



**QC Development**

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860-670-9068

QCDevelopment9068@gmail.com

September 9, 2016

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

**Notice of Exempt Modification – New Cingular Wireless PCS, LLC (AT&T)  
Sound Beach Avenue, Greenwich, CT 06870 (AT&T # CT5150)  
N 41-02-00.57  
W 73-33-55.93**

Dear Ms. Bachman:

AT&T currently maintains six (6) antennas at the 105-foot level of the existing 95-foot Utility Structure at Sound Beach Avenue (Old Greenwich Railroad Station), Greenwich, CT. The tower is owned by Eversource. The property is owned by the State of Connecticut Department of Transportation. AT&T now intends to replace three (3) of its existing Powerwave antennas with three (3) new Quintel antennas. These antennas would be installed at the 105-foot level of the structure. AT&T also intends to remove three (3) existing TMAs and install six (6) new Kaelus TMAs for a total of twelve (12) TMAs.

This facility was approved by the Connecticut Siting Council, Petition No. 467 on June 20, 2000. This approval included no condition(s) that could feasibly be violated by this modification. This modification therefore complies with the aforementioned approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2).

In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Peter Tessei, First Selectman for the Town of Greenwich, as well as the property and structure owner.

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

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Please feel free to call me at (860) 670-9068 with any questions regarding this matter. Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read 'MR', with a large, stylized flourish on the right side.

Mark Roberts  
QC Development  
Consultant for AT&T

#### Attachments

cc: Peter Tessei - as elected official (via e-mail)  
Eversource - as structure owner (via e-mail)  
CT DOT – as property owner

## Power Density

### Existing Loading on Tower

| Carrier         | # of Channels | ERP/Ch (W) | Antenna Centerline Height (ft) | Power Density (mW/cm <sup>2</sup> ) | Freq. Band (MHz <sup>**</sup> ) | Limit S (mW/cm <sup>2</sup> ) | %MPE  |
|-----------------|---------------|------------|--------------------------------|-------------------------------------|---------------------------------|-------------------------------|-------|
| Other Carriers* |               |            |                                |                                     |                                 |                               | 0.00% |
| AT&T GSM        | 2             | 500        | 105                            | 0.0367                              | 880                             | 0.5867                        | 0.63% |
| AT&T GSM        | 2             | 500        | 105                            | 0.0367                              | 1900                            | 1.0000                        | 0.37% |
| AT&T UMTS       | 6             | 296        | 105                            | 0.0652                              | 880                             | 0.5867                        | 1.11% |
| AT&T UMTS       | 6             | 427        | 105                            | 0.0940                              | 1900                            | 1.0000                        | 0.94% |
| AT&T LTE        | 1             | 500        | 105                            | 0.0183                              | 740                             | 0.4933                        | 0.37% |
| Site Total      |               |            |                                |                                     |                                 |                               | 3.42% |

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

### Proposed Loading on Tower

| Carrier         | # of Channels | ERP/Ch (W) | Antenna Centerline Height (ft) | Power Density (mW/cm <sup>2</sup> ) | Freq. Band (MHz <sup>**</sup> ) | Limit S (mW/cm <sup>2</sup> ) | %MPE  |
|-----------------|---------------|------------|--------------------------------|-------------------------------------|---------------------------------|-------------------------------|-------|
| Other Carriers* |               |            |                                |                                     |                                 |                               | 0.00% |
| AT&T GSM        | 1             | 313        | 105                            | 0.0115                              | 880                             | 0.5867                        | 0.20% |
| AT&T UMTS       | 2             | 313        | 105                            | 0.0230                              | 880                             | 0.5867                        | 0.23% |
| AT&T UMTS       | 1             | 628        | 105                            | 0.0461                              | 1900                            | 1.0000                        | 0.79% |
| AT&T LTE        | 1             | 1476       | 105                            | 0.0542                              | 740                             | 0.4933                        | 0.54% |
| AT&T LTE        | 1             | 3664       | 105                            | 0.1344                              | 1900                            | 1.0000                        | 2.73% |
| AT&T LTE        | 1             | 1285       | 105                            | 0.0471                              | 2300                            | 1.0000                        | 0.47% |
| Site Total      |               |            |                                |                                     |                                 |                               | 4.95% |

\*Per CSC Records (available upon request, includes calculation formulas)

\*\* If a range of frequencies are used, such as 880-894, enter the lowest value, i.e. 880

Note: Proposed Loading may also include corrections to certain Existing Loading values

**PROJECT INFORMATION**

SCOPE OF WORK: TELECOMMUNICATIONS FACILITY UPGRADE (LTE 3C & BWE 2017 UPGRADE):

SITE ADDRESS: OLD GREENWICH STATION  
OLD GREENWICH, CT 06870

LATITUDE: 41.033891° N 41° 2' 2.01" N

LONGITUDE: 73.563298° W 73° 33' 47.87" W

TYPE OF SITE: TRANSMISSION TOWER / INDOOR EQUIPMENT

TOWER HEIGHT: 105'-0" ±

RAD CENTER: 105'-0" ±

JURISDICTION: NATIONAL, STATE & LOCAL CODES OR ORDINANCES

CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY



**SITE NUMBER: CT5150**

**SITE NAME: OLD GREENWICH RAILROAD STATION**

**PROJECT: LTE 3C & BWE 2017 UPGRADE**

**TRANSMISSION STRUCTURE NO. 1255**

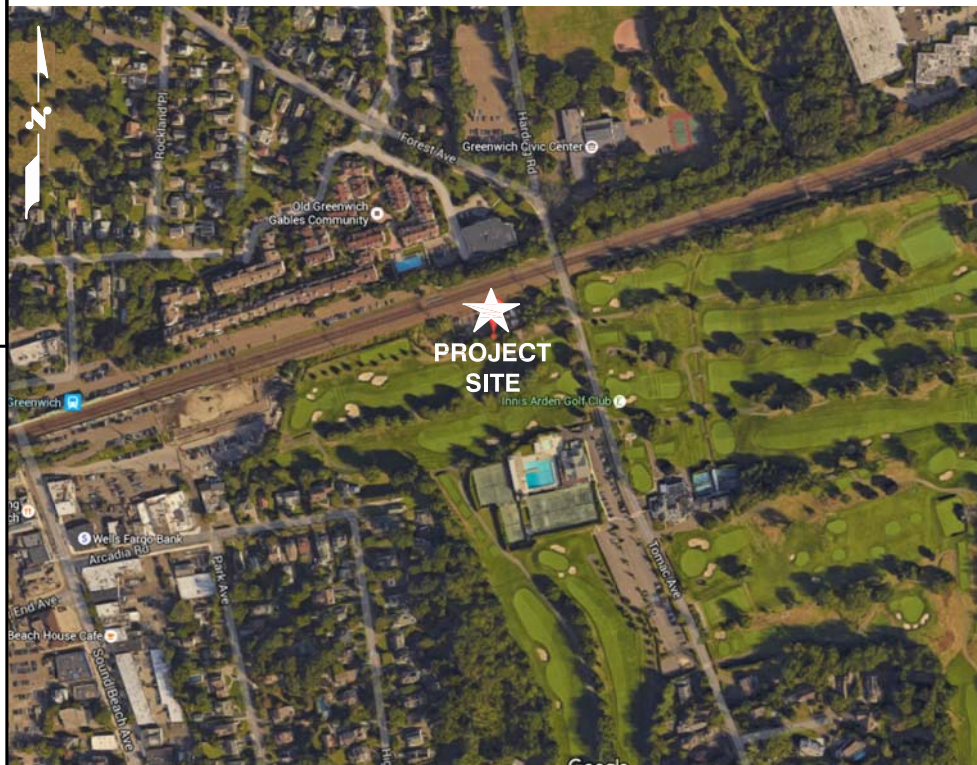
**DRAWING INDEX**

| SHEET NO. | DESCRIPTION                | REV. |
|-----------|----------------------------|------|
| T-1       | TITLE SHEET                | 1    |
| GN-1      | GENERAL NOTES              | 1    |
| A-1       | COMPOUND & EQUIPMENT PLANS | 1    |
| A-2       | ANTENNA LAYOUT & ELEVATION | 1    |
| A-3       | DETAILS                    | 1    |
| RF-1      | RF-PLUMBING DIAGRAM        | 1    |
| G-1       | GROUNDING DETAILS          | 1    |

**VICINITY MAP**

**DIRECTIONS TO SITE:**

START OUT GOING NORTHEAST ON ENTERPRISE DR TOWARD CAPITOL BLVD. 0.4 MI. TURN LEFT ONTO CAPITOL BLVD. 0.3 MI. TURN LEFT ONTO WEST ST. 0.3 MI. MERGE ONTO I-91 S VIA THE RAMP ON THE LEFT TOWARD NEW HAVEN. 29.1 MI. MERGE ONTO I-95 S/GOVERNOR JOHN DAVIS LODGE TURNPIKE VIA THE EXIT ON THE LEFT. 42.2 MI. TAKE THE US-1 N EXIT, EXIT 5. 0.1 MI. TURN RIGHT ONTO E PUTNAM AVE/US-1. 0.2 MI. TURN RIGHT ONTO SOUND BEACH AVE. 0.8 MI. END AT SOUND BEACH AVE OLD GREENWICH, CT 06870.



**GENERAL NOTES**

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

**72 HOURS**



CALL BEFORE YOU DIG  
CALL TOLL FREE 1-800-922-4455  
OR CALL 811



**UNDERGROUND SERVICE ALERT**

**Hudson Design Group LLC**  
1600 OSGOOD STREET  
BUILDING 20 NORTH, SUITE 3090  
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TEL: (978) 557-5553  
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**SAI**  
27 NORTHWESTERN DR.  
SALEM, NH 03079

**SITE NUMBER: CT5150**  
**SITE NAME: OLD GREENWICH RAILROAD STATION**  
OLD GREENWICH STATION  
OLD GREENWICH, CT 06870  
FAIRFIELD COUNTY

**at&t**  
500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

| NO. | DATE     | REVISIONS               | BY | CHK | APP'D |
|-----|----------|-------------------------|----|-----|-------|
| 1   | 07/18/16 | ISSUED FOR CONSTRUCTION | EB | AT  | DJC   |
| A   | 07/07/16 | ISSUED FOR REVIEW       | EB | AT  | DJC   |

SCALE: AS SHOWN    DESIGNED BY: AT    DRAWN BY: EB

**Professional Engineer Seal**  
State of Connecticut  
Professional Engineer  
16.2955  
10.2955

**AT&T**  
TITLE SHEET  
(LTE 3C & BWE)

| SITE NUMBER | DRAWING NUMBER | REV |
|-------------|----------------|-----|
| 5150.01     | T-1            | 1   |

**GROUNDING NOTES**

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

**GENERAL NOTES**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
 CONTRACTOR – SAI  
 SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)  
 OWNER – AT&T MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:  
 SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.  
 BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT, + 2009 & 2013 CT AMENDMENTS  
 ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS  
 LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

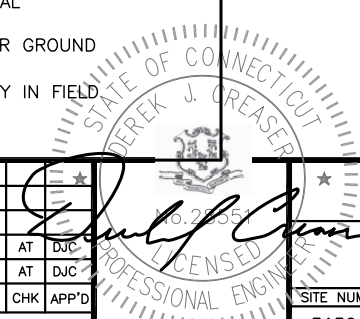
AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

EQUIPMENT AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

| ABBREVIATIONS |                               |     |                                 |      |                            |
|---------------|-------------------------------|-----|---------------------------------|------|----------------------------|
| AGL           | ABOVE GRADE LEVEL             | EQ  | EQUAL                           | REQ  | REQUIRED                   |
| AWG           | AMERICAN WIRE GAUGE           | GC  | GENERAL CONTRACTOR              | RF   | RADIO FREQUENCY            |
| BBU           | BATTERY BACKUP UNIT           | GRC | GALVANIZED RIGID CONDUIT        | TBD  | TO BE DETERMINED           |
| BTCW          | BARE TINNED SOLID COPPER WIRE | MGB | MASTER GROUND BAR               | TBR  | TO BE REMOVED              |
| BGR           | BURIED GROUND RING            | MIN | MINIMUM                         | TBRR | TO BE REMOVED AND REPLACED |
| BTS           | BASE TRANSCEIVER STATION      | P   | PROPOSED                        | TYP  | TYPICAL                    |
| E             | EXISTING                      | NTS | NOT TO SCALE                    | UG   | UNDER GROUND               |
| EGB           | EQUIPMENT GROUND BAR          | RAD | RADIATION CENTER LINE (ANTENNA) | VIF  | VERIFY IN FIELD            |
| EGR           | EQUIPMENT GROUND RING         | REF | REFERENCE                       |      |                            |



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**SAI**  
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 SALEM, NH 03079

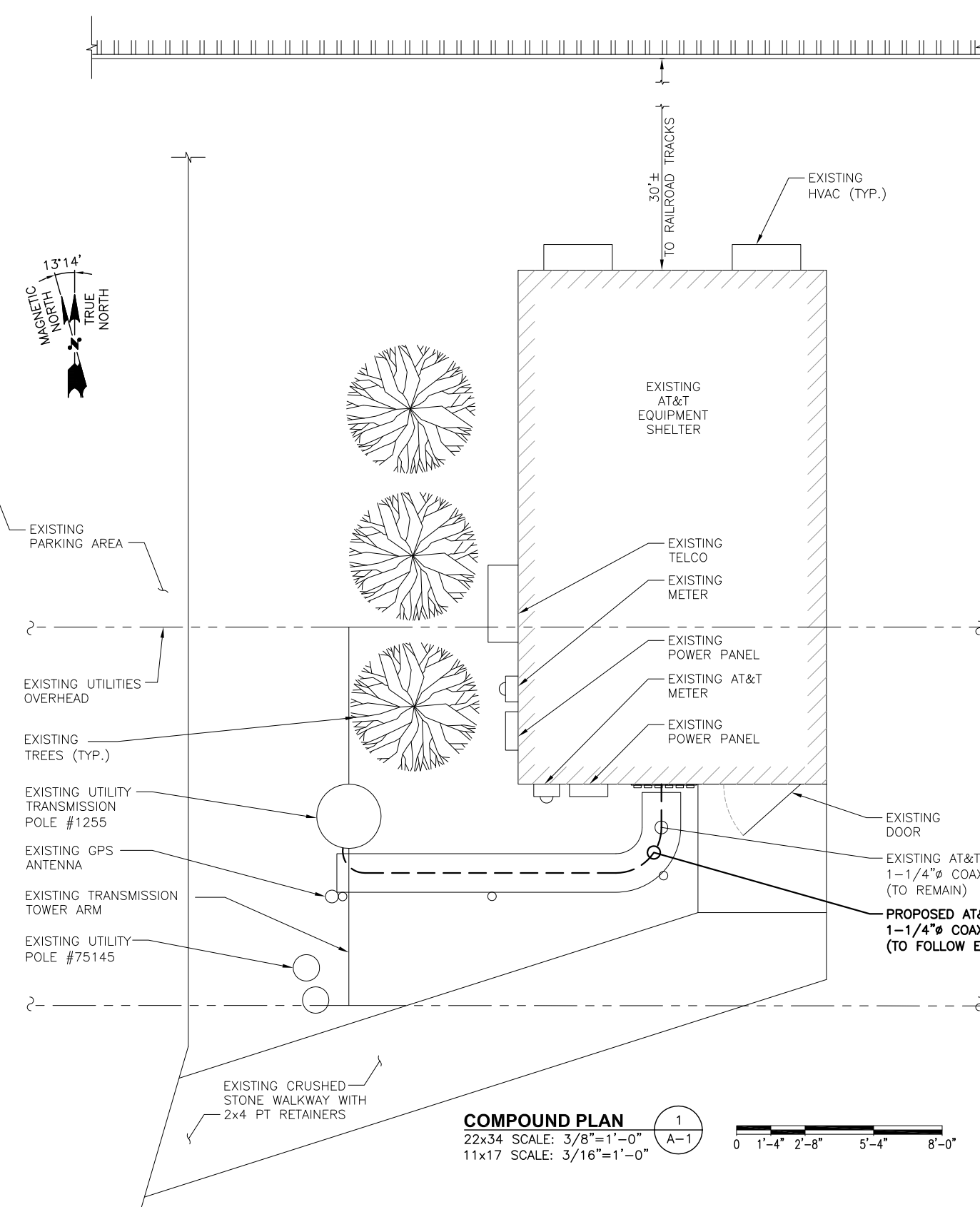
**SITE NUMBER: CT5150**  
**SITE NAME: OLD GREENWICH RAILROAD STATION**  
 OLD GREENWICH STATION  
 OLD GREENWICH, CT 06870  
 FAIRFIELD COUNTY

**at&t**  
 500 ENTERPRISE DRIVE, SUITE 3A  
 ROCKY HILL, CT 06067

|                 |          |                         |              |     |       |
|-----------------|----------|-------------------------|--------------|-----|-------|
| NO.             | DATE     | REVISIONS               | BY           | CHK | APP'D |
| 1               | 07/18/16 | ISSUED FOR CONSTRUCTION | EB           | AT  | DJC   |
| A               | 07/07/16 | ISSUED FOR REVIEW       | EB           | AT  | DJC   |
| SCALE: AS SHOWN |          | DESIGNED BY: AT         | DRAWN BY: EB |     |       |

**AT&T**  
**GENERAL NOTES (LTE 3C & BWE)**

|             |                |     |
|-------------|----------------|-----|
| SITE NUMBER | DRAWING NUMBER | REV |
| 5150.01     | GN-1           | 1   |

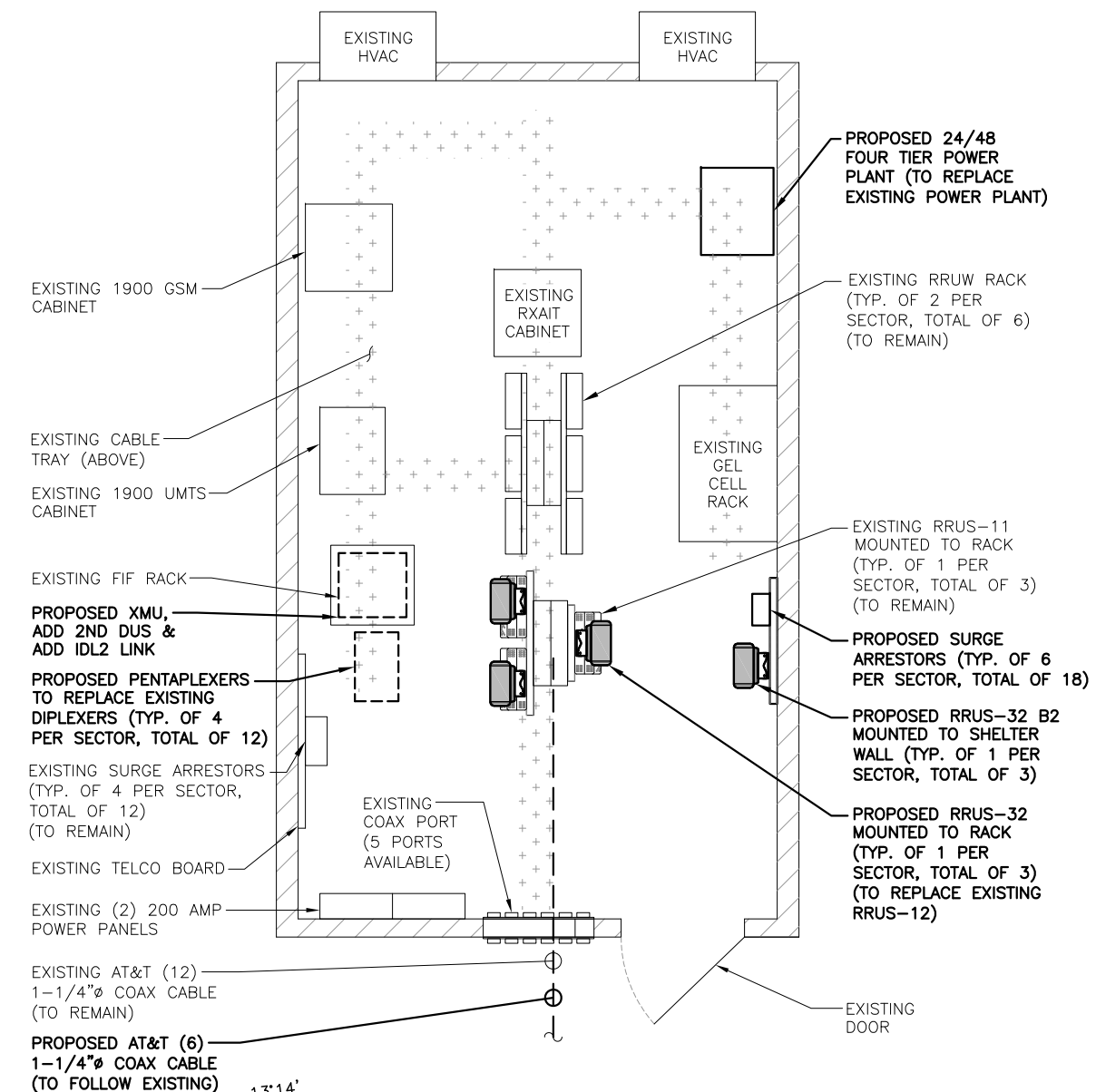


**COMPOUND PLAN**  
 22x34 SCALE: 3/8"=1'-0"  
 11x17 SCALE: 3/16"=1'-0"  
 1 A-1

**NOTE:**  
 1. PROPOSED DC POWER PLANT TO BE FED BY (11) 30A BREAKERS (ONE PER RECTIFIER) WIRED WITH A MINIMUM OF #10 AWG CONDUCTORS.  
 2. CONTRACTOR TO VERIFY IF THE BATTERY DISCONNECT NEEDS TO BE REPLACED. RUN (2) #4/0 & (1) #4/0 G FROM THE DISCONNECT TO THE NEW POWER PLANT IF NECESSARY.

**NOTE:**  
 AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

**NOTE:**  
 REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



**EQUIPMENT PLAN**  
 22x34 SCALE: 1/2"=1'-0"  
 11x17 SCALE: 1/4"=1'-0"  
 2 AT-1

**Hudson Design Group LLC**  
 1600 OSGOOD STREET  
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**SAI**  
 27 NORTHWESTERN DR.  
 SALEM, NH 03079

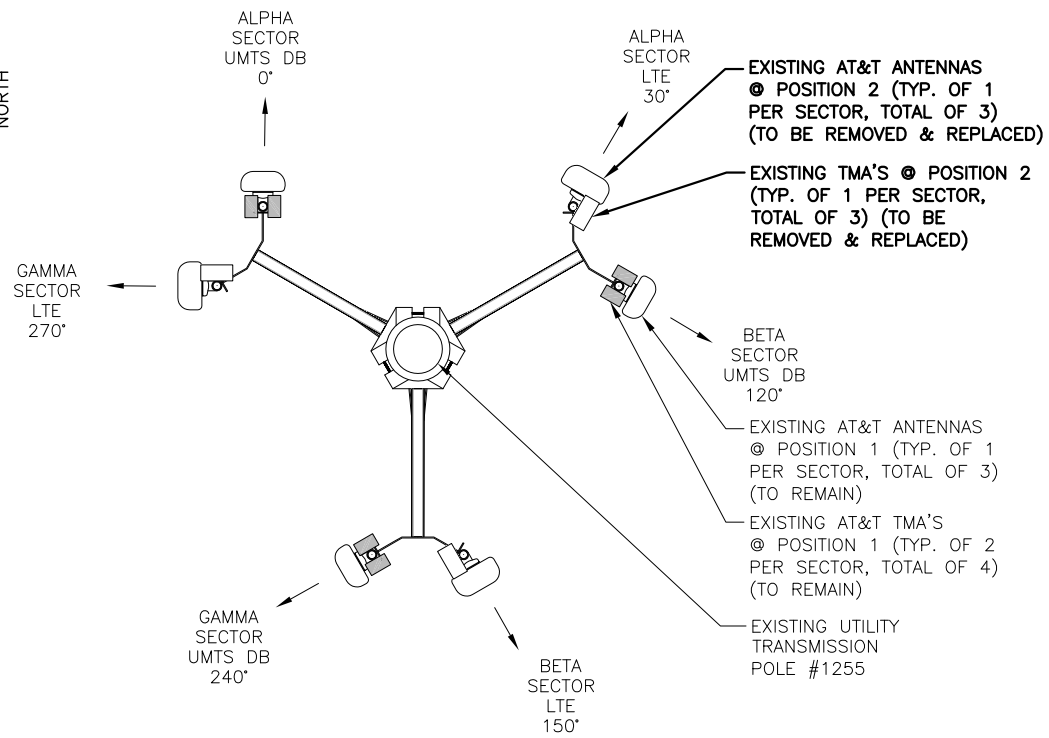
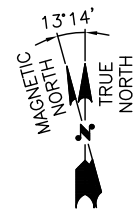
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**at&t**  
 500 ENTERPRISE DRIVE, SUITE 3A  
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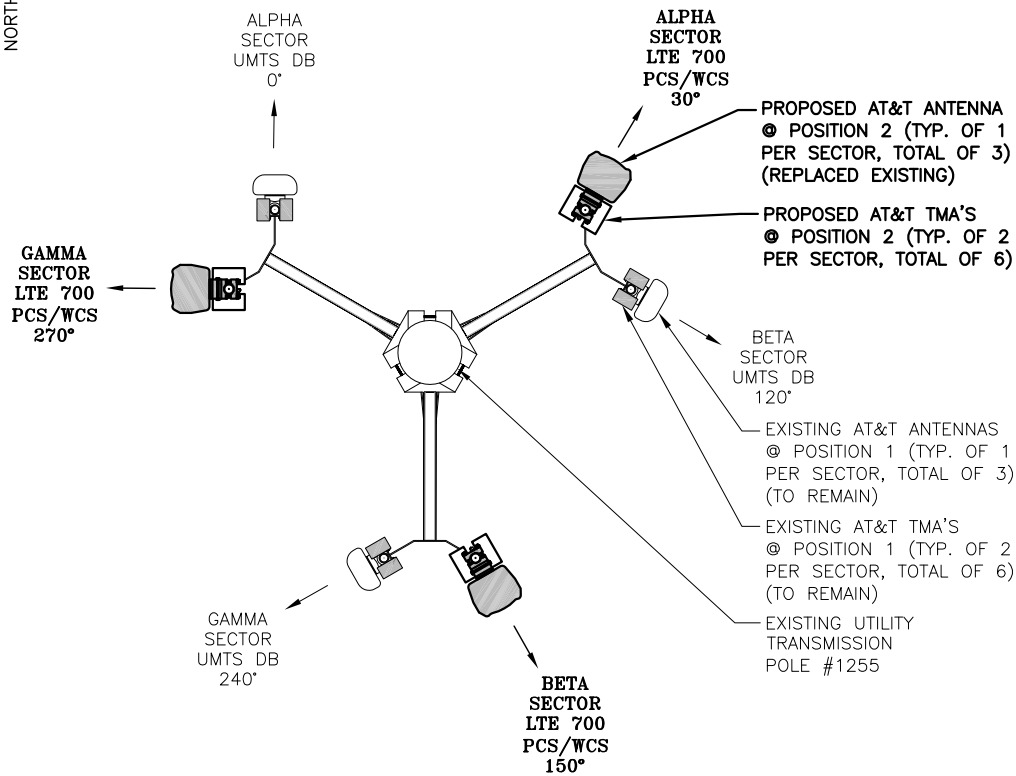
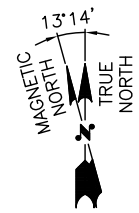
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| A   | 07/07/16 | ISSUED FOR REVIEW       | EB | AT  | DJC   |

SCALE: AS SHOWN    DESIGNED BY: AT    DRAWN BY: EB

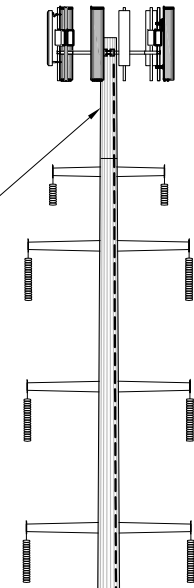
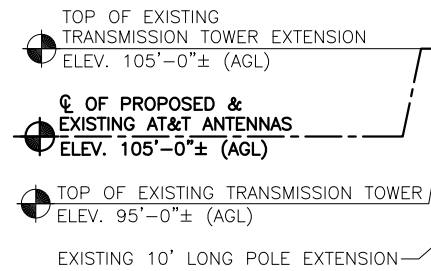
**AT&T**  
**COMPOUND & EQUIPMENT PLANS**  
 (LTE 3C & BWE)  
 SITE NUMBER: 5150.01    DRAWING NUMBER: A-1    REV: 1



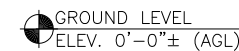
**EXISTING ANTENNA LAYOUT** 1  
SCALE: N.T.S. A-2



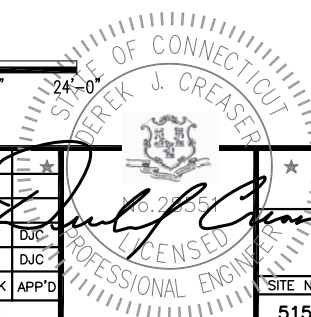
**PROPOSED ANTENNA LAYOUT** 2  
SCALE: N.T.S. A-2



- EXISTING AT&T (12) 1-1/4" COAX CABLE (TO REMAIN)
- PROPOSED AT&T (6) NEW 1-1/4" COAX CABLES FOR LTE ON NEW COAX BRACKET, VALMONT TRANSMISSION LINE BRACKET PART #B3254 (TO FOLLOW EXISTING)
- EXISTING 95' HIGH UTILITY TRANSMISSION POLE #1255
- EXISTING AT&T GPS ANTENNA
- EXISTING AT&T ICE BRIDGE
- EXISTING AT&T EQUIPMENT SHELTER



**ELEVATION** 3  
22x34 SCALE: 1/8"=1'-0"  
11x17 SCALE: 1/16"=1'-0" A-2



**NOTE:**  
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

**NOTE:**  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

**Hudson Design Group LLC**  
1600 OSGOOD STREET  
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N. ANDOVER, MA 01845  
TEL: (978) 557-5553  
FAX: (978) 336-5586

**SAI**  
27 NORTHWESTERN DR.  
SALEM, NH 03079

**SITE NUMBER: CT5150**  
**SITE NAME: OLD GREENWICH RAILROAD STATION**  
OLD GREENWICH STATION  
OLD GREENWICH, CT 06870  
FAIRFIELD COUNTY

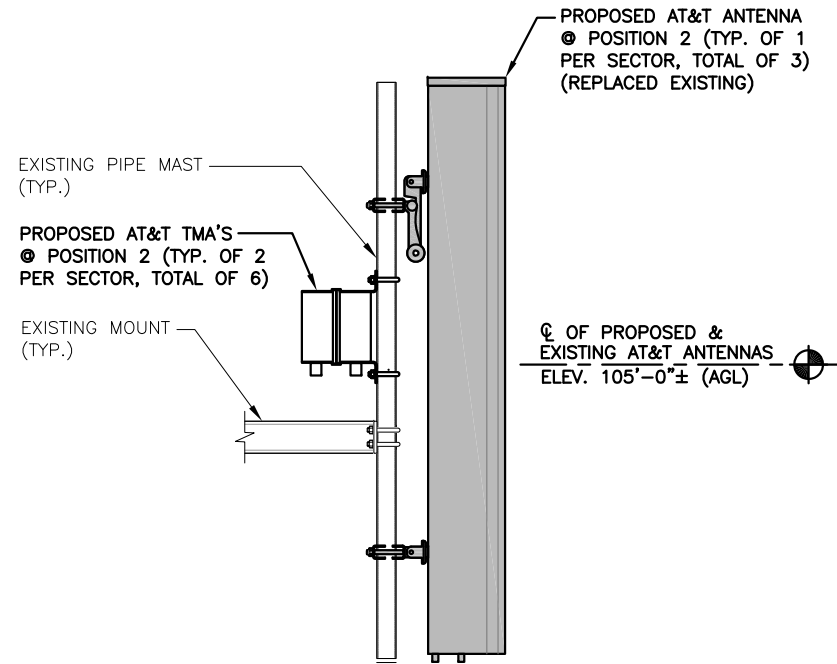
**at&t**  
500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

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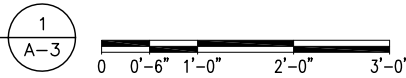
**AT&T**  
**ANTENNA LAYOUTS & ELEVATION (LTE 3C & BWE)**

| SITE NUMBER | DRAWING NUMBER | REV |
|-------------|----------------|-----|
| 5150.01     | A-2            | 1   |



**PROPOSED ANTENNA MOUNTING DETAIL**

22x34 SCALE: 1"=1'-0"  
11x17 SCALE: 1/2"=1'-0"



| RRU CHART |         |       |       |      |
|-----------|---------|-------|-------|------|
| QUANTITY  | MODEL   | L     | W     | D    |
| 3 (E)     | RRUS-11 | 19.7" | 17.0" | 7.2" |
| -         | RRUS-12 | 20.4" | 18.5" | 7.5" |
| 6 (P)     | RRUS-32 | 27.2" | 12.1" | 7.0" |
| -         | RRUS-E2 | 20.4" | 18.5" | 7.5" |
| -         | LTE-A2  | 16.4" | 15.2" | 3.4" |

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS

**NOTE:**

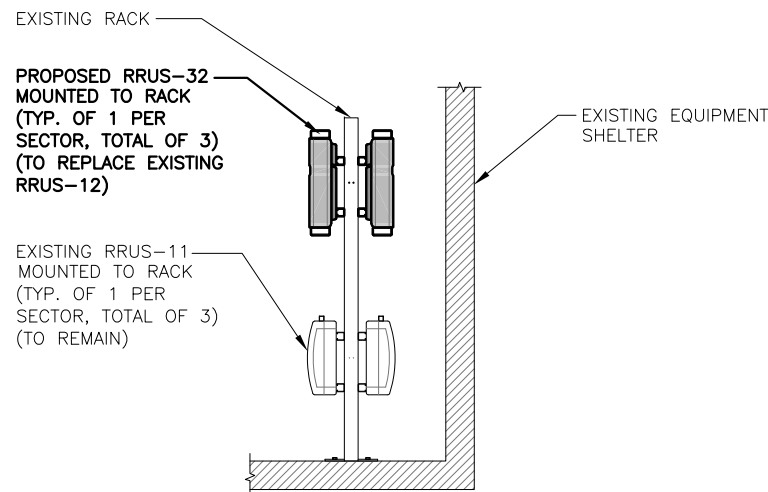
SEE RFDS FOR RRU FREQUENCY AND MODEL NUMBER

PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

NOTE:  
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

**RRU DETAIL**

SCALE: N.T.S.



EXISTING EQUIPMENT SHELTER WALL (V.I.F)

PROPOSED 8"x4"x3/8" BACKER PLATE (TYP.) (TO BRIDGE MIN. OF 3 STUDS)

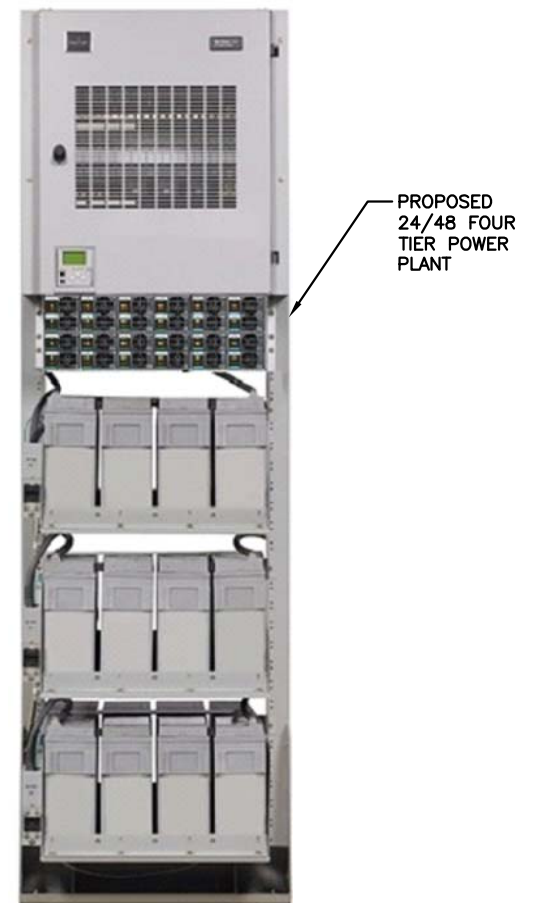
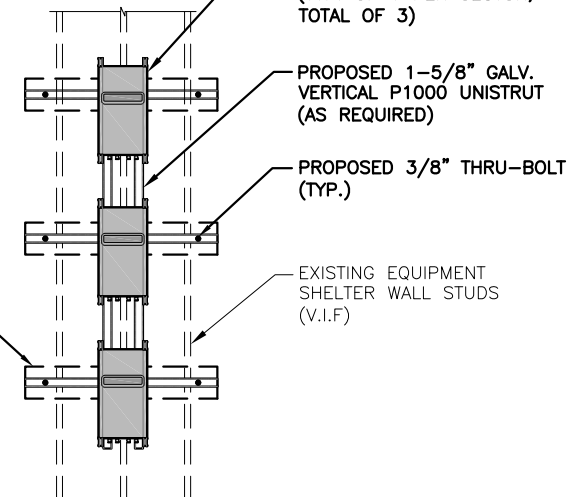
PROPOSED 3/8" THRU-BOLT (TYP.)

NOTE:  
MOUNT PROPOSED EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS

SHELTER NOTE:  
VERIFY SHELTER CONSTRUCTION AND AVOID OBSTRUCTIONS ON SHELTER WALL.

**PROPOSED RRU'S MOUNTING DETAIL**

22x34 SCALE: 3/4"=1'-0"  
11x17 SCALE: 3/8"=1'-0"



**EMERSON -48V DC POWER PLANT**

SCALE: N.T.S.



| EXISTING ANTENNA SCHEDULE |           |               |               | PROPOSED ANTENNA SCHEDULE |           |           |               |
|---------------------------|-----------|---------------|---------------|---------------------------|-----------|-----------|---------------|
| SECTOR                    | MAKE      | MODEL#        | SIZE (INCHES) | SECTOR                    | MAKE      | MODEL#    | SIZE (INCHES) |
| ALPHA:                    | POWERWAVE | 7770          | 55X11X5       | ALPHA:                    | POWERWAVE | 7770      | 55X11X5       |
|                           | POWERWAVE | P65-16-XLH-RR | 72X12X6       |                           | QUINTEL   | QS66512-2 | 72X12X9.6     |
| BETA:                     | POWERWAVE | 7770          | 55X11X5       | BETA:                     | POWERWAVE | 7770      | 55X11X5       |
|                           | POWERWAVE | P65-16-XLH-RR | 72X12X6       |                           | QUINTEL   | QS66512-2 | 72X12X9.6     |
| GAMMA:                    | POWERWAVE | 7770          | 55X11X5       | GAMMA:                    | POWERWAVE | 7770      | 55X11X5       |
|                           | POWERWAVE | P65-16-XLH-RR | 72X12X6       |                           | QUINTEL   | QS66512-2 | 72X12X9.6     |

**NOTE:**

- PROPOSED DC POWER PLANT TO BE FED BY (11) 30A BREAKERS (ONE PER RECTIFIER) WIRED WITH A MINIMUM OF #10 AWG CONDUCTORS.
- CONTRACTOR TO VERIFY IF THE BATTERY DISCONNECT NEEDS TO BE REPLACED. RUN (2) #4/0 & (1) #4/0 G FROM THE DISCONNECT TO THE NEW POWER PLANT IF NECESSARY.

**NOTE:**

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

**NOTE:**

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



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SALEM, NH 03079

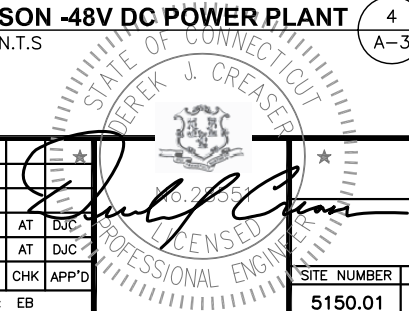
SITE NUMBER: CT5150  
SITE NAME: OLD GREENWICH RAILROAD STATION  
OLD GREENWICH STATION  
OLD GREENWICH, CT 06870  
FAIRFIELD COUNTY



500 ENTERPRISE DRIVE, SUITE 3A  
ROCKY HILL, CT 06067

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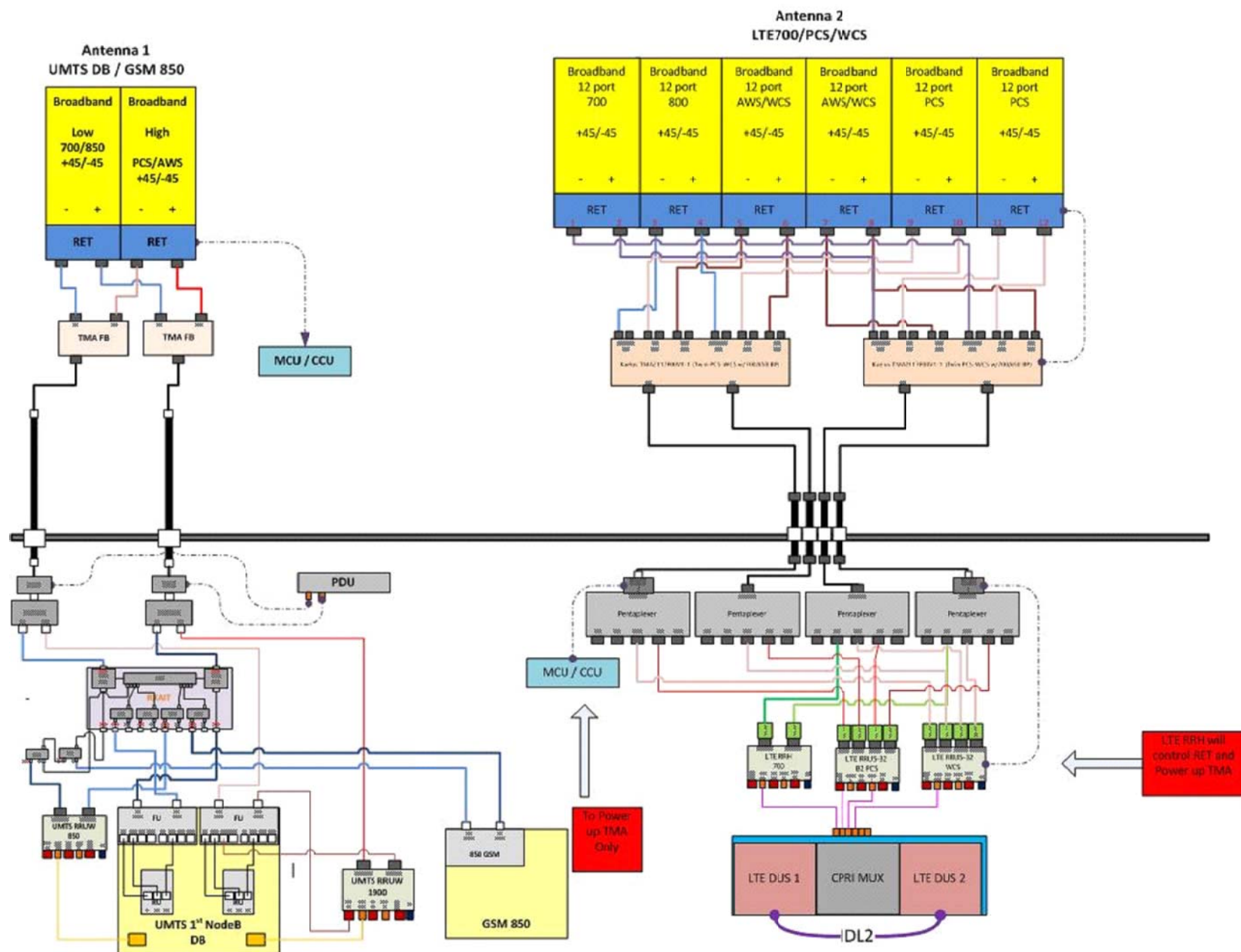


AT&T

DETAILS  
(LTE 3C & BWE)

| SITE NUMBER | DRAWING NUMBER | REV |
|-------------|----------------|-----|
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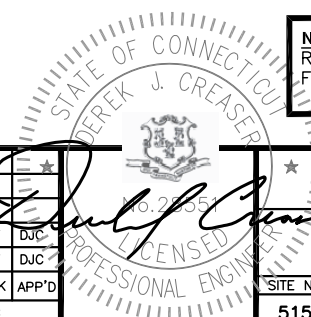




**RF PLUMBING DIAGRAM** 1  
SCALE: N.T.S. RF-1

**NOTE:**  
1. CONTRACTOR TO CONFIRM ALL PARTS.  
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

**NOTE:**  
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



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OLD GREENWICH STATION  
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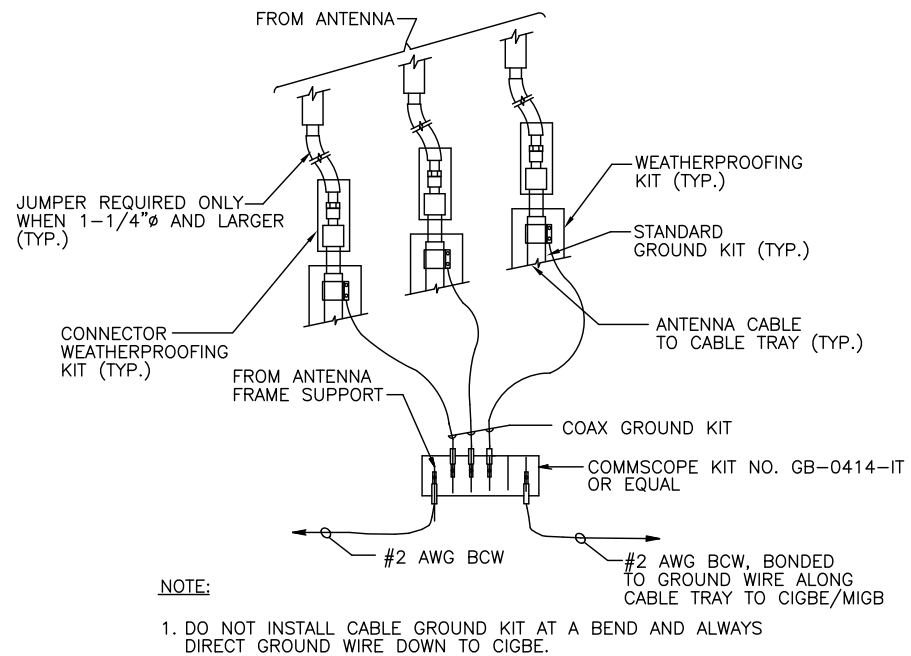
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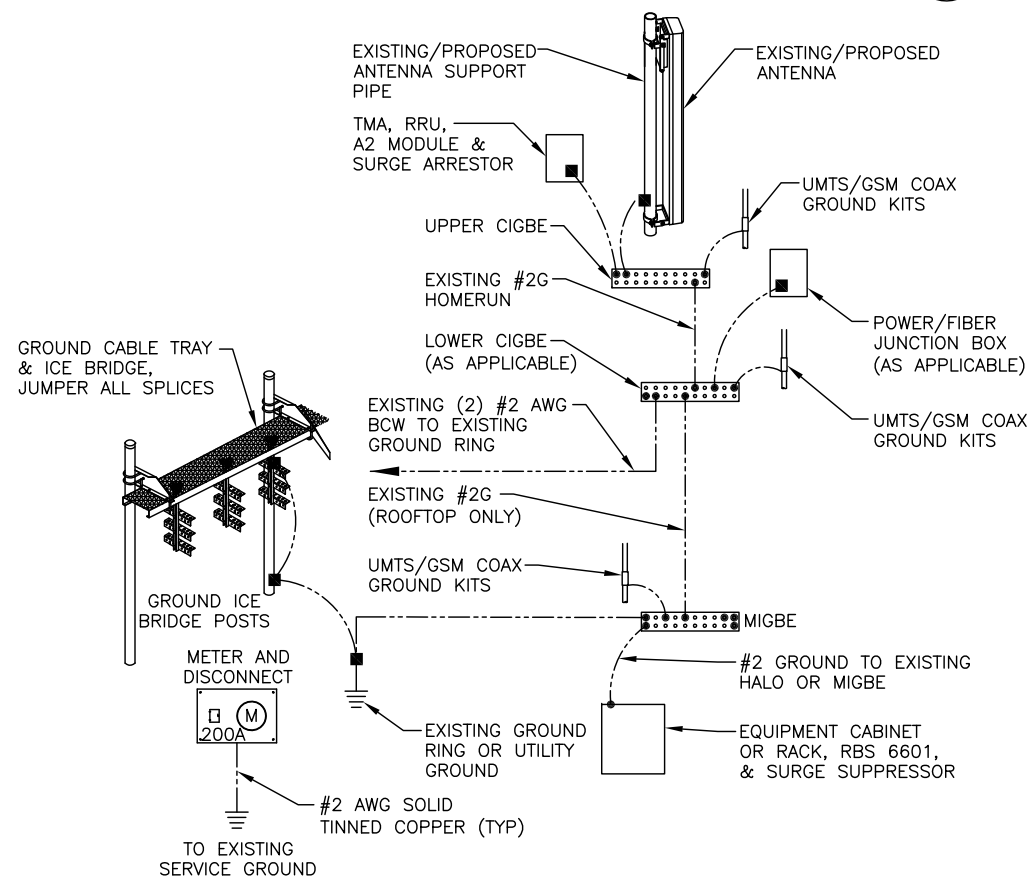
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**AT&T**  
RF PLUMBING DIAGRAM  
(LTE 3C & BWE)

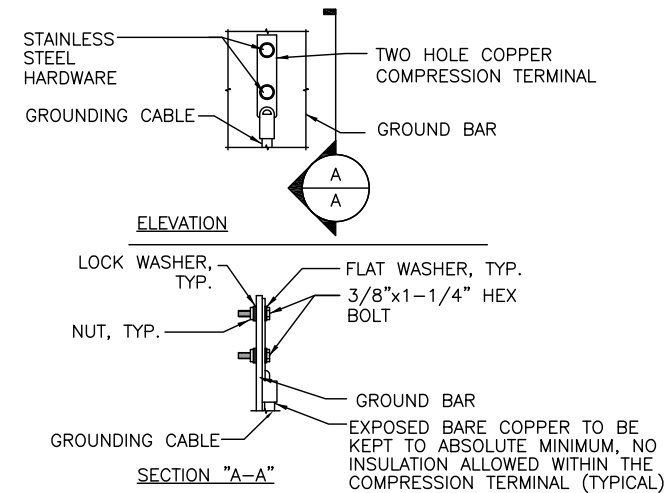
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|-------------|----------------|-----|
| SITE NUMBER | DRAWING NUMBER | REV |
| 5150.01     | RF-1           | 1   |



**GROUND WIRE TO GROUND BAR CONNECTION DETAIL** 1  
SCALE: N.T.S. G-1



**GROUNDING RISER DIAGRAM** 2  
SCALE: N.T.S. G-1



**TYPICAL GROUND BAR CONNECTION DETAIL** 3  
SCALE: N.T.S. G-1

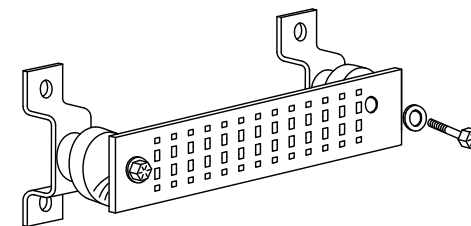
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

**SECTION "P" - SURGE PRODUCERS**

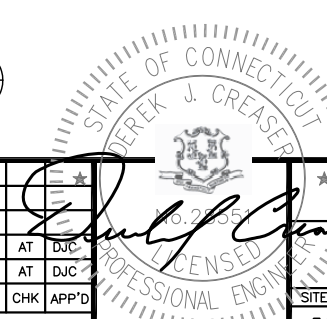
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
- GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
- TELCO GROUND BAR
- COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
- +24V POWER SUPPLY RETURN BAR (#2)
- 48V POWER SUPPLY RETURN BAR (#2)
- RECTIFIER FRAMES.

**SECTION "A" - SURGE ABSORBERS**

- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)



**GROUND BAR - DETAIL** 4  
SCALE: N.T.S. G-1



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|-----|----------|-------------------------|----|-----|-------|
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| A   | 07/07/16 | ISSUED FOR REVIEW       | EB | AT  | DJC   |

SCALE: AS SHOWN    DESIGNED BY: AT    DRAWN BY: EB

|   |                |     |
|---|----------------|-----|
| <b>AT&amp;T</b>                             |                |     |
| <b>GROUNDING DETAILS (LTE 3C &amp; BWE)</b> |                |     |
| SITE NUMBER                                 | DRAWING NUMBER | REV |
| 5150.01                                     | G-1            | 1   |

**Structural Analysis of  
Antenna Mast and Pole**

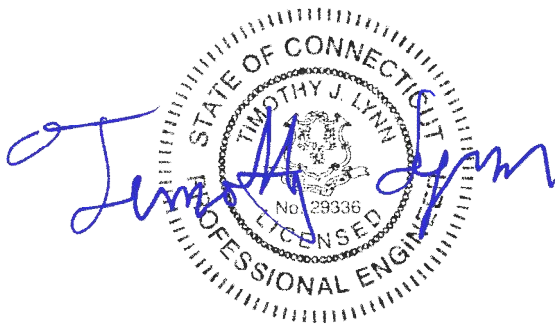
*AT&T Site Ref: CT5150*

*Eversource Structure No. 1255  
95' Electric Transmission Pole*

*Old Greenwich Station  
Greenwich, CT*

*CEN TEK Project No. 16034.04*

*Date: August 29, 2016*



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

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## Introduction

The purpose of this report is to analyze the existing mast and 95' utility pole located at Old Greenwich Station in Greenwich, CT for the proposed antenna and equipment upgrade by AT&T.

The existing/proposed loads consist of the following:

- **AT&T (Existing to Remain):**  
**Antennas:** Three (3) Powerwave 7770 panel antennas and six (6) Powerwave LGP-17201 TMAs mounted one three (3) standoff arms to the existing mast with a RAD center elevation of 105-ft above grade level.  
**Coax Cables:** Twelve (12) 1-5/8" Ø coax cables running on the exterior of the pole.
- **AT&T (Existing to Remove):**  
**Antennas:** Three (3) Powerwave P65-16-XLH-RR panel antennas and three (3) Powerwave TTAW-07BP111-001 TMAs mounted one three (3) standoff arms to the existing mast with a RAD center elevation of 105-ft above grade level.
- **AT&T (Proposed):**  
**Antennas:** Three (3) Qunitel QS66512-2 panel antennas and six (6) PoKaelus TMA2117F00V1-1 TMAs mounted one three (3) standoff arms to the existing mast with a RAD center elevation of 105-ft above grade level.  
**Coax Cables:** Six (6) 1-5/8" Ø coax cables running on the exterior of the pole.

## Primary assumptions used in the analysis

- Allowable steel stresses are defined by AISC-ASD 9<sup>th</sup> edition for design of the antenna 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 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.

## A n a l y s i s

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

The existing mast consisting of a HSS 14"x0.375" x 10' long pipe conforming to ASTM A500 Grade B (Fy = 42ksi) connected at one point to the existing pole was analyzed for its ability to resist loads prescribed by the TIA/EIA standard. Section 5 of this report details these gravity and lateral wind loads. NESC prescribed loads were also applied to the mast in order to obtain reactions needed for analyzing the utility pole structure. These loads are developed in Section 7 of this report. Load cases and combinations used in RISA-3D for TIA/EIA loading and for NESC/NU loading are listed in report Sections 6 and 8, respectively.

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

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

## D e s i g n B a s i s

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.

### ▪ 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 |
| Radial Ice Thickness.....                  | 0.5"    |
| Vertical Overload Capacity Factor.....     | 1.50    |
| Wind Overload Capacity Factor.....         | 2.50    |
| Wire Tension Overload Capacity Factor..... | 1.65    |

#### Load Case 2: NESC Extreme

|                           |                        |
|---------------------------|------------------------|
| Wind Speed.....           | 110 mph <sup>(1)</sup> |
| Radial Ice Thickness..... | 0"                     |

Note 1: NESC C2-2007, Section 25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

▪ **MAST ASSEMBLY ANALYSIS**

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

Load cases considered:

Load Case 1:

Wind Speed..... 85 mph <sup>(2)</sup>  
 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.

**R e s u l t s**

▪ **MAST ASSEMBLY**

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

| Member         | Stress Ratio<br>(% of capacity) | Result      |
|----------------|---------------------------------|-------------|
| HSS 14”x0.375” | 26.4%                           | <b>PASS</b> |

▪ **UTILITY POLE**

This analysis finds that the subject utility pole is adequate to support the proposed 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 Hi-Wind load cases. The detailed analysis results are provided in Section 9 of this report. The analysis results are summarized as follows:

A maximum usage of **96.37%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

| Tower Section | Elevation          | Stress Ratio<br>(% of capacity) | Result      |
|---------------|--------------------|---------------------------------|-------------|
| Tube Number 1 | 50.00-95.00’ (AGL) | 96.37%                          | <b>PASS</b> |

BASE PLATE:

The base plate was found to be within allowable limits from the PLS output based on 16 bend lines.

| Tower Component | Design Limit | Stress Ratio<br>(percentage of capacity) | Result      |
|-----------------|--------------|--|-------------|
| Base Plate      | Bending      | 95.36%                                   | <b>PASS</b> |



▪ FOUNDATION AND ANCHORS

The existing foundation consists of a 10-ft  $\varnothing$  x 15.5-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (12) 2.25"  $\varnothing$ , ASTM A615-75 anchor bolts embedded approximately 6-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01037-60005.

BASE REACTIONS:

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

| Load Case         | Shear      | Axial      | Moment          |
|-------------------|------------|------------|-----------------|
| NESC Heavy Wind   | 11.49 kips | 42.39 kips | 952.13 ft-kips  |
| NESC Extreme Wind | 20.57 kips | 22.05 kips | 1575.54 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<br>(% of capacity) | Result |
|-----------------|--------------|---------------------------------|--------|
| Anchor Bolts    | Tension      | 61.75%                          | PASS   |

FOUNDATION:

The foundation was found to be within allowable limits.

| Foundation                     | Design Limit       | Proposed Loading        | Result |
|--------------------------------|--------------------|-------------------------|--------|
| Reinforced Concrete<br>Caisson | Moment Capacity    | 24.5%                   | PASS   |
|                                | Lateral Deflection | 1.81 in. <sup>(1)</sup> | PASS   |

Note 1: Lateral deflection limited to L/100 per OTRM 059 Rev 4 dated 2/01/10. (L/100 = 15.5\*12/100=1.86-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 Eversource and AT&T. If the existing conditions are different than the information in this report, CENTEK engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:

  
 Timothy J. Lynn, PE  
 Structural Engineer



STANDARD CONDITIONS FOR FURNISHING OF  
PROFESSIONAL ENGINEERING SERVICES ON  
EXISTING STRUCTURES

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

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

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA - 3 D

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

### Modeling Features:

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

### Analysis Features:

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

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

#### Graphics Features:

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

#### Design Features:

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

Results Features:

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

## GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS - TOWER

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

### Modeling Features:

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

### Analysis Features:

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

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

Results Features:

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

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

*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.



## P C S M a s t

The PCS facility (mast, external cable/trays, including the initial and any planned future support platforms, antennas, etc. extending the full height above the top level of the electric transmission structure) shall be designed in accordance with the provisions of TIA/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  $W_i$ ) as specified in TIA section 2.3.16.

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

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

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

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

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



## Attachment A

### NU Design Criteria

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

\* Only for Structures Installed after 2007

### Communication Antennas on Transmission Structures (CL&P & WMECo Only)

|   |  |                    |                                   |
|---|--|--------------------|-----------------------------------|
| <b>Northeast Utilities</b><br>Approved by: KMS (NU) | <b>Design</b><br>NU Confidential Information | <b>OTRM 059</b>    | <b>Rev.1</b><br><b>03/17/2011</b> |
|   |  | <b>Page 7 of 9</b> |                                   |



Shape Factor Criteria shall be per TIA Shape Factors.

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

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

- a) Wireless communication mast for its total height above ground level, including the initial and any planned future equipment (Support Platforms, Antennas, TMA's etc.) above the top of an electric transmission structure.
- b) Conductors and related devices and hardware (wire loads will be provided by NU).
- c) Electric Transmission Structure
  - i) The loads from the wireless communication equipment components based on NESC and NU Criteria in Attachment A, and from the electric conductors shall be applied to the structure at conductor and wireless communication mast attachment points, where those loads transfer to the tower.
  - ii) Shape Factor Multiplier:

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

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

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

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

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

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

Wire Ld

TITLE ATT SITE CT-150, GREENWICH, CT  
 STRUCT # 1255

03/10/2000

CONDUCTOR

|               | AHEAD       | BACK       |
|---------------|-------------|------------|
| BITTERN       | BITTERN     | BITTERN    |
|               | 1272.000    | 1272.000   |
|               | 45/7 ACSR   | 45/7 ACSR  |
| DIAM =        | 1.345       | 1.345      |
| WEIGHT =      | 1.432       | 1.432      |
| TENSION (LBS) | AHEAD 4,609 | BACK 4,609 |

| LOADCASE   | HI WIND |
|------------|---------|
| WIND (PSF) | 20      |
| ICE (IN)   | 0.00    |
| OLF ANG    | 1.15    |
| OLF WIND   | 1.15    |
| OLF WT     | 1.15    |

| STR    | ANGLE | WIND SPAN | WGT SPAN | HI WIND |       |     |
|--------|-------|-----------|----------|---------|-------|-----|
|        |       |           |          | H       | L     | V   |
| BACK   | 0     | 250       | 216      | 644     | -5300 | 356 |
| AHEAD  | 0     | 250       | 216      | 644     | 5300  | 356 |
| TOTALS | 0.0   | 500       | 432      | 1289    | 0     | 711 |

Wire Ld

TITLE AT & T SITE CT-150, GREENWICH, CT  
 STRUCT # 1255

03/10/2000

CONDUCTOR

|               | AHEAD       | BACK       |
|---------------|-------------|------------|
|               | BITTERN ▼   | BITTERN ▼  |
|               | 1272.000    | 1272.000   |
|               | 45/7 ACSR   | 45/7 ACSR  |
| DIAM =        | 1.345       | 1.345      |
| WEIGHT =      | 1.432       | 1.432      |
| TENSION (LBS) | AHEAD 6,000 | BACK 6,000 |

| LOADCASE   | NESC HEAVY ▼ |
|------------|--------------|
| WIND (PSF) | 4            |
| ICE (IN)   | 0.50         |
| OLF ANG    | 1.65         |
| OLF WIND   | 2.50         |
| OLF WT     | 1.50         |

| STR    | ANGLE | WIND SPAN | WGT SPAN | NESC HEAVY |       |      |
|--------|-------|-----------|----------|------------|-------|------|
|        |       |           |          | H          | L     | V    |
| BACK   | 0     | 250       | 216      | 489        | -9900 | 836  |
| AHEAD  | 0     | 250       | 216      | 489        | 9900  | 836  |
| TOTALS | 0.0   | 500       | 432      | 977        | 0     | 1671 |

Wire Ld

TITLE AT&T SITE CT-150, GREENWICH, CT  
 STRUCT #1255

03/10/2000

SHIELD WIRE CONDUCTOR

|               | AHEAD       | BACK       |
|---------------|-------------|------------|
| LINNET        | LINNET      | LINNET     |
|               | 336         | 336        |
|               | 26/7 ACSR   | 26/7 ACSR  |
| DIAM =        | 0.720       | 0.720      |
| WEIGHT =      | 0.462       | 0.462      |
| TENSION (LBS) | AHEAD 2,793 | BACK 2,793 |

| LOADCASE   | HI WIND |
|------------|---------|
| WIND (PSF) | 20      |
| ICE (IN)   | 0.00    |
| OLF ANG    | 1.15    |
| OLF WIND   | 1.15    |
| OLF WT     | 1.15    |

| STR    | ANGLE | WIND SPAN | WGT SPAN | HI WIND |       |     |
|--------|-------|-----------|----------|---------|-------|-----|
|        |       |           |          | H       | L     | V   |
| BACK   | 0     | 250       | 216      | 345     | -3212 | 115 |
| AHEAD  | 0     | 250       | 216      | 345     | 3212  | 115 |
| TOTALS | 0.0   | 500       | 432      | 690     | 0     | 230 |

Wire Ld

TITLE AT&T SITE CT-150, GREENWICH, CT  
 STRUCT # 1255

03/10/2000

SHIELD WIRE CONDUCTOR

| AHEAD  | BACK   |
|--------|--------|
| LINNET | LINNET |

336

336

26/7 ACSR

26/7 ACSR

|          |       |       |
|----------|-------|-------|
| DIAM =   | 0.720 | 0.720 |
| WEIGHT = | 0.462 | 0.462 |

|               |       |       |      |       |
|---------------|-------|-------|------|-------|
| TENSION-(LBS) | AHEAD | 4,000 | BACK | 4,000 |
|---------------|-------|-------|------|-------|

| LOADCASE   | NESC HEAVY |
|------------|------------|
| WIND (PSF) | 4          |
| ICE (IN)   | 0.50       |
| OLF ANG    | 1.65       |
| OLF WIND   | 2.50       |
| OLF WT     | 1.50       |

| STR    | ANGLE | WIND SPAN | WGT SPAN | NESC HEAVY |       |     |
|--------|-------|-----------|----------|------------|-------|-----|
|        |       |           |          | H          | L     | V   |
| BACK   | 0     | 250       | 216      | 358        | -6600 | 395 |
| AHEAD  | 0     | 250       | 216      | 358        | 6600  | 395 |
| TOTALS | 0.0   | 500       | 432      | 717        | 0     | 791 |

☉ AT&T ANTENNAS  
EL. ±105'-0" AGL

☉ TOP CL&P POLE  
EL. ±95'-0" AGL

EXIST. HSS14X0.375  
X 10' LONG PIPE  
MAST

AT&T (EXISTING TO REMAIN): THREE (3) POWERWAVE 7770 PANEL ANTENNAS AND SIX (6) POWERWAVE LGP-17201 TMAs.  
AT&T (EXISTING TO REMOVE): THREE (3) POWERWAVE P65-16-XLH-RR PANEL ANTENNAS AND THREE (3) POWERWAVE TTAW-07BP111-001 TMAs.  
AT&T (PROPOSED): THREE (3) QUINTEL QS66512-2 PANEL ANTENNAS AND SIX (6) KAEIUS TMA2117FOOV1-1 TMAs FLUSH MOUNTED.

2  
EL-1

PROPOSED SIX (6) 1-1/4" DIA. COAX CABLES

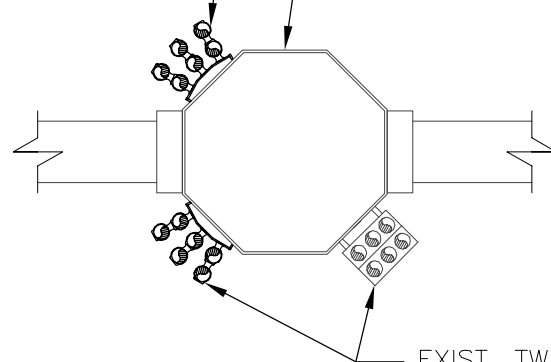
PROPOSED SIX (6) 1-1/4"  $\phi$  COAX CABLES ATTACHED TO THE MONOPOLE/MAST @ 4-FT O.C. W/ VALMONT MONOPOLE TRANSMISSION LINE BRACKET P/N B3254 AND RELATED HARDWARE

EXISTING 95' TALL STEEL POLE STRUCTURE NO. 1255

EXISTING 95' TALL STEEL POLE STRUCTURE NO. 1255

EXIST. TWELVE (12) 1-1/4" DIA. COAX CABLES

EXIST. TWELVE (12) 1-1/4" DIA. COAX CABLES



2  
EL-1

## COAX PLAN

SCALE: NOT TO SCALE

1  
EL-1

## TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

| REVISIONS |         |                   |
|-----------|---------|-------------------|
| NO.       | DATE    | DESCRIPTION       |
| 00        | 8/29/16 | ISSUED FOR REVIEW |
|           |         |                   |
|           |         |                   |
|           |         |                   |

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CT5150  
STRUCTURE 1255  
OLD GREENWICH STATION  
GREENWICH, CT 06870

PROJECT NO: 16034.04  
DRAWN BY: T.J.L.  
CHECKED BY: C.F.C.  
SCALE: AS NOTED  
DATE: 8/29/16

TOWER AND MAST  
ELEVATION  
**EL-1**  
DWG. 1 OF 1



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

**Wind Speeds**

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

**Heights above ground level, z**

|            |                   |    |              |
|------------|-------------------|----|--------------|
| Mast       | $z_{mast} := 100$ | ft | (User Input) |
| Antenna    | $z_{ant} := 105$  | ft | (User Input) |
| Coax Cable | $z_{coax} := 100$ | ft | (User Input) |

**Exposure Coefficients,  $k_z$**

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

|            |   |
|------------|---|
| Mast       | $Kz_{mast} := \left( \frac{z_{mast}}{33} \right)^{\frac{2}{7}} = 1.373$ |
| Antenna    | $Kz_{ant} := \left( \frac{z_{ant}}{33} \right)^{\frac{2}{7}} = 1.392$   |
| Coax Cable | $Kz_{coax} := \left( \frac{z_{coax}}{33} \right)^{\frac{2}{7}} = 1.373$ |

**Velocity Pressure without ice,  $q_z$**

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

|            |   |
|------------|---|
| Mast       | $qz_{mast} := 0.00256 \cdot Kz_{mast} \cdot V^2 = 25.389$ |
| Antenna    | $qz_{ant} := 0.00256 \cdot Kz_{ant} \cdot V^2 = 25.745$   |
| Coax Cable | $qz_{coax} := 0.00256 \cdot Kz_{coax} \cdot V^2 = 25.389$ |

**Velocity Pressure with ice,  $qz_{ICE}$**

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

|            |   |
|------------|---|
| Mast       | $qz_{ICE_{mast}} := 0.00256 \cdot Kz_{mast} \cdot V_i^2 = 19.243$ |
| Antenna    | $qz_{ICE_{ant}} := 0.00256 \cdot Kz_{ant} \cdot V_i^2 = 19.513$   |
| Coax Cable | $qz_{ICE_{coax}} := 0.00256 \cdot Kz_{coax} \cdot V_i^2 = 19.243$ |

**TIA/EIA Common Factors:**

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

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

(per TIA/EIA-222-F-1996 Criteria)

**Existing Mast Data:**

|                          |   |                             |
|--------------------------|---|-----------------------------|
| Mast Shape =             | Round   | (User Input)                |
| Mast Diameter =          | $D_{mast} := 14$ in                                 | (User Input)                |
| Mast Length =            | $L_{mast} := 10$ ft                                 | (User Input)                |
| Mast Thickness =         | $t_{mast} := 0.375$ in                              | (User Input)                |
| Mast Aspect Ratio =      | $A_{r_{mast}} := \frac{12L_{mast}}{D_{mast}} = 8.6$ |                             |
| Mast Force Coefficient = | $CF_{mast} := 0.59$                                 | (per TIA/EIA-222-F Table 1) |

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area =  $A_{mast} := \frac{D_{mast}}{12} = 1.167$  sf/ft

Total Mast Wind Force =  $qz_{mast} G_H CF_{mast} A_{mast} = 30$  plf **BLC 5**

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

Mast Projected Surface Area w/ Ice =  $A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot I_r)}{12} = 1.25$  sf/ft

Total Mast Wind Force w/ Ice =  $qz_{ICE_{mast}} G_H CF_{mast} A_{ICE_{mast}} = 24$  plf **BLC 4**

**Gravity Loads (without ice)**

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

**Gravity Loads (ice only)**

Ice Area per Linear Foot =  $A_{i_{mast}} := \frac{\pi}{4} [(D_{mast} + I_r \cdot 2)^2 - D_{mast}^2] = 22.8$  sq in

Weight of Ice on Mast =  $W_{ICE_{mast}} := I_d \cdot \frac{A_{i_{mast}}}{144} = 9$  plf **BLC 3**

**Development of Wind & Ice Load on Antennas**

(per TIA/EIA-222-F-1996 Criteria)

**Proposed Antenna Data:**

|                             |   |                                  |
|-----------------------------|---|----------------------------------|
| Antenna Model =             | Powerwave 7770                              |                                  |
| Antenna Shape =             | Flat  | (User Input)                     |
| Antenna Height =            | $L_{ant} := 55$                             | in (User Input)                  |
| Antenna Width =             | $W_{ant} := 11$                             | in (User Input)                  |
| Antenna Thickness =         | $T_{ant} := 5$                              | in (User Input)                  |
| Antenna Weight =            | $WT_{ant} := 39$                            | lbs (User Input)                 |
| Number of Antennas =        | $N_{ant} := 3$                              | (User Input)                     |
| Antenna Aspect Ratio =      | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 5.0$ |                                  |
| Antenna Force Coefficient = | $Ca_{ant} = 1.4$                            | (per TIA/EIA-222-F-1996 Table 3) |

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|                                   |  |                  |
|-----------------------------------|--|------------------|
| Surface Area for One Antenna =    | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$                                | sf               |
| Antenna Projected Surface Area =  | $A_{ant} := SA_{ant} \cdot N_{ant} = 12.6$   | sf               |
| <b>Total Antenna Wind Force =</b> | <b><math>F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 768</math></b> | lbs <b>BLC 5</b> |

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|  |  |                  |
|--|--|------------------|
| Surface Area for One Antenna w/ Ice =    | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4.7$                       | sf               |
| Antenna Projected Surface Area w/ Ice =  | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 14$   | sf               |
| <b>Total Antenna Wind Force w/ Ice =</b> | <b><math>F_{ant} := qz_{ICEant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 646</math></b> | lbs <b>BLC 4</b> |

**Gravity Load (without ice)**

**Weight of All Antennas =**

$WT_{ant} \cdot N_{ant} = 117$  lbs **BLC 2**

**Gravity Loads (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 =        | $V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1007$ | cu in            |
| Weight of Ice on Each Antenna =        | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot \rho_d = 33$                              | lbs              |
| <b>Weight of Ice on All Antennas =</b> | <b><math>W_{ICEant} \cdot N_{ant} = 98</math></b>                                   | lbs <b>BLC 3</b> |

**Development of Wind & Ice Load on Antennas**

(per TIA/EIA-222-F-1996 Criteria)

**Proposed Antenna Data:**

|                             |   |                                  |
|-----------------------------|---|----------------------------------|
| Antenna Model =             | Quintel QS66512-2                           |                                  |
| Antenna Shape =             | Flat  | (User Input)                     |
| Antenna Height =            | $L_{ant} := 72$                             | in (User Input)                  |
| Antenna Width =             | $W_{ant} := 12$                             | in (User Input)                  |
| Antenna Thickness =         | $T_{ant} := 9.6$                            | in (User Input)                  |
| Antenna Weight =            | $WT_{ant} := 111$                           | lbs (User Input)                 |
| Number of Antennas =        | $N_{ant} := 3$                              | (User Input)                     |
| Antenna Aspect Ratio =      | $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.0$ |                                  |
| Antenna Force Coefficient = | $Ca_{ant} = 1.4$                            | (per TIA/EIA-222-F-1996 Table 3) |

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|                                  |   |    |
|----------------------------------|---|----|
| Surface Area for One Antenna =   | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$ | sf |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 18$            | sf |

**Total Antenna Wind Force =**

$F_{ant} := qz_{ant} \cdot G_H \cdot Ca_{ant} \cdot A_{ant} = 1096$  lbs **BLC 5**

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|   |  |    |
|---|--|----|
| Surface Area for One Antenna w/ Ice =   | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.6$ | sf |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.8$                     | sf |

**Total Antenna Wind Force w/ Ice =**

$F_{ant} := qz_{ICEant} \cdot G_H \cdot Ca_{ant} \cdot A_{ICEant} = 913$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All Antennas =**

$WT_{ant} \cdot N_{ant} = 333$  lbs **BLC 2**

**Gravity Loads (ice only)**

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

**Development of Wind & Ice Load on TMA's**

(per TIA/EIA-222-F-1996 Criteria)

**Proposed TMA Data:**

|                         |   |                             |
|-------------------------|---|-----------------------------|
| TMA Model =             | Powerwave LGP-17201                         |                             |
| TMA Shape =             | Flat  | (User Input)                |
| TMA Height =            | $L_{TMA} := 14.4$                           | in (User Input)             |
| TMA Width =             | $W_{TMA} := 13.9$                           | in (User Input)             |
| TMA Thickness =         | $T_{TMA} := 3.7$                            | in (User Input)             |
| TMA Weight =            | $WT_{TMA} := 31$                            | lbs (User Input)            |
| Number of TMA's =       | $N_{TMA} := 6$                              | (User Input)                |
| TMA Aspect Ratio =      | $Ar_{TMA} := \frac{L_{TMA}}{T_{TMA}} = 3.9$ |                             |
| TMA Force Coefficient = | $Ca_{TMA} = 1.4$                            | (per TIA/EIA-222-F Table 3) |

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|                              |   |    |
|------------------------------|---|----|
| Surface Area for One TMA =   | $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.4$ | sf |
| TMA Projected Surface Area = | $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 8.3$             | sf |

**Total TMA Wind Force =**

$F_{TMA} := qz_{ant} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 508$  lbs **BLC 5**

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|                                     |  |    |
|-------------------------------------|--|----|
| Surface Area for One TMA w/ Ice =   | $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.6$ | sf |
| TMA Projected Surface Area w/ Ice = | $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 9.6$                      | sf |

**Total TMA Wind Force w/ Ice =**

$Fi_{TMA} := qz_{ICE_{ant}} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 441$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All TMA's =**

$WT_{TMA} \cdot N_{TMA} = 186$  lbs **BLC 2**

**Gravity Load (ice only)**

|                                   |  |                  |
|-----------------------------------|--|------------------|
| Volume of Each TMA =              | $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 741$               | cu in            |
| Volume of Ice on Each TMA =       | $V_{ice} := (L_{TMA} + 1)(W_{TMA} + 1)(T_{TMA} + 1) - V_{TMA} = 338$ | cu in            |
| Weight of Ice on Each TMA =       | $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 11$                   | lbs              |
| <b>Weight of Ice on All TMA's</b> | $W_{ICETMA} \cdot N_{TMA} = 66$                                      | lbs <b>BLC 3</b> |

**Development of Wind & Ice Load on TMA's**

(per TIA/EIA-222-F-1996 Criteria)

**Proposed TMA Data:**

|                         |   |                             |
|-------------------------|---|-----------------------------|
| TMA Model =             | Kaelus TMA2117F00V1-1                     |                             |
| TMA Shape =             | Flat                                      | (User Input)                |
| TMA Height =            | $L_{TMA} := 8.46$                         | in (User Input)             |
| TMA Width =             | $W_{TMA} := 11.81$                        | in (User Input)             |
| TMA Thickness =         | $T_{TMA} := 4.21$                         | in (User Input)             |
| TMA Weight =            | $WT_{TMA} := 18$                          | lbs (User Input)            |
| Number of TMA's =       | $N_{TMA} := 6$                            | (User Input)                |
| TMA Aspect Ratio =      | $Ar_{TMA} := \frac{L_{TMA}}{T_{TMA}} = 2$ |                             |
| TMA Force Coefficient = | $Ca_{TMA} = 1.4$                          | (per TIA/EIA-222-F Table 3) |

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|                              |   |    |
|------------------------------|---|----|
| Surface Area for One TMA =   | $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.7$ | sf |
| TMA Projected Surface Area = | $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 4.2$             | sf |

**Total TMA Wind Force =**

$F_{TMA} := qz_{ant} \cdot G_H \cdot Ca_{TMA} \cdot A_{TMA} = 254$  lbs **BLC 5**

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

|                                     |  |    |
|-------------------------------------|--|----|
| Surface Area for One TMA w/ Ice =   | $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 0.8$ | sf |
| TMA Projected Surface Area w/ Ice = | $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 5$                        | sf |

**Total TMA Wind Force w/ Ice =**

$Fi_{TMA} := qz_{ICE_{ant}} \cdot G_H \cdot Ca_{TMA} \cdot A_{ICETMA} = 233$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All TMA's =**

$WT_{TMA} \cdot N_{TMA} = 108$  lbs **BLC 2**

**Gravity Load (ice only)**

|                             |  |       |
|-----------------------------|--|-------|
| Volume of Each TMA =        | $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 421$                             | cu in |
| Volume of Ice on Each TMA = | $V_{ice} := (L_{TMA} + 1) \cdot (W_{TMA} + 1) \cdot (T_{TMA} + 1) - V_{TMA} = 211$ | cu in |
| Weight of Ice on Each TMA = | $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 7$                                  | lbs   |

**Weight of Ice on All TMA's**

$W_{ICETMA} \cdot N_{TMA} = 41$  lbs **BLC 3**

**Development of Wind & Ice Load on Antenna Mounts**

(per TIA/EIA-222-F-1996 Criteria)

**Existing Mount Data:**

|                           |  |              |                             |
|---------------------------|--|--------------|-----------------------------|
| Mount Type:               | (3) Valmont Standoff Arms for Two Antennas |              |                             |
| Mount Shape =             | Flat                                       | (User Input) |                             |
| Mount Area =              | $A_{mnt} := 6.13$                          | sq ft        | (User Input)                |
| Mount Area w/ Ice =       | $A_{ICE.mnt} := 8.38$                      | sq ft        | (User Input)                |
| Mount Weight =            | $WT_{mnt} := 620$                          | lbs          | (User Input)                |
| Mount Weight w/ Ice =     | $WT_{ICE.mnt} := 770$                      | lbs          | (User Input)                |
| Mount Force Coefficient = | $Ca_{mnt} := 1.4$                          | (User Input) | (per TIA/EIA-222-F Table 3) |

**Wind Load (without ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

Total Mount Wind Force =  $F_{mnt} := qZ_{ant} \cdot G_H \cdot Ca_{mnt} \cdot A_{mnt} = 373$  lbs **BLC 5**

**Wind Load (with ice)**

(per TIA/EIA-222-F-1996 Section 2.3.2)

Total Mount Wind Force w/ Ice =  $F_{i.mnt} := qZ_{ICE.ant} \cdot G_H \cdot Ca_{mnt} \cdot A_{ICE.mnt} = 387$  lbs **BLC 4**

**Gravity Load (without ice)**

Weight of Mount =  $WT_{mnt} = 620$  lbs **BLC 2**

**Gravity Loads (ice only)**

Weight of Ice on Mount =  $WT_{ICE.mnt} - WT_{mnt} = 150$  lbs **BLC 3**

**Development of Wind & Ice Load on Coax Cables**

per TIA/EIA-222-F-96 Criteria

**Coax Cable Data:**

|   |   |                          |
|---|---|--------------------------|
| Coax Type =                                       | HELIAX 1-1/4"   |                          |
| Shape =   | Round   | (User Input)             |
| Coax Outside Diameter =                           | $D_{\text{coax}} := 1.55$   | in (User Input)          |
| Coax Cable Length =                               | $L_{\text{coax}} := 10$   | ft (User Input)          |
| Weight of Coax per foot =                         | $Wt_{\text{coax}} := 0.66$  | plf (User Input)         |
| Total Number of Coax =                            | $N_{\text{coax}} := 18$   | (User Input)             |
| No. of Coax Projecting Outside Face of PCS Mast = | $NP_{\text{coax}} := 4$   | (User Input)             |
| Coax aspect ratio,                                | $Ar_{\text{coax}} := \frac{(L_{\text{coax}} \cdot 12)}{D_{\text{coax}}} = 77.4$ |                          |
| Coax Cable Force Factor Coefficient =             | $Ca_{\text{coax}} = 1.2$  | TIA/EIA-222-F-96 Table 3 |

**Wind Load (without ice)**

per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area =  $A_{\text{coax}} := \frac{(NP_{\text{coax}} \cdot D_{\text{coax}})}{12} = 0.5$  sf/ft

**Total Coax Wind Force =**

$F_{\text{coax}} := Ca_{\text{coax}} \cdot qz_{\text{coax}} \cdot G_H \cdot A_{\text{coax}} = 27$  plf **BLC 5**

**Wind Load (with ice)**

per TIA/EIA-222-F-96 Section 2.3.2

Coax projected surface area w/ Ice =  $A_{\text{ICE}_{\text{coax}}} := \frac{(NP_{\text{coax}} \cdot D_{\text{coax}} + 2 \cdot Ir)}{12} = 0.6$  sf/ft

**Total Coax Wind Force w/ Ice =**

$F_{i_{\text{coax}}} := Ca_{\text{coax}} \cdot qz_{\text{ICE}_{\text{coax}}} \cdot G_H \cdot A_{\text{ICE}_{\text{coax}}} = 23$  plf **BLC 4**

**Gravity Loads (without ice)**

**Weight of all cables w/o ice**

$WT_{\text{coax}} := Wt_{\text{coax}} \cdot N_{\text{coax}} = 12$  plf **BLC 2**

**Gravity Loads (ice only)**

**Ice Area per Linear Foot =**

$A_{i_{\text{coax}}} := \frac{\pi}{4} \left[ (D_{\text{coax}} + 2 \cdot Ir)^2 - D_{\text{coax}}^2 \right] = 3.2$  sq in

**Ice Weight All Coax per foot =**

$WT_{i_{\text{coax}}} := N_{\text{coax}} \cdot Id \cdot \frac{A_{i_{\text{coax}}}}{144} = 23$  plf **BLC 3**



**CEN TEK engineering, INC.**  
**Consulting Engineers**  
63-2 North Branford Road  
Branford, CT 06405

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

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

Date: 8/29/16

Prepared by: T.J.L.

Checked by: C.F.C.

Job No. 16034.04

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

Footnotes:

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

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

Location: **Greenwich, CT**

Date: 8/29/16

Prepared by: T.J.L.

Checked by: C.F.C.

Job No. 16034.04

| Load Combination | Description        | Envelope Wind |        |         |     |        |     |        |     |        |     |        |     |        |  |
|------------------|--------------------|---------------|--------|---------|-----|--------|-----|--------|-----|--------|-----|--------|-----|--------|--|
|                  |                    | Soultion      | Factor | P-Delta | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor | BLC | Factor |  |
| 1                | TIA/EIA Wind + Ice |               | 1      |         | 1   | 1      | 2   | 1      | 3   | 1      | 4   | 1      |     |        |  |
| 2                | TIA/EIA Wind       |               | 1      |         | 1   | 1      | 2   | 1      | 5   | 1      |     |        |     |        |  |

Footnotes:  
 (1) BLC = Basic Load Case



**Global**

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

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

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



**Global, Continued**

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

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

**Hot Rolled Steel Properties**

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



Company : CENTEK Engineering, INC.  
 Designer : tjf, cfc  
 Job Number : 16034.04 / CT5150  
 Model Name : Structure # 1255 - Mast

Aug 29, 2016

Checked By: \_\_\_\_\_

### Hot Rolled Steel Design Parameters

|   | Label | Shape         | Leng... | Lbyy[ft] | Lbzz[ft] | Lcomp ... | Lcomp ... | Kyy | Kzz | Cm...Cm... | Cb | y s... | z s... | Funci... |
|---|-------|---------------|---------|----------|----------|-----------|-----------|-----|-----|------------|----|--------|--------|----------|
| 1 | M1    | Existing Mast | 10      |          |          |           |           |     |     |            |    |        |        | Lateral  |

### Hot Rolled Steel Section Sets

|   | Label         | Shape       | Type | Design List | Material   | Design ... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---------------|-------------|------|-------------|------------|------------|---------|-----------|-----------|---------|
| 1 | Existing Mast | HSS14x0.375 | Beam | Pipe        | A500 Gr.42 | Typical    | 15      | 349       | 349       | 698     |

### Member Primary Data

|   | Label | I Joint | J Joint | K Joint | Rotate(d... | Section/Shape | Type | Design List | Material   | Design R... |
|---|-------|---------|---------|---------|-------------|---------------|------|-------------|------------|-------------|
| 1 | M1    | N1      | N4      |         |             | Existing Mast | Beam | Pipe        | A500 Gr.42 | Typical     |

### Joint Coordinates and Temperatures

|   | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From D... |
|---|-------|--------|--------|--------|----------|------------------|
| 1 | N1    | 0      | 0      | 0      | 0        |                  |
| 2 | N4    | 0      | 10     | 0      | 0        |                  |

### Joint Boundary Conditions

|   | Joint Label | X [k/in] | Y [k/in] | Z [k/in] | X Rot.[k-ft/rad] | Y Rot.[k-ft/rad] | Z Rot.[k-ft/rad] | Footing |
|---|-------------|----------|----------|----------|------------------|------------------|------------------|---------|
| 1 | N1          | Reaction | Reaction | Reaction | Reaction         | Reaction         | Reaction         |         |

### Member Point Loads (BLC 2 : Weight of Appurtenances)

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.117             | 9              |
| 2 | M1           | Y         | -.333             | 9              |
| 3 | M1           | Y         | -.186             | 9              |
| 4 | M1           | Y         | -.108             | 9              |
| 5 | M1           | Y         | -.62              | 9              |

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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.098             | 9              |
| 2 | M1           | Y         | -.172             | 9              |
| 3 | M1           | Y         | -.066             | 9              |
| 4 | M1           | Y         | -.041             | 9              |
| 5 | M1           | Y         | -.15              | 9              |

### Member Point Loads (BLC 4 : TIA/EIA Wind with Ice on PCS Str)

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .646              | 9              |
| 2 | M1           | X         | .913              | 9              |
| 3 | M1           | X         | .441              | 9              |
| 4 | M1           | X         | .233              | 9              |
| 5 | M1           | X         | .387              | 9              |



**Member Point Loads (BLC 5 : TIA/EIA Wind)**

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .768              | 9              |
| 2 | M1           | X         | 1.096             | 9              |
| 3 | M1           | X         | .508              | 9              |
| 4 | M1           | X         | .254              | 9              |
| 5 | M1           | X         | .373              | 9              |

**Joint Loads and Enforced Displacements**

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

**Member Distributed Loads (BLC 2 : Weight of Appurtenances)**

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | Y         | -.012                   | -.012                 | 0                    | 0                  |

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

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | Y         | -.009                   | -.009                 | 0                    | 0                  |
| 2 | M1           | Y         | -.023                   | -.023                 | 0                    | 0                  |

**Member Distributed Loads (BLC 4 : TIA/EIA Wind with Ice on PCS Str)**

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | X         | .024                    | .024                  | 0                    | 0                  |
| 2 | M1           | X         | .023                    | .023                  | 0                    | 0                  |

**Member Distributed Loads (BLC 5 : TIA/EIA Wind)**

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | X         | .03                     | .03                   | 0                    | 0                  |
| 2 | M1           | X         | .027                    | .027                  | 0                    | 0                  |

**Basic Load Cases**

|   | BLC Description                  | Category | X Gra... | Y Gravity | Z Gra... | Joint | Point | Distrib... | Area(... | Surfac... |
|---|----------------------------------|----------|----------|-----------|----------|-------|-------|------------|----------|-----------|
| 1 | Self Weight                      | None     |          | -1        |          |       |       |            |          |           |
| 2 | Weight of Appurtenances          | None     |          |           |          |       | 5     | 1          |          |           |
| 3 | Weight of Ice Only               | None     |          |           |          |       | 5     | 2          |          |           |
| 4 | TIA/EIA Wind with Ice on PCS ... | None     |          |           |          |       | 5     | 2          |          |           |
| 5 | TIA/EIA Wind                     | None     |          |           |          |       | 5     | 2          |          |           |

**Load Combinations**

|   | Description  | Sol... | PDelta | SR... | BLC Fact.. | BLC Fact.. | BLC Fact.. | BLC Fact.. | BLC Fact.. | BLC Fact.. | BLC Fact.. | BLC Fact.. | BLC Fact.. |
|---|--------------|--------|--------|-------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 | TIA/EIA Wind | Yes    |        |       | 1          | 1          | 2          | 1          | 3          | 1          | 4          | 1          |            |
| 2 | TIA/EIA Wind | Yes    |        |       | 1          | 1          | 2          | 1          | 5          | 1          |            |            |            |
| 3 | Self Weight  |        |        |       | 1          | 1          |            |            |            |            |            |            |            |



### Envelope Member Section Forces

| Member | Sec |   | Axial[k] | LC    | y Shear... | LC    | z Shear... | LC | Torque[...] | LC | y-y Mo... | LC | z-z Mo... | LC     |   |
|--------|-----|---|----------|-------|------------|-------|------------|----|-------------|----|-----------|----|-----------|--------|---|
| 1      | M1  | 1 | max      | 2.841 | 1          | 3.569 | 2          | 0  | 1           | 0  | 1         | 0  | 1         | 29.841 | 2 |
| 2      |     |   | min      | 1.994 | 2          | 3.09  | 1          | 0  | 1           | 0  | 1         | 0  | 1         | 25.93  | 1 |
| 3      |     | 2 | max      | 2.604 | 1          | 3.426 | 2          | 0  | 1           | 0  | 1         | 0  | 1         | 21.097 | 2 |
| 4      |     |   | min      | 1.837 | 2          | 2.972 | 1          | 0  | 1           | 0  | 1         | 0  | 1         | 18.352 | 1 |
| 5      |     | 3 | max      | 2.366 | 1          | 3.284 | 2          | 0  | 1           | 0  | 1         | 0  | 1         | 12.708 | 2 |
| 6      |     |   | min      | 1.679 | 2          | 2.855 | 1          | 0  | 1           | 0  | 1         | 0  | 1         | 11.068 | 1 |
| 7      |     | 4 | max      | 2.129 | 1          | 3.141 | 2          | 0  | 1           | 0  | 1         | 0  | 1         | 4.677  | 2 |
| 8      |     |   | min      | 1.522 | 2          | 2.737 | 1          | 0  | 1           | 0  | 1         | 0  | 1         | 4.077  | 1 |
| 9      |     | 5 | max      | 0     | 1          | 0     | 1          | 0  | 1           | 0  | 1         | 0  | 1         | 0      | 1 |
| 10     |     |   | min      | 0     | 1          | 0     | 1          | 0  | 1           | 0  | 1         | 0  | 1         | 0      | 1 |

### Envelope Member Section Stresses

| Member | Sec |   | Axial[ksi] | LC   | y Shear[...] | LC   | z Shear[...] | LC | y-Top[ksi] | LC     | y-Bot[ksi] | LC    | z-Top[ksi] | LC | z-Bot[ksi] | LC |   |
|--------|-----|---|------------|------|--------------|------|--------------|----|------------|--------|------------|-------|------------|----|------------|----|---|
| 1      | M1  | 1 | max        | .189 | 1            | .476 | 2            | 0  | 1          | -6.241 | 1          | 7.182 | 2          | 0  | 1          | 0  | 1 |
| 2      |     |   | min        | .133 | 2            | .412 | 1            | 0  | 1          | -7.182 | 2          | 6.241 | 1          | 0  | 1          | 0  | 1 |
| 3      |     | 2 | max        | .174 | 1            | .457 | 2            | 0  | 1          | -4.417 | 1          | 5.078 | 2          | 0  | 1          | 0  | 1 |
| 4      |     |   | min        | .122 | 2            | .396 | 1            | 0  | 1          | -5.078 | 2          | 4.417 | 1          | 0  | 1          | 0  | 1 |
| 5      |     | 3 | max        | .158 | 1            | .438 | 2            | 0  | 1          | -2.664 | 1          | 3.059 | 2          | 0  | 1          | 0  | 1 |
| 6      |     |   | min        | .112 | 2            | .381 | 1            | 0  | 1          | -3.059 | 2          | 2.664 | 1          | 0  | 1          | 0  | 1 |
| 7      |     | 4 | max        | .142 | 1            | .419 | 2            | 0  | 1          | -.981  | 1          | 1.126 | 2          | 0  | 1          | 0  | 1 |
| 8      |     |   | min        | .101 | 2            | .365 | 1            | 0  | 1          | -1.126 | 2          | .981  | 1          | 0  | 1          | 0  | 1 |
| 9      |     | 5 | max        | 0    | 1            | 0    | 1            | 0  | 1          | 0      | 1          | 0     | 1          | 0  | 1          | 0  | 1 |
| 10     |     |   | min        | 0    | 1            | 0    | 1            | 0  | 1          | 0      | 1          | 0     | 1          | 0  | 1          | 0  | 1 |

### Envelope Joint Reactions

| Joint |         | X [k] | LC     | Y [k] | LC    | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC     |   |
|-------|---------|-------|--------|-------|-------|-------|----|-----------|----|-----------|----|-----------|--------|---|
| 1     | N1      | max   | -3.09  | 1     | 2.841 | 1     | 0  | 1         | 0  | 1         | 0  | 1         | 29.841 | 2 |
| 2     |         | min   | -3.569 | 2     | 1.994 | 2     | 0  | 1         | 0  | 1         | 0  | 1         | 25.93  | 1 |
| 3     | Totals: | max   | -3.09  | 1     | 2.841 | 1     | 0  | 1         |    |           |    |           |        |   |
| 4     |         | min   | -3.569 | 2     | 1.994 | 2     | 0  | 1         |    |           |    |           |        |   |

### Envelope Joint Displacements

| Joint |    | X [in] | LC   | Y [in] | LC | Z [in] | LC | X Rotation... | LC | Y Rotation... | LC | Z Rotation... | LC        |   |
|-------|----|--------|------|--------|----|--------|----|---------------|----|---------------|----|---------------|-----------|---|
| 1     | N1 | max    | 0    | 2      | 0  | 2      | 0  | 1             | 0  | 1             | 0  | 1             | 0         | 1 |
| 2     |    | min    | 0    | 1      | 0  | 1      | 0  | 1             | 0  | 1             | 0  | 1             | 0         | 2 |
| 3     | N4 | max    | .162 | 2      | 0  | 2      | 0  | 1             | 0  | 1             | 0  | 1             | -1.621e-3 | 1 |
| 4     |    | min    | .141 | 1      | 0  | 1      | 0  | 1             | 0  | 1             | 0  | 1             | -1.863e-3 | 2 |

### Envelope AISC ASD Steel Code Checks

| Me... | Shape | Code Check | Loc[ft] | LC | Shear ... | Loc[ft] | Dir | LC | Fa ...Ft [...] | Fb y-y [ksi] | Fb ... | AS...    |
|-------|-------|------------|---------|----|-----------|---------|-----|----|----------------|--------------|--------|----------|
| 1     | M1    | HSS14...   | .264    | 0  | 2         | .028    | 0   | 2  | 23...25.2      | 27.72        | 27.... | 6...H1-2 |



Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 16034.04 / CT5150  
Model Name : Structure # 1255 - Mast

Aug 29, 2016

Checked By: \_\_\_\_\_

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### Joint Reactions

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|   | LC | Joint Label | X [k] | Y [k]    | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|----|-------------|-------|----------|-------|-----------|-----------|-----------|
| 1 | 1  | N1          | -3.09 | 2.841    | 0     | 0         | 0         | 25.93     |
| 2 | 1  | Totals:     | -3.09 | 2.841    | 0     |           |           |           |
| 3 | 1  | COG (ft):   | X: 0  | Y: 7.662 | Z: 0  |           |           |           |





Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 16034.04 / CT5150  
Model Name : Structure # 1255 - Mast

Aug 29, 2016

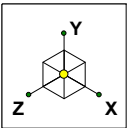
Checked By: \_\_\_\_\_

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### Joint Reactions

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|   | LC | Joint Label | X [k]  | Y [k]    | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|----|-------------|--------|----------|-------|-----------|-----------|-----------|
| 1 | 2  | N1          | -3.569 | 1.994    | 0     | 0         | 0         | 29.841    |
| 2 | 2  | Totals:     | -3.569 | 1.994    | 0     |           |           |           |
| 3 | 2  | COG (ft):   | X: 0   | Y: 7.736 | Z: 0  |           |           |           |



| Code Check |         |
|------------|---------|
| Black      | No Calc |
| Red        | > 1.0   |
| Magenta    | .90-1.0 |
| Green      | .75-.90 |
| Cyan       | .50-.75 |
| Blue       | 0-.50   |

N4

N1

CENTEK Engineering, INC.

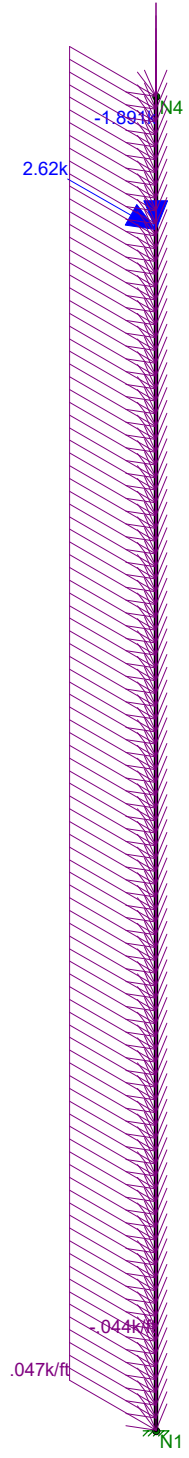
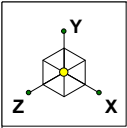
tjl, cfc

16034.04 / CT5150

Structure # 1255 - Mast  
Unity Check

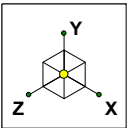
Aug 29, 2016 at 4:13 PM

EIA-TIA Loading.r3d



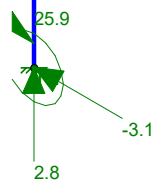
Loads: LC 1, TIA/EIA Wind

|                          |                         |                         |
|--------------------------|-------------------------|-------------------------|
| CENTEK Engineering, INC. |                         |                         |
| tjl, cfc                 | Structure # 1255 - Mast | Aug 29, 2016 at 4:13 PM |
| 16034.04 / CT5150        | LC #1 Loads             | EIA-TIA Loading.r3d     |



| Code Check |         |
|------------|---------|
| Black      | No Calc |
| Red        | > 1.0   |
| Magenta    | .90-1.0 |
| Green      | .75-.90 |
| Cyan       | .50-.75 |
| Blue       | 0-.50   |

M4



CENTEK Engineering, INC.

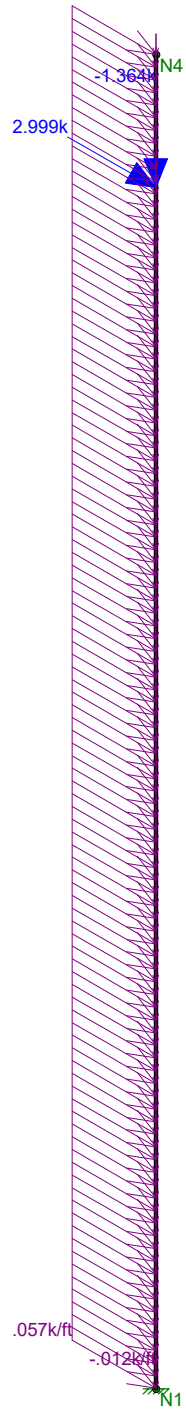
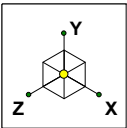
tjl, cfc

16034.04 / CT5150

Structure # 1255 - Mast  
LC #1 Reactions and Deflected Shape

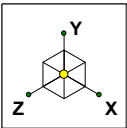
Aug 29, 2016 at 4:14 PM

EIA-TIA Loading.r3d



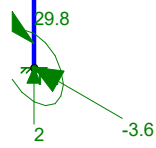
Loads: LC 2, TIA/EIA Wind

|                          |  |                         |
|--------------------------|--|-------------------------|
| CENTEK Engineering, INC. | Structure # 1255 - Mast<br>LC #2 Loads | Aug 29, 2016 at 4:13 PM |
| tjl, cfc                 |  | EIA-TIA Loading.r3d     |
| 16034.04 / CT5150        |  |                         |



| Code Check |         |
|------------|---------|
| Black      | No Calc |
| Red        | > 1.0   |
| Magenta    | .90-1.0 |
| Green      | .75-.90 |
| Cyan       | .50-.75 |
| Blue       | 0-.50   |

N4



CENTEK Engineering, INC.

tjl, cfc

16034.04 / CT5150

Structure # 1255 - Mast  
LC #2 Reactions and Deflected Shape

Aug 29, 2016 at 4:15 PM

EIA-TIA Loading.r3d

**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 := 105 | 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 = 
$$Kz := 2.01 \cdot \left( \frac{TME}{900} \right)^{\frac{2}{9.5}} = 1.279$$
 (NESC 2007 Table 250-2)

Exposure Factor = 
$$Es := 0.346 \left[ \frac{33}{(0.67 \cdot TME)} \right]^{\frac{1}{7}} = 0.311$$
 (NESC 2007 Table 250-3)

Response Term = 
$$Bs := \frac{1}{\left( 1 + 0.375 \cdot \frac{TME}{220} \right)} = 0.848$$
 (NESC 2007 Table 250-3)

Gust Response Factor = 
$$Grf := \frac{\left[ 1 + \left( 2.7 \cdot Es \cdot Bs \cdot \frac{1}{2} \right) \right]}{kv^2} = 0.867$$
 (NESC 2007 Table 250-3)

Wind Pressure = 
$$qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 34.3$$
 psf (NESC 2007 Section 250.C.2)

**Shape Factors**

|  |                            |              |
|--|----------------------------|--------------|
| Shape Factor for Round Members =                           | Cd <sub>R</sub> := 1.3     | (User Input) |
| Shape Factor for Flat Members =                            | Cd <sub>F</sub> := 1.6     | (User Input) |
| Shape Factor for Coax Cables Attached to Outside of P de = | Cd <sub>coax</sub> := 1.45 | (User Input) |

NUS Design Criteria Issued April 12, 2007

**Overload Factors**

NU Design Criteria Table

**Overload Factors for Wind Loads:**

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

**Overload Factors for Vertical Loads:**

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

**Development of Wind & Ice Load on PCS Mast**

**Proposed PCS Mast Data:**

(HSS14x0.375)

|                  |                        |              |
|------------------|------------------------|--------------|
| Mast Shape =     | Round                  | (User Input) |
| Mast Diameter =  | $D_{mast} := 14$ in    | (User Input) |
| Mast Length =    | $L_{mast} := 10$ ft    | (User Input) |
| Mast Thickness = | $t_{mast} := 0.375$ in | (User Input) |

**Wind Load (NESE Extreme)**

Mast Projected Surface Area =  $A_{mast} := \frac{D_{mast}}{12} = 1.167$  sf/ft

Total Mast Wind Force (Below NU Structure) =  $qz \cdot C_d \cdot A_{mast} = 65$  plf **BLC 5**

**Wind Load (NESE Heavy)**

Mast Projected Surface Area w/ Ice =  $A_{ICE_{mast}} := \frac{(D_{mast} + 2 \cdot I_r)}{12} = 1.25$  sf/ft

Total Mast Wind Force w/ Ice =  $p \cdot C_d \cdot A_{ICE_{mast}} = 7$  plf **BLC 4**

**Gravity Loads (without ice)**

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

**Gravity Loads (ice only)**

Ice Area per Linear Foot =  $A_{i_{mast}} := \frac{\pi}{4} [(D_{mast} + I_r \cdot 2)^2 - D_{mast}^2] = 22.8$  sq in

Weight of Ice on Mast =  $W_{ICE_{mast}} := I_d \cdot \frac{A_{i_{mast}}}{144} = 9$  plf **BLC 3**



**Development of Wind & Ice Load on Antennas**

**Proposed Antenna Data:**

|                      |                  |                  |
|----------------------|------------------|------------------|
| Antenna Model =      | Powerwave 7770   |                  |
| Antenna Shape =      | Flat             | (User Input)     |
| Antenna Height =     | $L_{ant} := 55$  | in (User Input)  |
| Antenna Width =      | $W_{ant} := 11$  | in (User Input)  |
| Antenna Thickness =  | $T_{ant} := 5$   | in (User Input)  |
| Antenna Weight =     | $WT_{ant} := 39$ | lbs (User Input) |
| Number of Antennas = | $N_{ant} := 3$   | (User Input)     |

**Wind Load (NESC Extreme)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

|                                  |   |    |
|----------------------------------|---|----|
| Surface Area for One Antenna =   | $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.2$ | sf |
| Antenna Projected Surface Area = | $A_{ant} := SA_{ant} \cdot N_{ant} = 12.6$            | sf |

**Total Antenna Wind Force =**  $F_{ant} := qz \cdot Cd_F \cdot A_{ant} = 865$  lbs **BLC 5**

**Wind Load (NESC Heavy)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

|   |  |    |
|---|--|----|
| Surface Area for One Antenna w/ Ice =   | $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 4.7$ | sf |
| Antenna Projected Surface Area w/ Ice = | $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 14$                       | sf |

**Total Antenna Wind Force w/ Ice =**  $F_{i_{ant}} := p \cdot Cd_F \cdot A_{ICEant} = 90$  lbs **BLC 4**

**Gravity Load (without ice)**

**Weight of All Antennas =**  $WT_{ant} \cdot N_{ant} = 117$  lbs **BLC 2**

**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 = | $V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1007$ | cu in |
| Weight of Ice on Each Antenna = | $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 33$                                  | lbs   |

**Weight of Ice on All Antennas =**  $W_{ICEant} \cdot N_{ant} = 98$  lbs **BLC 3**

**Development of Wind & Ice Load on Antennas**

**Proposed Antenna Data:**

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

**Wind Load (NESC Extreme)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

Surface Area for One Antenna =  $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 6$  sf

Antenna Projected Surface Area =  $A_{ant} := SA_{ant} \cdot N_{ant} = 18$  sf

Total Antenna Wind Force =  $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1236$  lbs **BLC 5**

**Wind Load (NESC Heavy)**

*Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously*

Surface Area for One Antenna w/ Ice =  $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 6.6$  sf

Antenna Projected Surface Area w/ Ice =  $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.8$  sf

Total Antenna Wind Force w/ Ice =  $F_{iant} := p \cdot Cd_F \cdot A_{ICEant} = 127$  lbs **BLC 4**

**Gravity Load (without ice)**

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

**Gravity Load (ice only)**

Volume of Each Antenna =  $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 8294$  cu in

Volume of Ice on Each Antenna =  $V_{ice} := (L_{ant} + 1) \cdot (W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1765$  cu in

Weight of Ice on Each Antenna =  $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 57$  lbs

Weight of Ice on All Antennas =  $W_{ICEant} \cdot N_{ant} = 172$  lbs **BLC 3**

**Development of Wind & Ice Load on TMA's**

**Proposed TMA Data:**

|                   |                                   |
|-------------------|-----------------------------------|
| TMA Model =       | Powerwave LGP-17201               |
| TMA Shape =       | Flat (User Input)                 |
| TMA Height =      | $L_{TMA} := 14.4$ in (User Input) |
| TMA Width =       | $W_{TMA} := 13.9$ in (User Input) |
| TMA Thickness =   | $T_{TMA} := 3.7$ in (User Input)  |
| TMA Weight =      | $WT_{TMA} := 31$ lbs (User Input) |
| Number of TMA's = | $N_{TMA} := 6$ (User Input)       |

**Wind Load (NESC Extreme)**

|                               |   |                  |
|-------------------------------|---|------------------|
| Surface Area for One TMA =    | $SA_{TMA} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 1.4$                   | sf               |
| TMA Projected Surface Area =  | $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 8.3$                               | sf               |
| <b>Total TMA Wind Force =</b> | <b><math>F_{TMA} := qz \cdot C_d \cdot A_{TMA} \cdot m = 573</math></b> | lbs <b>BLC 5</b> |

**Wind Load (NESC Heavy)**

|                                      |  |                  |
|--------------------------------------|--|------------------|
| Surface Area for One TMA w/ Ice =    | $SA_{ICETMA} := \frac{(L_{TMA} + 1) \cdot (W_{TMA} + 1)}{144} = 1.6$ | sf               |
| TMA Projected Surface Area w/ Ice =  | $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 9.6$                      | sf               |
| <b>Total TMA Wind Force w/ Ice =</b> | <b><math>F_{i_{TMA}} := p \cdot C_d \cdot A_{ICETMA} = 61</math></b> | lbs <b>BLC 4</b> |

**Gravity Load (without ice)**

|                              |  |                  |
|------------------------------|--|------------------|
| <b>Weight of All TMA's =</b> | <b><math>WT_{TMA} \cdot N_{TMA} = 186</math></b> | lbs <b>BLC 2</b> |
|------------------------------|--|------------------|

**Gravity Load (ice only)**

|                                   |  |                  |
|-----------------------------------|--|------------------|
| Volume of Each TMA =              | $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 741$                             | cu in            |
| Volume of Ice on Each TMA =       | $V_{ice} := (L_{TMA} + 1) \cdot (W_{TMA} + 1) \cdot (T_{TMA} + 1) - V_{TMA} = 338$ | cu in            |
| Weight of Ice on Each TMA =       | $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot \rho_d = 11$                             | lbs              |
| <b>Weight of Ice on All TMA's</b> | <b><math>W_{ICETMA} \cdot N_{TMA} = 66</math></b>                                  | lbs <b>BLC 3</b> |

**Development of Wind & Ice Load on TMA's**

**Proposed TMA Data:**

|                   |                                    |
|-------------------|------------------------------------|
| TMA Model =       | Kaelus TMA2117F00V1-1              |
| TMA Shape =       | Flat (User Input)                  |
| TMA Height =      | $L_{TMA} := 8.46$ in (User Input)  |
| TMA Width =       | $W_{TMA} := 11.81$ in (User Input) |
| TMA Thickness =   | $T_{TMA} := 4.21$ in (User Input)  |
| TMA Weight =      | $W_{TMA} := 18$ lbs (User Input)   |
| Number of TMA's = | $N_{TMA} := 6$ (User Input)        |

**Wind Load (NESC Extreme)**

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

TMA Projected Surface Area =  $A_{TMA} := SA_{TMA} \cdot N_{TMA} = 4.2$  sf

Total TMA Wind Force =  $F_{TMA} := qz \cdot C_d \cdot A_{TMA} \cdot m = 286$  lbs **BLC 5**

**Wind Load (NESC Heavy)**

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

TMA Projected Surface Area w/ Ice =  $A_{ICETMA} := SA_{ICETMA} \cdot N_{TMA} = 5$  sf

Total TMA Wind Force w/ Ice =  $F_{i_{TMA}} := p \cdot C_d \cdot A_{ICETMA} = 32$  lbs **BLC 4**

**Gravity Load (without ice)**

Weight of All TMA's =  $W_{TMA} \cdot N_{TMA} = 108$  lbs **BLC 2**

**Gravity Load (ice only)**

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

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

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

Weight of Ice on All TMA's =  $W_{ICETMA} \cdot N_{TMA} = 41$  lbs **BLC 3**

**Development of Wind & Ice Load on Mounts**

**Existing Mount Data:**

Mount Type =  
 Mount Shape =  
 Mount Area =  
 Mount Area w/ Ice =  
 Mount Weight =  
 Mount Weight w/ Ice =

(AT&T)

(3) Valmont Standoff Arms for Two Antennas

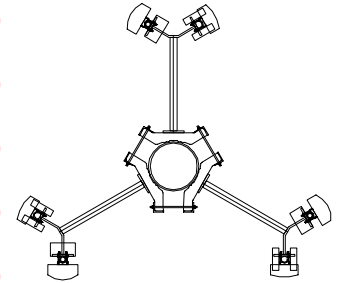
Flat (User Input)

$A_{mnt} := 6.13$  sq ft (User Input)

$A_{ICEmnt} := 8.38$  sq ft (User Input)

$WT_{mnt} := 620$  lbs (User Input)

$WT_{ICEmnt} := 770$  lbs (User Input)



**Wind Load (NESC Extreme)**

Total Mount Wind Force =

$F_{mnt} := qz \cdot C_d F \cdot A_{mnt} = 421$

lbs **BLC 5**

**Wind Load (NESC Heavy)**

Total Mount Wind Force w/ Ice =

$F_{i\_mnt} := p \cdot C_d F \cdot A_{ICEmnt} = 54$

lbs **BLC 4**

**Gravity Load (without ice)**

Weight of Mount =

$WT_{mnt} = 620$

lbs **BLC 2**

**Gravity Load (ice only)**

Weight of Ice on Mount =

$WT_{ICEmnt} - WT_{mnt} = 150$

lbs **BLC 3**

**Development of Wind & Ice Load on Coax Cables**

**Coax Cable Data:**

|   |                            |                  |
|---|----------------------------|------------------|
| Coax Type =                                       | HELIAX 1-1/4"              |                  |
| Shape =   | Round                      | (User Input)     |
| Coax Outside Diameter =                           | $D_{\text{coax}} := 1.55$  | in (User Input)  |
| Coax Cable Length =                               | $L_{\text{coax}} := 10$    | ft (User Input)  |
| Weight of Coax per foot =                         | $Wt_{\text{coax}} := 0.66$ | plf (User Input) |
| Total Number of Coax =                            | $N_{\text{coax}} := 18$    | (User Input)     |
| No. of Coax Projecting Outside Face of PCS Mast = | $NP_{\text{coax}} := 4$    | (User Input)     |

**Wind Load (NESC Extreme)**

Coax projected surface area =  $A_{\text{coax}} := \frac{(NP_{\text{coax}} D_{\text{coax}})}{12} = 0.5$  sf/ft

Total Coax Wind Force (Above NU Structure) =  $F_{\text{coax}} := qz \cdot C_d \cdot A_{\text{coax}} \cdot m = 32$  plf **BLC 5**

**Wind Load (NESC Heavy)**

Coax projected surface area w/ Ice =  $A_{\text{ICE}_{\text{coax}}} := \frac{(NP_{\text{coax}} \cdot D_{\text{coax}} + 2 \cdot 1r)}{12} = 0.6$  sf/ft

Total Coax Wind Force w/ Ice =  $F_{\text{ICE}_{\text{coax}}} := p \cdot C_d \cdot A_{\text{ICE}_{\text{coax}}} = 3$  plf **BLC 4**

**Gravity Loads (without ice)**

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

**Gravity Load (ice only)**

Ice Area per Linear Foot =  $A_{\text{ice}_{\text{coax}}} := \frac{\pi}{4} \left[ (D_{\text{coax}} + 2 \cdot 1r)^2 - D_{\text{coax}}^2 \right] = 3.2$  sq in

Ice Weight All Coax per foot =  $WT_{\text{ice}_{\text{coax}}} := N_{\text{coax}} \cdot 1d \cdot \frac{A_{\text{ice}_{\text{coax}}}}{144} = 23$  plf **BLC 3**

**CEN TEK engineering, INC.**  
**Consulting Engineers**  
63-2 North Branford Road  
Branford, CT 06405

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

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

Location: **Greenwich, CT**

Date: 8/29/16

Prepared by: T.J.L.

Checked by: C.F.C.

Job No. 16034.04

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

Footnotes:

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

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

Location: **Greenwich, CT**

Date: 8/29/16

Prepared by: T.J.L.

Checked by: C.F.C.

Job No. 16034.04

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

Footnotes:  
 (1) BLC = Basic Load Case





**Global**

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

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

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



**Global, Continued**

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

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

**Hot Rolled Steel Properties**

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



Company : CENTEK Engineering, INC.  
 Designer : tjf, cfc  
 Job Number : 16034.04 /AT&T CT5150  
 Model Name : Structure # 1255 - Mast

Aug 29, 2016

Checked By: \_\_\_\_\_

### Hot Rolled Steel Design Parameters

|   | Label | Shape         | Leng... | Lbyy[ft] | Lbzz[ft] | Lcomp ... | Lcomp ... | Kyy | Kzz | Cm...Cm... | Cb | y s... | z s... | Functi... |
|---|-------|---------------|---------|----------|----------|-----------|-----------|-----|-----|------------|----|--------|--------|-----------|
| 1 | M1    | Existing Mast | 10      |          |          |           |           |     |     |            |    |        |        | Lateral   |

### Hot Rolled Steel Section Sets

|   | Label         | Shape       | Type | Design List | Material   | Design ... | A [in <sup>2</sup> ] | Iyy [in <sup>4</sup> ] | Izz [in <sup>4</sup> ] | J [in <sup>4</sup> ] |
|---|---------------|-------------|------|-------------|------------|------------|----------------------|------------------------|------------------------|----------------------|
| 1 | Existing Mast | HSS14x0.375 | Beam | Pipe        | A500 Gr.42 | Typical    | 15                   | 349                    | 349                    | 698                  |

### Member Primary Data

|   | Label | I Joint | J Joint | K Joint | Rotate(d... | Section/Shape | Type | Design List | Material   | Design R... |
|---|-------|---------|---------|---------|-------------|---------------|------|-------------|------------|-------------|
| 1 | M1    | N1      | N4      |         |             | Existing Mast | Beam | Pipe        | A500 Gr.42 | Typical     |

### Joint Coordinates and Temperatures

|   | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From D... |
|---|-------|--------|--------|--------|----------|------------------|
| 1 | N1    | 0      | 0      | 0      | 0        |                  |
| 2 | N4    | 0      | 10     | 0      | 0        |                  |

### Joint Boundary Conditions

|   | Joint Label | X [k/in] | Y [k/in] | Z [k/in] | X Rot.[k-ft/rad] | Y Rot.[k-ft/rad] | Z Rot.[k-ft/rad] | Footing |
|---|-------------|----------|----------|----------|------------------|------------------|------------------|---------|
| 1 | N1          | Reaction | Reaction | Reaction | Reaction         | Reaction         | Reaction         |         |

### Member Point Loads (BLC 2 : Weight of Appurtenances)

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.117             | 9              |
| 2 | M1           | Y         | -.333             | 9              |
| 3 | M1           | Y         | -.186             | 9              |
| 4 | M1           | Y         | -.108             | 9              |
| 5 | M1           | Y         | -.62              | 9              |

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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | Y         | -.098             | 9              |
| 2 | M1           | Y         | -.172             | 9              |
| 3 | M1           | Y         | -.066             | 9              |
| 4 | M1           | Y         | -.041             | 9              |
| 5 | M1           | Y         | -.15              | 9              |

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

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .09               | 9              |
| 2 | M1           | X         | .127              | 9              |
| 3 | M1           | X         | .061              | 9              |
| 4 | M1           | X         | .032              | 9              |
| 5 | M1           | X         | .054              | 9              |



**Member Point Loads (BLC 5 : NESC Extreme Wind)**

|   | Member Label | Direction | Magnitude[k,k-ft] | Location[ft,%] |
|---|--------------|-----------|-------------------|----------------|
| 1 | M1           | X         | .865              | 9              |
| 2 | M1           | X         | 1.236             | 9              |
| 3 | M1           | X         | .573              | 9              |
| 4 | M1           | X         | .286              | 9              |
| 5 | M1           | X         | .421              | 9              |

**Joint Loads and Enforced Displacements**

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

**Member Distributed Loads (BLC 2 : Weight of Appurtenances)**

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | Y         | -.012                   | -.012                 | 0                    | 0                  |

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

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | Y         | -.009                   | -.009                 | 0                    | 0                  |
| 2 | M1           | Y         | -.023                   | -.023                 | 0                    | 0                  |

**Member Distributed Loads (BLC 4 : NESC Heavy Wind)**

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | X         | .007                    | .007                  | 0                    | 0                  |
| 2 | M1           | X         | .003                    | .003                  | 0                    | 0                  |

**Member Distributed Loads (BLC 5 : NESC Extreme Wind)**

|   | Member Label | Direction | Start Magnitude[k/ft,F] | End Magnitude[k/ft,F] | Start Location[ft,%] | End Location[ft,%] |
|---|--------------|-----------|-------------------------|-----------------------|----------------------|--------------------|
| 1 | M1           | X         | .065                    | .065                  | 0                    | 0                  |
| 2 | M1           | X         | .032                    | .032                  | 0                    | 0                  |

**Basic Load Cases**

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

**Load Combinations**

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



Company : CENTEK Engineering, INC.  
 Designer : tjf, cfc  
 Job Number : 16034.04 /AT&T CT5150  
 Model Name : Structure # 1255 - Mast

Aug 29, 2016

Checked By: \_\_\_\_\_

### ***Envelope Joint Reactions***

|   | Joint   |     | X [k]  | LC | Y [k] | LC | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC |
|---|---------|-----|--------|----|-------|----|-------|----|-----------|----|-----------|----|-----------|----|
| 1 | N1      | max | -1.16  | 1  | 4.262 | 1  | 0     | 1  | 0         | 1  | 0         | 1  | 35.279    | 2  |
| 2 |         | min | -4.351 | 2  | 1.994 | 2  | 0     | 1  | 0         | 1  | 0         | 1  | 9.44      | 1  |
| 3 | Totals: | max | -1.16  | 1  | 4.262 | 1  | 0     | 1  |           |    |           |    |           |    |
| 4 |         | min | -4.351 | 2  | 1.994 | 2  | 0     | 1  |           |    |           |    |           |    |



Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 16034.04 /AT&T CT5150  
Model Name : Structure # 1255 - Mast

Aug 29, 2016

Checked By: \_\_\_\_\_

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### Joint Reactions

---

|   | LC | Joint Label | X [k] | Y [k]    | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|----|-------------|-------|----------|-------|-----------|-----------|-----------|
| 1 | 1  | N1          | -1.16 | 4.262    | 0     | 0         | 0         | 9.44      |
| 2 | 1  | Totals:     | -1.16 | 4.262    | 0     |           |           |           |
| 3 | 1  | COG (ft):   | X: 0  | Y: 7.662 | Z: 0  |           |           |           |



Company : CENTEK Engineering, INC.  
Designer : tjf, cfc  
Job Number : 16034.04 /AT&T CT5150  
Model Name : Structure # 1255 - Mast

Aug 29, 2016

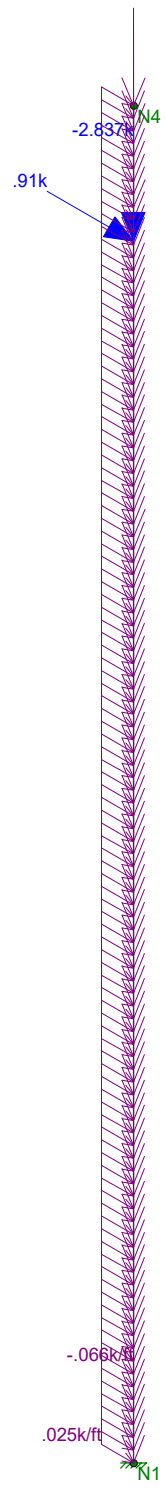
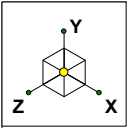
Checked By: \_\_\_\_\_

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### Joint Reactions

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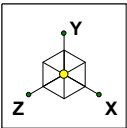
|   | LC | Joint Label | X [k]  | Y [k]    | Z [k] | MX [k-ft] | MY [k-ft] | MZ [k-ft] |
|---|----|-------------|--------|----------|-------|-----------|-----------|-----------|
| 1 | 2  | N1          | -4.351 | 1.994    | 0     | 0         | 0         | 35.279    |
| 2 | 2  | Totals:     | -4.351 | 1.994    | 0     |           |           |           |
| 3 | 2  | COG (ft):   | X: 0   | Y: 7.736 | Z: 0  |           |           |           |



Loads: LC 1, NESC Heavy Wind

|                          |  |                         |
|--------------------------|--|-------------------------|
| CENTEK Engineering, INC. | Structure # 1255 - Mast<br>LC #1 Loads |                         |
| tjl, cfc                 |  | Aug 29, 2016 at 3:46 PM |
| 16034.04 /AT&T CT5150    |  | NESC Loading.r3d        |





N4



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

CENTEK Engineering, INC.

tjl, cfc

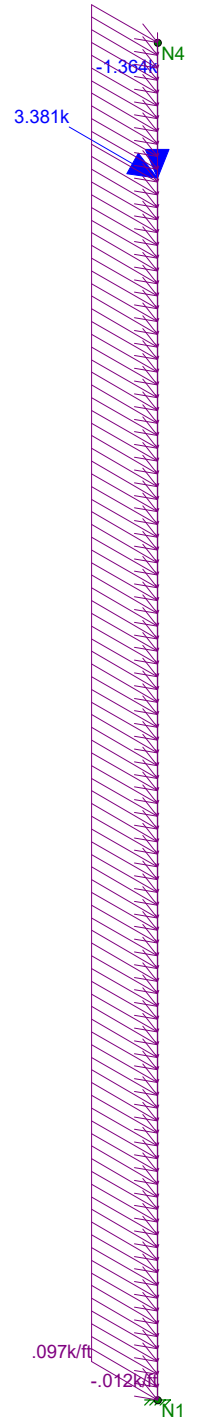
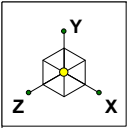
16034.04 /AT&T CT5150

Structure # 1255 - Mast

LC #1 Reactions

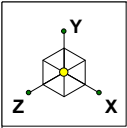
Aug 29, 2016 at 3:47 PM

NESC Loading.r3d

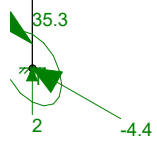


Loads: LC 2, NESC Extreme Wind

|                          |  |                         |
|--------------------------|--|-------------------------|
| CENTEK Engineering, INC. | Structure # 1255 - Mast<br>LC #2 Loads | Aug 29, 2016 at 3:46 PM |
| tjl, cfc                 |  | NESC Loading.r3d        |
| 16034.04 /AT&T CT5150    |  |                         |



N4



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

|                          |  |                         |
|--------------------------|--|-------------------------|
| CENTEK Engineering, INC. | Structure # 1255 - Mast<br>LC #2 Reactions | Aug 29, 2016 at 3:48 PM |
| tjl, cfc                 |  | NESC Loading.r3d        |
| 16034.04 /AT&T CT5150    |  |                         |

**Coax Cable on Pole**

Distance Between Coax Cable Attach Points =

Coaxial Cable Span =

$$\text{CoaxSpan} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot \text{ft} \quad (\text{User Input})$$

Diameter of Coax Cable =

$$D_{\text{coax}} := 1.55 \cdot \text{in} \quad (\text{User Input})$$

Weight of Coax Cable =

$$W_{\text{coax}} := 0.66 \cdot \text{plf} \quad (\text{User Input})$$

Number of Coax Cables =

$$N_{\text{coax}} := 18 \quad (\text{User Input})$$

Number of Projected Coax Cables =

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

Extreme Wind Pressure =

$$qz := 34.3 \cdot \text{psf} \quad (\text{User Input})$$

Heavy Wind Pressure =

$$p := 4 \cdot \text{psf} \quad (\text{User Input})$$

Radial Ice Thickness =

$$I_r := 0.5 \cdot \text{in} \quad (\text{User Input})$$

Radial Ice Density =

$$I_d := 56 \cdot \text{pcf} \quad (\text{User Input})$$

Shape Factor =

$$C_{d_{\text{coax}}} := 1.6 \quad (\text{User Input})$$

Overload Factor for NESC Heavy Wind Load =

$$OF_{\text{HW}} := 2.5 \quad (\text{User Input})$$

Overload Factor for NESC Extreme Wind Load =

$$OF_{\text{EW}} := 1.0 \quad (\text{User Input})$$

Overload Factor for NESC Heavy Vertical Load =

$$OF_{\text{HV}} := 1.5 \quad (\text{User Input})$$

Overload Factor for NESC Extreme Vertical Load =

$$OF_{\text{EV}} := 1.0 \quad (\text{User Input})$$

Wind Area with Ice =

$$A_{\text{ice}} := (NP_{\text{coax}} \cdot D_{\text{coax}} + 2 \cdot I_r) = 4.1 \cdot \text{in}$$

Wind Area without Ice =

$$A := (NP_{\text{coax}} \cdot D_{\text{coax}}) = 3.1 \cdot \text{in}$$

Ice Area per Linear Ft =

$$A_{i_{\text{coax}}} := \frac{\pi}{4} \cdot [(D_{\text{coax}} + 2 \cdot I_r)^2 - D_{\text{coax}}^2] = 0.022 \cdot \text{ft}^2$$

Weight of Ice on All Coax Cables =

$$W_{\text{ice}} := A_{i_{\text{coax}}} \cdot I_d \cdot N_{\text{coax}} = 22.541 \cdot \text{plf}$$

Heavy Vertical Load =

$$\text{Heavy}_{\text{Vert}} := \overrightarrow{\left[ (N_{\text{coax}} \cdot W_{\text{coax}} + W_{\text{ice}}) \cdot \text{CoaxSpan} \cdot \text{OFHV} \right]}$$

Heavy Transverse Load =

$$\text{Heavy}_{\text{Trans}} := \overrightarrow{\left( p \cdot A_{\text{ice}} \cdot C_{d_{\text{coax}}} \cdot \text{CoaxSpan} \cdot \text{OFHW} \right)}$$

$$\text{Heavy}_{\text{Vert}} = \begin{pmatrix} 516 \\ 516 \\ 516 \\ 516 \\ 516 \\ 516 \\ 516 \\ 516 \\ 516 \\ 516 \end{pmatrix} \text{ lb}$$

$$\text{Heavy}_{\text{Trans}} = \begin{pmatrix} 55 \\ 55 \\ 55 \\ 55 \\ 55 \\ 55 \\ 55 \\ 55 \\ 55 \\ 55 \end{pmatrix} \text{ lb}$$

Extreme Vertical Load =

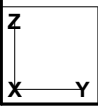
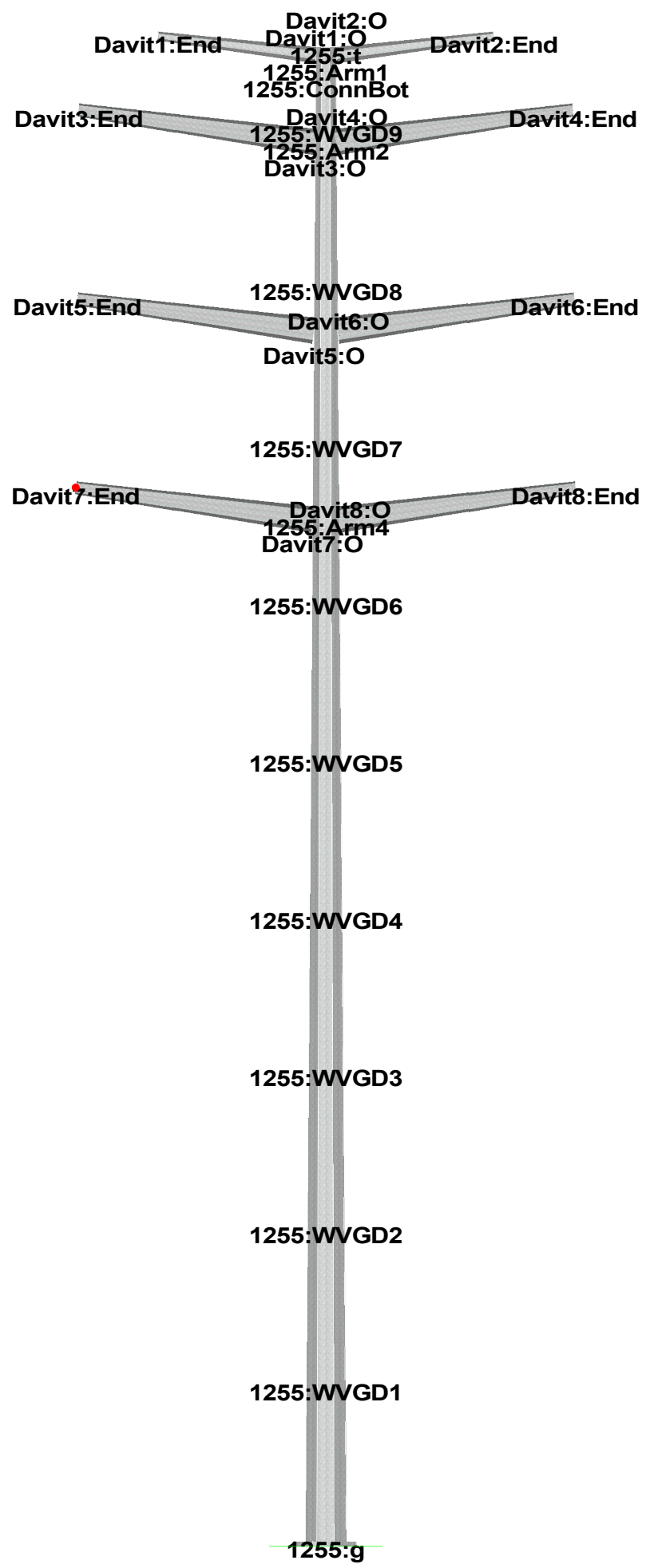
$$\text{Extreme}_{\text{Vert}} := \overrightarrow{\left[ (N_{\text{coax}} \cdot W_{\text{coax}}) \cdot \text{CoaxSpan} \cdot \text{OFEV} \right]}$$

Extreme Transverse Load =

$$\text{Extreme}_{\text{Trans}} := \overrightarrow{\left[ (qz \cdot A \cdot C_{d_{\text{coax}}}) \cdot \text{CoaxSpan} \cdot \text{OFEW} \right]}$$

$$\text{Extreme}_{\text{Vert}} = \begin{pmatrix} 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \end{pmatrix} \text{ lb}$$

$$\text{Extreme}_{\text{Trans}} = \begin{pmatrix} 142 \\ 142 \\ 142 \\ 142 \\ 142 \\ 142 \\ 142 \\ 142 \\ 142 \\ 142 \end{pmatrix} \text{ lb}$$



Project Name : 16034.04 - Greenwich, CT  
 Project Notes: Structure # 1255 / AT&T CT5150  
 Project File : J:\Jobs\1603400.WI\04\_Old Greenwich CT5150\02\_Structural\Backup Documentation\Calcs\PLS Pole\cl&p structure #1255.pol  
 Date run : 3:36:05 PM Monday, August 29, 2016  
 by : PLS-POLE Version 12.50  
 Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.

Loads from file: j:\jobs\1603400.wi\04\_old greenwich ct5150\02\_structural\backup documentation\calcs\pls pole\cl&p #1255.lca

\*\*\* Analysis Results:

Maximum element usage is 96.37% for Steel Pole "1255" in load case "NESC Extreme"  
 Maximum insulator usage is 44.10% for Clamp "Clamp18" in load case "NESC Extreme"

**Summary of Joint Support Reactions For All Load Cases:**

| Load Case    | Joint Label | Long. Force (kips) | Tran. Force (kips) | Vert. Force (kips) | Shear Force (kips) | Tran. Moment (ft-k) | Long. Moment (ft-k) | Bending Moment (ft-k) | Vert. Moment (ft-k) | Found. Usage % |
|--------------|-------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|-----------------------|---------------------|----------------|
| NESC Heavy   | 1255:g      | -0.07              | -11.49             | -42.39             | 11.49              | 952.12              | -3.43               | 952.13                | -0.02               | 0.00           |
| NESC Extreme | 1255:g      | -0.02              | -20.57             | -22.05             | 20.57              | 1575.54             | -1.01               | 1575.54               | -0.01               | 0.00           |

**Summary of Tip Deflections For All Load Cases:**

Note: positive tip load results in positive deflection

| 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   | 1255:t      | 0.15             | 54.76            | -1.79            | 54.79                | 0.01             | -5.02            | 0.00        |
| NESC Extreme | 1255:t      | 0.04             | 90.06            | -4.77            | 90.19                | 0.00             | -8.48            | 0.00        |

**Tubes Summary:**

| Pole Label | Tube Num. | Weight (lbs) | Load Case    | Maximum Usage % | Resultant Moment (ft-k) |
|------------|-----------|--------------|--------------|-----------------|-------------------------|
| 1255       | 1         | 2464         | NESC Extreme | 96.37           | 570.15                  |
| 1255       | 2         | 4117         | NESC Extreme | 85.86           | 1196.10                 |
| 1255       | 3         | 2338         | NESC Extreme | 94.69           | 1575.54                 |

\*\*\* 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) |
|------------------|-----------------|--------------|----------------|--------------|
| 1255             | 96.37           | NESC Extreme | 14             | 10156.2      |

**Summary of Tubular Davit Usages:**

| Tubular Davit Label | Maximum Usage % | Load Case  | Segment Number | Weight (lbs) |
|---------------------|-----------------|------------|----------------|--------------|
| Davit1              | 8.34            | NESC Heavy | 1              | 182.3        |
| Davit2              | 10.33           | NESC Heavy | 1              | 182.3        |
| Davit3              | 7.72            | NESC Heavy | 1              | 575.0        |
| Davit4              | 8.94            | NESC Heavy | 1              | 575.0        |
| Davit5              | 7.76            | NESC Heavy | 1              | 575.0        |
| Davit6              | 8.97            | NESC Heavy | 1              | 575.0        |
| Davit7              | 7.82            | NESC Heavy | 1              | 575.0        |
| Davit8              | 9.00            | NESC Heavy | 1              | 575.0        |

\*\*\* Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

| Load Case    | Maximum Usage % | Element Label   | Element Type |
|--------------|-----------------|-----------------|--------------|
| NESC Heavy   | 63.30           | 1255 Steel Pole |              |
| NESC Extreme | 96.37           | 1255 Steel Pole |              |

Summary of Steel Pole Usages by Load Case:

| Load Case    | Maximum Usage % | Steel Pole Label | Segment Number |
|--------------|-----------------|------------------|----------------|
| NESC Heavy   | 63.30           | 1255             | 14             |
| NESC Extreme | 96.37           | 1255             | 14             |

Summary of Base Plate Usages by Load Case:

| Load Case    | Pole Bend Label | Length Line # | Vertical Load (kips) | X Moment (ft-k) | Y Bending Moment (ft-k) | Stress (ksi) | Bolt Moment Sum (ft-k) | # Bolts | Max Bolt Load For Bend Line (kips) | Minimum Plate Thickness (in) | Usage % |       |
|--------------|-----------------|---------------|----------------------|-----------------|-------------------------|--------------|------------------------|---------|------------------------------------|------------------------------|---------|-------|
| NESC Heavy   | 1255            | 8             | 25.000               | 41.151          | 952.119                 | -3.426       | 32.526                 | 101.645 | 3                                  | 93.349                       | 2.307   | 59.14 |
| NESC Extreme | 1255            | 8             | 25.000               | 20.813          | 1575.539                | -1.005       | 52.449                 | 163.904 | 3                                  | 150.399                      | 2.930   | 95.36 |

Summary of Tubular Davit Usages by Load Case:

| Load Case    | Maximum Usage % | Tubular Davit Label | Segment Number |
|--------------|-----------------|---------------------|----------------|
| NESC Heavy   | 10.33           | Davit2              | 1              |
| NESC Extreme | 4.32            | Davit8              | 1              |

Summary of Insulator Usages:

| Insulator Label | Insulator Type | Maximum Usage % | Load Case  | Weight (lbs) |
|-----------------|----------------|-----------------|------------|--------------|
| Clamp1          | Clamp          | 1.33            | NESC Heavy | 0.0          |
| Clamp2          | Clamp          | 1.33            | NESC Heavy | 0.0          |
| Clamp3          | Clamp          | 2.42            | NESC Heavy | 0.0          |



|         |       |       |              |     |
|---------|-------|-------|--------------|-----|
| Clamp4  | Clamp | 2.42  | NESC Heavy   | 0.0 |
| Clamp5  | Clamp | 2.42  | NESC Heavy   | 0.0 |
| Clamp6  | Clamp | 2.42  | NESC Heavy   | 0.0 |
| Clamp7  | Clamp | 2.42  | NESC Heavy   | 0.0 |
| Clamp8  | Clamp | 2.42  | NESC Heavy   | 0.0 |
| Clamp9  | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp10 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp11 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp12 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp13 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp14 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp15 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp16 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp17 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp18 | Clamp | 44.10 | NESC Extreme | 0.0 |
| Clamp19 | Clamp | 5.98  | NESC Extreme | 0.0 |
| Clamp20 | Clamp | 44.10 | NESC Extreme | 0.0 |

```

*** Weight of structure (lbs):
    Weight of Tubular Davit Arms:      3814.7
    Weight of Steel Poles:             10156.2
    Total:                              13971.0

```

\*\*\* End of Report

```

*****
*
*                PLS-POLE
*          POLE AND FRAME ANALYSIS AND DESIGN
*    Copyright Power Line Systems, Inc. 1999-2011
*
*****

```

```

Project Name : 16034.04 - Greenwich, CT
Project Notes: Structure # 1255 / AT&T CT5150
Project File : J:\Jobs\1603400.WI\04_Old Greenwich CT5150\02_Structural\Backup Documentation\Calcs\PLS Pole\cl&p structure #1255.pol
Date run      : 3:36:05 PM Monday, August 29, 2016
by           : PLS-POLE Version 12.50
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 Ultimate Property | Stock Ultimate Number | Length | Default Embedded | Base Plate | Shape | Tip Diameter | Base Diameter | Taper | Default Drag | Tubes | Modulus of Elasticity | Weight Density | Shape At | Strength Check | Distance From |
|------------------------------|-----------------------|--------|------------------|------------|-------|--------------|---------------|-------|--------------|-------|-----------------------|----------------|----------|----------------|---------------|
|------------------------------|-----------------------|--------|------------------|------------|-------|--------------|---------------|-------|--------------|-------|-----------------------|----------------|----------|----------------|---------------|

| Trans. Load | Long. Label Load | Length (ft) | Length (ft) | Coef. (in) | Coef. (in) | Coef. (in/ft) | Override (ksi) | Override (lbs/ft^3) | Base | Type | Tip (ft) |
|-------------|------------------|-------------|-------------|------------|------------|---------------|----------------|---------------------|------|------|----------|
|-------------|------------------|-------------|-------------|------------|------------|---------------|----------------|---------------------|------|------|----------|

|          |      |       |   |     |    |       |       |   |     |         |   |   |            |       |
|----------|------|-------|---|-----|----|-------|-------|---|-----|---------|---|---|------------|-------|
| CL&P1255 | 1255 | 95.00 | 0 | Yes | 8F | 15.68 | 31.28 | 0 | 1.3 | 3 tubes | 0 | 0 | Calculated | 0.000 |
|----------|------|-------|---|-----|----|-------|-------|---|-----|---------|---|---|------------|-------|

**Steel Tubes Properties:**

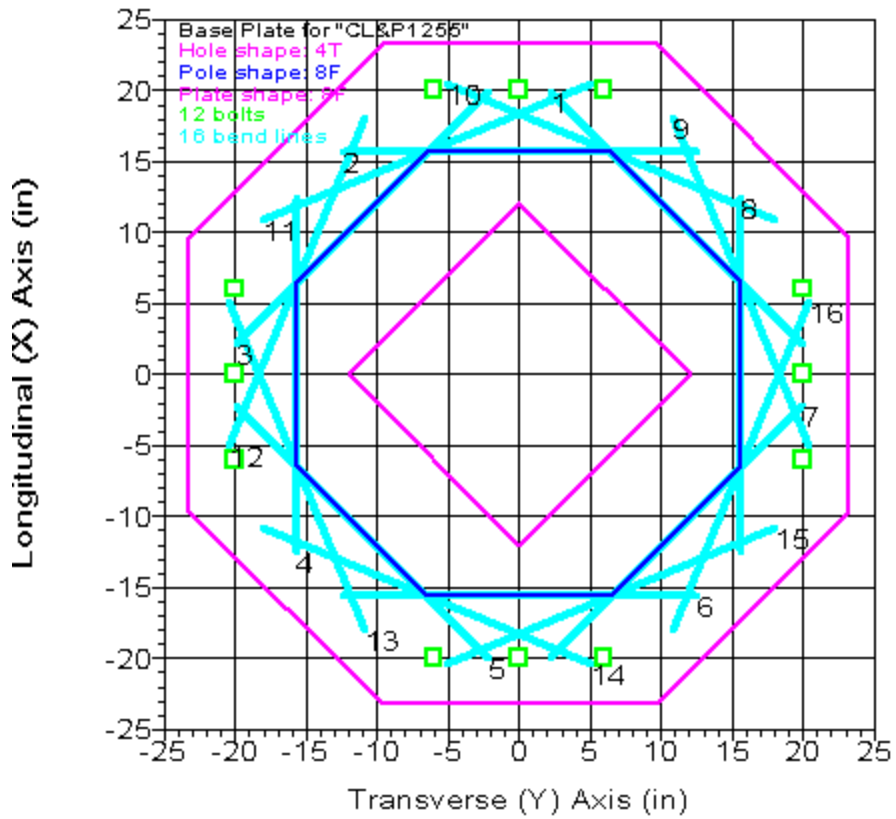
| Property | Pole No. | Tube Length (ft) | Thickness (in) | Lap Length (ft) | Lap Factor | Lap Gap (in) | Yield Stress (ksi) | Moment Cap. (ft-k) | Tube Weight (lbs) | Center of Gravity (ft) | Calculated Taper (in/ft) | Tube Top Diameter (in) | Tube Bot. Diameter (in) | 1.5x Diam. Lap (ft) | Actual Length (ft) | Overlap (ft) |
|----------|----------|------------------|----------------|-----------------|------------|--------------|--------------------|--------------------|-------------------|------------------------|--------------------------|------------------------|-------------------------|---------------------|--------------------|--------------|
| CL&P1255 | 1        | 45               | 0.25           | 3.000           | 0.000      | 0.000        | 65.000             | 0.000              | 2464              | 24.04                  | 0.17737                  | 15.68                  | 23.66                   | 2.895               | 3.000              |              |
| CL&P1255 | 2        | 38               | 0.375          | 3.917           | 0.000      | 0.000        | 65.000             | 0.000              | 4117              | 19.83                  | 0.17737                  | 22.63                  | 29.37                   | 3.577               | 3.917              |              |
| CL&P1255 | 3        | 18.917           | 0.375          | 0.000           | 0.000      | 0.000        | 65.000             | 0.000              | 2338              | 9.64                   | 0.17737                  | 27.92                  | 31.28                   | 0.000               | 0.000              |              |

**Base Plate Properties:**

| Property | Pole Diam. (in) | Plate Shape | Plate Thick. (in) | Plate Weight (lbs) | Plate Bend Length (in) | Line Length (in) | Hole Diam. (in) | Hole Shape | Steel Density (lbs/ft^3) | Steel Yield Stress (ksi) | Bolt Diam. (in) | Bolt Pattern (in) | Num. Of Bolts | Bolt Cage X Inertia (in^4) | Bolt Cage Y Inertia (in^4) |
|----------|-----------------|-------------|-------------------|--------------------|------------------------|------------------|-----------------|------------|--------------------------|--------------------------|-----------------|-------------------|---------------|----------------------------|----------------------------|
| CL&P1255 | 46.500          | 8F          | 3.000             | 1237               | 25.000                 | 17.000           | 4T              | 490.00     | 55.000                   | 2.250                    | 40.000          | 12                | 10115.14      | 10115.14                   |                            |

**Base Plate Bolt Coordinates for Property "CL&P1255":**

| Bolt X Coord. | Bolt Y Coord. | Bolt Angle (deg) |
|---------------|---------------|------------------|
| 0             | 1             | 0                |
| 0.3           | 1             | 0                |
| 1             | 0.3           | 0                |
| 1             | 0             | 0                |



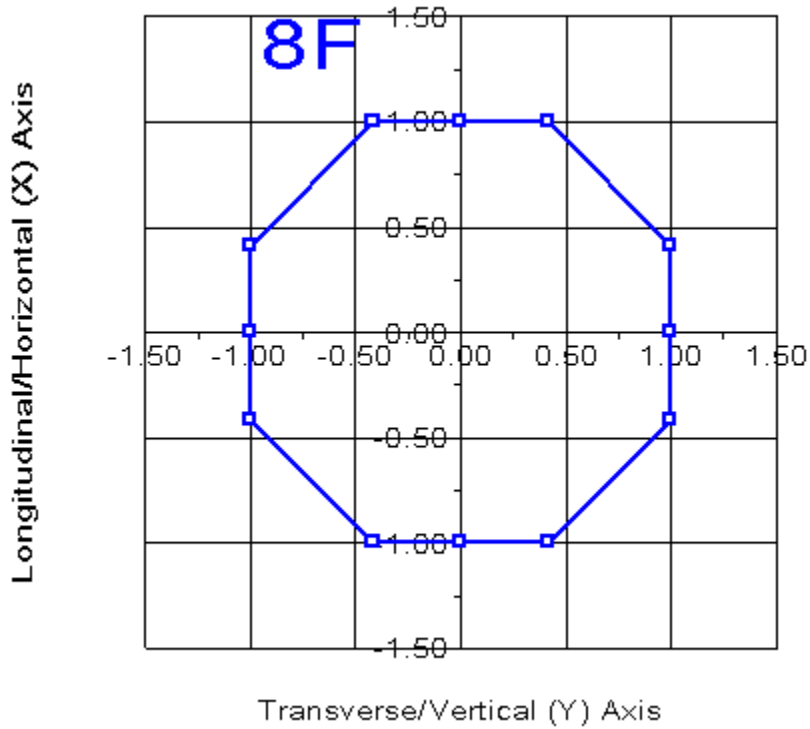
**Steel Pole Connectivity:**

| Pole Label | Tip Joint | Base X of Joint (ft) | Base Y of Joint (ft) | Base Z of Joint (ft) | Inclin. About X (deg) | Inclin. About Y (deg) | Property Set | Attach. Labels | Base Connect | Embed % Override | Embed C. Override (ft) |
|------------|-----------|----------------------|----------------------|----------------------|-----------------------|-----------------------|--------------|----------------|--------------|------------------|------------------------|
| 1255       |           | 0                    | 0                    | 0                    | 0                     | 0                     | CL&P1255     | 14 labels      |              | 0.00             | 0                      |

**Relative Attachment Labels for Steel Pole "1255":**

| Joint Label | Distance From Origin/Top Joint (ft) | Global Z of Attach (ft) |
|-------------|-------------------------------------|-------------------------|
| 1255:Arm1   | 0.00                                | 94.50                   |
| 1255:Arm2   | 0.00                                | 89.00                   |
| 1255:Arm3   | 0.00                                | 77.00                   |
| 1255:Arm4   | 0.00                                | 65.00                   |
| 1255:WVGD1  | 0.00                                | 10.00                   |

|              |      |       |
|--------------|------|-------|
| 1255:WVGD2   | 0.00 | 20.00 |
| 1255:WVGD3   | 0.00 | 30.00 |
| 1255:WVGD4   | 0.00 | 40.00 |
| 1255:WVGD5   | 0.00 | 50.00 |
| 1255:WVGD6   | 0.00 | 60.00 |
| 1255:WVGD7   | 0.00 | 70.00 |
| 1255:WVGD8   | 0.00 | 80.00 |
| 1255:WVGD9   | 0.00 | 90.00 |
| 1255:ConnBot | 0.00 | 94.00 |



**Pole Steel Properties:**

| Element Label | Joint Label  | Joint Position   | Rel. Dist. (ft) | Outer Diam. (in) | Area (in <sup>2</sup> ) | T-Moment Inertia (in <sup>4</sup> ) | L-Moment Inertia (in <sup>4</sup> ) | D/t  | W/t Max. | Fy (ksi) | Fa (ksi) | T-Moment Capacity (ft-k) | L-Moment Capacity (ft-k) |
|---------------|--------------|------------------|-----------------|------------------|-------------------------|-------------------------------------|-------------------------------------|------|----------|----------|----------|--------------------------|--------------------------|
| 1255          | 1255:t       | 1255:t Ori       | 0.00            | 15.68            | 12.78                   | 402.28                              | 402.28                              | 0.00 | 21.8     | 65.00    | 65.00    | 277.93                   | 277.93                   |
| 1255          | 1255:Arm1    | 1255:Arm1 End    | 0.50            | 15.77            | 12.86                   | 409.25                              | 409.25                              | 0.00 | 22.0     | 65.00    | 65.00    | 281.16                   | 281.16                   |
| 1255          | 1255:Arm1    | 1255:Arm1 Ori    | 0.50            | 15.77            | 12.86                   | 409.25                              | 409.25                              | 0.00 | 22.0     | 65.00    | 65.00    | 281.16                   | 281.16                   |
| 1255          | 1255:ConnBot | 1255:ConnBot End | 1.00            | 15.86            | 12.93                   | 416.31                              | 416.31                              | 0.00 | 22.1     | 65.00    | 65.00    | 284.41                   | 284.41                   |
| 1255          | 1255:ConnBot | 1255:ConnBot Ori | 1.00            | 15.86            | 12.93                   | 416.31                              | 416.31                              | 0.00 | 22.1     | 65.00    | 65.00    | 284.41                   | 284.41                   |
| 1255          | 1255:WVGD9   | 1255:WVGD9 End   | 5.00            | 16.57            | 13.52                   | 475.69                              | 475.69                              | 0.00 | 23.3     | 65.00    | 65.00    | 311.06                   | 311.06                   |
| 1255          | 1255:WVGD9   | 1255:WVGD9 Ori   | 5.00            | 16.57            | 13.52                   | 475.69                              | 475.69                              | 0.00 | 23.3     | 65.00    | 65.00    | 311.06                   | 311.06                   |
| 1255          | 1255:Arm2    | 1255:Arm2 End    | 6.00            | 16.74            | 13.66                   | 491.37                              | 491.37                              | 0.00 | 23.6     | 65.00    | 65.00    | 317.91                   | 317.91                   |

|      |            |                |       |       |       |         |         |      |      |       |       |         |         |
|------|------------|----------------|-------|-------|-------|---------|---------|------|------|-------|-------|---------|---------|
| 1255 | 1255:Arm2  | 1255:Arm2 Ori  | 6.00  | 16.74 | 13.66 | 491.37  | 491.37  | 0.00 | 23.6 | 65.00 | 65.00 | 317.91  | 317.91  |
| 1255 | #1255:0    | Tube 1 End     | 10.50 | 17.54 | 14.33 | 566.20  | 566.20  | 0.00 | 24.9 | 65.00 | 65.00 | 349.66  | 349.66  |
| 1255 | #1255:0    | Tube 1 Ori     | 10.50 | 17.54 | 14.33 | 566.20  | 566.20  | 0.00 | 24.9 | 65.00 | 65.00 | 349.66  | 349.66  |
| 1255 | 1255:WVGD8 | 1255:WVGD8 End | 15.00 | 18.34 | 14.99 | 648.26  | 648.26  | 0.00 | 26.2 | 65.00 | 65.00 | 382.91  | 382.91  |
| 1255 | 1255:WVGD8 | 1255:WVGD8 Ori | 15.00 | 18.34 | 14.99 | 648.26  | 648.26  | 0.00 | 26.2 | 65.00 | 65.00 | 382.91  | 382.91  |
| 1255 | 1255:Arm3  | 1255:Arm3 End  | 18.00 | 18.87 | 15.43 | 707.16  | 707.16  | 0.00 | 27.1 | 65.00 | 65.00 | 405.93  | 405.93  |
| 1255 | 1255:Arm3  | 1255:Arm3 Ori  | 18.00 | 18.87 | 15.43 | 707.16  | 707.16  | 0.00 | 27.1 | 65.00 | 65.00 | 405.93  | 405.93  |
| 1255 | #1255:1    | Tube 1 End     | 21.50 | 19.49 | 15.94 | 780.25  | 780.25  | 0.00 | 28.2 | 65.00 | 65.00 | 433.62  | 433.62  |
| 1255 | #1255:1    | Tube 1 Ori     | 21.50 | 19.49 | 15.94 | 780.25  | 780.25  | 0.00 | 28.2 | 65.00 | 65.00 | 433.62  | 433.62  |
| 1255 | 1255:WVGD7 | 1255:WVGD7 End | 25.00 | 20.11 | 16.46 | 858.22  | 858.22  | 0.00 | 29.2 | 65.00 | 65.00 | 462.23  | 462.23  |
| 1255 | 1255:WVGD7 | 1255:WVGD7 Ori | 25.00 | 20.11 | 16.46 | 858.22  | 858.22  | 0.00 | 29.2 | 65.00 | 65.00 | 462.23  | 462.23  |
| 1255 | 1255:Arm4  | 1255:Arm4 End  | 30.00 | 21.00 | 17.19 | 978.36  | 978.36  | 0.00 | 30.7 | 65.00 | 65.00 | 504.68  | 504.68  |
| 1255 | 1255:Arm4  | 1255:Arm4 Ori  | 30.00 | 21.00 | 17.19 | 978.36  | 978.36  | 0.00 | 30.7 | 65.00 | 65.00 | 504.68  | 504.68  |
| 1255 | 1255:WVGD6 | 1255:WVGD6 End | 35.00 | 21.89 | 17.93 | 1109.22 | 1109.22 | 0.00 | 32.1 | 65.00 | 65.00 | 549.01  | 549.01  |
| 1255 | 1255:WVGD6 | 1255:WVGD6 Ori | 35.00 | 21.89 | 17.93 | 1109.22 | 1109.22 | 0.00 | 32.1 | 65.00 | 65.00 | 549.01  | 549.01  |
| 1255 | #1255:2    | Tube 1 End     | 38.50 | 22.51 | 18.44 | 1207.45 | 1207.45 | 0.00 | 33.2 | 65.00 | 64.18 | 573.78  | 573.78  |
| 1255 | #1255:2    | Tube 1 Ori     | 38.50 | 22.51 | 18.44 | 1207.45 | 1207.45 | 0.00 | 33.2 | 65.00 | 64.18 | 573.78  | 573.78  |
| 1255 | #1255:3    | SpliceT End    | 42.00 | 23.13 | 18.95 | 1311.31 | 1311.31 | 0.00 | 34.2 | 65.00 | 63.30 | 598.16  | 598.16  |
| 1255 | #1255:3    | SpliceT Ori    | 42.00 | 23.13 | 18.95 | 1311.31 | 1311.31 | 0.00 | 34.2 | 65.00 | 63.30 | 598.16  | 598.16  |
| 1255 | 1255:WVGD5 | 1255:WVGD5 End | 45.00 | 23.16 | 28.32 | 1943.40 | 1943.40 | 0.00 | 21.4 | 65.00 | 65.00 | 908.98  | 908.98  |
| 1255 | 1255:WVGD5 | 1255:WVGD5 Ori | 45.00 | 23.16 | 28.32 | 1943.40 | 1943.40 | 0.00 | 21.4 | 65.00 | 65.00 | 908.98  | 908.98  |
| 1255 | #1255:4    | Tube 2 End     | 50.00 | 24.05 | 29.42 | 2179.21 | 2179.21 | 0.00 | 22.4 | 65.00 | 65.00 | 981.69  | 981.69  |
| 1255 | #1255:4    | Tube 2 Ori     | 50.00 | 24.05 | 29.42 | 2179.21 | 2179.21 | 0.00 | 22.4 | 65.00 | 65.00 | 981.69  | 981.69  |
| 1255 | 1255:WVGD4 | 1255:WVGD4 End | 55.00 | 24.94 | 30.52 | 2433.36 | 2433.36 | 0.00 | 23.4 | 65.00 | 65.00 | 1057.19 | 1057.19 |
| 1255 | 1255:WVGD4 | 1255:WVGD4 Ori | 55.00 | 24.94 | 30.52 | 2433.37 | 2433.37 | 0.00 | 23.4 | 65.00 | 65.00 | 1057.19 | 1057.19 |
| 1255 | #1255:5    | Tube 2 End     | 60.00 | 25.82 | 31.62 | 2706.55 | 2706.55 | 0.00 | 24.4 | 65.00 | 65.00 | 1135.50 | 1135.50 |
| 1255 | #1255:5    | Tube 2 Ori     | 60.00 | 25.82 | 31.62 | 2706.55 | 2706.55 | 0.00 | 24.4 | 65.00 | 65.00 | 1135.50 | 1135.50 |
| 1255 | 1255:WVGD3 | 1255:WVGD3 End | 65.00 | 26.71 | 32.72 | 2999.46 | 2999.46 | 0.00 | 25.4 | 65.00 | 65.00 | 1216.60 | 1216.60 |
| 1255 | 1255:WVGD3 | 1255:WVGD3 Ori | 65.00 | 26.71 | 32.72 | 2999.46 | 2999.46 | 0.00 | 25.4 | 65.00 | 65.00 | 1216.60 | 1216.60 |
| 1255 | #1255:6    | Tube 2 End     | 70.00 | 27.60 | 33.83 | 3312.77 | 3312.77 | 0.00 | 26.3 | 65.00 | 65.00 | 1300.50 | 1300.50 |
| 1255 | #1255:6    | Tube 2 Ori     | 70.00 | 27.60 | 33.83 | 3312.77 | 3312.77 | 0.00 | 26.3 | 65.00 | 65.00 | 1300.50 | 1300.50 |
| 1255 | 1255:WVGD2 | 1255:WVGD2 End | 75.00 | 28.48 | 34.93 | 3647.18 | 3647.18 | 0.00 | 27.3 | 65.00 | 65.00 | 1387.20 | 1387.20 |
| 1255 | 1255:WVGD2 | 1255:WVGD2 Ori | 75.00 | 28.48 | 34.93 | 3647.18 | 3647.18 | 0.00 | 27.3 | 65.00 | 65.00 | 1387.20 | 1387.20 |
| 1255 | #1255:7    | SpliceT End    | 76.08 | 28.67 | 35.17 | 3722.46 | 3722.46 | 0.00 | 27.5 | 65.00 | 65.00 | 1406.35 | 1406.35 |
| 1255 | #1255:7    | SpliceT Ori    | 76.08 | 28.67 | 35.17 | 3722.46 | 3722.46 | 0.00 | 27.5 | 65.00 | 65.00 | 1406.35 | 1406.35 |
| 1255 | #1255:8    | SpliceB End    | 80.00 | 28.62 | 35.10 | 3700.70 | 3700.70 | 0.00 | 27.5 | 65.00 | 65.00 | 1400.82 | 1400.82 |
| 1255 | #1255:8    | SpliceB Ori    | 80.00 | 28.62 | 35.10 | 3700.70 | 3700.70 | 0.00 | 27.5 | 65.00 | 65.00 | 1400.83 | 1400.83 |
| 1255 | 1255:WVGD1 | 1255:WVGD1 End | 85.00 | 29.51 | 36.20 | 4060.31 | 4060.31 | 0.00 | 28.4 | 65.00 | 65.00 | 1490.75 | 1490.75 |
| 1255 | 1255:WVGD1 | 1255:WVGD1 Ori | 85.00 | 29.51 | 36.20 | 4060.31 | 4060.31 | 0.00 | 28.4 | 65.00 | 65.00 | 1490.75 | 1490.75 |
| 1255 | #1255:9    | Tube 3 End     | 90.00 | 30.39 | 37.30 | 4442.50 | 4442.50 | 0.00 | 29.4 | 65.00 | 65.00 | 1583.48 | 1583.48 |
| 1255 | #1255:9    | Tube 3 Ori     | 90.00 | 30.39 | 37.30 | 4442.50 | 4442.50 | 0.00 | 29.4 | 65.00 | 65.00 | 1583.48 | 1583.48 |
| 1255 | 1255:g     | 1255:g End     | 95.00 | 31.28 | 38.40 | 4847.94 | 4847.94 | 0.00 | 30.4 | 65.00 | 65.00 | 1679.01 | 1679.01 |

**Tubular Davit Properties:**

| Davit Steel     | Stock  | Steel Shape | Thickness | Base Diameter | Tip Diameter | Taper   | Drag  | Modulus of Elasticity | Geometry | Strength   | Vertical Capacity | Tension Capacity | Compress. Capacity | Long. Capacity | Yield Stress | Weight Density |
|-----------------|--------|-------------|-----------|---------------|--------------|---------|-------|-----------------------|----------|------------|-------------------|------------------|--------------------|----------------|--------------|----------------|
| Property Number | Label  | Shape       | (in)      | (in)          | (in)         | (in/ft) | Coef. | (ksi)                 | of       | Type       | (lbs)             | (lbs)            | (lbs)              | (lbs)          | (ksi)        | (lbs/ft^3)     |
| ARM1            | 601420 | 6T          | 0.1875    | 10.75         | 6            | 0       | 1     | 29000                 | 1 point  | Calculated | 0                 | 0                | 0                  | 0              | 65           | 0              |
| ARM2            | 601515 | 8T          | 0.25      | 18.46         | 9            | 0       | 1     | 29000                 | 1 point  | Calculated | 0                 | 0                | 0                  | 0              | 65           | 0              |

**Intermediate Joints for Davit Property "ARM1":**

| Joint Label | Horz. Offset (ft) | Vert. Offset (ft) |
|-------------|-------------------|-------------------|
| End         | 10                | -1.2              |

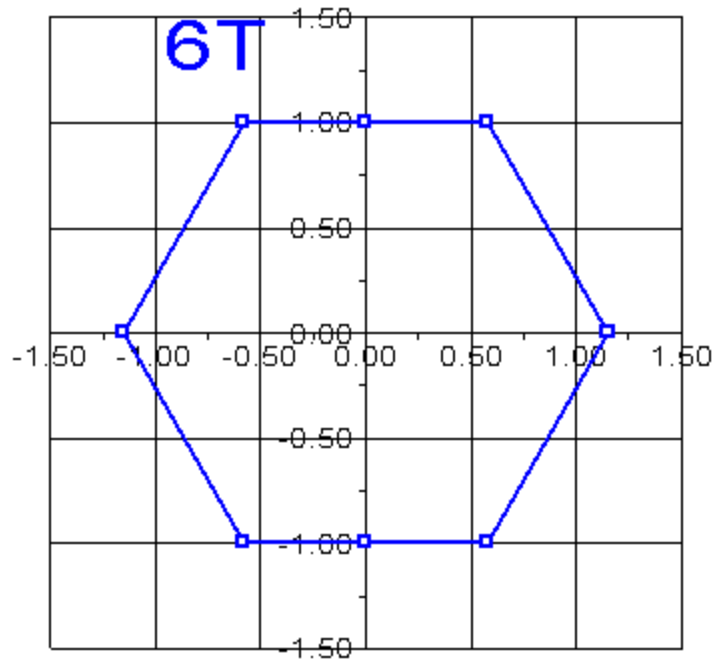
Intermediate Joints for Davit Property "ARM2":

| Joint Label | Horz. Offset (ft) | Vert. Offset (ft) |
|-------------|-------------------|-------------------|
| End         | 15                | -2                |

Tubular Davit Arm Connectivity:

| Davit Label | Attach Label | Davit Property Set | Azimuth (deg) |
|-------------|--------------|--------------------|---------------|
| Davit1      | 1255:Arm1    | ARM1               | 180           |
| Davit2      | 1255:Arm1    | ARM1               | 0             |
| Davit3      | 1255:Arm2    | ARM2               | 180           |
| Davit4      | 1255:Arm2    | ARM2               | 0             |
| Davit5      | 1255:Arm3    | ARM2               | 180           |
| Davit6      | 1255:Arm3    | ARM2               | 0             |
| Davit7      | 1255:Arm4    | ARM2               | 180           |
| Davit8      | 1255:Arm4    | ARM2               | 0             |

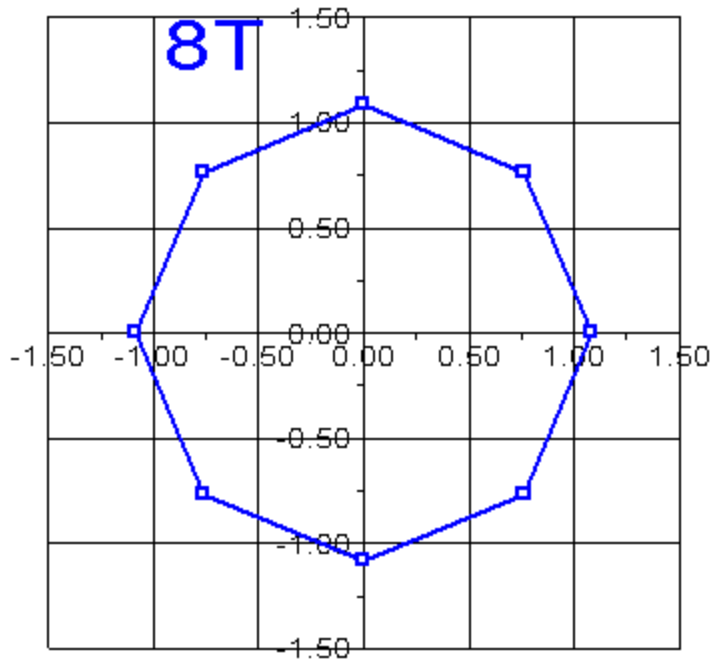
Longitudinal/Horizontal (X) Axis



Transverse/Vertical (Y) Axis



Longitudinal/Horizontal (X) Axis



Transverse/Vertical (Y) Axis

**Tubular Davit Arm Steel Properties:**

| Element Label | Joint Label | Joint Position | Rel. Dist. (ft) | Outer Diam. (in) | Area (in <sup>2</sup> ) | V-Moment Inertia (in <sup>4</sup> ) | H-Moment Inertia (in <sup>4</sup> ) | D/t  | W/t Max. | Fy (ksi) | Fa Min. (ksi) | V-Moment Capacity (ft-k) | H-Moment Capacity (ft-k) |
|---------------|-------------|----------------|-----------------|------------------|-------------------------|-------------------------------------|-------------------------------------|------|----------|----------|---------------|--------------------------|--------------------------|
| Davit1        | Davit1:0    | Origin         | 0.00            | 10.75            | 6.86                    | 106.34                              | 106.34                              | 0.00 | 27.3     | 65.00    | 65.00         | 92.80                    | 107.16                   |
| Davit1        | #Davit1:0   | End            | 5.00            | 8.39             | 5.33                    | 49.84                               | 49.84                               | 0.00 | 20.1     | 65.00    | 65.00         | 55.72                    | 64.34                    |
| Davit1        | #Davit1:0   | Origin         | 5.00            | 8.39             | 5.33                    | 49.84                               | 49.84                               | 0.00 | 20.1     | 65.00    | 65.00         | 55.72                    | 64.34                    |
| Davit1        | #Davit1:1   | End            | 7.54            | 7.20             | 4.55                    | 31.08                               | 31.08                               | 0.00 | 16.4     | 65.00    | 65.00         | 40.52                    | 46.78                    |
| Davit1        | #Davit1:1   | Origin         | 7.54            | 7.20             | 4.55                    | 31.08                               | 31.08                               | 0.00 | 16.4     | 65.00    | 65.00         | 40.52                    | 46.78                    |
| Davit1        | Davit1:End  | End            | 10.07           | 6.00             | 3.78                    | 17.73                               | 17.73                               | 0.00 | 12.7     | 65.00    | 65.00         | 27.73                    | 32.02                    |
| Davit2        | Davit2:0    | Origin         | 0.00            | 10.75            | 6.86                    | 106.34                              | 106.34                              | 0.00 | 27.3     | 65.00    | 65.00         | 92.80                    | 107.16                   |
| Davit2        | #Davit2:0   | End            | 5.00            | 8.39             | 5.33                    | 49.84                               | 49.84                               | 0.00 | 20.1     | 65.00    | 65.00         | 55.72                    | 64.34                    |
| Davit2        | #Davit2:0   | Origin         | 5.00            | 8.39             | 5.33                    | 49.84                               | 49.84                               | 0.00 | 20.1     | 65.00    | 65.00         | 55.72                    | 64.34                    |
| Davit2        | #Davit2:1   | End            | 7.54            | 7.20             | 4.55                    | 31.08                               | 31.08                               | 0.00 | 16.4     | 65.00    | 65.00         | 40.52                    | 46.78                    |
| Davit2        | #Davit2:1   | Origin         | 7.54            | 7.20             | 4.55                    | 31.08                               | 31.08                               | 0.00 | 16.4     | 65.00    | 65.00         | 40.52                    | 46.78                    |
| Davit2        | Davit2:End  | End            | 10.07           | 6.00             | 3.78                    | 17.73                               | 17.73                               | 0.00 | 12.7     | 65.00    | 65.00         | 27.73                    | 32.02                    |
| Davit3        | Davit3:0    | Origin         | 0.00            | 18.46            | 15.09                   | 661.20                              | 661.20                              | 0.00 | 26.4     | 65.00    | 65.00         | 358.49                   | 358.49                   |
| Davit3        | #Davit3:0   | End            | 5.00            | 15.33            | 12.50                   | 375.85                              | 375.85                              | 0.00 | 21.3     | 65.00    | 65.00         | 245.32                   | 245.32                   |
| Davit3        | #Davit3:0   | Origin         | 5.00            | 15.33            | 12.50                   | 375.85                              | 375.85                              | 0.00 | 21.3     | 65.00    | 65.00         | 245.32                   | 245.32                   |

|        |            |        |       |       |       |        |        |      |      |       |       |        |        |
|--------|------------|--------|-------|-------|-------|--------|--------|------|------|-------|-------|--------|--------|
| Davit3 | #Davit3:1  | End    | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit3 | #Davit3:1  | Origin | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit3 | #Davit3:2  | End    | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit3 | #Davit3:2  | Origin | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit3 | Davit3:End | End    | 15.13 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
|        |            |        |       |       |       |        |        |      |      |       |       |        |        |
| Davit4 | Davit4:0   | Origin | 0.00  | 18.46 | 15.09 | 661.20 | 661.20 | 0.00 | 26.4 | 65.00 | 65.00 | 358.49 | 358.49 |
| Davit4 | #Davit4:0  | End    | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit4 | #Davit4:0  | Origin | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit4 | #Davit4:1  | End    | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit4 | #Davit4:1  | Origin | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit4 | #Davit4:2  | End    | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit4 | #Davit4:2  | Origin | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit4 | Davit4:End | End    | 15.13 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
|        |            |        |       |       |       |        |        |      |      |       |       |        |        |
| Davit5 | Davit5:0   | Origin | 0.00  | 18.46 | 15.09 | 661.20 | 661.20 | 0.00 | 26.4 | 65.00 | 65.00 | 358.49 | 358.49 |
| Davit5 | #Davit5:0  | End    | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit5 | #Davit5:0  | Origin | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit5 | #Davit5:1  | End    | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit5 | #Davit5:1  | Origin | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit5 | #Davit5:2  | End    | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit5 | #Davit5:2  | Origin | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit5 | Davit5:End | End    | 15.13 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
|        |            |        |       |       |       |        |        |      |      |       |       |        |        |
| Davit6 | Davit6:0   | Origin | 0.00  | 18.46 | 15.09 | 661.20 | 661.20 | 0.00 | 26.4 | 65.00 | 65.00 | 358.49 | 358.49 |
| Davit6 | #Davit6:0  | End    | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit6 | #Davit6:0  | Origin | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit6 | #Davit6:1  | End    | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit6 | #Davit6:1  | Origin | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit6 | #Davit6:2  | End    | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit6 | #Davit6:2  | Origin | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit6 | Davit6:End | End    | 15.13 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
|        |            |        |       |       |       |        |        |      |      |       |       |        |        |
| Davit7 | Davit7:0   | Origin | 0.00  | 18.46 | 15.09 | 661.20 | 661.20 | 0.00 | 26.4 | 65.00 | 65.00 | 358.49 | 358.49 |
| Davit7 | #Davit7:0  | End    | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit7 | #Davit7:0  | Origin | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit7 | #Davit7:1  | End    | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit7 | #Davit7:1  | Origin | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit7 | #Davit7:2  | End    | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit7 | #Davit7:2  | Origin | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit7 | Davit7:End | End    | 15.13 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |
|        |            |        |       |       |       |        |        |      |      |       |       |        |        |
| Davit8 | Davit8:0   | Origin | 0.00  | 18.46 | 15.09 | 661.20 | 661.20 | 0.00 | 26.4 | 65.00 | 65.00 | 358.49 | 358.49 |
| Davit8 | #Davit8:0  | End    | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit8 | #Davit8:0  | Origin | 5.00  | 15.33 | 12.50 | 375.85 | 375.85 | 0.00 | 21.3 | 65.00 | 65.00 | 245.32 | 245.32 |
| Davit8 | #Davit8:1  | End    | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit8 | #Davit8:1  | Origin | 10.00 | 12.21 | 9.91  | 187.31 | 187.31 | 0.00 | 16.1 | 65.00 | 65.00 | 153.55 | 153.55 |
| Davit8 | #Davit8:2  | End    | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit8 | #Davit8:2  | Origin | 12.57 | 10.60 | 8.58  | 121.60 | 121.60 | 0.00 | 13.4 | 65.00 | 65.00 | 114.77 | 114.77 |
| Davit8 | Davit8:End | End    | 15.13 | 9.00  | 7.25  | 73.40  | 73.40  | 0.00 | 10.8 | 65.00 | 65.00 | 81.63  | 81.63  |

\*\*\* Insulator Data

**Clamp Properties:**

**Label Stock Holding  
Number Capacity  
(lbs)**

-----

clamp clamp1 8e+004

**Clamp Insulator Connectivity:**

| <b>Clamp Label</b> | <b>Structure And Tip Attach</b> | <b>Property Set</b> | <b>Min. Vertical Load (uplift) (lbs)</b> | <b>Required</b> |
|--------------------|---------------------------------|---------------------|--|-----------------|
| 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             | 1255:WVGD1                      | clamp               | No                                       | Limit           |
| Clamp10            | 1255:WVGD2                      | clamp               | No                                       | Limit           |
| Clamp11            | 1255:WVGD3                      | clamp               | No                                       | Limit           |
| Clamp12            | 1255:WVGD4                      | clamp               | No                                       | Limit           |
| Clamp13            | 1255:WVGD5                      | clamp               | No                                       | Limit           |
| Clamp14            | 1255:WVGD6                      | clamp               | No                                       | Limit           |
| Clamp15            | 1255:WVGD7                      | clamp               | No                                       | Limit           |
| Clamp16            | 1255:WVGD8                      | clamp               | No                                       | Limit           |
| Clamp17            | 1255:WVGD9                      | clamp               | No                                       | Limit           |
| Clamp18            | 1255:t                          | clamp               | No                                       | Limit           |
| Clamp19            | 1255:Arm1                       | clamp               | No                                       | Limit           |
| Clamp20            | 1255:ConnBot                    | clamp               | No                                       | Limit           |

\*\*\* Loads Data

Loads from file: j:\jobs\1603400.wi\04\_old greenwich ct5150\02\_structural\backup documentation\calcs\pls pole\cl&p #1255.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) 95.70 (ft)  
 Structure height 95.70 (ft)  
 Structure height above ground 95.70 (ft)

Vector Load Cases:

| Load Case       | Dead        | Wind      | SF for Pole   | SF for Wood | SF for Conc. | SF for Conc. | SF for Guys      | SF for Non Braces | SF for Insuls. | SF For Found. | Point Loads | Wind/Ice Model | Trans. Wind | Longit. Wind |    |   |
|-----------------|-------------|-----------|---------------|-------------|--------------|--------------|------------------|-------------------|----------------|---------------|-------------|----------------|-------------|--------------|----|---|
| Ice Description | Temperature | Load Area | Steel Tubular | Poles Arms  | Conc. Ult.   | Conc. First  | Guys and Tubular | Non Braces Arms   | Insuls.        | Found.        | Loads       | Model          | Wind        | Wind         |    |   |
| Thick. Density  | Factor      | Factor    | Deflection    | Deflection  | Crack        | Tens.        | Cables           | Arms              |                |               |             |                | Pressure    | Pressure     |    |   |
| Check           | Limit       |           | and Towers    | % or (ft)   |              |              |                  |                   |                |               |             |                | (psf)       | (psf)        |    |   |
| (in)            | (lbs/ft^3)  | (deg F)   |               |             |              |              |                  |                   |                |               |             |                |             |              |    |   |
| 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         | 20 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         | 20 loads    | NESC 2007    | 31 | 0 |
| 0.000           | 0.000       | 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  | 791                 | 717                   | 0                       |              |
| Davit2:End  | 791                 | 717                   | 0                       |              |
| Davit3:End  | 1671                | 977                   | 0                       |              |
| Davit4:End  | 1671                | 977                   | 0                       |              |
| Davit5:End  | 1671                | 977                   | 0                       |              |
| Davit6:End  | 1671                | 977                   | 0                       |              |
| Davit7:End  | 1671                | 977                   | 0                       |              |
| Davit8:End  | 1671                | 977                   | 0                       |              |
| 1255:WVGD1  | 516                 | 55                    | 0                       |              |
| 1255:WVGD2  | 516                 | 55                    | 0                       |              |
| 1255:WVGD3  | 516                 | 55                    | 0                       |              |
| 1255:WVGD4  | 516                 | 55                    | 0                       |              |
| 1255:WVGD5  | 516                 | 55                    | 0                       |              |
| 1255:WVGD6  | 516                 | 55                    | 0                       |              |
| 1255:WVGD7  | 516                 | 55                    | 0                       |              |
| 1255:WVGD8  | 516                 | 55                    | 0                       |              |

|              |      |       |   |
|--------------|------|-------|---|
| 1255:WVGD9   | 516  | 55    | 0 |
| 1255:t       | 0    | 9440  | 0 |
| 1255:Arm1    | 4262 | 1160  | 0 |
| 1255:ConnBot | 0    | -9440 | 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 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) | Ice Wind Load (lbs) | Ice Pole Load (lbs) | Tran. Wind Load (lbs) | Long. Wind Load (lbs) |
|------------|--------------|--------------|--------------------|-----------------------|--------------------------------|---------------------|-----------------|------------|------------------------------|-----------------------------|-----------------------|----------------------|--------------------------|---------------------|---------------------|-----------------------|-----------------------|
| 1255       | 1255:t       | 1255:Arm1    | 95.00              | 94.50                 | 94.75                          | 15.724              | 7.44e+005       | 1.300      | 10.00                        | 0.50                        | 32.72                 | 8.52                 | 5.07                     | 0.54                | 9.06                | 0.00                  |                       |
| 1255       | 1255:Arm1    | 1255:ConnBot | 94.50              | 94.00                 | 94.25                          | 15.813              | 7.49e+005       | 1.300      | 10.00                        | 0.50                        | 32.90                 | 8.57                 | 5.09                     | 0.54                | 9.11                | 0.00                  |                       |
| 1255       | 1255:ConnBot | 1255:WVGD9   | 94.00              | 90.00                 | 92.00                          | 16.212              | 7.68e+005       | 1.300      | 10.00                        | 0.50                        | 269.98                | 70.26                | 41.78                    | 4.33                | 74.59               | 0.00                  |                       |
| 1255       | 1255:WVGD9   | 1255:Arm2    | 90.00              | 89.00                 | 89.50                          | 16.656              | 7.89e+005       | 1.300      | 10.00                        | 0.50                        | 69.37                 | 18.04                | 10.73                    | 1.08                | 19.13               | 0.00                  |                       |
| 1255       | 1255:Arm2    |              | 89.00              | 84.50                 | 86.75                          | 17.143              | 8.12e+005       | 1.300      | 10.00                        | 0.50                        | 321.44                | 83.58                | 49.71                    | 4.88                | 88.45               | 0.00                  |                       |
| 1255       |              | 1255:WVGD8   | 84.50              | 80.00                 | 82.25                          | 17.941              | 8.49e+005       | 1.300      | 10.00                        | 0.50                        | 336.63                | 87.47                | 52.02                    | 4.88                | 92.34               | 0.00                  |                       |
| 1255       | 1255:WVGD8   | 1255:Arm3    | 80.00              | 77.00                 | 78.50                          | 18.607              | 8.81e+005       | 1.300      | 10.00                        | 0.50                        | 232.86                | 60.47                | 35.97                    | 3.25                | 63.72               | 0.00                  |                       |
| 1255       | 1255:Arm3    |              | 77.00              | 73.50                 | 75.25                          | 19.183              | 9.08e+005       | 1.300      | 10.00                        | 0.50                        | 280.20                | 72.74                | 43.26                    | 3.79                | 76.53               | 0.00                  |                       |
| 1255       |              | 1255:WVGD7   | 73.50              | 70.00                 | 71.75                          | 19.804              | 9.38e+005       | 1.300      | 10.00                        | 0.50                        | 289.39                | 75.09                | 44.66                    | 3.79                | 78.89               | 0.00                  |                       |
| 1255       | 1255:WVGD7   | 1255:Arm4    | 70.00              | 65.00                 | 67.50                          | 20.558              | 9.73e+005       | 1.300      | 10.00                        | 0.50                        | 429.35                | 111.36               | 66.23                    | 5.42                | 116.78              | 0.00                  |                       |
| 1255       | 1255:Arm4    | 1255:WVGD6   | 65.00              | 60.00                 | 62.50                          | 21.444              | 1.02e+006       | 1.300      | 10.00                        | 0.50                        | 448.10                | 116.16               | 69.09                    | 5.42                | 121.58              | 0.00                  |                       |
| 1255       | 1255:WVGD6   |              | 60.00              | 56.50                 | 58.25                          | 22.198              | 1.05e+006       | 1.300      | 10.00                        | 0.50                        | 324.82                | 84.17                | 50.06                    | 3.79                | 87.96               | 0.00                  |                       |
| 1255       |              |              | 56.50              | 53.00                 | 54.75                          | 22.819              | 1.08e+006       | 1.300      | 10.00                        | 0.50                        | 334.01                | 86.53                | 51.46                    | 3.79                | 90.32               | 0.00                  |                       |
| 1255       |              | 1255:WVGD5   | 53.00              | 50.00                 | 51.50                          | 23.146              | 1.1e+006        | 1.300      | 10.00                        | 0.50                        | 722.13                | 75.23                | 44.74                    | 3.25                | 78.48               | 0.00                  |                       |
| 1255       | 1255:WVGD5   |              | 50.00              | 45.00                 | 47.50                          | 23.605              | 1.12e+006       | 1.300      | 10.00                        | 0.50                        | 736.80                | 127.87               | 76.05                    | 5.42                | 133.28              | 0.00                  |                       |
| 1255       |              | 1255:WVGD4   | 45.00              | 40.00                 | 42.50                          | 24.492              | 1.16e+006       | 1.300      | 10.00                        | 0.50                        | 764.82                | 132.67               | 78.90                    | 5.42                | 138.09              | 0.00                  |                       |
| 1255       | 1255:WVGD4   |              | 40.00              | 35.00                 | 37.50                          | 25.379              | 1.2e+006        | 1.300      | 10.00                        | 0.50                        | 792.95                | 137.48               | 81.76                    | 5.42                | 142.89              | 0.00                  |                       |
| 1255       |              | 1255:WVGD3   | 35.00              | 30.00                 | 32.50                          | 26.266              | 1.24e+006       | 1.300      | 10.00                        | 0.50                        | 821.07                | 142.28               | 84.62                    | 5.42                | 147.70              | 0.00                  |                       |
| 1255       | 1255:WVGD3   |              | 30.00              | 25.00                 | 27.50                          | 27.152              | 1.29e+006       | 1.300      | 10.00                        | 0.50                        | 849.20                | 147.08               | 87.48                    | 5.42                | 152.50              | 0.00                  |                       |
| 1255       |              | 1255:WVGD2   | 25.00              | 20.00                 | 22.50                          | 28.039              | 1.33e+006       | 1.300      | 10.00                        | 0.50                        | 877.32                | 151.89               | 90.33                    | 5.42                | 157.30              | 0.00                  |                       |
| 1255       | 1255:WVGD2   |              | 20.00              | 18.92                 | 19.46                          | 28.579              | 1.35e+006       | 1.300      | 10.00                        | 0.50                        | 193.73                | 33.53                | 19.94                    | 1.17                | 34.71               | 0.00                  |                       |
| 1255       |              |              | 18.92              | 15.00                 | 16.96                          | 28.647              | 1.36e+006       | 1.300      | 10.00                        | 0.50                        | 1404.79               | 121.57               | 72.30                    | 4.24                | 125.81              | 0.00                  |                       |
| 1255       |              | 1255:WVGD1   | 15.00              | 10.00                 | 12.50                          | 29.063              | 1.38e+006       | 1.300      | 10.00                        | 0.50                        | 909.94                | 157.43               | 93.63                    | 5.42                | 162.85              | 0.00                  |                       |
| 1255       | 1255:WVGD1   |              | 10.00              | 5.00                  | 7.50                           | 29.950              | 1.42e+006       | 1.300      | 10.00                        | 0.50                        | 937.91                | 162.24               | 96.49                    | 5.42                | 167.65              | 0.00                  |                       |
| 1255       |              | 1255:g       | 5.00               | 0.00                  | 2.50                           | 30.837              | 1.46e+006       | 1.300      | 10.00                        | 0.50                        | 966.03                | 167.04               | 99.34                    | 5.42                | 172.46              | 0.00                  |                       |

Point Loads for Load Case "NESC Extreme":

| Joint Label | Vertical Load (lbs) | Transverse Load (lbs) | Longitudinal Load (lbs) | Load Comment |
|-------------|---------------------|-----------------------|-------------------------|--------------|
| Davit1:End  | 230                 | 690                   | 0                       |              |
| Davit2:End  | 230                 | 690                   | 0                       |              |
| Davit3:End  | 711                 | 1289                  | 0                       |              |
| Davit4:End  | 711                 | 1289                  | 0                       |              |
| Davit5:End  | 711                 | 1289                  | 0                       |              |
| Davit6:End  | 711                 | 1289                  | 0                       |              |
| Davit7:End  | 711                 | 1289                  | 0                       |              |
| Davit8:End  | 711                 | 1289                  | 0                       |              |
| 1255:WVGD1  | 119                 | 142                   | 0                       |              |
| 1255:WVGD2  | 119                 | 142                   | 0                       |              |
| 1255:WVGD3  | 119                 | 142                   | 0                       |              |
| 1255:WVGD4  | 119                 | 142                   | 0                       |              |

|              |      |        |   |
|--------------|------|--------|---|
| 1255:WVGD5   | 119  | 142    | 0 |
| 1255:WVGD6   | 119  | 142    | 0 |
| 1255:WVGD7   | 119  | 142    | 0 |
| 1255:WVGD8   | 119  | 142    | 0 |
| 1255:WVGD9   | 119  | 142    | 0 |
| 1255:t       | 0    | 35279  | 0 |
| 1255:Arm1    | 1994 | 4351   | 0 |
| 1255:ConnBot | 0    | -35279 | 0 |

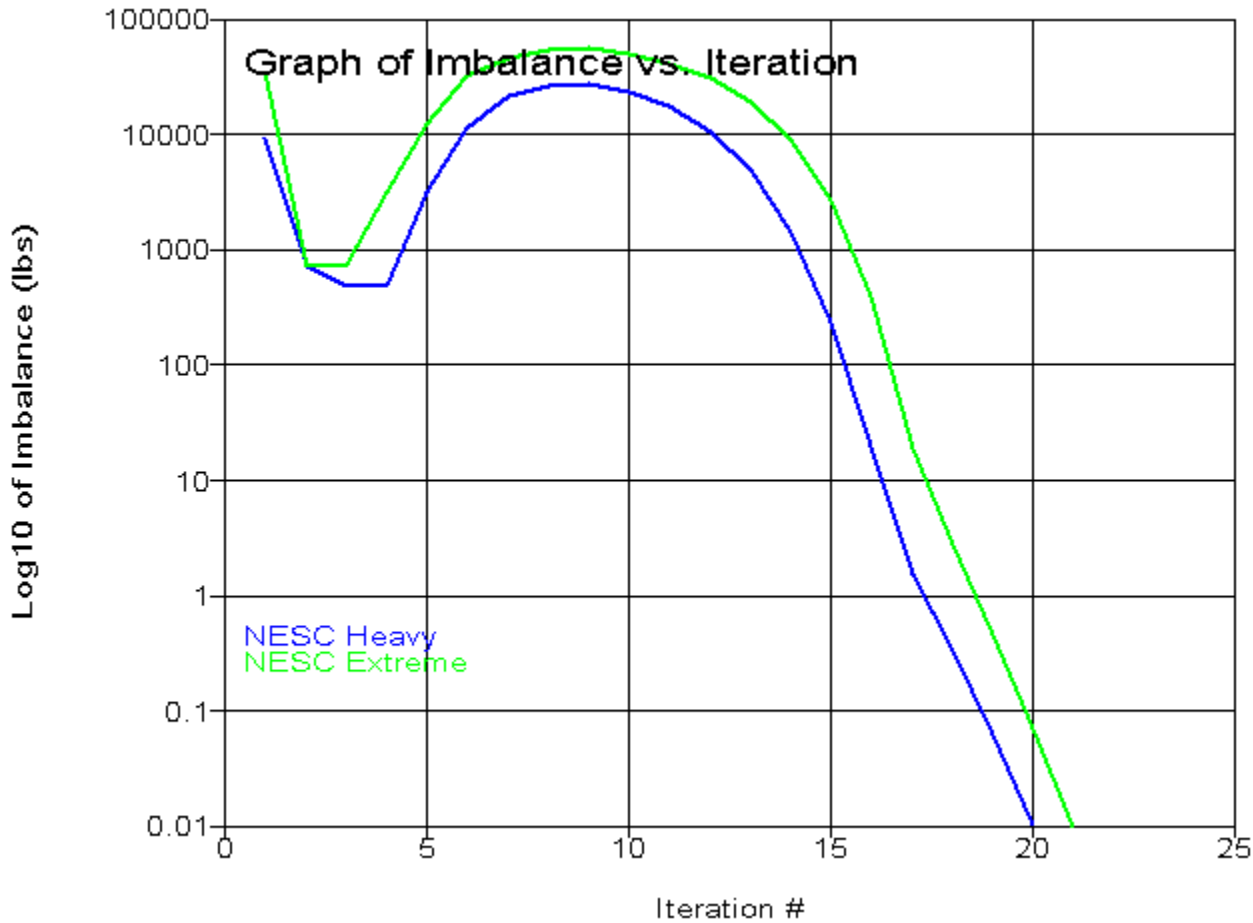
Detailed Pole Loading Data for Load Case "NESC Extreme":

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 | Section Bottom | Section Average  | Outer Diameter | Reynolds Number | Drag Coef. | Adjusted Wind Pressure | Adjusted Ice Thickness | Pole Vert. Load | Pole Wind Load | Pole Ice Vertical Load | Pole Ice Wind Load | Tran. Wind Load | Long. Wind Load |
|------------|--------------|--------------|-------------|----------------|------------------|----------------|-----------------|------------|------------------------|------------------------|-----------------|----------------|------------------------|--------------------|-----------------|-----------------|
|            |              |              | Z (ft)      | Z (ft)         | Z Elevation (ft) | (in)           |                 |            | (psf)                  | (in)                   | (lbs)           | (lbs)          | (lbs)                  | (lbs)              | (lbs)           | (lbs)           |
| 1255       | 1255:t       | 1255:Arm1    | 95.00       | 94.50          | 94.75            | 15.724         | 1.32e+006       | 1.000      | 31.21                  | 0.00                   | 21.81           | 20.45          | 0.00                   | 0.00               | 20.45           | 0.00            |
| 1255       | 1255:Arm1    | 1255:ConnBot | 94.50       | 94.00          | 94.25            | 15.813         | 1.32e+006       | 1.000      | 31.21                  | 0.00                   | 21.94           | 20.56          | 0.00                   | 0.00               | 20.56           | 0.00            |
| 1255       | 1255:ConnBot | 1255:WVGD9   | 94.00       | 90.00          | 92.00            | 16.212         | 1.36e+006       | 1.000      | 31.21                  | 0.00                   | 179.99          | 168.66         | 0.00                   | 0.00               | 168.66          | 0.00            |
| 1255       | 1255:WVGD9   | 1255:Arm2    | 90.00       | 89.00          | 89.50            | 16.656         | 1.39e+006       | 1.000      | 31.21                  | 0.00                   | 46.25           | 43.32          | 0.00                   | 0.00               | 43.32           | 0.00            |
| 1255       | 1255:Arm2    |              | 89.00       | 84.50          | 86.75            | 17.143         | 1.43e+006       | 1.000      | 31.21                  | 0.00                   | 214.30          | 200.64         | 0.00                   | 0.00               | 200.64          | 0.00            |
| 1255       |              | 1255:WVGD8   | 84.50       | 80.00          | 82.25            | 17.941         | 1.5e+006        | 1.000      | 31.21                  | 0.00                   | 224.42          | 209.98         | 0.00                   | 0.00               | 209.98          | 0.00            |
| 1255       | 1255:WVGD8   | 1255:Arm3    | 80.00       | 77.00          | 78.50            | 18.607         | 1.56e+006       | 1.000      | 31.21                  | 0.00                   | 155.24          | 145.17         | 0.00                   | 0.00               | 145.17          | 0.00            |
| 1255       | 1255:Arm3    |              | 77.00       | 73.50          | 75.25            | 19.183         | 1.6e+006        | 1.000      | 31.21                  | 0.00                   | 186.80          | 174.62         | 0.00                   | 0.00               | 174.62          | 0.00            |
| 1255       |              | 1255:WVGD7   | 73.50       | 70.00          | 71.75            | 19.804         | 1.66e+006       | 1.000      | 31.21                  | 0.00                   | 192.92          | 180.27         | 0.00                   | 0.00               | 180.27          | 0.00            |
| 1255       | 1255:WVGD7   | 1255:Arm4    | 70.00       | 65.00          | 67.50            | 20.558         | 1.72e+006       | 1.000      | 31.21                  | 0.00                   | 286.23          | 267.33         | 0.00                   | 0.00               | 267.33          | 0.00            |
| 1255       | 1255:Arm4    | 1255:WVGD6   | 65.00       | 60.00          | 62.50            | 21.444         | 1.79e+006       | 1.000      | 31.21                  | 0.00                   | 298.73          | 278.86         | 0.00                   | 0.00               | 278.86          | 0.00            |
| 1255       | 1255:WVGD6   |              | 60.00       | 56.50          | 58.25            | 22.198         | 1.86e+006       | 1.000      | 31.21                  | 0.00                   | 216.55          | 202.06         | 0.00                   | 0.00               | 202.06          | 0.00            |
| 1255       |              |              | 56.50       | 53.00          | 54.75            | 22.819         | 1.91e+006       | 1.000      | 31.21                  | 0.00                   | 222.67          | 207.72         | 0.00                   | 0.00               | 207.72          | 0.00            |
| 1255       |              | 1255:WVGD5   | 53.00       | 50.00          | 51.50            | 23.146         | 1.94e+006       | 1.000      | 31.21                  | 0.00                   | 481.42          | 180.59         | 0.00                   | 0.00               | 180.59          | 0.00            |
| 1255       | 1255:WVGD5   |              | 50.00       | 45.00          | 47.50            | 23.605         | 1.97e+006       | 1.000      | 31.21                  | 0.00                   | 491.20          | 306.96         | 0.00                   | 0.00               | 306.96          | 0.00            |
| 1255       |              | 1255:WVGD4   | 45.00       | 40.00          | 42.50            | 24.492         | 2.05e+006       | 1.000      | 31.21                  | 0.00                   | 509.88          | 318.49         | 0.00                   | 0.00               | 318.49          | 0.00            |
| 1255       | 1255:WVGD4   |              | 40.00       | 35.00          | 37.50            | 25.379         | 2.12e+006       | 1.000      | 31.21                  | 0.00                   | 528.63          | 330.02         | 0.00                   | 0.00               | 330.02          | 0.00            |
| 1255       |              | 1255:WVGD3   | 35.00       | 30.00          | 32.50            | 26.266         | 2.2e+006        | 1.000      | 31.21                  | 0.00                   | 547.38          | 341.55         | 0.00                   | 0.00               | 341.55          | 0.00            |
| 1255       | 1255:WVGD3   |              | 30.00       | 25.00          | 27.50            | 27.152         | 2.27e+006       | 1.000      | 31.21                  | 0.00                   | 566.13          | 353.09         | 0.00                   | 0.00               | 353.09          | 0.00            |
| 1255       |              | 1255:WVGD2   | 25.00       | 20.00          | 22.50            | 28.039         | 2.35e+006       | 1.000      | 31.21                  | 0.00                   | 584.88          | 364.62         | 0.00                   | 0.00               | 364.62          | 0.00            |
| 1255       | 1255:WVGD2   |              | 20.00       | 18.92          | 19.46            | 28.579         | 2.39e+006       | 1.000      | 31.21                  | 0.00                   | 129.16          | 80.50          | 0.00                   | 0.00               | 80.50           | 0.00            |
| 1255       |              |              | 18.92       | 15.00          | 16.96            | 28.647         | 2.4e+006        | 1.000      | 31.21                  | 0.00                   | 936.53          | 291.83         | 0.00                   | 0.00               | 291.83          | 0.00            |
| 1255       |              | 1255:WVGD1   | 15.00       | 10.00          | 12.50            | 29.063         | 2.43e+006       | 1.000      | 31.21                  | 0.00                   | 606.63          | 377.93         | 0.00                   | 0.00               | 377.93          | 0.00            |
| 1255       | 1255:WVGD1   |              | 10.00       | 5.00           | 7.50             | 29.950         | 2.5e+006        | 1.000      | 31.21                  | 0.00                   | 625.27          | 389.46         | 0.00                   | 0.00               | 389.46          | 0.00            |
| 1255       |              | 1255:g       | 5.00        | 0.00           | 2.50             | 30.837         | 2.58e+006       | 1.000      | 31.21                  | 0.00                   | 644.02          | 400.99         | 0.00                   | 0.00               | 400.99          | 0.00            |

\*\*\* Analysis Results:

Maximum element usage is 96.37% for Steel Pole "1255" in load case "NESC Extreme"  
 Maximum insulator usage is 44.10% for Clamp "Clamp18" in load case "NESC Extreme"



\*\*\* Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 20

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) |
|-------------|--------------|--------------|--------------|-------------|-------------|-------------|------------|------------|------------|
| 1255:g      | 0            | 0            | 0            | 0.0000      | 0.0000      | 0.0000      | 0          | 0          | 0          |
| 1255:t      | 0.01227      | 4.563        | -0.1489      | -5.0188     | 0.0118      | 0.0005      | 0.01227    | 4.563      | 94.85      |
| 1255:Arm1   | 0.01217      | 4.52         | -0.147       | -5.0180     | 0.0118      | 0.0005      | 0.01217    | 4.52       | 94.35      |

|              |           |        |            |         |        |        |           |        |       |
|--------------|-----------|--------|------------|---------|--------|--------|-----------|--------|-------|
| 1255:ConnBot | 0.01207   | 4.476  | -0.1451    | -5.0146 | 0.0118 | 0.0005 | 0.01207   | 4.476  | 93.85 |
| 1255:WVGD9   | 0.01125   | 4.128  | -0.1298    | -4.9653 | 0.0118 | 0.0005 | 0.01125   | 4.128  | 89.87 |
| 1255:Arm2    | 0.01104   | 4.041  | -0.126     | -4.9492 | 0.0118 | 0.0005 | 0.01104   | 4.041  | 88.87 |
| 1255:WVGD8   | 0.009219  | 3.283  | -0.09377   | -4.6815 | 0.0115 | 0.0004 | 0.009219  | 3.283  | 79.91 |
| 1255:Arm3    | 0.008623  | 3.041  | -0.08391   | -4.5610 | 0.0113 | 0.0004 | 0.008623  | 3.041  | 76.92 |
| 1255:WVGD7   | 0.007272  | 2.505  | -0.06303   | -4.2076 | 0.0108 | 0.0003 | 0.007272  | 2.505  | 69.94 |
| 1255:Arm4    | 0.006352  | 2.15   | -0.05023   | -3.9123 | 0.0103 | 0.0003 | 0.006352  | 2.15   | 64.95 |
| 1255:WVGD6   | 0.005481  | 1.823  | -0.03924   | -3.5795 | 0.0097 | 0.0002 | 0.005481  | 1.823  | 59.96 |
| 1255:WVGD5   | 0.003916  | 1.26   | -0.02288   | -2.8765 | 0.0083 | 0.0001 | 0.003916  | 1.26   | 49.98 |
| 1255:WVGD4   | 0.002586  | 0.8068 | -0.01223   | -2.3055 | 0.0069 | 0.0001 | 0.002586  | 0.8068 | 39.99 |
| 1255:WVGD3   | 0.0015    | 0.4542 | -0.005636  | -1.7272 | 0.0054 | 0.0001 | 0.0015    | 0.4542 | 29.99 |
| 1255:WVGD2   | 0.0006877 | 0.202  | -0.002077  | -1.1569 | 0.0038 | 0.0000 | 0.0006877 | 0.202  | 20    |
| 1255:WVGD1   | 0.0001763 | 0.0502 | -0.0005273 | -0.5725 | 0.0020 | 0.0000 | 0.0001763 | 0.0502 | 9.999 |
| Davit1:O     | 0.01219   | 4.522  | -0.08951   | -5.0180 | 0.0118 | 0.0005 | 0.01219   | 3.865  | 94.41 |
| Davit1:End   | 0.0127    | 4.662  | 0.7631     | -4.8473 | 0.0118 | 0.0005 | 0.0127    | -5.995 | 96.46 |
| Davit2:O     | 0.01215   | 4.517  | -0.2044    | -5.0180 | 0.0118 | 0.0005 | 0.01215   | 5.174  | 94.3  |
| Davit2:End   | 0.01213   | 4.584  | -1.106     | -5.2336 | 0.0118 | 0.0005 | 0.01213   | 15.24  | 94.59 |
| Davit3:O     | 0.01106   | 4.044  | -0.06585   | -4.9492 | 0.0118 | 0.0005 | 0.01106   | 3.346  | 88.93 |
| Davit3:End   | 0.01186   | 4.267  | 1.197      | -4.7854 | 0.0118 | 0.0005 | 0.01186   | -11.43 | 92.2  |
| Davit4:O     | 0.01102   | 4.039  | -0.1862    | -4.9492 | 0.0118 | 0.0005 | 0.01102   | 4.736  | 88.81 |
| Davit4:End   | 0.01104   | 4.157  | -1.517     | -5.1430 | 0.0118 | 0.0005 | 0.01104   | 19.85  | 89.48 |
| Davit5:O     | 0.00864   | 3.044  | -0.02138   | -4.5610 | 0.0113 | 0.0004 | 0.00864   | 2.257  | 76.98 |
| Davit5:End   | 0.009369  | 3.245  | 1.141      | -4.3962 | 0.0114 | 0.0004 | 0.009369  | -12.54 | 80.14 |
| Davit6:O     | 0.008605  | 3.039  | -0.1464    | -4.5610 | 0.0113 | 0.0004 | 0.008605  | 3.825  | 76.85 |
| Davit6:End   | 0.008661  | 3.152  | -1.375     | -4.7554 | 0.0113 | 0.0004 | 0.008661  | 18.94  | 77.63 |
| Davit7:O     | 0.006367  | 2.152  | 0.009475   | -3.9123 | 0.0103 | 0.0003 | 0.006367  | 1.277  | 65.01 |
| Davit7:End   | 0.006979  | 2.319  | 1.004      | -3.7460 | 0.0103 | 0.0003 | 0.006979  | -13.56 | 68    |
| Davit8:O     | 0.006338  | 2.148  | -0.1099    | -3.9123 | 0.0103 | 0.0003 | 0.006338  | 3.023  | 64.89 |
| Davit8:End   | 0.00644   | 2.251  | -1.167     | -4.1077 | 0.0103 | 0.0003 | 0.00644   | 18.13  | 65.83 |

Joint Support Reactions for Load Case "NESC Heavy":

| Joint Label | X Force (kips) | X Usage % (kips) | Y Force (kips) | Y Usage % (kips) | H-Shear Usage % (kips) | Z Comp. Force (kips) | Usage % (kips) | Uplift Usage % (kips) | Result. Force (kips) | Result. Usage % (ft-k) | X X-M. Usage % (ft-k) | Y Y-M. Usage % (ft-k) | H-Bend-M Usage % (ft-k) | Z Z-M. Usage % (ft-k) | Max. Usage % |       |     |     |
|-------------|----------------|------------------|----------------|------------------|------------------------|----------------------|----------------|-----------------------|----------------------|------------------------|-----------------------|-----------------------|-------------------------|-----------------------|--------------|-------|-----|-----|
| 1255:g      | -0.07          | 0.0              | -11.49         | 0.0              | 0.0                    | -42.39               | 0.0            | 0.0                   | 43.92                | 0.0                    | 952.12                | 0.0                   | -3.4                    | 0.0                   | 0.0          | -0.02 | 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. |
|---------------|--------------|----------------|-----------------|-------------------|------------------|------------------|-------------------------------|------------------------------|-------------------|--------------------|--------------------|--------------------|-----------|-----------|-----------|-----------|------------|--------------|--------|
| 1255          | 1255:t       | Origin         | 0.00            | 54.76             | 0.15             | -1.79            | -0.00                         | 0.00                         | -0.0              | 0.81               | 9.41               | -0.00              | 0.06      | 0.00      | 1.52      | 0.00      | 2.64       | 4.1          | 4      |
| 1255          | 1255:Arm1    | End            | 0.50            | 54.24             | 0.15             | -1.76            | 4.70                          | -0.00                        | -0.0              | 0.81               | 9.41               | -0.00              | 0.06      | 0.00      | 1.51      | 0.00      | 2.62       | 4.0          | 4      |
| 1255          | 1255:Arm1    | Origin         | 0.50            | 54.24             | 0.15             | -1.76            | 6.60                          | -0.00                        | 0.0               | -5.37              | 12.57              | -0.00              | -0.42     | 0.00      | 2.02      | 0.00      | 3.53       | 5.4          | 4      |
| 1255          | 1255:ConnBot | End            | 1.00            | 53.71             | 0.14             | -1.74            | 12.88                         | -0.00                        | 0.0               | -5.37              | 12.57              | -0.00              | -0.42     | 2.94      | 0.77      | 0.00      | 3.62       | 5.6          | 2      |
| 1255          | 1255:ConnBot | Origin         | 1.00            | 53.71             | 0.14             | -1.74            | 12.88                         | -0.00                        | 0.0               | -6.37              | 3.22               | -0.00              | -0.49     | 2.94      | 0.20      | 0.00      | 3.45       | 5.3          | 2      |
| 1255          | 1255:WVGD9   | End            | 5.00            | 49.53             | 0.13             | -1.56            | 25.74                         | -0.02                        | 0.0               | -6.37              | 3.22               | -0.00              | -0.47     | 5.38      | 0.19      | 0.00      | 5.86       | 9.0          | 2      |
| 1255          | 1255:WVGD9   | Origin         | 5.00            | 49.53             | 0.13             | -1.56            | 25.74                         | -0.02                        | 0.0               | -7.08              | 3.37               | -0.00              | -0.52     | 5.38      | 0.20      | 0.00      | 5.91       | 9.1          | 2      |
| 1255          | 1255:Arm2    | End            | 6.00            | 48.49             | 0.13             | -1.51            | 29.12                         | -0.02                        | 0.0               | -7.08              | 3.37               | -0.00              | -0.52     | 5.96      | 0.20      | 0.00      | 6.48       | 10.0         | 2      |
| 1255          | 1255:Arm2    | Origin         | 6.00            | 48.49             | 0.13             | -1.51            | 33.72                         | -0.02                        | 0.0               | -12.18             | 5.82               | -0.01              | -0.89     | 6.90      | 0.34      | 0.00      | 7.81       | 12.0         | 2      |
| 1255          | Tube 1       | End            | 10.50           | 43.88             | 0.12             | -1.31            | 59.92                         | -0.06                        | 0.0               | -12.18             | 5.82               | -0.01              | -0.85     | 11.14     | 0.32      | 0.00      | 12.01      | 18.5         | 2      |
| 1255          | Tube 1       | Origin         | 10.50           | 43.88             | 0.12             | -1.31            | 59.92                         | -0.06                        | 0.0               | -12.57             | 5.91               | -0.01              | -0.88     | 11.14     | 0.33      | 0.00      | 12.03      | 18.5         | 2      |
| 1255          | 1255:WVGD8   | End            | 15.00           | 39.40             | 0.11             | -1.13            | 86.53                         | -0.11                        | 0.0               | -12.57             | 5.91               | -0.01              | -0.84     | 14.70     | 0.31      | 0.00      | 15.54      | 23.9         | 2      |
| 1255          | 1255:WVGD8   | Origin         | 15.00           | 39.40             | 0.11             | -1.13            | 86.53                         | -0.11                        | 0.0               | -13.42             | 6.08               | -0.01              | -0.90     | 14.70     | 0.32      | 0.00      | 15.60      | 24.0         | 2      |
| 1255          | 1255:Arm3    | End            | 18.00           | 36.49             | 0.10             | -1.01            | 104.78                        | -0.15                        | 0.0               | -13.42             | 6.08               | -0.01              | -0.87     | 16.79     | 0.31      | 0.00      | 17.67      | 27.2         | 2      |



|      |            |        |       |       |      |       |        |       |     |        |       |       |       |       |      |      |       |      |   |
|------|------------|--------|-------|-------|------|-------|--------|-------|-----|--------|-------|-------|-------|-------|------|------|-------|------|---|
| 1255 | 1255:Arm3  | Origin | 18.00 | 36.49 | 0.10 | -1.01 | 109.33 | -0.15 | 0.0 | -18.62 | 8.49  | -0.02 | -1.21 | 17.52 | 0.44 | 0.00 | 18.74 | 28.8 | 2 |
| 1255 | Tube 1     | End    | 21.50 | 33.21 | 0.10 | -0.88 | 139.04 | -0.21 | 0.0 | -18.62 | 8.49  | -0.02 | -1.17 | 20.86 | 0.42 | 0.00 | 22.04 | 33.9 | 2 |
| 1255 | Tube 1     | Origin | 21.50 | 33.21 | 0.10 | -0.88 | 139.04 | -0.21 | 0.0 | -18.98 | 8.53  | -0.02 | -1.19 | 20.86 | 0.42 | 0.00 | 22.06 | 33.9 | 2 |
| 1255 | 1255:WVGD7 | End    | 25.00 | 30.06 | 0.09 | -0.76 | 168.90 | -0.28 | 0.0 | -18.98 | 8.53  | -0.02 | -1.15 | 23.77 | 0.41 | 0.00 | 24.93 | 38.4 | 2 |
| 1255 | 1255:WVGD7 | Origin | 25.00 | 30.06 | 0.09 | -0.76 | 168.90 | -0.28 | 0.0 | -19.94 | 8.67  | -0.02 | -1.21 | 23.77 | 0.42 | 0.00 | 24.99 | 38.4 | 2 |
| 1255 | 1255:Arm4  | End    | 30.00 | 25.80 | 0.08 | -0.60 | 212.26 | -0.38 | 0.0 | -19.94 | 8.67  | -0.02 | -1.16 | 27.36 | 0.40 | 0.00 | 28.53 | 44.4 | 2 |
| 1255 | 1255:Arm4  | Origin | 30.00 | 25.80 | 0.08 | -0.60 | 216.72 | -0.39 | 0.0 | -25.41 | 11.00 | -0.03 | -1.48 | 27.93 | 0.51 | 0.00 | 29.42 | 45.8 | 2 |
| 1255 | 1255:WVGD6 | End    | 35.00 | 21.87 | 0.07 | -0.47 | 271.71 | -0.52 | 0.0 | -25.41 | 11.00 | -0.03 | -1.42 | 32.19 | 0.49 | 0.00 | 33.62 | 53.6 | 2 |
| 1255 | 1255:WVGD6 | Origin | 35.00 | 21.87 | 0.07 | -0.47 | 271.71 | -0.52 | 0.0 | -26.43 | 11.08 | -0.03 | -1.47 | 32.19 | 0.49 | 0.00 | 33.68 | 53.7 | 2 |
| 1255 | Tube 1     | End    | 38.50 | 19.34 | 0.06 | -0.39 | 310.50 | -0.62 | 0.0 | -26.43 | 11.08 | -0.03 | -1.43 | 34.76 | 0.48 | 0.00 | 36.20 | 58.6 | 2 |
| 1255 | Tube 1     | Origin | 38.50 | 19.34 | 0.06 | -0.39 | 310.50 | -0.62 | 0.0 | -26.86 | 11.08 | -0.03 | -1.46 | 34.76 | 0.48 | 0.00 | 36.22 | 58.7 | 2 |
| 1255 | SpliceT    | End    | 42.00 | 16.99 | 0.05 | -0.32 | 349.26 | -0.73 | 0.0 | -26.86 | 11.08 | -0.03 | -1.42 | 36.99 | 0.46 | 0.00 | 38.42 | 63.2 | 2 |
| 1255 | SpliceT    | Origin | 42.00 | 16.99 | 0.05 | -0.32 | 349.26 | -0.73 | 0.0 | -27.48 | 11.08 | -0.03 | -1.45 | 36.99 | 0.46 | 0.00 | 38.45 | 63.3 | 2 |
| 1255 | 1255:WVGD5 | End    | 45.00 | 15.12 | 0.05 | -0.27 | 382.51 | -0.83 | 0.0 | -27.48 | 11.08 | -0.03 | -0.97 | 27.38 | 0.31 | 0.00 | 28.35 | 43.6 | 2 |
| 1255 | 1255:WVGD5 | Origin | 45.00 | 15.12 | 0.05 | -0.27 | 382.51 | -0.83 | 0.0 | -28.82 | 11.19 | -0.04 | -1.02 | 27.38 | 0.31 | 0.00 | 28.40 | 43.7 | 2 |
| 1255 | Tube 2     | End    | 50.00 | 12.25 | 0.04 | -0.20 | 438.47 | -1.01 | 0.0 | -28.82 | 11.19 | -0.04 | -0.98 | 29.06 | 0.30 | 0.00 | 30.04 | 46.2 | 2 |
| 1255 | Tube 2     | Origin | 50.00 | 12.25 | 0.04 | -0.20 | 438.47 | -1.01 | 0.0 | -29.71 | 11.22 | -0.04 | -1.01 | 29.06 | 0.30 | 0.00 | 30.07 | 46.3 | 2 |
| 1255 | 1255:WVGD4 | End    | 55.00 | 9.68  | 0.03 | -0.15 | 494.56 | -1.21 | 0.0 | -29.71 | 11.22 | -0.04 | -0.97 | 30.44 | 0.29 | 0.00 | 31.42 | 48.3 | 2 |
| 1255 | 1255:WVGD4 | Origin | 55.00 | 9.68  | 0.03 | -0.15 | 494.56 | -1.21 | 0.0 | -31.13 | 11.32 | -0.04 | -1.02 | 30.44 | 0.29 | 0.00 | 31.46 | 48.4 | 2 |
| 1255 | Tube 2     | End    | 60.00 | 7.41  | 0.02 | -0.10 | 551.14 | -1.42 | 0.0 | -31.13 | 11.32 | -0.04 | -0.98 | 31.58 | 0.28 | 0.00 | 32.57 | 50.1 | 2 |
| 1255 | Tube 2     | Origin | 60.00 | 7.41  | 0.02 | -0.10 | 551.14 | -1.42 | 0.0 | -32.08 | 11.33 | -0.05 | -1.01 | 31.58 | 0.28 | 0.00 | 32.60 | 50.2 | 2 |
| 1255 | 1255:WVGD3 | End    | 65.00 | 5.45  | 0.02 | -0.07 | 607.80 | -1.65 | 0.0 | -32.08 | 11.33 | -0.05 | -0.98 | 32.51 | 0.28 | 0.00 | 33.49 | 51.5 | 2 |
| 1255 | 1255:WVGD3 | Origin | 65.00 | 5.45  | 0.02 | -0.07 | 607.80 | -1.65 | 0.0 | -33.57 | 11.42 | -0.05 | -1.03 | 32.51 | 0.28 | 0.00 | 33.54 | 51.6 | 2 |
| 1255 | Tube 2     | End    | 70.00 | 3.79  | 0.01 | -0.04 | 664.88 | -1.90 | 0.0 | -33.57 | 11.42 | -0.05 | -0.99 | 33.27 | 0.27 | 0.00 | 34.27 | 52.7 | 2 |
| 1255 | Tube 2     | Origin | 70.00 | 3.79  | 0.01 | -0.04 | 664.88 | -1.90 | 0.0 | -34.58 | 11.43 | -0.05 | -1.02 | 33.27 | 0.27 | 0.00 | 34.30 | 52.8 | 2 |
| 1255 | 1255:WVGD2 | End    | 75.00 | 2.42  | 0.01 | -0.02 | 722.01 | -2.17 | 0.0 | -34.58 | 11.43 | -0.05 | -0.99 | 33.87 | 0.26 | 0.00 | 34.87 | 53.6 | 2 |
| 1255 | 1255:WVGD2 | Origin | 75.00 | 2.42  | 0.01 | -0.02 | 722.01 | -2.17 | 0.0 | -35.72 | 11.49 | -0.06 | -1.02 | 33.87 | 0.26 | 0.00 | 34.90 | 53.7 | 2 |
| 1255 | SpliceT    | End    | 76.08 | 2.17  | 0.01 | -0.02 | 734.46 | -2.23 | 0.0 | -35.72 | 11.49 | -0.06 | -1.02 | 33.99 | 0.26 | 0.00 | 35.01 | 53.9 | 2 |
| 1255 | SpliceT    | Origin | 76.08 | 2.17  | 0.01 | -0.02 | 734.46 | -2.23 | 0.0 | -36.60 | 11.50 | -0.06 | -1.04 | 33.99 | 0.26 | 0.00 | 35.03 | 53.9 | 2 |
| 1255 | SpliceB    | End    | 80.00 | 1.36  | 0.00 | -0.01 | 779.50 | -2.46 | 0.0 | -36.60 | 11.50 | -0.06 | -1.04 | 36.22 | 0.26 | 0.00 | 37.26 | 57.3 | 2 |
| 1255 | SpliceB    | Origin | 80.00 | 1.36  | 0.00 | -0.01 | 779.50 | -2.46 | 0.0 | -37.89 | 11.49 | -0.06 | -1.08 | 36.22 | 0.26 | 0.00 | 37.30 | 57.4 | 2 |
| 1255 | 1255:WVGD1 | End    | 85.00 | 0.60  | 0.00 | -0.01 | 836.95 | -2.76 | 0.0 | -37.89 | 11.49 | -0.06 | -1.05 | 36.54 | 0.25 | 0.00 | 37.59 | 57.8 | 2 |
| 1255 | 1255:WVGD1 | Origin | 85.00 | 0.60  | 0.00 | -0.01 | 836.95 | -2.76 | 0.0 | -39.48 | 11.53 | -0.06 | -1.09 | 36.54 | 0.25 | 0.00 | 37.64 | 57.9 | 2 |
| 1255 | Tube 3     | End    | 90.00 | 0.15  | 0.00 | -0.00 | 894.60 | -3.08 | 0.0 | -39.48 | 11.53 | -0.06 | -1.06 | 36.77 | 0.25 | 0.00 | 37.84 | 58.2 | 2 |
| 1255 | Tube 3     | Origin | 90.00 | 0.15  | 0.00 | -0.00 | 894.60 | -3.08 | 0.0 | -40.59 | 11.50 | -0.07 | -1.09 | 36.77 | 0.24 | 0.00 | 37.87 | 58.3 | 2 |
| 1255 | 1255:g     | End    | 95.00 | 0.00  | 0.00 | 0.00  | 952.12 | -3.43 | 0.0 | -40.59 | 11.50 | -0.07 | -1.06 | 36.91 | 0.24 | 0.00 | 37.97 | 58.9 | 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        | Davit1:0    | Origin         | 0.00            | 54.27             | 0.15             | -1.07            | -7.55             | 0.00              | 0.0               | -0.90              | 0.82               | -0.00              | -0.13     | 5.29      | 0.00      | 0.00      | 5.42       | 8.3          | 1      |
| Davit1        | #Davit1:0   | End            | 5.00            | 55.11             | 0.15             | 4.05             | -3.47             | 0.00              | 0.0               | -0.90              | 0.82               | -0.00              | -0.17     | 4.04      | 0.00      | 0.00      | 4.21       | 6.5          | 1      |
| Davit1        | #Davit1:0   | Origin         | 5.00            | 55.11             | 0.15             | 4.05             | -3.47             | 0.00              | 0.0               | -0.88              | 0.71               | -0.00              | -0.17     | 4.04      | 0.00      | 0.00      | 4.21       | 6.5          | 1      |
| Davit1        | #Davit1:1   | End            | 7.54            | 55.53             | 0.15             | 6.61             | -1.66             | 0.00              | 0.0               | -0.88              | 0.71               | -0.00              | -0.19     | 2.67      | 0.00      | 0.00      | 2.86       | 4.4          | 1      |
| Davit1        | #Davit1:1   | Origin         | 7.54            | 55.53             | 0.15             | 6.61             | -1.66             | 0.00              | 0.0               | -0.87              | 0.66               | -0.00              | -0.19     | 2.67      | 0.00      | 0.00      | 2.86       | 4.4          | 1      |
| Davit1        | Davit1:End  | End            | 10.07           | 55.94             | 0.15             | 9.16             | -0.00             | 0.00              | 0.0               | -0.87              | 0.66               | -0.00              | -0.23     | 0.00      | 0.37      | 0.00      | 0.68       | 1.0          | 3      |
| Davit2        | Davit2:0    | Origin         | 0.00            | 54.21             | 0.15             | -2.45            | -9.44             | -0.00             | -0.0              | 0.69               | 1.01               | 0.00               | 0.10      | 6.61      | 0.00      | 0.00      | 6.71       | 10.3         | 1      |
| Davit2        | #Davit2:0   | End            | 5.00            | 54.60             | 0.15             | -7.77            | -4.40             | -0.00             | -0.0              | 0.69               | 1.01               | 0.00               | 0.13      | 5.13      | 0.00      | 0.00      | 5.26       | 8.1          | 1      |
| Davit2        | #Davit2:0   | Origin         | 5.00            | 54.60             | 0.15             | -7.77            | -4.40             | -0.00             | -0.0              | 0.69               | 0.90               | 0.00               | 0.13      | 5.13      | 0.00      | 0.00      | 5.26       | 8.1          | 1      |
| Davit2        | #Davit2:1   | End            | 7.54            | 54.81             | 0.15             | -10.51           | -2.12             | -0.00             | -0.0              | 0.69               | 0.90               | 0.00               | 0.15      | 3.41      | 0.00      | 0.00      | 3.56       | 5.5          | 1      |
| Davit2        | #Davit2:1   | Origin         | 7.54            | 54.81             | 0.15             | -10.51           | -2.12             | -0.00             | 0.0               | 0.69               | 0.84               | 0.00               | 0.15      | 3.41      | 0.00      | 0.00      | 3.56       | 5.5          | 1      |
| Davit2        | Davit2:End  | End            | 10.07           | 55.01             | 0.15             | -13.27           | 0.00              | 0.00              | 0.0               | 0.69               | 0.84               | 0.00               | 0.18      | 0.00      | 0.47      | 0.00      | 0.84       | 1.3          | 3      |
| Davit3        | Davit3:0    | Origin         | 0.00            | 48.53             | 0.13             | -0.79            | -27.14            | 0.01              | 0.0               | -1.46              | 2.08               | -0.00              | -0.10     | 4.92      | 0.00      | 0.00      | 5.02       | 7.7          | 1      |

|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
|--------|------------|--------|-------|-------|------|--------|--------|-------|------|-------|------|-------|-------|------|------|------|------|-----|---|
| Davit3 | #Davit3:0  | End    | 5.00  | 49.42 | 0.14 | 4.28   | -16.72 | 0.01  | 0.0  | -1.46 | 2.08 | -0.00 | -0.12 | 4.43 | 0.00 | 0.00 | 4.55 | 7.0 | 1 |
| Davit3 | #Davit3:0  | Origin | 5.00  | 49.42 | 0.14 | 4.28   | -16.72 | 0.01  | 0.0  | -1.39 | 1.78 | -0.00 | -0.11 | 4.43 | 0.00 | 0.00 | 4.54 | 7.0 | 1 |
| Davit3 | #Davit3:1  | End    | 10.00 | 50.31 | 0.14 | 9.28   | -7.84  | 0.00  | 0.0  | -1.39 | 1.78 | -0.00 | -0.14 | 3.32 | 0.00 | 0.00 | 3.46 | 5.3 | 1 |
| Davit3 | #Davit3:1  | Origin | 10.00 | 50.31 | 0.14 | 9.28   | -7.84  | 0.00  | 0.0  | -1.35 | 1.58 | -0.00 | -0.14 | 3.32 | 0.00 | 0.00 | 3.45 | 5.3 | 1 |
| Davit3 | #Davit3:2  | End    | 12.57 | 50.76 | 0.14 | 11.83  | -3.78  | 0.00  | 0.0  | -1.35 | 1.58 | -0.00 | -0.16 | 2.14 | 0.00 | 0.00 | 2.30 | 3.5 | 1 |
| Davit3 | #Davit3:2  | Origin | 12.57 | 50.76 | 0.14 | 11.83  | -3.78  | 0.00  | 0.0  | -1.32 | 1.47 | -0.00 | -0.15 | 2.14 | 0.00 | 0.00 | 2.29 | 3.5 | 1 |
| Davit3 | Davit3:End | End    | 15.13 | 51.20 | 0.14 | 14.36  | -0.00  | 0.00  | 0.0  | -1.32 | 1.47 | -0.00 | -0.18 | 0.00 | 0.42 | 0.00 | 0.75 | 1.2 | 3 |
|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
| Davit4 | Davit4:0   | Origin | 0.00  | 48.46 | 0.13 | -2.23  | -31.74 | -0.01 | -0.0 | 0.87  | 2.40 | 0.00  | 0.06  | 5.75 | 0.00 | 0.00 | 5.81 | 8.9 | 1 |
| Davit4 | #Davit4:0  | End    | 5.00  | 48.93 | 0.13 | -7.44  | -19.74 | -0.00 | -0.0 | 0.87  | 2.40 | 0.00  | 0.07  | 5.23 | 0.00 | 0.00 | 5.30 | 8.2 | 1 |
| Davit4 | #Davit4:0  | Origin | 5.00  | 48.93 | 0.13 | -7.44  | -19.74 | -0.00 | -0.0 | 0.89  | 2.08 | 0.00  | 0.07  | 5.23 | 0.00 | 0.00 | 5.30 | 8.2 | 1 |
| Davit4 | #Davit4:1  | End    | 10.00 | 49.40 | 0.13 | -12.71 | -9.34  | -0.00 | -0.0 | 0.89  | 2.08 | 0.00  | 0.09  | 3.95 | 0.00 | 0.00 | 4.04 | 6.2 | 1 |
| Davit4 | #Davit4:1  | Origin | 10.00 | 49.40 | 0.13 | -12.71 | -9.34  | -0.00 | -0.0 | 0.90  | 1.88 | 0.00  | 0.09  | 3.95 | 0.00 | 0.00 | 4.04 | 6.2 | 1 |
| Davit4 | #Davit4:2  | End    | 12.57 | 49.64 | 0.13 | -15.45 | -4.52  | -0.00 | -0.0 | 0.90  | 1.88 | 0.00  | 0.10  | 2.56 | 0.00 | 0.00 | 2.67 | 4.1 | 1 |
| Davit4 | #Davit4:2  | Origin | 12.57 | 49.64 | 0.13 | -15.45 | -4.52  | -0.00 | 0.0  | 0.90  | 1.76 | 0.00  | 0.11  | 2.56 | 0.00 | 0.00 | 2.67 | 4.1 | 1 |
| Davit4 | Davit4:End | End    | 15.13 | 49.88 | 0.13 | -18.20 | -0.00  | 0.00  | 0.0  | 0.90  | 1.76 | 0.00  | 0.12  | 0.00 | 0.50 | 0.00 | 0.88 | 1.4 | 3 |
|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
| Davit5 | Davit5:0   | Origin | 0.00  | 36.52 | 0.10 | -0.26  | -27.28 | 0.01  | 0.0  | -1.45 | 2.09 | -0.00 | -0.10 | 4.95 | 0.00 | 0.00 | 5.04 | 7.8 | 1 |
| Davit5 | #Davit5:0  | End    | 5.00  | 37.34 | 0.11 | 4.41   | -16.81 | 0.01  | 0.0  | -1.45 | 2.09 | -0.00 | -0.12 | 4.46 | 0.00 | 0.00 | 4.57 | 7.0 | 1 |
| Davit5 | #Davit5:0  | Origin | 5.00  | 37.34 | 0.11 | 4.41   | -16.81 | 0.01  | 0.0  | -1.38 | 1.79 | -0.00 | -0.11 | 4.46 | 0.00 | 0.00 | 4.57 | 7.0 | 1 |
| Davit5 | #Davit5:1  | End    | 10.00 | 38.13 | 0.11 | 9.02   | -7.88  | 0.00  | 0.0  | -1.38 | 1.79 | -0.00 | -0.14 | 3.34 | 0.00 | 0.00 | 3.48 | 5.3 | 1 |
| Davit5 | #Davit5:1  | Origin | 10.00 | 38.13 | 0.11 | 9.02   | -7.88  | 0.00  | 0.0  | -1.34 | 1.59 | -0.00 | -0.14 | 3.34 | 0.00 | 0.00 | 3.47 | 5.3 | 1 |
| Davit5 | #Davit5:2  | End    | 12.57 | 38.54 | 0.11 | 11.36  | -3.80  | 0.00  | 0.0  | -1.34 | 1.59 | -0.00 | -0.16 | 2.15 | 0.00 | 0.00 | 2.31 | 3.6 | 1 |
| Davit5 | #Davit5:2  | Origin | 12.57 | 38.54 | 0.11 | 11.36  | -3.80  | 0.00  | 0.0  | -1.31 | 1.48 | -0.00 | -0.15 | 2.15 | 0.00 | 0.00 | 2.31 | 3.5 | 1 |
| Davit5 | Davit5:End | End    | 15.13 | 38.94 | 0.11 | 13.69  | -0.00  | 0.00  | 0.0  | -1.31 | 1.48 | -0.00 | -0.18 | 0.00 | 0.42 | 0.00 | 0.76 | 1.2 | 3 |
|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
| Davit6 | Davit6:0   | Origin | 0.00  | 36.46 | 0.10 | -1.76  | -31.83 | -0.01 | -0.0 | 0.85  | 2.41 | 0.00  | 0.06  | 5.77 | 0.00 | 0.00 | 5.83 | 9.0 | 1 |
| Davit6 | #Davit6:0  | End    | 5.00  | 36.91 | 0.10 | -6.55  | -19.80 | -0.00 | -0.0 | 0.85  | 2.41 | 0.00  | 0.07  | 5.25 | 0.00 | 0.00 | 5.31 | 8.2 | 1 |
| Davit6 | #Davit6:0  | Origin | 5.00  | 36.91 | 0.10 | -6.55  | -19.80 | -0.00 | -0.0 | 0.87  | 2.09 | 0.00  | 0.07  | 5.25 | 0.00 | 0.00 | 5.32 | 8.2 | 1 |
| Davit6 | #Davit6:1  | End    | 10.00 | 37.36 | 0.10 | -11.43 | -9.37  | -0.00 | -0.0 | 0.87  | 2.09 | 0.00  | 0.09  | 3.97 | 0.00 | 0.00 | 4.05 | 6.2 | 1 |
| Davit6 | #Davit6:1  | Origin | 10.00 | 37.36 | 0.10 | -11.43 | -9.37  | -0.00 | -0.0 | 0.88  | 1.88 | 0.00  | 0.09  | 3.97 | 0.00 | 0.00 | 4.06 | 6.2 | 1 |
| Davit6 | #Davit6:2  | End    | 12.57 | 37.59 | 0.10 | -13.95 | -4.54  | -0.00 | -0.0 | 0.88  | 1.88 | 0.00  | 0.10  | 2.57 | 0.00 | 0.00 | 2.67 | 4.1 | 1 |
| Davit6 | #Davit6:2  | Origin | 12.57 | 37.59 | 0.10 | -13.95 | -4.54  | -0.00 | 0.0  | 0.89  | 1.77 | 0.00  | 0.10  | 2.57 | 0.00 | 0.00 | 2.68 | 4.1 | 1 |
| Davit6 | Davit6:End | End    | 15.13 | 37.82 | 0.10 | -16.50 | -0.00  | 0.00  | 0.0  | 0.89  | 1.77 | 0.00  | 0.12  | 0.00 | 0.51 | 0.00 | 0.88 | 1.4 | 3 |
|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
| Davit7 | Davit7:0   | Origin | 0.00  | 25.82 | 0.08 | 0.11   | -27.52 | 0.01  | 0.0  | -1.43 | 2.11 | -0.00 | -0.09 | 4.99 | 0.00 | 0.00 | 5.09 | 7.8 | 1 |
| Davit7 | #Davit7:0  | End    | 5.00  | 26.50 | 0.08 | 4.12   | -16.97 | 0.01  | 0.0  | -1.43 | 2.11 | -0.00 | -0.11 | 4.50 | 0.00 | 0.00 | 4.61 | 7.1 | 1 |
| Davit7 | #Davit7:0  | Origin | 5.00  | 26.50 | 0.08 | 4.12   | -16.97 | 0.01  | 0.0  | -1.36 | 1.80 | -0.00 | -0.11 | 4.50 | 0.00 | 0.00 | 4.61 | 7.1 | 1 |
| Davit7 | #Davit7:1  | End    | 10.00 | 27.16 | 0.08 | 8.06   | -7.96  | 0.00  | 0.0  | -1.36 | 1.80 | -0.00 | -0.14 | 3.37 | 0.00 | 0.00 | 3.51 | 5.4 | 1 |
| Davit7 | #Davit7:1  | Origin | 10.00 | 27.16 | 0.08 | 8.06   | -7.96  | 0.00  | 0.0  | -1.32 | 1.61 | -0.00 | -0.13 | 3.37 | 0.00 | 0.00 | 3.50 | 5.4 | 1 |
| Davit7 | #Davit7:2  | End    | 12.57 | 27.49 | 0.08 | 10.06  | -3.84  | 0.00  | 0.0  | -1.32 | 1.61 | -0.00 | -0.15 | 2.18 | 0.00 | 0.00 | 2.33 | 3.6 | 1 |
| Davit7 | #Davit7:2  | Origin | 12.57 | 27.49 | 0.08 | 10.06  | -3.84  | 0.00  | 0.0  | -1.30 | 1.50 | -0.00 | -0.15 | 2.18 | 0.00 | 0.00 | 2.33 | 3.6 | 1 |
| Davit7 | Davit7:End | End    | 15.13 | 27.82 | 0.08 | 12.05  | -0.00  | 0.00  | 0.0  | -1.30 | 1.50 | -0.00 | -0.18 | 0.00 | 0.43 | 0.00 | 0.76 | 1.2 | 3 |
|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
| Davit8 | Davit8:0   | Origin | 0.00  | 25.78 | 0.08 | -1.32  | -31.98 | -0.01 | -0.0 | 0.83  | 2.42 | 0.00  | 0.05  | 5.80 | 0.00 | 0.00 | 5.85 | 9.0 | 1 |
| Davit8 | #Davit8:0  | End    | 5.00  | 26.18 | 0.08 | -5.44  | -19.90 | -0.00 | -0.0 | 0.83  | 2.42 | 0.00  | 0.07  | 5.27 | 0.00 | 0.00 | 5.34 | 8.2 | 1 |
| Davit8 | #Davit8:0  | Origin | 5.00  | 26.18 | 0.08 | -5.44  | -19.90 | -0.00 | -0.0 | 0.85  | 2.10 | 0.00  | 0.07  | 5.27 | 0.00 | 0.00 | 5.34 | 8.2 | 1 |
| Davit8 | #Davit8:1  | End    | 10.00 | 26.59 | 0.08 | -9.63  | -9.42  | -0.00 | -0.0 | 0.85  | 2.10 | 0.00  | 0.09  | 3.99 | 0.00 | 0.00 | 4.07 | 6.3 | 1 |
| Davit8 | #Davit8:1  | Origin | 10.00 | 26.59 | 0.08 | -9.63  | -9.42  | -0.00 | -0.0 | 0.86  | 1.89 | 0.00  | 0.09  | 3.99 | 0.00 | 0.00 | 4.08 | 6.3 | 1 |
| Davit8 | #Davit8:2  | End    | 12.57 | 26.80 | 0.08 | -11.81 | -4.57  | -0.00 | -0.0 | 0.86  | 1.89 | 0.00  | 0.10  | 2.59 | 0.00 | 0.00 | 2.69 | 4.1 | 1 |
| Davit8 | #Davit8:2  | Origin | 12.57 | 26.80 | 0.08 | -11.81 | -4.57  | -0.00 | 0.0  | 0.87  | 1.78 | 0.00  | 0.10  | 2.59 | 0.00 | 0.00 | 2.69 | 4.1 | 1 |
| Davit8 | Davit8:End | End    | 15.13 | 27.02 | 0.08 | -14.01 | -0.00  | 0.00  | 0.0  | 0.87  | 1.78 | 0.00  | 0.12  | 0.00 | 0.51 | 0.00 | 0.89 | 1.4 | 3 |

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

| Clamp Force Label | Input Holding Capacity | Factored Holding Capacity | Usage |
|-------------------|------------------------|---------------------------|-------|
|-------------------|------------------------|---------------------------|-------|

|         | (kips) | (kips) | (kips) | %     |
|---------|--------|--------|--------|-------|
| Clamp1  | 1.068  | 80.00  | 80.00  | 1.33  |
| Clamp2  | 1.068  | 80.00  | 80.00  | 1.33  |
| Clamp3  | 1.936  | 80.00  | 80.00  | 2.42  |
| Clamp4  | 1.936  | 80.00  | 80.00  | 2.42  |
| Clamp5  | 1.936  | 80.00  | 80.00  | 2.42  |
| Clamp6  | 1.936  | 80.00  | 80.00  | 2.42  |
| Clamp7  | 1.936  | 80.00  | 80.00  | 2.42  |
| Clamp8  | 1.936  | 80.00  | 80.00  | 2.42  |
| Clamp9  | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp10 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp11 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp12 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp13 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp14 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp15 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp16 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp17 | 0.519  | 80.00  | 80.00  | 0.65  |
| Clamp18 | 9.440  | 80.00  | 80.00  | 11.80 |
| Clamp19 | 4.417  | 80.00  | 80.00  | 5.52  |
| Clamp20 | 9.440  | 80.00  | 80.00  | 11.80 |

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) |
|--------------|--------------|--------------|--------------|-------------|-------------|-------------|------------|------------|------------|
| 1255:g       | 0            | 0            | 0            | 0.0000      | 0.0000      | 0.0000      | 0          | 0          | 0          |
| 1255:t       | 0.003501     | 7.505        | -0.3977      | -8.4775     | 0.0034      | 0.0003      | 0.003501   | 7.505      | 94.6       |
| 1255:Arm1    | 0.003473     | 7.431        | -0.3922      | -8.4744     | 0.0034      | 0.0003      | 0.003473   | 7.431      | 94.11      |
| 1255:ConnBot | 0.003444     | 7.357        | -0.3868      | -8.4643     | 0.0034      | 0.0003      | 0.003444   | 7.357      | 93.61      |
| 1255:WVGD9   | 0.003213     | 6.773        | -0.3438      | -8.3310     | 0.0034      | 0.0003      | 0.003213   | 6.773      | 89.66      |
| 1255:Arm2    | 0.003155     | 6.628        | -0.3333      | -8.2910     | 0.0033      | 0.0003      | 0.003155   | 6.628      | 88.67      |
| 1255:WVGD8   | 0.002642     | 5.368        | -0.2445      | -7.7527     | 0.0033      | 0.0002      | 0.002642   | 5.368      | 79.76      |
| 1255:Arm3    | 0.002474     | 4.969        | -0.2178      | -7.5270     | 0.0032      | 0.0002      | 0.002474   | 4.969      | 76.78      |
| 1255:WVGD7   | 0.002092     | 4.088        | -0.162       | -6.9005     | 0.0031      | 0.0002      | 0.002092   | 4.088      | 69.84      |
| 1255:Arm4    | 0.001831     | 3.508        | -0.1281      | -6.3940     | 0.0030      | 0.0002      | 0.001831   | 3.508      | 64.87      |
| 1255:WVGD6   | 0.001582     | 2.974        | -0.09945     | -5.8372     | 0.0028      | 0.0001      | 0.001582   | 2.974      | 59.9       |
| 1255:WVGD5   | 0.001134     | 2.058        | -0.05706     | -4.6846     | 0.0024      | 0.0001      | 0.001134   | 2.058      | 49.94      |
| 1255:WVGD4   | 0.000751     | 1.32         | -0.02957     | -3.7590     | 0.0020      | 0.0001      | 0.000751   | 1.32       | 39.97      |
| 1255:WVGD3   | 0.000437     | 0.7451       | -0.01277     | -2.8232     | 0.0016      | 0.0000      | 0.000437   | 0.7451     | 29.99      |
| 1255:WVGD2   | 0.0002008    | 0.3323       | -0.003997    | -1.8975     | 0.0011      | 0.0000      | 0.0002008  | 0.3323     | 20         |
| 1255:WVGD1   | 5.161e-005   | 0.08284      | -0.0006127   | -0.9429     | 0.0006      | 0.0000      | 5.161e-005 | 0.08284    | 9.999      |
| Davit1:O     | 0.003482     | 7.438        | -0.2954      | -8.4744     | 0.0034      | 0.0003      | 0.003482   | 6.781      | 94.2       |
| Davit1:End   | 0.003692     | 7.724        | 1.163        | -8.4540     | 0.0034      | 0.0003      | 0.003692   | -2.933     | 96.86      |
| Davit2:O     | 0.003463     | 7.424        | -0.4891      | -8.4744     | 0.0034      | 0.0003      | 0.003463   | 8.081      | 94.01      |
| Davit2:End   | 0.003393     | 7.491        | -1.983       | -8.5376     | 0.0034      | 0.0003      | 0.003393   | 18.15      | 93.72      |
| Davit3:O     | 0.003165     | 6.635        | -0.2327      | -8.2910     | 0.0033      | 0.0003      | 0.003165   | 5.938      | 88.77      |
| Davit3:End   | 0.003485     | 7.079        | 1.903        | -8.2451     | 0.0034      | 0.0003      | 0.003485   | -8.619     | 92.9       |
| Davit4:O     | 0.003146     | 6.621        | -0.4339      | -8.2910     | 0.0033      | 0.0003      | 0.003146   | 7.318      | 88.57      |
| Davit4:End   | 0.003058     | 6.752        | -2.631       | -8.3750     | 0.0033      | 0.0003      | 0.003058   | 22.45      | 88.37      |
| Davit5:O     | 0.002483     | 4.976        | -0.1148      | -7.5270     | 0.0032      | 0.0002      | 0.002483   | 4.189      | 76.89      |
| Davit5:End   | 0.002767     | 5.365        | 1.826        | -7.4790     | 0.0032      | 0.0002      | 0.002767   | -10.42     | 80.83      |
| Davit6:O     | 0.002465     | 4.962        | -0.3208      | -7.5270     | 0.0032      | 0.0002      | 0.002465   | 5.748      | 76.68      |
| Davit6:End   | 0.002406     | 5.095        | -2.316       | -7.6127     | 0.0032      | 0.0002      | 0.002406   | 20.88      | 76.68      |
| Davit7:O     | 0.001838     | 3.513        | -0.0307      | -6.3940     | 0.0030      | 0.0002      | 0.001838   | 2.638      | 64.97      |
| Davit7:End   | 0.00207      | 3.828        | 1.62         | -6.3430     | 0.0030      | 0.0002      | 0.00207    | -12.05     | 68.62      |
| Davit8:O     | 0.001823     | 3.502        | -0.2256      | -6.3940     | 0.0030      | 0.0002      | 0.001823   | 4.378      | 64.77      |
| Davit8:End   | 0.001798     | 3.632        | -1.922       | -6.4823     | 0.0030      | 0.0002      | 0.001798   | 19.51      | 65.08      |

Joint Support Reactions for Load Case "NESC Extreme":

| Joint Label | X Force (kips) | X Usage % | Y Force (kips) | Y Usage % | H-Shear Usage % | Z Comp. Force (kips) | Z Usage % | Uplift Usage % | Result. Force (kips) | Result. Usage % | X Moment (ft-k) | X-M. Usage % | Y Moment (ft-k) | Y-M. Usage % | H-Bend-M Usage % | Z Moment (ft-k) | Z-M. Usage % | Max. Usage % |
|-------------|----------------|-----------|----------------|-----------|-----------------|----------------------|-----------|----------------|----------------------|-----------------|-----------------|--------------|-----------------|--------------|------------------|-----------------|--------------|--------------|
| 1255:g      | -0.02          | 0.0       | -20.57         | 0.0       | 0.0             | -22.05               | 0.0       | 0.0            | 30.16                | 0.0             | 1575.54         | 0.0          | -1.0            | 0.0          | 0.0              | -0.01           | 0.0          | 0.0          |

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

| 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 Usage Pt. |
|---------------|-------------|----------------|-----------------|-------------------|------------------|------------------|-------------------------------|------------------------------|-------------------|--------------------|--------------------|--------------------|-----------|------------|------------|------------|------------|--------------|--------------|
| 1255          | 1255:t      | Origin         | 0.00            | 90.06             | 0.04             | -4.77            | 0.00                          | -0.00                        | -0.0              | 5.20               | 34.90              | -0.00              | 0.41      | 0.00       | 5.65       | 0.00       | 9.79       | 15.1         | 4            |
| 1255          | 1255:Arm1   | End            | 0.50            | 89.17             | 0.04             | -4.71            | 17.45                         | -0.00                        | -0.0              | 5.20               | 34.90              | -0.00              | 0.40      | 0.00       | 5.62       | 0.00       | 9.74       | 15.0         | 4            |

|      |              |        |       |       |      |       |         |       |     |        |       |       |       |       |      |      |       |      |   |
|------|--------------|--------|-------|-------|------|-------|---------|-------|-----|--------|-------|-------|-------|-------|------|------|-------|------|---|
| 1255 | 1255:Arm1    | Origin | 0.50  | 89.17 | 0.04 | -4.71 | 19.27   | -0.00 | 0.0 | 3.25   | 41.01 | -0.00 | 0.25  | 0.00  | 6.60 | 0.00 | 11.44 | 17.6 | 4 |
| 1255 | 1255:ConnBot | End    | 1.00  | 88.29 | 0.04 | -4.64 | 39.78   | -0.00 | 0.0 | 3.25   | 41.01 | -0.00 | 0.25  | 0.00  | 6.56 | 0.00 | 11.37 | 17.5 | 4 |
| 1255 | 1255:ConnBot | Origin | 1.00  | 88.29 | 0.04 | -4.64 | 39.78   | -0.00 | 0.0 | -2.07  | 6.23  | -0.00 | -0.16 | 9.09  | 0.38 | 0.00 | 9.28  | 14.3 | 2 |
| 1255 | 1255:WVGD9   | End    | 5.00  | 81.27 | 0.04 | -4.13 | 64.68   | -0.00 | 0.0 | -2.07  | 6.23  | -0.00 | -0.15 | 13.52 | 0.37 | 0.00 | 13.68 | 21.1 | 2 |
| 1255 | 1255:WVGD9   | Origin | 5.00  | 81.27 | 0.04 | -4.13 | 64.68   | -0.00 | 0.0 | -2.29  | 6.50  | -0.00 | -0.17 | 13.52 | 0.38 | 0.00 | 13.70 | 21.1 | 2 |
| 1255 | 1255:Arm2    | End    | 6.00  | 79.54 | 0.04 | -4.00 | 71.18   | -0.01 | 0.0 | -2.29  | 6.50  | -0.00 | -0.17 | 14.55 | 0.38 | 0.00 | 14.74 | 22.7 | 2 |
| 1255 | 1255:Arm2    | Origin | 6.00  | 79.54 | 0.04 | -4.00 | 77.12   | -0.01 | 0.0 | -4.57  | 9.56  | -0.00 | -0.33 | 15.77 | 0.56 | 0.00 | 16.13 | 24.8 | 2 |
| 1255 | Tube 1       | End    | 10.50 | 71.85 | 0.03 | -3.45 | 120.12  | -0.02 | 0.0 | -4.57  | 9.56  | -0.00 | -0.32 | 22.33 | 0.53 | 0.00 | 22.67 | 34.9 | 2 |
| 1255 | Tube 1       | Origin | 10.50 | 71.85 | 0.03 | -3.45 | 120.12  | -0.02 | 0.0 | -4.83  | 9.77  | -0.00 | -0.34 | 22.33 | 0.54 | 0.00 | 22.69 | 34.9 | 2 |
| 1255 | 1255:WVGD8   | End    | 15.00 | 64.42 | 0.03 | -2.93 | 164.06  | -0.03 | 0.0 | -4.83  | 9.77  | -0.00 | -0.32 | 27.85 | 0.52 | 0.00 | 28.19 | 43.4 | 2 |
| 1255 | 1255:WVGD8   | Origin | 15.00 | 64.42 | 0.03 | -2.93 | 164.06  | -0.03 | 0.0 | -5.17  | 10.10 | -0.00 | -0.34 | 27.85 | 0.54 | 0.00 | 28.21 | 43.4 | 2 |
| 1255 | 1255:Arm3    | End    | 18.00 | 59.63 | 0.03 | -2.61 | 194.36  | -0.04 | 0.0 | -5.17  | 10.10 | -0.00 | -0.33 | 31.13 | 0.52 | 0.00 | 31.47 | 48.4 | 2 |
| 1255 | 1255:Arm3    | Origin | 18.00 | 59.63 | 0.03 | -2.61 | 200.23  | -0.04 | 0.0 | -7.56  | 13.15 | -0.00 | -0.49 | 32.06 | 0.68 | 0.00 | 32.58 | 50.1 | 2 |
| 1255 | Tube 1       | End    | 21.50 | 54.23 | 0.03 | -2.26 | 246.24  | -0.06 | 0.0 | -7.56  | 13.15 | -0.00 | -0.47 | 36.92 | 0.65 | 0.00 | 37.41 | 57.5 | 2 |
| 1255 | Tube 1       | Origin | 21.50 | 54.23 | 0.03 | -2.26 | 246.24  | -0.06 | 0.0 | -7.82  | 13.30 | -0.01 | -0.49 | 36.92 | 0.66 | 0.00 | 37.42 | 57.6 | 2 |
| 1255 | 1255:WVGD7   | End    | 25.00 | 49.05 | 0.03 | -1.94 | 292.81  | -0.08 | 0.0 | -7.82  | 13.30 | -0.01 | -0.48 | 41.18 | 0.64 | 0.00 | 41.67 | 64.1 | 2 |
| 1255 | 1255:WVGD7   | Origin | 25.00 | 49.05 | 0.03 | -1.94 | 292.81  | -0.08 | 0.0 | -8.26  | 13.65 | -0.01 | -0.50 | 41.18 | 0.66 | 0.00 | 41.70 | 64.1 | 2 |
| 1255 | 1255:Arm4    | End    | 30.00 | 42.09 | 0.02 | -1.54 | 361.05  | -0.11 | 0.0 | -8.26  | 13.65 | -0.01 | -0.48 | 46.51 | 0.63 | 0.00 | 47.00 | 72.3 | 2 |
| 1255 | 1255:Arm4    | Origin | 30.00 | 42.09 | 0.02 | -1.54 | 366.82  | -0.11 | 0.0 | -10.93 | 16.72 | -0.01 | -0.64 | 47.25 | 0.77 | 0.00 | 47.90 | 73.7 | 2 |
| 1255 | 1255:WVGD6   | End    | 35.00 | 35.69 | 0.02 | -1.19 | 450.40  | -0.15 | 0.0 | -10.93 | 16.72 | -0.01 | -0.61 | 53.33 | 0.74 | 0.00 | 53.96 | 83.0 | 2 |
| 1255 | 1255:WVGD6   | Origin | 35.00 | 35.69 | 0.02 | -1.19 | 450.40  | -0.15 | 0.0 | -11.43 | 17.04 | -0.01 | -0.64 | 53.33 | 0.75 | 0.00 | 53.99 | 83.1 | 2 |
| 1255 | Tube 1       | End    | 38.50 | 31.56 | 0.02 | -0.99 | 510.03  | -0.17 | 0.0 | -11.43 | 17.04 | -0.01 | -0.62 | 57.06 | 0.73 | 0.00 | 57.69 | 89.9 | 2 |
| 1255 | Tube 1       | Origin | 38.50 | 31.56 | 0.02 | -0.99 | 510.03  | -0.17 | 0.0 | -11.78 | 17.18 | -0.01 | -0.64 | 57.06 | 0.74 | 0.00 | 57.71 | 89.9 | 2 |
| 1255 | SpliceT      | End    | 42.00 | 27.74 | 0.02 | -0.81 | 570.15  | -0.21 | 0.0 | -11.78 | 17.18 | -0.01 | -0.62 | 60.35 | 0.72 | 0.00 | 60.98 | 96.3 | 2 |
| 1255 | SpliceT      | Origin | 42.00 | 27.74 | 0.02 | -0.81 | 570.15  | -0.21 | 0.0 | -12.24 | 17.32 | -0.01 | -0.65 | 60.35 | 0.72 | 0.00 | 61.01 | 96.4 | 2 |
| 1255 | 1255:WVGD5   | End    | 45.00 | 24.70 | 0.01 | -0.68 | 622.12  | -0.23 | 0.0 | -12.24 | 17.32 | -0.01 | -0.43 | 44.49 | 0.49 | 0.00 | 44.93 | 69.1 | 2 |
| 1255 | 1255:WVGD5   | Origin | 45.00 | 24.70 | 0.01 | -0.68 | 622.12  | -0.23 | 0.0 | -12.95 | 17.67 | -0.01 | -0.46 | 44.49 | 0.50 | 0.00 | 44.96 | 69.2 | 2 |
| 1255 | Tube 2       | End    | 50.00 | 20.03 | 0.01 | -0.50 | 710.47  | -0.29 | 0.0 | -12.95 | 17.67 | -0.01 | -0.44 | 47.05 | 0.48 | 0.00 | 47.50 | 73.1 | 2 |
| 1255 | Tube 2       | Origin | 50.00 | 20.03 | 0.01 | -0.50 | 710.47  | -0.29 | 0.0 | -13.59 | 17.91 | -0.01 | -0.46 | 47.05 | 0.48 | 0.00 | 47.52 | 73.1 | 2 |
| 1255 | 1255:WVGD4   | End    | 55.00 | 15.84 | 0.01 | -0.35 | 800.03  | -0.34 | 0.0 | -13.59 | 17.91 | -0.01 | -0.45 | 49.20 | 0.47 | 0.00 | 49.65 | 76.4 | 2 |
| 1255 | 1255:WVGD4   | Origin | 55.00 | 15.84 | 0.01 | -0.35 | 800.03  | -0.34 | 0.0 | -14.37 | 18.30 | -0.01 | -0.47 | 49.20 | 0.48 | 0.00 | 49.68 | 76.4 | 2 |
| 1255 | Tube 2       | End    | 60.00 | 12.15 | 0.01 | -0.24 | 891.55  | -0.41 | 0.0 | -14.37 | 18.30 | -0.01 | -0.45 | 51.05 | 0.46 | 0.00 | 51.51 | 79.2 | 2 |
| 1255 | Tube 2       | Origin | 60.00 | 12.15 | 0.01 | -0.24 | 891.55  | -0.41 | 0.0 | -15.06 | 18.55 | -0.01 | -0.48 | 51.05 | 0.47 | 0.00 | 51.53 | 79.3 | 2 |
| 1255 | 1255:WVGD3   | End    | 65.00 | 8.94  | 0.01 | -0.15 | 984.29  | -0.47 | 0.0 | -15.06 | 18.55 | -0.01 | -0.46 | 52.60 | 0.45 | 0.00 | 53.06 | 81.6 | 2 |
| 1255 | 1255:WVGD3   | Origin | 65.00 | 8.94  | 0.01 | -0.15 | 984.29  | -0.47 | 0.0 | -15.88 | 18.94 | -0.01 | -0.49 | 52.60 | 0.46 | 0.00 | 53.09 | 81.7 | 2 |
| 1255 | Tube 2       | End    | 70.00 | 6.22  | 0.00 | -0.09 | 1079.02 | -0.55 | 0.0 | -15.88 | 18.94 | -0.01 | -0.47 | 53.94 | 0.44 | 0.00 | 54.42 | 83.7 | 2 |
| 1255 | Tube 2       | Origin | 70.00 | 6.22  | 0.00 | -0.09 | 1079.02 | -0.55 | 0.0 | -16.61 | 19.20 | -0.02 | -0.49 | 53.94 | 0.45 | 0.00 | 54.44 | 83.8 | 2 |
| 1255 | 1255:WVGD2   | End    | 75.00 | 3.99  | 0.00 | -0.05 | 1174.99 | -0.63 | 0.0 | -16.61 | 19.20 | -0.02 | -0.48 | 55.07 | 0.44 | 0.00 | 55.55 | 85.5 | 2 |
| 1255 | 1255:WVGD2   | Origin | 75.00 | 3.99  | 0.00 | -0.05 | 1174.99 | -0.63 | 0.0 | -17.17 | 19.49 | -0.02 | -0.49 | 55.07 | 0.44 | 0.00 | 55.57 | 85.5 | 2 |
| 1255 | SpliceT      | End    | 76.08 | 3.57  | 0.00 | -0.04 | 1196.10 | -0.65 | 0.0 | -17.17 | 19.49 | -0.02 | -0.49 | 55.30 | 0.44 | 0.00 | 55.79 | 85.8 | 2 |
| 1255 | SpliceT      | Origin | 76.08 | 3.57  | 0.00 | -0.04 | 1196.10 | -0.65 | 0.0 | -17.78 | 19.62 | -0.02 | -0.51 | 55.30 | 0.44 | 0.00 | 55.81 | 85.9 | 2 |
| 1255 | SpliceB      | End    | 80.00 | 2.24  | 0.00 | -0.02 | 1272.97 | -0.71 | 0.0 | -17.78 | 19.62 | -0.02 | -0.51 | 59.08 | 0.44 | 0.00 | 59.59 | 91.7 | 2 |
| 1255 | SpliceB      | Origin | 80.00 | 2.24  | 0.00 | -0.02 | 1272.97 | -0.71 | 0.0 | -18.70 | 19.84 | -0.02 | -0.53 | 59.08 | 0.45 | 0.00 | 59.62 | 91.7 | 2 |
| 1255 | 1255:WVGD1   | End    | 85.00 | 0.99  | 0.00 | -0.01 | 1372.18 | -0.80 | 0.0 | -18.70 | 19.84 | -0.02 | -0.52 | 59.84 | 0.43 | 0.00 | 60.37 | 92.9 | 2 |
| 1255 | 1255:WVGD1   | Origin | 85.00 | 0.99  | 0.00 | -0.01 | 1372.18 | -0.80 | 0.0 | -19.60 | 20.22 | -0.02 | -0.54 | 59.84 | 0.44 | 0.00 | 60.39 | 92.9 | 2 |
| 1255 | Tube 3       | End    | 90.00 | 0.25  | 0.00 | -0.00 | 1473.27 | -0.90 | 0.0 | -19.60 | 20.22 | -0.02 | -0.53 | 60.49 | 0.43 | 0.00 | 61.02 | 93.9 | 2 |
| 1255 | Tube 3       | Origin | 90.00 | 0.25  | 0.00 | -0.00 | 1473.27 | -0.90 | 0.0 | -20.41 | 20.45 | -0.02 | -0.55 | 60.49 | 0.43 | 0.00 | 61.04 | 93.9 | 2 |
| 1255 | 1255:g       | End    | 95.00 | 0.00  | 0.00 | 0.00  | 1575.54 | -1.01 | 0.0 | -20.41 | 20.45 | -0.02 | -0.53 | 61.01 | 0.42 | 0.00 | 61.55 | 94.7 | 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        | Davit1:0    | Origin         | 0.00            | 89.26             | 0.04             | -3.54            | -1.14             | 0.00              | 0.0               | -0.76              | 0.15               | -0.00              | -0.11     | 0.80      | 0.00      | 0.00      | 0.91       | 1.4          | 1      |
| Davit1        | #Davit1:0   | End            | 5.00            | 90.96             | 0.04             | 5.15             | -0.37             | 0.00              | 0.0               | -0.76              | 0.15               | -0.00              | -0.14     | 0.43      | 0.00      | 0.00      | 0.57       | 0.9          | 1      |
| Davit1        | #Davit1:0   | Origin         | 5.00            | 90.96             | 0.04             | 5.15             | -0.37             | 0.00              | 0.0               | -0.74              | 0.09               | -0.00              | -0.14     | 0.43      | 0.00      | 0.00      | 0.57       | 0.9          | 1      |

|        |            |        |       |       |      |        |        |       |      |       |      |       |       |      |      |      |      |     |   |
|--------|------------|--------|-------|-------|------|--------|--------|-------|------|-------|------|-------|-------|------|------|------|------|-----|---|
| Davit1 | #Davit1:1  | End    | 7.54  | 91.82 | 0.04 | 9.55   | -0.14  | 0.00  | 0.0  | -0.74 | 0.09 | -0.00 | -0.16 | 0.23 | 0.00 | 0.00 | 0.39 | 0.6 | 1 |
| Davit1 | #Davit1:1  | Origin | 7.54  | 91.82 | 0.04 | 9.55   | -0.14  | 0.00  | 0.0  | -0.73 | 0.06 | -0.00 | -0.16 | 0.23 | 0.00 | 0.00 | 0.39 | 0.6 | 1 |
| Davit1 | Davit1:End | End    | 10.07 | 92.69 | 0.04 | 13.95  | -0.00  | 0.00  | 0.0  | -0.73 | 0.06 | -0.00 | -0.19 | 0.00 | 0.03 | 0.00 | 0.20 | 0.3 | 3 |
| Davit2 | Davit2:0   | Origin | 0.00  | 89.09 | 0.04 | -5.87  | -2.95  | -0.00 | -0.0 | 0.70  | 0.34 | 0.00  | 0.10  | 2.07 | 0.00 | 0.00 | 2.17 | 3.3 | 1 |
| Davit2 | #Davit2:0  | End    | 5.00  | 89.49 | 0.04 | -14.75 | -1.25  | -0.00 | -0.0 | 0.70  | 0.34 | 0.00  | 0.13  | 1.46 | 0.00 | 0.00 | 1.59 | 2.5 | 1 |
| Davit2 | #Davit2:0  | Origin | 5.00  | 89.49 | 0.04 | -14.75 | -1.25  | -0.00 | -0.0 | 0.70  | 0.27 | 0.00  | 0.13  | 1.46 | 0.00 | 0.00 | 1.59 | 2.5 | 1 |
| Davit2 | #Davit2:1  | End    | 7.54  | 89.69 | 0.04 | -19.27 | -0.58  | -0.00 | -0.0 | 0.70  | 0.27 | 0.00  | 0.15  | 0.93 | 0.00 | 0.00 | 1.08 | 1.7 | 1 |
| Davit2 | #Davit2:1  | Origin | 7.54  | 89.69 | 0.04 | -19.27 | -0.58  | -0.00 | 0.0  | 0.70  | 0.23 | 0.00  | 0.15  | 0.93 | 0.00 | 0.00 | 1.08 | 1.7 | 1 |
| Davit2 | Davit2:End | End    | 10.07 | 89.90 | 0.04 | -23.79 | 0.00   | 0.00  | 0.0  | 0.70  | 0.23 | 0.00  | 0.18  | 0.00 | 0.13 | 0.00 | 0.29 | 0.4 | 3 |
| Davit3 | Davit3:0   | Origin | 0.00  | 79.62 | 0.04 | -2.79  | -8.48  | 0.00  | 0.0  | -1.56 | 0.74 | -0.00 | -0.10 | 1.54 | 0.00 | 0.00 | 1.64 | 2.5 | 1 |
| Davit3 | #Davit3:0  | End    | 5.00  | 81.39 | 0.04 | 5.69   | -4.79  | 0.00  | 0.0  | -1.56 | 0.74 | -0.00 | -0.12 | 1.27 | 0.00 | 0.00 | 1.39 | 2.1 | 1 |
| Davit3 | #Davit3:0  | Origin | 5.00  | 81.39 | 0.04 | 5.69   | -4.79  | 0.00  | 0.0  | -1.50 | 0.55 | -0.00 | -0.12 | 1.27 | 0.00 | 0.00 | 1.39 | 2.1 | 1 |
| Davit3 | #Davit3:1  | End    | 10.00 | 83.14 | 0.04 | 14.16  | -2.03  | 0.00  | 0.0  | -1.50 | 0.55 | -0.00 | -0.15 | 0.86 | 0.00 | 0.00 | 1.01 | 1.6 | 1 |
| Davit3 | #Davit3:1  | Origin | 10.00 | 83.14 | 0.04 | 14.16  | -2.03  | 0.00  | 0.0  | -1.46 | 0.43 | -0.00 | -0.15 | 0.86 | 0.00 | 0.00 | 1.01 | 1.6 | 1 |
| Davit3 | #Davit3:2  | End    | 12.57 | 84.04 | 0.04 | 18.49  | -0.93  | 0.00  | 0.0  | -1.46 | 0.43 | -0.00 | -0.17 | 0.53 | 0.00 | 0.00 | 0.70 | 1.1 | 1 |
| Davit3 | #Davit3:2  | Origin | 12.57 | 84.04 | 0.04 | 18.49  | -0.93  | 0.00  | 0.0  | -1.44 | 0.36 | -0.00 | -0.17 | 0.53 | 0.00 | 0.00 | 0.70 | 1.1 | 1 |
| Davit3 | Davit3:End | End    | 15.13 | 84.94 | 0.04 | 22.83  | -0.00  | 0.00  | 0.0  | -1.44 | 0.36 | -0.00 | -0.20 | 0.00 | 0.10 | 0.00 | 0.27 | 0.4 | 3 |
| Davit4 | Davit4:0   | Origin | 0.00  | 79.45 | 0.04 | -5.21  | -14.39 | -0.00 | -0.0 | 1.30  | 1.15 | 0.00  | 0.09  | 2.61 | 0.00 | 0.00 | 2.70 | 4.1 | 1 |
| Davit4 | #Davit4:0  | End    | 5.00  | 79.97 | 0.04 | -13.88 | -8.63  | -0.00 | -0.0 | 1.30  | 1.15 | 0.00  | 0.10  | 2.29 | 0.00 | 0.00 | 2.39 | 3.7 | 1 |
| Davit4 | #Davit4:0  | Origin | 5.00  | 79.97 | 0.04 | -13.88 | -8.63  | -0.00 | -0.0 | 1.30  | 0.94 | 0.00  | 0.10  | 2.29 | 0.00 | 0.00 | 2.39 | 3.7 | 1 |
| Davit4 | #Davit4:1  | End    | 10.00 | 80.49 | 0.04 | -22.60 | -3.93  | -0.00 | -0.0 | 1.30  | 0.94 | 0.00  | 0.13  | 1.66 | 0.00 | 0.00 | 1.79 | 2.8 | 1 |
| Davit4 | #Davit4:1  | Origin | 10.00 | 80.49 | 0.04 | -22.60 | -3.93  | -0.00 | -0.0 | 1.30  | 0.80 | 0.00  | 0.13  | 1.66 | 0.00 | 0.00 | 1.79 | 2.8 | 1 |
| Davit4 | #Davit4:2  | End    | 12.57 | 80.76 | 0.04 | -27.08 | -1.87  | -0.00 | -0.0 | 1.30  | 0.80 | 0.00  | 0.15  | 1.06 | 0.00 | 0.00 | 1.21 | 1.9 | 1 |
| Davit4 | #Davit4:2  | Origin | 12.57 | 80.76 | 0.04 | -27.08 | -1.87  | -0.00 | 0.0  | 1.30  | 0.73 | 0.00  | 0.15  | 1.06 | 0.00 | 0.00 | 1.21 | 1.9 | 1 |
| Davit4 | Davit4:End | End    | 15.13 | 81.03 | 0.04 | -31.57 | -0.00  | 0.00  | 0.0  | 1.30  | 0.73 | 0.00  | 0.18  | 0.00 | 0.21 | 0.00 | 0.40 | 0.6 | 3 |
| Davit5 | Davit5:0   | Origin | 0.00  | 59.71 | 0.03 | -1.38  | -8.81  | 0.00  | 0.0  | -1.55 | 0.76 | -0.00 | -0.10 | 1.60 | 0.00 | 0.00 | 1.70 | 2.6 | 1 |
| Davit5 | #Davit5:0  | End    | 5.00  | 61.25 | 0.03 | 6.33   | -5.00  | 0.00  | 0.0  | -1.55 | 0.76 | -0.00 | -0.12 | 1.32 | 0.00 | 0.00 | 1.45 | 2.2 | 1 |
| Davit5 | #Davit5:0  | Origin | 5.00  | 61.25 | 0.03 | 6.33   | -5.00  | 0.00  | 0.0  | -1.49 | 0.57 | -0.00 | -0.12 | 1.32 | 0.00 | 0.00 | 1.44 | 2.2 | 1 |
| Davit5 | #Davit5:1  | End    | 10.00 | 62.80 | 0.03 | 14.03  | -2.14  | 0.00  | 0.0  | -1.49 | 0.57 | -0.00 | -0.15 | 0.90 | 0.00 | 0.00 | 1.05 | 1.6 | 1 |
| Davit5 | #Davit5:1  | Origin | 10.00 | 62.80 | 0.03 | 14.03  | -2.14  | 0.00  | 0.0  | -1.46 | 0.45 | -0.00 | -0.15 | 0.90 | 0.00 | 0.00 | 1.05 | 1.6 | 1 |
| Davit5 | #Davit5:2  | End    | 12.57 | 63.59 | 0.03 | 17.97  | -0.98  | 0.00  | 0.0  | -1.46 | 0.45 | -0.00 | -0.17 | 0.56 | 0.00 | 0.00 | 0.73 | 1.1 | 1 |
| Davit5 | #Davit5:2  | Origin | 12.57 | 63.59 | 0.03 | 17.97  | -0.98  | 0.00  | 0.0  | -1.44 | 0.38 | -0.00 | -0.17 | 0.56 | 0.00 | 0.00 | 0.72 | 1.1 | 1 |
| Davit5 | Davit5:End | End    | 15.13 | 64.38 | 0.03 | 21.91  | -0.00  | 0.00  | 0.0  | -1.44 | 0.38 | -0.00 | -0.20 | 0.00 | 0.11 | 0.00 | 0.27 | 0.4 | 3 |
| Davit6 | Davit6:0   | Origin | 0.00  | 59.54 | 0.03 | -3.85  | -14.65 | -0.00 | -0.0 | 1.29  | 1.17 | 0.00  | 0.09  | 2.66 | 0.00 | 0.00 | 2.74 | 4.2 | 1 |
| Davit6 | #Davit6:0  | End    | 5.00  | 60.07 | 0.03 | -11.73 | -8.80  | -0.00 | -0.0 | 1.29  | 1.17 | 0.00  | 0.10  | 2.33 | 0.00 | 0.00 | 2.43 | 3.7 | 1 |
| Davit6 | #Davit6:0  | Origin | 5.00  | 60.07 | 0.03 | -11.73 | -8.80  | -0.00 | -0.0 | 1.29  | 0.96 | 0.00  | 0.10  | 2.33 | 0.00 | 0.00 | 2.43 | 3.7 | 1 |
| Davit6 | #Davit6:1  | End    | 10.00 | 60.60 | 0.03 | -19.64 | -4.02  | -0.00 | -0.0 | 1.29  | 0.96 | 0.00  | 0.13  | 1.70 | 0.00 | 0.00 | 1.83 | 2.8 | 1 |
| Davit6 | #Davit6:1  | Origin | 10.00 | 60.60 | 0.03 | -19.64 | -4.02  | -0.00 | -0.0 | 1.29  | 0.82 | 0.00  | 0.13  | 1.70 | 0.00 | 0.00 | 1.83 | 2.8 | 1 |
| Davit6 | #Davit6:2  | End    | 12.57 | 60.87 | 0.03 | -23.71 | -1.91  | -0.00 | -0.0 | 1.29  | 0.82 | 0.00  | 0.15  | 1.08 | 0.00 | 0.00 | 1.23 | 1.9 | 1 |
| Davit6 | #Davit6:2  | Origin | 12.57 | 60.87 | 0.03 | -23.71 | -1.91  | -0.00 | 0.0  | 1.29  | 0.75 | 0.00  | 0.15  | 1.08 | 0.00 | 0.00 | 1.23 | 1.9 | 1 |
| Davit6 | Davit6:End | End    | 15.13 | 61.14 | 0.03 | -27.79 | -0.00  | 0.00  | 0.0  | 1.29  | 0.75 | 0.00  | 0.18  | 0.00 | 0.21 | 0.00 | 0.41 | 0.6 | 3 |
| Davit7 | Davit7:0   | Origin | 0.00  | 42.16 | 0.02 | -0.37  | -9.29  | 0.00  | 0.0  | -1.53 | 0.80 | -0.00 | -0.10 | 1.68 | 0.00 | 0.00 | 1.79 | 2.7 | 1 |
| Davit7 | #Davit7:0  | End    | 5.00  | 43.41 | 0.02 | 6.19   | -5.30  | 0.00  | 0.0  | -1.53 | 0.80 | -0.00 | -0.12 | 1.41 | 0.00 | 0.00 | 1.53 | 2.4 | 1 |
| Davit7 | #Davit7:0  | Origin | 5.00  | 43.41 | 0.02 | 6.19   | -5.30  | 0.00  | 0.0  | -1.48 | 0.60 | -0.00 | -0.12 | 1.41 | 0.00 | 0.00 | 1.52 | 2.3 | 1 |
| Davit7 | #Davit7:1  | End    | 10.00 | 44.66 | 0.02 | 12.74  | -2.29  | 0.00  | 0.0  | -1.48 | 0.60 | -0.00 | -0.15 | 0.97 | 0.00 | 0.00 | 1.12 | 1.7 | 1 |
| Davit7 | #Davit7:1  | Origin | 10.00 | 44.66 | 0.02 | 12.74  | -2.29  | 0.00  | 0.0  | -1.45 | 0.48 | -0.00 | -0.15 | 0.97 | 0.00 | 0.00 | 1.11 | 1.7 | 1 |
| Davit7 | #Davit7:2  | End    | 12.57 | 45.29 | 0.02 | 16.09  | -1.06  | 0.00  | 0.0  | -1.45 | 0.48 | -0.00 | -0.17 | 0.60 | 0.00 | 0.00 | 0.77 | 1.2 | 1 |
| Davit7 | #Davit7:2  | Origin | 12.57 | 45.29 | 0.02 | 16.09  | -1.06  | 0.00  | 0.0  | -1.43 | 0.41 | -0.00 | -0.17 | 0.60 | 0.00 | 0.00 | 0.76 | 1.2 | 1 |
| Davit7 | Davit7:End | End    | 15.13 | 45.93 | 0.02 | 19.44  | -0.00  | 0.00  | 0.0  | -1.43 | 0.41 | -0.00 | -0.20 | 0.00 | 0.12 | 0.00 | 0.28 | 0.4 | 3 |
| Davit8 | Davit8:0   | Origin | 0.00  | 42.03 | 0.02 | -2.71  | -15.03 | -0.00 | -0.0 | 1.26  | 1.20 | 0.00  | 0.08  | 2.73 | 0.00 | 0.00 | 2.81 | 4.3 | 1 |
| Davit8 | #Davit8:0  | End    | 5.00  | 42.54 | 0.02 | -9.40  | -9.06  | -0.00 | -0.0 | 1.26  | 1.20 | 0.00  | 0.10  | 2.40 | 0.00 | 0.00 | 2.50 | 3.8 | 1 |
| Davit8 | #Davit8:0  | Origin | 5.00  | 42.54 | 0.02 | -9.40  | -9.06  | -0.00 | -0.0 | 1.27  | 0.98 | 0.00  | 0.10  | 2.40 | 0.00 | 0.00 | 2.50 | 3.8 | 1 |

|        |            |        |       |       |      |        |       |       |      |      |      |      |      |      |      |      |      |     |   |
|--------|------------|--------|-------|-------|------|--------|-------|-------|------|------|------|------|------|------|------|------|------|-----|---|
| Davit8 | #Davit8:1  | End    | 10.00 | 43.06 | 0.02 | -16.13 | -4.15 | -0.00 | -0.0 | 1.27 | 0.98 | 0.00 | 0.13 | 1.76 | 0.00 | 0.00 | 1.88 | 2.9 | 1 |
| Davit8 | #Davit8:1  | Origin | 10.00 | 43.06 | 0.02 | -16.13 | -4.15 | -0.00 | -0.0 | 1.27 | 0.85 | 0.00 | 0.13 | 1.76 | 0.00 | 0.00 | 1.88 | 2.9 | 1 |
| Davit8 | #Davit8:2  | End    | 12.57 | 43.32 | 0.02 | -19.59 | -1.98 | -0.00 | -0.0 | 1.27 | 0.85 | 0.00 | 0.15 | 1.12 | 0.00 | 0.00 | 1.27 | 2.0 | 1 |
| Davit8 | #Davit8:2  | Origin | 12.57 | 43.32 | 0.02 | -19.59 | -1.98 | -0.00 | 0.0  | 1.27 | 0.77 | 0.00 | 0.15 | 1.12 | 0.00 | 0.00 | 1.27 | 2.0 | 1 |
| Davit8 | Davit8:End | End    | 15.13 | 43.59 | 0.02 | -23.06 | -0.00 | 0.00  | 0.0  | 1.27 | 0.77 | 0.00 | 0.18 | 0.00 | 0.22 | 0.00 | 0.42 | 0.6 | 3 |

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

| Clamp Label | Force (kips) | Input Holding Capacity (kips) | Factored Holding Capacity (kips) | Usage % |
|-------------|--------------|-------------------------------|----------------------------------|---------|
| Clamp1      | 0.727        | 80.00                         | 80.00                            | 0.91    |
| Clamp2      | 0.727        | 80.00                         | 80.00                            | 0.91    |
| Clamp3      | 1.472        | 80.00                         | 80.00                            | 1.84    |
| Clamp4      | 1.472        | 80.00                         | 80.00                            | 1.84    |
| Clamp5      | 1.472        | 80.00                         | 80.00                            | 1.84    |
| Clamp6      | 1.472        | 80.00                         | 80.00                            | 1.84    |
| Clamp7      | 1.472        | 80.00                         | 80.00                            | 1.84    |
| Clamp8      | 1.472        | 80.00                         | 80.00                            | 1.84    |
| Clamp9      | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp10     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp11     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp12     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp13     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp14     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp15     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp16     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp17     | 0.185        | 80.00                         | 80.00                            | 0.23    |
| Clamp18     | 35.279       | 80.00                         | 80.00                            | 44.10   |
| Clamp19     | 4.786        | 80.00                         | 80.00                            | 5.98    |
| Clamp20     | 35.279       | 80.00                         | 80.00                            | 44.10   |

\*\*\* 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) |
|------------------|-----------------|--------------|----------------|--------------|
| 1255             | 96.37           | NESC Extreme | 14             | 10156.2      |

**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) | Mom. Sum (ft-k) | Bolt # | Bolts Acting | Bolt Max Load (kips) | Min Plate Thickness (in) | Actual Thickness (in) | Usage % |
|------------|--------------|-------------|--------------|--------------|------------|------------|-------------|----------------------|-----------------|--------|--------------|----------------------|--------------------------|-----------------------|---------|
| 1255       | NESC Heavy   | 1           | 1.658        | 0.185        | 0.185      | 1.658      | 25.000      | 9.018                | 28.182          | 2      | 93.155       | 1.215                | 3.000                    | 16.40                 |         |
| 1255       | NESC Heavy   | 2           | 1.303        | -1.042       | 1.303      | 1.042      | 25.000      | 6.627                | 20.710          | 3      | 30.053       | 1.041                | 3.000                    | 12.05                 |         |
| 1255       | NESC Heavy   | 3           | 0.185        | -1.658       | 1.658      | -0.185     | 25.000      | 8.076                | 25.237          | 2      | -86.490      | 1.150                | 3.000                    | 14.68                 |         |
| 1255       | NESC Heavy   | 4           | -1.042       | -1.303       | 1.042      | -1.303     | 25.000      | 30.134               | 94.169          | 3      | -86.490      | 2.221                | 3.000                    | 54.79                 |         |
| 1255       | NESC Heavy   | 5           | -1.658       | -0.185       | -0.185     | -1.658     | 25.000      | 8.014                | 25.044          | 2      | -86.296      | 1.145                | 3.000                    | 14.57                 |         |
| 1255       | NESC Heavy   | 6           | -1.303       | 1.042        | -1.303     | -1.042     | 25.000      | 6.702                | 20.945          | 3      | 30.699       | 1.047                | 3.000                    | 12.19                 |         |
| 1255       | NESC Heavy   | 7           | -0.185       | 1.658        | -1.658     | 0.185      | 25.000      | 9.080                | 28.374          | 2      | 93.349       | 1.219                | 3.000                    | 16.51                 |         |
| 1255       | NESC Heavy   | 8           | 1.042        | 1.303        | -1.042     | 1.303      | 25.000      | 32.526               | 101.645         | 3      | 93.349       | 2.307                | 3.000                    | 59.14                 |         |
| 1255       | NESC Heavy   | 9           | 1.502        | 0.905        | -0.423     | 1.702      | 25.000      | 13.404               | 41.886          | 2      | 93.252       | 1.481                | 3.000                    | 24.37                 |         |
| 1255       | NESC Heavy   | 10          | 1.702        | -0.423       | 0.905      | 1.502      | 25.000      | 3.210                | 10.031          | 2      | 30.053       | 0.725                | 3.000                    | 5.84                  |         |
| 1255       | NESC Heavy   | 11          | 0.905        | -1.502       | 1.702      | 0.423      | 25.000      | 2.573                | 8.040           | 2      | -23.841      | 0.649                | 3.000                    | 4.68                  |         |
| 1255       | NESC Heavy   | 12          | -0.423       | -1.702       | 1.502      | -0.905     | 25.000      | 12.437               | 38.866          | 2      | -86.490      | 1.427                | 3.000                    | 22.61                 |         |
| 1255       | NESC Heavy   | 13          | -1.502       | -0.905       | 0.423      | -1.702     | 25.000      | 12.417               | 38.803          | 2      | -86.393      | 1.425                | 3.000                    | 22.58                 |         |
| 1255       | NESC Heavy   | 14          | -1.702       | 0.423        | -0.905     | -1.502     | 25.000      | 2.533                | 7.916           | 2      | -23.194      | 0.644                | 3.000                    | 4.61                  |         |
| 1255       | NESC Heavy   | 15          | -0.905       | 1.502        | -1.702     | -0.423     | 25.000      | 3.303                | 10.321          | 2      | 30.699       | 0.735                | 3.000                    | 6.01                  |         |
| 1255       | NESC Heavy   | 16          | 0.423        | 1.702        | -1.502     | 0.905      | 25.000      | 13.424               | 41.949          | 2      | 93.349       | 1.482                | 3.000                    | 24.41                 |         |
| 1255       | NESC Extreme | 1           | 1.658        | 0.185        | 0.185      | 1.658      | 25.000      | 14.388               | 44.963          | 2      | 150.342      | 1.534                | 3.000                    | 26.16                 |         |
| 1255       | NESC Extreme | 2           | 1.303        | -1.042       | 1.303      | 1.042      | 25.000      | 10.559               | 32.998          | 3      | 46.230       | 1.315                | 3.000                    | 19.20                 |         |
| 1255       | NESC Extreme | 3           | 0.185        | -1.658       | 1.658      | -0.185     | 25.000      | 13.898               | 43.432          | 2      | -146.930     | 1.508                | 3.000                    | 25.27                 |         |
| 1255       | NESC Extreme | 4           | -1.042       | -1.303       | 1.042      | -1.303     | 25.000      | 51.239               | 160.122         | 3      | -146.930     | 2.896                | 3.000                    | 93.16                 |         |
| 1255       | NESC Extreme | 5           | -1.658       | -0.185       | -0.185     | -1.658     | 25.000      | 13.880               | 43.376          | 2      | -146.873     | 1.507                | 3.000                    | 25.24                 |         |
| 1255       | NESC Extreme | 6           | -1.303       | 1.042        | -1.303     | -1.042     | 25.000      | 10.582               | 33.067          | 3      | 46.420       | 1.316                | 3.000                    | 19.24                 |         |
| 1255       | NESC Extreme | 7           | -0.185       | 1.658        | -1.658     | 0.185      | 25.000      | 14.406               | 45.019          | 2      | 150.399      | 1.535                | 3.000                    | 26.19                 |         |
| 1255       | NESC Extreme | 8           | 1.042        | 1.303        | -1.042     | 1.303      | 25.000      | 52.449               | 163.904         | 3      | 150.399      | 2.930                | 3.000                    | 95.36                 |         |
| 1255       | NESC Extreme | 9           | 1.502        | 0.905        | -0.423     | 1.702      | 25.000      | 21.627               | 67.584          | 2      | 150.370      | 1.881                | 3.000                    | 39.32                 |         |
| 1255       | NESC Extreme | 10          | 1.702        | -0.423       | 0.905      | 1.502      | 25.000      | 4.808                | 15.025          | 2      | 46.230       | 0.887                | 3.000                    | 8.74                  |         |
| 1255       | NESC Extreme | 11          | 0.905        | -1.502       | 1.702      | 0.423      | 25.000      | 4.472                | 13.974          | 2      | -42.951      | 0.855                | 3.000                    | 8.13                  |         |
| 1255       | NESC Extreme | 12          | -0.423       | -1.702       | 1.502      | -0.905     | 25.000      | 21.134               | 66.042          | 2      | -146.930     | 1.860                | 3.000                    | 38.42                 |         |
| 1255       | NESC Extreme | 13          | -1.502       | -0.905       | 0.423      | -1.702     | 25.000      | 21.128               | 66.024          | 2      | -146.901     | 1.859                | 3.000                    | 38.41                 |         |
| 1255       | NESC Extreme | 14          | -1.702       | 0.423        | -0.905     | -1.502     | 25.000      | 4.460                | 13.938          | 2      | -42.761      | 0.854                | 3.000                    | 8.11                  |         |
| 1255       | NESC Extreme | 15          | -0.905       | 1.502        | -1.702     | -0.423     | 25.000      | 4.835                | 15.110          | 2      | 46.420       | 0.890                | 3.000                    | 8.79                  |         |
| 1255       | NESC Extreme | 16          | 0.423        | 1.702        | -1.502     | 0.905      | 25.000      | 21.633               | 67.602          | 2      | 150.399      | 1.881                | 3.000                    | 39.33                 |         |

**Summary of Tubular Davit Usages:**

| Tubular Davit Label | Maximum Usage % | Load Case  | Segment Number | Weight (lbs) |
|---------------------|-----------------|------------|----------------|--------------|
| Davit1              | 8.34            | NESC Heavy | 1              | 182.3        |
| Davit2              | 10.33           | NESC Heavy | 1              | 182.3        |
| Davit3              | 7.72            | NESC Heavy | 1              | 575.0        |



|        |      |            |   |       |
|--------|------|------------|---|-------|
| Davit4 | 8.94 | NESC Heavy | 1 | 575.0 |
| Davit5 | 7.76 | NESC Heavy | 1 | 575.0 |
| Davit6 | 8.97 | NESC Heavy | 1 | 575.0 |
| Davit7 | 7.82 | NESC Heavy | 1 | 575.0 |
| Davit8 | 9.00 | NESC Heavy | 1 | 575.0 |

\*\*\* Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

| Load Case    | Maximum Usage % | Element Label   | Element Type |
|--------------|-----------------|-----------------|--------------|
| NESC Heavy   | 63.30           | 1255 Steel Pole |              |
| NESC Extreme | 96.37           | 1255 Steel Pole |              |

Summary of Steel Pole Usages by Load Case:

| Load Case    | Maximum Usage % | Steel Pole Label | Segment Number |
|--------------|-----------------|------------------|----------------|
| NESC Heavy   | 63.30           | 1255             | 14             |
| NESC Extreme | 96.37           | 1255             | 14             |

Summary of Base Plate Usages by Load Case:

| Load Case    | Pole Bend Label Line # | Bend Length (in) | Vertical Load (kips) | X Moment (ft-k) | Y Bending Moment (ft-k) | 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   | 1255                   | 8                | 25.000               | 41.151          | 952.119                 | -3.426       | 32.526                 | 101.645                     | 3                                  | 93.349                       | 2.307   | 59.14 |
| NESC Extreme | 1255                   | 8                | 25.000               | 20.813          | 1575.539                | -1.005       | 52.449                 | 163.904                     | 3                                  | 150.399                      | 2.930   | 95.36 |

Summary of Tubular Davit Usages by Load Case:

| Load Case    | Maximum Usage % | Tubular Davit Label | Segment Number |
|--------------|-----------------|---------------------|----------------|
| NESC Heavy   | 10.33           | Davit2              | 1              |
| NESC Extreme | 4.32            | Davit8              | 1              |

Summary of Insulator Usages:

| Insulator Label | Insulator Type | Maximum Usage % | Load Case Weight (lbs) |
|-----------------|----------------|-----------------|------------------------|
| Clamp1          | Clamp          | 1.33            | NESC Heavy 0.0         |
| Clamp2          | Clamp          | 1.33            | NESC Heavy 0.0         |
| Clamp3          | Clamp          | 2.42            | NESC Heavy 0.0         |
| Clamp4          | Clamp          | 2.42            | NESC Heavy 0.0         |
| Clamp5          | Clamp          | 2.42            | NESC Heavy 0.0         |
| Clamp6          | Clamp          | 2.42            | NESC Heavy 0.0         |
| Clamp7          | Clamp          | 2.42            | NESC Heavy 0.0         |
| Clamp8          | Clamp          | 2.42            | NESC Heavy 0.0         |
| Clamp9          | Clamp          | 0.65            | NESC Heavy 0.0         |

|         |       |       |              |     |
|---------|-------|-------|--------------|-----|
| Clamp10 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp11 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp12 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp13 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp14 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp15 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp16 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp17 | Clamp | 0.65  | NESC Heavy   | 0.0 |
| Clamp18 | Clamp | 44.10 | NESC Extreme | 0.0 |
| Clamp19 | Clamp | 5.98  | NESC Extreme | 0.0 |
| Clamp20 | Clamp | 44.10 | NESC Extreme | 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                          | 0.717                          | 0.791                          | 1.068                             |
| NESC Heavy   | Clamp2          | Clamp          | Davit2:End             | 0.000                          | 0.717                          | 0.791                          | 1.068                             |
| NESC Heavy   | Clamp3          | Clamp          | Davit3:End             | 0.000                          | 0.977                          | 1.671                          | 1.936                             |
| NESC Heavy   | Clamp4          | Clamp          | Davit4:End             | 0.000                          | 0.977                          | 1.671                          | 1.936                             |
| NESC Heavy   | Clamp5          | Clamp          | Davit5:End             | 0.000                          | 0.977                          | 1.671                          | 1.936                             |
| NESC Heavy   | Clamp6          | Clamp          | Davit6:End             | 0.000                          | 0.977                          | 1.671                          | 1.936                             |
| NESC Heavy   | Clamp7          | Clamp          | Davit7:End             | 0.000                          | 0.977                          | 1.671                          | 1.936                             |
| NESC Heavy   | Clamp8          | Clamp          | Davit8:End             | 0.000                          | 0.977                          | 1.671                          | 1.936                             |
| NESC Heavy   | Clamp9          | Clamp          | 1255:WVGD1             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp10         | Clamp          | 1255:WVGD2             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp11         | Clamp          | 1255:WVGD3             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp12         | Clamp          | 1255:WVGD4             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp13         | Clamp          | 1255:WVGD5             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp14         | Clamp          | 1255:WVGD6             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp15         | Clamp          | 1255:WVGD7             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp16         | Clamp          | 1255:WVGD8             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp17         | Clamp          | 1255:WVGD9             | 0.000                          | 0.055                          | 0.516                          | 0.519                             |
| NESC Heavy   | Clamp18         | Clamp          | 1255:t                 | 0.000                          | 9.440                          | 0.000                          | 9.440                             |
| NESC Heavy   | Clamp19         | Clamp          | 1255:Arm1              | 0.000                          | 1.160                          | 4.262                          | 4.417                             |
| NESC Heavy   | Clamp20         | Clamp          | 1255:ConnBot           | 0.000                          | -9.440                         | 0.000                          | 9.440                             |
| NESC Extreme | Clamp1          | Clamp          | Davit1:End             | 0.000                          | 0.690                          | 0.230                          | 0.727                             |
| NESC Extreme | Clamp2          | Clamp          | Davit2:End             | 0.000                          | 0.690                          | 0.230                          | 0.727                             |
| NESC Extreme | Clamp3          | Clamp          | Davit3:End             | 0.000                          | 1.289                          | 0.711                          | 1.472                             |
| NESC Extreme | Clamp4          | Clamp          | Davit4:End             | 0.000                          | 1.289                          | 0.711                          | 1.472                             |
| NESC Extreme | Clamp5          | Clamp          | Davit5:End             | 0.000                          | 1.289                          | 0.711                          | 1.472                             |
| NESC Extreme | Clamp6          | Clamp          | Davit6:End             | 0.000                          | 1.289                          | 0.711                          | 1.472                             |
| NESC Extreme | Clamp7          | Clamp          | Davit7:End             | 0.000                          | 1.289                          | 0.711                          | 1.472                             |
| NESC Extreme | Clamp8          | Clamp          | Davit8:End             | 0.000                          | 1.289                          | 0.711                          | 1.472                             |
| NESC Extreme | Clamp9          | Clamp          | 1255:WVGD1             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp10         | Clamp          | 1255:WVGD2             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp11         | Clamp          | 1255:WVGD3             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp12         | Clamp          | 1255:WVGD4             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp13         | Clamp          | 1255:WVGD5             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp14         | Clamp          | 1255:WVGD6             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp15         | Clamp          | 1255:WVGD7             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp16         | Clamp          | 1255:WVGD8             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp17         | Clamp          | 1255:WVGD9             | 0.000                          | 0.142                          | 0.119                          | 0.185                             |
| NESC Extreme | Clamp18         | Clamp          | 1255:t                 | 0.000                          | 35.279                         | 0.000                          | 35.279                            |
| NESC Extreme | Clamp19         | Clamp          | 1255:Arm1              | 0.000                          | 4.351                          | 1.994                          | 4.786                             |
| NESC Extreme | Clamp20         | Clamp          | 1255:ConnBot           | 0.000                          | -35.279                        | 0.000                          | 35.279                            |

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<br>Tran.<br>Load<br>(kips) | Total<br>Long.<br>Load<br>(kips) | Total<br>Vert.<br>Load<br>(kips) | Transverse<br>Overturning<br>Moment<br>(ft-k) | Longitudinal<br>Overturning<br>Moment<br>(ft-k) | Torsional<br>Moment<br>(ft-k) |
|--------------|----------------------------------|----------------------------------|----------------------------------|---|---|-------------------------------|
| NESC Heavy   | 8.951                            | 0.000                            | 20.514                           | 744.142                                       | -0.000  | -0.000                        |
| NESC Extreme | 14.743                           | 0.000                            | 7.791                            | 1253.400                                      | -0.000  | -0.000                        |

\*\*\* Weight of structure (lbs):  
Weight of Tubular Davit Arms: 3814.7  
Weight of Steel Poles: 10156.2  
Total: 13971.0

\*\*\* End of Report

**Anchor Bolt Analysis:**

**Input Data:**

Bolt Force:

Maximum Tensile Force =  $T_{Max} := 150.4 \cdot \text{kips}$  (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =  $N := 12$  (User Input)

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

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

Bolt Yield Strength =  $F_y := 75 \cdot \text{ksi}$  (User Input)

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

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

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

**Anchor Bolt Analysis:**

Calculated Anchor Bolt Properties:

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

Bolt Tension Check:

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

Bolt Tension % of Capacity =  $\frac{T_{Max}}{T_{ALL.Net}} = 61.75 \cdot \%$

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

Condition1 = "OK"

**Caisson Foundation:**

Input Data:

|                                      |   |                                 |
|--------------------------------------|---|---------------------------------|
| Shear Force =                        | $S := 20.6k \cdot 1.1 = 22.7k$                            | <i>USER INPUT-FROM PLS-Pole</i> |
| Overturing Moment =                  | $M := 1575.5ft \cdot k \cdot 1.1 = 1733 \cdot ft \cdot k$ | <i>USER INPUT-FROM PLS-Pole</i> |
| Applied Axial Load =                 | $A1 := 22.1k \cdot 1.1 = 24.3 \cdot k$                    | <i>USER INPUT-FROM PLS-Pole</i> |
| Bending Moment =                     | $Mu := 1784ft \cdot k$                                    | <i>USER INPUT-FROM LPILE</i>    |
| Moment Capacity =                    | $Mn := 10539.1ft \cdot k$                                 | <i>USER INPUT-FROM LPILE</i>    |
| Foundation Diameter =                | $d := 10ft$   | <i>USER INPUT</i>               |
| Overall Length of Caisson =          | $L_c := 15.5ft$   | <i>USER INPUT</i>               |
| Depth From Top of Caisson to Grade = | $L_{pag} := 0.5ft$  | <i>USER INPUT</i>               |
| Number of Rebar =                    | $n := 24$   | <i>USER INPUT</i>               |
| Area of Rebar =                      | $Ar := 1.56in^2$  | <i>USER INPUT</i>               |
| Rebar Yield Strength =               | $fy := 60ksi$   | <i>USER INPUT</i>               |
| Concrete Comp Strength =             | $fc := 3.5ksi$  | <i>USER INPUT</i>               |

Check Moment Capacity:

|                             |   |
|-----------------------------|---|
| Factor of Safety =          | $FS := \frac{0.9 \cdot Mn}{Mu} = 5.3$                       |
| Factor of Safety Required = | $FS_{reqd} := 1.3$  |
|                             | $FOSCheck := \text{if}(FS \geq FS_{reqd}, "OK", "NO GOOD")$ |
|                             | <b>FOSCheck = "OK"</b>                                      |

Caisson Analysis.lpo

=====

LPILE Plus for Windows, Version 5.0 (5.0.47)

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

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=====

This program is licensed to:

TJL  
Centek Engineering

-----

Files Used for Analysis

-----

Path to file locations: J:\Jobs\1603400.WI\04\_Old Greenwich  
CT5150\02\_Structural\Backup Documentation\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: August 29, 2016 Time: 16:19:56

-----

Problem Title

-----

16034.04 / CT5150 - Old Greenwich RR / Structure # 1255

-----

Program Options

-----

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

Caisson Analysis.lpo

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 = 186.00 in
- Depth of ground surface below top of pile = 6.00 in
- Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

| Point No. | Point Depth in | Pile Diameter in | Moment of Inertia in**4 | Pile Area Sq.in | Modulus of Elasticity lbs/Sq.in |
|-----------|----------------|------------------|-------------------------|-----------------|---------------------------------|
| 1         | 0.0000         | 120.00000        | 10178760.               | 11309.7000      | 3300000.                        |
| 2         | 186.0000       | 120.00000        | 10178760.               | 11309.7000      | 3300000.                        |

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness

Caisson Analysis.lpo

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 1 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 = 186.000 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

(Depth of lowest layer extends 0.00 in below pile tip)

-----  
Effective Unit Weight of Soil vs. Depth  
-----

Effective unit weight of soil with depth defined using 2 points

| Point No. | Depth X in | Eff. Unit Weight lbs/in**3 |
|-----------|------------|----------------------------|
| 1         | 6.00       | 0.06700                    |
| 2         | 186.00     | 0.06700                    |

-----  
Shear Strength of Soils  
-----

Shear strength parameters with depth defined using 2 points

| Point No. | Depth X in | Cohesion c lbs/in**2 | Angle of Friction Deg. | E50 or k_rm | RQD % |
|-----------|------------|----------------------|------------------------|-------------|-------|
| 1         | 6.000      | 0.00000              | 32.00                  | -----       | ----- |
| 2         | 186.000    | 0.00000              | 32.00                  | -----       | ----- |

Notes:



Caisson Analysis.lpo

- (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<sub>rm</sub> 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 = 22627.000 lbs

Bending moment at pile head = 20797128.000 in-lbs

Axial load at pile head = 24255.000 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 = 120.0000 in

Caisson Analysis.lpo

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 = 24  
 Area of Single Bar = 1.56000 in\*\*2  
 Number of Rows of Reinforcing Bars = 13  
 Area of Steel = 37.440 in\*\*2  
 Area of Shaft = 11309.734 in\*\*2  
 Percentage of Steel Reinforcement = 0.331 percent  
 Cover Thickness (edge to bar center) = 4.000 in  
 Unfactored Axial Squash Load Capacity = 35781.47 kip

Distribution and Area of Steel Reinforcement

| Row Number | Area of Reinforcement in**2 | Distance to Centroidal Axis in |
|------------|-----------------------------|--------------------------------|
| 1          | 1.560                       | 56.000                         |
| 2          | 3.120                       | 54.092                         |
| 3          | 3.120                       | 48.497                         |
| 4          | 3.120                       | 39.598                         |
| 5          | 3.120                       | 28.000                         |
| 6          | 3.120                       | 14.494                         |
| 7          | 3.120                       | 0.000                          |
| 8          | 3.120                       | -14.494                        |
| 9          | 3.120                       | -28.000                        |
| 10         | 3.120                       | -39.598                        |
| 11         | 3.120                       | -48.497                        |
| 12         | 3.120                       | -54.092                        |
| 13         | 1.560                       | -56.000                        |

Axial Thrust Force = 24255.00 lbs

| Bending Max. Steel Moment Stress in-lbs psi | Bending Stiffness lb-in2 | Bending Curvature rad/in | Maximum Strain in/in | Neutral Axis Position inches | Max. Concrete Stress psi |
|---|--------------------------|--------------------------|----------------------|------------------------------|--------------------------|
| 18108109.833.32090                          | 3.621622E+13             | 5.000000E-07             | 0.00003074           | 61.47040665                  | 101.96352                |
| 36013398.                                   | 3.601340E+13             | 0.00000100               | 0.00006084           | 60.84197938                  | 200.08489                |

Caisson Analysis.lpo

|             |              |            |            |             |           |  |
|-------------|--------------|------------|------------|-------------|-----------|--|
| 1648.41740  |              |            |            |             |           |  |
| 53716269.   | 3.581085E+13 | 0.00000150 | 0.00009095 | 60.63224852 | 296.50024 |  |
| 2463.50281  |              |            |            |             |           |  |
| 71216722.   | 3.560836E+13 | 0.00000200 | 0.00012105 | 60.52719176 | 391.20964 |  |
| 3278.57712  |              |            |            |             |           |  |
| 71216722.   | 2.848669E+13 | 0.00000250 | 0.00005972 | 23.88868868 | 191.46972 |  |
| 6678.07007  |              |            |            |             |           |  |
| 71216722.   | 2.373891E+13 | 0.00000300 | 0.00007086 | 23.62157643 | 226.37993 |  |
| 8036.92285  |              |            |            |             |           |  |
| 71216722.   | 2.034763E+13 | 0.00000350 | 0.00008202 | 23.43446910 | 261.11178 |  |
| 9395.40139  |              |            |            |             |           |  |
| 71216722.   | 1.780418E+13 | 0.00000400 | 0.00009319 | 23.29737961 | 295.66465 |  |
| 10753.50396 |              |            |            |             |           |  |
| 71216722.   | 1.582594E+13 | 0.00000450 | 0.00010437 | 23.19366038 | 330.03808 |  |
| 12111.22732 |              |            |            |             |           |  |
| 71216722.   | 1.424334E+13 | 0.00000500 | 0.00011557 | 23.11331570 | 364.23152 |  |
| 13468.56922 |              |            |            |             |           |  |
| 71216722.   | 1.294849E+13 | 0.00000550 | 0.00012677 | 23.04998338 | 398.24436 |  |
| 14825.52765 |              |            |            |             |           |  |
| 71216722.   | 1.186945E+13 | 0.00000600 | 0.00013800 | 22.99942553 | 432.07606 |  |
| 16182.09996 |              |            |            |             |           |  |
| 71216722.   | 1.095642E+13 | 0.00000650 | 0.00014923 | 22.95870960 | 465.72610 |  |
| 17538.28324 |              |            |            |             |           |  |
| 71216722.   | 1.017382E+13 | 0.00000700 | 0.00016048 | 22.92573631 | 499.19385 |  |
| 18894.07553 |              |            |            |             |           |  |
| 71216722.   | 9.495563E+12 | 0.00000750 | 0.00017174 | 22.89896786 | 532.47872 |  |
| 20249.47449 |              |            |            |             |           |  |
| 71216722.   | 8.902090E+12 | 0.00000800 | 0.00018302 | 22.87725627 | 565.58023 |  |
| 21604.47654 |              |            |            |             |           |  |
| 71216722.   | 8.378438E+12 | 0.00000850 | 0.00019431 | 22.85971820 | 598.49775 |  |
| 22959.07946 |              |            |            |             |           |  |
| 71216722.   | 7.912969E+12 | 0.00000900 | 0.00020561 | 22.84566700 | 631.23066 |  |
| 24313.28091 |              |            |            |             |           |  |
| 71216722.   | 7.496497E+12 | 0.00000950 | 0.00021693 | 22.83456266 | 663.77839 |  |
| 25667.07799 |              |            |            |             |           |  |
| 71216722.   | 7.121672E+12 | 0.00001000 | 0.00022826 | 22.82597601 | 696.14045 |  |
| 27020.46696 |              |            |            |             |           |  |
| 71216722.   | 6.782545E+12 | 0.00001050 | 0.00023961 | 22.81954944 | 728.31599 |  |
| 28373.44720 |              |            |            |             |           |  |
| 71216722.   | 6.474247E+12 | 0.00001100 | 0.00025097 | 22.81500041 | 760.30453 |  |
| 29726.01487 |              |            |            |             |           |  |
| 71216722.   | 6.192758E+12 | 0.00001150 | 0.00026234 | 22.81209648 | 792.10558 |  |
| 31078.16583 |              |            |            |             |           |  |
| 71216722.   | 5.934727E+12 | 0.00001200 | 0.00027373 | 22.81063378 | 823.71829 |  |
| 32429.89945 |              |            |            |             |           |  |
| 71216722.   | 5.697338E+12 | 0.00001250 | 0.00028513 | 22.81045139 | 855.14217 |  |
| 33781.21137 |              |            |            |             |           |  |
| 71216722.   | 5.478209E+12 | 0.00001300 | 0.00029655 | 22.81140625 | 886.37647 |  |
| 35132.09984 |              |            |            |             |           |  |

Caisson Analysis.lpo

|              |              |            |            |             |            |
|--------------|--------------|------------|------------|-------------|------------|
| 71216722.    | 5.275313E+12 | 0.00001350 | 0.00030798 | 22.81338394 | 917.42072  |
| 36482.56019  |              |            |            |             |            |
| 71216722.    | 5.086909E+12 | 0.00001400 | 0.00031943 | 22.81628072 | 948.27421  |
| 37832.59003  |              |            |            |             |            |
| 71216722.    | 4.911498E+12 | 0.00001450 | 0.00033089 | 22.82000721 | 978.93622  |
| 39182.18697  |              |            |            |             |            |
| 71216722.    | 4.747781E+12 | 0.00001500 | 0.00034237 | 22.82448471 | 1009.40597 |
| 40531.34915  |              |            |            |             |            |
| 71216722.    | 4.594627E+12 | 0.00001550 | 0.00035386 | 22.82965600 | 1039.68316 |
| 41880.06963  |              |            |            |             |            |
| 71216722.    | 4.451045E+12 | 0.00001600 | 0.00036537 | 22.83545673 | 1069.76684 |
| 43228.34808  |              |            |            |             |            |
| 71216722.    | 4.316165E+12 | 0.00001650 | 0.00037689 | 22.84183681 | 1099.65635 |
| 44576.18109  |              |            |            |             |            |
| 71216722.    | 4.189219E+12 | 0.00001700 | 0.00038843 | 22.84874976 | 1129.35092 |
| 45923.56637  |              |            |            |             |            |
| 71216722.    | 4.069527E+12 | 0.00001750 | 0.00039998 | 22.85616338 | 1158.85017 |
| 47270.49708  |              |            |            |             |            |
| 71216722.    | 3.956485E+12 | 0.00001800 | 0.00041155 | 22.86403477 | 1188.15305 |
| 48616.97385  |              |            |            |             |            |
| 72849794.    | 3.937827E+12 | 0.00001850 | 0.00042314 | 22.87233889 | 1217.25911 |
| 49962.99018  |              |            |            |             |            |
| 74761423.    | 3.934812E+12 | 0.00001900 | 0.00043474 | 22.88104355 | 1246.16744 |
| 51308.54500  |              |            |            |             |            |
| 76671284.    | 3.931861E+12 | 0.00001950 | 0.00044636 | 22.89012730 | 1274.87747 |
| 52653.63301  |              |            |            |             |            |
| 80485624.    | 3.926128E+12 | 0.00002050 | 0.00046964 | 22.90933549 | 1331.69921 |
| 55342.40005  |              |            |            |             |            |
| 84292770.    | 3.920594E+12 | 0.00002150 | 0.00049299 | 22.92982042 | 1387.71885 |
| 58029.25697  |              |            |            |             |            |
| 87987213.    | 3.910543E+12 | 0.00002250 | 0.00051619 | 22.94185102 | 1442.40263 |
| 60000.00000  |              |            |            |             |            |
| 90758780.    | 3.862076E+12 | 0.00002350 | 0.00053755 | 22.87425935 | 1491.69452 |
| 60000.00000  |              |            |            |             |            |
| 93121240.    | 3.800867E+12 | 0.00002450 | 0.00055806 | 22.77805746 | 1538.20476 |
| 60000.00000  |              |            |            |             |            |
| 95015825.    | 3.726111E+12 | 0.00002550 | 0.00057758 | 22.65016615 | 1581.64597 |
| 60000.00000  |              |            |            |             |            |
| 96906689.    | 3.656856E+12 | 0.00002650 | 0.00059713 | 22.53332555 | 1624.50528 |
| 60000.00000  |              |            |            |             |            |
| 98395261.    | 3.578009E+12 | 0.00002750 | 0.00061572 | 22.38984168 | 1664.51418 |
| 60000.00000  |              |            |            |             |            |
| 99680685.    | 3.497568E+12 | 0.00002850 | 0.00063383 | 22.23981321 | 1702.86845 |
| 60000.00000  |              |            |            |             |            |
| 1.009633E+08 | 3.422484E+12 | 0.00002950 | 0.00065198 | 22.10095704 | 1740.71779 |
| 60000.00000  |              |            |            |             |            |
| 1.016851E+08 | 3.333937E+12 | 0.00003050 | 0.00067100 | 21.99999869 | 1779.88968 |
| 60000.00000  |              |            |            |             |            |
| 1.035236E+08 | 3.286465E+12 | 0.00003150 | 0.00069211 | 21.97186410 | 1822.86290 |

Caisson Analysis.lpo

|              |              |            |            |             |            |
|--------------|--------------|------------|------------|-------------|------------|
| 60000.00000  |              |            |            |             |            |
| 1.043254E+08 | 3.210013E+12 | 0.00003250 | 0.00070837 | 21.79610431 | 1854.94041 |
| 60000.00000  |              |            |            |             |            |
| 1.051253E+08 | 3.138067E+12 | 0.00003350 | 0.00072466 | 21.63153827 | 1886.61335 |
| 60000.00000  |              |            |            |             |            |
| 1.059231E+08 | 3.070235E+12 | 0.00003450 | 0.00074096 | 21.47720397 | 1917.88040 |
| 60000.00000  |              |            |            |             |            |
| 1.067190E+08 | 3.006169E+12 | 0.00003550 | 0.00075729 | 21.33223593 | 1948.73939 |
| 60000.00000  |              |            |            |             |            |
| 1.075129E+08 | 2.945558E+12 | 0.00003650 | 0.00077365 | 21.19586885 | 1979.18850 |
| 60000.00000  |              |            |            |             |            |
| 1.083047E+08 | 2.888126E+12 | 0.00003750 | 0.00079003 | 21.06742322 | 2009.22621 |
| 60000.00000  |              |            |            |             |            |
| 1.090946E+08 | 2.833625E+12 | 0.00003850 | 0.00080643 | 20.94628394 | 2038.85049 |
| 60000.00000  |              |            |            |             |            |
| 1.096042E+08 | 2.774791E+12 | 0.00003950 | 0.00082168 | 20.80193818 | 2065.83522 |
| 60000.00000  |              |            |            |             |            |
| 1.100718E+08 | 2.717823E+12 | 0.00004050 | 0.00083677 | 20.66095412 | 2092.14266 |
| 60000.00000  |              |            |            |             |            |
| 1.105379E+08 | 2.663564E+12 | 0.00004150 | 0.00085188 | 20.52723706 | 2118.09968 |
| 60000.00000  |              |            |            |             |            |
| 1.110024E+08 | 2.611822E+12 | 0.00004250 | 0.00086701 | 20.40027916 | 2143.70507 |
| 60000.00000  |              |            |            |             |            |
| 1.114654E+08 | 2.562424E+12 | 0.00004350 | 0.00088216 | 20.27961552 | 2168.95728 |
| 60000.00000  |              |            |            |             |            |
| 1.119269E+08 | 2.515210E+12 | 0.00004450 | 0.00089733 | 20.16482055 | 2193.85457 |
| 60000.00000  |              |            |            |             |            |
| 1.123868E+08 | 2.470038E+12 | 0.00004550 | 0.00091253 | 20.05551517 | 2218.39591 |
| 60000.00000  |              |            |            |             |            |
| 1.132424E+08 | 2.435321E+12 | 0.00004650 | 0.00093000 | 20.00000060 | 2246.39343 |
| 60000.00000  |              |            |            |             |            |
| 1.145313E+08 | 2.411186E+12 | 0.00004750 | 0.00095000 | 20.00000060 | 2278.02828 |
| 60000.00000  |              |            |            |             |            |
| 1.145313E+08 | 2.361471E+12 | 0.00004850 | 0.00096494 | 19.89568770 | 2300.79309 |
| 60000.00000  |              |            |            |             |            |
| 1.145313E+08 | 2.313764E+12 | 0.00004950 | 0.00097955 | 19.78894651 | 2322.65623 |
| 60000.00000  |              |            |            |             |            |
| 1.147599E+08 | 2.272474E+12 | 0.00005050 | 0.00099418 | 19.68682230 | 2344.18983 |
| 60000.00000  |              |            |            |             |            |
| 1.151446E+08 | 2.235818E+12 | 0.00005150 | 0.00100848 | 19.58215177 | 2364.84546 |
| 60000.00000  |              |            |            |             |            |
| 1.153844E+08 | 2.197798E+12 | 0.00005250 | 0.00102183 | 19.46340501 | 2383.71994 |
| 60000.00000  |              |            |            |             |            |
| 1.156231E+08 | 2.161180E+12 | 0.00005350 | 0.00103519 | 19.34938967 | 2402.32121 |
| 60000.00000  |              |            |            |             |            |
| 1.158609E+08 | 2.125887E+12 | 0.00005450 | 0.00104857 | 19.23985183 | 2420.64869 |
| 60000.00000  |              |            |            |             |            |
| 1.160975E+08 | 2.091847E+12 | 0.00005550 | 0.00106197 | 19.13454831 | 2438.70111 |
| 60000.00000  |              |            |            |             |            |

Caisson Analysis.lpo

|                             |              |            |            |             |            |
|-----------------------------|--------------|------------|------------|-------------|------------|
| 1.163331E+08<br>60000.00000 | 2.058993E+12 | 0.00005650 | 0.00107538 | 19.03325021 | 2456.47701 |
| 1.165677E+08<br>60000.00000 | 2.027263E+12 | 0.00005750 | 0.00108881 | 18.93575728 | 2473.97594 |
| 1.168011E+08<br>60000.00000 | 1.996601E+12 | 0.00005850 | 0.00110225 | 18.84187281 | 2491.19661 |
| 1.170336E+08<br>60000.00000 | 1.966951E+12 | 0.00005950 | 0.00111571 | 18.75141799 | 2508.13810 |
| 1.174952E+08<br>60000.00000 | 1.910490E+12 | 0.00006150 | 0.00114268 | 18.58012140 | 2541.17824 |
| 1.179524E+08<br>60000.00000 | 1.857519E+12 | 0.00006350 | 0.00116971 | 18.42065156 | 2573.08824 |
| 1.184054E+08<br>60000.00000 | 1.807716E+12 | 0.00006550 | 0.00119681 | 18.27193558 | 2603.85931 |
| 1.188538E+08<br>60000.00000 | 1.760798E+12 | 0.00006750 | 0.00122398 | 18.13301861 | 2633.48179 |
| 1.192979E+08<br>60000.00000 | 1.716516E+12 | 0.00006950 | 0.00125121 | 18.00307453 | 2661.94743 |
| 1.192979E+08<br>60000.00000 | 1.668502E+12 | 0.00007150 | 0.00128700 | 17.99999893 | 2698.12006 |
| 1.203327E+08<br>60000.00000 | 1.637179E+12 | 0.00007350 | 0.00131886 | 17.94361174 | 2728.23669 |
| 1.206735E+08<br>60000.00000 | 1.598325E+12 | 0.00007550 | 0.00134401 | 17.80151188 | 2750.40401 |
| 1.208755E+08<br>60000.00000 | 1.559685E+12 | 0.00007750 | 0.00136755 | 17.64585078 | 2770.08504 |
| 1.210746E+08<br>60000.00000 | 1.522951E+12 | 0.00007950 | 0.00139115 | 17.49867976 | 2788.90829 |
| 1.212708E+08<br>60000.00000 | 1.487985E+12 | 0.00008150 | 0.00141479 | 17.35938728 | 2806.86806 |
| 1.214640E+08<br>60000.00000 | 1.454659E+12 | 0.00008350 | 0.00143849 | 17.22740471 | 2823.95743 |
| 1.216542E+08<br>60000.00000 | 1.422856E+12 | 0.00008550 | 0.00146224 | 17.10222781 | 2840.17021 |
| 1.218414E+08<br>60000.00000 | 1.392473E+12 | 0.00008750 | 0.00148605 | 16.98339880 | 2855.50010 |
| 1.220255E+08<br>60000.00000 | 1.363414E+12 | 0.00008950 | 0.00150991 | 16.87049210 | 2869.94011 |
| 1.222066E+08<br>60000.00000 | 1.335591E+12 | 0.00009150 | 0.00153383 | 16.76312506 | 2883.48359 |
| 1.223846E+08<br>60000.00000 | 1.308926E+12 | 0.00009350 | 0.00155780 | 16.66095078 | 2896.12390 |
| 1.225594E+08<br>60000.00000 | 1.283345E+12 | 0.00009550 | 0.00158183 | 16.56364739 | 2907.85409 |
| 1.227311E+08<br>60000.00000 | 1.258781E+12 | 0.00009750 | 0.00160591 | 16.47091806 | 2918.66701 |
| 1.228996E+08<br>60000.00000 | 1.235172E+12 | 0.00009950 | 0.00163006 | 16.38249457 | 2928.55569 |
| 1.230649E+08                | 1.212463E+12 | 0.00010150 | 0.00165426 | 16.29813015 | 2937.51299 |

Caisson Analysis.lpo

|              |              |            |            |             |            |
|--------------|--------------|------------|------------|-------------|------------|
| 60000.00000  |              |            |            |             |            |
| 1.232270E+08 | 1.190599E+12 | 0.00010350 | 0.00167852 | 16.21759236 | 2945.53145 |
| 60000.00000  |              |            |            |             |            |
| 1.233858E+08 | 1.169533E+12 | 0.00010550 | 0.00170284 | 16.14066660 | 2952.60357 |
| 60000.00000  |              |            |            |             |            |
| 1.235413E+08 | 1.149221E+12 | 0.00010750 | 0.00172722 | 16.06716335 | 2958.72200 |
| 60000.00000  |              |            |            |             |            |
| 1.237294E+08 | 1.129949E+12 | 0.00010950 | 0.00175200 | 16.00000083 | 2963.94948 |
| 60000.00000  |              |            |            |             |            |
| 1.246658E+08 | 1.118079E+12 | 0.00011150 | 0.00178400 | 16.00000083 | 2969.29404 |
| 60000.00000  |              |            |            |             |            |
| 1.255791E+08 | 1.106424E+12 | 0.00011350 | 0.00181600 | 16.00000083 | 2972.88824 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 1.094971E+12 | 0.00011550 | 0.00184800 | 16.00000083 | 2974.73206 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 1.076333E+12 | 0.00011750 | 0.00187808 | 15.98365366 | 2972.50283 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 1.058319E+12 | 0.00011950 | 0.00190133 | 15.91074407 | 2967.87809 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 1.040898E+12 | 0.00012150 | 0.00192465 | 15.84076703 | 2963.23928 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 1.024042E+12 | 0.00012350 | 0.00194804 | 15.77359021 | 2958.58613 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 1.007722E+12 | 0.00012550 | 0.00197149 | 15.70908844 | 2953.91839 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.919149E+11 | 0.00012750 | 0.00199404 | 15.63953340 | 2956.59873 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.765958E+11 | 0.00012950 | 0.00201517 | 15.56113780 | 2960.42320 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.617426E+11 | 0.00013150 | 0.00203635 | 15.48552454 | 2963.81356 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.473345E+11 | 0.00013350 | 0.00205758 | 15.41256845 | 2966.76517 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.333517E+11 | 0.00013550 | 0.00207886 | 15.34215510 | 2969.27345 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.197757E+11 | 0.00013750 | 0.00210020 | 15.27418077 | 2971.33383 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 9.065889E+11 | 0.00013950 | 0.00212159 | 15.20854175 | 2972.94151 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 8.813181E+11 | 0.00014350 | 0.00216454 | 15.08390486 | 2974.77949 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 8.574180E+11 | 0.00014750 | 0.00220788 | 14.96869862 | 2971.45760 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 8.347799E+11 | 0.00015150 | 0.00225154 | 14.86166775 | 2964.56886 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 8.133065E+11 | 0.00015550 | 0.00229534 | 14.76102054 | 2957.65043 |
| 60000.00000  |              |            |            |             |            |
| 1.264692E+08 | 7.929101E+11 | 0.00015950 | 0.00233927 | 14.66629207 | 2950.70180 |
| 60000.00000  |              |            |            |             |            |

Caisson Analysis.lpo

|                             |              |            |            |             |            |
|-----------------------------|--------------|------------|------------|-------------|------------|
| 1.264692E+08<br>60000.00000 | 7.735116E+11 | 0.00016350 | 0.00238335 | 14.57705677 | 2943.72263 |
| 1.264692E+08<br>60000.00000 | 7.550397E+11 | 0.00016750 | 0.00242757 | 14.49293911 | 2950.40547 |
| 1.264692E+08<br>60000.00000 | 7.374295E+11 | 0.00017150 | 0.00247193 | 14.41359222 | 2957.36393 |
| 1.264692E+08<br>60000.00000 | 7.206220E+11 | 0.00017550 | 0.00251644 | 14.33870494 | 2963.19964 |
| 1.264692E+08<br>60000.00000 | 7.045635E+11 | 0.00017950 | 0.00256111 | 14.26799476 | 2967.89193 |
| 1.264692E+08<br>60000.00000 | 6.892052E+11 | 0.00018350 | 0.00260592 | 14.20120776 | 2971.41952 |
| 1.264692E+08<br>60000.00000 | 6.745022E+11 | 0.00018750 | 0.00265089 | 14.13810074 | 2973.76018 |
| 1.264692E+08<br>60000.00000 | 6.604133E+11 | 0.00019150 | 0.00269603 | 14.07846630 | 2974.89132 |
| 1.264692E+08<br>60000.00000 | 6.469010E+11 | 0.00019550 | 0.00274154 | 14.02322352 | 2971.74978 |
| 1.264692E+08<br>60000.00000 | 6.339306E+11 | 0.00019950 | 0.00279300 | 13.99999917 | 2964.90456 |
| 1.264692E+08<br>60000.00000 | 6.214700E+11 | 0.00020350 | 0.00284900 | 13.99999917 | 2957.07140 |
| 1.264692E+08<br>60000.00000 | 6.094899E+11 | 0.00020750 | 0.00290500 | 13.99999917 | 2949.23825 |
| 1.264692E+08<br>60000.00000 | 5.979629E+11 | 0.00021150 | 0.00296100 | 13.99999917 | 2941.40510 |
| 1.264692E+08<br>60000.00000 | 5.868638E+11 | 0.00021550 | 0.00301700 | 13.99999917 | 2933.57194 |
| 1.264692E+08<br>60000.00000 | 5.761693E+11 | 0.00021950 | 0.00307300 | 13.99999917 | 2931.04675 |
| 1.264692E+08<br>60000.00000 | 5.658575E+11 | 0.00022350 | 0.00312900 | 13.99999917 | 2941.86180 |
| 1.264692E+08<br>60000.00000 | 5.559084E+11 | 0.00022750 | 0.00318500 | 13.99999917 | 2951.15209 |
| 1.264692E+08<br>60000.00000 | 5.463030E+11 | 0.00023150 | 0.00324100 | 13.99999917 | 2958.91761 |
| 1.264692E+08<br>60000.00000 | 5.370240E+11 | 0.00023550 | 0.00329700 | 13.99999917 | 2965.15837 |
| 1.264692E+08<br>60000.00000 | 5.280549E+11 | 0.00023950 | 0.00335300 | 13.99999917 | 2969.87436 |
| 1.264692E+08<br>60000.00000 | 5.193805E+11 | 0.00024350 | 0.00340521 | 13.98443162 | 2972.72279 |
| 1.264692E+08<br>60000.00000 | 5.109865E+11 | 0.00024750 | 0.00345165 | 13.94607246 | 2974.12787 |
| 1.264692E+08<br>60000.00000 | 5.028595E+11 | 0.00025150 | 0.00349826 | 13.90957654 | 2974.87496 |
| 1.264692E+08<br>60000.00000 | 4.949869E+11 | 0.00025550 | 0.00354532 | 13.87600958 | 2973.32071 |
| 1.264692E+08                | 4.873570E+11 | 0.00025950 | 0.00359292 | 13.84555399 | 2969.05582 |



Caisson Analysis.lpo

60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 126469.15342 in-kip

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 Computed Values of Load Distribution and Deflection  
 for Lateral Loading for Load Case Number 1  
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Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)  
 Specified shear force at pile head = 22627.000 lbs  
 Specified moment at pile head = 20797128.000 in-lbs  
 Specified axial load at pile head = 24255.000 lbs

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 displacement 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= 22627.             | M= 2.08E+07           | 24255.0000     | 1.8053                  | 2.1400E+07            | -252528.          |

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

Caisson Analysis.lpo

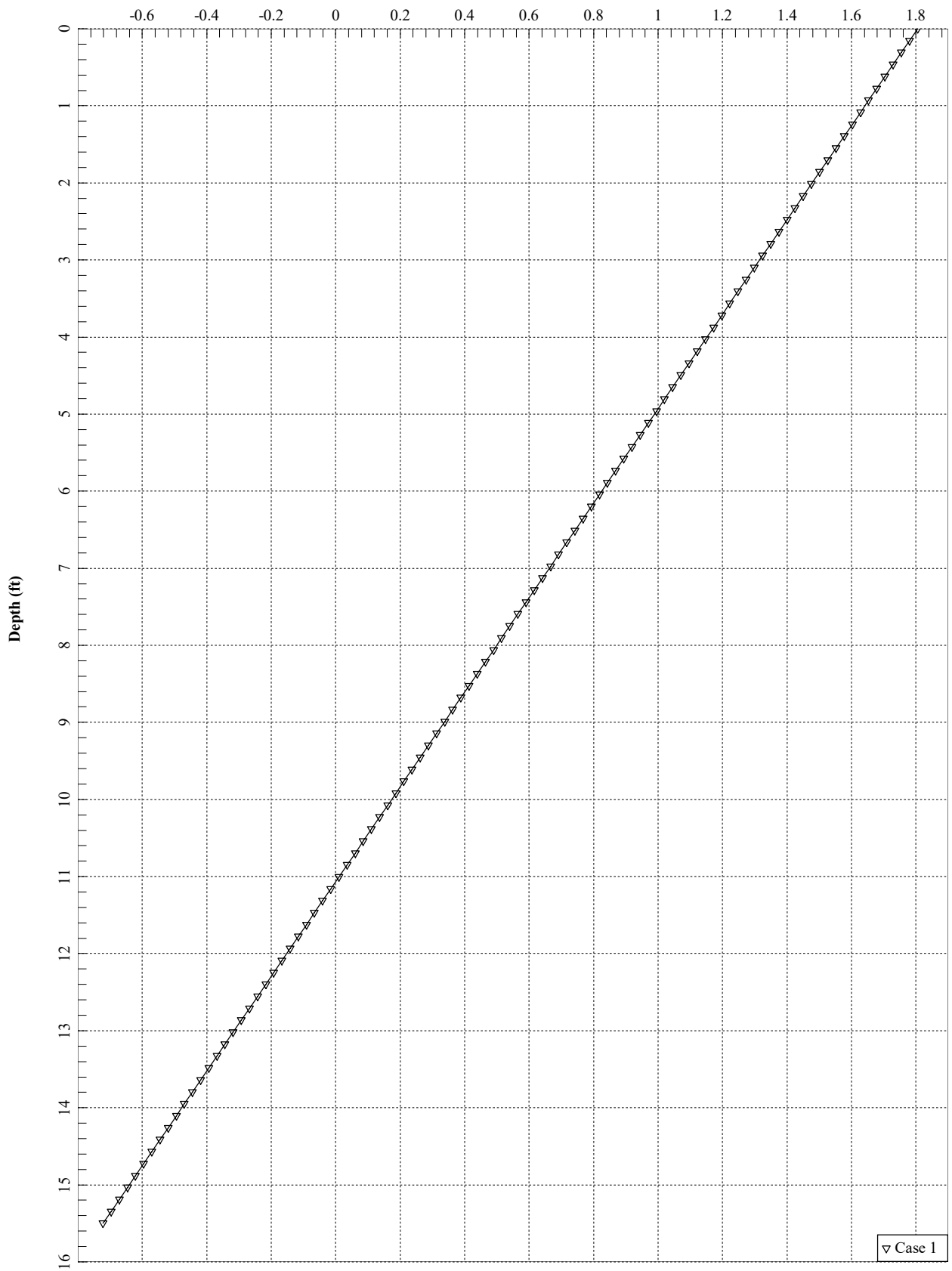
| Top y<br>in | Shear React.<br>lbs | Mom. React.<br>in-lbs | K22<br>lbs/in | K32<br>in-lbs/in |
|-------------|---------------------|-----------------------|---------------|------------------|
| 0.00159547  | 2262.70003          | 283841.29116          | 1418204.      | 1.779046E+08     |
| 0.00480284  | 6811.40571          | 854447.41946          | 1418204.      | 1.779046E+08     |
| 0.00761232  | 10795.82263         | 1354267.              | 1418204.      | 1.779046E+08     |
| 0.00960568  | 13622.81143         | 1708895.              | 1418204.      | 1.779046E+08     |
| 0.01115185  | 15815.59429         | 1983965.              | 1418204.      | 1.779046E+08     |
| 0.01241516  | 17607.22834         | 2208715.              | 1418204.      | 1.779046E+08     |
| 0.01348327  | 19122.03335         | 2398737.              | 1418204.      | 1.779046E+08     |
| 0.01440852  | 20434.21713         | 2563342.              | 1418204.      | 1.779046E+08     |
| 0.01522464  | 21591.64526         | 2708534.              | 1418204.      | 1.779046E+08     |
| 0.01595469  | 22627.00000         | 2838413.              | 1418204.      | 1.779046E+08     |

| Top Rota.<br>rad | Shear React.<br>lbs | Mom. React.<br>in-lbs | K23<br>lbs/rad | K33<br>in-lbs/rad |
|------------------|---------------------|-----------------------|----------------|-------------------|
| 0.00008346       | 14847.16155         | 2079713.              | 1.779046E+08   | 2.491995E+10      |
| 0.00025123       | 44694.40912         | 6260559.              | 1.779046E+08   | 2.491995E+10      |
| 0.00039819       | 70838.96244         | 9922752.              | 1.779046E+08   | 2.491995E+10      |
| 0.00050245       | 89388.81824         | 12521119.             | 1.779046E+08   | 2.491995E+10      |
| 0.00058333       | 103777.20422        | 14536569.             | 1.779046E+08   | 2.491995E+10      |
| 0.00064941       | 115533.37156        | 16183311.             | 1.779046E+08   | 2.491995E+10      |
| 0.00070528       | 125473.06943        | 17575612.             | 1.779046E+08   | 2.491995E+10      |
| 0.00075368       | 134083.22755        | 18781678.             | 1.779045E+08   | 2.491993E+10      |
| 0.00079637       | 141677.92700        | 19845504.             | 1.779039E+08   | 2.491985E+10      |
| 0.00083456       | 148471.62029        | 20797128.             | 1.779031E+08   | 2.491973E+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)

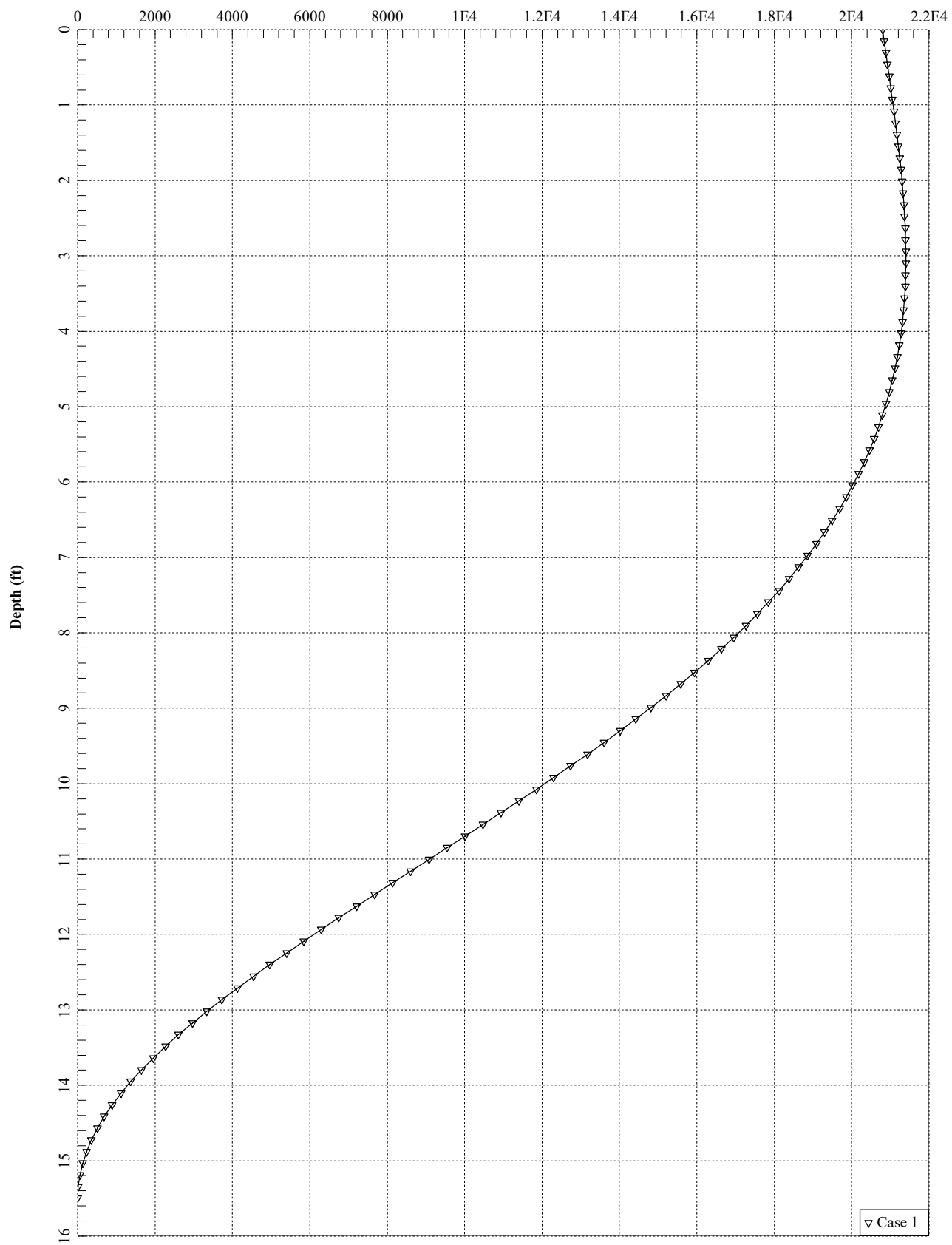
The analysis ended normally.

Lateral Deflection (in)

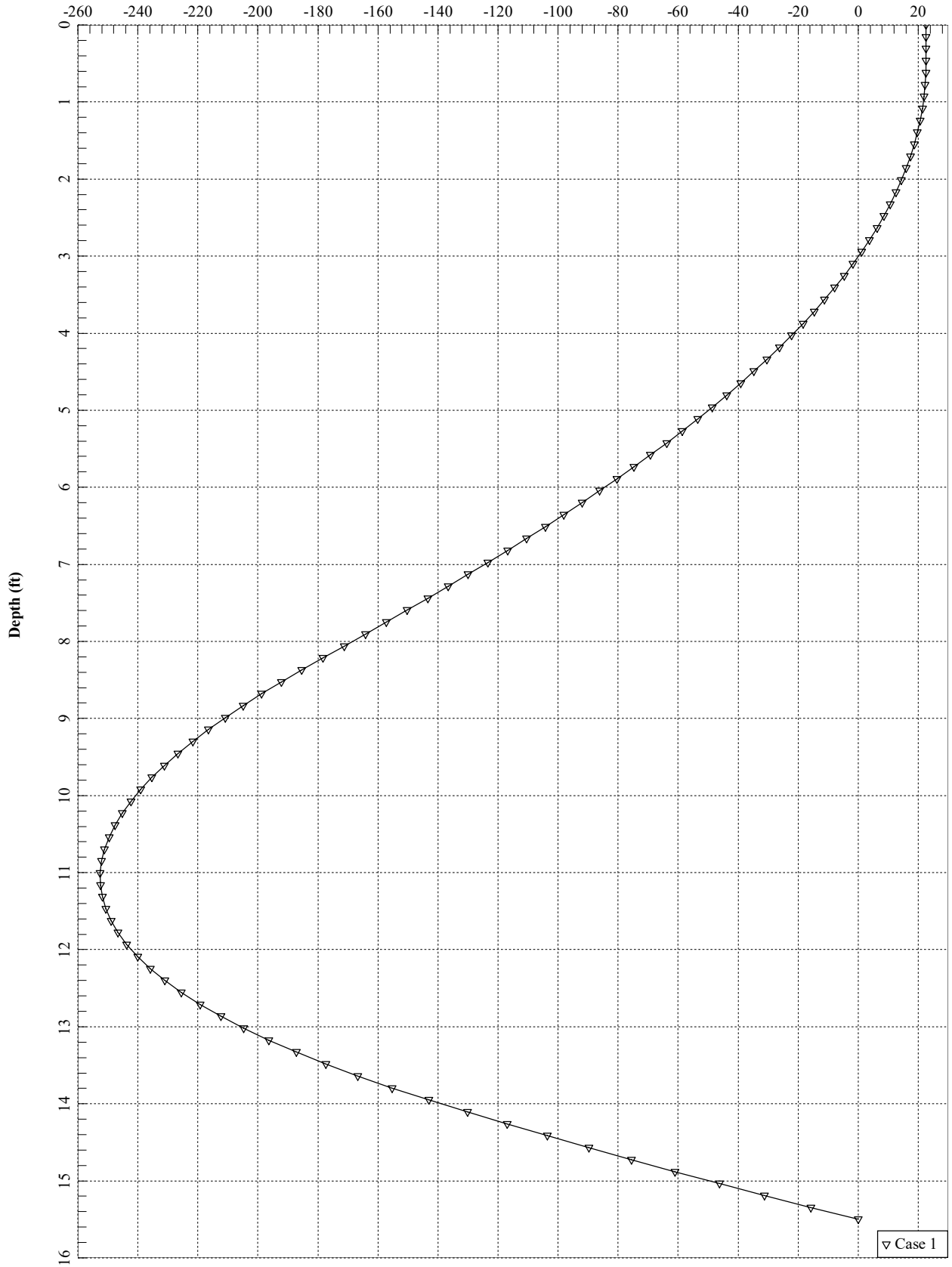


▽ Case 1

Bending Moment (in-kips)



### Shear Force (kips)



Section 1 - RFDS GENERAL INFORMATION

|                       |  |                                |              |                  |                  |                 |                   |                                |                            |
|-----------------------|--|--------------------------------|--------------|------------------|------------------|-----------------|-------------------|--------------------------------|----------------------------|
| RFDS NAME:            | CTS150                                       | DATE:                          | 9/22/2016    | RF DESIGN ENG:   | Omar Mohammed    | RF PERF ENG:    |                   | RFDS PROGRAM TYPE:             | 2016 LTE Next Carrier      |
| ISSUE:                | Bronze Standard                              | Approved? (Y/N):               | Yes          | RF DESIGN PHONE: | 860-721-4315     | RF PERF PHONE:  |                   | RFDS TECHNOLOGY:               | LTE 3C                     |
| REVISION:             | Preliminary                                  | RF MANAGER:                    | Cameron Syme | RF DESIGN EMAIL: | OM:36@US.ATT.COM | RF PERF EMAIL:  |                   | State:                         | Final                      |
| INITIATIVE / PROJECT: | LTE 3C -WCS w/Bronze Standard Configuration. |                                |              |                  |                  | TRIDENT:        |                   | Status:                        | Approved                   |
|                       |  |                                |              |                  |                  | GSM FREQUENCY:  | 850               | RFDS ID:                       | 1113527                    |
|                       |  |                                |              |                  |                  | UMTS FREQUENCY: | 850,1900          | Version:                       | 1.00                       |
|                       |  |                                |              |                  |                  | LTE FREQUENCY:  | 700,1900          | Created By:                    | cm636a                     |
|                       |  |                                |              |                  |                  |                 |                   | Date Created:                  | 3/10/2016                  |
|                       |  |                                |              |                  |                  |                 |                   | Date Updated:                  | 3/23/2016                  |
|                       |  |                                |              |                  |                  |                 |                   | Updated By:                    | cm636a                     |
|                       |  |                                |              |                  |                  | I-PLAN JOB # 1: | NER-RCTB-16-01082 | Product Group    Sub Group #1: | LTE Next Carrier    LTE 3C |
|                       |  |                                |              |                  |                  | I-PLAN JOB # 2: |                   | Product Group    Sub Group #2: |                            |
|                       |  |                                |              |                  |                  | I-PLAN JOB # 3: |                   | Product Group    Sub Group #3: |                            |
| I-PLAN JOB # 4:       |  | Product Group    Sub Group #4: |              |                  |                  |                 |                   |                                |                            |

Section 2 - LOCATION INFORMATION

|  |  |                    |                      |                 |                                |                                 |             |                      |             |
|--|--|--------------------|----------------------|-----------------|--------------------------------|---------------------------------|-------------|----------------------|-------------|
| USID:                                      | 14242  | FA LOCATION CODE:  | 10071182             | LOCATION NAME:  | OLD GREENWICH RAILROAD STATION | ORACLE PRJT #1:                 |             | PAGE JOB #1:         | MRCTB018379 |
| REGION:                                    | NORTHEAST  | MARKET CLUSTER:    | NEW ENGLAND          | MARKET:         | CONNECTICUT                    | ORACLE PRJT #2:                 |             | PAGE JOB #2:         |             |
| ADDRESS:                                   | OLD GREENWICH STATION  | CITY:              | OLD GREENWICH        | STATE:          | CT                             | ORACLE PRJT #3:                 |             | PAGE JOB #3:         |             |
| ZIP CODE:                                  | 06870  | COUNTY:            | FAIRFIELD            | MSA / RSA:      |                                | ORACLE PRJT #4:                 |             | PAGE JOB #4:         |             |
| LATITUDE (D-M-S):                          | 41d 2m 2.01084s  | LONGITUDE (D-M-S): | -73d -33m -47.87604s | LAT (DEC DEG.): | 41.0338919                     | SEARCH RING NAME:               |             |                      |             |
| DIRECTIONS, ACCESS AND EQUIPMENT LOCATION: | OLD GREENWICH RR STATION CT-150<br>.46 NORTH TO EXIT 5 RIVERSIDE, OLD GREENWICH, AT THE END OF THE RAMP TURN RIGHT ONTO ROUTE 1, GO 3/10 OF A MILE AND TURN RIGHT ONTO SOUND BEACH AVE. FOLLOW DOWN TO FORK IN RD AND STAY TO THE RIGHT GO UNDER TRAIN TRACKS AND TAKE YOUR FIRST LEFT INTO OLD GREENWICH RAIL ROAD STATION. STAY IN THE LOWER PARKING LOT AND GO TO THE REAR OF THE LOT AND YOU WILL SEE OUR SHELTER. DEMARC IS IN THE TELCO BOX ON THE OUTSIDE OF SHELTER.<br>ADDRESS: SOUND BEACH AVE OLD GREENWICH, CT<br>CONTACT:<br>SECURITY: NONE<br>ACCESS: 24/7<br>POWER COMPANY: UNITED ILLUMINATING (800) 722-5584 METER # 02 502 668<br>FIRE: (203) 622-3950 POLICE: (203) 622-8000<br>T-1 CIRCUIT NUMBERS HCS 673971 AND HCS 673972<br>SNET: (800) 448-1008 AND (203) 420-3131 (24-HR REPAIR) |                    |                      |                 |                                | SEARCH RING ID:                 |             | CASPR INITIATIVE #1: |             |
|  |  |                    |                      |                 |                                | BTA:                            |             | CASPR INITIATIVE #2: |             |
|  |  |                    |                      |                 |                                | LONG (DEC DEG.):                | -73.5632989 | CASPR INITIATIVE #3: |             |
|  |  |                    |                      |                 |                                | BORDER CELL WITH CONTOUR COORD: |             | CASPR INITIATIVE #4: |             |
|  |  |                    |                      |                 |                                | AM STUDY REQ'D (Y/N):           | No          |                      |             |
|  |  |                    |                      |                 |                                | FREQ COORD:                     |             |                      |             |

Section 3 - LICENSE COVERAGE/FILING INFORMATION

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

Section 4 - TOWER/REGULATORY INFORMATION

|                         |              |                        |      |                 |         |                                |        |
|-------------------------|--------------|------------------------|------|-----------------|---------|--------------------------------|--------|
| STRUCTURE AT & OWNED?:  | Yes          | GROUND ELEVATION (ft): | 0    | STRUCTURE TYPE: | UTILITY | MARKET LOCATION 700 MHz Band:  |        |
| ADDITIONAL REGULATORY?: | Yes          | HEIGHT OVERALL (ft):   |      | FCC ASR NUMBER: | NR      | MARKET LOCATION 850 MHz Band:  | On-Air |
| SUB-LEASE RIGHTS?:      | Yes          | STRUCTURE HEIGHT (ft): | 0.00 |                 |         | MARKET LOCATION 1900 MHz Band: | On-Air |
| LIGHTING TYPE:          | NOT REQUIRED |                        |      |                 |         | MARKET LOCATION AWS Band:      |        |
|                         |              |                        |      |                 |         | MARKET LOCATION WCS Band:      |        |
|                         |              |                        |      |                 |         | MARKET LOCATION Future Band:   |        |

Section 5 - E-911 INFORMATION - existing

|          | PSAP NAME:                       | PSAP ID: | E911 PHASE: | MPC SVC PROVIDER: | LMU REQUIRED: | ESRN: | DATE LIVE PH1: | DATE LIVE PH2: |
|----------|----------------------------------|----------|-------------|-------------------|---------------|-------|----------------|----------------|
| SECTOR A | E-911                            |          |             | INTRADO_MIAM      | 0             |       |                |                |
| SECTOR B |                                  |          |             | INTRADO_MIAM      | 0             |       |                |                |
| SECTOR C |                                  |          |             | INTRADO_MIAM      | 0             |       |                |                |
| SECTOR D | CONNECTICUT STATE POLICE-G TROOP | 1319     |             |                   | 0             |       |                |                |
| SECTOR E | CONNECTICUT STATE POLICE-G TROOP | 1319     |             |                   | 0             |       |                |                |
| SECTOR F | CONNECTICUT STATE POLICE-G TROOP | 1319     |             |                   | 0             |       |                |                |
| OMNI     |                                  |          |             |                   |               |       |                |                |

Section 5 - E-911 INFORMATION - final

|          | PSAP NAME:                       | PSAP ID: | E911 PHASE: | MPC SVC PROVIDER: | LMU REQUIRED: | ESRN: | DATE LIVE PH1: | DATE LIVE PH2: |
|----------|----------------------------------|----------|-------------|-------------------|---------------|-------|----------------|----------------|
| SECTOR A | E-911                            |          |             | INTRADO_MIAM      | 0             |       |                |                |
| SECTOR B |                                  |          |             | INTRADO_MIAM      | 0             |       |                |                |
| SECTOR C |                                  |          |             | INTRADO_MIAM      | 0             |       |                |                |
| SECTOR D | CONNECTICUT STATE POLICE-G TROOP | 1319     |             |                   | 0             |       |                |                |
| SECTOR E | CONNECTICUT STATE POLICE-G TROOP | 1319     |             |                   | 0             |       |                |                |
| SECTOR F | CONNECTICUT STATE POLICE-G TROOP | 1319     |             |                   | 0             |       |                |                |
| OMNI     |                                  |          |             |                   |               |       |                |                |

Section 6 - RBS GENERAL INFORMATION - existing

|                           | GSM 1ST RBS                    | UMTS 1ST RBS                   | UMTS 2ND RBS                   | LTE 1ST RBS                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>RBS ID:</b>            | 235733                         | 172457                         | 222814                         | 360129                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CTS COMMON ID:</b>     | 321D5150                       | CTU5150                        | CTV5150                        | CTLO5150                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BTATID:</b>            | 321G                           | 321V                           | 321U                           | 321L                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>4-DIGIT SITE ID:</b>   | 5150                           | 5150                           | 5150                           | 5150                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>COW OR TOY?</b>        | No                             | No                             | No                             | No                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CELL SITE TYPE:</b>    | SECTORIZED                     | SECTORIZED                     | SECTORIZED                     | SECTORIZED                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>SITE TYPE:</b>         | MACRO-CONVENTIONAL             | MACRO-CONVENTIONAL             | MACRO-CONVENTIONAL             | MACRO-CONVENTIONAL             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BTS LOCATION ID:</b>   | GROUND                         | INTERNAL                       | INTERNAL                       | INTERNAL                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>ORIGINATING CO:</b>    | CINGULAR                       | CINGULAR                       | CINGULAR                       | CINGULAR                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CELLULAR NETWORK:</b>  | GOLD                           | GOLD                           | GOLD                           | GOLD                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OPS DISTRICT:</b>      | CT-SOUTH                       | CT SOUTH-WEST                  | CT SOUTH-WEST                  | CT SOUTH-WEST                  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>RF DISTRICT:</b>       | NPO TRIAGE                     | NPO TRIAGE                     | BRIDGEPORT                     | NPO Triage                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OPS ZONE:</b>          | NE_CT_S_FRFD_SW_CS             | NE_CT_S_FRFD_SW_CS             | NE_CT_S_FRFD_SW_CS             | NE_CT_S_FRFD_SW_CS             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>RF ZONE:</b>           | HOTSEAT                        | HOTSEAT                        | BBP01                          | Hotseat                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BASE STATION TYPE:</b> | BASE                           | BASE                           | OVERLAY                        | BASE                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>EQUIPMENT NAME:</b>    | OLD GREENWICH RAILROAD STATION | OLD GREENWICH RAILROAD STATION | OLD GREENWICH RAILROAD STATION | OLD GREENWICH RAILROAD STATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>DISASTER PRIORITY:</b> | 3                              | 2                              | 0                              | 3                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Section 6 - RBS GENERAL INFORMATION - final

|                           | GSM 1ST RBS                    | UMTS 1ST RBS                   | UMTS 2ND RBS                   | LTE 1ST RBS                    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>RBS ID:</b>            | 235733                         | 172457                         | 222814                         | 360129                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CTS COMMON ID:</b>     | 321D5150                       | CTU5150                        | CTV5150                        | CTLO5150                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BTATID:</b>            | 321G                           | 321V                           | 321U                           | 321L                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>4-DIGIT SITE ID:</b>   | 5150                           | 5150                           | 5150                           | 5150                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>COW OR TOY?</b>        | No                             | No                             | No                             | No                             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CELL SITE TYPE:</b>    | SECTORIZED                     | SECTORIZED                     | SECTORIZED                     | SECTORIZED                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>SITE TYPE:</b>         | MACRO-CONVENTIONAL             | MACRO-CONVENTIONAL             | MACRO-CONVENTIONAL             | MACRO-CONVENTIONAL             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BTS LOCATION ID:</b>   | GROUND                         | INTERNAL                       | INTERNAL                       | INTERNAL                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>ORIGINATING CO:</b>    | CINGULAR                       | CINGULAR                       | CINGULAR                       | CINGULAR                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CELLULAR NETWORK:</b>  | GOLD                           | GOLD                           | GOLD                           | GOLD                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OPS DISTRICT:</b>      | CT-South                       |                                | CT-South                       | CT-South                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>RF DISTRICT:</b>       | NPO Triage                     | NPO Triage                     | Bridgeport                     | NPO Triage                     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>OPS ZONE:</b>          | NE_CT_S_FRFD_SW_CS             |                                | NE_CT_S_FRFD_SW_CS             | NE_CT_S_FRFD_SW_CS             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>RF ZONE:</b>           | Hotseat                        | Hotseat                        | BBP01                          | Hotseat                        |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BASE STATION TYPE:</b> | BASE                           | BASE                           | OVERLAY                        | BASE                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>EQUIPMENT NAME:</b>    | OLD GREENWICH RAILROAD STATION | OLD GREENWICH RAILROAD STATION | OLD GREENWICH RAILROAD STATION | OLD GREENWICH RAILROAD STATION |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>DISASTER PRIORITY:</b> | 3                              | 2                              | 0                              | 3                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Section 7 - RBS SPECIFIC INFORMATION - existing

|                                | GSM 1ST RBS       | UMTS 1ST RBS         | UMTS 2ND RBS         | LTE 1ST RBS    |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|--------------------------------|-------------------|----------------------|----------------------|----------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>MSC:</b>                    |                   |                      |                      |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BSC/RNC/ME POOL ID:</b>     | BRPCTBSC01        | BRPCTO4RNC001        | BRPCTO4RNC001        | FF01           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>LAC:</b>                    | 05010             | 05999                | 05999                |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>RAC:</b>                    |                   |                      |                      |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>EQUIPMENT VENDOR:</b>       | NOKIA             | ERICSSON             | ERICSSON             | ERICSSON       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>EQUIPMENT TYPE:</b>         | ULTRASITE         | 3206 INDOOR          | 3206 INDOOR          | 6601 INDOOR MU |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>BASEBAND CONFIGURATION:</b> |                   |                      |                      |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>LOCATION:</b>               |                   |                      |                      |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>CABINET LOCATION:</b>       |                   |                      |                      |                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>MARKET STATE CODE:</b>      |                   |                      |                      | CT             |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>AGPS:</b>                   | Yes               | Yes                  | Yes                  | Yes            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>NODE B NUMBER:</b>          | 0                 | 0                    | 0                    | 5150           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>PARENT NAME:</b>            | BRIDGEPORT BSC 01 | BRIDGEPORT CT RNC001 | BRIDGEPORT CT RNC001 | FF01           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Section 7 - RBS SPECIFIC INFORMATION - final

|                                | GSM 1ST RBS       | UMTS 1ST RBS         | UMTS 2ND RBS         | LTE 1ST RBS    |
|--------------------------------|-------------------|----------------------|----------------------|----------------|
| <b>MSC:</b>                    |                   |                      |                      |                |
| <b>BSC/RNC/MME POOL ID:</b>    | BRPCTCRSC01       | BRPCTO4RNC001        | BRPCTO4RNC001        | FF01           |
| <b>LAC:</b>                    | 05010             | 05999                | 05999                |                |
| <b>RAC:</b>                    |                   |                      |                      |                |
| <b>EQUIPMENT VENDOR:</b>       | NOKIA             | ERICSSON             | ERICSSON             | ERICSSON       |
| <b>EQUIPMENT TYPE:</b>         | ULTRASITE         | 3206 INDOOR          | 3206 INDOOR          | 5601 INDOOR MU |
| <b>BASEBAND CONFIGURATION:</b> |                   |                      |                      |                |
| <b>LOCATION:</b>               |                   |                      |                      |                |
| <b>CABINET LOCATION:</b>       |                   |                      |                      |                |
| <b>MARKET STATE CODE:</b>      |                   |                      |                      | CT             |
| <b>AGPS:</b>                   | Yes               | Yes                  | Yes                  | Yes            |
| <b>NODE B NUMBER:</b>          | 0                 | 0                    | 0                    | 5150           |
| <b>PARENT NAME:</b>            | BRIDGEPORT BSC 01 | BRIDGEPORT CT RNC001 | BRIDGEPORT CT RNC001 |                |

Section 8 - RBS INDIVIDUAL INFORMATION - existing

|                       | GSM 1ST 850 | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 1ST WCS |
|-----------------------|-------------|--------------|---------------|--------------|-------------|--------------|-------------|
| <b>RBS ID:</b>        | 235733      | 222814       | 172457        | 222814       | 360129      | 360129       |             |
| <b>CELL ID/BCF:</b>   | 32105150    | CTV5150      | CTU5150       | CTU5150      | CTL05150    | CTL05150     |             |
| <b>CTS COMMON ID:</b> | 32105150    | CTV5150      | CTU5150       | CTV5150      | CTL05150    | CTL05150     |             |

Section 8 - RBS INDIVIDUAL INFORMATION - final

|                       | GSM 1ST 850 | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | LTE 1ST 700 | LTE 1ST 1900 | LTE 1ST WCS |
|-----------------------|-------------|--------------|---------------|--------------|-------------|--------------|-------------|
| <b>RBS ID:</b>        | 235733      | 222814       | 172457        | 222814       | 360129      | 360129       | 360129      |
| <b>CELL ID/BCF:</b>   | 32105150    | CTV5150      | CTU5150       | CTU5150      | CTL05150    | CTL05150     | CTL05150    |
| <b>CTS COMMON ID:</b> | 32105150    | CTV5150      | CTU5150       | CTV5150      | CTL05150    | CTL05150     | CTL05150    |

Section 9 - SOFT SECTOR ID - existing

|                                      | GSM 1ST 850     | UMTS 1ST 850   | UMTS 1ST 1900   | UMTS 2ND 850   | LTE 1ST 700    | LTE 1ST 1900    | LTE 1ST WCS |
|--------------------------------------|-----------------|----------------|-----------------|----------------|----------------|-----------------|-------------|
| <b>USEID (excluding Hard Sector)</b> | 14242.850.25G.1 | 14242.850.3G.1 | 14242.1900.3G.1 | 14242.850.3G.2 | 14242.700.4G.1 | 14242.1900.4G.1 |             |
| <b>SECTOR A SOFT SECTOR ID</b>       | 321G51501       | CTV51501       | CTU51507        | CTV5150A       | CTL05150_7A_1  | CTL05150_9A_1   |             |
| <b>SECTOR B</b>                      | 321G51502       | CTV51502       | CTU51508        | CTV5150B       | CTL05150_7B_1  | CTL05150_9B_1   |             |
| <b>SECTOR C</b>                      | 321G51503       | CTV51503       | CTU51509        | CTV5150C       | CTL05150_7C_1  | CTL05150_9C_1   |             |
| <b>SECTOR D</b>                      |                 |                | CTU51504        |                |                |                 |             |
| <b>SECTOR E</b>                      |                 |                | CTU51505        |                |                |                 |             |
| <b>SECTOR F</b>                      |                 |                | CTU51506        |                |                |                 |             |
| <b>OMNI</b>                          |                 |                |                 |                |                |                 |             |

Section 9 - SOFT SECTOR ID - final

|                                      | GSM 1ST 850     | UMTS 1ST 850   | UMTS 1ST 1900   | UMTS 2ND 850   | LTE 1ST 700    | LTE 1ST 1900    | LTE 1ST WCS       |
|--------------------------------------|-----------------|----------------|-----------------|----------------|----------------|-----------------|-------------------|
| <b>USEID (excluding Hard Sector)</b> | 14242.850.25G.1 | 14242.850.3G.1 | 14242.1900.3G.1 | 14242.850.3G.2 | 14242.700.4G.1 | 14242.1900.4G.1 | 14242.WCS.4G.tmp1 |
| <b>SECTOR A SOFT SECTOR ID</b>       | 321G51501       | CTV51501       | CTU51507        | CTV5150A       | CTL05150_7A_1  | CTL05150_9A_1   | CTL05150_3A_1     |
| <b>SECTOR B</b>                      | 321G51502       | CTV51502       | CTU51508        | CTV5150B       | CTL05150_7B_1  | CTL05150_9B_1   | CTL05150_3B_1     |
| <b>SECTOR C</b>                      | 321G51503       | CTV51503       | CTU51509        | CTV5150C       | CTL05150_7C_1  | CTL05150_9C_1   | CTL05150_3C_1     |
| <b>SECTOR D</b>                      |                 |                |                 |                |                |                 |                   |
| <b>SECTOR E</b>                      |                 |                |                 |                |                |                 |                   |
| <b>SECTOR F</b>                      |                 |                |                 |                |                |                 |                   |
| <b>OMNI</b>                          |                 |                |                 |                |                |                 |                   |

Section 9 - Cell Number - existing

|                                      | GSM 1ST 850     | UMTS 1ST 850   | UMTS 1ST 1900   | UMTS 2ND 850   | LTE 1ST 700    | LTE 1ST 1900    | LTE 1ST WCS |
|--------------------------------------|-----------------|----------------|-----------------|----------------|----------------|-----------------|-------------|
| <b>USEID (excluding Hard Sector)</b> | 14242.850.25G.1 | 14242.850.3G.1 | 14242.1900.3G.1 | 14242.850.3G.2 | 14242.700.4G.1 | 14242.1900.4G.1 |             |
| <b>SECTOR A CELL NUMBER</b>          |                 |                |                 |                | 15             | 8               |             |
| <b>SECTOR B</b>                      |                 |                |                 |                | 16             | 9               |             |
| <b>SECTOR C</b>                      |                 |                |                 |                | 17             | 10              |             |
| <b>SECTOR D</b>                      |                 |                |                 |                |                |                 |             |
| <b>SECTOR E</b>                      |                 |                |                 |                |                |                 |             |
| <b>SECTOR F</b>                      |                 |                |                 |                |                |                 |             |
| <b>OMNI</b>                          |                 |                |                 |                |                |                 |             |





| Section 12 - CURRENT T1 COUNTS existing |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
|---|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
|   | GSM 1ST Cabinet | GSM 2ND Cabinet | UMTS 1ST Cabinet | UMTS 2ND Cabinet | UMTS 3RD Cabinet | UMTS 4TH Cabinet | UMTS 5TH Cabinet | UMTS 6TH Cabinet | LTE 1ST Cabinet | LTE 2ND Cabinet | LTE 3RD Cabinet | LTE 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 - location                          |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| FIBER JUMPER                            |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| DC CABLE                                |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| DC/Fiber Dem. Box                       |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| Bundled Fiber Cable                     |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| Bundled DC Cable                        |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |

| Section 13 - NEW/PROPOSED RADIO COUNTS |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
|--|-------------|--------------|-------------|--------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|--------------|---------------|-------------|-------------|--------------|--------------|-------------|----------------|----------------|
|  | GSM 1ST 850 | GSM 1ST 1900 | GSM 2ND 850 | GSM 2ND 1900 | UMTS 1ST 850 | UMTS 1ST 1900 | UMTS 2ND 850 | UMTS 2ND 1900 | UMTS 3RD 850 | UMTS 3RD 1900 | UMTS 4TH 850 | UMTS 4TH 1900 | UMTS 5TH 850 | UMTS 5TH 1900 | UMTS 6TH 850 | UMTS 6TH 1900 | LTE 1ST 700 | LTE 1ST 850 | LTE 1ST 1900 | LTE 1ST AWS  | LTE 1ST WCS | LTE 1ST FUTURE |                |
| SECTOR A RADIO COUNTS                  |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR B                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR C                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR D                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR E                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR F                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| OMNI                                   |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR A RADIO COUNTS                  |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             | LTE 2ND 700 | LTE 2ND 850  | LTE 2ND 1900 | LTE 2ND AWS | LTE 2ND WCS    | LTE 2ND FUTURE |
| SECTOR B                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR C                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR D                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR E                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| SECTOR F                               |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |
| OMNI                                   |             |              |             |              |              |               |              |               |              |               |              |               |              |               |              |               |             |             |              |              |             |                |                |

| Section 14 - NEW/PROPOSED T1 COUNTS |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
|-------------------------------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-----------------|-----------------|
|                                     | GSM 1ST Cabinet | GSM 2ND Cabinet | UMTS 1ST Cabinet | UMTS 2ND Cabinet | UMTS 3RD Cabinet | UMTS 4TH Cabinet | UMTS 5TH Cabinet | UMTS 6TH Cabinet | LTE 1ST Cabinet | LTE 2ND Cabinet | LTE 3RD Cabinet | LTE 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 - location                      |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| FIBER JUMPER                        |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| DC CABLE                            |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| DC/Fiber Dem. Box                   |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| Bundled Fiber Cable                 |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |
| Bundled DC Cable                    |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                 |                 |

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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1 | ANTENNA POSITION 2    | ANTENNA POSITION 3     | ANTENNA POSITION 4        | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|--------------------|-----------------------|------------------------|---------------------------|--------------------|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | 7770               | P65-16-XLH-RR         |                        |                           |                    |                    |                    |
| ANTENNA VENDOR   | Powerwave          | Powerwave             |                        |                           |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   | 55X11X5            | 72X12X6               |                        |                           |                    |                    |                    |
| ANTENNA WEIGHT   | 35                 | 64                    |                        |                           |                    |                    |                    |
| AZIMUTH  | 0                  | 30                    |                        |                           |                    |                    |                    |
| MAGNETIC DECLINATION   |                    |                       |                        |                           |                    |                    |                    |
| RADIATION CENTER (feet)  | 109                | 109                   |                        |                           |                    |                    |                    |
| ANTENNA TIP HEIGHT   | 111                | 112                   |                        |                           |                    |                    |                    |
| MECHANICAL DOWNTILT  | 0                  | 2                     |                        |                           |                    |                    |                    |
| FEEDER AMOUNT  | 2                  | 0                     |                        |                           |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |                    |                       |                        |                           |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |                    |                       |                        |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |                    |                       |                        |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |                    |                       |                        |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |                    |                       |                        |                           |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | 1                  | Powerwave 7020 (DB)   | Powerwave Built in RET |                           |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |                    |                       | 4                      | APTDC-BDFDM DBW Broadband |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2                  | Powerwave LGP21901    | 2                      | CM1007-DBPXC-003          |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |                    | Powerwave 7070        |                        | LTE RRH                   |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| TMALNA (QTY/MODEL)   | 2                  | Single Fullband (850) | 1                      | DTMABP7819V G12A Twin PCS |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2                  | Polyphaser/1000860    |                        |                           |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  | 1                  | Powerwave LGP 18104   |                        | LTE RRH                   |                    |                    |                    |
| FILTER (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| SQUID (QTY/MODEL)  |                    |                       |                        |                           |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |                    |                       |                        |                           |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |                    | 1                     |                        | RRUS-11                   |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |                    | 1                     |                        | RRUS-12                   |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |                    |                       |                        |                           |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |                    |                       |                        |                           |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |                    |                       |                        |                           |                    |                    |                    |
| Local Market Note 1  |                    |                       |                        |                           |                    |                    |                    |
| Local Market Note 2  |                    |                       |                        |                           |                    |                    |                    |
| Local Market Note 3  |                    |                       |                        |                           |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Aolli)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL    | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE        | FEEDER LENGTH (feet) | RX/IT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCP/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID (cssng) |
|----------------------|-------------|---------------|--------------------|---------------|---------------|--------|------------------------|------------------|--------------|--------------------|-----------------|---|---------------------|----------------------|-------------------|------------------------|--------------------------|------------------|--------------------------|-------------|------------------|--------------|------------------|
| ANTENNA POSITION 1   | PORT 1      |               | 14242.A.850.3G.1   | CTV51501      | CTV51501      |        | UMTS 850               | 7770.00.850.05   | 13.5         | 0                  | 5               | None                                      | Andrew 1-1/4 (850)  | 120.03               | 850 RX/IT         |                        |                          | No               |                          |             |                  |              |                  |
|                      | PORT 2      |               | 14242.A.850.3G.2   | CTV5150A      | CTV5150A      |        | UMTS 850               | 7770.00.850.05   | 13.5         | 0                  | 5               | Bottom                                    | Andrew 1-1/4 (850)  | 120.03               | 850 RX/IT         |                        |                          | No               |                          |             |                  |              |                  |
|                      | PORT 3      |               | 14242.A.1900.3.G.1 | CTU51507      | CTU51507      |        | UMTS 1900              | 7770.00.1900.00  | 16.5         | 0                  | 0               | None                                      | Andrew 1-1/4 (1900) | 120.03               |                   |                        | No                       |                  |                          |             |                  |              |                  |
|                      | PORT 4      |               | 14242.A.1900.3.G.2 | CTU51504      | CTU51504      |        | UMTS 1900              | 7770.00.1900.00  | 16.5         | 0                  | 0               | Bottom                                    | Andrew 1-1/4 (1900) | 120.03               |                   |                        | No                       |                  |                          |             |                  |              |                  |
|                      | PORT 5      |               | 14242.A.850.25.G.1 | 321G51501     | 321G51501     |        | GSM 850                | 7770.00.850.05   | 13.5         | 0                  | 5               | NONE                                      | Andrew 1-1/4 (850)  | 120.03               | 850 RX/IT         | 1                      | 850 LLC                  | No               |                          |             |                  |              |                  |
| ANTENNA POSITION 2   | PORT 1      |               | 14242.A.700.4G.1   | CTL05150_7A_1 | CTL05150_7A_1 |        | LTE 700                | RR_719MHz_02 DT  | 14.8         | 30                 | 2               | BOTTOM                                    | Andrew 1-1/4 (700)  | 120.03               |                   |                        |                          |                  |                          |             |                  |              |                  |
|                      | PORT 3      |               | 14242.A.1900.4.G.1 | CTL05150_9A_1 | CTL05150_9A_1 |        | LTE 1900               | RR_1930MHz_0 2DT | 17.2         | 30                 | 2               | BOTTOM                                    | Andrew 1-1/4 (1900) | 120.03               |                   |                        |                          |                  |                          |             |                  |              |                  |

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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1 | ANTENNA POSITION 2    | ANTENNA POSITION 3 | ANTENNA POSITION 4        | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|--------------------|-----------------------|--------------------|---------------------------|--------------------|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | 7770               | P65-16-XLH-RR         |                    |                           |                    |                    |                    |
| ANTENNA VENDOR   | Powerwave          | Powerwave             |                    |                           |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   | 55X11X5            | 72X12X6               |                    |                           |                    |                    |                    |
| ANTENNA WEIGHT   | 35                 | 64                    |                    |                           |                    |                    |                    |
| AZIMUTH  | 120                | 150                   |                    |                           |                    |                    |                    |
| MAGNETIC DECLINATION   |                    |                       |                    |                           |                    |                    |                    |
| RADIATION CENTER (feet)  | 109                | 109                   |                    |                           |                    |                    |                    |
| ANTENNA TIP HEIGHT   | 111                | 112                   |                    |                           |                    |                    |                    |
| MECHANICAL DOWNTILT  | 0                  | 0                     |                    |                           |                    |                    |                    |
| FEEDER AMOUNT  | 2                  | 0                     |                    |                           |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |                    |                       |                    |                           |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |                    |                       |                    |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |                    |                       |                    |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |                    |                       |                    |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |                    |                       |                    |                           |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | 1                  | Powerwave 7020 (DB)   |                    | Powerwave Built in RET    |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |                    |                       | 4                  | APTDC-BDFDM DBW Broadband |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2                  | Powerwave LGP21901    | 2                  | CM1007-DBPXC-003          |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |                    |                       |                    | LTE RRH                   |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| TMALNA (QTY/MODEL)   | 2                  | Single Fullband (850) | 1                  | DTMABP7819V G12A Twin PCS |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2                  | Polyphaser/1000860    |                    |                           |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |                    |                       |                    | LTE RRH                   |                    |                    |                    |
| FILTER (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| SQUID (QTY/MODEL)  |                    |                       |                    |                           |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |                    |                       |                    |                           |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |                    | 1                     |                    | RRUS-11                   |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |                    | 1                     |                    | RRUS-12                   |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |                    |                       |                    |                           |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |                    |                       |                    |                           |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Local Market Note 1  |                    |                       |                    |                           |                    |                    |                    |
| Local Market Note 2  |                    |                       |                    |                           |                    |                    |                    |
| Local Market Note 3  |                    |                       |                    |                           |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Acell)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL    | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE        | FEEDER LENGTH (feet) | RX/AT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCP/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|----------------------|-------------|---------------|--------------------|---------------|---------------|--------|------------------------|------------------|--------------|--------------------|-----------------|---|---------------------|----------------------|-------------------|------------------------|--------------------------|------------------|--------------------------|-------------|------------------|--------------|-----------------|
| ANTENNA POSITION 1   | PORT 1      |               | 14242.B.850.3G.1   | CTV51502      | CTV51502      |        | UMTS 850               | 7770.00.850.05   | 13.5         | 120                | 5               | None                                      | Andrew 1-1/4 (850)  | 120.03               | 850 RX/AT         |                        |                          | No               |                          |             |                  |              |                 |
|                      | PORT 2      |               | 14242.B.850.3G.2   | CTV5150B      | CTV5150B      |        | UMTS 850               | 7770.00.850.05   | 13.5         | 120                | 5               | Bottom                                    | Andrew 1-1/4 (850)  | 120.03               | 850 RX/AT         |                        |                          | No               |                          |             |                  |              |                 |
|                      | PORT 3      |               | 14242.B.1900.3 G.1 | CTU51508      | CTU51508      |        | UMTS 1900              | 7770.00.1900.02  | 16.5         | 120                | 2               | None                                      | Andrew 1-1/4 (1900) | 120.03               |                   |                        | No                       |                  |                          |             |                  |              |                 |
|                      | PORT 4      |               | 14242.B.1900.3 G.2 | CTU51505      | CTU51505      |        | UMTS 1900              | 7770.00.1900.02  | 16.5         | 120                | 2               | Bottom                                    | Andrew 1-1/4 (1900) | 120.03               |                   |                        | No                       |                  |                          |             |                  |              |                 |
|                      | PORT 5      |               | 14242.B.850.25 G.1 | 321G51502     | 321G51502     |        | GSM 850                | 7770.00.850.05   | 13.5         | 120                | 5               | NONE                                      | Andrew 1-1/4 (850)  | 120.03               | 850 RX/AT         | 1                      | 850 LLC                  | No               |                          |             |                  |              |                 |
| ANTENNA POSITION 2   | PORT 1      |               | 14242.B.700.4G.1   | CTL05150_7B_1 | CTL05150_7B_1 |        | LTE 700                | RR_719MHz_02 DT  | 14.8         | 150                | 2               | BOTTOM                                    | Andrew 1-1/4 (700)  | 120.03               |                   |                        |                          |                  |                          |             |                  |              |                 |
|                      | PORT 3      |               | 14242.B.1900.4 G.1 | CTL05150_9B_1 | CTL05150_9B_1 |        | LTE 1900               | RR_1930MHz_0 2DT | 17.2         | 150                | 2               | BOTTOM                                    | Andrew 1-1/4 (1900) | 120.03               |                   |                        |                          |                  |                          |             |                  |              |                 |

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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1 | ANTENNA POSITION 2    | ANTENNA POSITION 3 | ANTENNA POSITION 4        | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|--------------------|-----------------------|--------------------|---------------------------|--------------------|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | 7770               | P65-16-XLH-RR         |                    |                           |                    |                    |                    |
| ANTENNA VENDOR   | Powerwave          | Powerwave             |                    |                           |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   | 55X11X5            | 72X12X6               |                    |                           |                    |                    |                    |
| ANTENNA WEIGHT   | 35                 | 64                    |                    |                           |                    |                    |                    |
| AZIMUTH  | 240                | 270                   |                    |                           |                    |                    |                    |
| MAGNETIC DECLINATION   |                    |                       |                    |                           |                    |                    |                    |
| RADIATION CENTER (feet)  | 109                | 109                   |                    |                           |                    |                    |                    |
| ANTENNA TIP HEIGHT   | 111                | 112                   |                    |                           |                    |                    |                    |
| MECHANICAL DOWNTILT  | 0                  | 0                     |                    |                           |                    |                    |                    |
| FEEDER AMOUNT  | 2                  | 0                     |                    |                           |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |                    |                       |                    |                           |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |                    |                       |                    |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |                    |                       |                    |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |                    |                       |                    |                           |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |                    |                       |                    |                           |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | 1                  | Powerwave 7020 (DB)   |                    | Powerwave Built In RET    |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |                    |                       | 4                  | APTDC-BDFDM DBW Broadband |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2                  | Powerwave LGP21901    | 2                  | CM1007-DBPXC-003          |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |                    |                       |                    | LTE RRH                   |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| TMALNA (QTY/MODEL)   | 2                  | Single Fullband (850) | 1                  | DTMABP7819V G12A Twin PCS |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2                  | Polyphaser/1000860    |                    |                           |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |                    |                       |                    | LTE RRH                   |                    |                    |                    |
| FILTER (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| SQUID (QTY/MODEL)  |                    |                       |                    |                           |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |                    |                       |                    |                           |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |                    | 1                     |                    | RRUS-11                   |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |                    | 1                     |                    | RRUS-12                   |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |                    |                       |                    |                           |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |                    |                       |                    |                           |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |                    |                       |                    |                           |                    |                    |                    |
| Local Market Note 1  |                    |                       |                    |                           |                    |                    |                    |
| Local Market Note 2  |                    |                       |                    |                           |                    |                    |                    |
| Local Market Note 3  |                    |                       |                    |                           |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (Acell)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL    | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE        | FEEDER LENGTH (feet) | RX/IT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCP/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|----------------------|-------------|---------------|--------------------|---------------|---------------|--------|------------------------|------------------|--------------|--------------------|-----------------|---|---------------------|----------------------|-------------------|------------------------|--------------------------|------------------|--------------------------|-------------|------------------|--------------|-----------------|
| ANTENNA POSITION 1   | PORT 1      |               | 14242.C.850.3G.1   | CTV51503      | CTV51503      |        | UMTS 850               | 7770.00.850.02   | 13.5         | 240                | 2               | None                                      | Andrew 1-1/4 (850)  | 120.03               | 850 RX/IT         |                        |                          | No               |                          |             |                  |              |                 |
|                      | PORT 2      |               | 14242.C.850.3G.2   | CTV5150C      | CTV5150C      |        | UMTS 850               | 7770.00.850.02   | 13.5         | 240                | 2               | Bottom                                    | Andrew 1-1/4 (850)  | 120.03               | 850 RX/IT         |                        |                          | No               |                          |             |                  |              |                 |
|                      | PORT 3      |               | 14242.C.1900.3 G.1 | CTU51509      | CTU51509      |        | UMTS 1900              | 7770.00.1900.02  | 16.5         | 240                | 2               | None                                      | Andrew 1-1/4 (1900) | 120.03               |                   |                        | No                       |                  |                          |             |                  |              |                 |
|                      | PORT 4      |               | 14242.C.1900.3 G.2 | CTU51506      | CTU51506      |        | UMTS 1900              | 7770.00.1900.02  | 16.5         | 240                | 2               | Bottom                                    | Andrew 1-1/4 (1900) | 120.03               |                   |                        | No                       |                  |                          |             |                  |              |                 |
|                      | PORT 5      |               | 14242.C.850.25 G.1 | 321G51503     | 321G51503     |        | GSM 850                | 7770.00.850.02   | 13.5         | 240                | 2               | NONE                                      | Andrew 1-1/4 (850)  | 120.03               | 850 RX/IT         | 1                      | 850 LLC                  | No               |                          |             |                  |              |                 |
| ANTENNA POSITION 2   | PORT 1      |               | 14242.C.700.4G.1   | CTL05150_7C_1 | CTL05150_7C_1 |        | LTE 700                | RR_719MHz_02 DT  | 14.8         | 270                | 2               | BOTTOM                                    | Andrew 1-1/4 (700)  | 120.03               |                   |                        |                          |                  |                          |             |                  |              |                 |
|                      | PORT 3      |               | 14242.C.1900.4 G.1 | CTL05150_9C_1 | CTL05150_9C_1 |        | LTE 1900               | RR_1930MHz_0 2DT | 17.2         | 270                | 2               | BOTTOM                                    | Andrew 1-1/4 (1900) | 120.03               |                   |                        |                          |                  |                          |             |                  |              |                 |

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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1 | ANTENNA POSITION 2             | ANTENNA POSITION 3 | ANTENNA POSITION 4         | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|--------------------|--------------------------------|--------------------|----------------------------|--------------------|--------------------|--------------------|
| Existing Antenna?  |                    |                                |                    |                            |                    |                    |                    |
| ANTENNA MAKE - MODEL   |                    | QS66512-2                      |                    |                            |                    |                    |                    |
| ANTENNA VENDOR   |                    | Quintel                        |                    |                            |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   |                    | 72X12X9.6                      |                    |                            |                    |                    |                    |
| ANTENNA WEIGHT   |                    | 111                            |                    |                            |                    |                    |                    |
| AZIMUTH  |                    | 30                             |                    |                            |                    |                    |                    |
| MAGNETIC DECLINATION   |                    |                                |                    |                            |                    |                    |                    |
| RADIATION CENTER (feet)  |                    | 109                            |                    |                            |                    |                    |                    |
| ANTENNA TIP HEIGHT   |                    | 112                            |                    |                            |                    |                    |                    |
| MECHANICAL DOWNTILT  |                    |                                |                    |                            |                    |                    |                    |
| FEEDER AMOUNT  |                    | 2                              |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |                    |                                |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |                    |                                |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |                    |                                |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |                    |                                |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # & of inches)       |                    |                                |                    |                            |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  |                    |                                |                    | Built-in                   |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |                    | 4                              |                    | APTDC-BDFDM DBW Broadband  |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   |                    | 4                              |                    | CCI Pentaplexer 5PX-0728-O |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |                    |                                |                    | LTE RRH                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  |                    | 2                              |                    | TMA2117F00V1-1 (Twin PCS-  |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  |                    |                                |                    |                            |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |                    |                                |                    |                            |                    |                    |                    |
| FILTER (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| SQUID (QTY/MODEL)  |                    |                                |                    |                            |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |                    |                                |                    |                            |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |                    |                                |                    |                            |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |                    | 1                              |                    | RRUS-32                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |                    |                                |                    |                            |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |                    |                                |                    |                            |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |                    |                                |                    |                            |                    |                    |                    |
| Local Market Note 1  |                    | Bronze standard as WCS on this |                    |                            |                    |                    |                    |
| Local Market Note 2  |                    |                                |                    |                            |                    |                    |                    |
| Local Market Note 3  |                    | Config - 1 DUS + XMU           |                    |                            |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng) | USEID (AolI)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL   | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE        | FEEDER LENGTH (feet) | RX/IT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|----------------------|-------------|---------------|-------------------|---------------|---------------|--------|------------------------|-----------------|--------------|--------------------|-----------------|---|---------------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|-----------------|
| ANTENNA POSITION 2   | PORT 4      |               | 14242.A.WCS.4 G.1 | CTL02106_3A_1 | CTL02106_3A_1 |        | LTE WCS                | 2_2350MHz_03 DT | 17.8         | 30                 | 3               | BOTTOM                                    | Andrew 1-1/4 (2300) | 120.03               |                   |                        |                          |                   | 1285.2866                |             |                  |              |                 |







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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2    | ANTENNA POSITION 3 | ANTENNA POSITION 4         | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|-----------------------|--------------------|----------------------------|--------------------|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | 7770  | QS66512-2             |                    |                            |                    |                    |                    |
| ANTENNA VENDOR   | Powerwave   | Quintel               |                    |                            |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   | 55X11X5   | 72X12X9.6             |                    |                            |                    |                    |                    |
| ANTENNA WEIGHT   | 35  | 111                   |                    |                            |                    |                    |                    |
| AZIMUTH  | 0   | 30                    |                    |                            |                    |                    |                    |
| MAGNETIC DECLINATION   |   |                       |                    |                            |                    |                    |                    |
| RADIATION CENTER (feet)  | 109   | 109                   |                    |                            |                    |                    |                    |
| ANTENNA TIP HEIGHT   | 111   | 112                   |                    |                            |                    |                    |                    |
| MECHANICAL DOWNTILT  | 0   | 2                     |                    |                            |                    |                    |                    |
| FEEDER AMOUNT  | 2   | 4                     |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |                       |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |                       |                    |                            |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | 1   | Powerwave 7020 (DB)   | Built-in           |                            |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |   | None                  | 8                  | APTDC-BDFDM DBW Broadband  |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2   | Powerwave LGP21901    | 4                  | CCI Pentaplexer SPX-0726-O |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   | Powerwave 7070        |                    | LTE RRH                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  | 2   | Single Fullband (850) | 2                  | TMA2117F00V1-1 (Twin PCS-  |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2   | Polyphaser/ 1000860   |                    |                            |                    |                    |                    |
| PDU FOR TMA5 (QTY/MODEL)   | 1   | Powerwave LGP 18104   |                    | LTE RRH                    |                    |                    |                    |
| FILTER (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| SQUID (QTY/MODEL)  |   |                       |                    |                            |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |                       |                    |                            |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   | 1                     |                    | RRUS-11                    |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1                     |                    | RRUS-12                    |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   | 1                     |                    | RRUS-32                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |                       |                    |                            |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |                       |                    |                            |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Local Market Note 1  | LTE 3C will be Bronze standard as WCS on this site/ Replace existing LTE antenna with 12port antenna/Install RRUS 32 at bottom, pentaplexer and WCS capable TMA/Install 2 coax per sector//Add XMJ with DUS41 |                       |                    |                            |                    |                    |                    |
| Local Market Note 2  |   |                       |                    |                            |                    |                    |                    |
| Local Market Note 3  | DUS-1 - 7A;7B;7C;X1P1;X1P2;PC;XMJ-1 - PA - WA - PB - WB;WCS;D1E;D1D   |                       |                    |                            |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)       | USEID (Acell)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL   | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RX/IT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|----------------------|-------------|---------------------|--------------------|---------------|---------------|--------|------------------------|-----------------|--------------|--------------------|-----------------|---|--------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|-----------------|
| ANTENNA POSITION 1   | PORT 1      | 14242.A.850.3G      | 14242.A.850.3G     | CTV51501      | CTV51501      |        | UMTS 850               | 7770.00.850.05  | 13.5         | 0                  | 5               | None                                      | Andrew 1-1/4 | 120.03               | 850 RXAIT         |                        |                          | No                | 313.33                   |             | 1                |              |                 |
|                      | PORT 2      | 14242.A.850.3G      | 14242.A.850.3G     | CTV5150A      | CTV5150A      |        | UMTS 850               | 7770.00.850.05  | 13.5         | 0                  | 5               | Bottom                                    | Andrew 1-1/4 | 120.03               | 850 RXAIT         |                        |                          | No                | 313.33                   |             | 1                |              |                 |
|                      | PORT 3      | 14242.A.1900.3 G.1  | 14242.A.1900.3 G.1 | CTU51507      | CTU51507      |        | UMTS 1900              | 7770.00.1900.00 | 16.5         | 0                  | 0               | None                                      | Andrew 1-1/4 | 120.03               |                   |                        | No                       | 628.06            |                          | 2           |                  |              |                 |
|                      | PORT 4      | 14242.A.1900.3 G.2  | 14242.A.1900.3 G.2 | CTU51504      | CTU51504      |        | UMTS 1900              | 7770.00.1900.00 | 16.5         | 0                  | 0               | Bottom                                    | Andrew 1-1/4 | 120.03               |                   |                        | No                       | 628.06            |                          | 2           |                  |              |                 |
|                      | PORT 5      | 14242.A.850.25 G.1  | 14242.A.850.25 G.1 | 321G51501     | 321G51501     |        | GSM 850                | 7770.00.850.05  | 13.5         | 0                  | 5               | NONE                                      | Andrew 1-1/4 | 120.03               | 850 RXAIT         | 1                      | 850 LLC                  | No                | 313.33                   |             | 1                |              |                 |
| ANTENNA POSITION 2   | PORT 1      | 14242.A.700.4G      | 14242.A.700.4G     | CTL05150_7A_1 | CTL05150_7A_1 |        | LTE 700                | 2_719MHz_020 T  | 14           | 30                 | 2               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   | 1475.7065                |             | 3                |              |                 |
|                      | PORT 3      | 14242.A.1900.4 G.1  | 14242.A.1900.4 G.1 | CTL05150_9A_1 | CTL05150_9A_1 |        | LTE 1900               | 2_1930MHz_02 DT | 17           | 30                 | 2               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          | 3664.3757         |                          | 4           |                  |              |                 |
|                      | PORT 4      | 14242.A.WCS.4 Gtmp1 | 14242.A.WCS.4 G.1  | CTL02106_3A_1 | CTL02106_3A_1 |        | LTE WCS                | 2_2350MHz_03 DT | 17.8         | 30                 | 3               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   | 1285.2866                |             | 4                |              |                 |

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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2    | ANTENNA POSITION 3 | ANTENNA POSITION 4         | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|-----------------------|--------------------|----------------------------|--------------------|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | 7770  | QS66512-2             |                    |                            |                    |                    |                    |
| ANTENNA VENDOR   | Powerwave   | Quintel               |                    |                            |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   | 55X11X5   | 72X12X9.6             |                    |                            |                    |                    |                    |
| ANTENNA WEIGHT   | 35  | 111                   |                    |                            |                    |                    |                    |
| AZIMUTH  | 120   | 150                   |                    |                            |                    |                    |                    |
| MAGNETIC DECLINATION   |   |                       |                    |                            |                    |                    |                    |
| RADIATION CENTER (feet)  | 109   | 109                   |                    |                            |                    |                    |                    |
| ANTENNA TIP HEIGHT   | 111   | 112                   |                    |                            |                    |                    |                    |
| MECHANICAL DOWNTILT  | 0   | 0                     |                    |                            |                    |                    |                    |
| FEEDER AMOUNT  | 2   | 4                     |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |                       |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |                       |                    |                            |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | 1   | Powerwave 7020 (DB)   | Built-in           |                            |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |   | None                  | 8                  | APTDC-BDFDM DBW Broadband  |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2   | Powerwave LGP21901    | 4                  | CCI Pentaplexer SPX-0726-O |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   |                       |                    | LTE RRH                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  | 2   | Single Fullband (850) | 2                  | TMA2117F00V1-1 (Twin PCS-  |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2   | Polyphaser/ 1000860   |                    |                            |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |   |                       |                    | LTE RRH                    |                    |                    |                    |
| FILTER (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| SQUID (QTY/MODEL)  |   |                       |                    |                            |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |                       |                    |                            |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   | 1                     |                    | RRUS-11                    |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1                     |                    | RRUS-12                    |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   | 1                     |                    | RRUS-32                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |                       |                    |                            |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |                       |                    |                            |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Local Market Note 1  | LTE 3C will be Bronze standard as WCS on this site/ Replace existing LTE antenna with 12port antenna/Install RRUS 32 at bottom, pentaplexer and WCS capable TMA/Install 2 coax per sector//Add XMJ with DUS41 |                       |                    |                            |                    |                    |                    |
| Local Market Note 2  |   |                       |                    |                            |                    |                    |                    |
| Local Market Note 3  | DUS-1 - 7A:7B:7C:X1P1X1P2PC<br>XMU-1 - PA - WA - PB - WB:WCS:.....D1E:D1D   |                       |                    |                            |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)        | USEID (Acell)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL   | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RX/AT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|----------------------|-------------|----------------------|--------------------|---------------|---------------|--------|------------------------|-----------------|--------------|--------------------|-----------------|---|--------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|-----------------|
| ANTENNA POSITION 1   | PORT 1      | 14242.B.850.3G.1     | 14242.B.850.3G.1   | CTV51502      | CTV51502      |        | UMTS 850               | 7770.00.850.05  | 13.5         | 120                | 5               | None                                      | Andrew 1-1/4 | 120.03               | 850 RX/AT         |                        |                          | No                | 313.33                   |             | 9                |              |                 |
|                      | PORT 2      | 14242.B.850.3G.2     | 14242.B.850.3G.2   | CTV5150B      | CTV5150B      |        | UMTS 850               | 7770.00.850.05  | 13.5         | 120                | 5               | Bottom                                    | Andrew 1-1/4 | 120.03               | 850 RX/AT         |                        |                          | No                | 313.33                   |             | 9                |              |                 |
|                      | PORT 3      | 14242.B.1900.3.G.1   | 14242.B.1900.3.G.1 | CTU51508      | CTU51508      |        | UMTS 1900              | 7770.00.1900.02 | 16.5         | 120                | 2               | None                                      | Andrew 1-1/4 | 120.03               |                   |                        | No                       | 628.06            |                          | 10          |                  |              |                 |
|                      | PORT 4      | 14242.B.1900.3.G.2   | 14242.B.1900.3.G.2 | CTU51505      | CTU51505      |        | UMTS 1900              | 7770.00.1900.02 | 16.5         | 120                | 2               | Bottom                                    | Andrew 1-1/4 | 120.03               |                   |                        | No                       | 628.06            |                          | 10          |                  |              |                 |
|                      | PORT 5      | 14242.B.850.25.G.1   | 14242.B.850.25.G.1 | 321G51502     | 321G51502     |        | GSM 850                | 7770.00.850.05  | 13.5         | 120                | 5               | NONE                                      | Andrew 1-1/4 | 120.03               | 850 RX/AT         | 1                      | 850 LLC                  | No                | 313.33                   |             | 9                |              |                 |
| ANTENNA POSITION 2   | PORT 1      | 14242.B.700.4G.1     | 14242.B.700.4G.1   | CTL05150_7B_1 | CTL05150_7B_1 |        | LTE 700                | 2_719MHz_020T   | 14           | 150                | 2               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   | 1475.7065                |             | 11               |              |                 |
|                      | PORT 3      | 14242.B.1900.4.G.1   | 14242.B.1900.4.G.1 | CTL05150_9B_1 | CTL05150_9B_1 |        | LTE 1900               | 2_1930MHz_02DT  | 17           | 150                | 2               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   | 3664.3757                |             | 12               |              |                 |
|                      | PORT 4      | 14242.B.WCS.4.G.tmp1 | 14242.B.WCS.4.G.1  | CTL02106_3B_1 | CTL02106_3B_1 |        | LTE WCS                | 2_2350MHz_03DT  | 17.8         | 150                | 3               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   |                          | 1285.2866   |                  | 12           |                 |

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

| ANTENNA COMMON FIELDS  | ANTENNA POSITION 1  | ANTENNA POSITION 2    | ANTENNA POSITION 3 | ANTENNA POSITION 4         | ANTENNA POSITION 5 | ANTENNA POSITION 6 | ANTENNA POSITION 7 |
|--|---|-----------------------|--------------------|----------------------------|--------------------|--------------------|--------------------|
| ANTENNA MAKE - MODEL   | 7770  | QS66512-2             |                    |                            |                    |                    |                    |
| ANTENNA VENDOR   | Powerwave   | Quintel               |                    |                            |                    |                    |                    |
| ANTENNA SIZE (H x W x D)   | 55X11X5   | 72X12X9.6             |                    |                            |                    |                    |                    |
| ANTENNA WEIGHT   | 35  | 111                   |                    |                            |                    |                    |                    |
| AZIMUTH  | 240   | 270                   |                    |                            |                    |                    |                    |
| MAGNETIC DECLINATION   |   |                       |                    |                            |                    |                    |                    |
| RADIATION CENTER (feet)  | 109   | 109                   |                    |                            |                    |                    |                    |
| ANTENNA TIP HEIGHT   | 111   | 112                   |                    |                            |                    |                    |                    |
| MECHANICAL DOWNTILT  | 0   | 0                     |                    |                            |                    |                    |                    |
| FEEDER AMOUNT  | 2   | 4                     |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)                            |   |                       |                    |                            |                    |                    |                    |
| VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)                            |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)  |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE) |   |                       |                    |                            |                    |                    |                    |
| HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)     |   |                       |                    |                            |                    |                    |                    |
| Antenna RET Motor (QTY/MODEL)  | 1   | Powerwave 7020 (DB)   | Built-in           |                            |                    |                    |                    |
| SURGE ARRESTOR (QTY/MODEL)   |   | None                  | 8                  | APTDC-BDFDM DBW Broadband  |                    |                    |                    |
| DIPLEXER (QTY/MODEL)   | 2   | Powerwave LGP21901    | 4                  | CCI Pentaplexer SPX-0726-O |                    |                    |                    |
| DUPLEXER (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Antenna RET CONTROL UNIT (QTY/MODEL)   |   |                       |                    | LTE RRH                    |                    |                    |                    |
| DC BLOCK (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| TMA/LNA (QTY/MODEL)  | 2   | Single Fullband (850) | 2                  | TMA2117F00V1-1 (Twin PCS-  |                    |                    |                    |
| CURRENT INJECTORS FOR TMA (QTY/MODEL)  | 2   | Polyphaser/ 1000860   |                    |                            |                    |                    |                    |
| PDU FOR TMA (QTY/MODEL)  |   |                       |                    | LTE RRH                    |                    |                    |                    |
| FILTER (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| SQUID (QTY/MODEL)  |   |                       |                    |                            |                    |                    |                    |
| FIBER TRUNK (QTY/MODEL)  |   |                       |                    |                            |                    |                    |                    |
| DC TRUNK (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - 700 band (QTY/MODEL)   |   | 1                     |                    | RRUS-11                    |                    |                    |                    |
| RRH - 850 band (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - 1900 band (QTY/MODEL)  |   | 1                     |                    | RRUS-12                    |                    |                    |                    |
| RRH - AWS band (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| RRH - WCS band (QTY/MODEL)   |   | 1                     |                    | RRUS-32                    |                    |                    |                    |
| Additional RRH #1 - any band (QTY/MODEL)                                       |   |                       |                    |                            |                    |                    |                    |
| Additional RRH #2 - any band (QTY/MODEL)                                       |   |                       |                    |                            |                    |                    |                    |
| Additional Component 1 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Additional Component 2 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Additional Component 3 (QTY/MODEL)   |   |                       |                    |                            |                    |                    |                    |
| Local Market Note 1  | LTE 3C will be Bronze standard as WCS on this site/ Replace existing LTE antenna with 12port antenna/Install RRUS 32 at bottom, pentaplexer and WCS capable TMA/Install 2 coax per sector//Add XMJ with DUS41 |                       |                    |                            |                    |                    |                    |
| Local Market Note 2  |   |                       |                    |                            |                    |                    |                    |
| Local Market Note 3  | DUS-1 - 7A:7B:7C:X1P1X1P2PC<br>XMJ-1 - PA - WA - PB - WB:WCS:.....D1E:D1D   |                       |                    |                            |                    |                    |                    |

| PORT SPECIFIC FIELDS | PORT NUMBER | USEID (CSSng)       | USEID (Acell)      | ATOLL TXID    | ATOLL CELL ID | TX/RX? | TECHNOLOGY / FREQUENCY | ANTENNA ATOLL   | ANTENNA GAIN | ELECTRICAL AZIMUTH | ELECTRICAL TILT | RRH LOCATION (Top/Bottom/Integrated/None) | FEEDERS TYPE | FEEDER LENGTH (feet) | RX/AT KIT MODULE? | TRIPLEXER or LLC (QTY) | TRIPLEXER or LLC (MODEL) | SCPA/MCPA MODULE? | HATCHPLATE POWER (Watts) | ERP (Watts) | Antenna RET Name | CABLE NUMBER | CABLE ID(cssng) |
|----------------------|-------------|---------------------|--------------------|---------------|---------------|--------|------------------------|-----------------|--------------|--------------------|-----------------|---|--------------|----------------------|-------------------|------------------------|--------------------------|-------------------|--------------------------|-------------|------------------|--------------|-----------------|
| ANTENNA POSITION 1   | PORT 1      | 14242.C.850.3G.1    | 14242.C.850.3G.1   | CTV51503      | CTV51503      |        | UMTS 850               | 7770.00.850.02  | 13.5         | 240                | 2               | None                                      | Andrew 1-1/4 | 120.03               | 850 RX/AT         |                        |                          | No                | 313.33                   |             |                  | 17           |                 |
|                      | PORT 2      | 14242.C.850.3G.2    | 14242.C.850.3G.2   | CTV5150C      | CTV5150C      |        | UMTS 850               | 7770.00.850.02  | 13.5         | 240                | 2               | Bottom                                    | Andrew 1-1/4 | 120.03               | 850 RX/AT         |                        |                          | No                | 313.33                   |             |                  | 17           |                 |
|                      | PORT 3      | 14242.C.1900.3 G.1  | 14242.C.1900.3 G.1 | CTU51509      | CTU51509      |        | UMTS 1900              | 7770.00.1900.02 | 16.5         | 240                | 2               | None                                      | Andrew 1-1/4 | 120.03               |                   |                        |                          | No                | 628.06                   |             |                  | 18           |                 |
|                      | PORT 4      | 14242.C.1900.3 G.2  | 14242.C.1900.3 G.2 | CTU51506      | CTU51506      |        | UMTS 1900              | 7770.00.1900.02 | 16.5         | 240                | 2               | Bottom                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          | No                | 628.06                   |             |                  | 18           |                 |
|                      | PORT 5      | 14242.C.850.25 G.1  | 14242.C.850.25 G.1 | 321G51503     | 321G51503     |        | GSM 850                | 7770.00.850.02  | 13.5         | 240                | 2               | NONE                                      | Andrew 1-1/4 | 120.03               | 850 RX/AT         | 1                      | 850 LLC                  | No                | 313.33                   |             |                  | 17           |                 |
| ANTENNA POSITION 2   | PORT 1      | 14242.C.700.4G.1    | 14242.C.700.4G.1   | CTL05150_7C_1 | CTL05150_7C_1 |        | LTE 700                | 2_719MHz_020 T  | 14           | 270                | 2               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   | 1475.7065                |             |                  | 19           |                 |
|                      | PORT 3      | 14242.C.1900.4 G.1  | 14242.C.1900.4 G.1 | CTL05150_9C_1 | CTL05150_9C_1 |        | LTE 1900               | 2_1930MHz_02 DT | 17           | 270                | 2               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          | 3664.3757         |                          |             | 20               |              |                 |
|                      | PORT 4      | 14242.C.WCS.4 Gtmp1 | 14242.C.WCS.4 G.1  | CTL02106_3C_1 | CTL02106_3C_1 |        | LTE WCS                | 2_2350MHz_03 DT | 17.8         | 270                | 3               | BOTTOM                                    | Andrew 1-1/4 | 120.03               |                   |                        |                          |                   | 1285.2866                |             |                  | 20           |                 |



- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design

- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >159dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers four independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS66512-2 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each set of 4 ports having independent tilt for connection to 2T4R/4T4R services.

| Electrical Characteristics                  | 2x Ports<br>1&2 | 2x Ports<br>3&4 | 4x Ports<br>5-8                |           |            | 4 Ports<br>9-12  |
|---|-----------------|-----------------|--------------------------------|-----------|------------|------------------|
| Operating Frequency (MHz)                   | <b>698-806*</b> | <b>824-894</b>  | <b>1695-1780 and 2110-2400</b> |           |            | <b>1850-1990</b> |
|   | 698-806         | 824-894         | 1695-1780                      | 2110-2180 | 2300-2400  | 1850-1990        |
| Azimuth beamwidth <sup>1</sup>              | 67°             | 64°             | 68°                            | 63°       | 58°        | 69°              |
| Elevation beamwidth <sup>1</sup>            | 12°             | 10°             | 6.5°                           | 5.5°      | 4.5°       | 5.5°             |
| Gain <sup>1</sup> (dBi)                     | 13.2            | 13.5            | 16.2                           | 16.5      | 17.0       | 16.0             |
| Polarization                                | ±45°            | ±45°            | ±45°                           |           |            | ±45°             |
| Electrical down-tilt range                  | 2°-10°          | 2°-10°          | 2° - 7°                        |           |            | 2° - 7°          |
| Upper SLL (20° > mainbeam) <sup>1</sup>     | -17dB           | -19dB           | -18dB                          | -18B      | -18dB      | -16dB            |
| Front to Back Ratio(180°±10°) <sup>1</sup>  | ≥27dB           | ≥29dB           | ≥28dB                          | ≥28dB     | ≥28dB      | ≥27dB            |
| Port to Port isolation <sup>1</sup>         | ≥28dB           | ≥30dB           | ≥30dB                          | ≥30dB     | ≥30dB      | ≥30dB            |
| Return loss (VSWR)                          | 14dB(1.5)       | 14dB(1.5)       | 14dB(1.5)                      | 14dB(1.5) | 14dB (1.5) | 14dB(1.5)        |
| X Polar Discrimination (at 0°)              | >18dB           | >16dB           | >20dB                          | >20dB     | >18dB      | >20dB            |
| Max Power handling (per any port)           | 500 watts       | 500 watts       | 250 watts                      |           |            | 250 watts        |
| Total Composite Power (all ports)           | 1750 watts      |                 |                                |           |            |                  |
| PIM (3 <sup>rd</sup> Order) (2x43dBm)       | >153dBc         | >153dBc         | >153dBc                        |           |            | >153dBc          |
| XBand PIM (3 <sup>rd</sup> Order) (2x43dBm) | >159dBc         |                 |                                |           |            |                  |



<sup>1</sup>Typical Performance across frequency and Downtilt. \*Products Ordered after Jan 2016 will be 698-806MHz

| Mechanical Characteristics      |  |
|---------------------------------|--|
| Dimensions                      | L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm) |
| Weight (excl mounting brackets) | 111lbs (50.3kg)                              |
| No. of Connectors               | 12x 4.3-10.0 DIN Female Long Neck            |
| Max Wind Speed                  | 150mph (67m/s)                               |
| Equivalent Flat Plate Area      | 2.96ft <sup>2</sup> (0.275m <sup>2</sup> )   |
| Wind Load @ 160km/h (45m/s)     | Front: 587N (132 lbs), Side: 382N (86 lbs)   |
| Operating Temperature           | -40°C to +65°C                               |

| Fully Integrated RET Characteristics |                                  |
|--------------------------------------|----------------------------------|
| AISG Standards                       | V1.1, V 2.0 and 3GPP             |
| Factory Default                      | AISG 2.0                         |
| Surge immunity                       | IEC 61000-4-5:2005 4KV(AISG PIN) |
| Device Type                          | SRET Type 1                      |
| AISG Data rate                       | 9.6 kbps                         |
| No of connectors                     | 1in/1out.                        |
| Connector type                       | IEC 60130-9 (Ed 3.0)             |
| MTBF                                 | 36,000 Operational moves         |

**All specifications are subject to change without notice. Please contact your Quintel representative for complete information.**

# TMA2117F00V1-1

PCS / WCS Dual Band Twin TMA, with 700/850 bypass, AISG2.0

Designed to be deployed in co-located PCS & WCS systems with wideband antennas, the Kaelus TMA provides internal diplexing and gain in both bands while allowing 700/850 services to pass through to a separate antenna, thereby saving hardware costs.

## PRODUCT FEATURES

- Improved base station sensitivity through gain in PCS and WCS bands
- Hardware and software configuration using AISG “Personality” upload
- High Linearity and low noise performance; Bypass provided for 700/850MHz services
- Fail safe bypass mode with lightning protection

## TECHNICAL SPECIFICATIONS

|  |                          |
|--|--------------------------|
| Downlink Path, Band 1                        | PCS                      |
| Passband                                     | 1930 - 1990              |
| Insertion Loss                               | 0.5dB typ                |
| Return Loss                                  | 18dB min                 |
| Max Average input power (W)                  | 160                      |
| Max PEP Input Power (W)                      | 2000                     |
| Intermodulation, 2 x 43dBm TX carriers (dBc) | -153dBc max              |
| Uplink Path, Band 1                          |                          |
| Passband                                     | 1850 - 1910              |
| Gain (dB)                                    | 3dB to 13dB in 1dB steps |
| Gain window                                  | +/- 1dB max              |
| Return Loss (Operating)                      | 18dB min                 |
| Return Loss (Bypass)                         | 12dB min                 |
| Noise Figure                                 | 1.4dB typ                |
| Bypass Loss                                  | 2.5dB typ                |

## AISG MODE OF OPERATION (AUTO SELECTED ON VALID AISG 2.0 FRAMES)

|                               |                                   |
|-------------------------------|-----------------------------------|
| AISG Version                  | 2                                 |
| AISG Supply Current           | 400mA @ 8.5V, 120mA @ 30V typical |
| AISG Connector                | IEC60130-9, 8-pin female          |
| AISG Connector Current rating | < 4A peak, 2A continuous, pin 6   |
| Field firmware upgradable     | Yes                               |

## ENVIRONMENTAL

|                       |  |
|-----------------------|--|
| Temperature range     | -40°C to +65°C   -40° to +149°F  |
| Environmental sealing | IP67   |
| Lightning protection  | RF port: +/- 5kA max (8/20us), AISG port: +/- 2kA max (8/20us)<br>IEC61312-1 |
| MTBF                  | >1,000,000 hours   |
| Compliance            | EMC:EN301 489, Ingress ETSI EN 300 019 class 4.1, RoHS                       |

## MECHANICAL

|                       |   |
|-----------------------|---|
| Connectors            | DIN 4.3-10 (F) x 8 long shank, AISG (F) x 1                                     |
| Dimensions, H x D x W | 216 x 300 x 107mm   8.46 x 11.81 x 4.21in                                       |
| Finish                | Powder coated, light grey (RAL7035)   |
| Weight                | 8 kg   17.6lbs est  |
| Mounting              | Pole / wall bracket supplied with two metal clamps for 45-178 mm diameter poles |

## ELECTRICAL BLOCK DIAGRAM



107 Selden Street  
Berlin, CT 06037  
(860) 665-6926  
michael.green@eversource.com

September 2, 2016

Mr. Tim Burks  
Site Acquisition Manager- New England  
SAI Communications, Consultant for  
AT&T Mobility (a/k/a New Cingular Wireless  
500 Enterprise Drive  
Rocky Hill, CT 06067

Re: Site Permitting Authorization  
Sound Beach Avenue (a/k/a Old Greenwich Station), Greenwich, CT  
Telecommunications Site

Dear Mr. Burks:

Authorization is hereby given to New Cingular Wireless PCS, LLC (New Cingular), its employees and its duly authorized agents and independent contractors (hereinafter collectively referred to as "New Cingular"), to apply for any and all local municipal, state and federal licenses, permits and approvals, including but not limited to Connecticut Siting Council, building permits, zoning variances, zoning special exceptions, site plan and subdivision approvals, driveway, wetlands and terrain alteration permits, which are or may be necessary or required for New Cingular to construct, operate and maintain a wireless communications system (PCS System), and/or antenna site on the following property over which The Connecticut Light & Power Company (CL&P) has easement rights:

CL&P Structure #1255, FA #10071192  
Sound Beach Avenue (a/k/a Old Greenwich Station)  
Greenwich, Connecticut


The foregoing authorization is given subject to the following conditions:

1. This authorization shall be nonexclusive. Nothing herein shall prevent or restrict CL&P from authorizing any other person or entity to apply for any similar licenses, permits or approvals to construct, operate and maintain any other communication system or facility of any type on the property at any time.
2. This authorization shall not obligate CL&P to pay for or reimburse any costs or expenses or to provide any assistance of any kind in connection with any applications, or bind or obligate CL&P to agree or be responsible for any on-site or off-site improvements, development restrictions, impact fees or assessments, capital improvement charges, bonds or other security, or any other fee, assessment, charge or expense imposed or required as a condition of any license, permit or approval. New Cingular shall be solely and fully responsible for all fees, charges costs and expenses of any kind in connection with any applications. CL&P agrees to reasonably cooperate with New Cingular in signing such applications or other similar documents as may be required in order for New Cingular to apply for any license, permit or approval.
3. This authorization shall not be deemed or construed to grant or transfer to New Cingular any interest in the property, whatsoever, and shall not in any respect obligate or require CL&P to sell, lease or license the Property to New Cingular or otherwise allow New Cingular to use or occupy the property for any purpose, regardless of whether any licenses, permits and approvals applied for by New Cingular for the property are granted. New

Cingular understands and acknowledges that any and all applications filed by New Cingular for the property at New Cingular's sole risk and without any enforceable expectation that the property will be made available for New Cingular's use.

4. New Cingular shall be required to supply to CL&P, free of charge and contemporaneous with New Cingular's filing of same, a complete copy of any and all applications, plans, reports and other public filings made by New Cingular with any local, municipal, state or federal governmental or regulatory officer, agency board, bureau, commission or other person or body for any licenses, permits or approvals for the property, and to keep CL&P fully informed on a regular basis of the status of New Cingular's applications.
5. This authorization shall automatically expire six (6) months after the date of this letter, unless extended in writing by mutual agreement of CL&P and New Cingular.

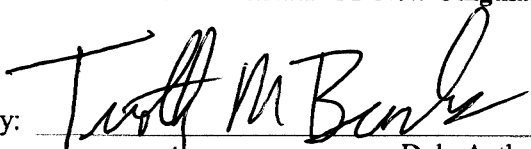
Very truly yours,



Michael J. Green, Senior Real Estate Analyst  
Transmission & Distribution ROW & Survey Engineering

**AGREED TO ON BEHALF OF New Cingular Wireless PCS, LLC**

By: \_\_\_\_\_



Duly Authorized

Date: \_\_\_\_\_

9/5/16