NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
199 Brickyard Rd Farmington, CT 06032
860-209-4690
denise@northeastsitesolutions.com

May 23, 2017

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
144 Chestnut Hill Road, Wilton CT 06897
Latitude: 41.18118739
Longitude: -73.39323950
T-Mobile Site#: CT11296A_L700

Dear Ms. Bachman:

T-Mobile currently maintains three (3) antennas at the 97.3-foot level of the existing 91-foot transmission tower (#936) located at 144 Chestnut Hill Road, Wilton CT. The electric transmission lattice tower (#936) is owned by CL&P d/b/a Eversource. The property is owned by CL&P d/b/a Eversource. T-Mobile now intends to install three (3) new 700MHz antenna and six (6) new 1900/2100MHz antenna. The new antennas would be installed at the 97.3-foot level of the tower. T-Mobile also intends to make the following modifications.

Planned Modifications:

Remove:
(1) Microwave Dish (flush mounted)
(7) 7/8" Coax Line

Remove and Replace:
(3) RR90-17-02DP Antenna (Remove) - (3) APX16DWV-16DWVS-E-A20 Antenna (Replace)
Remove existing antenna mast and replace with (1) MAST- HSS 16x0.5x100ft

Install New:
(3) APX16DWV-16DWVS-E-A20 Antenna
(3) LNX6515-DS Panel Antenna
(30) 1-1/4" Coax
(3) Smart Bias Tee
(3) Site Pro Triple T-Arm

This facility was approved by the CT Siting Council. Per the attached Petition No. 419 – Dated July 15, 1999. Note the correct structure number for the tower is #936. Please see attached.

NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman Lynne Vanderslice, Elected Official and Robert Nerney, Planning Director for the Town of Wilton, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site. ·

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Denise Sabo
Mobile: 860-209-4690
Fax: 413-521-0558
Office: 199 Brickyard Rd, Farmington, CT 06032
Email: denise@northeastsitesolutions.com

Attachments
cc: Lynne Vanderslice– First Selectman - as elected official
Robert Nerney- Diector of Planning and Zoning
CL&P d/b/a Eversource - as tower owner & property owner

Exhibit A

Petition No. 419
Omnipoint Communications
Wilton, CT
Staff Report
July 15, 1999

On July 7, 1999, Connecticut Siting Council (Council) member Edward S. Wilensky and Executive Director Joel M. Rinebold met with J. Brendan Sharkey, Mark Finley, Brian Ragazzine, and Cheatan Dhaduk of Omnipoint Communications, Inc. (Omnipoint) for a field review in the Town of Wilton, Connecticut. Omnipoint is petitioning the Council for a determination that no Certificate of Environmental Compatibility and Public Need (Certificate) would be required for modifications to an existing Connecticut Light and Power Company (CL&P) electric transmission line facility in Wilton. Omnipoint submits no Certificate would be required because the addition of three antennas and associated equipment would not have a substantial adverse environmental effect.

Omnipoint proposes to attach three PCS antennas to existing CL&P transmission line structure number 937, located east of Chestnut Hill Road in Wilton, Connecticut. Access would be from Chestnut Hill Road. A temporary staging area would be established adjacent to the transmission line structure in the right-of-way. The top of the antenna assembly would extend approximately 10 feet above the top of the existing 100-foot transmission line structure. The proposed antennas are 56 inches in length, 8 inches in width, and 2.75 inches in diameter, and weigh 18 lbs. The antennas would be placed on top of the existing tower structure and no compression post would be required. The communications equipment would be installed upon an eight-foot by 3.75–foot concrete slab, to be placed at the southeast corner of the tower base. Existing vegetation provides sufficient screening. Omnipoint has agreed to minimize clearing, replace the existing fence or install a gate, and to not remove existing vines on the west side of the tower.

The total calculated radio frequency power density at the base of the tower would be 0.0179 mw/cm^2, which is 1.79 percent of the maximum permissible exposure for uncontrolled environments based on Federal Communications Commission (FCC) Bulletin 65, August 1997.

Exhibit B

144 CHESTNUT HILL RD

Location	144 CHESTNUT HILL RD	**Mblu**	29/ / 81/ /
Acct#	001048	**Owner**	CONN LIGHT & POWER CO THE
Assessment	$118,580	**Appraisal**	$169,400
PID	1347	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$169,400	$169,400
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$0	$118,580	$118,580

Owner of Record

Owner CONN LIGHT & POWER CO THE
Co-Owner
Address P O BOX 270
HARTFORD, CT 06141

Sale Price $0
Certificate
Book & Page 0035/0121
Sale Date 03/22/1923
Instrument 00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CONN LIGHT & POWER CO THE	$0		0035/0121	00	03/22/1923

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes

Field	Description
Style	Vacant Land
Model	
Grade:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Rooms:	
Bath Style:	
Kitchen Style:	
Elevator	
Fireplaces	
Sauna	
Spa/Jet Tub	
Whirlpool Tub	
Cath. Ceil	

Building Photo

(http://images.vgsi.com/photos/WiltonCTPhotos//default.jpg)

Building Layout

Building Layout

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	4-1V
Description	Pub Utilit MDL-00
Zone	R-2
Neighborhood	05
Alt Land Appr	No

Land Line Valuation

Size (Acres)	1.2
Frontage	
Depth	
Assessed Value	$118,580
Appraised Value	$169,400

Category

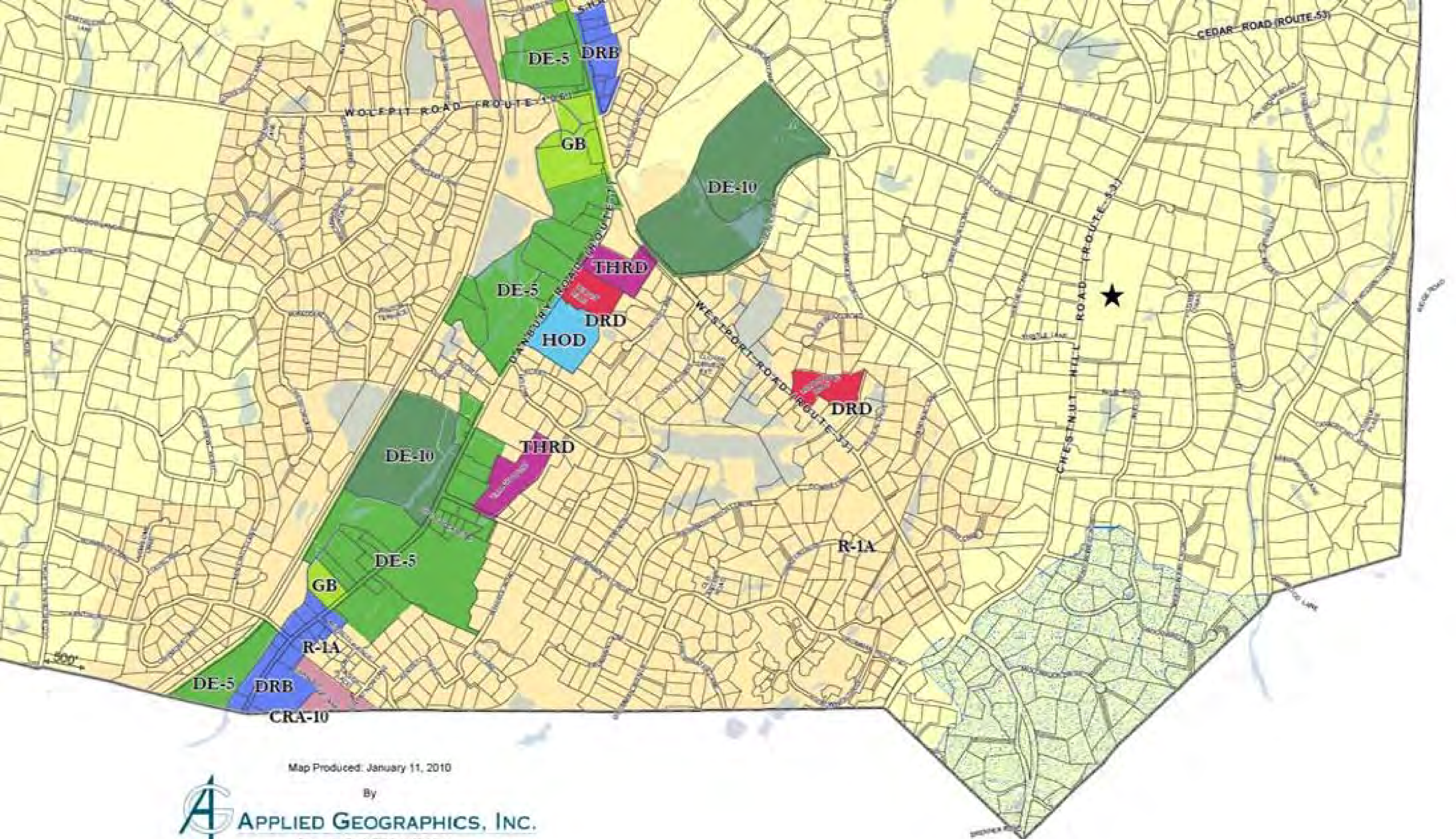
Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$0	$169,400	$169,400
2013	$0	$169,400	$169,400
2012	$0	$169,400	$169,400

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$0	$118,580	$118,580
2013	$0	$118,580	$118,580
2012	$0	$118,580	$118,580



Map Produced: January 11, 2010

By

APPLIED GEOGRAPHICS, INC.

Empowering People With Spatial Solutions

Exhibit C

WIRELESS COMMUNICATIONS FACILITY

WILTON/RT. 33

SITE ID: CT11296A

EVERSOURCE STRUCTURE #936

144 CHESTNUT HILL ROAD

WILTON, CT 06897

PROJECT SUMMARY

1. THE GENERAL SCOPE OF WORK INCLUDES THE REPLACEMENT OF T-MOBILE EQUIPMENT CABINET ON AN EXISTING CONC. PAD AT GRADE.
2. A TOTAL OF THREE (3) EXISTING T-MOBILE PANEL ANTENNAS SHALL BE REMOVED AND NINE (9) T-MOBILE PANEL ANTENNAS SHALL BE INSTALLED ON AN EXISTING 91' TALL EVERSOURCE STEEL TRANSMISSION TOWER WITH AN ANTENNA CENTERLINE ELEVATION OF ±97'-3" AGL.
3. ELECTRIC AND TELCO UTILITIES SHALL BE ROUTED UNDERGROUND TO THE T-MOBILE EQUIPMENT FROM EXISTING DEMARCS LOCATED ADJACENT TO THE EXISTING TOWER.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, 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 T-MOBILE 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 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.
19. 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.
20. 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: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

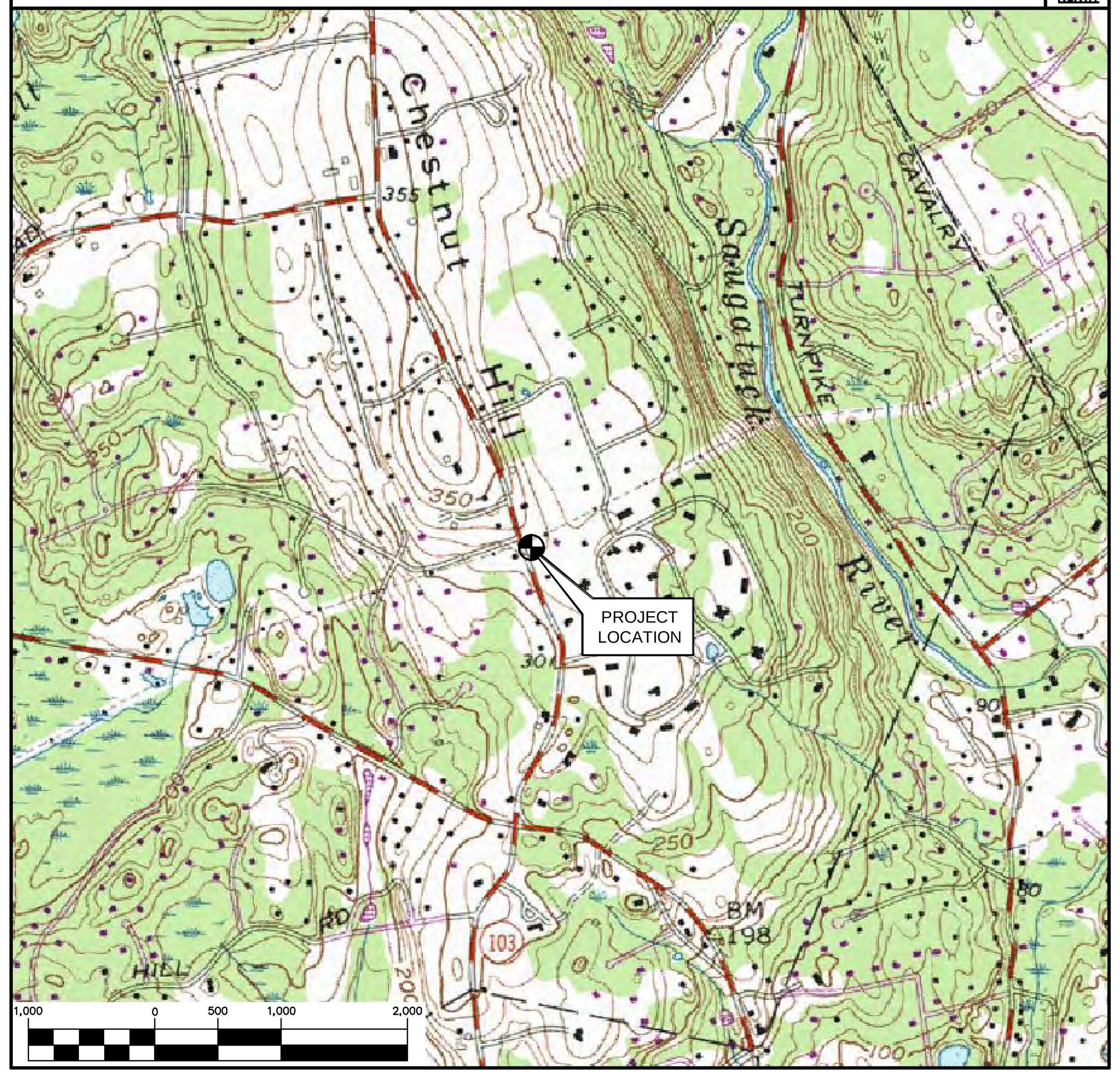
TO: 144 CHESTNUT HILL ROAD
WILTON, CT 06897

1.	HEAD NORTHEAST ON GRIFFIN RD S TOWARD W NEWBERRY ROAD	0.6 MI
2.	TURN RIGHT ONTO DAY HILL ROAD	0.4 MI
3.	MERGE ONTO I-91 S VIA THE RAMP TO HARTFORD	26.0 MI
4.	TAKE EXIT 17 TO MERGE ONTO CT-15 S/WILBUR CROSS PKWY	44.2 MI
5.	TAKE EXIT 41 TOWARD CT-33 N/WILTON ROAD	482 FT
6.	TURN RIGHT ONTO CT-53 N	1.1 MI
7.	YUR DESTINATION SHOULD BE ON THE RIGHT	0.5 MI

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT INFORMATION

SITE NAME:	WILTON/RT. 33
SITE ID:	CT11296A
SITE ADDRESS:	144 CHESTNUT HILL ROAD EVERSOURCE STRUCTURE #936 WILTON, CT 06897
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
T-MOBILE CONTACT:	MARK RICHARD (860) 692-7143
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-10'-52.00" N LONGITUDE: 73°-23'-36.00" W GROUND ELEVATION: ±321' A.M.S.L. SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM THE CONNECTICUT SITING COUNCIL DATABASE.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	05/04/17	KAWJR	CAG	CONSTRUCTION DRAWINGS - REVISED PER CLIENT COMMENTS
1	03/13/17	TJL	CFC	CONSTRUCTION DRAWINGS - REVISED ANTENNA CONFIGURATION
0	02/25/16	HMR	CFC	CONSTRUCTION DRAWINGS - ISSUED FOR CLIENT REVIEW

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT
PROFESSIONAL ENGINEER

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

T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
WILTON/RT 33
SITE ID: CT11296A
EVERSOURCE STRUCTURE #936
144 CHESTNUT HILL ROAD
WILTON, CT 06897

DATE:	02/18/16
SCALE:	AS NOTED
JOB NO.	15019.06

TITLE SHEET

T-1

SITE AND FOUNDATION SPECIFICATIONS

DESIGN BASIS

1. GOVERNING CODE: 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CT STATE SUPPLEMENT.
2. TIA-222-G, ASCE MANUAL NO. 10-97 – "DESIGN OF LATTICE STEEL TRANSMISSION STRUCTURES", NESC C2-2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.
3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2016 CSBC: APPENDIX 'N')

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

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR T-MOBILE DATED 3/13/17.
2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DRAWINGS PREPARED BY AMERICAN BRIDGE CO. DATED AUGUST 24, 1949.
3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.
4. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.
5. ALL REPLACEMENT STEEL MEMBERS SHALL BE INSTALLED WITH A325-N BOLTS (SIZE TO MATCH EXISTING). UNLESS OTHERWISE NOTED BELOW.
6. 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.
7. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE GOVERNING BUILDING CODE.
8. 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.
9. 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.
10. TOWER 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.
11. 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 REINFORCEMENT WORK.
12. 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.
13. 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.
14. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

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 PAQSSES 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 8" 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.
7. ONLY ONE LEG OF THE TOWER CAN BE EXCAVATED FOR MODIFICATION AT ANY TIME.

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.

STRUCTURAL STEEL

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

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

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B. U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.
17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
19. FABRICATE BEAMS WITH MILL CAMBER UP.
20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
2	05/04/17	KAWJR	CAG	CONSTRUCTION DRAWINGS – REVISED PER CLIENT COMMENTS
1	03/13/17	TJL	CFC	CONSTRUCTION DRAWINGS – REVISED ANTENNA CONFIGURATION
0	02/25/16	HMR	CFC	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

WILTON/RT 33

SITE ID: CT11296A

EVERSOURCE STRUCTURE #936

144 CHESTNUT HILL ROAD

WILTON, CT 06897

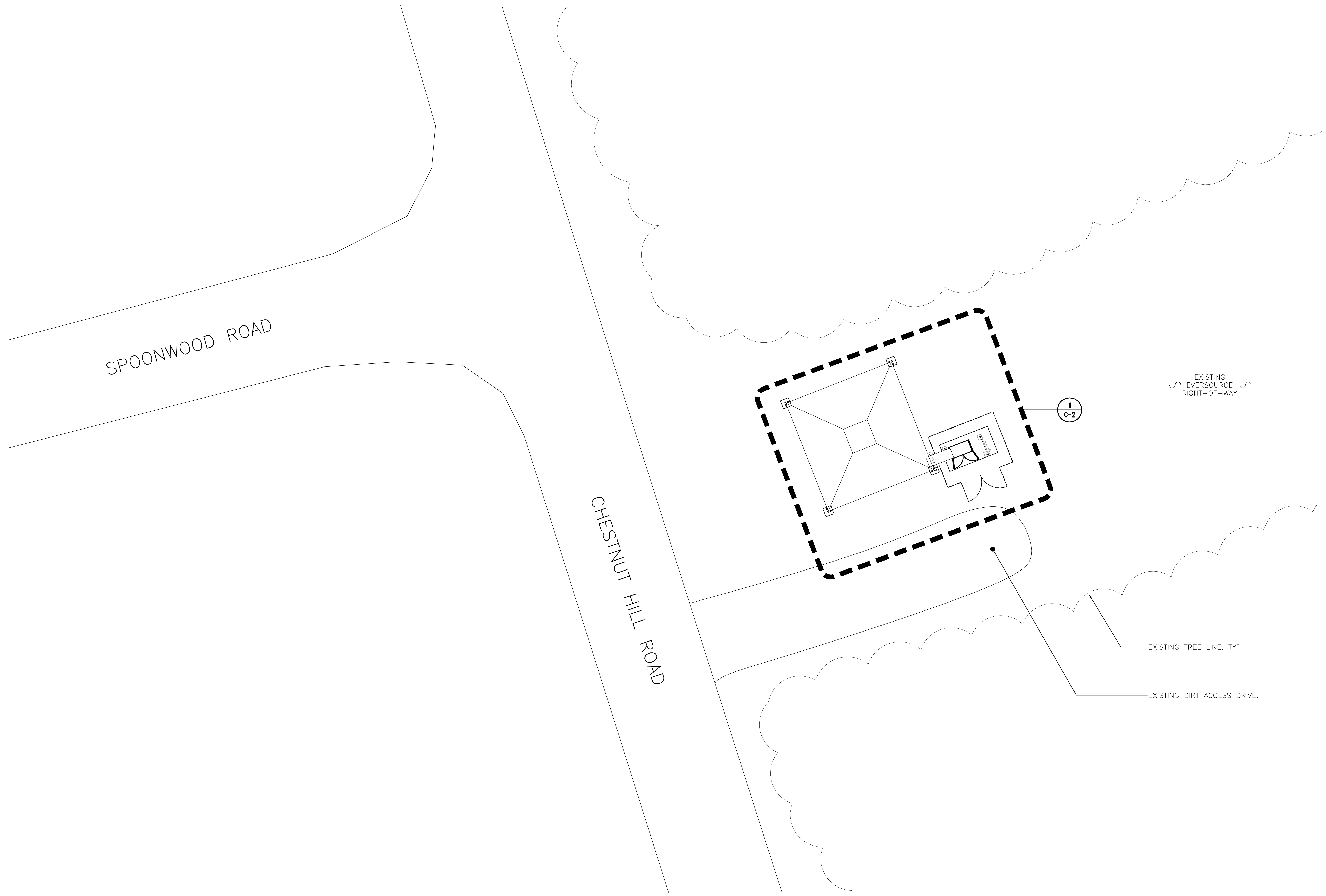
DATE: 02/18/16

SCALE: AS NOTED

JOB NO. 15019.06

DESIGN BASIS AND STRUCTURAL SPECIFICATIONS

N-1



1 C-1 **SITE LOCATION PLAN**
SCALE: 1" = 10'

APPROXIMATE NORTH

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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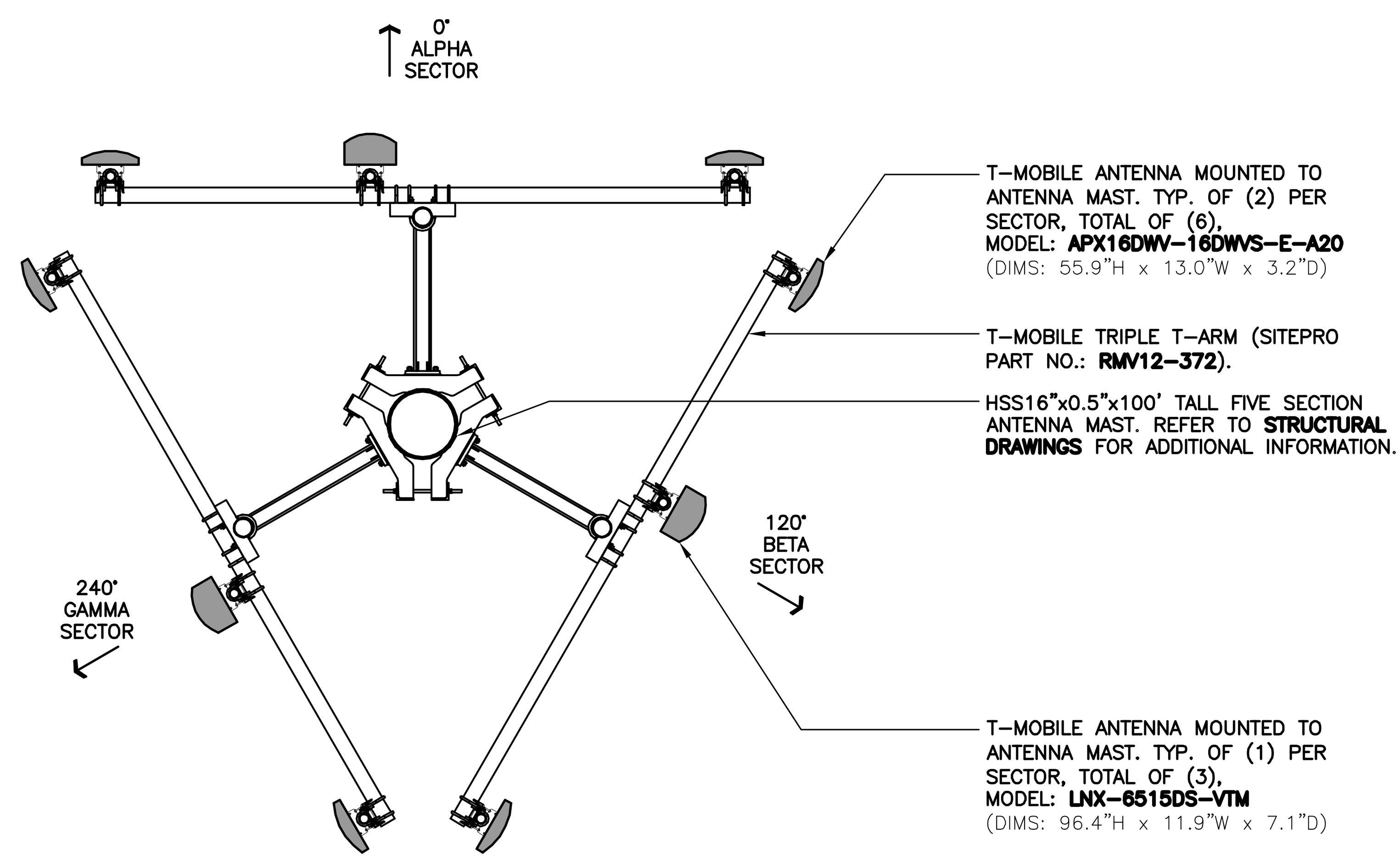
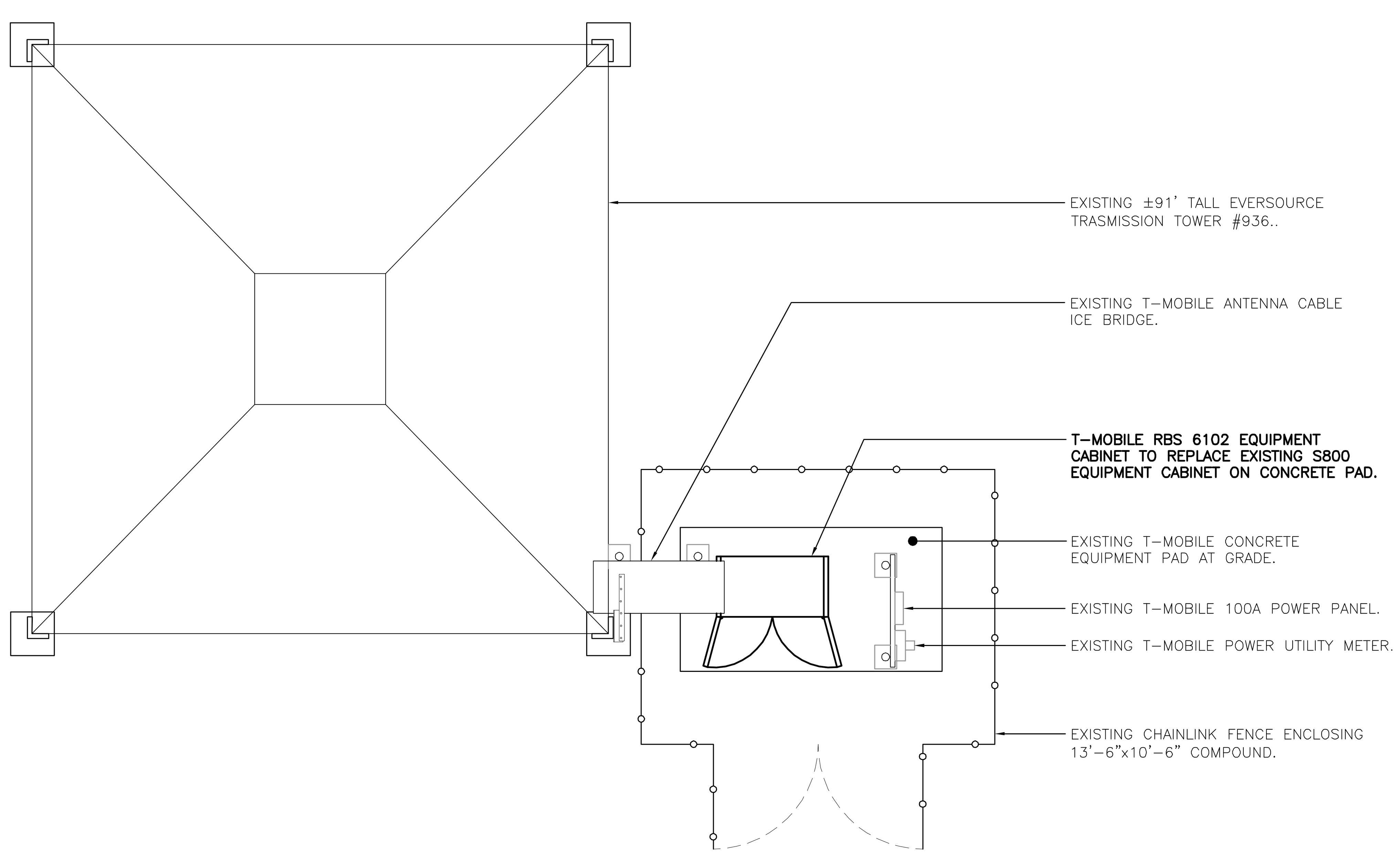
SITE LOCATION PLAN

C-1

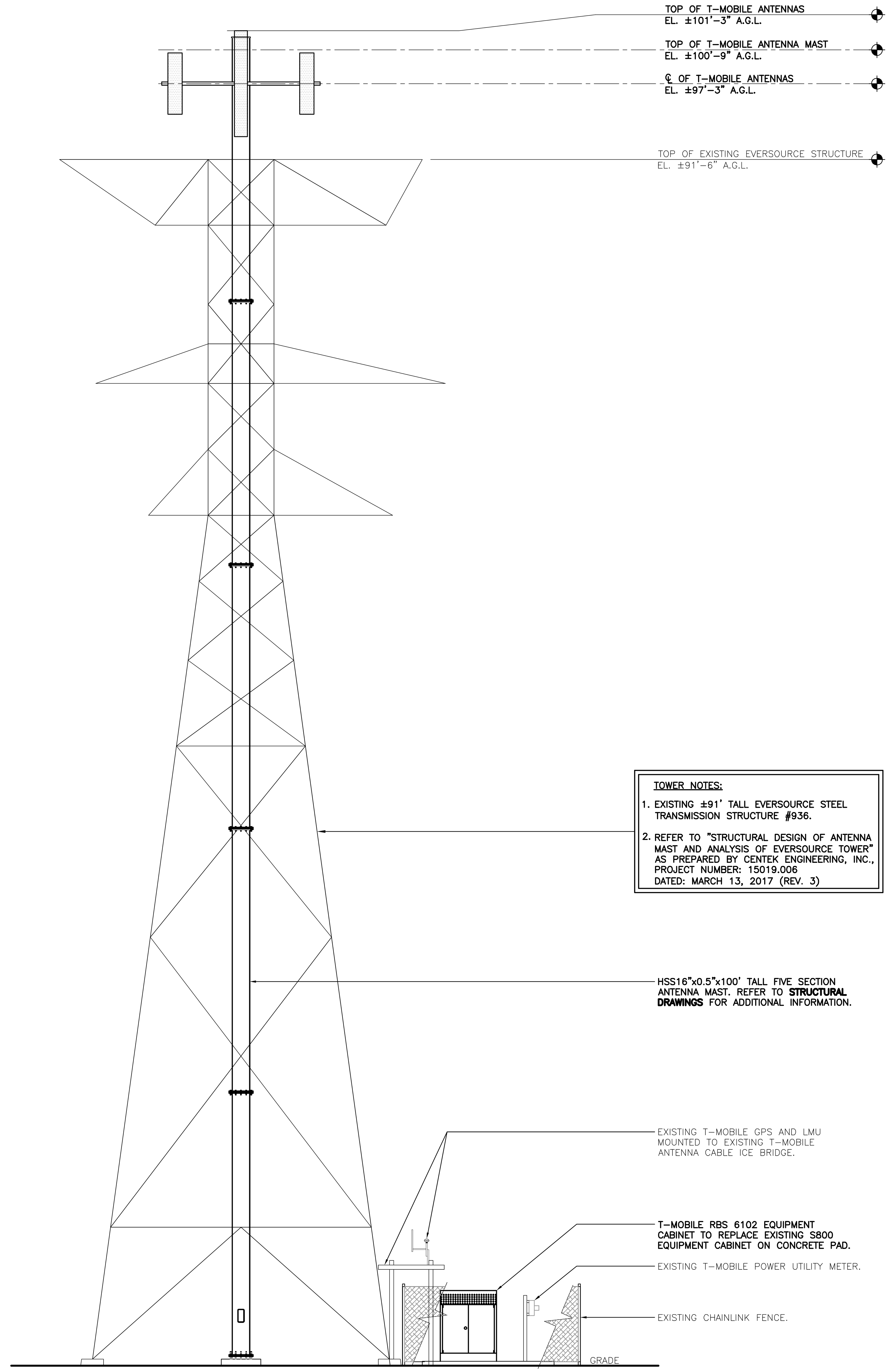
Sheet No. 3 of 11



3 / C-2 **ANTENNA MOUNTING CONFIG.**
SCALE: 3/8" = 1'
APPROXIMATE NORTH



1 / C-2 **COMPOUND PLAN**
SCALE: 1/4" = 1'
APPROXIMATE NORTH



TOWER NOTES:

1. EXISTING ±91' TALL EVERSOURCE STEEL TRANSMISSION STRUCTURE #936.
2. REFER TO "STRUCTURAL DESIGN OF ANTENNA MAST AND ANALYSIS OF EVERSOURCE TOWER" AS PREPARED BY CENTEK ENGINEERING, INC., PROJECT NUMBER: 15019.006 DATED: MARCH 13, 2017 (REV. 3)

2 / C-2 **TOWER ELEVATION**
SCALE: 1" = 5'

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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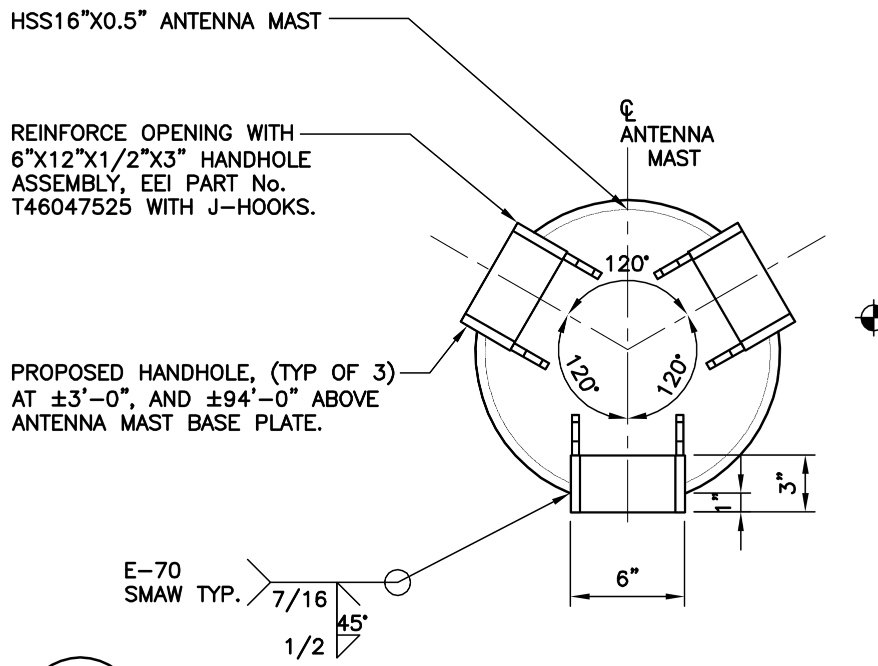
SCALE: AS NOTED
JOB NO. 15019.06

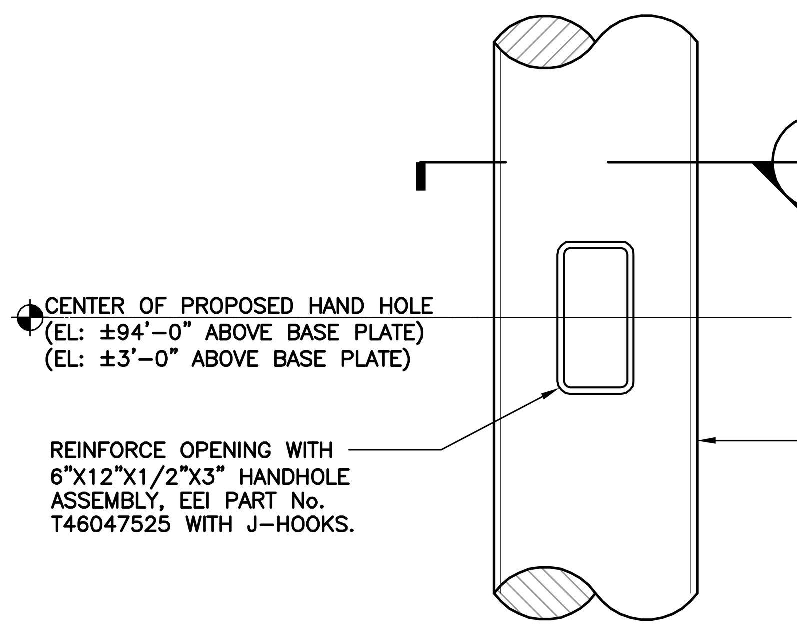
SITE PLAN, ELEVATION AND ANTENNA MOUNTING CONFIGURATION

C-2

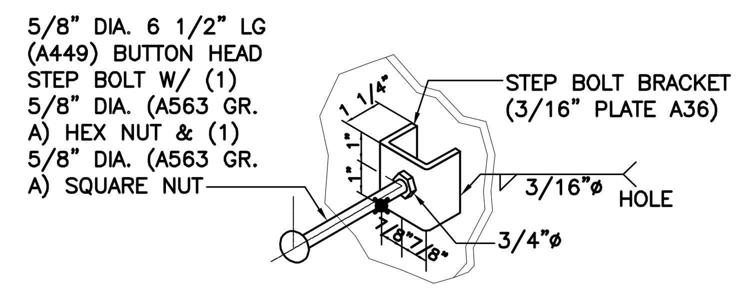
Sheet No. 4 of 11



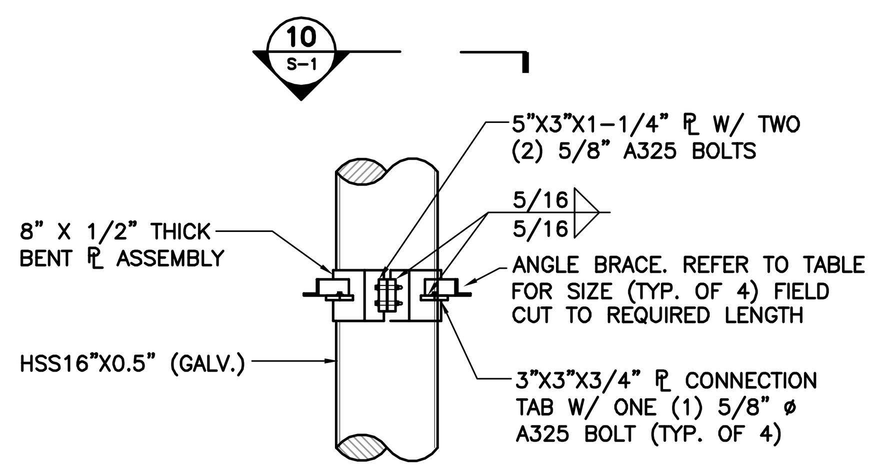
14 PROPOSED HAND HOLE (SECTION)
S-1 SCALE: 1-1/2" = 1'-0"



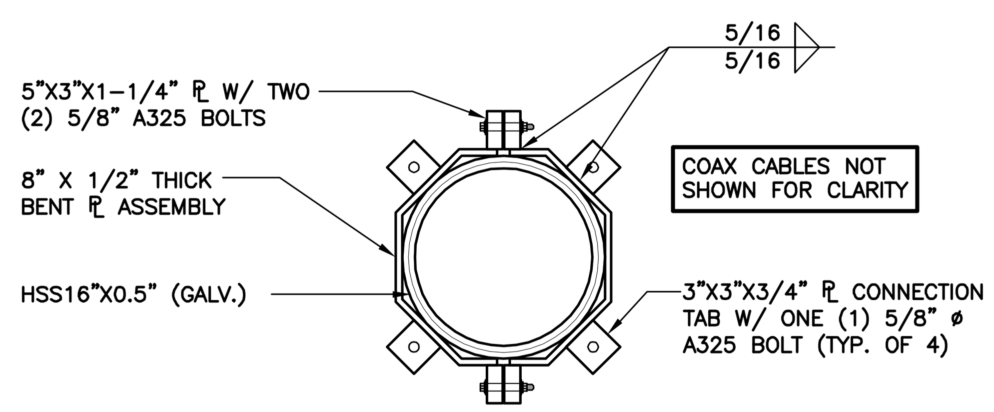
13 PROPOSED HAND HOLE (ELEVATION)
S-1 SCALE: 1" = 1'-0"



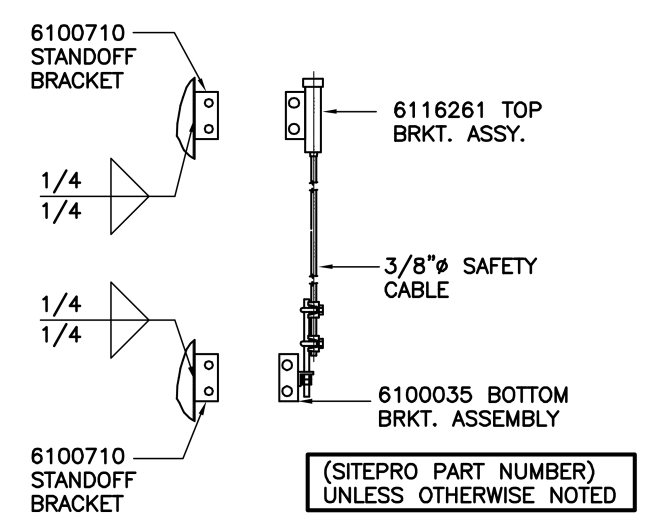
12 STEP BOLT DETAIL
S-1 SCALE: 3/4" = 1'-0"



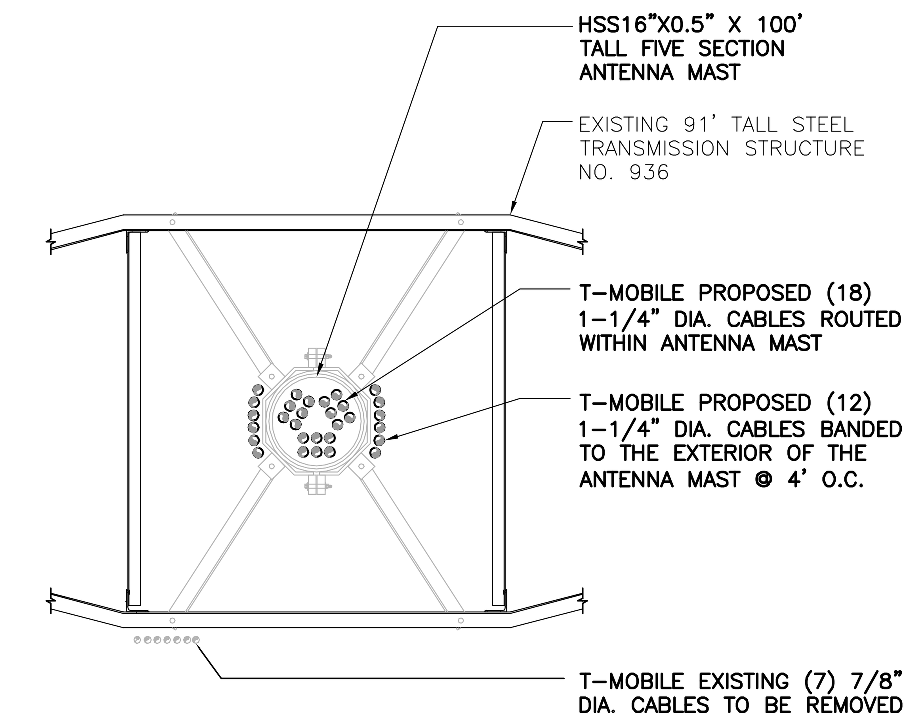
9 BRACKET ELEVATION
S-1 SCALE: 1/2" = 1'-0"



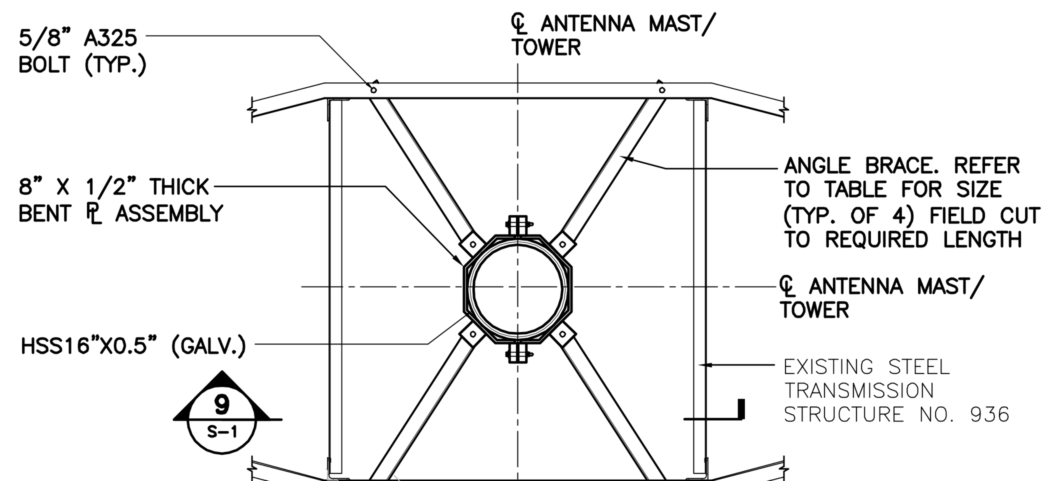
10 BRACKET DETAIL
S-1 SCALE: 1" = 1'-0"



11 SAFETY CLIMB DETAIL
S-1 SCALE: 1/2" = 1'-0"

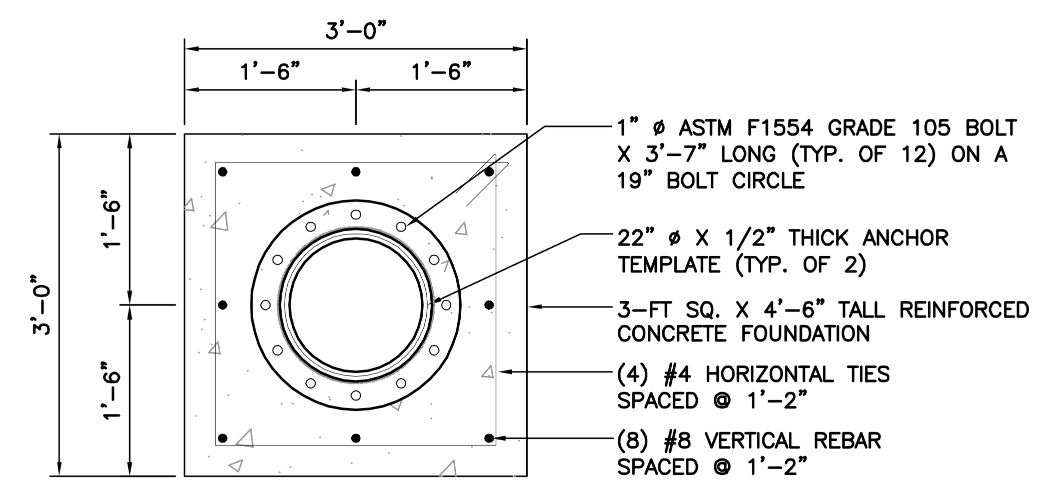


2 FEEDLINE PLAN
S-1 SCALE: NOT TO SCALE

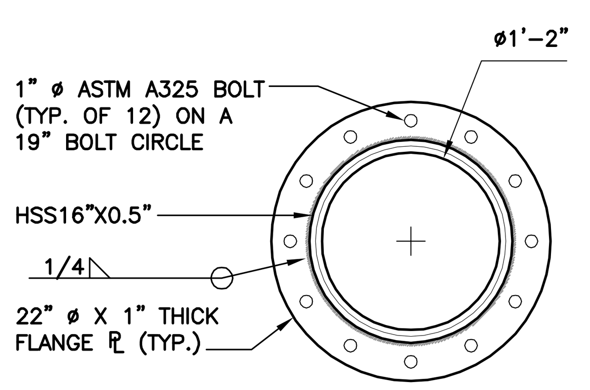


8 BRACKET PLAN
S-1 SCALE: 1/2" = 1'-0"

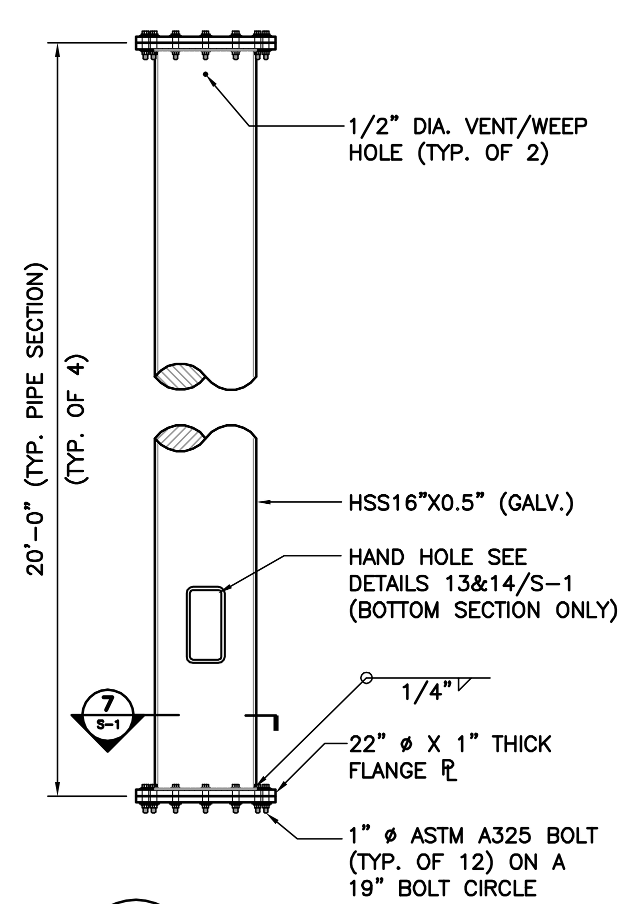
CONNECTION ELEVATION	ANGLE BRACE SIZE
91-FT (ATB)	L2-1/2X2-1/2-1/4
86-FT (ATB)	L2-1/2X2-1/2-1/4
74-FT (ATB)	L2-1/2X2-1/2-1/4
64-FT (ATB)	L2-1/2X2-1/2-1/4
32-FT (ATB)	L3-1/2X3-1/2-1/4



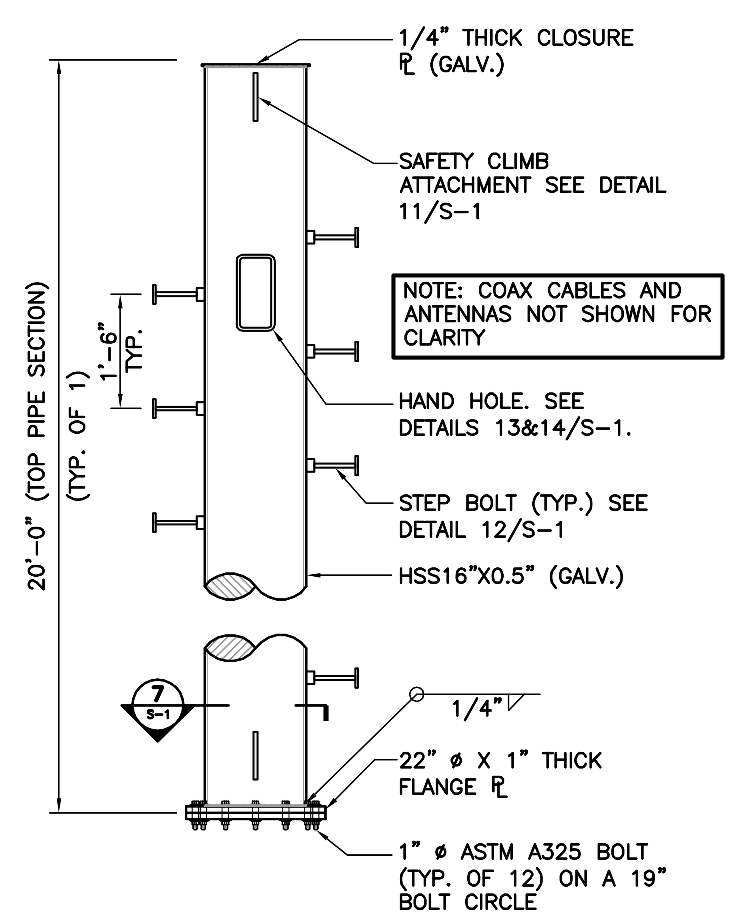
4 FOUNDATION PLAN
S-1 SCALE: 3/4" = 1'-0"



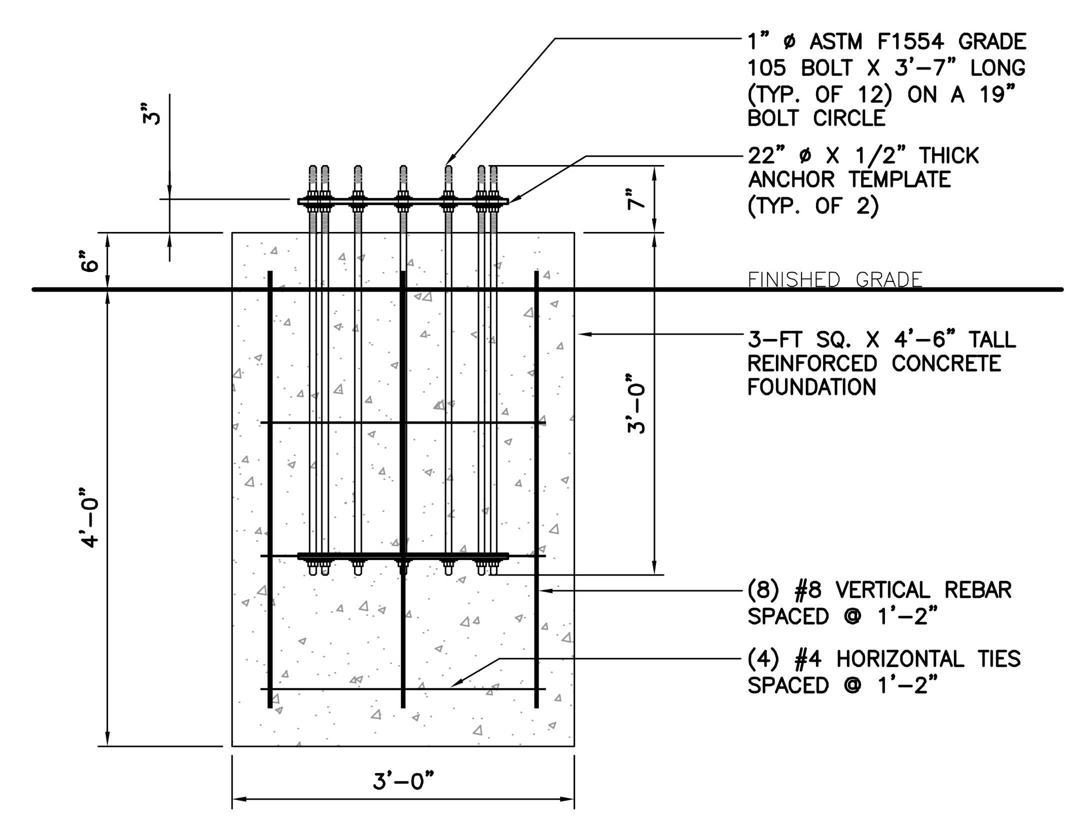
7 FLANGE PL DETAIL
S-1 SCALE: 1" = 1'-0"



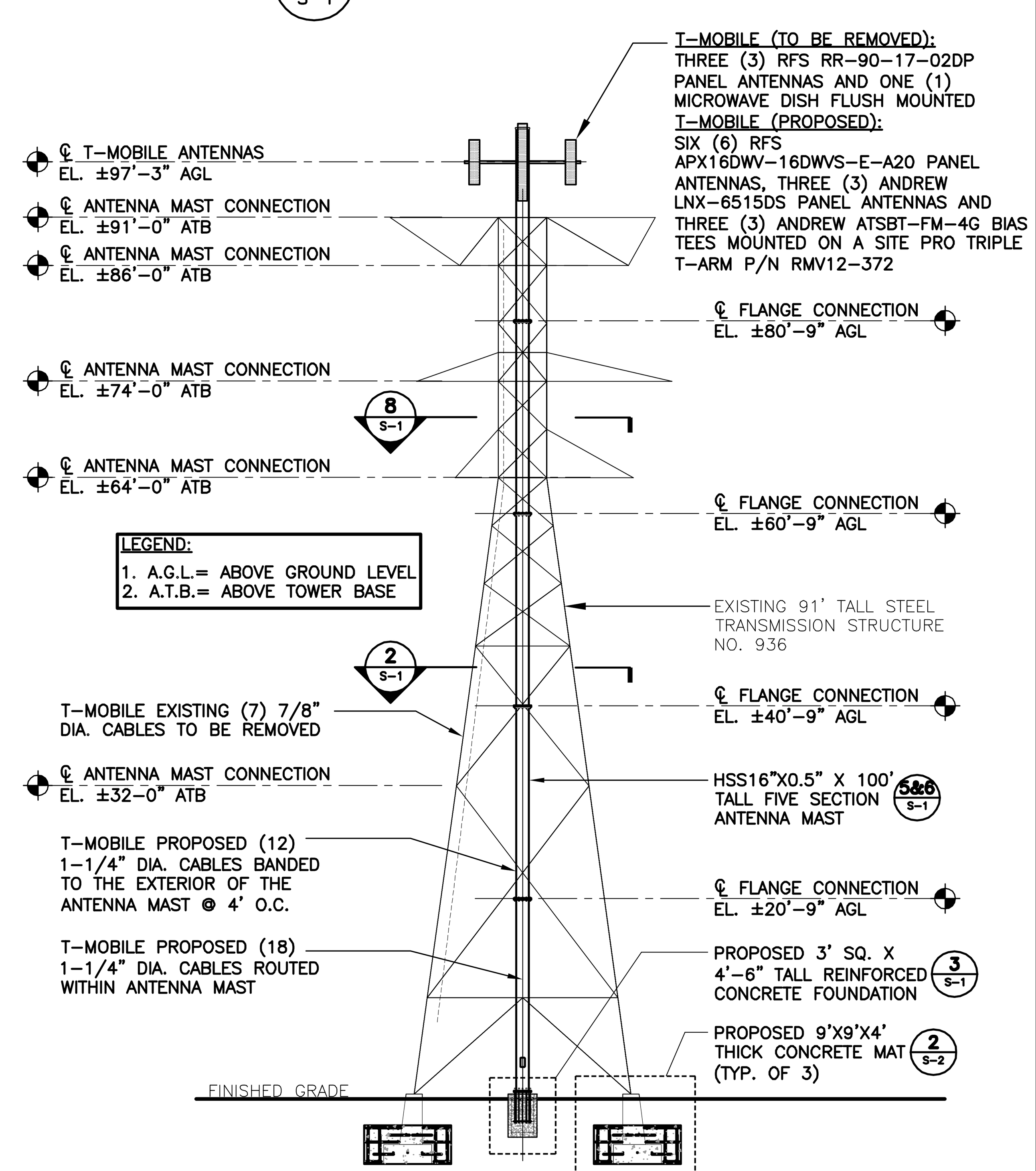
6 TYP. PIPE ELEVATION
S-1 SCALE: 1/2" = 1'-0"



5 TOP PIPE ELEVATION
S-1 SCALE: 1/2" = 1'-0"



3 FOUNDATION ELEVATION
S-1 SCALE: 3/4" = 1'-0"



1 TOWER + ANTENNA MAST ELEVATION
S-1 SCALE: NOT TO SCALE

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DATE: 02/18/16
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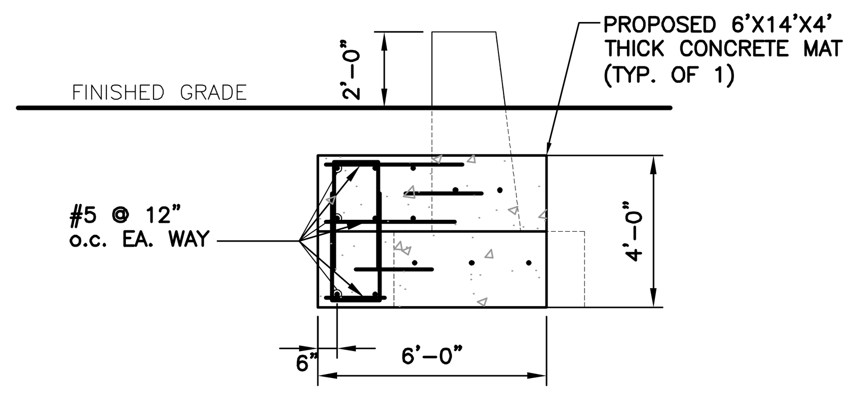
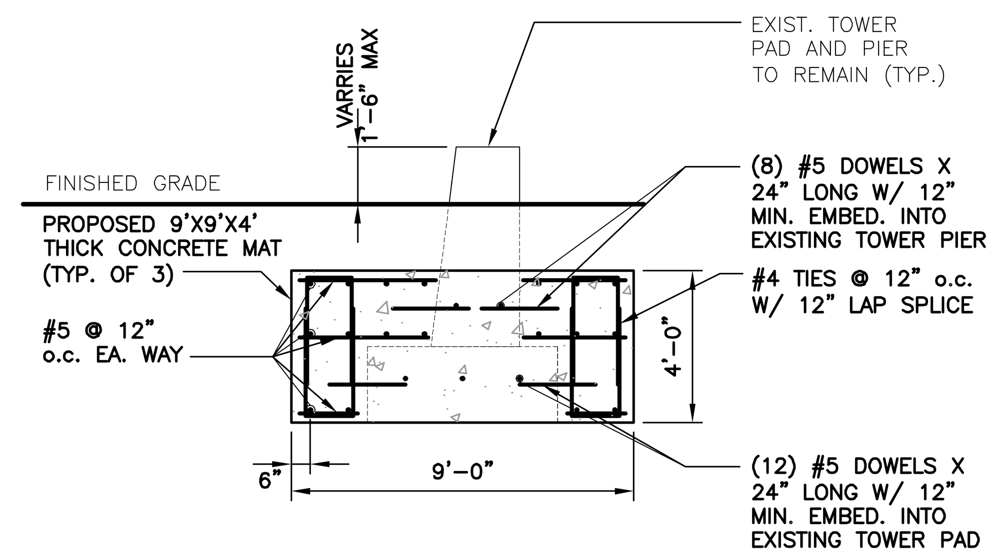
ANTENNA MAST DETAILS

S-1

Sheet No. 5 of 11



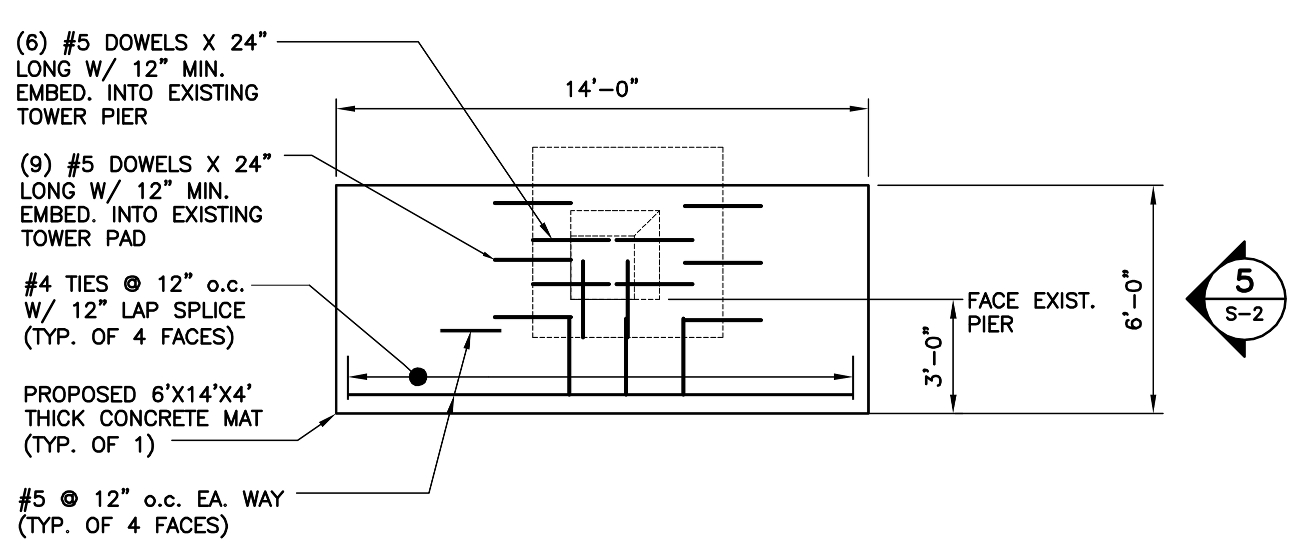
5
S-2
FOUNDATION REINFORCEMENT DETAIL (SE PIER)



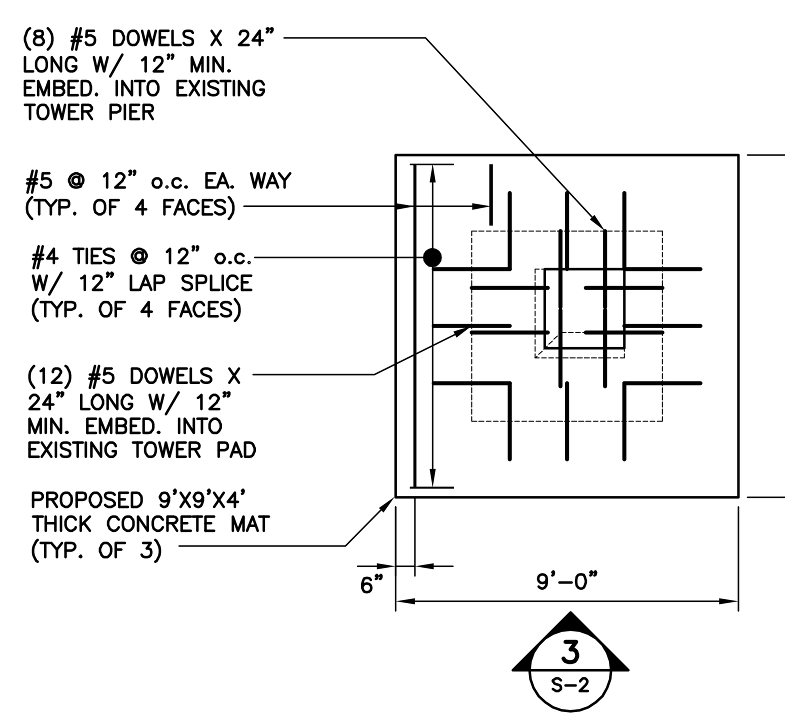
3
S-2
FOUNDATION REINFORCEMENT DETAIL (NW, NE, SW PIERS)

FOUNDATION PLAN NOTES:

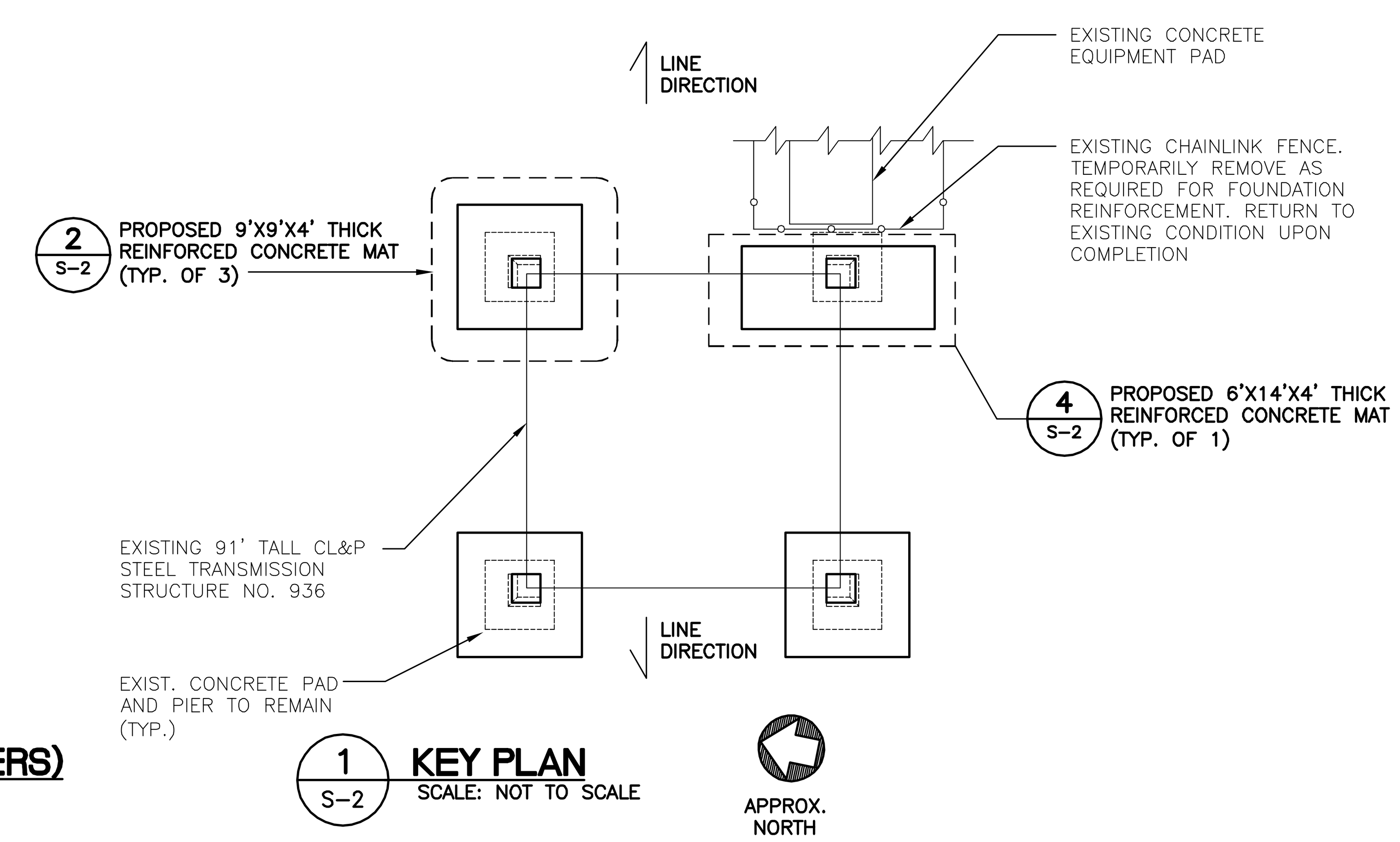
1. THE CONTRACTOR SHALL LIMIT THE FOUNDATION REINFORCEMENT WORK TO ONE TOWER LEG AT A TIME. CONSTRUCTION SHALL BE CONDUCTED IN WIND SPEEDS LESS THAN 15 MPH AND IN LOW ICE ACCUMULATION PERIODS. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.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



4
S-2
FOUNDATION REINFORCEMENT PLAN (SE PIER)
SCALE: 1/4" = 1'-0"



2
S-2
FOUNDATION REINFORCEMENT PLAN (NW, NE, SW PIERS)
SCALE: 1/4" = 1'-0"



1
S-2
KEY PLAN
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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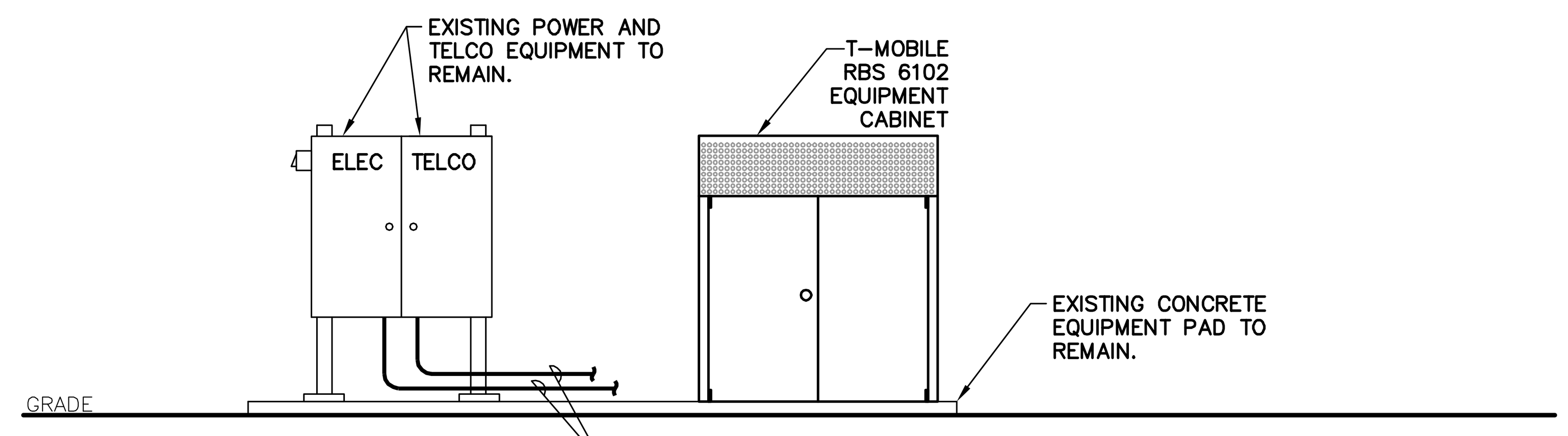
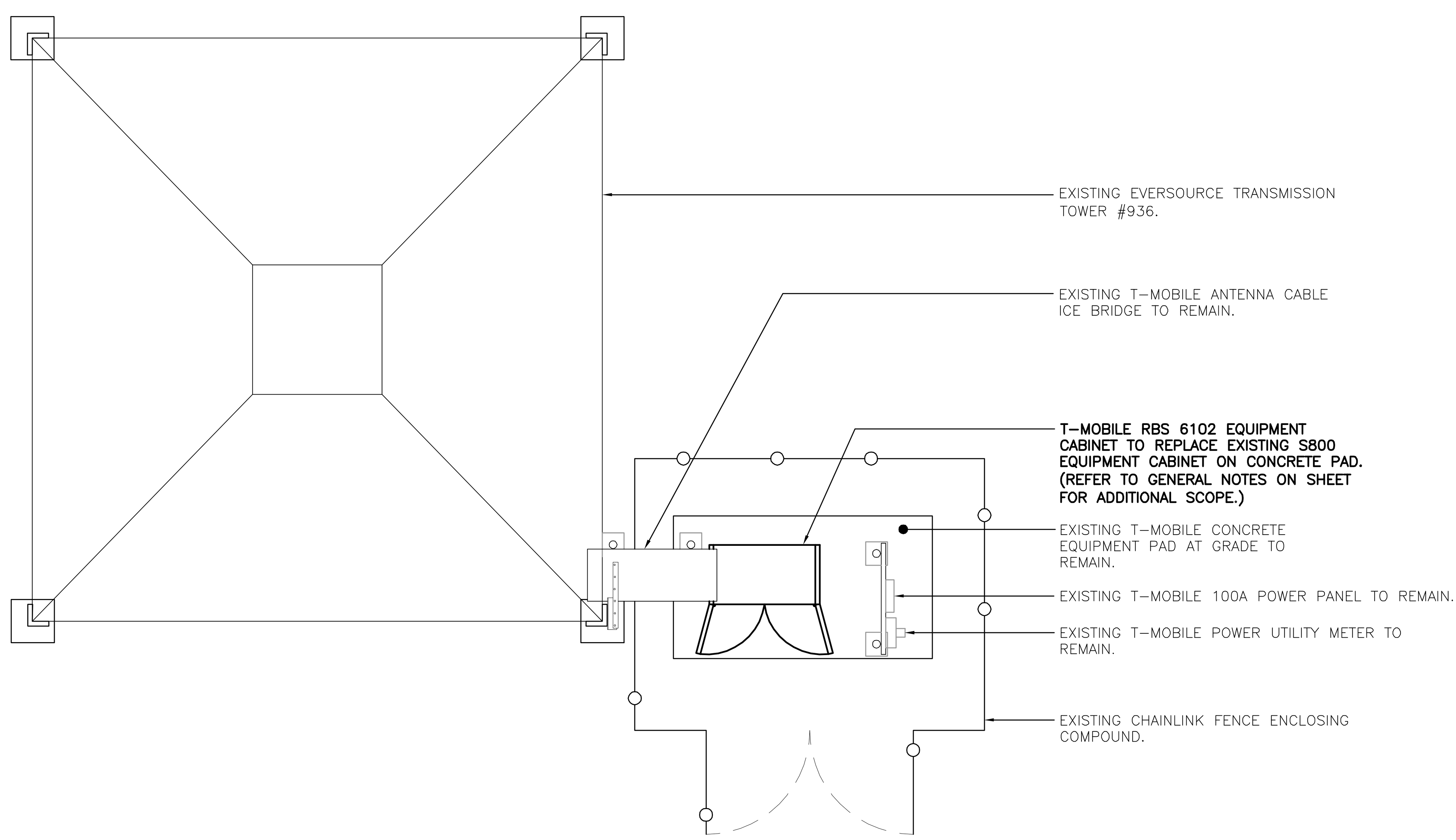
FOUNDATION REINFORCEMENT DETAILS

S-2

Sheet No. 6 of 11



2 / E-1 **ELECTRICAL POWER RISER DIAGRAM**
NOT TO SCALE



1 / E-1 **COMPOUND PLAN**
SCALE: 1/4" = 1'
APPROXIMATE NORTH

GENERAL NOTES

1. REFER TO CIVIL DRAWINGS FOR ACTUAL LOCATIONS OF STRUCTURES ON SITE.
2. COORDINATION, LAYOUT AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL / TELECOMMUNICATIONS SERVICES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
3. PROVIDE CADWELD CONNECTION STYLES: THROUGH (CABLE TO CABLE) TYPE "TA"
   (CABLE TO SURFACE) TYPE "LA" OR "VS" (PIPE)
   (CABLE TO ROD) TYPE "GT" OR "NC"
   (CABLE TO CABLE) TYPE "SS"
4. EXTEND UTILITY SERVICES TO OWNER'S EQUIPMENT. CONTRACTOR TO COORDINATE ALL UTILITY SERVICES TO NEW EQUIPMENT.
5. SCOPE OF WORK SHALL INCLUDE:
   A. REMOVAL OF EXISTING TOWER MOUNTED GROUNDING ASSOCIATED WITH EXISTING ANTENNA CABLE ROUTE.
   B. REMOVAL OF EXISTING RADIO CABINET AND ASSOCIATED HARDWARE, WIRING, CONTROLS, AND RELATED COMPONENTS.
   C. COORDINATION WITH OWNER FOR SEQUENCE OF CONSTRUCTION, AND SCHEDULING OF ALL OUTAGES.
   D. PROVIDING TEMPORARY POWER AND TELCO WIRING FOR TEMPORARY RADIO EQUIPMENT AS REQUIRED BY OWNER.
   E. PROVIDING ALL GROUNDING REQUIRED BY TOWER OWNER.
6. DESIGN BASED ON EXISTING OWNER'S GROUNDING SYSTEM TO BE IN PROPER WORKING CONDITION. REPORT ALL DEFICIENCIES TO OWNER.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
— — —	GROUND RING
	GROUND BAR
—o——o—	PERIMETER CHAIN LINK FENCE
■	EXOTHERMIC WELD TYPE "TA"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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144 CHESTNUT HILL ROAD
WILTON, CT 06897

DATE: 02/18/16
SCALE: AS NOTED
JOB NO. 15019.06

COMPOUND PLAN AND NOTES

E-1

Sheet No. 6 of 10

GROUNDING SCHEMATIC NOTES

1. #6 AWG.
2. #2/0 GREEN INSULATED.

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. GROUND CONDUCTORS SHOWN SHALL BE #2 AWG SOLID TINNED BCW UNLESS OTHERWISE NOTED OR REQUIRED BY CODE.
3. BOND CABLE TRAY AND ICE BRIDGE SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. ALL BONDS TO TOWER SHALL BE MADE IN STRICT ACCORDANCE WITH SPECIFICATIONS OF TOWER MANUFACTURER OR STRUCTURAL ENGINEER.
7. REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
8. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
9. COORDINATE ALL TOWER MOUNTED EQUIPMENT WITH OWNER.
10. ALL TOWER MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
11. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.
12. COORDINATE WITH EVERSOURCE TRANSMISSION DEPARTMENT REPRESENTATIVE TO DETERMINE ADDITIONAL GROUNDING REQUIREMENTS. PROVIDE ALL REQUIRED ELEMENTS TO MEET EVERSOURCE APPROVAL.
13. COORDINATE WITH TOWER OWNER BEFORE INSTALLING ANY GROUNDING ELEMENTS ON TOWER OR BONDING TO EXISTING TOWER GROUND RING.

CELLULAR GROUNDING NOTES

OBJECTIVE

PROVIDE A CELLULAR GROUNDING SYSTEM WITH MAXIMUM ALTERNATING CURRENT RESISTANCE OF 5 OHMS BETWEEN ANY POINT ON THE GROUNDING SYSTEM AND REFERENCE GROUND. PROVIDE EXTERIOR GROUNDING SCHEME WITH OWNER'S ENGINEER APPROVAL AS REQUIRED TO ACHIEVE DESIRED MAXIMUM AC RESISTANCE TO GROUND.

TESTING

CONTRACTOR TO PROVIDE AN INDEPENDENT TESTING CONTRACTOR TO DETERMINE THE GROUNDING SYSTEM RESISTANCE BY USE OF THE THREE POINT TEST AND AN AEMC MODEL 4500, OR APPROVED EQUAL. TEST TO BE PERFORMED PRIOR TO CONNECTION OF POWER SUPPLY TO THE CELL SITE AND CONNECTION OF THE GROUNDING SYSTEM TO THE WATER MAIN OR AC SUPPLY AS APPLICABLE.

CONDUCTOR USED FOR CELLULAR GROUNDING SYSTEM

EGR – #2 AWG ANNEALED SOLID TINNED BARE COPPER
IGR – #2 AWG ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION
INTER–BUS EXTENSION (FROM IGR TO EGR) – SEE DETAILS
EXTERNAL BOND CONNECTIONS TO EGR – #2 ANNEALED SOLID TINNED BARE COPPER
INTERIOR BOND CONNECTIONS TO IGR – #6 ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION

MINIMUM BENDING RADIUS

IGR #2 : 1'–0" NOMINAL AND 8" MINIMUM
EGR #2 : 2'–0" NOMINAL AND 8" MINIMUM
CELLULAR GROUNDING CONDUCTOR SHALL BE AS STRAIGHT AS POSSIBLE WITH MINIMUM 6" BENDING RADIUS.

FASTENER FOR CELLULAR GROUNDING CONDUCTOR

USE NON–METALLIC FASTENER AND STANDOFF 'CLIC' (AVAIL. FROM NEFCO 203–289–0285) TO SURFACE SUPPORT

CONDUCTOR 3" AWAY FROM SURFACES.

SPACING OF FASTENERS: 2'–0" O.C. OUTSIDE BUILDING
3'–0" O.C. INSIDE BUILDING

GROUNDING ELECTRODE

GROUNDING ELECTRODE SHALL BE 5/8" DIAZ. x 10'–0" l. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACE GROUNDING ELECTRODES 20'–0" APART (SPACING MAY BE REDUCED WHERE REQUIRED TO ACCOMMODATE FIELD CONDITIONS BUT SHALL NOT BE LESS THAN 10'–0"). ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'–6" BELOW FINISH GRADE.

CONNECTIONS ABOVE GRADE (MECHANICAL)

COMPRESSION LUG CONNECTOR – 15 TON COMPRESSION, 2 HOLE, LONG BARREL, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V RATED. USE 1/4" ø BOLT, 3/4" SPACING LUGS TO BOND OBJECTS FROM THE IGR. (CONNECTOR SHALL BE BURNDY HYLUG SERIES OR EQUAL.)

EXOTHERMIC WELD LUG CONNECTOR – 2 HOLE, OFFSET, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V. USE 1/2"ø BOLT, 1–3/4" SPACING LUGS. CONNECTOR SHALL BE CADWELD CONNECTION STYLE (CABLE TO SURFACE) TYPE LA, LUG SIZE 1/8 x 1. EXOTHERMIC WELD TO LUG AS REQUIRED.

C–TAP COMPRESSION CONNECTOR – HIGH CONDUCTIVITY COPPER FOR MAIN TO BRANCH LINE TAPPING. (CONNECTOR SHALL BE BURNDY HYTAP SERIES OR EQUAL.)

MECHANICAL CONNECTIONS

USE MATCHING MANUFACTURER TOOL AND DIE FOR COMPRESSION CONNECTION.

APPLY ANTI–OXIDANT CONDUCTIVITY ENHANCER COMPOUND ON SURFACES THAT ARE COMPRESSED.

SURFACES INTENDED TO BE CONNECTED WITH MECHANICAL CONNECTORS SHALL BE BARE METAL TO BARE METAL. PRIME AND PAINT OVER BONDED AREA TO PREVENT CORROSION.

WHEN BONDING #2 TO #2

EXTERIOR OF BUILDING – USE EXOTHERMIC WELD CONNECTION
INTERIOR OF BUILDING – USE COMPRESSION CONNECTION ON STRANDED CONDUCTORS ONLY.
– USE EXOTHERMIC WELD CONNECTION ON SOLID CONDUCTOR.

WHEN BONDING #2 TO FENCE POST

USE EXOTHERMIC WELD 'CADWELD TYPE VS' CONNECTION TO FENCE POST STEEL SURFACE. TEST WELD FOR POSSIBLE BURN THRU. PATCH WELDED AREA WITH GALVANIZED COATING AS REQUIRED FOR PROPER WELDED PERMANENT BOND. REFER TO MANUFACTURER'S REQUIREMENTS FOR DETAILS

GROUNDING SYSTEM INTERCONNECTION

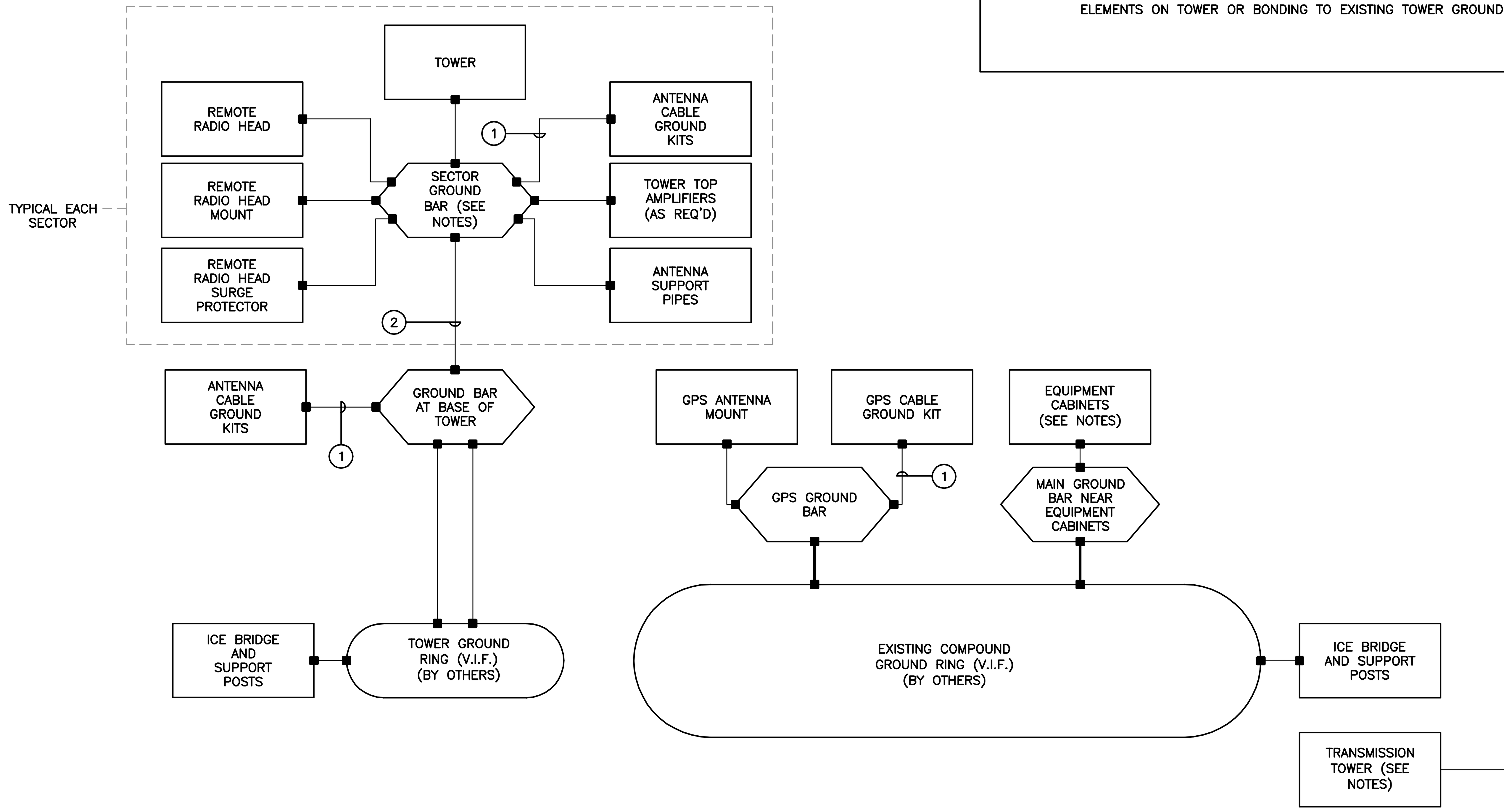
BOND THE EGR DOWN CONDUCTORS, AND/OR BURIED GROUND RING TO ANY METALLIC OBJECT OR EXISTING GROUNDING SYSTEM WITHIN 6'.

WHEN BONDING #2 TO TOWER GROUND PLATE

TOWER GROUND PLATE SHALL BE 6" x 8" x 1/4" COPPER AND BE MADE AVAILABLE TO TOWER CONTRACTOR TO BE INSTALLED DURING TOWER CONSTRUCTION. USE EXOTHERMIC WELD 'CADWELD TYPE HS' TO TOWER GROUND PLATE TEST WELD FOR POSSIBLE BURN THRU. COORDINATE THE SIZE OF THE MOUNTING HOLE WITH TOWER CONTRACTOR.

METALLIC CONDUITS

BOND ALL STEEL CONDUITS TO PANELS AT POINT OF CONTACT WITH APPROVED GROUNDING BUSHING.



1
E–2

SCHEMATIC RISER DIAGRAM

SCALE: N.T.S.

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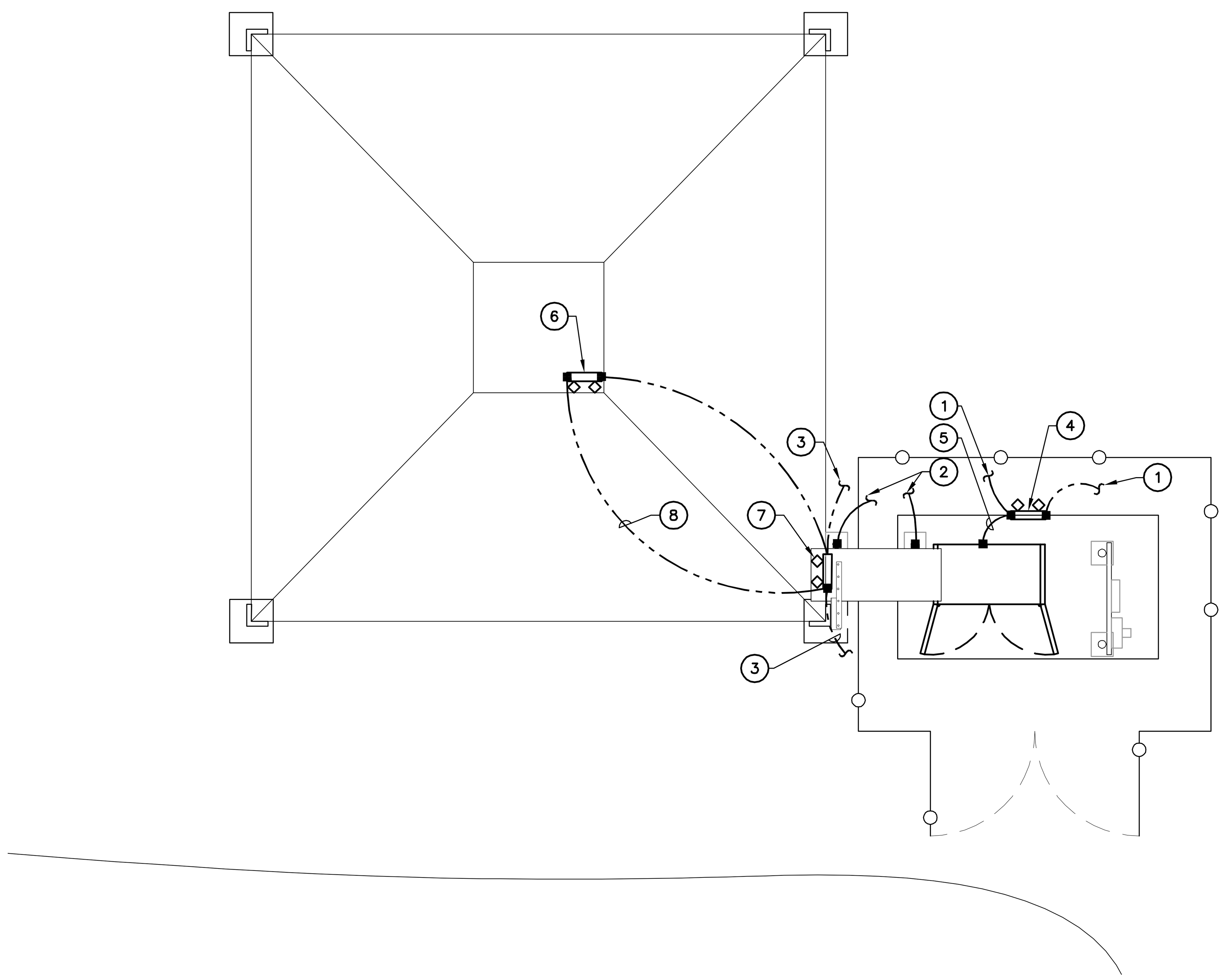
SCHEMATIC RISER DIAGRAM AND NOTES

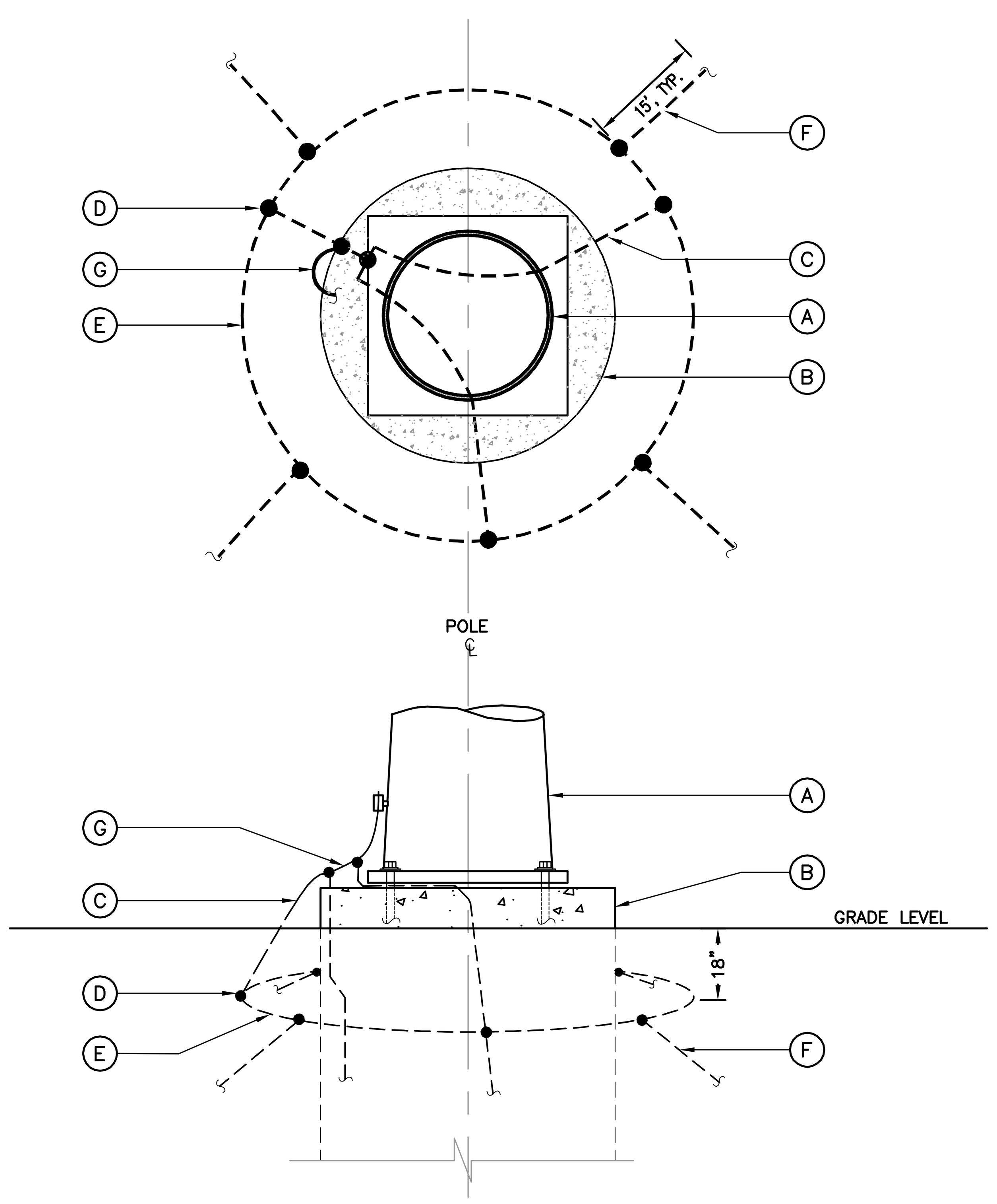
E–2

Sheet No. 7 of 10



1 E-3 **GROUNDING PLAN**
SCALE: 1/4" = 1'

APPROXIMATE NORTH



2 E-3 **EVERSOURCE TOWER GROUNDING DETAIL**
NOT TO SCALE

GROUNDING PLAN NOTES

1. BOND TO EXISTING COMPOUND GROUND RING.
2. ICE BRIDGE POST AND COVER. BOND EACH SECTION AND SUPPORT TO GROUND RING PER DETAILS.
3. BOND TO EXISTING TOWER GROUND RING.
4. GROUND BAR MOUNTED NEAR T-MOBILE EQUIPMENT. VERIFY LOCATION WITH CONSTRUCTION MANAGER.
5. BOND T-MOBILE EQUIPMENT CABINET PER MANUFACTURERS SPECIFICATIONS.
6. UPPER TOWER MOUNTED GROUND BAR.
7. LOWER TOWER MOUNTED GROUND BAR.
8. BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR. (2 GROUND LEADS) PER DETAILS.

GENERAL NOTES:

1. TOWER AND COMPOUND GROUND RINGS ARE TO BE PROVIDED BY OTHERS. VERIFY LOCATION IN FIELD.
2. FIELD VERIFY ALL EXISTING ELEMENTS PRIOR TO USE.
3. EXISTING CONDUITS, CONDUCTORS, AND OTHER EQUIPMENT MAY BE REUSED WITH T-MOBILE APPROVAL AND ONLY IF THEY ARE THOROUGHLY TESTED AND MEET T-MOBILE STANDARDS AND SATISFY THE SPECIFICATIONS WITHIN THESE PLANS AND CURRENT CODE REQUIREMENTS.

EVERSOURCE TOWER GROUNDING NOTES:

(EVERSOURCE REQUIREMENTS)

A. STEEL HYBRID POLE.

B. CONCRETE CAISSON TYPE FOUNDATION.

C. STRANDED COPPERWELD SPOKE FROM POLE GROUND TO GRADING RING. SPOKES ARE A CONTINUATION OF STRANDED COPPERWELD COUNTERPOISE CONNECTING GRADING RING TO POLE GROUND. SPOKES TO SLOPE ON STRAIGHT LINE FROM GROUND LEVEL TO GRADING RING.

D. PARALLEL GROVE CONNECTOR, EVERSOURCE SC190052.

E. GRADING RING @ 18" MINIMUM BELOW GRADE AND 24" TO 30" FROM TOWER FOUNDATION. GRADING RING TO BE 3 NO. 8 STRANDED ANNEALED COPPERWELD.

F. COUNTERPOISE, 3 NO. 8 STRANDED ANNEALED COPPERWELD (TYPICAL).

G. COPPERWELD POLE GROUND.

GENERAL NOTES:

1. THE INFORMATION ON THIS SHEET REPRESENTS TYPICAL EVERSOURCE GROUNDING REQUIREMENTS. CONTRACTOR MUST COORDINATE WITH EVERSOURCE SITE MANAGER FOR SPECIFIC (AND CURRENT) GROUNDING REQUIREMENTS AT THIS SITE.

EVERSOURCE - TOWER GROUNDING SYSTEM NOTES

GENERAL-

1. THE OWNER WILL FURNISH THE WIRE, CONNECTORS, AND MISCELLANEOUS MATERIAL ASSOCIATED WITH THE COUNTERPOISE GROUNDING SYSTEM.
2. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO INSTALL THE GROUNDING SYSTEM AND TO REHABILITATE THE RIGHT-OF-WAY AS CLOSE AS POSSIBLE TO ITS ORIGINAL CONDITION.
3. THE CONTRACTOR SHALL HANDLE AND TRANSPORT THE OWNER SUPPLIED MATERIAL FROM THE OWNER'S STOREROOMS AND YARDS TO THE JOB SITE AND SHALL RETURN SURPLUS MATERIAL AND EMPTY REELS TO DESIGNATED STOREROOMS AND YARDS UPON COMPLETION OF THE CONTRACT.
4. EVERSOURCE WILL BE RESPONSIBLE FOR PERFORMING TESTS FOR SURGE IMPEDANCE AND WAVE IMPENDENCE.

INSTALLATION-

1. UNLESS OTHERWISE DIRECTED BY THE OWNER'S REPRESENTATIVE, COUNTERPOISE SHALL BE BURIED A MINIMUM OF 24" IN CULTIVATED AREAS AND 18" IN WOODED OR OTHER AREAS. IN ROCKY AREAS OR WHERE OBSTRUCTIONS ARE ENCOUNTERED, THE COUNTERPOISE SHALL BE DIVERTED AROUND SUCH OBSTRUCTIONS. ALL INSTALLATIONS SHALL INCLUDE CONNECTIONS TO EXISTING OR PROPOSED STRUCTURES, AND SUCH CONNECTIONS SHALL BE MADE BELOW GROUND USING BOLTED PARALLEL GROVE CONNECTORS.
2. WHERE MULTIPLE STRUCTURE GROUNDS EXIST AT MULTI POLE STRUCTURES, THEY SHALL BE CONNECTED TOGETHER WITH BURIED COPPERWELD WIRE, BUT ONLY IF SUCH GROUNDS HAVE METALLIC CONNECTIONS UP THE POLES TO THE SHIELD WIRE(S). AT STRUCTURES THAT HAVE PALE GROUNDS AND ALSO POLE GUY GROUNDS, CONNECTIONS SHALL BE MADE ONLY TO THE POLE GROUNDS, AND THE MINIMUM SPACING BETWEEN THE COUNTERPOISE AND ANCHOR RODS SHALL BE 10'. AT WOOD POLE STRUCTURES WHERE NO SUCH POLE GROUND EXISTS, COUNTERPOISE CONNECTIONS SHALL BE MADE TO THE POLE TOP GUYS.
3. FOR SINGLE CONTINUOUS (TYPE A) AND SINGLE BROKEN (TYPE B) COUNTERPOISE, THE WIRE SHALL IN GENERAL BE LAYED AT THE CENTERLINE OF THE TRANSMISSION LINE. FOR DOUBLE CONTINUOUS (TYPE C) AND DOUBLE BROKEN (TYPE D) COUNTERPOISE, THE WIRES SHALL IN GENERAL SHALL BE LAYED UNDER THE OUTSIDE PHASE WIRES OF THE TRANSMISSION LINE. COUNTERPOISE SHALL NOT BE INSTALLED ACROSS BROOKS, RIVERS, HIGHWAYS, RAILROADS, OR IN THE VICINITY OF TELEPHONE CABLES OR PIPELINES.
4. AT STEEL POLE STRUCTURES, A BURIED GRADING RING AND SPOKES SHALL ALSO BE INSTALLED AROUND THE STRUCTURE UNLESS THE STRUCTURE HAS A PAD AND PIER FOUNDATION OR UNLESS A RING ALREADY EXISTS. COUNTERPOISE WIRE SHALL BE CONNECTED AT TWO PLACES TO EACH RING, AND COPPERWELD SPOKES SHALL SLOPE LINEARLY UP TO THE STRUCTURE GROUND.
5. AT WOOD POLE STRUCTURES, AN 8' LENGTH OF PLASTIC MOLDING SHALL BE STAPLED OVER THE BOTTOM WITH 8' OF DOWNLEAD.

GROUND RODS-

1. WHERE GROUND RODS ARE REQUIRED, THEY SHALL BE SINGLE OR SECTIONAL WITH THE LENGTH SPECIFIED. THEY SHALL BE DRIVEN VERTICALLY INTO THE GROUND TO A DEPTH WHICH WILL LEAVE THE TOP OF THE ROD AT LEAST 12" BELOW GRADE. ALL RODS SHALL BE CONNECTED TO COUNTERPOISE OR TO POLE GROUNDS USING BOLTED CONNECTORS.

REHABILITATION-

1. SELECTIVE CLEARING PROCEDURES WERE USED IN THE DEVELOPMENT OF THE RIGHT-OF-WAY, AND GROWTH OF SELECTED SPECIES HAS BEEN SAVED. THE CONTRACTOR SHALL NOT VIOLATE THE OWNER'S INTENT TO SAVE SELECTIVE SPECIES AND IMPOSE THE MINIMUM ENVIRONMENTAL IMPACT ON THE RIGHT OF WAY DURING THE EXECUTION OF THE WORK. THE CONTRACTOR SHALL REVIEW THE ROUTING OF EACH SECTION OF COUNTERPOISE WITH THE OWNER'S REPRESENTATIVE PRIOR TO ITS FIELD SPECIFIED LOCATION. THE CONTRACTOR IS RESPONSIBLE TO THE OWNER FOR DAMAGES TO THE RIGHT-OF-WAY IN OTHER THAN THE FIELD SPECIFIED LOCATIONS.
2. ANY BRUSH ALONG THE FIELD SPECIFIED COUNTERPOISE ROUTES WHICH IS LEFT IN AN UNSIGHTLY CONDITION BY THE INSTALLATION WORK WILL BE CUT TO THE GROUND BY THE CONTRACTOR AND LEFT IN SMALL, NEAT PILES IN PLACE WHERE CUT.
3. IN LOCATIONS WHERE EXCAVATION FOR THE INSTALLATION OF COUNTERPOISE BRINGS TO THE SURFACE ANY SMALL BOULDERS, THEY WILL BE BACKFILLED BELOW GRADE OR DISPERSED ON THE RIGHT-OF-WAY AS THE OWNER'S REPRESENTATIVE MAY DIRECT. INSTALLATION OF THE COUNTERPOISE SHALL NOT RESULT IN A PATH OF SMALL BOULDERS ON THE FINISHED SURFACE.
4. THE OWNER ANTICIPATES THAT SEASONAL CONDITIONS MAY NOT ALLOW PERMANENT REHABILITATION OF WORK SITES AND THE RIGHT-OF-WAY UPON COMPLETION OF THE INSTALLATION OF THE COUNTERPOISE. WHERE TEMPORARY REHABILITATION HAS BEEN COMPLETED IN ADVERSE SEASON, THE CONTRACTOR SHALL TAKE THE FOLLOWING STEPS:
   A. WATERBARS WILL BE CONSTRUCTED ON ACCESS ROADS AND TRENCH LINES TO SHUNT WATER OFF THIS LINE OF DISTURBED SURFACES AND CONTROL EROSION ALONG THE DISTURBED SURFACE.
   B. ALL DISTURBED SURFACES OF FOUNDATION SITES OR ALONG TRENCH LINES OR ACCESS ROADS WILL BE GRADED AND COVERED WITH HAY MULCH. SUCH DISTURBED SY=URFACES ON SLOPES GREATER THAN ONE (VERTICAL) ON FOUR (HORIZONTAL) SHALL BE COVERED WITH WOOD CHIPS.
5. AS DRYING CONDITIONS PERMIT IN THE SPRING, FOLLOWING COMPLETION OF THE INSTALLATION OF COUNTERPOISE, PERMANENT REHABILITATION OF ALL DISTURBED OR ERODED SURFACES SHALL BE ACCOMPLISHED AS FOLLOWS:
   A. LAWNS, GOLF COURSES, CEMETERIES AND OTHER SIMILAR OCCUPANCIES SHALL BE LOAMED, GRADED, FERTILIZED, SEEDED AND WHERE APPROPRIATE, MULCHED, TO ESTABLISH A REHABILITATION CONSISTENT WITH THE USE ESTABLISHED BY THE OCCUPANT.
   B. GARDENS, OTHER CULTIVATED AREAS AND PASTURES, SHALL BE GRADED AND TOPSOILED TO RESTORE THE DEPTH OF FERTILE SOIL COMMON TO THE ADJACENT GROUND. WHERE APPROPRIATE, SEEDING SHALL BE DONE IN ACCORDANCE WITH STEP C BELOW.
   C. THE CONTRACTOR SHALL SEED ALL DISTURBED AREAS ALONG THE NEW COUNTERPOISE ROUTES. SEED SHALL BE SPREAD AT THE RATE OF 100 LBS. PER ACRE AND SHALL BE AS FOLLOWS OR APPROVED EQUAL:

	% BY WEIGHT	% BY GERMINATION	% BY PURITY
CREEPING RED FESCUE	30	85	98
DOMESTIC RYE	20	90	98
KENTUCKY TALL FESCUE	50	---	---
	100		

   D. ALL OTHER DISTURBED AREAS INCLUDING REMAINING FOUNDATION SITES, ACCESS ROADS, AND REPAIR OF EROSION OF SITUATION SHALL BE SEEDED WITH MIXED SPECIFICATION ABOVE. IN REMOTE AREAS, A CONSERVATION MIX, AS USED BY THE CONNECTICUT STATE PARKS AND FOREST COMMISSION MAY BE SUBSTITUTED. ALL AREAS WHICH EXPERIENCED EROSION DAMAGE AND ALL SLOPES OVER ONE (VERTICAL) AND FOUR (HORIZONTAL) WHERE TEMPORARY REHABILITATION WORK HAS BEEN DONE SHALL BE REMULCHED.
6. IT IS IMPERATIVE THAT PERMANENT REHABILITATION BE ACCOMPLISHED IN GOOD TIME, WHICH WILL ALLOW THE OCCUPANT FULL AND UNDISTURBED USE OF THE SITE IN THE SUCCEEDING SEASON, AND TO PREVENT UNNECESSARY AND UNREASONABLE SPREADING OF CONTINUATION OF DISTURBED SURFACES.
7. ANY BRUSH ALONG THE ACCESS ROADS WHICH IS LEFT IN AN UNSIGHTLY CONDITION BY THE WORK CONDUCTED, SHALL BE CUT TO THE GROUND BY THE CONTRACTOR AND LEFT IN SMALL NEAT PILES IN PLACE WHERE CUT.

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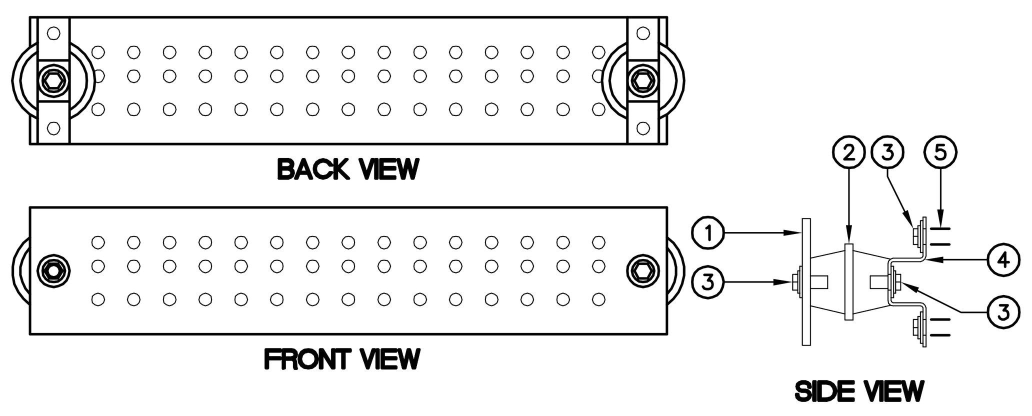
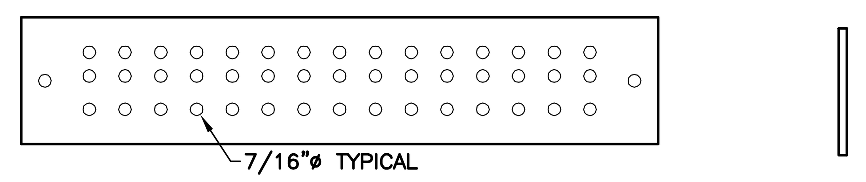
COMPOUND GROUNDING PLAN

E-3

Sheet No. 8 of 10



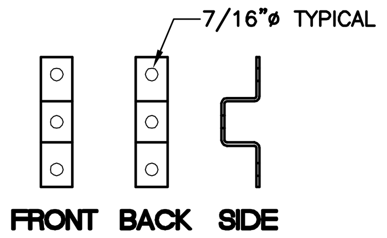
TYPICAL GROUND BAR ASSEMBLY
N.T.S.



TYPICAL GROUND BAR - DIMENSIONS
N.T.S.

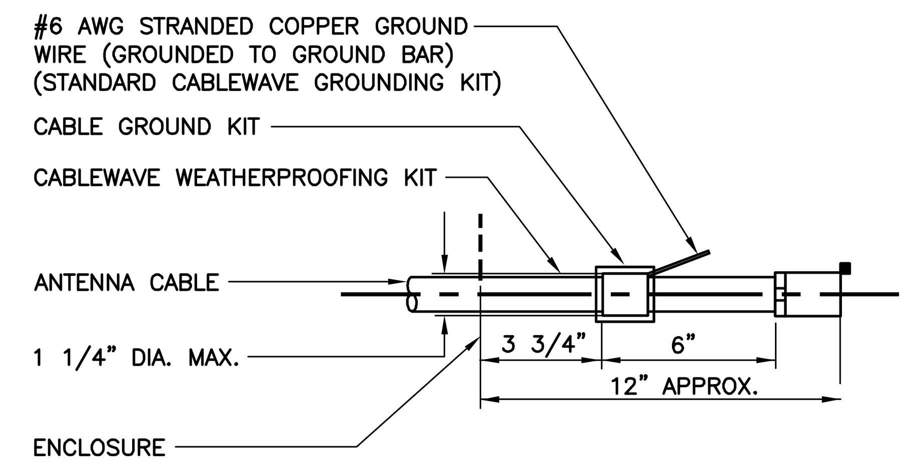
NOTES

1. HIGH CONDUCTIVITY TINNED COPPER BAR 1'-8"Lx4"Wx1/4"D.
2. RED COLORED STANDOFF INSULATOR PLASTIC #1872-1A.
3. STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS, SPLIT LOCKWASHER AND FLAT WASHER.
4. 1"Wx1/8"T STAINLESS STEEL TYPE 304 BRACKET.
5. STAINLESS STEEL TYPE 304 HARDWARE – 3/8"ø EXPANSION BOLT FOR CONCRETE.



BRACKET FOR GROUND BAR-DIMENSIONS
N.T.S.

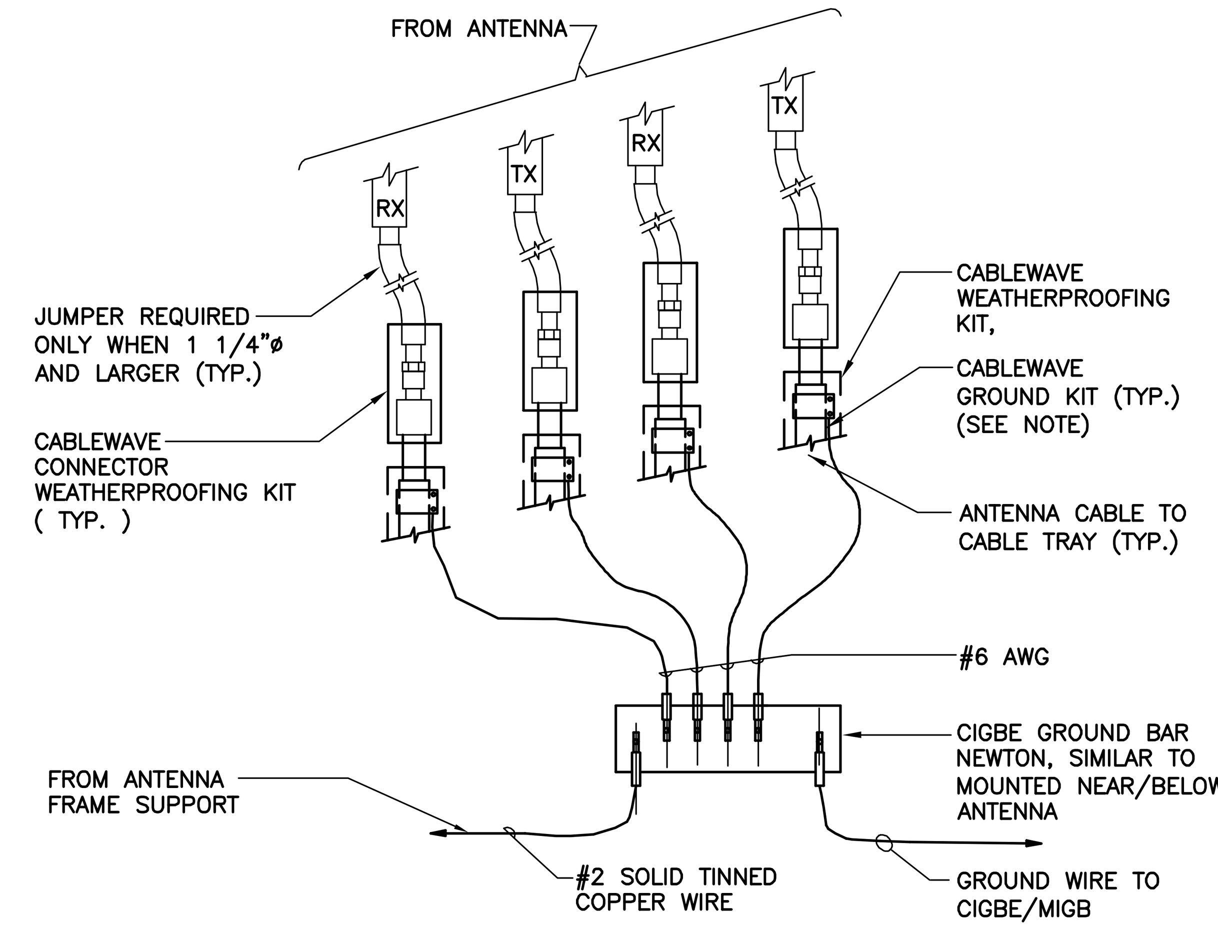
1 (E-4) MASTER/EQUIPMENT GROUND BAR DETAILS
N.T.S.



NOTES:

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

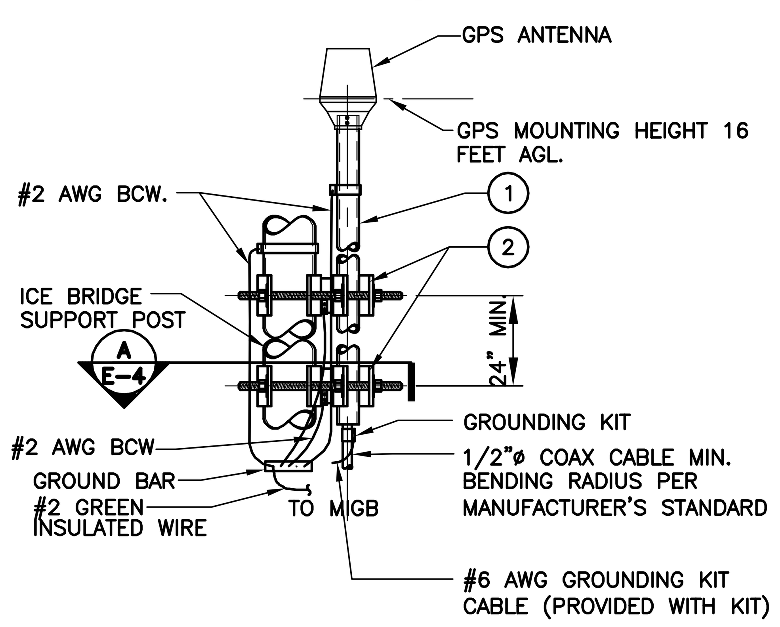
2 (E-4) ANTENNA CABLE GROUNDING DETAIL
NOT TO SCALE



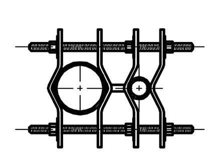
NOTES:

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

3 (E-4) CONNECTION OF GROUND WIRES TO GROUND BAR
NOT TO SCALE



GPS ANTENNA MOUNTING BRACKET



A (E-4) SECTION
NOT TO SCALE

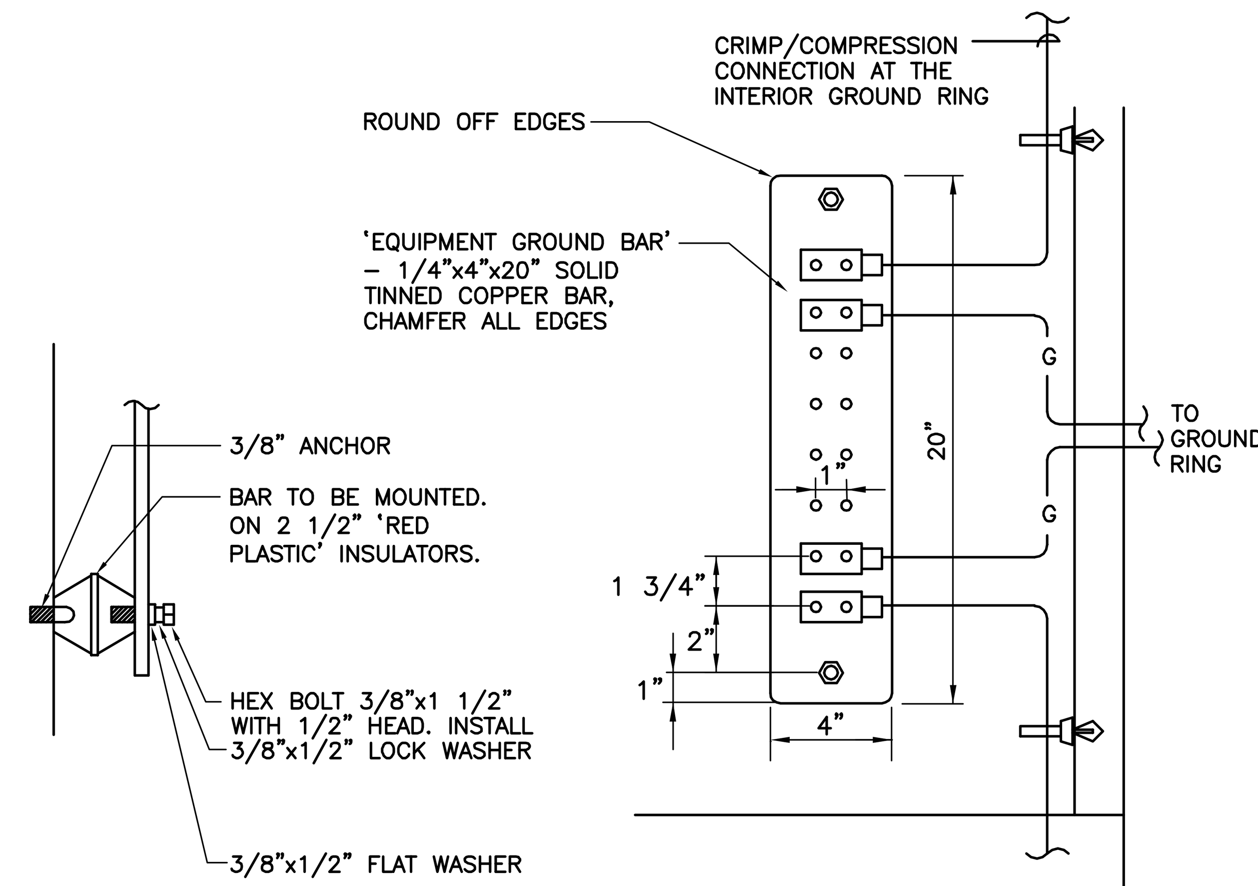
BILL OF MATERIALS

ITEM	DESCRIPTION	QUANTITY
1	2-1/2"ø SCH. 40 x 8'-0" LG. MAX SS OR GALV. PIPE	1
2	UNIVERSAL CLAMP SET.	2

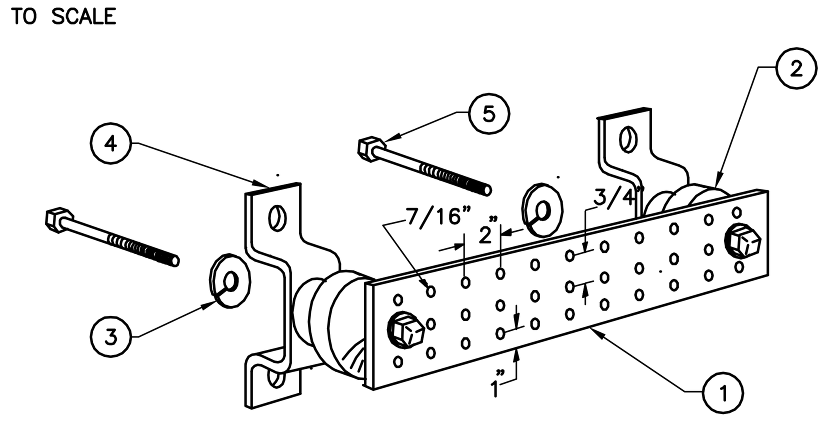
NOTES

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARD 2-1/2" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE MUST NOT BE THREADED AT THE ANTENNA MOUNT END. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH (MINIMUM OF 24 INCHES) USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.

4 (E-4) GPS GROUNDING/MOUNTING BRACKET DETAIL
NOT TO SCALE



5 (E-4) EQUIPMENT GROUND BAR DETAIL
NOT TO SCALE

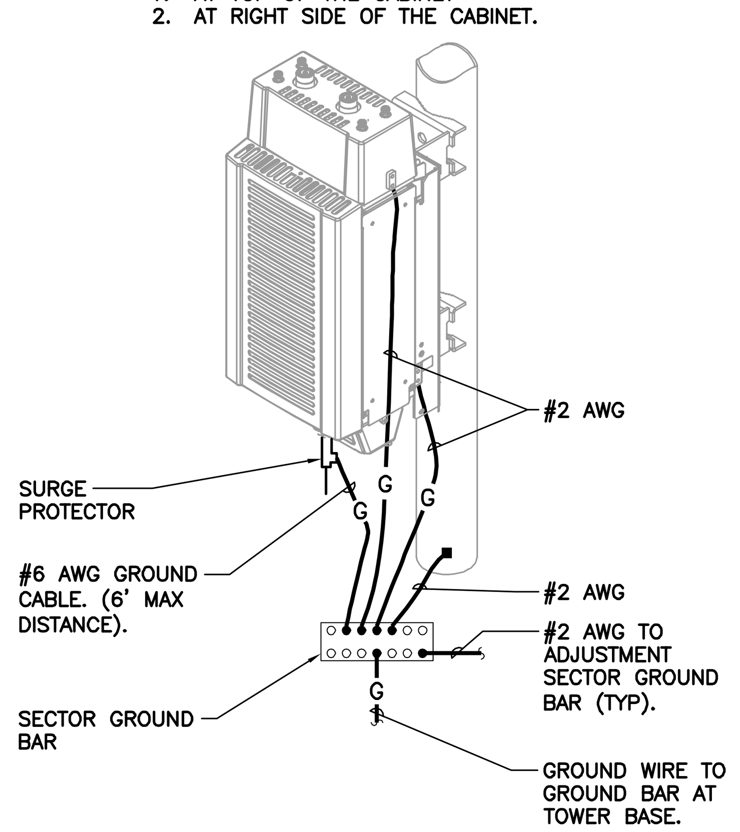


NOTES

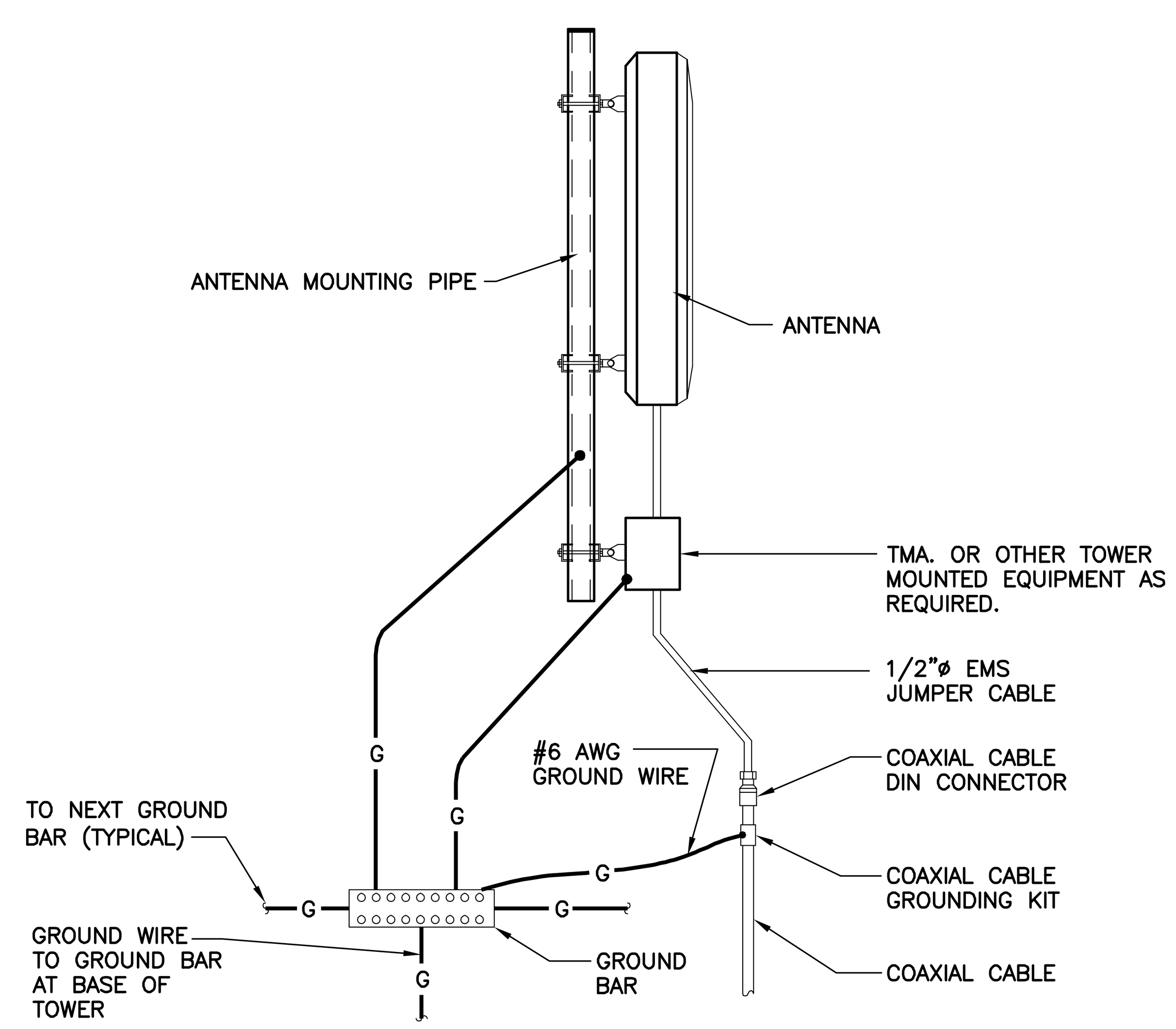
1. TINNED COPPER GROUND BAR, 1/4" x 4" x 20", NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 x 1" STAINLESS STEEL TRUSS SPANNER MACHINE SCREWS.

6 (E-4) GROUND BAR DETAIL
NOT TO SCALE

EACH RRH CABINET SHALL BE GROUNDED IN THE FOLLOWING MANNER:
1. AT TOP OF THE CABINET
2. AT RIGHT SIDE OF THE CABINET.



7 (E-4) RRH POLE MOUNT GROUNDING
NOT TO SCALE



8 (E-4) TYPICAL ANTENNA GROUNDING DETAIL
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	02/25/16	TJB	TGK	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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WILTON, CT 06897

DATE:	02/18/16
SCALE:	AS NOTED
JOB NO.	15019.06

ELECTRICAL DETAILS

E-4

Sheet No. 9 of 10

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.01. SCOPE OF WORK

A. WORK SHALL INCLUDE ALL LABOR, EQUIPMENT AND SERVICES REQUIRED TO COMPLETE (MAKE READY FOR OPERATION) ALL THE ELECTRICAL WORK INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

1. FEEDERS AND BRANCH CIRCUIT WIRING TO PANELS, RECEPTACLES, EQUIPMENT, LIGHTING FIXTURES, ETC. AS INDICATED OR NOTED ON PLANS.
2. CELLULAR SITE ALARMS, ASSOCIATED WIRING AND DEVICES.
3. CELLULAR GROUNDING SYSTEMS, CONSISTING OF ANTENNA GROUNDING, INTERIOR GROUNDING RING, GROUND BARS, ETC.
4. FIELD MEASURE EXISTING ELECTRICAL SERVICES TO CONFIRM AVAILABLE EXISTING POWER.
5. COORDINATE ALL WORK SHOWN, ON THESE PLANS WITH LOCAL UTILITY COMPANIES.

B. CONTRACTOR SHALL CONFER WITH LOCAL UTILITY COMPANIES TO ASCERTAIN THE LIMITS OF THEIR WORK AND SHALL INCLUDE IN BID ANY CHARGES OR FEES MADE BY THE UTILITY COMPANIES FOR THEIR PORTION OF THE WORK AND SHALL PROVIDE AND INSTALL ALL ITEMS REQUIRED, BUT NOT PROVIDED BY UTILITY COMPANY.

C. ELECTRICAL CONTRACTOR SHALL COORDINATE ELECTRICAL INSTALLATION WITH ELECTRIC UTILITY CO. PRIOR TO INSTALLATION.

D. CONTRACTOR SHALL COORDINATE WITH TELEPHONE UTILITY COMPANY FOR LOCATION OF TELEPHONE SERVICE AND TO DETERMINE ANY REQUIRED EQUIPMENT TO BE INSTALLED BY CONTRACTOR.

1.02. GENERAL REQUIREMENTS

A. 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.

B. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNERS REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.

C. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES THAT MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS THAT MAY BE REQUIRED BY THE LOCAL AUTHORITY.

D. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH LOCAL TELEPHONE COMPANY THAT MAY BE REQUIRED FOR THE INSTALLATION OF TELEPHONE SERVICE TO THE PROPOSED CELLULAR SITE.

F. NO MATERIAL OTHER THAN THAT CONTAINED IN THE "LATEST LIST OF ELECTRICAL FITTINGS" APPROVED BY THE UNDERWRITERS' LABORATORIES, SHALL BE USED IN ANY PART OF THE WORK. ALL MATERIAL FOR WHICH LABEL SERVICE HAS BEEN ESTABLISHED SHALL BEAR THE U.L. LABEL.

G. 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.

H. 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.

I. THE ELECTRICAL CONTRACTOR SHALL SUPPLY THREE (3) COMPLETE SETS OF APPROVED DRAWINGS, ENGINEERING DATA SHEETS, MAINTENANCE AND OPERATING INSTRUCTION MANUALS FOR ALL SYSTEMS AND THEIR RESPECTIVE EQUIPMENT. THESE MANUALS SHALL BE INSERTED IN VINYL COVERED 3–RING BINDERS AND TURNED OVER TO OWNER'S REPRESENTATIVE ONE (1) WEEK PRIOR TO FINAL PUNCH LIST.

J. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER AND WILL BE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE.

K. ALL EQUIPMENT AND MATERIALS TO BE INSTALLED SHALL BE NEW, UNLESS OTHERWISE NOTED.

L. BEFORE FINAL PAYMENT, THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF PRINTS (AS–BUILTS), LEGIBLY MARKED IN RED PENCIL TO SHOW ALL CHANGES FROM THE ORIGINAL PLANS.

M. PROVIDE TEMPORARY POWER AND LIGHTING IN WORK AREAS AS REQUIRED.

N. SHOP DRAWINGS:

1. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF SHOP DRAWINGS ON ALL EQUIPMENT AND MATERIALS PROPOSED FOR USE ON THIS PROJECT, GIVING ALL DETAILS, WHICH INCLUDE DIMENSIONS, CAPACITIES, ETC.
2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

O. ENTIRE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH OWNER'S SPECIFICATIONS, AND REQUIREMENTS OF ALL LOCAL AUTHORITIES HAVING JURISDICTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH APPROPRIATE INDIVIDUALS TO OBTAIN ALL SUCH SPECIFICATIONS AND REQUIREMENTS. NOTHING CONTAINED IN, OR OMITTED FROM, THESE DOCUMENTS SHALL RELIEVE CONTRACTOR FROM THIS OBLIGATION.

SECTION 16111

1.01. CONDUIT

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". ALL CONDUIT RUNS LOCATED WITHIN THE OWNER'S EQUIPMENT ROOM SHALL ORIGINATE FROM THE WIREWAY AND RUN VERTICALLY TO ITS DESTINATION. NO BENDS WILL BE ACCEPTED. CONDUITS SHALL BE PROPERLY FASTENED TO THE WALLS AND CEILINGS AS REQUIRED BY THE N.E.C.

CONDUIT MATERIAL SHALL BE AS FOLLOWS:

1. ELECTRIC METALLIC TUBING (EMT) – BRANCH CIRCUITS INSIDE WIRELESS ROOM
2. GALVANIZED RIGID CONDUIT (GRC) – FEEDERS AND CIRCUITS EXPOSED TO EXTERIOR & UNDERGROUND.
3. LIQUID TIGHT FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'–0") WIRING TO VIBRATING EQUIPMENT (HVAC UNITS, MOTORS, ETC.) IN WET LOCATIONS.
4. FLEXIBLE METAL CONDUIT – FOR SHORT LENGTHS (MAX. 3'–0") WIRING TO VIBRATING EQUIPMENT IN DRY LOCATIONS.
5. PVC CONDUIT – WHERE SHOWN ON GROUNDING DETAILS.

SECTION 16114

1.01. CABLE TRAY

A. CABLE TRAY SHALL BE SOLID SIDE BAR, 18" WIDE (NEWTON INSTRUMENT COMPANY, INC.). TRAY SHALL BE INSTALLED AS SHOWN ON CONTRACT DOCUMENTS.

B. CROSSWISE RUNS SHALL BE COORDINATED WITH THE SPECIFIC EQUIPMENT THE TRAY SHALL SERVE.

C. ALL PROTRUDING CABLE TRAY SUPPORT RODS SHALL BE FILED SMOOTH WITH NO SHARP EDGES. ALL SUPPORT RODS SHALL BE CAD–PLATED FOR RUST RESISTANCE AND A MINIMUM 1/2" DIAMETER.

SECTION 16123

1.01. CONDUCTORS

A. 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:

	120/208/240V	277/480V
LINE	COLOR	COLOR
A	BLACK	BROWN
B	RED	ORANGE
C	BLUE	YELLOW
N	CONTINUOUS WHITE	GREY
G	CONTINUOUS GREEN	GREEN WITH YELLOW STRIPE

B. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.

SECTION 16130

1.01. BOXES

A. FURNISH AND INSTALL OUTLET BOXES FOR ALL DEVICES, SWITCHES, RECEPTACLES, ETC.. BOXES TO BE ZINC COATED STEEL.

B. FURNISH AND INSTALL PULL BOXES IN MAIN FEEDERS RUNS WHERE REQUIRED. PULL BOXES SHALL BE GALVANIZED STEEL WITH SCREW REMOVABLE COVERS, SIZE AND QUANTITY AS REQUIRED. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

SECTION 16170

1.01. DISCONNECT SWITCHES

A. FUSIBLE AND NON–FUSIBLE, 600V, HEAVY DUTY DISCONNECT SWITCHES SHALL BE AS MANUFACTURED BY SQUARE "D". PROVIDE FUSES AS CALLED FOR ON THE CONTRACT DRAWINGS. AMPERE RATING SHALL BE CONSISTENT WITH LOAD BEING SERVED. DISCONNECT SWITCH COVER SHALL BE MECHANICALLY INTERLOCKED TO PREVENT COVER FROM OPENING WHEN THE SWITCH IS IN THE "ON" POSITION. EXTERIOR APPLICATIONS SHALL BE NEMA 3R CONSTRUCTION WITH PADLOCK FEATURE.

SECTION 16190

1.01. SEISMIC RESTRAINT

A. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE WITH ZONE 2 SEISMIC REQUIREMENTS.

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

A. CONTRACTOR SHALL FURNISH AND INSTALL NON–METALLIC ENGRAVED BACK–LIT NAMEPLATES ON ALL PANELS AND MAJOR ITEMS OF ELECTRICAL EQUIPMENT.

B. LETTERS TO BE WHITE ON BLACK BACKGROUND WITH LETTERS 1–1/2 INCH HIGH WITH 1/4 INCH MARGIN.

C. IDENTIFICATION NOMENCLATURE SHALL BE IN ACCORDANCE WITH OWNER'S STANDARDS.

D. PROVIDE NAMEPLATE FOR PORTABLE ENGINE/GENERATOR CONNECTION SHOWING VOLTAGE KVA/KW RATING, # PHASE, AND # OF WIRES. PLATE TO BE PLASTIC ENGRAVED, RED WITH WHITE LETTERS.

E. ALL RECEPTACLES, SWITCHES, DISCONNECT SWITCHES, ETC. SHALL BE LABELED WITH THE CORRECT BRANCH CIRCUIT NUMBER SERVED BY MEANS OF PERMANENT PRESSED TYPE BLACK 1/4" TRANSFER LETTERING. (FOR EXAMPLE: "MDP–5", ETC.).

F. PROVIDE A NAMEPLATE AT THE SERVICE EQUIPMENT INDICATING THE TYPE AND LOCATION OF THE ON SITE GENERATOR.

SECTION 16450

1.01. GROUNDING

A. 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.

B. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.
2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250–122.
2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.
3. REFER TO PANEL SCHEDULE "BRANCH CIRCUIT" DATA FOR EQUIPMENT GROUND CONDUCTOR SIZE FOR EACH BRANCH CIRCUIT.
4. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

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).

PROVIDE THE CELLULAR GROUNDING SYSTEM AS SPECIFIED ON DRAWINGS, INCLUDING, BUT NOT LIMITED TO:

1. GROUND BARS
2. INTERIOR GROUND RING
3. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).
4. ANTENNA GROUND CONNECTIONS AND PLATES.

F. CONTRACTOR, AFTER COMPLETION OF THE COMPLETE GROUNDING SYSTEM BUT PRIOR TO CONCEALMENT/BURIAL OF SAME, SHALL NOTIFY OWNER'S WIRELESS PROJECT ENGINEER WHO WILL HAVE A DESIGN ENGINEER VISIT SITE AND MAKE A VISUAL INSPECTION OF THE GROUNDING GRID AND CONNECTIONS OF THE SYSTEM.

G. ALL EQUIPMENT SHALL BE BONDED TO GROUND AS REQUIRED BY N.E.C., MFG. SPECIFICATIONS, AND OWNER'S SPECIFICATIONS.

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

A. FUSES SHALL BE NONRENEWABLE TYPE AS MANUFACTURED BY "BUSSMAN" OR APPROVED EQUAL. FUSES RATED TO 1/10 AMPERE UP TO 600 AMPERES SHALL BE EQUIVALENT TO BUSSMAN TYPE LPN–RK (250V) UL CLASS RK1, LOW PEAK, DUAL ELEMENT, TIME–DELAY FUSES. FUSES SHALL HAVE SEPARATE SHORT CIRCUIT AND OVERLOAD ELEMENTS AND HAVE AN INTERRUPTING RATING OF 200 KAIC. UPON COMPLETION OF WORK, PROVIDE ONE SPARE SET OF FUSES FOR EACH TYPE INSTALLED.

SECTION 16960

1.01. 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: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: 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. THESE TESTS SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNER'S CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION REPRESENTATIVE AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM'S 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.

SECTION 16961

1.01. TESTS BY CONTRACTOR

A. ALL TESTS AS REQUIRED UPON COMPLETION OF WORK, SHALL BE MADE BY THIS CONTRACTOR. THESE SHALL BE CONTINUITY AND INSULATION TESTS; TEST TO DETERMINE THE QUALITY OF MATERIALS, ETC. AND SHALL BE MADE IN ACCORDANCE WITH N.E.C. RECOMMENDATIONS. ALL FEEDERS AND BRANCH CIRCUIT WIRING (EXCEPT CLASS 2 SIGNAL CIRCUITS) MUST BE TESTED FREE FROM SHORT CIRCUIT AND GROUND FAULT CONDITIONS AT 500V IN A REASONABLY DRY AMBIENT OF APPROXIMATELY 70 DEGREES F.

B. CONTRACTOR SHALL PERFORM LOAD PHASE BALANCING TESTS. CIRCUITS SHALL BE SO CONNECTED TO THE PANELBOARDS SUCH THAT THE NEW LOAD IS DISTRIBUTED AS EQUALLY AS POSSIBLE BETWEEN EACH LOAD AND NEUTRAL. 10% SHALL BE CONSIDERED AS A REASONABLE AND ACCEPTABLE ALLOWANCE. BRANCH CIRCUITS SHALL BE BALANCED ON THEIR OWN PANELBOARDS; FEEDER LOADS SHALL, IN TURN, BE BALANCED ON THE SERVICE EQUIPMENT. REASONABLE LOAD TEST SHALL BE ARRANGED TO VERIFY LOAD BALANCE IF REQUESTED BY THE ENGINEER.

C. ALL TESTS, UPON REQUEST, SHALL BE REPEATED IN THE PRESENCE OF OWNER'S REPRESENTATIVE. ALL TESTS SHALL BE DOCUMENTED AND TURNED OVER TO OWNER. OWNER SHALL HAVE THE AUTHORITY TO STOP ANY OF THE WORK NOT BEING PROPERLY INSTALLED. ALL SUCH DETECTED WORK SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER AND THE TESTS SHALL BE REPEATED.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	02/25/16	TJB	TGK	CONSTRUCTION DRAWINGS – ISSUED FOR CLIENT REVIEW

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SCALE: AS NOTED
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ELECTRICAL SPECIFICATIONS

E–5

Sheet No. 10 of 10

Exhibit D

Centered on Solutions℠

Structural Design of Antenna Mast and Analysis of Eversource Tower

T-Mobile Site Ref: CT11296A

Eversource Structure No. 936
91' Electric Transmission Lattice Tower

144 Chestnut Hill Road
Wilton, CT

CENTEK Project No. 15019.006

~~Date: November 10, 2015~~
~~Rev 1: December 22, 2015~~
~~Rev 2: November 23, 2016~~
~~Rev 3: March 13, 2017~~
Rev 4: May 15, 2017

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
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Table of Contents

Introduction

The purpose of this report is to analyze the existing antenna mast and 91' CL&P tower located at 144 Chestnut Hill Road in Wilton, CT for the proposed T-Mobile antenna upgrade.

The existing and proposed loads consist of the following:

- T-MOBILE (Existing to be Removed):
  Antennas: Three (3) EMS RR-90-17-02DP panel antennas and one (1) microwave dish flush mounted to the existing mast with a RAD center elevation of 97.25-ft above grade.
  Coax Cables: Seven (7) 7/8" ∅ coax cable running on a leg of the existing tower as indicated in section 4 of this report.
  Mast: Pipe 4" Sch. 40 (O.D. = 4.5").

- **T-MOBILE (Proposed):**
  Antennas: Six (6) RFS APX16DWV-16DWVS-E-A20 panel antennas, three (3) Andrew LNX-6515DS panel antennas and three (3) Andrew ATSBT-TOP-FM-4G Bias Tees mounted on Site Pro Triple T-Arm p/n RMV12-372 with a RAD center elevation of 97.25-ft above grade.
  Coax Cables: Thirty (30) 1-1/4" ∅ coax cables. Eighteen (18) running the interior and twelve (12) banded to the exterior of the proposed antenna mast.
  Mast: HSS16x0.5 x 100-ft Long.

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 10-97, "Design of Latticed Steel Transmission Structures", defines allowable steel stresses for evaluation of the utility tower.
- All utility tower members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- All coaxial cable will be installed as indicated in Section 4 of this report.
- 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.

Analysis

Structural design of the 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 proposed Antenna Mast consisting of a HSS16x0.5 pipe conforming to ASTM A500 Grade 42 (Fy = 42ksi) connected at five elevations to the existing tower was designed 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 Eversource 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 Eversource 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.

Design Basis

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-222-G and AISC standards.

  Load cases considered:

  Load Case 1:
  Wind Speed………………………………... 93 mph (2016 CSBC Appendix-N)
  Radial Ice Thickness………………………. 0”

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

R e s u l t s

- MAST ASSEMBLY

  The existing pipe mast was determined to be structurally **inadequate**. Replacement of the existing antenna mast with a **HSS16x0.5 Pipe x 100-ft long** conforming to ASTM A500, Grade 42, F_y = 42 ksi specifications will be required.

Member	Stress Ratio (% of capacity)	Result
HSS16x0.5	9.3%	**PASS**
L3-1/2x3-1/2x1/4 Brace	20.4%	**PASS**
Mast Connection to Tower	26.6%	**PASS**

- UTILITY TOWER

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

  A maximum usage of **83.44%** occurs in the utility tower under the **NESC Heavy** loading condition.

  TOWER SECTION:

  The utility structure was found to be within allowable limits.

Tower Member	Stress Ratio (% of capacity)	Result
Angle g31Y	83.44%	**PASS**

- FOUNDATION AND ANCHORS

  The existing foundation consists of four (4) 1.67-ft square tapering to 2.583-ft square x 6.25-ft long reinforced concrete piers on four (4) 5.5-ft square x 2.0-ft thick reinforced concrete pads. The base of the tower is connected to the foundation by one (1) anchor stub angle per leg embedded into the concrete foundation. Foundation information was obtained from NUSCO drawing # 01064-60003.

BASE REACTIONS:

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

Load Case	Shear	Uplift	Compression
NESC Heavy Wind	11.81 kips	38.37 kips	55.77 kips
NESC Extreme Wind	16.70 kips	62.65 kips	74.82 kips

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

FOUNDATION:

The foundation **with the proposed reinforcements detailed in Section 4 of this report** was found to be within allowable limits.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Pad and Pier	Uplift	1.0 FS (1)	1.11 FS (1)	**PASS**
	Bearing	9.0 ksf	2.99 ksf	**PASS**

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

Conclusions and Recommendations

This analysis shows that the subject utility tower **with the proposed reinforcements detailed in Section 4 of this report is adequate** to support the proposed T-Mobile equipment installation.

The analysis is based, in part on the information provided to this office by Eversource and T-Mobile. 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

<u>Graphics Features:</u>

- 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

<u>Design Features:</u>

- 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.

G E N E R A L   D E S C R I P T I O N   O F   S T R U C T U R A L   A N A L Y S I S   P R O G R A M ~ P L S - T O W E R

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

Modeling Features:

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

Analysis Features:

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

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

Results Features:

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

Tool for interactive angle member sizing and bolt quantity determination.

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

Introduction

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

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

PCS Mast

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

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

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

ELECTRIC TRANSMISSION TOWER

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

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

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

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

Attachment A

NU Design Criteria

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

* 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

		Page	of
Job :	Spec. Number	Sheet	of
Description:	Computed by	Date	6/11/14
	Checked by	Date	

INPUT DATA

TOWER ID: 936

Structure Height (ft) : 91

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*
	556	556
	26/7 ACSR	26/7 ACSR
DIAMETER =	0.927 in	0.927 in
WEIGHT =	0.765 lb/ft	0.765 lb/ft

Number of Conductors per phase (BACK): 1

Number of Conductors per phase (AHEAD): 1

Insulator Weight = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	3,600	7,000	3,600	7,000
EXTREME WIND =	2,810	7,115	2,810	7,115
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 =	1,161	2,724	1,161	2,724

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	4	AHEAD:	4	**8**
WIND SPAN (ft) =	BACK:	367	AHEAD:	335	**702**
WEIGHT SPAN (ft) =	BACK:	456	AHEAD:	422	**879**

WIRE LOADING AT ATTACHMENTS

TOWER ID: 936

Wind Span =	702	ft
Weight Span =	879	ft
Total Angle =	8	degrees

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

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	1,614 lb	0 lb	1,030 lb	825 lb	5,926 lb	535 lb
Conductor =	2,739 lb	0 lb	2,778 lb	1,395 lb	11,522 lb	1,431 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	969 lb	0 lb	226 lb
Conductor =	2,551 lb	0 lb	1,072 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	226 lb
Conductor =	#VALUE!	#VALUE!	1,072 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,693 lb
Conductor =	#VALUE!	#VALUE!	3,178 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	686 lb
Conductor =	#VALUE!	#VALUE!	1,852 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	162 lb	0 lb	226 lb
Conductor =	380 lb	0 lb	1,072 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	162 lb	0 lb	226 lb
Conductor =	380 lb	0 lb	1,072 lb

Northeast Utilities System

			Page	of	
Job :		Spec. Number	Sheet	of	
Description:		Computed by	Date	6/11/14	
		Checked by	Date		

INPUT DATA

TOWER ID: 936

Structure Height (ft) : 91

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 = 200 lbs

Broken Wire Side = AHEAD SPAN

Horizontal Line Tensions:

	BACK		AHEAD	
	Shield	Conductor	Shield	Conductor
NESC HEAVY =	6,000	7,000	6,000	7,000
EXTREME WIND =	5,852	7,115	5,852	7,115
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 =	2,120	2,724	2,120	2,724

Line Geometry:

					SUM
LINE ANGLE (deg) =	BACK:	4	AHEAD:	4	**8**
WIND SPAN (ft) =	BACK:	367	AHEAD:	335	**702**
WEIGHT SPAN (ft) =	BACK:	456	AHEAD:	422	**879**

WIRE LOADING AT ATTACHMENTS

TOWER ID: 936

Wind Span =	702	ft
Weight Span =	879	ft
Total Angle =	8	degrees

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

1. NESC RULE 250B Heavy Loading:

	INTACT CONDITION			BROKEN WIRE CONDITION		
	Horizontal	Longitudinal	Vertical	Horizontal	Longitudinal	Vertical
Shield Wire =	2,398 lb	0 lb	1,698 lb	1,222 lb	9,876 lb	882 lb
Conductor =	2,739 lb	0 lb	2,778 lb	1,395 lb	11,522 lb	1,431 lb

2. NESC RULE 250C Transverse Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	2,057 lb	0 lb	455 lb
Conductor =	2,551 lb	0 lb	1,072 lb

3. NESC RULE 250C Longitudinal Extreme Wind Loading:

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	455 lb
Conductor =	#VALUE!	#VALUE!	1,072 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	2,355 lb
Conductor =	#VALUE!	#VALUE!	3,178 lb

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

	Horizontal	Longitudinal	Vertical
Shield Wire =	#VALUE!	#VALUE!	1,132 lb
Conductor =	#VALUE!	#VALUE!	1,852 lb

6. 60 Deg. F, No Wind

	Horizontal	Longitudinal	Vertical
Shield Wire =	296 lb	0 lb	455 lb
Conductor =	380 lb	0 lb	1,072 lb

7. Construction

	Horizontal	Longitudinal	Vertical
Shield Wire =	296 lb	0 lb	455 lb
Conductor =	380 lb	0 lb	1,072 lb

ANTENNA MAST DESIGN

STRUCT. NO. 936
T-MOBILE CT11296A
144 CHESTNUT HILL ROAD
WILTON, CT 06897

VICINITY MAP

PROJECT SUMMARY

SITE ADDRESS:	144 CHESTNUT HILL ROAD WILTON, CT 06897
PROJECT COORDINATES:	LAT: 41°-10'-52.30N LON: 73°-23'-36.00W ELEV: ±321' AMSL
EVERSOURCE STRUCT NO:	936
EVERSOURCE CONTACT:	ROBERT GRAY 860.728.6125
T-MOBILE SITE REF.:	CT11296A
T-MOBILE CONTACT:	MARK RICHARD 860.692.7143
ANTENNA CL HEIGHT:	97'-3"
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

SHT. NO.	DESCRIPTION	REV.
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N-4	STRUCTURAL STEEL NOTES	3
MI-1	MODIFICATION INSPECTION REQUIREMENTS	3
S-1	TOWER ELEVATION & FEEDLINE PLAN	3
S-2	TOWER FOUNDATION REINFORCEMENT DETAILS	3
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REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
3	5/15/17	TJL	CFC	REVISED FOUNDATION REINFORCEMENT DETAILS
2	3/13/17	TJL	CFC	CONSTRUCTION – REVISED ANTENNA CONFIGURATION
1	11/23/16	TJL	CFC	ISSUED FOR CONSTRUCTION
0	11/10/15	TJL	CFC	ISSUED FOR EVERSOURCE REVIEW

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WILTON, CT 06897

DATE: 11/10/15
SCALE: AS SHOWN
JOB NO. 15019.006

TITLE SHEET

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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 MANUAL NO. 10–97 – "DESIGN OF LATTICE STEEL TRANSMISSION STRUCTURES", NESC C2–2007 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   <u>WIND LOAD: (ANTENNA MAST)</u>
   NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2016 CSBC: APPENDIX 'N')

   <u>WIND LOAD: (UTILITY POLE & FOUNDATION)</u>
   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 T–MOBILE DATED 5/15/17.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE ORIGINAL TOWER DESIGN DRAWINGS PREPARED BY AMERICAN BRIDGE CO. DATED AUGUST 24, 1949.

3. THE TEMPORARY DETACHMENT AND/OR REPLACEMENT OF TOWER MEMBERS SHALL BE DONE ONE AT A TIME AND SHALL BE CONDUCTED ON DAYS WITH LESS THAN 15 MPH WIND PRESENT. NO MEMBER SHALL BE LEFT DISCONNECTED FOR THE NEXT WORKING DAY.

4. ALL STEEL REINFORCEMENT SHOWN HEREIN APPLIES TO ALL SIDES OF THE TOWER.

5. ALL REPLACEMENT STEEL MEMBERS SHALL BE INSTALLED WITH A325–N BOLTS (SIZE TO MATCH EXISTING). UNLESS OTHERWISE NOTED BELOW.

6. 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.

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

8. 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.

9. 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.

10. TOWER 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.

11. 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 REINFORCEMENT WORK.

12. 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.

13. 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.

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DESIGN BASIS AND GENERAL NOTES

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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 & FOUNDATION CONSTRUCTION NOTES

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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 3,500 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.

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CONCRETE CONSTRUCTION NOTES

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STRUCTURAL STEEL

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

2. MATERIAL SPECIFICATIONS

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

3. FASTENER SPECIFICATIONS

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

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

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

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

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

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

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

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

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

12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.

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

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

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

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

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

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

19. FABRICATE BEAMS WITH MILL CAMBER UP.

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

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

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STRUCTURAL NOTES

SHEET NO.
N-4

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
X	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	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

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

GENERAL

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

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

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

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

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

MODIFICATION INSPECTOR (MI)

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

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

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

GENERAL CONTRACTOR (GC)

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

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

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

CORRECTION OF FAILING MODIFICATION INSPECTION

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

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

REQUIRED PHOTOGRAPHS

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

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

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MODIFICATION INSPECTION REQUIREMENTS

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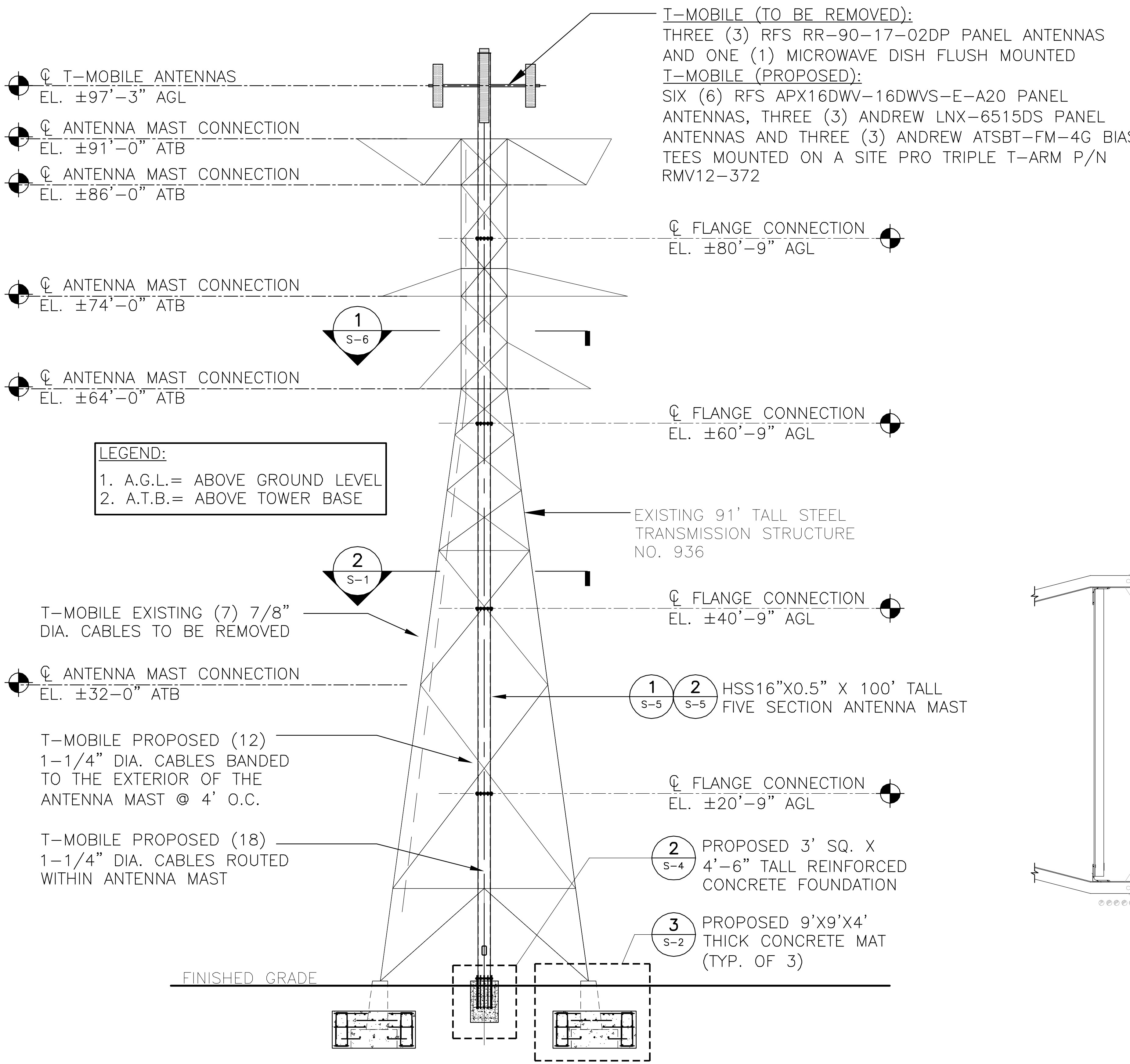
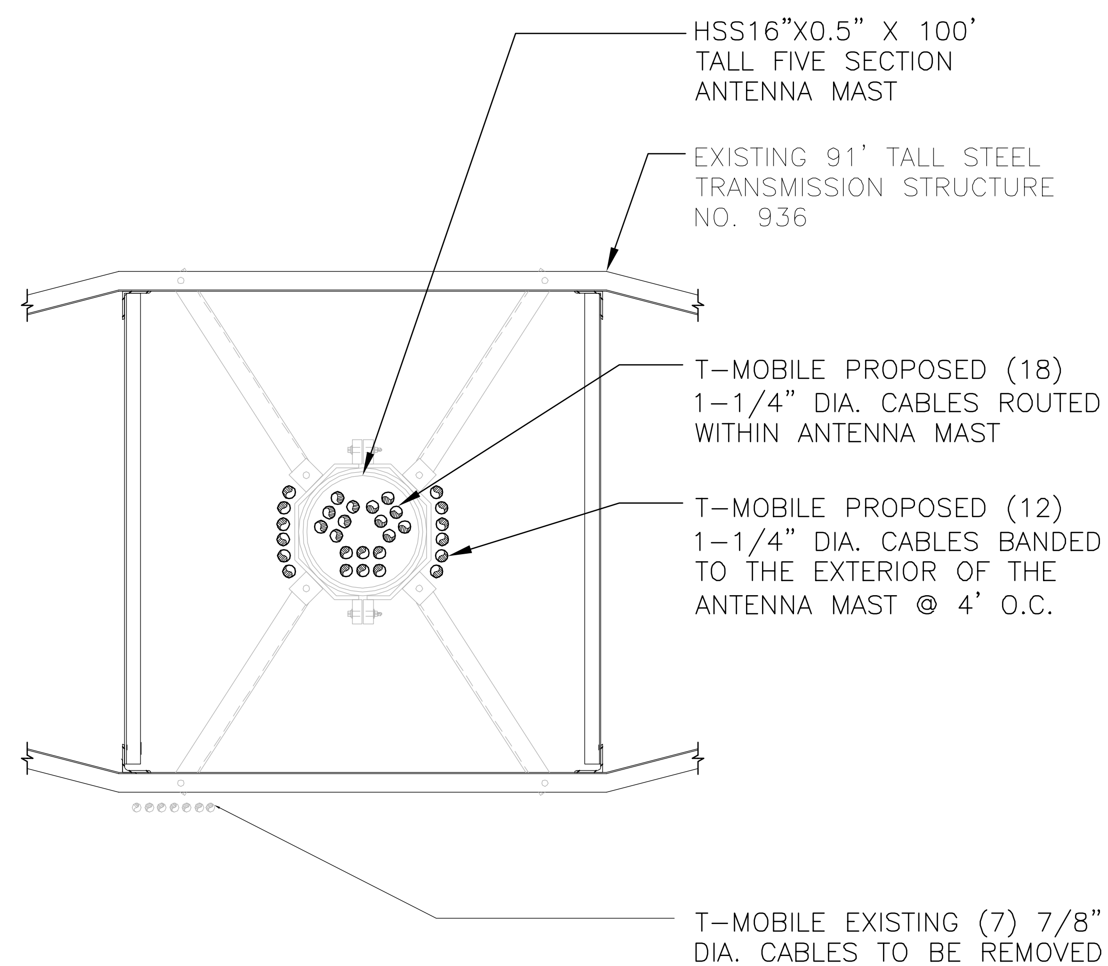


1 / S-1 **TOWER & ANTENNA MAST ELEVATION**

SCALE: NOT TO SCALE



2 / S-1 **FEEDLINE PLAN**

SCALE: NOT TO SCALE

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1	11/23/16	TJL	CFC	ISSUED FOR CONSTRUCTION
0	11/10/15	TJL	CFC	ISSUED FOR EVERSOURCE REVIEW

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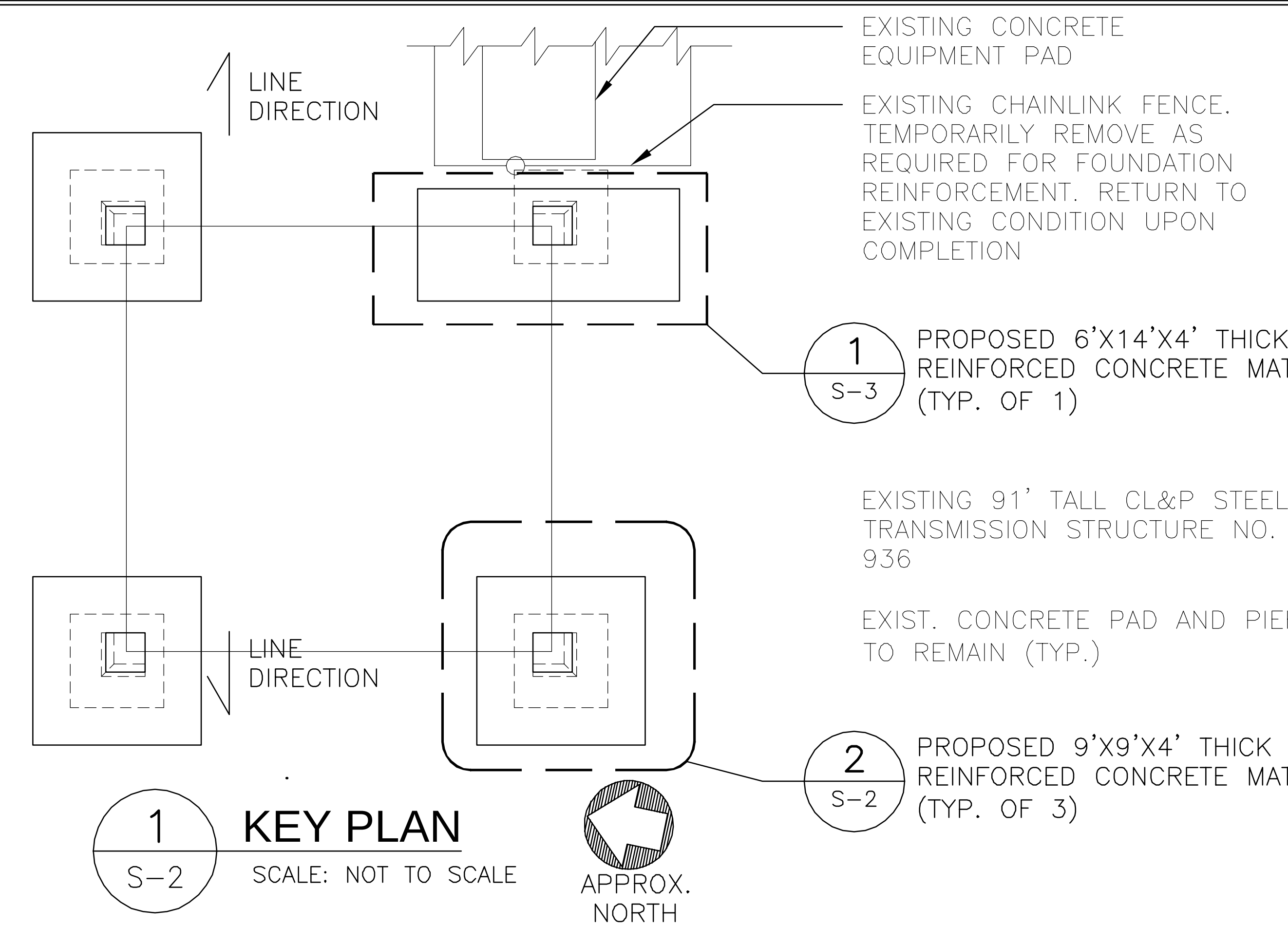
TOWER ELEVATION AND FEEDLINE PLAN

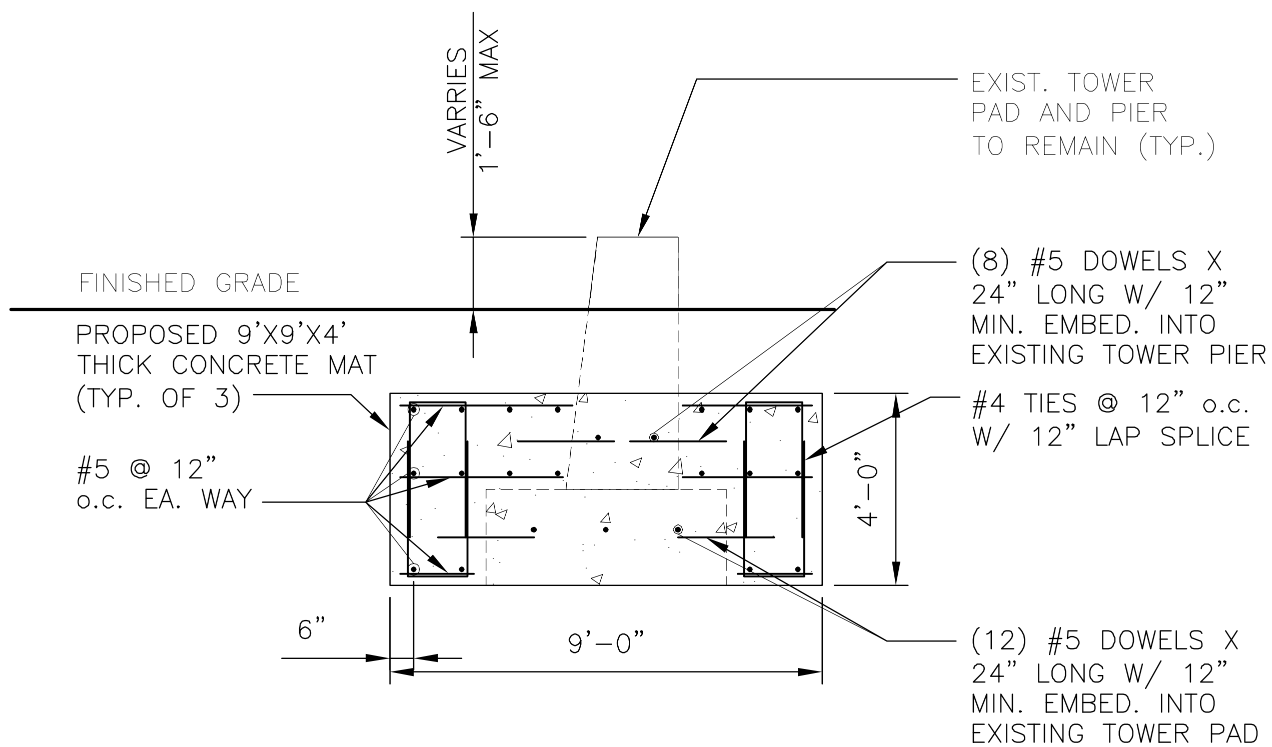
SHEET NO.
S-1
Sheet No. 7 of 12

FOUNDATION PLAN NOTES:

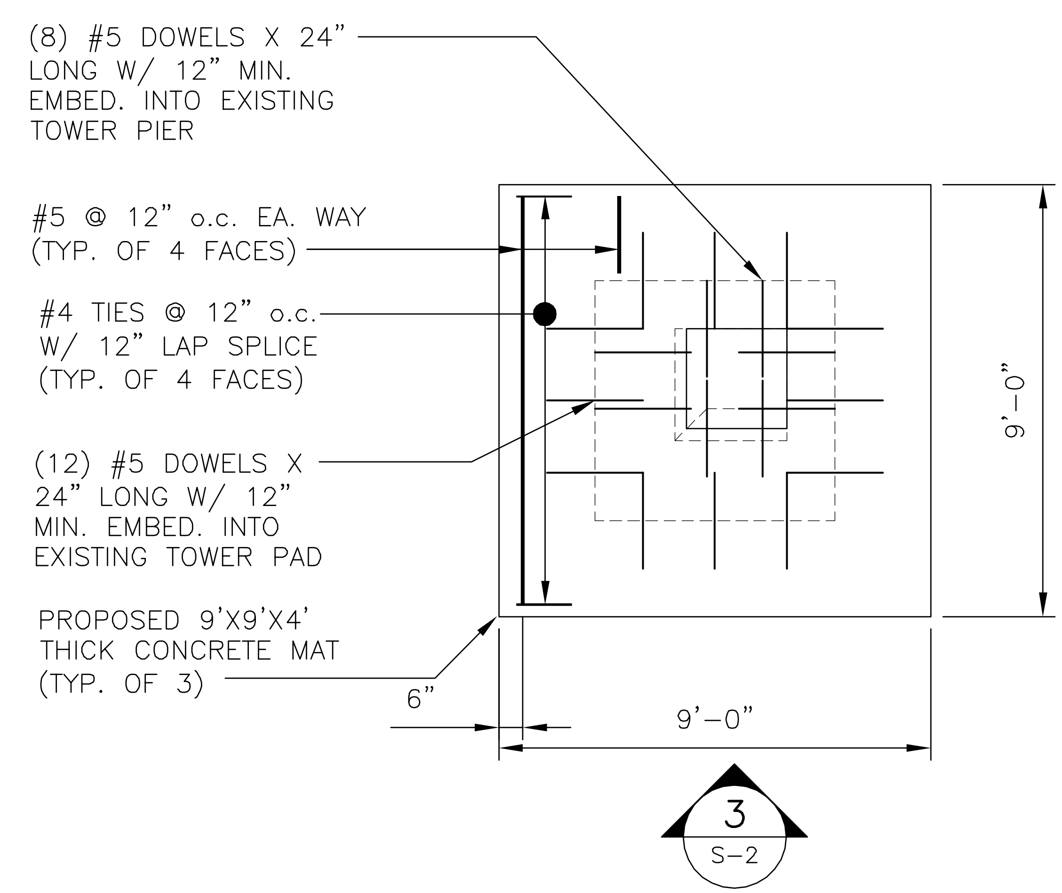
1. THE CONTRACTOR SHALL LIMIT THE FOUNDATION REINFORCEMENT WORK TO ONE TOWER LEG AT A TIME. CONSTRUCTION SHALL BE CONDUCTED IN WIND SPEEDS LESS THAN 15 MPH AND IN LOW ICE ACCUMULATION PERIODS. IF HIGHER WIND SPEED OR ICE EVENT IS EXPECTED, THE EXCAVATION AREA SHALL BE FILLED WITH COMPACT FILL MATERIAL.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



1 / S-2 **KEY PLAN**
SCALE: NOT TO SCALE



3 / S-2 **FOUNDATION REINFORCEMENT DETAIL**
SCALE: 1/4" = 1'-0"



2 / S-2 **FOUNDATION REINFORCEMENT PLAN**
SCALE: 1/4" = 1'-0"

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TOWER FOUNDATION REINFORCEMENT DETAILS

SHEET NO.
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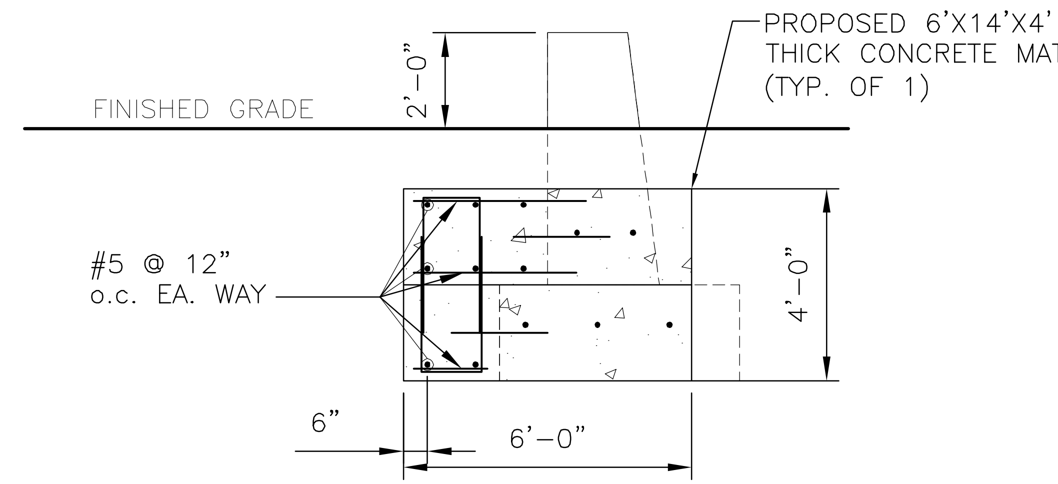
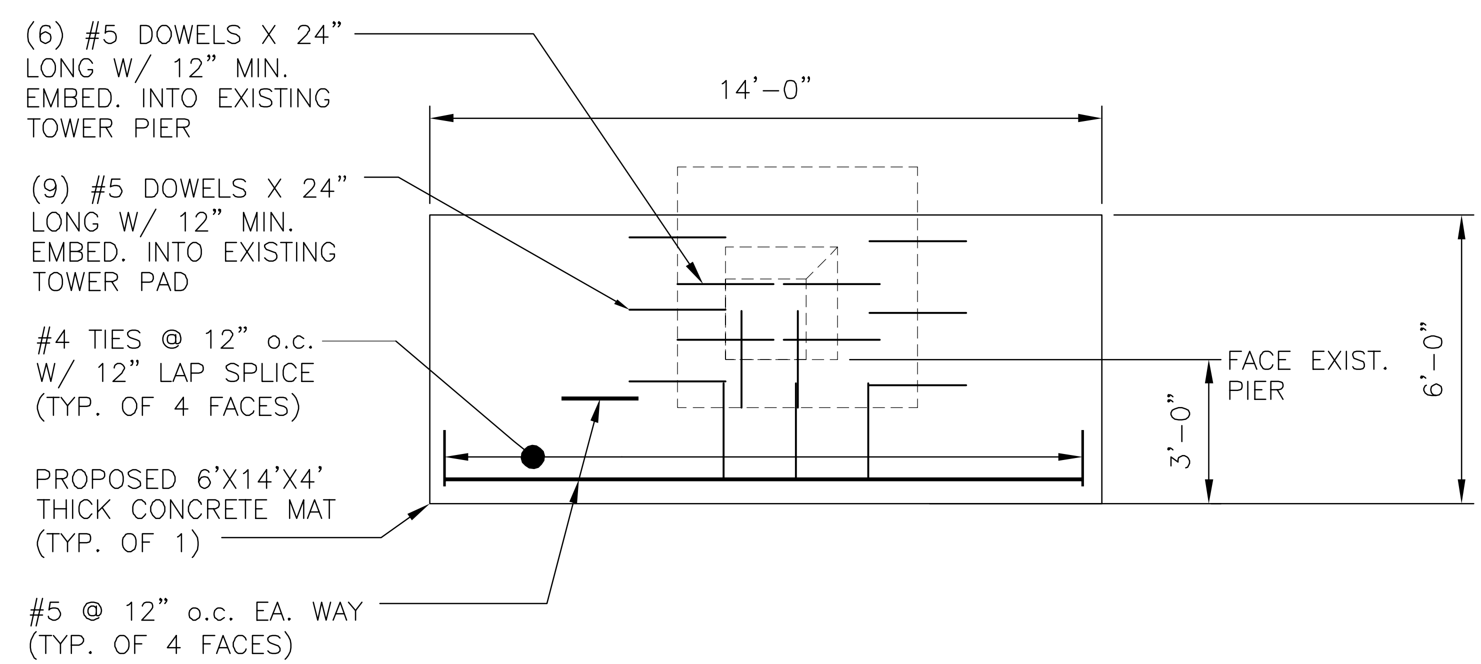


2 / S-3 FOUNDATION REINFORCEMENT DETAIL (SE PIER)



1 / S-3 FOUNDATION REINFORCEMENT PLAN (SE PIER)

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

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TOWER FOUNDATION REINFORCEMENT DETAILS

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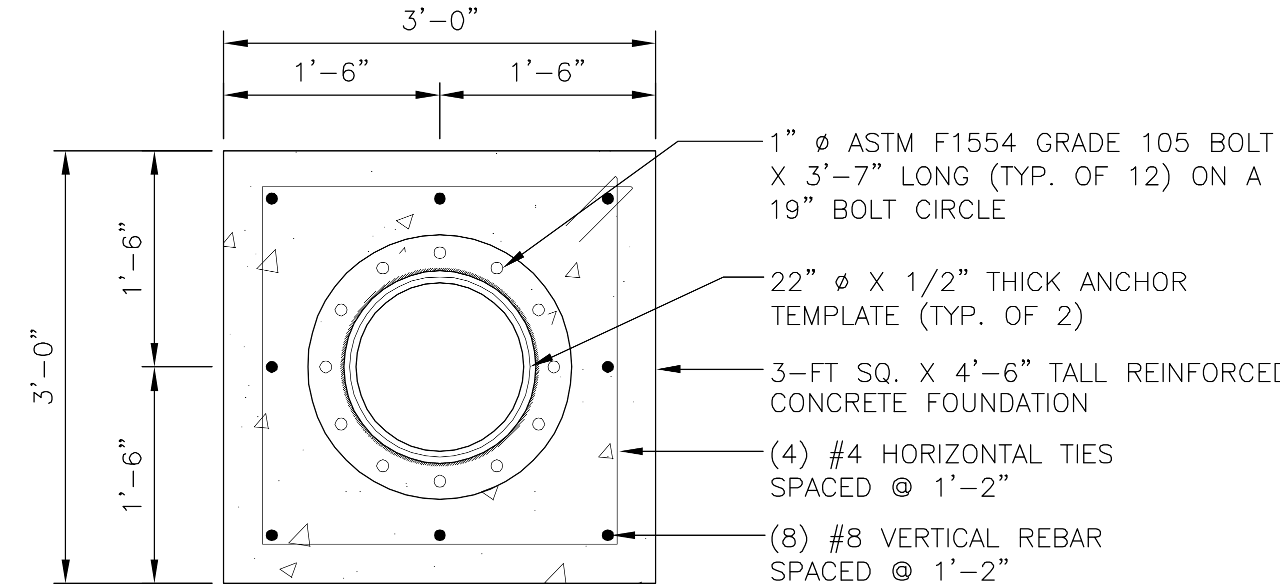
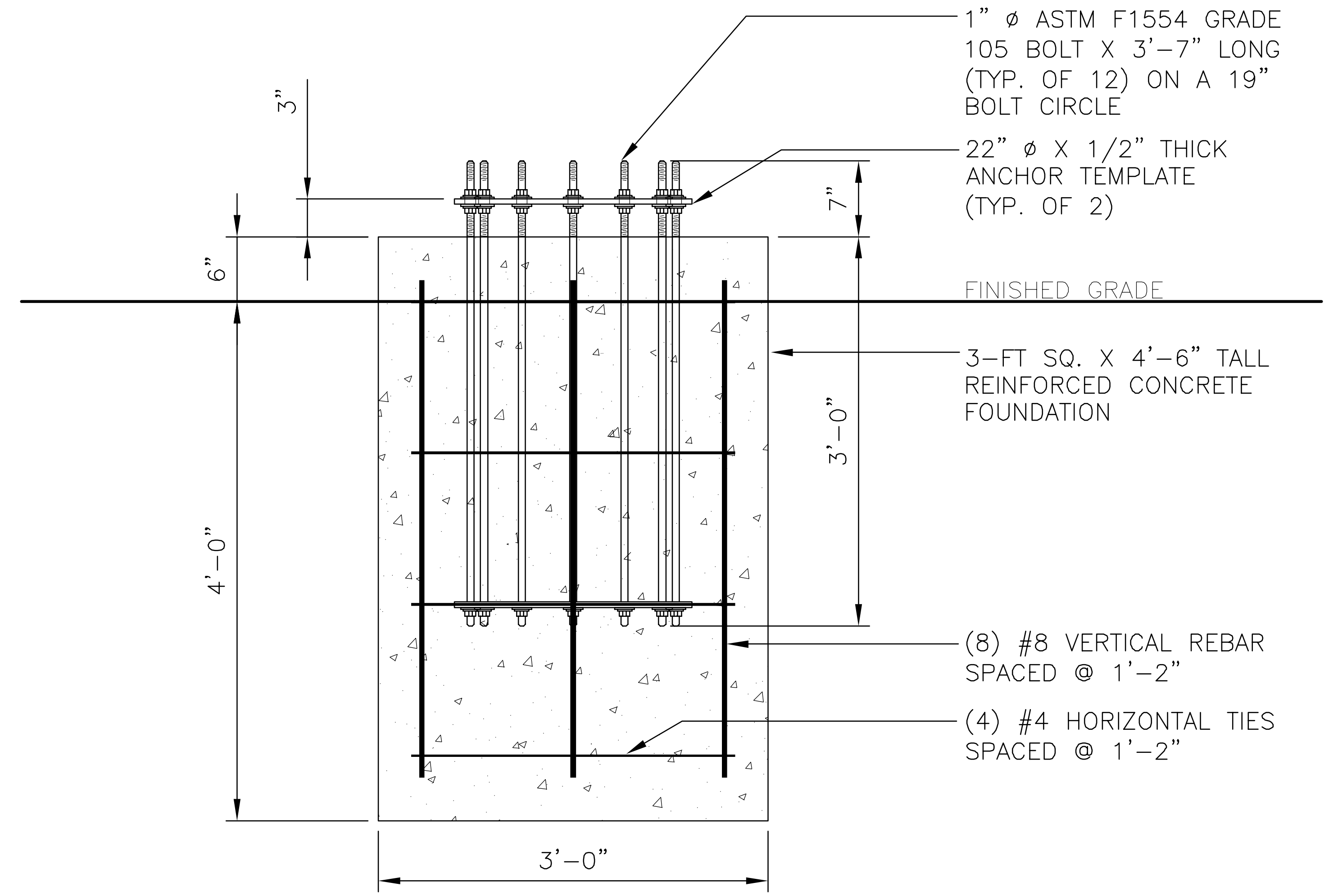
S-3
Sheet No. 9 of 12



1 / S-4 **FOUNDATION PLAN**
SCALE: 3/4" = 1'-0"



2 / S-4 **FOUNDATION ELEVATION**
SCALE: 3/4" = 1'-0"

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ANTENNA MAST FOUNDATION DETAILS

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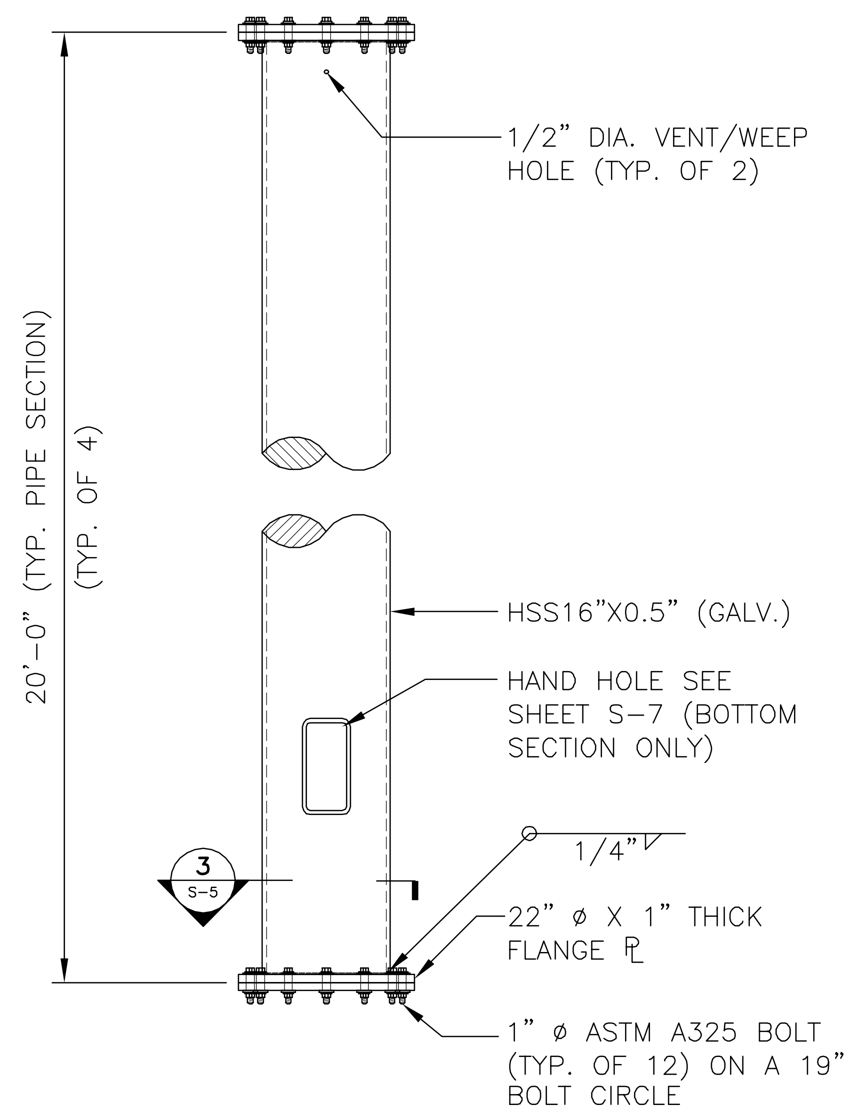
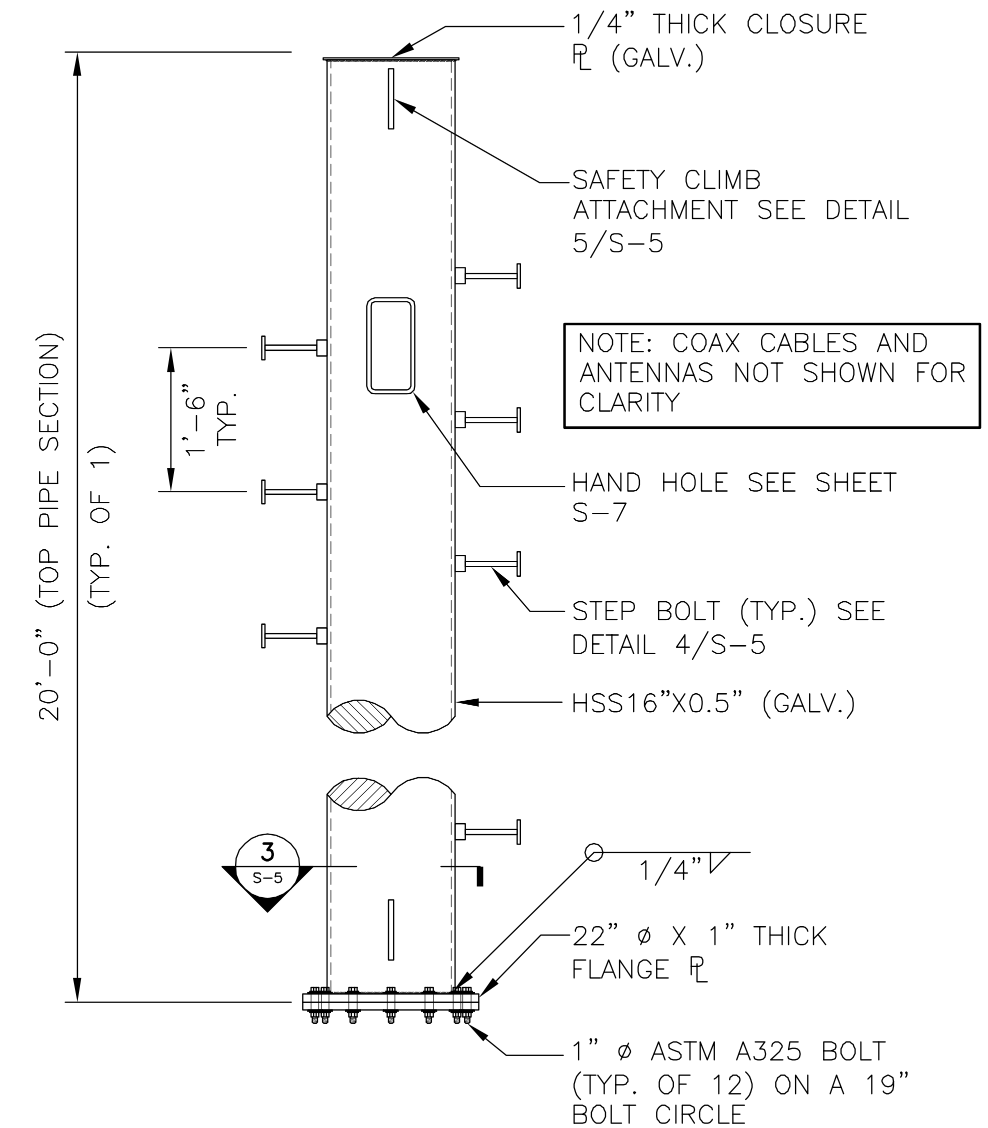


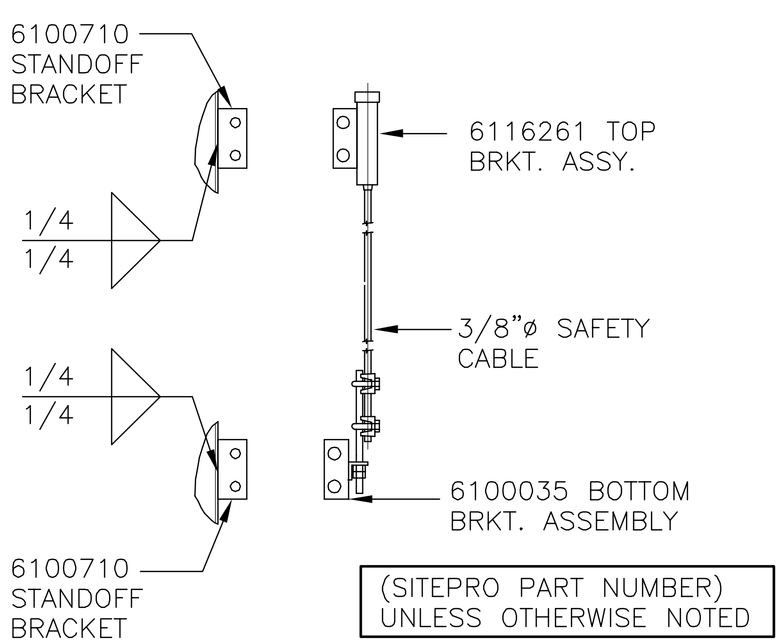
2 S-5 TYP. PIPE ELEVATION

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



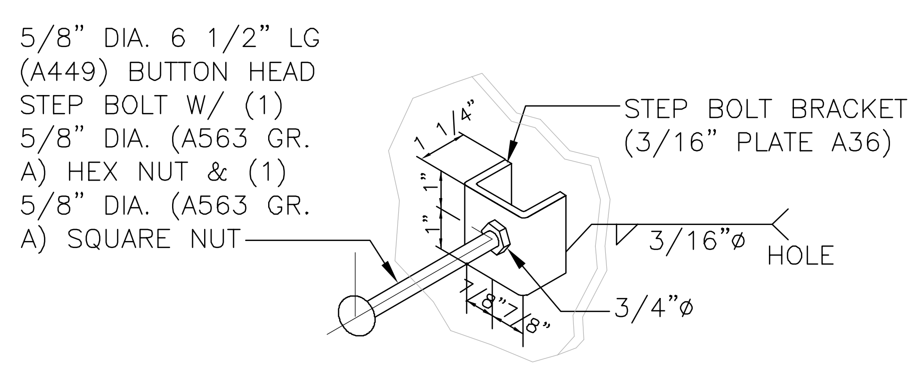
1 S-5 TOP PIPE ELEVATION

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



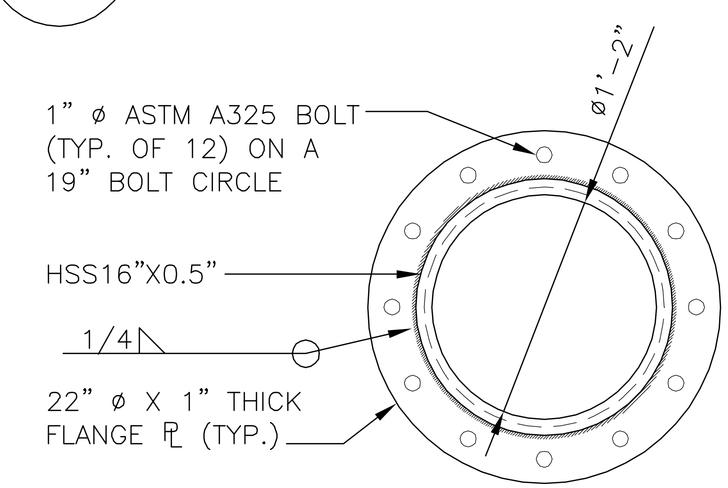
5 S-5 SAFETY CLIMB DETAIL

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



4 S-5 STEP BOLT DETAIL

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



3 S-5 FLANGE PL DETAIL

SCALE: 1" = 1'-0"

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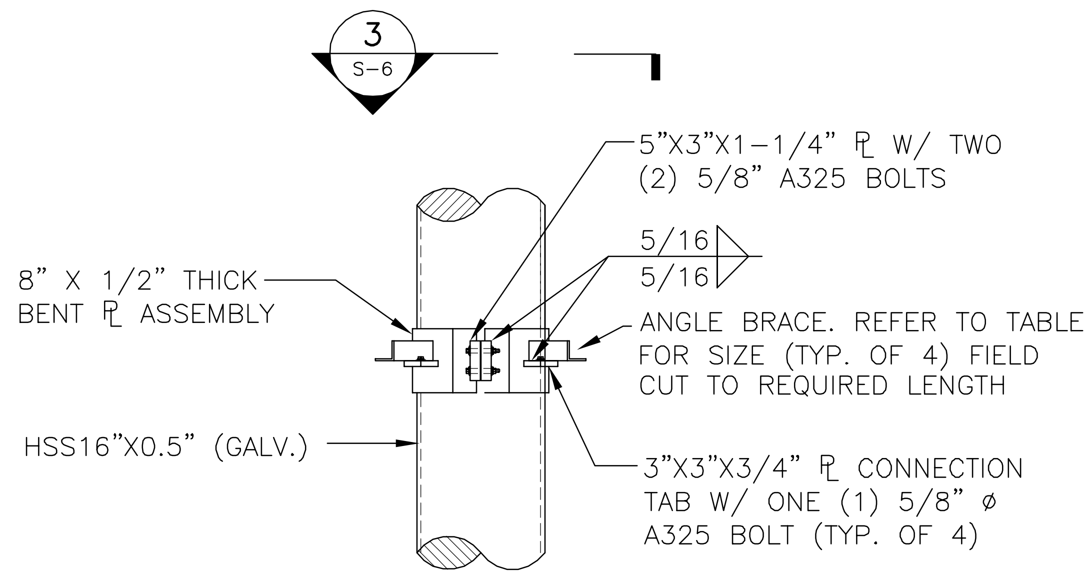
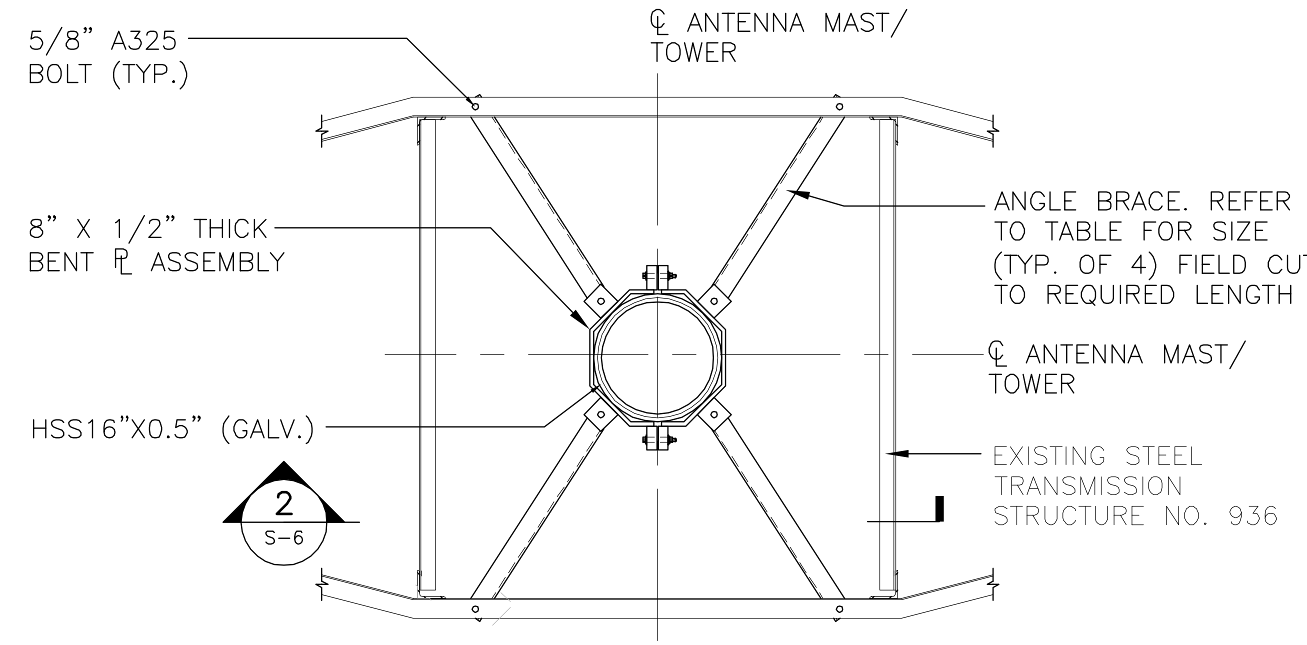
ANTENNA MAST DETAILS

SHEET NO.
S-5



2 S-6 BRACKET ELEVATION

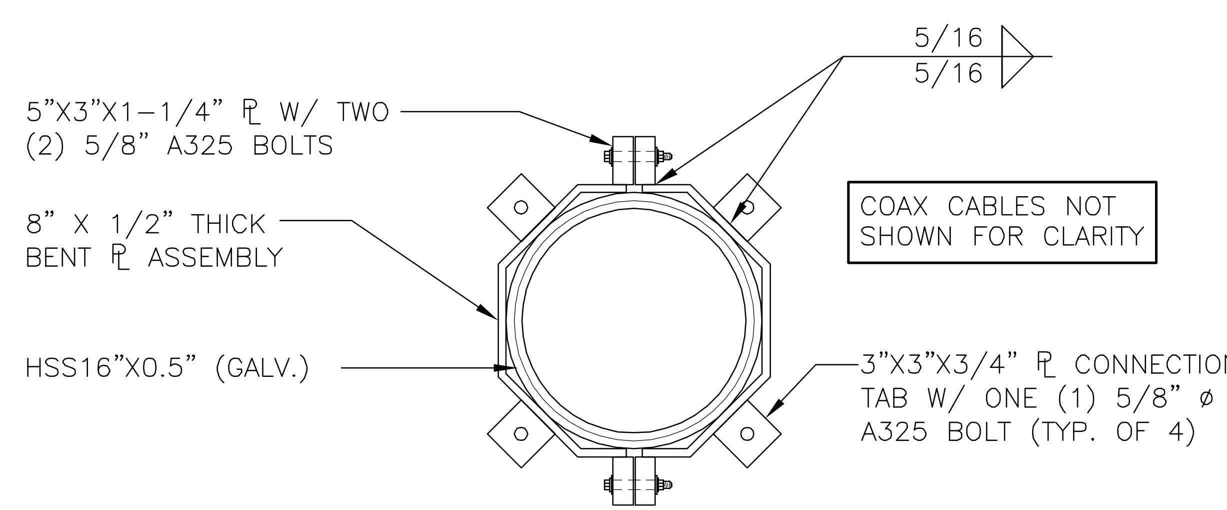
SCALE: 1/2" = 1'-0"



1 S-6 BRACKET PLAN

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

CONNECTION ELEVATION	ANGLE BRACE SIZE
91-FT (ATB)	L2-1/2X2-1/2-1/4
86-FT (ATB)	L2-1/2X2-1/2-1/4
74-FT (ATB)	L2-1/2X2-1/2-1/4
64-FT (ATB)	L2-1/2X2-1/2-1/4
32-FT (ATB)	L3-1/2X3-1/2-1/4



3 S-6 BRACKET DETAIL

SCALE: 1" = 1'-0"

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ANTENNA MAST CONNECTION DETAILS

SHEET NO. S-6

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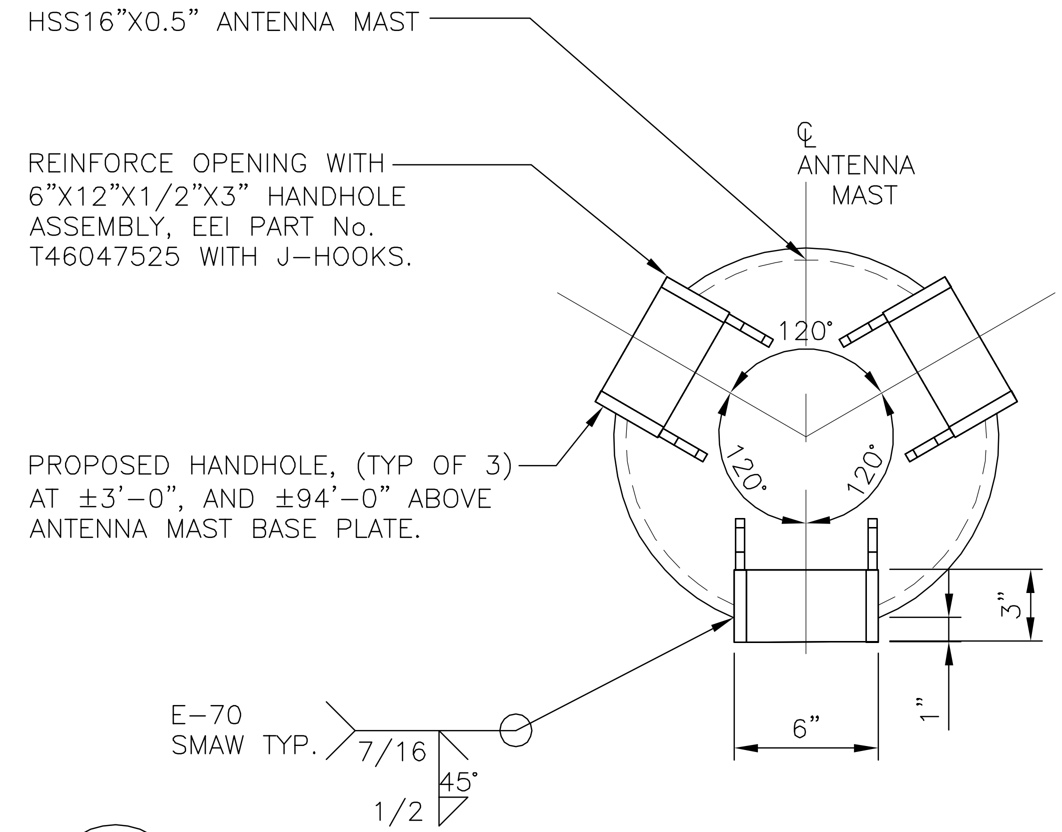
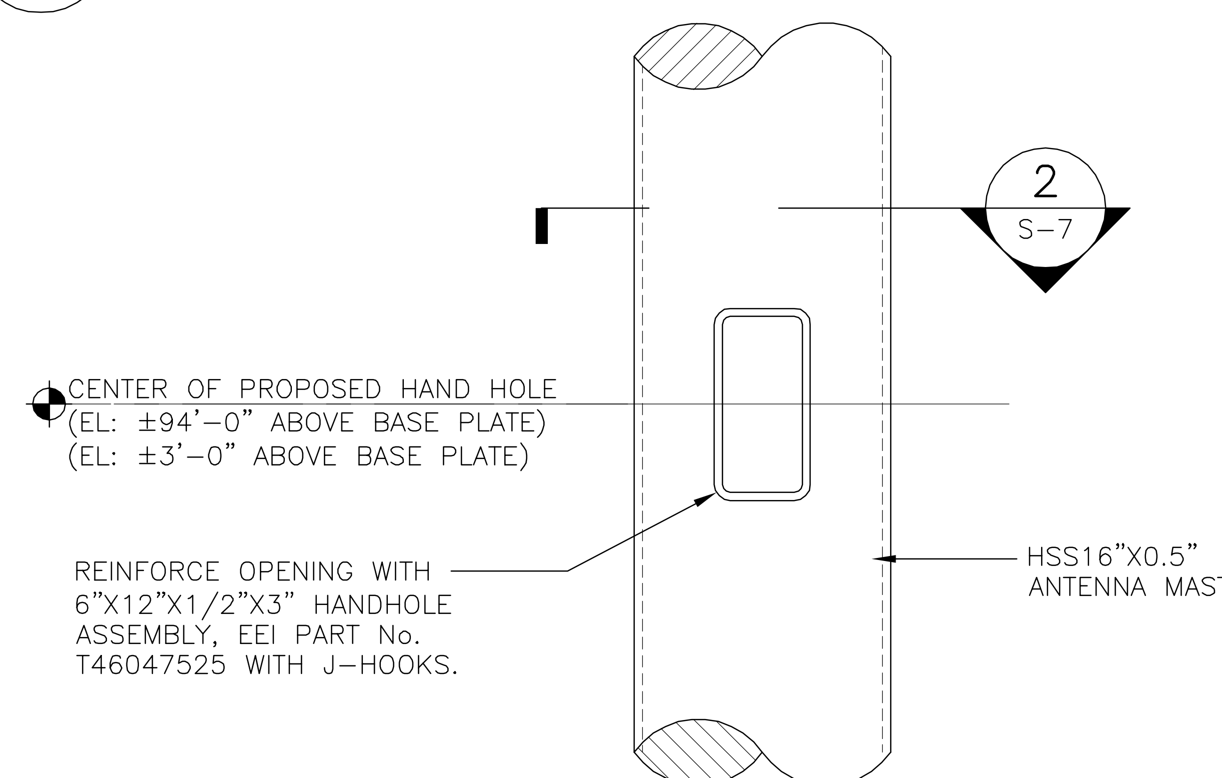


2
S-7

PROPOSED HAND HOLE (SECTION)

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



1
S-7

PROPOSED HAND HOLE (ELEVATION)

SCALE: 1" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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HAND HOLE DETAILS

SHEET NO.
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Sheet No. 13 of 12

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

Wind Speeds

Basic Wind Speed	$V := 93$	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 =	$h := 91$	ft	(User Input)
Height to Center of Antennas =	$z_{TMo} := 97.25$	ft	(User Input)
Height to Center of Mast =	$z_{Mast5} := 90$	ft	(User Input)
Height to Center of Mast =	$z_{Mast4} := 70$	ft	(User Input)
Height to Center of Mast =	$z_{Mast3} := 50$	ft	(User Input)
Height to Center of Mast =	$z_{Mast2} := 30$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 10$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H := 1.35$		(User Input)

Mast Based on Max 20-ft Section per 2.6.9.1.3

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)

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

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

$K_{iz} := \left(\frac{z_{TMo}}{33}\right)^{0.1} = 1.114$ $t_{iz.TMo} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.089$

Velocity Pressure Coefficient Antennas = $Kz_{TMo} := 2.01\left(\left(\frac{z_{TMo}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.258$

Velocity Pressure w/o Ice Antennas = $qz_{TMo} := 0.00256 \cdot K_d \cdot Kz_{TMo} \cdot V^2 \cdot I_{Wind} = 27.232$

Velocity Pressure with Ice Antennas = $qz_{ice.TMo} := 0.00256 \cdot K_d \cdot Kz_{TMo} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 6.845$

$K_{izMast5} := \left(\frac{z_{Mast5}}{33}\right)^{0.1} = 1.106$ $t_{izMast5} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast5} \cdot K_{zt}^{0.35} = 2.073$

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

Velocity Pressure w/o Ice Mast = $qz_{Mast5} := 0.00256 \cdot K_d \cdot Kz_{Mast5} \cdot V^2 \cdot I_{Wind} = 26.791$

Velocity Pressure with Ice Mast = $qz_{ice.Mast5} := 0.00256 \cdot K_d \cdot Kz_{Mast5} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 6.734$

$K_{izMast4} := \left(\frac{z_{Mast4}}{33}\right)^{0.1} = 1.078$ $t_{izMast4} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast4} \cdot K_{zt}^{0.35} = 2.021$

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

Velocity Pressure w/o Ice Mast = $qz_{Mast4} := 0.00256 \cdot K_d \cdot Kz_{Mast4} \cdot V^2 \cdot I_{Wind} = 25.411$

Velocity Pressure with Ice Mast = $qz_{ice.Mast4} := 0.00256 \cdot K_d \cdot Kz_{Mast4} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 6.387$

$K_{izMast3} := \left(\frac{z_{Mast3}}{33}\right)^{0.1} = 1.042$ $t_{izMast3} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast3} \cdot K_{zt}^{0.35} = 1.955$

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

Velocity Pressure w/o Ice Mast = $qz_{Mast3} := 0.00256 \cdot K_d \cdot Kz_{Mast3} \cdot V^2 \cdot I_{Wind} = 23.673$

Velocity Pressure with Ice Mast = $qz_{ice.Mast3} := 0.00256 \cdot K_d \cdot Kz_{Mast3} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 5.95$

$K_{izMast2} := \left(\frac{z_{Mast2}}{33}\right)^{0.1} = 0.991$ $\quad t_{izMast2} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast2} \cdot K_{zt}^{0.35} = 1.857$

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

Velocity Pressure w/o Ice Mast = $qz_{Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V^2 \cdot I_{Wind} = 21.259$

Velocity Pressure with Ice Mast = $qz_{ice.Mast2} := 0.00256 \cdot K_d \cdot Kz_{Mast2} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 5.343$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 0.887$ $\quad t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 1.664$

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

Velocity Pressure w/o Ice Mast = $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 16.869$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 4.24$

Development of Wind & Ice Load on Mast

Mast Data: (HSS16x0.5) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 16$ in (User Input)

Mast Length = $L_{mast} := 100$ ft (User Input)

Mast Thickness = $t_{mast} := 0.5$ in (User Input)

Velocity Coefficient = $C := \sqrt{I \cdot Kz_{Mast1}} \cdot V \cdot \frac{D_{mast}}{12} = 109$

Mast Force Coefficient = $CF_{mast} = 0.6$

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 1.333$ sf/ft

Total Mast Wind Force = $qz_{Mast5} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 29$ plf **BLC 5,7**

Total Mast Wind Force = $qz_{Mast4} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 27$ plf **BLC 5,7**

Total Mast Wind Force = $qz_{Mast3} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 26$ plf **BLC 5,7**

Total Mast Wind Force = $qz_{Mast2} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 23$ plf **BLC 5,7**

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot CF_{mast} \cdot A_{mast} = 18$ plf **BLC 5,7**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast5})}{12} = 1.679$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast5} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 9$ plf **BLC 4,6**

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast4})}{12} = 1.67$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast4} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 9$ plf **BLC 4,6**

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast3})}{12} = 1.659$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast3} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 8$ plf **BLC 4,6**

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast2})}{12} = 1.643$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast2} \cdot G_H \cdot CF_{mast} \cdot AICE_{mast} = 7$ plf **BLC 4,6**

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot t_{izMast1})}{12} = 1.611$ sf/ft

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

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast5} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 117.7$	sq in	
Weight of Ice on Mast =	$W_{ICEmast5} := Id \cdot \frac{Ai_{mast}}{144} = 46$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast4} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 114.4$	sq in	
Weight of Ice on Mast =	$W_{ICEmast4} := Id \cdot \frac{Ai_{mast}}{144} = 45$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast3} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 110.2$	sq in	
Weight of Ice on Mast =	$W_{ICEmast3} := Id \cdot \frac{Ai_{mast}}{144} = 43$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast2} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 104.2$	sq in	
Weight of Ice on Mast =	$W_{ICEmast2} := Id \cdot \frac{Ai_{mast}}{144} = 41$	plf	**BLC 3**
Ice Area per Linear Foot =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 92.3$	sq in	
Weight of Ice on Mast =	$W_{ICEmast1} := Id \cdot \frac{Ai_{mast}}{144} = 36$	plf	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (T-Mobile)

Antenna Model =	RFS APX 16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 30.3$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1425$	lbs	**BLC 5,7**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.TMo}) \cdot (W_{ant} + 2 \cdot t_{iz.TMo})}{144} = 7.2$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 43$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 509$	lbs	**BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 270$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz.TMo})(W_{ant} + 2 \cdot t_{iz.TMo}) \cdot (T_{ant} + 2 \cdot t_{iz.TMo}) - V_{ant} = 5274$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 171$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 1025$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (T-Mobile)

Antenna Model = Andrew LNX-6515DS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 96.4$ in (User Input)

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

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

Antenna Weight = $WT_{ant} := 45$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 8.1$

Antenna Force Coefficient = $Ca_{ant} = 1.44$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 8$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 23.9$ sf

Total Antenna Wind Force = $F_{ant} := qz_{TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1262$ lbs **BLC 5,7**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot t_{iz.TMo}\right) \cdot \left(W_{ant} + 2 \cdot t_{iz.TMo}\right)}{144} = 11.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 33.7$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 447$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 135$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8145$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 2 \cdot t_{iz.TMo}\right)\left(W_{ant} + 2 \cdot t_{iz.TMo}\right) \cdot \left(T_{ant} + 2 \cdot t_{iz.TMo}\right) - V_{ant} = 1 \times 10^4$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 327$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 981$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Andrew ATSBT-TOP-FM-4G		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.5$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.4$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 19$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{iz.TMo}) \cdot (W_{ant} + 2 \cdot t_{iz.TMo})}{144} = 0.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.TMo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 18$	lbs	**BLC 4**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz.TMo})(W_{ant} + 2 \cdot t_{iz.TMo}) \cdot (T_{ant} + 2 \cdot t_{iz.TMo}) - V_{ant} = 436$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 14$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 42$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (T-Mobile)

Mount Type: Site Pro Monopole T-Arm p/n RMV 12-372

Mount Shape = Flat

Mount Projected Surface Area = $CaAa := 14$ sf (User Input)

Mount Projected Surface Area w/ Ice = $CaAa_{ice} := 18$ sf (User Input)

Mount Weight = $WT_{mnt} := 1160$ lbs (User Input)

Mount Weight w/ Ice = $WT_{mnt.ice} := 1500$ lbs (User Input)

Wind Load (without ice)

Total Platform Wind Force = $F_{plt} := qz_{TMo} \cdot G_H \cdot CaAa = 515$ lbs **BLC 5,7**

Wind Load (with ice)

Total Platform Wind Force w/ Ice = $Fi_{plt} := qz_{ice.TMo} \cdot G_H \cdot CaAa_{ice} = 166$ lbs **BLC 4,6**

Gravity Load (without ice)

Weight of Platform = $WT_{mnt} = 1160$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{mnt.ice} - WT_{mnt} = 340$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data:	(T-Mobile)		
Coax Type =	HELIAX 1-1/4"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.55$	in	(User Input)
Coax Cable Length =	$L_{coax} := 95$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 0.66$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 30$		(User Input)
Total Number of Exterior Coax =	$Ne_{coax} := 12$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 2$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 735.5$

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

Wind Load (without ice)

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

Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast5} \cdot G_H \cdot A_{coax} = 11$	plf	**BLC 5,7**
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast4} \cdot G_H \cdot A_{coax} = 11$	plf	**BLC 5,7**
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast3} \cdot G_H \cdot A_{coax} = 10$	plf	**BLC 5,7**
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast2} \cdot G_H \cdot A_{coax} = 9$	plf	**BLC 5,7**
Total Coax Wind Force =	$F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 7$	plf	**BLC 5,7**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast5})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast5} \cdot G_H \cdot AICE_{coax} = 7$ plf **BLC 4,6**

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast4})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast4} \cdot G_H \cdot AICE_{coax} = 6$ plf **BLC 4,6**

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast3})}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast3} \cdot G_H \cdot AICE_{coax} = 6$ plf **BLC 4,6**

Coax projected surface area w/ Ice = $AICE_{coax} := \dfrac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast2}\right)}{12} = 0.6$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast2} \cdot G_H \cdot AICE_{coax} = 5$ plf **BLC 4,6**

Coax projected surface area w/ Ice = $AICE_{coax} := \dfrac{\left(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1}\right)}{12} = 0.5$ sf/ft

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

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 20$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \dfrac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast5}\right)^2 - D_{coax}{}^2\right] = 23.6$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Ne_{coax} \cdot Id \cdot \dfrac{Ai_{coax}}{144} = 110$ plf **BLC 3**

Ice Area per Linear Foot = $Ai_{coax} := \dfrac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast4}\right)^2 - D_{coax}{}^2\right] = 22.7$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Ne_{coax} \cdot Id \cdot \dfrac{Ai_{coax}}{144} = 106$ plf **BLC 3**

Ice Area per Linear Foot = $Ai_{coax} := \dfrac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast3}\right)^2 - D_{coax}{}^2\right] = 21.5$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Ne_{coax} \cdot Id \cdot \dfrac{Ai_{coax}}{144} = 100$ plf **BLC 3**

Ice Area per Linear Foot = $Ai_{coax} := \dfrac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast2}\right)^2 - D_{coax}{}^2\right] = 19.9$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Ne_{coax} \cdot Id \cdot \dfrac{Ai_{coax}}{144} = 93$ plf **BLC 3**

Ice Area per Linear Foot = $Ai_{coax} := \dfrac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast1}\right)^2 - D_{coax}{}^2\right] = 16.8$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := Ne_{coax} \cdot Id \cdot \dfrac{Ai_{coax}}{144} = 78$ plf **BLC 3**

Development of Wind & Ice Load on Brace Member

Member Data: L2.5x2.5x1/4

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 2.5$ in (User Input)

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

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

Length = $L_{mem} := 42$ in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 16.8$

Member Force Coefficient = $Ca_{mem} = 1.73$

Wind Load (without ice)

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

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 13$ plf **BLC 5,7**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{(H_{mem} + 2 \cdot t_{izMast5})}{12} = 0.6$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 9$ plf **BLC 4,6**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left[(H_{mem} + 2 \cdot t_{izMast5}) + (W_{mem} - t_{mem})\right] \cdot (t_{mem} + 2 \cdot t_{izMast5}) - \left[H_{mem} + (W_{mem} + t_{mem})\right] \cdot t_{mem} = 38$$ sq in

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 15$ plf **BLC 3**

Development of Wind & Ice Load on Brace Member

Member Data: L3.5x3.5x1/4

Antenna Shape = Flat (User Input)

Height = $H_{mem} := 3.5$ in (User Input)

Width = $W_{mem} := 3.5$ in (User Input)

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

Length = $L_{mem} := 120$ in (User Input)

Member Aspect Ratio = $Ar_{mem} := \frac{L_{mem}}{W_{mem}} = 34.3$

Member Force Coefficient = $Ca_{mem} = 2$

Wind Load (without ice)

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

Total Member Wind Force = $F_{mem} := qz_{Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{mem} = 21$ plf **BLC 5,7**

Wind Load (with ice)

Member Projected Surface Area w/ Ice = $A_{ICEmem} := \frac{\left(H_{mem} + 2 \cdot t_{izMast5}\right)}{12} = 0.6$ sf/ft

Total Member Wind Force w/ Ice = $Fi_{mem} := qz_{ice.Mast5} \cdot G_H \cdot Ca_{mem} \cdot A_{ICEmem} = 12$ plf **BLC 4,6**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear foot =

$$Ai_{mem} := \left[\left(H_{mem} + 2 \cdot t_{izMast5}\right) + \left(W_{mem} - t_{mem}\right)\right] \cdot \left(t_{mem} + 2 \cdot t_{izMast5}\right) - \left[H_{mem} + \left(W_{mem} + t_{mem}\right)\right] \cdot t_{mem} = 46$$ sq in

Weight of Ice on Member = $W_{ICE.mem} := Id \cdot \frac{Ai_{mem}}{144} = 18$ plf **BLC 3**

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

Subject: **Analysis of TIA/EIA Wind and Ice Loads for Analysis of Mast Only**
Tabulated Load Cases
Location: **Wilton, CT**

Date: 11/23/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.006

Load Case	Description
1	Self Weight (Mast)
2	Weight of Appurtenances
3	Weight of Ice Only
4	TIA Wind with Ice X-direction
5	TIA Wind X-direction
6	TIA Wind with Ice Z-direction
7	TIA Wind Z-direction

Footnotes:

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

Location: **Wilton, CT**

Date: 11/23/16 Prepared by: T.J.L. Checked by: C.F.C. Job No. 15019.006

Load Combination	Description	Envelope Soultion	Wind Factor	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.2D + 1.6W (X-direction)		1		1	1.2	2	1.2	5	1.6				
2	0.9D + 1.6W (X-direction)		1		1	0.9	2	0.9	5	1.6				
3	1.2D + 1.0Di + 1.0Wi (X-direction)		1		1	1.2	2	1.2	3	1.0	4	1.0		
4	1.2D + 1.6W (Z-direction)		1		1	1.2	2	1.2	7	1.6				
5	0.9D + 1.6W (Z-direction)		1		1	0.9	2	0.9	7	1.6				
6	1.2D + 1.0Di + 1.0Wi (Z-direction)		1		1	1.2	2	1.2	3	1.0	6	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
7	A500 Gr. C 50	29000	11154	.3	.65	.49	50	1.1	58	1.2

Design Size and Code Check Parameters

	Label	Max Depth[in]	Min Depth[in]	Max Width[in]	Min Width[in]	Max Bending Chk	Max Shear Chk
1	Typical					1	1

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Antenna Mast	HSS16x0.500	Beam	Pipe	A500 Gr.42	Typical	22.7	685	685	1370
2	L3.5x3.5x1/4	L3.5x3.5x4	Beam	Single Angle	A36 Gr.36	Typical	1.7	2	2	.039
3	L2.5x2.5x1/4	L2.5x2.5x4	Beam	Single Angle	A36 Gr.36	Typical	1.19	.692	.692	.026

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	Antenna Mast	100	Segment	Segment	Lbyy		Segme...				Lateral
2	M2	L3.5x3.5x1/4	9.723			Lbyy						Lateral
3	M3	L3.5x3.5x1/4	9.723			Lbyy						Lateral
4	M4	L3.5x3.5x1/4	9.723			Lbyy						Lateral
5	M5	L3.5x3.5x1/4	9.723			Lbyy						Lateral
6	M6	L2.5x2.5x1/4	3.536			Lbyy						Lateral
7	M7	L2.5x2.5x1/4	3.536			Lbyy						Lateral
8	M8	L2.5x2.5x1/4	3.536			Lbyy						Lateral
9	M9	L2.5x2.5x1/4	3.536			Lbyy						Lateral
10	M10	L2.5x2.5x1/4	3.536			Lbyy						Lateral
11	M11	L2.5x2.5x1/4	3.536			Lbyy						Lateral
12	M12	L2.5x2.5x1/4	3.536			Lbyy						Lateral
13	M13	L2.5x2.5x1/4	3.536			Lbyy						Lateral
14	M14	L2.5x2.5x1/4	3.536			Lbyy						Lateral
15	M15	L2.5x2.5x1/4	3.536			Lbyy						Lateral
16	M16	L2.5x2.5x1/4	3.536			Lbyy						Lateral
17	M17	L2.5x2.5x1/4	3.536			Lbyy						Lateral
18	M18	L2.5x2.5x1/4	3.536			Lbyy						Lateral
19	M19	L2.5x2.5x1/4	3.536			Lbyy						Lateral
20	M20	L2.5x2.5x1/4	3.536			Lbyy						Lateral
21	M21	L2.5x2.5x1/4	3.536			Lbyy						Lateral

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	32	0	0	
3	N4	0	64	0	0	
4	N5	0	74	0	0	
5	N6	0	86	0	0	
6	N7	0	91	0	0	
7	N8	0	100	0	0	
8	N9	6.875	32	6.875	0	
9	N10	6.875	32	-6.875	0	
10	N11	-6.875	32	6.875	0	
11	N12	-6.875	32	-6.875	0	
12	N17	2.5	64	2.5	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
13	N18	2.5	64	-2.5	0	
14	N19	-2.5	64	2.5	0	
15	N20	-2.5	64	-2.5	0	
16	N21	2.5	74	2.5	0	
17	N22	2.5	74	-2.5	0	
18	N23	-2.5	74	2.5	0	
19	N24	-2.5	74	-2.5	0	
20	N25	2.5	86	2.5	0	
21	N26	2.5	86	-2.5	0	
22	N27	-2.5	86	2.5	0	
23	N28	-2.5	86	-2.5	0	
24	N29	2.5	91	2.5	0	
25	N30	2.5	91	-2.5	0	
26	N31	-2.5	91	2.5	0	
27	N32	-2.5	91	-2.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N12	Reaction	Reaction	Reaction			
2	N11	Reaction	Reaction	Reaction			
3	N9	Reaction	Reaction	Reaction			
4	N10	Reaction	Reaction	Reaction			
5	N18	Reaction	Reaction	Reaction			
6	N22	Reaction	Reaction	Reaction			
7	N19	Reaction	Reaction	Reaction			
8	N23	Reaction	Reaction	Reaction			
9	N17	Reaction	Reaction	Reaction			
10	N20	Reaction	Reaction	Reaction			
11	N21	Reaction	Reaction	Reaction			
12	N25	Reaction	Reaction	Reaction			
13	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
14	N5						
15	N31	Reaction	Reaction	Reaction			
16	N32	Reaction	Reaction	Reaction			
17	N29	Reaction	Reaction	Reaction			
18	N30	Reaction	Reaction	Reaction			
19	N27	Reaction	Reaction	Reaction			
20	N28	Reaction	Reaction	Reaction			
21	N26	Reaction	Reaction	Reaction			
22	N24	Reaction	Reaction	Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.27	97.25
2	M1	Y	-.135	97.25
3	M1	Y	-.006	97.25
4	M1	Y	-1.16	97.25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-1.025	97.25
2	M1	Y	-.981	97.25
3	M1	Y	-.042	97.25
4	M1	Y	-.34	97.25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.509	97.25
2	M1	X	.447	97.25
3	M1	X	.018	97.25
4	M1	X	.166	97.25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.425	97.25
2	M1	X	1.262	97.25
3	M1	X	.019	97.25
4	M1	X	.515	97.25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	.509	97.25
2	M1	Z	.447	97.25
3	M1	Z	.018	97.25
4	M1	Z	.166	97.25

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Z	1.425	97.25
2	M1	Z	1.262	97.25
3	M1	Z	.019	97.25
4	M1	Z	.515	97.25

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	-.02	-.02	0	0

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	-.046	-.046	80	100
2	M1	Y	-.045	-.045	60	80
3	M1	Y	-.043	-.043	40	60
4	M1	Y	-.041	-.041	20	40
5	M1	Y	-.036	-.036	0	20
6	M1	Y	-.11	-.11	80	100
7	M1	Y	-.106	-.106	60	80
8	M1	Y	-.1	-.1	40	60
9	M1	Y	-.093	-.093	20	40

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
10	M1	Y	-.078	-.078	0	20
11	M2	Y	-.018	-.018	0	0
12	M3	Y	-.018	-.018	0	0
13	M4	Y	-.018	-.018	0	0
14	M5	Y	-.018	-.018	0	0
15	M6	Y	-.015	-.015	0	0
16	M7	Y	-.015	-.015	0	0
17	M8	Y	-.015	-.015	0	0
18	M9	Y	-.015	-.015	0	0
19	M10	Y	-.015	-.015	0	0
20	M11	Y	-.015	-.015	0	0
21	M12	Y	-.015	-.015	0	0
22	M13	Y	-.015	-.015	0	0
23	M14	Y	-.015	-.015	0	0
24	M15	Y	-.015	-.015	0	0
25	M16	Y	-.015	-.015	0	0
26	M17	Y	-.015	-.015	0	0
27	M18	Y	-.015	-.015	0	0
28	M19	Y	-.015	-.015	0	0
29	M20	Y	-.015	-.015	0	0
30	M21	Y	-.015	-.015	0	0

Member Distributed Loads (BLC 4 : (x) 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	.009	.009	80	100
2	M1	X	.009	.009	60	80
3	M1	X	.008	.008	40	60
4	M1	X	.007	.007	20	40
5	M1	X	.006	.006	0	20
6	M1	X	.007	.007	80	100
7	M1	X	.006	.006	60	80
8	M1	X	.006	.006	40	60
9	M1	X	.005	.005	20	40
10	M1	X	.004	.004	0	20
11	M4	X	.012	.012	0	0
12	M5	X	.012	.012	0	0
13	M2	X	.012	.012	0	0
14	M3	X	.012	.012	0	0
15	M8	X	.009	.009	0	0
16	M9	X	.009	.009	0	0
17	M6	X	.009	.009	0	0
18	M7	X	.009	.009	0	0
19	M12	X	.009	.009	0	0
20	M13	X	.009	.009	0	0
21	M10	X	.009	.009	0	0
22	M11	X	.009	.009	0	0
23	M16	X	.009	.009	0	0
24	M17	X	.009	.009	0	0
25	M14	X	.009	.009	0	0
26	M15	X	.009	.009	0	0
27	M20	X	.009	.009	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
28	M21	X	.009	.009	0	0
29	M18	X	.009	.009	0	0
30	M19	X	.009	.009	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.029	.029	80	100
2	M1	X	.027	.027	60	80
3	M1	X	.026	.026	40	60
4	M1	X	.023	.023	20	40
5	M1	X	.018	.018	0	20
6	M1	X	.011	.011	80	100
7	M1	X	.011	.011	60	80
8	M1	X	.01	.01	40	60
9	M1	X	.009	.009	20	40
10	M1	X	.007	.007	0	20
11	M4	X	.021	.021	0	0
12	M5	X	.021	.021	0	0
13	M2	X	.021	.021	0	0
14	M3	X	.021	.021	0	0
15	M8	X	.013	.013	0	0
16	M9	X	.013	.013	0	0
17	M6	X	.013	.013	0	0
18	M7	X	.013	.013	0	0
19	M12	X	.013	.013	0	0
20	M13	X	.013	.013	0	0
21	M10	X	.013	.013	0	0
22	M11	X	.013	.013	0	0
23	M16	X	.013	.013	0	0
24	M17	X	.013	.013	0	0
25	M14	X	.013	.013	0	0
26	M15	X	.013	.013	0	0
27	M20	X	.013	.013	0	0
28	M21	X	.013	.013	0	0
29	M18	X	.013	.013	0	0
30	M19	X	.013	.013	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.009	.009	80	100
2	M1	Z	.009	.009	60	80
3	M1	Z	.008	.008	40	60
4	M1	Z	.007	.007	20	40
5	M1	Z	.006	.006	0	20
6	M1	Z	.007	.007	80	100
7	M1	Z	.006	.006	60	80
8	M1	Z	.006	.006	40	60
9	M1	Z	.005	.005	20	40
10	M1	Z	.004	.004	0	20
11	M4	Z	.012	.012	0	0
12	M5	Z	.012	.012	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
13	M2	Z	.012	.012	0	0
14	M3	Z	.012	.012	0	0
15	M8	Z	.009	.009	0	0
16	M9	Z	.009	.009	0	0
17	M6	Z	.009	.009	0	0
18	M7	Z	.009	.009	0	0
19	M12	Z	.009	.009	0	0
20	M13	Z	.009	.009	0	0
21	M10	Z	.009	.009	0	0
22	M11	Z	.009	.009	0	0
23	M16	Z	.009	.009	0	0
24	M17	Z	.009	.009	0	0
25	M14	Z	.009	.009	0	0
26	M15	Z	.009	.009	0	0
27	M20	Z	.009	.009	0	0
28	M21	Z	.009	.009	0	0
29	M18	Z	.009	.009	0	0
30	M19	Z	.009	.009	0	0

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

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M1	Z	.029	.029	80	100
2	M1	Z	.027	.027	60	80
3	M1	Z	.026	.026	40	60
4	M1	Z	.023	.023	20	40
5	M1	Z	.018	.018	0	20
6	M1	Z	.011	.011	80	100
7	M1	Z	.011	.011	60	80
8	M1	Z	.01	.01	40	60
9	M1	Z	.009	.009	20	40
10	M1	Z	.007	.007	0	20
11	M4	Z	.021	.021	0	0
12	M5	Z	.021	.021	0	0
13	M2	Z	.021	.021	0	0
14	M3	Z	.021	.021	0	0
15	M8	Z	.013	.013	0	0
16	M9	Z	.013	.013	0	0
17	M6	Z	.013	.013	0	0
18	M7	Z	.013	.013	0	0
19	M12	Z	.013	.013	0	0
20	M13	Z	.013	.013	0	0
21	M10	Z	.013	.013	0	0
22	M11	Z	.013	.013	0	0
23	M16	Z	.013	.013	0	0
24	M17	Z	.013	.013	0	0
25	M14	Z	.013	.013	0	0
26	M15	Z	.013	.013	0	0
27	M20	Z	.013	.013	0	0
28	M21	Z	.013	.013	0	0
29	M18	Z	.013	.013	0	0
30	M19	Z	.013	.013	0	0

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					4	1		
3	Weight of Ice Only	None					4	30		
4	(x) TIA Wind with Ice	None					4	30		
5	(x) TIA Wind	None					4	30		
6	(z) TIA Wind with Ice	None					4	30		
7	(z) TIA Wind	None					4	30		

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												
4	1.2D + 1.6...	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6...	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N12	max	-.159	6	.121	3	-.159	3	0	1	0	1	0	1
2		min	-.747	1	.025	5	-.747	4	0	1	0	1	0	1
3	N11	max	.583	4	.121	3	.583	1	0	1	0	1	0	1
4		min	-.747	1	.025	5	-.747	4	0	1	0	1	0	1
5	N9	max	-.159	6	.121	6	-.159	3	0	1	0	1	0	1
6		min	-.747	1	.025	2	-.747	4	0	1	0	1	0	1
7	N10	max	.583	4	.121	6	.583	1	0	1	0	1	0	1
8		min	-.747	1	.025	2	-.747	4	0	1	0	1	0	1
9	N18	max	.46	4	.035	6	.46	1	0	1	0	1	0	1
10		min	-.497	1	.006	2	-.497	4	0	1	0	1	0	1
11	N22	max	.028	5	.035	6	.028	2	0	1	0	1	0	1
12		min	-.065	2	.006	2	-.065	5	0	1	0	1	0	1
13	N19	max	.46	4	.035	3	.46	1	0	1	0	1	0	1
14		min	-.497	1	.006	5	-.497	4	0	1	0	1	0	1
15	N23	max	.028	5	.035	3	.028	2	0	1	0	1	0	1
16		min	-.065	2	.006	5	-.065	5	0	1	0	1	0	1
17	N17	max	-.119	6	.035	3	-.119	3	0	1	0	1	0	1
18		min	-.497	1	.006	5	-.497	4	0	1	0	1	0	1
19	N20	max	-.119	6	.035	6	-.119	3	0	1	0	1	0	1
20		min	-.497	1	.007	2	-.497	4	0	1	0	1	0	1
21	N21	max	-.016	6	.035	3	-.016	3	0	1	0	1	0	1
22		min	-.065	2	.006	5	-.065	5	0	1	0	1	0	1
23	N25	max	1.409	4	.036	3	1.409	1	0	1	0	1	0	1
24		min	.287	3	.007	2	.287	6	0	1	0	1	0	1
25	N1	max	0	5	30.949	3	0	2	0	2	0	3	3.327	1
26		min	-.628	2	10.37	2	-.628	5	-3.327	4	0	2	0	5
27	N31	max	3.148	4	.036	3	3.147	1	0	1	0	1	0	1
28		min	-3.185	1	.005	5	-3.184	4	0	1	0	1	0	1
29	N32	max	-.712	6	.036	6	-.712	3	0	1	0	1	0	1

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
30		min	-3.185	1	.008	2	-3.185	4	0	1	0	1	0	1
31	N29	max	-.713	6	.034	3	-.713	3	0	1	0	1	0	1
32		min	-3.184	1	.005	5	-3.184	4	0	1	0	1	0	1
33	N30	max	3.147	4	.036	6	3.148	1	0	1	0	1	0	1
34		min	-3.184	1	.005	2	-3.185	4	0	1	0	1	0	1
35	N27	max	1.372	1	.036	6	1.372	4	0	1	0	1	0	1
36		min	-1.409	4	.006	2	-1.409	1	0	1	0	1	0	1
37	N28	max	1.409	4	.035	6	1.409	1	0	1	0	1	0	1
38		min	.287	3	.006	5	.287	6	0	1	0	1	0	1
39	N26	max	1.372	1	.036	3	1.372	4	0	1	0	1	0	1
40		min	-1.409	4	.006	5	-1.409	1	0	1	0	1	0	1
41	N24	max	-.016	6	.035	6	-.016	3	0	1	0	1	0	1
42		min	-.065	2	.006	2	-.065	5	0	1	0	1	0	1
43	Totals:	max	0	6	31.996	3	0	2						
44		min	-13.109	2	10.574	2	-13.109	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	2	0	2	0	5	0	4	0	5	0	5
2		min	0	5	0	3	0	2	0	2	0	3	0	1
3	N2	max	.003	1	-.007	2	.003	4	6.104e-05	5	0	5	0	6
4		min	0	6	-.02	3	0	3	0	3	0	3	-6.104e-05	2
5	N4	max	.001	1	-.011	2	.001	4	0	3	0	5	1.023e-04	2
6		min	0	6	-.034	3	0	3	-1.023e-04	5	0	3	0	6
7	N5	max	0	2	-.012	2	0	5	1.108e-06	5	0	5	0	6
8		min	0	6	-.036	3	0	2	0	3	0	3	-1.108e-06	2
9	N6	max	0	4	-.013	2	0	3	0	2	0	5	8.762e-06	1
10		min	-.004	1	-.039	3	-.004	4	-8.762e-06	4	0	3	0	5
11	N7	max	.01	1	-.013	2	.01	4	8.205e-04	4	0	5	0	6
12		min	0	6	-.04	3	0	3	0	3	0	3	-8.205e-04	1
13	N8	max	.183	1	-.013	2	.183	4	1.804e-03	4	0	5	0	6
14		min	0	6	-.041	3	0	3	0	3	0	3	-1.804e-03	1
15	N9	max	0	1	0	2	0	4	1.166e-03	5	3.842e-03	5	4.039e-03	3
16		min	0	6	0	6	0	3	-4.054e-03	3	-5.184e-03	1	-1.105e-03	5
17	N10	max	0	1	0	2	0	4	2.728e-03	3	3.842e-03	2	2.713e-03	3
18		min	0	4	0	6	0	1	-1.105e-03	2	-1.18e-03	3	-1.166e-03	2
19	N11	max	0	1	0	5	0	4	-2.547e-03	2	-4.332e-03	3	-2.608e-03	2
20		min	0	4	0	3	0	1	-4.039e-03	3	-5.184e-03	1	-4.054e-03	3
21	N12	max	0	1	0	5	0	4	4.054e-03	6	3.842e-03	2	1.105e-03	2
22		min	0	6	0	3	0	3	-1.166e-03	2	-5.184e-03	4	-4.039e-03	6
23	N17	max	0	1	0	5	0	4	-1.393e-04	5	3.481e-04	5	1.005e-03	3
24		min	0	6	0	3	0	3	-9.796e-04	3	-4.8e-04	1	3.704e-05	5
25	N18	max	0	1	0	2	0	4	8.4e-04	6	3.481e-04	2	8.651e-04	3
26		min	0	4	0	6	0	1	3.704e-05	2	-1.371e-04	3	1.393e-04	2
27	N19	max	0	1	0	5	0	4	-4.62e-04	2	-4.611e-04	2	-3.597e-04	5
28		min	0	4	0	3	0	1	-1.005e-03	6	-4.8e-04	1	-9.796e-04	6
29	N20	max	0	1	0	2	0	4	9.796e-04	6	3.481e-04	2	-3.704e-05	2
30		min	0	6	0	6	0	3	1.393e-04	2	-4.8e-04	4	-1.005e-03	6
31	N21	max	0	2	0	5	0	5	-1.036e-04	5	3.259e-04	5	1.041e-03	3
32		min	0	6	0	3	0	3	-1.042e-03	3	-4.737e-04	3	1.047e-04	5

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
33	N22	max	0	2	0	2	0	5	9.027e-04	3	3.259e-04	2	9.018e-04	3
34		min	0	5	0	6	0	2	1.047e-04	2	-1.424e-04	3	1.036e-04	2
35	N23	max	0	2	0	5	0	5	-4.262e-04	5	-4.39e-04	5	-4.273e-04	2
36		min	0	5	0	3	0	2	-1.041e-03	6	-4.737e-04	6	-1.042e-03	3
37	N24	max	0	2	0	2	0	5	1.042e-03	6	3.259e-04	2	-1.047e-04	2
38		min	0	6	0	6	0	3	1.036e-04	2	-4.737e-04	6	-1.041e-03	6
39	N25	max	0	3	0	2	0	6	-1.232e-04	5	2.523e-04	5	1.089e-03	3
40		min	0	4	0	3	0	1	-1.086e-03	3	-4.574e-04	3	1.144e-04	5
41	N26	max	0	4	0	5	0	1	9.467e-04	6	2.523e-04	2	9.49e-04	3
42		min	0	1	0	3	0	4	1.144e-04	2	-1.587e-04	6	1.232e-04	2
43	N27	max	0	4	0	2	0	1	-4.458e-04	2	-3.654e-04	5	-4.371e-04	2
44		min	0	1	0	6	0	4	-1.089e-03	3	-4.574e-04	3	-1.086e-03	3
45	N28	max	0	3	0	5	0	6	1.086e-03	6	2.523e-04	2	-1.144e-04	2
46		min	0	4	0	6	0	1	1.232e-04	2	-4.574e-04	6	-1.089e-03	6
47	N29	max	0	1	0	5	0	4	2.867e-04	5	4.857e-04	5	1.054e-03	6
48		min	0	6	0	3	0	3	-1.193e-03	3	-6.177e-04	1	3.589e-05	2
49	N30	max	0	1	0	2	0	4	1.054e-03	3	4.857e-04	5	8.705e-04	3
50		min	0	4	0	6	0	1	5.337e-04	2	-1.067e-04	3	-2.867e-04	5
51	N31	max	0	1	0	5	0	4	-3.589e-05	2	-5.094e-04	3	-8.563e-04	2
52		min	0	4	0	3	0	1	-1.01e-03	6	-6.177e-04	1	-1.193e-03	3
53	N32	max	0	1	0	2	0	4	1.193e-03	6	4.857e-04	2	-3.589e-05	5
54		min	0	6	0	6	0	3	-2.867e-04	2	-6.177e-04	4	-1.054e-03	3

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

	Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-...	phi*Mn z-...	Cb	Eqn
1	M1	HSS16x0.500	.093	90.625	1	.026	90.625		1	851.796	858.06	352.8	352.8	4....	H1-1b
2	M2	L3.5x3.5x4	.204	4.963	1	.007	9.723	y	3	13.355	55.08	2.416	3.905	1....	H2-1
3	M3	L3.5x3.5x4	.188	5.064	2	.007	9.723	y	3	13.355	55.08	2.416	3.905	1....	H2-1
4	M4	L3.5x3.5x4	.204	4.963	4	.007	9.723	y	3	13.355	55.08	2.416	3.905	1....	H2-1
5	M5	L3.5x3.5x4	.157	4.861	4	.007	9.723	y	6	13.355	55.08	2.416	3.905	1....	H2-1
6	M6	L2.5x2.5x4	.049	1.805	1	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
7	M7	L2.5x2.5x4	.045	1.805	2	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
8	M8	L2.5x2.5x4	.049	1.805	4	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
9	M9	L2.5x2.5x4	.041	1.805	4	.003	3.536	y	6	25.642	38.556	1.114	2.452	1....	H2-1
10	M10	L2.5x2.5x4	.033	1.768	3	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
11	M11	L2.5x2.5x4	.026	1.768	3	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
12	M12	L2.5x2.5x4	.033	1.768	6	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
13	M13	L2.5x2.5x4	.033	1.768	6	.003	3.536	y	6	25.642	38.556	1.114	2.452	1....	H2-1
14	M14	L2.5x2.5x4	.076	1.731	1	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
15	M15	L2.5x2.5x4	.097	1.731	5	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
16	M16	L2.5x2.5x4	.102	1.731	1	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
17	M17	L2.5x2.5x4	.102	1.731	4	.003	3.536	y	6	25.642	38.556	1.114	2.452	1....	H2-1
18	M18	L2.5x2.5x4	.197	1.805	1	.003	3.536	y	6	25.642	38.556	1.114	2.452	1....	H2-1
19	M19	L2.5x2.5x4	.193	1.805	2	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1
20	M20	L2.5x2.5x4	.197	1.805	4	.003	3.536	y	6	25.642	38.556	1.114	2.452	1....	H2-1
21	M21	L2.5x2.5x4	.139	1.805	4	.003	3.536	y	3	25.642	38.556	1.114	2.452	1....	H2-1

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N12	-.747	.034	-.583	0	0	0
2	1	N11	-.747	.034	.583	0	0	0
3	1	N9	-.747	.034	-.583	0	0	0
4	1	N10	-.747	.034	.583	0	0	0
5	1	N18	-.497	.008	.46	0	0	0
6	1	N22	-.065	.009	.028	0	0	0
7	1	N19	-.497	.009	.46	0	0	0
8	1	N23	-.065	.009	.028	0	0	0
9	1	N17	-.497	.008	-.46	0	0	0
10	1	N20	-.497	.009	-.46	0	0	0
11	1	N21	-.065	.009	-.028	0	0	0
12	1	N25	1.372	.009	1.409	0	0	0
13	1	N1	-.628	13.827	0	0	0	3.327
14	1	N31	-3.185	.01	3.147	0	0	0
15	1	N32	-3.185	.01	-3.147	0	0	0
16	1	N29	-3.184	.007	-3.148	0	0	0
17	1	N30	-3.184	.007	3.148	0	0	0
18	1	N27	1.372	.008	-1.409	0	0	0
19	1	N28	1.372	.008	1.409	0	0	0
20	1	N26	1.372	.009	-1.409	0	0	0
21	1	N24	-.065	.009	-.028	0	0	0
22	1	Totals:	-13.109	14.099	0			
23	1	COG (ft):	X: 0	Y: 56.534	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N12	-.747	.025	-.583	0	0	0
2	2	N11	-.747	.025	.583	0	0	0
3	2	N9	-.747	.025	-.583	0	0	0
4	2	N10	-.747	.025	.583	0	0	0
5	2	N18	-.497	.006	.46	0	0	0
6	2	N22	-.065	.006	.028	0	0	0
7	2	N19	-.497	.007	.46	0	0	0
8	2	N23	-.065	.006	.028	0	0	0
9	2	N17	-.497	.006	-.46	0	0	0
10	2	N20	-.497	.007	-.46	0	0	0
11	2	N21	-.065	.006	-.028	0	0	0
12	2	N25	1.372	.007	1.409	0	0	0
13	2	N1	-.628	10.37	0	0	0	3.327
14	2	N31	-3.185	.008	3.147	0	0	0
15	2	N32	-3.185	.008	-3.147	0	0	0
16	2	N29	-3.184	.005	-3.148	0	0	0
17	2	N30	-3.184	.005	3.148	0	0	0
18	2	N27	1.372	.006	-1.409	0	0	0
19	2	N28	1.372	.006	1.409	0	0	0
20	2	N26	1.372	.007	-1.409	0	0	0
21	2	N24	-.065	.006	-.028	0	0	0
22	2	Totals:	-13.109	10.574	0			
23	2	COG (ft):	X: 0	Y: 56.534	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N12	-.217	.121	-.159	0	0	0
2	3	N11	-.217	.121	.159	0	0	0
3	3	N9	-.217	.121	-.159	0	0	0
4	3	N10	-.217	.121	.159	0	0	0
5	3	N18	-.135	.035	.119	0	0	0
6	3	N22	-.032	.035	.016	0	0	0
7	3	N19	-.135	.035	.119	0	0	0
8	3	N23	-.032	.035	.016	0	0	0
9	3	N17	-.135	.035	-.119	0	0	0
10	3	N20	-.135	.035	-.119	0	0	0
11	3	N21	-.032	.035	-.016	0	0	0
12	3	N25	.287	.036	.303	0	0	0
13	3	N1	-.156	30.949	0	0	0	.829
14	3	N31	-.728	.036	.712	0	0	0
15	3	N32	-.728	.036	-.712	0	0	0
16	3	N29	-.728	.034	-.713	0	0	0
17	3	N30	-.728	.034	.713	0	0	0
18	3	N27	.287	.035	-.303	0	0	0
19	3	N28	.287	.035	.303	0	0	0
20	3	N26	.287	.036	-.303	0	0	0
21	3	N24	-.032	.035	-.016	0	0	0
22	3	Totals:	-3.456	31.996	0			
23	3	COG (ft):	X: 0	Y: 58.037	Z: 0			

Joint Reactions

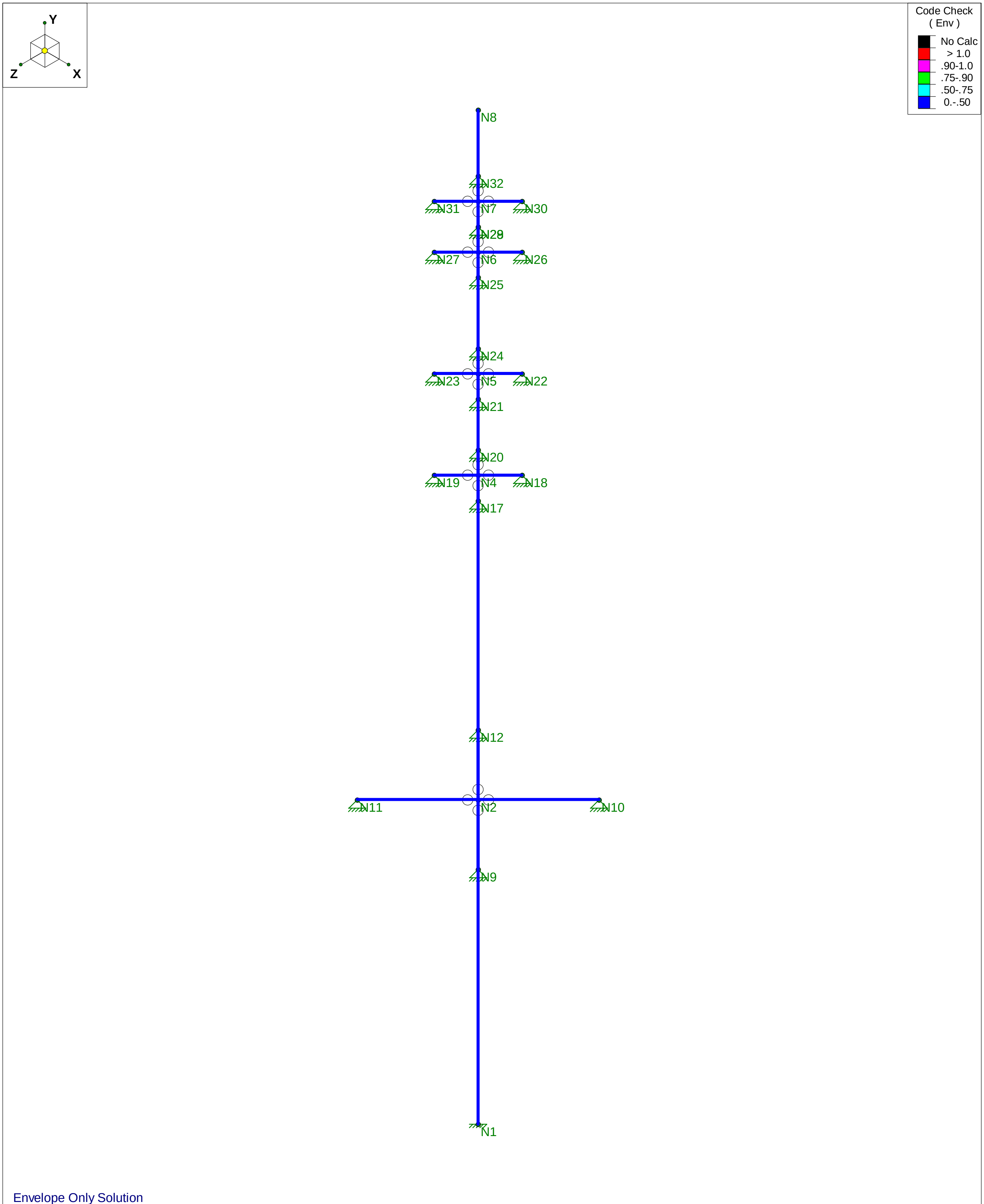
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N12	-.583	.034	-.747	0	0	0
2	4	N11	.583	.034	-.747	0	0	0
3	4	N9	-.583	.034	-.747	0	0	0
4	4	N10	.583	.034	-.747	0	0	0
5	4	N18	.46	.009	-.497	0	0	0
6	4	N22	.028	.009	-.065	0	0	0
7	4	N19	.46	.008	-.497	0	0	0
8	4	N23	.028	.009	-.065	0	0	0
9	4	N17	-.46	.008	-.497	0	0	0
10	4	N20	-.46	.009	-.497	0	0	0
11	4	N21	-.028	.009	-.065	0	0	0
12	4	N25	1.409	.009	1.372	0	0	0
13	4	N1	0	13.827	-.628	-3.327	0	0
14	4	N31	3.148	.007	-3.184	0	0	0
15	4	N32	-3.147	.01	-3.185	0	0	0
16	4	N29	-3.148	.007	-3.184	0	0	0
17	4	N30	3.147	.01	-3.185	0	0	0
18	4	N27	-1.409	.009	1.372	0	0	0
19	4	N28	1.409	.008	1.372	0	0	0
20	4	N26	-1.409	.008	1.372	0	0	0
21	4	N24	-.028	.009	-.065	0	0	0
22	4	Totals:	0	14.099	-13.109			
23	4	COG (ft):	X: 0	Y: 56.534	Z: 0			

Joint Reactions

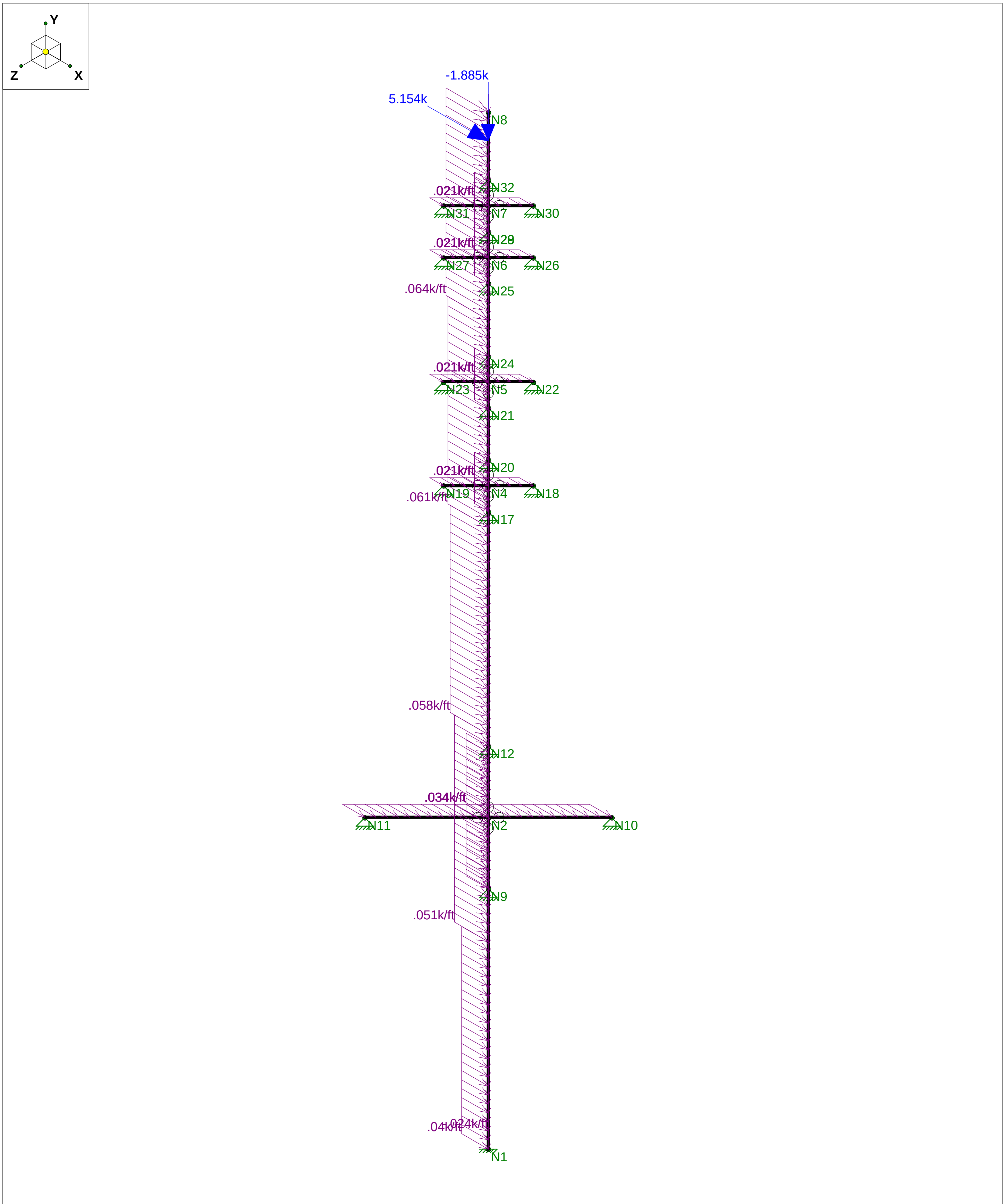
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	5	N12	-.583	.025	-.747	0	0	0
2	5	N11	.583	.025	-.747	0	0	0
3	5	N9	-.583	.025	-.747	0	0	0
4	5	N10	.583	.025	-.747	0	0	0
5	5	N18	.46	.007	-.497	0	0	0
6	5	N22	.028	.006	-.065	0	0	0
7	5	N19	.46	.006	-.497	0	0	0
8	5	N23	.028	.006	-.065	0	0	0
9	5	N17	-.46	.006	-.497	0	0	0
10	5	N20	-.46	.007	-.497	0	0	0
11	5	N21	-.028	.006	-.065	0	0	0
12	5	N25	1.409	.007	1.372	0	0	0
13	5	N1	0	10.37	-.628	-3.327	0	0
14	5	N31	3.148	.005	-3.184	0	0	0
15	5	N32	-3.147	.008	-3.185	0	0	0
16	5	N29	-3.148	.005	-3.184	0	0	0
17	5	N30	3.147	.008	-3.185	0	0	0
18	5	N27	-1.409	.007	1.372	0	0	0
19	5	N28	1.409	.006	1.372	0	0	0
20	5	N26	-1.409	.006	1.372	0	0	0
21	5	N24	-.028	.006	-.065	0	0	0
22	5	Totals:	0	10.574	-13.109			
23	5	COG (ft):	X: 0	Y: 56.534	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	6	N12	-.159	.121	-.217	0	0	0
2	6	N11	.159	.121	-.217	0	0	0
3	6	N9	-.159	.121	-.217	0	0	0
4	6	N10	.159	.121	-.217	0	0	0
5	6	N18	.119	.035	-.135	0	0	0
6	6	N22	.016	.035	-.032	0	0	0
7	6	N19	.119	.035	-.135	0	0	0
8	6	N23	.016	.035	-.032	0	0	0
9	6	N17	-.119	.035	-.135	0	0	0
10	6	N20	-.119	.035	-.135	0	0	0
11	6	N21	-.016	.035	-.032	0	0	0
12	6	N25	.303	.036	.287	0	0	0
13	6	N1	0	30.949	-.156	-.829	0	0
14	6	N31	.713	.034	-.728	0	0	0
15	6	N32	-.712	.036	-.728	0	0	0
16	6	N29	-.713	.034	-.728	0	0	0
17	6	N30	.712	.036	-.728	0	0	0
18	6	N27	-.303	.036	.287	0	0	0
19	6	N28	.303	.035	.287	0	0	0
20	6	N26	-.303	.035	.287	0	0	0
21	6	N24	-.016	.035	-.032	0	0	0
22	6	Totals:	0	31.996	-3.456			
23	6	COG (ft):	X: 0	Y: 58.037	Z: 0			

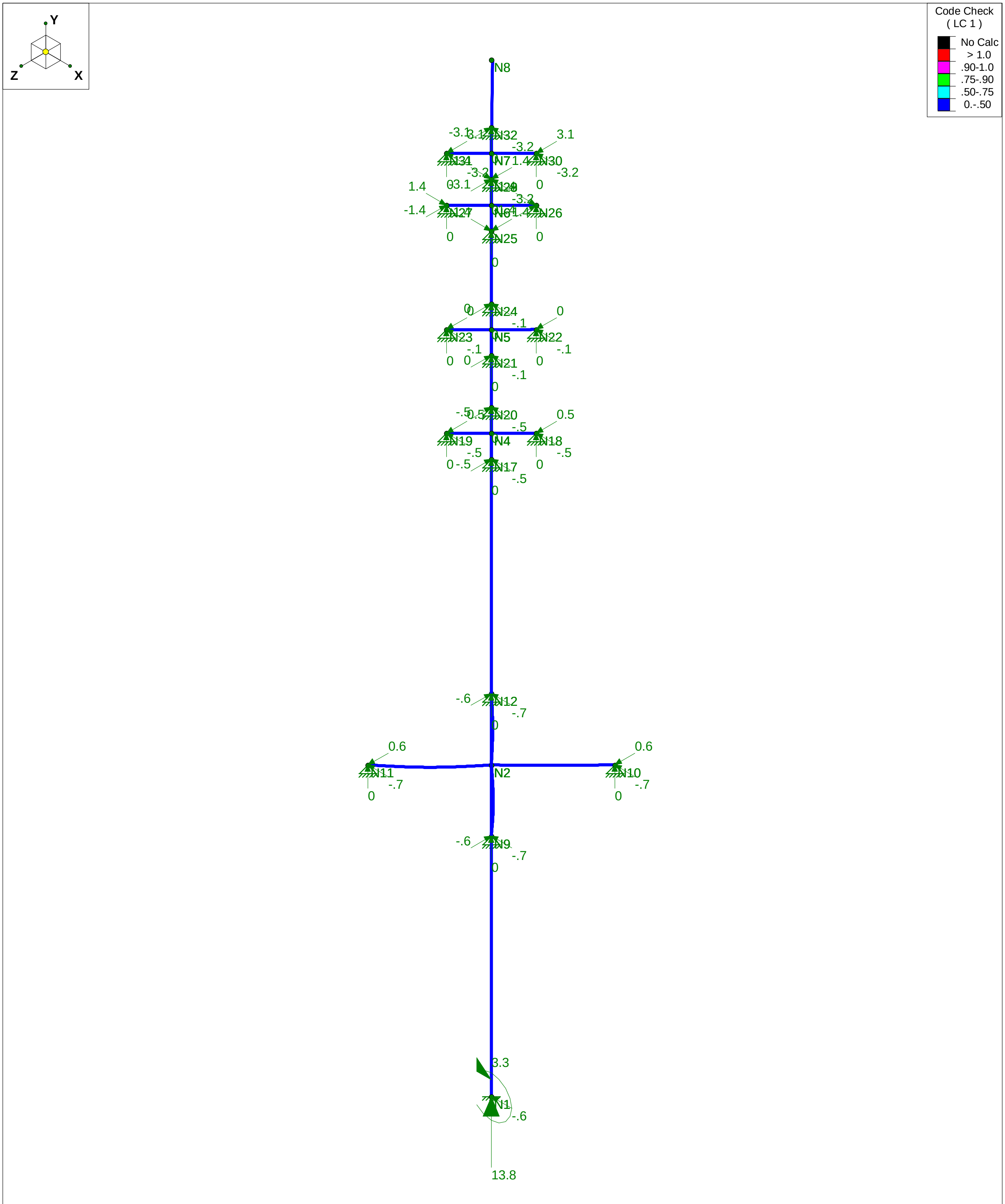


CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:53 AM
15019.006 - CT11296A	Unity Check	TIA - Antenna Mast.r3d



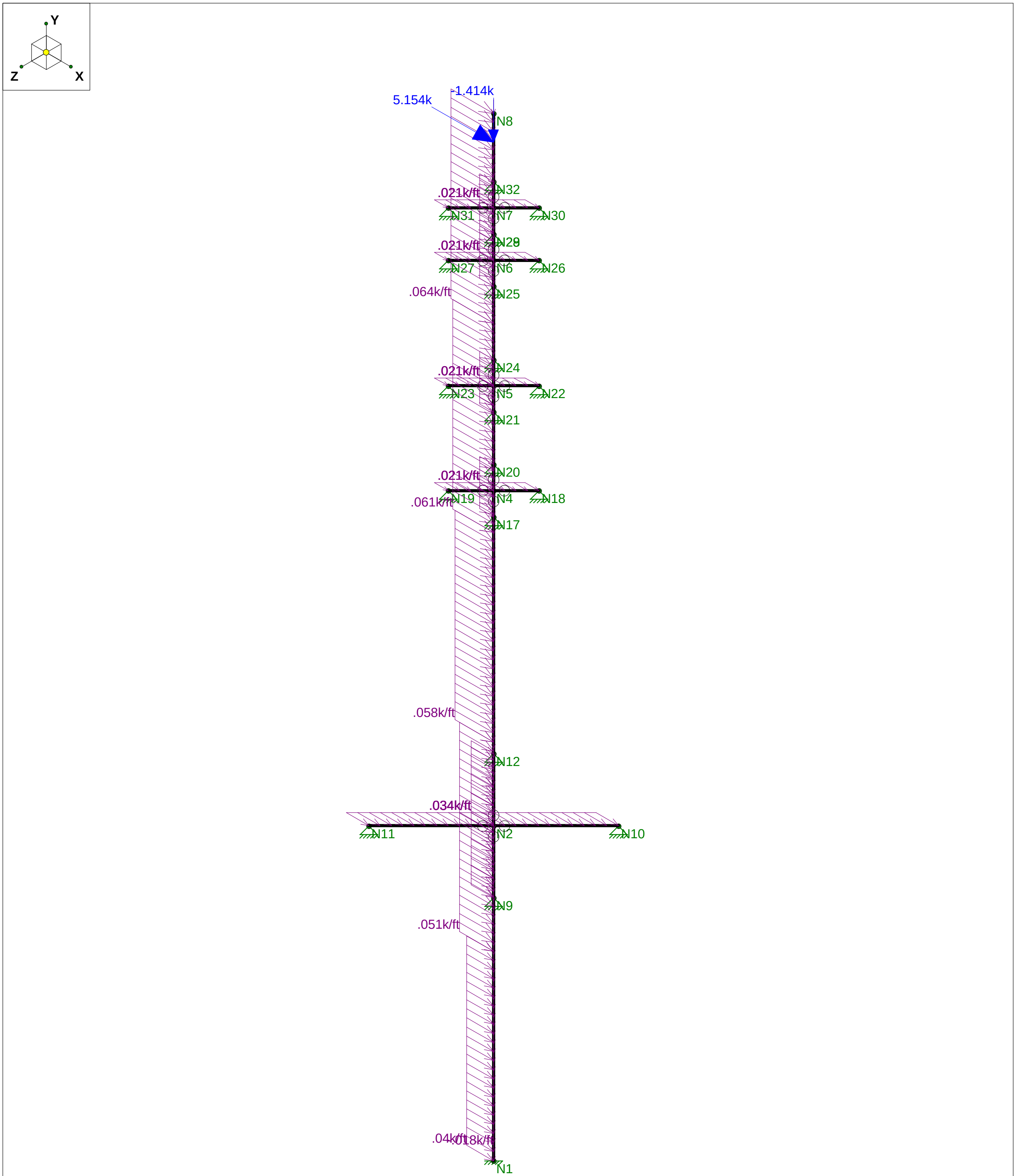
Loads: LC 1, 1.2D + 1.6W (X-direction)

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:53 AM
15019.006 - CT11296A	LC #1 Loads	TIA - Antenna Mast.r3d



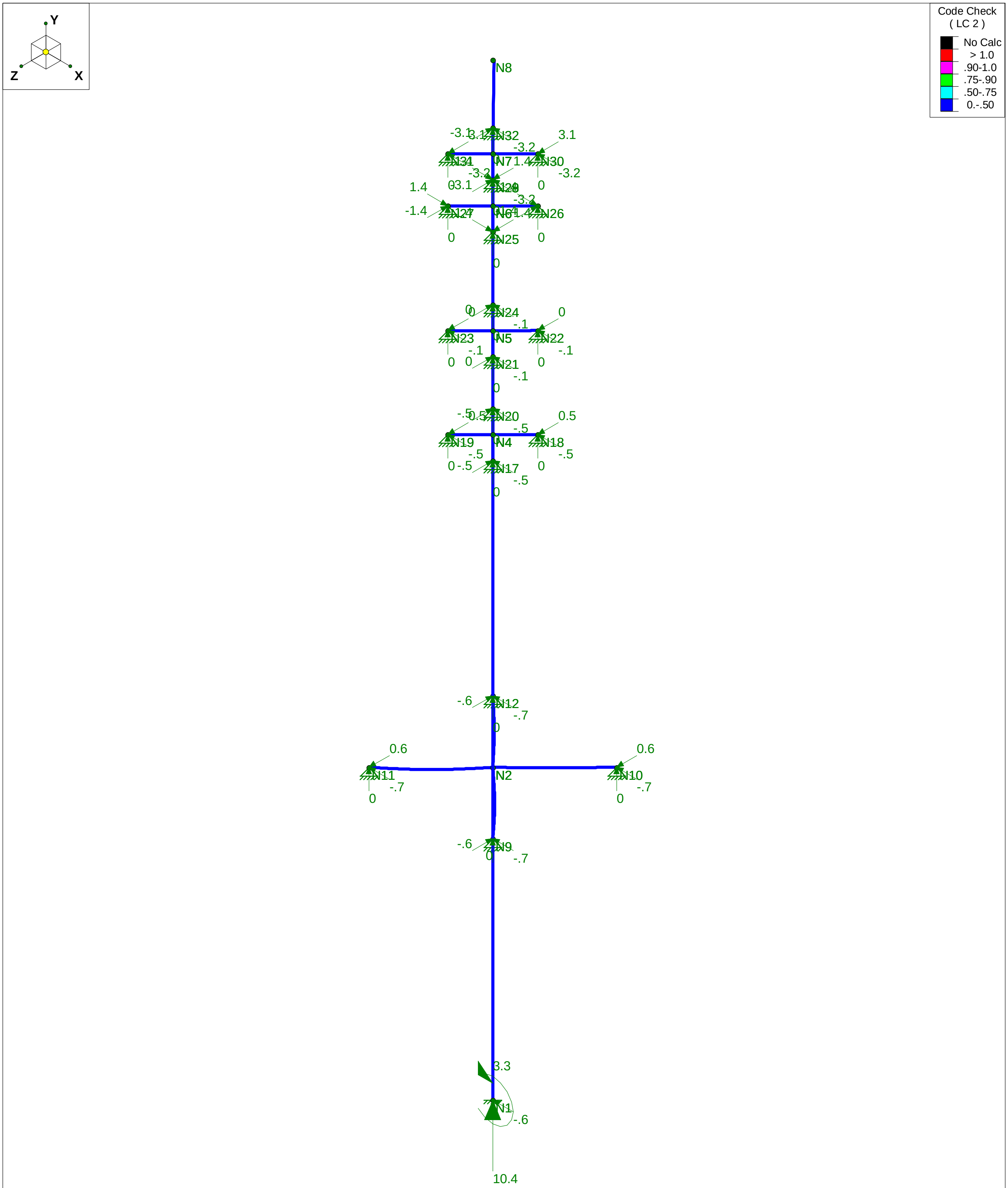
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:55 AM
15019.006 - CT11296A	LC #1 Reactions and Deflected Shape	TIA - Antenna Mast.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:53 AM
15019.006 - CT11296A	LC #2 Loads	TIA - Antenna Mast.r3d

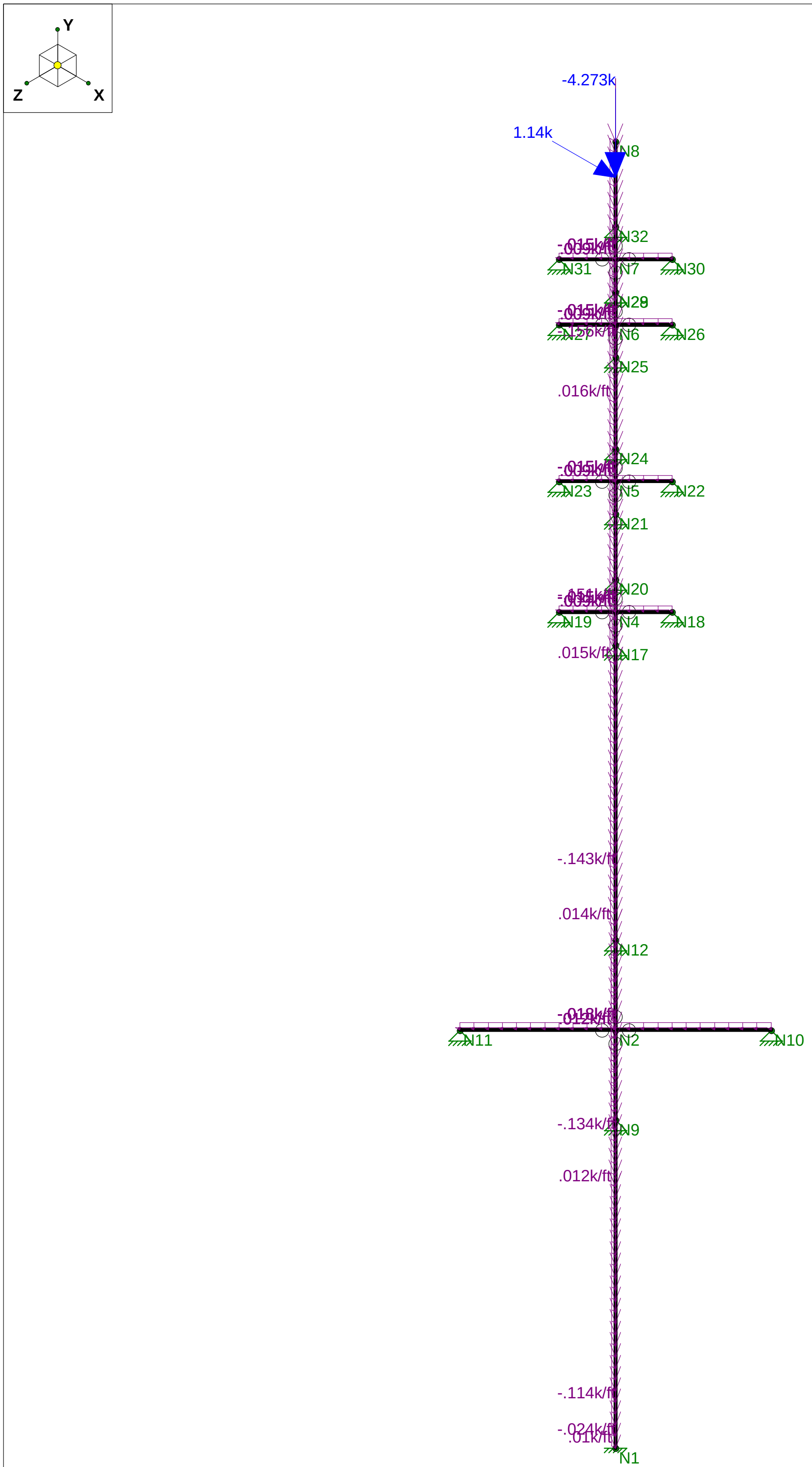


Code Check
(LC 2)

	No Calc
	> 1.0
	.90-1.0
	.75-.90
	.50-.75
	0.-.50

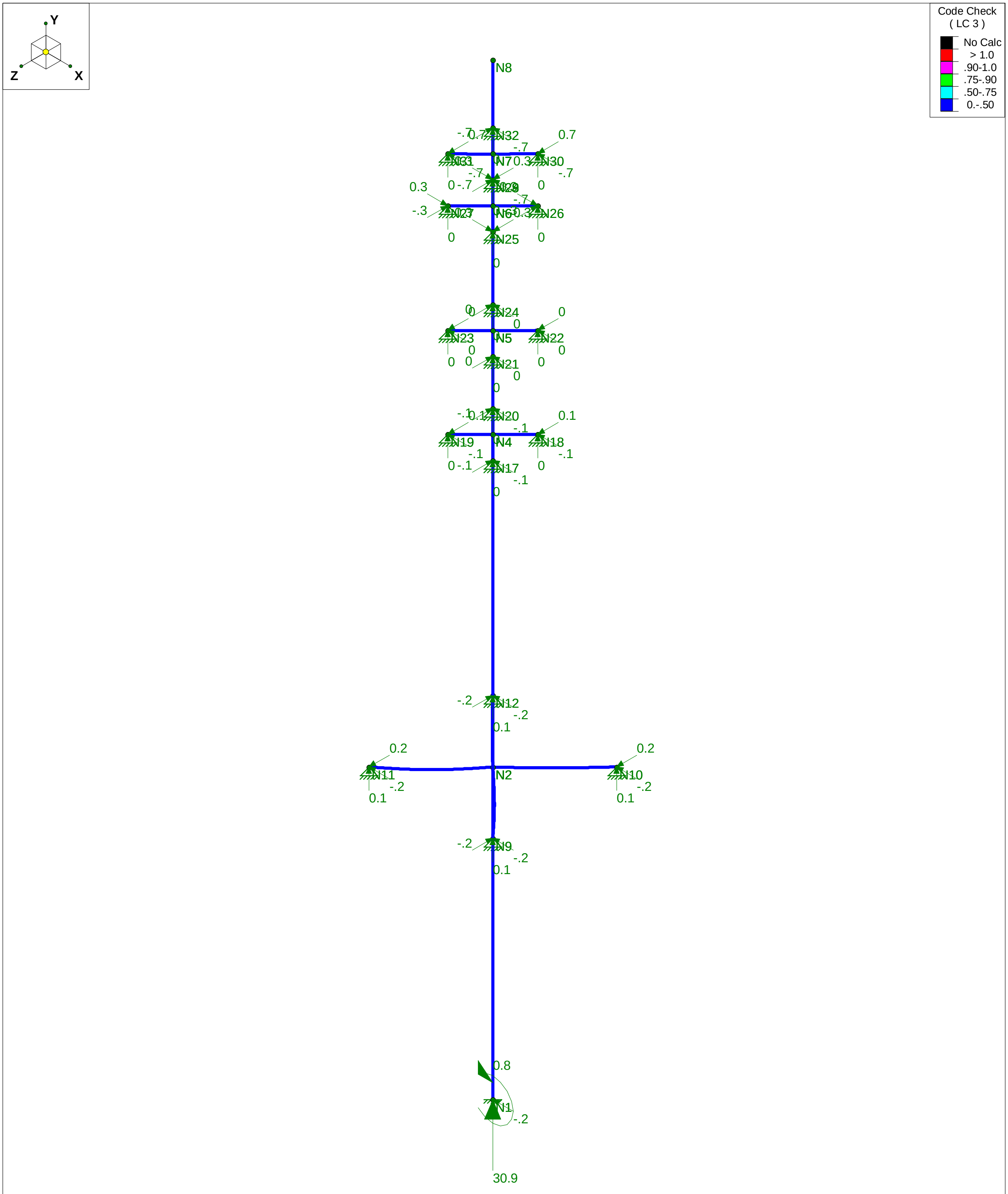
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:56 AM
15019.006 - CT11296A	LC #2 Reactions and Deflected Shape	TIA - Antenna Mast.r3d



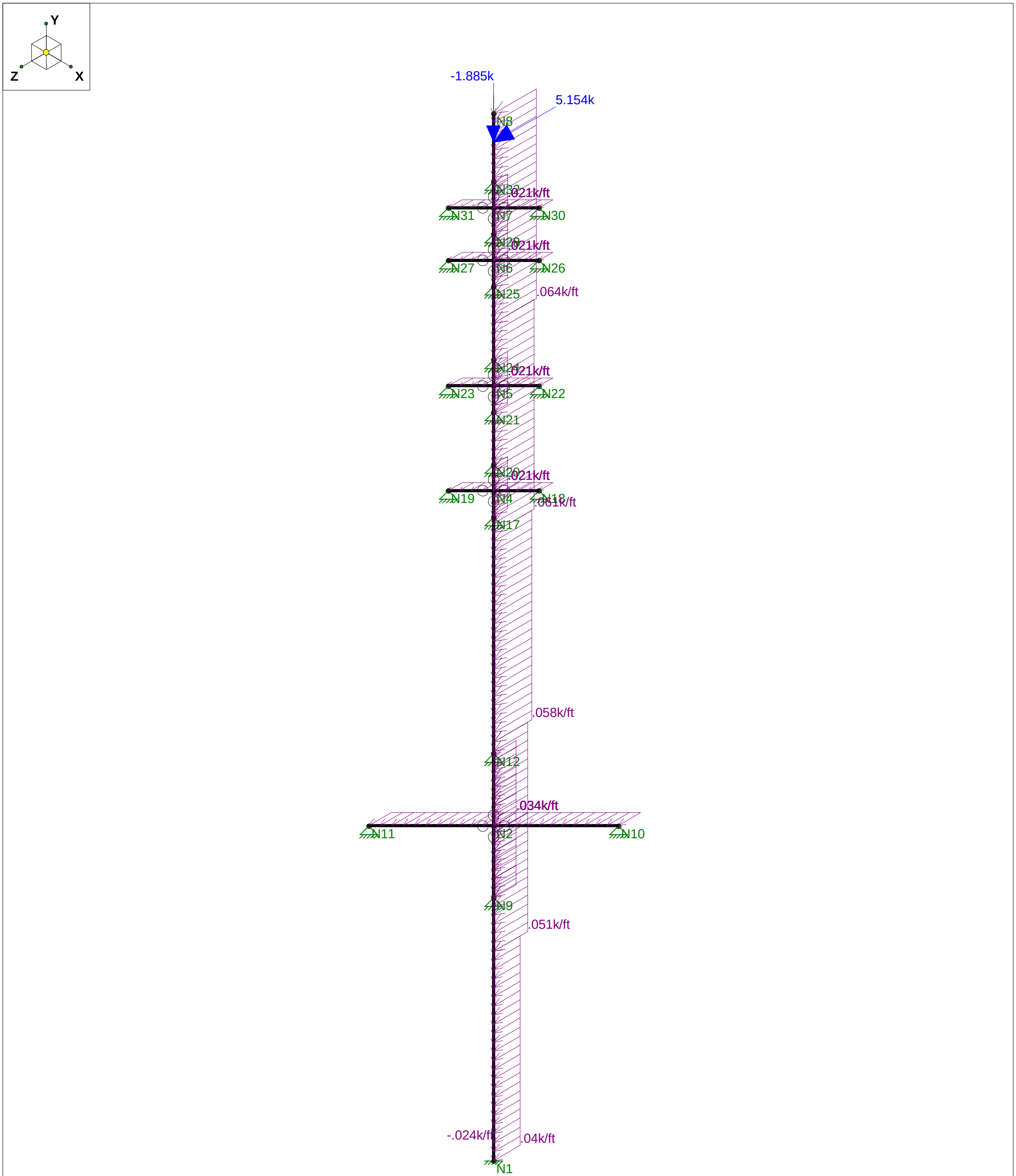
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:53 AM
15019.006 - CT11296A	LC #3 Loads	TIA - Antenna Mast.r3d



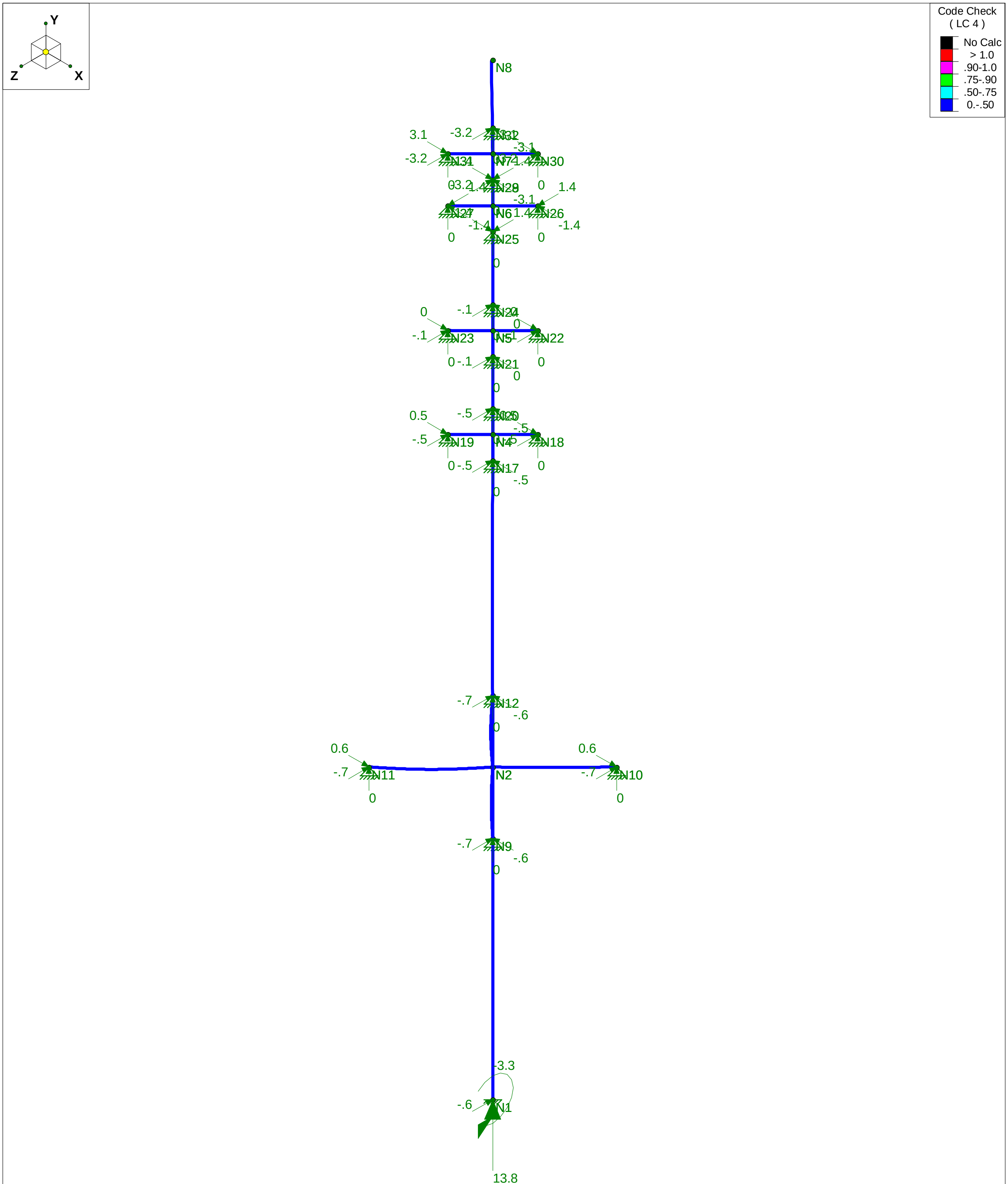
Results for LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:56 AM
15019.006 - CT11296A	LC #3 Reactions and Deflected Shape	TIA - Antenna Mast.r3d



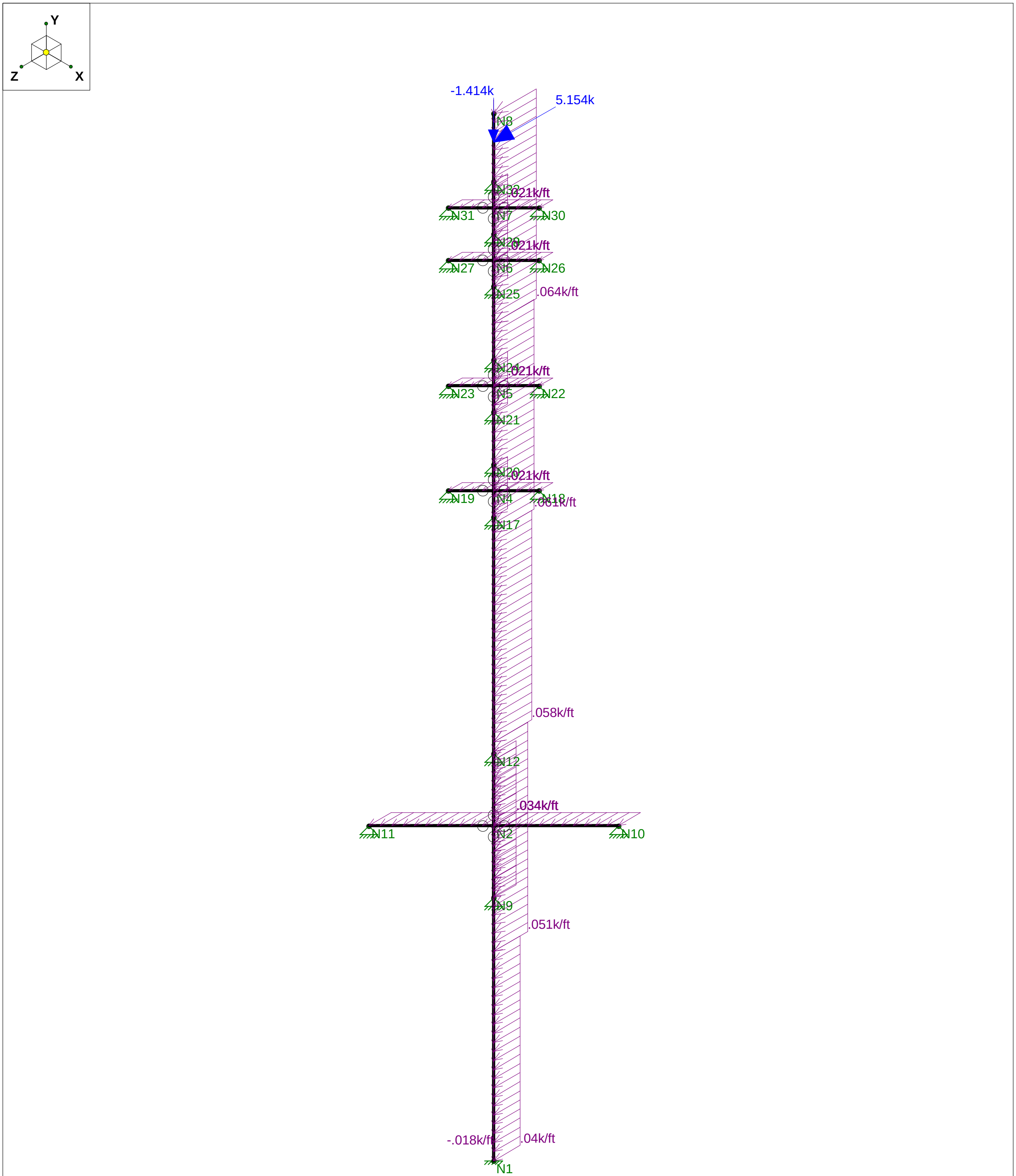
Loads: LC 4, 1.2D + 1.6W (Z-direction)

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:54 AM
15019.006 - CT11296A	LC #4 Loads	TIA - Antenna Mast.r3d



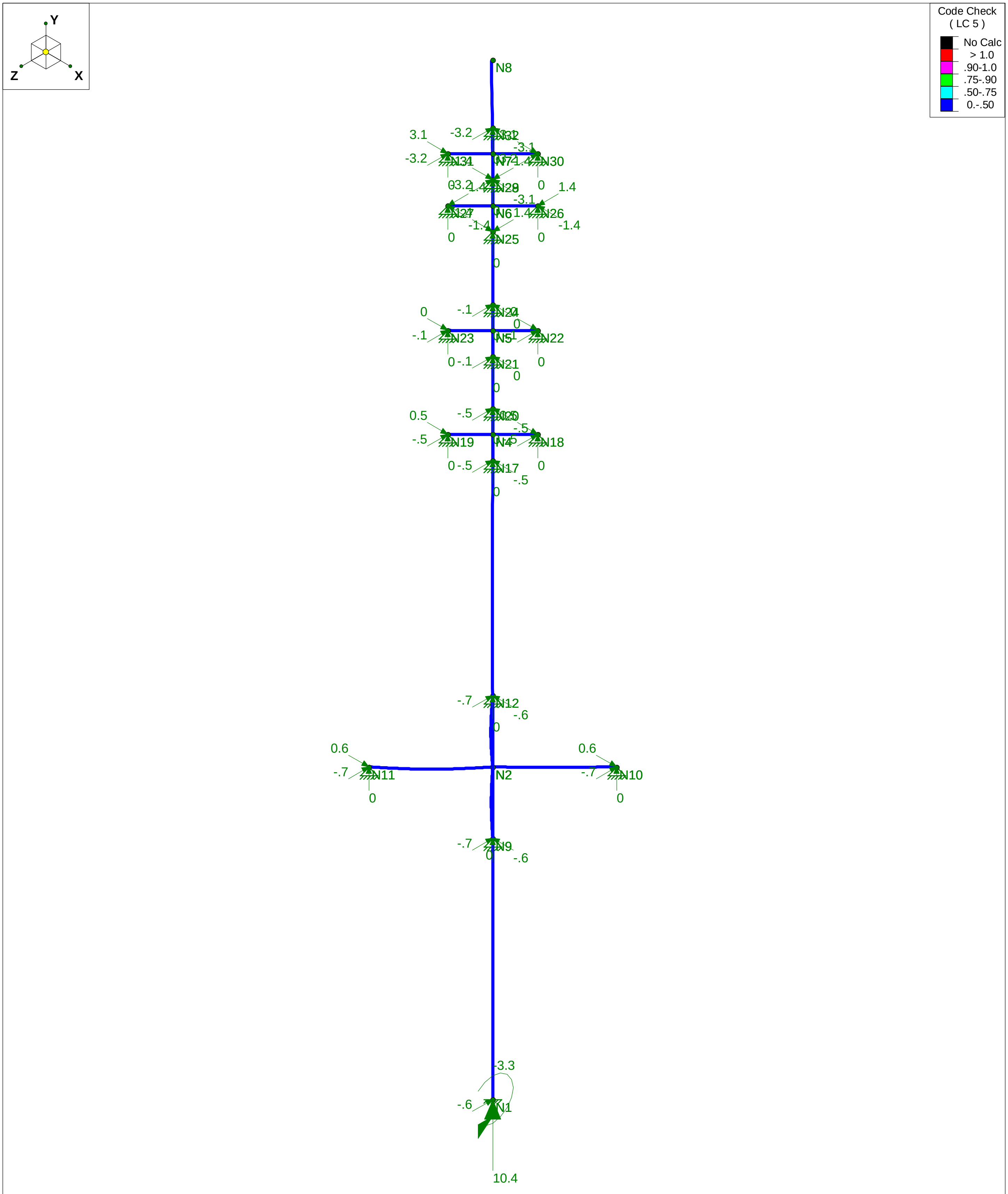
Results for LC 4, 1.2D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:57 AM
15019.006 - CT11296A	LC #4 Reactions and Deflected Shape	TIA - Antenna Mast.r3d



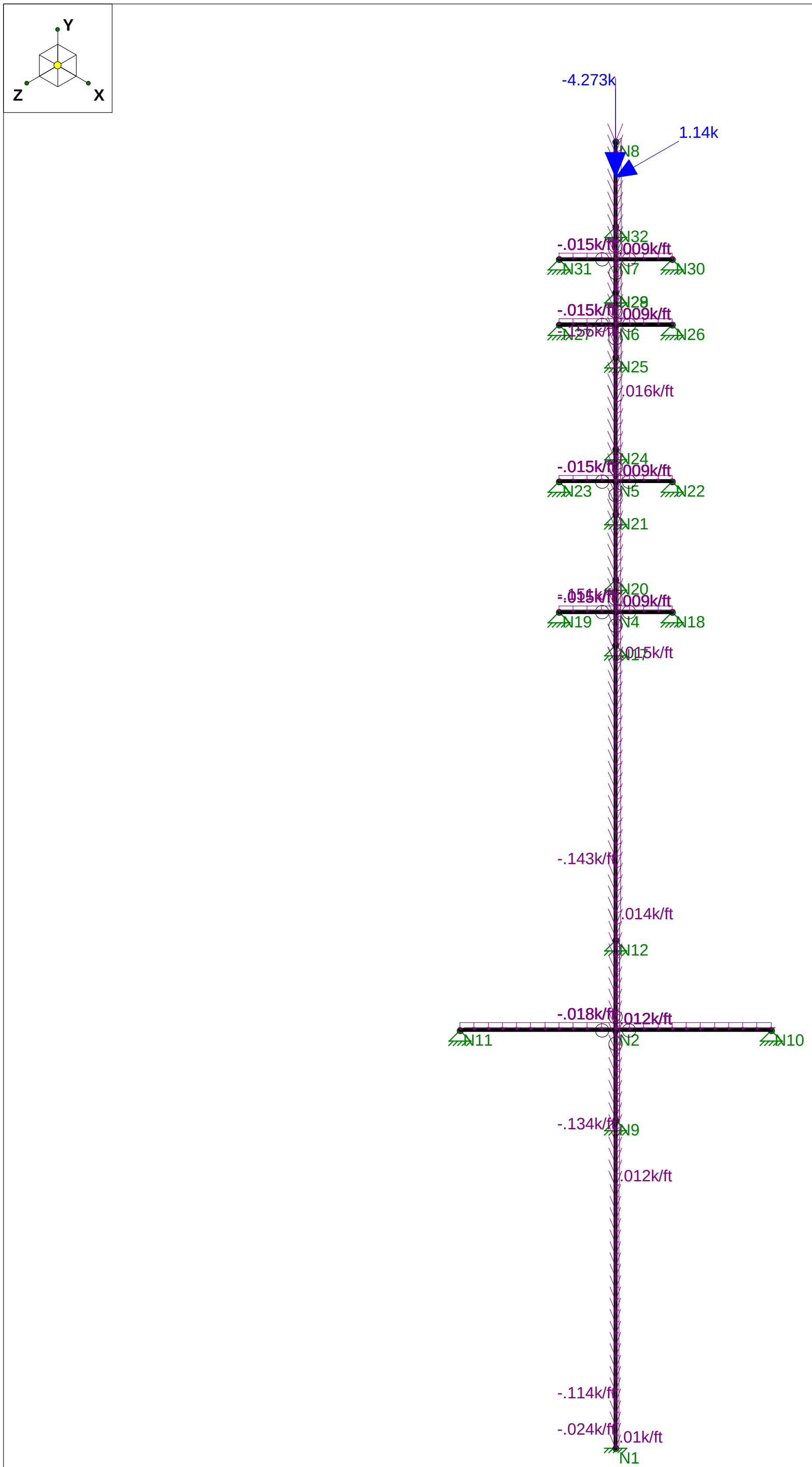
Loads: LC 5, 0.9D + 1.6W (Z-direction)

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:54 AM
15019.006 - CT11296A	LC #5 Loads	TIA - Antenna Mast.r3d



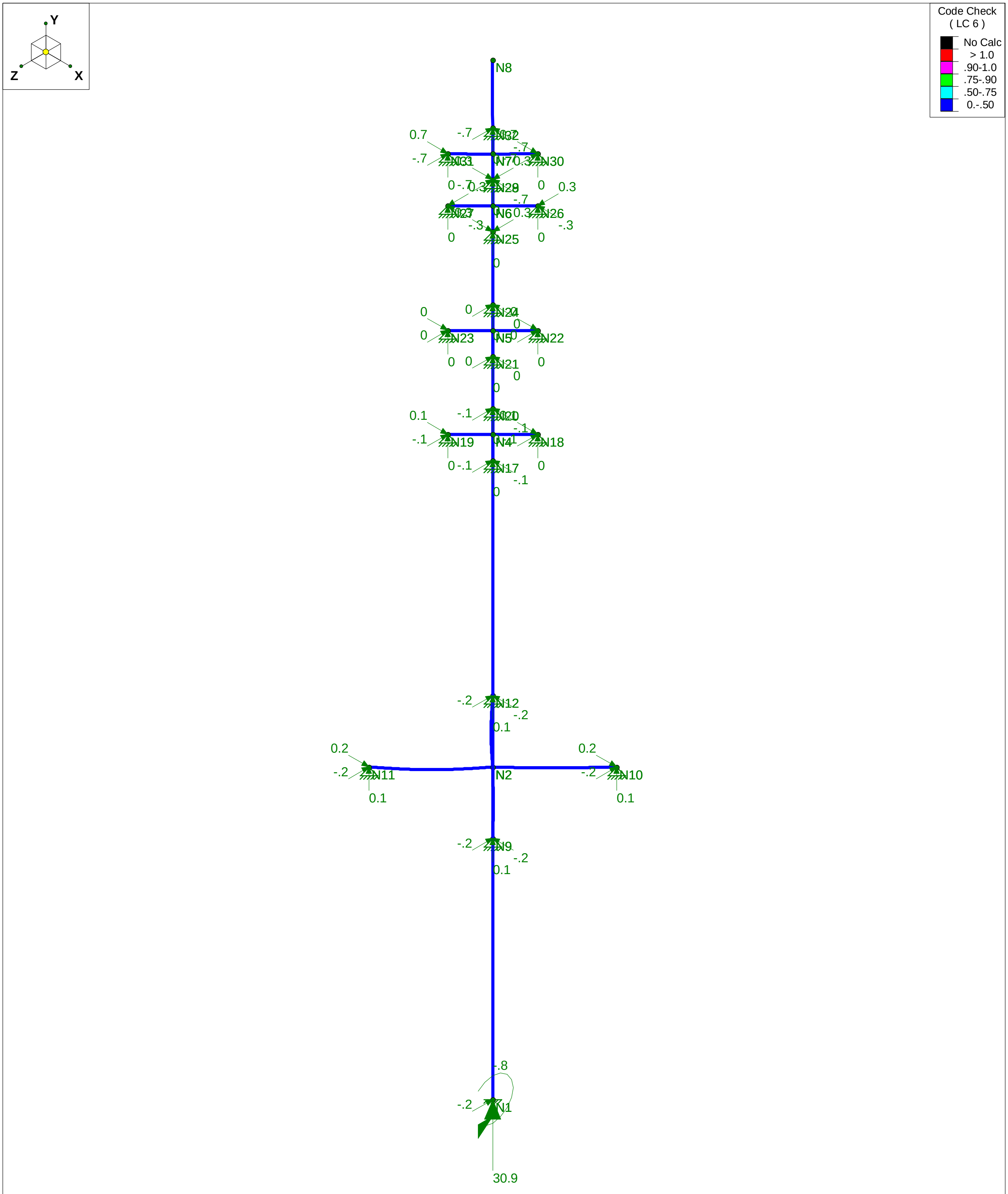
Results for LC 5, 0.9D + 1.6W (Z-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:57 AM
15019.006 - CT11296A	LC #5 Reactions and Deflected Shape	TIA - Antenna Mast.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:54 AM
15019.006 - CT11296A	LC #6 Loads	TIA - Antenna Mast.r3d



Results for LC 6, 1.2D + 1.0Di + 1.0Wi (Z-direction)
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Struct # 936 - Antenna Mast	Mar 13, 2017 at 9:58 AM
15019.006 - CT11296A	LC #6 Reactions and Deflected Shape	TIA - Antenna Mast.r3d

Antenna Mast Connection to Tower:

Reactions:

Horz = $Horz := 13 \cdot kips$ (User Input)

Pipe Collar:

Bolt Data:

Bolt Type = ASTM A325 (User Input)

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

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

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

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

Plate Data:

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

Plate Thickness = $t_{plt} := 1.25 \cdot in$ (User Input)

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

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

Weld Data:

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

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

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

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

Check Pipe Collar Bolts:

Tension Force = $f_t := \frac{Horz}{N_b} = 3.3 \cdot kips$

Bolt Tenison % of Capacity = $\frac{f_t}{F_t} = 15.7 \cdot \%$

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

$Bolt\_Tension = "OK"$

Check Pipe Collar Plate:

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

Plate Section Modulus = $Z_{plt} := \frac{1}{4} \cdot W_{plt} \cdot t_{plt}^{\,2} = 1.953 \cdot in^3$

Plate Bending Moment = $M := \frac{Horz}{2} \cdot d_{st} = 11.375 \cdot in \cdot kips$

Plate Bending Stress = $f_b := \frac{M}{Z_{plt}} = 5.824 \cdot ksi$

$Plate\_Bending := if\left(f_b < F_b, "OK", "Overstressed"\right)$

$Plate\_Bending = "OK"$

Check Pipe Collar Weld:

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

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

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

Plate Stress = $f_w := \frac{Horz}{A_w \cdot n_w} = 5.884 \cdot ksi$

$Weld := if\left(f_w < F_w, "OK", "Overstressed"\right)$

$Weld = "OK"$

Reactions:

Force =	$Fab := 4.5 \cdot kips$	(User Input)

Angle Plate:

Bolt Data:

Bolt Type =	ASTM A325	(User Input)
Bolt Diameter =	$D := 0.625 \cdot in$	(User Input)
Number of Bolts =	$N_b := 1$	(User Input)
Design Tensile Strength =	$F_t := 20.7 \cdot kips$	(User Input)
Design Shear Strength =	$F_v := 12.4 \cdot kips$	(User Input)

Plate Data:

Plate Width =	$W_{plt} := 3 \cdot in$	(User Input)
Plate Thickness =	$t_{plt} := 0.75 \cdot in$	(User Input)
Distance from Bolt to Collar =	$d_{st} := 1.5 \cdot in$	(User Input)
Yield Strength =	$F_y := 36 \cdot ksi$	(User Input)
Tensile Strength =	$F_u := 58 \cdot ksi$	(User Input)
Hole Diamter =	$Hole_d := .8125 \cdot in$	(User Input)

Weld Data:

Weld Size =	$sw := \frac{5}{16} \cdot in$	(User Input)
Weld Length =	$l_w := 3 \cdot in$	(User Input)
Number of Welds =	$n_w := 2$	(User Input)
Weld Strength =	$F_w := 70 \cdot ksi$	(User Input)

Check Angle Brace Bolts:

Shear Force = $f_v := \frac{Fab}{N_b} = 4.5 \cdot kips$

Bolt Shear % of Capacity = $\frac{f_v}{F_v} = 36.29 \cdot \%$

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

$Bolt\_Shear = "OK"$

Check Angle Connection Plate:

Plate Gross Area = $A_g := W_{plt} \cdot t_{plt} = 2.25 \cdot in^2$

Plate Net Area = $A_n := \left[W_{plt} - \left(Hole_d + .0625 \cdot in\right)\right] \cdot t_{plt} = 1.594 \cdot in^2$

Shear Lag Factor = $U := 1.0$

Plate Effective Net Area = $A_e := A_n \cdot U = 1.594 \cdot in^2$

Yielding Factor = $\phi_t := 0.9$

Rupture Factor = $\phi_r := 0.75$

Bearing Strength Factor = $\phi_b := 0.75$

Clear Distance = $l_c := d_{st} - \frac{Hole_d}{2} = 1.094 \cdot in$

Tensile Yielding = $P_{at} := \phi_t \cdot F_y \cdot A_g = 72.9 \cdot kips$

Tensile Rupture = $P_{ar} := \phi_r \cdot F_u \cdot A_e = 69.328 \cdot kips$

Bearing Strength = $R_a := \phi_b \cdot 1.2 \cdot l_c \cdot t_{plt} \cdot F_u = 42.82 \cdot kips$

$Pa := \min\left(P_{at}, P_{ar}, R_a\right) = 42.82 \cdot kips$

$Plate := if\left(Fab < Pa, "OK", "Overstressed"\right)$

$Plate = "OK"$

Check Angle Connection Plate Weld:

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

Weld Area = $A_w := .707 \cdot sw \cdot l_w = 0.663 \cdot in^2$

Plate Stress = $f_w := \frac{Fab}{A_w \cdot n_w} = 3.395 \cdot ksi$

$Weld := if\left(f_w < F_w, "OK", "Overstressed"\right)$

$Weld = "OK"$

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 32.3 \cdot ft \cdot kips$	(Input From Risa3D)
Shear Force =	$Shear := 6.7 \cdot kips$	(Input From Risa3D)
Axial Force =	$Axial := 14 \cdot kips$	(Input From Risa3D)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 12$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 19 \cdot in$	(User Input)
Bolt Minimum Tensile Strength =	$F_{ub} := 120 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1.00 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A36

Plate Yield Strength =	$Fy_{bp} := 36 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1 \cdot in$	(User Input)
Flange Plate Diameter =	$D_{bp} := 22 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 16 \cdot in$	(User Input)

Weld Data:

Weld Size =	$sw := \frac{1}{4} \cdot in$	(User Input)
Weld Strength =	$F_w := 70 \cdot ksi$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 9.5 \cdot in$

Distance to Bolts = $i := 1..N$

$$d_i := \left\| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 4.75 \cdot in$	$d_7 = -4.75 \cdot in$
$d_2 = 8.23 \cdot in$	$d_8 = -8.23 \cdot in$
$d_3 = 9.50 \cdot in$	$d_9 = -9.50 \cdot in$
$d_4 = 8.23 \cdot in$	$d_{10} = -8.23 \cdot in$
$d_5 = 4.75 \cdot in$	$d_{11} = -4.75 \cdot in$
$d_6 = 0.00 \cdot in$	$d_{12} = -0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 8 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := \mathrm{if}\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$	$MA_7 = 0.00 \cdot in$
$MA_2 = 0.23 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_3 = 1.50 \cdot in$	$MA_9 = 0.00 \cdot in$
$MA_4 = 0.23 \cdot in$	$MA_{10} = 0.00 \cdot in$
$MA_5 = 0.00 \cdot in$	$MA_{11} = 0.00 \cdot in$
$MA_6 = 0.00 \cdot in$	$MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 12.1 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 541.5 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 0.606 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 0.878 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.22 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^{\ 3}}{32} = 0.066 \cdot in^3$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 5.6 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 0.6 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := \left(0.75 \cdot F_{ub} \cdot 0.75 \cdot A_g\right) = 53 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 10.63 \cdot \%$

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

$Condition1 = \text{"OK"}$

Design Shear Strength = $\Phi R_{nv} := \left(0.75 \cdot 0.45 \cdot F_{ub} \cdot A_g\right) = 31.8 \cdot kips$

Condition2 = $Condition2 := if\left[\left(\frac{V_{Max}}{\Phi R_{nv}}\right)^2 + \left(\frac{T_{Max}}{\Phi R_{nt}}\right)^2 \le 1.00, \text{"OK"}, \text{"Overstressed"}\right]$

$Condition2 = \text{"OK"}$

Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 4.6 \cdot kips$ $\quad C_7 = -2.2 \cdot kips$

$C_2 = 7.1 \cdot kips$ $\quad C_8 = -4.7 \cdot kips$

$C_3 = 8.0 \cdot kips$ $\quad C_9 = -5.6 \cdot kips$

$C_4 = 7.1 \cdot kips$ $\quad C_{10} = -4.7 \cdot kips$

$C_5 = 4.6 \cdot kips$ $\quad C_{11} = -2.2 \cdot kips$

$C_6 = 1.2 \cdot kips$ $\quad C_{12} = 1.2 \cdot kips$

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} t_{bp}^{\ 2}\right)} = 5 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 0.9 \cdot Fy_{bp} = 32.4 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 15.5 \cdot \%$

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

Condition3 = "Ok"

Check Weld:

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

Weld Area = $A_w := \frac{\pi}{4} \cdot \left[\left(D_{pole} + 2sw \cdot 0.707\right)^2 - D_{pole}^{\ 2}\right] = 8.98 \cdot in^2$

Section Modulus of Weld = $S_w := \frac{\pi \cdot \left[\left(D_{pole} + 2sw \cdot 0.707\right)^4 - D_{pole}^{\ 4}\right]}{32 \cdot \left(D_{pole} + 2sw \cdot 0.707\right)} = 35.94 \cdot in^3$

Weld Stress = $f_w := \frac{OM}{S_w} + \frac{Shear}{A_w} = 11.53 \cdot ksi$

$Condition3 := if\left(f_w < F_w, \text{"OK"}, \text{"Overstressed"}\right)$

Condition3 = "OK"

Basic Components

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

Factors for Extreme Wind Calculation

Elevation of Top of PCS Mast Above Grade = $TME := 100$ 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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.266$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.313$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.854$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.871$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 34.1$ psf (NESC 2007 Section 250.C.2)

Shape Factors

NUS Design Criteria Issued April 12, 2007

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

Overload Factors

NU Design Criteria Table

Overload Factors for Wind Loads:

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

Overload Factors for Vertical Loads:

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

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 270$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$ cu in

Volume of Ice on Each Antenna = $V_{ice} := \left(L_{ant} + 1\right)\left(W_{ant} + 1\right) \cdot \left(T_{ant} + 1\right) - V_{ant} = 1017$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \dfrac{V_{ice}}{1728} \cdot Id = 33$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 198$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \dfrac{L_{ant} \cdot W_{ant}}{144} = 5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 30.3$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2067$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \dfrac{\left(L_{ant} + 1\right) \cdot \left(W_{ant} + 1\right)}{144} = 5.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 33.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 212$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Andrew LNX-6515DS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 96.4$	in	(User Input)
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 45$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 135$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8145$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 2032$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 66$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 198$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 8$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 23.9$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1632$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 8.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 26.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 168$ lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Andrew ATSBT-TOP-FM-4G		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 6$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 52$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 2$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 5$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$ sf

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

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 30$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 0.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 4$ lbs

Development of Wind & Ice Load on Platform

Platform Data:

Platform Model = SitePro Monopole Triple T-Arm RMV 12-372

Mount Shape = Flat

Mount Projected Surface Area = $CdAa := 14$ sf (User Input)

Mount Projected Surface Area w/ Ice = $CdAa_{ice} := 18$ sf (User Input)

Mount Weight = $WT_{mnt} := 1160$ lbs (User Input)

Mount Weight w/ Ice = $WT_{mnt.ice} := 1500$ lbs (User Input)

Gravity Loads (without ice)

Weight of All Mounts = $Wt_{mnt1} := WT_{mnt} = 1160$ lbs

Gravity Load (ice only)

Weight of Ice on All Mounts = $Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 340$ lbs

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice = $Fi_{mnt1} := p \cdot CdAa_{ice} = 72$ lbs

Wind Load (NESC Extreme)

Total Mount Wind Force = $F_{mnt1} := qz \cdot CdAa \cdot m = 597$ lbs

Total Equipment Loads:

NESC Heavy Wind Vertical =

$$\left(Wt_{ant1} + Wt_{ice.ant1} + Wt_{ant2} + Wt_{ice.ant2} + Wt_{ant3} + Wt_{ice.ant3} + Wt_{mnt1} + Wt_{ice.mnt1}\right)\cdot 1.5 = 3467$$

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant1} + Fi_{ant2} + Fi_{ant3} + Fi_{mnt1}\right)\cdot 2.5 = 1140$

NESC Extreme Wind Vertical = $\left(Wt_{ant1} + Wt_{ant2} + Wt_{ant3} + Wt_{mnt1}\right) = 1571$

NESC Extreme Wind Trasnsverse = $\left(F_{ant1} + F_{ant2} + F_{ant3} + F_{mnt1}\right) = 4326$

Coax Cable on Antenna Mast

Distance Between Coax Cable Attach Points = $Coax_{Span} := \begin{pmatrix} 8.75 \\ 8.5 \\ 11 \\ 21 \\ 48 \end{pmatrix} \cdot ft$ *(User Input)*

Diameter of Coax Cable = $D_{coax} := 1.55 \cdot in$ *(User Input)*

Weight of Coax Cable = $W_{coax} := 0.66 \cdot plf$ *(User Input)*

Number of Coax Cables = $N_{coax} := 30$ *(User Input)*

Number of Projected Coax Cables Transverse = $NP_{coax} := 2$ *(User Input)*

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

Extreme Wind Pressure = $qz := 34.1 \cdot psf$ *(User Input)*

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

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

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

Shape Factor = $Cd_{coax} := 1.6$ *(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 without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 3.1 \cdot in$

Wind Area with Ice = $A_{ice} := NP_{coax} \cdot \left(D_{coax} + 2Ir\right) = 5.1 \cdot in$

Ice Area per Liner Ft = $Ai_{coax} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir\right)^2 - D_{coax}^{\ 2}\right] = 0.022 \, ft^2$

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot NX_{coax} = 15.027 \cdot plf$

Heavy Vertical Load =

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

Heavy Wind Transverse Load =

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

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 457 \\ 444 \\ 575 \\ 1097 \\ 2508 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 60 \\ 58 \\ 75 \\ 143 \\ 326 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

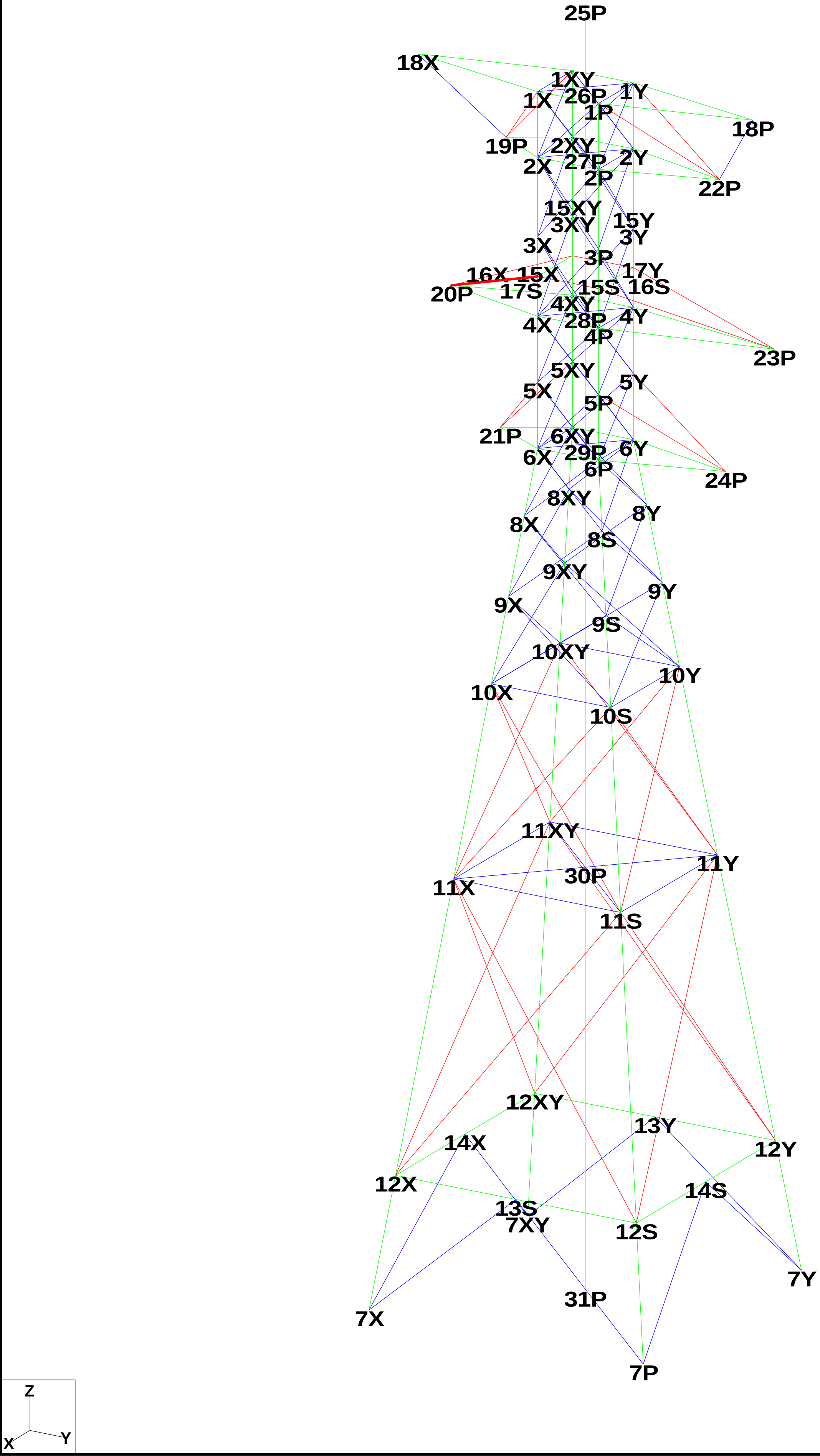
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EV}\right)}$$

Extreme Wind Transverse Load =

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

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 173 \\ 168 \\ 218 \\ 416 \\ 950 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 123 \\ 120 \\ 155 \\ 296 \\ 677 \end{pmatrix} lb$$

Centek Engineering Inc, Project: "wilton - 936"
Tower Version 12.50, 11:01:51 AM Monday, March 13, 2017
Undeformed geometry displayed



Project Name : 15019.006 - Wilton, CT
Project Notes: Structure # 936/ T-Mobile CT11296A
Project File : J:\Jobs\1501900.WI\006 - CT11296A\04_Structural\Backup Documentation\Rev (3)\PLS Tower\wilton - 936.tow
Date run : 11:00:24 AM Monday, March 13, 2017
by : Tower Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "g4P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g4X" will not be checked for block 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 "g6P" will not be checked for block 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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Unusual number of fixed joints found: 5. Towers normally have from between 1 and 4 fixed joints. ??
The model has 65 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\1501900.wi\006 - ct11296a\04_structural\backup documentation\rev (3)\pls tower\wilton - 936.lca

*** Analysis Results:

Maximum element usage is 83.44% for Angle "g31P" in load case "NESC Heavy"
Maximum insulator usage is 14.15% for Clamp "23" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	7P	5.19	6.27	38.37	8.14	0.06	-0.05	0.08	0.05	0.00
NESC Heavy	31P	0.00	0.91	-21.57	0.91	-10.80	0.00	10.80	0.00	0.00
NESC Heavy	7X	-7.73	8.92	-55.77	11.81	0.18	0.08	0.20	-0.34	0.00
NESC Heavy	7XY	7.73	8.92	-55.77	11.81	0.18	-0.08	0.20	0.34	0.00
NESC Heavy	7Y	-5.19	6.27	38.37	8.14	0.06	0.05	0.08	-0.05	0.00
NESC Extreme	7P	8.52	11.16	62.65	14.04	0.20	0.01	0.20	-0.69	0.00
NESC Extreme	31P	0.00	0.76	-5.22	0.76	-14.98	0.00	14.98	-0.00	0.00
NESC Extreme	7X	-10.42	13.05	-74.82	16.70	0.23	0.12	0.26	-0.58	0.00
NESC Extreme	7XY	10.42	13.05	-74.82	16.70	0.23	-0.12	0.26	0.58	0.00
NESC Extreme	7Y	-8.52	11.16	62.65	14.04	0.20	-0.01	0.20	0.69	0.00

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

Load Case	Support Joint	Origin Joint	Leg Member	Force In Leg Dir.	Residual Shear Perpendicular	Residual Shear Horizontal	Residual Shear Horizontal	Residual Shear Horizontal	Total Long.	Total Tran.	Total Vert.

				(kips)	To Leg (kips)	To Leg - Res. (kips)	To Leg - Long. (kips)	To Leg - Tran. (kips)	Force (kips)	Force (kips)	Force (kips)
NESC Heavy	7P	12S	g12P	-39.213	1.022	1.031	0.060	-1.029	5.19	6.27	38.37
NESC Heavy	7X	12X	g12X	56.989	1.290	1.304	0.109	-1.299	-7.73	8.92	-55.77
NESC Heavy	7XY	12XY	g12XY	56.989	1.290	1.304	-0.109	-1.299	7.73	8.92	-55.77
NESC Heavy	7Y	12Y	g12Y	-39.213	1.022	1.031	-0.060	-1.029	-5.19	6.27	38.37
NESC Extreme	7P	12S	g12P	-64.153	2.569	2.592	0.047	-2.591	8.52	11.16	62.65
NESC Extreme	7X	12X	g12X	76.607	2.799	2.828	0.189	-2.822	-10.42	13.05	-74.82
NESC Extreme	7XY	12XY	g12XY	76.607	2.799	2.828	-0.189	-2.822	10.42	13.05	-74.82
NESC Extreme	7Y	12Y	g12Y	-64.153	2.569	2.592	-0.047	-2.591	-8.52	11.16	62.65

Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Count	Member Count	Tran. Face Top Width (ft)	Tran. Face Bot Width (ft)	Tran. Face Gross Area (ft^2)	Long. Face Top Width (ft)	Long. Face Bot Width (ft)	Long. Face Gross Area (ft^2)
1	97.250	64.000	45	146	0.00	5.00	150.625	0.00	18.50	374.437
2	64.000	0.000	35	94	5.00	22.50	880.000	5.00	22.50	880.000

*** 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 Cont-rol	Max Use In Comp. %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/R Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/R Comp.	KL/R Comp.	Length Comp. Member (ft)	Curve No.	No. Of Bolts
Leg1	Leg1	SAE	4X4X0.25	33.0	35.60	Tens	33.96	g4X	-20.454	NESC Ext	60.236	91.000	140.625	1.000	1.000	1.000	45.28	45.28	3.000	1	10
Leg2	Leg2	SAE	5X5X0.3125	33.0	72.66	Comp	72.66	g9XY	-59.276	NESC Ext	81.579	109.200	210.937	1.000	1.000	1.000	79.92	79.92	6.620	1	12
Leg3	Leg3	SAE	5X5X0.375	33.0	79.94	Comp	79.94	g11X	-72.777	NESC Ext	91.040	127.400	295.312	0.333	0.333	0.333	90.44	90.44	22.407	1	14
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	34.83	Comp	34.83	g13P	-4.025	NESC Ext	11.559	18.200	21.094	0.750	0.500	0.500	123.69	122.85	7.071	5	2
XBrace2	XBrace2	SAU	3X2X0.25	33.0	30.93	Tens	29.86	g21P	-7.399	NESC Ext	24.777	36.400	56.250	0.500	0.750	0.500	110.87	113.15	7.071	2	4
XBrace3	XBrace3	SAE	2.5X2.5X0.1875	33.0	23.18	Comp	23.18	g29P	-3.014	NESC Ext	13.003	18.200	21.094	0.775	0.550	0.550	147.38	140.91	11.054	5	2
XBrace4	XBrace4	SAE	2X2X0.25	33.0	83.44	Comp	83.44	g31P	-2.995	NESC Hea	3.590	27.300	42.187	1.000	0.585	0.585	370.03	273.77	18.779	6	3
XBrace5	XBrace5	SAE	2.5X2.5X0.1875	33.0	34.43	Tens	0.00	g34Y	0.000		2.685	27.300	31.641	1.000	0.410	0.410	429.08	310.08	27.819	6	3
XBrace6	XBrace6	SAU	3.5X2.5X0.25	33.0	40.97	Comp	40.97	g35X	-3.728	NESC Ext	14.832	9.100	14.062	1.000	0.500	0.500	166.70	166.70	15.114	4	1

```
 XBrace7         XBrace7   SAU         3X2X0.25     33.0 40.10  Comp 40.10    g18X  -6.353NESC Ext   15.844   27.300   42.187 1.000 2.000 1.000
163.28  146.62  3.905     6     3
   Horz1    Horizontal 1   SAE 1.75X1.75X0.1875     33.0 32.69  Comp 32.69    g37P  -2.453NESC Ext    7.504   18.200   21.094 1.000 1.000 1.000
174.93  153.78  5.000     6     2
   Horz2    Horizontal 2   SAU     2.5X2X0.1875     33.0 39.83  Comp 39.83    g41P  -4.900NESC Ext   12.304   18.200   21.094 1.000 0.500 0.500
148.07  137.26  9.785     6     2
   Horz3    Horizontal 3   SAU       3X2.5X0.25     33.0 38.97  Comp 38.97    g43P  -6.195NESC Ext   15.896   18.200   28.125 1.000 0.500 0.500
174.60  153.58 13.750     6     2
   Horz4    Horizontal 4   SAU         4X3X0.25     33.0 22.25  Comp 22.25    g46P  -4.050NESC Ext   18.857   18.200   28.125 2.000 1.000 1.000
185.30  160.16  9.883     6     2 A potentially damaging moment exists in the following members (make sure your system is well triangulated to
minimize moments): g45P g45X g45XY g45Y  ??
   Horz5    Horizontal 5   Bar         1.75x1/4     33.0 65.73  Tens  0.00    g48Y   0.000            0.129    9.100   14.062 1.000 2.000 1.000
983.61  983.61  2.500     4     1
   Horz6    Horizontal 6   SAE 1.75X1.75X0.1875     33.0 13.18  Comp 13.18    g47P  -1.199NESC Hea   12.543    9.100   10.547 2.000 1.000 1.000
111.73  115.87  2.500     3     1
  Inner1          Inner1   SAE 1.75X1.75X0.1875     33.0  0.00        0.00           0.000            0.000    0.000    0.000 0.000 0.000 0.000
0.00    0.00  0.000     0     0
  Inner2          Inner2   SAU     2.5X2X0.1875     33.0  0.00        0.00           0.000            0.000    0.000    0.000 0.000 0.000 0.000
0.00    0.00  0.000     0     0
    Arm1 Ground Wire Arm   SAU       3X2.5X0.25     33.0 19.42  Tens  2.85   g54XY  -0.518NESC Hea   19.099   18.200   28.125 1.000 0.500 0.500
146.34  140.11 11.524     5     2
    Arm2           Arm 2   SAE   2.5X2.5X0.1875     33.0 11.22  Comp 11.22    g56P  -2.018NESC Hea   17.986   18.200   21.094 1.000 1.000 1.000
114.35  117.18  4.717     3     2
    Arm3           Arm 3   SAU       3X2X0.1875     33.0 15.59  Comp 15.59    g58P  -2.674NESC Hea   17.147   27.300   31.641 1.000 0.500 0.500
121.09  121.09  8.860     4     3
    Arm4           Arm 4   SAU         4X3X0.25     33.0 42.39  Comp 42.39    g67Y  -7.715NESC Hea   31.382   18.200   28.125 1.000 0.500 0.500
124.11  123.17 13.238     5     2
  ArmBr1          ArmBr1   SAE       3X3X0.1875     33.0 34.49  Comp 34.49    g62P  -3.138NESC Hea    9.922    9.100   10.547 1.000 1.000 1.000
177.32  177.32  8.807     4     1
  ArmBr2          ArmBr2   SAE   2.5X2.5X0.1875     33.0 13.90  Comp 13.90    g69P  -1.265NESC Hea   13.491    9.100   10.547 1.000 1.000 1.000
138.34  138.34  5.706     4     1
  ArmBr3          ArmBr3   Bar         1.75x1/4     33.0 73.90  Tens  0.00    g72Y   0.000            0.029    9.100   14.062 1.000 1.000 1.000
2084.22 2084.22 10.595     4     1
 AntMast       HSS16x0.5 Pwmnt Pipe HSS16"x0.5"     42.0  2.49  Comp  2.49    g73P -19.487NESC Hea  782.285    0.000    0.000 1.000 1.000 1.000
69.95   69.95 32.000     1     0
  Brace1    L2.5x2.5x1/4   SAE     2.5X2.5X0.25     36.0 24.52  Tens 19.16    g79X  -2.605NESC Ext   28.492   16.800   13.594 1.000 1.000 1.000
86.41  103.20  3.536     3     1
  Brace2    L3.5x3.5x1/4   SAE     3.5X3.5X0.25     36.0 20.51  Comp 20.51    g83X  -2.788NESC Ext   17.115   16.800   13.594 1.000 1.000 1.000
168.12  168.12  9.723     4     1
```

Group Summary (Tension Portion):

```
   Group          Group Angle           Angle    Steel   Max Usage   Max Tension Tension Tension      Net  Tension  Tension  Tension Length   No.
No.   Hole
   Label          Desc.  Type            Size Strength Usage Cont-    Use Control   Force Control  Section Connect. Connect. Connect.  Tens.    Of
Of Diameter
                                                               rol     In  Member          Load Capacity    Shear  Bearing  Rupture Member Bolts
Holes
                                                                    Tens.                       Case          Capacity Capacity Capacity        Tens.
                                                    (ksi)      %        %         (kips)               (kips)   (kips)   (kips)   (kips)    (ft)
(in)
-------------------------------------------------------------------------------------------------------------------------------------------------------
------------
    Leg1            Leg1   SAE         4X4X0.25     33.0 35.60  Tens 35.60     g4P  16.610NESC Ext   46.653   91.000  140.625  128.676  3.000    10
3.062   0.6875
    Leg2            Leg2   SAE       5X5X0.3125     33.0 72.66  Comp 67.50     g9P  51.368NESC Ext   76.097  109.200  210.937  220.588  6.620    12
3.370   0.6875
    Leg3            Leg3   SAE        5X5X0.375     33.0 79.94  Comp 69.24    g12P  62.086NESC Ext   89.667  127.400  295.312  289.522 10.185    14
```

																	3.463	0.6875
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	34.83	Comp	26.59	g13X	3.878	NESC Ext	14.585	18.200	21.094	16.189	7.071	2	1.000	0.6875
XBrace2	XBrace2	SAU	3X2X0.25	33.0	30.93	Tens	30.93	g21X	8.280	NESC Ext	26.767	36.400	56.250	50.000	7.071	4	1.680	0.6875
XBrace3	XBrace3	SAE	2.5X2.5X0.1875	33.0	23.18	Comp	16.46	g27X	2.937	NESC Ext	22.961	27.300	31.641	17.842	9.399	3	1.000	0.6875
XBrace4	XBrace4	SAE	2X2X0.25	33.0	83.44	Comp	28.34	g31X	6.465	NESC Ext	22.813	27.300	42.187	26.039	18.779	3	1.000	0.6875
XBrace5	XBrace5	SAE	2.5X2.5X0.1875	33.0	34.43	Tens	34.43	g34Y	7.014	NESC Ext	22.961	27.300	31.641	20.373	27.819	3	1.000	0.6875
XBrace6	XBrace6	SAU	3.5X2.5X0.25	33.0	40.97	Comp	35.07	g35P	3.192	NESC Ext	30.238	9.100	14.062	12.500	15.114	1	1.000	0.6875
XBrace7	XBrace7	SAU	3X2X0.25	33.0	40.10	Comp	22.05	g18P	6.019	NESC Ext	30.238	27.300	42.187	37.500	3.905	3	1.000	0.6875
Horz1	Horizontal 1	SAE	1.75X1.75X0.1875	33.0	32.69	Comp	18.20	g40P	2.486	NESC Ext	14.585	18.200	21.094	13.658	5.000	2	1.000	0.6875
Horz2	Horizontal 2	SAU	2.5X2X0.1875	33.0	39.83	Comp	5.95	g41X	0.986	NESC Ext	17.444	18.200	21.094	16.576	9.785	2	1.000	0.6875
Horz3	Horizontal 3	SAU	3X2.5X0.25	33.0	38.97	Comp	10.54	g43X	1.919	NESC Ext	30.090	18.200	28.125	21.820	13.750	2	1.000	0.6875
Horz4	**Horizontal 4**	**SAU**	**4X3X0.25**	**33.0**	**22.25**	**Comp**	**3.33**	**g46X**	**0.606**	**NESC Ext**	**37.663**	**18.200**	**28.125**	**21.820**	**9.883**	**2**	**1.000**	**0.6875**

A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45P g45X g45XY g45Y ??

Horz5	Horizontal 5	Bar	1.75x1/4	33.0	65.73	Tens	65.73	g48X	5.761	NESC Hea	8.766	9.100	14.062	12.500	2.500	1	1.000	0.6875
Horz6	Horizontal 6	SAE	1.75X1.75X0.1875	33.0	13.18	Comp	0.00	g47Y	0.000		14.585	9.100	10.547	7.330	2.500	1	1.000	0.6875
Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
Inner2	Inner2	SAU	2.5X2X0.1875	33.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000	0
Arm1	Ground Wire Arm	SAU	3X2.5X0.25	33.0	19.42	Tens	19.42	g55Y	3.535	NESC Hea	33.802	18.200	28.125	28.125	5.000	2	1.000	0.6875
Arm2	Arm 2	SAE	2.5X2.5X0.1875	33.0	11.22	Comp	5.29	g60Y	0.963	NESC Ext	22.961	18.200	21.094	18.750	5.148	2	1.000	0.6875
Arm3	Arm 3	SAU	3X2X0.1875	33.0	15.59	Comp	0.00	g58Y	0.000		17.333	27.300	31.641	22.061	8.860	3	1.000	0.6875
Arm4	Arm 4	SAU	4X3X0.25	33.0	42.39	Comp	0.00	g68Y	0.000		45.088	18.200	28.125	31.250	9.341	2	1.000	0.6875
ArmBr1	ArmBr1	SAE	3X3X0.1875	33.0	34.49	Comp	0.00	g62P	0.000		28.544	9.100	10.547	9.375	8.807	1	1.000	0.6875
ArmBr2	ArmBr2	SAE	2.5X2.5X0.1875	33.0	13.90	Comp	0.00	g69P	0.000		22.961	9.100	10.547	9.375	5.706	1	1.000	0.6875
ArmBr3	ArmBr3	Bar	1.75x1/4	33.0	73.90	Tens	73.90	g71P	6.478	NESC Hea	8.766	9.100	14.062	12.500	13.574	1	1.000	0.6875
AntMast	HSS16x0.5	Pwmnt Pipe	HSS16"x0.5"	42.0	2.49	Comp	0.00	g78P	0.000		953.399	0.000	0.000	0.000	6.250	0	0.000	0
Brace1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	24.52	Tens	24.52	g79Y	2.962	NESC Ext	32.987	16.800	13.594	12.083	3.536	1	1.000	0.6875
Brace2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	36.0	20.51	Comp	0.00	g83Y	0.000		49.187	16.800	13.594	12.083	9.723	1	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	83.44	g31P	Angle
NESC Extreme	79.94	g11X	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	3.94	NESC Heavy	0.0
2	Clamp	6.07	NESC Heavy	0.0
3	Clamp	7.99	NESC Heavy	0.0
4	Clamp	7.95	NESC Heavy	0.0
5	Clamp	7.92	NESC Heavy	0.0
6	Clamp	7.97	NESC Heavy	0.0
7	Clamp	8.02	NESC Heavy	0.0
8	Clamp	7.96	NESC Heavy	0.0
9	Clamp	0.45	NESC Extreme	0.0
10	Clamp	0.45	NESC Extreme	0.0
11	Clamp	1.22	NESC Extreme	0.0
12	Clamp	1.22	NESC Extreme	0.0
13	Clamp	1.46	NESC Heavy	0.0
14	Clamp	1.22	NESC Extreme	0.0
15	Clamp	0.45	NESC Extreme	0.0
16	Clamp	0.45	NESC Extreme	0.0
17	Clamp	0.45	NESC Extreme	0.0
18	Clamp	9.63	NESC Extreme	0.0
19	Clamp	2.50	NESC Heavy	0.0
20	Clamp	3.26	NESC Heavy	0.0
21	Clamp	4.26	NESC Heavy	0.0
22	Clamp	8.05	NESC Heavy	0.0
23	Clamp	14.15	NESC Heavy	0.0

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 18946.5
Total: 18946.5

*** End of Report

```
****************************************************************************
*                                                                          *
* TOWER - Analysis and Design -  Copyright Power Line Systems, Inc. 1986-2011 *
*                                                                          *
****************************************************************************
```

Project Name : 15019.006 - Wilton, CT
Project Notes: Structure # 936/ T-Mobile CT11296A
Project File : J:\Jobs\1501900.WI\006 - CT11296A\04_Structural\Backup Documentation\Rev (3)\PLS Tower\wilton - 936.tow
Date run : 11:00:24 AM Monday, March 13, 2017
by : Tower Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

Member "g4P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g4X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g4XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g4Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g6X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g6XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g9P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g9X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g9XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g9Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge

and spacing distances will be checked. ??
Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g15Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g16Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g17P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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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 "g20P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g20Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g21XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge

and spacing distances will be checked. ??
Member "g21Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g22Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
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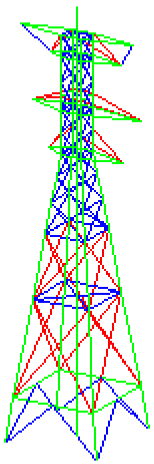
Member "g23XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
Member "g23Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) 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. ??
Unusual number of fixed joints found: 5. Towers normally have from between 1 and 4 fixed joints. ??
The model has 65 warnings. ??



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

Climbing load check: None
Redundant members checked with: Actual Force

Joints Geometry:

Joint Label	Symmetry Code	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)	X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
1P	XY-Symmetry	2.5	2.5	91	Free	Free	Free	Free	Free	Free
2P	XY-Symmetry	2.5	2.5	86	Free	Free	Free	Free	Free	Free
3P	XY-Symmetry	2.5	2.5	80	Free	Free	Free	Free	Free	Free
4P	XY-Symmetry	2.5	2.5	74	Free	Free	Free	Free	Free	Free
5P	XY-Symmetry	2.5	2.5	69	Free	Free	Free	Free	Free	Free
6P	XY-Symmetry	2.5	2.5	64	Free	Free	Free	Free	Free	Free
7P	XY-Symmetry	11.25	11.25	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
18P	X-Symmetry	0	13.75	91	Free	Free	Free	Free	Free	Free
19P	None	0	-6.5	86	Free	Free	Free	Free	Free	Free
20P	None	0	-11	74	Free	Free	Free	Free	Free	Free
21P	None	0	-7	64	Free	Free	Free	Free	Free	Free
22P	None	0	11	86	Free	Free	Free	Free	Free	Free
23P	None	0	15.5	74	Free	Free	Free	Free	Free	Free
24P	None	0	11.5	64	Free	Free	Free	Free	Free	Free
25P	None	0	0	97.25	Free	Free	Free	Free	Free	Free
26P	None	0	0	91	Free	Free	Free	Free	Free	Free
27P	None	0	0	86	Free	Free	Free	Free	Free	Free
28P	None	0	0	74	Free	Free	Free	Free	Free	Free
29P	None	0	0	64	Free	Free	Free	Free	Free	Free
30P	None	0	0	32	Free	Free	Free	Free	Free	Free
31P	None	0	0	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
1X	X-GenXY	2.5	-2.5	91	Free	Free	Free	Free	Free	Free
1XY	XY-GenXY	-2.5	-2.5	91	Free	Free	Free	Free	Free	Free
1Y	Y-GenXY	-2.5	2.5	91	Free	Free	Free	Free	Free	Free
2X	X-GenXY	2.5	-2.5	86	Free	Free	Free	Free	Free	Free
2XY	XY-GenXY	-2.5	-2.5	86	Free	Free	Free	Free	Free	Free
2Y	Y-GenXY	-2.5	2.5	86	Free	Free	Free	Free	Free	Free
3X	X-GenXY	2.5	-2.5	80	Free	Free	Free	Free	Free	Free
3XY	XY-GenXY	-2.5	-2.5	80	Free	Free	Free	Free	Free	Free
3Y	Y-GenXY	-2.5	2.5	80	Free	Free	Free	Free	Free	Free
4X	X-GenXY	2.5	-2.5	74	Free	Free	Free	Free	Free	Free
4XY	XY-GenXY	-2.5	-2.5	74	Free	Free	Free	Free	Free	Free
4Y	Y-GenXY	-2.5	2.5	74	Free	Free	Free	Free	Free	Free
5X	X-GenXY	2.5	-2.5	69	Free	Free	Free	Free	Free	Free
5XY	XY-GenXY	-2.5	-2.5	69	Free	Free	Free	Free	Free	Free
5Y	Y-GenXY	-2.5	2.5	69	Free	Free	Free	Free	Free	Free
6X	X-GenXY	2.5	-2.5	64	Free	Free	Free	Free	Free	Free
6XY	XY-GenXY	-2.5	-2.5	64	Free	Free	Free	Free	Free	Free
6Y	Y-GenXY	-2.5	2.5	64	Free	Free	Free	Free	Free	Free
7X	X-GenXY	11.25	-11.25	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7XY	XY-GenXY	-11.25	-11.25	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
7Y	Y-GenXY	-11.25	11.25	0	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
18X	X-Gen	0	-13.75	91	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	59	Free	Free	Free	Free	Free	Free
9S	XY-Symmetry	6P	7P	0	53	Free	Free	Free	Free	Free	Free
10S	XY-Symmetry	6P	7P	0	46.5	Free	Free	Free	Free	Free	Free
11S	XY-Symmetry	6P	7P	0	32	Free	Free	Free	Free	Free	Free
12S	XY-Symmetry	6P	7P	0	10	Free	Free	Free	Free	Free	Free
13S	Y-Symmetry	12S	12X	0.5	0	Free	Free	Free	Free	Free	Free
14S	X-Symmetry	12S	12Y	0.5	0	Free	Free	Free	Free	Free	Free
15S	XY-Symmetry	3P	4P	0.5	0	Free	Free	Free	Free	Free	Free
16S	X-Symmetry	3P	4Y	0.5	0	Free	Free	Free	Free	Free	Free
17S	Y-Symmetry	3P	4X	0.5	0	Free	Free	Free	Free	Free	Free
8X	X-GenXY	6P	7P	0	59	Free	Free	Free	Free	Free	Free
8XY	XY-GenXY	6P	7P	0	59	Free	Free	Free	Free	Free	Free
8Y	Y-GenXY	6P	7P	0	59	Free	Free	Free	Free	Free	Free
9X	X-GenXY	6P	7P	0	53	Free	Free	Free	Free	Free	Free
9XY	XY-GenXY	6P	7P	0	53	Free	Free	Free	Free	Free	Free
9Y	Y-GenXY	6P	7P	0	53	Free	Free	Free	Free	Free	Free
10X	X-GenXY	6P	7P	0	46.5	Free	Free	Free	Free	Free	Free
10XY	XY-GenXY	6P	7P	0	46.5	Free	Free	Free	Free	Free	Free
10Y	Y-GenXY	6P	7P	0	46.5	Free	Free	Free	Free	Free	Free
11X	X-GenXY	6P	7P	0	32	Free	Free	Free	Free	Free	Free
11XY	XY-GenXY	6P	7P	0	32	Free	Free	Free	Free	Free	Free
11Y	Y-GenXY	6P	7P	0	32	Free	Free	Free	Free	Free	Free
12X	X-GenXY	6P	7P	0	10	Free	Free	Free	Free	Free	Free
12XY	XY-GenXY	6P	7P	0	10	Free	Free	Free	Free	Free	Free
12Y	Y-GenXY	6P	7P	0	10	Free	Free	Free	Free	Free	Free
13Y	Y-Gen	12S	12X	0.5	0	Free	Free	Free	Free	Free	Free
14X	X-Gen	12S	12Y	0.5	0	Free	Free	Free	Free	Free	Free
15X	X-GenXY	3P	4P	0.5	0	Free	Free	Free	Free	Free	Free
15XY	XY-GenXY	3P	4P	0.5	0	Free	Free	Free	Free	Free	Free
15Y	Y-GenXY	3P	4P	0.5	0	Free	Free	Free	Free	Free	Free
16X	X-Gen	3P	4Y	0.5	0	Free	Free	Free	Free	Free	Free
17Y	Y-Gen	3P	4X	0.5	0	Free	Free	Free	Free	Free	Free

The model contains 43 primary and 32 secondary joints for a total of 75 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)
A 36	2.9e+004	36	58	0	0	0	0	0	0
A7	2.9e+004	33	60	0	0	0	0	0	0
A500-42	2.9e+004	42	58	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
5/8 A325	0.625	0.6875	16.8	1.25	1.5	0	0

Number Bolts Used By Type:

Bolt Number

Type	Bolts
5/8 A394	704
5/8 A325	20

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	5X5X0.375	5	5	0.375	12.3	3.61	11	1.56	1.56	0.99	1	5	2.5	0	1.0000	0
SAE	5X5X0.3125	5	5	0.3125	10.3	3.03	13.4	1.57	1.57	0.994	1	5	2.5	0	1.0000	0
SAE	4X4X0.25	4	4	0.25	6.6	1.94	13.5	1.25	1.25	0.795	1	4	2	0	1.0000	0
SAE	3.5X3.5X0.25	3.5	3.5	0.25	5.8	1.69	11.5	1.09	1.09	0.694	1	3.5	1.75	0	1.0000	0
SAE	3X3X0.1875	3	3	0.1875	3.71	1.09	13.33	0.939	0.939	0.596	1	3	1.5	0	1.0000	0
SAE	2.5X2.5X0.25	2.5	2.5	0.25	4.1	1.19	7.75	0.769	0.769	0.491	1	2.5	1.25	0	1.0000	0
SAE	2.5X2.5X0.1875	2.5	2.5	0.1875	3.07	0.902	10.67	0.778	0.778	0.495	1	2.5	1.25	0	1.0000	0
SAE	2X2X0.25	2	2	0.25	3.19	0.94	5	0.609	0.609	0.391	1	2	1	0	1.0000	0
SAE	1.75X1.75X0.1875	1.75	1.75	0.1875	2.12	0.62	6	0.537	0.537	0.343	1	1.75	0.875	0	1.0000	0
SAU	4X3X0.25	4	3	0.25	5.8	1.69	13.25	1.28	0.896	0.651	1	4	1.5	0	1.0000	0
SAU	3.5X2.5X0.25	3.5	2.5	0.25	4.9	1.44	11.25	1.12	0.735	0.544	1	3.5	1.25	0	1.0000	0
SAU	3X2.5X0.25	3	2.5	0.25	4.5	1.31	9.5	0.945	0.753	0.528	1	3	1.25	0	1.0000	0
SAU	3X2X0.25	3	2	0.25	4.1	1.19	9.75	0.957	0.574	0.435	1	3	1	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	1.75x1/4	1.75	0	0.25	1.5	0.4375	7	0.305	0.061	0.305	1	1.75	0	0	0.0000	0
Pwmnt Pipe	HSS16"x0.5"	16	15.07	0	82.85	22.7	1	5.49	5.49	5.49	1	16	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	Leg1	SAE	4X4X0.25	A7	Beam	Leg	None	0.000
Leg2	Leg2	SAE	5X5X0.3125	A7	Beam	Leg	None	0.000
Leg3	Leg3	SAE	5X5X0.375	A7	Beam	Leg	None	0.000
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	A7	Truss	Crossing Diagonal	None	0.000
XBrace2	XBrace2	SAU	3X2X0.25	A7	Truss	Crossing Diagonal	None	0.000
XBrace3	XBrace3	SAE	2.5X2.5X0.1875	A7	Truss	Crossing Diagonal	None	0.000
XBrace4	XBrace4	SAE	2X2X0.25	A7	T-Only	Other	None	0.000
XBrace5	XBrace5	SAE	2.5X2.5X0.1875	A7	T-Only	Other	None	0.000
XBrace6	XBrace6	SAU	3.5X2.5X0.25	A7	Truss	Other	None	0.000
XBrace7	XBrace7	SAU	3X2X0.25	A7	Truss	Other	None	0.000
Horz1	Horizontal 1	SAE	1.75X1.75X0.1875	A7	Truss	Other	None	0.000
Horz2	Horizontal 2	SAU	2.5X2X0.1875	A7	Truss	Other	None	0.000
Horz3	Horizontal 3	SAU	3X2.5X0.25	A7	Truss	Other	None	0.000
Horz4	Horizontal 4	SAU	4X3X0.25	A7	Beam	Other	None	0.000
Horz5	Horizontal 5	Bar	1.75x1/4	A7	T-Only Beam	Other	None	0.000
Horz6	Horizontal 6	SAE	1.75X1.75X0.1875	A7	Beam	Other	None	0.000
Inner1	Inner1	SAE	1.75X1.75X0.1875	A7	Truss	Other	None	0.000
Inner2	Inner2	SAU	2.5X2X0.1875	A7	Truss	Other	None	0.000
Arm1	Ground Wire Arm	SAU	3X2.5X0.25	A7	Beam	Other	None	0.000
Arm2	Arm 2	SAE	2.5X2.5X0.1875	A7	Beam	Other	None	0.000
Arm3	Arm 3	SAU	3X2X0.1875	A7	Beam	Other	None	0.000
Arm4	Arm 4	SAU	4X3X0.25	A7	Beam	Other	None	0.000

ArmBr1	ArmBr1	SAE	3X3X0.1875	A7	Truss	Other	None	0.000
ArmBr2	ArmBr2	SAE	2.5X2.5X0.1875	A7	Truss	Other	None	0.000
ArmBr3	ArmBr3	Bar	1.75x1/4	A7	T-Only	Other	None	0.000
AntMast	HSS16x0.5	Pwmnt Pipe	HSS16"x0.5"	A500-42	Beam	Other	None	0.000
Brace1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	A 36	Truss	Other	None	0.000
Brace2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	A 36	Truss	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	68.00	90.67	448.80
SAE	5X5X0.3125	A7	111.30	185.49	1146.35
SAE	5X5X0.375	A7	189.44	315.74	2330.17
SAE	1.75X1.75X0.1875	A7	106.57	62.16	225.93
SAU	3X2X0.25	A7	238.10	198.42	976.21
SAE	2.5X2.5X0.1875	A7	472.41	393.67	1450.30
SAE	2X2X0.25	A7	150.23	100.16	479.24
SAU	3.5X2.5X0.25	A7	120.91	120.91	592.47
SAU	2.5X2X0.1875	A7	39.14	29.36	107.64
SAU	3X2.5X0.25	A7	111.10	101.84	499.94
SAU	4X3X0.25	A7	171.94	200.60	997.25
Bar	1.75x1/4	A7	125.49	36.60	188.24
SAU	3X2X0.1875	A7	17.72	14.77	54.40
SAE	3X3X0.1875	A7	8.81	8.81	32.67
Pwmnt Pipe	HSS16"x0.5"	A500-42	97.25	503.59	8057.16
SAE	2.5X2.5X0.25	A 36	56.57	47.14	231.93
SAE	3.5X3.5X0.25	A 36	38.89	45.37	225.57

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

Section Label	Joint Defining Section Bottom	Dead Load Adjust. Factor	Transverse Drag x Area Factor For Face	Longitudinal Drag x Area Factor For Face	Transverse Area Factor (CD From Code)	Longitudinal Area Factor (CD From Code)	Af Flat Factor For Face EIA Only	Ar Round Factor For Face EIA Only	Transverse Drag x Area Factor For All	Longitudinal Drag x Area Factor For All	SAPS Angle Drag x Area Factor	SAPS Round Drag x Area Factor	Force Solid Face
1	6P	1.050	3.300	3.300	1.100	1.100	0.000	0.000	1.000	1.000	0.000	0.000	None
2	7P	1.050	3.300	3.300	1.100	1.100	0.000	0.000	1.000	1.000	0.000	0.000	None

Angle Member Connectivity:

Member Label	Group Label	Section Label	Symmetry Code	Origin Joint	End Joint	Ecc. Code	Rest. Code	Ratio RLX	Ratio RLY	Ratio RLZ	Bolt Type	# Bolts	# Bolt Holes	# Shear Planes	Connect Leg	Short Edge Dist. (in)	Long Edge Dist. (in)	End Dist. (in)	Bolt Spacing (in)	Shear Path Length (in)	Tension Path Length (in)	Rest. Coef.
g1P	Leg1		XY-Symmetry	1P	2P	1	4	1	1	1	5/8 A394	0	4	1		0	0	0	0			

0	0	0																
g1X	Leg1	X-GenXY	1X	2X	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g1XY	Leg1	XY-GenXY	1XY	2XY	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g1Y	Leg1	Y-GenXY	1Y	2Y	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g2P	Leg1	XY-Symmetry	2P	3P	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g2X	Leg1	X-GenXY	2X	3X	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g2XY	Leg1	XY-GenXY	2XY	3XY	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g2Y	Leg1	Y-GenXY	2Y	3Y	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g3P	Leg1	XY-Symmetry	3P	15S	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g3X	Leg1	X-GenXY	3X	15X	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g3XY	Leg1	XY-GenXY	3XY	15XY	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g3Y	Leg1	Y-GenXY	3Y	15Y	1	4	1	1	1 5/8	A394	0	2	1		0	0	0	0
0	0	0																
g4P	Leg1	XY-Symmetry	15S	4P	1	4	1	1	1 5/8	A394	10	3.062	1	Both	0.875	2.375	1.5	3.5
0	0	0																
g4X	Leg1	X-GenXY	15X	4X	1	4	1	1	1 5/8	A394	10	3.062	1	Both	0.875	2.375	1.5	3.5
0	0	0																
g4XY	Leg1	XY-GenXY	15XY	4XY	1	4	1	1	1 5/8	A394	10	3.062	1	Both	0.875	2.375	1.5	3.5
0	0	0																
g4Y	Leg1	Y-GenXY	15Y	4Y	1	4	1	1	1 5/8	A394	10	3.062	1	Both	0.875	2.375	1.5	3.5
0	0	0																
g5P	Leg2	XY-Symmetry	4P	5P	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g5X	Leg2	X-GenXY	4X	5X	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g5XY	Leg2	XY-GenXY	4XY	5XY	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g5Y	Leg2	Y-GenXY	4Y	5Y	1	4	1	1	1 5/8	A394	0	4	1		0	0	0	0
0	0	0																
g6P	Leg2	XY-Symmetry	5P	6P	1	4	1	1	1 5/8	A394	14	4	1	Both	1.375	3	1.4375	4
0	0	0																
g6X	Leg2	X-GenXY	5X	6X	1	4	1	1	1 5/8	A394	14	4	1	Both	1.375	3	1.4375	4
0	0	0																
g6XY	Leg2	XY-GenXY	5XY	6XY	1	4	1	1	1 5/8	A394	14	4	1	Both	1.375	3	1.4375	4
0	0	0																
g6Y	Leg2	Y-GenXY	5Y	6Y	1	4	1	1	1 5/8	A394	14	4	1	Both	1.375	3	1.4375	4
0	0	0																
g7P	Leg2	XY-Symmetry	6P	8S	1	4	1	1	1 5/8	A394	0	4.79	1		0	0	0	0
0	0	0																
g7X	Leg2	X-GenXY	6X	8X	1	4	1	1	1 5/8	A394	0	4.79	1		0	0	0	0
0	0	0																
g7XY	Leg2	XY-GenXY	6XY	8XY	1	4	1	1	1 5/8	A394	0	4.79	1		0	0	0	0
0	0	0																
g7Y	Leg2	Y-GenXY	6Y	8Y	1	4	1	1	1 5/8	A394	0	4.79	1		0	0	0	0
0	0	0																
g8P	Leg2	XY-Symmetry	8S	9S	1	4	1	1	1 5/8	A394	0	3.5	1		0	0	0	0
0	0	0																
g8X	Leg2	X-GenXY	8X	9X	1	4	1	1	1 5/8	A394	0	3.5	1		0	0	0	0
0	0	0																
g8XY	Leg2	XY-GenXY	8XY	9XY	1	4	1	1	1 5/8	A394	0	3.5	1		0	0	0	0

0	0	0																	
g8Y	Leg2	Y-GenXY	8Y	9Y	1	4	1	1	1	5/8	A394	0	3.5	1		0	0	0	0
0	0	0																	
g9P	Leg2	XY-Symmetry	9S	10S	1	4	1	1	1	5/8	A394	12	3.37	1	Both	1	2.625	1.5	3
0	0	0																	
g9X	Leg2	X-GenXY	9X	10X	1	4	1	1	1	5/8	A394	12	3.37	1	Both	1	2.625	1.5	3
0	0	0																	
g9XY	Leg2	XY-GenXY	9XY	10XY	1	4	1	1	1	5/8	A394	12	3.37	1	Both	1	2.625	1.5	3
0	0	0																	
g9Y	Leg2	Y-GenXY	9Y	10Y	1	4	1	1	1	5/8	A394	12	3.37	1	Both	1	2.625	1.5	3
0	0	0																	
g10P	Leg3	XY-Symmetry	10S	11S	1	4	0.5	0.5	0.5	5/8	A394	14	3.36	1	Both	1.375	3	1.5	3.25
0	0	0																	
g10X	Leg3	X-GenXY	10X	11X	1	4	0.5	0.5	0.5	5/8	A394	14	3.36	1	Both	1.375	3	1.5	3.25
0	0	0																	
g10XY	Leg3	XY-GenXY	10XY	11XY	1	4	0.5	0.5	0.5	5/8	A394	14	3.36	1	Both	1.375	3	1.5	3.25
0	0	0																	
g10Y	Leg3	Y-GenXY	10Y	11Y	1	4	0.5	0.5	0.5	5/8	A394	14	3.36	1	Both	1.375	3	1.5	3.25
0	0	0																	
g11P	Leg3	XY-Symmetry	11S	12S	1	4	0.333	0.333	0.333	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5	2.75
0	0	0																	
g11X	Leg3	X-GenXY	11X	12X	1	4	0.333	0.333	0.333	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5	2.75
0	0	0																	
g11XY	Leg3	XY-GenXY	11XY	12XY	1	4	0.333	0.333	0.333	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5	2.75
0	0	0																	
g11Y	Leg3	Y-GenXY	11Y	12Y	1	4	0.333	0.333	0.333	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5	2.75
0	0	0																	
g12P	Leg3	XY-Symmetry	12S	7P	1	4	0.5	0.5	0.5	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5625	2.75
0	0	0																	
g12X	Leg3	X-GenXY	12X	7X	1	4	0.5	0.5	0.5	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5625	2.75
0	0	0																	
g12XY	Leg3	XY-GenXY	12XY	7XY	1	4	0.5	0.5	0.5	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5625	2.75
0	0	0																	
g12Y	Leg3	Y-GenXY	12Y	7Y	1	4	0.5	0.5	0.5	5/8	A394	14	3.463	1	Both	0.9375	2.5625	1.5625	2.75
0	0	0																	
g13P	XBrace1	XY-Symmetry	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																	
g13X	XBrace1	X-GenXY	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																	
g13XY	XBrace1	XY-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																	
g13Y	XBrace1	Y-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																	
g14P	XBrace1	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																	
g14X	XBrace1	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																	
g14XY	XBrace1	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																	
g14Y	XBrace1	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																	
g15P	XBrace2	XY-Symmetry	2P	3X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3
0	0	0																	
g15X	XBrace2	X-GenXY	2X	3P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3
0	0	0																	
g15XY	XBrace2	XY-GenXY	2XY	3Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3
0	0	0																	
g15Y	XBrace2	Y-GenXY	2Y	3XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3
0	0	0																	
g16P	XBrace2	XY-Symmetry	2P	3Y	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3

0 0 0

g16X	XBrace2	X-GenXY	2X	3XY	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g16XY	XBrace2	XY-GenXY	2XY	3X	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g16Y	XBrace2	Y-GenXY	2Y	3P	2	5	0.5	0.75	0.5	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g17P	XBrace7	XY-Symmetry	3P	17S	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g17X	XBrace7	X-GenXY	3X	17S	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g17XY	XBrace7	XY-GenXY	3XY	17Y	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g17Y	XBrace7	Y-GenXY	3Y	17Y	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g18P	XBrace7	XY-Symmetry	17S	4P	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g18X	XBrace7	X-GenXY	17S	4X	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g18XY	XBrace7	XY-GenXY	17Y	4XY	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g18Y	XBrace7	Y-GenXY	17Y	4Y	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g19P	XBrace7	XY-Symmetry	3P	16S	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g19X	XBrace7	X-GenXY	3X	16X	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g19XY	XBrace7	XY-GenXY	3XY	16X	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g19Y	XBrace7	Y-GenXY	3Y	16S	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g20P	XBrace7	XY-Symmetry	16S	4P	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g20X	XBrace7	X-GenXY	16X	4X	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g20XY	XBrace7	XY-GenXY	16X	4XY	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g20Y	XBrace7	Y-GenXY	16S	4Y	3	6	1	2	1	5/8	A394	3	1	1	Long only	0.875	1.4375	1	3	0	0	0
g21P	XBrace2	XY-Symmetry	4P	5X	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g21X	XBrace2	X-GenXY	4X	5P	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g21XY	XBrace2	XY-GenXY	4XY	5Y	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g21Y	XBrace2	Y-GenXY	4Y	5XY	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g22P	XBrace2	XY-Symmetry	4P	5Y	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g22X	XBrace2	X-GenXY	4X	5XY	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g22XY	XBrace2	XY-GenXY	4XY	5X	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g22Y	XBrace2	Y-GenXY	4Y	5P	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g23P	XBrace2	XY-Symmetry	5P	6X	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g23X	XBrace2	X-GenXY	5X	6P	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g23XY	XBrace2	XY-GenXY	5XY	6Y	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2			

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g23Y	XBrace2	Y-GenXY	5Y	6XY	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g24P	XBrace2	XY-Symmetry	5P	6Y	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g24X	XBrace2	X-GenXY	5X	6XY	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g24XY	XBrace2	XY-GenXY	5XY	6X	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g24Y	XBrace2	Y-GenXY	5Y	6P	2	5	0.5	0.75	0.5	5/8	A394	4	1.68	1	Long only	0.875	2	1	2	0	0	0
g25P	XBrace3	XY-Symmetry	6P	8X	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g25X	XBrace3	X-GenXY	6X	8S	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g25XY	XBrace3	XY-GenXY	6XY	8Y	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g25Y	XBrace3	Y-GenXY	6Y	8XY	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g26P	XBrace3	XY-Symmetry	6P	8Y	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g26X	XBrace3	X-GenXY	6X	8XY	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g26XY	XBrace3	XY-GenXY	6XY	8X	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g26Y	XBrace3	Y-GenXY	6Y	8S	2	5	0.781	0.563	0.563	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g27P	XBrace3	XY-Symmetry	8S	9X	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g27X	XBrace3	X-GenXY	8X	9S	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g27XY	XBrace3	XY-GenXY	8XY	9Y	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g27Y	XBrace3	Y-GenXY	8Y	9XY	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g28P	XBrace3	XY-Symmetry	8S	9Y	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g28X	XBrace3	X-GenXY	8X	9XY	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g28XY	XBrace3	XY-GenXY	8XY	9X	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g28Y	XBrace3	Y-GenXY	8Y	9S	2	5	0.779	0.557	0.557	5/8	A394	3	1	1	Short only	0.875	0	1	1.4375	0	0	0
g29P	XBrace3	XY-Symmetry	9S	10X	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g29X	XBrace3	X-GenXY	9X	10S	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g29XY	XBrace3	XY-GenXY	9XY	10Y	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g29Y	XBrace3	Y-GenXY	9Y	10XY	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g30P	XBrace3	XY-Symmetry	9S	10Y	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g30X	XBrace3	X-GenXY	9X	10XY	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g30XY	XBrace3	XY-GenXY	9XY	10X	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g30Y	XBrace3	Y-GenXY	9Y	10S	2	5	0.775	0.55	0.55	5/8	A394	2	1	1	Short only	1.25	0	1	2.25	0	0	0
g31P	XBrace4	XY-Symmetry	10S	11X	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625			

																				0	0	0
g31X	XBrace4	X-GenXY	10X	11S	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g31XY	XBrace4	XY-GenXY	10XY	11Y	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g31Y	XBrace4	Y-GenXY	10Y	11XY	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g32P	XBrace4	XY-Symmetry	10S	11Y	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g32X	XBrace4	X-GenXY	10X	11XY	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g32XY	XBrace4	XY-GenXY	10XY	11X	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g32Y	XBrace4	Y-GenXY	10Y	11S	3	6	1	0.585	0.585	5/8	A394	3	1	1	Short only	0.875	0	1	1.5625	0	0	0
g33P	XBrace5	XY-Symmetry	11S	12X	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g33X	XBrace5	X-GenXY	11X	12S	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g33XY	XBrace5	XY-GenXY	11XY	12Y	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g33Y	XBrace5	Y-GenXY	11Y	12XY	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g34P	XBrace5	XY-Symmetry	11S	12Y	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g34X	XBrace5	X-GenXY	11X	12XY	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g34XY	XBrace5	XY-GenXY	11XY	12X	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g34Y	XBrace5	Y-GenXY	11Y	12S	3	6	1	0.41	0.41	5/8	A394	3	1	1	Short only	0.875	0	1	1.625	0	0	0
g35P	XBrace6	XY-Symmetry	13S	7P	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g35X	XBrace6	X-GenXY	13S	7X	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g35XY	XBrace6	XY-GenXY	13Y	7XY	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g35Y	XBrace6	Y-GenXY	13Y	7Y	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g36P	XBrace6	XY-Symmetry	14S	7P	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g36X	XBrace6	X-GenXY	14X	7X	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g36XY	XBrace6	XY-GenXY	14X	7XY	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g36Y	XBrace6	Y-GenXY	14S	7Y	3	4	1	0.5	0.5	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g37P	Horz1	X-Symmetry	1P	1Y	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.5	0	0	0
g37X	Horz1	X-Gen	1X	1XY	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.5	0	0	0
g38P	Horz1	X-Symmetry	2P	2Y	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.5	0	0	0
g38X	Horz1	X-Gen	2X	2XY	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.5	0	0	0
g39P	Horz1	X-Symmetry	4P	4Y	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.5	0	0	0
g39X	Horz1	X-Gen	4X	4XY	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.5	0	0	0
g40P	Horz1	X-Symmetry	6P	6Y	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.625			

0 0 0

g40X	Horz1	X-Gen	6X	6XY	3	6	1	1	1	5/8	A394	2	1	1	Short only	0.8125	0	1	1.625	0	0	0
g41P	Horz2	X-Symmetry	10S	10Y	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1	2	0	0	0
g41X	Horz2	X-Gen	10X	10XY	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1	2	0	0	0
g42P	Horz2	Y-Symmetry	10X	10S	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1	2	0	0	0
g42Y	Horz2	Y-Gen	10XY	10Y	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	0.875	0	1	2	0	0	0
g43P	Horz3	X-Symmetry	11S	11Y	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g43X	Horz3	X-Gen	11X	11XY	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g44P	Horz3	Y-Symmetry	11X	11S	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g44Y	Horz3	Y-Gen	11XY	11Y	3	6	1	0.5	0.5	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g45P	Horz4	XY-Symmetry	12Y	14S	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g45X	Horz4	X-GenXY	12XY	14X	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g45XY	Horz4	XY-GenXY	12X	14X	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g45Y	Horz4	Y-GenXY	12S	14S	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g46P	Horz4	XY-Symmetry	12S	13S	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g46X	Horz4	X-GenXY	12X	13S	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g46XY	Horz4	XY-GenXY	12XY	13Y	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g46Y	Horz4	Y-GenXY	12Y	13Y	3	6	2	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.625	0	0	0
g47P	Horz6	XY-Symmetry	15S	16S	3	4	2	1	1	5/8	A394	1	1	1	Short only	0.8125	0	1	0	0	0	0
g47X	Horz6	X-GenXY	15X	16X	3	4	2	1	1	5/8	A394	1	1	1	Short only	0.8125	0	1	0	0	0	0
g47XY	Horz6	XY-GenXY	15XY	16X	3	4	2	1	1	5/8	A394	1	1	1	Short only	0.8125	0	1	0	0	0	0
g47Y	Horz6	Y-GenXY	15Y	16S	3	4	2	1	1	5/8	A394	1	1	1	Short only	0.8125	0	1	0	0	0	0
g48P	Horz5	XY-Symmetry	15X	17S	1	4	1	2	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g48X	Horz5	X-GenXY	15S	17S	1	4	1	2	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g48XY	Horz5	XY-GenXY	15Y	17Y	1	4	1	2	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g48Y	Horz5	Y-GenXY	15XY	17Y	1	4	1	2	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g54P	Arm1	XY-Symmetry	18X	1X	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	2.375	1.5	0	0	0
g54X	Arm1	X-GenXY	18P	1P	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	2.375	1.5	0	0	0
g54XY	Arm1	XY-GenXY	18P	1Y	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	2.375	1.5	0	0	0
g54Y	Arm1	Y-GenXY	18X	1XY	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	1.25	0	2.375	1.5	0	0	0
g55P	Arm1	Y-Symmetry	1X	1P	3	5	1	1	1	5/8	A394	2	1	1	Long only	1.25	0	2.375	1.5			

0 0 0

g55Y	Arm1	Y-Gen	1XY	1Y	3	5	1	1	1	5/8	A394	2	1	1	Long only	1.25	0	2.375	1.5	0	0	0
g56P	Arm2	Y-Symmetry	19P	2X	3	4	1	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.75	0	0	0
g56Y	Arm2	Y-Gen	19P	2XY	3	4	1	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	1.75	0	0	0
g57P	Arm4	Y-Symmetry	2X	2P	3	6	1	1	1	5/8	A394	2	1	1	Long only	2	0	2.375	1.5	0	0	0
g57Y	Arm4	Y-Gen	2XY	2Y	3	6	1	1	1	5/8	A394	2	1	1	Long only	2	0	2.375	1.5	0	0	0
g58P	Arm3	Y-Symmetry	20P	4X	3	4	1	0.5	0.5	5/8	A394	3	1	1	Short only	0.875	0	1	1.75	0	0	0
g58Y	Arm3	Y-Gen	20P	4XY	3	4	1	0.5	0.5	5/8	A394	3	1	1	Short only	0.875	0	1	1.75	0	0	0
g59P	Arm4	Y-Symmetry	4X	4P	3	6	1	1	1	5/8	A394	2	1	1	Long only	2	0	2.75	1.5	0	0	0
g59Y	Arm4	Y-Gen	4XY	4Y	3	6	1	1	1	5/8	A394	2	1	1	Long only	2	0	2.75	1.5	0	0	0
g60P	Arm2	Y-Symmetry	21P	6X	3	4	1	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	2	0	0	0
g60Y	Arm2	Y-Gen	21P	6XY	3	4	1	1	1	5/8	A394	2	1	1	Short only	1.25	0	1	2	0	0	0
g61P	Arm4	Y-Symmetry	6X	6P	3	6	1	1	1	5/8	A394	2	1	1	Long only	2	0	3.125	1.625	0	0	0
g61Y	Arm4	Y-Gen	6XY	6Y	3	6	1	1	1	5/8	A394	2	1	1	Long only	2	0	3.125	1.625	0	0	0
g62P	ArmBr1	None	18X	19P	3	4	1	1	1	5/8	A394	1	1	1	Short only	1.5	0	1	0	0	0	0
g63P	ArmBr3	Y-Symmetry	19P	1X	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g63Y	ArmBr3	Y-Gen	19P	1XY	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g64P	ArmBr3	Y-Symmetry	20P	15X	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g64Y	ArmBr3	Y-Gen	20P	15XY	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g65P	ArmBr3	Y-Symmetry	21P	5X	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g65Y	ArmBr3	Y-Gen	21P	5XY	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g66P	Arm4	Y-Symmetry	22P	2P	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	2	0	2.375	1.5	0	0	0
g66Y	Arm4	Y-Gen	22P	2Y	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	2	0	2.375	1.5	0	0	0
g67P	Arm4	Y-Symmetry	23P	4P	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	2	0	2.75	1.5	0	0	0
g67Y	Arm4	Y-Gen	23P	4Y	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	2	0	2.75	1.5	0	0	0
g68P	Arm4	Y-Symmetry	24P	6P	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	2	0	3.125	1.625	0	0	0
g68Y	Arm4	Y-Gen	24P	6Y	3	5	1	0.5	0.5	5/8	A394	2	1	1	Long only	2	0	3.125	1.625	0	0	0
g69P	ArmBr2	None	22P	18P	3	4	1	1	1	5/8	A394	1	1	1	Short only	1.25	0	1	0	0	0	0
g70P	ArmBr3	Y-Symmetry	22P	1P	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g70Y	ArmBr3	Y-Gen	22P	1Y	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0	0	0
g71P	ArmBr3	Y-Symmetry	23P	15S	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0			

0 0 0

g71Y	ArmBr3	Y-Gen	23P	15Y	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0 0	0
g72P	ArmBr3	Y-Symmetry	24P	5P	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0 0	0
g72Y	ArmBr3	Y-Gen	24P	5Y	1	4	1	1	1	5/8	A394	1	1	1	Both	0.875	0	1	0	0 0	0
g73P	AntMast	None	31P	30P	1	4	1	1	1			0	0	0		0	0	0	0	0 0	0
g74P	AntMast	None	30P	29P	1	4	1	1	1			0	0	0		0	0	0	0	0 0	0
g75P	AntMast	None	29P	28P	1	4	1	1	1			0	0	0		0	0	0	0	0 0	0
g76P	AntMast	None	28P	27P	1	4	1	1	1			0	0	0		0	0	0	0	0 0	0
g77P	AntMast	None	27P	26P	1	4	1	1	1			0	0	0		0	0	0	0	0 0	0
g78P	AntMast	None	26P	25P	1	4	1	1	1			0	0	0		0	0	0	0	0 0	0
g79P	Brace1	XY-Symmetry	1P	26P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g79X	Brace1	X-GenXY	1X	26P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g79XY	Brace1	XY-GenXY	1XY	26P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g79Y	Brace1	Y-GenXY	1Y	26P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g80P	Brace1	XY-Symmetry	2P	27P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g80X	Brace1	X-GenXY	2X	27P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g80XY	Brace1	XY-GenXY	2XY	27P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g80Y	Brace1	Y-GenXY	2Y	27P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g81P	Brace1	XY-Symmetry	4P	28P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g81X	Brace1	X-GenXY	4X	28P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g81XY	Brace1	XY-GenXY	4XY	28P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g81Y	Brace1	Y-GenXY	4Y	28P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g82P	Brace1	XY-Symmetry	6P	29P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g82X	Brace1	X-GenXY	6X	29P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g82XY	Brace1	XY-GenXY	6XY	29P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g82Y	Brace1	Y-GenXY	6Y	29P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g83P	Brace2	XY-Symmetry	11S	30P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g83X	Brace2	X-GenXY	11X	30P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g83XY	Brace2	XY-GenXY	11XY	30P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0
g83Y	Brace2	Y-GenXY	11Y	30P	3	4	1	1	1	5/8	A325	1	1	1	Short only	1.25	0	1	0	0 0	0

Member Capacities and Overrides:

Member Label	Group Label	Design Comp. Capacity (kips)	Comp. Control Criterion	Design Tension Capacity (kips)	Tension Control Criterion	L/r	Length (ft)	L/r Comp. Capacity (kips)	Connection Shear Capacity (kips)	Connection Bearing Capacity (kips)	Net Section Tension Capacity (kips)	Rupture Tension Capacity (kips)	RTE End Dist. Tension Capacity (kips)	RTE Edge Dist. Tension Capacity (kips)	Override Comp. Capacity (kips)	Override Comp. Capacity Unsup. (kips)	Override Comp. Control Criterion (kips)	Override Tension Capacity	Override Tension Control Criterion	Override Face Membership 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	
g1X	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	
g1XY	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	
g1Y	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	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	
g2X	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	
g2XY	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	
g2Y	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	
g3P	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	
g3X	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	
g3XY	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	
g3Y	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	
g4P	**Leg1**	**60.236**	**L/r**	**46.653**	**Net Sect**	**45**	**3.00**	**60.236**	**91.000**	**140.625**	**46.653**	**128.676**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**		**Automatic**	**Member "g4P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
g4X	**Leg1**	**60.236**	**L/r**	**46.653**	**Net Sect**	**45**	**3.00**	**60.236**	**91.000**	**140.625**	**46.653**	**128.676**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**		**Automatic**	**Member "g4X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
g4XY	**Leg1**	**60.236**	**L/r**	**46.653**	**Net Sect**	**45**	**3.00**	**60.236**	**91.000**	**140.625**	**46.653**	**128.676**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**		**Automatic**	**Member "g4XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
g4Y	**Leg1**	**60.236**	**L/r**	**46.653**	**Net Sect**	**45**	**3.00**	**60.236**	**91.000**	**140.625**	**46.653**	**128.676**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**		**Automatic**	**Member "g4Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??**
g5P	Leg2	89.489	L/r	71.631	Net Sect	60	5.00	89.489	0.000	0.000	71.631	0.000	0.000	0.000	0.000	0.000	0.000		Automatic	
g5X	Leg2	89.489	L/r	71.631	Net Sect	60	5.00	89.489	0.000	0.000	71.631	0.000	0.000	0.000	0.000	0.000	0.000		Automatic	
g5XY	Leg2	89.489	L/r	71.631	Net Sect	60	5.00	89.489	0.000	0.000	71.631	0.000	0.000	0.000	0.000	0.000	0.000		Automatic	

g5Y Leg2 89.489 L/r 71.631 Net Sect 60 5.00 89.489 0.000 0.000 71.631 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g6P Leg2 89.489 L/r 71.631 Net Sect 60 5.00 89.489 127.400 246.093 71.631 314.453 0.000 0.000 0.000 0.000
0.000 Automatic Member "g6P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g6X Leg2 89.489 L/r 71.631 Net Sect 60 5.00 89.489 127.400 246.093 71.631 314.453 0.000 0.000 0.000 0.000
0.000 Automatic Member "g6X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g6XY Leg2 89.489 L/r 71.631 Net Sect 60 5.00 89.489 127.400 246.093 71.631 314.453 0.000 0.000 0.000 0.000
0.000 Automatic Member "g6XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g6Y Leg2 89.489 L/r 71.631 Net Sect 60 5.00 89.489 127.400 246.093 71.631 314.453 0.000 0.000 0.000 0.000
0.000 Automatic Member "g6Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g7P Leg2 89.096 L/r 66.030 Net Sect 61 5.09 89.096 0.000 0.000 66.030 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g7X Leg2 89.096 L/r 66.030 Net Sect 61 5.09 89.096 0.000 0.000 66.030 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g7XY Leg2 89.096 L/r 66.030 Net Sect 61 5.09 89.096 0.000 0.000 66.030 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g7Y Leg2 89.096 L/r 66.030 Net Sect 61 5.09 89.096 0.000 0.000 66.030 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g8P Leg2 84.303 L/r 75.175 Net Sect 74 6.11 84.303 0.000 0.000 75.175 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g8X Leg2 84.303 L/r 75.175 Net Sect 74 6.11 84.303 0.000 0.000 75.175 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g8XY Leg2 84.303 L/r 75.175 Net Sect 74 6.11 84.303 0.000 0.000 75.175 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g8Y Leg2 84.303 L/r 75.175 Net Sect 74 6.11 84.303 0.000 0.000 75.175 0.000 0.000 0.000 0.000 0.000
0.000 Automatic

g9P Leg2 81.579 L/r 76.097 Net Sect 80 6.62 81.579 109.200 210.937 76.097 220.588 0.000 0.000 0.000 0.000
0.000 Automatic Member "g9P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g9X Leg2 81.579 L/r 76.097 Net Sect 80 6.62 81.579 109.200 210.937 76.097 220.588 0.000 0.000 0.000 0.000
0.000 Automatic Member "g9X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g9XY Leg2 81.579 L/r 76.097 Net Sect 80 6.62 81.579 109.200 210.937 76.097 220.588 0.000 0.000 0.000 0.000
0.000 Automatic Member "g9XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g9Y Leg2 81.579 L/r 76.097 Net Sect 80 6.62 81.579 109.200 210.937 76.097 220.588 0.000 0.000 0.000 0.000
0.000 Automatic Member "g9Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g10P Leg3 91.620 L/r 90.544 Net Sect 90 14.77 91.620 127.400 295.312 90.544 393.749 0.000 0.000 0.000 0.000
0.000 Automatic Member "g10P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g10X Leg3 91.620 L/r 90.544 Net Sect 90 14.77 91.620 127.400 295.312 90.544 393.749 0.000 0.000 0.000 0.000
0.000 Automatic Member "g10X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g10XY Leg3 91.620 L/r 90.544 Net Sect 90 14.77 91.620 127.400 295.312 90.544 393.749 0.000 0.000 0.000 0.000
0.000 Automatic Member "g10XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g10Y Leg3 91.620 L/r 90.544 Net Sect 90 14.77 91.620 127.400 295.312 90.544 393.749 0.000 0.000 0.000 0.000
0.000 Automatic Member "g10Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g11P Leg3 91.040 L/r 89.667 Net Sect 90 22.41 91.040 127.400 295.312 89.667 289.522 0.000 0.000 0.000 0.000
0.000 Automatic Member "g11P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??

g11X Leg3 91.040 L/r 89.667 Net Sect 90 22.41 91.040 127.400 295.312 89.667 289.522 0.000 0.000 0.000 0.000

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0.000          Automatic  Member "g11X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
  g11XY    Leg3   91.040      L/r   89.667  Net Sect   90  22.41   91.040    127.400    295.312   89.667  289.522    0.000    0.000    0.000    0.000
0.000          Automatic Member "g11XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g11Y    Leg3   91.040      L/r   89.667  Net Sect   90  22.41   91.040    127.400    295.312   89.667  289.522    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g11Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g12P    Leg3  106.046      L/r   89.667  Net Sect   62  10.19  106.046    127.400    295.312   89.667  289.522    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g12P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g12X    Leg3  106.046      L/r   89.667  Net Sect   62  10.19  106.046    127.400    295.312   89.667  289.522    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g12X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
  g12XY    Leg3  106.046      L/r   89.667  Net Sect   62  10.19  106.046    127.400    295.312   89.667  289.522    0.000    0.000    0.000    0.000
0.000          Automatic Member "g12XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g12Y    Leg3  106.046      L/r   89.667  Net Sect   62  10.19  106.046    127.400    295.312   89.667  289.522    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g12Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g13P XBrace1   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
   g13X XBrace1   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
  g13XY XBrace1   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
   g13Y XBrace1   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
   g14P XBrace1   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
   g14X XBrace1   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
  g14XY XBrace1   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
   g14Y XBrace1   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
   g15P XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g15P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g15X XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g15X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
  g15XY XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic Member "g15XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g15Y XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g15Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g16P XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g16P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g16X XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic  Member "g16X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
  g16XY XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000          Automatic Member "g16XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g16Y XBrace2   22.446      L/r   27.300     Shear  122   7.81   22.446     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
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0.000           Automatic  Member "g16Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g17P XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    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 XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000           Automatic  Member "g20P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g20X XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000           Automatic  Member "g20X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
  g20XY XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000           Automatic Member "g20XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g20Y XBrace7   15.844       L/r   27.300     Shear  163    3.91   15.844     27.300     42.187   30.238   37.500    0.000    0.000    0.000    0.000
0.000           Automatic  Member "g20Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g21P XBrace2   24.777       L/r   26.767  Net Sect  111    7.07   24.777     36.400     56.250   26.767   50.000    0.000    0.000    0.000    0.000
0.000           Automatic  Member "g21P" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
   g21X XBrace2   24.777       L/r   26.767  Net Sect  111    7.07   24.777     36.400     56.250   26.767   50.000    0.000    0.000    0.000    0.000
0.000           Automatic  Member "g21X" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
zero); however, end, edge and spacing distances will be checked.  ??
  g21XY XBrace2   24.777       L/r   26.767  Net Sect  111    7.07   24.777     36.400     56.250   26.767   50.000    0.000    0.000    0.000    0.000
0.000           Automatic Member "g21XY" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than
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zero); however, end, edge and spacing distances will be checked. ??

g21Y	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	0.000	0.000	0.000	0.000	0.000	Automatic	Member "g21Y" will not be checked for block shear since more than one gage line exists (long edge distance (g) greater than zero); however, end, edge and spacing distances will be checked. ??
g22P	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace2	24.777	L/r	26.767	Net Sect	111	7.07	24.777	36.400	56.250	26.767	50.000	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	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g25X	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g25XY	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g25Y	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g26P	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g26X	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g26XY	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g26Y	XBrace3	19.795	L/r	19.529	Rupture	104	7.60	19.795	27.300	31.641	22.961	19.529	0.000	0.000	0.000	0.000	0.000	Automatic	
g27P	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic	

g27X	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g27XY	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g27Y	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g28P	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g28X	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g28XY	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g28Y	XBrace3	16.295	L/r	17.842	Rupture	127	9.40	16.295	27.300	31.641	22.961	17.842	0.000	0.000	0.000	0.000	0.000	Automatic
g29P	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g29X	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g29XY	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g29Y	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g30P	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g30X	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g30XY	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g30Y	XBrace3	13.003	L/r	18.200	Shear	147	11.05	13.003	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g31P	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g31X	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g31XY	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g31Y	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g32P	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g32X	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g32XY	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g32Y	XBrace4	3.590	L/r	22.813	Net Sect	370	18.78	3.590	27.300	42.187	22.813	26.039	0.000	0.000	0.000	0.000	0.000	Automatic
g33P	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g33X	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g33XY	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g33Y	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g34P	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g34X	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g34XY	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic

g34Y	XBrace5	2.685	L/r	20.373	Rupture	429	27.82	2.685	27.300	31.641	22.961	20.373	0.000	0.000	0.000	0.000	0.000	Automatic
g35P	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g35X	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g35XY	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g35Y	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g36P	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g36X	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g36XY	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g36Y	XBrace6	9.100	Shear	9.100	Shear	167	15.11	14.832	9.100	14.062	30.238	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g37P	Horz1	7.504	L/r	12.814	Rupture	175	5.00	7.504	18.200	21.094	14.585	12.814	0.000	0.000	0.000	0.000	0.000	Automatic
g37X	Horz1	7.504	L/r	12.814	Rupture	175	5.00	7.504	18.200	21.094	14.585	12.814	0.000	0.000	0.000	0.000	0.000	Automatic
g38P	Horz1	7.504	L/r	12.814	Rupture	175	5.00	7.504	18.200	21.094	14.585	12.814	0.000	0.000	0.000	0.000	0.000	Automatic
g38X	Horz1	7.504	L/r	12.814	Rupture	175	5.00	7.504	18.200	21.094	14.585	12.814	0.000	0.000	0.000	0.000	0.000	Automatic
g39P	Horz1	7.504	L/r	12.814	Rupture	175	5.00	7.504	18.200	21.094	14.585	12.814	0.000	0.000	0.000	0.000	0.000	Automatic
g39X	Horz1	7.504	L/r	12.814	Rupture	175	5.00	7.504	18.200	21.094	14.585	12.814	0.000	0.000	0.000	0.000	0.000	Automatic
g40P	Horz1	7.504	L/r	13.658	Rupture	175	5.00	7.504	18.200	21.094	14.585	13.658	0.000	0.000	0.000	0.000	0.000	Automatic
g40X	Horz1	7.504	L/r	13.658	Rupture	175	5.00	7.504	18.200	21.094	14.585	13.658	0.000	0.000	0.000	0.000	0.000	Automatic
g41P	Horz2	12.304	L/r	16.576	Rupture	148	9.79	12.304	18.200	21.094	17.444	16.576	0.000	0.000	0.000	0.000	0.000	Automatic
g41X	Horz2	12.304	L/r	16.576	Rupture	148	9.79	12.304	18.200	21.094	17.444	16.576	0.000	0.000	0.000	0.000	0.000	Automatic
g42P	Horz2	12.304	L/r	16.576	Rupture	148	9.79	12.304	18.200	21.094	17.444	16.576	0.000	0.000	0.000	0.000	0.000	Automatic
g42Y	Horz2	12.304	L/r	16.576	Rupture	148	9.79	12.304	18.200	21.094	17.444	16.576	0.000	0.000	0.000	0.000	0.000	Automatic
g43P	Horz3	15.896	L/r	18.200	Shear	175	13.75	15.896	18.200	28.125	30.090	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g43X	Horz3	15.896	L/r	18.200	Shear	175	13.75	15.896	18.200	28.125	30.090	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g44P	Horz3	15.896	L/r	18.200	Shear	175	13.75	15.896	18.200	28.125	30.090	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g44Y	Horz3	15.896	L/r	18.200	Shear	175	13.75	15.896	18.200	28.125	30.090	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g45P	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g45X	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g45XY	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g45Y	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g46P	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic

g46X	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g46XY	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g46Y	Horz4	18.200	Shear	18.200	Shear	185	9.88	18.857	18.200	28.125	37.663	21.820	0.000	0.000	0.000	0.000	0.000	Automatic
g47P	Horz6	9.100	Shear	7.330	Rupture	112	2.50	12.543	9.100	10.547	14.585	7.330	0.000	0.000	0.000	0.000	0.000	Automatic
g47X	Horz6	9.100	Shear	7.330	Rupture	112	2.50	12.543	9.100	10.547	14.585	7.330	0.000	0.000	0.000	0.000	0.000	Automatic
g47XY	Horz6	9.100	Shear	7.330	Rupture	112	2.50	12.543	9.100	10.547	14.585	7.330	0.000	0.000	0.000	0.000	0.000	Automatic
g47Y	Horz6	9.100	Shear	7.330	Rupture	112	2.50	12.543	9.100	10.547	14.585	7.330	0.000	0.000	0.000	0.000	0.000	Automatic
g48P	Horz5	0.129	L/r	8.766	Net Sect	984	2.50	0.129	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g48X	Horz5	0.129	L/r	8.766	Net Sect	984	2.50	0.129	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g48XY	Horz5	0.129	L/r	8.766	Net Sect	984	2.50	0.129	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g48Y	Horz5	0.129	L/r	8.766	Net Sect	984	2.50	0.129	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g54P	Arm1	18.200	Shear	18.200	Shear	146	11.52	19.099	18.200	28.125	33.802	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g54X	Arm1	18.200	Shear	18.200	Shear	146	11.52	19.099	18.200	28.125	33.802	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g54XY	Arm1	18.200	Shear	18.200	Shear	146	11.52	19.099	18.200	28.125	33.802	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g54Y	Arm1	18.200	Shear	18.200	Shear	146	11.52	19.099	18.200	28.125	33.802	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g55P	Arm1	18.200	Shear	18.200	Shear	114	5.00	26.226	18.200	28.125	33.802	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g55Y	Arm1	18.200	Shear	18.200	Shear	114	5.00	26.226	18.200	28.125	33.802	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g56P	Arm2	17.986	L/r	17.209	Rupture	114	4.72	17.986	18.200	21.094	22.961	17.209	0.000	0.000	0.000	0.000	0.000	Automatic
g56Y	Arm2	17.986	L/r	17.209	Rupture	114	4.72	17.986	18.200	21.094	22.961	17.209	0.000	0.000	0.000	0.000	0.000	Automatic
g57P	Arm4	18.200	Shear	18.200	Shear	92	5.00	37.680	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g57Y	Arm4	18.200	Shear	18.200	Shear	92	5.00	37.680	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g58P	Arm3	17.147	L/r	17.333	Net Sect	121	8.86	17.147	27.300	31.641	17.333	22.061	0.000	0.000	0.000	0.000	0.000	Automatic
g58Y	Arm3	17.147	L/r	17.333	Net Sect	121	8.86	17.147	27.300	31.641	17.333	22.061	0.000	0.000	0.000	0.000	0.000	Automatic
g59P	Arm4	18.200	Shear	18.200	Shear	92	5.00	37.680	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g59Y	Arm4	18.200	Shear	18.200	Shear	92	5.00	37.680	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g60P	Arm2	16.404	L/r	18.200	Shear	125	5.15	16.404	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g60Y	Arm2	16.404	L/r	18.200	Shear	125	5.15	16.404	18.200	21.094	22.961	18.750	0.000	0.000	0.000	0.000	0.000	Automatic
g61P	Arm4	18.200	Shear	18.200	Shear	92	5.00	37.680	18.200	28.125	45.088	31.250	0.000	0.000	0.000	0.000	0.000	Automatic
g61Y	Arm4	18.200	Shear	18.200	Shear	92	5.00	37.680	18.200	28.125	45.088	31.250	0.000	0.000	0.000	0.000	0.000	Automatic
g62P	ArmBr1	9.100	Shear	9.100	Shear	177	8.81	9.922	9.100	10.547	28.544	9.375	0.000	0.000	0.000	0.000	0.000	Automatic

g63P	ArmBr3	0.068	L/r	8.766	Net Sect	1352	6.87	0.068	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g63Y	ArmBr3	0.068	L/r	8.766	Net Sect	1352	6.87	0.068	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g64P	ArmBr3	0.037	L/r	8.766	Net Sect	1840	9.35	0.037	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g64Y	ArmBr3	0.037	L/r	8.766	Net Sect	1840	9.35	0.037	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g65P	ArmBr3	0.063	L/r	8.766	Net Sect	1412	7.18	0.063	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g65Y	ArmBr3	0.063	L/r	8.766	Net Sect	1412	7.18	0.063	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g66P	Arm4	18.200	Shear	18.200	Shear	83	8.86	39.199	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g66Y	Arm4	18.200	Shear	18.200	Shear	83	8.86	39.199	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g67P	Arm4	18.200	Shear	18.200	Shear	124	13.24	31.382	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g67Y	Arm4	18.200	Shear	18.200	Shear	124	13.24	31.382	18.200	28.125	45.088	28.125	0.000	0.000	0.000	0.000	0.000	Automatic
g68P	Arm4	18.200	Shear	18.200	Shear	88	9.34	38.455	18.200	28.125	45.088	31.250	0.000	0.000	0.000	0.000	0.000	Automatic
g68Y	Arm4	18.200	Shear	18.200	Shear	88	9.34	38.455	18.200	28.125	45.088	31.250	0.000	0.000	0.000	0.000	0.000	Automatic
g69P	ArmBr2	9.100	Shear	9.100	Shear	138	5.71	13.491	9.100	10.547	22.961	9.375	0.000	0.000	0.000	0.000	0.000	Automatic
g70P	ArmBr3	0.031	L/r	8.766	Net Sect	2001	10.17	0.031	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g70Y	ArmBr3	0.031	L/r	8.766	Net Sect	2001	10.17	0.031	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g71P	ArmBr3	0.018	L/r	8.766	Net Sect	2670	13.57	0.018	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g71Y	ArmBr3	0.018	L/r	8.766	Net Sect	2670	13.57	0.018	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g72P	ArmBr3	0.029	L/r	8.766	Net Sect	2084	10.59	0.029	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g72Y	ArmBr3	0.029	L/r	8.766	Net Sect	2084	10.59	0.029	9.100	14.062	8.766	12.500	0.000	0.000	0.000	0.000	0.000	Automatic
g73P	AntMast	782.285	L/r	953.399	Net Sect	70	32.00	782.285	0.000	0.000	953.399	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g74P	AntMast	782.285	L/r	953.399	Net Sect	70	32.00	782.285	0.000	0.000	953.399	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g75P	AntMast	936.688	L/r	953.399	Net Sect	22	10.00	936.688	0.000	0.000	953.399	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g76P	AntMast	929.336	L/r	953.399	Net Sect	26	12.00	929.336	0.000	0.000	953.399	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g77P	AntMast	949.221	L/r	953.399	Net Sect	11	5.00	949.221	0.000	0.000	953.399	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g78P	AntMast	946.871	L/r	953.399	Net Sect	14	6.25	946.871	0.000	0.000	953.399	0.000	0.000	0.000	0.000	0.000	0.000	Automatic
g79P	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g79X	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g79XY	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g79Y	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g80P	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic

g80X	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g80XY	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g80Y	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g81P	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g81X	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g81XY	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g81Y	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g82P	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g82X	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g82XY	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g82Y	Brace1	13.594	Bearing	12.083	Rupture	86	3.54	28.492	16.800	13.594	32.987	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g83P	Brace2	13.594	Bearing	12.083	Rupture	168	9.72	17.115	16.800	13.594	49.187	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g83X	Brace2	13.594	Bearing	12.083	Rupture	168	9.72	17.115	16.800	13.594	49.187	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g83XY	Brace2	13.594	Bearing	12.083	Rupture	168	9.72	17.115	16.800	13.594	49.187	12.083	0.000	0.000	0.000	0.000	0.000	Automatic
g83Y	Brace2	13.594	Bearing	12.083	Rupture	168	9.72	17.115	16.800	13.594	49.187	12.083	0.000	0.000	0.000	0.000	0.000	Automatic

The model contains 240 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	0.0888	4.724	3.059
2P	0.136	6.950	5.481
3P	0.0777	4.089	4.089
4P	0.146	7.174	4.955
5P	0.117	5.852	5.509
6P	0.158	7.510	5.958
7P	0.137	5.770	5.770
18P	0.0606	3.407	1.146
19P	0.0411	2.868	1.961
20P	0.0412	3.440	1.194
21P	0.0266	1.918	1.336
22P	0.0754	4.866	2.169
23P	0.0971	6.279	1.403
24P	0.0701	4.501	1.649
25P	0.259	4.167	4.167
26P	0.495	8.542	8.542
27P	0.733	12.375	12.375
28P	0.94	15.708	15.708
29P	1.77	29.042	29.042
30P	2.76	46.677	46.677

31P	1.33	21.333	21.333
1X	0.0864	4.472	3.059
1XY	0.0864	4.472	3.059
1Y	0.0888	4.724	3.059
2X	0.118	5.950	5.325
2XY	0.118	5.950	5.325
2Y	0.136	6.950	5.481
3X	0.0777	4.089	4.089
3XY	0.0777	4.089	4.089
3Y	0.0777	4.089	4.089
4X	0.121	6.070	4.851
4XY	0.121	6.070	4.851
4Y	0.146	7.174	4.955
5X	0.115	5.592	5.509
5XY	0.115	5.592	5.509
5Y	0.117	5.852	5.509
6X	0.139	6.479	5.802
6XY	0.139	6.479	5.802
6Y	0.158	7.510	5.958
7X	0.137	5.770	5.770
7XY	0.137	5.770	5.770
7Y	0.137	5.770	5.770
18X	0.0682	3.913	1.250
8S	0.11	5.233	5.233
9S	0.128	6.066	6.066
10S	0.246	10.042	10.042
11S	0.464	18.366	18.366
12S	0.343	13.570	13.570
13S	0.131	7.684	2.944
14S	0.131	2.944	7.684
15S	0.0345	2.155	1.467
16S	0.0373	1.500	2.317
17S	0.0358	2.317	1.500
8X	0.11	5.233	5.233
8XY	0.11	5.233	5.233
8Y	0.11	5.233	5.233
9X	0.128	6.066	6.066
9XY	0.128	6.066	6.066
9Y	0.128	6.066	6.066
10X	0.246	10.042	10.042
10XY	0.246	10.042	10.042
10Y	0.246	10.042	10.042
11X	0.464	18.366	18.366
11XY	0.464	18.366	18.366
11Y	0.464	18.366	18.366
12X	0.343	13.570	13.570
12XY	0.343	13.570	13.570
12Y	0.343	13.570	13.570
13Y	0.131	7.684	2.944
14X	0.131	2.944	7.684
15X	0.0313	1.840	1.467
15XY	0.0313	1.840	1.467
15Y	0.0345	2.155	1.467
16X	0.0373	1.500	2.317
17Y	0.0358	2.317	1.500
Total	18	580.003	536.266

Unadjusted Dead Load and Drag Areas by Section:

Section	Unfactored	X-Drag	Y-Drag	X-Drag	Y-Drag

Label	Dead Load (kips)	Area All (ft^2)	Area All (ft^2)	Area Face (ft^2)	Area Face (ft^2)
1	6.194	223.757	180.021	119.115	85.239
2	11.850	356.246	356.246	189.402	189.402
Total	18.044	580.003	536.266	308.517	274.641

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	6.194	6.504	845.487	887.761
2	11.850	12.443	1513.580	1589.259
Total	18.044	18.946	2359.067	2477.020

Section Joint Information:

Section Label	Joint Label	Joint Elevation (ft)
1	1P	91.000
1	2P	86.000
1	1X	91.000
1	2X	86.000
1	1XY	91.000
1	2XY	86.000
1	1Y	91.000
1	2Y	86.000
1	3P	80.000
1	3X	80.000
1	3XY	80.000
1	3Y	80.000
1	15S	77.000
1	15X	77.000
1	15XY	77.000
1	15Y	77.000
1	4P	74.000
1	4X	74.000
1	4XY	74.000
1	4Y	74.000
1	5P	69.000
1	5X	69.000
1	5XY	69.000
1	5Y	69.000
1	6P	64.000
1	6X	64.000
1	6XY	64.000
1	6Y	64.000
1	17S	77.000
1	17Y	77.000
1	16S	77.000
1	16X	77.000
1	18X	91.000
1	18P	91.000
1	19P	86.000
1	20P	74.000

1	21P	64.000
1	22P	86.000
1	23P	74.000
1	24P	64.000
1	29P	64.000
1	28P	74.000
1	27P	86.000
1	26P	91.000
1	25P	97.250
2	6P	64.000
2	8S	59.000
2	6X	64.000
2	8X	59.000
2	6XY	64.000
2	8XY	59.000
2	6Y	64.000
2	8Y	59.000
2	9S	53.000
2	9X	53.000
2	9XY	53.000
2	9Y	53.000
2	10S	46.500
2	10X	46.500
2	10XY	46.500
2	10Y	46.500
2	11S	32.000
2	11X	32.000
2	11XY	32.000
2	11Y	32.000
2	12S	10.000
2	12X	10.000
2	12XY	10.000
2	12Y	10.000
2	7P	0.000
2	7X	0.000
2	7XY	0.000
2	7Y	0.000
2	13S	10.000
2	13Y	10.000
2	14S	10.000
2	14X	10.000
2	31P	0.000
2	30P	32.000
2	29P	64.000

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	97.250	64.000	45	146	0.00	5.00	150.625	0.00	18.50	374.437
2	64.000	0.000	35	94	5.00	22.50	880.000	5.00	22.50	880.000

*** Insulator Data

Clamp Properties:

Label Stock Holding

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

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
1	18P	C-EX1	No Limit
2	18X	C-EX1	No Limit
3	19P	C-EX1	No Limit
4	20P	C-EX1	No Limit
5	21P	C-EX1	No Limit
6	22P	C-EX1	No Limit
7	23P	C-EX1	No Limit
8	24P	C-EX1	No Limit
9	3Y	C-EX1	No Limit
10	5Y	C-EX1	No Limit
11	8Y	C-EX1	No Limit
12	10Y	C-EX1	No Limit
13	11Y	C-EX1	No Limit
14	12Y	C-EX1	No Limit
15	1XY	C-EX1	No Limit
16	1Y	C-EX1	No Limit
17	3XY	C-EX1	No Limit
18	25P	C-EX1	No Limit
19	26P	C-EX1	No Limit
20	27P	C-EX1	No Limit
21	28P	C-EX1	No Limit
22	29P	C-EX1	No Limit
23	30P	C-EX1	No Limit

*** Loads Data

Loads from file: j:\jobs\1501900.wi\006 - ct11296a\04_structural\backup documentation\rev (3)\pls tower\wilton - 936.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)	97.25 (ft)
Structure height	97.25 (ft)
Structure height above ground	97.25 (ft)
Tower Shape	Rectangular

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

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Guys and Cables	SF for Insuls.	SF For 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	14 loads	Wind on Face	-4	0	0.000	56.000	60.0	
NESC Extreme	1.0000	1.0000	1.00000	1.0000	1.0000	1.0000	14 loads	NESC 2012	-31	0	0.000	56.000	60.0	

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
18X	1698	-2398	0	Fiber Shield Wire
18P	1030	-1614	0	Shield Wire
19P	2778	-2739	0	Conductor
20P	2778	-2739	0	Conductor
21P	2778	-2739	0	Conductor
22P	2778	-2739	0	Conductor
23P	2778	-2739	0	Conductor
24P	2778	-2739	0	Conductor
25P	3467	-1140	0	T-Mobile Antennas
26P	457	-60	0	Coax Cables
27P	444	-58	0	Coax Cables
28P	575	-75	0	Coax Cables
29P	1097	-143	0	Coax Cables
30P	2508	-326	0	Coax Cables

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

Section Label	Z of Top	Z of Bottom	Ave. Elev. Above	Res. Adj. Wind	Tran Adj. Wind	Tran Drag Coef	Tran Wind Load	Long Adj. Wind	Long Drag Coef	Long Wind Load	Ice Weight	Total Weight

	(ft)	(ft)	Ground (ft)	Pres. (psf)	Pres. (psf)		(lbs)	Pres. (psf)		(lbs)	(lbs)	(lbs)
1	97.25	64.00	80.63	10.00	-10.00	3.300	-2812.9	0.00	3.300	0.0	0	9756
2	64.00	0.00	32.00	10.00	-10.00	3.300	-6250.2	0.00	3.300	0.0	0	18664

Point Loads for Load Case "NESC Extreme":

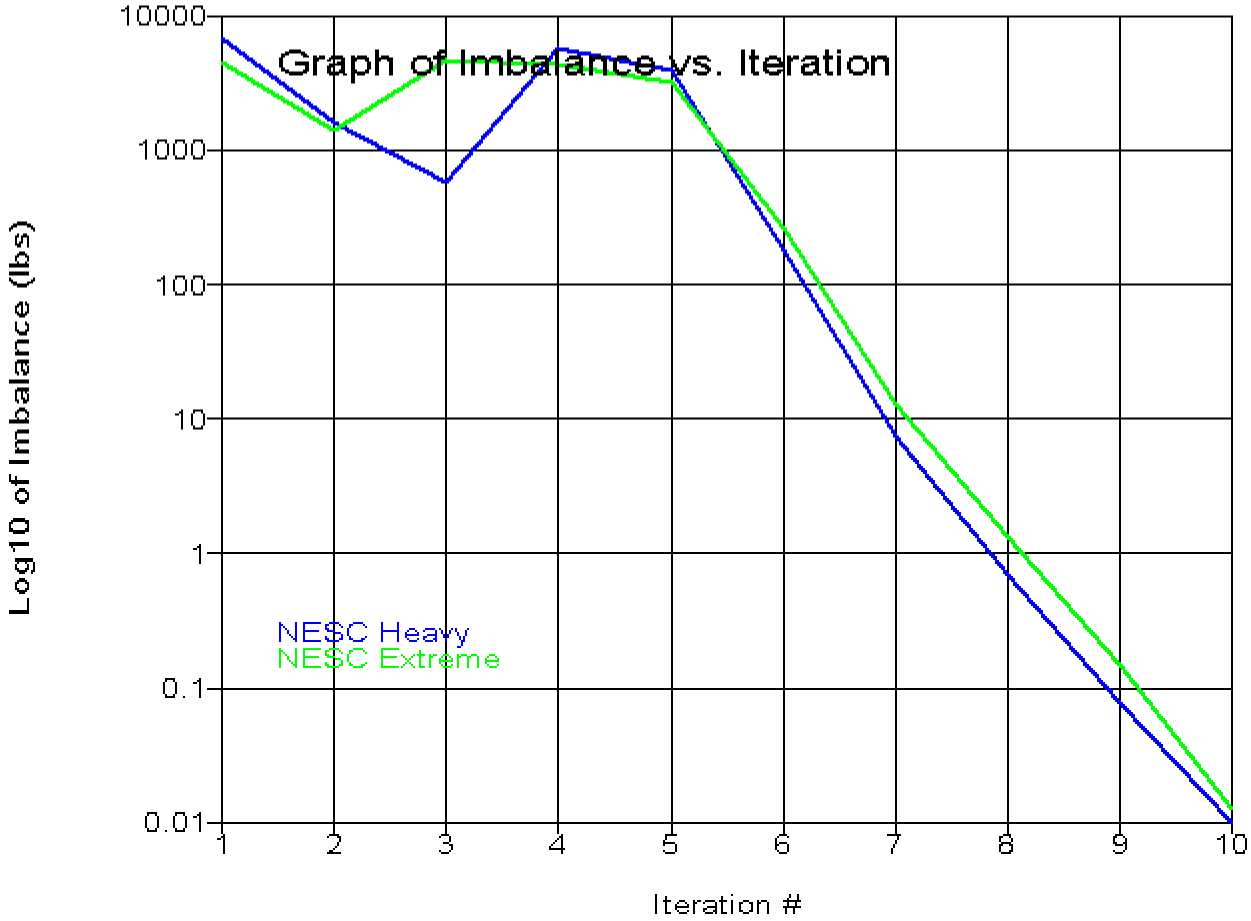
Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
18X	455	-2057	0	Fiber Shield Wire
18P	226	-969	0	Shield Wire
19P	1072	-2551	0	Conductor
20P	1072	-2551	0	Conductor
21P	1072	-2551	0	Conductor
22P	1072	-2551	0	Conductor
23P	1072	-2551	0	Conductor
24P	1072	-2551	0	Conductor
25P	1571	-4326	0	T-Mobile Antennas
26P	173	-123	0	Coax Cables
27P	168	-120	0	Coax Cables
28P	218	-155	0	Coax Cables
29P	416	-296	0	Coax Cables
30P	950	-677	0	Coax Cables

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

Section Label	Z of Top (ft)	Z of Bottom (ft)	Ave. Elev. Above Ground (ft)	Res. Adj. Wind Pres. (psf)	Tran Adj. Wind Pres. (psf)	Tran Angle Face Area (ft^2)	Tran Round Face Area (ft^2)	Tran Gross Area (ft^2)	Tran Soli- dity Ratio	Tran Angle Drag Coef	Tran Round Drag Coef	Tran Wind Load (lbs)	Long Adj. Wind Pres. (psf)	Long Angle Face Area (ft^2)	Long Round Face Area (ft^2)	Long Gross Area (ft^2)	Long Soli- dity Ratio	Long Angle Drag Coef	Long Round Drag Coef	Long Wind Load (lbs)	Ice Weight (lbs)	Total Weight (lbs)
1	97.25	64.00	80.63	31.27	-31.27	52.33	41.43	150.63	0.622	3.200	2.000	-7827.0	0.00	82.26	48.77	374.44	0.350	3.200	2.000	0.0	0	6504
2	64.00	0.00	32.00	31.27	-31.27	114.48	93.87	880.00	0.237	3.200	2.000	-17323.9	0.00	114.48	93.87	880.00	0.237	3.200	2.000	0.0	0	12443

*** Analysis Results:

Maximum element usage is 83.44% for Angle "g31P" in load case "NESC Heavy"
Maximum insulator usage is 14.15% for Clamp "23" in load case "NESC Heavy"



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

Group Label	Angle Label	Max. Usage For All LC %	Max. Tens. For All LC (kips)	Max. Comp. For All LC (kips)	LC 1 (kips)	LC 2 (kips)
Leg1	g1P	4.50	1.861	-0.655	-0.655	1.861
Leg1	g1X	6.49	0.000	-3.471	-3.187	-3.471
Leg1	g1XY	6.49	0.000	-3.471	-3.187	-3.471
Leg1	g1Y	4.50	1.861	-0.655	-0.655	1.861

Leg1	g2P	18.64	9.817	0.000	4.061	9.817
Leg1	g2X	25.00	0.000	-12.222	-9.524	-12.222
Leg1	g2XY	25.00	0.000	-12.222	-9.524	-12.222
Leg1	g2Y	18.64	9.817	0.000	4.061	9.817
Leg1	g3P	32.93	17.345	0.000	9.784	17.345
Leg1	g3X	32.74	0.000	-19.724	-14.713	-19.724
Leg1	g3XY	32.74	0.000	-19.724	-14.713	-19.724
Leg1	g3Y	32.93	17.345	0.000	9.784	17.345
Leg1	g4P	35.60	16.610	0.000	8.277	16.610
Leg1	g4X	33.96	0.000	-20.454	-16.163	-20.454
Leg1	g4XY	33.96	0.000	-20.454	-16.163	-20.454
Leg1	g4Y	35.60	16.610	0.000	8.277	16.610
Leg2	g5P	39.14	28.035	0.000	15.040	28.035
Leg2	g5X	37.11	0.000	-33.210	-25.147	-33.210
Leg2	g5XY	37.11	0.000	-33.210	-25.147	-33.210
Leg2	g5Y	39.14	28.035	0.000	15.040	28.035
Leg2	g6P	50.97	36.509	0.000	20.346	36.509
Leg2	g6X	47.86	0.000	-42.833	-32.967	-42.833
Leg2	g6XY	47.86	0.000	-42.833	-32.967	-42.833
Leg2	g6Y	50.97	36.509	0.000	20.346	36.509
Leg2	g7P	67.12	44.322	0.000	26.647	44.322
Leg2	g7X	56.66	0.000	-50.485	-38.372	-50.485
Leg2	g7XY	56.66	0.000	-50.485	-38.372	-50.485
Leg2	g7Y	67.12	44.322	0.000	26.647	44.322
Leg2	g8P	65.74	49.423	0.000	30.847	49.423
Leg2	g8X	68.86	0.000	-58.054	-44.454	-58.054
Leg2	g8XY	68.86	0.000	-58.054	-44.454	-58.054
Leg2	g8Y	65.74	49.423	0.000	30.847	49.423
Leg2	g9P	67.50	51.368	0.000	32.441	51.368
Leg2	g9X	72.66	0.000	-59.276	-45.470	-59.276
Leg2	g9XY	72.66	0.000	-59.276	-45.470	-59.276
Leg2	g9Y	67.50	51.368	0.000	32.441	51.368
Leg3	g10P	53.32	48.277	0.000	32.646	48.277
Leg3	g10X	73.55	0.000	-67.384	-48.282	-67.384
Leg3	g10XY	73.55	0.000	-67.384	-48.282	-67.384
Leg3	g10Y	53.32	48.277	0.000	32.646	48.277
Leg3	g11P	57.91	51.928	0.000	32.091	51.928
Leg3	g11X	79.94	0.000	-72.777	-54.652	-72.777
Leg3	g11XY	79.94	0.000	-72.777	-54.652	-72.777
Leg3	g11Y	57.91	51.928	0.000	32.091	51.928
Leg3	g12P	69.24	62.086	0.000	38.323	62.086
Leg3	g12X	68.87	0.000	-73.034	-55.135	-73.034
Leg3	g12XY	68.87	0.000	-73.034	-55.135	-73.034
Leg3	g12Y	69.24	62.086	0.000	38.323	62.086
XBrace1	g13P	34.83	0.000	-4.025	-2.032	-4.025
XBrace1	g13X	26.59	3.878	0.000	1.620	3.878
XBrace1	g13XY	26.59	3.878	0.000	1.620	3.878
XBrace1	g13Y	34.83	0.000	-4.025	-2.032	-4.025
XBrace1	g14P	1.10	0.160	-0.018	-0.018	0.160
XBrace1	g14X	6.71	0.000	-0.579	-0.579	-0.472
XBrace1	g14XY	6.71	0.000	-0.579	-0.579	-0.472
XBrace1	g14Y	1.10	0.160	-0.018	-0.018	0.160
XBrace2	g15P	25.98	0.000	-5.832	-4.190	-5.832
XBrace2	g15X	22.18	6.055	0.000	4.765	6.055
XBrace2	g15XY	22.18	6.055	0.000	4.765	6.055
XBrace2	g15Y	25.98	0.000	-5.832	-4.190	-5.832
XBrace2	g16P	5.90	0.000	-0.935	-0.750	-0.935
XBrace2	g16X	3.43	0.937	0.000	0.808	0.937
XBrace2	g16XY	3.43	0.937	0.000	0.808	0.937
XBrace2	g16Y	5.90	0.000	-0.935	-0.750	-0.935

XBrace7	g17P	38.86	0.000	-6.157	-4.521	-6.157
XBrace7	g17X	22.05	6.018	0.000	4.318	6.018
XBrace7	g17XY	22.05	6.018	0.000	4.318	6.018
XBrace7	g17Y	38.86	0.000	-6.157	-4.521	-6.157
XBrace7	g18P	22.05	6.019	0.000	2.887	6.019
XBrace7	g18X	40.10	0.000	-6.353	-3.170	-6.353
XBrace7	g18XY	40.10	0.000	-6.353	-3.170	-6.353
XBrace7	g18Y	22.05	6.019	0.000	2.887	6.019
XBrace7	g19P	4.72	1.289	0.000	0.925	1.289
XBrace7	g19X	8.43	0.000	-1.336	-1.105	-1.336
XBrace7	g19XY	8.43	0.000	-1.336	-1.105	-1.336
XBrace7	g19Y	4.72	1.289	0.000	0.925	1.289
XBrace7	g20P	4.39	1.200	0.000	0.889	1.200
XBrace7	g20X	9.07	0.000	-1.436	-1.148	-1.436
XBrace7	g20XY	9.07	0.000	-1.436	-1.148	-1.436
XBrace7	g20Y	4.39	1.200	0.000	0.889	1.200
XBrace2	g21P	29.86	0.000	-7.399	-4.891	-7.399
XBrace2	g21X	30.93	8.280	0.000	7.099	8.280
XBrace2	g21XY	30.93	8.280	0.000	7.099	8.280
XBrace2	g21Y	29.86	0.000	-7.399	-4.891	-7.399
XBrace2	g22P	5.98	0.000	-1.083	-0.901	-1.083
XBrace2	g22X	3.88	1.038	0.000	0.629	1.038
XBrace2	g22XY	3.88	1.038	0.000	0.629	1.038
XBrace2	g22Y	5.98	0.000	-1.083	-0.901	-1.083
XBrace2	g23P	29.18	0.000	-7.230	-4.009	-7.230
XBrace2	g23X	30.72	8.223	0.000	6.532	8.223
XBrace2	g23XY	30.72	8.223	0.000	6.532	8.223
XBrace2	g23Y	29.18	0.000	-7.230	-4.009	-7.230
XBrace2	g24P	5.12	1.371	0.000	0.406	1.371
XBrace2	g24X	11.10	0.000	-2.010	-1.954	-2.010
XBrace2	g24XY	11.10	0.000	-2.010	-1.954	-2.010
XBrace2	g24Y	5.12	1.371	0.000	0.406	1.371
XBrace3	g25P	16.51	0.000	-3.269	-3.164	-3.269
XBrace3	g25X	11.94	2.332	0.000	2.332	2.275
XBrace3	g25XY	11.94	2.332	0.000	2.332	2.275
XBrace3	g25Y	16.51	0.000	-3.269	-3.164	-3.269
XBrace3	g26P	11.23	2.192	0.000	1.424	2.192
XBrace3	g26X	15.77	0.000	-2.791	-1.964	-2.791
XBrace3	g26XY	15.77	0.000	-2.791	-1.964	-2.791
XBrace3	g26Y	11.23	2.192	0.000	1.424	2.192
XBrace3	g27P	14.59	0.000	-2.377	-1.984	-2.377
XBrace3	g27X	16.46	2.937	0.000	2.420	2.937
XBrace3	g27XY	16.46	2.937	0.000	2.420	2.937
XBrace3	g27Y	14.59	0.000	-2.377	-1.984	-2.377
XBrace3	g28P	9.53	0.000	-1.343	-0.857	-1.343
XBrace3	g28X	10.32	1.841	0.000	1.323	1.841
XBrace3	g28XY	10.32	1.841	0.000	1.323	1.841
XBrace3	g28Y	9.53	0.000	-1.343	-0.857	-1.343
XBrace3	g29P	23.18	0.000	-3.014	-1.856	-3.014
XBrace3	g29X	12.47	2.269	0.000	1.661	2.269
XBrace3	g29XY	12.47	2.269	0.000	1.661	2.269
XBrace3	g29Y	23.18	0.000	-3.014	-1.856	-3.014
XBrace3	g30P	4.58	0.834	0.000	0.532	0.834
XBrace3	g30X	12.54	0.000	-1.419	-1.026	-1.419
XBrace3	g30XY	12.54	0.000	-1.419	-1.026	-1.419
XBrace3	g30Y	4.58	0.834	0.000	0.532	0.834
XBrace4	g31P	83.44	0.000	-2.995	-2.995	0.000
XBrace4	g31X	28.34	6.465	0.000	0.877	6.465
XBrace4	g31XY	28.34	6.465	0.000	0.877	6.465
XBrace4	g31Y	83.44	0.000	-2.995	-2.995	0.000

XBrace4	g32P	25.61	5.843	0.000	3.894	5.843
XBrace4	g32X	0.00	0.000	0.000	0.000	0.000
XBrace4	g32XY	0.00	0.000	0.000	0.000	0.000
XBrace4	g32Y	25.61	5.843	0.000	3.894	5.843
XBrace5	g33P	0.00	0.000	0.000	0.000	0.000
XBrace5	g33X	30.56	6.226	0.000	4.048	6.226
XBrace5	g33XY	30.56	6.226	0.000	4.048	6.226
XBrace5	g33Y	0.00	0.000	0.000	0.000	0.000
XBrace5	g34P	34.43	7.014	0.000	4.422	7.014
XBrace5	g34X	0.00	0.000	0.000	0.000	0.000
XBrace5	g34XY	0.00	0.000	0.000	0.000	0.000
XBrace5	g34Y	34.43	7.014	0.000	4.422	7.014
XBrace6	g35P	35.07	3.192	0.000	1.566	3.192
XBrace6	g35X	40.97	0.000	-3.728	-1.882	-3.728
XBrace6	g35XY	40.97	0.000	-3.728	-1.882	-3.728
XBrace6	g35Y	35.07	3.192	0.000	1.566	3.192
XBrace6	g36P	1.31	0.000	-0.119	-0.119	-0.107
XBrace6	g36X	4.59	0.000	-0.418	-0.249	-0.418
XBrace6	g36XY	4.59	0.000	-0.418	-0.249	-0.418
XBrace6	g36Y	1.31	0.000	-0.119	-0.119	-0.107
Horz1	g37P	32.69	0.000	-2.453	-1.641	-2.453
Horz1	g37X	13.78	1.361	-1.034	-1.034	1.361
Horz1	g38P	15.53	1.989	0.000	1.989	1.903
Horz1	g38X	13.73	0.755	-1.030	0.755	-1.030
Horz1	g39P	12.69	1.626	0.000	1.626	0.838
Horz1	g39X	9.93	1.273	0.000	1.273	0.273
Horz1	g40P	18.20	2.486	0.000	2.179	2.486
Horz1	g40X	28.54	0.000	-2.141	-0.910	-2.141
Horz2	g41P	39.83	0.000	-4.900	-3.273	-4.900
Horz2	g41X	5.95	0.986	0.000	0.703	0.986
Horz2	g42P	17.54	0.882	-2.158	0.882	-2.158
Horz2	g42Y	17.54	0.882	-2.158	0.882	-2.158
Horz3	g43P	38.97	0.000	-6.195	-4.671	-6.195
Horz3	g43X	10.54	1.919	0.000	0.950	1.919
Horz3	g44P	13.23	0.043	-2.103	0.043	-2.103
Horz3	g44Y	13.23	0.043	-2.103	0.043	-2.103
Horz4	g45P	19.81	0.000	-3.605	-2.296	-3.605
Horz4	g45X	0.25	0.019	-0.045	-0.045	0.019
Horz4	g45XY	0.25	0.019	-0.045	-0.045	0.019
Horz4	g45Y	19.81	0.000	-3.605	-2.296	-3.605
Horz4	g46P	22.25	0.000	-4.050	-2.173	-4.050
Horz4	g46X	3.33	0.606	0.000	0.393	0.606
Horz4	g46XY	3.33	0.606	0.000	0.393	0.606
Horz4	g46Y	22.25	0.000	-4.050	-2.173	-4.050
Horz6	g47P	13.18	0.000	-1.199	-1.199	-0.603
Horz6	g47X	10.59	0.000	-0.964	-0.964	-0.265
Horz6	g47XY	10.59	0.000	-0.964	-0.964	-0.265
Horz6	g47Y	13.18	0.000	-1.199	-1.199	-0.603
Horz5	g48P	45.39	3.979	0.000	3.979	1.968
Horz5	g48X	65.73	5.761	0.000	5.761	2.019
Horz5	g48XY	65.73	5.761	0.000	5.761	2.019
Horz5	g48Y	45.39	3.979	0.000	3.979	1.968
Arm1	g54P	14.17	2.579	0.000	2.579	1.573
Arm1	g54X	2.85	0.000	-0.518	-0.518	-0.487
Arm1	g54XY	2.85	0.000	-0.518	-0.518	-0.487
Arm1	g54Y	14.17	2.579	0.000	2.579	1.573
Arm1	g55P	19.42	3.535	0.000	3.535	1.464
Arm1	g55Y	19.42	3.535	0.000	3.535	1.464
Arm2	g56P	11.22	0.293	-2.018	-2.018	0.293
Arm2	g56Y	11.22	0.293	-2.018	-2.018	0.293

Arm4	g57P	18.99	0.000	-3.456	-3.456	-1.285
Arm4	g57Y	18.99	0.000	-3.456	-3.456	-1.285
Arm3	g58P	15.59	0.000	-2.674	-2.674	-0.318
Arm3	g58Y	15.59	0.000	-2.674	-2.674	-0.318
Arm4	g59P	28.03	0.000	-5.102	-5.102	-2.064
Arm4	g59Y	28.03	0.000	-5.102	-5.102	-2.064
Arm2	g60P	5.29	0.963	0.000	0.171	0.963
Arm2	g60Y	5.29	0.963	0.000	0.171	0.963
Arm4	g61P	15.40	0.000	-2.803	-2.803	-1.097
Arm4	g61Y	15.40	0.000	-2.803	-2.803	-1.097
ArmBr1	g62P	34.49	0.000	-3.138	-3.138	-1.014
ArmBr3	g63P	35.93	3.149	0.000	3.149	1.205
ArmBr3	g63Y	35.93	3.149	0.000	3.149	1.205
ArmBr3	g64P	49.78	4.363	0.000	4.363	1.841
ArmBr3	g64Y	49.78	4.363	0.000	4.363	1.841
ArmBr3	g65P	22.73	1.992	0.000	1.992	0.838
ArmBr3	g65Y	22.73	1.992	0.000	1.992	0.838
Arm4	g66P	28.89	0.000	-5.258	-5.258	-2.894
Arm4	g66Y	28.89	0.000	-5.258	-5.258	-2.894
Arm4	g67P	42.39	0.000	-7.715	-7.715	-3.983
Arm4	g67Y	42.39	0.000	-7.715	-7.715	-3.983
Arm4	g68P	22.55	0.000	-4.104	-4.104	-2.554
Arm4	g68Y	22.55	0.000	-4.104	-4.104	-2.554
ArmBr2	g69P	13.90	0.000	-1.265	-1.265	-0.408
ArmBr3	g70P	45.91	4.024	0.000	4.024	1.568
ArmBr3	g70Y	45.91	4.024	0.000	4.024	1.568
ArmBr3	g71P	73.90	6.478	0.000	6.478	2.657
ArmBr3	g71Y	73.90	6.478	0.000	6.478	2.657
ArmBr3	g72P	34.63	3.036	0.000	3.036	1.287
ArmBr3	g72Y	34.63	3.036	0.000	3.036	1.287
AntMast	g73P	2.49	0.000	-19.487	-19.487	-4.867
AntMast	g74P	1.61	0.000	-12.630	-12.630	-3.569
AntMast	g75P	0.93	0.000	-8.753	-8.753	-2.659
AntMast	g76P	0.72	0.000	-6.702	-6.702	-2.300
AntMast	g77P	0.54	0.000	-5.104	-5.104	-1.992
AntMast	g78P	0.41	0.000	-3.866	-3.866	-1.668
Brace1	g79P	24.52	2.962	0.000	1.119	2.962
Brace1	g79X	19.16	0.000	-2.605	-0.396	-2.605
Brace1	g79XY	19.16	0.000	-2.605	-0.396	-2.605
Brace1	g79Y	24.52	2.962	0.000	1.119	2.962
Brace1	g80P	7.58	0.000	-1.030	-0.113	-1.030
Brace1	g80X	8.58	1.037	0.000	0.390	1.037
Brace1	g80XY	8.58	1.037	0.000	0.390	1.037
Brace1	g80Y	7.58	0.000	-1.030	-0.113	-1.030
Brace1	g81P	3.75	0.000	-0.510	-0.469	-0.510
Brace1	g81X	2.05	0.189	-0.279	-0.279	0.189
Brace1	g81XY	2.05	0.189	-0.279	-0.279	0.189
Brace1	g81Y	3.75	0.000	-0.510	-0.469	-0.510
Brace1	g82P	7.70	0.931	0.000	0.666	0.931
Brace1	g82X	10.10	0.000	-1.373	-1.373	-1.314
Brace1	g82XY	10.10	0.000	-1.373	-1.373	-1.314
Brace1	g82Y	7.70	0.931	0.000	0.666	0.931
Brace2	g83P	19.71	0.000	-2.679	-0.852	-2.679
Brace2	g83X	20.51	0.000	-2.788	-1.490	-2.788
Brace2	g83XY	20.51	0.000	-2.788	-1.490	-2.788
Brace2	g83Y	19.71	0.000	-2.679	-0.852	-2.679

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

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

Joint Label	X-Displ (ft)	Y-Displ (ft)	Z-Displ (ft)	X-Rot (deg)	Y-Rot (deg)	Z-Rot (deg)	X-Pos (ft)	Y-Pos (ft)	Z-Pos (ft)
1P	-0.0002282	-0.2801	0.008001	0.3646	-0.0105	0.0001	2.5	2.22	91.01
2P	0.0002766	-0.248	0.008163	0.3587	0.0042	0.0002	2.5	2.252	86.01
3P	-0.001061	-0.2087	0.007859	0.3870	-0.0045	0.0007	2.499	2.291	80.01
4P	0.0002261	-0.1738	0.006998	0.3072	0.0136	0.0008	2.5	2.326	74.01
5P	-0.001343	-0.1447	0.006228	0.3172	-0.0032	0.0034	2.499	2.355	69.01
6P	0.0003029	-0.1206	0.005128	0.2531	-0.0029	0.0062	2.5	2.379	64.01
7P	0	0	0	0.0000	0.0000	0.0000	11.25	11.25	0
18P	1.595e-015	-0.2804	0.07104	0.3011	-0.0000	-0.0000	1.595e-015	13.47	91.07
19P	-2.532e-015	-0.2469	-0.05277	0.4351	-0.0000	-0.0000	-2.532e-015	-6.747	85.95
20P	-1.662e-015	-0.172	-0.08527	0.4883	0.0000	0.0000	-1.662e-015	-11.17	73.91
21P	-4.317e-015	-0.1203	-0.04314	0.3599	0.0000	-0.0000	-4.317e-015	-7.12	63.96
22P	3.859e-015	-0.2492	0.05428	0.2870	0.0000	-0.0000	3.859e-015	10.75	86.05
23P	4.595e-015	-0.176	0.03405	0.0251	-0.0000	-0.0000	4.595e-015	15.32	74.03
24P	1.179e-015	-0.1216	0.04202	0.2266	0.0000	-0.0000	1.179e-015	11.38	64.04
25P	-7.512e-016	-0.3232	-0.002655	0.3946	0.0000	-0.0000	-7.512e-016	-0.3232	97.25
26P	-9.514e-016	-0.2805	-0.002473	0.3840	0.0000	-0.0000	-9.514e-016	-0.2805	91
27P	-1.155e-015	-0.2477	-0.002326	0.3703	0.0000	-0.0000	-1.155e-015	-0.2477	86
28P	-2.203e-015	-0.1735	-0.001975	0.3333	0.0000	-0.0000	-2.203e-015	-0.1735	74
29P	-2.359e-015	-0.1204	-0.001701	0.2665	-0.0000	-0.0000	-2.359e-015	-0.1204	64
30P	-1.262e-015	-0.03111	-0.0009624	0.0951	-0.0000	-0.0000	-1.262e-015	-0.03111	32
31P	0	0	0	0.0000	0.0000	0.0000	0	0	0
1X	-0.0001438	-0.2805	-0.02368	0.3795	0.0017	0.0011	2.5	-2.781	90.98
1XY	0.0001438	-0.2805	-0.02368	0.3795	-0.0017	-0.0011	-2.5	-2.781	90.98
1Y	0.0002282	-0.2801	0.008001	0.3646	0.0105	-0.0001	-2.5	2.22	91.01
2X	0.000105	-0.2475	-0.02329	0.3693	-0.0149	-0.0004	2.5	-2.748	85.98
2XY	-0.000105	-0.2475	-0.02329	0.3693	0.0149	0.0004	-2.5	-2.748	85.98
2Y	-0.0002766	-0.248	0.008163	0.3587	-0.0042	-0.0002	-2.5	2.252	86.01
3X	0.001399	-0.2099	-0.02215	0.3556	0.0199	0.0111	2.501	-2.71	79.98
3XY	-0.001399	-0.2099	-0.02215	0.3556	-0.0199	-0.0111	-2.501	-2.71	79.98
3Y	0.001061	-0.2087	0.007859	0.3870	0.0045	-0.0007	-2.499	2.291	80.01
4X	0.000177	-0.1732	-0.02039	0.3221	-0.0220	0.0055	2.5	-2.673	73.98
4XY	-0.000177	-0.1732	-0.02039	0.3221	0.0220	-0.0055	-2.5	-2.673	73.98
4Y	-0.0002261	-0.1738	0.006998	0.3072	-0.0136	-0.0008	-2.5	2.326	74.01
5X	0.001436	-0.1464	-0.01889	0.3077	0.0078	0.0058	2.501	-2.646	68.98
5XY	-0.001436	-0.1464	-0.01889	0.3077	-0.0078	-0.0058	-2.501	-2.646	68.98
5Y	0.001343	-0.1447	0.006228	0.3172	0.0032	-0.0034	-2.499	2.355	69.01
6X	-0.0001266	-0.1203	-0.01695	0.2686	0.0007	0.0058	2.5	-2.62	63.98
6XY	0.0001266	-0.1203	-0.01695	0.2686	-0.0007	-0.0058	-2.5	-2.62	63.98
6Y	-0.0003029	-0.1206	0.005128	0.2531	0.0029	-0.0062	-2.5	2.379	64.01
7X	0	0	0	0.0000	0.0000	0.0000	11.25	-11.25	0
7XY	0	0	0	0.0000	0.0000	0.0000	-11.25	-11.25	0
7Y	0	0	0	0.0000	0.0000	0.0000	-11.25	11.25	0
18X	-8.201e-015	-0.281	-0.1042	0.4251	0.0000	-0.0000	-8.201e-015	-14.03	90.9
8S	-0.00133	-0.0988	0.00636	0.2273	0.0170	0.0061	3.182	3.085	59.01
9S	-0.0008422	-0.07773	0.007159	0.1778	-0.0055	-0.0032	4.003	3.926	53.01
10S	-0.0006817	-0.0592	0.00725	0.1409	0.0052	-0.0059	4.892	4.833	46.51
11S	-0.0008452	-0.03051	0.006488	0.0985	0.0051	-0.0103	6.874	6.844	32.01
12S	-0.000464	-0.001285	0.003558	0.0270	-0.0040	-0.0191	9.882	9.882	10
13S	-0.01203	-0.0008383	-0.001739	0.0307	0.0116	-0.0305	9.871	-0.0008383	9.998
14S	-1.557e-017	-0.002939	-0.0004676	0.0270	0.0000	0.0000	-1.557e-017	9.88	10

15S	-0.0001668	-0.1894	0.007399	0.3260	-0.0204	0.0008	2.5	2.311	77.01
16S	-1.286e-015	-0.1895	0.0069	0.3260	0.0000	-0.0000	-1.286e-015	2.311	77.01
17S	0.0004775	-0.1905	-0.006549	0.3230	-0.0013	-0.0032	2.5	-0.1905	76.99
8X	0.001558	-0.09945	-0.01725	0.2121	-0.0206	0.0195	3.185	-3.283	58.98
8XY	-0.001558	-0.09945	-0.01725	0.2121	0.0206	-0.0195	-3.185	-3.283	58.98
8Y	0.00133	-0.0988	0.00636	0.2273	-0.0170	-0.0061	-3.182	3.085	59.01
9X	0.001708	-0.07797	-0.01698	0.1779	0.0120	0.0329	4.006	-4.082	52.98
9XY	-0.001708	-0.07797	-0.01698	0.1779	-0.0120	-0.0329	-4.006	-4.082	52.98
9Y	0.0008422	-0.07773	0.007159	0.1778	0.0055	0.0032	-4.003	3.926	53.01
10X	0.0001464	-0.05954	-0.0162	0.1297	0.0137	0.0504	4.893	-4.952	46.48
10XY	-0.0001464	-0.05954	-0.0162	0.1297	-0.0137	-0.0504	-4.893	-4.952	46.48
10Y	0.0006817	-0.0592	0.00725	0.1409	-0.0052	0.0059	-4.892	4.833	46.51
11X	0.0001719	-0.03051	-0.0132	0.0852	0.0037	0.0917	6.875	-6.906	31.99
11XY	-0.0001719	-0.03051	-0.0132	0.0852	-0.0037	-0.0917	-6.875	-6.906	31.99
11Y	0.0008452	-0.03051	0.006488	0.0985	-0.0051	0.0103	-6.874	6.844	32.01
12X	-0.0001123	-0.0009097	-0.005354	0.0053	0.0272	0.1474	9.883	-9.884	9.995
12XY	0.0001123	-0.0009097	-0.005354	0.0053	-0.0272	-0.1474	-9.883	-9.884	9.995
12Y	0.000464	-0.001285	0.003558	0.0270	0.0040	0.0191	-9.882	9.882	10
13Y	0.01203	-0.0008383	-0.001739	0.0307	-0.0116	0.0305	-9.871	-0.0008383	9.998
14X	-1.385e-016	-0.04465	0.005867	0.0039	-0.0000	-0.0000	-1.385e-016	-9.927	10.01
15X	-0.0001348	-0.1912	-0.02131	0.3552	0.0176	0.0168	2.5	-2.691	76.98
15XY	0.0001348	-0.1912	-0.02131	0.3552	-0.0176	-0.0168	-2.5	-2.691	76.98
15Y	0.0001668	-0.1894	0.007399	0.3260	0.0204	-0.0008	-2.5	2.311	77.01
16X	-2.067e-015	-0.1931	-0.02078	0.3552	0.0000	-0.0000	-2.067e-015	-2.693	76.98
17Y	-0.0004775	-0.1905	-0.006549	0.3230	0.0013	0.0032	-2.5	-0.1905	76.99

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
7P	5.19	0.0	6.27	0.0	0.0	38.37	0.0	0.0	39.23	0.0	0.06	0.0	-0.1	0.0	0.0	0.05	0.0	0.0
31P	0.00	0.0	0.91	0.0	0.0	-21.57	0.0	0.0	21.59	0.0	-10.80	0.0	0.0	0.0	0.0	0.00	0.0	0.0
7X	-7.73	0.0	8.92	0.0	0.0	-55.77	0.0	0.0	57.00	0.0	0.18	0.0	0.1	0.0	0.0	-0.34	0.0	0.0
7XY	7.73	0.0	8.92	0.0	0.0	-55.77	0.0	0.0	57.00	0.0	0.18	0.0	-0.1	0.0	0.0	0.34	0.0	0.0
7Y	-5.19	0.0	6.27	0.0	0.0	38.37	0.0	0.0	39.23	0.0	0.06	0.0	0.1	0.0	0.0	-0.05	0.0	0.0

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

Joint Label	X External Load (kips)	Y External Load (kips)	Z External Load (kips)	X Member Force (kips)	Y Member Force (kips)	Z Member Force (kips)	X Disp. (ft)	Y Disp. (ft)	Z Disp. (ft)
1P	0.0000	0.0000	-0.1399	-0.0000	-0.0000	0.1399	-0.0002	-0.2801	0.0080
2P	0.0000	0.0000	-0.2143	-0.0000	-0.0000	0.2143	0.0003	-0.2480	0.0082
3P	0.0000	0.0000	-0.1224	-0.0000	-0.0000	0.1224	-0.0011	-0.2087	0.0079
4P	0.0000	0.0000	-0.2301	-0.0000	-0.0000	0.2301	0.0002	-0.1738	0.0070
5P	0.0000	0.0000	-0.1850	-0.0000	-0.0000	0.1850	-0.0013	-0.1447	0.0062
6P	0.0000	0.0000	-0.2495	-0.0000	-0.0000	0.2495	0.0003	-0.1206	0.0051
7P	0.0000	0.0000	-0.2153	-5.1858	-6.2750	38.5877	0.0000	0.0000	0.0000
18P	0.0000	-1.6140	-1.1255	0.0000	1.6140	1.1255	0.0000	-0.2804	0.0710
19P	0.0000	-2.8037	-2.8428	-0.0000	2.8037	2.8428	-0.0000	-0.2469	-0.0528
20P	0.0000	-2.7784	-2.8429	-0.0000	2.7784	2.8429	-0.0000	-0.1720	-0.0853
21P	0.0000	-2.7831	-2.8198	0.0000	2.7831	2.8198	-0.0000	-0.1203	-0.0431
22P	0.0000	-2.7390	-2.8968	-0.0000	2.7390	2.8968	0.0000	-0.2492	0.0543
23P	0.0000	-2.7390	-2.9310	0.0000	2.7390	2.9310	0.0000	-0.1760	0.0340
24P	0.0000	-2.7390	-2.8884	-0.0000	2.7390	2.8884	0.0000	-0.1216	0.0420

25P	0.0000	-1.2775	-3.8748	-0.0000	1.2775	3.8748	-0.0000	-0.3232	-0.0027
26P	0.0000	-0.1975	-1.2367	0.0000	0.1975	1.2367	-0.0000	-0.2805	-0.0025
27P	0.0000	-0.3220	-1.5988	-0.0000	0.3220	1.5988	-0.0000	-0.2477	-0.0023
28P	0.0000	-0.5590	-2.0560	0.0000	0.5590	2.0560	-0.0000	-0.1735	-0.0020
29P	0.0000	-1.0670	-3.8829	-0.0000	1.0670	3.8829	-0.0000	-0.1204	-0.0017
30P	0.0000	-1.7340	-6.8613	-0.0000	1.7340	6.8613	-0.0000	-0.0311	-0.0010
31P	0.0000	-0.7040	-2.0878	-0.0000	-0.2096	-19.4870	0.0000	0.0000	0.0000
1X	0.0000	-0.0683	-0.1360	-0.0000	0.0683	0.1360	-0.0001	-0.2805	-0.0237
1XY	0.0000	-0.0683	-0.1360	0.0000	0.0683	0.1360	0.0001	-0.2805	-0.0237
1Y	0.0000	0.0000	-0.1399	0.0000	-0.0000	0.1399	0.0002	-0.2801	0.0080
2X	0.0000	-0.1183	-0.1852	-0.0000	0.1183	0.1852	0.0001	-0.2475	-0.0233
2XY	0.0000	-0.1183	-0.1852	0.0000	0.1183	0.1852	-0.0001	-0.2475	-0.0233
2Y	0.0000	0.0000	-0.2143	0.0000	-0.0000	0.2143	-0.0003	-0.2480	0.0082
3X	0.0000	-0.0978	-0.1224	-0.0000	0.0978	0.1224	0.0014	-0.2099	-0.0222
3XY	0.0000	-0.0978	-0.1224	0.0000	0.0978	0.1224	-0.0014	-0.2099	-0.0222
3Y	0.0000	0.0000	-0.1224	0.0000	-0.0000	0.1224	0.0011	-0.2087	0.0079
4X	0.0000	-0.1065	-0.1910	-0.0000	0.1065	0.1910	0.0002	-0.1732	-0.0204
4XY	0.0000	-0.1065	-0.1910	0.0000	0.1065	0.1910	-0.0002	-0.1732	-0.0204
4Y	0.0000	0.0000	-0.2301	0.0000	-0.0000	0.2301	-0.0002	-0.1738	0.0070
5X	0.0000	-0.1405	-0.1809	0.0000	0.1405	0.1809	0.0014	-0.1464	-0.0189
5XY	0.0000	-0.1405	-0.1809	-0.0000	0.1405	0.1809	-0.0014	-0.1464	-0.0189
5Y	0.0000	0.0000	-0.1850	0.0000	-0.0000	0.1850	0.0013	-0.1447	0.0062
6X	0.0000	-0.1329	-0.2193	-0.0000	0.1329	0.2193	-0.0001	-0.1203	-0.0169
6XY	0.0000	-0.1329	-0.2193	0.0000	0.1329	0.2193	0.0001	-0.1203	-0.0169
6Y	0.0000	0.0000	-0.2495	0.0000	-0.0000	0.2495	-0.0003	-0.1206	0.0051
7X	0.0000	-0.1418	-0.2153	7.7336	-8.7820	-55.5515	0.0000	0.0000	0.0000
7XY	0.0000	-0.1418	-0.2153	-7.7336	-8.7820	-55.5515	0.0000	0.0000	0.0000
7Y	0.0000	0.0000	-0.2153	5.1858	-6.2750	38.5877	0.0000	0.0000	0.0000
18X	0.0000	-2.4392	-1.8054	0.0000	2.4392	1.8054	-0.0000	-0.2810	-0.1042
8S	0.0000	0.0000	-0.1731	-0.0000	-0.0000	0.1731	-0.0013	-0.0988	0.0064
9S	0.0000	0.0000	-0.2022	-0.0000	-0.0000	0.2022	-0.0008	-0.0777	0.0072
10S	0.0000	0.0000	-0.3869	-0.0000	-0.0000	0.3869	-0.0007	-0.0592	0.0073
11S	0.0000	0.0000	-0.7308	-0.0000	-0.0000	0.7308	-0.0008	-0.0305	0.0065
12S	0.0000	0.0000	-0.5405	-0.0000	0.0000	0.5405	-0.0005	-0.0013	0.0036
13S	0.0000	0.0000	-0.2069	-0.0000	-0.0000	0.2069	-0.0120	-0.0008	-0.0017
14S	0.0000	0.0000	-0.2069	-0.0000	0.0000	0.2069	-0.0000	-0.0029	-0.0005
15S	0.0000	0.0000	-0.0543	0.0000	-0.0000	0.0543	-0.0002	-0.1894	0.0074
16S	0.0000	0.0000	-0.0588	-0.0000	-0.0000	0.0588	-0.0000	-0.1895	0.0069
17S	0.0000	0.0000	-0.0563	0.0000	-0.0000	0.0563	0.0005	-0.1905	-0.0065
8X	0.0000	-0.1345	-0.1731	0.0000	0.1345	0.1731	0.0016	-0.0994	-0.0173
8XY	0.0000	-0.1345	-0.1731	-0.0000	0.1345	0.1731	-0.0016	-0.0994	-0.0173
8Y	0.0000	0.0000	-0.1731	0.0000	-0.0000	0.1731	0.0013	-0.0988	0.0064
9X	0.0000	-0.1568	-0.2022	0.0000	0.1568	0.2022	0.0017	-0.0780	-0.0170
9XY	0.0000	-0.1568	-0.2022	-0.0000	0.1568	0.2022	-0.0017	-0.0780	-0.0170
9Y	0.0000	0.0000	-0.2022	0.0000	-0.0000	0.2022	0.0008	-0.0777	0.0072
10X	0.0000	-0.2686	-0.3869	0.0000	0.2686	0.3869	0.0001	-0.0595	-0.0162
10XY	0.0000	-0.2686	-0.3869	-0.0000	0.2686	0.3869	-0.0001	-0.0595	-0.0162
10Y	0.0000	0.0000	-0.3869	0.0000	-0.0000	0.3869	0.0007	-0.0592	0.0073
11X	0.0000	-0.4564	-0.7308	0.0000	0.4564	0.7308	0.0002	-0.0305	-0.0132
11XY	0.0000	-0.4564	-0.7308	-0.0000	0.4564	0.7308	-0.0002	-0.0305	-0.0132
11Y	0.0000	0.0000	-0.7308	0.0000	-0.0000	0.7308	0.0008	-0.0305	0.0065
12X	0.0000	-0.3715	-0.5405	0.0000	0.3715	0.5405	-0.0001	-0.0009	-0.0054
12XY	0.0000	-0.3715	-0.5405	-0.0000	0.3715	0.5405	0.0001	-0.0009	-0.0054
12Y	0.0000	0.0000	-0.5405	0.0000	0.0000	0.5405	0.0005	-0.0013	0.0036
13Y	0.0000	0.0000	-0.2069	0.0000	-0.0000	0.2069	0.0120	-0.0008	-0.0017
14X	0.0000	-0.2536	-0.2069	0.0000	0.2536	0.2069	-0.0000	-0.0447	0.0059
15X	0.0000	-0.0484	-0.0494	0.0000	0.0484	0.0494	-0.0001	-0.1912	-0.0213
15XY	0.0000	-0.0484	-0.0494	-0.0000	0.0484	0.0494	0.0001	-0.1912	-0.0213
15Y	0.0000	0.0000	-0.0543	-0.0000	-0.0000	0.0543	0.0002	-0.1894	0.0074
16X	0.0000	-0.0765	-0.0588	0.0000	0.0765	0.0588	-0.0000	-0.1931	-0.0208

17Y	0.0000	0.0000	-0.0563	-0.0000	-0.0000	0.0563	-0.0005	-0.1905	-0.0065

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

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R Cap. (kips)	Original Supported RLX	Original Supported RLY	Original Supported RLZ	Original Supported L/R	Original Supported KL/R	Original Supported Curve No.	Alternate Unsupported L/R Cap. (kips)	Alternate Unsupported RLOUT	Alternate Unsupported L/R	Alternate Unsupported KL/R	Alternate Unsupported Curve No.
g14P	g14Y	Short only	-0.02	-0.02	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g14X	g14XY	Short only	-0.58	-0.58	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g14XY	g14X	Short only	-0.58	-0.58	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g14Y	g14P	Short only	-0.02	-0.02	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g16P	g16Y	Long only	-0.75	-0.75	22.45	0.500	0.750	0.500	122.46	121.91	5	15.84	1.000	163.28	146.62	6
g16Y	g16P	Long only	-0.75	-0.75	22.45	0.500	0.750	0.500	122.46	121.91	5	15.84	1.000	163.28	146.62	6
g22P	g22Y	Long only	-0.90	-0.90	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g22Y	g22P	Long only	-0.90	-0.90	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g24X	g24XY	Long only	-1.95	-1.95	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g24XY	g24X	Long only	-1.95	-1.95	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g26X	g26XY	Short only	-1.96	-1.96	19.79	0.781	0.563	0.563	103.74	107.80	2	17.69	1.000	117.23	118.62	3
g26XY	g26X	Short only	-1.96	-1.96	19.79	0.781	0.563	0.563	103.74	107.80	2	17.69	1.000	117.23	118.62	3
g28P	g28Y	Short only	-0.86	-0.86	16.29	0.779	0.557	0.557	126.91	125.30	5	14.09	1.000	144.97	135.35	6
g28Y	g28P	Short only	-0.86	-0.86	16.29	0.779	0.557	0.557	126.91	125.30	5	14.09	1.000	144.97	135.35	6
g30X	g30XY	Short only	-1.03	-1.03	13.00	0.775	0.550	0.550	147.38	140.91	5	11.31	1.000	170.50	151.06	6
g30XY	g30X	Short only	-1.03	-1.03	13.00	0.775	0.550	0.550	147.38	140.91	5	11.31	1.000	170.50	151.06	6

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	1.968	50.00	50.00	3.94
2	3.035	50.00	50.00	6.07
3	3.993	50.00	50.00	7.99
4	3.975	50.00	50.00	7.95
5	3.962	50.00	50.00	7.92
6	3.987	50.00	50.00	7.97
7	4.012	50.00	50.00	8.02
8	3.981	50.00	50.00	7.96
9	0.122	50.00	50.00	0.24
10	0.185	50.00	50.00	0.37
11	0.173	50.00	50.00	0.35
12	0.387	50.00	50.00	0.77
13	0.731	50.00	50.00	1.46
14	0.540	50.00	50.00	1.08
15	0.152	50.00	50.00	0.30
16	0.140	50.00	50.00	0.28
17	0.157	50.00	50.00	0.31
18	4.080	50.00	50.00	8.16
19	1.252	50.00	50.00	2.50
20	1.631	50.00	50.00	3.26
21	2.131	50.00	50.00	4.26
22	4.027	50.00	50.00	8.05
23	7.077	50.00	50.00	14.15

*** 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	-0.0003411	-0.4047	0.01592	0.5413	-0.0152	0.0030	2.5	2.095	91.02
2P	0.0002646	-0.3571	0.01599	0.5292	0.0128	0.0016	2.5	2.143	86.02
3P	-0.001852	-0.3016	0.01519	0.5303	-0.0136	0.0246	2.498	2.198	80.02
4P	0.0001166	-0.2506	0.0136	0.4521	0.0238	0.0113	2.5	2.249	74.01
5P	-0.002026	-0.2105	0.01217	0.4422	-0.0072	0.0146	2.498	2.289	69.01
6P	0.0003456	-0.1754	0.01021	0.3621	-0.0023	0.0181	2.5	2.325	64.01
7P	0	0	0	0.0000	0.0000	0.0000	11.25	11.25	0
18P	-1.12e-014	-0.4053	0.1189	0.5180	0.0000	-0.0000	-1.12e-014	13.34	91.12
19P	-6.669e-015	-0.3567	-0.06871	0.5669	0.0000	0.0000	-6.669e-015	-6.857	85.93
20P	-5.675e-015	-0.2498	-0.102	0.5381	0.0000	0.0000	-5.675e-015	-11.25	73.9
21P	-3.37e-015	-0.1755	-0.05491	0.4605	0.0000	0.0000	-3.37e-015	-7.175	63.95
22P	-1.03e-014	-0.3581	0.09331	0.5152	0.0000	0.0000	-1.03e-014	10.64	86.09
23P	-1.768e-014	-0.252	0.1008	0.3480	-0.0000	0.0000	-1.768e-014	15.25	74.1
24P	-7.15e-015	-0.1762	0.0711	0.4004	0.0000	0.0000	-7.15e-015	11.32	64.07
25P	-8.778e-015	-0.4719	-0.002165	0.6207	0.0000	0.0000	-8.778e-015	-0.4719	97.25
26P	-8.988e-015	-0.4054	-0.001796	0.5840	0.0000	0.0000	-8.988e-015	-0.4054	91
27P	-9.042e-015	-0.3566	-0.001542	0.5412	-0.0000	0.0000	-9.042e-015	-0.3566	86
28P	-7.242e-015	-0.2504	-0.00103	0.4717	-0.0000	0.0000	-7.242e-015	-0.2504	74
29P	-6.036e-015	-0.1752	-0.0007072	0.3790	-0.0000	0.0000	-6.036e-015	-0.1752	64
30P	-3.494e-015	-0.04476	-0.0002679	0.1406	-0.0000	0.0000	-3.494e-015	-0.04476	32
31P	0	0	0	0.0000	0.0000	0.0000	0	0	0
1X	0.0001893	-0.4047	-0.0299	0.5475	0.0117	0.0045	2.5	-2.905	90.97
1XY	-0.0001893	-0.4047	-0.0299	0.5475	-0.0117	-0.0045	-2.5	-2.905	90.97
1Y	0.0003411	-0.4047	0.01592	0.5413	0.0152	-0.0030	-2.5	2.095	91.02
2X	-0.0001432	-0.3568	-0.02936	0.5321	-0.0170	0.0026	2.5	-2.857	85.97
2XY	0.0001432	-0.3568	-0.02936	0.5321	0.0170	-0.0026	-2.5	-2.857	85.97
2Y	-0.0002646	-0.3571	0.01599	0.5292	-0.0128	-0.0016	-2.5	2.143	86.02
3X	0.002038	-0.302	-0.02781	0.5179	0.0234	0.0260	2.502	-2.802	79.97
3XY	-0.002038	-0.302	-0.02781	0.5179	-0.0234	-0.0260	-2.502	-2.802	79.97
3Y	0.001852	-0.3016	0.01519	0.5303	0.0136	-0.0246	-2.498	2.198	80.02
4X	3.796e-005	-0.2502	-0.02544	0.4576	-0.0309	0.0112	2.5	-2.75	73.97
4XY	-3.796e-005	-0.2502	-0.02544	0.4576	0.0309	-0.0112	-2.5	-2.75	73.97
4Y	-0.0001166	-0.2506	0.0136	0.4521	-0.0238	-0.0113	-2.5	2.249	74.01
5X	0.002152	-0.2112	-0.0234	0.4380	0.0094	0.0124	2.502	-2.711	68.98
5XY	-0.002152	-0.2112	-0.0234	0.4380	-0.0094	-0.0124	-2.502	-2.711	68.98
5Y	0.002026	-0.2105	0.01217	0.4422	0.0072	-0.0146	-2.498	2.289	69.01
6X	-0.0002977	-0.1752	-0.02083	0.3706	0.0040	0.0134	2.5	-2.675	63.98
6XY	0.0002977	-0.1752	-0.02083	0.3706	-0.0040	-0.0134	-2.5	-2.675	63.98
6Y	-0.0003456	-0.1754	0.01021	0.3621	0.0023	-0.0181	-2.5	2.325	64.01
7X	0	0	0	0.0000	0.0000	0.0000	11.25	-11.25	0
7XY	0	0	0	0.0000	0.0000	0.0000	-11.25	-11.25	0
7Y	0	0	0	0.0000	0.0000	0.0000	-11.25	11.25	0
18X	-7.081e-015	-0.4046	-0.1394	0.5643	0.0000	0.0000	-7.081e-015	-14.15	90.86
8S	-0.002088	-0.1459	0.01138	0.3018	0.0208	0.0482	3.182	3.038	59.01
9S	-0.001386	-0.1163	0.0121	0.2331	-0.0185	0.0751	4.003	3.888	53.01
10S	-0.001021	-0.09159	0.01163	0.1811	-0.0109	0.1145	4.892	4.801	46.51
11S	-0.001121	-0.0444	0.01121	0.1330	-0.0170	0.1932	6.874	6.831	32.01
12S	-0.001412	-0.002502	0.005617	0.0057	-0.0648	0.2999	9.881	9.88	10.01
13S	-0.006166	-0.001682	-0.0009918	0.0523	-0.0098	-0.1328	9.877	-0.001682	9.999
14S	-4.008e-017	-0.1167	-0.01671	0.0121	0.0000	-0.0000	-4.008e-017	9.766	9.983

15S	-8.708e-005	-0.2746	0.01439	0.4853	-0.0314	0.0360	2.5	2.225	77.01
16S	-8.35e-015	-0.2786	0.01355	0.4851	0.0000	0.0000	-8.35e-015	2.221	77.01
17S	0.003058	-0.2749	-0.005957	0.4595	-0.0008	-0.0153	2.503	-0.2749	76.99
8X	0.002126	-0.1459	-0.02144	0.2931	-0.0271	0.0369	3.186	-3.33	58.98
8XY	-0.002126	-0.1459	-0.02144	0.2931	0.0271	-0.0369	-3.186	-3.33	58.98
8Y	0.002088	-0.1459	0.01138	0.3018	-0.0208	-0.0482	-3.182	3.038	59.01
9X	0.002175	-0.117	-0.0212	0.2392	0.0196	0.0595	4.006	-4.121	52.98
9XY	-0.002175	-0.117	-0.0212	0.2392	-0.0196	-0.0595	-4.006	-4.121	52.98
9Y	0.001386	-0.1163	0.0121	0.2331	0.0185	-0.0751	-4.003	3.888	53.01
10X	0.0002054	-0.09064	-0.02047	0.1965	0.0202	0.0927	4.893	-4.983	46.48
10XY	-0.0002054	-0.09064	-0.02047	0.1965	-0.0202	-0.0927	-4.893	-4.983	46.48
10Y	0.001021	-0.09159	0.01163	0.1811	0.0109	-0.1145	-4.892	4.801	46.51
11X	0.0003473	-0.04361	-0.01713	0.1326	0.0100	0.1595	6.875	-6.919	31.98
11XY	-0.0003473	-0.04361	-0.01713	0.1326	-0.0100	-0.1595	-6.875	-6.919	31.98
11Y	0.001121	-0.0444	0.01121	0.1330	0.0170	-0.1932	-6.874	6.831	32.01
12X	-0.0003703	-0.001801	-0.007042	0.0050	0.0447	0.2500	9.882	-9.885	9.993
12XY	0.0003703	-0.001801	-0.007042	0.0050	-0.0447	-0.2500	-9.882	-9.885	9.993
12Y	0.001412	-0.002502	0.005617	0.0057	0.0648	-0.2999	-9.881	9.88	10.01
13Y	0.006166	-0.001682	-0.0009918	0.0523	0.0098	0.1328	-9.877	-0.001682	9.999
14X	1.626e-017	-0.08586	0.01113	0.0007	-0.0000	-0.0000	1.626e-017	-9.969	10.01
15X	-4.04e-005	-0.2752	-0.02663	0.4973	0.0290	0.0376	2.5	-2.775	76.97
15XY	4.04e-005	-0.2752	-0.02663	0.4973	-0.0290	-0.0376	-2.5	-2.775	76.97
15Y	8.708e-005	-0.2746	0.01439	0.4853	0.0314	-0.0360	-2.5	2.225	77.01
16X	-6.797e-015	-0.2794	-0.02582	0.4975	0.0000	0.0000	-6.797e-015	-2.779	76.97
17Y	-0.003058	-0.2749	-0.005957	0.4595	0.0008	0.0153	-2.503	-0.2749	76.99

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	8.52	0.0	11.16	0.0	0.0	62.65	0.0	0.0	64.20	0.0	0.20	0.0	0.0	0.0	0.0	-0.69	0.0	0.0
31P	0.00	0.0	0.76	0.0	0.0	-5.22	0.0	0.0	5.28	0.0	-14.98	0.0	0.0	0.0	0.0	-0.00	0.0	0.0
7X	-10.42	0.0	13.05	0.0	0.0	-74.82	0.0	0.0	76.66	0.0	0.23	0.0	0.1	0.0	0.0	-0.58	0.0	0.0
7XY	10.42	0.0	13.05	0.0	0.0	-74.82	0.0	0.0	76.66	0.0	0.23	0.0	-0.1	0.0	0.0	0.58	0.0	0.0
7Y	-8.52	0.0	11.16	0.0	0.0	62.65	0.0	0.0	64.20	0.0	0.20	0.0	-0.0	0.0	0.0	0.69	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	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0003	-0.4047	0.0159
2P	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0003	-0.3571	0.0160
3P	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0019	-0.3016	0.0152
4P	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0001	-0.2506	0.0136
5P	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0020	-0.2105	0.0122
6P	0.0000	-0.6689	-0.5000	-0.0000	0.6689	0.5000	0.0003	-0.1754	0.0102
7P	0.0000	-0.4950	-0.3555	-8.5188	-10.6619	63.0066	0.0000	0.0000	0.0000
18P	0.0000	-1.1429	-0.3705	-0.0000	1.1429	0.3705	-0.0000	-0.4053	0.1189
19P	0.0000	-2.7249	-1.2165	-0.0000	2.7249	1.2165	-0.0000	-0.3567	-0.0687
20P	0.0000	-2.7249	-1.2165	0.0000	2.7249	1.2165	-0.0000	-0.2498	-0.1020
21P	0.0000	-2.7249	-1.2165	-0.0000	2.7249	1.2165	-0.0000	-0.1755	-0.0549
22P	0.0000	-2.7249	-1.2165	0.0000	2.7249	1.2165	-0.0000	-0.3581	0.0933
23P	0.0000	-2.7249	-1.2165	0.0000	2.7249	1.2165	-0.0000	-0.2520	0.1008
24P	0.0000	-2.7249	-1.2165	-0.0000	2.7249	1.2165	-0.0000	-0.1762	0.0711

25P	0.0000	-4.4999	-1.7155	-0.0000	4.4999	1.7155	-0.0000	-0.4719	-0.0022
26P	0.0000	-0.2969	-0.3175	-0.0000	0.2969	0.3175	-0.0000	-0.4054	-0.0018
27P	0.0000	-0.2939	-0.3125	0.0000	0.2939	0.3125	-0.0000	-0.3566	-0.0015
28P	0.0000	-0.3289	-0.3625	-0.0000	0.3289	0.3625	-0.0000	-0.2504	-0.0010
29P	0.0000	-0.9649	-0.9160	0.0000	0.9649	0.9160	-0.0000	-0.1752	-0.0007
30P	0.0000	-1.1720	-1.3055	0.0000	1.1720	1.3055	-0.0000	-0.0448	-0.0003
31P	0.0000	-0.4950	-0.3555	-0.0000	-0.2691	-4.8679	0.0000	0.0000	0.0000
1X	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0002	-0.4047	-0.0299
1XY	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0002	-0.4047	-0.0299
1Y	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	0.0003	-0.4047	0.0159
2X	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0001	-0.3568	-0.0294
2XY	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	0.0001	-0.3568	-0.0294
2Y	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0003	-0.3571	0.0160
3X	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0020	-0.3020	-0.0278
3XY	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0020	-0.3020	-0.0278
3Y	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	0.0019	-0.3016	0.0152
4X	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0000	-0.2502	-0.0254
4XY	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0000	-0.2502	-0.0254
4Y	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0001	-0.2506	0.0136
5X	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0022	-0.2112	-0.0234
5XY	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0022	-0.2112	-0.0234
5Y	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	0.0020	-0.2105	0.0122
6X	0.0000	-0.6689	-0.5000	-0.0000	0.6689	0.5000	-0.0003	-0.1752	-0.0208
6XY	0.0000	-0.6689	-0.5000	0.0000	0.6689	0.5000	0.0003	-0.1752	-0.0208
6Y	0.0000	-0.6689	-0.5000	0.0000	0.6689	0.5000	-0.0003	-0.1754	0.0102
7X	0.0000	-0.4950	-0.3555	10.4178	-12.5561	-74.4617	0.0000	0.0000	0.0000
7XY	0.0000	-0.4950	-0.3555	-10.4178	-12.5561	-74.4617	0.0000	0.0000	0.0000
7Y	0.0000	-0.4950	-0.3555	8.5188	-10.6619	63.0066	0.0000	0.0000	0.0000
18X	0.0000	-2.2309	-0.5995	0.0000	2.2309	0.5995	-0.0000	-0.4046	-0.1394
8S	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0021	-0.1459	0.0114
9S	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0014	-0.1163	0.0121
10S	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0010	-0.0916	0.0116
11S	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	-0.0011	-0.0444	0.0112
12S	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0014	-0.0025	0.0056
13S	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0062	-0.0017	-0.0010
14S	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	-0.0000	-0.1167	-0.0167
15S	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0001	-0.2746	0.0144
16S	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0000	-0.2786	0.0136
17S	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	0.0031	-0.2749	-0.0060
8X	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0021	-0.1459	-0.0214
8XY	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0021	-0.1459	-0.0214
8Y	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0021	-0.1459	0.0114
9X	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	0.0022	-0.1170	-0.0212
9XY	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	-0.0022	-0.1170	-0.0212
9Y	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0014	-0.1163	0.0121
10X	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0002	-0.0906	-0.0205
10XY	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	-0.0002	-0.0906	-0.0205
10Y	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0010	-0.0916	0.0116
11X	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	0.0003	-0.0436	-0.0171
11XY	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	-0.0003	-0.0436	-0.0171
11Y	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	0.0011	-0.0444	0.0112
12X	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	-0.0004	-0.0018	-0.0070
12XY	0.0000	-0.4950	-0.3555	0.0000	0.4950	0.3555	0.0004	-0.0018	-0.0070
12Y	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0014	-0.0025	0.0056
13Y	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0062	-0.0017	-0.0010
14X	0.0000	-0.4950	-0.3555	-0.0000	0.4950	0.3555	0.0000	-0.0859	0.0111
15X	0.0000	-0.1739	-0.1445	0.0000	0.1739	0.1445	-0.0000	-0.2752	-0.0266
15XY	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0000	-0.2752	-0.0266
15Y	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	0.0001	-0.2746	0.0144
16X	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0000	-0.2794	-0.0258

17Y	0.0000	-0.1739	-0.1445	-0.0000	0.1739	0.1445	-0.0031	-0.2749	-0.0060

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

Comp. Member Label	Tens. Member Label	Connect Leg for Comp. Member	Force In Comp. Member (kips)	Force In Tens. Member (kips)	Original Supported L/R Cap. (kips)	RLX	RLY	RLZ	L/R	KL/R	Curve No.	Alternate Unsupported L/R Cap. (kips)	RLOUT	L/R	KL/R	Curve No.
g14X	g14XY	Short only	-0.47	-0.47	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g14XY	g14X	Short only	-0.47	-0.47	11.56	0.750	0.500	0.500	123.69	122.85	5	8.63	1.000	158.01	143.38	6
g16P	g16Y	Long only	-0.94	-0.94	22.45	0.500	0.750	0.500	122.46	121.91	5	15.84	1.000	163.28	146.62	6
g16Y	g16P	Long only	-0.94	-0.94	22.45	0.500	0.750	0.500	122.46	121.91	5	15.84	1.000	163.28	146.62	6
g22P	g22Y	Long only	-1.08	-1.08	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g22Y	g22P	Long only	-1.08	-1.08	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g24X	g24XY	Long only	-2.01	-2.01	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g24XY	g24X	Long only	-2.01	-2.01	24.78	0.500	0.750	0.500	110.87	113.15	2	18.12	1.000	147.83	137.11	6
g26X	g26XY	Short only	-2.79	-2.79	19.79	0.781	0.563	0.563	103.74	107.80	2	17.69	1.000	117.23	118.62	3
g26XY	g26X	Short only	-2.79	-2.79	19.79	0.781	0.563	0.563	103.74	107.80	2	17.69	1.000	117.23	118.62	3
g28P	g28Y	Short only	-1.34	-1.34	16.29	0.779	0.557	0.557	126.91	125.30	5	14.09	1.000	144.97	135.35	6
g28Y	g28P	Short only	-1.34	-1.34	16.29	0.779	0.557	0.557	126.91	125.30	5	14.09	1.000	144.97	135.35	6
g30X	g30XY	Short only	-1.42	-1.42	13.00	0.775	0.550	0.550	147.38	140.91	5	11.31	1.000	170.50	151.06	6
g30XY	g30X	Short only	-1.42	-1.42	13.00	0.775	0.550	0.550	147.38	140.91	5	11.31	1.000	170.50	151.06	6

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
1	1.201	50.00	50.00	2.40
2	2.310	50.00	50.00	4.62
3	2.984	50.00	50.00	5.97
4	2.984	50.00	50.00	5.97
5	2.984	50.00	50.00	5.97
6	2.984	50.00	50.00	5.97
7	2.984	50.00	50.00	5.97
8	2.984	50.00	50.00	5.97
9	0.226	50.00	50.00	0.45
10	0.226	50.00	50.00	0.45
11	0.609	50.00	50.00	1.22
12	0.609	50.00	50.00	1.22
13	0.609	50.00	50.00	1.22
14	0.609	50.00	50.00	1.22
15	0.226	50.00	50.00	0.45
16	0.226	50.00	50.00	0.45
17	0.226	50.00	50.00	0.45
18	4.816	50.00	50.00	9.63
19	0.435	50.00	50.00	0.87
20	0.429	50.00	50.00	0.86
21	0.490	50.00	50.00	0.98
22	1.330	50.00	50.00	2.66
23	1.754	50.00	50.00	3.51

*** 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 Use In Comp. %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/R Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/R Comp.	KL/R Comp.	Length Comp. Member (ft)	Curve No.	No. Of Bolts
Leg1	Leg1	SAE	4X4X0.25	33.0	35.60	Tens	33.96	g4X	-20.454	NESC Ext	60.236	91.000	140.625	1.000	1.000	1.000	45.28	45.28	3.000	1	10
Leg2	Leg2	SAE	5X5X0.3125	33.0	72.66	Comp	72.66	g9XY	-59.276	NESC Ext	81.579	109.200	210.937	1.000	1.000	1.000	79.92	79.92	6.620	1	12
Leg3	Leg3	SAE	5X5X0.375	33.0	79.94	Comp	79.94	g11X	-72.777	NESC Ext	91.040	127.400	295.312	0.333	0.333	0.333	90.44	90.44	22.407	1	14
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	34.83	Comp	34.83	g13P	-4.025	NESC Ext	11.559	18.200	21.094	0.750	0.500	0.500	123.69	122.85	7.071	5	2
XBrace2	XBrace2	SAU	3X2X0.25	33.0	30.93	Tens	29.86	g21P	-7.399	NESC Ext	24.777	36.400	56.250	0.500	0.750	0.500	110.87	113.15	7.071	2	4
XBrace3	XBrace3	SAE	2.5X2.5X0.1875	33.0	23.18	Comp	23.18	g29P	-3.014	NESC Ext	13.003	18.200	21.094	0.775	0.550	0.550	147.38	140.91	11.054	5	2
XBrace4	XBrace4	SAE	2X2X0.25	33.0	83.44	Comp	83.44	g31P	-2.995	NESC Hea	3.590	27.300	42.187	1.000	0.585	0.585	370.03	273.77	18.779	6	3
XBrace5	XBrace5	SAE	2.5X2.5X0.1875	33.0	34.43	Tens	0.00	g34Y	0.000		2.685	27.300	31.641	1.000	0.410	0.410	429.08	310.08	27.819	6	3
XBrace6	XBrace6	SAU	3.5X2.5X0.25	33.0	40.97	Comp	40.97	g35X	-3.728	NESC Ext	14.832	9.100	14.062	1.000	0.500	0.500	166.70	166.70	15.114	4	1
XBrace7	XBrace7	SAU	3X2X0.25	33.0	40.10	Comp	40.10	g18X	-6.353	NESC Ext	15.844	27.300	42.187	1.000	2.000	1.000	163.28	146.62	3.905	6	3
Horz1	Horizontal 1	SAE	1.75X1.75X0.1875	33.0	32.69	Comp	32.69	g37P	-2.453	NESC Ext	7.504	18.200	21.094	1.000	1.000	1.000	174.93	153.78	5.000	6	2
Horz2	Horizontal 2	SAU	2.5X2X0.1875	33.0	39.83	Comp	39.83	g41P	-4.900	NESC Ext	12.304	18.200	21.094	1.000	0.500	0.500	148.07	137.26	9.785	6	2
Horz3	Horizontal 3	SAU	3X2.5X0.25	33.0	38.97	Comp	38.97	g43P	-6.195	NESC Ext	15.896	18.200	28.125	1.000	0.500	0.500	174.60	153.58	13.750	6	2
Horz4	**Horizontal 4**	**SAU**	**4X3X0.25**	**33.0**	**22.25**	**Comp**	**22.25**	**g46P**	**-4.050**	**NESC Ext**	**18.857**	**18.200**	**28.125**	**2.000**	**1.000**	**1.000**	**185.30**	**160.16**	**9.883**	**6**	**2**

A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45P g45X g45XY g45Y ??

Group Label	Group Desc.	Angle Type	Angle Size	Steel Strength (ksi)	Max Usage %	Usage Control	Max Use In Comp. %	Comp. Control Member	Comp. Force (kips)	Comp. Control Load Case	L/R Capacity (kips)	Comp. Connect. Shear Capacity (kips)	Comp. Connect. Bearing Capacity (kips)	RLX	RLY	RLZ	L/R Comp.	KL/R Comp.	Length Comp. Member (ft)	Curve No.	No. Of Bolts
Horz5	Horizontal 5	Bar	1.75x1/4	33.0	65.73	Tens	0.00	g48Y	0.000		0.129	9.100	14.062	1.000	2.000	1.000	983.61	983.61	2.500	4	1
Horz6	Horizontal 6	SAE	1.75X1.75X0.1875	33.0	13.18	Comp	13.18	g47P	-1.199	NESC Hea	12.543	9.100	10.547	2.000	1.000	1.000	111.73	115.87	2.500	3	1
Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.000	0	0
Inner2	Inner2	SAU	2.5X2X0.1875	33.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.000	0	0

Arm1	Ground Wire Arm	SAU	3X2.5X0.25	33.0	19.42	Tens	2.85	g54XY	-0.518	NESC Hea	19.099	18.200	28.125	1.000	0.500	0.500	146.34	140.11	11.524	5	2
Arm2	Arm 2	SAE	2.5X2.5X0.1875	33.0	11.22	Comp	11.22	g56P	-2.018	NESC Hea	17.986	18.200	21.094	1.000	1.000	1.000	114.35	117.18	4.717	3	2
Arm3	Arm 3	SAU	3X2X0.1875	33.0	15.59	Comp	15.59	g58P	-2.674	NESC Hea	17.147	27.300	31.641	1.000	0.500	0.500	121.09	121.09	8.860	4	3
Arm4	Arm 4	SAU	4X3X0.25	33.0	42.39	Comp	42.39	g67Y	-7.715	NESC Hea	31.382	18.200	28.125	1.000	0.500	0.500	124.11	123.17	13.238	5	2
ArmBr1	ArmBr1	SAE	3X3X0.1875	33.0	34.49	Comp	34.49	g62P	-3.138	NESC Hea	9.922	9.100	10.547	1.000	1.000	1.000	177.32	177.32	8.807	4	1
ArmBr2	ArmBr2	SAE	2.5X2.5X0.1875	33.0	13.90	Comp	13.90	g69P	-1.265	NESC Hea	13.491	9.100	10.547	1.000	1.000	1.000	138.34	138.34	5.706	4	1
ArmBr3	ArmBr3	Bar	1.75x1/4	33.0	73.90	Tens	0.00	g72Y	0.000		0.029	9.100	14.062	1.000	1.000	1.000	2084.22	2084.22	10.595	4	1
AntMast	HSS16x0.5	Pwmnt Pipe	HSS16"x0.5"	42.0	2.49	Comp	2.49	g73P	-19.487	NESC Hea	782.285	0.000	0.000	1.000	1.000	1.000	69.95	69.95	32.000	1	0
Brace1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	24.52	Tens	19.16	g79X	-2.605	NESC Ext	28.492	16.800	13.594	1.000	1.000	1.000	86.41	103.20	3.536	3	1
Brace2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	36.0	20.51	Comp	20.51	g83X	-2.788	NESC Ext	17.115	16.800	13.594	1.000	1.000	1.000	168.12	168.12	9.723	4	1

Group Summary (Tension Portion):

Group Label	Group 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.	No. Of Holes	Hole Diameter (in)
Leg1	Leg1	SAE	4X4X0.25	33.0	35.60	Tens	35.60	g4P	16.610	NESC Ext	46.653	91.000	140.625	128.676	3.000	10	3.062	0.6875
Leg2	Leg2	SAE	5X5X0.3125	33.0	72.66	Comp	67.50	g9P	51.368	NESC Ext	76.097	109.200	210.937	220.588	6.620	12	3.370	0.6875
Leg3	Leg3	SAE	5X5X0.375	33.0	79.94	Comp	69.24	g12P	62.086	NESC Ext	89.667	127.400	295.312	289.522	10.185	14	3.463	0.6875
XBrace1	XBrace1	SAE	1.75X1.75X0.1875	33.0	34.83	Comp	26.59	g13X	3.878	NESC Ext	14.585	18.200	21.094	16.189	7.071	2	1.000	0.6875
XBrace2	XBrace2	SAU	3X2X0.25	33.0	30.93	Tens	30.93	g21X	8.280	NESC Ext	26.767	36.400	56.250	50.000	7.071	4	1.680	0.6875
XBrace3	XBrace3	SAE	2.5X2.5X0.1875	33.0	23.18	Comp	16.46	g27X	2.937	NESC Ext	22.961	27.300	31.641	17.842	9.399	3	1.000	0.6875
XBrace4	XBrace4	SAE	2X2X0.25	33.0	83.44	Comp	28.34	g31X	6.465	NESC Ext	22.813	27.300	42.187	26.039	18.779	3	1.000	0.6875
XBrace5	XBrace5	SAE	2.5X2.5X0.1875	33.0	34.43	Tens	34.43	g34Y	7.014	NESC Ext	22.961	27.300	31.641	20.373	27.819	3	1.000	0.6875
XBrace6	XBrace6	SAU	3.5X2.5X0.25	33.0	40.97	Comp	35.07	g35P	3.192	NESC Ext	30.238	9.100	14.062	12.500	15.114	1	1.000	0.6875
XBrace7	XBrace7	SAU	3X2X0.25	33.0	40.10	Comp	22.05	g18P	6.019	NESC Ext	30.238	27.300	42.187	37.500	3.905	3	1.000	0.6875
Horz1	Horizontal 1	SAE	1.75X1.75X0.1875	33.0	32.69	Comp	18.20	g40P	2.486	NESC Ext	14.585	18.200	21.094	13.658	5.000	2	1.000	0.6875
Horz2	Horizontal 2	SAU	2.5X2X0.1875	33.0	39.83	Comp	5.95	g41X	0.986	NESC Ext	17.444	18.200	21.094	16.576	9.785	2	1.000	0.6875

Horz3	Horizontal 3	SAU	3X2.5X0.25	33.0	38.97	Comp	10.54	g43X	1.919	NESC Ext	30.090	18.200	28.125	21.820	13.750	2	1.000 0.6875
Horz4	**Horizontal 4**	**SAU**	**4X3X0.25**	**33.0**	**22.25**	**Comp**	**3.33**	**g46X**	**0.606**	**NESC Ext**	**37.663**	**18.200**	**28.125**	**21.820**	**9.883**	**2**	**1.000 0.6875 A potentially damaging moment exists in the following members (make sure your system is well triangulated to minimize moments): g45P g45X g45XY g45Y ??**
Horz5	Horizontal 5	Bar	1.75x1/4	33.0	65.73	Tens	65.73	g48X	5.761	NESC Hea	8.766	9.100	14.062	12.500	2.500	1	1.000 0.6875
Horz6	Horizontal 6	SAE	1.75X1.75X0.1875	33.0	13.18	Comp	0.00	g47Y	0.000		14.585	9.100	10.547	7.330	2.500	1	1.000 0.6875
Inner1	Inner1	SAE	1.75X1.75X0.1875	33.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000 0
Inner2	Inner2	SAU	2.5X2X0.1875	33.0	0.00		0.00		0.000		0.000	0.000	0.000	0.000	0.000	0	0.000 0
Arm1	Ground Wire Arm	SAU	3X2.5X0.25	33.0	19.42	Tens	19.42	g55Y	3.535	NESC Hea	33.802	18.200	28.125	28.125	5.000	2	1.000 0.6875
Arm2	Arm 2	SAE	2.5X2.5X0.1875	33.0	11.22	Comp	5.29	g60Y	0.963	NESC Ext	22.961	18.200	21.094	18.750	5.148	2	1.000 0.6875
Arm3	Arm 3	SAU	3X2X0.1875	33.0	15.59	Comp	0.00	g58Y	0.000		17.333	27.300	31.641	22.061	8.860	3	1.000 0.6875
Arm4	Arm 4	SAU	4X3X0.25	33.0	42.39	Comp	0.00	g68Y	0.000		45.088	18.200	28.125	31.250	9.341	2	1.000 0.6875
ArmBr1	ArmBr1	SAE	3X3X0.1875	33.0	34.49	Comp	0.00	g62P	0.000		28.544	9.100	10.547	9.375	8.807	1	1.000 0.6875
ArmBr2	ArmBr2	SAE	2.5X2.5X0.1875	33.0	13.90	Comp	0.00	g69P	0.000		22.961	9.100	10.547	9.375	5.706	1	1.000 0.6875
ArmBr3	ArmBr3	Bar	1.75x1/4	33.0	73.90	Tens	73.90	g71P	6.478	NESC Hea	8.766	9.100	14.062	12.500	13.574	1	1.000 0.6875
AntMast	HSS16x0.5	Pwmnt Pipe	HSS16"x0.5"	42.0	2.49	Comp	0.00	g78P	0.000		953.399	0.000	0.000	0.000	6.250	0	0.000 0
Brace1	L2.5x2.5x1/4	SAE	2.5X2.5X0.25	36.0	24.52	Tens	24.52	g79Y	2.962	NESC Ext	32.987	16.800	13.594	12.083	3.536	1	1.000 0.6875
Brace2	L3.5x3.5x1/4	SAE	3.5X3.5X0.25	36.0	20.51	Comp	0.00	g83Y	0.000		49.187	16.800	13.594	12.083	9.723	1	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	83.44	g31P	Angle
NESC Extreme	79.94	g11X	Angle

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
1	Clamp	3.94	NESC Heavy	0.0
2	Clamp	6.07	NESC Heavy	0.0
3	Clamp	7.99	NESC Heavy	0.0
4	Clamp	7.95	NESC Heavy	0.0
5	Clamp	7.92	NESC Heavy	0.0

6	Clamp	7.97	NESC Heavy	0.0
7	Clamp	8.02	NESC Heavy	0.0
8	Clamp	7.96	NESC Heavy	0.0
9	Clamp	0.45	NESC Extreme	0.0
10	Clamp	0.45	NESC Extreme	0.0
11	Clamp	1.22	NESC Extreme	0.0
12	Clamp	1.22	NESC Extreme	0.0
13	Clamp	1.46	NESC Heavy	0.0
14	Clamp	1.22	NESC Extreme	0.0
15	Clamp	0.45	NESC Extreme	0.0
16	Clamp	0.45	NESC Extreme	0.0
17	Clamp	0.45	NESC Extreme	0.0
18	Clamp	9.63	NESC Extreme	0.0
19	Clamp	2.50	NESC Heavy	0.0
20	Clamp	3.26	NESC Heavy	0.0
21	Clamp	4.26	NESC Heavy	0.0
22	Clamp	8.05	NESC Heavy	0.0
23	Clamp	14.15	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	18P	0.000	-1.614	1.125	1.968
NESC Heavy	2	Clamp	18X	0.000	-2.439	1.805	3.035
NESC Heavy	3	Clamp	19P	0.000	-2.804	2.843	3.993
NESC Heavy	4	Clamp	20P	0.000	-2.778	2.843	3.975
NESC Heavy	5	Clamp	21P	0.000	-2.783	2.820	3.962
NESC Heavy	6	Clamp	22P	0.000	-2.739	2.897	3.987
NESC Heavy	7	Clamp	23P	0.000	-2.739	2.931	4.012
NESC Heavy	8	Clamp	24P	0.000	-2.739	2.888	3.981
NESC Heavy	9	Clamp	3Y	0.000	-0.000	0.122	0.122
NESC Heavy	10	Clamp	5Y	0.000	-0.000	0.185	0.185
NESC Heavy	11	Clamp	8Y	0.000	-0.000	0.173	0.173
NESC Heavy	12	Clamp	10Y	0.000	-0.000	0.387	0.387
NESC Heavy	13	Clamp	11Y	0.000	-0.000	0.731	0.731
NESC Heavy	14	Clamp	12Y	0.000	-0.000	0.540	0.540
NESC Heavy	15	Clamp	1XY	0.000	-0.068	0.136	0.152
NESC Heavy	16	Clamp	1Y	0.000	-0.000	0.140	0.140
NESC Heavy	17	Clamp	3XY	0.000	-0.098	0.122	0.157
NESC Heavy	18	Clamp	25P	0.000	-1.277	3.875	4.080
NESC Heavy	19	Clamp	26P	0.000	-0.197	1.237	1.252
NESC Heavy	20	Clamp	27P	0.000	-0.322	1.599	1.631
NESC Heavy	21	Clamp	28P	0.000	-0.559	2.056	2.131
NESC Heavy	22	Clamp	29P	0.000	-1.067	3.883	4.027
NESC Heavy	23	Clamp	30P	0.000	-1.734	6.861	7.077
NESC Extreme	1	Clamp	18P	0.000	-1.143	0.371	1.201
NESC Extreme	2	Clamp	18X	0.000	-2.231	0.600	2.310
NESC Extreme	3	Clamp	19P	0.000	-2.725	1.217	2.984
NESC Extreme	4	Clamp	20P	0.000	-2.725	1.217	2.984
NESC Extreme	5	Clamp	21P	0.000	-2.725	1.217	2.984
NESC Extreme	6	Clamp	22P	0.000	-2.725	1.217	2.984
NESC Extreme	7	Clamp	23P	0.000	-2.725	1.217	2.984
NESC Extreme	8	Clamp	24P	0.000	-2.725	1.217	2.984
NESC Extreme	9	Clamp	3Y	0.000	-0.174	0.145	0.226
NESC Extreme	10	Clamp	5Y	0.000	-0.174	0.145	0.226

NESC Extreme	11	Clamp	8Y	0.000	-0.495	0.356	0.609
NESC Extreme	12	Clamp	10Y	0.000	-0.495	0.356	0.609
NESC Extreme	13	Clamp	11Y	0.000	-0.495	0.356	0.609
NESC Extreme	14	Clamp	12Y	0.000	-0.495	0.356	0.609
NESC Extreme	15	Clamp	1XY	0.000	-0.174	0.145	0.226
NESC Extreme	16	Clamp	1Y	0.000	-0.174	0.145	0.226
NESC Extreme	17	Clamp	3XY	0.000	-0.174	0.145	0.226
NESC Extreme	18	Clamp	25P	0.000	-4.500	1.716	4.816
NESC Extreme	19	Clamp	26P	0.000	-0.297	0.318	0.435
NESC Extreme	20	Clamp	27P	0.000	-0.294	0.313	0.429
NESC Extreme	21	Clamp	28P	0.000	-0.329	0.363	0.490
NESC Extreme	22	Clamp	29P	0.000	-0.965	0.916	1.330
NESC Extreme	23	Clamp	30P	0.000	-1.172	1.306	1.754

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy	-22.248	0.000	27.944	-1710.293	0.000	0.000
NESC Extreme	-24.029	0.000	10.609	-1901.185	0.000	0.000

*** Weight of structure (lbs):
Weight of Angles*Section DLF: 18946.5
Total: 18946.5

*** End of Report

Foundation Analysis

SE Pier

Input Data:

Max. Reactions at Tower Leg:

Shear (Compression Leg) = $Shear_{comp} := 16.70 \cdot 1.1 \cdot kips = 18.4 \cdot kips$ (User Input from PLS Tower)

Shear (Uplift Leg) = $Shear_{up} := 14.04 \cdot 1.1 \cdot kips = 15.4 \cdot kips$ (User Input from PLS Tower)

Compression = $Comp := 74.82 \cdot 1.1 \cdot kips = 82.3 \cdot kips$ (User Input from PLS Tower)

Uplift = $Uplift := 62.65 \cdot 1.1 \cdot kips = 68.9 \cdot kips$ (User Input from PLS Tower)

Tower Properties:

Tower Height = $H_t := 91 \cdot ft$ (User Input)

Foundation Properties:

Pier Height = $P_H := 4.25 \cdot ft$ (User Input)

Pier Width Top = $P_{w1} := 1.67 \cdot ft$ (User Input)

Pier Width Botttom = $P_{w2} := 2.29 \cdot ft$ (User Input)

Pier Projection Above Grade = $P_P := 2 \cdot ft$ (User Input)

Pad Width = $Pd_w := 6 \cdot ft$ (User Input)

Pad Length = $Pd_L := 14 \cdot ft$ (User Input)

Pad Thickness = $Pd_t := 4 \cdot ft$ (User Input)

Subgrade Properties:

Concrete Unit Weight = $\gamma c := 150 \cdot pcf$ (User Input)

Water Unit Weight = $\gamma w := 62.4 \cdot pcf$ (User Input)

Soil Unit Weight = $\gamma s := 100 \cdot pcf$ (User Input)

Uplift Angle = $\phi := 30.0 \cdot deg$ (User Input)

Soil Bearing Capacity = $BC_{soil} := 9000 \cdot psf$ (User Input)

Coefficient of Friction = $\mu := 0.45$ (User Input)

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

Calculated Data:

Volume of the Concrete Pad = $V_{pad} := Pd_w \cdot Pd_L \cdot Pd_t = 336 \cdot ft^3$

Volume of the Concrete Pier = $V_{pier} := \frac{(P_H)}{3} \cdot \left(P_{w1}{}^2 + P_{w2}{}^2 + \sqrt{P_{w1}{}^2 \cdot P_{w2}{}^2}\right) = 16.8 \cdot ft^3$

Resisting Pyramid Base 1 = $B_1 := Pd_w \cdot Pd_L = 84\, ft^2$

Resisting Pyramid Base 2 = $B_2 := \left[2 \cdot \tan(\phi) \cdot (P_H - P_P) + Pd_w\right] \cdot \left[2 \cdot \tan(\phi) \cdot (P_H - P_P) + Pd_L\right] = 143 ft^2$

Volume of Soil = $V_{soil} := \left[\frac{(P_H - P_P)}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right] - V_{pier} = 235 \cdot ft^3$

Total Volume of Concrete = $V_{Conc} := V_{pad} + V_{pier} = 353 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 52.9 \cdot kips$

Mass of Soil = $Mass_{Soil} := V_{soil} \cdot \gamma s = 24 \cdot kips$

Total Mass = $Mass_{tot} := Mass_{Conc} + Mass_{Soil} = 76 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{Mass_{tot}}{Uplift} = 1.11$

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

$Uplift\_Check = \text{"OK"}$

Check Bearing:

Cross Sectional Area of Pad = $A_{pad} := Pd_w \cdot Pd_L = 84\, ft^2$

Section Modulus of Pad = $S_{pad} := \frac{Pd_w{}^2 \cdot Pd_L}{6} = 84 \cdot ft^3$

Residual Mass of Concrete = $Mass_{Concr} := V_{Conc} \cdot (\gamma c - \gamma s) = 17.6 \cdot kips$

$Bearing := \frac{Comp + Mass_{Concr}}{A_{pad}} + \frac{\left[Shear_{comp} \cdot (P_H + Pd_t)\right]}{S_{pad}} = 2.99 \cdot ksf$

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

$Bearing\_Check = \text{"OK"}$

Check Sliding:

Sliding Resistance = $S_R := \mu \cdot (Mass_{Conc} + Comp) = 60.85 \cdot kips$

$Sliding\_Check := if\left(Shear_{comp} \leq S_R, \text{"OK"}, \text{"No Good"}\right)$

$Sliding\_Check = \text{"OK"}$

Foundation Analysis

NE, NW and SW Piers

Input Data:

Max. Reactions at Tower Leg:

Shear (Compression Leg) = $Shear_{comp} := 16.70 \cdot 1.1 \cdot kips = 18.4 \cdot kips$ (User Input from PLS Tower)

Shear (Uplift Leg) = $Shear_{up} := 14.04 \cdot 1.1 \cdot kips = 15.4 \cdot kips$ (User Input from PLS Tower)

Compression = $Comp := 74.82 \cdot 1.1 \cdot kips = 82.3 \cdot kips$ (User Input from PLS Tower)

Uplift = $Uplift := 62.65 \cdot 1.1 \cdot kips = 68.9 \cdot kips$ (User Input from PLS Tower)

Tower Properties:

Tower Height = $H_t := 91 \cdot ft$ (User Input)

Foundation Properties:

Pier Height = $P_H := 4.25 \cdot ft$ (User Input)

Pier Width Top = $P_{w1} := 1.67 \cdot ft$ (User Input)

Pier Width Botttom = $P_{w2} := 2.29 \cdot ft$ (User Input)

Pier Projection Above Grade = $P_P := 1.5 \cdot ft$ (User Input)

Pad Width = $Pd_w := 9 \cdot ft$ (User Input)

Pad Thickness = $Pd_t := 4 \cdot ft$ (User Input)

Subgrade Properties:

Concrete Unit Weight = $\gamma c := 150 \cdot pcf$ (User Input)

Water Unit Weight = $\gamma w := 62.4 \cdot pcf$ (User Input)

Soil Unit Weight = $\gamma s := 100 \cdot pcf$ (User Input)

Uplift Angle = $\phi := 30.0 \cdot deg$ (User Input)

Soil Bearing Capacity = $BC_{soil} := 9000 \cdot psf$ (User Input)

Coefficient of Friction = $\mu := 0.45$ (User Input)

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

Calculated Data:

Volume of the Concrete Pad = $V_{pad} := Pd_w^{\,2} \cdot Pd_t = 324 \cdot ft^3$

Volume of the Concrete Pier = $V_{pier} := \frac{(P_H)}{3} \cdot \left(P_{w1}^{\,2} + P_{w2}^{\,2} + \sqrt{P_{w1}^{\,2} \cdot P_{w2}^{\,2}}\right) = 16.8 \cdot ft^3$

Resisting Pyramid Base 1 = $B_1 := Pd_w^{\,2} = 81\,ft^2$

Resisting Pyramid Base 2 = $B_2 := \left[2 \cdot \tan(\phi) \cdot \left(P_H - P_P\right) + Pd_w\right]^2 = 148ft^2$

Volume of Soil = $V_{soil} := \left[\frac{\left(P_H - P_P\right)}{3} \cdot \left(B_1 + B_2 + \sqrt{B_1 \cdot B_2}\right)\right] - V_{pier} = 294 \cdot ft^3$

Total Volume of Concrete = $V_{Conc} := V_{pad} + V_{pier} = 341 \cdot ft^3$

Mass of Concrete = $Mass_{Conc} := V_{Conc} \cdot \gamma c = 51.1 \cdot kips$

Mass of Soil = $Mass_{Soil} := V_{soil} \cdot \gamma s = 29 \cdot kips$

Total Mass = $Mass_{tot} := Mass_{Conc} + Mass_{Soil} = 80 \cdot kips$

Check Uplift:

Required Factor of Safety = $F_S := 1.0$

$ActualFS := \frac{Mass_{tot}}{Uplift} = 1.17$

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

$Uplift\_Check = \text{"OK"}$

Check Bearing:

Cross Sectional Area of Pad = $A_{pad} := Pd_w^{\,2} = 81\,ft^2$

Section Modulus of Pad = $S_{pad} := \frac{\left(Pd_w\right)^3}{6} = 122 \cdot ft^3$

Residual Mass of Concrete = $Mass_{Concr} := V_{Conc} \cdot (\gamma c - \gamma s) = 17 \cdot kips$

$Bearing := \frac{Comp + Mass_{Concr}}{A_{pad}} + \frac{\left[Shear_{comp} \cdot \left(P_H + Pd_t\right)\right]}{S_{pad}} = 2.47 \cdot ksf$

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

$Bearing\_Check = \text{"OK"}$

Check Sliding:

Sliding Resistance = $S_R := \mu \cdot \left(Mass_{Conc} + Comp\right) = 60.04 \cdot kips$

$Sliding\_Check := if\left(Shear_{comp} \leq S_R, \text{"OK"}, \text{"No Good"}\right)$

$Sliding\_Check = \text{"OK"}$

RAN Template:	A&L Template:
794AR V2 Outdoor	794AR V2_1DP+2QP

CT11296A_1.1_Capacity-L1900

Section 1 - Site Information

Site ID: CT11296A
Status: Draft
Version: 1.1
Project Type: Capacity-L1900
Approved: Not Approved
Approved By: Not Approved
Last Modified: 2/23/2017 6:36:03 AM
Last Modified By: GSM1900\AMurill9

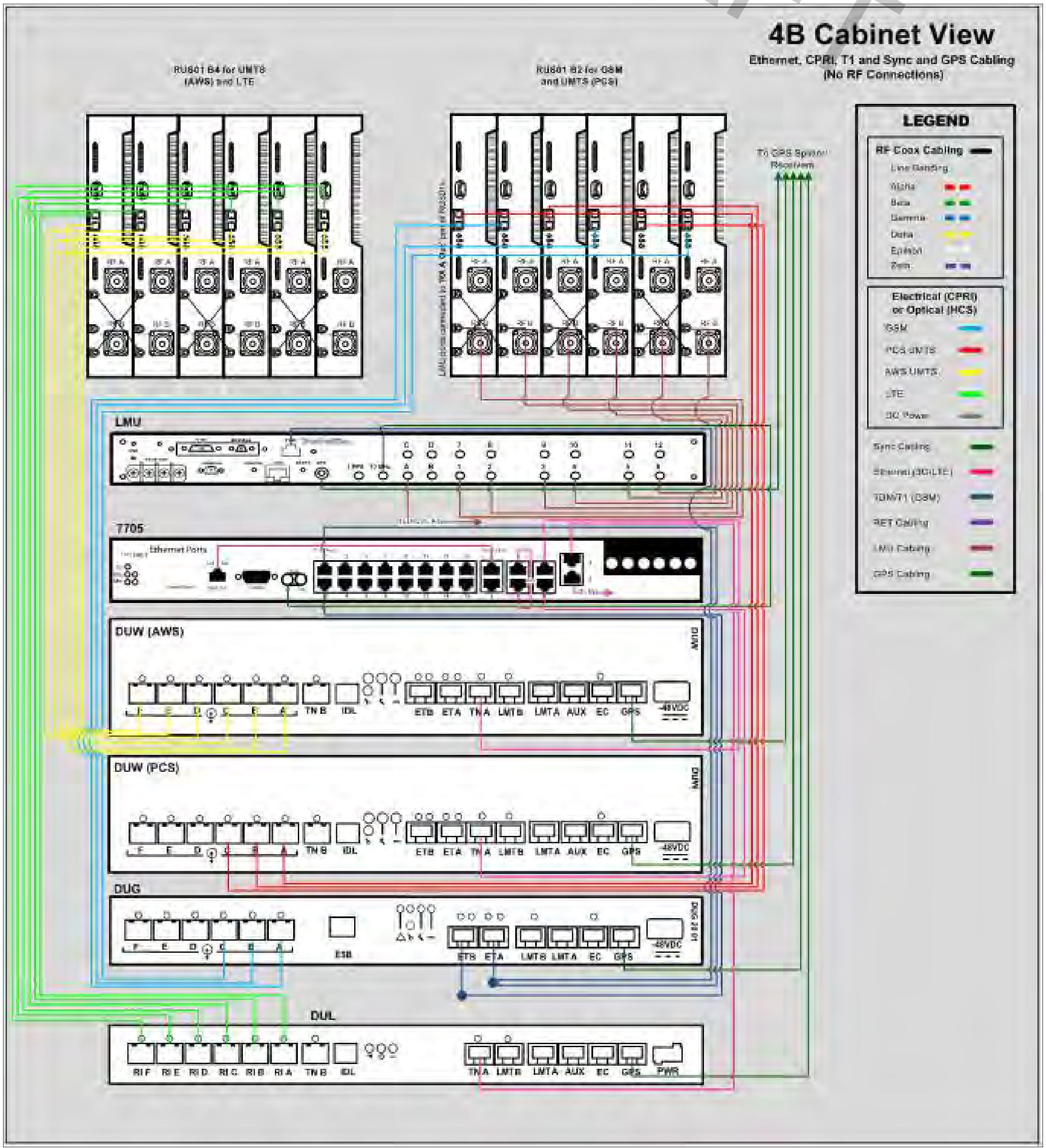
Site Name: Wilton/Rt 33
Site Class: Utility Lattice Tower
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: CL&P

Latitude: 41.18118739
Longitude: -73.39323950
Address: 144 Chestnut Hill Road (Rte-53)
City, State: Wilton, CT
Region: NORTHEAST

RAN Template: 794AR V2 Outdoor			**AL Template:** 794AR V2_1DP+2QP	
Sector Count: 3	**Antenna Count:** 9	**Coax Line Count:** 30	**TMA Count:** 6	**RRU Count:** 0

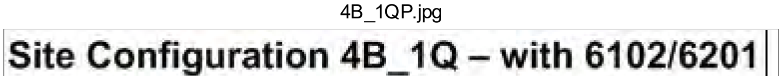
Section 2 - Existing Template Images

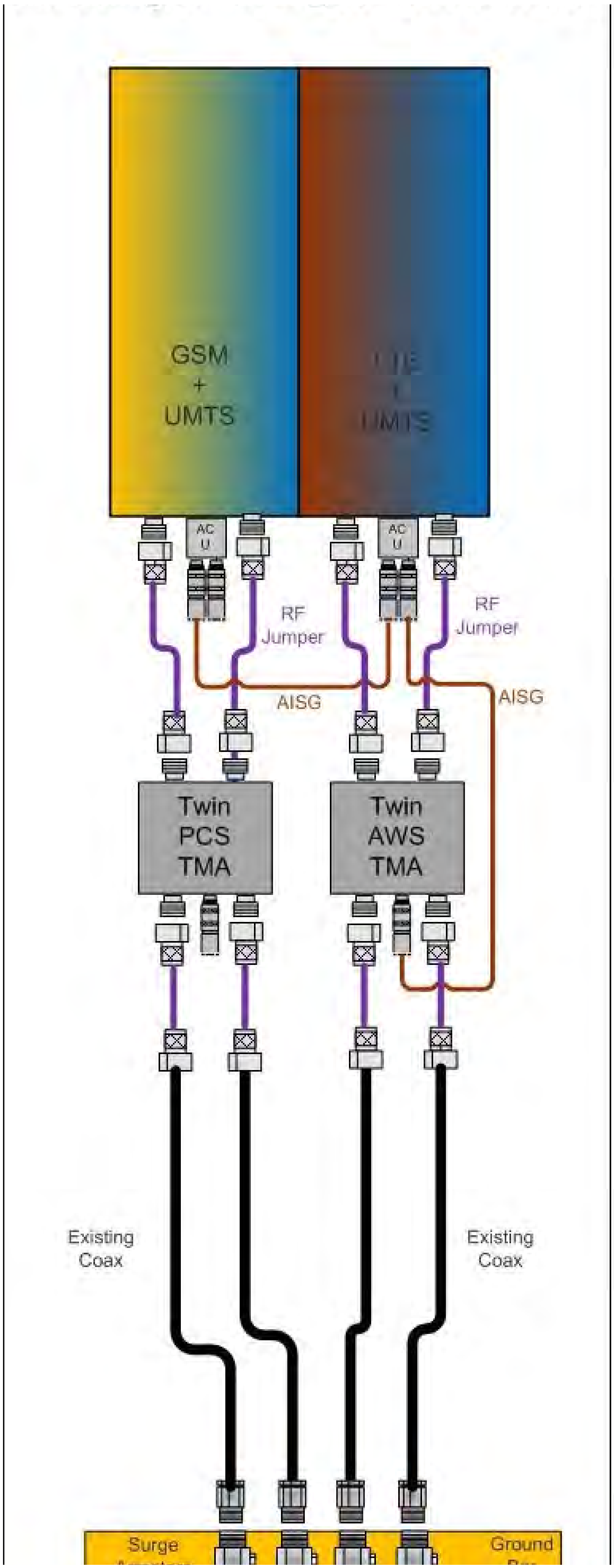
RAN_4B.jpg

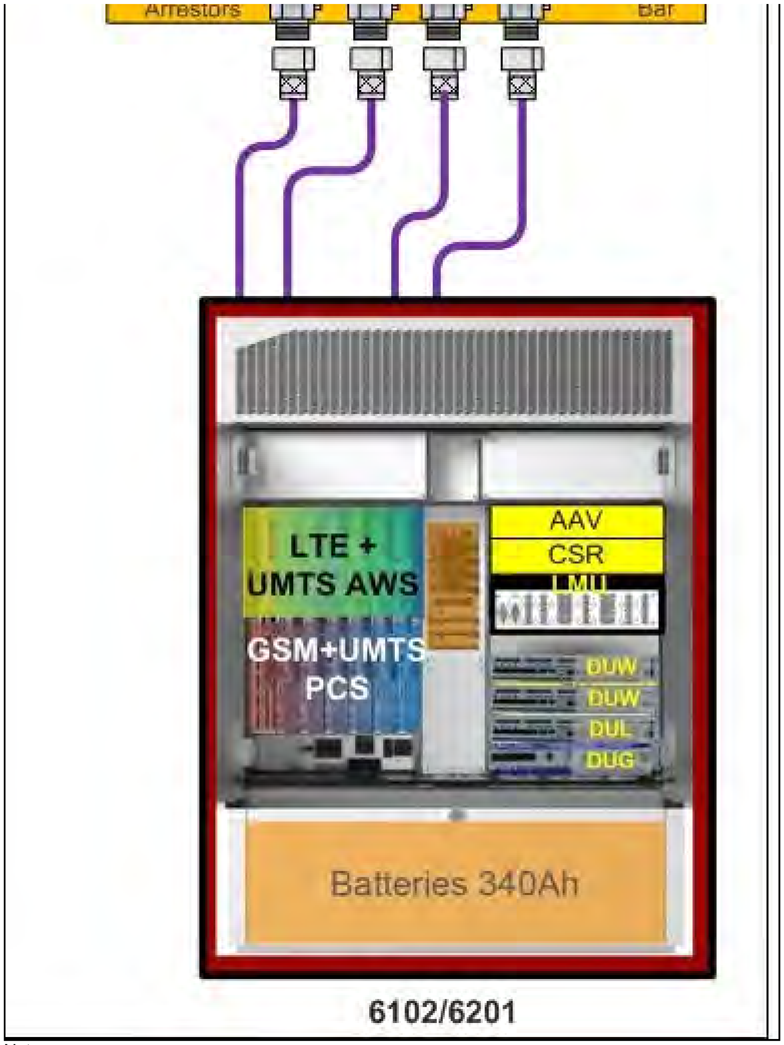


Notes:

4B_1QP.jpg



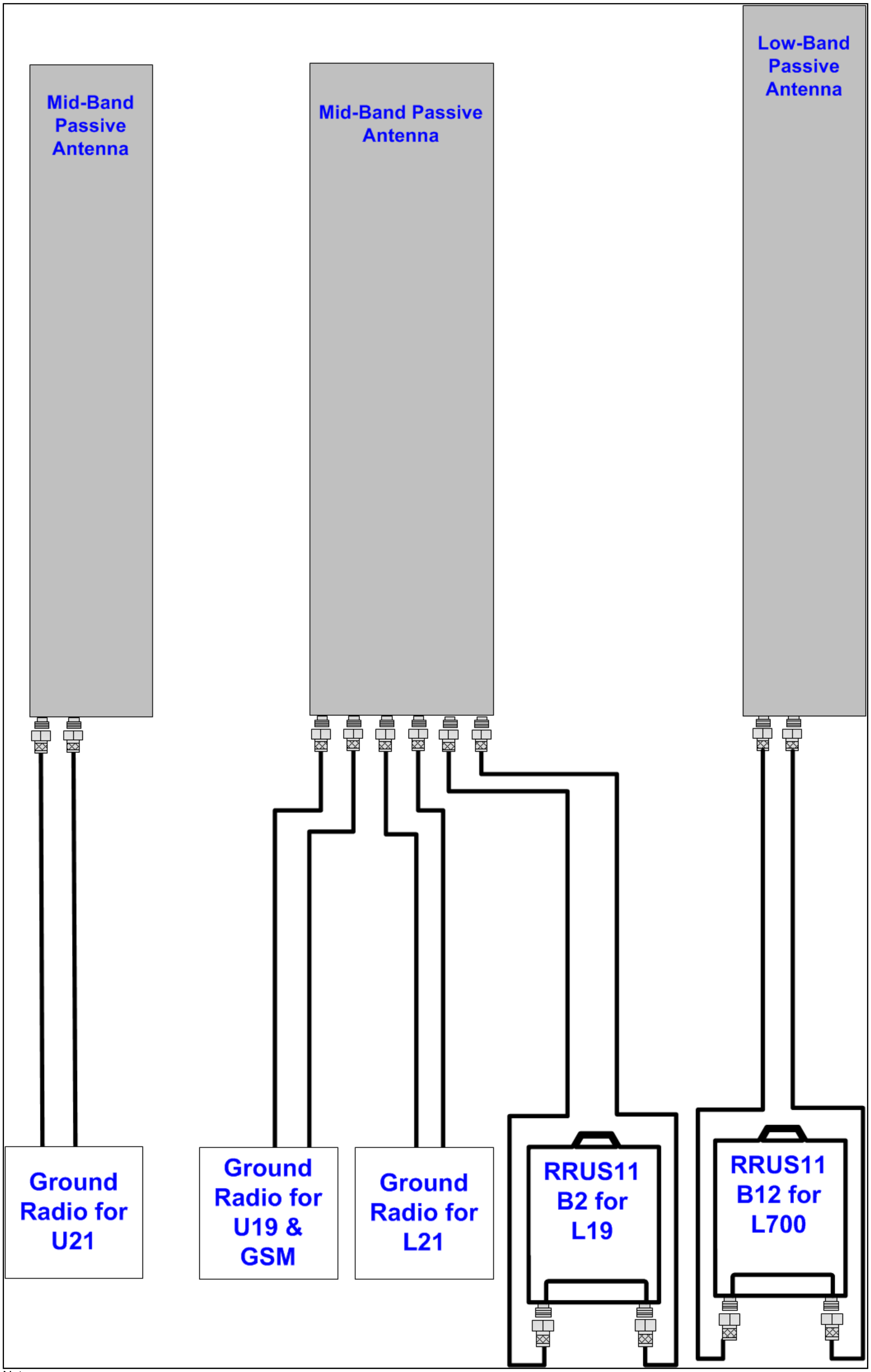

GSM
+
UMTS
AC
U
AC
U
RF
Jumper
RF
Jumper
AISG
AISG
Twin
PCS
TMA
Twin
AWS
TMA
Existing
Coax
Existing
Coax
Surge
Ground


Arrestors
Bar
LTE +
UMTS AWS
GSM+UMTS
PCS
AAV
CSR
LMU
DUW
DUW
DUL
DUG
Batteries 340Ah
6102/6201

Notes:

Section 3 - Proposed Template Images

794AR V2.png


Mid-Band Passive Antenna
Mid-Band Passive Antenna
Low-Band Passive Antenna
Ground Radio for U21
Ground Radio for U19 & GSM
Ground Radio for L21
RRUS11 B2 for L19
RRUS11 B12 for L700

Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
794AR V2 Outdoor	794AR V2_1DP+2QP

Section 5 - RAN Equipment

Existing RAN Equipment	
Template: 4B Outdoor	
Enclosure	1
Enclosure Type	RBS 6102
Baseband	DUL20 L2100; DUW30 U1900; DUW30 U2100; DUG20 G1900
Radio	RUS01 B4 **(x6)** U2100 L2100; RUS01 B2 **(x3)** G1900; RUS01 B2 **(x3)** U1900

Proposed RAN Equipment		
Template: 794AR V2 Outdoor		
Enclosure	1	2
Enclosure Type	RBS 6102	Ground Mount
Baseband	DUS41 **(x2)**; DUW30 **(x2)**; DUG20	
Multiplexer	XMU	
Radio	RUS01 B2 **(x3)** U1900 G1900; RUS01 B4 **(x3)** U2100; RUS01 B4 **(x6)** L2100	RRUS11 B2 **(x3)** L1900; RRUS11 B12 **(x3)** L700

RAN Scope of Work:

RAN Template:	A&L Template:
794AR V2 Outdoor	794AR V2_1DP+2QP

Section 6 - A&L Equipment

Existing Template: 4B_1QP
Proposed Template: 794AR V2_1DP+2QP

Sector 1 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	30	
M. Tilt	0	
Height	97	
Ports	**P1**	**P2**
Active Tech.	U1900 G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	7/8" Coax - 99 ft. Generic Feeder Coax - 99 ft.	Generic Feeder Coax - 99 ft. Generic Feeder Coax - 99 ft.
TMAs	Generic Style 1A - Twin PCS	Generic Style 1B - Twin AWS
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
794AR V2 Outdoor	794AR V2_1DP+2QP

CT11296A_1.1_Capacity-L1900

Sector 1 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Andrew - LNX-6515DS-A1M (Dual)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	30		30	30	
M. Tilt	0		0	0	
Height	126		126	126	
Ports	P1	P2	P3	P4	P5
Active Tech.	U1900 G1900	U2100	L700	L2100	L1900
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2	2	2	2	2
Cables	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.
TMAs	Generic Style 1A - Twin PCS	Generic Style 1B - Twin AWS			
Diplexers / Combiners					
Radio					
Sector Equipment			Andrew Smart Bias T		

Unconnected Equipment:

Scope of Work:

GMA's- These should be installed on the Ground.

RAN Template:	**A&L Template:**
794AR V2 Outdoor	794AR V2_1DP+2QP

CT11296A_1.1_Capacity-L1900

Sector 2 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	150	
M. Tilt	0	
Height	97	
Ports	**P1**	**P2**
Active Tech.	U1900 G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	7/8" Coax - 99 ft. Generic Feeder Coax - 99 ft.	Generic Feeder Coax - 99 ft. Generic Feeder Coax - 99 ft.
TMAs	Generic Style 1A - Twin PCS	Generic Style 1B - Twin AWS
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template: 794AR V2 Outdoor	**A&L Template:** 794AR V2_1DP+2QP

CT11296A_1.1_Capacity-L1900

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Andrew - LNX-6515DS-A1M (Dual)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	150		150	150	
M. Tilt	0		0	0	
Height	126		126	126	
Ports	P1	P2	P3	P4	P5
Active Tech.	U1900 G1900	U2100	L700	L2100	L1900
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2	2	2	2	2
Cables	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.
TMAs	Generic Style 1A - Twin PCS	Generic Style 1B - Twin AWS			
Diplexers / Combiners					
Radio					
Sector Equipment			Andrew Smart Bias T		

Unconnected Equipment:

Scope of Work:

GMA's- These should be installed on the Ground.

RAN Template:	A&L Template:
794AR V2 Outdoor	794AR V2_1DP+2QP

CT11296A_1.1_Capacity-L1900

Sector 3 (Existing) view from behind		
Coverage Type	A - Outdoor Macro	
Antenna	1	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	270	
M. Tilt	0	
Height	97	
Ports	P1	P2
Active Tech.	U1900 G1900	U2100 L2100
Dark Tech.		
Restricted Tech.		
Decomm. Tech.		
E. Tilt	2	2
Cables	7/8" Coax - 99 ft. Generic Feeder Coax - 99 ft.	Generic Feeder Coax - 99 ft. Generic Feeder Coax - 99 ft.
TMAs	Generic Style 1A - Twin PCS	Generic Style 1B - Twin AWS
Diplexers / Combiners		
Radio		
Sector Equipment		

Unconnected Equipment:

Scope of Work:

RAN Template: 794AR V2 Outdoor	**A&L Template:** 794AR V2_1DP+2QP

CT11296A_1.1_Capacity-L1900

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	
Antenna Model	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Andrew - LNX-6515DS-A1M (Dual)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)	
Azimuth	270		270	270	
M. Tilt	0		0	0	
Height	126		126	126	
Ports	P1	P2	P3	P4	P5
Active Tech.	U1900 G1900	U2100	L700	L2100	L1900
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2	2	2	2	2
Cables	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.	1-1/4" Coax - 125 ft. 1-1/4" Coax - 125 ft.
TMAs	Generic Style 1A - Twin PCS	Generic Style 1B - Twin AWS			
Diplexers / Combiners					
Radio					
Sector Equipment			Andrew Smart Bias T		

Unconnected Equipment:

Scope of Work:

GMA's- These should be installed on the Ground.

Optimizer® Side-by-Side Dual Polarized Antenna, 1710-2200, 65deg, 18.4dBi, 1.4m, VET, 0-10deg RET

Product Description

A combination of two X-Polarized antennas in a single radome, this pair of variable tilt antennas provides exceptional suppression of all upper sidelobes at all downtilt angles. It also features a wide downtilt range. This antenna is optimized for performance across the entire frequency band (1710-2200 MHz). The antenna comes pre-connected with two antenna control units (ACU).

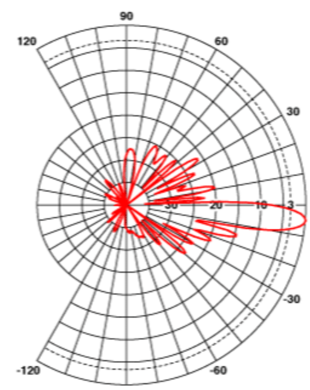
Features/Benefits

- **Variable electrical downtilt - provides enhanced precision in controlling intercell interference. The tilt is infield adjustable 0-10 deg.**
- **High Suppression of all Upper Sidelobes (Typically <-20dB).**
- **Gain tracking – difference between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz) <1dB.**
- **Two X-Polarised panels in a single radome.**
- **Azimuth horizontal beamwidth difference <4deg between AWS UL (1710-1755 MHz) and DL (2110-2155 MHz).**
- **Low profile for low visual impact.**
- **Dual polarization; Broadband design.**
- **Includes (2) AISG 2.0 Compatible ACU-A20-N antenna control units.**

Technical Specifications

Electrical Specifications

Frequency Range, MHz	1710-2200
Horizontal Beamwidth, deg	65
Vertical Beamwidth, deg	5.9 to 7.7
Electrical Downtilt, deg	0-10
Gain, dBi (dBd)	18.4 (16.3)
1st Upper Sidelobe Suppression, dB	> 18 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Front-To-Back Ratio, dB	>26 (typically 28)
Polarization	Dual pol +/-45°
VSWR	< 1.5:1
Isolation between Ports, dB	> 30
3rd Order IMP @ 2 x 43 dBm, dBc	> 150 (155 Typical)
Impedance, Ohms	50
Maximum Power Input, W	300
Lightning Protection	Direct Ground
Connector Type	(4) 7-16 Long Neck Female



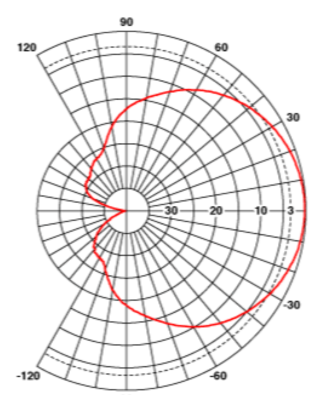
Vertical Pattern

Mechanical Specifications

Dimensions - HxWxD, mm (in)	1420 x 331 x 80 (55.9 x 13 x 3.15)
Weight w/o Mtg Hardware, kg (lb)	18.5 (40.7)
Survival Wind Speed, km/h (mph)	200 (125)
Rated Wind Speed, km/h (mph)	160 (100)
Max Wind Loading Area, m² (ft²)	0.47 (5.03)
Front Thrust @ Rated Wind, N (lbf)	756 (170)
Maximum Thrust @ Rated Wind, N (lbf)	756 (170)
Wind Load - Side @ Rated Wind, N (lbf)	231 (52)
Wind Load - Rear @ Rated Wind, N (lbf)	408 (92)
Radome Material	Fiberglass
Radome Color	Light Grey RAL7035
Mounting Hardware Material	Diecasted Aluminum
Shipping Weight, kg (lb)	24.5 (53.9)
Packing Dimensions, HxWxD, mm (in)	1520 x 408 x 198 (59.8 x 16 x 7.8)

Ordering Information

Mounting Hardware	APM40-2 + APM40-E2



Horizontal Pattern

Product Specifications

LNX-6515DS-VTM

Andrew® Antenna, 698–896 MHz, 65° horizontal beamwidth, RET compatible

- Excellent choice to maximize both coverage and capacity in suburban and rural applications
- Fully compatible with Andrew remote electrical tilt system for greater OpEx savings
- Exceptional horizontal pattern roll-off and strong front-to-back ratio
- Extended bandwidth allows one antenna to serve multiple frequency allocations
- Great solution to maximize network coverage and capacity
- The RF connectors are designed for IP67 rating and the radome for IP56 rating
- The values presented on this datasheet have been calculated based on N-P-BASTA White Paper version 9.6 by the NGMN Alliance

Electrical Specifications

Frequency Band, MHz	**698–806**	**806–896**
Gain by all Beam Tilts, average, dBi	16.6	16.9
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3
Gain by Beam Tilt, average, dBi	0 ° | 16.6 4 ° | 16.6 8 ° | 16.4	0 ° | 17.0 4 ° | 17.0 8 ° | 16.8
Beamwidth, Horizontal, degrees	65	64
Beamwidth, Horizontal Tolerance, degrees	±1	±0.9
Beamwidth, Vertical, degrees	9.7	8.6
Beamwidth, Vertical Tolerance, degrees	±0.6	±0.4
Beam Tilt, degrees	0–8	0–8
USLS, dB	18	18
Front-to-Back Total Power at 180° ± 30°, dB	25	23
CPR at Boresight, dB	24	27
CPR at Sector, dB	15	13
Isolation, dB	30	30
VSWR | Return Loss, dB	1.4 | 15.6	1.4 | 15.6
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153
Input Power per Port, maximum, watts	400	400
Polarization	±45°	±45°
Impedance	50 ohm	50 ohm

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol®
Band	Single band
Brand	DualPol® | Teletilt®
Operating Frequency Band	698 – 896 MHz

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Aluminum
Radome Material	Fiberglass, UV resistant

RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	2
Wind Loading, maximum	878.0 N @ 150 km/h 197.4 lbf @ 150 km/h
Wind Speed, maximum	241.0 km/h | 149.8 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	2449.0 mm | 96.4 in
Width	301.0 mm | 11.9 in
Net Weight	19.8 kg | 43.7 lb

Remote Electrical Tilt (RET) Information

Model with Factory Installed AISG 1.1 Actuator	LNX-6515DS-R2M
Model with Factory Installed AISG 2.0 Actuator	LNX-6515DS-A1M
RET System	Teletilt®

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system

Included Products

DB380-3 — Pipe Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Used for wide panel antennas. Includes three clamp sets.

DB5083D — Downtilt Mounting Kit for 2.4"-4.5" (60-115 mm) OD round members. Consists of two DB5083 heavy-duty, galvanized steel downtilt mounting brackets. This kit is compatible with the DB380-3 pipe mount for panel antennas with three mounting points.

Exhibit E

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11296A

Wilston/Rt. 33
144 Chestnut Hill Road
Wilton, CT 06897

May 5, 2017

EBI Project Number: 6217001921

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general public allowable limit:	**6.05 %**

May 5, 2017

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11296A – Wilston/Rt. 33**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **144 Chestnut Hill Road, Wilton, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile 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.

<u>General population/uncontrolled exposure</u> limits apply to situations in which the general public 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 public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) 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 done for the proposed T-Mobile Wireless antenna facility located at **144 Chestnut Hill Road, Wilton, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile 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 tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

7) Since all radios are ground mounted there are additional cabling losses accounted for. For each ground mounted RF path the following losses were calculated. 0.87 dB of additional cable loss for all ground mounted 700 MHz Channels, 1.53 dB of additional cable loss for all ground mounted 1900 MHz channels and 1.61 dB of additional cable loss for all ground mounted 2100 MHz channels were factored into the calculations used for this analysis. This is based on manufacturers Specifications for 125 feet of 1-1/4" coax cable on each path.

8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. 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. This is rarely the case, and if so, is never continuous.

9) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-A1M** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Commscope LNX-6515DS-A1M** has a maximum gain of **14.6 dBd** at its main lobe at 700 MHz. 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.

11) The antenna mounting height centerline of the proposed antennas is **97.25 feet** above ground level (AGL).

12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

13) All calculations were done with respect to uncontrolled / general public threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	97.25	Height (AGL):	97.25	Height (AGL):	97.25
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	7,132.30	ERP (W):	7,132.30	ERP (W):	7,132.30
Antenna A1 MPE%	3.08	Antenna B1 MPE%	3.08	Antenna C1 MPE%	3.08
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	97.25	Height (AGL):	97.25	Height (AGL):	97.25
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,365.65	ERP (W):	5,365.65	ERP (W):	5,365.65
Antenna A2 MPE%	2.32	Antenna B2 MPE%	2.32	Antenna C2 MPE%	2.32
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M	Make / Model:	Commscope LNX-6515DS-A1M
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	97.25	Height (AGL):	97.25	Height (AGL):	97.25
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power(W):	30	Total TX Power(W):	30	Total TX Power(W):	30
ERP (W):	708.14	ERP (W):	708.14	ERP (W):	708.14
Antenna A3 MPE%	0.65	Antenna B3 MPE%	0.65	Antenna C3 MPE%	0.65

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**6.05 %**
No Additional Carriers Located on This Facility	NA
Site Total MPE %:	**6.05 %**

T-Mobile Sector A Total:	6.05 %
T-Mobile Sector B Total:	6.05 %
T-Mobile Sector C Total:	6.05 %
Site Total:	6.05 %

T-Mobile _Max Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	1,766.65	97.25	15.26	AWS - 2100 MHz	1000	1.53%
T-Mobile PCS - 1900 MHz LTE	2	1,799.50	97.25	15.54	PCS - 1900 MHz	1000	1.55%
T-Mobile AWS - 2100 MHz UMTS	2	883.33	97.25	7.63	AWS - 2100 MHz	1000	0.76%
T-Mobile PCS - 1900 MHz UMTS	2	899.75	97.25	7.77	PCS - 1900 MHz	1000	0.78%
T-Mobile PCS - 1900 MHz GSM	2	899.75	97.25	7.77	PCS - 1900 MHz	1000	0.78%
T-Mobile 700 MHz LTE	1	708.14	97.25	3.06	700 MHz	467	0.65%
						Total*:	**6.05%**

*NOTE: Totals may vary by 0.01% due to summing of remainders

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	6.05 %
Sector B:	6.05 %
Sector C:	6.05 %
T-Mobile Per Sector Maximum:	6.05 %
Site Total:	6.05 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **6.05%** of the allowable FCC established general public 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.

Exhibit F

EVERSOURCE ENERGY

56 Prospect Street, Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

May 15, 2017

Mr. Mark Richard
T-Mobile
35 Griffin Road South
Bloomfield, CT 06002

RE: T-Mobile Antenna Site, CT-11 296A, Chestnut Hill Road, Wilton, structure 936.

Dear Mr. Richard:

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

Since there are no outstanding structural or site related issues to resolve at this time, please contact Mr. Michael Green of Eversource Real Estate (860-665-6926) to review and execute the lease amendment.

Sincerely,

Joel Szarkowicz

Joel Szarkowicz
Transmission Line & Civil Engineering

Ref: 15019.006 CT11296A - CD Rev2 17.05.15.pdf
Ref: 15019.006 – CT11296A Structural Analysis Rev4 17.05.15.pdf