label	Bolt Diameter (in)	Hole Diameter (in)	Ultimate Shear Capacity (kips)	Default End Distance (in)	Default Bolt Spacing (in)	Shear Capacity Hyp. 1 (kips)	Shear Capacity Hyp. 2 (kips)
5/8 A394	0.625	0.6875	9.1	1.125	1.5	0	0

Number Bolts Used By Type:

Bolt Type	Number Bolts
5/8 A394	440

Angle Properties:

Angle Type	Angle Size	Long Leg (in)	Short Leg (in)	Thick. (in)	Unit Weight (lbs/ft)	Gross Area (in^2)	w/t Ratio	Radius of Gyration Rx (in)	Radius of Gyration Ry (in)	Radius of Gyration Rz (in)	Number of Angles	Wind Width (in)	Short Edge Dist. (in)	Long Edge Dist. (in)	Optimize Cost Factor	Section Modulus (in^3)
SAE	4X4X0.375	4	4	0.375	9.8	2.86	8.67	1.23	1.23	0.788	1	4	2	0	1.0000	0
SAE	4X4X0.3125	4	4	0.3125	8.2	2.4	10.6	1.24	1.24	0.791	1	4	2	0	1.0000	0
SAE	4X4X0.25	4	4	0.25	6.6	1.94	13.5	1.25	1.25	0.795	1	4	2	0	1.0000	0
SAE	2.5X2.5X0.1875	2.5	2.5	0.1875	3.07	0.902	10.67	0.778	0.778	0.495	1	2.5	1.25	0	1.0000	0
SAE	2X2X0.1875	2	2	0.1875	2.44	0.71	8	0.617	0.617	0.394	1	2	1	0	1.0000	0
SAE	1.75X1.75X0.25	1.75	1.75	0.25	2.77	0.81	4.25	0.529	0.529	0.341	1	1.75	0.875	0	1.0000	0
SAE	1.75X1.75X0.1875	1.75	1.75	0.1875	2.12	0.62	6	0.537	0.537	0.343	1	1.75	0.875	0	1.0000	0
SAU	3.5X2.5X0.25	3.5	2.5	0.25	4.9	1.44	11.25	1.12	0.735	0.544	1	3.5	1.25	0	1.0000	0
SAU	3X2.5X0.25	3	2.5	0.25	4.5	1.31	9.5	0.945	0.753	0.528	1	3	1.25	0	1.0000	0
SAU	3X2X0.1875	3	2	0.1875	3.07	0.9	13.33	0.966	0.583	0.439	1	3	1	0	1.0000	0

SAU	2.5X2X0.1875	2.5	2	0.1875	2.75	0.81	10.67	0.793	0.6	0.427	1	2.5	1	0	1.0000	0
Bar	1-3/4x1/4	1.75	0	0.25	2	0.4375	7	0.875	0.875	0.25	1	2	0	0	0.0000	0

Angle Groups:

Group Label	Group Description	Angle Type	Angle Size	Material Type	Element Type	Group Type	Optimize Group	Allow. Add. Angle Width For Optimize (in)
LEG1	L4X4X1/4	SAE	4X4X0.25	A7	Beam	Leg	None	0.000
LEG2	L4X4X5/16	SAE	4X4X0.3125	A7	Beam	Leg	None	0.000
LEG3	L4X4X3/8	SAE	4X4X0.375	A7	Beam	Leg	None	0.000
XBR1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	A7	Truss Crossing Diagonal		None	0.000
XBR2	L3X2X3/16	SAU	3X2X0.1875	A7	Truss Crossing Diagonal		None	0.000
XBR3	L2X2X3/16	SAE	2X2X0.1875	A7	Truss Crossing Diagonal		None	0.000
XBR4	L2.5X2X3/16	SAU	2.5X2X0.1875	A7	Truss Crossing Diagonal		None	0.000
XBR5	L1.75X1.75X1/4	SAE	1.75X1.75X0.25	A7	T-Only	Other	None	0.000
HORZ1	L2.5X2X3/16	SAU	2.5X2X0.1875	A7	Beam	Other	None	0.000
HORZ2	L3X2.5X1/4	SAU	3X2.5X0.25	A7	Beam	Other	None	0.000
ARM1	L3X2.5X1/4	SAU	3X2.5X0.25	A7	Beam	Other	None	0.000
ARM2	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	A7	Beam	Other	None	0.000
M1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	A7	Beam	Other	None	0.000
M2	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	A7	Truss Crossing Diagonal		None	0.000
M3	L2.5X2.5X3/16	SAE	2.5X2.5X0.1875	A7	Truss	Other	None	0.000
M4	BAR 1.75X1/4	Bar	1-3/4x1/4	A7	T-Only	Other	None	0.000
XBR6	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	A7	T-Only	Other	None	0.000

Aggregate Angle Information:

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

Angle Type	Angle Size	Material Type	Total Length (ft)	Total Surface Area (ft^2)	Total Weight (lbs)
SAE	4X4X0.25	A7	108.00	144.00	712.80
SAE	4X4X0.3125	A7	71.31	95.08	584.77
SAE	4X4X0.375	A7	150.78	201.04	1477.61
SAE	1.75X1.75X0.1875	A7	379.63	221.45	804.82
SAU	3X2X0.1875	A7	238.10	198.42	730.97
SAE	2X2X0.1875	A7	60.84	40.56	148.44
SAU	2.5X2X0.1875	A7	203.14	152.36	558.65
SAE	1.75X1.75X0.25	A7	150.47	87.77	416.79
SAU	3X2.5X0.25	A7	194.58	178.36	875.59
SAU	3.5X2.5X0.25	A7	58.05	58.05	284.46
SAE	2.5X2.5X0.1875	A7	12.81	10.67	39.32
Bar	1-3/4x1/4	A7	134.37	39.19	268.74

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

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

1	10X	1.000	3.200	3.200	1.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000 None
2	7X	1.100	3.200	3.200	1.100	1.100	0.000	0.000	0.000	0.000	0.000	0.000 None

Angle Member Connectivity:

Member Label	Group Label	Section Label	Symmetry Code	Origin Joint	End Joint	Ecc. Code	Rest. Code	Ratio RLX	Ratio RLY	Ratio RLZ	Bolt Type	# Bolts	# Bolt Holes	# Shear Planes	Connect Leg	Short Edge Dist. (in)	Long Edge Dist. (in)	End Dist. (in)	Bolt Spacing (in)	Shear Path Length (in)	Tension Path Length (in)	Rest. Coef.
g1P	LEG1		None	1X	2X	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g2P	LEG1		None	1P	2P	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g3P	LEG1		None	1Y	2Y	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g4P	LEG1		None	1XY	1XYF0.50S	1	4	2	2	2	5/8 A394	0	4	0		0	0	0	0	0	0	0
g5P	LEG1		None	1XYF0.50S	2XY	1	4	2	2	2	5/8 A394	0	4	0		0	0	0	0	0	0	0
g6P	LEG1		XY-Symmetry	2X	3X	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g6X	LEG1		X-GenXY	2P	3P	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g6XY	LEG1		XY-GenXY	2Y	3Y	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g6Y	LEG1		Y-GenXY	2XY	3XY	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g7P	LEG1		XY-Symmetry	3X	16S	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g7X	LEG1		X-GenXY	3P	16X	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g7XY	LEG1		XY-GenXY	3Y	16XY	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g7Y	LEG1		Y-GenXY	3XY	16Y	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g8P	LEG1		XY-Symmetry	16S	4X	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g8X	LEG1		X-GenXY	16X	4P	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g8XY	LEG1		XY-GenXY	16XY	4Y	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g8Y	LEG1		Y-GenXY	16Y	4XY	1	4	1	1	1	5/8 A394	0	4	0		0	0	0	0	0	0	0
g9P	LEG1		None	4X	5X	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g10P	LEG1		None	4P	5P	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g11P	LEG1		None	4Y	5Y	1	4	1	1	1	5/8 A394	0	2	0		0	0	0	0	0	0	0
g12P	LEG1		None	4XY	4XYF0.50S	1	4	2	2	2	5/8 A394	0	2	0		0	0	0	0	0	0	0
g13P	LEG1		None	4XYF0.50S	5XY	1	4	2	2	2	5/8 A394	0	2	0		0	0	0	0	0	0	0

g14P	LEG1		XY-Symmetry	5X	6X	1	4	1	1	1	5/8	A394	12	2	1	Both	1.25	2.375	1.5	2.75	0	0	0	
g14X	LEG1		X-GenXY	5P	6P	1	4	1	1	1	5/8	A394	12	2	1	Both	1.25	2.375	1.5	2.75	0	0	0	
g14XY	LEG1		XY-GenXY	5Y	6Y	1	4	1	1	1	5/8	A394	12	2	1	Both	1.25	2.375	1.5	2.75	0	0	0	
g14Y	LEG1		Y-GenXY	5XY	6XY	1	4	1	1	1	5/8	A394	12	2	1	Both	1.25	2.375	1.5	2.75	0	0	0	
g15P	LEG2		XY-Symmetry	6X	8X	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g15X	LEG2		X-GenXY	6P	8S	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g15XY	LEG2		XY-GenXY	6Y	8Y	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g15Y	LEG2		Y-GenXY	6XY	8XY	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g16P	LEG2		XY-Symmetry	8X	9X	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g16X	LEG2		X-GenXY	8S	9S	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g16XY	LEG2		XY-GenXY	8Y	9Y	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g16Y	LEG2		Y-GenXY	8XY	9XY	1	4	1	1	1	5/8	A394	0	2.99	0		0	0	0	0	0	0	0	
g17P	LEG2		XY-Symmetry	9X	10X	1	4	1	1	1	5/8	A394	10	2.02	1	Both	0.875	2	1.5	3.5	0	0	0	
g17X	LEG2		X-GenXY	9S	10S	1	4	1	1	1	5/8	A394	10	2.02	1	Both	0.875	2	1.5	3.5	0	0	0	
g17XY	LEG2		XY-GenXY	9Y	10Y	1	4	1	1	1	5/8	A394	10	2.02	1	Both	0.875	2	1.5	3.5	0	0	0	
g17Y	LEG2		Y-GenXY	9XY	10XY	1	4	1	1	1	5/8	A394	10	2.02	1	Both	0.875	2	1.5	3.5	0	0	0	
g18P	LEG3		XY-Symmetry	10X	11X	1	4	0.25	0.25	0.25	5/8	A394	10	2	1	Both	1.3125	2.375	1.5	3.5	0	0	0	
g18X	LEG3		X-GenXY	10S	11S	1	4	0.25	0.25	0.25	5/8	A394	10	2	1	Both	1.3125	2.375	1.5	3.5	0	0	0	
g18XY	LEG3		XY-GenXY	10Y	11Y	1	4	0.25	0.25	0.25	5/8	A394	10	2	1	Both	1.3125	2.375	1.5	3.5	0	0	0	
g18Y	LEG3		Y-GenXY	10XY	11XY	1	4	0.25	0.25	0.25	5/8	A394	10	2	1	Both	1.3125	2.375	1.5	3.5	0	0	0	
g19P	LEG3		XY-Symmetry	11X	7X	1	4	0.167	0.167	0.167	5/8	A394	10	2	1	Both	0.875	1.9375	1.5	3.75	0	0	0	
g19X	LEG3		X-GenXY	11S	7P	1	4	0.167	0.167	0.167	5/8	A394	10	2	1	Both	0.875	1.9375	1.5	3.75	0	0	0	
g19XY	LEG3		XY-GenXY	11Y	7Y	1	4	0.167	0.167	0.167	5/8	A394	10	2	1	Both	0.875	1.9375	1.5	3.75	0	0	0	
g19Y	LEG3		Y-GenXY	11XY	7XY	1	4	0.167	0.167	0.167	5/8	A394	10	2	1	Both	0.875	1.9375	1.5	3.75	0	0	0	
g20P	XBR1		XY-Symmetry	1X	2P	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0	
g20X	XBR1		X-GenXY	1P	2X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0	
g20XY	XBR1		XY-GenXY	1Y	2XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0	
g20Y	XBR1		Y-GenXY	1XY	2Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0	
g21P	XBR1		XY-Symmetry	1P	2Y	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0	
g21X	XBR1		X-GenXY	1X	2XY	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0	

g21XY	XBR1		XY-GenXY	1XY	2X	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0
g21Y	XBR1		Y-GenXY	1Y	2P	2	5	0.75	0.5	0.5	5/8	A394	2	1	1	Short only	0.8125	0	1	2	0	0	0
g22P	XBR2		XY-Symmetry	2X	3P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g22X	XBR2		X-GenXY	2P	3X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g22XY	XBR2		XY-GenXY	2Y	3XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g22Y	XBR2		Y-GenXY	2XY	3Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g23P	XBR2		XY-Symmetry	2P	3Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g23X	XBR2		X-GenXY	2X	3XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g23XY	XBR2		XY-GenXY	2XY	3X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g23Y	XBR2		Y-GenXY	2Y	3P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3.625	0	0	0
g24P	XBR2		XY-Symmetry	3X	4P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g24X	XBR2		X-GenXY	3P	4X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g24XY	XBR2		XY-GenXY	3Y	4XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g24Y	XBR2		Y-GenXY	3XY	4Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g25P	XBR2		XY-Symmetry	3P	4Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g25X	XBR2		X-GenXY	3X	4XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g25XY	XBR2		XY-GenXY	3XY	4X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g25Y	XBR2		Y-GenXY	3Y	4P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g26P	XBR2		XY-Symmetry	4X	5P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g26X	XBR2		X-GenXY	4P	5X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g26XY	XBR2		XY-GenXY	4Y	5XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g26Y	XBR2		Y-GenXY	4XY	5Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g27P	XBR2		XY-Symmetry	4P	5Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g27X	XBR2		X-GenXY	4X	5XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g27XY	XBR2		XY-GenXY	4XY	5X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g27Y	XBR2		Y-GenXY	4Y	5P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g28P	XBR2		XY-Symmetry	5X	6P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g28X	XBR2		X-GenXY	5P	6X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g28XY	XBR2		XY-GenXY	5Y	6XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g28Y	XBR2		Y-GenXY	5XY	6Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0

g29P	XBR2	XY-Symmetry	5P	6Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g29X	XBR2	X-GenXY	5X	6XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g29XY	XBR2	XY-GenXY	5XY	6X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g29Y	XBR2	Y-GenXY	5Y	6P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	2	1	3	0	0	0
g30P	XBR3	XY-Symmetry	6X	8S	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g30X	XBR3	X-GenXY	6P	8X	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g30XY	XBR3	XY-GenXY	6Y	8XY	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g30Y	XBR3	Y-GenXY	6XY	8Y	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g31P	XBR3	XY-Symmetry	6P	8Y	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g31X	XBR3	X-GenXY	6X	8XY	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g31XY	XBR3	XY-GenXY	6XY	8X	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g31Y	XBR3	Y-GenXY	6Y	8S	2	5	0.779	0.559	0.559	5/8	A394	2	1	1	Short only	1	0	1	1.375	0	0	0
g32P	XBR4	XY-Symmetry	8X	9S	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g32X	XBR4	X-GenXY	8S	9X	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g32XY	XBR4	XY-GenXY	8Y	9XY	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g32Y	XBR4	Y-GenXY	8XY	9Y	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g33P	XBR4	XY-Symmetry	8S	9Y	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g33X	XBR4	X-GenXY	8X	9XY	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g33XY	XBR4	XY-GenXY	8XY	9X	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g33Y	XBR4	Y-GenXY	8Y	9S	2	5	0.563	0.781	0.563	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.8125	0	0	0
g34P	XBR4	XY-Symmetry	9X	10S	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g34X	XBR4	X-GenXY	9S	10X	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g34XY	XBR4	XY-GenXY	9Y	10XY	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g34Y	XBR4	Y-GenXY	9XY	10Y	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g35P	XBR4	XY-Symmetry	9S	10Y	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g35X	XBR4	X-GenXY	9X	10XY	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g35XY	XBR4	XY-GenXY	9XY	10X	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g35Y	XBR4	Y-GenXY	9Y	10S	2	5	0.55	0.775	0.55	5/8	A394	2	1	1	Long only	0.875	1.5625	1	1.625	0	0	0
g36P	XBR5	XY-Symmetry	10X	11S	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g36X	XBR5	X-GenXY	10S	11X	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0

g36XY	XBR5		XY-GenXY	10Y	11XY	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g36Y	XBR5		Y-GenXY	10XY	11Y	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g37P	XBR5		XY-Symmetry	10S	11Y	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g37X	XBR5		X-GenXY	10X	11XY	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g37XY	XBR5		XY-GenXY	10XY	11X	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g37Y	XBR5		Y-GenXY	10Y	11S	2	5	0.5	0.25	0.25	5/8	A394	2	1	1	Short only	0.8125	0	1	1.4375	0	0	0
g38P	XBR6		XY-Symmetry	11X	7P	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g38X	XBR6		X-GenXY	11S	7X	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g38XY	XBR6		XY-GenXY	11Y	7XY	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g38Y	XBR6		Y-GenXY	11XY	7Y	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g39P	XBR6		XY-Symmetry	11S	7Y	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g39X	XBR6		X-GenXY	11X	7XY	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g39XY	XBR6		XY-GenXY	11XY	7X	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g39Y	XBR6		Y-GenXY	11Y	7P	2	5	0.333	0.167	0.167	5/8	A394	2	1	1	Long only	0.875	0	1	1.5	0	0	0
g40P	HORZ1		Y-Symmetry	10X	10S	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g40Y	HORZ1		Y-Gen	10XY	10Y	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g41P	HORZ1		X-Symmetry	10S	10Y	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g41X	HORZ1		X-Gen	10X	10XY	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g42P	HORZ2		Y-Symmetry	11X	11S	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g42Y	HORZ2		Y-Gen	11XY	11Y	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g43P	HORZ2		X-Symmetry	11S	11Y	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g43X	HORZ2		X-Gen	11X	11XY	3	4	0.5	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g44P	ARM1		XY-Symmetry	12P	1X	3	6	0.5	1	0.5	5/8	A394	2	1	1	Long only	1.25	0	1.5	4	0	0	0
g44X	ARM1		X-GenXY	12X	1P	3	6	0.5	1	0.5	5/8	A394	2	1	1	Long only	1.25	0	1.5	4	0	0	0
g44XY	ARM1		XY-GenXY	12X	1Y	3	6	0.5	1	0.5	5/8	A394	2	1	1	Long only	1.25	0	1.5	4	0	0	0
g44Y	ARM1		Y-GenXY	12P	1XY	3	6	0.5	1	0.5	5/8	A394	2	1	1	Long only	1.25	0	1.5	4	0	0	0
g45P	ARM1		Y-Symmetry	1X	1P	3	4	1	1	1			0	1	0		0	0	0	0	0	0	0
g45Y	ARM1		Y-Gen	1XY	1Y	3	4	1	1	1			0	1	0		0	0	0	0	0	0	0
g46P	ARM1		XY-Symmetry	13P	2X	3	6	0.5	1	0.5	5/8	A394	3	1	1	Long only	1.25	0	1.5	2.75	0	0	0
g46X	ARM1		X-GenXY	13X	2P	3	6	0.5	1	0.5	5/8	A394	3	1	1	Long only	1.25	0	1.5	2.75	0	0	0

g46XY	ARM1		XY-GenXY	13X	2Y	3	6	0.5	1	0.5	5/8 A394	3	1	1	Long only	1.25	0	1.5	2.75	0	0	0
g46Y	ARM1		Y-GenXY	13P	2XY	3	6	0.5	1	0.5	5/8 A394	3	1	1	Long only	1.25	0	1.5	2.75	0	0	0
g47P	ARM1		Y-Symmetry	2X	2P	3	4	1	1	1		0	1	0		0	0	0	0	0	0	0
g47Y	ARM1		Y-Gen	2XY	2Y	3	4	1	1	1		0	1	0		0	0	0	0	0	0	0
g48P	ARM2		XY-Symmetry	14P	4X	3	6	0.5	1	0.5	5/8 A394	3	1	1	Long only	1.75	0	1.5	2	0	0	0
g48X	ARM2		X-GenXY	14X	4P	3	6	0.5	1	0.5	5/8 A394	3	1	1	Long only	1.75	0	1.5	2	0	0	0
g48XY	ARM2		XY-GenXY	14X	4Y	3	6	0.5	1	0.5	5/8 A394	3	1	1	Long only	1.75	0	1.5	2	0	0	0
g48Y	ARM2		Y-GenXY	14P	4XY	3	6	0.5	1	0.5	5/8 A394	3	1	1	Long only	1.75	0	1.5	2	0	0	0
g49P	ARM2		Y-Symmetry	4X	4P	3	4	1	1	1		0	1	0		0	0	0	0	0	0	0
g49Y	ARM2		Y-Gen	4XY	4Y	3	4	1	1	1		0	1	0		0	0	0	0	0	0	0
g50P	ARM1		XY-Symmetry	15P	6X	3	6	0.5	1	0.5	5/8 A394	2	1	1	Long only	1.5	0	1.5	4	0	0	0
g50X	ARM1		X-GenXY	15X	6P	3	6	0.5	1	0.5	5/8 A394	2	1	1	Long only	1.5	0	1.5	4	0	0	0
g50XY	ARM1		XY-GenXY	15X	6Y	3	6	0.5	1	0.5	5/8 A394	2	1	1	Long only	1.5	0	1.5	4	0	0	0
g50Y	ARM1		Y-GenXY	15P	6XY	3	6	0.5	1	0.5	5/8 A394	2	1	1	Long only	1.5	0	1.5	4	0	0	0
g51P	ARM1		Y-Symmetry	6X	6P	3	4	1	1	1		0	1	0		0	0	0	0	0	0	0
g51Y	ARM1		Y-Gen	6XY	6Y	3	4	1	1	1		0	1	0		0	0	0	0	0	0	0
g52P	M1		X-Symmetry	1P	1Y	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g52X	M1		X-Gen	1X	1XY	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g53P	M1		X-Symmetry	2P	2Y	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g53X	M1		X-Gen	2X	2XY	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g54P	M1		X-Symmetry	4P	4Y	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g54X	M1		X-Gen	4X	4XY	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g55P	M1		X-Symmetry	6P	6Y	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g55X	M1		X-Gen	6X	6XY	3	4	1	1	1	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g56P	M2		X-Symmetry	1X	1Y	3	4	0.75	0.5	0.5	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g56X	M2		X-Gen	1P	1XY	3	4	0.75	0.5	0.5	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g57P	M2		X-Symmetry	2X	2Y	3	4	0.75	0.5	0.5	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g57X	M2		X-Gen	2P	2XY	3	4	0.75	0.5	0.5	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g58P	M2		X-Symmetry	4X	4Y	3	4	0.75	0.5	0.5	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0
g58X	M2		X-Gen	4P	4XY	3	4	0.75	0.5	0.5	5/8 A394	1	1	1	Short only	0.875	0	1	0	0	0	0

g59P	M2	X-Symmetry	6X	6Y	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	1	0	0	0
g59X	M2	X-Gen	6P	6XY	3	4	0.75	0.5	0.5	5/8	A394	1	1	1	Short only	0.875	0	1	0	0	0
g60P	M3	X-Symmetry	12P	13P	2	4	1	1	1	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0
g60X	M3	X-Gen	12X	13X	2	4	1	1	1	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0
g61P	M4	XY-Symmetry	1X	13P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g61X	M4	X-GenXY	1P	13X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g61XY	M4	XY-GenXY	1Y	13X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g61Y	M4	Y-GenXY	1XY	13P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g62P	M4	XY-Symmetry	14P	16S	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g62X	M4	X-GenXY	14X	16X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g62XY	M4	XY-GenXY	14X	16XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g62Y	M4	Y-GenXY	14P	16Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g63P	M4	XY-Symmetry	15P	5X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g63X	M4	X-GenXY	15X	5P	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g63XY	M4	XY-GenXY	15X	5Y	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g63Y	M4	Y-GenXY	15P	5XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g64P	M4	Y-Symmetry	16S	16X	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0
g64Y	M4	Y-Gen	16Y	16XY	2	4	1	1	1	5/8	A394	1	1	1	Long only	1.25	0	1	0	0	0

Member Capacities and Overrides:

Member Label	Group Label	Design Comp. Control	Design Capacity	Criterion	Tension Control Capacity	Criterion	L/r Length (ft)	L/r	Comp. Capacity (kips)	Connection Shear Capacity (kips)	Connection Bearing Capacity (kips)	Net Section Tension Capacity (kips)	Rupture Tension Capacity (kips)	RTE End Dist. Tension Capacity (kips)	RTE Edge Dist. Comp. Capacity (kips)	Override Comp. Capacity (kips)	Override Tension Unsup. (kips)	Override Warnings or Errors
g1P	LEG1	53.509	L/r	41.332	Net Sect	75	5.00	53.509	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g2P	LEG1	53.509	L/r	41.332	Net Sect	75	5.00	53.509	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g3P	LEG1	53.509	L/r	41.332	Net Sect	75	5.00	53.509	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000	0.000	

0.000		Automatic														
g4P	LEG1	53.509	L/r	41.332	Net Sect	75	2.50	53.509	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g5P	LEG1	53.509	L/r	41.332	Net Sect	75	2.50	53.509	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g6P	LEG1	48.884	L/r	52.676	Net Sect	91	6.00	48.884	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g6X	LEG1	48.884	L/r	52.676	Net Sect	91	6.00	48.884	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g6XY	LEG1	48.884	L/r	52.676	Net Sect	91	6.00	48.884	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g6Y	LEG1	48.884	L/r	52.676	Net Sect	91	6.00	48.884	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g7P	LEG1	60.236	L/r	52.676	Net Sect	45	3.00	60.236	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g7X	LEG1	60.236	L/r	52.676	Net Sect	45	3.00	60.236	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g7XY	LEG1	60.236	L/r	52.676	Net Sect	45	3.00	60.236	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g7Y	LEG1	60.236	L/r	52.676	Net Sect	45	3.00	60.236	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g8P	LEG1	60.236	L/r	41.332	Net Sect	45	3.00	60.236	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g8X	LEG1	60.236	L/r	41.332	Net Sect	45	3.00	60.236	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g8XY	LEG1	60.236	L/r	41.332	Net Sect	45	3.00	60.236	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g8Y	LEG1	60.236	L/r	41.332	Net Sect	45	3.00	60.236	0.000	0.000	41.332	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g9P	LEG1	53.509	L/r	52.676	Net Sect	75	5.00	53.509	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g10P	LEG1	53.509	L/r	52.676	Net Sect	75	5.00	53.509	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g11P	LEG1	53.509	L/r	52.676	Net Sect	75	5.00	53.509	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g12P	LEG1	53.509	L/r	52.676	Net Sect	75	2.50	53.509	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g13P	LEG1	53.509	L/r	52.676	Net Sect	75	2.50	53.509	0.000	0.000	52.676	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g14P	**LEG1**	**53.509**	**L/r**	**52.676**	**Net Sect**	**75**	**5.00**	**53.509**	**109.200**	**168.750**	**52.676**	**220.588**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g14P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g14X	**LEG1**	**53.509**	**L/r**	**52.676**	**Net Sect**	**75**	**5.00**	**53.509**	**109.200**	**168.750**	**52.676**	**220.588**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g14X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g14XY	**LEG1**	**53.509**	**L/r**	**52.676**	**Net Sect**	**75**	**5.00**	**53.509**	**109.200**	**168.750**	**52.676**	**220.588**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g14XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g14Y	**LEG1**	**53.509**	**L/r**	**52.676**	**Net Sect**	**75**	**5.00**	**53.509**	**109.200**	**168.750**	**52.676**	**220.588**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g14Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g15P	LEG2	65.567	L/r	58.001	Net Sect	77	5.09	65.567	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g15X	LEG2	65.567	L/r	58.001	Net Sect	77	5.09	65.567	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g15XY	LEG2	65.567	L/r	58.001	Net Sect	77	5.09	65.567	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g15Y	LEG2	65.567	L/r	58.001	Net Sect	77	5.09	65.567	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														

g16P	LEG2	59.569	L/r	58.001	Net Sect	93	6.11	59.569	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g16X	LEG2	59.569	L/r	58.001	Net Sect	93	6.11	59.569	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g16XY	LEG2	59.569	L/r	58.001	Net Sect	93	6.11	59.569	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g16Y	LEG2	59.569	L/r	58.001	Net Sect	93	6.11	59.569	0.000	0.000	58.001	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g17P	**LEG2**	**56.161**	**L/r**	**64.878**	**Net Sect**	**100**	**6.62**	**56.161**	**91.000**	**175.781**	**64.878**	**160.845**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g17P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g17X	**LEG2**	**56.161**	**L/r**	**64.878**	**Net Sect**	**100**	**6.62**	**56.161**	**91.000**	**175.781**	**64.878**	**160.845**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g17X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g17XY	**LEG2**	**56.161**	**L/r**	**64.878**	**Net Sect**	**100**	**6.62**	**56.161**	**91.000**	**175.781**	**64.878**	**160.845**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g17XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g17Y	**LEG2**	**56.161**	**L/r**	**64.878**	**Net Sect**	**100**	**6.62**	**56.161**	**91.000**	**175.781**	**64.878**	**160.845**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g17Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g18P	**LEG3**	**85.776**	**L/r**	**77.364**	**Net Sect**	**56**	**14.77**	**85.776**	**91.000**	**210.937**	**77.364**	**281.250**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g18P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g18X	**LEG3**	**85.776**	**L/r**	**77.364**	**Net Sect**	**56**	**14.77**	**85.776**	**91.000**	**210.937**	**77.364**	**281.250**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g18X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g18XY	**LEG3**	**85.776**	**L/r**	**77.364**	**Net Sect**	**56**	**14.77**	**85.776**	**91.000**	**210.937**	**77.364**	**281.250**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g18XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g18Y	**LEG3**	**85.776**	**L/r**	**77.364**	**Net Sect**	**56**	**14.77**	**85.776**	**91.000**	**210.937**	**77.364**	**281.250**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g18Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g19P	**LEG3**	**85.135**	**L/r**	**77.364**	**Net Sect**	**58**	**22.92**	**85.135**	**91.000**	**210.937**	**77.364**	**193.014**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g19P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g19X	**LEG3**	**85.135**	**L/r**	**77.364**	**Net Sect**	**58**	**22.92**	**85.135**	**91.000**	**210.937**	**77.364**	**193.014**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g19X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g19XY	**LEG3**	**85.135**	**L/r**	**77.364**	**Net Sect**	**58**	**22.92**	**85.135**	**91.000**	**210.937**	**77.364**	**193.014**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g19XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g19Y	**LEG3**	**85.135**	**L/r**	**77.364**	**Net Sect**	**58**	**22.92**	**85.135**	**91.000**	**210.937**	**77.364**	**193.014**	**0.000**	**0.000**	**0.000**	**0.000**
0.000		**Automatic**	**Member "g19Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**													
g20P	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g20X	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g20XY	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g20Y	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g21P	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g21X	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g21XY	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000
0.000		Automatic														
g21Y	XBR1	11.559	L/r	14.585	Net Sect	124	7.07	11.559	18.200	21.094	14.585	16.189	0.000	0.000	0.000	0.000

0.000 Automatic
g22P XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g22X XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g22XY XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g22Y XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g23P XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g23P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g23X XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g23X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g23XY XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g23XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g23Y XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g23Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g24P XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g24P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g24X XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g24X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g24XY XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g24XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g24Y XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g24Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g25P XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g25P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g25X XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g25X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g25XY XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g25XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g25Y XBR2 17.275 L/r 22.901 Net Sect 121 7.81 17.275 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g25Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g26P XBR2 18.986 L/r 22.901 Net Sect 109 7.07 18.986 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g26P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g26X XBR2 18.986 L/r 22.901 Net Sect 109 7.07 18.986 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g26X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??
g26XY XBR2 18.986 L/r 22.901 Net Sect 109 7.07 18.986 27.300 31.641 22.901 28.125 0.000 0.000 0.000 0.000
0.000 Automatic Member "g26XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked. ??

g26Y	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g26Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g27P	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g27P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g27X	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g27X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g27XY	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g27XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g27Y	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g27Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g28P	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g28P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g28X	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g28X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g28XY	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g28XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g28Y	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g28Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g29P	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g29P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g29X	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g29X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g29XY	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g29XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g29Y	XBR2	18.986	L/r	22.901	Net Sect	109	7.07	18.986	27.300	31.641	22.901	28.125	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g29Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g30P	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g30X	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g30XY	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g30Y	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g31P	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g31X	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g31XY	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g31Y	XBR3	12.493	L/r	13.131	Rupture	129	7.60	12.493	18.200	21.094	17.258	13.131	0.000	0.000	0.000	0.000
0.000	Automatic															
g32P	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g32P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														

g32X	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g32X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g32XY	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g32XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g32Y	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g32Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g33P	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g33P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g33X	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g33X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g33XY	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g33XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g33Y	XBR4	11.489	L/r	18.200	Shear	149	9.41	11.489	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g33Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g34P	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g34P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g34X	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g34X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g34XY	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g34XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g34Y	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g34Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g35P	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g35P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g35X	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g35X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g35XY	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g35XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g35Y	XBR4	9.124	L/r	18.200	Shear	172	11.07	9.124	18.200	21.094	20.228	18.750	0.000	0.000	0.000	0.000
0.000	Automatic	Member "g35Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??														
g36P	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000
0.000	Automatic															
g36X	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000
0.000	Automatic															
g36XY	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000
0.000	Automatic															
g36Y	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000
0.000	Automatic															
g37P	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000
0.000	Automatic															
g37X	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000
0.000	Automatic															
g37XY	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000

0.000		Automatic															
g37Y	XBR5	6.345	L/r	16.523	Rupture	213	18.81	6.345	18.200	28.125	18.952	16.523	0.000	0.000	0.000	0.000	
0.000		Automatic															
g38P	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g38X	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g38XY	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g38Y	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g39P	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g39X	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g39XY	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g39Y	XBR6	4.961	L/r	13.201	Rupture	211	28.31	4.961	18.200	21.094	14.585	13.201	0.000	0.000	0.000	0.000	
0.000		Automatic															
g40P	HORZ1	9.100	Shear	7.717	Rupture	149	9.82	10.506	9.100	10.547	17.444	7.717	0.000	0.000	0.000	0.000	
0.000		Automatic															
g40Y	HORZ1	9.100	Shear	7.717	Rupture	149	9.82	10.506	9.100	10.547	17.444	7.717	0.000	0.000	0.000	0.000	
0.000		Automatic															
g41P	HORZ1	9.100	Shear	7.717	Rupture	149	9.82	10.506	9.100	10.547	17.444	7.717	0.000	0.000	0.000	0.000	
0.000		Automatic															
g41X	HORZ1	9.100	Shear	7.717	Rupture	149	9.82	10.506	9.100	10.547	17.444	7.717	0.000	0.000	0.000	0.000	
0.000		Automatic															
g42P	HORZ2	9.100	Shear	9.100	Shear	157	13.81	15.230	9.100	14.062	30.090	12.500	0.000	0.000	0.000	0.000	
0.000		Automatic															
g42Y	HORZ2	9.100	Shear	9.100	Shear	157	13.81	15.230	9.100	14.062	30.090	12.500	0.000	0.000	0.000	0.000	
0.000		Automatic															
g43P	HORZ2	9.100	Shear	9.100	Shear	157	13.81	15.230	9.100	14.062	30.090	12.500	0.000	0.000	0.000	0.000	
0.000		Automatic															
g43X	HORZ2	9.100	Shear	9.100	Shear	157	13.81	15.230	9.100	14.062	30.090	12.500	0.000	0.000	0.000	0.000	
0.000		Automatic															
g44P	ARM1	14.803	L/r	18.200	Shear	184	11.52	14.803	18.200	28.125	33.802	36.765	0.000	0.000	0.000	0.000	
0.000		Automatic															
g44X	ARM1	14.803	L/r	18.200	Shear	184	11.52	14.803	18.200	28.125	33.802	36.765	0.000	0.000	0.000	0.000	
0.000		Automatic															
g44XY	ARM1	14.803	L/r	18.200	Shear	184	11.52	14.803	18.200	28.125	33.802	36.765	0.000	0.000	0.000	0.000	
0.000		Automatic															
g44Y	ARM1	14.803	L/r	18.200	Shear	184	11.52	14.803	18.200	28.125	33.802	36.765	0.000	0.000	0.000	0.000	
0.000		Automatic															
g45P	ARM1	26.226	L/r	43.230	Net Sect	114	5.00	26.226	0.000	0.000	43.230	0.000	0.000	0.000	0.000	0.000	
0.000		Automatic															
g45Y	ARM1	26.226	L/r	43.230	Net Sect	114	5.00	26.226	0.000	0.000	43.230	0.000	0.000	0.000	0.000	0.000	
0.000		Automatic															
g46P	ARM1	24.877	L/r	27.300	Shear	122	7.67	24.877	27.300	42.187	33.802	55.008	0.000	0.000	0.000	0.000	
0.000		Automatic															
g46X	ARM1	24.877	L/r	27.300	Shear	122	7.67	24.877	27.300	42.187	33.802	55.008	0.000	0.000	0.000	0.000	
0.000		Automatic															
g46XY	ARM1	24.877	L/r	27.300	Shear	122	7.67	24.877	27.300	42.187	33.802	55.008	0.000	0.000	0.000	0.000	
0.000		Automatic															
g46Y	ARM1	24.877	L/r	27.300	Shear	122	7.67	24.877	27.300	42.187	33.802	55.008	0.000	0.000	0.000	0.000	
0.000		Automatic															
g47P	ARM1	26.226	L/r	43.230	Net Sect	114	5.00	26.226	0.000	0.000	43.230	0.000	0.000	0.000	0.000	0.000	
0.000		Automatic															
g47Y	ARM1	26.226	L/r	43.230	Net Sect	114	5.00	26.226	0.000	0.000	43.230	0.000	0.000	0.000	0.000	0.000	
0.000		Automatic															
g48P	ARM2	14.810	L/r	27.300	Shear	196	12.01	14.810	27.300	42.187	37.663	45.633	0.000	0.000	0.000	0.000	

0.000		Automatic														
g48X	ARM2	14.810	L/r	27.300	Shear	196	12.01	14.810	27.300	42.187	37.663	45.633	0.000	0.000	0.000	0.000
0.000		Automatic														
g48XY	ARM2	14.810	L/r	27.300	Shear	196	12.01	14.810	27.300	42.187	37.663	45.633	0.000	0.000	0.000	0.000
0.000		Automatic														
g48Y	ARM2	14.810	L/r	27.300	Shear	196	12.01	14.810	27.300	42.187	37.663	45.633	0.000	0.000	0.000	0.000
0.000		Automatic														
g49P	ARM2	29.359	L/r	47.520	Net Sect	110	5.00	29.359	0.000	0.000	47.520	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g49Y	ARM2	29.359	L/r	47.520	Net Sect	110	5.00	29.359	0.000	0.000	47.520	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g50P	ARM1	18.200	Shear	18.200	Shear	130	8.14	23.444	18.200	28.125	33.802	37.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g50X	ARM1	18.200	Shear	18.200	Shear	130	8.14	23.444	18.200	28.125	33.802	37.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g50XY	ARM1	18.200	Shear	18.200	Shear	130	8.14	23.444	18.200	28.125	33.802	37.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g50Y	ARM1	18.200	Shear	18.200	Shear	130	8.14	23.444	18.200	28.125	33.802	37.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g51P	ARM1	26.226	L/r	43.230	Net Sect	114	5.00	26.226	0.000	0.000	43.230	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g51Y	ARM1	26.226	L/r	43.230	Net Sect	114	5.00	26.226	0.000	0.000	43.230	0.000	0.000	0.000	0.000	0.000
0.000		Automatic														
g52P	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g52X	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g53P	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g53X	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g54P	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g54X	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g55P	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g55X	M1	5.799	L/r	7.717	Rupture	175	5.00	5.799	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g56P	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g56X	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g57P	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g57X	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g58P	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g58X	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g59P	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g59X	M2	9.100	Shear	7.717	Rupture	124	7.07	11.437	9.100	10.547	14.585	7.717	0.000	0.000	0.000	0.000
0.000		Automatic														
g60P	M3	9.100	Shear	9.100	Shear	155	6.40	10.714	9.100	10.547	22.961	9.375	0.000	0.000	0.000	0.000
0.000		Automatic														
g60X	M3	9.100	Shear	9.100	Shear	155	6.40	10.714	9.100	10.547	22.961	9.375	0.000	0.000	0.000	0.000
0.000		Automatic														
g61P	M4	0.648	L/r	7.889	Net Sect	439	9.15	0.648	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000

0.000		Automatic														
g61X	M4	0.648	L/r	7.889	Net Sect	439	9.15	0.648	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g61XY	M4	0.648	L/r	7.889	Net Sect	439	9.15	0.648	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g61Y	M4	0.648	L/r	7.889	Net Sect	439	9.15	0.648	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g62P	M4	0.354	L/r	7.889	Net Sect	594	12.38	0.354	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g62X	M4	0.354	L/r	7.889	Net Sect	594	12.38	0.354	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g62XY	M4	0.354	L/r	7.889	Net Sect	594	12.38	0.354	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g62Y	M4	0.354	L/r	7.889	Net Sect	594	12.38	0.354	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g63P	M4	0.595	L/r	7.889	Net Sect	459	9.56	0.595	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g63X	M4	0.595	L/r	7.889	Net Sect	459	9.56	0.595	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g63XY	M4	0.595	L/r	7.889	Net Sect	459	9.56	0.595	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g63Y	M4	0.595	L/r	7.889	Net Sect	459	9.56	0.595	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g64P	M4	2.174	L/r	7.889	Net Sect	240	5.00	2.174	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														
g64Y	M4	2.174	L/r	7.889	Net Sect	240	5.00	2.174	9.100	14.062	7.889	12.500	0.000	0.000	0.000	0.000
0.000		Automatic														

The model contains 190 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	0.0906	4.843	3.221
2P	0.117	6.336	5.481
3P	0.0777	4.953	4.953
4P	0.127	7.376	5.662
5P	0.086	5.453	5.150
6P	0.12	6.193	5.277
7P	0.172	7.493	7.493
12P	0.0617	3.479	1.146
13P	0.0626	3.947	2.078
14P	0.0836	5.448	1.380
15P	0.0558	3.475	1.557
1X	0.0906	4.843	3.221
1XY	0.0824	4.427	2.804
1Y	0.0906	4.843	3.221
2X	0.117	6.336	5.481
2XY	0.108	5.919	5.065
2Y	0.117	6.336	5.481
3X	0.0777	4.953	4.953
3XY	0.0777	4.953	4.953
3Y	0.0777	4.953	4.953
4X	0.127	7.376	5.662
4XY	0.118	6.959	5.246
4Y	0.127	7.376	5.662

5X	0.086	5.453	5.150
5XY	0.0777	5.036	4.734
5Y	0.086	5.453	5.150
6X	0.12	6.193	5.277
6XY	0.12	6.193	5.277
6Y	0.12	6.193	5.277
7X	0.172	7.493	7.493
7XY	0.172	7.493	7.493
7Y	0.172	7.493	7.493
12X	0.0617	3.479	1.146
13X	0.0626	3.947	2.078
14X	0.0836	5.448	1.380
15X	0.0558	3.475	1.557
8S	0.0904	4.510	4.510
9S	0.109	5.544	5.544
10S	0.209	8.820	8.820
11S	0.359	14.090	14.090
16S	0.0372	2.427	1.325
1XYF0.50S	0.0165	0.833	0.833
4XYF0.50S	0.0165	0.833	0.833
8X	0.0904	4.510	4.510
8XY	0.0904	4.510	4.510
8Y	0.0904	4.510	4.510
9X	0.109	5.544	5.544
9XY	0.109	5.544	5.544
9Y	0.109	5.544	5.544
10X	0.209	8.820	8.820
10XY	0.209	8.820	8.820
10Y	0.209	8.820	8.820
11X	0.359	14.090	14.090
11XY	0.359	14.090	14.090
11Y	0.359	14.090	14.090
16X	0.0372	2.427	1.325
16XY	0.0372	2.427	1.325
16Y	0.0372	2.427	1.325
Total	6.9	344.848	298.425

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	4.280	239.034	192.610	98.536	71.074
2	2.623	105.815	105.815	42.014	42.014
Total	6.903	344.848	298.425	140.550	113.087

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	4.280	4.280	955.397	955.397
2	2.623	2.885	471.558	518.713
Total	6.903	7.165	1426.955	1474.111

Section Joint Information:

Section Label	Joint Label	Joint Elevation (ft)
1	1X	81.500
1	2X	76.500
1	1P	81.500
1	2P	76.500
1	1Y	81.500
1	2Y	76.500
1	1XY	81.500
1	1XYF0.50S	79.000
1	2XY	76.500
1	3X	70.500
1	3P	70.500
1	3Y	70.500
1	3XY	70.500
1	16S	67.500
1	16X	67.500
1	16XY	67.500
1	16Y	67.500
1	4X	64.500
1	4P	64.500
1	4Y	64.500
1	4XY	64.500
1	5X	59.500
1	5P	59.500
1	5Y	59.500
1	4XYF0.50S	62.000
1	5XY	59.500
1	6X	54.500
1	6P	54.500
1	6Y	54.500
1	6XY	54.500
1	8X	49.500
1	8S	49.500
1	8Y	49.500
1	8XY	49.500
1	9X	43.500
1	9S	43.500
1	9Y	43.500
1	9XY	43.500
1	10X	37.000
1	10S	37.000
1	10Y	37.000
1	10XY	37.000
1	12P	81.500
1	12X	81.500
1	13P	76.500
1	13X	76.500
1	14P	64.500
1	14X	64.500
1	15P	54.500
1	15X	54.500
2	10X	37.000
2	11X	22.500
2	10S	37.000
2	11S	22.500
2	10Y	37.000

2	11Y	22.500
2	10XY	37.000
2	11XY	22.500
2	7X	0.000
2	7P	0.000
2	7Y	0.000
2	7XY	0.000

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)
1	81.500	37.000	50	162	5.00	9.82	264.644	27.50	9.82	431.144
2	37.000	0.000	12	28	9.82	20.00	551.606	9.82	20.00	551.606

*** Insulator Data

Clamp Properties:

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

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
1	12P	C-EX1	No Limit
2	12X	C-EX1	No Limit
3	13P	C-EX1	No Limit
4	13X	C-EX1	No Limit
5	14P	C-EX1	No Limit
6	14X	C-EX1	No Limit
7	15P	C-EX1	No Limit
8	15X	C-EX1	No Limit
9	1XY	C-EX1	No Limit
10	2XY	C-EX1	No Limit
11	3XY	C-EX1	No Limit
12	4XY	C-EX1	No Limit
13	5XY	C-EX1	No Limit
14	6XY	C-EX1	No Limit
15	8XY	C-EX1	No Limit
16	9XY	C-EX1	No Limit
17	10XY	C-EX1	No Limit
18	11XY	C-EX1	No Limit
19	1XYF0.50S	C-EX1	No Limit
20	4XYF0.50S	C-EX1	No Limit
21	1Y	C-EX1	No Limit
22	2Y	C-EX1	No Limit
23	3Y	C-EX1	No Limit
24	4Y	C-EX1	No Limit
25	5Y	C-EX1	No Limit

26	6Y	C-EX1	No Limit
27	8Y	C-EX1	No Limit
28	9Y	C-EX1	No Limit
29	10Y	C-EX1	No Limit
30	11Y	C-EX1	No Limit

*** Loads Data

Loads from file: j:\jobs\1700400.wi\04_southington-cathydrive nu ct1109\04_structural\backup documentation\calcs\pls tower\cl&p # 4119.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)	81.50	(ft)	
Structure height	81.50	(ft)	
Structure height above ground	81.50	(ft)	
Tower Shape	Rectangular		

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

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles and Tubular Arms and Towers	SF for Guys and Cables	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Joint Displ.
NESC Heavy	1.5000	2.5000	1.00000	1.0000	1.0000	1.0000	30 loads	Wind on Face	4	0	0.000	0.000	0.0	
NESC Extreme	1.0000	1.0000	1.00000	1.0000	1.0000	1.0000	30 loads	NESC 2012	31	0	0.000	0.000	0.0	

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
12P	1333	1008	0	Shield Wire
12X	808	779	0	Shield Wire
13P	1710	1118	0	Conductor
13X	1710	1118	0	Conductor
14P	1710	1118	0	Conductor
14X	1710	1118	0	Conductor
15P	1710	1118	0	Conductor
15X	1710	1118	0	Conductor
1XYF0.50S	0	2137	0	Top Mast Connection
4XYF0.50S	6073	-605	0	Bottom Mast Connection
1XY	115	43	0	Coax Cable - Southeast Leg
2XY	253	94	0	Coax Cable - Southeast Leg
3XY	276	103	0	Coax Cable - Southeast Leg
4XY	253	94	0	Coax Cable - Southeast Leg
5XY	230	86	0	Coax Cable - Southeast Leg
6XY	230	86	0	Coax Cable - Southeast Leg
8XY	253	94	0	Coax Cable - Southeast Leg
9XY	287	107	0	Coax Cable - Southeast Leg
10XY	483	180	0	Coax Cable - Southeast Leg
11XY	1368	511	0	Coax Cable - Southeast Leg

1Y	57	23	0	Coax Cable - Southwest Leg
2Y	126	51	0	Coax Cable - Southwest Leg
3Y	138	56	0	Coax Cable - Southwest Leg
4Y	126	51	0	Coax Cable - Southwest Leg
5Y	115	46	0	Coax Cable - Southwest Leg
6Y	115	46	0	Coax Cable - Southwest Leg
8Y	126	51	0	Coax Cable - Southwest Leg
9Y	144	58	0	Coax Cable - Southwest Leg
10Y	241	97	0	Coax Cable - Southwest Leg
11Y	684	275	0	Coax Cable - Southwest Leg

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

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	81.50	37.00	59.25	10.00	10.00	3.200	2274.3	0.00	3.200	0.0	0	6420
2	37.00	0.00	18.50	10.00	10.00	3.200	1344.4	0.00	3.200	0.0	0	4328

Point Loads for Load Case "NESC Extreme":

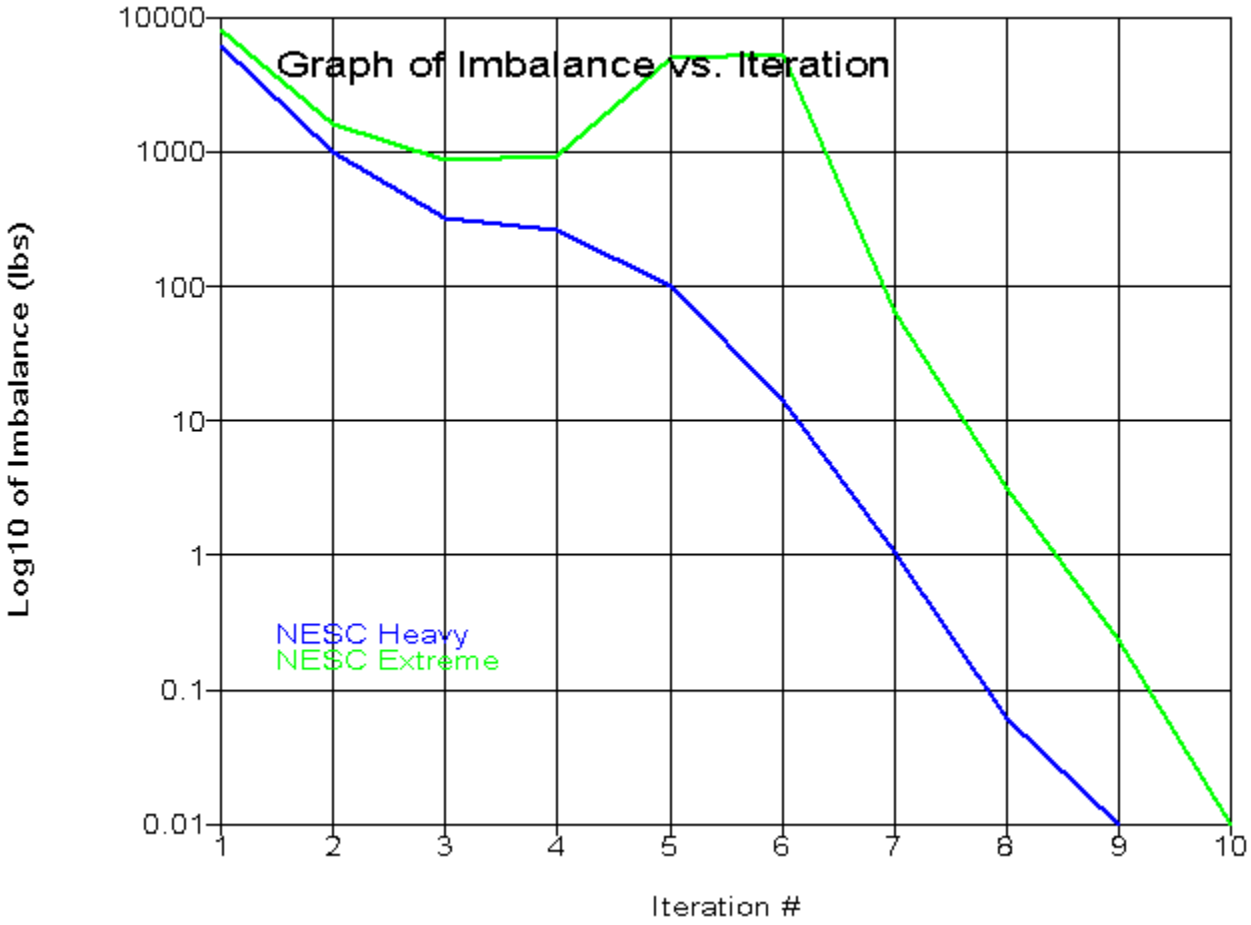
Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
12P	357	1214	0	Shield Wire
12X	177	564	0	Shield Wire
13P	528	1524	0	Conductor
13X	528	1524	0	Conductor
14P	528	1524	0	Conductor
14X	528	1524	0	Conductor
15P	528	1524	0	Conductor
15X	528	1524	0	Conductor
1XYF0.50S	0	7865	0	Top Mast Connection
4XYF0.50S	2929	-2321	0	Bottom Mast Connection
1XY	31	134	0	Coax Cable - Southeast Leg
2XY	69	294	0	Coax Cable - Southeast Leg
3XY	75	321	0	Coax Cable - Southeast Leg
4XY	69	294	0	Coax Cable - Southeast Leg
5XY	62	268	0	Coax Cable - Southeast Leg
6XY	62	268	0	Coax Cable - Southeast Leg
8XY	69	294	0	Coax Cable - Southeast Leg
9XY	78	335	0	Coax Cable - Southeast Leg
10XY	131	562	0	Coax Cable - Southeast Leg
11XY	371	1593	0	Coax Cable - Southeast Leg
1Y	16	67	0	Coax Cable - Southwest Leg
2Y	34	147	0	Coax Cable - Southwest Leg
3Y	37	161	0	Coax Cable - Southwest Leg
4Y	34	147	0	Coax Cable - Southwest Leg
5Y	31	134	0	Coax Cable - Southwest Leg
6Y	31	134	0	Coax Cable - Southwest Leg
8Y	34	147	0	Coax Cable - Southwest Leg
9Y	39	167	0	Coax Cable - Southwest Leg
10Y	66	281	0	Coax Cable - Southwest Leg
11Y	186	796	0	Coax Cable - Southwest Leg

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

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Angle Face Area (ft^2)	Tran Gross Area (ft^2)	Tran Soli- dity Ratio	Tran Angle Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Angle Face Area (ft^2)	Long Gross Area (ft^2)	Long Soli- dity Ratio	Long Angle Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	81.50	37.00	59.25	30.62	30.62	71.07	264.64	0.269	3.200	6964.9	0.00	98.54	431.14	0.229	3.200	0.0	0	4280
2	37.00	0.00	18.50	30.62	30.62	46.22	551.61	0.084	3.200	4528.9	0.00	46.22	551.61	0.084	3.200	0.0	0	2885

*** Analysis Results:

Maximum element usage is 81.86% for Angle "g17X" in load case "NESC Extreme"
Maximum insulator usage is 16.01% for Clamp "19" in load case "NESC Extreme"



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

Group Label	Angle Label	Max. Usage For All LC %	Max. Tens. For All LC (kips)	Max. Comp. For All LC (kips)	LC 1 (kips)	LC 2 (kips)
LEG1	g1P	2.37	0.981	-1.079	-1.079	0.981
LEG1	g2P	3.64	0.000	-1.945	-1.661	-1.945
LEG1	g3P	2.67	0.000	-1.429	-1.429	-0.874
LEG1	g4P	2.36	0.689	-1.264	-1.264	0.689

LEG1	g5P	2.39	0.685	-1.280	-1.280	0.685
LEG1	g6P	14.69	7.737	0.000	1.356	7.737
LEG1	g6X	18.35	0.000	-8.969	-4.727	-8.969
LEG1	g6XY	18.80	0.000	-9.192	-5.234	-9.192
LEG1	g6Y	14.03	7.390	0.000	1.207	7.390
LEG1	g7P	29.49	15.536	0.000	4.803	15.536
LEG1	g7X	27.49	0.000	-16.562	-7.736	-16.562
LEG1	g7XY	29.34	0.000	-17.670	-9.133	-17.670
LEG1	g7Y	29.39	15.482	0.000	5.078	15.482
LEG1	g8P	36.81	15.214	0.000	3.852	15.214
LEG1	g8X	28.20	0.000	-16.987	-8.712	-16.987
LEG1	g8XY	29.88	0.000	-17.999	-10.085	-17.999
LEG1	g8Y	36.40	15.047	0.000	4.099	15.047
LEG1	g9P	49.70	26.178	0.000	7.397	26.178
LEG1	g10P	54.08	0.000	-28.936	-14.810	-28.936
LEG1	g11P	56.81	0.000	-30.398	-17.370	-30.398
LEG1	g12P	50.28	26.483	0.000	8.475	26.483
LEG1	g13P	44.52	23.450	0.000	2.375	23.450
LEG1	g14P	65.14	34.316	0.000	10.124	34.316
LEG1	g14X	70.29	0.000	-37.613	-18.985	-37.613
LEG1	g14XY	71.03	0.000	-38.006	-22.452	-38.006
LEG1	g14Y	58.37	30.749	0.000	6.303	30.749
LEG2	g15P	69.77	40.469	0.000	13.433	40.469
LEG2	g15X	66.06	0.000	-43.313	-21.829	-43.313
LEG2	g15XY	65.45	0.000	-42.914	-25.499	-42.914
LEG2	g15Y	62.78	36.413	0.000	9.920	36.413
LEG2	g16P	73.99	42.913	0.000	14.589	42.913
LEG2	g16X	79.12	0.000	-47.133	-25.096	-47.133
LEG2	g16XY	78.47	0.000	-46.744	-27.962	-46.744
LEG2	g16Y	67.87	39.363	0.000	11.171	39.363
LEG2	g17P	64.66	41.952	0.000	14.785	41.952
LEG2	g17X	81.86	0.000	-45.974	-25.577	-45.974
LEG2	g17XY	81.60	0.000	-45.828	-27.774	-45.828
LEG2	g17Y	60.36	39.163	0.000	11.716	39.163
LEG3	g18P	51.23	39.637	0.000	14.457	39.637
LEG3	g18X	56.83	0.000	-48.744	-24.545	-48.744
LEG3	g18XY	57.30	0.000	-49.145	-26.318	-49.145
LEG3	g18Y	49.82	38.543	0.000	11.944	38.543
LEG3	g19P	53.32	41.252	0.000	14.779	41.252
LEG3	g19X	60.16	0.000	-51.214	-26.605	-51.214
LEG3	g19XY	69.00	0.000	-58.744	-29.070	-58.744
LEG3	g19Y	49.82	38.540	0.000	12.631	38.540
XBR1	g20P	15.09	0.000	-1.744	-0.741	-1.744
XBR1	g20X	11.06	1.614	0.000	0.309	1.614
XBR1	g20XY	14.16	2.065	0.000	0.435	2.065
XBR1	g20Y	27.91	0.000	-3.227	-1.126	-3.227
XBR1	g21P	1.41	0.177	-0.122	-0.122	0.177
XBR1	g21X	2.48	0.000	-0.287	-0.134	-0.287
XBR1	g21XY	5.15	0.752	0.000	0.127	0.752
XBR1	g21Y	6.51	0.000	-0.753	-0.360	-0.753
XBR2	g22P	23.60	0.000	-4.077	-2.016	-4.077
XBR2	g22X	18.26	4.181	0.000	2.198	4.181
XBR2	g22XY	35.65	8.164	0.000	3.464	8.164
XBR2	g22Y	44.61	0.000	-7.707	-3.159	-7.707
XBR2	g23P	10.98	2.514	0.000	0.533	2.514
XBR2	g23X	15.03	0.000	-2.596	-0.970	-2.596
XBR2	g23XY	3.07	0.703	-0.258	-0.258	0.703
XBR2	g23Y	4.42	0.000	-0.763	-0.185	-0.763
XBR2	g24P	27.06	0.000	-4.674	-2.365	-4.674
XBR2	g24X	20.11	4.605	0.000	2.148	4.605

XBR2 g24XY	37.38	8.562	0.000	3.401	8.562
XBR2 g24Y	44.84	0.000	-7.746	-3.427	-7.746
XBR2 g25P	4.77	0.327	-0.583	-0.583	0.327
XBR2 g25X	4.08	0.000	-0.705	-0.334	-0.705
XBR2 g25XY	11.24	2.573	0.000	0.371	2.573
XBR2 g25Y	23.52	0.000	-2.878	-1.282	-2.878
XBR2 g26P	27.17	0.000	-5.159	-1.866	-5.159
XBR2 g26X	25.65	5.874	0.000	3.660	5.874
XBR2 g26XY	40.40	9.252	0.000	5.051	9.252
XBR2 g26Y	41.72	0.000	-7.921	-3.085	-7.921
XBR2 g27P	11.20	2.565	0.000	0.682	2.565
XBR2 g27X	18.18	0.000	-2.542	-0.646	-2.542
XBR2 g27XY	2.21	0.307	-0.309	-0.309	0.307
XBR2 g27Y	1.54	0.352	-0.223	0.352	-0.223
XBR2 g28P	30.37	0.000	-5.767	-1.986	-5.767
XBR2 g28X	28.09	6.433	0.000	3.860	6.433
XBR2 g28XY	35.50	8.131	0.000	4.606	8.131
XBR2 g28Y	38.16	0.000	-7.245	-3.232	-7.245
XBR2 g29P	7.67	0.000	-1.072	-1.072	-0.491
XBR2 g29X	0.43	0.098	-0.017	-0.017	0.098
XBR2 g29XY	12.02	2.753	0.000	0.372	2.753
XBR2 g29Y	20.66	0.000	-2.890	-1.252	-2.890
XBR3 g30P	7.80	0.617	-0.975	-0.975	0.617
XBR3 g30X	6.81	0.236	-0.850	0.236	-0.850
XBR3 g30XY	11.86	1.557	0.000	0.617	1.557
XBR3 g30Y	15.66	0.000	-1.957	-1.684	-1.957
XBR3 g31P	10.78	0.000	-1.164	-0.294	-1.164
XBR3 g31X	6.89	0.904	0.000	0.604	0.904
XBR3 g31XY	22.90	3.007	0.000	0.792	3.007
XBR3 g31Y	35.79	0.000	-3.866	-1.798	-3.866
XBR4 g32P	3.32	0.469	-0.381	-0.381	0.469
XBR4 g32X	4.15	0.645	-0.476	0.645	-0.476
XBR4 g32XY	9.36	1.703	0.000	1.221	1.703
XBR4 g32Y	15.06	0.000	-1.730	-0.830	-1.730
XBR4 g33P	15.53	2.827	0.000	1.285	2.827
XBR4 g33X	23.72	0.000	-2.097	-0.544	-2.097
XBR4 g33XY	5.31	0.000	-0.469	-0.439	-0.469
XBR4 g33Y	4.07	0.741	0.000	0.086	0.741
XBR4 g34P	7.30	0.141	-0.666	-0.666	0.141
XBR4 g34X	2.70	0.273	-0.246	0.273	-0.246
XBR4 g34XY	8.86	1.612	0.000	0.662	1.612
XBR4 g34Y	20.77	0.000	-1.895	-1.265	-1.895
XBR4 g35P	7.43	0.000	-0.517	-0.060	-0.517
XBR4 g35X	1.54	0.280	0.000	0.280	0.267
XBR4 g35XY	8.25	1.501	0.000	0.317	1.501
XBR4 g35Y	31.21	0.000	-2.174	-0.997	-2.174
XBR5 g36P	20.86	0.000	-1.323	-1.323	-1.141
XBR5 g36X	2.15	0.000	-0.136	-0.098	-0.136
XBR5 g36XY	11.35	1.876	0.000	0.282	1.876
XBR5 g36Y	65.98	0.000	-4.186	-2.337	-4.186
XBR5 g37P	45.98	1.684	-2.917	-2.917	1.684
XBR5 g37X	27.94	4.616	0.000	1.758	4.616
XBR5 g37XY	35.10	5.800	0.000	1.707	5.800
XBR5 g37Y	61.37	0.000	-3.894	-3.894	0.000
XBR6 g38P	31.31	0.000	-1.553	-1.492	-1.553
XBR6 g38X	1.83	0.242	-0.083	-0.083	0.242
XBR6 g38XY	67.31	8.886	0.000	0.733	8.886
XBR6 g38Y	59.31	0.000	-2.942	-2.942	0.000
XBR6 g39P	64.16	1.375	-3.183	-3.183	1.375
XBR6 g39X	35.90	4.740	0.000	1.908	4.740

XBR6	g39XY	42.02	5.547	0.000	1.609	5.547
XBR6	g39Y	81.50	0.000	-4.043	-4.043	0.000
HORZ1	g40P	6.37	0.492	0.000	0.492	0.408
HORZ1	g40Y	9.18	0.709	0.000	0.709	0.699
HORZ1	g41P	36.49	2.816	0.000	2.816	0.305
HORZ1	g41X	49.53	0.000	-4.507	-1.561	-4.507
HORZ2	g42P	7.67	0.698	0.000	0.650	0.698
HORZ2	g42Y	33.17	0.783	-3.019	0.783	-3.019
HORZ2	g43P	46.17	4.202	-0.983	4.202	-0.983
HORZ2	g43X	70.36	0.000	-6.403	-2.321	-6.403
ARM1	g44P	3.29	0.050	-0.487	0.050	-0.487
ARM1	g44X	4.23	0.769	0.000	0.769	0.476
ARM1	g44XY	4.20	0.765	0.000	0.765	0.461
ARM1	g44Y	3.45	0.045	-0.511	0.045	-0.511
ARM1	g45P	5.93	2.563	0.000	2.563	0.787
ARM1	g45Y	4.98	2.154	-0.726	2.154	-0.726
ARM1	g46P	14.55	0.000	-3.619	-3.619	-1.628
ARM1	g46X	7.67	0.000	-1.908	-1.908	-0.119
ARM1	g46XY	7.10	0.362	-1.767	-1.767	0.362
ARM1	g46Y	15.06	0.000	-3.745	-3.745	-2.060
ARM1	g47P	9.69	0.000	-2.540	-2.540	-0.687
ARM1	g47Y	12.09	0.000	-3.171	-3.171	-2.984
ARM2	g48P	28.05	0.000	-4.154	-4.154	-1.791
ARM2	g48X	20.76	0.000	-3.075	-3.075	-0.492
ARM2	g48XY	20.14	0.000	-2.983	-2.983	-0.137
ARM2	g48Y	28.83	0.000	-4.270	-4.270	-2.268
ARM2	g49P	12.68	0.000	-3.723	-3.723	-1.220
ARM2	g49Y	12.45	0.000	-3.656	-3.656	-1.065
ARM1	g50P	11.68	0.000	-2.126	-2.126	-1.116
ARM1	g50X	5.73	0.000	-1.042	-1.042	-0.062
ARM1	g50XY	4.83	0.879	-0.660	-0.660	0.879
ARM1	g50Y	11.09	0.000	-2.019	-2.019	-1.642
ARM1	g51P	8.28	0.000	-2.172	-2.172	-0.855
ARM1	g51Y	8.45	0.000	-2.217	-2.217	-1.101
M1	g52P	13.56	0.000	-0.786	-0.786	-0.084
M1	g52X	15.65	0.000	-0.908	-0.908	-0.229
M1	g53P	10.50	0.810	-0.166	0.810	-0.166
M1	g53X	21.81	1.683	0.000	1.683	1.133
M1	g54P	9.60	0.741	0.000	0.741	0.177
M1	g54X	11.76	0.907	0.000	0.907	0.314
M1	g55P	43.18	0.000	-2.504	-0.928	-2.504
M1	g55X	36.83	2.842	0.000	1.558	2.842
M2	g56P	6.72	0.518	0.000	0.290	0.518
M2	g56X	7.26	0.000	-0.661	-0.020	-0.661
M2	g57P	9.12	0.704	0.000	0.118	0.704
M2	g57X	11.97	0.000	-1.089	-0.223	-1.089
M2	g58P	7.59	0.000	-0.539	-0.539	-0.200
M2	g58X	3.17	0.000	-0.225	-0.225	-0.047
M2	g59P	0.99	0.076	-0.057	-0.057	0.076
M2	g59X	9.37	0.000	-0.666	-0.666	-0.370
M3	g60P	20.12	0.000	-1.831	-1.831	-0.612
M3	g60X	12.59	0.000	-1.145	-1.145	-0.335
M4	g61P	36.11	2.849	0.000	2.849	0.657
M4	g61X	32.20	2.541	0.000	2.541	1.078
M4	g61XY	29.99	2.366	0.000	2.366	0.473
M4	g61Y	37.99	2.997	0.000	2.997	1.157
M4	g62P	46.52	3.670	0.000	3.670	0.980
M4	g62X	47.75	3.767	0.000	3.767	1.401
M4	g62XY	46.48	3.667	0.000	3.667	1.006
M4	g62Y	47.96	3.784	0.000	3.784	1.445

M4	g63P	22.48	1.774	0.000	1.774	0.290
M4	g63X	24.32	1.918	0.000	1.918	1.111
M4	g63XY	18.57	1.465	-0.015	1.465	-0.015
M4	g63Y	20.85	1.645	0.000	1.645	0.890
M4	g64P	42.71	3.369	0.000	3.369	1.086
M4	g64Y	41.47	3.271	0.000	3.271	0.727

*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 9

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	-0.00985	0.1572	-0.01559	-0.2347	-0.0151	-0.0349	2.49	2.657	81.48
2P	-0.007939	0.1368	-0.0154	-0.2327	-0.0394	-0.0317	2.492	2.637	76.48
3P	-0.005527	0.1132	-0.01485	-0.2138	0.0447	-0.0276	2.494	2.613	70.49
4P	-0.004228	0.08949	-0.01392	-0.2247	-0.0824	-0.0226	2.496	2.589	64.49
5P	-0.001418	0.07285	-0.01257	-0.1881	0.0038	-0.0179	2.499	2.573	59.49
6P	-0.001923	0.05627	-0.01086	-0.1652	-0.0136	-0.0130	2.498	2.556	54.49
7P	0	0	0	0.0000	0.0000	0.0000	10	10	0
12P	-0.02013	0.1585	0.04114	-0.2138	-0.0720	-0.0374	-0.02013	-13.59	81.54
13P	-0.01557	0.1397	0.0267	-0.1417	0.0219	-0.0369	-0.01557	-9.61	76.53
14P	-0.01149	0.0923	0.02252	-0.0465	-0.0131	-0.0239	-0.01149	-14.16	64.52
15P	-0.005828	0.05797	0.02107	-0.1415	-0.0124	-0.0191	-0.005828	-10.19	54.52
1X	-0.01299	0.1569	0.004147	-0.2190	-0.0248	-0.0360	2.487	-2.343	81.5
1XY	-0.01273	0.1601	0.002359	-0.0817	-0.0264	-0.0351	-2.513	-2.34	81.5
1Y	-0.00963	0.1604	-0.01734	-0.2568	-0.0260	-0.0355	-2.51	2.66	81.48
2X	-0.01079	0.1372	0.004282	-0.2281	-0.0296	-0.0352	2.489	-2.363	76.5
2XY	-0.01126	0.1403	0.002522	-0.3294	-0.0056	-0.0329	-2.511	-2.36	76.5
2Y	-0.008163	0.1399	-0.01717	-0.2215	0.0016	-0.0353	-2.508	2.64	76.48
3X	-0.009456	0.1124	0.004189	-0.2349	0.0313	-0.0313	2.491	-2.388	70.5
3XY	-0.008086	0.1148	0.002448	-0.2234	-0.0792	-0.0277	-2.508	-2.385	70.5
3Y	-0.006738	0.1158	-0.01657	-0.2237	-0.0795	-0.0306	-2.507	2.616	70.48
4X	-0.006386	0.08997	0.003773	-0.1999	-0.0679	-0.0267	2.494	-2.41	64.5
4XY	-0.006637	0.09206	0.002005	-0.2184	0.0288	-0.0231	-2.507	-2.408	64.5
4Y	-0.004433	0.09159	-0.01549	-0.2223	0.0476	-0.0268	-2.504	2.592	64.48
5X	-0.005654	0.07109	0.003151	-0.2000	-0.0070	-0.0257	2.494	-2.429	59.5
5XY	-0.003897	0.07266	0.001562	-0.1774	-0.0318	-0.0174	-2.504	-2.427	59.5
5Y	-0.004467	0.0749	-0.01392	-0.1925	-0.0344	-0.0244	-2.504	2.575	59.49
6X	-0.003069	0.05658	0.002273	-0.1476	-0.0193	-0.0243	2.497	-2.443	54.5
6XY	-0.003502	0.05824	0.001023	-0.1525	-0.0098	-0.0122	-2.504	-2.442	54.5
6Y	-0.001664	0.05793	-0.01189	-0.1649	-0.0052	-0.0223	-2.502	2.558	54.49
7X	0	0	0	0.0000	0.0000	0.0000	10	-10	0
7XY	0	0	0	0.0000	0.0000	0.0000	-10	-10	0
7Y	0	0	0	0.0000	0.0000	0.0000	-10	10	0
12X	-0.00259	0.1589	-0.06722	-0.2655	-0.0282	-0.0368	-0.00259	13.91	81.43
13X	-0.003616	0.1378	-0.04993	-0.2794	-0.0152	-0.0357	-0.003616	9.888	76.45
14X	0.0006713	0.08942	-0.08486	-0.3913	-0.0167	-0.0241	0.0006713	14.34	64.42
15X	0.0009133	0.0569	-0.04113	-0.2450	-0.0107	-0.0210	0.0009133	10.31	54.46
8S	0.0002479	0.04439	-0.01055	-0.1159	-0.0203	-0.0100	3.188	3.232	49.49
9S	0.000491	0.03241	-0.009911	-0.0991	0.0013	-0.0082	4.014	4.046	43.49
10S	0.000629	0.0225	-0.00877	-0.0704	-0.0051	-0.0089	4.909	4.931	36.99
11S	0.001332	0.008242	-0.006175	-0.0376	-0.0018	-0.0073	6.905	6.912	22.49
16S	-0.01062	0.1006	0.003956	-0.2128	-0.0349	-0.0290	2.489	-2.399	67.5
1XYF0.50S	-0.01176	0.1554	0.00242	-0.2368	-0.0176	-0.0340	-2.512	-2.345	79
4XYF0.50S	-0.005929	0.08129	0.001652	-0.2338	-0.0460	-0.0201	-2.506	-2.419	62
8X	-0.003102	0.04383	0.003037	-0.1273	-0.0015	-0.0237	3.185	-3.144	49.5
8XY	-0.001592	0.04564	0.001771	-0.1289	-0.0216	-0.0090	-3.19	-3.142	49.5
8Y	-0.002434	0.04656	-0.01144	-0.1149	0.0123	-0.0203	-3.191	3.235	49.49
9X	-0.00193	0.03211	0.003518	-0.0931	-0.0133	-0.0171	4.012	-3.982	43.5
9XY	-0.001079	0.03437	0.002261	-0.0933	-0.0038	-0.0107	-4.015	-3.979	43.5
9Y	-0.001407	0.03483	-0.01068	-0.1006	-0.0083	-0.0172	-4.015	4.049	43.49
10X	-0.001177	0.0223	0.003546	-0.0718	-0.0042	-0.0151	4.907	-4.886	37

10XY	-0.000524	0.02487	0.002365	-0.0730	-0.0083	-0.0067	-4.909	-4.883	37
10Y	-0.0005472	0.02515	-0.009432	-0.0708	0.0006	-0.0115	-4.909	4.933	36.99
11X	-0.0004291	0.008008	0.002999	-0.0378	-0.0023	-0.0098	6.903	-6.896	22.5
11XY	0.0004147	0.01056	0.002044	-0.0424	-0.0029	-0.0030	-6.903	-6.893	22.5
11Y	-0.000195	0.01084	-0.006668	-0.0418	0.0023	-0.0043	-6.904	6.915	22.49
16X	-0.008026	0.1019	-0.01441	-0.2303	-0.0095	-0.0251	2.492	2.602	67.49
16XY	-0.00247	0.1041	-0.01605	-0.2358	-0.0252	-0.0286	-2.502	2.604	67.48
16Y	-0.004507	0.1028	0.002204	-0.2154	-0.0086	-0.0255	-2.505	-2.397	67.5

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
7P	-6.17	0.0	-4.92	0.0	0.0	-30.80	0.0	0.0	31.79	0.0	0.02	0.0	-0.0	0.0	0.0	0.00	0.0	0.0
7X	2.95	0.0	-2.31	0.0	0.0	15.43	0.0	0.0	15.88	0.0	0.02	0.0	-0.0	0.0	0.0	0.01	0.0	0.0
7XY	-2.93	0.0	-2.55	0.0	0.0	14.21	0.0	0.0	14.73	0.0	0.05	0.0	-0.0	0.0	0.0	-0.00	0.0	0.0
7Y	6.15	0.0	-6.02	0.0	0.0	-33.69	0.0	0.0	34.77	0.0	0.04	0.0	-0.0	0.0	0.0	-0.00	0.0	0.0

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

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0000	-0.1359	-0.0000	0.0000	0.1359	-0.0098	0.1572	-0.0156
2P	0.0000	0.0000	-0.1749	-0.0000	0.0000	0.1749	-0.0079	0.1368	-0.0154
3P	0.0000	0.0000	-0.1165	0.0000	0.0000	0.1165	-0.0055	0.1132	-0.0148
4P	0.0000	0.0000	-0.1898	-0.0000	0.0000	0.1898	-0.0042	0.0895	-0.0139
5P	0.0000	0.0000	-0.1290	-0.0000	0.0000	0.1290	-0.0014	0.0729	-0.0126
6P	0.0000	0.0000	-0.1800	-0.0000	0.0000	0.1800	-0.0019	0.0563	-0.0109
7P	0.0000	0.0000	-0.2844	6.1720	4.9166	-30.5157	0.0000	0.0000	0.0000
12P	0.0000	1.0447	-1.4255	-0.0000	-1.0447	1.4255	-0.0201	0.1585	0.0411
13P	0.0000	1.1845	-1.8040	-0.0000	-1.1845	1.8040	-0.0156	0.1397	0.0267
14P	0.0000	1.1622	-1.8354	-0.0000	-1.1622	1.8354	-0.0115	0.0923	0.0225
15P	0.0000	1.1678	-1.7936	-0.0000	-1.1678	1.7936	-0.0058	0.0580	0.0211
1X	0.0000	0.0681	-0.1359	-0.0000	-0.0681	0.1359	-0.0130	0.1569	0.0041
1XY	0.0000	0.0977	-0.2386	-0.0000	-0.0977	0.2386	-0.0127	0.1601	0.0024
1Y	0.0000	0.0230	-0.1929	-0.0000	-0.0230	0.1929	-0.0096	0.1604	-0.0173
2X	0.0000	0.1164	-0.1749	-0.0000	-0.1164	0.1749	-0.0108	0.1372	0.0043
2XY	0.0000	0.1971	-0.4155	-0.0000	-0.1971	0.4155	-0.0113	0.1403	0.0025
2Y	0.0000	0.0510	-0.3009	-0.0000	-0.0510	0.3009	-0.0082	0.1399	-0.0172
3X	0.0000	0.1105	-0.1165	0.0000	-0.1105	0.1165	-0.0095	0.1124	0.0042
3XY	0.0000	0.2135	-0.3925	-0.0000	-0.2135	0.3925	-0.0081	0.1148	0.0024
3Y	0.0000	0.0560	-0.2545	-0.0000	-0.0560	0.2545	-0.0067	0.1158	-0.0166
4X	0.0000	0.1139	-0.1898	-0.0000	-0.1139	0.1898	-0.0064	0.0900	0.0038
4XY	0.0000	0.1945	-0.4305	-0.0000	-0.1945	0.4305	-0.0066	0.0921	0.0020
4Y	0.0000	0.0510	-0.3158	-0.0000	-0.0510	0.3158	-0.0044	0.0916	-0.0155
5X	0.0000	0.1248	-0.1290	-0.0000	-0.1248	0.1290	-0.0057	0.0711	0.0032
5XY	0.0000	0.1975	-0.3466	-0.0000	-0.1975	0.3466	-0.0039	0.0727	0.0016
5Y	0.0000	0.0460	-0.2440	-0.0000	-0.0460	0.2440	-0.0045	0.0749	-0.0139
6X	0.0000	0.1121	-0.1800	-0.0000	-0.1121	0.1800	-0.0031	0.0566	0.0023
6XY	0.0000	0.1981	-0.4100	-0.0000	-0.1981	0.4100	-0.0035	0.0582	0.0010
6Y	0.0000	0.0460	-0.2950	-0.0000	-0.0460	0.2950	-0.0017	0.0579	-0.0119
7X	0.0000	0.1868	-0.2844	-2.9474	2.1281	15.7193	0.0000	0.0000	0.0000
7XY	0.0000	0.1868	-0.2844	2.9255	2.3605	14.4957	0.0000	0.0000	0.0000
7Y	0.0000	0.0000	-0.2844	-6.1501	6.0189	-33.4038	0.0000	0.0000	0.0000

12X	0.0000	0.7790	-0.9005	-0.0000	-0.7790	0.9005	-0.0026	0.1589	-0.0672
13X	0.0000	1.1180	-1.8040	-0.0000	-1.1180	1.8040	-0.0036	0.1378	-0.0499
14X	0.0000	1.1180	-1.8354	-0.0000	-1.1180	1.8354	0.0007	0.0894	-0.0849
15X	0.0000	1.1180	-1.7936	-0.0000	-1.1180	1.7936	0.0009	0.0569	-0.0411
8S	0.0000	0.0000	-0.1356	-0.0000	0.0000	0.1356	0.0002	0.0444	-0.0106
9S	0.0000	0.0000	-0.1628	-0.0000	0.0000	0.1628	0.0005	0.0324	-0.0099
10S	0.0000	0.0000	-0.3323	0.0000	0.0000	0.3323	0.0006	0.0225	-0.0088
11S	0.0000	0.0000	-0.5923	0.0000	0.0000	0.5923	0.0013	0.0082	-0.0062
16S	0.0000	0.0424	-0.0558	-0.0000	-0.0424	0.0558	-0.0106	0.1006	0.0040
1XYF0.50S	0.0000	2.1637	-0.0248	0.0000	-2.1637	0.0248	-0.0118	0.1554	0.0024
4XYF0.50S	0.0000	-0.5783	-6.0978	-0.0000	0.5783	6.0977	-0.0059	0.0813	0.0017
8X	0.0000	0.1107	-0.1356	-0.0000	-0.1107	0.1356	-0.0031	0.0438	0.0030
8XY	0.0000	0.2047	-0.3886	0.0000	-0.2047	0.3886	-0.0016	0.0456	0.0018
8Y	0.0000	0.0510	-0.2616	0.0000	-0.0510	0.2616	-0.0024	0.0466	-0.0114
9X	0.0000	0.1353	-0.1628	-0.0000	-0.1353	0.1628	-0.0019	0.0321	0.0035
9XY	0.0000	0.2423	-0.4498	-0.0000	-0.2423	0.4498	-0.0011	0.0344	0.0023
9Y	0.0000	0.0580	-0.3068	-0.0000	-0.0580	0.3068	-0.0014	0.0348	-0.0107
10X	0.0000	0.2262	-0.3323	-0.0000	-0.2262	0.3323	-0.0012	0.0223	0.0035
10XY	0.0000	0.4062	-0.8153	-0.0000	-0.4062	0.8153	-0.0005	0.0249	0.0024
10Y	0.0000	0.0970	-0.5733	-0.0000	-0.0970	0.5733	-0.0005	0.0252	-0.0094
11X	0.0000	0.3637	-0.5923	-0.0000	-0.3637	0.5923	-0.0004	0.0080	0.0030
11XY	0.0000	0.8747	-1.9603	-0.0000	-0.8747	1.9603	0.0004	0.0106	0.0020
11Y	0.0000	0.2750	-1.2763	-0.0000	-0.2750	1.2763	-0.0002	0.0108	-0.0067
16X	0.0000	0.0000	-0.0558	-0.0000	0.0000	0.0558	-0.0080	0.1019	-0.0144
16XY	0.0000	0.0000	-0.0558	0.0000	0.0000	0.0558	-0.0025	0.1041	-0.0161
16Y	0.0000	0.0424	-0.0558	0.0000	-0.0424	0.0558	-0.0045	0.1028	0.0022

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

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R	Original Supported RLX	Original Supported RLY	Original Supported RLZ	Original Supported L/R Cap. (kips)	Original Supported KL/R	Original Supported Curve No.	Alternate Unsupported L/R	Alternate Unsupported RLOUT	Alternate Unsupported L/R Cap. (kips)	Alternate Unsupported KL/R	Alternate Unsupported Curve No.
g21P	g21Y	Short only	-0.12	-0.36	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g21Y	g21P	Short only	-0.36	-0.12	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g23X	g23XY	Long only	-0.97	-0.26	17.27	0.500	0.750	0.500	120.57	120.47	5	12.24	1.000	160.76	145.07	6
g23XY	g23X	Long only	-0.26	-0.97	17.27	0.500	0.750	0.500	120.57	120.47	5	12.24	1.000	160.76	145.07	6
g25P	g25Y	Long only	-0.58	-1.28	17.27	0.500	0.750	0.500	120.57	120.47	5	12.24	1.000	160.76	145.07	6
g25Y	g25P	Long only	-1.28	-0.58	17.27	0.500	0.750	0.500	120.57	120.47	5	12.24	1.000	160.76	145.07	6
g27X	g27XY	Long only	-0.65	-0.31	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g27XY	g27X	Long only	-0.31	-0.65	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g29P	g29Y	Long only	-1.07	-1.25	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g29Y	g29P	Long only	-1.25	-1.07	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g31P	g31Y	Short only	-0.29	-1.80	12.49	0.779	0.559	0.559	129.47	127.26	5	10.80	1.000	147.90	137.16	6
g31Y	g31P	Short only	-1.80	-0.29	12.49	0.779	0.559	0.559	129.47	127.26	5	10.80	1.000	147.90	137.16	6
g33X	g33XY	Long only	-0.54	-0.44	11.49	0.563	0.781	0.563	148.89	142.05	5	8.84	1.000	188.20	161.94	6
g33XY	g33X	Long only	-0.44	-0.54	11.49	0.563	0.781	0.563	148.89	142.05	5	8.84	1.000	188.20	161.94	6
g35P	g35Y	Long only	-0.06	-1.00	9.12	0.550	0.775	0.550	171.66	159.41	5	6.97	1.000	221.50	182.42	6
g35Y	g35P	Long only	-1.00	-0.06	9.12	0.550	0.775	0.550	171.66	159.41	5	6.97	1.000	221.50	182.42	6
g58P	g58X	Short only	-0.54	-0.23	11.44	0.750	0.500	0.500	123.69	123.69	4	7.11	1.000	158.01	158.01	4
g58X	g58P	Short only	-0.23	-0.54	11.44	0.750	0.500	0.500	123.69	123.69	4	7.11	1.000	158.01	158.01	4
g59P	g59X	Short only	-0.06	-0.67	11.44	0.750	0.500	0.500	123.69	123.69	4	7.11	1.000	158.01	158.01	4
g59X	g59P	Short only	-0.67	-0.06	11.44	0.750	0.500	0.500	123.69	123.69	4	7.11	1.000	158.01	158.01	4

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	1.767	50.00	50.00	3.53
2	1.191	50.00	50.00	2.38
3	2.158	50.00	50.00	4.32
4	2.122	50.00	50.00	4.24
5	2.172	50.00	50.00	4.34
6	2.149	50.00	50.00	4.30
7	2.140	50.00	50.00	4.28
8	2.114	50.00	50.00	4.23
9	0.258	50.00	50.00	0.52
10	0.460	50.00	50.00	0.92
11	0.447	50.00	50.00	0.89
12	0.472	50.00	50.00	0.94
13	0.399	50.00	50.00	0.80
14	0.455	50.00	50.00	0.91
15	0.439	50.00	50.00	0.88
16	0.511	50.00	50.00	1.02
17	0.911	50.00	50.00	1.82
18	2.147	50.00	50.00	4.29
19	2.164	50.00	50.00	4.33
20	6.125	50.00	50.00	12.25
21	0.194	50.00	50.00	0.39
22	0.305	50.00	50.00	0.61
23	0.261	50.00	50.00	0.52
24	0.320	50.00	50.00	0.64
25	0.248	50.00	50.00	0.50
26	0.299	50.00	50.00	0.60
27	0.266	50.00	50.00	0.53
28	0.312	50.00	50.00	0.62
29	0.581	50.00	50.00	1.16
30	1.306	50.00	50.00	2.61

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 10

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	-0.003061	0.3531	-0.02701	-0.5358	-0.0266	-0.2213	2.497	2.853	81.47
2P	-0.0005027	0.3064	-0.02662	-0.5358	-0.0477	-0.2139	2.499	2.806	76.47
3P	0.003788	0.251	-0.02541	-0.4970	0.0027	-0.1983	2.504	2.751	70.47
4P	0.004835	0.1981	-0.02338	-0.4953	-0.0678	-0.1815	2.505	2.698	64.48
5P	0.01003	0.1584	-0.02065	-0.4316	-0.0142	-0.1690	2.51	2.658	59.48
6P	0.008792	0.1234	-0.01718	-0.3453	-0.0219	-0.1563	2.509	2.623	54.48
7P	0	0	0	0.0000	0.0000	0.0000	10	10	0
12P	-0.06729	0.3639	0.1202	-0.6517	-0.2246	-0.2280	-0.06729	-13.39	81.62
13P	-0.0477	0.3172	0.08341	-0.4221	0.1185	-0.2299	-0.0477	-9.433	76.58
14P	-0.04856	0.2074	0.1133	-0.4542	-0.0090	-0.1828	-0.04856	-14.04	64.61
15P	-0.02662	0.1313	0.06408	-0.4156	-0.0184	-0.1626	-0.02662	-10.12	54.56
1X	-0.02255	0.3533	0.01884	-0.5211	-0.0555	-0.2222	2.477	-2.147	81.52
1XY	-0.02245	0.3731	0.01567	-0.0146	-0.0576	-0.2222	-2.522	-2.127	81.52
1Y	-0.002998	0.3728	-0.02998	-0.6165	-0.0437	-0.2208	-2.503	2.873	81.47
2X	-0.01917	0.3067	0.01898	-0.5391	-0.0244	-0.2162	2.481	-2.193	76.52
2XY	-0.01944	0.3262	0.01597	-0.9102	-0.0264	-0.2166	-2.519	-2.174	76.52
2Y	-0.0004188	0.3255	-0.02967	-0.4944	-0.0115	-0.2154	-2.5	2.826	76.47
3X	-0.01675	0.2509	0.01841	-0.5027	-0.0368	-0.1995	2.483	-2.249	70.52
3XY	-0.01358	0.2681	0.01546	-0.4626	-0.0635	-0.1991	-2.514	-2.232	70.52
3Y	0.0006316	0.2687	-0.02843	-0.5330	-0.0519	-0.1985	-2.499	2.769	70.47
4X	-0.01102	0.1984	0.017	-0.4885	-0.0354	-0.1829	2.489	-2.302	64.52
4XY	-0.01108	0.2142	0.01408	-0.5559	-0.0339	-0.1827	-2.511	-2.286	64.51
4Y	0.004811	0.2139	-0.02627	-0.4930	0.0077	-0.1826	-2.495	2.714	64.47
5X	-0.01052	0.1579	0.01484	-0.4350	-0.0421	-0.1719	2.489	-2.342	59.51
5XY	-0.005016	0.1724	0.01205	-0.3504	-0.0379	-0.1705	-2.505	-2.328	59.51
5Y	0.003935	0.1734	-0.0234	-0.4460	-0.0373	-0.1708	-2.496	2.673	59.48
6X	-0.004333	0.1237	0.01191	-0.3391	-0.0355	-0.1607	2.496	-2.376	54.51
6XY	-0.005104	0.1377	0.009434	-0.3666	-0.0306	-0.1591	-2.505	-2.362	54.51
6Y	0.009509	0.1374	-0.01989	-0.3537	-0.0298	-0.1590	-2.49	2.637	54.48
7X	0	0	0	0.0000	0.0000	0.0000	10	-10	0
7XY	0	0	0	0.0000	0.0000	0.0000	-10	-10	0
7Y	0	0	0	0.0000	0.0000	0.0000	-10	10	0
12X	0.04129	0.3625	-0.1354	-0.5311	-0.0628	-0.2272	0.04129	14.11	81.36
13X	0.02752	0.3156	-0.09742	-0.5581	-0.0146	-0.2240	0.02752	10.07	76.4
14X	0.04231	0.2053	-0.1387	-0.5801	-0.0295	-0.1826	0.04231	14.46	64.36
15X	0.03115	0.1304	-0.07586	-0.4598	-0.0314	-0.1645	0.03115	10.38	54.42
8S	0.0152	0.09624	-0.01674	-0.2492	-0.0587	-0.1452	3.203	3.284	49.48
9S	0.01985	0.06994	-0.01544	-0.1998	-0.0191	-0.1300	4.034	4.084	43.48
10S	0.02288	0.0482	-0.01353	-0.1438	-0.0052	-0.1170	4.931	4.956	36.99
11S	0.01928	0.01676	-0.009472	-0.0747	0.0342	-0.0756	6.923	6.92	22.49
16S	-0.01424	0.225	0.01769	-0.5036	-0.0671	-0.1909	2.486	-2.275	67.52
1XYF0.50S	-0.02054	0.3684	0.01564	-0.5746	-0.0345	-0.2193	-2.521	-2.132	79.02
4XYF0.50S	-0.008111	0.1887	0.01303	-0.4915	-0.0885	-0.1762	-2.508	-2.311	62.01
8X	-0.006085	0.09612	0.01252	-0.2531	-0.0015	-0.1500	3.182	-3.092	49.51
8XY	-0.00152	0.112	0.009824	-0.2711	-0.0600	-0.1498	-3.19	-3.076	49.51
8Y	0.01073	0.1124	-0.02025	-0.2700	0.0120	-0.1475	-3.177	3.3	49.48
9X	-0.004427	0.06997	0.01256	-0.1978	-0.0359	-0.1329	4.009	-3.944	43.51
9XY	-0.001679	0.08809	0.00966	-0.2187	-0.0144	-0.1418	-4.015	-3.926	43.51
9Y	0.01552	0.08805	-0.02002	-0.2193	-0.0444	-0.1410	-3.998	4.102	43.48
10X	-0.00343	0.04809	0.01168	-0.1452	-0.0152	-0.1236	4.905	-4.86	37.01

10XY	-0.001525	0.06803	0.008633	-0.1599	-0.0284	-0.1244	-4.91	-4.84	37.01
10Y	0.02277	0.06825	-0.01927	-0.1587	-0.0206	-0.1233	-4.885	4.977	36.98
11X	-0.002503	0.01653	0.00899	-0.0737	-0.0126	-0.0866	6.901	-6.887	22.51
11XY	-0.0001563	0.03954	0.005399	-0.1137	-0.0164	-0.0808	-6.904	-6.864	22.51
11Y	0.01966	0.03841	-0.014	-0.1136	0.0496	-0.0687	-6.884	6.942	22.49
16X	0.002817	0.2253	-0.02441	-0.5097	-0.0024	-0.1902	2.503	2.725	67.48
16XY	0.003914	0.2415	-0.02736	-0.5288	-0.0521	-0.1903	-2.496	2.741	67.47
16Y	-0.01141	0.2414	0.01476	-0.5168	-0.0154	-0.1912	-2.511	-2.259	67.51

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
7P	-7.06	0.0	-8.19	0.0	0.0	-51.76	0.0	0.0	52.87	0.0	0.04	0.0	-0.1	0.0	0.0	0.02	0.0	0.0
7X	8.91	0.0	-6.73	0.0	0.0	44.85	0.0	0.0	46.22	0.0	0.03	0.0	0.0	0.0	0.0	0.04	0.0	0.0
7XY	-9.01	0.0	-11.50	0.0	0.0	48.40	0.0	0.0	50.56	0.0	0.25	0.0	0.0	0.0	0.0	0.01	0.0	0.0
7Y	7.16	0.0	-8.08	0.0	0.0	-56.82	0.0	0.0	57.83	0.0	0.23	0.0	-0.2	0.0	0.0	-0.01	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	0.1393	-0.0856	-0.0000	-0.1393	0.0856	-0.0031	0.3531	-0.0270
2P	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	-0.0005	0.3064	-0.0266
3P	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	0.0038	0.2510	-0.0254
4P	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	0.0048	0.1981	-0.0234
5P	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	0.0100	0.1584	-0.0207
6P	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	0.0088	0.1234	-0.0172
7P	0.0000	0.3774	-0.2405	7.0603	7.8098	-51.5148	0.0000	0.0000	0.0000
12P	0.0000	1.3533	-0.4426	-0.0000	-1.3533	0.4426	-0.0673	0.3639	0.1202
13P	0.0000	1.6633	-0.6136	-0.0000	-1.6633	0.6136	-0.0477	0.3172	0.0834
14P	0.0000	1.6633	-0.6136	-0.0000	-1.6633	0.6136	-0.0486	0.2074	0.1133
15P	0.0000	1.6633	-0.6136	-0.0000	-1.6633	0.6136	-0.0266	0.1313	0.0641
1X	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	-0.0226	0.3533	0.0188
1XY	0.0000	0.2733	-0.1166	-0.0000	-0.2733	0.1166	-0.0224	0.3731	0.0157
1Y	0.0000	0.2063	-0.1016	-0.0000	-0.2063	0.1016	-0.0030	0.3728	-0.0300
2X	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	-0.0192	0.3067	0.0190
2XY	0.0000	0.4333	-0.1546	0.0000	-0.4333	0.1546	-0.0194	0.3262	0.0160
2Y	0.0000	0.2863	-0.1196	-0.0000	-0.2863	0.1196	-0.0004	0.3255	-0.0297
3X	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	-0.0167	0.2509	0.0184
3XY	0.0000	0.4603	-0.1606	0.0000	-0.4603	0.1606	-0.0136	0.2681	0.0155
3Y	0.0000	0.3003	-0.1226	0.0000	-0.3003	0.1226	0.0006	0.2687	-0.0284
4X	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	-0.0110	0.1984	0.0170
4XY	0.0000	0.4333	-0.1546	-0.0000	-0.4333	0.1546	-0.0111	0.2142	0.0141
4Y	0.0000	0.2863	-0.1196	-0.0000	-0.2863	0.1196	0.0048	0.2139	-0.0263
5X	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	-0.0105	0.1579	0.0148
5XY	0.0000	0.4073	-0.1476	0.0000	-0.4073	0.1476	-0.0050	0.1724	0.0120
5Y	0.0000	0.2733	-0.1166	0.0000	-0.2733	0.1166	0.0039	0.1734	-0.0234
6X	0.0000	0.1393	-0.0856	-0.0000	-0.1393	0.0856	-0.0043	0.1237	0.0119
6XY	0.0000	0.4073	-0.1476	-0.0000	-0.4073	0.1476	-0.0051	0.1377	0.0094
6Y	0.0000	0.2733	-0.1166	-0.0000	-0.2733	0.1166	0.0095	0.1374	-0.0199
7X	0.0000	0.3774	-0.2405	-8.9120	6.3563	45.0884	0.0000	0.0000	0.0000
7XY	0.0000	0.3774	-0.2405	9.0091	11.1216	48.6414	0.0000	0.0000	0.0000
7Y	0.0000	0.3774	-0.2405	-7.1574	7.7064	-56.5746	0.0000	0.0000	0.0000

12X	0.0000	0.7033	-0.2626	-0.0000	-0.7033	0.2626	0.0413	0.3625	-0.1354
13X	0.0000	1.6633	-0.6136	-0.0000	-1.6633	0.6136	0.0275	0.3156	-0.0974
14X	0.0000	1.6633	-0.6136	0.0000	-1.6633	0.6136	0.0423	0.2053	-0.1387
15X	0.0000	1.6633	-0.6136	0.0000	-1.6633	0.6136	0.0312	0.1304	-0.0759
8S	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	0.0152	0.0962	-0.0167
9S	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	0.0198	0.0699	-0.0154
10S	0.0000	0.5167	-0.3260	-0.0000	-0.5167	0.3260	0.0229	0.0482	-0.0135
11S	0.0000	0.3774	-0.2405	0.0000	-0.3774	0.2405	0.0193	0.0168	-0.0095
16S	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	-0.0142	0.2250	0.0177
1XYF0.50S	0.0000	8.0043	-0.0856	-0.0000	-8.0043	0.0856	-0.0205	0.3684	0.0156
4XYF0.50S	0.0000	-2.1817	-3.0146	0.0000	2.1817	3.0146	-0.0081	0.1887	0.0130
8X	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	-0.0061	0.0961	0.0125
8XY	0.0000	0.4333	-0.1546	0.0000	-0.4333	0.1546	-0.0015	0.1120	0.0098
8Y	0.0000	0.2863	-0.1196	0.0000	-0.2863	0.1196	0.0107	0.1124	-0.0202
9X	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	-0.0044	0.0700	0.0126
9XY	0.0000	0.4743	-0.1636	0.0000	-0.4743	0.1636	-0.0017	0.0881	0.0097
9Y	0.0000	0.3063	-0.1246	0.0000	-0.3063	0.1246	0.0155	0.0881	-0.0200
10X	0.0000	0.5167	-0.3260	-0.0000	-0.5167	0.3260	-0.0034	0.0481	0.0117
10XY	0.0000	1.0787	-0.4570	-0.0000	-1.0787	0.4570	-0.0015	0.0680	0.0086
10Y	0.0000	0.7977	-0.3920	-0.0000	-0.7977	0.3920	0.0228	0.0683	-0.0193
11X	0.0000	0.3774	-0.2405	-0.0000	-0.3774	0.2405	-0.0025	0.0165	0.0090
11XY	0.0000	1.9704	-0.6115	-0.0000	-1.9704	0.6115	-0.0002	0.0395	0.0054
11Y	0.0000	1.1734	-0.4265	0.0000	-1.1734	0.4265	0.0197	0.0384	-0.0140
16X	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	0.0028	0.2253	-0.0244
16XY	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	0.0039	0.2415	-0.0274
16Y	0.0000	0.1393	-0.0856	0.0000	-0.1393	0.0856	-0.0114	0.2414	0.0148

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

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R	Original Supported RLX	Original Supported RLY	Original Supported RLZ	Original Supported L/R Cap. (kips)	Original Supported KL/R	Original Supported Curve No.	Alternate Unsupported L/R	Alternate Unsupported RLOUT	Alternate Unsupported L/R Cap. (kips)	Alternate Unsupported KL/R	Alternate Unsupported Curve No.
g25Y	g25P	Long only	-2.88	0.33	17.27	0.500	0.750	0.500	120.57	120.47	5	12.24	1.000	160.76	145.07	6
g27X	g27XY	Long only	-2.54	0.31	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g29P	g29Y	Long only	-0.49	-2.89	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g29Y	g29P	Long only	-2.89	-0.49	18.99	0.500	0.750	0.500	109.16	111.87	2	13.99	1.000	145.55	135.71	6
g31P	g31Y	Short only	-1.16	-3.87	12.49	0.779	0.559	0.559	129.47	127.26	5	10.80	1.000	147.90	137.16	6
g31Y	g31P	Short only	-3.87	-1.16	12.49	0.779	0.559	0.559	129.47	127.26	5	10.80	1.000	147.90	137.16	6
g33X	g33XY	Long only	-2.10	-0.47	11.49	0.563	0.781	0.563	148.89	142.05	5	8.84	1.000	188.20	161.94	6
g33XY	g33X	Long only	-0.47	-2.10	11.49	0.563	0.781	0.563	148.89	142.05	5	8.84	1.000	188.20	161.94	6
g35P	g35Y	Long only	-0.52	-2.17	9.12	0.550	0.775	0.550	171.66	159.41	5	6.97	1.000	221.50	182.42	6
g35Y	g35P	Long only	-2.17	-0.52	9.12	0.550	0.775	0.550	171.66	159.41	5	6.97	1.000	221.50	182.42	6
g58P	g58X	Short only	-0.20	-0.05	11.44	0.750	0.500	0.500	123.69	123.69	4	7.11	1.000	158.01	158.01	4
g58X	g58P	Short only	-0.05	-0.20	11.44	0.750	0.500	0.500	123.69	123.69	4	7.11	1.000	158.01	158.01	4

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	1.424	50.00	50.00	2.85
2	0.751	50.00	50.00	1.50

3	1.773	50.00	50.00	3.55
4	1.773	50.00	50.00	3.55
5	1.773	50.00	50.00	3.55
6	1.773	50.00	50.00	3.55
7	1.773	50.00	50.00	3.55
8	1.773	50.00	50.00	3.55
9	0.297	50.00	50.00	0.59
10	0.460	50.00	50.00	0.92
11	0.488	50.00	50.00	0.98
12	0.460	50.00	50.00	0.92
13	0.433	50.00	50.00	0.87
14	0.433	50.00	50.00	0.87
15	0.460	50.00	50.00	0.92
16	0.502	50.00	50.00	1.00
17	1.172	50.00	50.00	2.34
18	2.063	50.00	50.00	4.13
19	8.005	50.00	50.00	16.01
20	3.721	50.00	50.00	7.44
21	0.230	50.00	50.00	0.46
22	0.310	50.00	50.00	0.62
23	0.324	50.00	50.00	0.65
24	0.310	50.00	50.00	0.62
25	0.297	50.00	50.00	0.59
26	0.297	50.00	50.00	0.59
27	0.310	50.00	50.00	0.62
28	0.331	50.00	50.00	0.66
29	0.889	50.00	50.00	1.78
30	1.248	50.00	50.00	2.50

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

Group Summary (Compression Portion):

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Control	Max Comp. Use %	Comp. Control Member	Comp. Force (kips)	Comp. Load Case	L/R Comp. Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/R	KL/R	Length (ft)	Curve No.	No. Of Bolts
LEG1	**L4X4X1/4**	**SAE**	**4X4X0.25**	**33.0**	**71.03**	**Comp**	**71.03**	**g14XY**	**-38.006**	**NESC Ext**	**53.509**	**109.200**	**168.750**	**1.000**	**1.000**	**1.000**	**75.47**	**75.47**	**5.000**	**1**	**12**
A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g4P g5P g6Y g12P g13P ??																					
LEG2	L4X4X5/16	SAE	4X4X0.3125	33.0	81.86	Comp	81.86	g17X	-45.974	NESC Ext	56.161	91.000	175.781	1.000	1.000	1.000	100.46	100.46	6.622	1	10
LEG3	L4X4X3/8	SAE	4X4X0.375	33.0	69.00	Comp	69.00	g19XY	-58.744	NESC Ext	85.135	91.000	210.937	0.167	0.167	0.167	58.29	58.29	22.922	1	10
XBR1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	27.91	Comp	27.91	g20Y	-3.227	NESC Ext	11.559	18.200	21.094	0.750	0.500	0.500	123.69	122.85	7.071	5	2
XBR2	L3X2X3/16	SAU	3X2X0.1875	33.0	44.84	Comp	44.84	g24Y	-7.746	NESC Ext	17.275	27.300	31.641	0.500	0.750	0.500	120.57	120.47	7.810	5	3
XBR3	L2X2X3/16	SAE	2X2X0.1875	33.0	35.79	Cross	35.79	g31Y	-3.866	NESC Ext	10.802	18.200	21.094	1.000	0.559	0.559	147.90	137.16	7.604	6	2
XBR4	L2.5X2X3/16	SAU	2.5X2X0.1875	33.0	31.21	Cross	31.21	g35Y	-2.174	NESC Ext	6.967	18.200	21.094	0.550	1.000	0.550	221.50	182.42	11.075	6	2
XBR5	L1.75X1.75X1/4	SAE	1.75X1.75X0.25	33.0	65.98	Comp	65.98	g36Y	-4.186	NESC Ext	6.345	18.200	28.125	0.500	0.250	0.250	213.33	191.16	18.808	5	2
HORZ1	L2.5X2X3/16	SAU	2.5X2X0.1875	33.0	49.53	Comp	49.53	g41X	-4.507	NESC Ext	10.506	9.100	10.547	1.000	0.500	0.500	148.55	148.55	9.817	4	1
HORZ2	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	70.36	Comp	70.36	g43X	-6.403	NESC Ext	15.230	9.100	14.062	0.500	0.500	0.500	156.90	156.90	13.807	4	1
ARM1	**L3X2.5X1/4**	**SAU**	**3X2.5X0.25**	**33.0**	**15.06**	**Comp**	**15.06**	**g46Y**	**-3.745**	**NESC Hea**	**24.877**	**27.300**	**42.187**	**0.500**	**1.000**	**0.500**	**122.21**	**121.36**	**7.669**	**6**	**3**
A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45Y g47Y ??																					
ARM2	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	28.83	Comp	28.83	g48Y	-4.270	NESC Hea	14.810	27.300	42.187	0.500	1.000	0.500	196.13	166.82	12.013	6	3
M1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	43.18	Comp	43.18	g55P	-2.504	NESC Ext	5.799	9.100	10.547	1.000	1.000	1.000	174.93	174.93	5.000	4	1
M2	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	11.97	Comp	11.97	g57X	-1.089	NESC Ext	11.437	9.100	10.547	0.750	0.500	0.500	123.69	123.69	7.071	4	1
M3	L2.5X2.5X3/16	SAE	2.5X2.5X0.1875	33.0	20.12	Comp	20.12	g60P	-1.831	NESC Hea	10.714	9.100	10.547	1.000	1.000	1.000	155.23	155.23	6.403	4	1
M4	BAR 1.75X1/4	Bar	1-3/4x1/4	33.0	47.96	Tens	2.46	g63XY	-0.015	NESC Ext	0.595	9.100	14.062	1.000	1.000	1.000	458.68	458.68	9.556	4	1
XBR6	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	81.50	Comp	81.50	g39Y	-4.043	NESC Hea	4.961	18.200	21.094	0.333	0.167	0.167	210.68	189.14	28.312	5	2

Group Summary (Tension Portion):

Group No.	Group Label	Angle Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Cont-rol	Max Tension Use In Tens. %	Tension Control Member	Tension Force (kips)	Tension Control Load Case	Net Section Capacity (kips)	Tension Connect. Shear Capacity (kips)	Tension Connect. Bearing Capacity (kips)	Tension Connect. Rupture Capacity (kips)	Length Tens. Member (ft)	No. Of Bolts Tens. Holes	Hole Diameter (in)
LEG1	**L4X4X1/4**	**SAE**	**4X4X0.25**	**33.0**	**71.03**	**Comp**	**65.14**	**g14P**	**34.316NESC**	**Ext**	**52.676**	**109.200**	**168.750**	**220.588**	**5.000**	**12**	**2.000**	**0.6875**
A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g4P g5P g6Y g12P g13P ??																		
LEG2	L4X4X5/16	SAE	4X4X0.3125	33.0	81.86	Comp	73.99	g16P	42.913NESC	Ext	58.001	0.000	0.000	0.000	6.113	0	2.990	0.6875
LEG3	L4X4X3/8	SAE	4X4X0.375	33.0	69.00	Comp	53.32	g19P	41.252NESC	Ext	77.364	91.000	210.937	193.014	22.922	10	2.000	0.6875
XBR1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	27.91	Comp	14.16	g20XY	2.065NESC	Ext	14.585	18.200	21.094	16.189	7.071	2	1.000	0.6875
XBR2	L3X2X3/16	SAU	3X2X0.1875	33.0	44.84	Comp	40.40	g26XY	9.252NESC	Ext	22.901	27.300	31.641	28.125	7.071	3	1.000	0.6875
XBR3	L2X2X3/16	SAE	2X2X0.1875	33.0	35.79	Cross	22.90	g31XY	3.007NESC	Ext	17.258	18.200	21.094	13.131	7.604	2	1.000	0.6875
XBR4	L2.5X2X3/16	SAU	2.5X2X0.1875	33.0	31.21	Cross	15.53	g33P	2.827NESC	Ext	20.228	18.200	21.094	18.750	9.410	2	1.000	0.6875
XBR5	L1.75X1.75X1/4	SAE	1.75X1.75X0.25	33.0	65.98	Comp	35.10	g37XY	5.800NESC	Ext	18.952	18.200	28.125	16.523	18.808	2	1.000	0.6875
HORZ1	L2.5X2X3/16	SAU	2.5X2X0.1875	33.0	49.53	Comp	36.49	g41P	2.816NESC	Hea	17.444	9.100	10.547	7.717	9.817	1	1.000	0.6875
HORZ2	L3X2.5X1/4	SAU	3X2.5X0.25	33.0	70.36	Comp	46.17	g43P	4.202NESC	Hea	30.090	9.100	14.062	12.500	13.807	1	1.000	0.6875
ARM1	**L3X2.5X1/4**	**SAU**	**3X2.5X0.25**	**33.0**	**15.06**	**Comp**	**5.93**	**g45P**	**2.563NESC**	**Hea**	**43.230**	**0.000**	**0.000**	**0.000**	**5.000**	**0**	**1.000**	**0**
A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45Y g47Y ??																		
ARM2	L3.5X2.5X1/4	SAU	3.5X2.5X0.25	33.0	28.83	Comp	0.00	g49Y	0.000		47.520	0.000	0.000	0.000	5.000	0	1.000	0
M1	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	43.18	Comp	36.83	g55X	2.842NESC	Ext	14.585	9.100	10.547	7.717	5.000	1	1.000	0.6875
M2	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	11.97	Comp	9.12	g57P	0.704NESC	Ext	14.585	9.100	10.547	7.717	7.071	1	1.000	0.6875
M3	L2.5X2.5X3/16	SAE	2.5X2.5X0.1875	33.0	20.12	Comp	0.00	g60X	0.000		22.961	9.100	10.547	9.375	6.403	1	1.000	0.6875
M4	BAR 1.75X1/4	Bar	1-3/4x1/4	33.0	47.96	Tens	47.96	g62Y	3.784NESC	Hea	7.889	9.100	14.062	12.500	12.382	1	1.000	0.6875
XBR6	L1.75X1.75X3/16	SAE	1.75X1.75X0.1875	33.0	81.50	Comp	67.31	g38XY	8.886NESC	Ext	14.585	18.200	21.094	13.201	28.312	2	1.000	0.6875

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case Maximum Element Element

	Usage %	Label	Type
NESC Heavy	81.50	g39Y	Angle
NESC Extreme	81.86	g17X	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	3.53	NESC Heavy	0.0
2	Clamp	2.38	NESC Heavy	0.0
3	Clamp	4.32	NESC Heavy	0.0
4	Clamp	4.24	NESC Heavy	0.0
5	Clamp	4.34	NESC Heavy	0.0
6	Clamp	4.30	NESC Heavy	0.0
7	Clamp	4.28	NESC Heavy	0.0
8	Clamp	4.23	NESC Heavy	0.0
9	Clamp	0.59	NESC Extreme	0.0
10	Clamp	0.92	NESC Extreme	0.0
11	Clamp	0.98	NESC Extreme	0.0
12	Clamp	0.94	NESC Heavy	0.0
13	Clamp	0.87	NESC Extreme	0.0
14	Clamp	0.91	NESC Heavy	0.0
15	Clamp	0.92	NESC Extreme	0.0
16	Clamp	1.02	NESC Heavy	0.0
17	Clamp	2.34	NESC Extreme	0.0
18	Clamp	4.29	NESC Heavy	0.0
19	Clamp	16.01	NESC Extreme	0.0
20	Clamp	12.25	NESC Heavy	0.0
21	Clamp	0.46	NESC Extreme	0.0
22	Clamp	0.62	NESC Extreme	0.0
23	Clamp	0.65	NESC Extreme	0.0
24	Clamp	0.64	NESC Heavy	0.0
25	Clamp	0.59	NESC Extreme	0.0
26	Clamp	0.60	NESC Heavy	0.0
27	Clamp	0.62	NESC Extreme	0.0
28	Clamp	0.66	NESC Extreme	0.0
29	Clamp	1.78	NESC Extreme	0.0
30	Clamp	2.61	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	12P	0.000	1.045	1.426	1.767
NESC Heavy	2	Clamp	12X	0.000	0.779	0.901	1.191
NESC Heavy	3	Clamp	13P	0.000	1.184	1.804	2.158
NESC Heavy	4	Clamp	13X	0.000	1.118	1.804	2.122
NESC Heavy	5	Clamp	14P	0.000	1.162	1.835	2.172
NESC Heavy	6	Clamp	14X	0.000	1.118	1.835	2.149
NESC Heavy	7	Clamp	15P	0.000	1.168	1.794	2.140
NESC Heavy	8	Clamp	15X	0.000	1.118	1.794	2.114
NESC Heavy	9	Clamp	1XY	0.000	0.098	0.239	0.258

NESC Heavy	10	Clamp	2XY	0.000	0.197	0.415	0.460
NESC Heavy	11	Clamp	3XY	0.000	0.213	0.392	0.447
NESC Heavy	12	Clamp	4XY	0.000	0.195	0.430	0.472
NESC Heavy	13	Clamp	5XY	0.000	0.197	0.347	0.399
NESC Heavy	14	Clamp	6XY	0.000	0.198	0.410	0.455
NESC Heavy	15	Clamp	8XY	0.000	0.205	0.389	0.439
NESC Heavy	16	Clamp	9XY	0.000	0.242	0.450	0.511
NESC Heavy	17	Clamp	10XY	0.000	0.406	0.815	0.911
NESC Heavy	18	Clamp	11XY	0.000	0.875	1.960	2.147
NESC Heavy	19	Clamp	1XYF0.50S	0.000	2.164	0.025	2.164
NESC Heavy	20	Clamp	4XYF0.50S	0.000	-0.578	6.098	6.125
NESC Heavy	21	Clamp	1Y	0.000	0.023	0.193	0.194
NESC Heavy	22	Clamp	2Y	0.000	0.051	0.301	0.305
NESC Heavy	23	Clamp	3Y	0.000	0.056	0.254	0.261
NESC Heavy	24	Clamp	4Y	0.000	0.051	0.316	0.320
NESC Heavy	25	Clamp	5Y	0.000	0.046	0.244	0.248
NESC Heavy	26	Clamp	6Y	0.000	0.046	0.295	0.299
NESC Heavy	27	Clamp	8Y	0.000	0.051	0.262	0.266
NESC Heavy	28	Clamp	9Y	0.000	0.058	0.307	0.312
NESC Heavy	29	Clamp	10Y	0.000	0.097	0.573	0.581
NESC Heavy	30	Clamp	11Y	0.000	0.275	1.276	1.306
NESC Extreme	1	Clamp	12P	0.000	1.353	0.443	1.424
NESC Extreme	2	Clamp	12X	0.000	0.703	0.263	0.751
NESC Extreme	3	Clamp	13P	0.000	1.663	0.614	1.773
NESC Extreme	4	Clamp	13X	0.000	1.663	0.614	1.773
NESC Extreme	5	Clamp	14P	0.000	1.663	0.614	1.773
NESC Extreme	6	Clamp	14X	0.000	1.663	0.614	1.773
NESC Extreme	7	Clamp	15P	0.000	1.663	0.614	1.773
NESC Extreme	8	Clamp	15X	0.000	1.663	0.614	1.773
NESC Extreme	9	Clamp	1XY	0.000	0.273	0.117	0.297
NESC Extreme	10	Clamp	2XY	0.000	0.433	0.155	0.460
NESC Extreme	11	Clamp	3XY	0.000	0.460	0.161	0.488
NESC Extreme	12	Clamp	4XY	0.000	0.433	0.155	0.460
NESC Extreme	13	Clamp	5XY	0.000	0.407	0.148	0.433
NESC Extreme	14	Clamp	6XY	0.000	0.407	0.148	0.433
NESC Extreme	15	Clamp	8XY	0.000	0.433	0.155	0.460
NESC Extreme	16	Clamp	9XY	0.000	0.474	0.164	0.502
NESC Extreme	17	Clamp	10XY	0.000	1.079	0.457	1.172
NESC Extreme	18	Clamp	11XY	0.000	1.970	0.611	2.063
NESC Extreme	19	Clamp	1XYF0.50S	0.000	8.004	0.086	8.005
NESC Extreme	20	Clamp	4XYF0.50S	0.000	-2.182	3.015	3.721
NESC Extreme	21	Clamp	1Y	0.000	0.206	0.102	0.230
NESC Extreme	22	Clamp	2Y	0.000	0.286	0.120	0.310
NESC Extreme	23	Clamp	3Y	0.000	0.300	0.123	0.324
NESC Extreme	24	Clamp	4Y	0.000	0.286	0.120	0.310
NESC Extreme	25	Clamp	5Y	0.000	0.273	0.117	0.297
NESC Extreme	26	Clamp	6Y	0.000	0.273	0.117	0.297
NESC Extreme	27	Clamp	8Y	0.000	0.286	0.120	0.310
NESC Extreme	28	Clamp	9Y	0.000	0.306	0.125	0.331
NESC Extreme	29	Clamp	10Y	0.000	0.798	0.392	0.889
NESC Extreme	30	Clamp	11Y	0.000	1.173	0.426	1.248

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	Total Long. Load	Total Vert. Load	Transverse Overturning Moment	Longitudinal Overturning Moment	Torsional Moment

	(kips)	(kips)	(kips)	(ft-k)	(ft-k)	(ft-k)
NESC Heavy	12.179	0.000	24.094	777.472	-40.926	-13.688
NESC Extreme	23.010	0.000	8.156	1493.081	-14.310	-43.834

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 7165.3
Total: 7165.3

*** End of Report

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

Subject:	Local Member Stress Analysis @ Top Connection
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Mast Top Connection:

Maximum Design Reactions at Brace:

Compression Force =	Compression := 1.9·kips	(User Input from {PLS-Tower)
Tension Force =	Tension := 1.0·kips	(User Input from {PLS-Tower)
Vertical =	Vert := 0·kips	(User Input from Risa-3D)
Horizontal =	Horz := 7.9·kips	(User Input from Risa-3D)
Moment =	Moment := 0·ft·kips	(User Input from Risa-3D)

Member Properties:

Member Type =	L4x4x1/4 w/ (2) L6x6x5/8	
Member Width =	w := 6·in	(User Input)
Member Thickness =	t := 1.5·in	(User Input)
Member Area =	$A := 14.1375 \cdot in^2$	(User Input)
Moment of Inertia =	$I := 29.57 \cdot in^4$	(User Input)
Unbraced Length =	L := 5·ft	(User Input)
Effective Length Coefficient =	K := 1	(User Input)
Radius of Gyration =	r := 1.35·in	(User Input)
Yield Stress =	$F_y := 33 \cdot ksi$	(User Input)
Modulus of Elasticity =	E := 29000·ksi	(User Input)

Calculate Design Compression Stress: (Per ASCE 10-97 Section 3.6 and 3.7)

Width Thickness Ratio = $w\_t := \frac{w}{t} = 4$

Yield Stress =

$$F_y := \left[\begin{array}{ll} F_y & \text{if } w\_t < \frac{80}{\sqrt{f_y}} \\ \left[1.677 - 0.677 \cdot \frac{w\_t}{\left(\frac{80}{\sqrt{f_y}}\right)}\right] \cdot F_y & \text{if } \frac{80}{\sqrt{f_y}} \le w\_t \le \frac{144}{\sqrt{f_y}} \\ \frac{0.0332 \cdot \pi^2 \cdot E}{(w\_t)^2} & \text{if } w\_t > \frac{144}{\sqrt{f_y}} \end{array} \right] = 33 \cdot ksi$$

(3.7-1), (3.7-2), (3.7-3)

Column Slenderness Ratio = $C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 131.706$ (3.6-3)

Design Axial Compressive Stress =

$$F_a := \left[\begin{array}{ll} \left[1 - 0.5 \left(\frac{\frac{K \cdot L}{r}}{C_c}\right)^2\right] \cdot F_y & \text{if } \frac{K \cdot L}{r} \le C_c \\ \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r}\right)^2} & \text{if } \frac{K \cdot L}{r} > C_c \end{array} \right] = 31.1 \cdot ksi$$

(3.6-1), (3.6-2)

Calculate Allowable Bending Moment: (Per ASCE 10-97 Section 3.14.8)

$b := w - \frac{t}{2} = 5.25 \cdot in$

Elastic Critical Moment = $M_e := \frac{\left(0.66 \cdot E \cdot b^4 \cdot t\right)}{(K \cdot L)^2} \cdot \left[\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1\right] = 24865.8 \cdot kips \cdot in$ (3.14-7)

Section Modulus z-axis = $S_z := \frac{b^2 \cdot t}{3 \cdot \sqrt{2}} = 9.745 \cdot in^3$

Moment Causing Compressive Yield = $M_{yc} := F_y \cdot S_z = 321.579 \cdot kips \cdot in$ (3.14-9)

Lateral Bukling Moment = $M_b := \left[\begin{array}{l} M_e \text{ if } M_e \le 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) \text{ if } M_e > 0.5 \cdot M_{yc} \end{array}\right] = 320.5 \cdot kips \cdot in$ (3.14-5), (3.14-6)

Allowable Moment = $M_a := \left(\begin{array}{l} M_{yc} \text{ if } M_{yc} \le M_b \\ M_b \end{array}\right) = 320.5 \cdot kips \cdot in$

Check Combined Axial Compression and Bending: (Per ASCE 10-97 Section 3.12)

Bending Coefficient = $C_m := 0.85$ (for restrained ends)

Applied Axial Compression = $P := Compression + Vert = 1.9 \cdot kips$

Design Axial Compression = $P_a := F_a \cdot A = 440 \cdot kips$

Axial Compression at Yield = $P_y := F_y \cdot A = 466.538 \cdot kips$

Euler Bukling Load = $P_e := \frac{\pi^2 \cdot E \cdot I}{(K \cdot L)^2} = 2351 \cdot kips$

Applied Moment = $M := Moment + \frac{Horz \cdot L}{4} = 118.5 \cdot kips \cdot in$

$Condition1 := if\left[\frac{P}{P_a} + \frac{C_m \cdot M}{M_b} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_e}\right)}\right] \le 1.00, "OK", "Overstressed"\right]$ (3.12-1)

Condition1 = "OK"

$Condition2 := if\left(\frac{P}{P_y} + \frac{M}{M_b} \le 1.00, "OK", "Overstressed"\right)$ (3.12-2)

Condition2 = "OK"

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Subject:	Local Member Stress Analysis @ Bottom Connection
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Mast Bottom Connection:

Maximum Design Reactions at Brace:

Compression Force =	Compression := 30.4·kips	(User Input from {PLS-Tower)
Tension Force =	Tension := 26.5·kips	(User Input from {PLS-Tower)
Vertical =	Vert := 3.0·kips	(User Input from Risa-3D)
Horizontal =	Horz := 2.3·kips	(User Input from Risa-3D)
Moment =	Moment := 0·ft·kips	(User Input from Risa-3D)

Member Properties:

Member Type =	L4x4x1/4 w/ (2) L6x6x5/8	
Member Width =	w := 6·in	(User Input)
Member Thickness =	t := 1.5·in	(User Input)
Member Area =	$A := 14.1375 \cdot in^2$	(User Input)
Moment of Inertia =	$I := 29.57 \cdot in^4$	(User Input)
Unbraced Length =	L := 5·ft	(User Input)
Effective Length Coefficient =	K := 1	(User Input)
Radius of Gyration =	r := 1.35·in	(User Input)
Yield Stress =	$F_y := 33 \cdot ksi$	(User Input)
Modulus of Elasticity =	E := 29000·ksi	(User Input)

Calculate Design Compression Stress: (Per ASCE 10-97 Section 3.6 and 3.7)

Width Thickness Ratio = $w\_t := \frac{w}{t} = 4$

Yield Stress =

$$F_y := \left[\begin{array}{ll} F_y & \text{if } w\_t < \frac{80}{\sqrt{f_y}} \\ \left[1.677 - 0.677 \cdot \frac{w\_t}{\left(\frac{80}{\sqrt{f_y}}\right)}\right] \cdot F_y & \text{if } \frac{80}{\sqrt{f_y}} \le w\_t \le \frac{144}{\sqrt{f_y}} \\ \frac{0.0332 \cdot \pi^2 \cdot E}{(w\_t)^2} & \text{if } w\_t > \frac{144}{\sqrt{f_y}} \end{array} \right] = 33 \cdot ksi$$

(3.7-1), (3.7-2), (3.7-3)

Column Slenderness Ratio = $C_c := \pi \cdot \sqrt{\frac{2 \cdot E}{F_y}} = 131.706$ (3.6-3)

Design Axial Compressive Stress =

$$F_a := \left[\begin{array}{ll} \left[1 - 0.5 \left(\frac{\frac{K \cdot L}{r}}{C_c}\right)^2\right] \cdot F_y & \text{if } \frac{K \cdot L}{r} \le C_c \\ \frac{\pi^2 \cdot E}{\left(\frac{K \cdot L}{r}\right)^2} & \text{if } \frac{K \cdot L}{r} > C_c \end{array} \right] = 31.1 \cdot ksi$$

(3.6-1), (3.6-2)

Calculate Allowable Bending Moment: (Per ASCE 10-97 Section 3.14.8)

$$b := w - \frac{t}{2} = 5.25 \cdot in$$

Elastic Critical Moment = $$M_e := \frac{\left(0.66 \cdot E \cdot b^4 \cdot t\right)}{(K \cdot L)^2} \cdot \left[\sqrt{1 + \frac{0.81 \cdot (K \cdot L)^2 \cdot t^2}{b^4}} + 1\right] = 24865.8 \cdot kips \cdot in \quad (3.14\text{-}7)$$

Section Modulus z-axis = $$S_z := \frac{b^2 \cdot t}{3 \cdot \sqrt{2}} = 9.745 \cdot in^3$$

Moment Causing Compressive Yield = $$M_{yc} := F_y \cdot S_z = 321.579 \cdot kips \cdot in \quad (3.14\text{-}9)$$

Lateral Bukling Moment = $$M_b := \left[\begin{array}{ll} M_e & \text{if } M_e \le 0.5 \cdot M_{yc} \\ M_{yc} \cdot \left(1 - \frac{M_{yc}}{4 \cdot M_e}\right) & \text{if } M_e > 0.5 \cdot M_{yc} \end{array}\right] = 320.5 \cdot kips \cdot in \quad (3.14\text{-}5),\ (3.14\text{-}6)$$

Allowable Moment = $$M_a := \left(\begin{array}{l} M_{yc} \text{ if } M_{yc} \le M_b \\ M_b \end{array}\right) = 320.5 \cdot kips \cdot in$$

Check Combined Axial Compression and Bending: (Per ASCE 10-97 Section 3.12)

Bending Coefficient = $$C_m := 0.85$$ (for restrained ends)

Applied Axial Compression = $$P := Compression + Vert = 33.4 \cdot kips$$

Design Axial Compression = $$P_a := F_a \cdot A = 440 \cdot kips$$

Axial Compression at Yield = $$P_y := F_y \cdot A = 466.538 \cdot kips$$

Euler Bukling Load = $$P_e := \frac{\pi^2 \cdot E \cdot I}{(K \cdot L)^2} = 2351 \cdot kips$$

Applied Moment = $$M := Moment + \frac{Horz \cdot L}{4} = 34.5 \cdot kips \cdot in$$

$$Condition1 := if\left[\frac{P}{P_a} + \frac{C_m \cdot M}{M_b} \cdot \left[\frac{1}{\left(1 - \frac{P}{P_e}\right)}\right] \le 1.00, \text{"OK"}, \text{"Overstressed"}\right] \quad (3.12\text{-}1)$$

Condition1 = "OK"

$$Condition2 := if\left(\frac{P}{P_y} + \frac{M}{M_b} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right) \quad (3.12\text{-}2)$$

Condition2 = "OK"

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Subject:	Foundation Analysis Tower # 4119
Location:	Southington, CT
Rev. 0: 1/26/17	Prepared by: T.J.L. Checked by: C.F.C. Job No. 17004.04

Foundation Analysis

Input Data:

Max. Reactions at Tower Leg:

Shear =	Shear := 14.6·1.1·kips = 16.1·kips	(User Input)
Compression =	Comp := 56.8·1.1·kips = 62.5·kips	(User Input)
Uplift =	Uplift := 48.4·1.1·kips = 53.2·kips	(User Input)

Tower Properties:

Tower Height =	$H_t := 81 \cdot ft$	(User Input)

Foundation Properties:

Pier Height =	$P_H := 2.25 \cdot ft$	(User Input)
Pier Width Top =	$P_{w1} := 1.67 \cdot ft$	(User Input)
Pier Width Botttom =	$P_{w2} := 1.95 \cdot ft$	(User Input)
Pier Projection Above Grade =	$P_P := 0.5 \cdot ft$	(User Input)
Pad Width =	$Pd_w := 9 \cdot ft$	(User Input)
Pad Thickness =	$Pd_t := 5 \cdot ft$	(User Input)
Mat Width =	$Mat_w := 0 \cdot ft$	(User Input)
Mat Thickness =	$Mat_t := 0 \cdot ft$	(User Input)

Subgrade Properties:

Concrete Unit Weight =	$\gamma c := 150 \cdot pcf$	(User Input)
Water Unit Weight =	$\gamma w := 62.4 \cdot pcf$	(User Input)
Soil Unit Weight =	$\gamma s := 100 \cdot pcf$	(User Input)
Uplift Angle =	$\psi := 30.0 \cdot deg$	(User Input)
Soil Bearing Capacity =	$BC_{soil} := 9000 \cdot psf$	(User Input)

Calculated Data:

Volume of the Concrete Pad =

$$V_{pad} := Pd_w^{\,2} \cdot Pd_t = 405 \cdot ft^3$$

Volume of the Concrete Pier =

$$V_{pier} := \frac{(P_H)}{3} \cdot \left(P_{w1}^{\,2} + P_{w2}^{\,2} + \sqrt{P_{w1}^{\,2} \cdot P_{w2}^{\,2}} \right) = 7.39 \cdot ft^3$$

Volume of Soil =

$$V_{soil} := \left[Pd_w^{\,2} \cdot (P_H - P_P) \right] - V_{pier} = 134.36 \cdot ft^3$$

Total Volume of Concrete =

$$V_{Conc} := V_{pad} + V_{pier} = 412 \cdot ft^3$$

Mass of Concrete =

$$Mass_{Conc} := V_{Conc} \cdot \gamma c = 61.9 \cdot kips$$

Mass of Soil =

$$Mass_{Soil} := \frac{V_{soil}}{3} \cdot \gamma s = 4 \cdot kips$$

Total Mass =

$$Mass_{tot} := Mass_{Conc} + Mass_{Soil} = 66 \cdot kips$$

<u>Check Uplift:</u>

Required Factor of Safety =

$$F_S := 1.0$$

$$ActualFS := \frac{Mass_{tot}}{Uplift} = 1.25$$

$$Uplift\_Check := if\left(\frac{Mass_{tot}}{Uplift} \geq F_S, "OK", "Overstressed" \right)$$

Uplift_Check = "OK"

Cross Sectional Area of Pad =

$$A_{pad} := Pd_w^{\,2} = 81 ft^2$$

Section Modulus of Pad =

$$S_{pad} := \frac{(Pd_w)^3}{6} = 122 \cdot ft^3$$

<u>Check Bearing:</u>

$$Bearing := \frac{Comp + Mass_{Conc}}{A_{pad}} + \frac{Shear \cdot (P_H + Pd_t)}{S_{pad}} = 2.49 \cdot ksf$$

$$Bearing\_Check := if\left(Bearing \leq BC_{soil}, "OK", "No Good" \right)$$

Bearing_Check = "OK"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTV1109	DATE:	09/16/2016	RF DESIGN ENG:	Md Mateen
ISSUE:	BRONZE STANDARD	Approved? (Y/N):	Yes	RF DESIGN PHONE:	8602586382
REVISION:	Preliminary	RF MANAGER:	John Benedetto	RF DESIGN EMAIL:	MM093Q@ATT.COM
INITIATIVE /PROJECT:	LTE 2C 1900 A3-A4 & E -DUS 41 + XMU with Bronze Standard configuration..				

RF PERF ENG:		RFDS PROGRAM TYPE:	2017 LTE Next Carrier		
RF PERF PHONE:		RFDS TECHNOLOGY:	LTE 2C		
RF PERF EMAIL:		STATE/STATUS:	Final/Approved		
RFDS VERSION:	1.00	RFDS ID:	1397197		
GSM FREQUENCY:	850	Created By:	mm093q	Updated By:	mm093q
UMTS FREQUENCY:	850, 1900	Date Created:	9/16/2016 6:50:21 PM	Date Updated:	9/20/2016 10:00:32 AM
LTE FREQUENCY:	700, 1900				
I-PLAN JOB # 1:	NER-RCTB-12-04166	IPLAN PRD GRP || SUB GRP #1:	LTE Next Carrier || LTE 2C		
I-PLAN JOB # 2:	NER-RCTB-16-03448	IPLAN PRD GRP || SUB GRP #2:	LTE Multi Carrier || Software Carrier		
I-PLAN JOB # 3:		IPLAN PRD GRP || SUB GRP #3:			
I-PLAN JOB # 4:		IPLAN PRD GRP || SUB GRP #4:			
I-PLAN JOB # 5:		IPLAN PRD GRP || SUB GRP #5:			
I-PLAN JOB # 6:		IPLAN PRD GRP || SUB GRP #6:			
I-PLAN JOB # 7:		IPLAN PRD GRP || SUB GRP #7:			
I-PLAN JOB # 8:		IPLAN PRD GRP || SUB GRP #8:			

Section 2 - LOCATION INFORMATION

USID:	59427	FA LOCATION CODE:	10049124	LOCATION NAME:	SOUTHINGTON-CATHYDRIVE NU
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT
ADDRESS:	CATHY DRIVE	CITY:	SOUTHINGTON	STATE:	CT
ZIP CODE:	06489	COUNTY:	HARTFORD	LONG (DEC. DEG.):	-72.8524381
LATITUDE (D-M-S):	41d 35m55.89204s	LONGITUDE (D-M-S):	-72d -51m-8.77716s	LAT (DEC. DEG.):	41.5988589
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	FROM ROCKY HILL - TAKE 91 SOUTH TO ROUTE 691 WEST TAKE EXIT 4 TURN RIGHT ONTO (RT322) TAKE RIGHT ONTO RT 120 TAKE RIGHT ONTO 364 TAKE LEFT ONTO ARLINGTON TAKE LEFT ONTO CATHY DR SITE IS UNDER POWERLINE OUTDOOR CABINET. ON 691 EAST TAKE EXIT 4 ROUTE 322. AT END OF EXIT TAKE A LEFT OVER HIGHWAY AND GO TO SECOND TRAFFIC LIGHT.FOR 691 WEST TAKE EXIT 4 AT END OF EXIT AT TRAFFIC LIGHT TAKE RIGHT AND GO TO NEXT TRAFFIC LIGHT. DIRECTIONS ARE NOW THE SAME FROM 2ND TRAFFIC LIGHT.AT 2 ND TRAFFIC LIGHT TAKE RIGHT ONTO ROUTE 120 NORTH AND GO FOR 3.2 MILES TO BELLVIEW ST. (INTERSECTION AT LEWIS FARMS).AT BELLVIEW TAKE A RIGHT AND GO FOR .7 MILE TO INTERSECTION OF BERIN ST. TAKE A RIGHT ON BERLIN ST AND GO FOR .9 MILE TO ARLINGTON DR. TAKE A LEFT ON TO ARLINGTON AND THEN THE NEXT LEFT ONTO CATHY DRIVE.THIS OUTSIDE CELL IS LOCATED A SHORT DISTANCE DOWN THE ROAD AT THE POWER LINE TOWER ON YOUR LEFT.T-1 INFO GSM 1 HCGS 717576 2 HCGS 717577 3 HCGS 717699				

ORACLE PTN # 1:	2051A07A0F	PACE JOB # 1:	MRCTB019775		
ORACLE PTN # 2:		PACE JOB # 2:	MRCTB020075		
ORACLE PTN # 3:		PACE JOB # 3:			
ORACLE PTN # 4:		PACE JOB # 4:			
ORACLE PTN # 5:		PACE JOB # 5:			
ORACLE PTN # 6:		PACE JOB # 6:			
ORACLE PTN # 7:		PACE JOB # 7:			
ORACLE PTN # 8:		PACE JOB # 8:			
BORDER CELL WITH CONTOUR COORD:		SEARCH RING NAME:			
AM STUDY REQ'D (Y/N):	No	SEARCH_RING_ID:			
FREQ COORD:		BTA:		MSA / RSA:	
OPS DISTRICT:	CT-North	LAC(GSM):	05014		
OPS ZONE:	NE_CT_N_HRFR_SE_CS	LAC(UMTS):	05998		
RF DISTRICT:	NPO Triage	BSC(GSM):	BRPTCTBSC05		
RF ZONE:	Hotseat	RNC(UMTS):	BRPTCT04RNC002		
PARENT NAME(GSM):	BRIDGEPORT BSC 05	MME POOL ID(LTE):	FF01		
PARENT NAME(UMTS):	BRIDGEPORT CT RNC002				

Section 3 - LICENSE COVERAGE/FILING INFORMATION

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

CGSA CALL SIGNS:	

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	GROUND ELEVATION (ft):		STRUCTURE TYPE:	UTILITY
ADDITIONAL REGULATORY?:	Yes	HEIGHT OVERALL (ft):	82.00	FCC ASR NUMBER:	
SUB-LEASE RIGHTS?:	Yes	STRUCTURE HEIGHT (ft):	82.00		
LIGHTING TYPE:	NOT REQUIRED				

MARKET LOCATION 700 MHz Band:	
MARKET LOCATION 850 MHz Band:	
MARKET LOCATION 1900 MHz Band:	
MARKET LOCATION AWS Band:	
MARKET LOCATION WCS Band:	
MARKET LOCATION Future Band:	

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A E-911	SOUTHINGTON POLICE DEPARTMENT	1395		INTRADO_MIAMI		0				
SECTOR B	SOUTHINGTON POLICE DEPARTMENT	1395		INTRADO_MIAMI		0				
SECTOR C	SOUTHINGTON POLICE DEPARTMENT	1395		INTRADO_MIAMI		0				
SECTOR D										
SECTOR E										
SECTOR F										
OMNI										

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A E-911	SOUTHINGTON POLICE DEPARTMENT	1395		INTRADO_MIAMI		0				
SECTOR B	SOUTHINGTON POLICE DEPARTMENT	1395		INTRADO_MIAMI		0				
SECTOR C	SOUTHINGTON POLICE DEPARTMENT	1395		INTRADO_MIAMI		0				
SECTOR D										
SECTOR E										
SECTOR F										
OMNI										

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RBS ID:	96622	96623	210587	336059	366953							
CTS COMMON ID:	032D1109	184D1109	CTV1109	CTU1109	CTL01109							
CELL ID / BCF:	032D1109	032D1109	CTV1109	CTV1109	CTL01109							
BTA/TID:	184G	184P	184U	184W	184L							
4-9 DIGIT SITE ID:	1109	1109	1109	1109	1109							
COW OR TOY?:	No	No	No	No	No							
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED							
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL							
BTS LOCATION ID:	GROUND	GROUND	GROUND	GROUND	INTERNAL							
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	BASE							
EQUIPMENT NAME:	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU							
DISASTER PRIORITY:	0	0	0	3	3							

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RBS ID:	96622	96623	210587	336059	366953							
CTS COMMON ID:	032D1109	184D1109	CTV1109	CTU1109	CTL01109							
CELL ID / BCF:	032D1109	032D1109	CTV1109	CTV1109	CTL01109							
BTA/TID:	184G	184P	184U	184W	184L							
4-9 DIGIT SITE ID:	1109	1109	1109	1109	1109							
COW OR TOY?:	No	No	No	No	No							
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED							
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL							
BTS LOCATION ID:	GROUND	GROUND	GROUND	GROUND	INTERNAL							
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	BASE							
EQUIPMENT NAME:	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU	SOUTHINGTON-CATHYDRIVE NU							
DISASTER PRIORITY:	0	0	0	3	3							

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RAC:												
EQUIPMENT VENDOR:	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON							
EQUIPMENT TYPE:	ULTRASITE	ULTRASITE	3106 OUTDOOR	3106 OUTDOOR	6601 INDOOR MU							
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:					CT							
AGPS:	Yes	Yes	Yes	Yes	Yes							
NODE B NUMBER:	0	0	0	0	1109							

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RAC:												
EQUIPMENT VENDOR:	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON							
EQUIPMENT TYPE:	ULTRASITE	ULTRASITE	3106 OUTDOOR	3106 OUTDOOR	6601 INDOOR MU							
BASEBAND CONFIGURATION:					1x6601 / 1xDUS41 / 1xXMU03							
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:					CT							
AGPS:	Yes	Yes	Yes	Yes	Yes							
NODE B NUMBER:	0	0	0	0	1109							

Section 8 - RBS/SECTOR ASSOCIATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS														
CTS Common ID	032D1109	184D1109	CTV1109	CTU1109	CTL01109														
Soft Sector IDs	184G11091	184P11091	CTV11091	CTU11097	CTL01109_7A_1														
	184G11092	184P11092	CTV11092	CTU11098	CTL01109_7B_1														
	184G11093	184P11093	CTV11093	CTU11099	CTL01109_7C_1														

Section 8 - RBS/SECTOR ASSOCIATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS														
CTS Common ID	032D1109	184D1109	CTV1109	CTU1109	CTL01109														
Soft Sector IDs	184G11091	184P11091	CTV11091		CTL01109_7A_1														
	184G11092	184P11092	CTV11092		CTL01109_7B_1														
	184G11093	184P11093	CTV11093		CTL01109_7C_1														
					CTL01109_9A_1														
					CTL01109_9A_2														
					CTL01109_9B_1														
					CTL01109_9B_2														
					CTL01109_9C_1														
					CTL01109_9C_2														

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900																		
USEID (excluding Hard Sector)	59427.850.25G.1	59427.1900.25G.1	59427.850.3G.1	59427.1900.3G.2																					
SECTOR A SOFT SECTOR ID	184G11091	184P11091	CTV11091	CTU11097	CTL01109_7A_1																				
SECTOR B	184G11092	184P11092	CTV11092	CTU11098	CTL01109_7B_1																				
SECTOR C	184G11093	184P11093	CTV11093	CTU11099	CTL01109_7C_1																				
SECTOR D																									
SECTOR E																									
SECTOR F																									
OMNI																									

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900																		
USEID (excluding Hard Sector)	59427.850.25G.1	59427.1900.25G.1	59427.850.3G.1																						
SECTOR A SOFT SECTOR ID	184G11091	184P11091	CTV11091		CTL01109_7A_1	CTL01109_9A_1	CTL01109_9A_2																		
SECTOR B	184G11092	184P11092	CTV11092		CTL01109_7B_1	CTL01109_9B_1	CTL01109_9B_2																		
SECTOR C	184G11093	184P11093	CTV11093		CTL01109_7C_1	CTL01109_9C_1	CTL01109_9C_2																		
SECTOR D																									
SECTOR E																									
SECTOR F																									
OMNI																									

Section 9 - Cell Number - existing

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900																			
USEID (excluding Hard Sector)	59427.850.25 G.1	59427.1900.2 5G.1	59427.850.3G .1	59427.1900.3 G.2																						
SECTOR A CELL NUMBER	0	0	0	0	15																					
SECTOR B	0	0	0	0	16																					
SECTOR C	0	0	0	0	17																					
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 9 - Cell Number - final

	GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900																			
USEID (excluding Hard Sector)	59427.850.25 G.1	59427.1900.2 5G.1	59427.850.3G .1																							
SECTOR A CELL NUMBER	0	0	0		15	8	178																			
SECTOR B	0	0	0		16	9	179																			
SECTOR C	0	0	0		17	10	180																			
SECTOR D																										
SECTOR E																										
SECTOR F																										
OMNI																										

Section 10 - CID/SAC - existing

		GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900																				
SECTOR A	CID/SAC	11091	11091	11091	11097																							
SECTOR B		11092	11092	11092	11098																							
SECTOR C		11093	11093	11093	11099																							
SECTOR D																												
SECTOR E																												
SECTOR F																												
OMNI																												

Section 10 - CID/SAC - final

		GSM 1ST 850	GSM 1ST 1900	UMTS 1ST 850	UMTS 1ST 1900	LTE 1ST 700	LTE 1ST 1900	LTE 2ND 1900																				
SECTOR A	CID/SAC	11091	11091	11091																								
SECTOR B		11092	11092	11092																								
SECTOR C		11093	11093	11093																								
SECTOR D																												
SECTOR E																												
SECTOR F																												
OMNI																												

Section 15A - CURRENT SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET						AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	KMW						KMW							
ANTENNA SIZE (H x W x D)	72X11.8X5.9						72X11.8X5.9							
ANTENNA WEIGHT	48.5						48.5							
AZIMUTH	143						23							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	93						93							
ANTENNA TIP HEIGHT	96						96							
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2						2							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025					2	Kathrein 860-10025						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave / CM1007-DBPXBC-003					2	Powerwave / CM1007-DBPXBC-003						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006												
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	DTMABP7819VG12A					1	DTMABP7819VG12A						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew / APTDC-BDFDM-DB					1	Andrew / APTDC-BDFDM-DB						
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104												
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							1	Kathrein / 782 11055						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	59427.A.850.3G.1	59427.A.850.3G.1	CTV11091	CTV11091		UMTS 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO					
	PORT 2	59427.A.850.25G.1	59427.A.850.25G.1	184G11091			GSM 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO	11.22	201.83			
	PORT 4	59427.A.1900.25G.1	59427.A.1900.25G.1	184P11091			GSM 1900	P65-15-XLH-RR_1950MHz_00DT	17		0	None	Andrew 1-5/8 (1900)	120.030726	NO			NO	28.18	729.45			
ANTENNA POSITION 4	PORT 1	59427.A.700.4G.1	59427.A.700.4G.1	CTL01109_7A_1	CTL01109_7A_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_05DT	15.6		5	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO								

Section 15B - CURRENT SECTOR/CELL INFORMATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET						AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	KMW						KMW							
ANTENNA SIZE (H x W x D)	72X11.8X5.9						72X11.8X5.9							
ANTENNA WEIGHT	48.5						48.5							
AZIMUTH	263						143							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	93						93							
ANTENNA TIP HEIGHT	96						96							
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2						2							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025					2	Kathrein 860-10025						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave / CM1007-DBPXBC-003					2	Powerwave / CM1007-DBPXBC-003						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	DTMABP7819VG12A					1	DTMABP7819VG12A						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew / APTDC-BDFDM-DB					1	Andrew / APTDC-BDFDM-DB						
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							1	Kathrein / 782 11055						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	59427.B.850.3G.1	59427.B.850.3G.1	CTV11092	CTV11092		UMTS 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO					
	PORT 2	59427.B.850.25G.1	59427.B.850.25G.1	184G11092			GSM 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO	12.58	226.46			
	PORT 4	59427.B.1900.25G.1	59427.B.1900.25G.1	184P11092			GSM 1900	P65-15-XLH-RR_1950MHz_00DT	17		0	None	Andrew 1-5/8 (1900)	120.030726	NO			NO	28.18	729.45			
ANTENNA POSITION 4	PORT 1	59427.B.700.4G.1	59427.B.700.4G.1	CTL01109_7B_1	CTL01109_7B_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_05DT	15.6		5	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO								

Section 15C - CURRENT SECTOR/CELL INFORMATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET						AM-X-CD-16-65-00T-RET							
ANTENNA VENDOR	KMW						KMW							
ANTENNA SIZE (H x W x D)	72X11.8X5.9						72X11.8X5.9							
ANTENNA WEIGHT	48.5						48.5							
AZIMUTH	23						263							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	93						93							
ANTENNA TIP HEIGHT	96						96							
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2						2							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025					2	Kathrein 860-10025						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave / CM1007-DBPXBC-003					2	Powerwave / CM1007-DBPXBC-003						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	DTMABP7819VG12A					1	DTMABP7819VG12A						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew / APTDC-BDFDM-DB					1	Andrew / APTDC-BDFDM-DB						
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)														
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							1	Kathrein / 782 11055						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1														
Local Market Note 2														
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	59427.C.850.3G.1	59427.C.850.3G.1	CTV11093	CTV11093		UMTS 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO					
	PORT 2	59427.C.850.25G.1	59427.C.850.25G.1	184G11093			GSM 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO	11.22	201.83			
	PORT 4	59427.C.1900.25G.1	59427.C.1900.25G.1	184P11093			GSM 1900	P65-15-XLH-RR_1950MHz_00DT	17		0	None	Andrew 1-5/8 (1900)	120.030726	NO			NO	28.18	729.45			
ANTENNA POSITION 4	PORT 1	59427.C.700.4G.1	59427.C.700.4G.1	CTL01109_7C_1	CTL01109_7C_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_04DT	15.6		4	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO								

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL				QS66512-2			
ANTENNA VENDOR				Quintel			
ANTENNA SIZE (H x W x D)				72X12X9.6			
ANTENNA WEIGHT				111			
AZIMUTH				23			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)				93			
ANTENNA TIP HEIGHT				96			
MECHANICAL DOWNTILT				0			
FEEDER AMOUNT				2			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)				Built in			
SURGE ARRESTOR (QTY/MODEL)			4	Andrew / APTDC-BDFDM-DB			
DIPLEXER (QTY/MODEL)			4	CCI Pentaplexer 5PX-0726-O			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)			2	Kaelus TMA2117F00V1-1 (Twin PCS-WCS w/700/850 BP)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)			2	860 10030			
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)			2	RRUS-12			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)			2	Kathrein / 782 11055			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C 1900 A3-A4 & E - with Bronze Standard configuration, Replace the exisiting LTE Antenna with 12port 6' Quintel antenna, Add 2 Additional coax, Replace the existing TMA with 6ports Kaelus twin TMA , Replace the diplexers with pentaplexers, Add 2*Radio RRUS-12 at the bottom for LTE 1900, DUL to DUS upgrade add XMU.						
Local Market Note 2	Antenna postions are based on As-built CD's, LTE alpha is with UMTS Gamma Face // LTE Beta is with UMTS Alpha Face // LTE Gamma is with UMTS Beta Face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3		59427.A.1900.4G.1	CTL01109_9A_1	CTL01109_9A_1		LTE 1900	QS66512-2_1930MHz_06DT	17.18		6	BOTTOM	1 5/8" ANDREW AVA7-50_1900 MHz	120.030742	NO								
	PORT 4		59427.A.1900.4G.1	CTL01109_9A_2	CTL01109_9A_2		LTE 1900	QS66512-2_1930MHz_06DT	17.18		6	BOTTOM	1 5/8" ANDREW AVA7-50_1900 MHz	120.030742	NO								

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL				QS66512-2			
ANTENNA VENDOR				Quintel			
ANTENNA SIZE (H x W x D)				72X12X9.6			
ANTENNA WEIGHT				111			
AZIMUTH				143			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)				93			
ANTENNA TIP HEIGHT				96			
MECHANICAL DOWNTILT				0			
FEEDER AMOUNT				2			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)				Built in			
SURGE ARRESTOR (QTY/MODEL)			4	Andrew / APTDC-BDFDM-DB			
DIPLEXER (QTY/MODEL)			4	CCI Pentaplexer 5PX-0726-O			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)			2	Kaelus TMA2117F00V1-1 (Twin PCS-WCS w/700/850 BP)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)			2	860 10030			
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)			2	RRUS-12			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)			2	Kathrein / 782 11055			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C 1900 A3-A4 & E - with Bronze Standard configuration, Replace the exisiting LTE Antenna with 12port 6' Quintel antenna, Add 2 Additional coax, Replace the existing TMA with 6ports Kaelus twin TMA , Replace the diplexers with pentaplexers, Add 2*Radio RRUS-12 at the bottom for LTE 1900, DUL to DUS upgrade add XMU.						
Local Market Note 2	Antenna postions are based on As-built CD's, LTE alpha is with UMTS Gamma Face // LTE Beta is with UMTS Alpha Face // LTE Gamma is with UMTS Beta Face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3		59427.B.1900.4G.1	CTL01109_9B_1	CTL01109_9B_1		LTE 1900	QS66512-2_1930MHz_02DT	16.85		2	BOTTOM	1 5/8" ANDREW AVA7-50_1900 MHz	120.030742	NO								
	PORT 4		59427.B.1900.4G.1	CTL01109_9B_2	CTL01109_9B_2		LTE 1900	QS66512-2_1930MHz_02DT	16.85		2	BOTTOM	1 5/8" ANDREW AVA7-50_1900 MHz	120.030742	NO								

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL				QS66512-2			
ANTENNA VENDOR				Quintel			
ANTENNA SIZE (H x W x D)				72X12X9.6			
ANTENNA WEIGHT				111			
AZIMUTH				263			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)				93			
ANTENNA TIP HEIGHT				96			
MECHANICAL DOWNTILT				0			
FEEDER AMOUNT				2			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)				Built in			
SURGE ARRESTOR (QTY/MODEL)			4	Andrew / APTDC-BDFDM-DB			
DIPLEXER (QTY/MODEL)			4	CCI Pentaplexer 5PX-0726-O			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)							
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)			2	Kaelus TMA2117F00V1-1 (Twin PCS-WCS w/700/850 BP)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)			2	860 10030			
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)			2	RRUS-12			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)			2	Kathrein / 782 11055			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C 1900 A3-A4 & E - with Bronze Standard configuration, Replace the exisiting LTE Antenna with 12port 6' Quintel antenna, Add 2 Additional coax, Replace the existing TMA with 6ports Kaelus twin TMA , Replace the diplexers with pentaplexers, Add 2*Radio RRUS-12 at the bottom for LTE 1900, DUL to DUS upgrade add XMU.						
Local Market Note 2	Antenna postions are based on As-built CD's, LTE alpha is with UMTS Gamma Face // LTE Beta is with UMTS Alpha Face // LTE Gamma is with UMTS Beta Face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/ Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3		59427.C.1900.4G.1	CTL01109_9C_1	CTL01109_9C_1		LTE 1900	QS66512-2_1930MHz_04DT	17.14		4	BOTTOM	1 5/8" ANDREW AVA7-50_1900 MHz	120.030742	NO								
	PORT 4		59427.C.1900.4G.1	CTL01109_9C_2	CTL01109_9C_2		LTE 1900	QS66512-2_1930MHz_04DT	17.14		4	BOTTOM	1 5/8" ANDREW AVA7-50_1900 MHz	120.030742	NO								

Section 17A - FINAL SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET			QS66512-2			
ANTENNA VENDOR	KMW			Quintel			
ANTENNA SIZE (H x W x D)	72X11.8X5.9			72X12X9.6			
ANTENNA WEIGHT	48.5			111			
AZIMUTH	143			23			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	93			93			
ANTENNA TIP HEIGHT	96			96			
MECHANICAL DOWNTILT	0			0			
FEEDER AMOUNT	2			4			
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025		Built in			
SURGE ARRESTOR (QTY/MODEL)				6 Andrew / APTDC-BDFDM-DB			
DIPLEXER (QTY/MODEL)	2	Powerwave / CM1007-DBPXBC-003		4 CCI Pentaplexer 5PX-0726-O			
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006					
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1	DTMABP7819VG12A		2 Kaelus TMA2117F00V1-1 (Twin PCS-WCS w/700/850 BP)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew / APTDC-BDFDM-DB		2 860 10030			
PDU FOR TMAS (QTY/MODEL)	1	LGP 12104					
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 RRUS-11			
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				2 RRUS-12			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)				2 Kathrein / 782 11055			
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE 2C 1900 A3-A4 & E - with Bronze Standard configuration, Replace the exisiting LTE Antenna with 12port 6' Quintel antenna, Add 2 Additional coax, Replace the existing TMA with 6ports Kaelus twin TMA , Replace the diplexers with pentaplexers, Add 2*Radio RRUS-12 at the bottom for LTE 1900, DUL to DUS upgrade add XMU.						
Local Market Note 2	Antenna postions are based on As-built CD's, LTE alpha is with UMTS Gamma Face // LTE Beta is with UMTS Alpha Face // LTE Gamma is with UMTS Beta Face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	59427.A.850.3G.1	59427.A.850.3G.1	CTV11091	CTV11091		UMTS 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO		557.19		1	
	PORT 2	59427.A.850.25G.1	59427.A.850.25G.1	184G11091			GSM 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO	11.22	201.83		1	
	PORT 4	59427.A.1900.25G.1	59427.A.1900.25G.1	184P11091			GSM 1900	P65-15-XLH-RR_1950MHz_00DT	17		0	None	Andrew 1-5/8 (1900)	120.030726	NO			NO	28.18	729.45		2	
ANTENNA POSITION 4	PORT 1	59427.A.700.4G.1	59427.A.700.4G.1	CTL01109_7A_1	CTL01109_7A_1		LTE 700	QS66512-	14.22		3	BOTTOM	1 5/8" ANDREW	120.030726	NO					1475.7065		7	

								2_719MHz_03DT					AVA7-50_700 MHz										
	PORT 3	59427.A.1900.4G.tmp1	59427.A.1900.4G.1	CTL01109_9A_1	CTL01109_9A_1		LTE 1900	QS66512-2_1930MHz_06DT	17.18		6	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO					2421.029		7	
	PORT 4	59427.A.1900.4G.tmp1,59427.A.1900.4G.tmp2	59427.A.1900.4G.1	CTL01109_9A_2	CTL01109_9A_2		LTE 1900	QS66512-2_1930MHz_06DT	17.18		6	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO					2421.029		7	

Section 17B - FINAL SECTOR/CELL INFORMATION - SECTOR B

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET						QS66512-2							
ANTENNA VENDOR	KMW						Quintel							
ANTENNA SIZE (H x W x D)	72X11.8X5.9						72X12X9.6							
ANTENNA WEIGHT	48.5						111							
AZIMUTH	263						143							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	93						93							
ANTENNA TIP HEIGHT	96						96							
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2						4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025						Built in						
SURGE ARRESTOR (QTY/MODEL)							6	Andrew / APTDC-BDFDM-DB						
DIPLEXER (QTY/MODEL)	2	Powerwave / CM1007-DBPXBC-003					4	CCI Pentaplexer 5PX-0726-O						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	DTMABP7819VG12A					2	Kaelus TMA2117F00V1-1 (Twin PCS-WCS w/700/850 BP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew / APTDC-BDFDM-DB					2	860 10030						
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							2	Kathrein / 782 11055						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 2C 1900 A3-A4 & E - with Bronze Standard configuration, Replace the exisiting LTE Antenna with 12port 6' Quintel antenna, Add 2 Additional coax, Replace the existing TMA with 6ports Kaelus twin TMA , Replace the diplexers with pentaplexers, Add 2*Radio RRUS-12 at the bottom for LTE 1900, DUL to DUS upgrade add XMU.													
Local Market Note 2	Antenna postions are based on As-built CD's, LTE alpha is with UMTS Gamma Face // LTE Beta is with UMTS Alpha Face // LTE Gamma is with UMTS Beta Face.													
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	59427.B.850.3G.1	59427.B.850.3G.1	CTV11092	CTV11092		UMTS 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO		557.19		9	
	PORT 2	59427.B.850.25G.1	59427.B.850.25G.1	184G11092			GSM 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO	12.58	226.46		9	
	PORT 4	59427.B.1900.25G.1	59427.B.1900.25G.1	184P11092			GSM 1900	P65-15-XLH-RR_1950MHz_00DT	17		0	None	Andrew 1-5/8 (1900)	120.030726	NO			NO	28.18	729.45		10	
ANTENNA POSITION 4	PORT 1	59427.B.700.4G.1	59427.B.700.4G.1	CTL01109_7B_1	CTL01109_7B_1		LTE 700	QS66512-	14.22		3	BOTTOM	1 5/8" ANDREW	120.030726	NO					1475.7065		15	

								2_719MHz_03DT					AVA7-50_700 MHz										
	PORT 3	59427.B.1900.4G.tmp1	59427.B.1900.4G.1	CTL01109_9B_1	CTL01109_9B_1		LTE 1900	QS66512-2_1930MHz_02DT	16.85		2	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO					2421.029		15	
	PORT 4	59427.B.1900.4G.tmp1,59427.B.1900.4G.tmp2	59427.B.1900.4G.1	CTL01109_9B_2	CTL01109_9B_2		LTE 1900	QS66512-2_1930MHz_02DT	16.85		2	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO					2421.029		15	

Section 17C - FINAL SECTOR/CELL INFORMATION - SECTOR C

ANTENNA POSITION is LEFT to RIGHT from BACK OF ANTENNA	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	AM-X-CD-16-65-00T-RET						QS66512-2							
ANTENNA VENDOR	KMW						Quintel							
ANTENNA SIZE (H x W x D)	72X11.8X5.9						72X12X9.6							
ANTENNA WEIGHT	48.5						111							
AZIMUTH	23						263							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	93						93							
ANTENNA TIP HEIGHT	96						96							
MECHANICAL DOWNTILT	0						0							
FEEDER AMOUNT	2						4							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Kathrein 860-10025						Built in						
SURGE ARRESTOR (QTY/MODEL)							6	Andrew / APTDC-BDFDM-DB						
DIPLEXER (QTY/MODEL)	2	Powerwave / CM1007-DBPXBC-003					4	CCI Pentaplexer 5PX-0726-O						
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)														
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	DTMABP7819VG12A					2	Kaelus TMA2117F00V1-1 (Twin PCS-WCS w/700/850 BP)						
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew / APTDC-BDFDM-DB					2	860 10030						
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							2	RRUS-12						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)														
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)							2	Kathrein / 782 11055						
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	LTE 2C 1900 A3-A4 & E - with Bronze Standard configuration, Replace the exisiting LTE Antenna with 12port 6' Quintel antenna, Add 2 Additional coax, Replace the existing TMA with 6ports Kaelus twin TMA , Replace the diplexers with pentaplexers, Add 2*Radio RRUS-12 at the bottom for LTE 1900, DUL to DUS upgrade add XMU.													
Local Market Note 2	Antenna postions are based on As-built CD's, LTE alpha is with UMTS Gamma Face // LTE Beta is with UMTS Alpha Face // LTE Gamma is with UMTS Beta Face.													
Local Market Note 3														

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	59427.C.850.3G.1	59427.C.850.3G.1	CTV11093	CTV11093		UMTS 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO		557.19		17	
	PORT 2	59427.C.850.25G.1	59427.C.850.25G.1	184G11093			GSM 850	P65-15-XLH-RR_840MHz_04DT	14.69		4	None	Andrew 1-5/8 (850)	120.030726	RxAIT 850			NO	11.22	201.83		17	
	PORT 4	59427.C.1900.25G.1	59427.C.1900.25G.1	184P11093			GSM 1900	P65-15-XLH-RR_1950MHz_00DT	17		0	None	Andrew 1-5/8 (1900)	120.030726	NO			NO	28.18	729.45		18	
ANTENNA POSITION 4	PORT 1	59427.C.700.4G.1	59427.C.700.4G.1	CTL01109_7C_1	CTL01109_7C_1		LTE 700	QS66512-	14.22		3	BOTTOM	1 5/8" ANDREW	120.030726	NO					1475.7065		23	

								2_719MHz_03DT					AVA7-50_700 MHz										
	PORT 3	59427.C.1900.4G.tmp1	59427.C.1900.4G.1	CTL01109_9C_1	CTL01109_9C_1		LTE 1900	QS66512-2_1930MHz_04DT	17.14		4	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO					2421.029		23	
	PORT 4	59427.C.1900.4G.tmp1,59427.C.1900.4G.tmp2	59427.C.1900.4G.1	CTL01109_9C_2	CTL01109_9C_2		LTE 1900	QS66512-2_1930MHz_04DT	17.14		4	BOTTOM	1 5/8" ANDREW AVA7-50_700 MHz	120.030726	NO					2421.029		23	

Diagram - Sector	A	Diagram File Name - CT1109_A_B_C_LTE 2C_Brnzstand_Rev1.vsd					
Atoll Site Name -	CTV1109	Location Name -	SOUTHINGTON-CATHYDRIVE NU	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

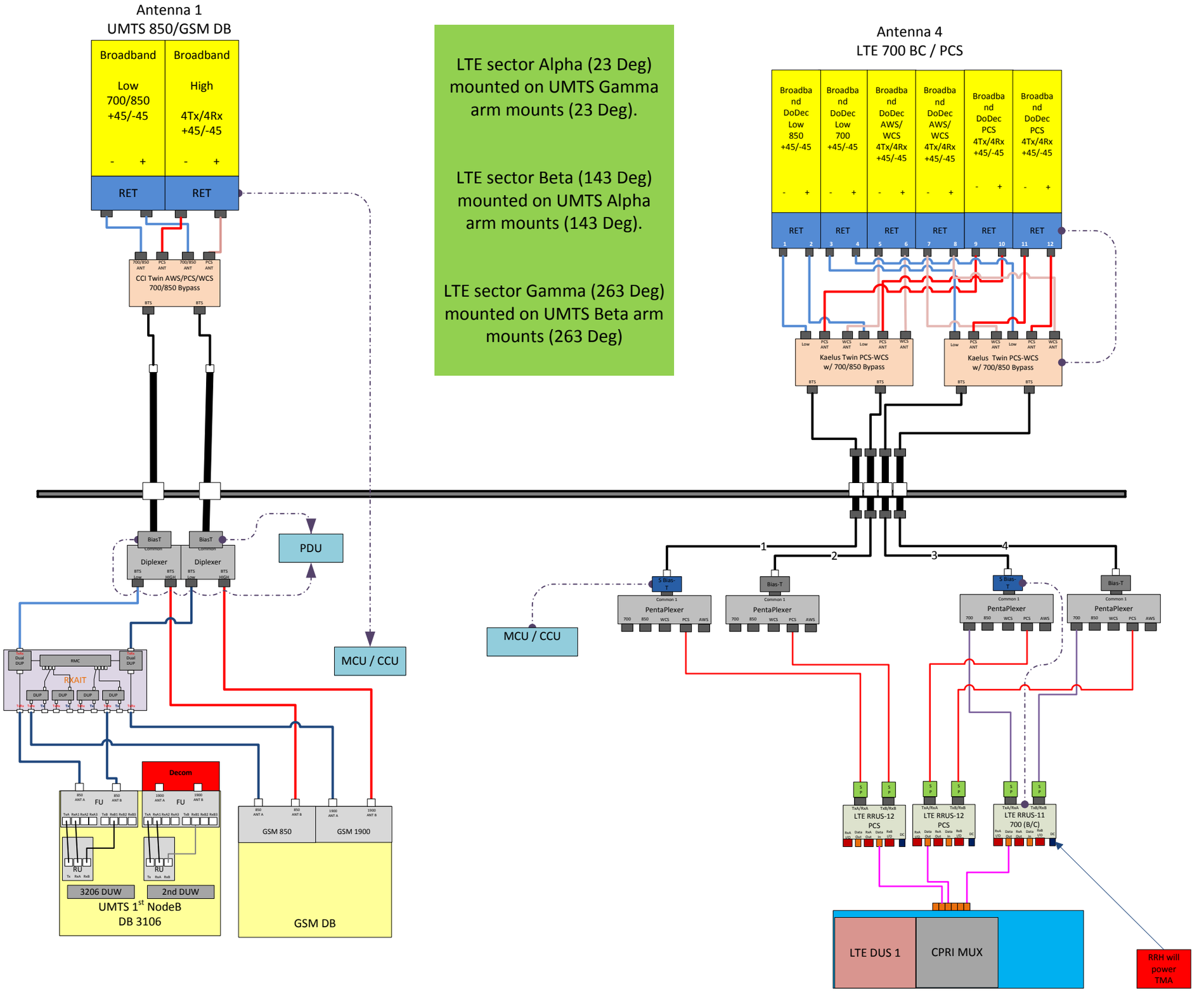


Diagram - Sector	B	Diagram File Name - CT1109_A_B_C_LTE 2C_Brnzstand_Rev1.vsd					
Atoll Site Name -	CTV1109	Location Name -	SOUTHINGTON-CATHYDRIVE NU	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

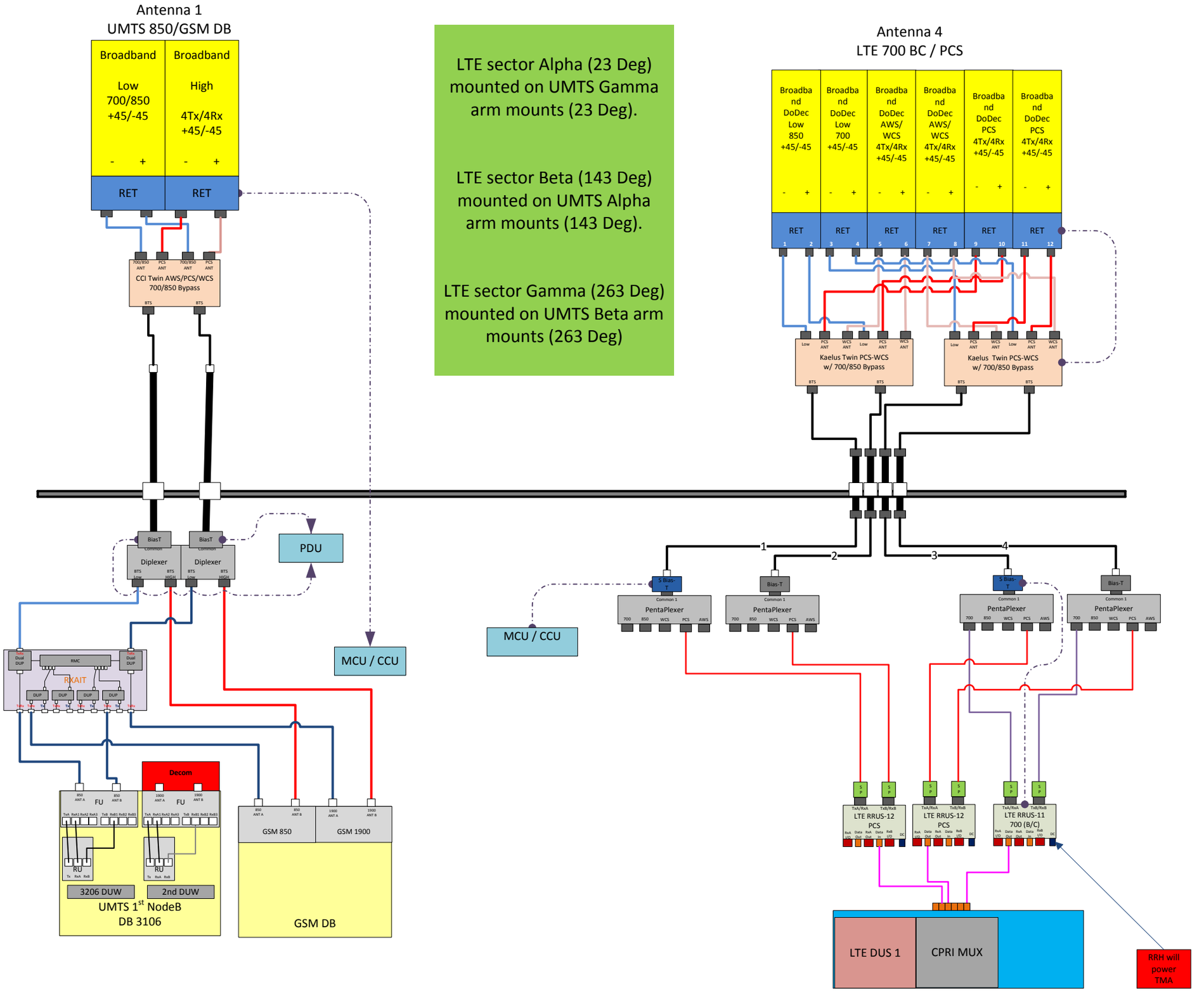
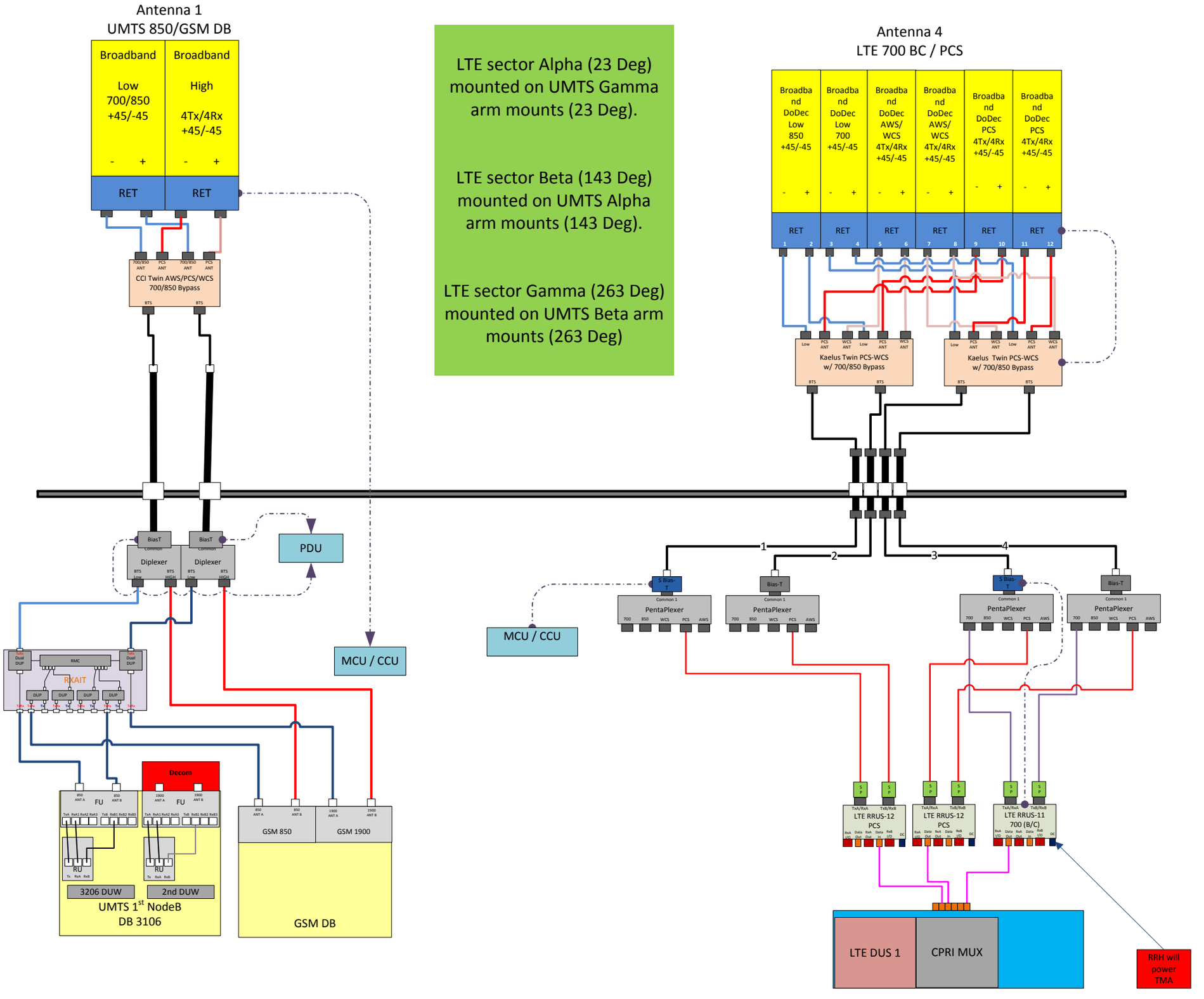


Diagram - Sector	C	Diagram File Name - CT1109_A_B_C_LTE 2C_Brnzstand_Rev1.vsd					
Atoll Site Name -	CTV1109	Location Name -	SOUTHINGTON-CATHYDRIVE NU	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							



WORKFLOW SUMMARY							
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments	PACE Status
09/20/2016	Preliminary In Progress	mm093q	Preliminary Submitted for Approval	RC475S	Promote	LTE Preliminary RFDS	
09/22/2016	Preliminary Submitted for Approval	RC475S	Preliminary Approved	BG144B	Promote		
12/20/2016	Preliminary Approved	BG144B	Final RF Approval	OM636A	Promote	Needs Final	
12/20/2016	Final RF Approval	OM636A	Final Approved	BG144B	Promote	LTE Final RFDS	NER-RCTB-12-04166 MRCTB019775 SUCCESS 12/20/2016 11:21:09 AM NER-RCTB-16-03448 FAILURE 12/20/2016 11:21:09 AM

Quintel®
New Dimensions in Wireless™

QS66512-2

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-806*MHz / 2x824-894MHz / 4x1850-1990MHz / 4x1695-1780+2110-2400MHz

MultiServ

- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design
- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >159dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers four independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS66512-2 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each set of 4 ports having independent tilt for connection to 2T4R/4T4R services.

Electrical Characteristics	2x Ports 1&2	2x Ports 3&4	4x Ports 5-8			4 Ports 9-12
Operating Frequency (MHz	698-806*	824-894	1695-1780 and 2110-2400			1850-1990
	698-806	824-894	1695-1780	2110-2180	2300-2400	1850-1990
Azimuth beamwidth[1]	67°	64°	68°	63°	58°	69°
Elevation beamwidth[1]	12°	10°	6.5°	5.5°	4.5°	5.5°
Gain[1] (dBi)	13.2	13.5	16.2	16.5	17.0	16.0
Polarization	±45°	±45°	±45° ±45°			±45° ±45°
Electrical down-tilt range	2°-10°	2°-10°	2° – 7°			2° – 7°
Upper SLL (20° > mainbeam)[1]	-17dB	-19dB	-18dB	-18B	-18dB	-16dB
Front to Back Ratio(180°±10°)[1]	≥27dB	≥29dB	≥28dB	≥28dB	≥28dB	≥27dB
Port to Port isolation[1]	≥28dB	≥30dB	≥30dB	≥30dB	≥30dB	≥30dB
Return loss (VSWR)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB (1.5)	14dB(1.5)
X Polar Discrimination (at 0°)	>18dB	>16dB	>20dB	>20dB	>18dB	>20dB
Max Power handling (per any port)	500 watts	500 watts	250 watts			250 watts
Total Composite Power (all ports)	1750 watts					
PIM (3rd Order) (2x43dBm)	>153dBc	>153dBc	>153dBc			>153dBc
XBand PIM (3rd Order) (2x43dBm)			>159dBc			

[1] *Typical Performance across frequency and Downtilt. *Products Ordered after Jan 2016 will be 698-806MHz*

Mechanical Characteristics	
Dimensions	L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm)
Weight (excl mounting brackets)	111lbs (50.3kg)
No. of Connectors	12x 4.3-10.0 DIN Female Long Neck
Max Wind Speed	150mph (67m/s)
Equivalent Flat Plate Area	2.96ft² (0.275m²)
Wind Load @160km/h (45m/s)	Front: 587N (132 lbs), Side: 382N (86 lbs)
Operating Temperature	-40°C to +65°C

Fully Integrated RET Characteristics	
AISG Standards	V1.1,V 2.0 and 3GPP
Factory Default	AISG 2.0
Surge immunity	IEC 61000-4-5:2005 4KV(AISG PIN)
Device Type	SRET Type 1
AISG Data rate	9.6 kbps
No of connectors	1in/1out.
Connector type	IEC 60130-9 (Ed 3.0)
MTBF	36,000 Operational moves

All specifications are subject to change without notice. Please contact your Quintel representative for complete information.

AM-X-CD-16-65-00T-RET(6' 65° Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V12°

1710 ~ 2170MHz, X-pol., H65° / V6.0°

Electrical Specification

Frequency Range		698~894MHz	1710~2170MHz
Impedance		50Ω	
Polarization		Dual, Slant ±45°	
Gain		15.5dBi / 13.35dBd @ 698-806MHz 16.0dBi / 13.85dBd @ 824-894MHz	17.3dBi / 15.15dBd @ 1710-1755MHz 17.4dBi / 15.25dBd @ 1850-1900MHz 17.1dBi / 14.95dBd @ 2110-2155MHz
Beamwidth	Horizontal	65° @ 698-806MHz 63° @ 824-894MHz	65° @ 1710-1755MHz 67° @ 1850-1900MHz 69° @ 2110-2155MHz
	Vertical	12.3° @ 698-806MHz 11.5° @ 824-894MHz	6.5° @ 1710-1755MHz 6.0° @ 1850-1900MHz 5.7° @ 2110-2155MHz
VSWR		≤1.5:1	
Front-to-Back Ratio		≥27 dB	
Electrical Downtilt Range		2° ~ 16°	0° ~ 10°
Isolation Between Ports		≥30 dB	
Isolation Between Ports of Different Frequency Elements		≥35 dB	
Cross Pole Discrimination		10.0 dB @ ±60° 15.0 dBi @ 0°	
First Upper Side Lobe Suppression		16dB	
Side Lobe Suppression		> 16 dB @ 0-6° Tilt > 18 dB @ 7-12° Tilt (Up to 10° from Boresight)	> 16 dB @ 0-6° Tilt > 18 dB @ 7-10° Tilt (Up to 10° from Boresight)
Passive Intermodulation		≤ -150 dBc @ 2x20w	
Input Maximum CW Power		500 W	300 W
Environmental Compliance		IP65 for Radome IP67 for Connectors	
RET Motor Configuration		Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0		AISG 1.1 and 2.0	

Mechanical Specification

Dimension (W×D×H)	11.8×5.9×72 inches (300×150×1829mm)
Weight (Without clamp)	48.5 lbs (22.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	1891 N

300

Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information

CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Diplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Model
DTMABP7819VG12A

Contents:

Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are diplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications

Description	Typical Specifications
Electrical Specifications	
700 Band & Cellular Frequency Range	698 to 894 MHz
PCS Receive Frequency Range	1850 – 1910 MHz
PCS Transmit Frequency Range	1930 - 1990 MHz
PCS Amplifier Gain	6 to 12 dB Adjustable in 0.25 dB steps via AISG
PCS Gain Variation	±1.0 dB
PCS System Noise Figure	1.4 dB (@ +25°C),1.6 dB (@ +65°C), At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C)
PCS Input Third Order Intercept Point	+12 dBm Min @ Max. Gain
Input/Output Return Loss	18 dB Min. all ports, 15 dB Min. Bypass Mode
Insertion Loss	
700 Band & Cellular Passband	< 0.2 dB, 0.1 dB typical
PCS Transmit Passband	0.4 dB Typical
PCS Transmit Passband Ripple	±0.2 dB
PCS Bypass Mode, Rx Passband	1.6 dB (@ +25°C),1.8 dB (@ +65°C), At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C)
PCS Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
700 Band & Cellular Path Rejection	70 dB @ 1850 - 1990 MHz
PCS Path Rejection	80 dB @ 698 - 894 MHz
Continuous Average Power	200 Watts max
Peak Envelope Power	2 kW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-112 dBm Min. (2 x +43 dBm tones)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	≤ 2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female (Long Neck) x 6, AISG x 1
Dimensions (Body Only)	10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)
Dimensions (with Bracket)	14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)
Weight (w/o Bracket)	19.18 Lbs. (8.7 Kg)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40˚ C to +65˚C
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
Enclosure	IP65 (Unit Body), IP68 (Connector)
MTBF	>500,000 hours

All specifications are subject to change. The latest specifications are available at www.cciproducts.com

TMA2117F00V1-1

PCS / WCS Dual Band Twin TMA, with 700/850 bypass, AISG2.0

Designed to be deployed in co-located PCS & WCS systems with wideband antennas, the Kaelus TMA provides internal diplexing and gain in both bands while allowing 700/850 services to pass through to a separate antenna, thereby saving hardware costs.

PRODUCT FEATURES

- Improved base station sensitivity through gain in PCS and WCS bands
- Hardware and software configuration using AISG "Personality" upload
- High Linearity and low noise performance; Bypass provided for 700/850MHz services
- Fail safe bypass mode with lightning protection

TECHNICAL SPECIFICATIONS

Downlink Path, Band 1	PCS
Passband	1930 - 1990
Insertion Loss	0.5dB typ
Return Loss	18dB min
Max Average input power (W)	160
Max PEP Input Power (W)	2000
Intermodulation, 2 x 43dBm TX carriers (dBc)	-153dBc max
Uplink Path, Band 1	
Passband	1850 - 1910
Gain (dB)	3dB to 13dB in 1dB steps
Gain window	+/- 1dB max
Return Loss (Operating)	18dB min
Return Loss (Bypass)	12dB min
Noise Figure	1.4dB typ
Bypass Loss	2.5dB typ

Output IP3	+30dBm typ
Maximum input power with no damage	+12dBm max
Downlink Path, Band 2	WCS
Passband	2350 - 2360
Insertion Loss	0.5dB typ
Return Loss	18dB min
Max Average input power (W)	120
Max PEP Input Power (W)	1200
Intermodulation, 2 x 43dBm TX carriers (dBc)	-153dBc max
Uplink Path, Band 2	
Passband	2305 - 2315
Gain (dB)	2dB to 12dB in 1dB steps
Gain window	+/- 1dB max
Return Loss (dB Min, Operating)	18
Return Loss (dB Min Bypass)	12
Noise Figure	1.7dB typ
Rejection @ Freq x (dBc Min)	2324.54 - 2341.285MHz (27.5dB min)
Bypass (Insertion) Loss	3.3dB typ
Output IP3	+30dBm typ
Maximum input power with no damage	+12dBm max
Bypass Passband	698 – 896MHz
Insertion Loss	0.35dB typ
Return loss, all ports	18dB min
Continuous average power	200
Peak envelope power	2000
Intermodulation @ antenna port	-153dBc max

CURRENT ALARM MODE (DEFAULT MODE SELECTED ON THE ABSENCE OF AISG PACKETS)

DC Supply Voltage (VDC min)	8.5
DC Supply Voltage (VDC max)	30
Supply Current, Normal operation	250 +/- 20mA per port (programmable)

Supply Current, alarm mode	320 +/- 30mA per port (programmable)

AISG MODE OF OPERATION (AUTO SELECTED ON VALID AISG 2.0 FRAMES)

AISG Version	2
AISG Supply Current	400mA @ 8.5V, 120mA @ 30V typical
AISG Connector	IEC60130-9, 8-pin female
AISG Connector Current rating	< 4A peak, 2A continuous, pin 6
Field firmware upgradable	Yes

ENVIRONMENTAL

Temperature range	-40ºC to +65ºC | -40º to +149ºF
Environmental sealing	IP67
Lightning protection	RF port: +/- 5kA max (8/20us), AISG port: +/- 2kA max (8/20us) IEC61312-1
MTBF	>1,000,000 hours
Compliance	EMC:EN301 489, Ingress ETSI EN 300 019 class 4.1, RoHS

MECHANICAL

Connectors	DIN 4.3-10 (F) x 8 long shank, AISG (F) x 1
Dimensions, H x D x W	216 x 300 x 107mm | 8.46 x 11.81 x 4.21in
Finish	Powder coated, light grey (RAL7035)
Weight	8 kg | 17.6lbs est
Mounting	Pole / wall bracket supplied with two metal clamps for 45-178 mm diameter poles

ELECTRICAL BLOCK DIAGRAM

Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT1109

Southington - Cathy Drive NU
Cathy Drive
Southington, CT 6489

May 12, 2017

Centerline Communications Project Number: 950006-053

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**6.56 %**

May 12, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT1109 – Southington - Cathy Drive NU**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility located at **Cathy Drive, Southington, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications facility that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed AT&T Wireless antenna facility located at **Cathy Drive, Southington, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the utility transmission tower. For this report the sample point is the top of a 6-foot person standing at the base of the utility transmission tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
GSM	850 MHz	2	30
GSM	1900 MHz (PCS)	2	30
LTE	700 MHz	2	60
LTE	1900 MHz (PCS)	2	60

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	KMW AM-X-CD-16-65-00T-RET	91
A	2	Quintel QS66512-2	91
B	1	KMW AM-X-CD-16-65-00T-RET	91
B	2	Quintel QS66512-2	91
C	1	KMW AM-X-CD-16-65-00T-RET	91
C	2	Quintel QS66512-2	91

Table 2: Antenna Data

All calculations were done with respect to uncontrolled / general population threshold limits.

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	KMW AM-X-CD-16-65-00T-RET	850 MHz / 1900 MHz (PCS)	13.85 / 15.25	6	180	4,921.72	3.56
Antenna A2	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	3.00
						Sector A Composite MPE%	**6.56**
Antenna B1	KMW AM-X-CD-16-65-00T-RET	850 MHz / 1900 MHz (PCS)	13.85 / 15.25	6	180	4,921.72	3.56
Antenna B2	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	3.00
						Sector B Composite MPE%	**6.56**
Antenna C1	KMW AM-X-CD-16-65-00T-RET	850 MHz / 1900 MHz (PCS)	13.85 / 15.25	6	180	4,921.72	3.56
Antenna C2	Quintel QS66512-2	700 MHz / 1900 MHz (PCS)	10.85 / 13.85	4	240	4,371.36	3.00
						Sector C Composite MPE%	**6.56**

Table 3: AT&T Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max Sector Value	**6.56 %**
No Additional Carriers Present at This Facility	NA
Site Total MPE %:	**6.56 %**

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	6.56 %
AT&T Sector B Total:	6.56 %
AT&T Sector C Total:	6.56 %
Site Total:	6.56 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology (All Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	727.98	91	7.24	850 MHz	567	1.28%
AT&T 850 MHz GSM	2	727.98	91	7.24	850 MHz	567	1.28%
AT&T 1900 MHz (PCS) GSM	2	1,004.90	91	10.00	1900 MHz (PCS)	1000	1.00%
AT&T 700 MHz LTE	2	729.71	91	7.26	700 MHz	467	1.56%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	91	14.49	1900 MHz (PCS)	1000	1.45%
						Total:	**6.56%**

Table 6: AT&T Maximum Sector MPE Power Values

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	6.56 %
Sector B:	6.56 %
Sector C:	6.56 %
AT&T Maximum Total (per sector):	6.56 %
Site Total:	6.56 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.56 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Scott Heffernan
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