10/19/12

VIA UPS Delivery

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

ORIGINAL

RECEIVED
OCT 19 2012
CONNECTICUT
SITING COUNCIL

RE: AT&T Mobility - Notice of Exempt Modification
4286 Whitney Ave Hamden CT 06518

Dear Ms. Roberts:

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

AT&T plans to modify the existing facility at 4286 Whitney Ave Hamden CT 06518, owned by Connecticut Light and Power (coordinates 41-26-53.75 N, 72-54-36.7 W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to AT&T's operations at the site.

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

1. The height of the overall structure will be unaffected. AT&T will AT&T will add Three (3) new antennas, six (6) RRU's and one (1) surge arrestor. Additionally, AT&T will install one (1) fiber cable and two (2) DC control cables within the existing coax.

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

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

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environment as calculated for a mixed frequency site. As indicated in the attached

power density calculations, AT&T's operations at the site will result in a power density of 2.39%; the combined site operations will result in a total power density of 6.64%.

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

Respectfully submitted,

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

Cc: Mayor of Hamden Scott Jackson. City of Hamden Building Officials

CONNECTICUT SITING COUNCIL
NOTICE OF INTENT TO MODIFY AN EXISTING TOWER FACILITY
EXEMPT MODIFICATION FILING FORM

Public Utility Environmental Standards Act, Connecticut General Statutes §§ 16-50g - 16-50aa
Regulations of Connecticut State Agencies §§ 16-50j-72(b)(2) and 16-50j-73

TO BE COMPLETED BY FILER

Date: 10/18/12

Filer Name and Contact Information
Name: Matthew Bandle
Address: Nexlink Global Services; Suite A Building 2
800 Marshall Phelps Road, Windsor, CT 06095
Phone Number: 508-642-8801

Wireless Carrier: AT&T

Tower Owner: Connecticut Light and Power

Tower Site Address: 4286 Whitney Ave Hamden CT 06518

Municipality and Name of Chief Elected Official Provided A Copy Of This Notice:
Mayor of Hamded, Scott Jackson

Description of Exempt Modification (including antenna and equipment changes):
AT&T will add Three (3) new antennas, six (6) RRU's and one (1) surge arrestor. Additionally, AT&T will install one (1) fiber cable and two (2) DC control cables within the existing coax.

Attachments
____Plans
____Power density calculations if applicable
____Tower structural report if applicable
____$625.00 Filing Fee

If required:
Municipality w/i 2,500' & Name of Chief Elected Official Provided A Copy Of This Notice:

Underlying Property Owner Provided A Copy Of This Notice:

FOR STAFF USE ONLY

____ Modification will not result in an increase in tower height
____ Modification is within existing site boundaries
____ Modification will not increase noise levels at the site boundary by 6 dbA or more, or to level that exceed State & local criteria
____ Modification will meet FCC and DEEP MPE limits
____ Modification will not result in significant adverse change in physical or environmental characteristics of the site
____ Modification will not impair the structural integrity of the facility as determined by PE
____ If yes to all of the above, approval of acknowledgement letter

WIRELESS COMMUNICATIONS FACILITY

CT2255

CL&P STRUCT. NO. 4008

4286 WHITNEY AVENUE

HAMDEN, CT 06518

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2005 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2009 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.

2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.

3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.

4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.

5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.

6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.

7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.

8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.

9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.

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

11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.

12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.

13. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.

14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.

15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.

16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.

17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.

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

20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.

21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT

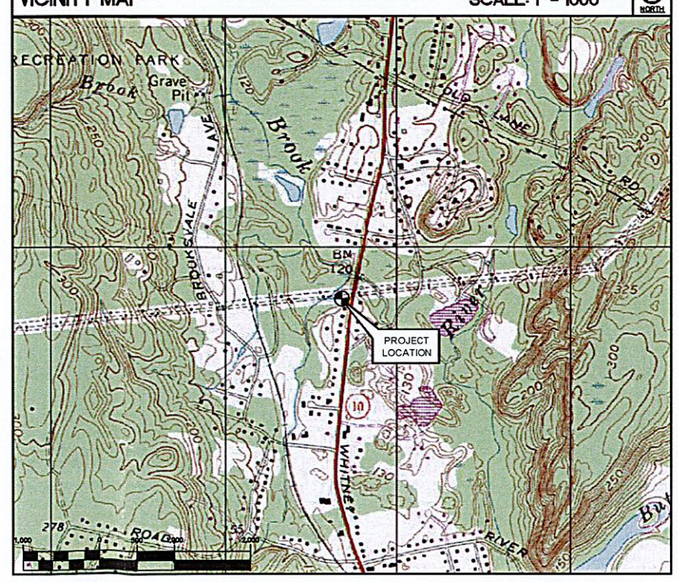
TO: 4286 WHITNEY AVENUE
HAMDEN, CT 06518

1.	Take ramp left for I-91 South	9.1 mi
2.	At exit 18, take ramp right for I-691 West toward Meriden / Waterbury	6.8 mi
3.	At exit 3, take ramp right for CT-10 toward Milldale / Cheshire	0.3 mi
4.	Turn left onto CT-10 / Highland Ave, Pass CHEVROLET in 1.4 mi	1.4 mi
5.	Keep straight onto CT-10 / CT-68 / CT-70 / Highland Ave	4.0 mi
6.	Keep straight onto CT-10 / S Main St, Pass Arby's in 1.4 mi	0.2 mi
	Arrive at 4286 Whitney Ave, Hamden, CT 06518	1.4 mi
		3.6 mi

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK GENERALLY CONSISTS OF THE INSTALLATION OF ONE (1) LTE ANTENNA PER SECTOR FOR A TOTAL OF (3) LTE ANTENNAS TO THE EXISTING AT&T ANTENNA ARRAY. AN LTE BASEBAND EQUIPMENT UNIT (RBS) WILL BE INSTALLED WITHIN THE EXISTING AT&T EQUIPMENT SHELTER.

2. ADDITIONALLY, (2) REMOTE RADIO UNITS (RRUs) PER SECTOR WILL BE INSTALLED. SURGE ARRESTORS WILL BE INSTALLED AT BOTH AT&T RRU AND EQUIPMENT LOCATIONS. REFER TO THESE ACCOMPANYING DRAWINGS FOR FURTHER INFORMATION.

PROJECT INFORMATION

AT&T SITE NUMBER:	CT2255
SITE ADDRESS:	CL&P STRUCT. NO. 4008 4286 WHITNEY AVENUE HAMDEN, CT 06518
LESSEE/APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE, SUITE 3A ROCKY HILL, CT 06067
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT. 06405
PROJECT COORDINATES:	LATITUDE: 41°-26'-53.75"N LONGITUDE: 72°-54'-36.7"W GROUND ELEVATION: ±125'AMSL

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS, SPECIFICATIONS AND DETAIL	0
C-1	PLANS, ELEVATION AND DETAIL	0
C-2	LTE EQUIPMENT DETAILS	0
E-1	ELECTRICAL DETAILS AND NOTES	0
E-2	ELECTRICAL DETAILS	0

DESIGNED BY:			CFC
DRAWN BY:			DEB
CHK'D BY:			CFC
REV.	DATE	DRAWN BY	CHK'D BY	
0	4/30/12	DEB	CFC	CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT
CARLOS F. CARDONA-MORENO
No. 18694
LICENSED
PROFESSIONAL ENGINEER

at&t

NEXLINK

CENTEK engineering
Centered on Solutions
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Branford, CT 06405
www.CentekEng.com

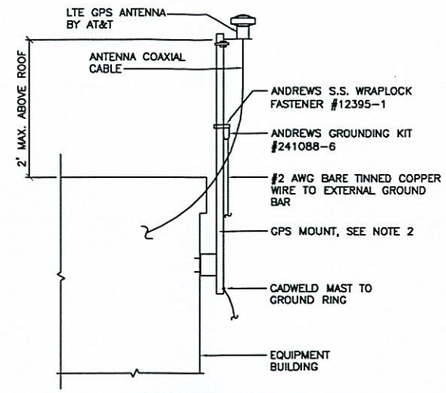
AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY LTE UPGRADE
CT2255
CL&P STRUCT. NO. 4008
4286 WHITNEY AVENUE
HAMDEN, CT 06518

DATE:	03/27/12
SCALE:	AS NOTED
JOB NO.	11118.C032

TITLE SHEET

T-1

Sheet No. 1 of 6



GPS ANTENNA MOUNTING NOTES:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND SHALL BE COORDINATED WITH AT&T'S CONSTRUCTION MANAGER.
2. GPS ANTENNA MOUNT, 3/4"ø THREADED MAST, 4 FEET LONG WITH (4) 7/16" MOUNTING HOLES AND 6" STANDOFF BY SITE PRO 1, INC., TELEPHONE 1-800-438-7761, PART NUMBER GPS1.
3. HOLLOW WALL KITS (HWK38) FOR "STICK BUILD" SHELTERS AND SOLID WALL KITS (SWK38) FOR CONCRETE SHELTERS ARE ALSO AVAILABLE FROM SITE PRO 1.

1 / N-1 GPS ANTENNA MOUNTING DETAIL

NOT TO SCALE

STRUCTURAL SPECIFICATIONS

DESIGN BASIS

GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT STATE BUILDING CODE AND 2009 AMENDMENTS.

1. DESIGN CRITERIA:
   - WIND LOAD (PCS MAST): BASIC WIND SPEED (V) = 85 MPH (BASED ON EIA/TIA-222-F-96 AND NU MAST DESIGN CRITERIA EXCEPTION 1.
   - WIND LOAD (UTILITY POLE & FOUNDATION): BASIC WIND SPEED (V) = 110 MPH (3 SECOND GUST) BASED ON NESC C2-2007, SECTION 25 RULE 250C.
   - BASIC WIND SPEED (OTHER STRUCTURE): 110 MPH (3 SECOND GUST) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-02) PER 2003 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMMENDMENT.
   - SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-95 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.

GENERAL NOTES

1. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.
2. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST THE PRE MANUFACTURED EQUIPMENT BUILDING SHOP DRAWINGS.
3. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
4. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)
   - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   - E. PIPE---ASTM A53 (FY = 35 KSI)
   - F. CONNECTION BOLTS---ASTM A325-N
   - G. U-BOLTS---ASTM A36
   - H. ANCHOR RODS---ASTM F 1554
   - I. WELDING ELECTRODE---ASTM E 70XX
2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLET J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
11. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
12. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
13. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
14. CONNECTIONS SHALL CONFORM TO ALL REQUIREMENTS OF THE "AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR SHELTERS", LATEST EDITION, AND THE "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", LATEST EDITION.
15. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
16. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
17. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
18. FABRICATE BEAMS WITH MILL CAMBER UP.
19. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
20. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
21. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
22. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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

REV.	DATE	DRAWN BY	CHK'D BY	
0	4/30/12	DEB	CFC	CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

at&t

NEXLINK

CENTEK engineering
Centered on Solutions
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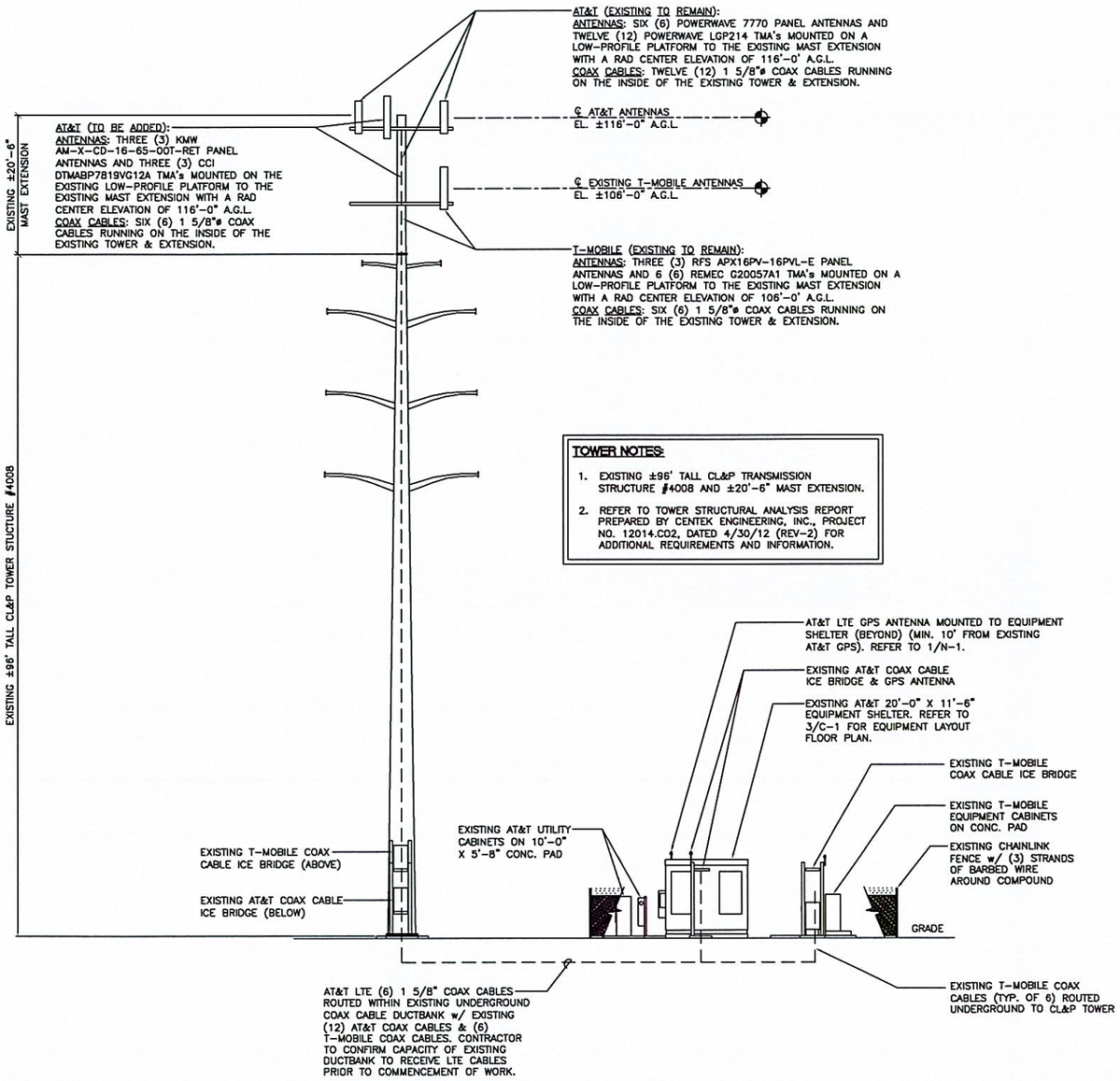
JOB NO.	11118.C032

DESIGN BASIS, SPECIFICATIONS AND DETAIL

N-1

Sheet No. 2 of 6



TOWER NOTES:

1. EXISTING ±96' TALL CL&P TRANSMISSION STRUCTURE #4008 AND ±20'-6" MAST EXTENSION.
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 12014.C02, DATED 4/30/12 (REV-2) FOR ADDITIONAL REQUIREMENTS AND INFORMATION.

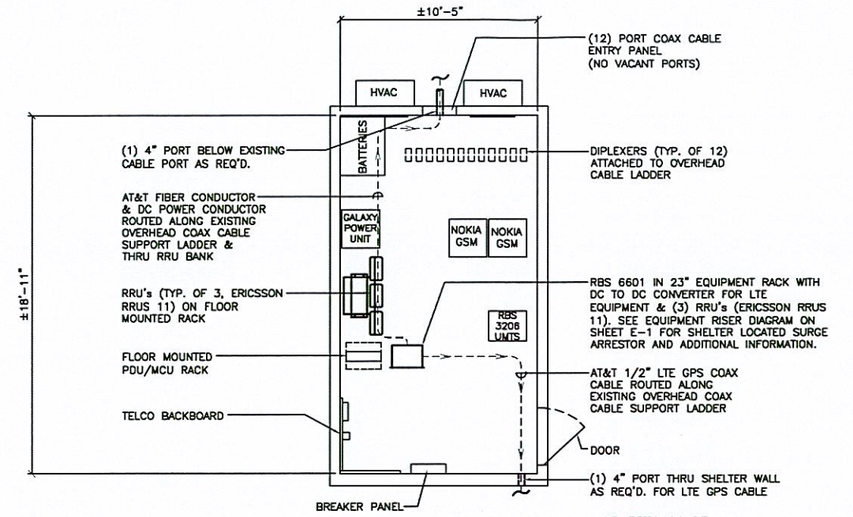
2 / C-1 NORTH ELEVATION

SCALE: 1" = 10'-0"

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.



3 / C-1 EQUIPMENT BUILDING FLOOR PLAN

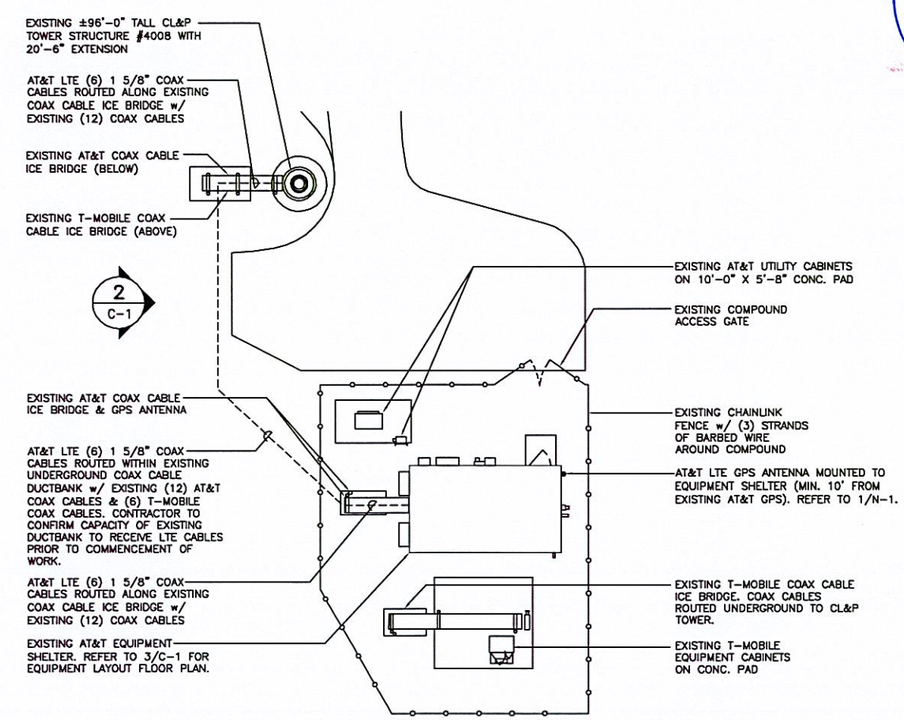
SCALE: 1/4" = 1'-0"

APPROX. NORTH

GRAPHIC SCALE

4 0 2 4 8 16

(IN FEET)
1 inch = 4 ft.



1 / C-1 COMPOUND PLAN

SCALE: 1" = 10'-0"

APPROX. NORTH

GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

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

REV.	DATE	DRAWN BY	CHK'D BY	
0	4/30/12	DEB	CFC	CONSTRUCTION

STATE OF CONNECTICUT
CARL FRANCIS CHIARENZA JR.
No. 16694
LICENSED
PROFESSIONAL ENGINEER

at&t

NEXLINK

CENTEK engineering
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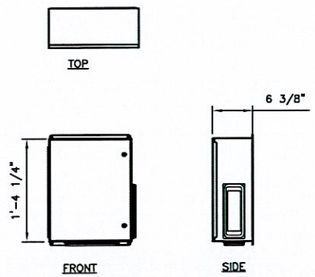
PLANS AND ELEVATION

C-1

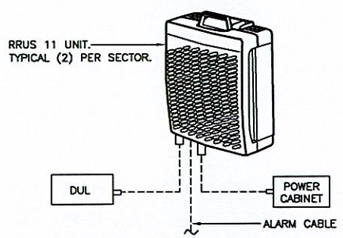
Sheet No. 3 of 6



SURGE ARRESTOR			
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION
TOWER	MAKE: RAYCAP **MODEL: DC6-48-60-0-1B**	(1) PER SITE	EQUIPMENT SHELTER

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

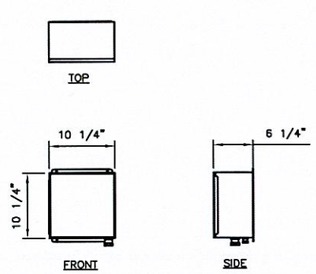
5 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERRICSON **MODEL: RRUS 11**	17.8"L x 17.3"W x 7.2"D	BAND 4: 44 LBS. BAND 12: 50 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. SIDE: 0" MIN.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

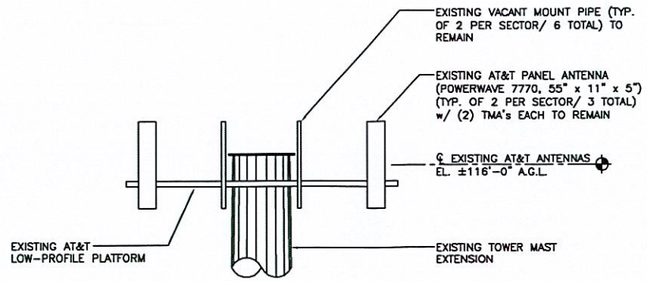
6 / C-2 RRU DETAIL
NOT TO SCALE



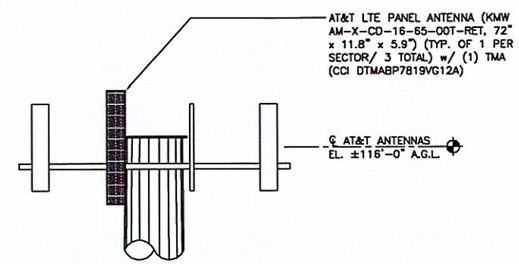
SURGE ARRESTOR				
SITE TYPE	ARRESTOR MAKE/MODEL	QTY REQUIRED	ARRESTOR LOCATION	WEIGHT
TOWER	MAKE: RAYCAP **MODEL: DC2-48-60-0-9E**	(1) PER SITE	EQUIPMENT SHELTER	16 LBS.

NOTES:
1. CONTRACTOR TO COORDINATE FINAL SURGE ARRESTOR MODEL SELECTION(S) WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.
2. CONTRACTOR TO INSTALL ARRESTOR IN CONFORMANCE WITH MANUFACTURERS RECOMMENDATIONS.

7 / C-2 SURGE ARRESTOR DETAIL
NOT TO SCALE



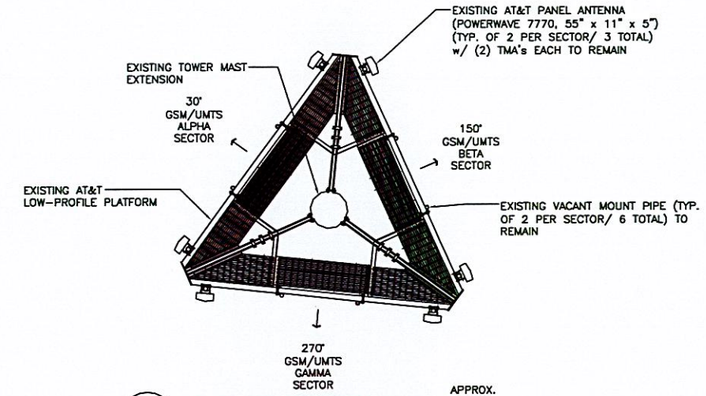
2 / C-2 ANTENNA SECTOR ELEVATION - EXISTING
SCALE: 1/4" = 1'-0"



NOTE:
REPLACE EXISTING MOUNT PIPE AS REQUIRED TO ACCOMMODATE LTE ANTENNA LENGTH.

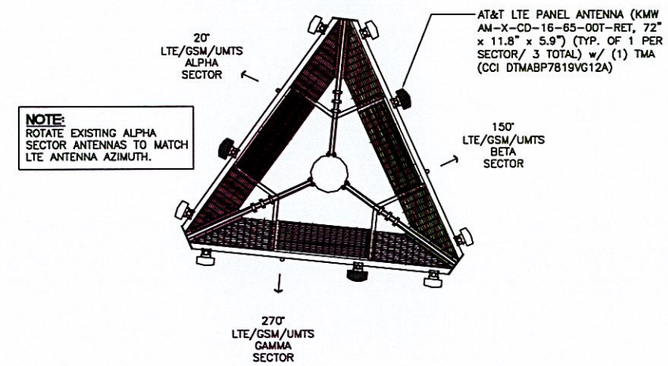
4 / C-2 ANTENNA SECTOR ELEVATION - PROPOSED
SCALE: 1/4" = 1'-0"

REFER TO FINAL AT&T RF ENGINEER'S RF RADIO PLAN PRIOR TO INSTALLATION OF ANTENNAS AND COAX



1 / C-2 EXISTING ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH



NOTE:
ROTATE EXISTING ALPHA SECTOR ANTENNAS TO MATCH LTE ANTENNA AZIMUTH.

3 / C-2 PROPOSED ANTENNA PLAN
SCALE: 1/4" = 1'-0"

APPROX. NORTH

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

REV.	DATE	DRAWN BY	CHK'D BY	
	4/30/12	DEB	CFC	CONSTRUCTION

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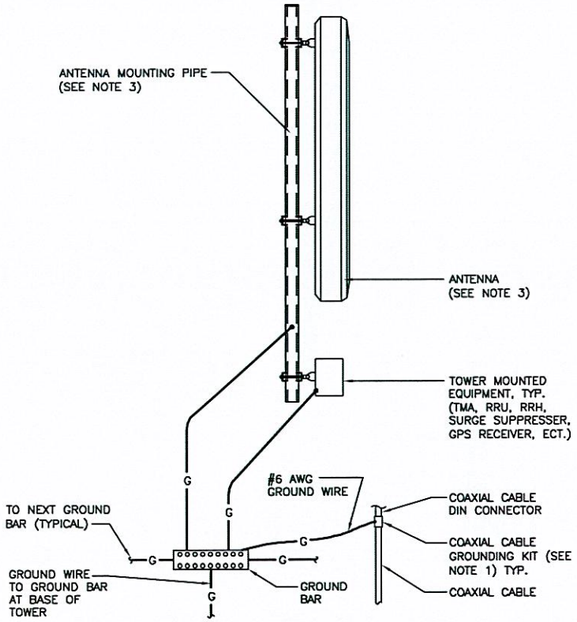
JOB NO.	11118.C032

LTE EQUIPMENT DETAILS

C-2

Sheet No. 4 of 6

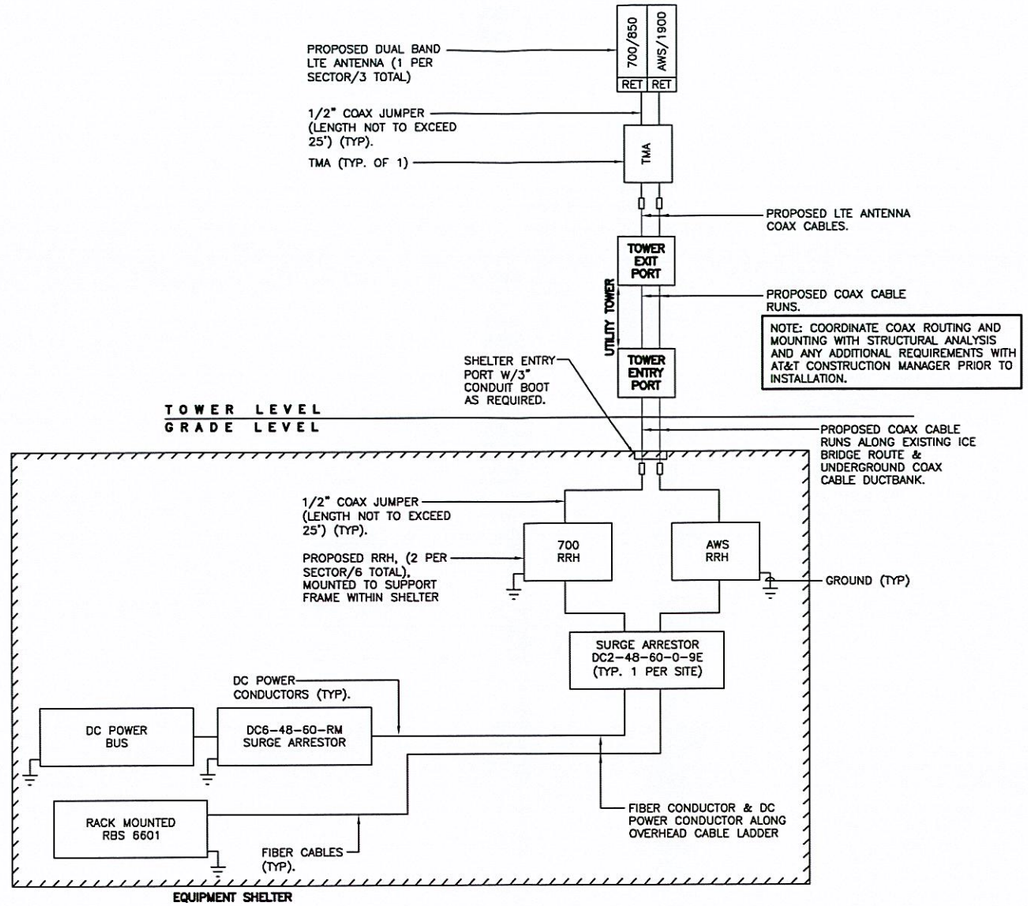


NOTES:

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

1 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

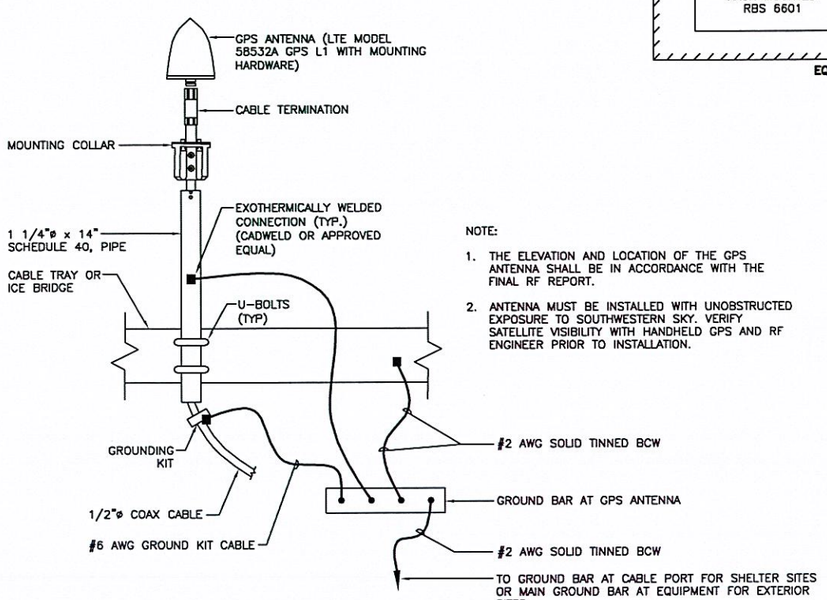


NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURERS RECOMMENDATIONS.

2 / E-1 LTE SCHEMATIC DIAGRAM

NOT TO SCALE



NOTE:

1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. ANTENNA MUST BE INSTALLED WITH UNOBSTRUCTED EXPOSURE TO SOUTHWESTERN SKY. VERIFY SATELLITE VISIBILITY WITH HANDHELD GPS AND RF ENGINEER PRIOR TO INSTALLATION.

3 / E-1 GPS MOUNTED TO CABLE TRAY / ICE BRIDGE

NOT TO SCALE

ELECTRICAL NOTES

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

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

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

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

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

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

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

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

DESIGNED BY:	CKD
DRAWN BY:	TJB
CHK'D BY:	CKD

REV.	DATE	DRAWN BY	CHK'D BY	
0	4/30/12	DEB	CFC	CONSTRUCTION

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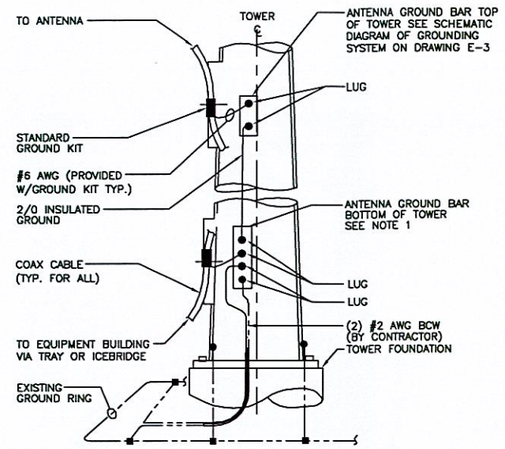
JOB NO.	11118.C032

ELECTRICAL DETAILS AND NOTES

E-1

Sheet No. 5 of 6

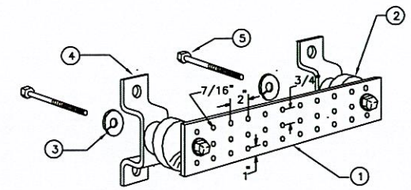


NOTES:

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

1 / E-2 ANTENNA CABLE GROUNDING - TOWER

NOT TO SCALE

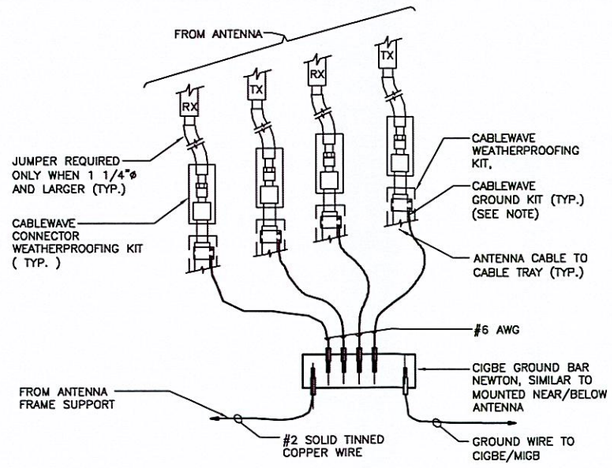


LEGEND

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

2 / E-2 GROUND BAR DETAIL

NOT TO SCALE

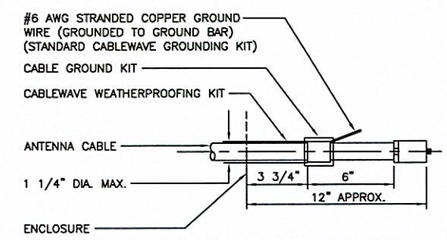


NOTE:

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

3 / E-2 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE



NOTE:

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

4 / E-2 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

DESIGNED BY:	CKD
DRAWN BY:	TJB
CHK'D BY:	CKD

REV.	DATE	DRAWN BY	CHK'D BY	
0	4/30/12	DEB	CFC	CONSTRUCTION

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HAMDEN, CT 06518

DATE:	03/27/12
SCALE:	AS NOTED
JOB NO.	11118.C032

ELECTRICAL DETAILS

E-2

Sheet No. 6 of 6

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support@csquaredsystems.com

Calculated Radio Frequency Emissions

CT2255

(Hamden NU)

4286 Whitney Avenue, Hamden, CT 06518

(a.k.a. 4280 Whitney Avenue)

August 29, 2012

Table of Contents

1. Introduction 1
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits 1
3. RF Exposure Prediction Methods 2
4. Calculation Results 3
5. Conclusion 4
6. Statement of Certification 4
Attachment A: References 5
Attachment B: FCC Limits for Maximum Permissible Exposure (MPE) 6
Attachment C: AT&T Antenna Data Sheets and Electrical Patterns 8

List of Tables

Table 1: Carrier Information 3
Table 2: FCC Limits for Maximum Permissible Exposure (MPE) 6

List of Figures

Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE) 7

1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed modifications to the existing AT&T antenna arrays mounted on the high tension power line tower located at 4286 Whitney Avenue in Hamden, CT. The coordinates of the tower are 41° 26' 53.69" N, 72° 54' 36.63" W.

AT&T is proposing the following modifications:

1) Install three LTE 700 MHz antennas (one per sector).

2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

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

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

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

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

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

3. RF Exposure Prediction Methods

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

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

Where:

EIRP = Effective Isotropic Radiated Power

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

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Ground reflection factor of 1.6

Off Beam Loss is determined by the selected antenna pattern

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

4. Calculation Results

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

Carrier	Antenna Height (Feet)	Operating Frequency (MHz)	Number of Trans.	ERP Per Transmitter (Watts)	Power Density (mw/cm^2)	Limit	%MPE
Cingular	*116*	*880*	*6*	*296*	*0.0475*	*0.5867*	*8.09%*
Cingular	*116*	*1930*	*3*	*427*	*0.0342*	*1.0000*	*3.42%*
T-Mobile	106	1935	8	166	0.0425	1.0000	4.25%
AT&T UMTS	116	880	2	565	0.0030	0.5867	0.51%
AT&T UMTS	116	1900	2	875	0.0047	1.0000	0.47%
AT&T LTE	116	734	1	1313	0.0035	0.4893	0.72%
AT&T GSM	116	880	1	283	0.0008	0.5867	0.13%
AT&T GSM	116	1900	4	525	0.0056	1.0000	0.56%
						Total	**6.64%**

Table 1: Carrier Information[1 2 3]

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

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

[3] Antenna height listed for AT&T is in reference to the Centek Engineering Structural Analysis Report dated April 30, 2012.

5. Conclusion

The above analysis verifies that emissions from the existing site will be below the maximum power density levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Even when using conservative methods, the cumulative power density from the proposed transmit antennas at the existing facility is well below the limits for the general public. The highest expected percent of Maximum Permissible Exposure at ground level is **6.64% of the FCC limit**.

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

6. Statement of Certification

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

Daniel L. Goulet
C Squared Systems, LLC

August 29, 2012
Date

Attachment A: References

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

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

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

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

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

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

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

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

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

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

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

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

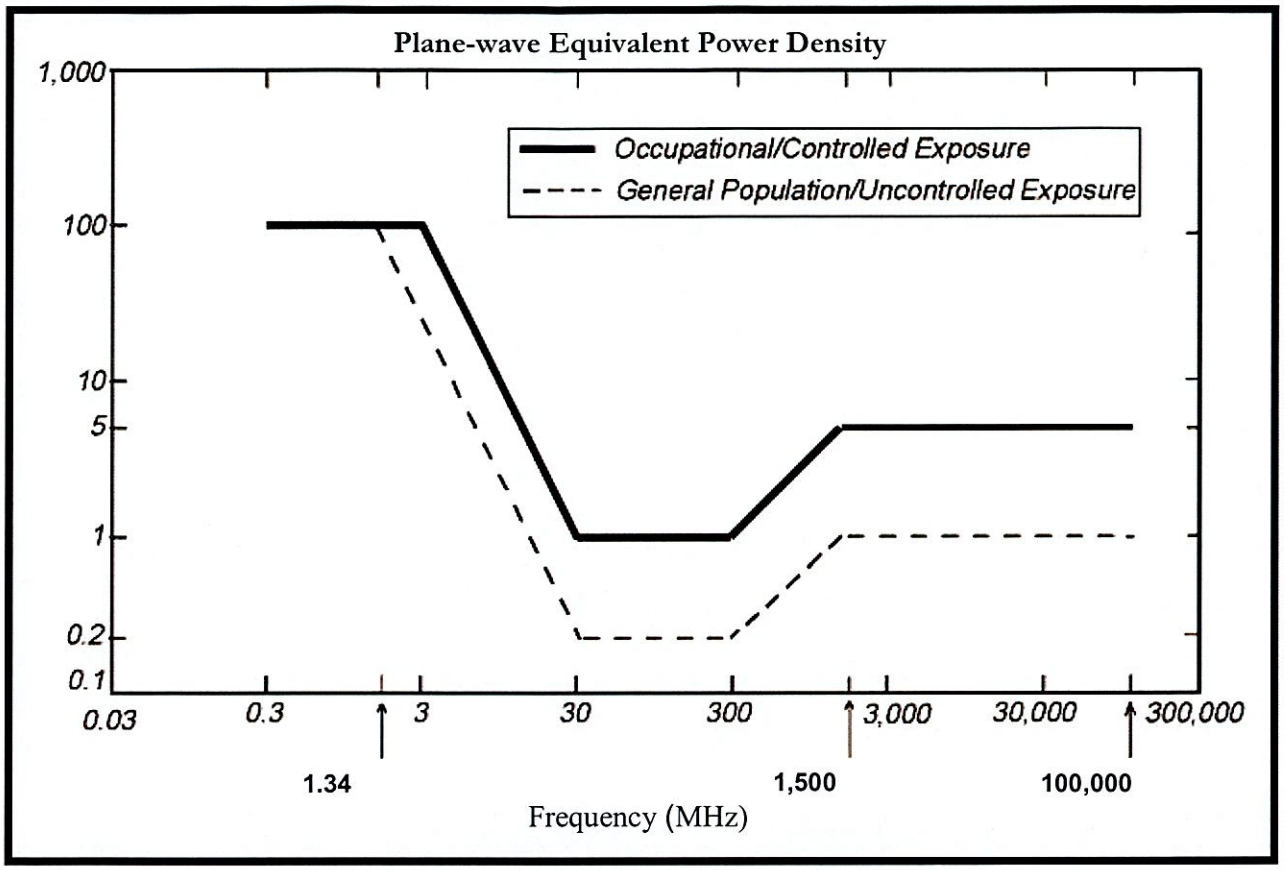
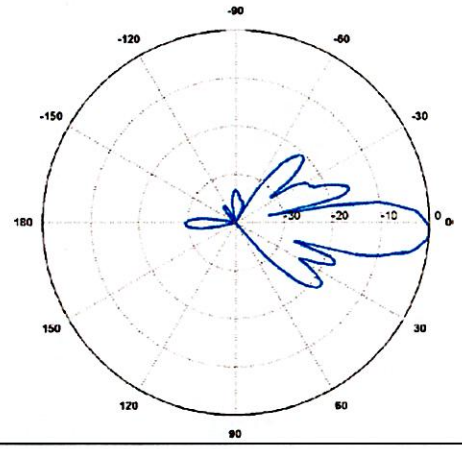


Figure 1: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

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

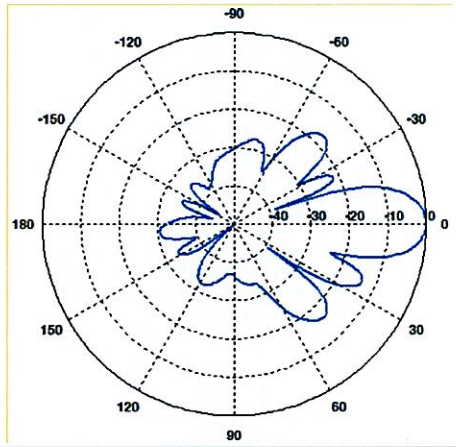
700 MHz

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



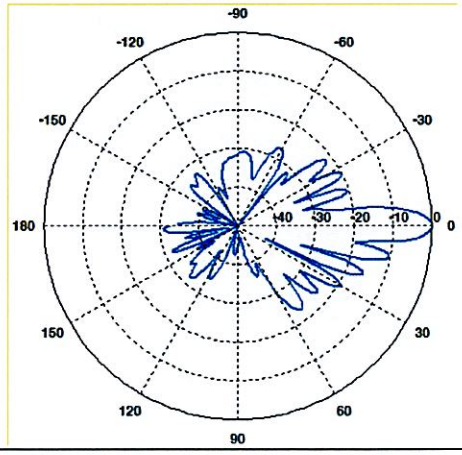
850 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	824-896 MHz
Gain:	11.5 dBd
Vertical Beamwidth:	15°
Horizontal Beamwidth:	82°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



1900 MHz

Manufacturer:	Powerwave
Model #:	7770.00
Frequency Band:	1850-1990 MHz
Gain:	13.4 dBd
Vertical Beamwidth:	7°
Horizontal Beamwidth:	86°
Polarization:	Dual Linear ± 45°
Size L x W x D:	55.0" x 11.0" x 5.0"



CENTEK engineering

Centered on Solutions℠

Structural Analysis of PCS Mast and CL&P Pole

AT&T Site Ref: CT2255 Hamden-NU

CL&P Structure No. 4008
96' Electric Transmission Pole
w/ 20.5-ft Extension

4286 Whitney Ave.
Hamden, CT

CENTEK Project No. 12014.CO2

~~Date: March 20, 2012~~
~~Rev 1: March 29, 2012~~
Rev 2: April 30, 2012

STATE OF CONNECTICUT
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Table of Contents

SECTION 1 - REPORT

- INTRODUCTION
- PRIMARY ASSUMPTIONS USED IN THE ANALYSIS
- ANALYSIS
- DESIGN BASIS
- RESULTS
- CONCLUSION

SECTION 2 - CONDITIONS & SOFTWARE

- STANDARD ENGINEERING CONDITIONS
- GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAMS
  - RISA TOWER
  - PLS POLE

SECTION 3 - DESIGN CRITERIA

- CRITERIA FOR DESIGN OF PCS FACILITIES ON OR EXTENDING ABOVE METAL ELECTRIC TRANSMISSON TOWERS
- NU DESIGN CRITERIA TABLE
- PCS SHAPE FACTOR CRITERIA
- WIRE LOADS SHEET

SECTION 4 - DRAWINGS

- EL-1 POLE AND MAST ELEVATION

SECTION 5 - MAST ANALYSIS PER EIA/TIA-222F

- RISATOWER ANALYSIS REPORT
- MAST CONNECTION TO CL&P POLE ANALYSIS

SECTION 6 - NECS/NU LOAD CALCULATIONS FOR OBTAINING LOADS APPLIED TO UTILITY STRUCTURE

- MAST WIND LOAD

SECTION 7 - PLS POLE ANALYSIS

- COAX CABLE LOAD ON CL&P POLE CALCULATION
- PLS REPORT
- ANCHOR BOLT ANALYSIS.
- MATHCAD CAISSON FOUNDATION ANALYSIS.
- L-PILE CAISSON ANALYSIS.
- L-PILE LATERAL DEFLECTION VS. DEPTH.
- L-PILE BENDING MOMENT VS. DEPTH.
- L-PILE SHEAR FORCE VS. DEPTH.

SECTION 8 - REFERENCE MATERIAL

- EQUIPMENT CUT SHEETS

Introduction

The purpose of this report is to analyze the existing mast and 96' CL&P pole located at 4286 Whitney Ave., in Hamden, CT for the proposed antenna and equipment upgrade by AT&T.

The existing/proposed loads consist of the following:

- T-MOBILE (Existing to Remain):
  Antennas: Three (3) RFS APX16PV-16PVL-E panel antennas and six (6) Remec G20057A1 TMAs mounted with a RAD center elevation of 106-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the interior of the CL&P pole.
- AT&T (Existing to Remain):
  Antennas: Six (6) Powerwave 7770 panel antennas and twelve (12) Powerwave LGP-21401 TMAs mounted with a RAD center elevation of 116-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the interior of the CL&P pole.
- **AT&T (Proposed):**
  Antennas: Three (3) KMW AM-X-CD-16-65-00T-RET panel antennas and three (3) CCI DTMABP7819VG12A TMAs mounted with a RAD center elevation of 116-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables running on the interior of the CL&P pole.

Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9th edition for design of the PCS Mast and antenna supporting elements.
- ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", defines allowable steel stresses for evaluation of the CL&P utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

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

The PCS mast consisting of a 20.5-ft long 12-sided tapered shaft conforming to ASTM A572 Grade 65 specifications flange connected to the top of the CL&P tower was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details this analysis. NESC prescribed loads were also applied to the PCS Mast in order to analyze the CL&P pole structure. These loads are developed in Section 6 of this report.

Design Basis

Our analysis was performed in accordance with TIA/EIA-222-F-1996, ASCE Manual No. 72 – "Design of Steel Transmission Pole Structures Second Edition", NESC C2-2007 and Northeast Utilities Design Criteria.

The CL&P pole structure, considering existing and future conductor and shield wire loading, with the pcs antenna mast was analyzed under three conditions:

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole 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. 72.

  Load cases considered:

  Load Case 1: NESC Heavy
  Wind Pressure..... 4.0 psf
  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"

  Load Case 3: NESC Extreme Ice w/ Wind
  Wind Pressure..... 6.4 psf
  Radial Ice Thickness..... 0.75"
  Vertical Overload Capacity Factor..... 1.0
  Wind Overload Capacity Factor..... 1.0

  Note 1: 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

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

Load cases considered:

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

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

Note 2: Per NU Mast Design Criteria Exception 1.

Results

- MAST ASSEMBLY

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

Member	Stress Ratio (% of capacity)	Result
20.5-ft long tapered 12-sided shaft	26.3%	**PASS**
Flange Bolts	30.0%	**PASS**
Flange Plate	12.8%	**PASS**

- UTILITY POLE

This analysis finds that the subject utility pole is adequate to support the existing antenna mast and related appurtenances. The pole stresses meet the requirements set forth by the ASCE Manual No. 72, "Design of Steel Transmission Pole Structures Second Edition", for the applied NESC Heavy and NESC Extreme. The detailed analysis results are provided in Section 7 of this report. The analysis results are summarized as follows:

A maximum usage of **66.65%** occurs in the utility pole base plate under the **NESC Extreme Wind** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 2	45.00' - 96.00' (AGL)	65.95%	**PASS**

BASE PLATE:
The base plate was found to be within allowable limits from the PLS output based on 24 bend lines.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	66.65%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft ∅ x 27.5-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (20) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8-ft into the concrete foundation structure. Foundation information was obtained from the original Paul J. Ford and Company foundation design Job no. 29205-0284.

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

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	24.88 kips	95.23 kips	1942.51 ft-kips
NESC Extreme Wind	48.62 kips	45.16 kips	3764.76 ft-kips
NESC Extreme Ice w/ Wind	19.89 kips	82.97 kips	1590.78 ft-kips

Note 1 – 10% increase applied to tower base reactions per OTRM 051

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	57.07%	**PASS**

FOUNDATION:

The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	59.1%	**PASS**
	Lateral Deflection	1.04 in.(1)	**PASS**

Note 1: Lateral deflection limited to L/100 per OTRM 059 Rev 4 dated 2/01/10. (L/100 = 27.5'*12/100=3.3-in)
Note 2: 10% increase to PLS base reactions used in foundation analysis per OTRM 051.

Conclusion

This analysis shows that the subject utility pole **is adequate** to support the proposed AT&T equipment upgrade.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Carlo F. Centore, PE
Principal ~ Structural Engineer

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

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots. RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Results Features:

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM~PLS-POLE

PLS-POLE provides all of the capabilities a structural engineer requires to design transmission, substation or communications structures. It does so using a simple easy to use graphical interface that rests upon our time tested finite element engine. Regardless of whether you want to model a simple wood pole or a guyed steel X-Frame; PLS-POLE can handle the job simply, reliably and efficiently.

Modeling Features:

- Structures are made of standard reusable components that are available in libraries. You can easily create your own libraries or get them from a manufacturer
- Structure models are built interactively using interactive menus and graphical commands
- Automatic generation of underlying finite element model of structure
- Steel poles can have circular, 4, 6, 8, 12, 16, or 18-sided, regular, elliptical or user input cross sections (flat-to-flat or tip-to-tip orientations)
- Steel and concrete poles can be selected from standard sizes available from manufacturers
- Automatic pole class selection
- Cross brace position optimizer
- Capability to specify pole ground line rotations
- Capability to model foundation displacements
- Can optionally model foundation stiffness
- Guys are easily handled (modeled as exact cable elements in nonlinear analysis)
- Powerful graphics module (members color-coded by stress usage)
- Graphical selection of joints and components allows graphical editing and checking
- Poles can be shown as lines, wire frames or can be rendered as 3-d polygon surfaces

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and 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
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- 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
- Automatic tracking of part numbers and costs

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 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 Standard 222 with two exceptions:

1. An 85 mph extreme wind speed shall be used for locations in all counties throughout the NU system.
2. The stress increase of TIA Section 3.1.1.1 is disallowed. The combined wind and ice condition shall consider ½" radial ice in combination with the wind load (0.75 Wi) as specified in TIA section 2.3.16.

ELECTRIC TRANSMISSION TOWER

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

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

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

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

Northeast Utilities
Overhead Transmission Standards

Attachment A

NU Design Criteria

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

* Only for Structures Installed after 2007

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

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

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

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

c) Electric Transmission Structure

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

ii) Shape Factor Multiplier:

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

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

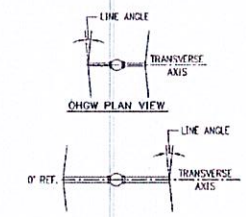
Mount Type	Cable Cd	Pole Cd
Coaxial Cables on outside periphery (One layer)	1.45	1.45
Coaxial Cables mounted on stand offs	1.6	1.3

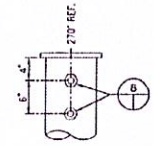
d) The uniform loadings and factors specified for the above components in Attachment A, "NU Design Criteria" are based upon the National Electric Safety Code 2007 Edition Extreme Wind (Rule 250C) and Combined Ice and Wind (Rule 250B-Heavy) Loadings. These provide equivalent loadings compared to the TIA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

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

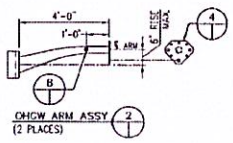
e) Mast reaction loads shall be evaluated for local effects on the transmission structure members at the attachment points.

If the electric transmission structure is not sufficient to support the additional loadings of the wireless communication mast, reinforcement will be required to upgrade the strength of the overstressed members. Any reinforcement design will be reviewed by NU TL&CE to determine the feasibility of construction and its impact on the use of the structure as a transmission structure.

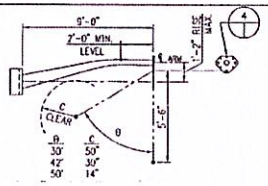




AERIAL MARKER ATTACHMENT (1)
(1 PLACE)



OHGW ARM ASSY (2)
(2 PLACES)

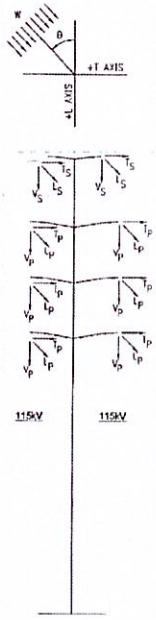


115kV ARM ASSEMBLY (3)
(6 PLACES)

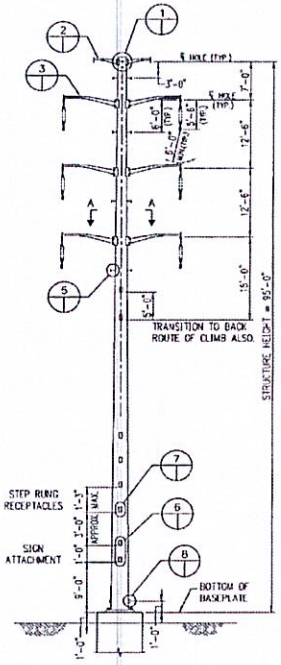
NOTES:

1. ALL INDICATED LOADS ARE ULTIMATE AND INCLUDE ALL OVERLOAD FACTORS.
2. V, T & L ARE IN KIPS AND ARE THE STRUCTURES VERTICAL, TRANSVERSE AND LONGITUDINAL AXIS RESPECTIVELY.
3. W IS THE WIND LOAD APPLIED TO THE STRUCTURE IN PSF. A SHAPE FACTOR OF 1.3 SHALL BE APPLIED TO "W".
4. THETA IS THE ANGLE IN DEGREES BETWEEN THE L-AXIS AND THE WIND DIRECTION AS SHOWN ON THE LOADING TREE DIAGRAM.
5. THE DEAD LOAD OF THE STRUCTURE SHALL BE MULTIPLIED BY K.
6. PROVIDE STEP RUNG RECEPTACLES FOR CLIMBING, STARTING APPROXIMATELY 13'-0" ABOVE GROUND TO THE TOP OF THE STRUCTURE IN CENTER OF FLAT 6 (SEE RECEPTACLE LOCATIONS) AND AS NOTED FOR BACK ROUTE OF CLIMB TO TOP. PROVIDE ADDITIONAL RECEPTACLES ON FLATS WHERE NECESSARY, SO THAT ALL PARTS OF THE STRUCTURE, INSULATORS, AND HARDWARE ASSEMBLIES CAN BE REACHED FOR MAINTENANCE.

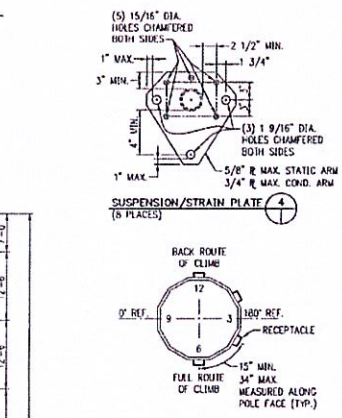
   CAUTION: "CLIMBING SPACE" HAS BEEN PROVIDED FOR CLIMBING CLEARANCE TO ENERGIZED CONDUCTORS. ADDITIONAL STEP RUNG LOCATIONS MAY NOT PROVIDE ELECTRICAL CLEARANCES TO ENERGIZED CONDUCTORS.
7. STRUCTURE SHALL BE DESIGNED FOR THE FOLLOWING OPTIONS:
   A. ALL CONDUCTORS AND GROUNDWIRES INSTALLED.
   B. ONE GROUNDWIRE AND THREE PHASES ON ONE SIDE INSTALLED.
   C. OPTIONS A. & B. ABOVE AND THE BROKEN CONDUCTOR LOADING CASE APPLIED SINGULARLY AT EACH LOAD POINT.
   D. OPTIONS A. & B. ABOVE AND THE BROKEN SHIELD WIRE LOADING CASE APPLIED SINGULARLY AT EACH LOAD POINT.
8. TTI IN STRUCTURE TYPE DESIGNATION REFERS TO THE HEIGHT OF THE STRUCTURE ABOVE ITS FOUNDATION.
9. QUANTITIES OF BOLTS AS REQUIRED BY SPECIFICATIONS.



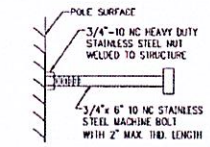
LOADING TREE



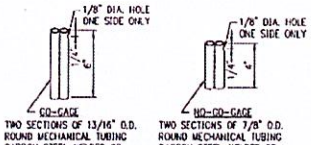
ELEVATION



SUSPENSION/STRAIN PLATE (4)
(6 PLACES)



REMOVABLE GROUNDING BOLT (5)
(8 PLACES) SEE NOTE 9.

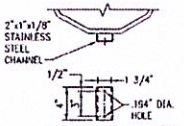


TWO SECTIONS OF 13/16" O.D. ROUND MECHANICAL TUBING CARBON STEEL-WELDED OR BRAZED TOGETHER. THICKNESS OF TUBING SUFFICIENT FOR WELDING OR BRAZING.

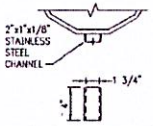
TWO SECTIONS OF 7/8" O.D. ROUND MECHANICAL TUBING CARBON STEEL-WELDED OR BRAZED TOGETHER. THICKNESS OF TUBING SUFFICIENT FOR WELDING OR BRAZING.

RECEPTACLE GAGES

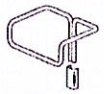
RECEPTACLE LOCATIONS



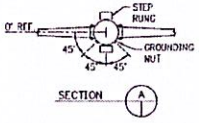
SIGN ATTACHMENT (6)
(2 PLACES)



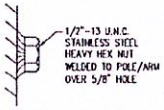
STEP RUNG RECEPTACLE (7)
(AS REQ'D)



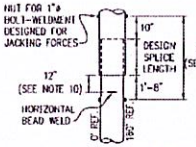
RECEPTACLE & STEP RUNG



SECTION (A)



GROUNDING LUG (B)
(6 PLACES)



SPLICE DETAILS JACKING NUT LOCATIONS

NOTES:

10. PERMISSIBLE VARIATION FROM THIS 12" DESIGN DIMENSION SHALL BE INDICATED IN FINAL DESIGN AND ERECTION DRAWING.
11. THE 10" AND 1'-8" DIMENSIONS MAY BE INCREASED TO ACHIEVE THIS 60" MIN.

TYPE 11-OCSP-02-UGC TTT
115kV CONDUCTOR: 1 - 1590 KCMIL 45/7 ACSR "LAPWING" CONDUCTOR PER PHASE (14000# @ NESC HEAVY, FINAL)
OPGW: SI-84 144 FIBERS 0.668 DIA. 0.477 lbs./FT. (5500# @ NESC HEAVY, FINAL)
WIND SPAN: 800 FT.
WEIGHT SPAN: 1200 FT.
LINE ANGLE: 0-2 DEGREES

CKT. #1640	
STR. NO.	HEIGHT
-	-
-	-
-	-
-	-
-	-
-	-
-	-
-	-

LOADING CASE					DESIGN LOADS								
NO.	DESCRIPTION	TEMP. F	ICE R=IN	WIND MPH	V_S	T_S	L_S	V_P	T_P	L_P	W	θ	K
1	NESC HEAVY (250 B)	0	0.50	39.5	2.20	1.43	0	5.84	2.44	0	10.0	90	1.50
2	NO HEAVY ICE	0	1.00	0.0	3.40	0.28	0	6.86	0.67	0	0.0	90	1.10
3	ASCE ICE/WIND (NESC PROPOSED 250 D)	32	0.75	50.0	2.40	1.26	0	5.41	1.96	0	7.0	90	1.10
4	NESC EXT. WIND (250 C)	60	0.00	112.0	0.66	1.78	0	2.53	4.07	0	40.7	90	1.10
5	BROKEN SHIELD WIRE	0	0.50	39.5	2.20	1.25	5.55	5.84	2.39	0	4.4	90	1.10
6	BROKEN CONDUCTOR	0	0.50	39.5	2.20	1.39	0	5.84	2.03	14.49	4.4	90	1.10
7	UNBALANCED ICE	0	0.50	39.5	2.20	1.32	2.75	5.84	2.27	4.72	4.4	90	1.10
8	DEFLECTION	60	0.00	0.0	0.60	0.07	0	2.30	0.23	0	0.0	90	1.00
9	CONSTRUCTION	30	0.00	30.0	2.54	0.29	0.23	8.62	0.84	0.88	3.5	90	1.50

DRAWING NOT TO SCALE

Burns & McDonnell
SINCE 1898
38565

CAD GENERATED DWG. MAKE NO MANUAL CHANGES

date	detailed
JUNE 2, 2005	D.D. LAURSEN
designed	checked
J.J. WELLER	MEC

NO	DATE	REVISIONS	BY	CHK	APP	APP

NORTHEAST UTILITIES SERVICE CO.

FOR THE CONNECTICUT LIGHT & POWER CO.

TITLE 115-kV DOUBLE CIRCUIT MONOPOLE
0-2 DEGREE TANGENT
11-OCSP-02-UGC TTT

BY BALD	CHKD -	APP -	APP -
DATE 6/01/2005	DATE -	DATE -	DATE -
SCALE NONE	D	DWG. NO. CINGULAR	

*** Loads Data

Loads from file: x:\jobs 25000\25050\eng\spole\hamden hybrid rev1.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 (lowest joint)	0.00	(ft)
Ground elevation shift	0.00	(ft)
Z of ground with shift	0.00	(ft)
Z of structure top (highest joint)	116.50	(ft)
Structure height	116.50	(ft)
Structure height above ground	116.50	(ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insula.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Pole Deflection Check	Pole Deflection Limit % or (ft)
NESC HEAVY	1.5000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	10	0	0.500	56.000	No Limit	0
NU HEAVY ICE	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	0	0	1.000	56.000	No Limit	0
ASCE ICE/WIND	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	7	0	0.750	56.000	No Limit	0
EX WIND	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	40.7	0	0.000	56.000	No Limit	0
UNBALANCED ICE	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	4.4	0	0.500	56.000	No Limit	0
DEFLECTION	1.0000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	0	0	0.000	56.000	No Limit	0
CONSTRUCTION	1.5000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	3.5	0	0.000	56.000	No Limit	0
EIA	1.0000	1.0000	0.80000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	41.12	0	0.000	56.000	No Limit	0
BROKEN SW	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	4.4	0	0.500	56.000	No Limit	0
BROKEN COND	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	10 loads	Wind on All	4.4	0	0.500	56.000	No Limit	0
NESC HEAVY 1 SIDE	1.5000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	10	0	0.500	56.000	No Limit	0
NU HEAVY ICE 1 SIDE	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	0	0	1.000	56.000	No Limit	0
ASCE ICE/WIND 1 SIDE	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	7	0	0.750	56.000	No Limit	0
EX WIND 1 SIDE	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	40.7	0	0.000	56.000	No Limit	0
UNBALANCED ICE 1SIDE	1.1000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	4.4	0	0.500	56.000	No Limit	0
DEFLECTION 1 SIDE	1.0000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	0	0	0.000	56.000	No Limit	0
CONSTRUCTION 1 SIDE	1.5000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	3.5	0	0.000	56.000	No Limit	0
EIA 1 SIDE	1.0000	1.0000	0.80000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	6 loads	Wind on All	41.12	0	0.000	56.000	No Limit	0

Point Loads for Load Case "NESC HEAVY":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
25050:P1	5010	1320	0	
25050:P2	4110	1500	0	
SWL:T	2200	1430	0	
SWR:T	2200	1430	0	
C1L:T	5840	2440	0	
C2L:T	5840	2440	0	
C3L:T	5840	2440	0	
C1R:T	5840	2440	0	
C2R:T	5840	2440	0	
C3R:T	5840	2440	0	

Detailed Pole Loading Data for Load Case "NESC HEAVY":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole	Top	Bottom	Section	Section	Section	Outer	Reynolds	Drag	Adjusted	Adjusted	Pole	Pole	Pole	Ice	Pole	Ice	Tran.	Long.

25050	25050:P2		106.00	101.00	103.50	24.225	0	1.300	0.00	1.00	271.22	0.00	151.46	0.00	0.00	0.00
25050			101.00	96.00	98.50	25.850	0	1.300	0.00	1.00	289.57	0.00	161.62	0.00	0.00	0.00
25050		25050:A1	96.00	94.50	95.25	27.156	0	1.300	0.00	1.00	151.41	0.00	50.94	0.00	0.00	0.00
25050	25050:A1		94.50	90.67	92.58	28.022	0	1.300	0.00	1.00	399.16	0.00	134.20	0.00	0.00	0.00
25050		25050:A2	90.67	86.84	88.75	29.267	0	1.300	0.00	1.00	417.09	0.00	140.16	0.00	0.00	0.00
25050	25050:A2		86.84	81.84	84.34	30.702	0	1.300	0.00	1.00	571.48	0.00	191.95	0.00	0.00	0.00
25050			81.84	78.09	79.96	32.124	0	1.300	0.00	1.00	448.67	0.00	150.63	0.00	0.00	0.00
25050		25050:A3	78.09	74.34	76.21	33.343	0	1.300	0.00	1.00	465.86	0.00	156.35	0.00	0.00	0.00
25050	25050:A3		74.34	69.34	71.84	34.765	0	1.300	0.00	1.00	647.88	0.00	217.35	0.00	0.00	0.00
25050			69.34	65.59	67.47	36.186	0	1.300	0.00	1.00	505.96	0.00	169.68	0.00	0.00	0.00
25050		25050:A4	65.59	61.84	63.72	37.405	0	1.300	0.00	1.00	523.15	0.00	175.40	0.00	0.00	0.00
25050	25050:A4		61.84	56.84	59.34	38.827	0	1.300	0.00	1.00	724.28	0.00	242.75	0.00	0.00	0.00
25050			56.84	53.67	55.26	40.155	0	1.300	0.00	1.00	475.02	0.00	159.17	0.00	0.00	0.00
25050			53.67	50.50	52.08	41.185	0	1.300	0.00	1.00	487.30	0.00	163.25	0.00	0.00	0.00
25050			50.50	47.75	49.12	41.834	0	1.300	0.00	1.00	1027.59	0.00	143.86	0.00	0.00	0.00
25050			47.75	45.00	46.37	42.416	0	1.300	0.00	1.00	1049.59	0.00	145.85	0.00	0.00	0.00
25050			45.00	40.00	42.50	43.675	0	1.300	0.00	1.00	1138.33	0.00	273.06	0.00	0.00	0.00
25050			40.00	35.00	37.50	45.300	0	1.300	0.00	1.00	1181.11	0.00	283.22	0.00	0.00	0.00
25050			35.00	30.00	32.50	46.925	0	1.300	0.00	1.00	1223.89	0.00	293.38	0.00	0.00	0.00
25050			30.00	25.00	27.50	48.550	0	1.300	0.00	1.00	1266.68	0.00	303.54	0.00	0.00	0.00
25050			25.00	20.00	22.50	50.175	0	1.300	0.00	1.00	1309.46	0.00	313.70	0.00	0.00	0.00
25050			20.00	15.00	17.50	51.800	0	1.300	0.00	1.00	1352.24	0.00	323.86	0.00	0.00	0.00
25050			15.00	10.00	12.50	53.425	0	1.300	0.00	1.00	1395.02	0.00	334.02	0.00	0.00	0.00
25050			10.00	5.00	7.50	55.050	0	1.300	0.00	1.00	1437.80	0.00	344.18	0.00	0.00	0.00
25050		25050:g	5.00	0.00	2.50	56.675	0	1.300	0.00	1.00	1480.59	0.00	354.34	0.00	0.00	0.00

Point Loads for Load Case "ASCE ICE/WIND":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
25050:P1	4609	994	0	
25050:P2	3520	1113	0	
SWL:T	2400	1260	0	
SWR:T	2400	1260	0	
C1L:T	5410	1960	0	
C2L:T	5410	1960	0	
C3L:T	5410	1960	0	
C1R:T	5410	1960	0	
C2R:T	5410	1960	0	
C3R:T	5410	1960	0	

Detailed Pole Loading Data for Load Case "ASCE ICE/WIND":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
25050	25050:t	25050:P1	116.50	116.00	116.25	20.081	7.95e+005	1.300	7.00	0.75	22.45	7.61	9.42	0.57	8.18	0.00
25050	25050:P1		116.00	111.00	113.50	20.975	8.31e+005	1.300	7.00	0.75	234.55	79.53	98.35	5.69	85.22	0.00
25050		25050:P2	111.00	106.00	108.50	22.600	8.95e+005	1.300	7.00	0.75	252.88	85.69	105.97	5.69	91.38	0.00
25050	25050:P2		106.00	101.00	103.50	24.225	9.6e+005	1.300	7.00	0.75	271.22	91.85	113.59	5.69	97.54	0.00
25050			101.00	96.00	98.50	25.850	1.02e+006	1.300	7.00	0.75	289.57	98.01	121.21	5.69	103.70	0.00
25050		25050:A1	96.00	94.50	95.25	27.156	1.08e+006	1.300	7.00	0.75	151.41	30.89	38.20	1.71	32.60	0.00
25050	25050:A1		94.50	90.67	92.58	28.022	1.11e+006	1.300	7.00	0.75	399.16	81.39	100.65	4.36	85.75	0.00
25050		25050:A2	90.67	86.84	88.75	29.267	1.16e+006	1.300	7.00	0.75	417.09	85.00	105.12	4.36	89.36	0.00
25050	25050:A2		86.84	81.84	84.34	30.702	1.22e+006	1.300	7.00	0.75	571.48	116.41	143.97	5.69	122.10	0.00
25050			81.84	78.09	79.96	32.124	1.27e+006	1.300	7.00	0.75	448.67	91.35	112.97	4.27	95.62	0.00

25050		25050:A3	78.09	74.34	76.21	33.343	1.32e+006	1.300	7.00	0.75	465.86	94.82	117.26	4.27	99.08	0.00
25050	25050:A3		74.34	69.34	71.84	34.765	1.38e+006	1.300	7.00	0.75	647.88	131.82	163.01	5.69	137.50	0.00
25050			69.34	65.59	67.47	36.186	1.43e+006	1.300	7.00	0.75	505.96	102.90	127.26	4.27	107.17	0.00
25050		25050:A4	65.59	61.84	63.72	37.405	1.48e+006	1.300	7.00	0.75	523.15	106.37	131.55	4.27	110.64	0.00
25050	25050:A4		61.84	56.84	59.34	38.827	1.54e+006	1.300	7.00	0.75	724.28	147.22	182.06	5.69	152.91	0.00
25050			56.84	53.67	55.26	40.155	1.59e+006	1.300	7.00	0.75	475.02	96.53	119.38	3.61	100.13	0.00
25050			53.67	50.50	52.08	41.185	1.63e+006	1.300	7.00	0.75	487.30	99.00	122.44	3.61	102.61	0.00
25050			50.50	47.75	49.12	41.834	1.66e+006	1.300	7.00	0.75	1027.59	87.24	107.89	3.13	90.37	0.00
25050			47.75	45.00	46.37	42.416	1.68e+006	1.300	7.00	0.75	1049.59	88.45	109.39	3.13	91.58	0.00
25050			45.00	40.00	42.50	43.675	1.73e+006	1.300	7.00	0.75	1138.33	165.60	204.80	5.69	171.29	0.00
25050			40.00	35.00	37.50	45.300	1.79e+006	1.300	7.00	0.75	1181.11	171.76	212.42	5.69	177.45	0.00
25050			35.00	30.00	32.50	46.925	1.86e+006	1.300	7.00	0.75	1223.89	177.92	220.04	5.69	183.61	0.00
25050			30.00	25.00	27.50	48.550	1.92e+006	1.300	7.00	0.75	1266.68	184.09	227.66	5.69	189.77	0.00
25050			25.00	20.00	22.50	50.175	1.99e+006	1.300	7.00	0.75	1309.46	190.25	235.28	5.69	195.93	0.00
25050			20.00	15.00	17.50	51.800	2.05e+006	1.300	7.00	0.75	1352.24	196.41	242.90	5.69	202.10	0.00
25050			15.00	10.00	12.50	53.425	2.12e+006	1.300	7.00	0.75	1395.02	202.57	250.52	5.69	208.26	0.00
25050			10.00	5.00	7.50	55.050	2.18e+006	1.300	7.00	0.75	1437.80	208.73	258.14	5.69	214.42	0.00
25050		25050:g	5.00	0.00	2.50	56.675	2.24e+006	1.300	7.00	0.75	1480.59	214.89	265.76	5.69	220.58	0.00

Point Loads for Load Case "EX WIND":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
25050:P1	2712	4762	0	
25050:P2	2350	5536	0	
SWL:T	660	1780	0	
SWR:T	660	1780	0	
C1L:T	2530	4070	0	
C2L:T	2530	4070	0	
C3L:T	2530	4070	0	
C1R:T	2530	4070	0	
C2R:T	2530	4070	0	
C3R:T	2530	4070	0	

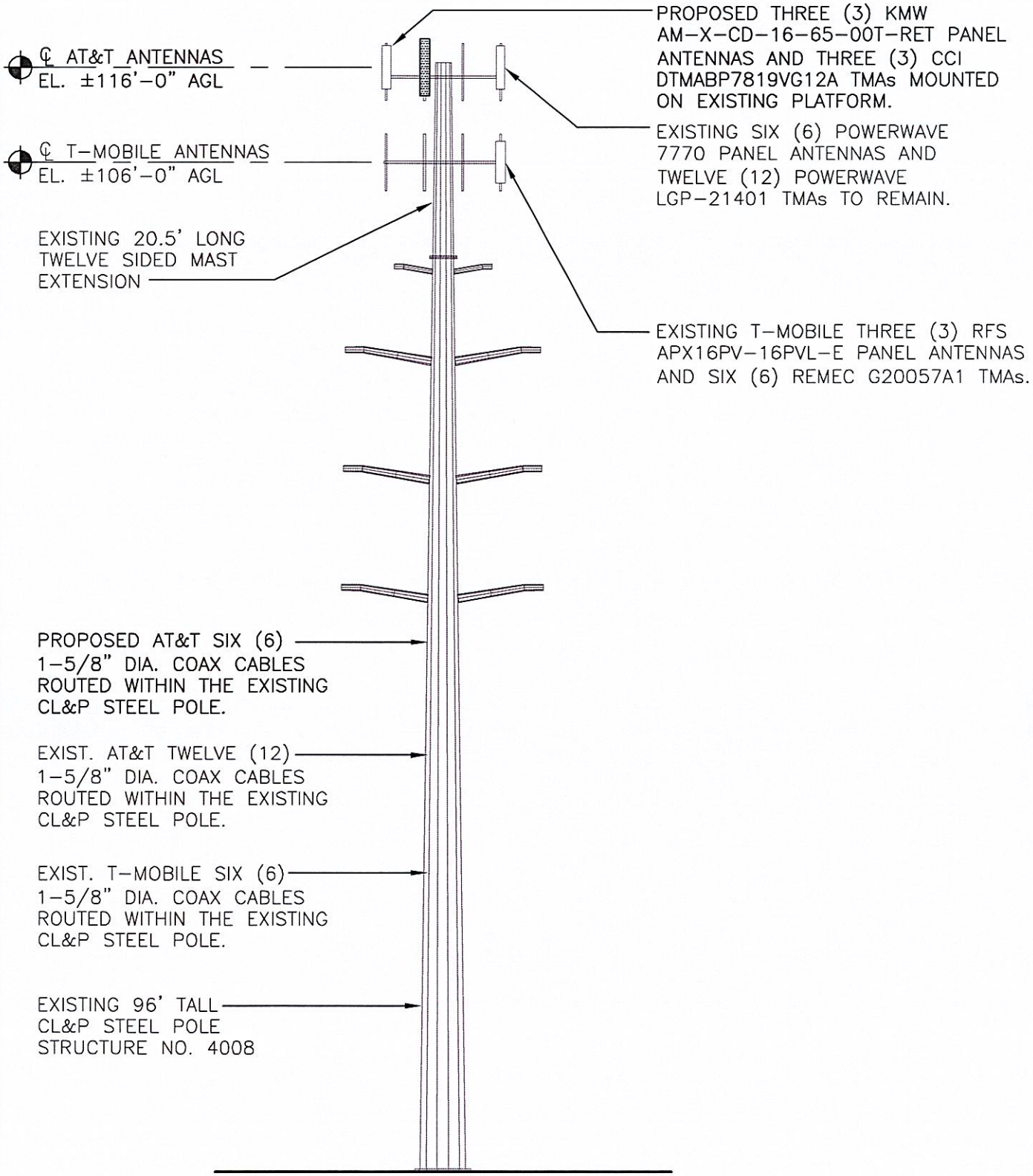
Point Loads for Load Case "UNBALANCED ICE":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
25050:P1	3674	581	0	
25050:P2	3014	660	0	
SWL:T	2200	1320	2750	
SWR:T	2200	1320	2750	
C1L:T	5840	2270	4720	
C2L:T	5840	2270	4720	
C3L:T	5840	2270	4720	
C1R:T	5840	2270	4720	
C2R:T	5840	2270	4720	
C3R:T	5840	2270	4720	

Detailed Pole Loading Data for Load Case "UNBALANCED ICE":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)



1 / EL-1

TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	3/20/12	ISSUED FOR NU REVIEW
01	3/29/12	CONSTRUCTION
02	4/27/12	CONSTRUCTION

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

CT2255
HAMDEN-NU
CL&P 4008

4286 WHITNEY AVE
HAMDEN, CT 06518

PROJECT NO:	12014.CO2
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	3/20/12

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

DESIGNED APPURTENANCE LOADING

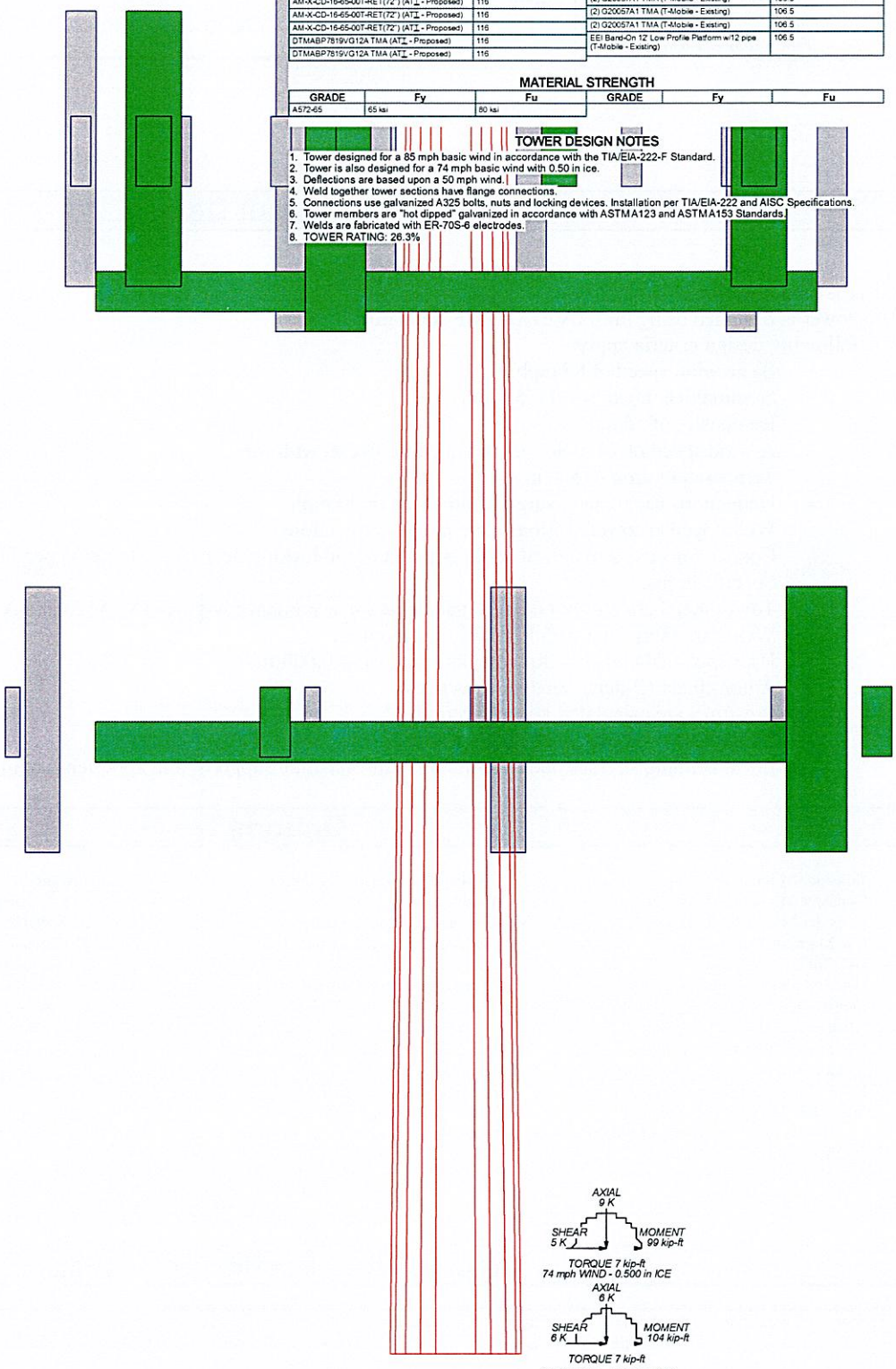
TYPE	ELEVATION	TYPE	ELEVATION
(2) 7770.00 (AT&T - Existing)	116	DTMABP7819VG12A TMA (AT&T - Proposed)	116
(2) 7770.00 (AT&T - Existing)	116	EEI Band-On 12' Low Profile Platform w/12 pipe (AT&T - Existing)	114
(2) 7770.00 (AT&T - Existing)	116	APX16PV-16PVL-E (T-Mobile - Existing)	106.5
(4) LGP21401 TMA (AT&T - Existing)	116	APX16PV-16PVL-E (T-Mobile - Existing)	106.5
(4) LGP21401 TMA (AT&T - Existing)	116	APX16PV-16PVL-E (T-Mobile - Existing)	106.5
(4) LGP21401 TMA (AT&T - Existing)	116	(2) G20057A1 TMA (T-Mobile - Existing)	106.5
AM-X-CD-16-65-00T-RET(72") (AT&T - Proposed)	116	(2) G20057A1 TMA (T-Mobile - Existing)	106.5
AM-X-CD-16-65-00T-RET(72") (AT&T - Proposed)	116	(2) G20057A1 TMA (T-Mobile - Existing)	106.5
AM-X-CD-16-65-00T-RET(72") (AT&T - Proposed)	116	EEI Band-On 12' Low Profile Platform w/12 pipe (T-Mobile - Existing)	106.5
DTMABP7819VG12A TMA (AT&T - Proposed)	116		
DTMABP7819VG12A TMA (AT&T - Proposed)	116		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Weld together tower sections have flange connections.
5. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
6. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
7. Welds are fabricated with ER-70S-6 electrodes.
8. TOWER RATING: 26.3%



Section	1
Length (ft)	20.500
Number of Sides	12
Thickness (in)	0.188
Top Dia (in)	20.000
Bot Dia (in)	26.660
Grade	A572-65
Weight (K)	1.0
	1.0

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job:	12014.CO2 / CT2255 / CL&P #4008
Project:	21-ft PCS Mast Extension- 4286 Whitney Ave., Hamden, CT
Client:	AT&T Mobility / Northeast Utilities
Drawn by:	TJL
App'd:	
Code:	TIA/EIA-222-F
Date:	04/27/12
Scale:	NTS
Path:	
Dwg No.	E-1

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
User specified elevation for calculation of G_h is 0.000 ft.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
√ Use Code Stress Ratios
Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
Add IBC .6D+W Combination

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
SR Members Have Cut Ends
√ Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing

Treat Feedline Bundles As Cylinder
Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
Consider Feedline Torque
Include Angle Block Shear Check

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	116.500-96.000	20.500		12	20.000	26.660	0.188	0.750	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	20.706	11.962	599.323	7.093	10.360	57.850	1214.391	5.887	4.857	25.907
	27.600	15.983	1429.644	9.477	13.810	103.523	2896.847	7.866	6.642	35.426

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 116.500-96.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
1 5/8 (AT&T - Existing)	B	No	Inside Pole	116.500 - 99.000	12	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001
1 5/8 (T-Mobile - Existing)	B	No	Inside Pole	106.500 - 99.000	6	No Ice	0.000	0.001
						1/2" Ice	0.000	0.001

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	116.500-96.000	A	0.000	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000	0.265
		C	0.000	0.000	0.000	0.000	0.000

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	116.500-96.000	A	0.500	0.000	0.000	0.000	0.000	0.000
		B		0.000	0.000	0.000	0.000	0.265
		C		0.000	0.000	0.000	0.000	0.000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) 7770.00	A	From Face	3.500	0.000	116.000	No Ice	5.882	2.928	0.035
(AT&T - Existing)			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						
(2) 7770.00	B	From Face	3.500	0.000	116.000	No Ice	5.882	2.928	0.035
(AT&T - Existing)			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						
(2) 7770.00	C	From Face	3.500	0.000	116.000	No Ice	5.882	2.928	0.035
(AT&T - Existing)			0.000			1/2" Ice	6.314	3.273	0.068
			0.000						
(4) LGP21401 TMA	A	From Face	3.500	0.000	116.000	No Ice	0.953	0.367	0.018
(AT&T - Existing)			0.000			1/2" Ice	1.093	0.480	0.023
			0.000						
(4) LGP21401 TMA	B	From Face	3.500	0.000	116.000	No Ice	0.953	0.367	0.018
(AT&T - Existing)			0.000			1/2" Ice	1.093	0.480	0.023
			0.000						
(4) LGP21401 TMA	C	From Face	3.500	0.000	116.000	No Ice	0.953	0.367	0.018
(AT&T - Existing)			0.000			1/2" Ice	1.093	0.480	0.023
			0.000						
AM-X-CD-16-65-00T-RET(72")	A	From Face	3.500	0.000	116.000	No Ice	8.260	4.642	0.050
			2.000			1/2" Ice	8.807	5.088	0.096
(AT&T - Proposed)			0.000						
AM-X-CD-16-65-00T-RET(72")	B	From Face	3.500	0.000	116.000	No Ice	8.260	4.642	0.050
			2.000			1/2" Ice	8.807	5.088	0.096
(AT&T - Proposed)			0.000						
AM-X-CD-16-65-00T-RET(72")	C	From Face	3.500	0.000	116.000	No Ice	8.260	4.642	0.050
			2.000			1/2" Ice	8.807	5.088	0.096
(AT&T - Proposed)			0.000						
DTMABP7819VG12A TMA	A	From Face	3.500	0.000	116.000	No Ice	1.588	0.578	0.020
(AT&T - Proposed)			2.000			1/2" Ice	1.759	0.701	0.030
			0.000						
DTMABP7819VG12A TMA	B	From Face	3.500	0.000	116.000	No Ice	1.588	0.578	0.020
(AT&T - Proposed)			2.000			1/2" Ice	1.759	0.701	0.030
			0.000						
DTMABP7819VG12A TMA	C	From Face	3.500	0.000	116.000	No Ice	1.588	0.578	0.020
(AT&T - Proposed)			2.000			1/2" Ice	1.759	0.701	0.030
			0.000						
EEI Band-On 12' Low Profile	C	From Face	2.000	0.000	114.000	No Ice	39.000	39.000	2.000
Platform w/12 pipe			0.000			1/2" Ice	50.000	50.000	3.000
(AT&T - Existing)			0.000						
APX16PV-16PVL-E	A	From Face	3.500	0.000	106.500	No Ice	6.647	1.981	0.053
(T-Mobile - Existing)			-6.000			1/2" Ice	7.079	2.304	0.084
			0.000						
APX16PV-16PVL-E	B	From Face	3.500	0.000	106.500	No Ice	6.647	1.981	0.053
(T-Mobile - Existing)			-6.000			1/2" Ice	7.079	2.304	0.084
			0.000						
APX16PV-16PVL-E	C	From Face	3.500	0.000	106.500	No Ice	6.647	1.981	0.053
(T-Mobile - Existing)			-6.000			1/2" Ice	7.079	2.304	0.084
			0.000						
(2) G20057A1 TMA	A	From Face	3.500	0.000	106.500	No Ice	0.821	0.385	0.011
(T-Mobile - Existing)			-2.000			1/2" Ice	0.953	0.494	0.016
			0.000						
(2) G20057A1 TMA	B	From Face	3.500	0.000	106.500	No Ice	0.821	0.385	0.011
(T-Mobile - Existing)			-2.000			1/2" Ice	0.953	0.494	0.016
			0.000						
(2) G20057A1 TMA	C	From Face	3.500	0.000	106.500	No Ice	0.821	0.385	0.011
(T-Mobile - Existing)			-2.000			1/2" Ice	0.953	0.494	0.016
			0.000						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
EEI Band-On 12' Low Profile Platform w/12 pipe (T-Mobile - Existing)	C	From Face	2.000 0.000 0.000	0.000	106.500	No Ice 1/2" Ice	39.000 50.000	39.000 50.000	2.000 3.000

Tower Pressures - No Ice

$G_H = 1.250$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 116.500-96.000	105.762	1.395	0.026	39.855	A	0.000	39.855	39.855	100.00	0.000	0.000
					B	0.000	39.855		100.00	0.000	0.000
					C	0.000	39.855		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.250$

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 116.500-96.000	105.762	1.395	0.019	0.500	41.564	A	0.000	41.564	41.564	100.00	0.000	0.000
						B	0.000	41.564		100.00	0.000	0.000
						C	0.000	41.564		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.250$

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 116.500-96.000	105.762	1.395	0.009	39.855	A	0.000	39.855	39.855	100.00	0.000	0.000
					B	0.000	39.855		100.00	0.000	0.000
					C	0.000	39.855		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	1.324	0.065	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	12.924 kip-ft	1.324		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	1.324	0.065	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	12.924 kip-ft	1.324		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	1.324	0.065	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	12.924 kip-ft	1.324		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	1.324	0.065	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	12.924 kip-ft	1.324		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	1.281	A	1	1.03	1	1	1	41.564	1.035	0.051	C
116.500-96.00			B	1	1.03	1	1	1	41.564			
0			C	1	1.03	1	1	1	41.564			
Sum Weight:	0.265	1.281						OTM	10.108 kip-ft	1.035		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	1.281	A	1	1.03	1	1	1	41.564	1.035	0.051	C
116.500-96.00			B	1	1.03	1	1	1	41.564			
0			C	1	1.03	1	1	1	41.564			
Sum Weight:	0.265	1.281						OTM	10.108 kip-ft	1.035		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	1.281	A	1	1.03	1	1	1	41.564	1.035	0.051	C
116.500-96.00			B	1	1.03	1	1	1	41.564			
0			C	1	1.03	1	1	1	41.564			
Sum Weight:	0.265	1.281						OTM	10.108 kip-ft	1.035		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	1.281	A	1	1.03	1	1	1	41.564	1.035	0.051	C
116.500-96.00			B	1	1.03	1	1	1	41.564			
0			C	1	1.03	1	1	1	41.564			
Sum Weight:	0.265	1.281						OTM	10.108 kip-ft	1.035		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	0.458	0.022	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	4.472 kip-ft	0.458		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	0.458	0.022	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	4.472 kip-ft	0.458		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	0.458	0.022	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	4.472 kip-ft	0.458		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.265	0.975	A	1	1.03	1	1	1	39.855	0.458	0.022	C
116.500-96.00			B	1	1.03	1	1	1	39.855			
0			C	1	1.03	1	1	1	39.855			
Sum Weight:	0.265	0.975						OTM	4.472 kip-ft	0.458		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	0.975					
Bracing Weight	0.000					
Total Member Self-Weight	0.975			11.672	0.000	
Total Weight	6.101			11.672	0.000	
Wind 0 deg - No Ice		0.000	-6.290	-80.947	0.000	0.000
Wind 30 deg - No Ice		3.145	-5.447	-68.538	-46.309	3.713
Wind 45 deg - No Ice		4.448	-4.448	-53.819	-65.491	5.250
Wind 60 deg - No Ice		5.447	-3.145	-34.638	-80.210	6.430
Wind 90 deg - No Ice		6.290	0.000	11.672	-92.619	7.425
Wind 120 deg - No Ice		5.447	3.145	57.981	-80.210	6.430
Wind 135 deg - No Ice		4.448	4.448	77.163	-65.491	5.250
Wind 150 deg - No Ice		3.145	5.447	91.882	-46.309	3.713
Wind 180 deg - No Ice		0.000	6.290	104.290	0.000	0.000
Wind 210 deg - No Ice		-3.145	5.447	91.882	46.309	-3.713
Wind 225 deg - No Ice		-4.448	4.448	77.163	65.491	-5.250
Wind 240 deg - No Ice		-5.447	3.145	57.981	80.210	-6.430
Wind 270 deg - No Ice		-6.290	0.000	11.672	92.619	-7.425
Wind 300 deg - No Ice		-5.447	-3.145	-34.638	80.210	-6.430
Wind 315 deg - No Ice		-4.448	-4.448	-53.819	65.491	-5.250
Wind 330 deg - No Ice		-3.145	-5.447	-68.538	46.309	-3.713
Member Ice	0.306					
Total Weight Ice	8.961			17.508	0.000	
Wind 0 deg - Ice		0.000	-5.487	-63.407	0.000	0.000
Wind 30 deg - Ice		2.743	-4.752	-52.566	-40.457	3.570
Wind 45 deg - Ice		3.880	-3.880	-39.708	-57.215	5.048
Wind 60 deg - Ice		4.752	-2.743	-22.950	-70.074	6.183
Wind 90 deg - Ice		5.487	0.000	17.508	-80.914	7.140
Wind 120 deg - Ice		4.752	2.743	57.965	-70.074	6.183
Wind 135 deg - Ice		3.880	3.880	74.723	-57.215	5.048
Wind 150 deg - Ice		2.743	4.752	87.582	-40.457	3.570
Wind 180 deg - Ice		0.000	5.487	98.422	0.000	0.000
Wind 210 deg - Ice		-2.743	4.752	87.582	40.457	-3.570
Wind 225 deg - Ice		-3.880	3.880	74.723	57.215	-5.048
Wind 240 deg - Ice		-4.752	2.743	57.965	70.074	-6.183
Wind 270 deg - Ice		-5.487	0.000	17.508	80.914	-7.140
Wind 300 deg - Ice		-4.752	-2.743	-22.950	70.074	-6.183
Wind 315 deg - Ice		-3.880	-3.880	-39.708	57.215	-5.048
Wind 330 deg - Ice		-2.743	-4.752	-52.566	40.457	-3.570
Total Weight	6.101			11.672	0.000	
Wind 0 deg - Service		0.000	-2.176	-20.376	0.000	0.000
Wind 30 deg - Service		1.088	-1.885	-16.083	-16.024	1.285
Wind 45 deg - Service		1.539	-1.539	-10.990	-22.661	1.817
Wind 60 deg - Service		1.885	-1.088	-4.352	-27.754	2.225
Wind 90 deg - Service		2.176	0.000	11.672	-32.048	2.569
Wind 120 deg - Service		1.885	1.088	27.696	-27.754	2.225
Wind 135 deg - Service		1.539	1.539	34.333	-22.661	1.817
Wind 150 deg - Service		1.088	1.885	39.426	-16.024	1.285
Wind 180 deg - Service		0.000	2.176	43.720	0.000	0.000
Wind 210 deg - Service		-1.088	1.885	39.426	16.024	-1.285
Wind 225 deg - Service		-1.539	1.539	34.333	22.661	-1.817
Wind 240 deg - Service		-1.885	1.088	27.696	27.754	-2.225
Wind 270 deg - Service		-2.176	0.000	11.672	32.048	-2.569
Wind 300 deg - Service		-1.885	-1.088	-4.352	27.754	-2.225

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 315 deg - Service		-1.539	-1.539	-10.990	22.661	-1.817
Wind 330 deg - Service		-1.088	-1.885	-16.083	16.024	-1.285

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service

Comb. No.	Description
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	116.5 - 96	Pole	Max Tension	18	0.000	0.000	0.000
			Max. Compression	18	-8.961	0.000	-17.575
			Max. Mx	6	-6.100	-92.780	-11.702
			Max. My	10	-6.100	0.000	-104.482
			Max. Vy	6	6.291	-92.780	-11.702
			Max. Vx	10	6.291	0.000	-104.482
			Max. Torque	6			-7.414

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	8.961	0.000	-5.487
	Max. H_x	14	6.101	6.290	0.000
	Max. H_z	2	6.101	0.000	6.290
	Max. M_x	2	81.078	0.000	6.290
	Max. M_z	6	92.780	-6.290	0.000
	Max. Torsion	14	7.414	6.290	0.000
	Min. Vert	43	6.101	0.000	-2.176
	Min. H_x	6	6.101	-6.290	0.000
	Min. H_z	10	6.101	0.000	-6.290
	Min. M_x	10	-104.482	0.000	-6.290
	Min. M_z	14	-92.780	6.290	0.000
	Min. Torsion	6	-7.414	-6.290	0.000

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	6.101	0.000	0.000	11.701	0.000	0.000
Dead+Wind 0 deg - No Ice	6.101	0.000	-6.290	-81.078	0.000	0.000
Dead+Wind 30 deg - No Ice	6.101	3.145	-5.447	-68.648	-46.390	3.707
Dead+Wind 45 deg - No Ice	6.101	4.448	-4.448	-53.903	-65.605	5.242
Dead+Wind 60 deg - No Ice	6.101	5.447	-3.145	-34.688	-80.350	6.421
Dead+Wind 90 deg - No Ice	6.101	6.290	0.000	11.702	-92.780	7.414
Dead+Wind 120 deg - No Ice	6.101	5.447	3.145	58.092	-80.350	6.421
Dead+Wind 135 deg - No Ice	6.101	4.448	4.448	77.307	-65.605	5.242
Dead+Wind 150 deg - No Ice	6.101	3.145	5.447	92.051	-46.390	3.707
Dead+Wind 180 deg - No Ice	6.101	0.000	6.290	104.482	0.000	0.000
Dead+Wind 210 deg - No Ice	6.101	-3.145	5.447	92.051	46.390	-3.707
Dead+Wind 225 deg - No Ice	6.101	-4.448	4.448	77.307	65.605	-5.242
Dead+Wind 240 deg - No Ice	6.101	-5.447	3.145	58.092	80.350	-6.421

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 270 deg - No Ice	6.101	-6.290	0.000	11.702	92.780	-7.414
Dead+Wind 300 deg - No Ice	6.101	-5.447	-3.145	-34.688	80.350	-6.421
Dead+Wind 315 deg - No Ice	6.101	-4.448	-4.448	-53.903	65.605	-5.242
Dead+Wind 330 deg - No Ice	6.101	-3.145	-5.447	-68.648	46.390	-3.707
Dead+Ice+Temp	8.961	0.000	0.000	17.575	0.000	0.000
Dead+Wind 0 deg+Ice+Temp	8.961	0.000	-5.487	-63.550	0.000	0.000
Dead+Wind 30 deg+Ice+Temp	8.961	2.743	-4.752	-52.681	-40.563	3.562
Dead+Wind 45 deg+Ice+Temp	8.961	3.880	-3.880	-39.789	-57.364	5.038
Dead+Wind 60 deg+Ice+Temp	8.961	4.752	-2.743	-22.987	-70.257	6.170
Dead+Wind 90 deg+Ice+Temp	8.961	5.487	0.000	17.576	-81.126	7.125
Dead+Wind 120 deg+Ice+Temp	8.961	4.752	2.743	58.138	-70.257	6.170
Dead+Wind 135 deg+Ice+Temp	8.961	3.880	3.880	74.940	-57.364	5.038
Dead+Wind 150 deg+Ice+Temp	8.961	2.743	4.752	87.832	-40.563	3.562
Dead+Wind 180 deg+Ice+Temp	8.961	0.000	5.487	98.701	0.000	0.000
Dead+Wind 210 deg+Ice+Temp	8.961	-2.743	4.752	87.832	40.563	-3.562
Dead+Wind 225 deg+Ice+Temp	8.961	-3.880	3.880	74.940	57.364	-5.038
Dead+Wind 240 deg+Ice+Temp	8.961	-4.752	2.743	58.138	70.257	-6.170
Dead+Wind 270 deg+Ice+Temp	8.961	-5.487	0.000	17.576	81.126	-7.125
Dead+Wind 300 deg+Ice+Temp	8.961	-4.752	-2.743	-22.987	70.257	-6.170
Dead+Wind 315 deg+Ice+Temp	8.961	-3.880	-3.880	-39.789	57.364	-5.038
Dead+Wind 330 deg+Ice+Temp	8.961	-2.743	-4.752	-52.681	40.563	-3.562
Dead+Wind 0 deg - Service	6.101	0.000	-2.176	-20.402	0.000	0.000
Dead+Wind 30 deg - Service	6.101	1.088	-1.885	-16.101	-16.052	1.283
Dead+Wind 45 deg - Service	6.101	1.539	-1.539	-10.999	-22.701	1.814
Dead+Wind 60 deg - Service	6.101	1.885	-1.088	-4.350	-27.802	2.222
Dead+Wind 90 deg - Service	6.101	2.176	0.000	11.702	-32.103	2.565
Dead+Wind 120 deg - Service	6.101	1.885	1.088	27.754	-27.802	2.222
Dead+Wind 135 deg - Service	6.101	1.539	1.539	34.402	-22.701	1.814
Dead+Wind 150 deg - Service	6.101	1.088	1.885	39.504	-16.052	1.283
Dead+Wind 180 deg - Service	6.101	0.000	2.176	43.805	0.000	0.000
Dead+Wind 210 deg - Service	6.101	-1.088	1.885	39.504	16.052	-1.283
Dead+Wind 225 deg - Service	6.101	-1.539	1.539	34.402	22.701	-1.814
Dead+Wind 240 deg - Service	6.101	-1.885	1.088	27.754	27.802	-2.222
Dead+Wind 270 deg - Service	6.101	-2.176	0.000	11.702	32.103	-2.565
Dead+Wind 300 deg - Service	6.101	-1.885	-1.088	-4.350	27.802	-2.222
Dead+Wind 315 deg - Service	6.101	-1.539	-1.539	-10.999	22.701	-1.814
Dead+Wind 330 deg - Service	6.101	-1.088	-1.885	-16.101	16.052	-1.283

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-6.101	0.000	0.000	6.101	0.000	0.000%
2	0.000	-6.101	-6.290	0.000	6.101	6.290	0.000%
3	3.145	-6.101	-5.447	-3.145	6.101	5.447	0.000%
4	4.448	-6.101	-4.448	-4.448	6.101	4.448	0.000%
5	5.447	-6.101	-3.145	-5.447	6.101	3.145	0.000%
6	6.290	-6.101	0.000	-6.290	6.101	0.000	0.000%
7	5.447	-6.101	3.145	-5.447	6.101	-3.145	0.000%
8	4.448	-6.101	4.448	-4.448	6.101	-4.448	0.000%
9	3.145	-6.101	5.447	-3.145	6.101	-5.447	0.000%
10	0.000	-6.101	6.290	0.000	6.101	-6.290	0.000%
11	-3.145	-6.101	5.447	3.145	6.101	-5.447	0.000%
12	-4.448	-6.101	4.448	4.448	6.101	-4.448	0.000%
13	-5.447	-6.101	3.145	5.447	6.101	-3.145	0.000%
14	-6.290	-6.101	0.000	6.290	6.101	0.000	0.000%
15	-5.447	-6.101	-3.145	5.447	6.101	3.145	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
16	-4.448	-6.101	-4.448	4.448	6.101	4.448	0.000%
17	-3.145	-6.101	-5.447	3.145	6.101	5.447	0.000%
18	0.000	-8.961	0.000	0.000	8.961	0.000	0.000%
19	0.000	-8.961	-5.487	0.000	8.961	5.487	0.000%
20	2.743	-8.961	-4.752	-2.743	8.961	4.752	0.000%
21	3.880	-8.961	-3.880	-3.880	8.961	3.880	0.000%
22	4.752	-8.961	-2.743	-4.752	8.961	2.743	0.000%
23	5.487	-8.961	0.000	-5.487	8.961	0.000	0.000%
24	4.752	-8.961	2.743	-4.752	8.961	-2.743	0.000%
25	3.880	-8.961	3.880	-3.880	8.961	-3.880	0.000%
26	2.743	-8.961	4.752	-2.743	8.961	-4.752	0.000%
27	0.000	-8.961	5.487	0.000	8.961	-5.487	0.000%
28	-2.743	-8.961	4.752	2.743	8.961	-4.752	0.000%
29	-3.880	-8.961	3.880	3.880	8.961	-3.880	0.000%
30	-4.752	-8.961	2.743	4.752	8.961	-2.743	0.000%
31	-5.487	-8.961	0.000	5.487	8.961	0.000	0.000%
32	-4.752	-8.961	-2.743	4.752	8.961	2.743	0.000%
33	-3.880	-8.961	-3.880	3.880	8.961	3.880	0.000%
34	-2.743	-8.961	-4.752	2.743	8.961	4.752	0.000%
35	0.000	-6.101	-2.176	0.000	6.101	2.176	0.000%
36	1.088	-6.101	-1.885	-1.088	6.101	1.885	0.000%
37	1.539	-6.101	-1.539	-1.539	6.101	1.539	0.000%
38	1.885	-6.101	-1.088	-1.885	6.101	1.088	0.000%
39	2.176	-6.101	0.000	-2.176	6.101	0.000	0.000%
40	1.885	-6.101	1.088	-1.885	6.101	-1.088	0.000%
41	1.539	-6.101	1.539	-1.539	6.101	-1.539	0.000%
42	1.088	-6.101	1.885	-1.088	6.101	-1.885	0.000%
43	0.000	-6.101	2.176	0.000	6.101	-2.176	0.000%
44	-1.088	-6.101	1.885	1.088	6.101	-1.885	0.000%
45	-1.539	-6.101	1.539	1.539	6.101	-1.539	0.000%
46	-1.885	-6.101	1.088	1.885	6.101	-1.088	0.000%
47	-2.176	-6.101	0.000	2.176	6.101	0.000	0.000%
48	-1.885	-6.101	-1.088	1.885	6.101	1.088	0.000%
49	-1.539	-6.101	-1.539	1.539	6.101	1.539	0.000%
50	-1.088	-6.101	-1.885	1.088	6.101	1.885	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001

17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	*Elevation* *ft*	*Horz. Deflection* *in*	*Gov. Load Comb.*	*Tilt* °	*Twist* °
L1	116.5 - 96	0.310	43	0.114	0.013

Critical Deflections and Radius of Curvature - Service Wind

Elevation *ft*	*Appurtenance*	*Gov. Load Comb.*	*Deflection* *in*	*Tilt* °	*Twist* °	*Radius of Curvature* *ft*
116.000	(2) 7770.00	43	0.302	0.111	0.012	Inf
114.000	EEI Band-On 12' Low Profile Platform w/12 pipe	43	0.272	0.100	0.011	Inf
106.500	APX16PV-16PVL-E	43	0.159	0.058	0.007	Inf

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	116.5 - 96	0.681	10	0.242	0.037

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
116.000	(2) 7770.00	10	0.664	0.236	0.036	Inf
114.000	EEI Band-On 12' Low Profile Platform w/12 pipe	10	0.598	0.213	0.032	Inf
106.500	APX16PV-16PVL-E	10	0.349	0.124	0.019	Inf

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	116.5 - 96 (1)	TP26.66x20x0.188	20.500	0.000	0.0	35.715	15.983	-6.100	570.819	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	116.5 - 96 (1)	TP26.66x20x0.188	104.482	12.111	35.715	0.339	0.000	0.000	35.715	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	116.5 - 96 (1)	TP26.66x20x0.188	6.291	0.394	26.000	0.031	0.000	0.000	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	116.5 - 96 (1)	0.011	0.339	0.000	0.031	0.000	0.350 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	116.5 - 96	Pole	TP26.66x20x0.188	1	-6.100	760.902	26.3	Pass
							Summary	
						Pole (L1)	26.3	Pass
						RATING =	**26.3**	**Pass**

Program Version 5.4.1.8 - 4/8/2010 File:J:/Jobs/1201400.WI/CO.02 - CT2255 - 4286 WHITNEY AVENUE, HAMDEN, CT/Rev (2)/Calcs/ERI Files/21' PennSummit Extension_ Hamden CT.eri

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 104 \cdot ft \cdot kips$	(Input From RisaTower)
Shear Force =	$Shear := 6 \cdot kips$	(Input From RisaTower)
Axial Force =	$Axial := 6 \cdot kips$	(Input From RisaTower)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 12$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 32.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 120 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 92 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1.0 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A572 Mod 50

Plate Yield Strength =	$Fy_{bp} := 50 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.5 \cdot in$	(User Input)
Flange Plate Diameter =	$D_{bp} := 35 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 26.96 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 16 \cdot in$

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

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

$d_1 = 8.00 \cdot in$ $d_7 = -8.00 \cdot in$

$d_2 = 13.86 \cdot in$ $d_8 = -13.86 \cdot in$

$d_3 = 16.00 \cdot in$ $d_9 = -16.00 \cdot in$

$d_4 = 13.86 \cdot in$ $d_{10} = -13.86 \cdot in$

$d_5 = 8.00 \cdot in$ $d_{11} = -8.00 \cdot in$

$d_6 = 0.00 \cdot in$ $d_{12} = -0.00 \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 13.5 \cdot in$

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

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.38 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 2.52 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.38 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ $MA_{12} = 0.00 \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 17.9 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 1.536 \times 10^3 \cdot in^2$

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 = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 12.5 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot (0.33 \cdot A_g \cdot F_u) = 41.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} = 30 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Flange Plate Analysis:

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

$C_1 = 7.0 \cdot kips$ $C_7 = -6.0 \cdot kips$

$C_2 = 11.8 \cdot kips$ $C_8 = -10.8 \cdot kips$

$C_3 = 13.5 \cdot kips$ $C_9 = -12.5 \cdot kips$

$C_4 = 11.8 \cdot kips$ $C_{10} = -10.8 \cdot kips$

$C_5 = 7.0 \cdot kips$ $C_{11} = -6.0 \cdot kips$

$C_6 = 0.5 \cdot kips$ $C_{12} = 0.5 \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 6.4 \cdot ksi$$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 49.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 12.8 \cdot \%$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "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 = $TME := 116.5$ 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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.307$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346\left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.306$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.834$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.858$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 34.7$ psf (NESC 2007 Section 250.C.2)

NESC Extreme Ice w/ Wind Components

Heavy Wind Pressure =	$p_{ex} := 6.4$	psf	(User Input NESC 2007 Figure 250-3 & Table 250-4)
Radial Ice Thickness =	$Ir_{ex} := 0.75$	in	(User Input NESC 2007 Figure 250-3)

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 Wind Loading =	**2.5**	(User Input)
NESC Extreme Wind Loading =	**1.0**	(User Input)
NESC Extreme Ice w/ Wind Loading =	**1.0**	(User Input)

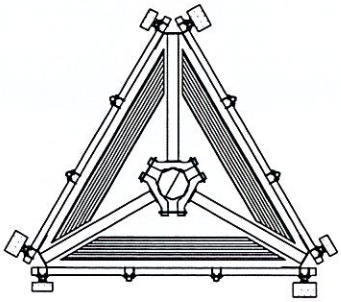
Overload Factors for Vertical Loads:

NESC Heavy Wind Loading =	**1.5**	(User Input)
NESC Extreme Wind Loading =	**1.0**	(User Input)
NESC Extreme Ice w/ Wind Loading =	**1.0**	(User Input)

Development of Wind & Ice Load on Antennas

Proposed Antenna Data: (AT&T)

Antenna Model =	KMW AM-X-CD-16-65-00T-RET		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 11.8$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 49$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)



Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant1} := WT_{ant} \cdot N_{ant} = 147$ lbs

Gravity Load (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1435$ cu in

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

Weight of Ice on All Antennas = $Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 139$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 2221$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 72$ lbs

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

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.5$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 125$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 17.7$ sf

Total Antenna Wind Force = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1230$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 6.8$ sf

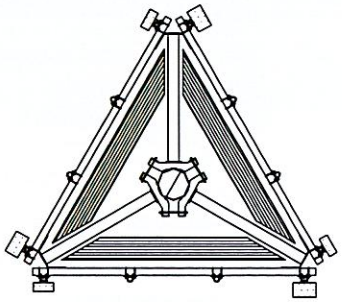
Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 20.4$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant1} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 261$ lbs

Development of Wind & Ice Load on Antennas

Existing Antenna Data: (AT&T)

Antenna Model =	Powerwave 7770		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55$	in	(User Input)
Antenna Width =	$W_{ant} := 11.0$	in	(User Input)
Antenna Thickness =	$T_{ant} := 5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 39$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)



Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 234$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 3025$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1007$ cu in

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

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 196$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 1566$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 51$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant2} := W_{ICE.exant} \cdot N_{ant} = 304$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 4.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 28$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 179$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 25.2$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1751$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 4.9$ sf

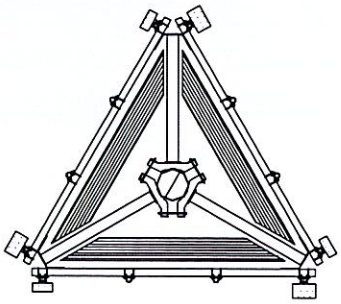
Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 29.4$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant2} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 377$ lbs

Development of Wind & Ice Load on TMA's

Proposed TMA Data: (AT&T)

TMA Model =	CCI DTMABP7819VG12A		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 14.25$	in	(User Input)
TMA Width =	$W_{TMA} := 11.46$	in	(User Input)
TMA Thickness =	$T_{TMA} := 4.17$	in	(User Input)
TMA Weight =	$WT_{TMA} := 20$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 3$		(User Input)



Gravity Load (without ice)

Weight of All TMA's = $Wt_{TMA1} := WT_{TMA} \cdot N_{TMA} = 60$ lbs

Gravity Load (ice only)

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

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 301$ cu in

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

Weight of Ice on All TMA's = $Wt_{ice.TMA1} := W_{ICETMA} \cdot N_{TMA} = 29$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each TMA = $V_{ice.ex} := (L_{TMA} + 2 \cdot Ir_{ex})(W_{TMA} + 2 \cdot Ir_{ex})(T_{TMA} + 2 \cdot Ir_{ex}) - V_{TMA} = 476$ cu in

Weight of Extreme Ice on Each TMA = $W_{ICE.exTMA} := \frac{V_{ice.ex}}{1728} \cdot Id = 15$ lbs

Weight of Extreme Ice on All TMA's = $Wt_{ice.ex.TMA1} := W_{ICE.exTMA} \cdot N_{TMA} = 46$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 1.3$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 4$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA1} := p \cdot Cd_F \cdot A_{ICETMA} = 25$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

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

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 3.4$ sf

Total TMA Wind Force = $F_{TMA1} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 236$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Extreme Ice = $SA_{ICE.exTMA} := \frac{(L_{TMA} + 2 \cdot Ir_{ex}) \cdot (W_{TMA} + 2 \cdot Ir_{ex})}{144} = 1.4$ sf

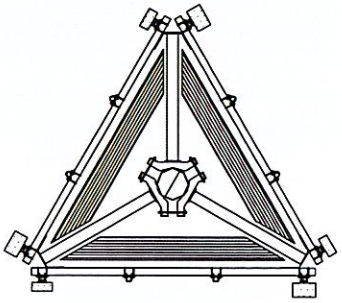
TMA Projected Surface Area w/ Extreme Ice = $A_{ICE.exTMA} := SA_{ICE.exTMA} \cdot N_{TMA} = 4.3$ sf

Total TMA Wind Force w/ Extreme Ice = $Fi_{ex.TMA1} := p_{ex} \cdot Cd_F \cdot A_{ICE.exTMA} \cdot m = 54$ lbs

Development of Wind & Ice Load on TMA's

Existing TMA Data: (AT&T)

TMA Model =	Powerwave LGP 21401		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 14.4$	in	(User Input)
TMA Width =	$W_{TMA} := 9.2$	in	(User Input)
TMA Thickness =	$T_{TMA} := 2.6$	in	(User Input)
TMA Weight =	$WT_{TMA} := 14$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 12$		(User Input)



Gravity Load (without ice)

Weight of All TMA's = $Wt_{TMA2} := WT_{TMA} \cdot N_{TMA} = 168$ lbs

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 344$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 221$ cu in

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

Weight of Ice on All TMA's = $Wt_{ice.TMA2} := W_{ICETMA} \cdot N_{TMA} = 86$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each TMA = $V_{ice.ex} := (L_{TMA} + 2 \cdot Ir_{ex})(W_{TMA} + 2 \cdot Ir_{ex})(T_{TMA} + 2 \cdot Ir_{ex}) - V_{TMA} = 353$ cu in

Weight of Extreme Ice on Each TMA = $W_{ICE.exTMA} := \frac{V_{ice.ex}}{1728} \cdot Id = 11$ lbs

Weight of Extreme Ice on All TMA's = $Wt_{ice.ex.TMA2} := W_{ICE.exTMA} \cdot N_{TMA} = 137$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 1.1$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 13.1$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA2} := p \cdot Cd_F \cdot A_{ICETMA} = 84$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.9$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 11$ sf

Total TMA Wind Force = $F_{TMA2} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 767$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Extreme Ice = $SA_{ICE.exTMA} := \frac{(L_{TMA} + 2 \cdot Ir_{ex}) \cdot (W_{TMA} + 2 \cdot Ir_{ex})}{144} = 1.2$ sf

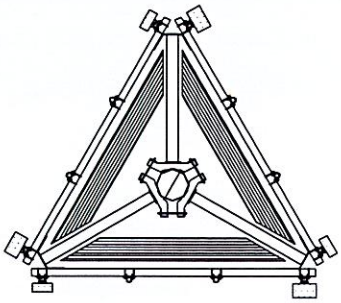
TMA Projected Surface Area w/ Extreme Ice = $A_{ICE.exTMA} := SA_{ICE.exTMA} \cdot N_{TMA} = 14.2$ sf

Total TMA Wind Force w/ Extreme Ice = $Fi_{ex.TMA2} := p_{ex} \cdot Cd_F \cdot A_{ICE.exTMA} \cdot m = 181$ lbs

Development of Wind & Ice Load on Platform

Existing Platform Data: (AT&T)

Platform Model =	12' Low Profile Platform w/ (12) Pipe Masts		(User Input)
Platform Shape =	Flat		(User Input)
Platform Area =	$CdA_{plt} := 39$	sq ft	(User Input)
Platform Area w/ Ice =	$CdA_{ICEplt} := 50$	sq ft	(User Input)
Platform Area w/ Extreme Ice =	$CdA_{ICE.EXplt} := 75$	sq ft	(User Input)
Platform Weight =	$WT_{plt} := 2000$	lbs	(User Input)
Platform Weight w/ Ice =	$WT_{ICEplt} := 3000$	lbs	(User Input)
Platform Weight w/ Extreme Ice =	$WT_{ICE.EXplt} := 4500$	lbs	(User Input)



Gravity Load (without ice)

Weight of Platform = $Wt_{plt1} := WT_{plt} = 2000$ lbs

Gravity Load (ice only)

Weight of Ice on Platform = $Wt_{ice.plt1} := WT_{ICEplt} - WT_{plt} = 1000$ lbs

Gravity Load (Extreme ice only)

Weight of Extreme Ice on Platform = $Wt_{ice.ex.plt1} := WT_{ICE.EXplt} - WT_{plt} = 2500$ lbs

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt1} := p \cdot CdA_{ICEplt} = 200$ lbs

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt1} := qz \cdot CdA_{plt} \cdot m = 1693$ lbs

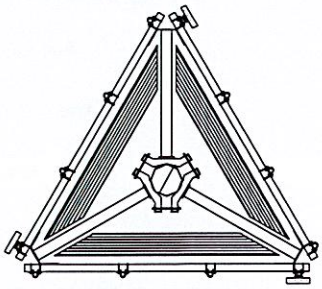
Wind Load (NESC Extreme Ice w/ Wind)

Total Platform Wind Force w/ Extreme Ice = $Fi_{ex.plt1} := p_{ex} \cdot CdA_{ICE.EXplt} \cdot m = 600$ lbs

Development of Wind & Ice Load on Antennas

Existing Antenna Data: (T-Mobile)

Antenna Model =	RFS APX 16PV-16PVL-E		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 53$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 40$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)



Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 120$ lbs

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2119$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 958$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 31$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 93$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each Antenna = $V_{ice.ex} := (L_{ant} + 2 \cdot Ir_{ex})(W_{ant} + 2 \cdot Ir_{ex})(T_{ant} + 2 \cdot Ir_{ex}) - V_{ant} = 1491$ cu in

Weight of Extreme Ice on Each Antenna = $W_{ICE.exant} := \frac{V_{ice.ex}}{1728} \cdot Id = 48$ lbs

Weight of Extreme Ice on All Antennas = $Wt_{ice.ex.ant3} := W_{ICE.exant} \cdot N_{ant} = 145$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 5.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 15.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 100$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 14.2$ sf

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 990$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Extreme Ice = $SA_{ICE.exant} := \frac{(L_{ant} + 2 \cdot Ir_{ex}) \cdot (W_{ant} + 2 \cdot Ir_{ex})}{144} = 5.5$ sf

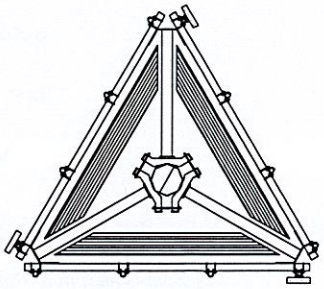
Antenna Projected Surface Area w/ Extreme Ice = $A_{ICE.exant} := SA_{ICE.exant} \cdot N_{ant} = 16.4$ sf

Total Antenna Wind Force w/ Extreme Ice = $Fi_{ex.ant3} := p_{ex} \cdot Cd_F \cdot A_{ICE.exant} \cdot m = 209$ lbs

Development of Wind & Ice Load on TMA's

Existing TMA Data: (T-Mobile)

TMA Model =	Remec G20057A1 TMA		
TMA Shape =	Flat		(User Input)
TMA Height =	$L_{TMA} := 13.2$	in	(User Input)
TMA Width =	$W_{TMA} := 6.4$	in	(User Input)
TMA Thickness =	$T_{TMA} := 3.0$	in	(User Input)
TMA Weight =	$WT_{TMA} := 11$	lbs	(User Input)
Number of TMA's =	$N_{TMA} := 6$		(User Input)



Gravity Load (without ice)

Weight of All TMA's = $Wt_{TMA3} := WT_{TMA} \cdot N_{TMA} = 66$ lbs

Gravity Load (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 253$ cu in

Volume of Ice on Each TMA = $V_{ice} := (L_{TMA} + 2 \cdot Ir)(W_{TMA} + 2 \cdot Ir)(T_{TMA} + 2 \cdot Ir) - V_{TMA} = 167$ cu in

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

Weight of Ice on All TMA's = $Wt_{ice.TMA3} := W_{ICETMA} \cdot N_{TMA} = 32$ lbs

Gravity Load (Extreme ice only)

Volume of Extreme Ice on Each TMA = $V_{ice.ex} := (L_{TMA} + 2 \cdot Ir_{ex})(W_{TMA} + 2 \cdot Ir_{ex})(T_{TMA} + 2 \cdot Ir_{ex}) - V_{TMA} = 269$ cu in

Weight of Extreme Ice on Each TMA = $W_{ICE.exTMA} := \frac{V_{ice.ex}}{1728} \cdot Id = 9$ lbs

Weight of Extreme Ice on All TMA's = $Wt_{ice.ex.TMA3} := W_{ICE.exTMA} \cdot N_{TMA} = 52$ lbs

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Ice = $SA_{ICETMA} := \frac{(L_{TMA} + 2 \cdot Ir) \cdot (W_{TMA} + 2 \cdot Ir)}{144} = 0.7$ sf

TMA Projected Surface Area w/ Ice = $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 4.4$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA3} := p \cdot Cd_F \cdot A_{ICETMA} = 28$ lbs

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA = $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.6$ sf

TMA Projected Surface Area = $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 3.5$ sf

Total TMA Wind Force = $F_{TMA3} := qz \cdot Cd_F \cdot A_{TMA} \cdot m = 245$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Assumes Maximum Possible Wind Pressure Applied to all TMA's Simultaneously

Surface Area for One TMA w/ Extreme Ice = $SA_{ICE.exTMA} := \frac{(L_{TMA} + 2 \cdot Ir_{ex}) \cdot (W_{TMA} + 2 \cdot Ir_{ex})}{144} = 0.8$ sf

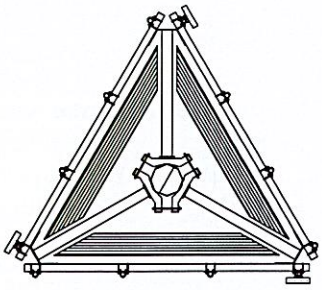
TMA Projected Surface Area w/ Extreme Ice = $A_{ICE.exTMA} := SA_{ICE.exTMA} \cdot N_{TMA} = 4.8$ sf

Total TMA Wind Force w/ Extreme Ice = $Fi_{ex.TMA3} := p_{ex} \cdot Cd_F \cdot A_{ICE.exTMA} \cdot m = 62$ lbs

Development of Wind & Ice Load on Platform

Existing Platform Data: (T-Mobile)

Platform Model =	12' Low Profile Platform w/ (12) Pipe Masts		(User Input)
Platform Shape =	Flat		(User Input)
Platform Area =	$CdA_{plt} := 39$	sq ft	(User Input)
Platform Area w/ Ice =	$CdA_{ICEplt} := 50$	sq ft	(User Input)
Platform Area w/ Extreme Ice =	$CdA_{ICE.EXplt} := 75$	sq ft	(User Input)
Platform Weight =	$WT_{plt} := 2000$	lbs	(User Input)
Platform Weight w/ Ice =	$WT_{ICEplt} := 3000$	lbs	(User Input)
Platform Weight w/ Extreme Ice =	$WT_{ICE.EXplt} := 4500$	lbs	(User Input)



Gravity Load (without ice)

Weight of Platform = $Wt_{plt2} := WT_{plt} = 2000$ lbs

Gravity Load (ice only)

Weight of Ice on Platform = $Wt_{ice.plt2} := WT_{ICEplt} - WT_{plt} = 1000$ lbs

Gravity Load (Extreme ice only)

Weight of Extreme Ice on Platform = $Wt_{ice.ex.plt2} := WT_{ICE.EXplt} - WT_{plt} = 2500$ lbs

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt2} := p \cdot CdA_{ICEplt} = 200$ lbs

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt2} := qz \cdot CdA_{plt} \cdot m = 1693$ lbs

Wind Load (NESC Extreme Ice w/ Wind)

Total Platform Wind Force w/ Extreme Ice = $Fi_{ex.plt2} := p_{ex} \cdot CdA_{ICE.EXplt} \cdot m = 600$ lbs

Total Equipment Loads:

AT&T @ 116-ft AGL

NESC Heavy Wind Vertical =

$$\left(Wt_{ant1} + Wt_{ice.ant1} + Wt_{ant2} + Wt_{ice.ant2} + Wt_{TMA1} + Wt_{ice.TMA1} + Wt_{TMA2} + Wt_{ice.TMA2} + Wt_{plt1} + Wt_{ice.plt1}\right)\cdot 1.5 = 6089$$ lbs

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant1} + Fi_{ant2} + Fi_{TMA1} + Fi_{TMA2} + Fi_{plt1}\right)\cdot 2.5 = 1532$ lbs

NESC Extreme Wind Vertical = $\left(Wt_{ant1} + Wt_{ant2} + Wt_{TMA1} + Wt_{TMA2} + Wt_{plt1}\right) = 2609$ lbs

NESC Extreme Wind Trasnsverse = $\left(F_{ant1} + F_{ant2} + F_{TMA1} + F_{TMA2} + F_{plt1}\right) = 5678$ lbs

NESC Extreme Ice w/ Wind Vertical =

$$\left(Wt_{ant1} + Wt_{ice.ex.ant1} + Wt_{ant2} + Wt_{ice.ex.ant2} + Wt_{TMA1} + Wt_{ice.ex.TMA1} + Wt_{TMA2} + Wt_{ice.ex.TMA2} + Wt_{plt1} + Wt_{ice.ex.plt1}\right) = 5813$$ lbs

NESC Extreme Ice w/ Wind Trasnsverse = $\left(Fi_{ex.ant1} + Fi_{ex.ant2} + Fi_{ex.TMA1} + Fi_{ex.TMA2} + Fi_{ex.plt1}\right) = 1473$ lbs

T-Mobile @ 106-ft AGL

NESC Heavy Wind Vertical = $\left(Wt_{ant3} + Wt_{ice.ant3} + Wt_{TMA3} + Wt_{ice.TMA3} + Wt_{plt2} + Wt_{ice.plt2}\right)\cdot 1.5 = 4967$ lbs

NESC Heavy Wind Trasnsverse = $\left(Fi_{ant3} + Fi_{TMA3} + Fi_{plt2}\right)\cdot 2.5 = 820$ lbs

NESC Extreme Wind Vertical = $\left(Wt_{ant3} + Wt_{TMA3} + Wt_{plt2}\right) = 2186$ lbs

NESC Extreme Wind Trasnsverse = $\left(F_{ant3} + F_{TMA3} + F_{plt2}\right) = 2928$ lbs

NESC Extreme Ice w/ Wind Vertical = $\left(Wt_{ant3} + Wt_{ice.ex.ant3} + Wt_{TMA3} + Wt_{ice.ex.TMA3} + Wt_{plt2} + Wt_{ice.ex.plt2}\right) = 4883$ lbs

NESC Extreme Ice w/ Wind Trasnsverse = $\left(Fi_{ex.ant3} + Fi_{ex.TMA3} + Fi_{ex.plt2}\right) = 871$ lbs

Coax Cable on CL&P Pole

Distance Between Coax Cable Attach Points =

Coaxial Cable Span = $Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input)*

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

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

Number of Coax Cables = $N_{coax} := 24$ *(User Input)*

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

Extreme Wind Pressure = $qz := 34.7 \cdot psf$ *(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)*

Extreme Ice w/ Wind Pressure = $p_{ex} := 6.4 \cdot psf$ *(User Input)*

Extreme Radial Ice Thickness = $Ir_{ex} := 0.75 \cdot in$ *(User Input)*

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

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

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

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

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

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

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

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 0 \cdot in$

Wind Area with Ice = $A_{ice} := 0 = 0 \cdot in$

Wind Area with Extreme Ice = $A_{ice.ex} := 0 = 0 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 36.359 \cdot plf$

Extreme Ice Area per Liner Ft = $Ai_{coax.ex} := \frac{\pi}{4} \cdot \left[\left(D_{coax} + 2 \cdot Ir_{ex}\right)^2 - D_{coax}^2\right] = 0.045\,ft^2$

Weight of Extreme Ice on All Coax Cables = $W_{ice.ex} := Ai_{coax.ex} \cdot Id \cdot N_{coax} = 60.036 \cdot plf$

Heavy Vertical Load =

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

Heavy Transverse Load =

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

$$Heavy_{Vert} = \begin{pmatrix} 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \\ 920 \end{pmatrix} lb \qquad Heavy_{Trans} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

Extreme Wind Vertical Load =

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

Extreme Wind Transverse Load =

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

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \\ 250 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

Extreme Ice w/ Wind Vertical Load =

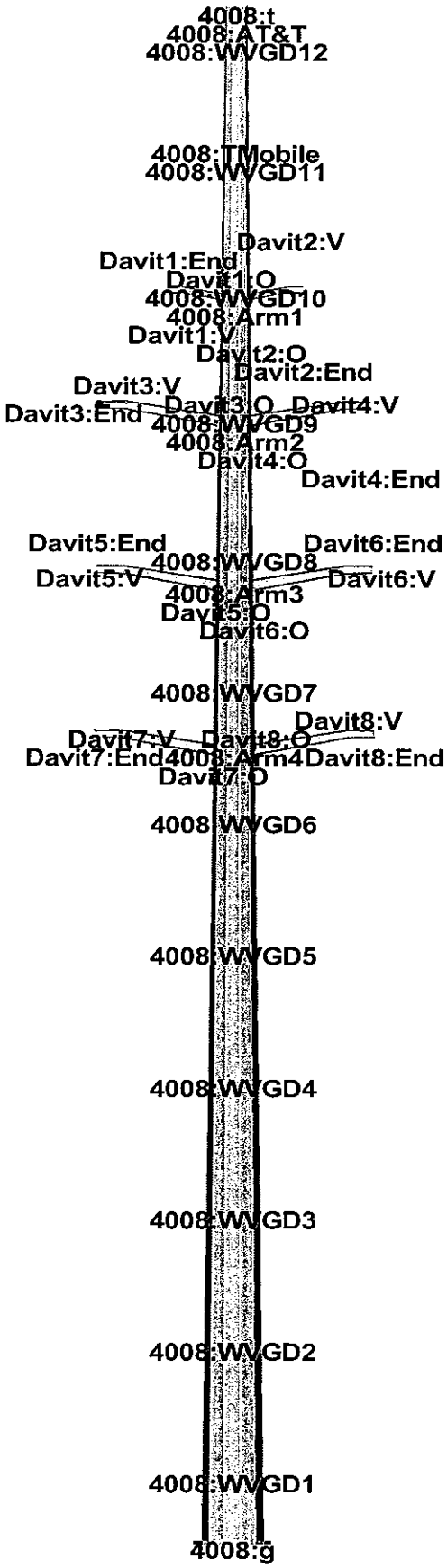
$$Extreme\_Ice_{Vert} := \overrightarrow{\left[\left(N_{coax} \cdot W_{coax} + W_{ice.ex}\right) \cdot Coax_{Span} \cdot OF_{EIV}\right]}$$

Extreme Ice w/ Wind Transverse Load =

$$Extreme\_Ice_{Trans} := \overrightarrow{\left(p_{ex} \cdot A_{ice.ex} \cdot Cd_{coax} \cdot Coax_{Span} \cdot OF_{EIT}\right)}$$

$$Extreme\_Ice_{Vert} = \begin{pmatrix} 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \\ 850 \end{pmatrix} lb \qquad Extreme\_Ice_{Trans} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix}$$

ntek Engineering Inc, Project: "cl&p structure #4008"
PLS-POLE Version 11.11, 2:56:19 PM Friday, April 27, 2012
Undeformed geometry displayed



Project Name : 12014.CO2 - Hamden, CT
Project Notes: CL&P Structure # 4008 / AT&T CT2255
Project File : J:\Jobs\1201400.WI\CO.02 - CT2255 - 4286 WHITNEY AVENUE, HAMDEN, CT\Rev (2)\Calcs\PLS-Pole\cl&p structure #4008.pol
Date run : 8:31:53 AM Monday, April 30, 2012
by : PLS-POLE Version 11.11
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1201400.wi\co.02 - ct2255 - 4286 whitney avenue, hamden, ct\rev (2)\calcs\pls-pole\cl&p #4008.lca

*** Analysis Results:

Maximum element usage is 66.65% for Base Plate "4008" in load case "NESC Extreme"
Maximum insulator usage is 7.91% for Clamp "Clamp3" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Vert. Moment (ft-k)	Bending Moment (ft-k)	Found. Usage %
NESC Heavy	4008:g	-0.13	-24.88	95.23	24.88	1942.49	-6.86	-0.00	1942.51	0.00
NESC Extreme	4008:g	-0.04	-48.62	45.16	48.62	3764.76	-2.08	-0.00	3764.76	0.00
NESC Extreme Ice w/ Wind	4008:g	-0.05	-19.89	82.97	19.89	1590.77	-2.77	-0.00	1590.78	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive tip load results in positive rotation

Load Case	Joint Label	Long. Defl. (in)	Tran. Defl. (in)	Vert. Defl. (in)	Resultant Defl. (in)	Long. Rot. (deg)	Tran. Rot. (deg)	Twist (deg)
NESC Heavy	4008:t	0.07	24.19	-0.33	24.19	0.00	-1.69	0.00
NESC Extreme	4008:t	0.02	49.18	-1.17	49.20	0.00	-3.64	0.00
NESC Extreme Ice w/ Wind	4008:t	0.03	20.25	-0.24	20.26	0.00	-1.43	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
4008	1	973	NESC Extreme	30.73	160.48
4008	2	6084	NESC Extreme	65.95	1458.94
4008	3	11808	NESC Extreme	63.18	3764.76

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
4008	65.95	NESC Extreme	23	20879.9

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	33.54	NESC Extreme Ice w/ Wind	1	50.3
Davit2	37.90	NESC Extreme Ice w/ Wind	1	50.3

Davit3	41.62	NESC Heavy	1	260.4
Davit4	45.91	NESC Heavy	1	260.4
Davit5	41.69	NESC Heavy	1	260.4
Davit6	45.95	NESC Heavy	1	260.4
Davit7	41.78	NESC Heavy	1	260.4
Davit8	46.00	NESC Heavy	1	260.4

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	46.00	Davit8	Tubular Davit
NESC Extreme	66.65	4008	Base Plate
NESC Extreme Ice w/ Wind	42.03	Davit8	Tubular Davit

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	35.11	4008	23
NESC Extreme	65.95	4008	23
NESC Extreme Ice w/ Wind	29.64	4008	23

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	4008	12	25.762	95.230	1942.493	-6.855	18.082	58.228	3	75.334	1.804	36.16
NESC Extreme	4008	12	25.762	45.158	3764.756	-2.080	33.327	107.324	3	139.035	2.449	66.65
NESC Extreme Ice w/ Wind	4008	12	25.762	82.970	1590.773	-2.772	14.869	47.883	3	61.943	1.636	29.74

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	46.00	Davit8	1
NESC Extreme	22.56	Davit8	1
NESC Extreme Ice w/ Wind	42.03	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.39	NESC Extreme Ice w/ Wind	0.0
Clamp2	Clamp	3.39	NESC Extreme Ice w/ Wind	0.0
Clamp3	Clamp	7.91	NESC Heavy	0.0
Clamp4	Clamp	7.91	NESC Heavy	0.0
Clamp5	Clamp	7.91	NESC Heavy	0.0
Clamp6	Clamp	7.91	NESC Heavy	0.0
Clamp7	Clamp	7.91	NESC Heavy	0.0
Clamp8	Clamp	7.91	NESC Heavy	0.0
Clamp9	Clamp	1.15	NESC Heavy	0.0
Clamp10	Clamp	1.15	NESC Heavy	0.0
Clamp11	Clamp	1.15	NESC Heavy	0.0

Clamp12	Clamp	1.15	NESC	Heavy	0.0
Clamp13	Clamp	1.15	NESC	Heavy	0.0
Clamp14	Clamp	1.15	NESC	Heavy	0.0
Clamp15	Clamp	1.15	NESC	Heavy	0.0
Clamp16	Clamp	1.15	NESC	Heavy	0.0
Clamp17	Clamp	1.15	NESC	Heavy	0.0
Clamp18	Clamp	1.15	NESC	Heavy	0.0
Clamp19	Clamp	1.15	NESC	Heavy	0.0
Clamp20	Clamp	1.15	NESC	Heavy	0.0
Clamp21	Clamp	7.85	NESC	Heavy	0.0
Clamp22	Clamp	6.29	NESC	Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	1663.2
Weight of Steel Poles:	20879.9
Total:	22543.1

*** End of Report

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*********************************************************************
*                                                                   *
*                              PLS-POLE                             *
*                   POLE AND FRAME ANALYSIS AND DESIGN              *
*              Copyright Power Line Systems, Inc. 1999-2011         *
*                                                                   *
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Project Name : 12014.CO2 - Hamden, CT
Project Notes: CL&P Structure # 4008 / AT&T CT2255
Project File : J:\Jobs\1201400.WI\CO.02 - CT2255 - 4286 WHITNEY AVENUE, HAMDEN, CT\Rev (2)\Calcs\PLS-Pole\cl&p structure #4008.pol
Date run : 8:31:52 AM Monday, April 30, 2012
by : PLS-POLE Version 11.11
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Modeling options:
- Offset Arms from Pole/Mast: Yes
- Offset Braces from Pole/Mast: Yes
- Offset Guys from Pole/Mast: Yes
- Offset Posts from Pole/Mast: Yes
- Offset Strains from Pole/Mast: Yes
- Use Alternate Convergence Process: No
- Steel poles checked with ASCE/SEI 48-05

Default Modulus of Elasticity for Steel = 29000.00 (ksi)
Default Weight Density for Steel = 490.00 (lbs/ft^3)

Steel Pole Properties:

Steel Pole Property Label	Stock Number	Length (ft)	Default Embedded Length (ft)	Base Plate	Shape	Tip Diameter (in)	Base Diameter (in)	Taper (in/ft)	Default Drag Coef.	Tubes	Modulus of Elasticity Override (ksi)	Weight Density Override (lbs/ft^3)	Shape At Base	Strength Check Type	Distance From Tip (ft)	Ultimate Trans. Load (kips)	Ultimate Long. Load (kips)
CL&P4008	4008	116.50	0	Yes	12F	20	57.49	0	1.3	3 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

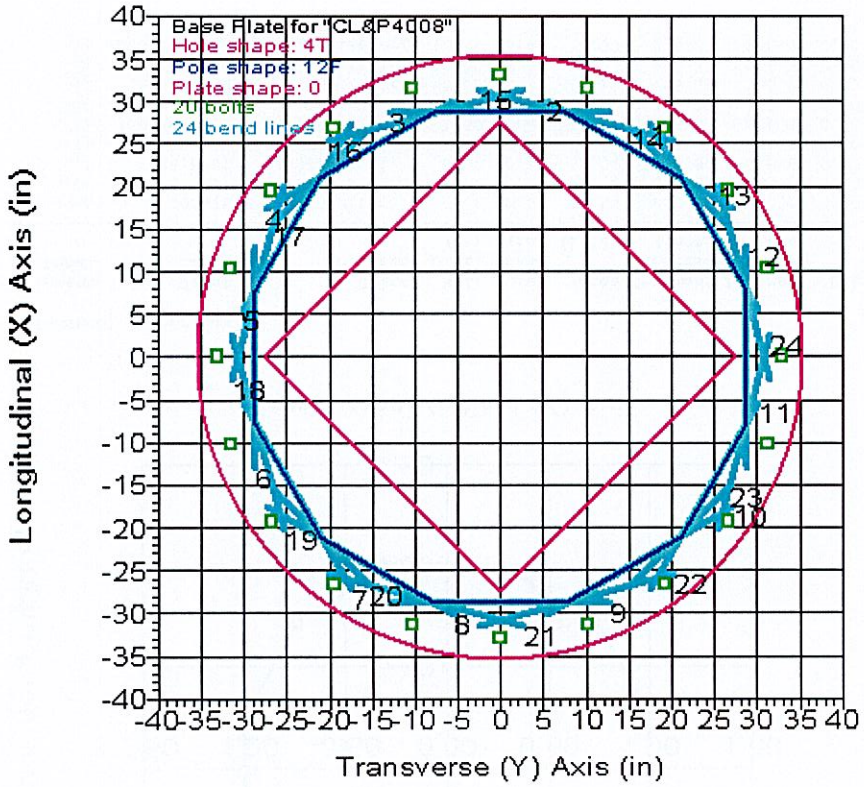
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)
CL&P4008	1	20.5	0.1875	0.000	0.000	65.000	0.000	973	10.74	0.32502	20.00	26.66	3.29
CL&P4008	2	51	0.3125	5.500	0.000	65.000	0.000	6084	27.52	0.32502	26.91	43.49	5.36
CL&P4008	3	50.5	0.4375	0.000	0.000	65.000	0.000	11808	26.66	0.32502	41.08	57.49	0.00

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CL&P4008	71.000	0	3.000	2015	0.000	38.875	4T	490.00	50.000	2.250	66.000	20	43338.49	43338.49

Base Plate Bolt Coordinates for Property "CL&P4008":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0	1	0
0.3106	0.9508	0
0.5871	0.8106	0
0.8106	0.5871	0
0.9508	0.3106	0
1	0	0



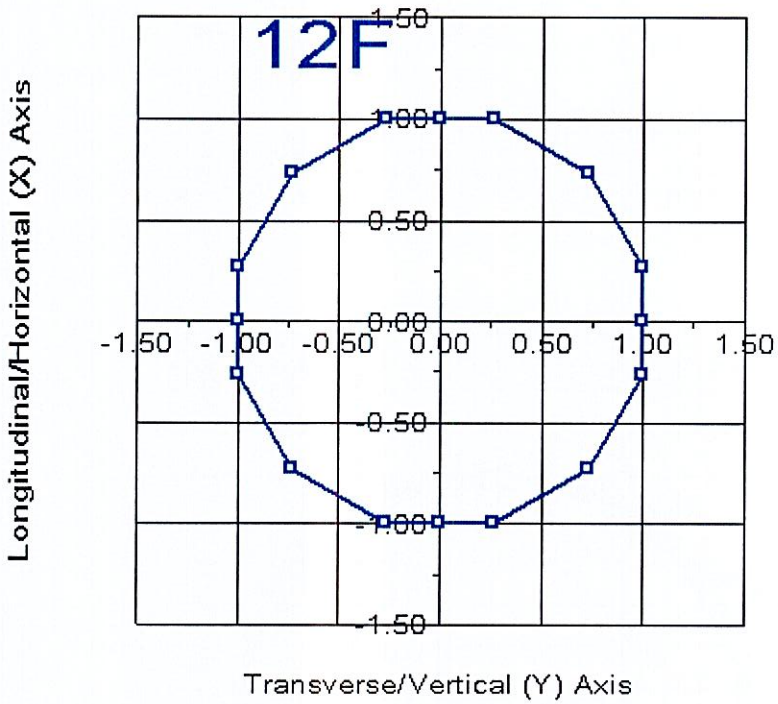
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
4008			0	0	0	0	0	CL&P4008	18 labels		0.00	0

Relative Attachment Labels for Steel Pole "4008":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
4008:Arm1	0.00	94.50
4008:Arm2	0.00	85.06
4008:Arm3	0.00	72.56
4008:Arm4	0.00	60.06
4008:WVGD1	0.00	5.00
4008:WVGD2	0.00	15.00
4008:WVGD3	0.00	25.00

4008:WVGD4	0.00	35.00
4008:WVGD5	0.00	45.00
4008:WVGD6	0.00	55.00
4008:WVGD7	0.00	65.00
4008:WVGD8	0.00	75.00
4008:WVGD9	0.00	85.50
4008:WVGD10	0.00	95.00
4008:WVGD11	0.00	105.00
4008:TMobile	0.00	106.00
4008:AT&T	0.00	116.00
4008:WVGD12	0.00	115.00



Pole Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	ASCE Cap Trans. (ft-k)	ASCE Cap Long. (ft-k)
4008	4008:t	4008:t Ori	0.00	20.00	11.94	600.17	600.17	0.00	25.9	65.00	65.00	325.09	325.09
4008	4008:AT&T	4008:AT&T End	0.50	20.16	12.04	615.06	615.06	0.00	26.1	65.00	65.00	330.47	330.47
4008	4008:AT&T	4008:AT&T Ori	0.50	20.16	12.04	615.06	615.06	0.00	26.1	65.00	65.00	330.47	330.47
4008	4008:WVGD12	4008:WVGD12 End	1.50	20.49	12.24	645.57	645.57	0.00	26.6	65.00	65.00	341.36	341.36
4008	4008:WVGD12	4008:WVGD12 Ori	1.50	20.49	12.24	645.57	645.57	0.00	26.6	65.00	65.00	341.36	341.36
4008	#4008:0	Tube 1 End	6.00	21.95	13.12	795.39	795.39	0.00	28.7	65.00	65.00	392.56	392.56
4008	#4008:0	Tube 1 Ori	6.00	21.95	13.12	795.39	795.39	0.00	28.7	65.00	65.00	392.56	392.56
4008	4008:TMobile	4008:TMobile End	10.50	23.41	14.00	966.77	966.77	0.00	30.8	65.00	64.08	441.00	441.00
4008	4008:TMobile	4008:TMobile Ori	10.50	23.41	14.00	966.77	966.77	0.00	30.8	65.00	64.08	441.00	441.00

4008	4008:WVGD11	4008:WVGD11	End	11.50	23.74	14.20	1007.93	1007.93	0.00	31.2	65.00	63.62	450.26	450.26
4008	4008:WVGD11	4008:WVGD11	Ori	11.50	23.74	14.20	1007.93	1007.93	0.00	31.2	65.00	63.62	450.26	450.26
4008	#4008:1	Tube 1	End	16.00	25.20	15.08	1207.62	1207.62	0.00	33.3	65.00	61.58	491.79	491.79
4008	#4008:1	Tube 1	Ori	16.00	25.20	15.08	1207.62	1207.62	0.00	33.3	65.00	61.58	491.79	491.79
4008	#4008:2	SpliceT	End	20.50	26.66	15.96	1432.08	1432.08	0.00	35.4	65.00	59.53	532.87	532.87
4008	#4008:2	SpliceT	Ori	20.50	26.91	26.73	2420.97	2420.97	0.00	20.4	65.00	65.00	974.52	974.52
4008	4008:WVGD10	4008:WVGD10	End	21.50	27.24	27.05	2510.80	2510.80	0.00	20.7	65.00	65.00	998.62	998.62
4008	4008:WVGD10	4008:WVGD10	Ori	21.50	27.24	27.05	2510.80	2510.80	0.00	20.7	65.00	65.00	998.62	998.62
4008	4008:Arm1	4008:Arm1	End	22.00	27.40	27.22	2556.53	2556.53	0.00	20.8	65.00	65.00	1010.77	1010.77
4008	4008:Arm1	4008:Arm1	Ori	22.00	27.40	27.22	2556.53	2556.53	0.00	20.8	65.00	65.00	1010.77	1010.77
4008	#4008:3	Tube 2	End	26.50	28.86	28.69	2993.37	2993.37	0.00	22.1	65.00	65.00	1123.52	1123.52
4008	#4008:3	Tube 2	Ori	26.50	28.86	28.69	2993.37	2993.37	0.00	22.1	65.00	65.00	1123.52	1123.52
4008	4008:WVGD9	4008:WVGD9	End	31.00	30.33	30.16	3477.33	3477.33	0.00	23.3	65.00	65.00	1242.22	1242.22
4008	4008:WVGD9	4008:WVGD9	Ori	31.00	30.33	30.16	3477.33	3477.33	0.00	23.3	65.00	65.00	1242.22	1242.22
4008	4008:Arm2	4008:Arm2	End	31.44	30.47	30.30	3526.99	3526.99	0.00	23.4	65.00	65.00	1254.08	1254.08
4008	4008:Arm2	4008:Arm2	Ori	31.44	30.47	30.30	3526.99	3526.99	0.00	23.4	65.00	65.00	1254.08	1254.08
4008	#4008:4	Tube 2	End	36.44	32.09	31.93	4128.45	4128.45	0.00	24.8	65.00	65.00	1393.60	1393.60
4008	#4008:4	Tube 2	Ori	36.44	32.09	31.93	4128.45	4128.45	0.00	24.8	65.00	65.00	1393.60	1393.60
4008	#4008:5	Tube 2	End	38.97	32.92	32.76	4457.42	4457.42	0.00	25.5	65.00	65.00	1467.04	1467.04
4008	#4008:5	Tube 2	Ori	38.97	32.92	32.76	4457.42	4457.42	0.00	25.5	65.00	65.00	1467.04	1467.04
4008	4008:WVGD8	4008:WVGD8	End	41.50	33.74	33.59	4803.42	4803.42	0.00	26.2	65.00	65.00	1542.37	1542.37
4008	4008:WVGD8	4008:WVGD8	Ori	41.50	33.74	33.59	4803.43	4803.43	0.00	26.2	65.00	65.00	1542.37	1542.37
4008	4008:Arm3	4008:Arm3	End	43.94	34.53	34.38	5153.11	5153.11	0.00	26.9	65.00	65.00	1616.69	1616.69
4008	4008:Arm3	4008:Arm3	Ori	43.94	34.53	34.38	5153.11	5153.11	0.00	26.9	65.00	65.00	1616.69	1616.69
4008	#4008:6	Tube 2	End	47.72	35.76	35.62	5728.50	5728.50	0.00	28.0	65.00	65.00	1735.44	1735.44
4008	#4008:6	Tube 2	Ori	47.72	35.76	35.62	5728.50	5728.50	0.00	28.0	65.00	65.00	1735.44	1735.44
4008	4008:WVGD7	4008:WVGD7	End	51.50	36.99	36.85	6345.20	6345.20	0.00	29.0	65.00	65.00	1858.40	1858.40
4008	4008:WVGD7	4008:WVGD7	Ori	51.50	36.99	36.85	6345.20	6345.20	0.00	29.0	65.00	65.00	1858.40	1858.40
4008	4008:Arm4	4008:Arm4	End	56.44	38.59	38.46	7215.05	7215.05	0.00	30.4	65.00	64.44	2007.82	2007.82
4008	4008:Arm4	4008:Arm4	Ori	56.44	38.59	38.47	7215.05	7215.05	0.00	30.4	65.00	64.44	2007.82	2007.82
4008	#4008:7	Tube 2	End	58.97	39.42	39.29	7690.29	7690.29	0.00	31.1	65.00	63.75	2072.92	2072.92
4008	#4008:7	Tube 2	Ori	58.97	39.42	39.29	7690.29	7690.29	0.00	31.1	65.00	63.75	2072.92	2072.92
4008	4008:WVGD6	4008:WVGD6	End	61.50	40.24	40.12	8185.94	8185.94	0.00	31.8	65.00	63.06	2137.96	2137.96
4008	4008:WVGD6	4008:WVGD6	Ori	61.50	40.24	40.12	8185.94	8185.94	0.00	31.8	65.00	63.06	2137.96	2137.96
4008	#4008:8	SpliceT	End	66.00	41.70	41.59	9118.87	9118.87	0.00	33.1	65.00	61.83	2253.29	2253.29
4008	#4008:8	SpliceT	Ori	66.00	41.70	41.59	9118.88	9118.88	0.00	33.1	65.00	61.83	2253.29	2253.29
4008	#4008:9	Tube 2	End	68.75	41.97	58.43	12900.64	12900.64	0.00	23.0	65.00	65.00	3329.90	3329.90
4008	#4008:9	Tube 2	Ori	68.75	41.97	58.43	12900.64	12900.64	0.00	23.0	65.00	65.00	3329.90	3329.90
4008	4008:WVGD5	4008:WVGD5	End	71.50	42.86	59.68	13751.52	13751.52	0.00	23.6	65.00	65.00	3475.51	3475.51
4008	4008:WVGD5	4008:WVGD5	Ori	71.50	42.86	59.68	13751.52	13751.52	0.00	23.6	65.00	65.00	3475.52	3475.52
4008	#4008:10	Tube 3	End	76.50	44.49	61.97	15392.92	15392.92	0.00	24.6	65.00	65.00	3748.25	3748.25
4008	#4008:10	Tube 3	Ori	76.50	44.49	61.97	15392.93	15392.93	0.00	24.6	65.00	65.00	3748.25	3748.25
4008	4008:WVGD4	4008:WVGD4	End	81.50	46.11	64.25	17160.01	17160.01	0.00	25.6	65.00	65.00	4031.29	4031.29
4008	4008:WVGD4	4008:WVGD4	Ori	81.50	46.11	64.25	17160.01	17160.01	0.00	25.6	65.00	65.00	4031.29	4031.29
4008	#4008:11	Tube 3	End	86.50	47.74	66.54	19057.41	19057.41	0.00	26.6	65.00	65.00	4324.63	4324.63
4008	#4008:11	Tube 3	Ori	86.50	47.74	66.54	19057.41	19057.41	0.00	26.6	65.00	65.00	4324.63	4324.63
4008	4008:WVGD3	4008:WVGD3	End	91.50	49.36	68.83	21089.76	21089.76	0.00	27.6	65.00	65.00	4628.27	4628.27
4008	4008:WVGD3	4008:WVGD3	Ori	91.50	49.36	68.83	21089.76	21089.76	0.00	27.6	65.00	65.00	4628.27	4628.27
4008	#4008:12	Tube 3	End	96.50	50.99	71.11	23261.71	23261.71	0.00	28.5	65.00	65.00	4942.22	4942.22
4008	#4008:12	Tube 3	Ori	96.50	50.99	71.11	23261.71	23261.71	0.00	28.5	65.00	65.00	4942.22	4942.22
4008	4008:WVGD2	4008:WVGD2	End	101.50	52.61	73.40	25577.88	25577.88	0.00	29.5	65.00	65.00	5266.46	5266.46
4008	4008:WVGD2	4008:WVGD2	Ori	101.50	52.61	73.40	25577.88	25577.88	0.00	29.5	65.00	65.00	5266.46	5266.46
4008	#4008:13	Tube 3	End	106.50	54.24	75.69	28042.92	28042.92	0.00	30.5	65.00	64.31	5541.88	5541.88
4008	#4008:13	Tube 3	Ori	106.50	54.24	75.69	28042.92	28042.92	0.00	30.5	65.00	64.31	5541.88	5541.88
4008	4008:WVGD1	4008:WVGD1	End	111.50	55.86	77.97	30661.45	30661.45	0.00	31.5	65.00	63.34	5793.85	5793.85
4008	4008:WVGD1	4008:WVGD1	Ori	111.50	55.86	77.97	30661.46	30661.46	0.00	31.5	65.00	63.34	5793.85	5793.85
4008	4008:g	4008:g	End	116.50	57.49	80.26	33438.13	33438.13	0.00	32.5	65.00	62.36	6045.35	6045.35

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density Override (lbs/ft^3)	Steel Shape At End
ARMA	5-25050-009	8T	0.19	6	6	0	1.3	29000	2 points	Calculated	0	0	0	0	65	0	

ARMB	5-25050-010	8T	0.31	10	7	0	1.3	29000	2 points Calculated	0	0	0	0	65	0

Intermediate Joints for Davit Property "ARMA":

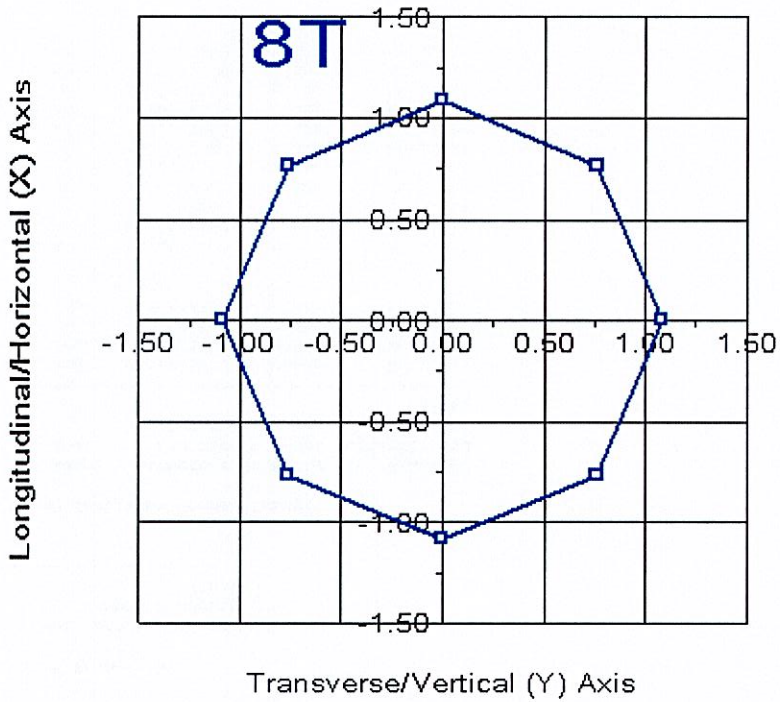
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
V	3	-0.5
End	4	-0.5

Intermediate Joints for Davit Property "ARMB":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
V	7	-1.17
End	9	-1.17

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	4008:Arm1	ARMA	180
Davit2	4008:Arm1	ARMA	0
Davit3	4008:Arm2	ARMB	180
Davit4	4008:Arm2	ARMB	0
Davit5	4008:Arm3	ARMB	180
Davit6	4008:Arm3	ARMB	0
Davit7	4008:Arm4	ARMB	180
Davit8	4008:Arm4	ARMB	0



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	ASCE Cap V-Mom. (ft-k)	ASCE Cap H-Mom. (ft-k)
Davit1	Davit1:O	Origin	0.00	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit1	Davit1:V	End	3.04	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit1	Davit1:V	Origin	3.04	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit1	Davit1:End	End	4.04	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit2	Davit2:O	Origin	0.00	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit2	Davit2:V	End	3.04	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit2	Davit2:V	Origin	3.04	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit2	Davit2:End	End	4.04	6.00	3.66	16.33	16.33	0.00	8.9	65.00	65.00	27.25	27.25
Davit3	Davit3:O	Origin	0.00	10.00	9.95	123.64	123.64	0.00	9.2	65.00	65.00	123.74	123.74
Davit3	#Davit3:O	End	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit3	#Davit3:O	Origin	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit3	Davit3:V	End	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit3	Davit3:V	Origin	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit3	Davit3:End	End	9.10	7.00	6.87	40.73	40.73	0.00	5.2	65.00	65.00	58.24	58.24
Davit4	Davit4:O	Origin	0.00	10.00	9.95	123.64	123.64	0.00	9.2	65.00	65.00	123.74	123.74
Davit4	#Davit4:O	End	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit4	#Davit4:O	Origin	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28

Davit4	Davit4:V	End	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit4	Davit4:V	Origin	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit4	Davit4:End	End	9.10	7.00	6.87	40.73	40.73	0.00	5.2	65.00	65.00	58.24	58.24
Davit5	Davit5:O	Origin	0.00	10.00	9.95	123.64	123.64	0.00	9.2	65.00	65.00	123.74	123.74
Davit5	#Davit5:O	End	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit5	#Davit5:O	Origin	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit5	Davit5:V	End	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit5	Davit5:V	Origin	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit5	Davit5:End	End	9.10	7.00	6.87	40.73	40.73	0.00	5.2	65.00	65.00	58.24	58.24
Davit6	Davit6:O	Origin	0.00	10.00	9.95	123.64	123.64	0.00	9.2	65.00	65.00	123.74	123.74
Davit6	#Davit6:O	End	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit6	#Davit6:O	Origin	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit6	Davit6:V	End	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit6	Davit6:V	Origin	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit6	Davit6:End	End	9.10	7.00	6.87	40.73	40.73	0.00	5.2	65.00	65.00	58.24	58.24
Davit7	Davit7:O	Origin	0.00	10.00	9.95	123.64	123.64	0.00	9.2	65.00	65.00	123.74	123.74
Davit7	#Davit7:O	End	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit7	#Davit7:O	Origin	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit7	Davit7:V	End	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit7	Davit7:V	Origin	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit7	Davit7:End	End	9.10	7.00	6.87	40.73	40.73	0.00	5.2	65.00	65.00	58.24	58.24
Davit8	Davit8:O	Origin	0.00	10.00	9.95	123.64	123.64	0.00	9.2	65.00	65.00	123.74	123.74
Davit8	#Davit8:O	End	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit8	#Davit8:O	Origin	3.55	8.83	8.75	84.06	84.06	0.00	7.7	65.00	65.00	95.28	95.28
Davit8	Davit8:V	End	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit8	Davit8:V	Origin	7.10	7.66	7.55	53.98	53.98	0.00	6.1	65.00	65.00	70.54	70.54
Davit8	Davit8:End	End	9.10	7.00	6.87	40.73	40.73	0.00	5.2	65.00	65.00	58.24	58.24

*** Insulator Data

Clamp Properties:

Label	Stock Number	Holding Capacity (lbs)
clamp	clamp1	8e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp1	Davit1:End	clamp	No Limit
Clamp2	Davit2:End	clamp	No Limit
Clamp3	Davit3:End	clamp	No Limit
Clamp4	Davit4:End	clamp	No Limit
Clamp5	Davit5:End	clamp	No Limit
Clamp6	Davit6:End	clamp	No Limit
Clamp7	Davit7:End	clamp	No Limit
Clamp8	Davit8:End	clamp	No Limit
Clamp9	4008:WVGD1	clamp	No Limit
Clamp10	4008:WVGD2	clamp	No Limit
Clamp11	4008:WVGD3	clamp	No Limit
Clamp12	4008:WVGD4	clamp	No Limit
Clamp13	4008:WVGD5	clamp	No Limit
Clamp14	4008:WVGD6	clamp	No Limit
Clamp15	4008:WVGD7	clamp	No Limit
Clamp16	4008:WVGD8	clamp	No Limit
Clamp17	4008:WVGD9	clamp	No Limit

Clamp18	4008:WVGD10	clamp	No Limit
Clamp19	4008:WVGD11	clamp	No Limit
Clamp20	4008:WVGD12	clamp	No Limit
Clamp21	4008:AT&T	clamp	No Limit
Clamp22	4008:TMobile	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1201400.wi\co.02 - ct2255 - 4286 whitney avenue, hamden, ct\rev (2)\calcs\pls-pole\cl&p #4008.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)	116.50	(ft)
Structure height	116.50	(ft)
Structure height above ground	116.50	(ft)

Vector Load Cases:

Load Case Description	Dead Load Factor % or (ft)	Wind Pole Area Factor	SF for Steel Poles and Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Tubular Arms	SF for Non Braces	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 Check (deg F)	Deflection Limit
NESC Heavy	1.5000	2.5000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	22 loads	Wind on All	4	0	0.500	56.000	0.0	No Limit 0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	22 loads	NESC 2007	31	0	0.000	0.000	0.0	No Limit 0
NESC Extreme Ice w/ Wind	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	22 loads	Wind on All	6.4	0	0.750	56.000	0.0	No Limit 0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	2200	1430	0	Shield Wire
Davit2:End	2200	1430	0	Shield Wire
Davit3:End	5840	2440	0	Conductor
Davit4:End	5840	2440	0	Conductor
Davit5:End	5840	2440	0	Conductor
Davit6:End	5840	2440	0	Conductor
Davit7:End	5840	2440	0	Conductor
Davit8:End	5840	2440	0	Conductor
4008:WVGD1	920	0	0	Conductor
4008:WVGD2	920	0	0	Conductor
4008:WVGD3	920	0	0	Conductor
4008:WVGD4	920	0	0	Conductor
4008:WVGD5	920	0	0	Conductor
4008:WVGD6	920	0	0	Conductor
4008:WVGD7	920	0	0	Conductor
4008:WVGD8	920	0	0	Conductor
4008:WVGD9	920	0	0	Conductor
4008:WVGD10	920	0	0	Conductor
4008:WVGD11	920	0	0	Conductor
4008:WVGD12	920	0	0	Conductor
4008:AT&T	6089	1532	0	AT&T Equipment

4008:TMobile	4967	820	0	T-Mobile Equipment

Detailed Pole Loading Data for Load Case "NESC Heavy":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
4008	4008:t	4008:AT&T	116.50	116.00	116.25	20.081	9.51e+005	1.300	10.00	0.50	30.61	10.88	6.28	0.54	11.42	0.00
4008	4008:AT&T	4008:WVGD12	116.00	115.00	115.50	20.325	9.62e+005	1.300	10.00	0.50	61.97	22.02	12.71	1.08	23.10	0.00
4008	4008:WVGD12		115.00	110.50	112.75	21.219	1e+006	1.300	10.00	0.50	291.23	103.45	59.70	4.88	108.32	0.00
4008		4008:TMobile	110.50	106.00	108.25	22.681	1.07e+006	1.300	10.00	0.50	311.49	110.58	63.81	4.88	115.45	0.00
4008	4008:TMobile	4008:WVGD11	106.00	105.00	105.50	23.575	1.12e+006	1.300	10.00	0.50	71.97	25.54	14.74	1.08	26.62	0.00
4008	4008:WVGD11		105.00	100.50	102.75	24.469	1.16e+006	1.300	10.00	0.50	336.24	119.29	68.84	4.88	124.17	0.00
4008			100.50	96.00	98.25	25.932	1.23e+006	1.300	10.00	0.50	356.52	126.42	72.96	4.88	131.30	0.00
4008		4008:WVGD10	96.00	95.00	95.50	27.075	1.28e+006	1.300	10.00	0.50	137.22	29.33	16.93	1.08	30.42	0.00
4008	4008:WVGD10	4008:Arm1	95.00	94.50	94.75	27.319	1.29e+006	1.300	10.00	0.50	69.25	14.80	8.54	0.54	15.34	0.00
4008	4008:Arm1		94.50	90.00	92.25	28.132	1.33e+006	1.300	10.00	0.50	642.05	137.15	79.15	4.88	142.02	0.00
4008		4008:WVGD9	90.00	85.50	87.75	29.594	1.4e+006	1.300	10.00	0.50	675.80	144.28	83.26	4.88	149.16	0.00
4008	4008:WVGD9	4008:Arm2	85.50	85.06	85.28	30.397	1.44e+006	1.300	10.00	0.50	67.50	14.41	8.31	0.47	14.88	0.00
4008	4008:Arm2		85.06	80.06	82.56	31.280	1.48e+006	1.300	10.00	0.50	794.13	169.44	97.78	5.42	174.86	0.00
4008			80.06	77.53	78.80	32.504	1.54e+006	1.300	10.00	0.50	417.92	89.14	51.44	2.74	91.88	0.00
4008		4008:WVGD8	77.53	75.00	76.27	33.327	1.58e+006	1.300	10.00	0.50	428.60	91.39	52.74	2.74	94.14	0.00
4008	4008:WVGD8	4008:Arm3	75.00	72.56	73.78	34.135	1.62e+006	1.300	10.00	0.50	422.82	90.14	52.02	2.64	92.78	0.00
4008	4008:Arm3		72.56	68.78	70.67	35.145	1.66e+006	1.300	10.00	0.50	675.51	143.97	83.09	4.10	148.07	0.00
4008		4008:WVGD7	68.78	65.00	66.89	36.374	1.72e+006	1.300	10.00	0.50	699.34	149.01	85.99	4.10	153.11	0.00
4008	4008:WVGD7	4008:Arm4	65.00	60.06	62.53	37.791	1.79e+006	1.300	10.00	0.50	949.07	202.15	116.66	5.35	207.50	0.00
4008	4008:Arm4		60.06	57.53	58.80	39.005	1.85e+006	1.300	10.00	0.50	502.31	106.96	61.73	2.74	109.71	0.00
4008		4008:WVGD6	57.53	55.00	56.27	39.827	1.89e+006	1.300	10.00	0.50	512.99	109.22	63.03	2.74	111.96	0.00
4008	4008:WVGD6		55.00	50.50	52.75	40.970	1.94e+006	1.300	10.00	0.50	938.35	199.74	115.27	4.88	204.62	0.00
4008			50.50	47.75	49.12	41.836	1.98e+006	1.300	10.00	0.50	1401.31	124.64	71.93	2.98	127.62	0.00
4008		4008:WVGD5	47.75	45.00	46.38	42.417	2.01e+006	1.300	10.00	0.50	1431.32	126.37	72.93	2.98	129.35	0.00
4008	4008:WVGD5		45.00	40.00	42.50	43.677	2.07e+006	1.300	10.00	0.50	1552.47	236.59	136.54	5.42	242.01	0.00
4008		4008:WVGD4	40.00	35.00	37.50	45.302	2.14e+006	1.300	10.00	0.50	1610.67	245.40	141.62	5.42	250.81	0.00
4008	4008:WVGD4		35.00	30.00	32.50	46.927	2.22e+006	1.300	10.00	0.50	1669.01	254.20	146.70	5.42	259.62	0.00
4008		4008:WVGD3	30.00	25.00	27.50	48.552	2.3e+006	1.300	10.00	0.50	1727.36	263.00	151.78	5.42	268.42	0.00
4008	4008:WVGD3		25.00	20.00	22.50	50.177	2.38e+006	1.300	10.00	0.50	1785.70	271.81	156.86	5.42	277.22	0.00
4008		4008:WVGD2	20.00	15.00	17.50	51.802	2.45e+006	1.300	10.00	0.50	1844.04	280.61	161.94	5.42	286.03	0.00
4008	4008:WVGD2		15.00	10.00	12.50	53.427	2.53e+006	1.300	10.00	0.50	1902.38	289.41	167.02	5.42	294.83	0.00
4008		4008:WVGD1	10.00	5.00	7.50	55.052	2.61e+006	1.300	10.00	0.50	1960.73	298.22	172.10	5.42	303.63	0.00
4008	4008:WVGD1	4008:g	5.00	0.00	2.50	56.677	2.68e+006	1.300	10.00	0.50	2019.07	307.02	177.18	5.42	312.44	0.00

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	660	1780	0	Shield Wire
Davit2:End	660	1780	0	Shield Wire
Davit3:End	2530	4070	0	Conductor
Davit4:End	2530	4070	0	Conductor
Davit5:End	2530	4070	0	Conductor
Davit6:End	2530	4070	0	Conductor
Davit7:End	2530	4070	0	Conductor
Davit8:End	2530	4070	0	Conductor
4008:WVGD1	250	0	0	Conductor
4008:WVGD2	250	0	0	Conductor
4008:WVGD3	250	0	0	Conductor
4008:WVGD4	250	0	0	Conductor
4008:WVGD5	250	0	0	Conductor
4008:WVGD6	250	0	0	Conductor

4008:WVGD7	250	0	0	Conductor
4008:WVGD8	250	0	0	Conductor
4008:WVGD9	250	0	0	Conductor
4008:WVGD10	250	0	0	Conductor
4008:WVGD11	250	0	0	Conductor
4008:WVGD12	250	0	0	Conductor
4008:AT&T	2609	5678	0	AT&T Equipment
4008:TMobile	2186	2928	0	T-Mobile Equipment

Detailed Pole Loading Data for Load Case "NESC Extreme":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
4008	4008:t	4008:AT&T	116.50	116.00	116.25	20.081	1.7e+006	1.000	31.92	0.00	20.41	26.71	0.00	0.00	26.71	0.00
4008	4008:AT&T	4008:WVGD12	116.00	115.00	115.50	20.325	1.72e+006	1.000	31.92	0.00	41.31	54.07	0.00	0.00	54.07	0.00
4008	4008:WVGD12		115.00	110.50	112.75	21.219	1.79e+006	1.000	31.92	0.00	194.15	254.02	0.00	0.00	254.02	0.00
4008		4008:TMobile	110.50	106.00	108.25	22.681	1.92e+006	1.000	31.92	0.00	207.66	271.53	0.00	0.00	271.53	0.00
4008	4008:TMobile	4008:WVGD11	106.00	105.00	105.50	23.575	1.99e+006	1.000	31.92	0.00	47.98	62.72	0.00	0.00	62.72	0.00
4008	4008:WVGD11		105.00	100.50	102.75	24.469	2.07e+006	1.000	31.92	0.00	224.16	292.93	0.00	0.00	292.93	0.00
4008			100.50	96.00	98.25	25.932	2.19e+006	1.000	31.92	0.00	237.68	310.44	0.00	0.00	310.44	0.00
4008		4008:WVGD10	96.00	95.00	95.50	27.075	2.29e+006	1.000	31.92	0.00	91.48	72.03	0.00	0.00	72.03	0.00
4008	4008:WVGD10	4008:Arm1	95.00	94.50	94.75	27.319	2.31e+006	1.000	31.92	0.00	46.17	36.34	0.00	0.00	36.34	0.00
4008	4008:Arm1		94.50	90.00	92.25	28.132	2.38e+006	1.000	31.92	0.00	428.03	336.78	0.00	0.00	336.78	0.00
4008		4008:WVGD9	90.00	85.50	87.75	29.594	2.5e+006	1.000	31.92	0.00	450.53	354.29	0.00	0.00	354.29	0.00
4008	4008:WVGD9	4008:Arm2	85.50	85.06	85.28	30.397	2.57e+006	1.000	31.92	0.00	45.00	35.38	0.00	0.00	35.38	0.00
4008	4008:Arm2		85.06	80.06	82.56	31.280	2.65e+006	1.000	31.92	0.00	529.42	416.08	0.00	0.00	416.08	0.00
4008			80.06	77.53	78.80	32.504	2.75e+006	1.000	31.92	0.00	278.61	218.88	0.00	0.00	218.88	0.00
4008		4008:WVGD8	77.53	75.00	76.27	33.327	2.82e+006	1.000	31.92	0.00	285.73	224.42	0.00	0.00	224.42	0.00
4008	4008:WVGD8	4008:Arm3	75.00	72.56	73.78	34.135	2.89e+006	1.000	31.92	0.00	281.88	221.35	0.00	0.00	221.35	0.00
4008	4008:Arm3		72.56	68.78	70.67	35.145	2.97e+006	1.000	31.92	0.00	450.34	353.54	0.00	0.00	353.54	0.00
4008		4008:WVGD7	68.78	65.00	66.89	36.374	3.08e+006	1.000	31.92	0.00	466.23	365.90	0.00	0.00	365.90	0.00
4008	4008:WVGD7	4008:Arm4	65.00	60.06	62.53	37.791	3.2e+006	1.000	31.92	0.00	632.71	496.40	0.00	0.00	496.40	0.00
4008	4008:Arm4		60.06	57.53	58.80	39.005	3.3e+006	1.000	31.92	0.00	334.87	262.66	0.00	0.00	262.66	0.00
4008		4008:WVGD6	57.53	55.00	56.27	39.827	3.37e+006	1.000	31.92	0.00	341.99	268.20	0.00	0.00	268.20	0.00
4008	4008:WVGD6		55.00	50.50	52.75	40.970	3.47e+006	1.000	31.92	0.00	625.56	490.47	0.00	0.00	490.47	0.00
4008			50.50	47.75	49.12	41.836	3.54e+006	1.000	31.92	0.00	934.21	306.07	0.00	0.00	306.07	0.00
4008		4008:WVGD5	47.75	45.00	46.38	42.417	3.59e+006	1.000	31.92	0.00	954.21	310.32	0.00	0.00	310.32	0.00
4008	4008:WVGD5		45.00	40.00	42.50	43.677	3.69e+006	1.000	31.92	0.00	1034.98	580.97	0.00	0.00	580.97	0.00
4008		4008:WVGD4	40.00	35.00	37.50	45.302	3.83e+006	1.000	31.92	0.00	1073.78	602.59	0.00	0.00	602.59	0.00
4008	4008:WVGD4		35.00	30.00	32.50	46.927	3.97e+006	1.000	31.92	0.00	1112.67	624.20	0.00	0.00	624.20	0.00
4008		4008:WVGD3	30.00	25.00	27.50	48.552	4.11e+006	1.000	31.92	0.00	1151.57	645.82	0.00	0.00	645.82	0.00
4008	4008:WVGD3		25.00	20.00	22.50	50.177	4.24e+006	1.000	31.92	0.00	1190.47	667.44	0.00	0.00	667.44	0.00
4008		4008:WVGD2	20.00	15.00	17.50	51.802	4.38e+006	1.000	31.92	0.00	1229.36	689.05	0.00	0.00	689.05	0.00
4008	4008:WVGD2		15.00	10.00	12.50	53.427	4.52e+006	1.000	31.92	0.00	1268.26	710.67	0.00	0.00	710.67	0.00
4008		4008:WVGD1	10.00	5.00	7.50	55.052	4.66e+006	1.000	31.92	0.00	1307.15	732.29	0.00	0.00	732.29	0.00
4008	4008:WVGD1	4008:g	5.00	0.00	2.50	56.677	4.79e+006	1.000	31.92	0.00	1346.05	753.90	0.00	0.00	753.90	0.00

Point Loads for Load Case "NESC Extreme Ice w/ Wind":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	2400	1260	0	Shield Wire
Davit2:End	2400	1260	0	Shield Wire
Davit3:End	5410	1960	0	Conductor
Davit4:End	5410	1960	0	Conductor
Davit5:End	5410	1960	0	Conductor
Davit6:End	5410	1960	0	Conductor
Davit7:End	5410	1960	0	Conductor

Davit8:End	5410	1960	0	Conductor
4008:WVGD1	850	0	0	Conductor
4008:WVGD2	850	0	0	Conductor
4008:WVGD3	850	0	0	Conductor
4008:WVGD4	850	0	0	Conductor
4008:WVGD5	850	0	0	Conductor
4008:WVGD6	850	0	0	Conductor
4008:WVGD7	850	0	0	Conductor
4008:WVGD8	850	0	0	Conductor
4008:WVGD9	850	0	0	Conductor
4008:WVGD10	850	0	0	Conductor
4008:WVGD11	850	0	0	Conductor
4008:WVGD12	850	0	0	Conductor
4008:AT&T	5813	1473	0	AT&T Equipment
4008:TMobile	4883	871	0	T-Mobile Equipment

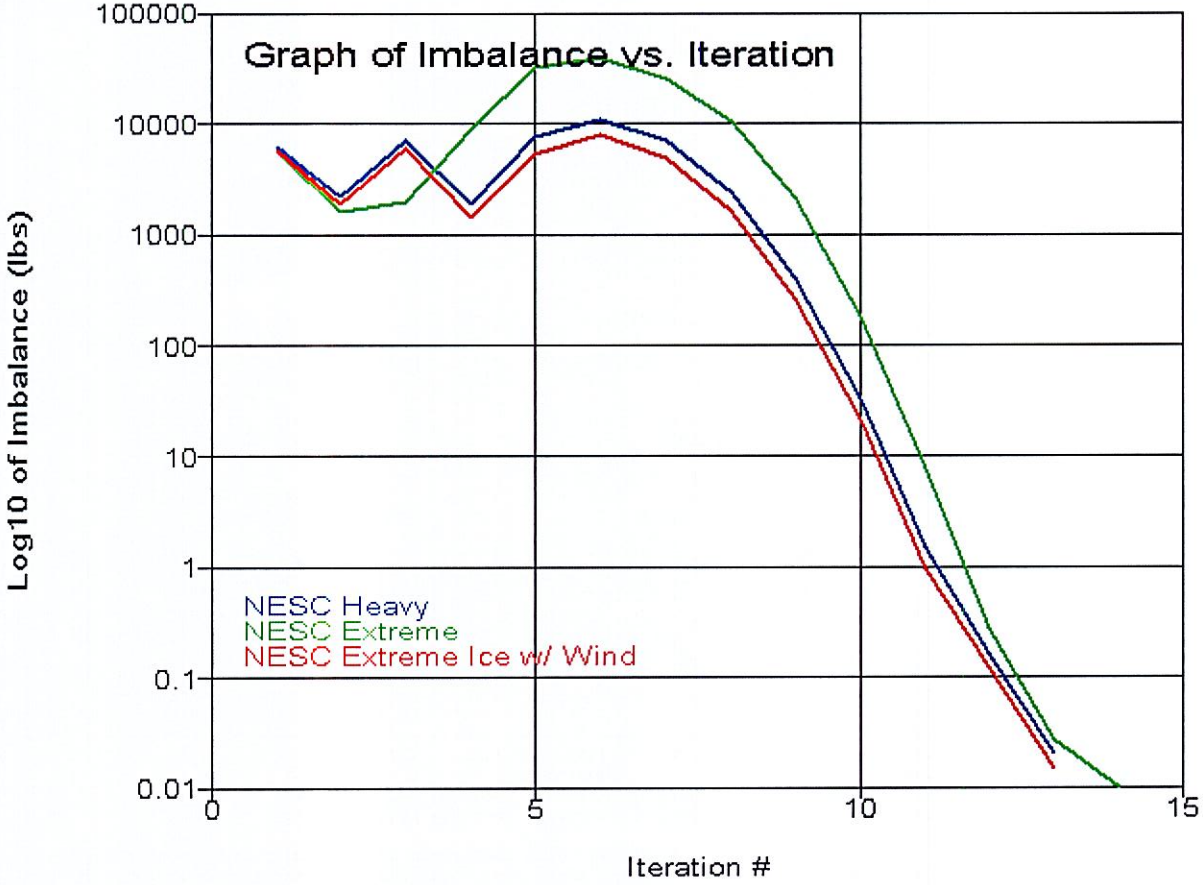
Detailed Pole Loading Data for Load Case "NESC Extreme Ice w/ Wind":

Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
4008	4008:t	4008:AT&T	116.50	116.00	116.25	20.081	7.61e+005	1.300	6.40	0.75	20.41	6.96	9.42	0.52	7.48	0.00
4008	4008:AT&T	4008:WVGD12	116.00	115.00	115.50	20.325	7.7e+005	1.300	6.40	0.75	41.31	14.09	19.06	1.04	15.13	0.00
4008	4008:WVGD12		115.00	110.50	112.75	21.219	8.04e+005	1.300	6.40	0.75	194.15	66.21	89.55	4.68	70.89	0.00
4008		4008:TMobile	110.50	106.00	108.25	22.681	8.59e+005	1.300	6.40	0.75	207.66	70.78	95.72	4.68	75.46	0.00
4008	4008:TMobile	4008:WVGD11	106.00	105.00	105.50	23.575	8.93e+005	1.300	6.40	0.75	47.98	16.35	22.11	1.04	17.39	0.00
4008	4008:WVGD11		105.00	100.50	102.75	24.469	9.27e+005	1.300	6.40	0.75	224.16	76.35	103.26	4.68	81.03	0.00
4008			100.50	96.00	98.25	25.932	9.82e+005	1.300	6.40	0.75	237.68	80.92	109.44	4.68	85.60	0.00
4008		4008:WVGD10	96.00	95.00	95.50	27.075	1.03e+006	1.300	6.40	0.75	91.48	18.77	25.39	1.04	19.81	0.00
4008	4008:WVGD10	4008:Arm1	95.00	94.50	94.75	27.319	1.03e+006	1.300	6.40	0.75	46.17	9.47	12.81	0.52	9.99	0.00
4008	4008:Arm1		94.50	90.00	92.25	28.132	1.07e+006	1.300	6.40	0.75	428.03	87.78	118.72	4.68	92.46	0.00
4008		4008:WVGD9	90.00	85.50	87.75	29.594	1.12e+006	1.300	6.40	0.75	450.53	92.35	124.89	4.68	97.03	0.00
4008	4008:WVGD9	4008:Arm2	85.50	85.06	85.28	30.397	1.15e+006	1.300	6.40	0.75	45.00	9.22	12.47	0.46	9.68	0.00
4008	4008:Arm2		85.06	80.06	82.56	31.280	1.18e+006	1.300	6.40	0.75	529.42	108.45	146.68	5.20	113.65	0.00
4008			80.06	77.53	78.80	32.504	1.23e+006	1.300	6.40	0.75	278.61	57.05	77.16	2.63	59.69	0.00
4008		4008:WVGD8	77.53	75.00	76.27	33.327	1.26e+006	1.300	6.40	0.75	285.73	58.50	79.11	2.63	61.13	0.00
4008	4008:WVGD8	4008:Arm3	75.00	72.56	73.78	34.135	1.29e+006	1.300	6.40	0.75	281.88	57.69	78.03	2.54	60.23	0.00
4008	4008:Arm3		72.56	68.78	70.67	35.145	1.33e+006	1.300	6.40	0.75	450.34	92.15	124.63	3.93	96.08	0.00
4008		4008:WVGD7	68.78	65.00	66.89	36.374	1.38e+006	1.300	6.40	0.75	466.23	95.37	128.99	3.93	99.31	0.00
4008	4008:WVGD7	4008:Arm4	65.00	60.06	62.53	37.791	1.43e+006	1.300	6.40	0.75	632.71	129.39	174.99	5.14	134.52	0.00
4008	4008:Arm4		60.06	57.53	58.80	39.005	1.48e+006	1.300	6.40	0.75	334.87	68.46	92.59	2.63	71.10	0.00
4008		4008:WVGD6	57.53	55.00	56.27	39.827	1.51e+006	1.300	6.40	0.75	341.99	69.91	94.54	2.63	72.54	0.00
4008	4008:WVGD6		55.00	50.50	52.75	40.970	1.55e+006	1.300	6.40	0.75	625.56	127.84	172.90	4.68	132.52	0.00
4008			50.50	47.75	49.12	41.836	1.58e+006	1.300	6.40	0.75	934.21	79.78	107.90	2.86	82.64	0.00
4008		4008:WVGD5	47.75	45.00	46.38	42.417	1.61e+006	1.300	6.40	0.75	954.21	80.89	109.39	2.86	83.75	0.00
4008	4008:WVGD5		45.00	40.00	42.50	43.677	1.65e+006	1.300	6.40	0.75	1034.98	151.43	204.80	5.20	156.63	0.00
4008		4008:WVGD4	40.00	35.00	37.50	45.302	1.72e+006	1.300	6.40	0.75	1073.78	157.07	212.42	5.20	162.27	0.00
4008	4008:WVGD4		35.00	30.00	32.50	46.927	1.78e+006	1.300	6.40	0.75	1112.67	162.70	220.04	5.20	167.90	0.00
4008		4008:WVGD3	30.00	25.00	27.50	48.552	1.84e+006	1.300	6.40	0.75	1151.57	168.34	227.67	5.20	173.54	0.00
4008	4008:WVGD3		25.00	20.00	22.50	50.177	1.9e+006	1.300	6.40	0.75	1190.47	173.97	235.29	5.20	179.17	0.00
4008		4008:WVGD2	20.00	15.00	17.50	51.802	1.96e+006	1.300	6.40	0.75	1229.36	179.60	242.91	5.20	184.81	0.00
4008	4008:WVGD2		15.00	10.00	12.50	53.427	2.02e+006	1.300	6.40	0.75	1268.26	185.24	250.53	5.20	190.44	0.00
4008		4008:WVGD1	10.00	5.00	7.50	55.052	2.09e+006	1.300	6.40	0.75	1307.15	190.87	258.15	5.20	196.07	0.00
4008	4008:WVGD1	4008:g	5.00	0.00	2.50	56.677	2.15e+006	1.300	6.40	0.75	1346.05	196.51	265.77	5.20	201.71	0.00

*** Analysis Results:

Maximum element usage is 66.65% for Base Plate "4008" in load case "NESC Extreme"
Maximum insulator usage is 7.91% for Clamp "Clamp3" in load case "NESC Heavy"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 13

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)
4008:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
4008:t	0.005986	2.016	-0.02714	-1.6868	0.0049	0.0000	0.005986	2.016	116.5
4008:AT&T	0.005943	2.001	-0.02692	-1.6868	0.0049	0.0000	0.005943	2.001	116
4008:WVGD12	0.005858	1.972	-0.02647	-1.6864	0.0049	0.0000	0.005858	1.972	115
4008:TMobile	0.005096	1.709	-0.02245	-1.6551	0.0048	0.0000	0.005096	1.709	106

4008:WVGD11	0.005012	1.68	-0.022	-1.6493	0.0048	0.0000	0.005012	1.68	105
4008:WVGD10	0.00419	1.399	-0.01773	-1.5683	0.0046	0.0000	0.00419	1.399	94.98
4008:Arm1	0.00415	1.385	-0.01754	-1.5653	0.0046	0.0000	0.00415	1.385	94.48
4008:WVGD9	0.003448	1.144	-0.01409	-1.4927	0.0043	0.0000	0.003448	1.144	85.49
4008:Arm2	0.003415	1.133	-0.01393	-1.4886	0.0043	0.0000	0.003415	1.133	85.05
4008:WVGD8	0.002684	0.8814	-0.0104	-1.3623	0.0040	0.0000	0.002684	0.8814	74.99
4008:Arm3	0.002517	0.8241	-0.00963	-1.3261	0.0039	0.0000	0.002517	0.8241	72.55
4008:WVGD7	0.002029	0.6571	-0.007406	-1.1962	0.0035	0.0000	0.002029	0.6571	64.99
4008:Arm4	0.001737	0.5577	-0.006164	-1.1013	0.0032	0.0000	0.001737	0.5577	60.06
4008:WVGD6	0.001461	0.4648	-0.005011	-0.9954	0.0030	0.0000	0.001461	0.4648	54.99
4008:WVGD5	0.0009912	0.309	-0.003282	-0.7929	0.0024	0.0000	0.0009912	0.309	45
4008:WVGD4	0.0006087	0.1858	-0.002099	-0.6133	0.0019	0.0000	0.0006087	0.1858	35
4008:WVGD3	0.0003154	0.0941	-0.001261	-0.4327	0.0014	0.0000	0.0003154	0.0941	25
4008:WVGD2	0.0001158	0.0337	-0.0006637	-0.2553	0.0009	0.0000	0.0001158	0.0337	15
4008:WVGD1	1.359e-005	0.003822	-0.0002066	-0.0835	0.0003	0.0000	1.359e-005	0.003822	5
Davit1:O	0.004153	1.385	0.01365	-1.5653	0.0046	0.0000	0.004153	0.2437	94.51
Davit1:V	0.004199	1.399	0.08683	-1.2940	0.0046	0.0000	0.004199	-2.743	95.09
Davit1:End	0.004201	1.399	0.1091	-1.2750	0.0046	0.0000	0.004201	-3.743	95.11
Davit2:O	0.004147	1.385	-0.04872	-1.5653	0.0046	0.0000	0.004147	2.526	94.45
Davit2:V	0.00418	1.398	-0.1409	-1.8746	0.0046	0.0000	0.00418	5.54	94.86
Davit2:End	0.004177	1.398	-0.1739	-1.8934	0.0046	0.0000	0.004177	6.54	94.83
Davit3:O	0.003417	1.133	0.01905	-1.4886	0.0043	0.0000	0.003417	-0.1363	85.08
Davit3:V	0.003518	1.157	0.1519	-0.7783	0.0043	0.0000	0.003518	-7.113	86.38
Davit3:End	0.00352	1.157	0.1772	-0.7081	0.0043	0.0000	0.00352	-9.112	86.41
Davit4:O	0.003412	1.132	-0.04691	-1.4886	0.0043	0.0000	0.003412	2.402	85.02
Davit4:V	0.003482	1.168	-0.2829	-2.2584	0.0043	-0.0000	0.003482	9.437	85.95
Davit4:End	0.003476	1.166	-0.3635	-2.3277	0.0043	-0.0000	0.003476	11.44	85.87
Davit5:O	0.002519	0.8245	0.02367	-1.3261	0.0039	0.0000	0.002519	-0.6142	72.59
Davit5:V	0.002607	0.8445	0.1366	-0.6147	0.0039	0.0000	0.002607	-7.594	73.87
Davit5:End	0.002609	0.8446	0.1563	-0.5444	0.0039	0.0000	0.002609	-9.594	73.89
Davit6:O	0.002514	0.8238	-0.04293	-1.3261	0.0039	0.0000	0.002514	2.263	72.52
Davit6:V	0.002579	0.8565	-0.259	-2.0966	0.0039	-0.0000	0.002579	9.295	73.47
Davit6:End	0.002574	0.8551	-0.334	-2.1660	0.0039	-0.0000	0.002574	11.29	73.4
Davit7:O	0.001739	0.558	0.02474	-1.1013	0.0032	0.0000	0.001739	-1.05	60.09
Davit7:V	0.001811	0.573	0.1102	-0.3884	0.0033	0.0000	0.001811	-8.035	61.34
Davit7:End	0.001813	0.573	0.1219	-0.3179	0.0033	0.0000	0.001813	-10.04	61.35
Davit8:O	0.001735	0.5574	-0.03707	-1.1013	0.0032	0.0000	0.001735	2.165	60.03
Davit8:V	0.001791	0.5864	-0.2257	-1.8728	0.0033	-0.0000	0.001791	9.194	61.01
Davit8:End	0.001787	0.5853	-0.2928	-1.9424	0.0033	-0.0000	0.001787	11.19	60.94

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
4008:g	-0.13	0.0	-24.88	0.0	95.23	0.0	0.0	98.43	0.0	1942.49	0.0	-6.9	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
4008	4008:t	Origin	0.00	24.19	0.07	-0.33	-0.00	-0.00	0.0	-0.02	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
4008	4008:AT&T	End	0.50	24.02	0.07	-0.32	0.00	-0.00	0.0	-0.02	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
4008	4008:AT&T	Origin	0.50	24.02	0.07	-0.32	0.00	-0.00	-0.0	-6.12	1.74	-0.00	-0.51	0.00	0.29	0.00	0.72	1.1	5
4008	4008:WVGD12	End	1.50	23.66	0.07	-0.32	1.74	-0.00	-0.0	-6.12	1.74	-0.00	-0.50	0.33	0.07	0.00	0.84	1.3	2
4008	4008:WVGD12	Origin	1.50	23.66	0.07	-0.32	1.74	-0.00	0.0	-7.25	1.83	-0.00	-0.59	0.33	0.08	0.00	0.93	1.4	2
4008	Tube 1	End	6.00	22.08	0.07	-0.29	9.99	-0.01	0.0	-7.25	1.83	-0.00	-0.55	1.66	0.07	0.00	2.21	3.4	2
4008	Tube 1	Origin	6.00	22.08	0.07	-0.29	9.99	-0.01	0.0	-7.61	1.95	-0.01	-0.58	1.66	0.08	0.00	2.24	3.4	2
4008	4008:TMobile	End	10.50	20.51	0.06	-0.27	18.79	-0.04	0.0	-7.61	1.95	-0.01	-0.54	2.73	0.07	0.00	3.28	5.1	2
4008	4008:TMobile	Origin	10.50	20.51	0.06	-0.27	18.79	-0.04	-0.0	-12.78	2.99	-0.01	-0.91	2.73	0.11	0.00	3.65	5.7	2
4008	4008:WVGD11	End	11.50	20.16	0.06	-0.26	21.78	-0.05	-0.0	-12.78	2.99	-0.01	-0.90	3.08	0.11	0.00	3.98	6.3	2
4008	4008:WVGD11	Origin	11.50	20.16	0.06	-0.26	21.78	-0.05	0.0	-13.95	3.10	-0.01	-0.98	3.08	0.12	0.00	4.07	6.4	2

4008	Tube 1	End	16.00	18.62	0.06	-0.24	35.72	-0.10	0.0	-13.95	3.10	-0.01	-0.93	4.48	0.11	0.00	5.40	8.8	2
4008	Tube 1	Origin	16.00	18.62	0.06	-0.24	35.72	-0.10	0.0	-14.37	3.23	-0.01	-0.95	4.48	0.11	0.00	5.43	8.8	2
4008	SpliceT	End	20.50	17.11	0.05	-0.22	50.25	-0.16	0.0	-14.37	3.23	-0.01	-0.90	5.62	0.11	0.00	6.52	11.0	2
4008	SpliceT	Origin	20.50	17.11	0.05	-0.22	50.25	-0.16	-0.0	-14.66	3.31	-0.02	-0.55	3.35	0.07	0.00	3.90	6.0	2
4008	4008:WVGD10	End	21.50	16.78	0.05	-0.21	53.56	-0.17	-0.0	-14.66	3.31	-0.02	-0.54	3.49	0.06	0.00	4.03	6.2	2
4008	4008:WVGD10	Origin	21.50	16.78	0.05	-0.21	53.56	-0.17	-0.0	-15.70	3.36	-0.02	-0.58	3.49	0.07	0.00	4.07	6.3	2
4008	4008:Arm1	End	22.00	16.62	0.05	-0.21	55.24	-0.18	-0.0	-15.70	3.36	-0.02	-0.58	3.56	0.07	0.00	4.13	6.4	2
4008	4008:Arm1	Origin	22.00	16.62	0.05	-0.21	56.69	-0.18	0.0	-20.57	6.43	-0.02	-0.76	3.65	0.13	0.00	4.41	6.8	2
4008	Tube 2	End	26.50	15.16	0.05	-0.19	85.61	-0.27	0.0	-20.57	6.43	-0.02	-0.72	4.96	0.12	0.00	5.68	8.7	2
4008	Tube 2	Origin	26.50	15.16	0.05	-0.19	85.61	-0.27	0.0	-21.31	6.58	-0.02	-0.74	4.96	0.12	0.00	5.70	8.8	2
4008	4008:WVGD9	End	31.00	13.73	0.04	-0.17	115.22	-0.37	0.0	-21.31	6.58	-0.02	-0.71	6.03	0.12	0.00	6.74	10.4	2
4008	4008:WVGD9	Origin	31.00	13.73	0.04	-0.17	115.22	-0.37	0.0	-22.65	6.69	-0.02	-0.75	6.03	0.12	0.00	6.79	10.4	2
4008	4008:Arm2	End	31.44	13.59	0.04	-0.17	118.14	-0.38	0.0	-22.65	6.69	-0.02	-0.75	6.13	0.12	0.00	6.88	10.6	2
4008	4008:Arm2	Origin	31.44	13.59	0.04	-0.17	123.83	-0.38	0.0	-35.47	11.98	-0.03	-1.17	6.42	0.21	0.00	7.60	11.7	2
4008	Tube 2	End	36.44	12.06	0.04	-0.15	183.74	-0.53	0.0	-35.47	11.98	-0.03	-1.11	8.58	0.20	0.00	9.69	14.9	2
4008	Tube 2	Origin	36.44	12.06	0.04	-0.15	183.74	-0.53	0.0	-36.16	12.10	-0.03	-1.13	8.58	0.20	0.00	9.72	14.9	2
4008	Tube 2	End	38.97	11.31	0.03	-0.13	214.37	-0.61	0.0	-36.16	12.10	-0.03	-1.10	9.51	0.20	0.00	10.61	16.3	2
4008	Tube 2	Origin	38.97	11.31	0.03	-0.13	214.37	-0.61	0.0	-36.65	12.18	-0.03	-1.12	9.51	0.20	0.00	10.63	16.4	2
4008	4008:WVGD8	End	41.50	10.58	0.03	-0.12	245.21	-0.70	0.0	-36.65	12.18	-0.03	-1.09	10.34	0.19	0.00	11.44	17.6	2
4008	4008:WVGD8	Origin	41.50	10.58	0.03	-0.12	245.21	-0.70	0.0	-38.05	12.29	-0.04	-1.13	10.34	0.19	0.00	11.48	17.7	2
4008	4008:Arm3	End	43.94	9.89	0.03	-0.12	275.16	-0.79	0.0	-38.05	12.29	-0.04	-1.11	11.07	0.19	0.00	12.18	18.7	2
4008	4008:Arm3	Origin	43.94	9.89	0.03	-0.12	280.82	-0.79	0.0	-51.02	17.55	-0.04	-1.48	11.30	0.27	0.00	12.79	19.7	2
4008	Tube 2	End	47.72	8.86	0.03	-0.10	347.18	-0.95	0.0	-51.02	17.55	-0.04	-1.43	13.01	0.26	0.00	14.45	22.2	2
4008	Tube 2	Origin	47.72	8.86	0.03	-0.10	347.18	-0.95	0.0	-51.82	17.66	-0.05	-1.45	13.01	0.26	0.00	14.47	22.3	2
4008	4008:WVGD7	End	51.50	7.88	0.02	-0.09	413.96	-1.12	0.0	-51.82	17.66	-0.05	-1.41	14.49	0.25	0.00	15.90	24.5	2
4008	4008:WVGD7	Origin	51.50	7.88	0.02	-0.09	413.96	-1.12	0.0	-53.69	17.81	-0.05	-1.46	14.49	0.26	0.00	15.95	24.5	2
4008	4008:Arm4	End	56.44	6.69	0.02	-0.07	501.87	-1.37	0.0	-53.69	17.81	-0.05	-1.40	16.12	0.24	0.00	17.52	27.2	2
4008	4008:Arm4	Origin	56.44	6.69	0.02	-0.07	507.47	-1.37	0.0	-66.89	23.02	-0.06	-1.74	16.30	0.32	0.00	18.05	28.0	2
4008	Tube 2	End	58.97	6.12	0.02	-0.07	565.75	-1.51	0.0	-66.89	23.02	-0.06	-1.70	17.41	0.31	0.00	19.12	30.0	2
4008	Tube 2	Origin	58.97	6.12	0.02	-0.07	565.75	-1.51	0.0	-67.48	23.08	-0.06	-1.72	17.41	0.31	0.00	19.14	30.0	2
4008	4008:WVGD6	End	61.50	5.58	0.02	-0.06	624.18	-1.66	0.0	-67.48	23.08	-0.06	-1.68	18.42	0.30	0.00	20.11	31.9	2
4008	4008:WVGD6	Origin	61.50	5.58	0.02	-0.06	624.18	-1.66	0.0	-69.25	23.18	-0.06	-1.73	18.42	0.30	0.00	20.16	32.0	2
4008	SpliceT	End	66.00	4.68	0.01	-0.05	728.49	-1.94	0.0	-69.25	23.18	-0.06	-1.67	20.00	0.29	0.00	21.67	35.1	2
4008	SpliceT	Origin	66.00	4.68	0.01	-0.05	728.49	-1.94	0.0	-70.54	23.27	-0.07	-1.70	20.00	0.30	0.00	21.71	35.1	2
4008	Tube 2	End	68.75	4.18	0.01	-0.04	792.48	-2.12	0.0	-70.54	23.27	-0.07	-1.21	15.48	0.21	0.00	16.69	25.7	2
4008	Tube 2	Origin	68.75	4.18	0.01	-0.04	792.48	-2.12	0.0	-72.05	23.36	-0.07	-1.23	15.48	0.21	0.00	16.72	25.7	2
4008	4008:WVGD5	End	71.50	3.71	0.01	-0.04	856.71	-2.31	0.0	-72.05	23.36	-0.07	-1.21	16.03	0.21	0.00	17.24	26.5	2
4008	4008:WVGD5	Origin	71.50	3.71	0.01	-0.04	856.71	-2.31	0.0	-74.60	23.49	-0.07	-1.25	16.03	0.21	0.00	17.29	26.6	2
4008	Tube 3	End	76.50	2.92	0.01	-0.03	974.16	-2.68	0.0	-74.60	23.49	-0.07	-1.20	16.91	0.20	0.00	18.11	27.9	2
4008	Tube 3	Origin	76.50	2.92	0.01	-0.03	974.16	-2.68	0.0	-76.35	23.64	-0.08	-1.23	16.91	0.20	0.00	18.14	27.9	2
4008	4008:WVGD4	End	81.50	2.23	0.01	-0.03	1092.35	-3.08	0.0	-76.35	23.64	-0.08	-1.19	17.63	0.19	0.00	18.82	29.0	2
4008	4008:WVGD4	Origin	81.50	2.23	0.01	-0.03	1092.35	-3.08	0.0	-79.09	23.80	-0.09	-1.23	17.63	0.20	0.00	18.86	29.0	2
4008	Tube 3	End	86.50	1.63	0.01	-0.02	1211.35	-3.52	0.0	-79.09	23.80	-0.09	-1.19	18.22	0.19	0.00	19.41	29.9	2
4008	Tube 3	Origin	86.50	1.63	0.01	-0.02	1211.35	-3.52	0.0	-80.98	23.96	-0.09	-1.22	18.22	0.19	0.00	19.44	29.9	2
4008	4008:WVGD3	End	91.50	1.13	0.00	-0.02	1331.12	-3.99	0.0	-80.98	23.96	-0.09	-1.18	18.71	0.18	0.00	19.89	30.6	2
4008	4008:WVGD3	Origin	91.50	1.13	0.00	-0.02	1331.12	-3.99	0.0	-83.85	24.12	-0.10	-1.22	18.71	0.19	0.00	19.93	30.7	2
4008	Tube 3	End	96.50	0.72	0.00	-0.01	1451.72	-4.49	0.0	-83.85	24.12	-0.10	-1.18	19.11	0.18	0.00	20.29	31.2	2
4008	Tube 3	Origin	96.50	0.72	0.00	-0.01	1451.72	-4.49	0.0	-85.86	24.28	-0.11	-1.21	19.11	0.18	0.00	20.32	31.3	2
4008	4008:WVGD2	End	101.50	0.40	0.00	-0.01	1573.13	-5.03	0.0	-85.86	24.28	-0.11	-1.17	19.43	0.17	0.00	20.60	31.7	2
4008	4008:WVGD2	Origin	101.50	0.40	0.00	-0.01	1573.13	-5.03	0.0	-88.85	24.45	-0.11	-1.21	19.43	0.18	0.00	20.65	31.8	2
4008	Tube 3	End	106.50	0.18	0.00	-0.01	1695.39	-5.60	0.0	-88.85	24.45	-0.11	-1.17	19.69	0.17	0.00	20.87	32.4	2
4008	Tube 3	Origin	106.50	0.18	0.00	-0.01	1695.39	-5.60	0.0	-90.99	24.62	-0.12	-1.20	19.69	0.17	0.00	20.90	32.5	2
4008	4008:WVGD1	End	111.50	0.05	0.00	-0.00	1818.50	-6.21	0.0	-90.99	24.62	-0.12	-1.17	19.90	0.17	0.00	21.07	33.3	2
4008	4008:WVGD1	Origin	111.50	0.05	0.00	-0.00	1818.50	-6.21	0.0	-94.11	24.80	-0.13	-1.21	19.90	0.17	0.00	21.11	33.3	2
4008	4008:g	End	116.50	0.00	0.00	0.00	1942.49	-6.86	0.0	-94.11	24.80	-0.13	-1.17	20.06	0.16	0.00	21.23	34.0	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Heavy":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	16.62	0.05	0.16	-8.07	0.00	0.0	-1.83	1.94	-0.00	-0.50	19.25	0.00	0.00	19.74	30.4	1
Davit1	Davit1:V	End	3.04	16.78	0.05	1.04	-2.18	0.00	0.0	-1.83	1.94	-0.00	-0.50	5.19	0.00	0.00	5.69	8.8	1
Davit1	Davit1:V	Origin	3.04	16.78	0.05	1.04	-2.18	0.00	0.0	-1.48	2.18	-0.00	-0.40	5.19	0.00	0.00	5.60	8.6	1
Davit1	Davit1:End	End	4.04	16.79	0.05	1.31	-0.00	0.00	0.0	-1.48	2.18	-0.00	-0.40	0.00	1.24	0.00	2.18	3.3	3

Davit2	Davit2:O	Origin	0.00	16.61	0.05	-0.58	-9.52	-0.00	-0.0	1.12	2.42	0.00	0.31	22.70	0.00	0.00	23.01	35.4	1
Davit2	Davit2:V	End	3.04	16.78	0.05	-1.69	-2.16	-0.00	-0.0	1.12	2.42	0.00	0.31	5.15	0.00	0.00	5.46	8.4	1
Davit2	Davit2:V	Origin	3.04	16.78	0.05	-1.69	-2.16	-0.00	-0.0	1.50	2.16	0.00	0.41	5.15	0.00	0.00	5.57	8.6	1
Davit2	Davit2:End	End	4.04	16.78	0.05	-2.09	0.00	0.00	-0.0	1.50	2.16	0.00	0.41	0.00	1.23	0.00	2.16	3.3	3
Davit3	Davit3:O	Origin	0.00	13.60	0.04	0.23	-50.83	0.01	0.0	-3.54	5.58	-0.00	-0.36	26.70	0.00	0.00	27.05	41.6	1
Davit3	#Davit3:O	End	3.55	13.77	0.04	1.16	-31.02	0.00	0.0	-3.54	5.58	-0.00	-0.40	21.16	0.00	0.00	21.57	33.2	1
Davit3	#Davit3:O	Origin	3.55	13.77	0.04	1.16	-31.02	0.00	0.0	-3.48	5.45	-0.00	-0.40	21.16	0.00	0.00	21.56	33.2	1
Davit3	Davit3:V	End	7.10	13.88	0.04	1.82	-11.69	0.00	0.0	-3.48	5.45	-0.00	-0.46	10.77	0.00	0.00	11.23	17.3	1
Davit3	Davit3:V	Origin	7.10	13.88	0.04	1.82	-11.69	0.00	0.0	-2.51	5.85	-0.00	-0.33	10.77	0.00	0.00	11.11	17.1	1
Davit3	Davit3:End	End	9.10	13.88	0.04	2.13	-0.00	0.00	0.0	-2.51	5.85	-0.00	-0.37	0.00	1.77	0.00	3.09	4.8	3
Davit4	Davit4:O	Origin	0.00	13.59	0.04	-0.56	-56.51	-0.00	-0.0	1.59	6.42	0.00	0.16	29.68	0.00	0.00	29.84	45.9	1
Davit4	#Davit4:O	End	3.55	13.78	0.04	-1.83	-33.73	-0.00	-0.0	1.59	6.42	0.00	0.18	23.01	0.00	0.00	23.19	35.7	1
Davit4	#Davit4:O	Origin	3.55	13.78	0.04	-1.83	-33.73	-0.00	-0.0	1.65	6.25	0.00	0.19	23.01	0.00	0.00	23.20	35.7	1
Davit4	Davit4:V	End	7.10	14.01	0.04	-3.40	-11.55	-0.00	-0.0	1.65	6.25	0.00	0.22	10.64	0.00	0.00	10.86	16.7	1
Davit4	Davit4:V	Origin	7.10	14.01	0.04	-3.40	-11.55	-0.00	0.0	2.67	5.77	0.00	0.35	10.64	0.00	0.00	10.99	16.9	1
Davit4	Davit4:End	End	9.10	13.99	0.04	-4.36	0.00	0.00	0.0	2.67	5.77	0.00	0.39	0.00	1.75	0.00	3.06	4.7	3
Davit5	Davit5:O	Origin	0.00	9.89	0.03	0.28	-50.91	0.00	0.0	-3.53	5.59	-0.00	-0.35	26.74	0.00	0.00	27.10	41.7	1
Davit5	#Davit5:O	End	3.55	10.04	0.03	1.09	-31.07	0.00	0.0	-3.53	5.59	-0.00	-0.40	21.20	0.00	0.00	21.60	33.2	1
Davit5	#Davit5:O	Origin	3.55	10.04	0.03	1.09	-31.07	0.00	0.0	-3.46	5.46	-0.00	-0.40	21.20	0.00	0.00	21.59	33.2	1
Davit5	Davit5:V	End	7.10	10.13	0.03	1.64	-11.70	0.00	0.0	-3.46	5.46	-0.00	-0.46	10.79	0.00	0.00	11.24	17.3	1
Davit5	Davit5:V	Origin	7.10	10.13	0.03	1.64	-11.70	0.00	0.0	-2.50	5.85	-0.00	-0.33	10.79	0.00	0.00	11.12	17.1	1
Davit5	Davit5:End	End	9.10	10.14	0.03	1.88	-0.00	0.00	0.0	-2.50	5.85	-0.00	-0.36	0.00	1.78	0.00	3.10	4.8	3
Davit6	Davit6:O	Origin	0.00	9.89	0.03	-0.52	-56.56	-0.00	-0.0	1.57	6.42	0.00	0.16	29.71	0.00	0.00	29.87	45.9	1
Davit6	#Davit6:O	End	3.55	10.06	0.03	-1.67	-33.76	-0.00	-0.0	1.57	6.42	0.00	0.18	23.03	0.00	0.00	23.21	35.7	1
Davit6	#Davit6:O	Origin	3.55	10.06	0.03	-1.67	-33.76	-0.00	-0.0	1.63	6.26	0.00	0.19	23.03	0.00	0.00	23.22	35.7	1
Davit6	Davit6:V	End	7.10	10.28	0.03	-3.11	-11.56	-0.00	-0.0	1.63	6.26	0.00	0.22	10.65	0.00	0.00	10.87	16.7	1
Davit6	Davit6:V	Origin	7.10	10.28	0.03	-3.11	-11.56	-0.00	0.0	2.66	5.78	0.00	0.35	10.65	0.00	0.00	11.01	16.9	1
Davit6	Davit6:End	End	9.10	10.26	0.03	-4.01	0.00	0.00	0.0	2.66	5.78	0.00	0.39	0.00	1.75	0.00	3.06	4.7	3
Davit7	Davit7:O	Origin	0.00	6.70	0.02	0.30	-51.03	0.00	0.0	-3.51	5.60	-0.00	-0.35	26.81	0.00	0.00	27.16	41.8	1
Davit7	#Davit7:O	End	3.55	6.81	0.02	0.94	-31.14	0.00	0.0	-3.51	5.60	-0.00	-0.40	21.24	0.00	0.00	21.64	33.3	1
Davit7	#Davit7:O	Origin	3.55	6.81	0.02	0.94	-31.14	0.00	0.0	-3.44	5.47	-0.00	-0.39	21.24	0.00	0.00	21.64	33.3	1
Davit7	Davit7:V	End	7.10	6.88	0.02	1.32	-11.72	0.00	0.0	-3.44	5.47	-0.00	-0.46	10.80	0.00	0.00	11.26	17.3	1
Davit7	Davit7:V	Origin	7.10	6.88	0.02	1.32	-11.72	0.00	0.0	-2.47	5.86	-0.00	-0.33	10.80	0.00	0.00	11.13	17.1	1
Davit7	Davit7:End	End	9.10	6.88	0.02	1.46	-0.00	0.00	0.0	-2.47	5.86	-0.00	-0.36	0.00	1.78	0.00	3.10	4.8	3
Davit8	Davit8:O	Origin	0.00	6.69	0.02	-0.44	-56.62	-0.00	-0.0	1.54	6.43	0.00	0.16	29.74	0.00	0.00	29.90	46.0	1
Davit8	#Davit8:O	End	3.55	6.84	0.02	-1.43	-33.80	-0.00	-0.0	1.54	6.43	0.00	0.18	23.06	0.00	0.00	23.24	35.8	1
Davit8	#Davit8:O	Origin	3.55	6.84	0.02	-1.43	-33.80	-0.00	-0.0	1.61	6.26	0.00	0.18	23.06	0.00	0.00	23.25	35.8	1
Davit8	Davit8:V	End	7.10	7.04	0.02	-2.71	-11.58	-0.00	-0.0	1.61	6.26	0.00	0.21	10.67	0.00	0.00	10.89	16.7	1
Davit8	Davit8:V	Origin	7.10	7.04	0.02	-2.71	-11.58	-0.00	0.0	2.64	5.79	0.00	0.35	10.67	0.00	0.00	11.02	17.0	1
Davit8	Davit8:End	End	9.10	7.02	0.02	-3.51	0.00	0.00	0.0	2.64	5.79	0.00	0.38	0.00	1.76	0.00	3.07	4.7	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	2.624	80.00	80.00	3.28
Clamp2	2.624	80.00	80.00	3.28
Clamp3	6.329	80.00	80.00	7.91
Clamp4	6.329	80.00	80.00	7.91
Clamp5	6.329	80.00	80.00	7.91
Clamp6	6.329	80.00	80.00	7.91
Clamp7	6.329	80.00	80.00	7.91
Clamp8	6.329	80.00	80.00	7.91
Clamp9	0.920	80.00	80.00	1.15
Clamp10	0.920	80.00	80.00	1.15
Clamp11	0.920	80.00	80.00	1.15

Clamp12	0.920	80.00	80.00	1.15
Clamp13	0.920	80.00	80.00	1.15
Clamp14	0.920	80.00	80.00	1.15
Clamp15	0.920	80.00	80.00	1.15
Clamp16	0.920	80.00	80.00	1.15
Clamp17	0.920	80.00	80.00	1.15
Clamp18	0.920	80.00	80.00	1.15
Clamp19	0.920	80.00	80.00	1.15
Clamp20	0.920	80.00	80.00	1.15
Clamp21	6.279	80.00	80.00	7.85
Clamp22	5.034	80.00	80.00	6.29

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 14

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)
4008:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
4008:t	0.00178	4.099	-0.09732	-3.6431	0.0014	0.0000	0.00178	4.099	116.4
4008:AT&T	0.001767	4.067	-0.09631	-3.6431	0.0014	0.0000	0.001767	4.067	115.9
4008:WVGD12	0.001742	4.003	-0.09428	-3.6417	0.0014	0.0000	0.001742	4.003	114.9
4008:TMobile	0.001517	3.437	-0.0764	-3.5381	0.0014	0.0000	0.001517	3.437	105.9
4008:WVGD11	0.001493	3.376	-0.07449	-3.5189	0.0014	0.0000	0.001493	3.376	104.9
4008:WVGD10	0.00125	2.783	-0.05679	-3.2584	0.0014	0.0000	0.00125	2.783	94.94
4008:Arm1	0.001238	2.755	-0.05597	-3.2486	0.0014	0.0000	0.001238	2.755	94.44
4008:WVGD9	0.00103	2.26	-0.04226	-3.0435	0.0013	0.0000	0.00103	2.26	85.46
4008:Arm2	0.00102	2.236	-0.04163	-3.0325	0.0013	0.0000	0.00102	2.236	85.02
4008:WVGD8	0.0008036	1.729	-0.02865	-2.7297	0.0012	0.0000	0.0008036	1.729	74.97
4008:Arm3	0.000754	1.614	-0.02592	-2.6475	0.0011	0.0000	0.000754	1.614	72.54
4008:WVGD7	0.0006088	1.282	-0.01848	-2.3658	0.0010	0.0000	0.0006088	1.282	64.98
4008:Arm4	0.0005217	1.086	-0.01449	-2.1669	0.0010	0.0000	0.0005217	1.086	60.05
4008:WVGD6	0.0004394	0.9039	-0.01107	-1.9499	0.0009	0.0000	0.0004394	0.9039	54.99
4008:WVGD5	0.0002986	0.5999	-0.006208	-1.5443	0.0007	0.0000	0.0002986	0.5999	44.99
4008:WVGD4	0.0001837	0.3603	-0.003139	-1.1909	0.0006	0.0000	0.0001837	0.3603	35
4008:WVGD3	9.533e-005	0.1824	-0.001357	-0.8390	0.0004	0.0000	9.533e-005	0.1824	25
4008:WVGD2	3.506e-005	0.0653	-0.0004717	-0.4948	0.0003	0.0000	3.506e-005	0.0653	15
4008:WVGD1	4.125e-006	0.007409	-0.0001023	-0.1617	0.0001	0.0000	4.125e-006	0.007409	5
Davit1:O	0.00124	2.757	0.008723	-3.2486	0.0014	0.0000	0.00124	1.615	94.51
Davit1:V	0.001256	2.789	0.1763	-3.1959	0.0014	0.0000	0.001256	-1.352	95.18
Davit1:End	0.001258	2.791	0.232	-3.1910	0.0014	0.0000	0.001258	-2.351	95.23
Davit2:O	0.001236	2.753	-0.1207	-3.2486	0.0014	0.0000	0.001236	3.895	94.38
Davit2:V	0.001244	2.777	-0.2948	-3.3491	0.0014	0.0000	0.001244	6.918	94.71
Davit2:End	0.001242	2.775	-0.3533	-3.3540	0.0014	0.0000	0.001242	7.917	94.65
Davit3:O	0.001022	2.238	0.02552	-3.0325	0.0013	0.0000	0.001022	0.9686	85.09
Davit3:V	0.001058	2.306	0.3776	-2.7844	0.0013	0.0000	0.001058	-5.963	86.61
Davit3:End	0.00106	2.309	0.4741	-2.7561	0.0013	0.0000	0.00106	-7.961	86.71
Davit4:O	0.001019	2.235	-0.1088	-3.0325	0.0013	0.0000	0.001019	3.504	84.95
Davit4:V	0.001035	2.29	-0.5058	-3.3840	0.0013	0.0000	0.001035	10.56	85.73
Davit4:End	0.001033	2.286	-0.6245	-3.4117	0.0013	0.0000	0.001033	12.56	85.61
Davit5:O	0.0007555	1.616	0.04054	-2.6475	0.0011	0.0000	0.0007555	0.1769	72.6
Davit5:V	0.0007863	1.674	0.3458	-2.3957	0.0012	0.0000	0.0007863	-6.765	74.08
Davit5:End	0.0007884	1.676	0.4286	-2.3671	0.0012	0.0000	0.0007884	-8.763	74.16
Davit6:O	0.0007525	1.613	-0.09238	-2.6475	0.0011	0.0000	0.0007525	3.051	72.47
Davit6:V	0.0007685	1.662	-0.4422	-3.0023	0.0011	0.0000	0.0007685	10.1	73.29
Davit6:End	0.0007663	1.66	-0.5477	-3.0304	0.0011	0.0000	0.0007663	12.1	73.18
Davit7:O	0.0005228	1.088	0.04631	-2.1669	0.0010	0.0000	0.0005228	-0.5205	60.11
Davit7:V	0.0005478	1.133	0.2929	-1.9103	0.0010	0.0000	0.0005478	-7.475	61.53
Davit7:End	0.0005492	1.134	0.3589	-1.8812	0.0010	0.0000	0.0005492	-9.474	61.59
Davit8:O	0.0005205	1.085	-0.07529	-2.1669	0.0010	0.0000	0.0005205	2.693	59.99
Davit8:V	0.0005352	1.128	-0.3663	-2.5258	0.0010	0.0000	0.0005352	9.736	60.87
Davit8:End	0.0005336	1.126	-0.4551	-2.5543	0.0010	0.0000	0.0005336	11.73	60.78

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
4008:g	-0.04	0.0	-48.62	0.0	45.16	0.0	0.0	66.36	0.0	3764.76	0.0	-2.1	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme":

Element	Joint	Joint	Rel.	Trans.	Long.	Vert.	Trans. Mom.	Long. Mom.	Tors.	Axial	Tran.	Long.	P/A	M/S.	V/Q.	T/R.	Res.	Max.	At

Label	Label	Position	Dist. (ft)	Defl. (in)	Defl. (in)	Defl. (in)	(Local Mx) (ft-k)	(Local My) (ft-k)	Mom. (ft-k)	Force (kips)	Shear (kips)	Shear (kips)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	Usage %	Pt.
4008	4008:t	Origin	0.00	49.18	0.02	-1.17	-0.00	-0.00	-0.0	-0.01	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
4008	4008:AT&T	End	0.50	48.80	0.02	-1.16	0.01	-0.00	-0.0	-0.01	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
4008	4008:AT&T	Origin	0.50	48.80	0.02	-1.16	0.01	-0.00	0.0	-2.28	5.89	-0.00	-0.19	0.00	0.99	0.00	1.73	2.7	5
4008	4008:WVGD12	End	1.50	48.04	0.02	-1.13	5.90	-0.00	0.0	-2.28	5.89	-0.00	-0.19	0.30	0.95	0.00	1.71	2.6	4
4008	4008:WVGD12	Origin	1.50	48.04	0.02	-1.13	5.90	-0.00	0.0	-2.65	6.06	-0.00	-0.22	0.30	0.97	0.00	1.76	2.7	4
4008	Tube 1	End	6.00	44.62	0.02	-1.02	33.19	-0.00	0.0	-2.65	6.06	-0.00	-0.20	5.50	0.24	0.00	5.71	8.8	2
4008	Tube 1	Origin	6.00	44.62	0.02	-1.02	33.19	-0.00	0.0	-2.86	6.34	-0.00	-0.22	5.50	0.25	0.00	5.73	8.8	2
4008	4008:TMobile	End	10.50	41.25	0.02	-0.92	61.70	-0.01	0.0	-2.86	6.34	-0.00	-0.20	8.97	0.24	0.00	9.18	14.3	2
4008	4008:TMobile	Origin	10.50	41.25	0.02	-0.92	61.70	-0.01	-0.0	-4.99	9.57	-0.00	-0.36	8.97	0.36	0.00	9.34	14.6	2
4008	4008:WVGD11	End	11.50	40.51	0.02	-0.89	71.27	-0.01	-0.0	-4.99	9.57	-0.00	-0.35	10.07	0.36	0.00	10.44	16.4	2
4008	4008:WVGD11	Origin	11.50	40.51	0.02	-0.89	71.27	-0.01	0.0	-5.39	9.76	-0.00	-0.38	10.07	0.36	0.00	10.47	16.5	2
4008	Tube 1	End	16.00	37.24	0.02	-0.79	115.19	-0.03	0.0	-5.39	9.76	-0.00	-0.36	14.42	0.34	0.00	14.79	24.0	2
4008	Tube 1	Origin	16.00	37.24	0.02	-0.79	115.19	-0.03	0.0	-5.64	10.06	-0.00	-0.37	14.42	0.35	0.00	14.81	24.1	2
4008	SpliceT	End	20.50	34.08	0.02	-0.70	160.48	-0.04	0.0	-5.64	10.06	-0.00	-0.35	17.93	0.33	0.00	18.29	30.7	2
4008	SpliceT	Origin	20.50	34.08	0.02	-0.70	160.48	-0.04	-0.0	-5.82	10.26	-0.00	-0.22	10.70	0.20	0.00	10.93	16.8	2
4008	4008:WVGD10	End	21.50	33.40	0.01	-0.68	170.73	-0.05	-0.0	-5.82	10.26	-0.00	-0.22	11.11	0.20	0.00	11.33	17.4	2
4008	4008:WVGD10	Origin	21.50	33.40	0.01	-0.68	170.73	-0.05	-0.0	-6.14	10.33	-0.00	-0.23	11.11	0.20	0.00	11.35	17.5	2
4008	4008:Arm1	End	22.00	33.06	0.01	-0.67	175.89	-0.05	-0.0	-6.14	10.33	-0.00	-0.23	11.31	0.20	0.00	11.54	17.8	2
4008	4008:Arm1	Origin	22.00	33.06	0.01	-0.67	177.71	-0.05	0.0	-7.60	14.15	-0.01	-0.28	11.43	0.28	0.00	11.72	18.0	2
4008	Tube 2	End	26.50	30.04	0.01	-0.59	241.40	-0.08	0.0	-7.60	14.15	-0.01	-0.26	13.97	0.26	0.00	14.24	21.9	2
4008	Tube 2	Origin	26.50	30.04	0.01	-0.59	241.40	-0.08	0.0	-8.07	14.51	-0.01	-0.28	13.97	0.27	0.00	14.26	21.9	2
4008	4008:WVGD9	End	31.00	27.11	0.01	-0.51	306.69	-0.11	0.0	-8.07	14.51	-0.01	-0.27	16.05	0.25	0.00	16.32	25.1	2
4008	4008:WVGD9	Origin	31.00	27.11	0.01	-0.51	306.69	-0.11	0.0	-8.58	14.72	-0.01	-0.28	16.05	0.26	0.00	16.34	25.1	2
4008	4008:Arm2	End	31.44	26.84	0.01	-0.50	313.13	-0.11	0.0	-8.58	14.72	-0.01	-0.28	16.23	0.26	0.00	16.52	25.4	2
4008	4008:Arm2	Origin	31.44	26.84	0.01	-0.50	322.77	-0.11	0.0	-14.03	23.37	-0.01	-0.46	16.73	0.41	0.00	17.21	26.5	2
4008	Tube 2	End	36.44	23.73	0.01	-0.42	439.62	-0.15	0.0	-14.03	23.37	-0.01	-0.44	20.51	0.39	0.00	20.96	32.2	2
4008	Tube 2	Origin	36.44	23.73	0.01	-0.42	439.62	-0.15	0.0	-14.48	23.68	-0.01	-0.45	20.51	0.39	0.00	20.97	32.3	2
4008	Tube 2	End	38.97	22.22	0.01	-0.38	499.56	-0.18	0.0	-14.48	23.68	-0.01	-0.44	22.14	0.38	0.00	22.59	34.8	2
4008	Tube 2	Origin	38.97	22.22	0.01	-0.38	499.56	-0.18	0.0	-14.79	23.89	-0.01	-0.45	22.14	0.39	0.00	22.60	34.8	2
4008	4008:WVGD8	End	41.50	20.74	0.01	-0.34	560.04	-0.20	0.0	-14.79	23.89	-0.01	-0.44	23.60	0.38	0.00	24.05	37.0	2
4008	4008:WVGD8	Origin	41.50	20.74	0.01	-0.34	560.04	-0.20	0.0	-15.36	24.12	-0.01	-0.46	23.60	0.38	0.00	24.07	37.0	2
4008	4008:Arm3	End	43.94	19.37	0.01	-0.31	618.83	-0.23	0.0	-15.36	24.12	-0.01	-0.45	24.88	0.37	0.00	25.34	39.0	2
4008	4008:Arm3	Origin	43.94	19.37	0.01	-0.31	628.43	-0.23	0.0	-20.97	32.78	-0.01	-0.61	25.27	0.50	0.00	25.89	39.8	2
4008	Tube 2	End	47.72	17.32	0.01	-0.26	752.38	-0.28	0.0	-20.97	32.78	-0.01	-0.59	28.18	0.49	0.00	28.78	44.3	2
4008	Tube 2	Origin	47.72	17.32	0.01	-0.26	752.38	-0.28	0.0	-21.51	33.11	-0.01	-0.60	28.18	0.49	0.00	28.80	44.3	2
4008	4008:WVGD7	End	51.50	15.39	0.01	-0.22	877.56	-0.33	0.0	-21.51	33.11	-0.01	-0.58	30.70	0.47	0.00	31.29	48.1	2
4008	4008:WVGD7	Origin	51.50	15.39	0.01	-0.22	877.56	-0.33	0.0	-22.41	33.50	-0.01	-0.61	30.70	0.48	0.00	31.32	48.2	2
4008	4008:Arm4	End	56.44	13.04	0.01	-0.17	1042.99	-0.40	0.0	-22.41	33.50	-0.01	-0.58	33.48	0.46	0.00	34.07	52.9	2
4008	4008:Arm4	Origin	56.44	13.04	0.01	-0.17	1052.53	-0.40	0.0	-28.26	42.18	-0.02	-0.73	33.78	0.58	0.00	34.53	53.6	2
4008	Tube 2	End	58.97	11.91	0.01	-0.15	1159.31	-0.44	0.0	-28.26	42.18	-0.02	-0.72	35.66	0.57	0.00	36.39	57.1	2
4008	Tube 2	Origin	58.97	11.91	0.01	-0.15	1159.31	-0.44	0.0	-28.67	42.41	-0.02	-0.73	35.66	0.57	0.00	36.40	57.1	2
4008	4008:WVGD6	End	61.50	10.85	0.01	-0.13	1266.65	-0.49	0.0	-28.67	42.41	-0.02	-0.71	37.36	0.56	0.00	38.09	60.4	2
4008	4008:WVGD6	Origin	61.50	10.85	0.01	-0.13	1266.65	-0.49	0.0	-29.52	42.73	-0.02	-0.74	37.36	0.56	0.00	38.11	60.4	2
4008	SpliceT	End	66.00	9.10	0.00	-0.10	1458.94	-0.57	0.0	-29.52	42.73	-0.02	-0.71	40.04	0.54	0.00	40.76	65.9	2
4008	SpliceT	Origin	66.00	9.10	0.00	-0.10	1458.94	-0.57	0.0	-30.42	43.07	-0.02	-0.73	40.04	0.55	0.00	40.78	66.0	2
4008	Tube 2	End	68.75	8.12	0.00	-0.09	1577.39	-0.63	0.0	-30.42	43.07	-0.02	-0.52	30.79	0.39	0.00	31.32	48.2	2
4008	Tube 2	Origin	68.75	8.12	0.00	-0.09	1577.39	-0.63	0.0	-31.44	43.35	-0.02	-0.54	30.79	0.39	0.00	31.34	48.2	2
4008	4008:WVGD5	End	71.50	7.20	0.00	-0.07	1696.61	-0.68	0.0	-31.44	43.35	-0.02	-0.53	31.73	0.38	0.00	32.27	49.6	2
4008	4008:WVGD5	Origin	71.50	7.20	0.00	-0.07	1696.61	-0.68	0.0	-32.79	43.76	-0.02	-0.55	31.73	0.39	0.00	32.29	49.7	2
4008	Tube 3	End	76.50	5.67	0.00	-0.05	1915.38	-0.80	0.0	-32.79	43.76	-0.02	-0.53	33.22	0.37	0.00	33.75	51.9	2
4008	Tube 3	Origin	76.50	5.67	0.00	-0.05	1915.38	-0.80	0.0	-33.98	44.27	-0.02	-0.55	33.22	0.38	0.00	33.77	52.0	2
4008	4008:WVGD4	End	81.50	4.32	0.00	-0.04	2136.72	-0.92	0.0	-33.98	44.27	-0.02	-0.53	34.46	0.36	0.00	34.99	53.8	2
4008	4008:WVGD4	Origin	81.50	4.32	0.00	-0.04	2136.72	-0.92	0.0	-35.46	44.80	-0.03	-0.55	34.46	0.37	0.00	35.01	53.9	2
4008	Tube 3	End	86.50	3.16	0.00	-0.03	2360.72	-1.05	0.0	-35.46	44.80	-0.03	-0.53	35.49	0.36	0.00	36.02	55.4	2
4008	Tube 3	Origin	86.50	3.16	0.00	-0.03	2360.72	-1.05	0.0	-36.73	45.35	-0.03	-0.55	35.49	0.36	0.00	36.04	55.5	2
4008	4008:WVGD3	End	91.50	2.19	0.00	-0.02	2587.45	-1.19	0.0	-36.73	45.35	-0.03	-0.53	36.34	0.35	0.00	36.88	56.7	2
4008	4008:WVGD3	Origin	91.50	2.19	0.00	-0.02	2587.45	-1.19	0.0	-38.29	45.91	-0.03	-0.56	36.34	0.35	0.00	36.90	56.8	2
4008	Tube 3	End	96.50	1.40	0.00	-0.01	2817.00	-1.35	0.0	-38.29	45.91	-0.03	-0.54	37.05	0.34	0.00	37.60	57.8	2
4008	Tube 3	Origin	96.50	1.40	0.00	-0.01	2817.00	-1.35	0.0	-39.64	46.48	-0.03	-0.56	37.05	0.35	0.00	37.62	57.9	2
4008	4008:WVGD2	End	101.50	0.78	0.00	-0.01	3049.42	-1.51	0.0	-39.64	46.48	-0.03	-0.54	37.64	0.33	0.00	38.19	58.7	2
4008	4008:WVGD2	Origin	101.50	0.78	0.00	-0.01	3049.42	-1.51	0.0	-41.27	47.08	-0.04	-0.56	37.64	0.34	0.00	38.21	58.8	2
4008	Tube 3	End	106.50	0.35	0.00	-0.00	3284.80	-1.69	0.0	-41.27	47.08	-0.04	-0.55	38.13	0.33	0.00	38.68	60.1	2
4008	Tube 3	Origin	106.50	0.35	0.00	-0.00	3284.80	-1.69	0.0	-42.70	47.68	-0.04	-0.56	38.13	0.33	0.00	38.69	60.2	2
4008	4008:WVGD1	End	111.50	0.09	0.00	-0.00	3523.22	-1.88	0.0	-42.70	47.68	-0.04	-0.55	38.52	0.32	0.00	39.07	61.7	2

4008	4008:WVGD1	Origin	111.50	0.09	0.00	-0.00	3523.22	-1.88	0.0	-44.41	48.31	-0.04	-0.57	38.52	0.33	0.00	39.09	61.7	2
4008	4008:g	End	116.50	0.00	0.00	0.00	3764.76	-2.08	0.0	-44.41	48.31	-0.04	-0.55	38.84	0.32	0.00	39.40	63.2	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	33.08	0.01	0.10	-1.42	0.00	0.0	-1.89	0.28	-0.00	-0.52	3.40	0.00	0.00	3.91	6.0	1
Davit1	Davit1:V	End	3.04	33.47	0.02	2.12	-0.57	0.00	0.0	-1.89	0.28	-0.00	-0.52	1.35	0.00	0.00	1.87	2.9	1
Davit1	Davit1:V	Origin	3.04	33.47	0.02	2.12	-0.57	0.00	0.0	-1.81	0.57	-0.00	-0.50	1.35	0.00	0.00	1.85	2.8	1
Davit1	Davit1:End	End	4.04	33.49	0.02	2.78	-0.00	0.00	0.0	-1.81	0.57	-0.00	-0.50	0.00	0.32	0.00	0.75	1.1	3
Davit2	Davit2:O	Origin	0.00	33.03	0.01	-1.45	-3.23	-0.00	-0.0	1.70	0.88	0.00	0.46	7.71	0.00	0.00	8.17	12.6	1
Davit2	Davit2:V	End	3.04	33.32	0.01	-3.54	-0.56	-0.00	-0.0	1.70	0.88	0.00	0.46	1.34	0.00	0.00	1.80	2.8	1
Davit2	Davit2:V	Origin	3.04	33.32	0.01	-3.54	-0.56	-0.00	-0.0	1.82	0.56	0.00	0.50	1.34	0.00	0.00	1.83	2.8	1
Davit2	Davit2:End	End	4.04	33.30	0.01	-4.24	0.00	0.00	-0.0	1.82	0.56	0.00	0.50	0.00	0.32	0.00	0.74	1.1	3
Davit3	Davit3:O	Origin	0.00	26.86	0.01	0.31	-17.07	0.00	0.0	-4.56	1.79	-0.00	-0.46	8.96	0.00	0.00	9.42	14.5	1
Davit3	#Davit3:0	End	3.55	27.28	0.01	2.46	-10.73	0.00	0.0	-4.56	1.79	-0.00	-0.52	7.32	0.00	0.00	7.84	12.1	1
Davit3	#Davit3:0	Origin	3.55	27.28	0.01	2.46	-10.73	0.00	0.0	-4.54	1.70	-0.00	-0.52	7.32	0.00	0.00	7.84	12.1	1
Davit3	Davit3:V	End	7.10	27.68	0.01	4.53	-4.71	0.00	0.0	-4.54	1.70	-0.00	-0.60	4.34	0.00	0.00	4.94	7.6	1
Davit3	Davit3:V	Origin	7.10	27.68	0.01	4.53	-4.71	0.00	0.0	-4.19	2.36	-0.00	-0.55	4.34	0.00	0.00	4.90	7.5	1
Davit3	Davit3:End	End	9.10	27.70	0.01	5.69	-0.00	0.00	0.0	-4.19	2.36	-0.00	-0.61	0.00	0.71	0.00	1.38	2.1	3
Davit4	Davit4:O	Origin	0.00	26.81	0.01	-1.31	-26.69	-0.00	-0.0	3.74	3.17	0.00	0.38	14.02	0.00	0.00	14.39	22.1	1
Davit4	#Davit4:0	End	3.55	27.14	0.01	-3.62	-15.44	-0.00	-0.0	3.74	3.17	0.00	0.43	10.53	0.00	0.00	10.96	16.9	1
Davit4	#Davit4:0	Origin	3.55	27.14	0.01	-3.62	-15.44	-0.00	-0.0	3.76	3.05	0.00	0.43	10.53	0.00	0.00	10.96	16.9	1
Davit4	Davit4:V	End	7.10	27.47	0.01	-6.07	-4.62	-0.00	-0.0	3.76	3.05	0.00	0.50	4.25	0.00	0.00	4.75	7.3	1
Davit4	Davit4:V	Origin	7.10	27.47	0.01	-6.07	-4.62	-0.00	0.0	4.21	2.31	0.00	0.56	4.25	0.00	0.00	4.81	7.4	1
Davit4	Davit4:End	End	9.10	27.43	0.01	-7.49	-0.00	0.00	0.0	4.21	2.31	0.00	0.61	0.00	0.70	0.00	1.36	2.1	3
Davit5	Davit5:O	Origin	0.00	19.39	0.01	0.49	-17.34	0.00	0.0	-4.55	1.82	-0.00	-0.46	9.11	0.00	0.00	9.57	14.7	1
Davit5	#Davit5:0	End	3.55	19.75	0.01	2.36	-10.90	0.00	0.0	-4.55	1.82	-0.00	-0.52	7.43	0.00	0.00	7.95	12.2	1
Davit5	#Davit5:0	Origin	3.55	19.75	0.01	2.36	-10.90	0.00	0.0	-4.53	1.73	-0.00	-0.52	7.43	0.00	0.00	7.95	12.2	1
Davit5	Davit5:V	End	7.10	20.09	0.01	4.15	-4.77	0.00	0.0	-4.53	1.73	-0.00	-0.60	4.39	0.00	0.00	4.99	7.7	1
Davit5	Davit5:V	Origin	7.10	20.09	0.01	4.15	-4.77	0.00	0.0	-4.17	2.38	-0.00	-0.55	4.39	0.00	0.00	4.95	7.6	1
Davit5	Davit5:End	End	9.10	20.11	0.01	5.14	-0.00	0.00	0.0	-4.17	2.38	-0.00	-0.61	0.00	0.72	0.00	1.39	2.1	3
Davit6	Davit6:O	Origin	0.00	19.35	0.01	-1.11	-26.92	-0.00	-0.0	3.72	3.19	0.00	0.37	14.14	0.00	0.00	14.51	22.3	1
Davit6	#Davit6:0	End	3.55	19.64	0.01	-3.14	-15.59	-0.00	-0.0	3.72	3.19	0.00	0.43	10.63	0.00	0.00	11.06	17.0	1
Davit6	#Davit6:0	Origin	3.55	19.64	0.01	-3.14	-15.59	-0.00	-0.0	3.74	3.08	0.00	0.43	10.63	0.00	0.00	11.06	17.0	1
Davit6	Davit6:V	End	7.10	19.95	0.01	-5.31	-4.67	-0.00	-0.0	3.74	3.08	0.00	0.50	4.31	0.00	0.00	4.80	7.4	1
Davit6	Davit6:V	Origin	7.10	19.95	0.01	-5.31	-4.67	-0.00	0.0	4.20	2.34	0.00	0.56	4.31	0.00	0.00	4.86	7.5	1
Davit6	Davit6:End	End	9.10	19.91	0.01	-6.57	-0.00	0.00	0.0	4.20	2.34	0.00	0.61	0.00	0.71	0.00	1.37	2.1	3
Davit7	Davit7:O	Origin	0.00	13.05	0.01	0.56	-17.69	0.00	0.0	-4.54	1.86	-0.00	-0.46	9.29	0.00	0.00	9.75	15.0	1
Davit7	#Davit7:0	End	3.55	13.33	0.01	2.08	-11.10	0.00	0.0	-4.54	1.86	-0.00	-0.52	7.58	0.00	0.00	8.09	12.5	1
Davit7	#Davit7:0	Origin	3.55	13.33	0.01	2.08	-11.10	0.00	0.0	-4.51	1.77	-0.00	-0.52	7.58	0.00	0.00	8.09	12.4	1
Davit7	Davit7:V	End	7.10	13.60	0.01	3.52	-4.84	0.00	0.0	-4.51	1.77	-0.00	-0.60	4.46	0.00	0.00	5.06	7.8	1
Davit7	Davit7:V	Origin	7.10	13.60	0.01	3.52	-4.84	0.00	0.0	-4.15	2.42	-0.00	-0.55	4.46	0.00	0.00	5.01	7.7	1
Davit7	Davit7:End	End	9.10	13.61	0.01	4.31	-0.00	0.00	0.0	-4.15	2.42	-0.00	-0.60	0.00	0.73	0.00	1.41	2.2	3
Davit8	Davit8:O	Origin	0.00	13.02	0.01	-0.90	-27.21	-0.00	-0.0	3.69	3.23	0.00	0.37	14.29	0.00	0.00	14.67	22.6	1
Davit8	#Davit8:0	End	3.55	13.27	0.01	-2.58	-15.77	-0.00	-0.0	3.69	3.23	0.00	0.42	10.76	0.00	0.00	11.18	17.2	1
Davit8	#Davit8:0	Origin	3.55	13.27	0.01	-2.58	-15.77	-0.00	-0.0	3.72	3.11	0.00	0.42	10.76	0.00	0.00	11.18	17.2	1
Davit8	Davit8:V	End	7.10	13.53	0.01	-4.40	-4.74	-0.00	-0.0	3.72	3.11	0.00	0.49	4.37	0.00	0.00	4.86	7.5	1
Davit8	Davit8:V	Origin	7.10	13.53	0.01	-4.40	-4.74	-0.00	0.0	4.18	2.37	0.00	0.55	4.37	0.00	0.00	4.92	7.6	1
Davit8	Davit8:End	End	9.10	13.51	0.01	-5.46	-0.00	0.00	0.0	4.18	2.37	0.00	0.61	0.00	0.72	0.00	1.39	2.1	3

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

Clamp	Force	Input	Factored	Usage

Label	(kips)	Holding Capacity (kips)	Holding Capacity (kips)	%
Clamp1	1.898	80.00	80.00	2.37
Clamp2	1.898	80.00	80.00	2.37
Clamp3	4.792	80.00	80.00	5.99
Clamp4	4.792	80.00	80.00	5.99
Clamp5	4.792	80.00	80.00	5.99
Clamp6	4.792	80.00	80.00	5.99
Clamp7	4.792	80.00	80.00	5.99
Clamp8	4.792	80.00	80.00	5.99
Clamp9	0.250	80.00	80.00	0.31
Clamp10	0.250	80.00	80.00	0.31
Clamp11	0.250	80.00	80.00	0.31
Clamp12	0.250	80.00	80.00	0.31
Clamp13	0.250	80.00	80.00	0.31
Clamp14	0.250	80.00	80.00	0.31
Clamp15	0.250	80.00	80.00	0.31
Clamp16	0.250	80.00	80.00	0.31
Clamp17	0.250	80.00	80.00	0.31
Clamp18	0.250	80.00	80.00	0.31
Clamp19	0.250	80.00	80.00	0.31
Clamp20	0.250	80.00	80.00	0.31
Clamp21	6.249	80.00	80.00	7.81
Clamp22	3.654	80.00	80.00	4.57

*** Analysis Results for Load Case No. 3 "NESC Extreme Ice w/ Wind" - Number of iterations in SAPS 13

Equilibrium Joint Positions and Rotations for Load Case "NESC Extreme Ice w/ Wind":

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)
4008:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
4008:t	0.002421	1.688	-0.02009	-1.4330	0.0020	0.0000	0.002421	1.688	116.5
4008:AT&T	0.002404	1.675	-0.01993	-1.4330	0.0020	0.0000	0.002404	1.675	116
4008:WVGD12	0.00237	1.65	-0.0196	-1.4327	0.0020	0.0000	0.00237	1.65	115
4008:TMobile	0.002061	1.427	-0.01666	-1.4036	0.0019	0.0000	0.002061	1.427	106
4008:WVGD11	0.002027	1.403	-0.01633	-1.3982	0.0019	0.0000	0.002027	1.403	105
4008:WVGD10	0.001694	1.165	-0.01321	-1.3232	0.0019	0.0000	0.001694	1.165	94.99
4008:Arm1	0.001678	1.153	-0.01306	-1.3204	0.0018	0.0000	0.001678	1.153	94.49
4008:WVGD9	0.001394	0.9503	-0.01056	-1.2541	0.0018	0.0000	0.001394	0.9503	85.49
4008:Arm2	0.001381	0.9408	-0.01045	-1.2504	0.0018	0.0000	0.001381	0.9408	85.05
4008:WVGD8	0.001085	0.7301	-0.007874	-1.1387	0.0016	0.0000	0.001085	0.7301	74.99
4008:Arm3	0.001018	0.6822	-0.007317	-1.1071	0.0016	0.0000	0.001018	0.6822	72.56
4008:WVGD7	0.0008203	0.543	-0.005687	-0.9953	0.0014	0.0000	0.0008203	0.543	64.99
4008:Arm4	0.0007022	0.4604	-0.004773	-0.9145	0.0013	0.0000	0.0007022	0.4604	60.06
4008:WVGD6	0.0005908	0.3833	-0.003913	-0.8250	0.0012	0.0000	0.0005908	0.3833	55
4008:WVGD5	0.0004007	0.2545	-0.002614	-0.6550	0.0010	0.0000	0.0004007	0.2545	45
4008:WVGD4	0.0002461	0.1528	-0.001717	-0.5054	0.0008	0.0000	0.0002461	0.1528	35
4008:WVGD3	0.0001275	0.07726	-0.00106	-0.3559	0.0006	0.0000	0.0001275	0.07726	25
4008:WVGD2	4.681e-005	0.02763	-0.0005715	-0.2096	0.0003	0.0000	4.681e-005	0.02763	15
4008:WVGD1	5.496e-006	0.003129	-0.00018	-0.0684	0.0001	0.0000	5.496e-006	0.003129	5
Davit1:O	0.001679	1.153	0.01324	-1.3204	0.0018	0.0000	0.001679	0.01167	94.51
Davit1:V	0.001697	1.164	0.07274	-1.0203	0.0019	0.0000	0.001697	-2.978	95.07
Davit1:End	0.001698	1.164	0.09024	-0.9996	0.0019	0.0000	0.001698	-3.978	95.09
Davit2:O	0.001677	1.153	-0.03937	-1.3204	0.0018	0.0000	0.001677	2.294	94.46
Davit2:V	0.001691	1.165	-0.1194	-1.6539	0.0019	0.0000	0.001691	5.307	94.88
Davit2:End	0.00169	1.165	-0.1486	-1.6745	0.0019	0.0000	0.00169	6.306	94.85
Davit3:O	0.001382	0.9411	0.01726	-1.2504	0.0018	0.0000	0.001382	-0.3284	85.08
Davit3:V	0.001421	0.96	0.1245	-0.5909	0.0018	0.0000	0.001421	-7.31	86.36
Davit3:End	0.001422	0.9601	0.1435	-0.5259	0.0018	0.0000	0.001422	-9.309	86.38
Davit4:O	0.00138	0.9405	-0.03815	-1.2504	0.0018	0.0000	0.00138	2.21	85.02
Davit4:V	0.001409	0.9713	-0.2405	-1.9579	0.0018	-0.0000	0.001409	9.241	85.99
Davit4:End	0.001407	0.9701	-0.3105	-2.0224	0.0018	-0.0000	0.001407	11.24	85.92
Davit5:O	0.001018	0.6825	0.02048	-1.1071	0.0016	0.0000	0.001018	-0.7563	72.58
Davit5:V	0.001053	0.6982	0.1103	-0.4469	0.0016	0.0000	0.001053	-7.741	73.84
Davit5:End	0.001054	0.6983	0.1242	-0.3818	0.0016	0.0000	0.001054	-9.74	73.86
Davit6:O	0.001017	0.682	-0.03512	-1.1071	0.0016	0.0000	0.001017	2.121	72.53
Davit6:V	0.001044	0.7104	-0.2199	-1.8152	0.0016	-0.0000	0.001044	9.149	73.51
Davit6:End	0.001042	0.7093	-0.2849	-1.8797	0.0016	-0.0000	0.001042	11.15	73.45
Davit7:O	0.0007028	0.4606	0.02089	-0.9145	0.0013	0.0000	0.0007028	-1.147	60.08
Davit7:V	0.0007318	0.4721	0.08709	-0.2531	0.0013	0.0000	0.0007318	-8.136	61.32
Davit7:End	0.0007321	0.4721	0.09427	-0.1879	0.0013	0.0000	0.0007321	-10.14	61.33
Davit8:O	0.0007016	0.4602	-0.03044	-0.9145	0.0013	0.0000	0.0007016	2.068	60.03
Davit8:V	0.0007248	0.4852	-0.1917	-1.6232	0.0013	-0.0000	0.0007248	9.093	61.04
Davit8:End	0.0007235	0.4844	-0.25	-1.6878	0.0013	-0.0000	0.0007235	11.09	60.98

Joint Support Reactions for Load Case "NESC Extreme Ice w/ Wind":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
4008:g	-0.05	0.0	-19.89	0.0	82.97	0.0	0.0	85.32	0.0	1590.77	0.0	-2.8	0.0	-0.00	0.0	0.0

Detailed Steel Pole Usages for Load Case "NESC Extreme Ice w/ Wind":

Element	Joint	Joint	Rel.	Trans.	Long.	Vert.	Trans. Mom.	Long. Mom.	Tors.	Axial	Tran.	Long.	P/A	M/S.	V/Q.	T/R.	Res.	Max.	At

Label	Label	Position	Dist. (ft)	Defl. (in)	Defl. (in)	Defl. (in)	(Local Mx) (ft-k)	(Local My) (ft-k)	Mom. (ft-k)	Force (kips)	Shear (kips)	Shear (kips)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	Usage %	Pt.
4008	4008:t	Origin	0.00	20.25	0.03	-0.24	-0.00	-0.00	0.0	-0.01	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
4008	4008:AT&T	End	0.50	20.10	0.03	-0.24	0.00	-0.00	0.0	-0.01	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
4008	4008:AT&T	Origin	0.50	20.10	0.03	-0.24	0.00	-0.00	-0.0	-5.83	1.63	-0.00	-0.48	0.00	0.28	0.00	0.68	1.0	5
4008	4008:WVGD12	End	1.50	19.80	0.03	-0.24	1.64	-0.00	-0.0	-5.83	1.63	-0.00	-0.48	0.31	0.07	0.00	0.80	1.2	2
4008	4008:WVGD12	Origin	1.50	19.80	0.03	-0.24	1.64	-0.00	0.0	-6.86	1.70	-0.00	-0.56	0.31	0.07	0.00	0.88	1.4	2
4008	Tube 1	End	6.00	18.46	0.03	-0.22	9.30	-0.01	0.0	-6.86	1.70	-0.00	-0.52	1.54	0.07	0.00	2.07	3.2	2
4008	Tube 1	Origin	6.00	18.46	0.03	-0.22	9.30	-0.01	0.0	-7.15	1.78	-0.00	-0.54	1.54	0.07	0.00	2.09	3.2	2
4008	4008:TMobile	End	10.50	17.12	0.02	-0.20	17.31	-0.02	0.0	-7.15	1.78	-0.00	-0.51	2.52	0.07	0.00	3.03	4.7	2
4008	4008:TMobile	Origin	10.50	17.12	0.02	-0.20	17.31	-0.02	-0.0	-12.20	2.82	-0.00	-0.87	2.52	0.11	0.00	3.39	5.3	2
4008	4008:WVGD11	End	11.50	16.83	0.02	-0.20	20.13	-0.02	-0.0	-12.20	2.82	-0.00	-0.86	2.85	0.10	0.00	3.71	5.8	2
4008	4008:WVGD11	Origin	11.50	16.83	0.02	-0.20	20.13	-0.02	0.0	-13.25	2.89	-0.00	-0.93	2.85	0.11	0.00	3.78	5.9	2
4008	Tube 1	End	16.00	15.53	0.02	-0.18	33.15	-0.04	0.0	-13.25	2.89	-0.00	-0.88	4.15	0.10	0.00	5.03	8.2	2
4008	Tube 1	Origin	16.00	15.53	0.02	-0.18	33.15	-0.04	0.0	-13.59	2.97	-0.01	-0.90	4.15	0.10	0.00	5.06	8.2	2
4008	SpliceT	End	20.50	14.25	0.02	-0.16	46.53	-0.06	0.0	-13.59	2.97	-0.01	-0.85	5.20	0.10	0.00	6.05	10.2	2
4008	SpliceT	Origin	20.50	14.25	0.02	-0.16	46.53	-0.06	-0.0	-13.82	3.03	-0.01	-0.52	3.10	0.06	0.00	3.62	5.6	2
4008	4008:WVGD10	End	21.50	13.98	0.02	-0.16	49.56	-0.07	-0.0	-13.82	3.03	-0.01	-0.51	3.23	0.06	0.00	3.74	5.8	2
4008	4008:WVGD10	Origin	21.50	13.98	0.02	-0.16	49.56	-0.07	-0.0	-14.76	3.06	-0.01	-0.55	3.23	0.06	0.00	3.77	5.8	2
4008	4008:Arm1	End	22.00	13.84	0.02	-0.16	51.09	-0.07	-0.0	-14.76	3.06	-0.01	-0.54	3.29	0.06	0.00	3.83	5.9	2
4008	4008:Arm1	Origin	22.00	13.84	0.02	-0.16	52.37	-0.07	0.0	-19.90	5.75	-0.01	-0.73	3.37	0.11	0.00	4.10	6.3	2
4008	Tube 2	End	26.50	12.60	0.02	-0.14	78.23	-0.11	0.0	-19.90	5.75	-0.01	-0.69	4.53	0.11	0.00	5.22	8.0	2
4008	Tube 2	Origin	26.50	12.60	0.02	-0.14	78.23	-0.11	0.0	-20.47	5.84	-0.01	-0.71	4.53	0.11	0.00	5.24	8.1	2
4008	4008:WVGD9	End	31.00	11.40	0.02	-0.13	104.53	-0.15	0.0	-20.47	5.84	-0.01	-0.68	5.47	0.10	0.00	6.15	9.5	2
4008	4008:WVGD9	Origin	31.00	11.40	0.02	-0.13	104.53	-0.15	0.0	-21.63	5.92	-0.01	-0.72	5.47	0.10	0.00	6.19	9.5	2
4008	4008:Arm2	End	31.44	11.29	0.02	-0.13	107.12	-0.15	0.0	-21.63	5.92	-0.01	-0.71	5.55	0.10	0.00	6.27	9.6	2
4008	4008:Arm2	Origin	31.44	11.29	0.02	-0.13	111.70	-0.15	0.0	-33.26	10.14	-0.01	-1.10	5.79	0.18	0.00	6.90	10.6	2
4008	Tube 2	End	36.44	10.00	0.01	-0.11	162.39	-0.21	0.0	-33.26	10.14	-0.01	-1.04	7.58	0.17	0.00	8.62	13.3	2
4008	Tube 2	Origin	36.44	10.00	0.01	-0.11	162.39	-0.21	0.0	-33.78	10.21	-0.01	-1.06	7.58	0.17	0.00	8.64	13.3	2
4008	Tube 2	End	38.97	9.37	0.01	-0.10	188.23	-0.25	0.0	-33.78	10.21	-0.01	-1.03	8.34	0.16	0.00	9.38	14.4	2
4008	Tube 2	Origin	38.97	9.37	0.01	-0.10	188.23	-0.25	0.0	-34.15	10.26	-0.01	-1.04	8.34	0.17	0.00	9.39	14.4	2
4008	4008:WVGD8	End	41.50	8.76	0.01	-0.09	214.20	-0.28	0.0	-34.15	10.26	-0.01	-1.02	9.03	0.16	0.00	10.05	15.5	2
4008	4008:WVGD8	Origin	41.50	8.76	0.01	-0.09	214.20	-0.28	0.0	-35.36	10.33	-0.02	-1.05	9.03	0.16	0.00	10.09	15.5	2
4008	4008:Arm3	End	43.94	8.19	0.01	-0.09	239.37	-0.32	0.0	-35.36	10.33	-0.02	-1.03	9.63	0.16	0.00	10.66	16.4	2
4008	4008:Arm3	Origin	43.94	8.19	0.01	-0.09	243.92	-0.32	0.0	-47.10	14.52	-0.02	-1.37	9.81	0.22	0.00	11.19	17.2	2
4008	Tube 2	End	47.72	7.33	0.01	-0.08	298.83	-0.38	0.0	-47.10	14.52	-0.02	-1.32	11.20	0.22	0.00	12.52	19.3	2
4008	Tube 2	Origin	47.72	7.33	0.01	-0.08	298.83	-0.38	0.0	-47.70	14.58	-0.02	-1.34	11.20	0.22	0.00	12.54	19.3	2
4008	4008:WVGD7	End	51.50	6.52	0.01	-0.07	353.97	-0.45	0.0	-47.70	14.58	-0.02	-1.29	12.38	0.21	0.00	13.68	21.1	2
4008	4008:WVGD7	Origin	51.50	6.52	0.01	-0.07	353.97	-0.45	0.0	-49.27	14.67	-0.02	-1.34	12.38	0.21	0.00	13.73	21.1	2
4008	4008:Arm4	End	56.44	5.52	0.01	-0.06	426.40	-0.55	0.0	-49.27	14.67	-0.02	-1.28	13.69	0.20	0.00	14.97	23.2	2
4008	4008:Arm4	Origin	56.44	5.52	0.01	-0.06	430.91	-0.55	0.0	-61.18	18.82	-0.02	-1.59	13.83	0.26	0.00	15.43	23.9	2
4008	Tube 2	End	58.97	5.05	0.01	-0.05	478.56	-0.61	0.0	-61.18	18.82	-0.02	-1.56	14.72	0.25	0.00	16.28	25.5	2
4008	Tube 2	Origin	58.97	5.05	0.01	-0.05	478.56	-0.61	0.0	-61.63	18.85	-0.02	-1.57	14.72	0.25	0.00	16.30	25.6	2
4008	4008:WVGD6	End	61.50	4.60	0.01	-0.05	526.28	-0.67	0.0	-61.63	18.85	-0.02	-1.54	15.53	0.25	0.00	17.07	27.1	2
4008	4008:WVGD6	Origin	61.50	4.60	0.01	-0.05	526.28	-0.67	0.0	-63.12	18.91	-0.03	-1.57	15.53	0.25	0.00	17.11	27.1	2
4008	SpliceT	End	66.00	3.86	0.01	-0.04	611.36	-0.78	0.0	-63.12	18.91	-0.03	-1.52	16.78	0.24	0.00	18.30	29.6	2
4008	SpliceT	Origin	66.00	3.86	0.01	-0.04	611.36	-0.78	0.0	-64.06	18.95	-0.03	-1.54	16.78	0.24	0.00	18.33	29.6	2
4008	Tube 2	End	68.75	3.44	0.01	-0.03	663.49	-0.86	0.0	-64.06	18.95	-0.03	-1.10	12.96	0.17	0.00	14.06	21.6	2
4008	Tube 2	Origin	68.75	3.44	0.01	-0.03	663.49	-0.86	0.0	-65.13	19.00	-0.03	-1.11	12.96	0.17	0.00	14.07	21.7	2
4008	4008:WVGD5	End	71.50	3.05	0.00	-0.03	715.74	-0.93	0.0	-65.13	19.00	-0.03	-1.09	13.39	0.17	0.00	14.48	22.3	2
4008	4008:WVGD5	Origin	71.50	3.05	0.00	-0.03	715.74	-0.93	0.0	-67.15	19.08	-0.03	-1.13	13.39	0.17	0.00	14.52	22.3	2
4008	Tube 3	End	76.50	2.40	0.00	-0.03	811.13	-1.08	0.0	-67.15	19.08	-0.03	-1.08	14.07	0.16	0.00	15.16	23.3	2
4008	Tube 3	Origin	76.50	2.40	0.00	-0.03	811.13	-1.08	0.0	-68.44	19.16	-0.03	-1.10	14.07	0.16	0.00	15.18	23.4	2
4008	4008:WVGD4	End	81.50	1.83	0.00	-0.02	906.94	-1.25	0.0	-68.44	19.16	-0.03	-1.07	14.63	0.16	0.00	15.70	24.1	2
4008	4008:WVGD4	Origin	81.50	1.83	0.00	-0.02	906.94	-1.25	0.0	-70.62	19.26	-0.04	-1.10	14.63	0.16	0.00	15.73	24.2	2
4008	Tube 3	End	86.50	1.34	0.00	-0.02	1003.22	-1.42	0.0	-70.62	19.26	-0.04	-1.06	15.08	0.15	0.00	16.15	24.8	2
4008	Tube 3	Origin	86.50	1.34	0.00	-0.02	1003.22	-1.42	0.0	-72.00	19.34	-0.04	-1.08	15.08	0.15	0.00	16.17	24.9	2
4008	4008:WVGD3	End	91.50	0.93	0.00	-0.01	1099.93	-1.61	0.0	-72.00	19.34	-0.04	-1.05	15.45	0.15	0.00	16.50	25.4	2
4008	4008:WVGD3	Origin	91.50	0.93	0.00	-0.01	1099.93	-1.61	0.0	-74.28	19.44	-0.04	-1.08	15.45	0.15	0.00	16.53	25.4	2
4008	Tube 3	End	96.50	0.59	0.00	-0.01	1197.13	-1.81	0.0	-74.28	19.44	-0.04	-1.04	15.75	0.14	0.00	16.80	25.8	2
4008	Tube 3	Origin	96.50	0.59	0.00	-0.01	1197.13	-1.81	0.0	-75.75	19.53	-0.04	-1.07	15.75	0.14	0.00	16.82	25.9	2
4008	4008:WVGD2	End	101.50	0.33	0.00	-0.01	1294.79	-2.03	0.0	-75.75	19.53	-0.04	-1.03	15.99	0.14	0.00	17.02	26.2	2
4008	4008:WVGD2	Origin	101.50	0.33	0.00	-0.01	1294.79	-2.03	0.0	-78.12	19.63	-0.05	-1.06	15.99	0.14	0.00	17.05	26.2	2
4008	Tube 3	End	106.50	0.15	0.00	-0.00	1392.94	-2.26	0.0	-78.12	19.63	-0.05	-1.03	16.17	0.14	0.00	17.21	26.8	2
4008	Tube 3	Origin	106.50	0.15	0.00	-0.00	1392.94	-2.26	0.0	-79.69	19.73	-0.05	-1.05	16.17	0.14	0.00	17.23	26.8	2
4008	4008:WVGD1	End	111.50	0.04	0.00	-0.00	1491.60	-2.51	0.0	-79.69	19.73	-0.05	-1.02	16.31	0.13	0.00	17.34	27.4	2

4008	4008:WVGD1	Origin	111.50	0.04	0.00	-0.00	1491.60	-2.51	0.0	-82.15	19.84	-0.05	-1.05	16.31	0.13	0.00	17.37	27.4	2
4008	4008:g	End	116.50	0.00	0.00	0.00	1590.77	-2.77	0.0	-82.15	19.84	-0.05	-1.02	16.42	0.13	0.00	17.44	28.0	2

Detailed Tubular Davit Arm Usages for Load Case "NESC Extreme Ice w/ Wind":

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	13.84	0.02	0.16	-8.95	0.00	0.0	-1.69	2.16	-0.00	-0.46	21.34	0.00	0.00	21.80	33.5	1
Davit1	Davit1:V	End	3.04	13.97	0.02	0.87	-2.38	0.00	0.0	-1.69	2.16	-0.00	-0.46	5.69	0.00	0.00	6.15	9.5	1
Davit1	Davit1:V	Origin	3.04	13.97	0.02	0.87	-2.38	0.00	0.0	-1.30	2.38	-0.00	-0.36	5.69	0.00	0.00	6.04	9.3	1
Davit1	Davit1:End	End	4.04	13.97	0.02	1.08	-0.00	0.00	0.0	-1.30	2.38	-0.00	-0.36	0.00	1.35	0.00	2.37	3.6	3
Davit2	Davit2:O	Origin	0.00	13.83	0.02	-0.47	-10.22	-0.00	-0.0	0.91	2.58	0.00	0.25	24.38	0.00	0.00	24.63	37.9	1
Davit2	Davit2:V	End	3.04	13.98	0.02	-1.43	-2.37	-0.00	-0.0	0.91	2.58	0.00	0.25	5.65	0.00	0.00	5.90	9.1	1
Davit2	Davit2:V	Origin	3.04	13.98	0.02	-1.43	-2.37	-0.00	-0.0	1.33	2.37	0.00	0.36	5.65	0.00	0.00	6.01	9.3	1
Davit2	Davit2:End	End	4.04	13.98	0.02	-1.78	0.00	0.00	-0.0	1.33	2.37	0.00	0.36	0.00	1.34	0.00	2.36	3.6	3
Davit3	Davit3:O	Origin	0.00	11.29	0.02	0.21	-47.15	0.00	0.0	-2.95	5.16	-0.00	-0.30	24.76	0.00	0.00	25.06	38.6	1
Davit3	#Davit3:0	End	3.55	11.43	0.02	0.97	-28.84	0.00	0.0	-2.95	5.16	-0.00	-0.34	19.67	0.00	0.00	20.01	30.8	1
Davit3	#Davit3:0	Origin	3.55	11.43	0.02	0.97	-28.84	0.00	0.0	-2.90	5.07	-0.00	-0.33	19.67	0.00	0.00	20.00	30.8	1
Davit3	Davit3:V	End	7.10	11.52	0.02	1.49	-10.83	0.00	0.0	-2.90	5.07	-0.00	-0.38	9.98	0.00	0.00	10.37	15.9	1
Davit3	Davit3:V	Origin	7.10	11.52	0.02	1.49	-10.83	0.00	0.0	-2.01	5.42	-0.00	-0.27	9.98	0.00	0.00	10.25	15.8	1
Davit3	Davit3:End	End	9.10	11.52	0.02	1.72	-0.00	0.00	0.0	-2.01	5.42	-0.00	-0.29	0.00	1.64	0.00	2.86	4.4	3
Davit4	Davit4:O	Origin	0.00	11.29	0.02	-0.46	-51.72	-0.00	-0.0	1.16	5.83	0.00	0.12	27.17	0.00	0.00	27.29	42.0	1
Davit4	#Davit4:0	End	3.55	11.45	0.02	-1.54	-31.02	-0.00	-0.0	1.16	5.83	0.00	0.13	21.16	0.00	0.00	21.30	32.8	1
Davit4	#Davit4:0	Origin	3.55	11.45	0.02	-1.54	-31.02	-0.00	-0.0	1.21	5.72	0.00	0.14	21.16	0.00	0.00	21.30	32.8	1
Davit4	Davit4:V	End	7.10	11.66	0.02	-2.89	-10.73	-0.00	-0.0	1.21	5.72	0.00	0.16	9.88	0.00	0.00	10.04	15.5	1
Davit4	Davit4:V	Origin	7.10	11.66	0.02	-2.89	-10.73	-0.00	0.0	2.15	5.36	0.00	0.28	9.88	0.00	0.00	10.17	15.6	1
Davit4	Davit4:End	End	9.10	11.64	0.02	-3.73	0.00	0.00	0.0	2.15	5.36	0.00	0.31	0.00	1.63	0.00	2.84	4.4	3
Davit5	Davit5:O	Origin	0.00	8.19	0.01	0.25	-47.21	0.00	0.0	-2.94	5.17	-0.00	-0.30	24.80	0.00	0.00	25.09	38.6	1
Davit5	#Davit5:0	End	3.55	8.31	0.01	0.91	-28.87	0.00	0.0	-2.94	5.17	-0.00	-0.34	19.70	0.00	0.00	20.03	30.8	1
Davit5	#Davit5:0	Origin	3.55	8.31	0.01	0.91	-28.87	0.00	0.0	-2.89	5.08	-0.00	-0.33	19.70	0.00	0.00	20.03	30.8	1
Davit5	Davit5:V	End	7.10	8.38	0.01	1.32	-10.84	0.00	0.0	-2.89	5.08	-0.00	-0.38	9.99	0.00	0.00	10.37	16.0	1
Davit5	Davit5:V	Origin	7.10	8.38	0.01	1.32	-10.84	0.00	0.0	-2.00	5.42	-0.00	-0.26	9.99	0.00	0.00	10.25	15.8	1
Davit5	Davit5:End	End	9.10	8.38	0.01	1.49	-0.00	0.00	0.0	-2.00	5.42	-0.00	-0.29	0.00	1.65	0.00	2.86	4.4	3
Davit6	Davit6:O	Origin	0.00	8.18	0.01	-0.42	-51.76	-0.00	-0.0	1.14	5.84	0.00	0.11	27.19	0.00	0.00	27.30	42.0	1
Davit6	#Davit6:0	End	3.55	8.34	0.01	-1.40	-31.05	-0.00	-0.0	1.14	5.84	0.00	0.13	21.18	0.00	0.00	21.31	32.8	1
Davit6	#Davit6:0	Origin	3.55	8.34	0.01	-1.40	-31.05	-0.00	-0.0	1.19	5.72	0.00	0.14	21.18	0.00	0.00	21.32	32.8	1
Davit6	Davit6:V	End	7.10	8.52	0.01	-2.64	-10.74	-0.00	-0.0	1.19	5.72	0.00	0.16	9.89	0.00	0.00	10.05	15.5	1
Davit6	Davit6:V	Origin	7.10	8.52	0.01	-2.64	-10.74	-0.00	0.0	2.14	5.37	0.00	0.28	9.89	0.00	0.00	10.18	15.7	1
Davit6	Davit6:End	End	9.10	8.51	0.01	-3.42	0.00	0.00	0.0	2.14	5.37	0.00	0.31	0.00	1.63	0.00	2.84	4.4	3
Davit7	Davit7:O	Origin	0.00	5.53	0.01	0.25	-47.29	0.00	0.0	-2.92	5.18	-0.00	-0.29	24.84	0.00	0.00	25.13	38.7	1
Davit7	#Davit7:0	End	3.55	5.62	0.01	0.77	-28.92	0.00	0.0	-2.92	5.18	-0.00	-0.33	19.73	0.00	0.00	20.06	30.9	1
Davit7	#Davit7:0	Origin	3.55	5.62	0.01	0.77	-28.92	0.00	0.0	-2.87	5.09	-0.00	-0.33	19.73	0.00	0.00	20.06	30.9	1
Davit7	Davit7:V	End	7.10	5.67	0.01	1.05	-10.85	0.00	0.0	-2.87	5.09	-0.00	-0.38	10.00	0.00	0.00	10.38	16.0	1
Davit7	Davit7:V	Origin	7.10	5.67	0.01	1.05	-10.85	0.00	0.0	-1.98	5.43	-0.00	-0.26	10.00	0.00	0.00	10.26	15.8	1
Davit7	Davit7:End	End	9.10	5.67	0.01	1.13	-0.00	0.00	0.0	-1.98	5.43	-0.00	-0.29	0.00	1.65	0.00	2.87	4.4	3
Davit8	Davit8:O	Origin	0.00	5.52	0.01	-0.37	-51.80	-0.00	-0.0	1.12	5.84	0.00	0.11	27.21	0.00	0.00	27.32	42.0	1
Davit8	#Davit8:0	End	3.55	5.65	0.01	-1.20	-31.07	-0.00	-0.0	1.12	5.84	0.00	0.13	21.20	0.00	0.00	21.33	32.8	1
Davit8	#Davit8:0	Origin	3.55	5.65	0.01	-1.20	-31.07	-0.00	-0.0	1.18	5.73	0.00	0.13	21.20	0.00	0.00	21.33	32.8	1
Davit8	Davit8:V	End	7.10	5.82	0.01	-2.30	-10.75	-0.00	-0.0	1.18	5.73	0.00	0.16	9.91	0.00	0.00	10.06	15.5	1
Davit8	Davit8:V	Origin	7.10	5.82	0.01	-2.30	-10.75	-0.00	0.0	2.12	5.38	0.00	0.28	9.91	0.00	0.00	10.19	15.7	1
Davit8	Davit8:End	End	9.10	5.81	0.01	-3.00	0.00	0.00	0.0	2.12	5.38	0.00	0.31	0.00	1.63	0.00	2.84	4.4	3

Summary of Clamp Capacities and Usages for Load Case "NESC Extreme Ice w/ Wind":

Clamp	Force	Input	Factored	Usage

Label	(kips)	Holding Capacity (kips)	Holding Capacity (kips)	%
Clamp1	2.711	80.00	80.00	3.39
Clamp2	2.711	80.00	80.00	3.39
Clamp3	5.754	80.00	80.00	7.19
Clamp4	5.754	80.00	80.00	7.19
Clamp5	5.754	80.00	80.00	7.19
Clamp6	5.754	80.00	80.00	7.19
Clamp7	5.754	80.00	80.00	7.19
Clamp8	5.754	80.00	80.00	7.19
Clamp9	0.850	80.00	80.00	1.06
Clamp10	0.850	80.00	80.00	1.06
Clamp11	0.850	80.00	80.00	1.06
Clamp12	0.850	80.00	80.00	1.06
Clamp13	0.850	80.00	80.00	1.06
Clamp14	0.850	80.00	80.00	1.06
Clamp15	0.850	80.00	80.00	1.06
Clamp16	0.850	80.00	80.00	1.06
Clamp17	0.850	80.00	80.00	1.06
Clamp18	0.850	80.00	80.00	1.06
Clamp19	0.850	80.00	80.00	1.06
Clamp20	0.850	80.00	80.00	1.06
Clamp21	5.997	80.00	80.00	7.50
Clamp22	4.960	80.00	80.00	6.20

*** Overall summary for all load cases - Usage = Maximum Stress / Allowable Stress

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
4008	65.95	NESC Extreme	23	20879.9

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
4008	NESC Heavy	1	2.272	1.454	0.450	2.506	25.252	15.148	47.815	3	71.785	1.651	3.000	30.30
4008	NESC Heavy	2	2.506	0.450	1.454	2.272	25.252	9.768	30.831	3	61.821	1.326	3.000	19.54
4008	NESC Heavy	3	2.395	-1.073	2.395	1.073	25.762	3.482	11.213	3	26.445	0.792	3.000	6.96
4008	NESC Heavy	4	1.454	-2.272	2.506	-0.450	25.252	7.587	23.947	3	-52.591	1.169	3.000	15.17
4008	NESC Heavy	5	0.450	-2.506	2.272	-1.454	25.252	12.929	40.811	3	-62.416	1.526	3.000	25.86
4008	NESC Heavy	6	-1.073	-2.395	1.073	-2.395	25.762	15.736	50.675	3	-65.811	1.683	3.000	31.47
4008	NESC Heavy	7	-2.272	-1.454	-0.450	-2.506	25.252	12.868	40.618	3	-62.262	1.522	3.000	25.74
4008	NESC Heavy	8	-2.506	-0.450	-1.454	-2.272	25.252	7.487	23.634	3	-52.298	1.161	3.000	14.97
4008	NESC Heavy	9	-2.395	1.073	-2.395	-1.073	25.762	3.537	11.390	3	26.918	0.798	3.000	7.07
4008	NESC Heavy	10	-1.454	2.272	-2.506	0.450	25.252	9.867	31.144	3	62.114	1.333	3.000	19.73
4008	NESC Heavy	11	-0.450	2.506	-2.272	1.454	25.252	15.210	48.009	3	71.939	1.655	3.000	30.42
4008	NESC Heavy	12	1.073	2.395	-1.073	2.395	25.762	18.082	58.228	3	75.334	1.804	3.000	36.16
4008	NESC Heavy	13	1.679	2.118	-0.216	2.625	23.542	12.937	38.071	3	75.334	1.526	3.000	25.87
4008	NESC Heavy	14	2.229	1.278	1.278	2.229	16.142	12.716	25.657	2	61.821	1.513	3.000	25.43
4008	NESC Heavy	15	2.625	-0.216	2.118	1.679	23.542	4.092	12.042	3	45.993	0.858	3.000	8.18
4008	NESC Heavy	16	2.118	-1.679	2.625	0.216	23.542	2.989	8.797	3	-36.874	0.734	3.000	5.98
4008	NESC Heavy	17	1.278	-2.229	2.229	-1.278	16.142	10.552	21.290	2	-52.591	1.378	3.000	21.10
4008	NESC Heavy	18	-0.216	-2.625	1.679	-2.118	23.542	11.231	33.051	3	-65.811	1.422	3.000	22.46
4008	NESC Heavy	19	-1.679	-2.118	0.216	-2.625	23.542	11.208	32.983	3	-65.811	1.420	3.000	22.42
4008	NESC Heavy	20	-2.229	-1.278	-1.278	-2.229	16.142	10.469	21.124	2	-52.298	1.373	3.000	20.94
4008	NESC Heavy	21	-2.625	0.216	-2.118	-1.679	23.542	2.964	8.722	3	-36.470	0.730	3.000	5.93
4008	NESC Heavy	22	-2.118	1.679	-2.625	-0.216	23.542	4.177	12.293	3	46.397	0.867	3.000	8.35
4008	NESC Heavy	23	-1.278	2.229	-2.229	1.278	16.142	12.798	25.823	2	62.114	1.518	3.000	25.60
4008	NESC Heavy	24	0.216	2.625	-1.679	2.118	23.542	12.960	38.139	3	75.334	1.527	3.000	25.92
4008	NESC Extreme	1	2.272	1.454	0.450	2.506	25.252	27.740	87.561	3	132.282	2.235	3.000	55.48
4008	NESC Extreme	2	2.506	0.450	1.454	2.272	25.252	17.343	54.742	3	113.085	1.767	3.000	34.69
4008	NESC Extreme	3	2.395	-1.073	2.395	1.073	25.762	6.026	19.405	3	44.669	1.041	3.000	12.05
4008	NESC Extreme	4	1.454	-2.272	2.506	-0.450	25.252	16.292	51.424	3	-108.658	1.712	3.000	32.58
4008	NESC Extreme	5	0.450	-2.506	2.272	-1.454	25.252	26.678	84.207	3	-127.813	2.191	3.000	53.36
4008	NESC Extreme	6	-1.073	-2.395	1.073	-2.395	25.762	32.215	103.743	3	-134.519	2.408	3.000	64.43
4008	NESC Extreme	7	-2.272	-1.454	-0.450	-2.506	25.252	26.659	84.148	3	-127.766	2.191	3.000	53.32
4008	NESC Extreme	8	-2.506	-0.450	-1.454	-2.272	25.252	16.262	51.329	3	-108.569	1.711	3.000	32.52
4008	NESC Extreme	9	-2.395	1.073	-2.395	-1.073	25.762	6.043	19.459	3	44.813	1.043	3.000	12.09
4008	NESC Extreme	10	-1.454	2.272	-2.506	0.450	25.252	17.373	54.837	3	113.174	1.768	3.000	34.75
4008	NESC Extreme	11	-0.450	2.506	-2.272	1.454	25.252	27.759	87.620	3	132.329	2.235	3.000	55.52
4008	NESC Extreme	12	1.073	2.395	-1.073	2.395	25.762	33.327	107.324	3	139.035	2.449	3.000	66.65
4008	NESC Extreme	13	1.679	2.118	-0.216	2.625	23.542	23.827	70.117	3	139.035	2.071	3.000	47.65
4008	NESC Extreme	14	2.229	1.278	1.278	2.229	16.142	23.067	46.544	2	113.085	2.038	3.000	46.13
4008	NESC Extreme	15	2.625	-0.216	2.118	1.679	23.542	6.735	19.820	3	82.498	1.101	3.000	13.47
4008	NESC Extreme	16	2.118	-1.679	2.625	0.216	23.542	6.203	18.253	3	-78.105	1.057	3.000	12.41
4008	NESC Extreme	17	1.278	-2.229	2.229	-1.278	16.142	22.027	44.445	2	-108.658	1.991	3.000	44.05
4008	NESC Extreme	18	-0.216	-2.625	1.679	-2.118	23.542	23.014	67.725	3	-134.519	2.035	3.000	46.03
4008	NESC Extreme	19	-1.679	-2.118	0.216	-2.625	23.542	23.007	67.704	3	-134.519	2.035	3.000	46.01
4008	NESC Extreme	20	-2.229	-1.278	-1.278	-2.229	16.142	22.002	44.394	2	-108.569	1.990	3.000	44.00
4008	NESC Extreme	21	-2.625	0.216	-2.118	-1.679	23.542	6.195	18.231	3	-77.983	1.056	3.000	12.39
4008	NESC Extreme	22	-2.118	1.679	-2.625	-0.216	23.542	6.761	19.896	3	82.621	1.103	3.000	13.52
4008	NESC Extreme	23	-1.278	2.229	-2.229	1.278	16.142	23.092	46.594	2	113.174	2.039	3.000	46.18
4008	NESC Extreme	24	0.216	2.625	-1.679	2.118	23.542	23.834	70.138	3	139.035	2.071	3.000	47.67

4008	NESC Extreme Ice w/ Wind	1	2.272	1.454	0.450	2.506	25.252	12.478	39.386	3	59.068	1.499	3.000	24.96
4008	NESC Extreme Ice w/ Wind	2	2.506	0.450	1.454	2.272	25.252	8.079	25.502	3	50.937	1.206	3.000	16.16
4008	NESC Extreme Ice w/ Wind	3	2.395	-1.073	2.395	1.073	25.762	2.890	9.308	3	22.004	0.721	3.000	5.78
4008	NESC Extreme Ice w/ Wind	4	1.454	-2.272	2.506	-0.450	25.252	6.133	19.358	3	-42.759	1.051	3.000	12.27
4008	NESC Extreme Ice w/ Wind	5	0.450	-2.506	2.272	-1.454	25.252	10.516	33.193	3	-50.834	1.376	3.000	21.03
4008	NESC Extreme Ice w/ Wind	6	-1.073	-2.395	1.073	-2.395	25.762	12.826	41.302	3	-53.646	1.519	3.000	25.65
4008	NESC Extreme Ice w/ Wind	7	-2.272	-1.454	-0.450	-2.506	25.252	10.491	33.115	3	-50.771	1.374	3.000	20.98
4008	NESC Extreme Ice w/ Wind	8	-2.506	-0.450	-1.454	-2.272	25.252	6.093	19.231	3	-42.640	1.047	3.000	12.19
4008	NESC Extreme Ice w/ Wind	9	-2.395	1.073	-2.395	-1.073	25.762	2.913	9.379	3	22.195	0.724	3.000	5.83
4008	NESC Extreme Ice w/ Wind	10	-1.454	2.272	-2.506	0.450	25.252	8.119	25.628	3	51.056	1.209	3.000	16.24
4008	NESC Extreme Ice w/ Wind	11	-0.450	2.506	-2.272	1.454	25.252	12.503	39.464	3	59.131	1.500	3.000	25.01
4008	NESC Extreme Ice w/ Wind	12	1.073	2.395	-1.073	2.395	25.762	14.869	47.883	3	61.943	1.636	3.000	29.74
4008	NESC Extreme Ice w/ Wind	13	1.679	2.118	-0.216	2.625	23.542	10.645	31.325	3	61.943	1.384	3.000	21.29
4008	NESC Extreme Ice w/ Wind	14	2.229	1.278	1.278	2.229	16.142	10.489	21.164	2	50.937	1.374	3.000	20.98
4008	NESC Extreme Ice w/ Wind	15	2.625	-0.216	2.118	1.679	23.542	3.414	10.047	3	37.998	0.784	3.000	6.83
4008	NESC Extreme Ice w/ Wind	16	2.118	-1.679	2.625	0.216	23.542	2.427	7.143	3	-29.864	0.661	3.000	4.85
4008	NESC Extreme Ice w/ Wind	17	1.278	-2.229	2.229	-1.278	16.142	8.565	17.282	2	-42.759	1.242	3.000	17.13
4008	NESC Extreme Ice w/ Wind	18	-0.216	-2.625	1.679	-2.118	23.542	9.148	26.919	3	-53.646	1.283	3.000	18.30
4008	NESC Extreme Ice w/ Wind	19	-1.679	-2.118	0.216	-2.625	23.542	9.138	26.892	3	-53.646	1.283	3.000	18.28
4008	NESC Extreme Ice w/ Wind	20	-2.229	-1.278	-1.278	-2.229	16.142	8.532	17.215	2	-42.640	1.239	3.000	17.06
4008	NESC Extreme Ice w/ Wind	21	-2.625	0.216	-2.118	-1.679	23.542	2.417	7.113	3	-29.701	0.660	3.000	4.83
4008	NESC Extreme Ice w/ Wind	22	-2.118	1.679	-2.625	-0.216	23.542	3.449	10.148	3	38.161	0.788	3.000	6.90
4008	NESC Extreme Ice w/ Wind	23	-1.278	2.229	-2.229	1.278	16.142	10.522	21.231	2	51.056	1.376	3.000	21.04
4008	NESC Extreme Ice w/ Wind	24	0.216	2.625	-1.679	2.118	23.542	10.654	31.352	3	61.943	1.385	3.000	21.31

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	33.54	NESC Extreme Ice w/ Wind	1	50.3
Davit2	37.90	NESC Extreme Ice w/ Wind	1	50.3
Davit3	41.62	NESC Heavy	1	260.4
Davit4	45.91	NESC Heavy	1	260.4
Davit5	41.69	NESC Heavy	1	260.4
Davit6	45.95	NESC Heavy	1	260.4
Davit7	41.78	NESC Heavy	1	260.4
Davit8	46.00	NESC Heavy	1	260.4

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	46.00	Davit8	Tubular Davit
NESC Extreme	66.65	4008	Base Plate
NESC Extreme Ice w/ Wind	42.03	Davit8	Tubular Davit

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	35.11	4008	23
NESC Extreme	65.95	4008	23
NESC Extreme Ice w/ Wind	29.64	4008	23

Summary of Base Plate Usages by Load Case:

Load Case	Pole Bend Label	Length Line	Vertical Load	X Moment	Y Moment	Bending Stress	Bolt Moment	# Bolts Acting On	Max Bolt Load For	Minimum Plate	Usage

	#	(in)	(kips)	(ft-k)	(ft-k)	(ksi)	Sum (ft-k)	Bend Line (kips)	Bend Line (in)	Thickness %
NESC Heavy	4008	12 25.762	95.230	1942.493	-6.855	18.082	58.228	3	75.334	1.804	36.16
NESC Extreme	4008	12 25.762	45.158	3764.756	-2.080	33.327	107.324	3	139.035	2.449	66.65
NESC Extreme Ice w/ Wind	4008	12 25.762	82.970	1590.773	-2.772	14.869	47.883	3	61.943	1.636	29.74

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Tubular Usage %	Davit Label	Segment Number
NESC Heavy	46.00	Davit8	1
NESC Extreme	22.56	Davit8	1
NESC Extreme Ice w/ Wind	42.03	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.39	NESC Extreme Ice w/ Wind	0.0
Clamp2	Clamp	3.39	NESC Extreme Ice w/ Wind	0.0
Clamp3	Clamp	7.91	NESC Heavy	0.0
Clamp4	Clamp	7.91	NESC Heavy	0.0
Clamp5	Clamp	7.91	NESC Heavy	0.0
Clamp6	Clamp	7.91	NESC Heavy	0.0
Clamp7	Clamp	7.91	NESC Heavy	0.0
Clamp8	Clamp	7.91	NESC Heavy	0.0
Clamp9	Clamp	1.15	NESC Heavy	0.0
Clamp10	Clamp	1.15	NESC Heavy	0.0
Clamp11	Clamp	1.15	NESC Heavy	0.0
Clamp12	Clamp	1.15	NESC Heavy	0.0
Clamp13	Clamp	1.15	NESC Heavy	0.0
Clamp14	Clamp	1.15	NESC Heavy	0.0
Clamp15	Clamp	1.15	NESC Heavy	0.0
Clamp16	Clamp	1.15	NESC Heavy	0.0
Clamp17	Clamp	1.15	NESC Heavy	0.0
Clamp18	Clamp	1.15	NESC Heavy	0.0
Clamp19	Clamp	1.15	NESC Heavy	0.0
Clamp20	Clamp	1.15	NESC Heavy	0.0
Clamp21	Clamp	7.85	NESC Heavy	0.0
Clamp22	Clamp	6.29	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	Clamp1	Clamp	Davit1:End	0.000	1.430	2.200	2.624
NESC Heavy	Clamp2	Clamp	Davit2:End	0.000	1.430	2.200	2.624
NESC Heavy	Clamp3	Clamp	Davit3:End	0.000	2.440	5.840	6.329
NESC Heavy	Clamp4	Clamp	Davit4:End	0.000	2.440	5.840	6.329
NESC Heavy	Clamp5	Clamp	Davit5:End	0.000	2.440	5.840	6.329
NESC Heavy	Clamp6	Clamp	Davit6:End	0.000	2.440	5.840	6.329
NESC Heavy	Clamp7	Clamp	Davit7:End	0.000	2.440	5.840	6.329
NESC Heavy	Clamp8	Clamp	Davit8:End	0.000	2.440	5.840	6.329
NESC Heavy	Clamp9	Clamp	4008:WVGD1	0.000	0.000	0.920	0.920
NESC Heavy	Clamp10	Clamp	4008:WVGD2	0.000	0.000	0.920	0.920
NESC Heavy	Clamp11	Clamp	4008:WVGD3	0.000	0.000	0.920	0.920
NESC Heavy	Clamp12	Clamp	4008:WVGD4	0.000	0.000	0.920	0.920
NESC Heavy	Clamp13	Clamp	4008:WVGD5	0.000	0.000	0.920	0.920
NESC Heavy	Clamp14	Clamp	4008:WVGD6	0.000	0.000	0.920	0.920

NESC Heavy	Clamp15	Clamp	4008:WVGD7	0.000	0.000	0.920	0.920
NESC Heavy	Clamp16	Clamp	4008:WVGD8	0.000	0.000	0.920	0.920
NESC Heavy	Clamp17	Clamp	4008:WVGD9	0.000	0.000	0.920	0.920
NESC Heavy	Clamp18	Clamp	4008:WVGD10	0.000	0.000	0.920	0.920
NESC Heavy	Clamp19	Clamp	4008:WVGD11	0.000	0.000	0.920	0.920
NESC Heavy	Clamp20	Clamp	4008:WVGD12	0.000	0.000	0.920	0.920
NESC Heavy	Clamp21	Clamp	4008:AT&T	0.000	1.532	6.089	6.279
NESC Heavy	Clamp22	Clamp	4008:TMobile	0.000	0.820	4.967	5.034
NESC Extreme	Clamp1	Clamp	Davit1:End	0.000	1.780	0.660	1.898
NESC Extreme	Clamp2	Clamp	Davit2:End	0.000	1.780	0.660	1.898
NESC Extreme	Clamp3	Clamp	Davit3:End	0.000	4.070	2.530	4.792
NESC Extreme	Clamp4	Clamp	Davit4:End	0.000	4.070	2.530	4.792
NESC Extreme	Clamp5	Clamp	Davit5:End	0.000	4.070	2.530	4.792
NESC Extreme	Clamp6	Clamp	Davit6:End	0.000	4.070	2.530	4.792
NESC Extreme	Clamp7	Clamp	Davit7:End	0.000	4.070	2.530	4.792
NESC Extreme	Clamp8	Clamp	Davit8:End	0.000	4.070	2.530	4.792
NESC Extreme	Clamp9	Clamp	4008:WVGD1	0.000	0.000	0.250	0.250
NESC Extreme	Clamp10	Clamp	4008:WVGD2	0.000	0.000	0.250	0.250
NESC Extreme	Clamp11	Clamp	4008:WVGD3	0.000	0.000	0.250	0.250
NESC Extreme	Clamp12	Clamp	4008:WVGD4	0.000	0.000	0.250	0.250
NESC Extreme	Clamp13	Clamp	4008:WVGD5	0.000	0.000	0.250	0.250
NESC Extreme	Clamp14	Clamp	4008:WVGD6	0.000	0.000	0.250	0.250
NESC Extreme	Clamp15	Clamp	4008:WVGD7	0.000	0.000	0.250	0.250
NESC Extreme	Clamp16	Clamp	4008:WVGD8	0.000	0.000	0.250	0.250
NESC Extreme	Clamp17	Clamp	4008:WVGD9	0.000	0.000	0.250	0.250
NESC Extreme	Clamp18	Clamp	4008:WVGD10	0.000	0.000	0.250	0.250
NESC Extreme	Clamp19	Clamp	4008:WVGD11	0.000	0.000	0.250	0.250
NESC Extreme	Clamp20	Clamp	4008:WVGD12	0.000	0.000	0.250	0.250
NESC Extreme	Clamp21	Clamp	4008:AT&T	0.000	5.678	2.609	6.249
NESC Extreme	Clamp22	Clamp	4008:TMobile	0.000	2.928	2.186	3.654
NESC Extreme Ice w/ Wind	Clamp1	Clamp	Davit1:End	0.000	1.260	2.400	2.711
NESC Extreme Ice w/ Wind	Clamp2	Clamp	Davit2:End	0.000	1.260	2.400	2.711
NESC Extreme Ice w/ Wind	Clamp3	Clamp	Davit3:End	0.000	1.960	5.410	5.754
NESC Extreme Ice w/ Wind	Clamp4	Clamp	Davit4:End	0.000	1.960	5.410	5.754
NESC Extreme Ice w/ Wind	Clamp5	Clamp	Davit5:End	0.000	1.960	5.410	5.754
NESC Extreme Ice w/ Wind	Clamp6	Clamp	Davit6:End	0.000	1.960	5.410	5.754
NESC Extreme Ice w/ Wind	Clamp7	Clamp	Davit7:End	0.000	1.960	5.410	5.754
NESC Extreme Ice w/ Wind	Clamp8	Clamp	Davit8:End	0.000	1.960	5.410	5.754
NESC Extreme Ice w/ Wind	Clamp9	Clamp	4008:WVGD1	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp10	Clamp	4008:WVGD2	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp11	Clamp	4008:WVGD3	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp12	Clamp	4008:WVGD4	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp13	Clamp	4008:WVGD5	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp14	Clamp	4008:WVGD6	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp15	Clamp	4008:WVGD7	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp16	Clamp	4008:WVGD8	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp17	Clamp	4008:WVGD9	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp18	Clamp	4008:WVGD10	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp19	Clamp	4008:WVGD11	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp20	Clamp	4008:WVGD12	0.000	0.000	0.850	0.850
NESC Extreme Ice w/ Wind	Clamp21	Clamp	4008:AT&T	0.000	1.473	5.813	5.997
NESC Extreme Ice w/ Wind	Clamp22	Clamp	4008:TMobile	0.000	0.871	4.883	4.960

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)
NESC Heavy	19.852	0.000	61.536	1615.776	-0.000
NESC Extreme	36.586	0.000	24.295	3107.764	-0.000
NESC Extreme Ice w/ Wind	16.624	0.000	58.156	1369.688	-0.000

```
*** Weight of structure (lbs):
    Weight of Tubular Davit Arms:      1663.2
    Weight of Steel Poles:            20879.9
    Total:                            22543.1

*** End of Report
```

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 139 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 20$ (User Input)

Bolt "Column" Distance = $l := 3.0 \cdot in$ (User Input)

Bolt Ultimate Strength = $F_u := 100 \cdot ksi$ (User Input)

Bolt Yeild Strength= $F_y := 75 \cdot ksi$ (User Input)

Bolt Modulus = $E := 29000 \cdot ksi$ (User Input)

Diameter of Anchor Bolts = $D := 2.25 \cdot in$ (User Input)

Threads per Inch = $n := 4.5$ (User Input)

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Bolt Tension Check:

Allowable Tensile Force (Net Area) = $T_{ALL.Net} := 1.0 \cdot \left(A_n \cdot F_y\right) = 243.576 \cdot kips$

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 57.07 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Caisson Foundation:

Input Data:

Shear Force =	$S := 48.6k \cdot 1.1 = 53.5 \cdot k$	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	$M := 3764ft \cdot k \cdot 1.1 = 4140 \cdot ft \cdot k$	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	$A1 := 45.2k \cdot 1.1 = 49.7 \cdot k$	*USER INPUT-FROM PLS-Pole*
Bending Moment =	$Mu := 4408.9ft \cdot k$	*USER INPUT–FROM LPILE*
Moment Capacity =	$Mn := 9836.6ft \cdot k$	*USER INPUT–FROM LPILE*
Foundation Diameter =	$d := 8ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 27.5ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 30$	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3.5ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 2.2$

Factor of Safety Required = $FS_{reqd} := 1.3$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

$FOSCheck = "OK"$

Check Axial Capacity:

Concrete Weight = $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 203.6 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 253.3 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 50.27ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 24202.5 \cdot kips$

$AxialCheck := if(AT \leq Po, "OK", "NO GOOD")$

$AxialCheck = "OK"$

```
================================================================================

                LPILE Plus for Windows, Version 5.0 (5.0.39)

               Analysis of Individual Piles and Drilled Shafts
              Subjected to Lateral Loading Using the p-y Method

                       (c) 1985-2007 by Ensoft, Inc.
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This program is licensed to:

TJL
Centek Engineering Inc

Path to file locations: J:\Jobs\1201400.WI\CO.02 - CT2255 - 4286 WHITNEY AVENUE, HAMDEN, CT\Rev (2)\Calcs\L-Pile\
Name of input data file: Caisson Analysis.lpd
Name of output file: Caisson Analysis.lpo
Name of plot output file: Caisson Analysis.lpp
Name of runtime file: Caisson Analysis.lpr

Time and Date of Analysis

Date: April 27, 2012 Time: 14:59:53

Problem Title

12014.CO2 / CT2255 / CL&P # 4008

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment, and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 330.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X	Pile Diameter	Moment of Inertia	Pile Area	Modulus of Elasticity

	in	in	in**4	Sq.in	lbs/Sq.in
1	0.0000	96.00000000	4169220.	7238.2000	3300000.
2	330.0000	96.00000000	4169220.	7238.2000	3300000.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 5 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 12.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 12.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 228.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 228.000 in
Distance from top of pile to bottom of layer = 246.000 in
p-y subgrade modulus k for top of soil layer = 60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 60.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 246.000 in
Distance from top of pile to bottom of layer = 294.000 in
p-y subgrade modulus k for top of soil layer = 60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 60.000 lbs/in**3

Layer 5 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 294.000 in
Distance from top of pile to bottom of layer = 414.000 in
p-y subgrade modulus k for top of soil layer = 60.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 60.000 lbs/in**3

(Depth of lowest layer extends 84.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 10 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	6.00	.05800
2	48.00	.05800
3	48.00	.07200
4	228.00	.07200
5	228.00	.03600
6	246.00	.03600
7	246.00	.03600
8	294.00	.03600
9	294.00	.03600
10	414.00	.03600

Shear Strength of Soils

Shear strength parameters with depth defined using 10 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	.00000	20.00	------	------
2	48.000	.00000	20.00	------	------
3	48.000	.00000	32.00	------	------
4	228.000	.00000	32.00	------	------
5	228.000	.00000	32.00	------	------

6	246.000	.00000	32.00	------	------
7	246.000	.00000	32.00	------	------
8	294.000	.00000	32.00	------	------
9	294.000	.00000	32.00	------	------
10	414.000	.00000	32.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 53482.000 lbs
Bending moment at pile head = 49694832.000 in-lbs
Axial load at pile head = 49676.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 96.0000 in

Material Properties:

Compressive Strength of Concrete = 3.500 kip/in**2
Yield Stress of Reinforcement = 60. kip/in**2
Modulus of Elasticity of Reinforcement = 29000. kip/in**2
Number of Reinforcing Bars = 30
Area of Single Bar = 1.56000 in**2
Number of Rows of Reinforcing Bars = 15
Area of Steel = 46.800 in**2
Area of Shaft = 7238.229 in**2
Percentage of Steel Reinforcement = .647 percent
Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 24202.50 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	3.120	43.759
2	3.120	41.846
3	3.120	38.105
4	3.120	32.698
5	3.120	25.863
6	3.120	17.896
7	3.120	9.148
8	3.120	0.000
9	3.120	-9.148
10	3.120	-17.896

11	3.120	-25.863
12	3.120	-32.698
13	3.120	-38.105
14	3.120	-41.846
15	3.120	-43.759

Axial Thrust Force = 49676.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
9655034.	1.544805E+13	6.250000E-07	.00003203	51.24752569	106.28933	851.99261
19207841.	1.536627E+13	.00000125	.00006214	49.71426630	204.35702	1648.40458
28658484.	1.528452E+13	.00000188	.00009230	49.22545481	300.85389	2446.02774
38003947.	1.520158E+13	.00000250	.00012241	48.96424627	395.50738	3242.43270
38003947.	1.216126E+13	.00000313	.00007689	24.60404921	247.66695	6085.91410
38003947.	1.013439E+13	.00000375	.00009068	24.18114996	290.78705	7349.08721
38003947.	8.686616E+12	.00000438	.00010473	23.93821478	334.39279	8604.75748
38003947.	7.600789E+12	.00000500	.00011850	23.70026636	376.75538	9868.51107
38003947.	6.756257E+12	.00000563	.00013229	23.51845407	418.83322	11131.73308
38003947.	6.080631E+12	.00000625	.00014610	23.37595510	460.62522	12394.42025
38003947.	5.527847E+12	.00000688	.00015993	23.26206923	502.13043	13656.56828
38003947.	5.067193E+12	.00000750	.00017377	23.16965818	543.34773	14918.17388
38003947.	4.677409E+12	.00000813	.00018764	23.09378672	584.27619	16179.23226
38003947.	4.343308E+12	.00000875	.00020152	23.03092718	624.91476	17439.73919
38003947.	4.053754E+12	.00000938	.00021542	22.97848749	665.26225	18699.69189
38003947.	3.800395E+12	.00001000	.00022935	22.93453074	705.31767	19959.08547
38003947.	3.576842E+12	.00001063	.00024329	22.89757490	745.07998	21217.91533
38003947.	3.378129E+12	.00001125	.00025725	22.86646128	784.54791	22476.17882
38003947.	3.200332E+12	.00001188	.00027123	22.84028578	823.72057	23733.86960
38003947.	3.040316E+12	.00001250	.00028523	22.81831598	862.59669	24990.98469
38003947.	2.895539E+12	.00001313	.00029925	22.79996538	901.17526	26247.51862
39004961.	2.836724E+12	.00001375	.00031329	22.78475046	939.45506	27503.46741
40695218.	2.830972E+12	.00001438	.00032735	22.77227068	977.43486	28758.82753
42383499.	2.825567E+12	.00001500	.00034143	22.76219988	1015.11369	30013.59213
44069781.	2.820466E+12	.00001563	.00035554	22.75425482	1052.49018	31267.75857
45754054.	2.815634E+12	.00001625	.00036966	22.74820089	1089.56316	32521.32183
47436311.	2.811041E+12	.00001688	.00038380	22.74384069	1126.33155	33774.27567
49116533.	2.806659E+12	.00001750	.00039797	22.74099970	1162.79400	35026.61658
50794705.	2.802467E+12	.00001813	.00041215	22.73952913	1198.94923	36278.34013
52470827.	2.798444E+12	.00001875	.00042636	22.73930597	1234.79622	37529.43872
54144868.	2.794574E+12	.00001938	.00044059	22.74021292	1270.33341	38779.91043
55816824.	2.790841E+12	.00002000	.00045484	22.74215555	1305.55967	40029.74855
57486687.	2.787233E+12	.00002063	.00046912	22.74505091	1340.47382	41278.94641
59154431.	2.783738E+12	.00002125	.00048341	22.74881887	1375.07430	42527.50156
60820050.	2.780345E+12	.00002188	.00049773	22.75339651	1409.35996	43775.40649
62483527.	2.777046E+12	.00002250	.00051207	22.75872374	1443.32940	45022.65638
64144843.	2.773831E+12	.00002313	.00052643	22.76474619	1476.98116	46269.24691
65803993.	2.770694E+12	.00002375	.00054082	22.77142096	1510.31407	47515.16986
67460953.	2.767629E+12	.00002438	.00055523	22.77870226	1543.32653	48760.42209
70768256.	2.761688E+12	.00002563	.00058412	22.79494429	1608.38476	51248.88670
74066641.	2.755968E+12	.00002688	.00061311	22.81321764	1672.14454	53734.59060
77355964.	2.750434E+12	.00002813	.00064219	22.83330774	1734.59381	56217.48789
80636098.	2.745059E+12	.00002938	.00067137	22.85504293	1795.72050	58697.52724
83649868.	2.731424E+12	.00003063	.00069989	22.85357237	1853.93258	60000.00000
85948258.	2.696416E+12	.00003188	.00072638	22.78834963	1906.52515	60000.00000
87946122.	2.654977E+12	.00003313	.00075201	22.70211554	1956.14482	60000.00000
89631653.	2.607466E+12	.00003438	.00077671	22.59506750	2002.77501	60000.00000
91287190.	2.562447E+12	.00003563	.00080137	22.49469137	2048.25617	60000.00000
92712609.	2.514240E+12	.00003688	.00082600	22.40000010	2092.57135	60000.00000
93814316.	2.460703E+12	.00003813	.00085062	22.31127691	2135.78426	60000.00000
95045490.	2.413854E+12	.00003938	.00087362	22.18714571	2175.06437	60000.00000
96091577.	2.365331E+12	.00004063	.00089586	22.05195379	2212.09497	60000.00000
96957300.	2.315398E+12	.00004188	.00091735	21.90694857	2246.98832	60000.00000
97820242.	2.268295E+12	.00004313	.00093889	21.77135611	2281.13624	60000.00000
98680390.	2.223783E+12	.00004438	.00096047	21.64439249	2314.53434	60000.00000
99537695.	2.181648E+12	.00004563	.00098209	21.52535391	2347.17774	60000.00000
1.003187E+08	2.140131E+12	.00004688	.00100337	21.40528822	2378.46733	60000.00000
1.008948E+08	2.096514E+12	.00004813	.00102362	21.26994467	2407.41974	60000.00000
1.014686E+08	2.055061E+12	.00004938	.00104390	21.14221144	2435.70614	60000.00000
1.020403E+08	2.015610E+12	.00005063	.00106422	21.02153349	2463.32294	60000.00000
1.026097E+08	1.978018E+12	.00005188	.00108457	20.90740728	2490.26634	60000.00000
1.026818E+08	1.932834E+12	.00005313	.00110500	20.79999876	2516.57662	60000.00000
1.038151E+08	1.909243E+12	.00005438	.00113027	20.78666353	2548.41883	60000.00000
1.043683E+08	1.876284E+12	.00005563	.00115019	20.67749548	2572.43068	60000.00000
1.048760E+08	1.843973E+12	.00005688	.00116981	20.56816149	2595.40400	60000.00000
1.052257E+08	1.810334E+12	.00005813	.00118832	20.44421911	2616.37795	60000.00000
1.055738E+08	1.778084E+12	.00005938	.00120686	20.32603884	2636.79288	60000.00000
1.059202E+08	1.747138E+12	.00006063	.00122543	20.21327162	2656.64600	60000.00000
1.062651E+08	1.717416E+12	.00006188	.00124403	20.10559130	2675.93407	60000.00000
1.066083E+08	1.688844E+12	.00006313	.00126267	20.00270033	2694.65404	60000.00000
1.069499E+08	1.661357E+12	.00006438	.00128134	19.90432405	2712.80277	60000.00000
1.072898E+08	1.634892E+12	.00006563	.00130004	19.81020784	2730.37704	60000.00000
1.076280E+08	1.609390E+12	.00006688	.00131878	19.72011709	2747.37364	60000.00000
1.079645E+08	1.584800E+12	.00006813	.00133755	19.63383150	2763.78913	60000.00000
1.082993E+08	1.561071E+12	.00006938	.00135636	19.55115366	2779.62051	60000.00000

1.086324E+08	1.538158E+12	.00007063	.00137520	19.47189474	2794.86432	60000.00000
1.089638E+08	1.516018E+12	.00007188	.00139408	19.39588022	2809.51719	60000.00000
1.092066E+08	1.493424E+12	.00007313	.00141213	19.31119680	2822.91549	60000.00000
1.094077E+08	1.471028E+12	.00007438	.00142982	19.22440481	2835.47689	60000.00000
1.099125E+08	1.429757E+12	.00007688	.00147341	19.16636324	2864.43951	60000.00000
1.102820E+08	1.389380E+12	.00007938	.00150738	18.99065924	2884.41056	60000.00000
1.106467E+08	1.351411E+12	.00008188	.00154147	18.82713175	2902.45682	60000.00000
1.110065E+08	1.315633E+12	.00008438	.00157568	18.67471647	2918.55681	60000.00000
1.113613E+08	1.281857E+12	.00008688	.00161001	18.53247786	2932.68884	60000.00000
1.117110E+08	1.249913E+12	.00008938	.00164446	18.39958048	2944.83047	60000.00000
1.120556E+08	1.219652E+12	.00009188	.00167904	18.27528620	2954.95889	60000.00000
1.123949E+08	1.190940E+12	.00009438	.00171375	18.15893412	2963.05064	60000.00000
1.127290E+08	1.163654E+12	.00009688	.00174859	18.04993200	2969.08161	60000.00000
1.130381E+08	1.137490E+12	.00009938	.00178323	17.94444323	2972.99815	60000.00000
1.132167E+08	1.111330E+12	.00010188	.00181589	17.82471228	2974.78968	60000.00000
1.133868E+08	1.086341E+12	.00010438	.00184867	17.71182489	2971.50358	60000.00000
1.135505E+08	1.062461E+12	.00010688	.00188157	17.60532045	2964.78079	60000.00000
1.135505E+08	1.038176E+12	.00010938	.00192500	17.59999895	2967.70697	60000.00000
1.139798E+08	1.018814E+12	.00011188	.00196194	17.53691053	2971.98747	60000.00000
1.141227E+08	9.977937E+11	.00011438	.00199349	17.42942762	2974.11840	60000.00000
1.142639E+08	9.776586E+11	.00011688	.00202516	17.32757235	2974.98090	60000.00000
1.144012E+08	9.583347E+11	.00011938	.00205706	17.23193407	2970.33069	60000.00000
1.145370E+08	9.397907E+11	.00012188	.00208908	17.14118814	2964.66902	60000.00000
1.146716E+08	9.219831E+11	.00012438	.00212120	17.05483961	2959.70700	60000.00000
1.148052E+08	9.048683E+11	.00012688	.00215340	16.97263956	2964.64386	60000.00000
1.149376E+08	8.884062E+11	.00012938	.00218571	16.89436197	2968.63671	60000.00000
1.150688E+08	8.725593E+11	.00013188	.00221811	16.81979227	2971.67313	60000.00000
1.151987E+08	8.572930E+11	.00013438	.00225061	16.74873304	2973.74046	60000.00000
1.153276E+08	8.425757E+11	.00013688	.00228321	16.68100977	2974.82577	60000.00000
1.154540E+08	8.283693E+11	.00013938	.00231599	16.61694288	2972.95822	60000.00000
1.155779E+08	8.146462E+11	.00014188	.00234894	16.55640364	2967.96385	60000.00000
1.157012E+08	8.013933E+11	.00014438	.00238196	16.49845648	2962.95392	60000.00000
1.158237E+08	7.885866E+11	.00014688	.00241506	16.44297552	2957.92822	60000.00000
1.159454E+08	7.762036E+11	.00014938	.00244823	16.38984346	2956.65015	60000.00000
1.160322E+08	7.639980E+11	.00015188	.00248026	16.33093786	2961.15059	60000.00000
1.160859E+08	7.519737E+11	.00015438	.00251120	16.26686811	2964.80263	60000.00000
1.161392E+08	7.403298E+11	.00015688	.00254220	16.20523310	2967.90703	60000.00000
1.161921E+08	7.290482E+11	.00015938	.00257326	16.14591837	2970.45769	60000.00000
1.162444E+08	7.181122E+11	.00016188	.00260438	16.08882380	2972.44858	60000.00000
1.162963E+08	7.075059E+11	.00016438	.00263556	16.03384924	2973.87345	60000.00000
1.165242E+08	6.982724E+11	.00016688	.00267000	16.00000048	2974.82018	60000.00000
1.170434E+08	6.910311E+11	.00016938	.00271000	16.00000048	2972.30248	60000.00000
1.175453E+08	6.839000E+11	.00017188	.00275000	16.00000048	2966.64520	60000.00000
1.180396E+08	6.769294E+11	.00017438	.00279000	16.00000048	2960.98792	60000.00000
1.180396E+08	6.580603E+11	.00017938	.00285802	15.93323278	2952.27930	60000.00000
1.180396E+08	6.402146E+11	.00018438	.00292108	15.84316778	2951.48117	60000.00000
1.180396E+08	6.233112E+11	.00018938	.00298434	15.75891352	2959.00364	60000.00000
1.180396E+08	6.072775E+11	.00019438	.00304781	15.68005228	2965.12123	60000.00000
1.180396E+08	5.920480E+11	.00019938	.00311149	15.60620356	2969.80167	60000.00000
1.180396E+08	5.775636E+11	.00020438	.00317538	15.53703260	2973.01154	60000.00000
1.180396E+08	5.637711E+11	.00020938	.00323950	15.47223616	2974.71565	60000.00000
1.180396E+08	5.506219E+11	.00021438	.00330404	15.41243792	2972.51108	60000.00000
1.180396E+08	5.380721E+11	.00021938	.00336903	15.35740900	2966.20317	60000.00000
1.180396E+08	5.260816E+11	.00022438	.00343414	15.30536413	2959.86931	60000.00000
1.180396E+08	5.146139E+11	.00022938	.00350136	15.26479769	2953.07581	60000.00000
1.180396E+08	5.036355E+11	.00023438	.00357040	15.23372698	2945.88633	60000.00000
1.180396E+08	4.931157E+11	.00023938	.00363966	15.20484209	2938.65060	60000.00000
1.180396E+08	4.830264E+11	.00024438	.00370913	15.17803717	2939.72194	60000.00000
1.180396E+08	4.733416E+11	.00024938	.00377883	15.15322065	2948.60033	60000.00000
1.180396E+08	4.640376E+11	.00025438	.00384877	15.13030386	2956.25753	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 118039.56716 in-kip

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Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 53482.000 lbs
Specified moment at pile head = 49694832.000 in-lbs
Specified axial load at pile head = 49676.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment)condition.

Output Verification:

Computed forces and moments are within specified convergence limits.

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 53482.	M= 4.97E+07	49676.0000	1.0402	5.2907E+07	-333880.

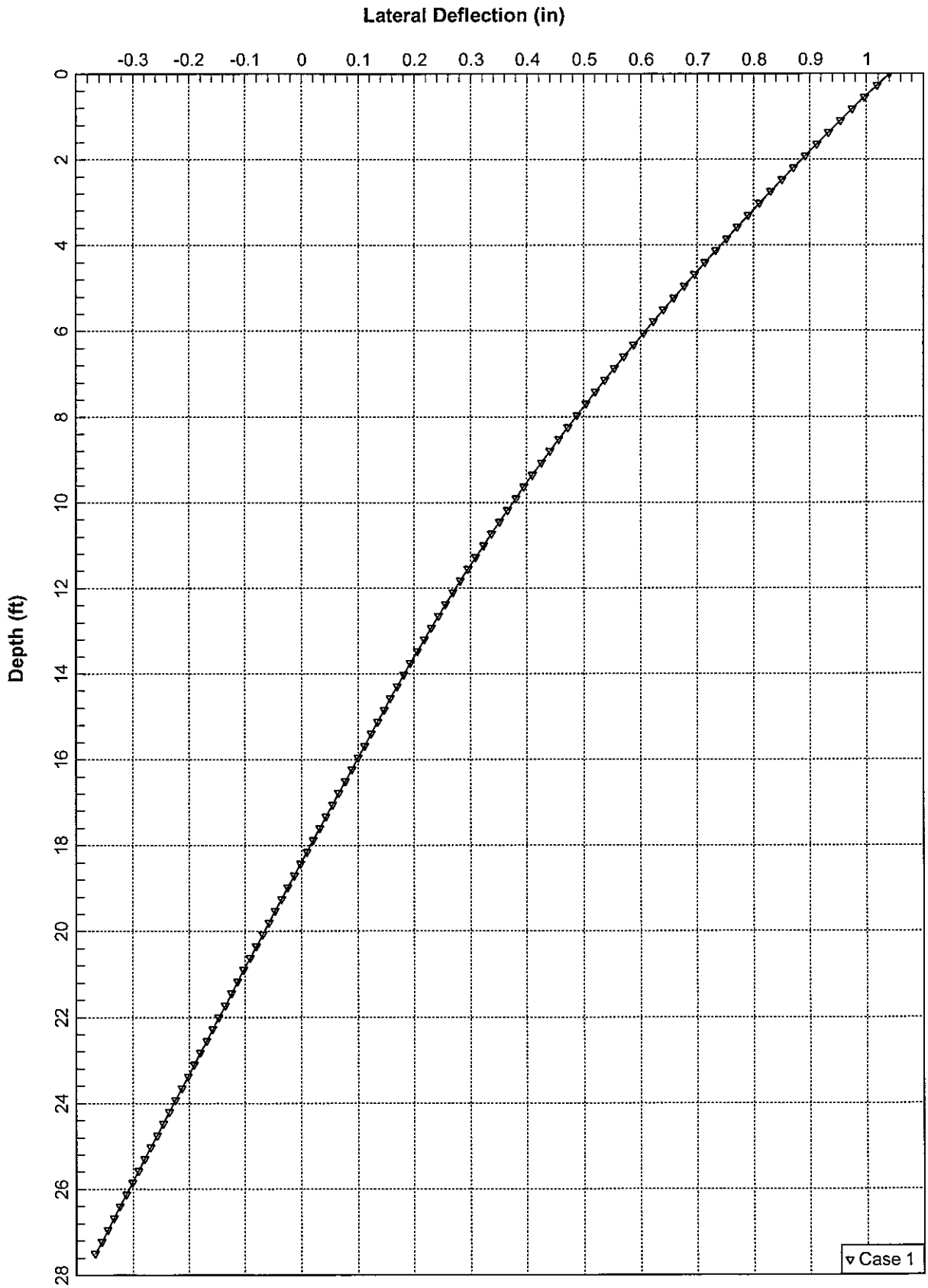
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

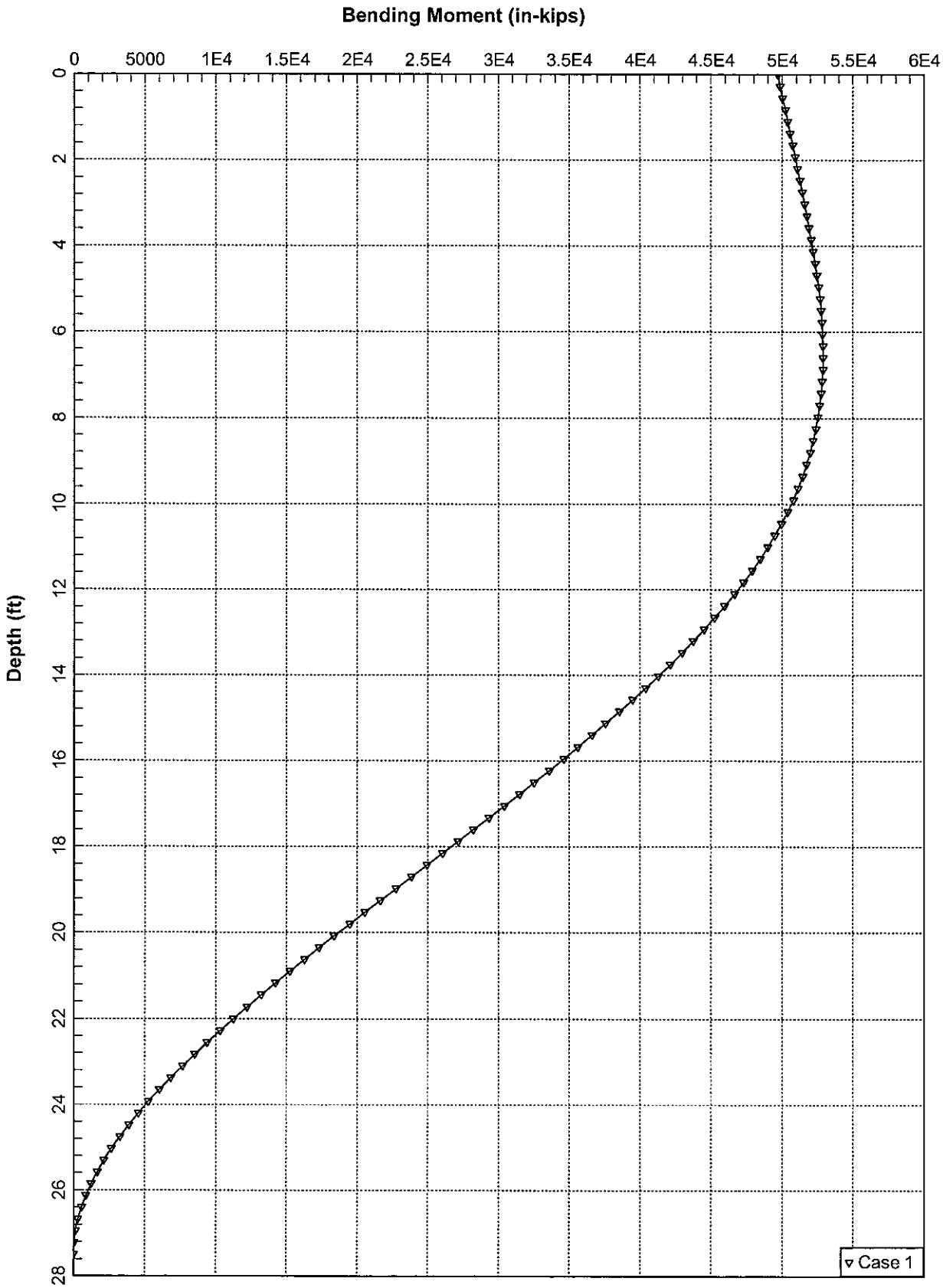
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00252813	5348.20008	1026611.	2115473.	4.060746E+08
.00761044	16099.68623	3090408.	2115473.	4.060746E+08
.01206227	25517.39894	4898181.	2115473.	4.060746E+08
.01522089	32199.37246	6180817.	2115473.	4.060746E+08
.01767090	37382.31377	7175706.	2115473.	4.060746E+08
.01967271	41617.08517	7988589.	2115473.	4.060746E+08
.02136522	45197.53338	8675873.	2115473.	4.060746E+08
.02283133	48299.05868	9271225.	2115473.	4.060746E+08
.02412454	51034.79789	9796362.	2115473.	4.060746E+08
.02528185	53482.00000	10266072.	2115431.	4.060650E+08

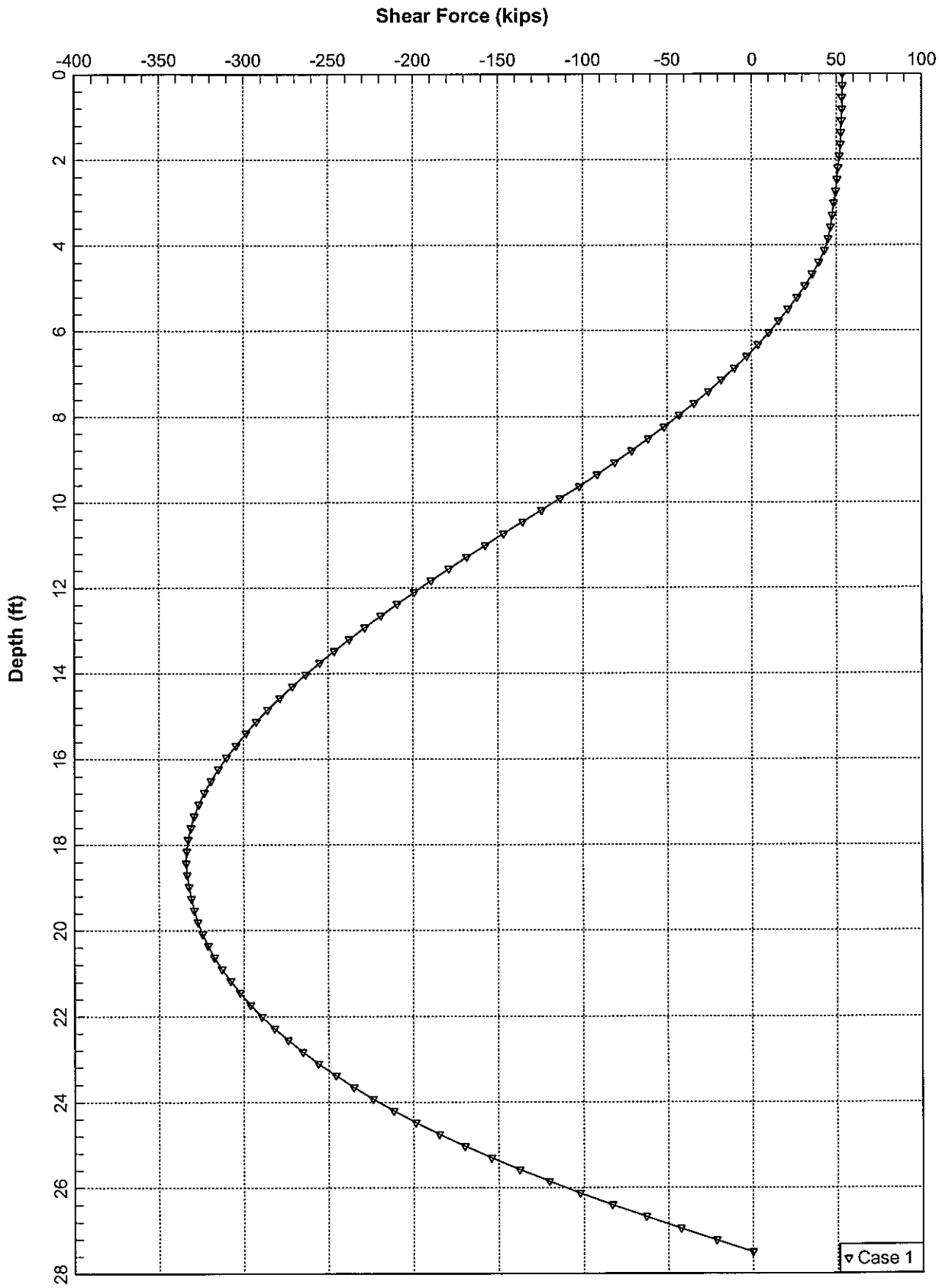
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00005308	21552.50582	4969483.	4.060746E+08	9.363093E+10
.00015991	64880.94662	14959635.	4.057464E+08	9.355318E+10
.00025384	102842.24148	23710461.	4.051511E+08	9.340830E+10
.00032068	129781.02428	29919270.	4.047010E+08	9.329838E+10
.00037266	150679.12154	34735197.	4.043315E+08	9.320822E+10
.00041538	167756.23120	38670096.	4.038630E+08	9.309593E+10
.00046441	182227.75242	41997005.	3.923843E+08	9.043060E+10
.00077846	196127.99961	44878905.	2.519434E+08	5.765085E+10
.00091211	208315.92400	47420921.	2.283885E+08	5.199023E+10
.00105445	219934.12701	49694832.	2.085772E+08	4.712870E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
5.5E4
6E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Shear Force (kips)
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CT2255	DATE:	3/21/2012 13:00	RF DESIGN ENG:	Evan Thibodeau	RF PERF ENG:	
ISSUE:	Preliminary	Approved? (Y/N)		RF DESIGN PHONE:	(603) 320-8556	RF PERF PHONE:	
REVISION:	V01	RF MANAGER:	Walt Saddig	RF DESIGN EMAIL:	et2267@att.com	RF PERF EMAIL:	
INITIATIVE / PROJECT:	LTE Wave 3 Prelim					TRIDENT:	
						GSM FREQUENCY:	850/
						UMTS FREQUENCY:	850/
						LTE FREQUENCY:	70
						I-PLAN JOB # 1:	
						I-PLAN JOB # 2:	
						I-PLAN JOB # 3:	
						I-PLAN JOB # 4:	

Section 2 - LOCATION INFORMATION

USID:		FA LOCATION CODE:	10035414	LOCATION NAME:		ORACLE PRJT # 1:	20513
REGION:	North East	MARKET CLUSTER:	New England	MARKET:	CT	ORACLE PRJT # 2:	
ADDRESS:.		CITY:		STATE:	CT	ORACLE PRJT # 3:	
ZIP CODE:		COUNTY:		MSA/RSA:		ORACLE PRJT # 4:	
LATITUDE (D-M-S):	" ' 0"	LONGITUDE (D-M-S):	" ' 0"	LAT (DEC. DEG.):		SEARCH RING NAME:	
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:						SEARCH RING ID:	
						BTA:	
						LONG (DEC. DEG.):	
						BORDER CELL WITH CONTOUR COORD:	
						AM STUDY REQ'D (Y/N):	
						FREQ COORD:	

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED:		CGSA LOSS:		PCS REDUCED - UPS ZIP:	
CGSA - MINOR FILING NEEDED:		CGSA EXT AGMT NEEDED:		PCS POPS REDUCED:	
CGSA - MAJOR FILING NEEDED:		CGSA SCORECARD UPDATED:			

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:		GROUND ELEVATION (ft):		STRUCTURE TYPE:		MKT LOCATION 850 MHZ CALL SIGN(S):	
ADDITIONAL REGULATORY?:		HEIGHT OVERALL (ft):		FCC ASR NUMBER:		MKT LOCATION 1900 MHZ CALL SIGN(S):	
SUB-LEASE RIGHTS?:		STRUCTURE HEIGHT (ft):				MKT LOCATION 700 MHZ CALL SIGN(S):	
LIGHTING TYPE:						MKT LOCATION AWS MHZ CALL SIGN(S):	

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
ALPHA								
BETA								
GAMMA								
DELTA								
EPSILON								
PSI								

Section 6 - RBS GENERAL INFORMATION

4-DIGIT SITE ID:		COW OR TOY?:	No	CELLULAR NETWORK:		DISASTER PRIORITY:
CELL SITE TYPE:	Sectorized	SITE TYPE:		OPS DISTRICT:		OPS ZONE:
BTS LOCATION ID:		ORIGINATING CO:		RF DISTRICT:		RF ZONE:

Section 7 - RBS SPECIFIC INFORMATION

	GSM RBSs	UMTS 1ST CARRIER RBSs	UMTS 2ND CARRIER RBSs	UMTS 3RD CARRIER RBSs	UMTS 4TH CARRIER RBSs	UMTS 5TH CARRIER RBSs
MSC						
BSC/RNC						
LAC						
RAC						
EQUIPMENT VENDOR						
EQUIPMENT TYPE						
LOCATION						
CABINET LOCATION						

Section 8 - RBS INDIVIDUAL INFORMATION

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	UMTS 5TH 850 RBS	UMTS 5TH 1900 RBS
CELL ID/BCF												
CTS COMMON ID												

Section 9 - SOFT SECTOR ID

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	UMTS 5TH 850 RBS	UMTS 5TH 1900 RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 10 - CID/SAC

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	UMTS 5TH 850 RBS	UMTS 5TH 1900 RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 11 - CURRENT RADIO COUNTS (Existing)

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	UMTS 5TH 850 RBS	UMTS 5TH 1900 RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 12 - CURRENT BASE BAND CONFIGURATION (Existing)

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet
# T1s						
LINK PROFILE						
RF Combining						
Fiber or Ethernet?						
Tx Board Model						
Tx Board QTY						
RAX/ECU Board Model						
RAX/ECU Board QTY						
BBU Board Model						
BBU Board QTY						
RRU - Type(Qty-Model)						
Fiber Jumper						
DC Cable						
DC/Fiber Dem. Box						
Bundled Fiber Cable						
Bundled DC Cable						

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	UMTS 5TH 850 RBS	UMTS 5TH 1900 RBS
ALPHA (OR OMNI)												
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												

Section 14 - NEW/PROPOSED BASE BAND CONFIGURATION

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet
# T1s						
LINK PROFILE						
RF Combining						
Fiber or Ethernet?						
Tx Board Model						
Tx Board QTY						
RAX/ECU Board Model						
RAX/ECU Board QTY						
BBU Board Model						
BBU Board QTY						
RRU - Type(Qty-Model)						
Fiber Jumper						
DC Cable						
DC/Fiber Dem. Box						
Bundled Fiber Cable						
Bundled DC Cable						

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

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx	TxRx-TxRx		
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850	GSM / 1900		
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A	N/A		
FEEDERS TYPE	1 5/8" - Andrew	1 5/8" - Andrew					1 5/8" - Andrew	1 5/8" - Andrew		
Feeder Length (feet)	130 '	130 '					130 '	130 '		
ANTENNA ATOLL										
ANTENNA MAKE - MODEL	7770						7770			
ANTENNA VENDOR	Powerwave						Powerwave			
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0						55.0 x 11.0 x 5.0			
ANTENNA WEIGHT	35						35			
ANTENNA GAIN										
AZIMUTH	30 °						30 °			
RADIATION CENTER (feet)	116 '						116 '			
ANTENNA TIP HEIGHT	118 '						118 '			
ELECTRICAL TILT (700/850/1900/AWS)	TBD	TBD					TBD	TBD		
MECHANICAL DOWNTILT	TBD						TBD			
FEEDER AMOUNT	2						2			
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)						1 / Powerwave / 7020 (DB)			
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)						2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A			
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA						LGP 12104 (1900 AND 850 Bypass TMA)			
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A			
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901						0 + 2 / Powerwave / LGP 21901			
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT		
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC		
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A		
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION	-14 °						-14 °			
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx	TxRx-TxRx		
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850	GSM / 1900		
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A	N/A		
FEEDERS TYPE	1 5/8" - Andrew	1 5/8" - Andrew					1 5/8" - Andrew	1 5/8" - Andrew		
Feeder Length (feet)	130 '	130 '					130 '	130 '		
ANTENNA ATOLL										
ANTENNA MAKE - MODEL	7770						7770			
ANTENNA VENDOR	Powerwave						Powerwave			
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0						55.0 x 11.0 x 5.0			
ANTENNA WEIGHT	35						35			
ANTENNA GAIN										
AZIMUTH	150 °						150 °			
RADIATION CENTER (feet)	116 '						116 '			
ANTENNA TIP HEIGHT	118 '						118 '			
ELECTRICAL TILT (700/850/1900/AWS)	TBD	TBD					TBD	TBD		
MECHANICAL DOWNTILT	TBD						TBD			
FEEDER AMOUNT	2						2			
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)						1 / Powerwave / 7020 (DB)			
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)						2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A			
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA						LGP 12104 (1900 AND 850 Bypass TMA)			
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A			
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901						0 + 2 / Powerwave / LGP 21901			
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT		
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC		
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A		
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION	-14 °						-14 °			
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx					TxRx-TxRx	TxRx-TxRx		
TECHNOLOGY	UMTS / 850	UMTS / 1900					GSM / 850	GSM / 1900		
RRH LOCATION (Top/Bottom/None)	N/A	N/A					N/A	N/A		
FEEDERS TYPE	1 5/8" - Andrew	1 5/8" - Andrew					1 5/8" - Andrew	1 5/8" - Andrew		
Feeder Length (feet)	130 '	130 '					130 '	130 '		
ANTENNA ATOLL										
ANTENNA MAKE - MODEL	7770						7770			
ANTENNA VENDOR	Powerwave						Powerwave			
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0						55.0 x 11.0 x 5.0			
ANTENNA WEIGHT	35						35			
ANTENNA GAIN										
AZIMUTH	270 °						270 °			
RADIATION CENTER (feet)	116 '						116 '			
ANTENNA TIP HEIGHT	118 '						118 '			
ELECTRICAL TILT (700/850/1900/AWS)	TBD	TBD					TBD	TBD		
MECHANICAL DOWNTILT	TBD						TBD			
FEEDER AMOUNT	2						2			
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)						1 / Powerwave / 7020 (DB)			
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)						2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A			
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA						LGP 12104 (1900 AND 850 Bypass TMA)			
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A			
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901						0 + 2 / Powerwave / LGP 21901			
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT		
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC		
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A		
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION	-14 °						-14 °			
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 15D - CURRENT SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

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

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx			TxRx-Rx	N/A	TxRx-TxRx	TxRx-TxRx		
TECHNOLOGY	UMTS / 850	UMTS / 1900			LTE / 700	N/A	GSM / 850	GSM / 1900		
RRH LOCATION (Top/Bottom/None)	N/A	N/A			BOTTOM	BOTTOM	N/A	N/A		
FEEDERS TYPE	1 5/8" - Andrew	1 5/8" - Andrew					1 5/8" - Andrew	1 5/8" - Andrew		
Feeder Length (feet)	130 '	130 '					130 '	130 '		
ANTENNA ATOLL										
ANTENNA MAKE - MODEL	7770				AM-X-CD-16-65-00T-RET		7770			
ANTENNA VENDOR	Powerwave				KMW		Powerwave			
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0				72.0 x 11.8 x 5.9		55.0 x 11.0 x 5.0			
ANTENNA WEIGHT	35				48.5		35			
ANTENNA GAIN										
AZIMUTH	20 °				20 °		20 °			
RADIATION CENTER (feet)	116 '				116 '		116 '			
ANTENNA TIP HEIGHT	118 '				119 '		118 '			
ELECTRICAL TILT (700/850/1900/AWS)	TBD	TBD			TBD		TBD	TBD		
MECHANICAL DOWNTILT	TBD				0 °		TBD			
FEEDER AMOUNT	2						2			
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)				N/A / KMW / Built-in RET Equipment		1 / Powerwave / 7020 (DB)			
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)				1 / CCI / DTMABP7819VG12A		2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A			
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA						LGP 12104 (1900 AND 850 Bypass TMA)			
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A			
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901				0 + 1 / CM1007-DBPXBC-003		0 + 2 / Powerwave / LGP 21901			
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT		
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC		
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A		
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION	-14 °				-14 °		-14 °			
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

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

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx			TxRx-Rx	N/A	TxRx-TxRx	TxRx-TxRx		
TECHNOLOGY	UMTS / 850	UMTS / 1900			LTE / 700	N/A	GSM / 850	GSM / 1900		
RRH LOCATION (Top/Bottom/None)	N/A	N/A			BOTTOM	BOTTOM	N/A	N/A		
FEEDERS TYPE	1 5/8" - Andrew	1 5/8" - Andrew					1 5/8" - Andrew	1 5/8" - Andrew		
Feeder Length (feet)	130 '	130 '					130 '	130 '		
ANTENNA ATOLL										
ANTENNA MAKE - MODEL	7770				AM-X-CD-16-65-00T-RET		7770			
ANTENNA VENDOR	Powerwave				KMW		Powerwave			
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0				72.0 x 11.8 x 5.9		55.0 x 11.0 x 5.0			
ANTENNA WEIGHT	35				48.5		35			
ANTENNA GAIN										
AZIMUTH	150 °				150 °		150 °			
RADIATION CENTER (feet)	116 '				116 '		116 '			
ANTENNA TIP HEIGHT	118 '				119 '		118 '			
ELECTRICAL TILT (700/850/1900/AWS)	TBD	TBD			TBD		TBD	TBD		
MECHANICAL DOWNTILT	TBD				0 °		TBD			
FEEDER AMOUNT	2						2			
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)				N/A / KMW / Built-in RET Equipment		1 / Powerwave / 7020 (DB)			
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)				1 / CCI / DTMABP7819VG12A		2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A			
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA						LGP 12104 (1900 AND 850 Bypass TMA)			
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A			
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901				0 + 1 / CM1007-DBPXBC-003		0 + 2 / Powerwave / LGP 21901			
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT		
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC		
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A		
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION	-14 °				-14 °		-14 °			
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

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

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?	TxRx-TxRx	TxRx-TxRx			TxRx-Rx	N/A	TxRx-TxRx	TxRx-TxRx		
TECHNOLOGY	UMTS / 850	UMTS / 1900			LTE / 700	N/A	GSM / 850	GSM / 1900		
RRH LOCATION (Top/Bottom/None)	N/A	N/A			BOTTOM	BOTTOM	N/A	N/A		
FEEDERS TYPE	1 5/8" - Andrew	1 5/8" - Andrew					1 5/8" - Andrew	1 5/8" - Andrew		
Feeder Length (feet)	130 '	130 '					130 '	130 '		
ANTENNA ATOLL										
ANTENNA MAKE - MODEL	7770				AM-X-CD-16-65-00T-RET		7770			
ANTENNA VENDOR	Powerwave				KMW		Powerwave			
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0				72.0 x 11.8 x 5.9		55.0 x 11.0 x 5.0			
ANTENNA WEIGHT	35				48.5		35			
ANTENNA GAIN										
AZIMUTH	270 °				270 °		270 °			
RADIATION CENTER (feet)	116 '				116 '		116 '			
ANTENNA TIP HEIGHT	118 '				119 '		118 '			
ELECTRICAL TILT (700/850/1900/AWS)	TBD	TBD			TBD		TBD	TBD		
MECHANICAL DOWNTILT	TBD				0 °		TBD			
FEEDER AMOUNT	2						2			
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)				N/A / KMW / Built-in RET Equipment		1 / Powerwave / 7020 (DB)			
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)				1 / CCI / DTMABP7819VG12A		2 / Powerwave / LGP 21401 (Dual Band - 850 Bypass)			
CURRENT INJECTORS FOR TMA (QTY/MODEL)	N/A						N/A			
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA						LGP 12104 (1900 AND 850 Bypass TMA)			
SURGE ARRESTOR (QTY/MODEL)	N/A						N/A			
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901				0 + 1 / CM1007-DBPXBC-003		0 + 2 / Powerwave / LGP 21901			
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?	No RxAIT	No RxAIT					No RxAIT	No RxAIT		
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A / No LLC	N/A / No LLC					N/A / No LLC	N/A / No LLC		
SCPA/MCPA MODULE?	N/A	N/A					N/A	N/A		
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION	-14 °				-14 °		-14 °			
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 16D - NEW/PROPOSED SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 16E - NEW/PROPOSED SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 16F - NEW/PROPOSED SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

AM-X-CD-16-65-00T-RET(6' 65° Dual Broadband Antenna)

Dual Band Electrical DownTilt Antenna

698 ~ 894MHz, X-pol., H65° / V12°

1710 ~ 2170MHz, X-pol., H65° / V6.0°

Electrical Specification

Frequency Range	698~894MHz	1710~2170MHz
Impedance	50Ω	
Polarization	Dual, Slant ±45°	
Gain	15.5dBi / 13.35dBd @ 698-806MHz 16.0dBi / 13.85dBd @ 824-894MHz	17.3dBi / 15.15dBd @ 1710-1755MHz 17.4dBi / 15.25dBd @ 1850-1900MHz 17.1dBi / 14.95dBd @ 2110-2155MHz
Beamwidth — Horizontal	65° @ 698-806MHz 63° @ 824-894MHz	65° @ 1710-1755MHz 67° @ 1850-1900MHz 69° @ 2110-2155MHz
Beamwidth — Vertical	12.3° @ 698-806MHz 11.5° @ 824-894MHz	6.5° @ 1710-1755MHz 6.0° @ 1850-1900MHz 5.7° @ 2110-2155MHz
VSWR	≤1.5:1	
Front-to-Back Ratio	≥27 dB	
Electrical Downtilt Range	2° ~ 16°	0° ~ 10°
Isolation Between Ports	≥30 dB	
Isolation Between Ports of Different Frequency Elements	≥35 dB	
Cross Pole Discrimination	10.0 dB @ ±60° 15.0 dBi @ 0°	
First Upper Side Lobe Suppression	16dB	
Side Lobe Suppression	> 16 dB @ 0-6° Tilt > 18 dB @ 7-12° Tilt (Up to 10° from Boresight)	> 16 dB @ 0-6° Tilt > 18 dB @ 7-10° Tilt (Up to 10° from Boresight)
Passive Intermodulation	≤ -150 dBc @ 2x20w	
Input Maximum CW Power	500 W	300 W
Environmental Compliance	IP65 for Radome IP67 for Connectors	
RET Motor Configuration	Field Replaceable RET Electronic Control Module / RET Motor is internal to antenna & not field replaceable	
Compliant with AISG 1.1 and 2.0	AISG 1.1 and 2.0	

Mechanical Specification

Dimension (W×D×H)	11.8×5.9×72 inches (300×150×1829mm)
Weight (Without clamp)	48.5 lbs (22.0 kg)
Connector	4 x 7/16 DIN(F), Long Neck
Max Wind Speed	150 mph
Wind Load (@150 mph)	1891 N

300

7770.00A

DBB90 Broadband Cross Polarized

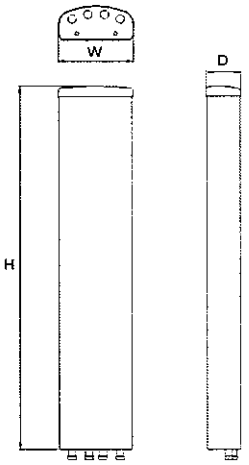
POLARIZATION: XX-Pol
FREQUENCY (MHz): 824-896, 1710-2170
HORIZONTAL BEAM WIDTH (°): 90
GAIN (dBi/dBd): 13.5/11.4, 15.5/13.4
TILT: MET
LENGTH: 1.4m (4'7")

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	824-896	1710-2170		
Frequency band (MHz)	824-896	1710-1880	1850-1990	1900-2170
Gain (dBi/dBd)	13.5/11.4	15.5/13.4	15.5/13.4	15.5/13.4
Polarization	Dual linear ±45°	Dual linear ±45°		
Nominal Impedance (Ω)	50	50		
VSWR	<1.5:1	<1.5:1		
Horizontal beam width, -3 dB (°)	85	90	90	90
Vertical beam width, -3 dB (°)	15	7	7	7
Electrical down tilt (°)	0 to 10	0 to 8		
Side lobe suppression, vertical 1st upper (dB)	>18	>18	>18	>18
Isolation between inputs (dB)	>30	>30	>30	>25
Inter band Isolation (dB)	>36	>36		
Tracking, horizontal plane ±60° (dB)	<2	<2	<2	<2
First null fill (dB)	-	-	-	-
Vertical beam squint (°)	<1.0	<0.5	<0.5	<0.5
Front to back ratio (dB) 180°±30° copolar	>25	>25	>25	>25
Front to back ratio (dB) 180°±30° total power	>22	>21	>21	>21
Cross polar discrimination (XPD) 0° (dB)	-	-	-	-
Cross polar discrimination (XPD) ±60° (dB)	>10	>10	>10	>10
Far field coupling	-	-	-	-
IM3, 2xTx@43dBm (dBc)	<-153	<-153		
IM7, 2xTx@43dBm (dBc)	-	<-160		
Power handling, average per input (W)	500	250		
Power handling, average total (W)	800	500		

MECHANICAL SPECIFICATIONS*

Connector	4 x 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	1408x280x125mm
Mounting	Pre-mounted heavy duty brackets
Weight, with brackets, kg (lbs)	17.6 (39)
Weight, without brackets, kg (lbs)	12.1 (27)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	415
Maximum operational wind speed, m/s (mph)	42 (93)
Survival wind speed, m/s (mph)	55 (123)
Lightning protection	DC grounded
Operating Temperature	-40°C to +60°C
Radome material	GRP
Package size, HxWxD, mm (ft)	1550x355x255 (61"x1'2"x10")
Radome colour	Light Grey
Shipping weight, kg (lbs)	21.5 (47.4)
RET	8220.10, 8220.40, 8210.10, 8210.40
Brackets	7256.00, 7454.00



*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

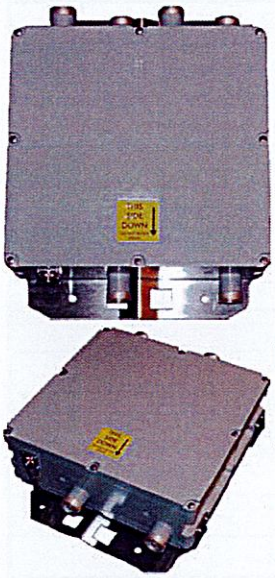
For detailed patterns visithttp://www.powerwave.com/rpa/.

Updated: 2010-12-02

Twin Triple Band "Active PCS with 700 and 850 Band Pass-thru" Dual Duplexed TMA

Tel: 201-342-3338 Fax: 201-342-3339 www.cciproducts.com

General Information



CCI's Twin Triple Band (700 Band, Cellular and PCS) TMA contains two triple band TMA's in a single housing. The PCS TMA is full band and fully duplexed, while the 700 Band and Cellular RF is bypassed and combined (Diplexed) with the PCS RF signal. High linearity improves the uplink sensitivity and the receive performance of base stations. The TMA is fully compliant with the latest AISG 2.0 specification. The TMA supports EDGE/GSM, UMTS and LTE BTS equipment. It provides a convenient package for sites upgraded to triple or quad antenna configurations. The twin TMA package reduces tower loading, leasing, and installation costs. Unit count on the tower is cut in half. An excellent match for two branch receive diversity applications using triple polarization antennas. The input and output connectors are located inline for ease of installation in space constrained areas such as uni-pole structures and stealth antennas.

Model
DTMABP7819VG12A

Contents:

General Info and Technical Description	1
Electrical & Mechanical Specs (AISG TMA)	2
Block Diagram & Outline Drawing (AISG TMA)	3

Features:

- Small, lightweight, twin unit
- Triple Band Dual Duplexed (PCS with 700 Band & Cellular Bypass)
- Optional AISG 2.0 compatible unit
- AISG TMA detects BTS port that DC voltage and AISG sampling is applied to, and automatically switches to utilize that port
- AISG TMA operates at constant power
- AISG TMA may be powered by a standard PDU
- High linearity
- Lightning protected
- Fail-safe bypass mode
- High reliability

Technical Description

The TMA system consists of a twin outdoor triple band tower mount unit which combine separate PCS, 700 Band & Cellular antennas onto a single BTS port. The PCS path of the tower mount unit is dual duplexed to separate the low-power uplink signals from the high-power downlink signals at the antenna port, amplifies the low-level uplink signals using an ultra-low noise amplifier (LNA), and recombines the two paths at the BTS port. The 700 Band & Cellular path is ultra low loss and passive. Both paths are diplexed at the BTS port. The tower mount units consist of eight band-pass filters, two redundant low-noise amplifiers, bypass failure circuitry, and bias tee's which are all housed in an IP65 moisture proof enclosure, with IP68 Immersion proof connectors suited to long-life masthead mounting. The unit provides protection against lightning strikes via a multi-stage surge protection circuit. DC power and control is provided via the feeder cable from the BTS or a Power Distribution Unit (PDU). Optional AISG 2.0 DC power and control is provided via the feeder cable from the BTS using the AISG 2.0 and 3GPP standard. The optional AISG TMA detects which BTS port has DC Voltage/AISG Sampling applied and automatically switches to utilize that port. Additionally the AISG TMA operates at constant power when powered by an AISG 2.0 Compatible Site Control Unit, but may be powered by a "Standard Power distribution Unit. A separate AISG connector is also provided to allow direct AISG connection or "Daisy Chaining" to multiple AISG products at the top of the tower.

An optional indoor site control unit (SCU) is available to power up to up to 32 AISG modules per sector and to provide the all the monitoring and alarm functions for the system. The SCU is housed in a single (1U) 1.75" x 19" rack and contains triple redundant power supplies capable of being "hot swapped" that provide a regulated DC supply voltage on the RF coax for the tower mount amplifiers.

Twin Triple Band "Active AWS with 700 and 850 Band Pass-thru" TMA Typical Specifications

Description	Typical Specifications
Electrical Specifications	
700 Band & Cellular Frequency Range	698 to 894 MHz
PCS Receive Frequency Range	1850 – 1910 MHz
PCS Transmit Frequency Range	1930 - 1990 MHz
PCS Amplifier Gain	6 to 12 dB Adjustable in 0.25 dB steps via AISG
PCS Gain Variation	±1.0 dB
PCS System Noise Figure	1.4 dB (@ +25°C),1.6 dB (@ +65°C), At 1910 MHz: 1.7 dB (@ +25°C), 1.9 dB (@ +65°C)
PCS Input Third Order Intercept Point	+12 dBm Min @ Max. Gain
Input/Output Return Loss	18 dB Min. all ports, 15 dB Min. Bypass Mode
Insertion Loss	
700 Band & Cellular Passband	< 0.2 dB, 0.1 dB typical
PCS Transmit Passband	0.4 dB Typical
PCS Transmit Passband Ripple	±0.2 dB
PCS Bypass Mode, Rx Passband	1.6 dB (@ +25°C),1.8 dB (@ +65°C), At 1910 MHz: 2.3 dB (@ +25°C), 2.5 dB (@ +65°C)
PCS Bypass Mode, Rx Passband Ripple	±1 dB
Filter Characteristics	
700 Band & Cellular Path Rejection	70 dB @ 1850 - 1990 MHz
PCS Path Rejection	80 dB @ 698 - 894 MHz
Continuous Average Power	200 Watts max
Peak Envelope Power	2 kW max
Intermodulation Performance	
IMD at ANT port in Rx Band	-112 dBm Min. (2 x +43 dBm tones)
Operating Voltage	+10V to +30V DC provided via coax or AISG
Power Consumption	≤ 2.1 Watts
Mechanical Specifications	
Connectors	DIN 7-16 Female (Long Neck) x 6, AISG x 1
Dimensions (Body Only)	10.63" (H) x 11.02" (W) x 3.78" (D); (270 (H) x 280 (W) x 96 (D) mm)
Dimensions (with Bracket)	14.25" (H) x 11.46" (W) x 4.17" (D); (362 (H) x 291 (W) x 106 (D) mm)
Weight (w/o Bracket)	19.18 Lbs. (8.7 Kg)
Mounting	Pole/Wall Mounting Bracket
Environmental Specifications	
Operating Temperature	-40° C to +65°C
Lightning Protection	8/20us, ±2KA max, 10 strikes each, IEC61000-4-5
Enclosure	IP65 (Unit Body), IP68 (Connector)
MTBF	>500,000 hours

All specifications are subject to change. The latest specifications are available at www.cciproducts.com

Tower Mounted Amplifier

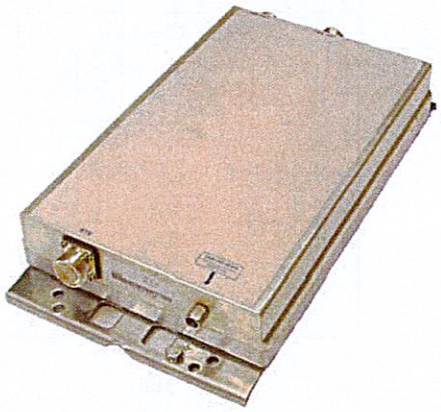
Dual Band 1900 MHz with 850 MHz Bypass

1900/850 MHz

Part Number: LGP 214nn	Up-link: 1850-1910 MHz Down-link: 1930-1990 MHz Bypass: 824-894 MHz	Gain: 12 dB Noise Figure: < 1.7 dB

The Powerwave® TMA-DD 1900/850 is a dual band Tower Mounted Amplifier (TMA) to be installed near the antenna. Deployed in an AMPS, GSM, GPRS, EDGE and CDMA network it will increase capacity and coverage as well as extend the battery life time for the handsets. The TMA System will provide enhanced coverage and improved up-link signal quality. Appropriate for new rollouts by optimizing coverage with a reduced number of BTSs or as an upgrade to existing BTSs for enhancing the existing coverage.

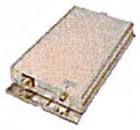
Extended band TMA facilitates simplified logistics, especially when the frequency bands are scattered. The unit comprises of high Q band-pass filters, dual balanced low noise amplifiers with circuits for active bias, supervision, alarms and lightning protection circuit. The Powerwave patented design with all active components integrated within the filter body provides an extremely reliable, compact and lightweight TMA solution. The vented enclosure design is employed to prevent the effect of condensation, thereby guaranteeing long, reliable, maintenance-free service in all environmental conditions. These TMAs offer an easy to install, maintenance free, cost effective solution for coverage enhancement and increased quality in mobile communication networks.



Key Benefits:

- 850 MHz Bypass
- Improved Network Quality
- Increased Coverage
- State of the Art Performance
- Excellent Power Handling
- Low Tx Loss
- Exceptional Reliability

Tower Mounted Amplifier



1900/850 MHz

Technical Specifications

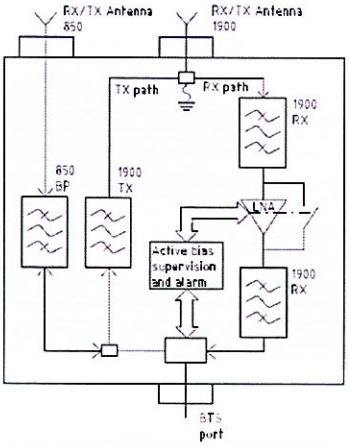
Product Number	LGP214nn	
850 MHz	Bypass (MHz)	824-894
	Return loss* (dB)	> 20
	Insertion loss* (dB)	< 0.3
1900 MHz		
Up-link	Frequency range, full band (60 MHz)	1850-1910
	Nominal gain (dB)	12
	Return loss* (dB)	> 20
	Noise figure* (dB)	< 1.7
	Output 3rd order Intercept Point* (dBm)	> +23
Down-link	Frequency range, full band (60 MHz)	1930-1990
	Insertion loss* (dB)	< 0.6
	Return loss* (dB)	> 20
Intermodulation	2 Tx@x43 dBm (dBc)	<-158
Alarm Functionality	Two levels,individually supervised LNAs	
Power Consumption	@12 VDC	1.2 W

* Typical

All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

Mechanical Specifications

Size,W x H x D (without mounting plate)	235 x 366 x 66 mm (9.2 x 14.4 x 2.6 in)
Weight	6.4 kg (14.1 lbs)
Color	Off white (NCS 1502-R)
Housing	Aluminum
RF-connectors	DIN 7/16 female.
Mounting kit	Mounting kit for pole and wall is included
Temperature range	-40 °C to +65 °C (-40 °F to +149 °F)
MTBF	>1 million hours
Safety	UL 60 950
Ingress protection, IP 65	EN 60 529
Environmental	ETS 300 019
EMC	FCC Part 15



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Powerwave technologies

COVERAGE AND CAPACITY | TECHNOLOGY LEADERSHIP | GLOBAL PARTNER | INTEGRATED SOLUTIONS | QUALITY AND RELIABILITY

Optimizer® Panel Dual Polarized Antenna

Connector Type	(4) 7-16 DIN Female
Connector Location	Bottom
Mount Type	Downtilt Kit w/Scissor Kit
Electrical Downtilt, deg	0-10 , 0-10
Horizontal Beamwidth, deg	66 , 66
Mounting Hardware	APM40-2 + APM40-E2
Rated Wind Speed, km/h (mph)	160 (100)
VSWR	< 1.5:1
Vertical Beamwidth, deg	6.6
1st Upper Sidelobe Suppression, dB	> 17 (typically > 20)
Upper Sidelobe Suppression, dB	> 18 all (typically > 20)
Polarization	Dual pol +/-45°
Front-To-Back Ratio, dB	> 25
Maximum Power Input, W	300
Isolation between Ports, dB	> 30
Lightning protection	Direct Ground
3rd Order IMP @ 2 x 38 dBm, dBc	> 160
Overall Length, m (ft)	1.35 (4.42)
Dimensions - HxWxD, mm (in)	1349 x 330 x 80 (53 x 12.9 x 3.1)
Weight w/o Mtg. Hardware, kg (lb)	18.0 (39.6)
Radiating Element Material	Brass
Radome Material	Fiberglass
Reflector Material	Aluminum
Max Wind Loading Area, m² (ft²)	0.64 (6.6)
Maximum Thrust @ Rated Wind, N (lbf)	787 (177)
Shipping Weight, kg (lb)	24.1 (52.7)
Packing Dimensions, HxWxD, mm (in)	1550 x 420 x 210 (61 x 16.5 x 8.3)
Survival Wind Speed, km/h (mph)	200 (125)

PCS Full Band Tower Mounted Amplifier
G20057A1

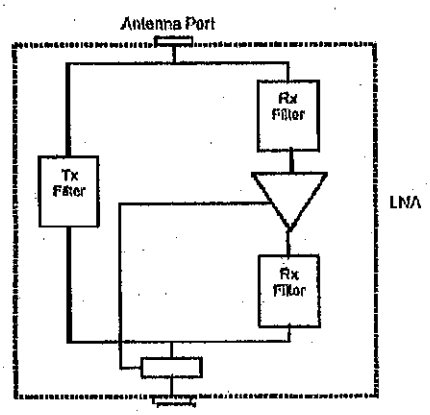
Tx Characteristics	Specification
Frequency Range	1930 to 1990 MHz
Operating Bandwidth	60 MHz
Insertion Loss	≤0.9 dB
Ripple	± 0.3 dB
Max Power Handling - CW	+52 dBm (160 W)
Max Power Handling - Peak	+61.6 dBm (1400 W)
Return Loss (VSWR)	>18 dB (<1.29:1)

Rx Characteristics	Specification
Frequency Range	1850 to 1910 MHz
Operating Bandwidth	60 MHz
Noise Figure (Ambient)	1.7 dB
Gain Variation Over Frequency &Temperature	12.0 ± 1.3 dB
Gain Variation with Frequency	± 0.7 dB
Output 1dB Compression	≥+11.5 dBm
Output IP3	≥+22 dBm
Return Loss (VSWR)	>18 dB (<1.29:1)

System Characteristics	Specification
Rx to Tx Rejection	>60 dB
Intermodulation (2 Tx Carriers at +43 dBm, products in Rx operating Band)	<-110 dBm
DC Supply Voltage	+10V to +17V DC
Current (nominal)	<110 mA normal >170 mA alarm

Environmental Characteristics	Specification
Operating Temperature Range	-40°C to +65°C (-40°F to +149°F)
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Relative Humidity	5% to full immersion
Enclosure Protection	IP68
Lightning Protection BTS Port ANT Port	 8/20 µ S 10 kA pulse DC Grounded
EMC	ETS 300 342-3 Compliant
MTBF	>800,000 hrs

Configuration Diagram



Mechanical Characteristics	Specification
Dimensions	335 x 162 x 77 mm (13.2 x 6.4 x 3.0 in.)
Weight	<5 kg (<11.0 lb).
Volume	4.2 Ltr (256 cu.in.)
RF Connectors BTS ANT	 7/16 Female 7/16 Female

This document gives only a general description of the product(s) and shall not form part of any contract.

ISSUE : TMA S20057A1 Preliminary

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