10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

October 1, 2019

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

RE: Notice of Exempt Modification
8 Sky Lane Bethel, CT 06825
Latitude: 41.413461
Longitude: -73.400867
Sprint Site#: CT03XC351 – DO Macro

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 157.5-foot level of the existing 170-foot transmission tower at 8 Sky Lane Bethel, CT. The 170-foot transmission tower and property are owned by The Connecticut Light & Power Company, d/b/a Eversource Energy. Sprint now intends to replace three (3) of its existing antennas with three (3) new 800/1900/2500 MHz antennas. The new antennas will be installed at the same 157.5-foot level of the tower.

Planned Modifications:
Tower:

Remove
N/A

Remove and Replace:
(3) RFS APXVSPP18-C antennas (Remove) - CommScope DHHTT65B-3XR antennas (Replace) 800/1900/2500 MHz

Install New:
(3) RFS KIT-FD9R6004 / 1C-DL diplexers
(3) CCI DPO-7126Y-0-T1 diplexers

Existing to Remain:
(18) 1-5/8" coax cables

Ground:
Install New: (3) RFS KIT-FD9R6004 / 1C-DL diplexers, (3) CCI DPO-7126Y-0-T1 diplexers

Remove and Replace: (3) 1900 MHz RRHs (remove) - (3) 2500 MHz RRHs (replace)

This facility was approved by the CSC for Sprint use in Petition No. 515 dated July 11, 2001. This modification complies with this approval. Please see the enclosed.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to First Selectman – Matthew Knickerbocker, Elected Official, and Beth Cavagna, Planning Director for the Town of Bethel, as well as the 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, Sprint respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Jake Shappy
Transcend Wireless
Cell: 845-553-3330
Email: jshappy@transcendwireless.com

Attachments
cc: Matthew Knickerbocker – Town of Bethel Mayor
Beth Cavagna – Town of Bethel Planning Director
The Connecticut Light & Power Company, d/b/a Eversource Energy – tower and property owner

EVERSOURCE ENERGY

56 Prospect Street,
Hartford, CT 06103

P.O. Box 270
Hartford, CT 06141-0270
(860) 665-5000

August 9, 2019

Mr. Jake Shappy
Transcend Mobile
10 Industrial Ave, Suite 3
Mahwah, NJ 07430

RE: Sprint Antenna Site, CT-03XC351, Sky Edge Lane, Bethel, CT, structure 10255

Dear Mr. Shappy:

Based on the structural report and construction drawings provided by Centek Engineering, as well as a review of the structural report by Paul J. Ford & Company, Eversource accepts the proposed modification of the subject site.

Please contact Christopher Gelinas of Eversource Real Estate at 860-665-2008 to complete the site lease amendment if needed. Please contact me at 860-728-4503 for other questions regarding this site.

Sincerely,

Joel Szarkowicz
Transmission Line Engineering

REF: 17159.08 - CT03XC351 - Structural Analysis Rev2 18.12.03
17159.08 CT03XC351 Bethel - CD Rev.0 19.01.07 S&S

Petition No. 515
Sprint Spectrum, L.P.
Bethel, Connecticut
Staff Report
July 11, 2001

On July 9, 2001, Connecticut Siting Council (Council) member Gerald J. Heffernan and Christina Lepage of the Council staff met with Sprint Spectrum, L.P. (Sprint) representative Julie Donaldson, Kim Filomia, Laura Thoman and John Lusi at 8 Sky Edge Lane, Bethel, Connecticut for inspection of an electric transmission structure. The property and structure is owned by Connecticut Light and Power Co. (CL&P). Sprint, with the agreement of CL&P, proposes to modify the structure by installing antennas and associated equipment for telecommunications use and is petitioning the Council for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need (Certificate) is required for the modification.

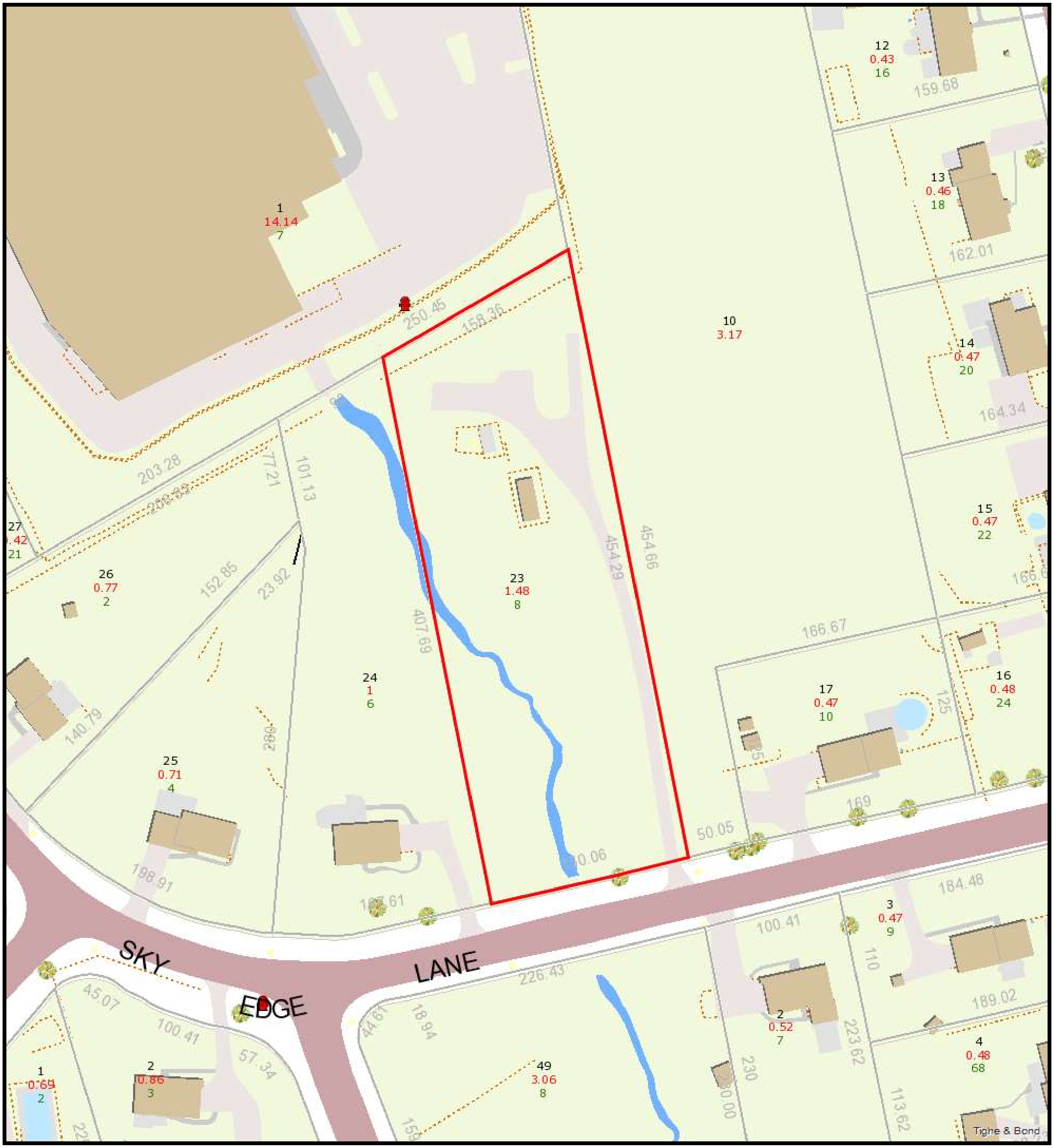
Sprint proposes the installation of twelve PCS panel antennas on a Power Mount. The antennas will extend approximately 9-feet 10-inches above the existing 150-foot transmission line monopole structure (#10255). The centerline of the antennas will be at approximately 157-feet 6-inches above ground level (AGL). The top of the antennas will be approximately 159-feet 10-inches. A global positioning system (GPS) antenna will be placed at 50-feet AGL on the monopole.

Sprint proposes a 20-foot by 10-foot concrete pad with space for four cabinets containing equipment and three growth cabinets. The associated equipment will be placed immediately adjacent to the base of the structure. Sprint also proposes to install equipment cabinets off of the concrete pad. A 6-foot high chain link fence topped with 1 foot of barbed wire will surround the equipment cabinets. The access drive will extend from Sky Edge Lane to the monopole structure. An underground conduit from an adjacent utility pole along the proposed access drive will provide power and telephone service to the site.

Surrounding land uses includes undeveloped land with mature trees and vegetation, and residential homes, with commercial and industrial uses on an adjacent parcel owned by Yankee Gas. The zoning designation of this site is R-30 (residential). The nearest residence is about 290 feet to the southwest.

The worst-case power density for the telecommunications operations at the site has been calculated to be 5.54% of the applicable standard for uncontrolled environments.

The Town of Bethel Planning and Zoning Commission has requested the opportunity to review the erosion and sedimentation control and landscaping for the proposed site.
Sprint contends that the increase in height of this monopole structure will not result in a substantial environmental effect, and will eliminate the need to construct a new telecommunications tower to provide coverage to this area of Bethel.



8/21/2019 9:10:29 AM

Scale: 1"=100'

Scale is approximate

The information depicted on this map is for planning purposes only.
It is not adequate for legal boundary definition, regulatory
interpretation, or parcel-level analyses.

Bethel, CT : Assessor Database

Property Search:

Parcel ID:	Alternate ID:	Owner 1 Name:	Street Number:	Street Name:
				SKY EDGE LANE ▼

Search Reset

Property Detail:

Parcel ID:	Alternate ID/Map Block Lot:	Card:	Card:	Street Name:	Street Number:	Zoning:	LUC:	Acres:
59 095 23	R01090			SKY EDGE LANE	8	R-30	PP FOR PUBLIC UTILITIES	1.48

Owner Information:

Owner 1 Name:	CONN LIGHT & POWER CO
Owner 2 Name:	% TAX DEPARTMENT
Street 1:	PO BOX 270
Street 2:	
City:	HARTFORD
State:	CT
Zip:	06141
Volume:	188
Page:	199
Deed Date:	0000-00-00

Property Images:

Picture:
There is no picture available.

Sketch:
There is no sketch available.

Valuation:

Appraised Land:	$20,100.00
Appraised Land PA490:	$0.00
Appraised Bldg:	$379,900.00
Appraised Total:	$400,000.00
Total Assessment:	$280,000.00

Out-Buildings:

Code:	Description:	Units:	Year Built:	Size1:	Size2:	Area:	Grade:	Condition:
RS1	FRAME UTILITY SHED	1	2012	12	30	360	A	EXCELLENT

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
   Schedule a same day or future day Pickup to have a UPS driver pickup all of your Internet Shipping packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™	UPS Access Point™	UPS Access Point™
MICHAELS STORE # 7773	THE UPS STORE	THE UPS STORE
75 INTERSTATE SHOP CTR	115 FRANKLIN TPKE	120 E MAIN ST
RAMSEY ,NJ 07446	MAHWAH ,NJ 07430	RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

2 LBS 1 OF 1
DWT: 12,9,2

SHIP TO:
MELANIE A. BACHMAN
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE
NEW BRITAIN CT 06051-2655

CT 067 9-06

UPS GROUND
TRACKING #: 1Z V25 742 03 9106 3095

BILLING: P/P

Reference#1: CT03XC351

UIS 21.5.41. WNTNV50 15.0A 07/2019

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RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS DWT: 14,9,1 1 OF 1

SHIP TO:
CHRIS GELINAS
860-665-2008
EVERSOURCE ENERGY
107 SELDEN ST.
BERLIN CT 06037-1616

CT 061 9-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9130 5109

BILLING: P/P

Reference#1: CT03XC351

UIS 21.5.41. WNTNV50 15.0A 07/2019

UPS Internet Shipping: View/Print Label

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

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   Customers with a Daily Pickup
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   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
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RAMSEY ,NJ 07446

FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS 1 OF 1
DWT: 14,9,1

SHIP TO:
MATTHEW KNICKERBOCKER
TOWN OF BETHEL
1 SCHOOL STREET
BETHEL CT 06801-1828

CT 068 0-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9335 1118

BILLING: P/P

Reference#1: CT03XC351

UIS 21.5.41. WNTNV50 15.0A 07/2019

UPS Internet Shipping: View/Print Label

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   Customers with a Daily Pickup
   Your driver will pickup your shipment(s) as usual.

   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the 'Find Locations' Quick link at ups.com.
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FOLD HERE

JAKE SHAPPY
8455533330
TRANSCEND WIRELESS
10 INDUSTRIAL AVE
MAHWAH NJ 074302284

1 LBS 1 OF 1
DWT: 14,9,1

SHIP TO:
BETH CAVAGNA
TOWN OF BETHEL
1 SCHOOL STREET
BETHEL CT 06801-1828

CT 068 0-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9380 1122

BILLING: P/P

Reference#1: CT03XC351

UIS 21.5.41. WNTNV50 15.0A 07/2019

Sprint

WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 10255
SITE ID: CT03XC351
SKY EDGE LANE
BETHEL, CT 06801

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

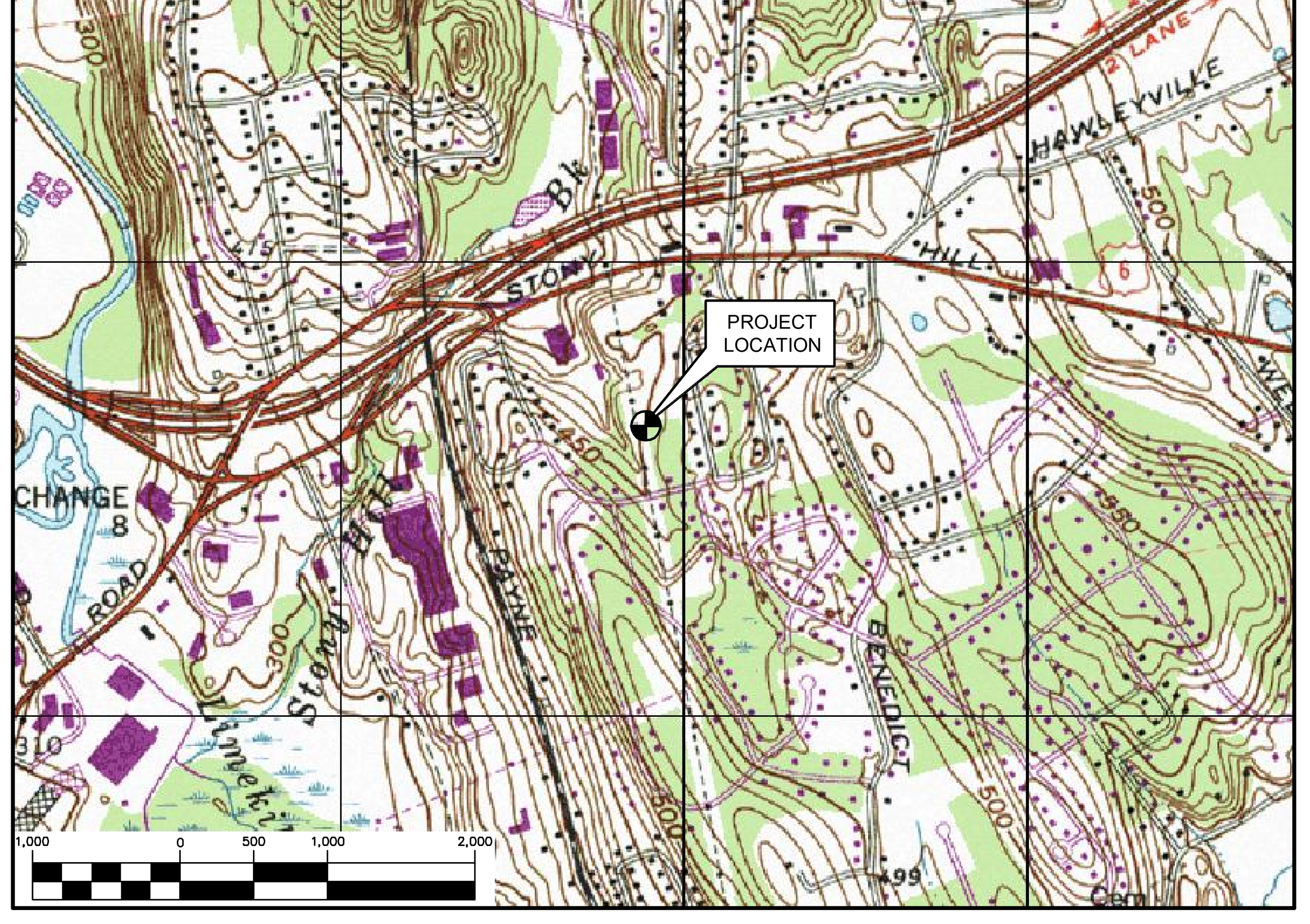
FROM: 5 WAYSIDE ROAD, BURLINGTON, MA 01803
TO: SKY EDGE LANE, BETHEL, CT 06801

1.	START OUT BY GOING TO WAYSIDE ROAD.	0.12 MI.
2.	TURN LEFT ONTO CAMBRIDGE ST/US-3 N/MA	0.12 MI.
3.	MERGE ONTO I-95 S/US-3 N TOWARD WALTHAM/LOWELL	0.27 MI.
4.	TAKE THE I-90/MASS PIKE EXIT, EXIT 25, TOWARD BOSTON/ALBANY NY.	12.10 MI.
5.	MERGE ONTO I-90 W/MASSACHUSETTS TPKE W TOWARD WORCESTER (PORTIONS TOLL).	44.45 MI.
6.	MERGE ONTO I-84 W/WILBUR CROSS HWY S VIA EXIT 9 TOWARD US-20(PORTIONS TOLL).	97.30 MI.
7.	TAKE EXIT 8 TO MERGE ONTO NEWTOWN ROAD TOWARD BETHEL.	0.20 MI.
8.	MERGE ONTO NEWTOWN ROAD.	0.20 MI.
9.	CONTINUE STRAIGHT TO STAY ON NEWTOWN ROAD.	0.10 MI.
10.	USE LEFT TWO LANES TO TURN LEFT ONTO US-6 E/NEWTOWN ROAD.	0.40 MI.
11.	TURN RIGHT ONTO SKY EDGE LANE.	0.20 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE (3) EXISTING PANEL ANTENNAS FROM EXISTING TOWER MOUNT.
   B. INSTALL (3) PROPOSED 10-PORT PANEL ANTENNAS, (1) PER SECTOR.
   C. INSTALL (6) PROPOSED DIPLEXERS ON TOWER.
   D. INSTALL (6) PROPOSED DIPLEXERS ON EXISTING UNISTRUT RACK.
   E. REMOVE (3) EXISTING RRH'S ON EXISTING UNISTRUT RACK.
   F. INSTALL (3) PROPOSED RRH'S ON EXISTING UNISTRUT RACK.

PROJECT INFORMATION

SITE NAME:	EVERSOURCE STRUCT.: 10255
SITE ID:	CT03XC351
SITE ADDRESS:	SKY EDGE LANE BETHEL, CT 06801
APPLICANT:	SPRINT 5 WAYSIDE ROAD BURLINGTON, MA 01803
CONTACT PERSON:	MIKE KITHCART (PROJECT MANAGER) (973)626-5792
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41° 24' 48.46"N LONGITUDE: 73° 24' 03.12"W GROUND ELEVATION: ±450' AMSL SITE COORDINATES REFERENCED AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	COMPOUND PLANS AND ELEVATION	0
C-2	TYPICAL DETAILS	0
C-3	COLOR CODE AND CPRI DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/7/19	TJL	CAG	CONSTRUCTION DRAWINGS – ISSUED FOR REVIEW

PROFESSIONAL ENGINEER SEAL

Sprint

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

SPRINT
WIRELESS COMMUNICATIONS FACILITY
EVERSOURCE STRUCT.: 10255
SITE ID: CT03CX351
SKY EDGE LANE
BETHEL, CT 06801

DATE: 01/29/18
SCALE: AS NOTED
JOB NO. 17159.08

TITLE SHEET

T-1

Sheet No. 1 of 5

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD (UTILITY TOWER): 100 MPH (3 SECOND GUSTS) PER NESC C2-2012 SECTION 25 RULE 250C
- WIND LOAD (ANTENNA MAST): 93 MPH (Vasd) (EXPOSURE C/IMPORTANCE FACTOR 1.15 BASED ON ASCE 7-10) PER 2015 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

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

STRUCTURAL STEEL

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

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

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

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EVERSOURCE STRUCT.: 10255
SITE ID: CT03CX351
SKY EDGE LANE
BETHEL, CT 06801

DATE:	01/29/18
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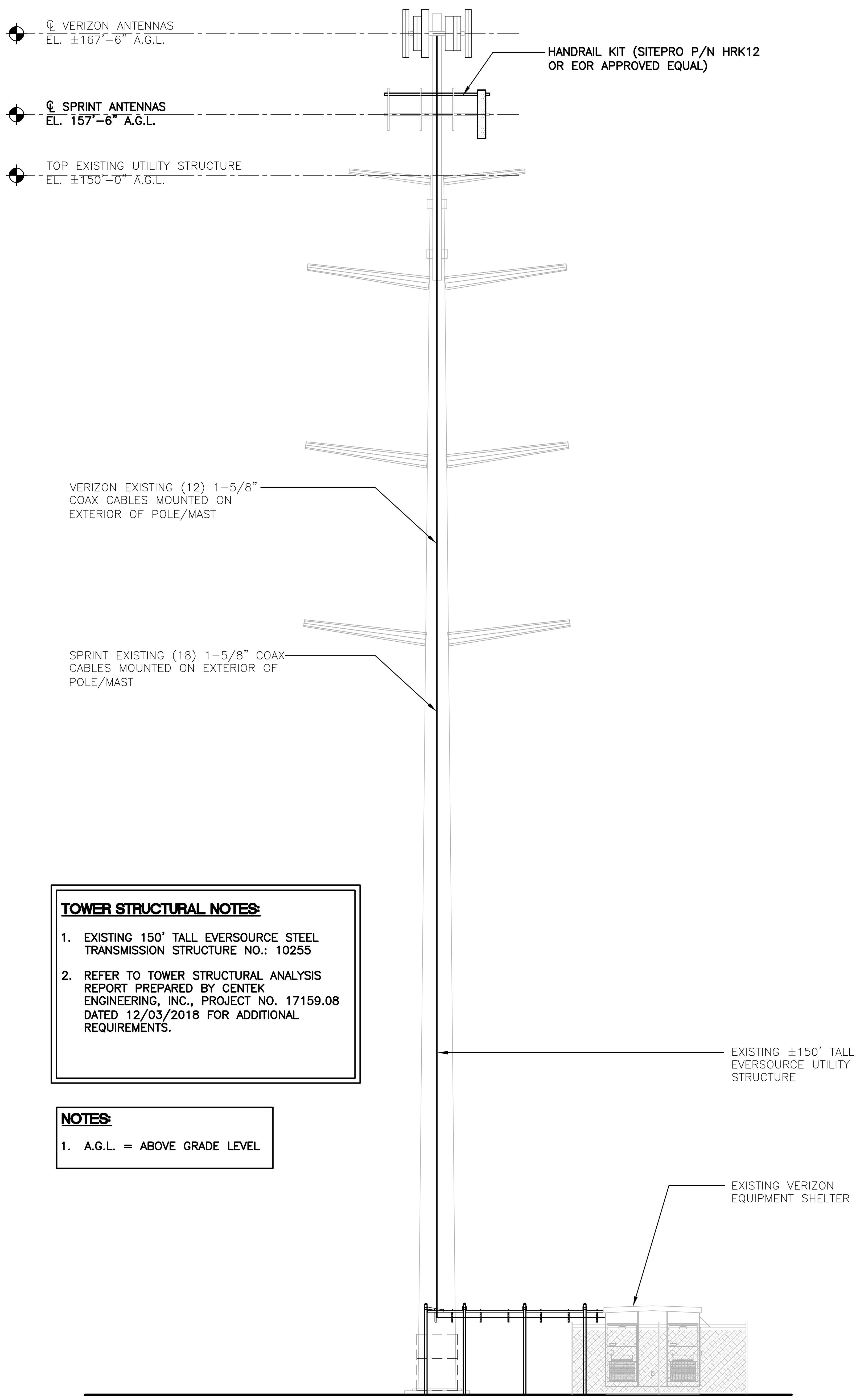
JOB NO.	17159.08

DESIGN BASIS AND SITE NOTES

N-1

Sheet No. 2 of 5



TOWER STRUCTURAL NOTES:

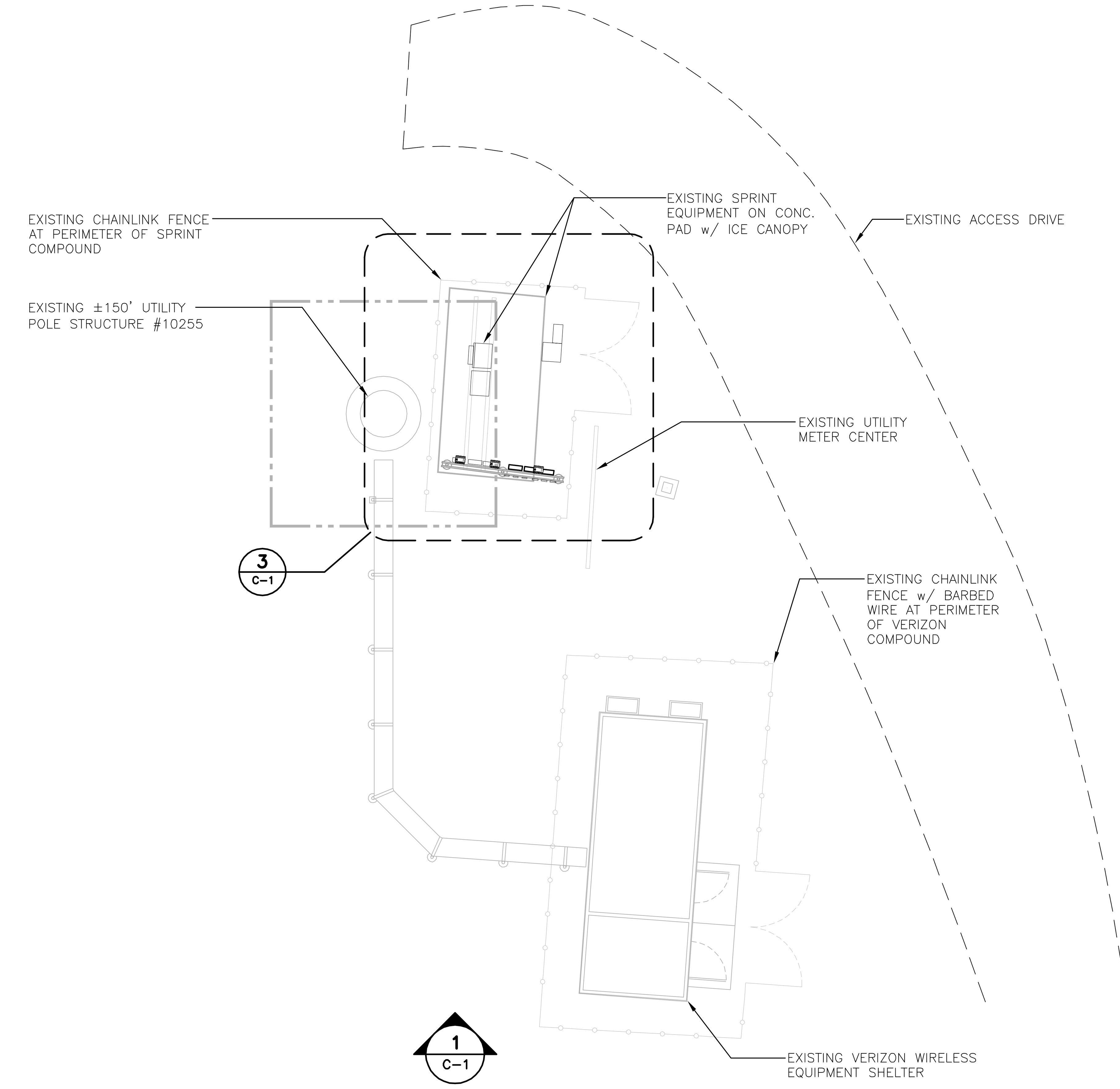
1. EXISTING 150' TALL EVERSOURCE STEEL TRANSMISSION STRUCTURE NO.: 10255
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 17159.08 DATED 12/03/2018 FOR ADDITIONAL REQUIREMENTS.

NOTES:

1. A.G.L. = ABOVE GRADE LEVEL

1 / C-1 **SOUTH TOWER ELEVATION**
SCALE: 1" = 10'-0"

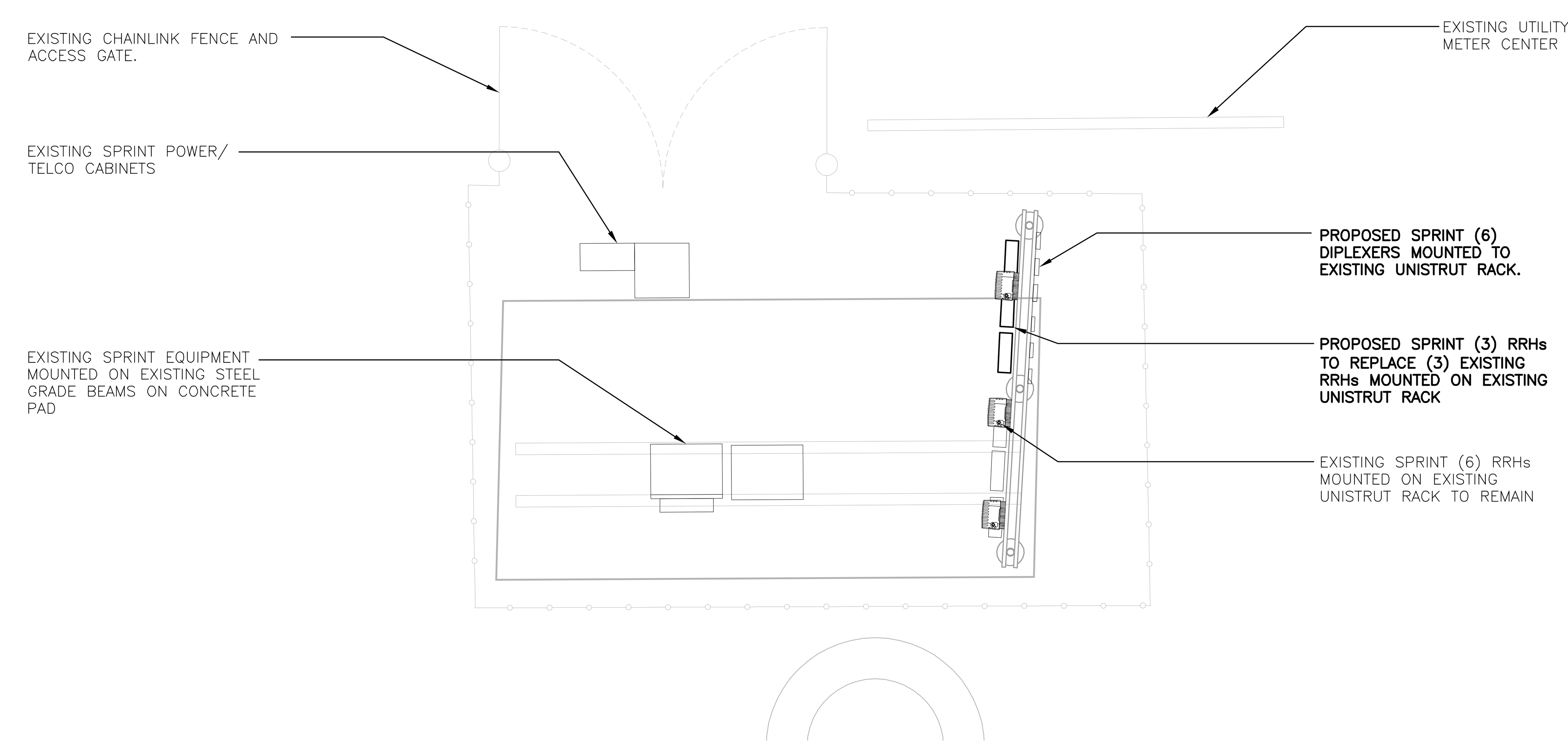
GRAPHIC SCALE: 10 0 5 10 20 40 (IN FEET) 1 inch = 10 ft.



2 / C-1 **COMPOUND PLAN**
SCALE: 1" = 10'

APPROX. NORTH

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



3 / C-1 **EQUIPMENT PLAN**
SCALE: 1/4 = 1'-0"

APPROX. NORTH

GRAPHIC SCALE: 4 0 2 4 8 16 (IN FEET) 1/4 inch = 1 ft.

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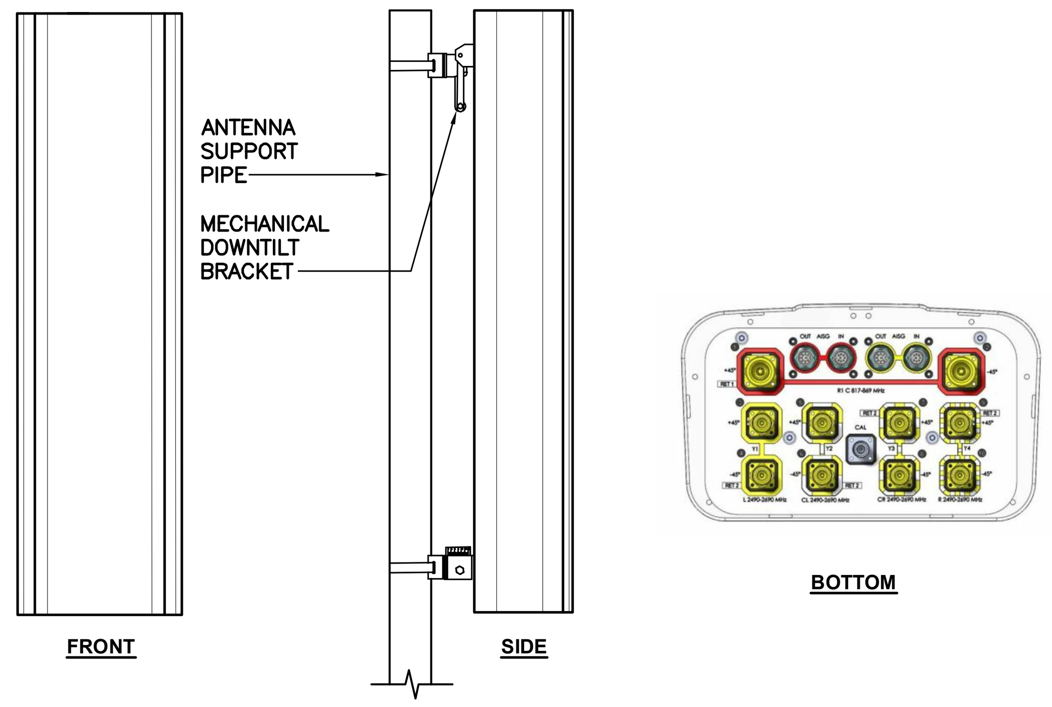
COMPOUND PLANS AND ELEVATION

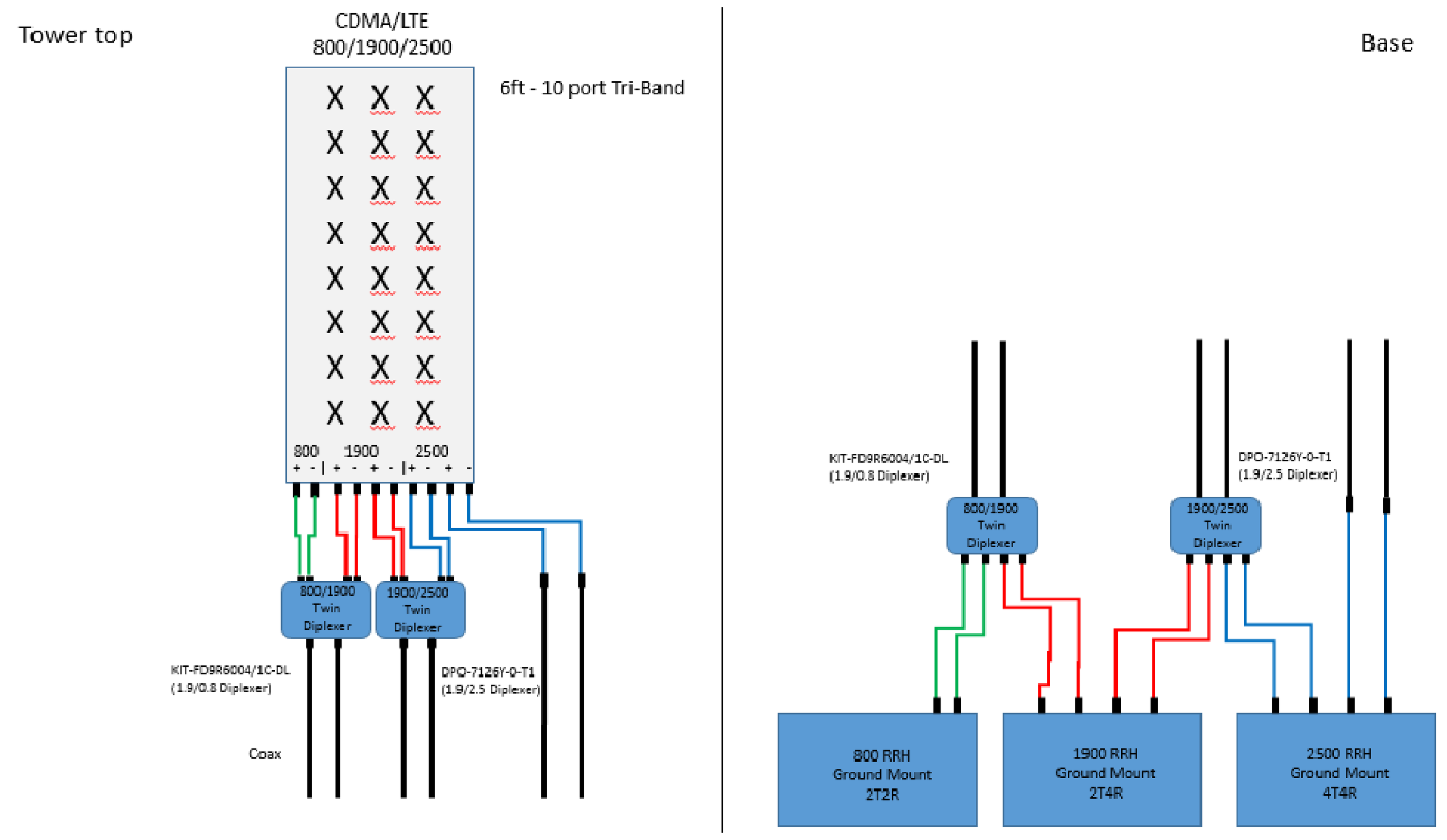
C-1

Sheet No. 3 of 5



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: DHHT65B–3XR	71.9"L x 13.8"W x 8.2"D	58 LBS.

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



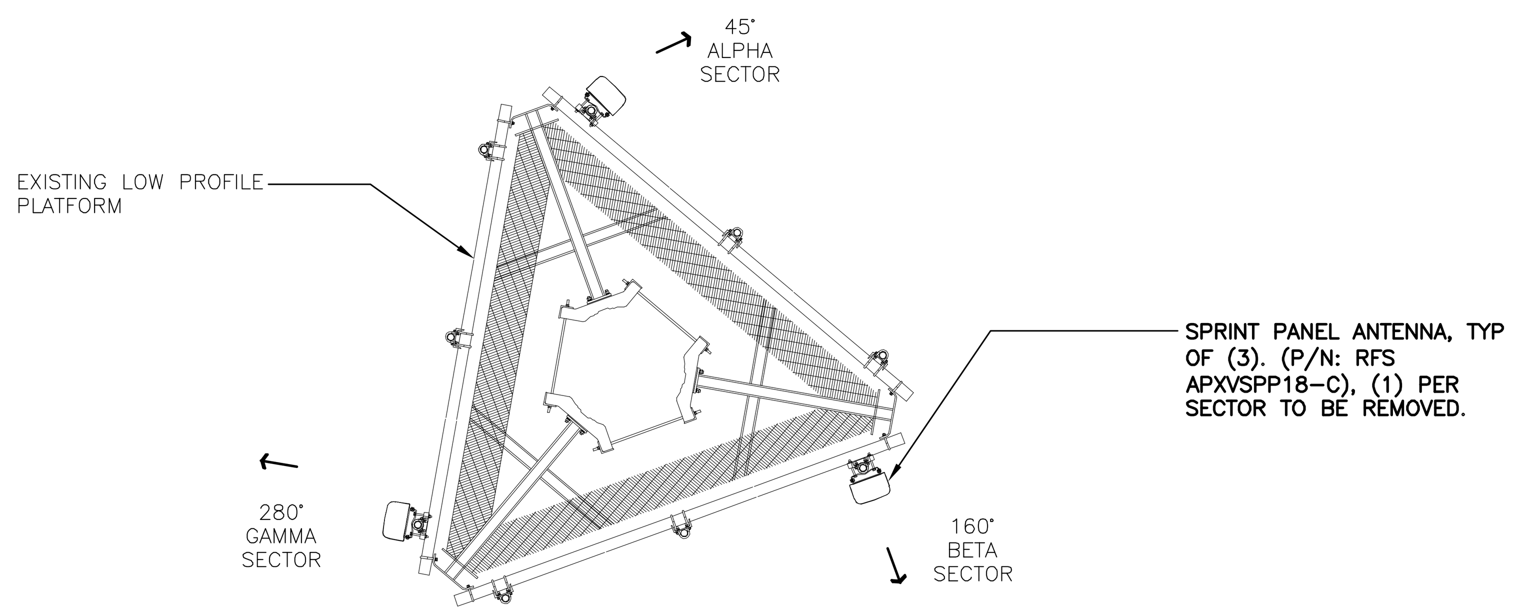
4 PLUMBING DIAGRAM
C–2
NOT TO SCALE

TD-RRH8x20-25

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ALCATEL–LUCENT MODEL: TD–RRH8x20–25	25.3"L x 17.5"W x 5.7"D	66 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

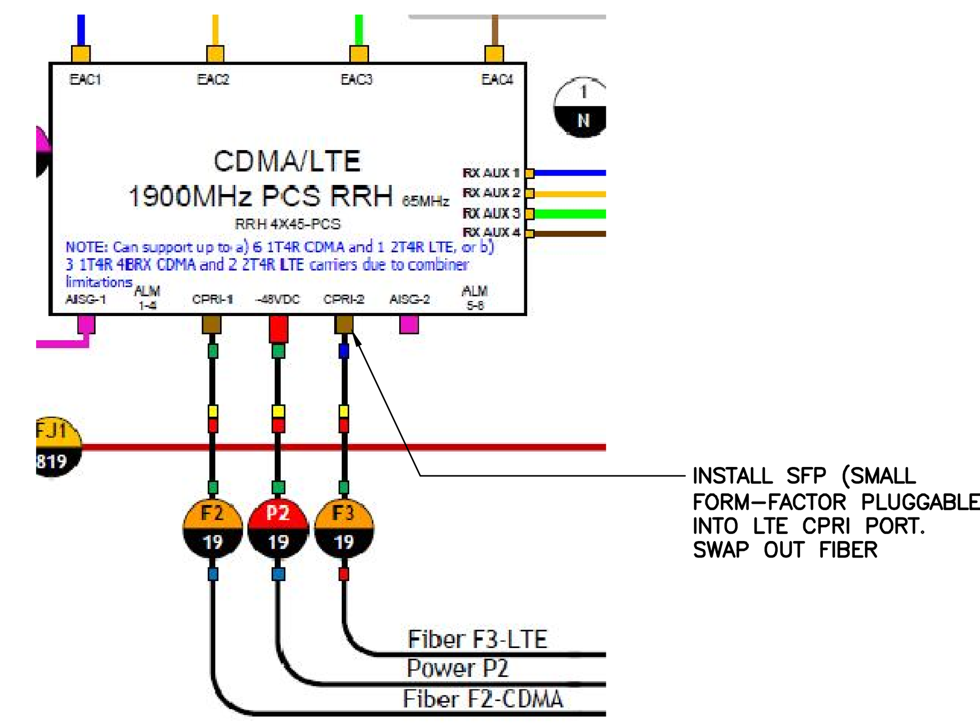
NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH SPRINT CONSTRUCTION MANAGER PRIOR TO ORDERING.

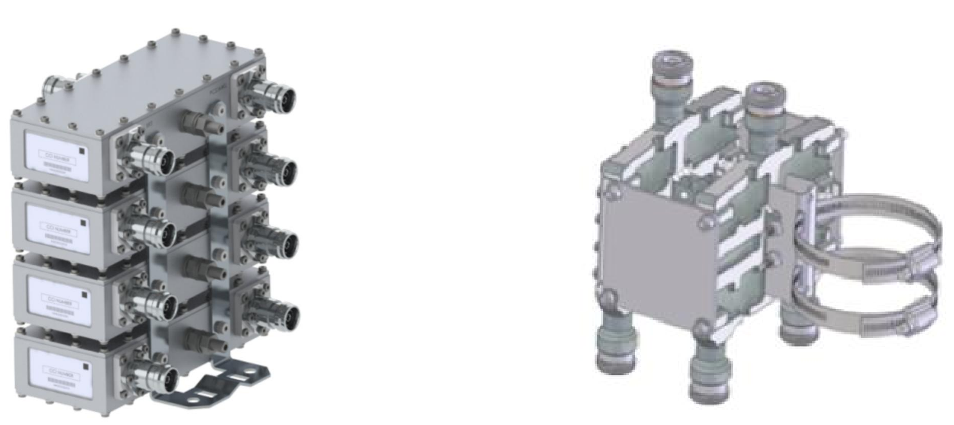
2 REMOTE RADIO HEAD DETAIL
C–2
SCALE: NOT TO SCALE



5 EXISTING ANTENNA PLAN
C–2
SCALE: = 1" = 1'

SMALL FORM-FACTOR PLUGGABLE





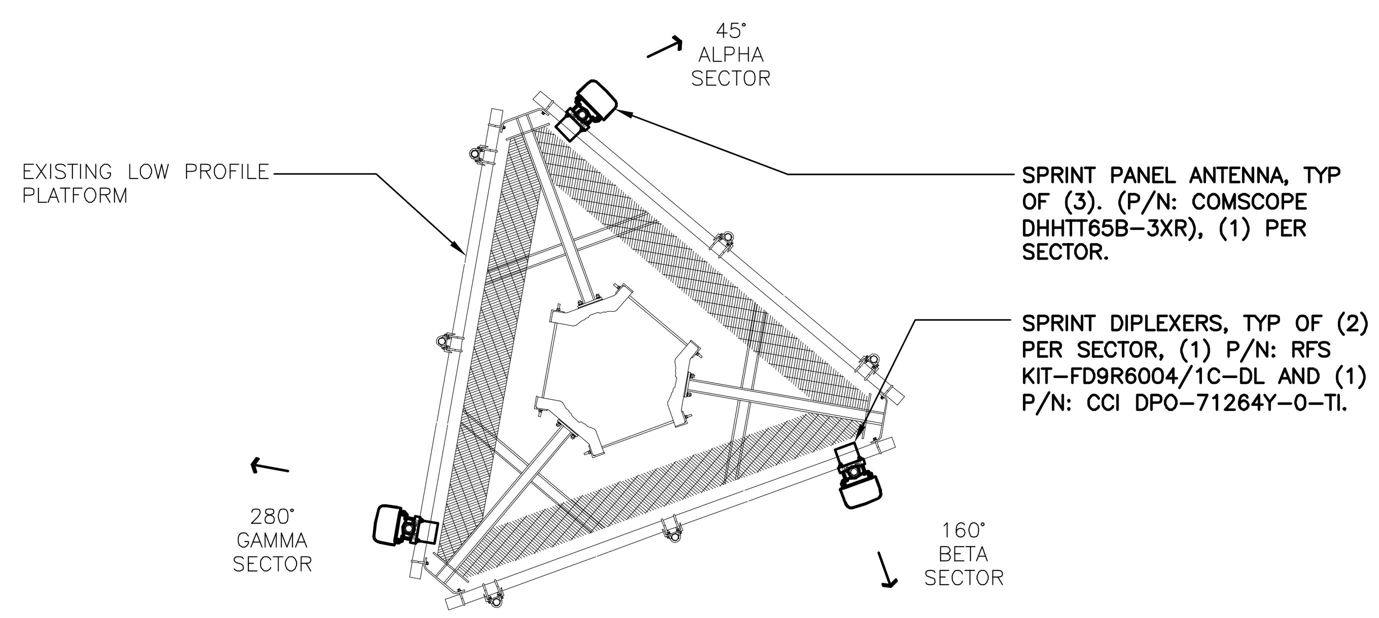
DOP-7126Y-0-T1

KIT-FD9R6004/1C-DL

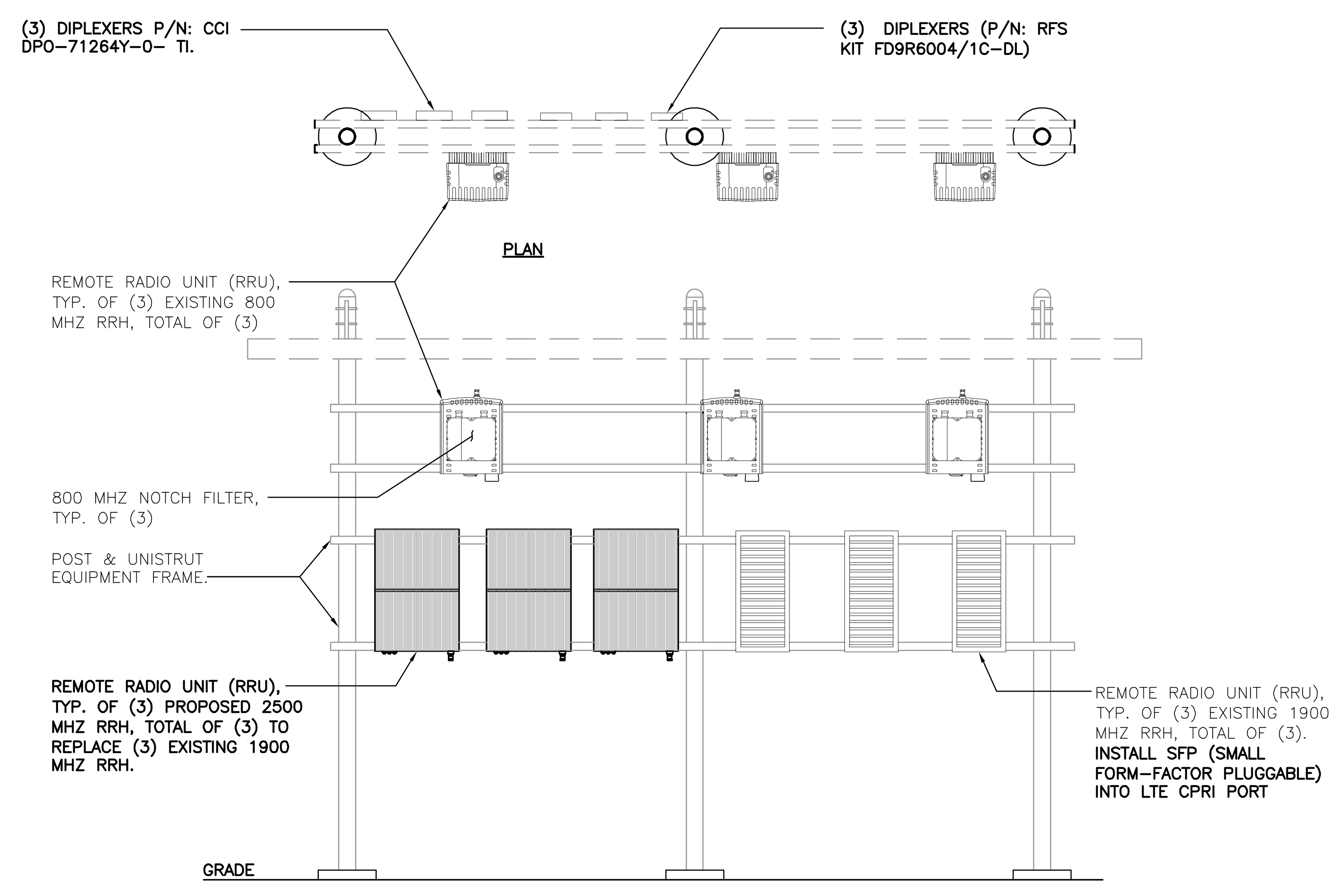
DIPLEXERS		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: KIT–FD9R6004/1C–DL	5.8"L x 6.5"W x 4.6"D	6.4 LBS.
MAKE: CCI MODEL: DPO–7126Y–0–T1	6.26"L x 7.42"W x 4.07"D	7.3 LBS.

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

3 DIPLEXER DETAIL
C–2
SCALE: NOT TO SCALE



6 PROPOSED ANTENNA PLAN
C–2
SCALE: = 1" = 1'



7 RRU MOUNTING CONFIG.
C–2
SCALE: 1/2" = 1'– 0"

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TYPICAL DETAILS

C-2

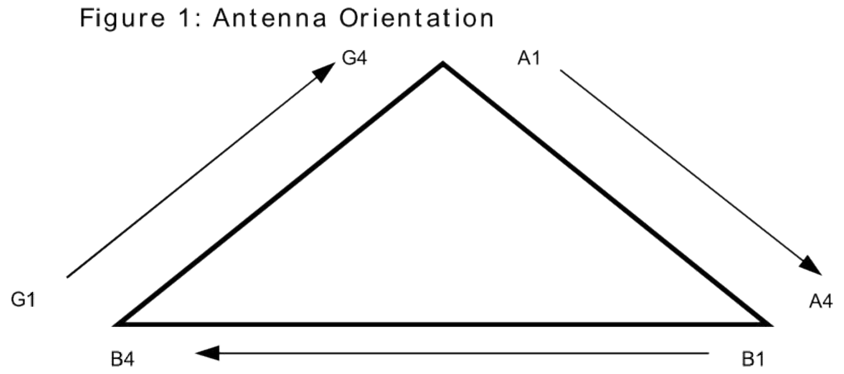
Sheet No. 4 of 5

NV CABLES				
BAND	INDICATOR		PORT	COLOR
800-1	YEL	GRN	NV-1	GRN
1900-1	YEL	RED	NV-2	BLU
1900-2	YEL	BRN	NV-3	BRN
1900-3	YEL	BLU	NV-4	WHT
1900-4	YEL	SLT	NV-5	RED
800-2	YEL	ORG	NV-6	SLT
SPARE	YEL	WHT	NV-7	PPL
2500	YEL	PPL	NV-8	ORG

HYBRID	
HYBRID	COLOR
1	GRN
2	BLU
3	BRN
4	WHT
5	RED
6	SLT
7	PPL
8	ORG

2.5 Band		
2500 Radio 1		COLOR
YEL	WHT	GRN
YEL	WHT	BLU
YEL	WHT	BRN
YEL	WHT	WHT
YEL	WHT	RED
YEL	WHT	SLT
YEL	WHT	PPL
YEL	WHT	ORG

Figure 1: Antenna Orientation



NOTES

1. *All cables shall be marked at the top and bottom with 2" colored tape, stencil tag colored tape, or colored heat shrink tubing*
2. *Colored tape may be obtained from Graybar Electronic. UV stabilized tape or heat shrink are preferred.*
3. *The first ring shall be closest to the end of the cable, and there shall be a 1" space between each ring.*
4. *The cable color code shall be applied in accordance to Table 19-1.*
   A. Table 19-1 only shows 3 sectors, but additional sectors are easily supported by adding the appropriate number of colored rings to the cable color code.
5. *After the cable color code is applied, the frequency color code, Table 19-2, must be applied for the specific frequency band in use on a*
   A.2" gap shall separate the cable color code from the frequency color code.
   B. The 2" color rings for the frequency code shall be placed next to each other with no spaces.
6. *Wrap 2" colored tape a minimum of 3 times around the coax, and keep the tape in the same area as much as possible. This will allow remova*
7. *Examples of the cable and frequency color codes are shown in Figure 19-1 and Figure 19-2.*

FIGURE 19.1 CABLE COLOR CODE

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

FIGURE 19.2 COLOR CODE

FREQUENC	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

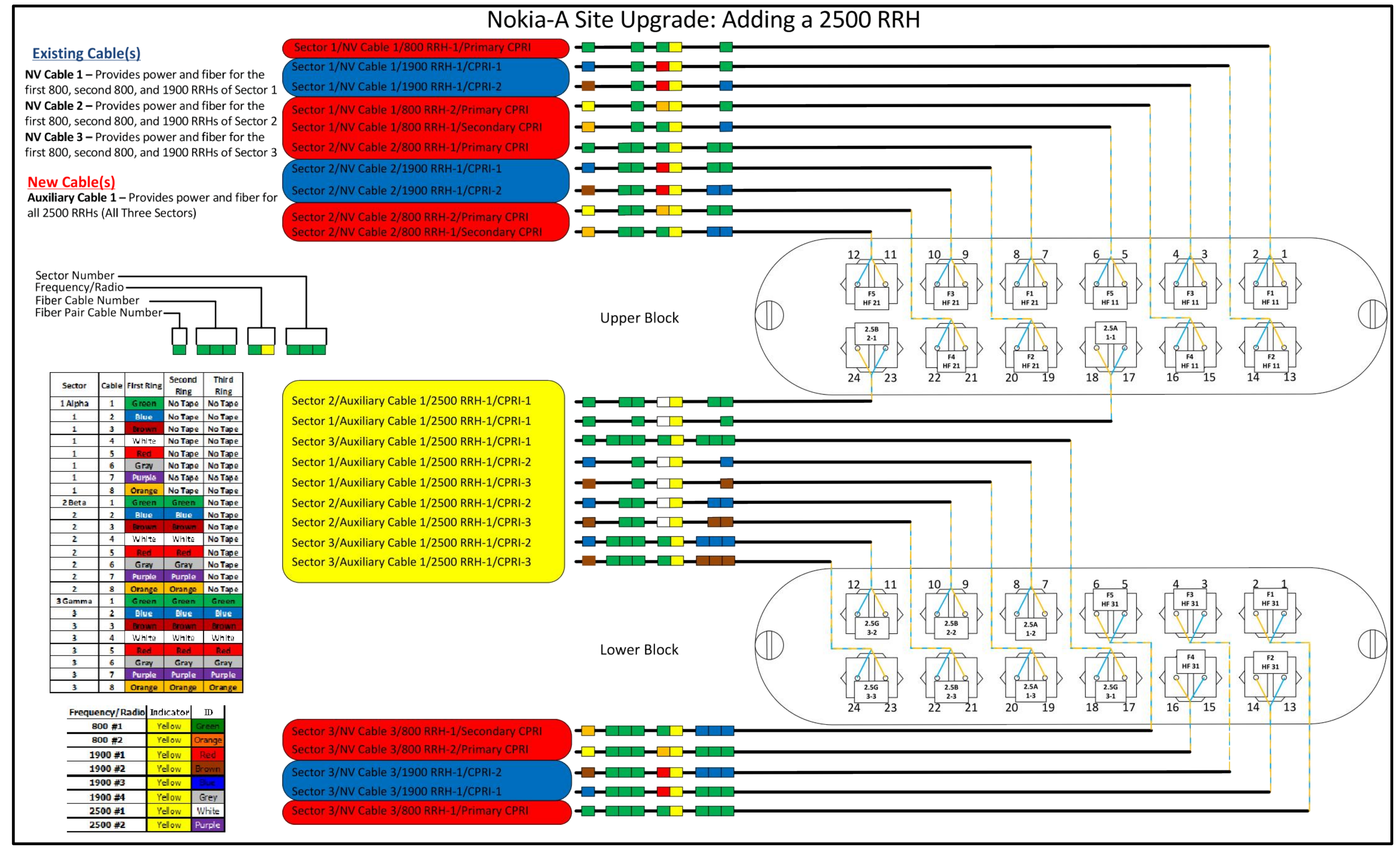
FREQUE	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

Example – Sector 2, Cable 2, 800mhz Radio #1

Example – Sector 3, Cable 1, 1900mhz Radio #1

Example – Sector 1, Cable 4, 800 mhz Radio #1 and 1900mhz Radio #1

1 / C-3 **COLOR CODE DIAGRAM**
NOT TO SCALE



2 / C-3 **CPRI DIAGRAM**
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COLOR CODE AND CPRI DETAILS

C-3

Sheet No. 5 of 5

CENTEK engineering

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Structural Analysis of Antenna Mast and Pole

Sprint Site Ref: CT03XC351

Eversource Structure No. 10255
150' Electric Transmission Pole

Sky Edge Lane
Bethel, CT

CENTEK Project No. 17159.08

~~Date: January 29, 2018~~
Rev 2: December 3, 2018

Prepared for:
Transcend Wireless
10 Industrial Ave, Suite 3
Mahwah, NJ 07430

Table of Contents

Introduction

The purpose of this report is to analyze the existing mast and 150' utility pole located on Sky Edge Lane in Bethel, CT for the proposed antenna and equipment upgrade by Sprint.

The existing/proposed loads consist of the following:

- VERIZON (Existing):
  Antennas: Three (3) Andrew HBX-6516DS panel antennas, three (3) Andrew LNX-6513DS panel antennas and three (3) Bias Tees mounted on three (3) dual standoff mounts with RAD center elevation of 167-ft 6-in above grade.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the outside of the tower as indicated in section 4 of this report.
- SPRINT (Existing to Remain):
  Coax Cables: Eighteen (18) 1-1/4" ∅ coax cables running on the exterior of the pole and antenna mast.
- SPRINT (Existing to Remove):
  Antennas: Three (3) RFS APXVSPP18-C panel antennas mounted on an existing 13-ft low profile platform with RAD center elevation of 157-ft 6-in above grade.
- **SPRINT (Proposed):**
  Antennas: Three (3) Commscope DHHTT65B-3XR panel antennas, three (3) RFS KIT-FD9R6004/1C-DL Diplexers and three (3) CCI DPO-7126Y-0-T1 Diplexers mounted on an existing 13-ft low profile platform with RAD center elevation of 157-ft 6-in above grade.
  (Handrail to be installed on existing platform. Refer to section 4 for details)

Primary assumptions used in the analysis

- ASCE 48-05, "Design of Steel Transmission Pole Structures", defines 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.

Analysis

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 12-in x 33-ft long SCH. 80 pipe (O.D. = 12.75") connected at two points to the existing tower was analyzed for its ability to resist loads prescribed by the TIA-222G 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-222-G 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.

Design Basis

Our analysis was performed in accordance with TIA-222-G, ASCE 48-05, "Design of Steel Transmission Pole Structures", NESC C2-2012 and Eversource 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 Eversource Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE 48-05.

  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.……………………………….. 100 mph (1)
  Radial Ice Thickness………………………. 0"

  Note 1: NESC C2-2012, Section25, Rule 250C: Extreme Wind Loading, 1.25 x Gust Response Factor (wind speed: 3-second gust)

- MAST ASSEMBLY ANALYSIS

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

  Load cases considered:

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

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

R e s u l t s

- MAST ASSEMBLY

  The existing pipe mast was determined to be structurally adequate.

Component	Stress Ratio (percentage of capacity)	Result
12" Sch. 80 Pipe	72.2%	**PASS**
Connection to Tower	42.0%	**PASS**

Horizontal Displacement (% of Cantilever Height)	Allowable	Result
0.89 %	1.5 %	**PASS**

- 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 48-05, "Design of Steel Transmission Pole Structures" for the applied NESC Heavy and Extreme 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 **98.37%** occurs in the utility pole base plate under the **NESC Extreme** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 3	0.00' -51.17' (AGL)	96.53%	**PASS**

BASE PLATE:

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	98.37%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft ∅ x 20.5-ft long reinforced concrete caisson with a 24-ft square by 4-ft thick reinforced concrete mat installed at the periphery of the caisson. The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01143-60001.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	36.41 kips	131.10 kips	4478.52 ft-kips
NESC Extreme Wind	53.84 kips	63.68 kips	6091.39 ft-kips

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

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	58.32%	**PASS**

FOUNDATION:

The foundation was found to be structurally adequate.

Foundation	Design Limit	Allowable Limit	Proposed Loading (2)	Result
Reinforced Conc. Caisson with Mat	Overturning	1.0 FS (1)	1.54 FS (1)	**PASS**

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

Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

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

Modeling Features:

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

Analysis Features:

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

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

Graphics Features:

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

Design Features:

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

Results Features:

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-TOWER

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

Modeling Features:

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

Analysis Features:

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

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

Results Features:

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

Tool for interactive angle member sizing and bolt quantity determination.

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

Introduction

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

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

PCS Mast

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

ELECTRIC TRANSMISSION TOWER

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

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

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

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

Attachment A
Eversource Design Criteria

Condition		Attachment A NU Design Criteria	Basic Wind Speed	Pressure	Height factor	Gust Factor	Load or Stress Factor	Force Coef. - Shape Factor
			V (MPH)	Q (PSF)	Kz	Gh		
Ice Condition	TIA/EIA	Antenna Mount	TIA	TIA (0.75Wi)	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas extending above top of Tower/Pole (Yield Stress)	____	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Tower/Pole Analysis with antennas below top of Tower/Pole (on two faces)	____	4	1	1	2.50	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor Loads Provided by NU					
High Wind Condition	TIA/EIA	Antenna Mount	85	TIA	TIA	TIA	TIA, Section 3.1.1.1 disallowed for connection design	TIA
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condition	NESC Extreme Wind	Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250C: Extreme Wind Loading Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
High Wind Condition	NESC Extreme Wind	Conductors:	Conductor Loads Provided by NU					
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas extending above top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load 1.25 X Gust Response Factor Apply a 1.25 X Gust Response Factor to all telecommunication equipment projected above top of tower/pole and apply a 1.0 x Gust Response Factor to the tower/pole structure					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Condition*		Tower/Pole Analysis with antennas below top of Tower/Pole	For wind speed use OTRM 060 Map 1, Rule 250D: Extreme Ice with Wind Loading 4 PSF Wind Load Height above ground is based on overall height to top of tower/pole					1.6 Flat Surfaces 1.3 Round Surfaces
NESC Extreme Ice with Wind Condition*		Conductors:	Conductor Loads Provided by NU					
		* Only for structures installed after 2007						

mount as specified below, and shall include the wireless communication mast and antenna loads per NESC criteria)

The strength reduction factor obtained from the field investigation shall be applied to the members or connections that are showing signs of deterioration from their original condition

With the written approval of Eversource Transmission Line Engineering on a case by case the existing structures may be analyzed initially using the current NESC code, then it is permitted to use the original design code with the original conductor load should the existing tower fail the current NESC code.

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

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

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

c) Electric Transmission Structure

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

   ii) Shape Factor Multiplier:

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

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

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

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

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

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

Project: 321/1618 Line, Structure 10255
Date: 7/12/18
Engineer: JS
Purpose: Recalculate wire loads for Sprint site. OPGW installed over 321 circuit.

Shield Wires:
321:0.457" AFL DNO-4963 OPGW, tensioned to 4200# @ NESC 250B final
1618: 7#8 Alumoweld, tensioned to 4200# @ NESC 250B final

Conductors:
Bundled 1272 ACSR, tensioned to 10000# @ NESC 250B final
Tangent line angle. Suspension cond. insulator configuration

Wind Span: 936'. 250B Weight Span: 935'.

NESC 250B

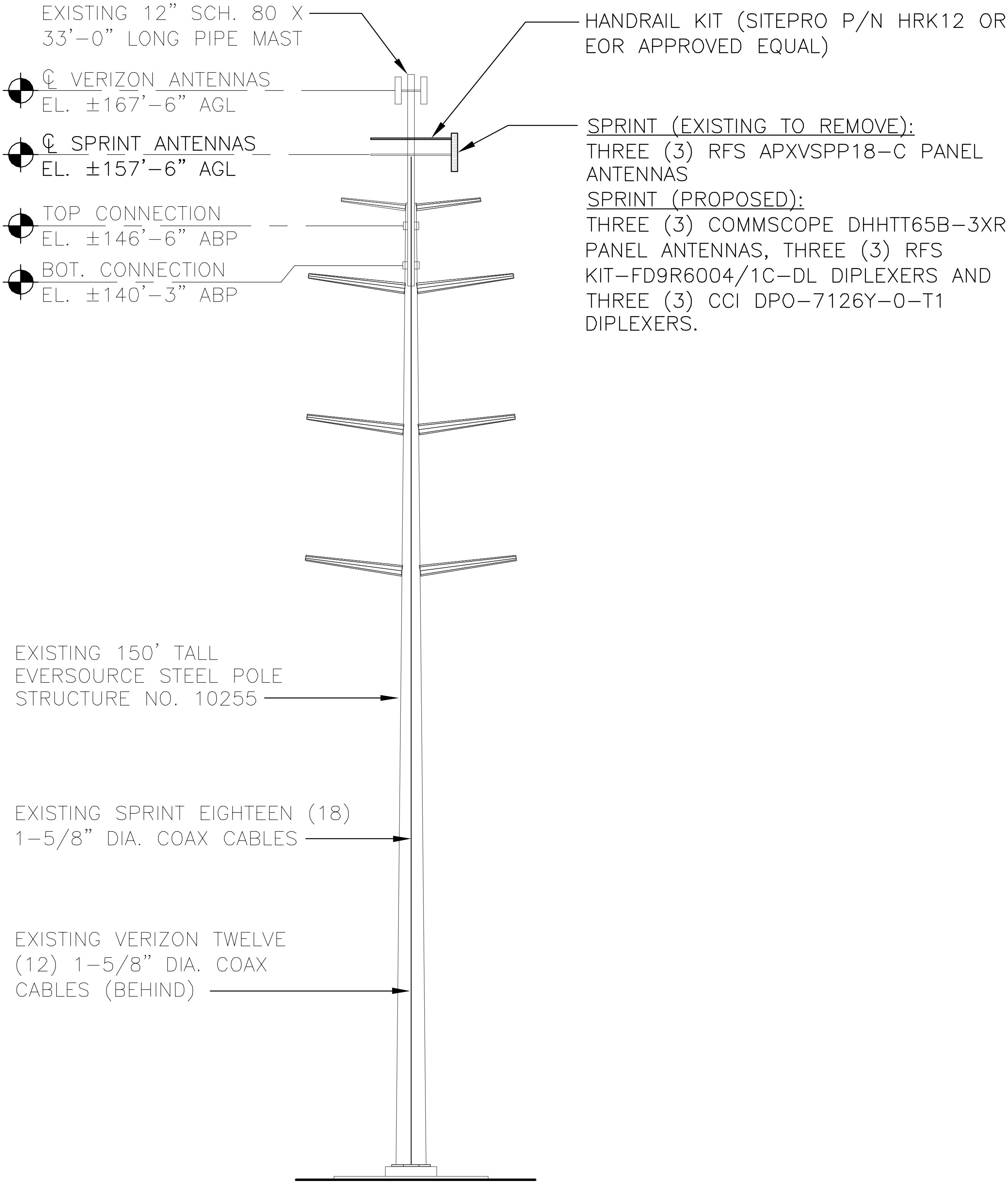
	Vertical	Transverse	Longitudinal
OPGW	1235	1202	0
Alumoweld	1194	1133	0
Conductor	7920	3813	0

NESC 250C

	Vertical	Transverse	Longitudinal
OPGW	236	881	0
Alumoweld	254	742	0
Conductor	3062	4981	0

60 deg F

	Vertical	Transverse	Longitudinal
OPGW	239	0	0
Alumoweld	256	0	0
Conductor	3072	0	0



1 / EL–1

TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

REVISIONS		
00	1/29/18	ISSUED FOR REVIEW
01	12/3/18	CONSTRUCTION

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CT03XC351
EVERSOURCE 10255

SKY EDGE LANE
BETHEL, CT 06801

PROJECT NO:	17159.08
DRAWN BY:	TJL
CHECKED BY:	CFC
SCALE:	AS NOTED
DATE:	1/29/18

TOWER AND MAST ELEVATION

EL-1

DWG. 1 OF 1

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

Wind Speeds

Basic Wind Speed	$V := 93$	mph	(User Input - 2016 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)
Basic Wind Speed Service Loads	$V_{Ser} := 60$	mph	(User Input - TIA-222-G Section 2.8.3)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := III		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 150$	ft	(User Input)
Height to Center of Antennas =	$z_{VZ} := 167.5$	ft	(User Input)
Height to Center of Antennas =	$z_{Sprint} := 157.5$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 156.5$	ft	(User Input)
Radial Ice Thickness =	$t_i := 0.75$	in	(User Input per Annex B of TIA-222-G)
Radial Ice Density =	$Id := 56.00$	pcf	(User Input)
Topograpic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H := 1.35$		(User Input)

Output

Wind Direction Probability Factor =

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

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

Importance Factors =

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

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

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

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

Wind Direction Probability Factor (Service) = $K_{dSer} := 0.85$ (Per Section 2.8.3 of TIA-222-G)

Importance Factor (Service) = $I_{Ser} := 1$ (Per Section 2.8.3 of TIA-222-G)

$K_{iz} := \left(\frac{z_{VZ}}{33}\right)^{0.1} = 1.176$ $t_{izVZ} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.206$

Velocity Pressure Coefficient Antennas = $Kz_{VZ} := 2.01\left(\left(\frac{z_{VZ}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.411$

Velocity Pressure w/o Ice Antennas = $qz_{VZ} := 0.00256 \cdot K_d \cdot Kz_{VZ} \cdot V^2 \cdot I_{Wind} = 34.126$

Velocity Pressure with Ice Antennas = $qz_{ice.VZ} := 0.00256 \cdot K_d \cdot Kz_{VZ} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.578$

Velocity Pressure Service = $qz_{VZ.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{VZ} \cdot V_{Ser}^2 \cdot I_{Ser} = 11.052$

$K_{iz} := \left(\frac{z_{Sprint}}{33}\right)^{0.1} = 1.169$ $t_{izSprint} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.192$

Velocity Pressure Coefficient Antennas = $Kz_{Sprint} := 2.01\left(\left(\frac{z_{Sprint}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.393$

Velocity Pressure w/o Ice Antennas = $qz_{Sprint} := 0.00256 \cdot K_d \cdot Kz_{Sprint} \cdot V^2 \cdot I_{Wind} = 33.687$

Velocity Pressure with Ice Antennas = $qz_{ice.Sprint} := 0.00256 \cdot K_d \cdot Kz_{Sprint} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.467$

Velocity Pressure Service = $qz_{Sprint.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Sprint} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.909$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.168$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.191$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.391$

Velocity Pressure w/o Ice Mast= $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 33.642$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.456$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.895$

Development of Wind & Ice Load on Mast

Mast Data: (Pipe 12" SCH. 80) (User Input)

Mast Shape = Round (User Input)

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

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

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

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

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

Wind Load (without ice)

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

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 58$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.428$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 20$ plf **BLC 4**

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 19$ plf **BLC 6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^2\right] = 102.8$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 40$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model = Andrew LNX-6513DS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 54.7$ in (User Input)

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

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

Antenna Weight = $WT_{ant} := 31.1$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$

Antenna Force Coefficient = $Ca_{ant} = 1.29$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 13.6$ sf

Total Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 808$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 6.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 20.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 301$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{VZ.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 262$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 93$ lbs **BLC 2**

Gravity Loads (ice only)

cu in

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 4622$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 6478$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 210$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 630$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model =	Andrew HBX-6516DS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 51.4$	in	(User Input)
Antenna Width =	$W_{ant} := 6.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 11$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 7.9$		
Antenna Force Coefficient =	$Ca_{ant} = 1.43$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.3$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 7$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 459$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 4.2$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 12.7$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 210$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{VZ.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 149$	lbs	**BLC 6**

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 33$	lbs	**BLC 2**

Gravity Loads (ice only) cu in

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1103$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 3594$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 116$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 349$	lbs	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model = Bias Tee

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.63$ in (User Input)

Antenna Width = $W_{ant} := 3.7$ in (User Input)

Antenna Thickness = $T_{ant} := 2.0$ in (User Input)

Antenna Weight = $WT_{ant} := 2$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.5$

Antenna Force Coefficient = $Ca_{ant} = 1.2$

Wind Load (without ice)

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

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

Total Antenna Wind Force = $F_{ant} := qz_{VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 24$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izVZ}) \cdot (W_{ant} + 2 \cdot t_{izVZ})}{144} = 0.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.7$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.VZ} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 24$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{VZ.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 8$ lbs **BLC 6**

Gravity Load (without ice)

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

Gravity Loads (ice only)

cu in

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izVZ})(W_{ant} + 2 \cdot t_{izVZ}) \cdot (T_{ant} + 2 \cdot t_{izVZ}) - V_{ant} = 481$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 16$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 47$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data: (Verizon)

Mount Type: Dual Standoff Mount
B1827 w/ 6 Pipe Mounts

Platform Shape =	Flat		(User Input)	
Platform Area =	$A_{plt} := 7$	sq ft	(User Input)	(Force Coefficient Included)
Platform Area w/ Ice =	$A_{ICE.plt} := 10$	sq ft	(User Input)	(Force Coefficient Included)
Platform Weight =	$WT_{plt} := 575$	lbs	(User Input)	
Platform Weight w/ Ice =	$WT_{ICE.plt} := 800$	lbs	(User Input)	

Wind Load (without ice)

Total Platform Wind Force = $F_{plt} := qz_{VZ} \cdot G_H \cdot A_{plt} = 322$ lbs **BLC 5**

Wind Load (with ice)

Total Platform Wind Force w/ Ice = $Fi_{plt} := qz_{ice.VZ} \cdot G_H \cdot A_{ICE.plt} = 116$ lbs **BLC 4**

Wind Load (Service)

Total Platform Wind Force Service Loads = $F_{ant.Ser} := qz_{VZ.Ser} \cdot G_H \cdot A_{plt} = 104$ lbs **BLC 6**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 575$ lbs **BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform = $WT_{ICE.plt} - WT_{plt} = 225$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = Commscope DHHTT65B-3XR

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72.1$ in (User Input)

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

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

Antenna Weight = $WT_{ant} := 46$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 6.1$

Antenna Force Coefficient = $Ca_{ant} = 1.36$

Wind Load (without ice)

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

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 17.9$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1104$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 8.6$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 25.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 403$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 358$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 138$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6092$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 8212$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 266$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 798$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = RFS KIT-FD9R6004/1C-DL Diplexer

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 5.8$ in (User Input)

Antenna Width = $W_{ant} := 6.5$ in (User Input)

Antenna Thickness = $T_{ant} := 4.6$ in (User Input)

Antenna Weight = $WT_{ant} := 7$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 0.9$

Antenna Force Coefficient = $Ca_{ant} = 1.2$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.8$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 43$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 0.8$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 32$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 14$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 21$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 173$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 823$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 27$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 80$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Sprint)

Antenna Model = CCI DPO-7126Y-0-T1 Diplexer

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 7.94$ in (User Input)

Antenna Width = $W_{ant} := 5.94$ in (User Input)

Antenna Thickness = $T_{ant} := 4.07$ in (User Input)

Antenna Weight = $WT_{ant} := 8$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.3$

Antenna Force Coefficient = $Ca_{ant} = 1.2$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 1$ sf

Total Antenna Wind Force = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 54$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 0.9$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2.7$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 36$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 17$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 24$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 192$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 884$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 29$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 86$ lbs **BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:	(Sprint)			
Mount Type:	13-ft Low Profile Platform			
Platform Shape =	Flat		(User Input)	
Platform Area =	$A_{plt} := 27$	sq ft	(User Input)	(Force Coefficient Included)
Platform Area w/ Ice =	$A_{ICE.plt} := 32$	sq ft	(User Input)	(Force Coefficient Included)
Platform Weight =	$WT_{plt} := 1650$	lbs	(User Input)	
Platform Weight w/ Ice =	$WT_{ICE.plt} := 2250$	lbs	(User Input)	

Wind Load (without ice)

Total Platform Wind Force =	$F_{plt} := qz_{Sprint} \cdot G_H \cdot A_{plt} = 1228$	lbs	**BLC 5**

Wind Load (with ice)

Total Platform Wind Force w/ Ice =	$Fi_{plt} := qz_{ice.Sprint} \cdot G_H \cdot A_{ICE.plt} = 366$	lbs	**BLC 4**

Wind Load (Service)

Total Platform Wind Force Service Loads =	$F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot A_{plt} = 398$	lbs	**BLC 6**

Gravity Load (without ice)

Weight of Platform =	$WT_{plt} = 1650$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on Platform =	$WT_{ICE.plt} - WT_{plt} = 600$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (Bottom Mast to Sprint Antennas)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 31$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

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

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 4$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 187.9$

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

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.7$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 36$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 14$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 12$ plf **BLC 6**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 31$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{izMast1})^2 - D_{coax}^2\right] = 28.7$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 335$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (Above Sprint Antennas)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 31$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

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

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 2$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 187.9$

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

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 18$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 0.7$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 10$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 6$ plf **BLC 6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast1}\right)^2 - D_{coax}^{\ 2}\right] = 28.7$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 134$ plf **BLC 3**

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0X	Column	Pipe	A53 Gr. B	Typical	17.5	339	339	678

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	14			Lbyy						Lateral
2	M2	Mast	19			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	FLANGE			Mast	Column	Pipe	A53 Gr. B	Typical
2	M2	FLANGE	TOPMA...			Mast	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTMAST	0	0	0	0	
2	BOTCONNECTION	0	3.25	0	0	
3	TOPCONNECTION	0	9.42	0	0	
4	FLANGE	0	14	0	0	
5	TOPMAST	0	33	0	0	

Joint Boundary Conditions

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

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.093	16.5
2	M2	Y	-.033	16.5
3	M2	Y	-.006	16.5
4	M2	Y	-.575	16.5
5	M2	Y	-.138	6.5
6	M2	Y	-.021	6.5
7	M2	Y	-.024	6.5
8	M2	Y	-1.65	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.63	16.5
2	M2	Y	-.349	16.5
3	M2	Y	-.047	16.5
4	M2	Y	-.225	16.5
5	M2	Y	-.798	6.5
6	M2	Y	-.08	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
7	M2	Y	-.086	6.5
8	M2	Y	-.6	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.301	16.5
2	M2	X	.21	16.5
3	M2	X	.024	16.5
4	M2	X	.116	16.5
5	M2	X	.403	6.5
6	M2	X	.032	6.5
7	M2	X	.036	6.5
8	M2	X	.366	6.5

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.808	16.5
2	M2	X	.459	16.5
3	M2	X	.024	16.5
4	M2	X	.322	16.5
5	M2	X	1.104	6.5
6	M2	X	.043	6.5
7	M2	X	.054	6.5
8	M2	X	1.228	6.5

Member Point Loads (BLC 6 : Service Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.262	16.5
2	M2	X	.149	16.5
3	M2	X	.008	16.5
4	M2	X	.104	16.5
5	M2	X	.358	6.5
6	M2	X	.014	6.5
7	M2	X	.017	6.5
8	M2	X	.398	6.5

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.031	-.031	0	0
2	M2	Y	-.031	-.031	0	6.5
3	M2	Y	-.012	-.012	6.5	16.5

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.04	-.04	0	0
2	M2	Y	-.04	-.04	0	0
3	M1	Y	-.335	-.335	0	0
4	M2	Y	-.335	-.335	0	6.5

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
5	M2	Y	-.134	-.134	6.5	16.5

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.02	.02	0	0
2	M2	X	.02	.02	0	0
3	M1	X	.014	.014	0	0
4	M2	X	.014	.014	0	6.5
5	M2	X	.01	.01	6.5	16.5

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.058	.058	0	0
2	M2	X	.058	.058	0	0
3	M1	X	.036	.036	0	0
4	M2	X	.036	.036	0	6.5
5	M2	X	.018	.018	6.5	16.5

Member Distributed Loads (BLC 6 : Service Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.019	.019	0	0
2	M2	X	.019	.019	0	0
3	M1	X	.012	.012	0	0
4	M2	X	.012	.012	0	6.5
5	M2	X	.006	.006	6.5	16.5

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					8	3		
3	Weight of Ice Only	None					8	5		
4	TIA Wind with Ice	None					8	5		
5	TIA Wind	None					8	5		
6	Service Wind	None					8	5		

Load Combinations

	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D +1.0Di + 1.0Wi	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.0D + 1.0WService	Yes	Y		1	1	2	1	6	1	4	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	BOTCONNEC...	max	20.423	1	3.064	3	0	4	0	4	0	4	0	4
2		min	4.907	3	.516	2	0	1	0	1	0	1	0	1
3	TOPCONNEC...	max	-7.442	3	15.591	3	0	4	0	4	0	4	0	4
4		min	-31.422	1	4.218	2	0	1	0	1	0	1	0	1
5	Totals:	max	-2.535	3	18.655	3	0	4						
6		min	-10.998	1	4.735	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	BOTMAST	max	.09	1	0	2	0	4	0	4	0	4	2.311e-03	1
2		min	.022	3	0	3	0	1	0	1	0	1	5.532e-04	3
3	BOTCONNECT...	max	0	4	0	4	0	4	0	4	0	4	2.295e-03	1
4		min	0	1	0	1	0	1	0	1	0	1	5.497e-04	3
5	TOPCONNECT...	max	0	4	0	4	0	4	0	4	0	4	-1.243e-03	3
6		min	0	1	0	1	0	1	0	1	0	1	-5.19e-03	1
7	FLANGE	max	.563	1	0	2	0	4	0	4	0	4	-3.487e-03	3
8		min	.135	3	-.002	3	0	1	0	1	0	1	-1.451e-02	1
9	TOPMAST	max	5.662	1	-.001	2	0	4	0	4	0	4	-6.099e-03	3
10		min	1.374	3	-.005	3	0	1	0	1	0	1	-2.498e-02	1

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

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc...	...	L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M1	PIPE_12.0X	.722	9.4...	1	.132	9.3...		1	511.638	551.25	184.275	184.275	1..	H1-1b
2	M2	PIPE_12.0X	.494	0	1	.054	0		1	480.506	551.25	184.275	184.275	2..	H1-1b

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	20.423	.688	0	0	0	0
2	1	TOPCONNECTION	-31.422	5.624	0	0	0	0
3	1	Totals:	-10.998	6.313	0			
4	1	COG (ft):	X: 0	Y: 19.226	Z: 0			

Joint Reactions

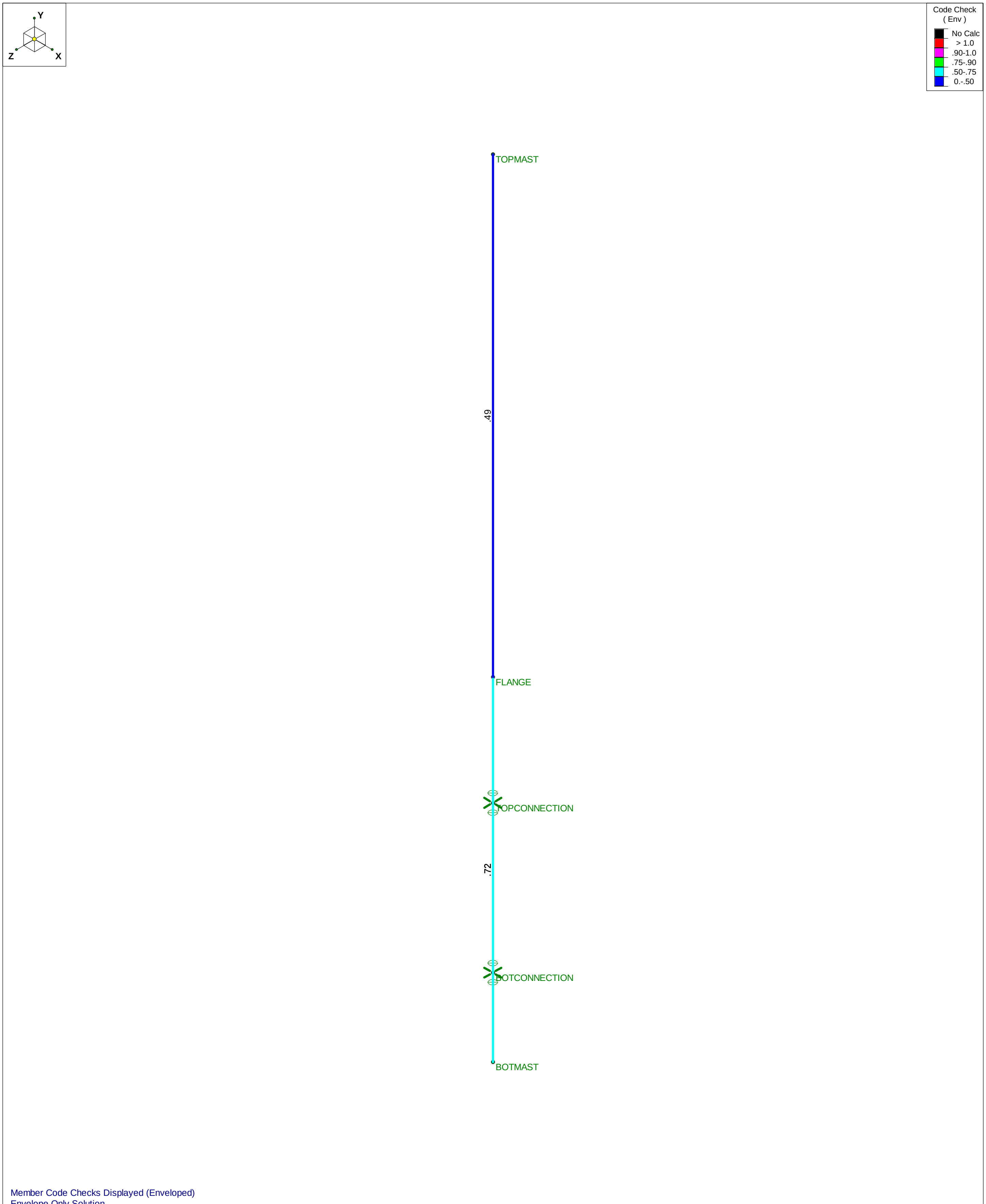
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	20.372	.516	0	0	0	0
2	2	TOPCONNECTION	-31.371	4.218	0	0	0	0
3	2	Totals:	-10.998	4.735	0			
4	2	COG (ft):	X: 0	Y: 19.226	Z: 0			

Joint Reactions

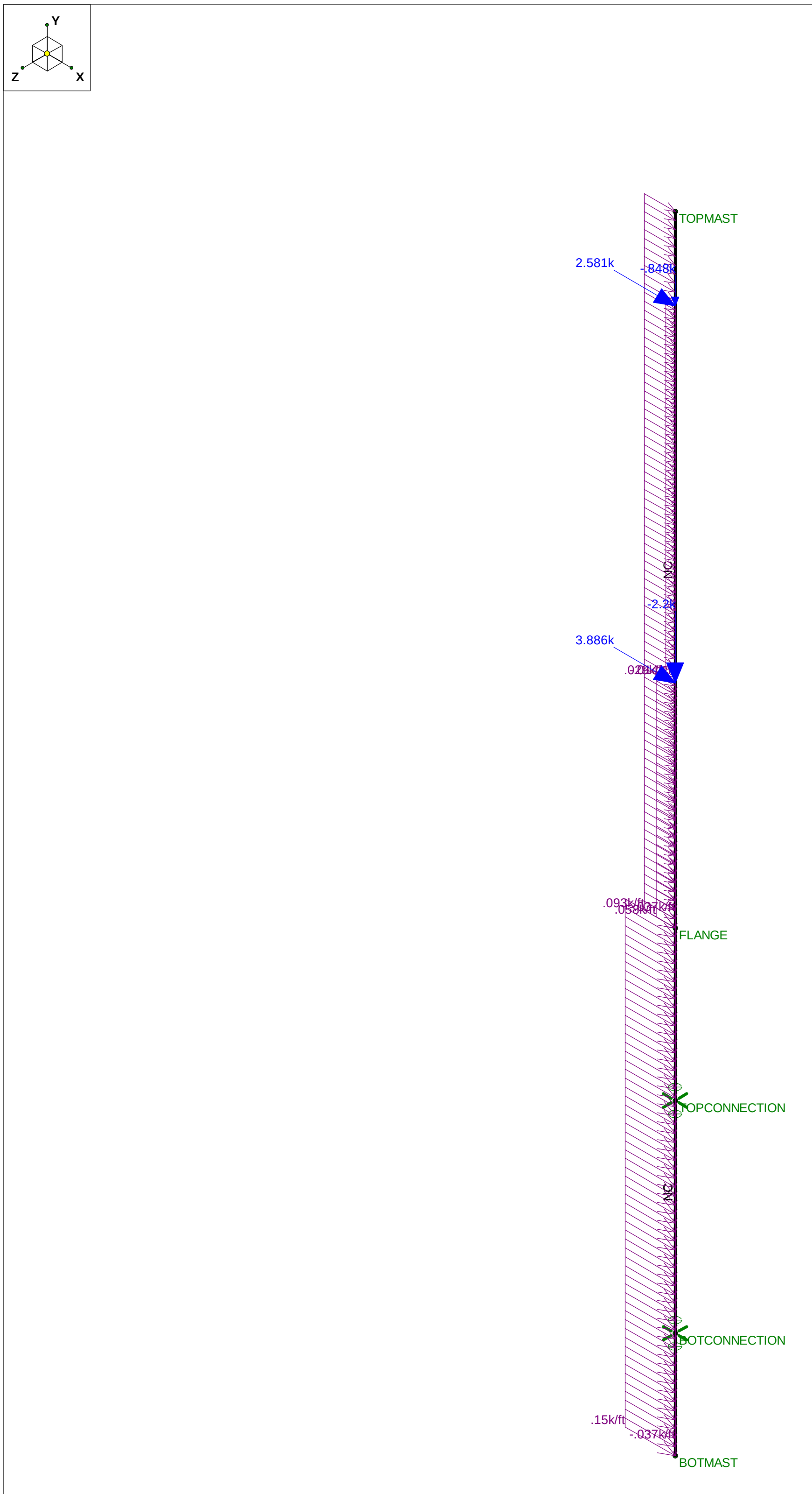
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	BOTCONNECTION	4.907	3.064	0	0	0	0
2	3	TOPCONNECTION	-7.442	15.591	0	0	0	0
3	3	Totals:	-2.535	18.655	0			
4	3	COG (ft):	X: 0	Y: 17.042	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	BOTCONNECTION	8.968	.574	0	0	0	0
2	4	TOPCONNECTION	-13.746	4.687	0	0	0	0
3	4	Totals:	-4.778	5.261	0			
4	4	COG (ft):	X: 0	Y: 19.226	Z: 0			

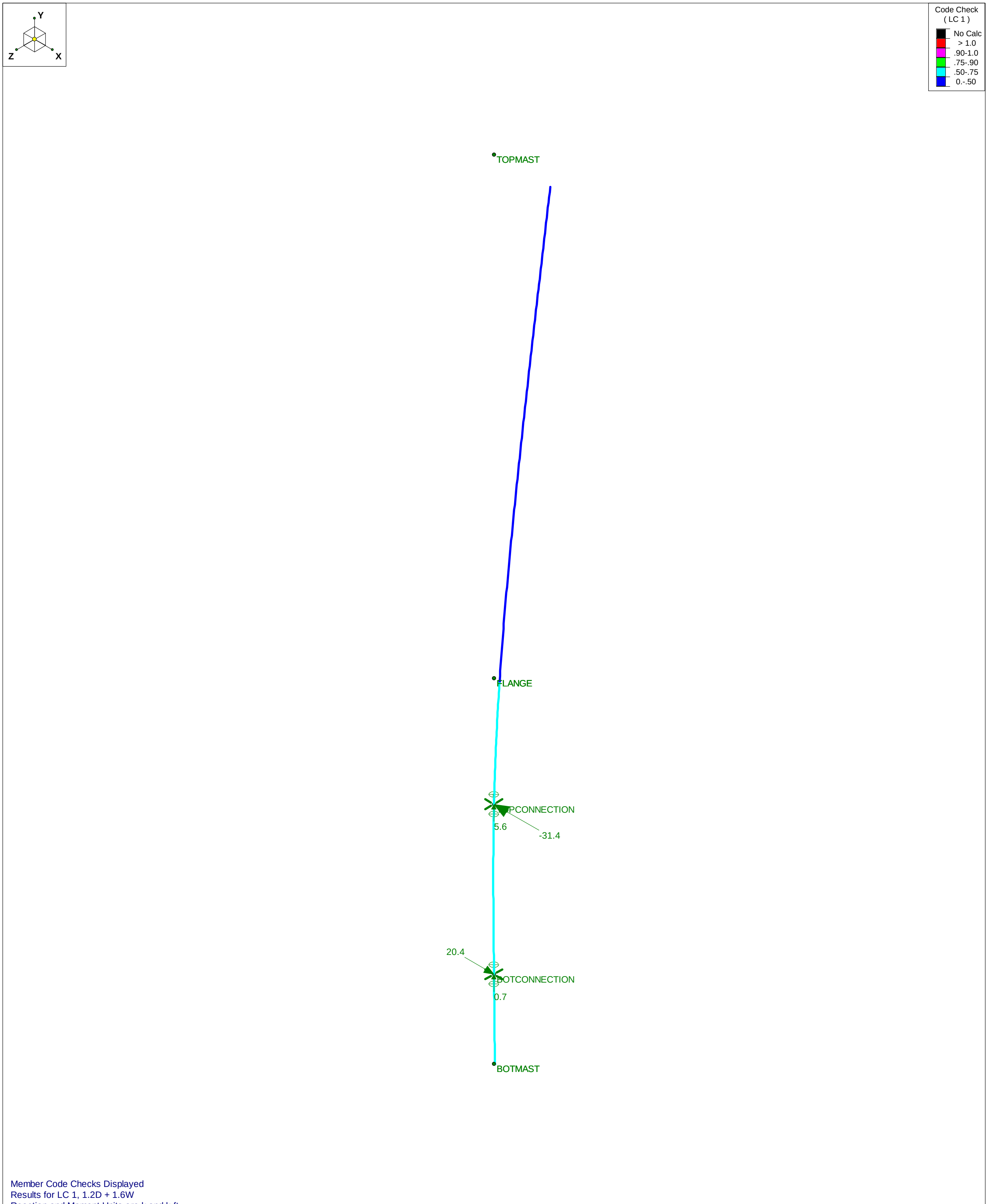


CENTEK Engineering, INC.		
tjl, cfc	Strcuture #10255 - Mast	Dec 3, 2018 at 9:24 AM
17159.08 / Sprint CT03XC...	Unity Check	TIA.r3d

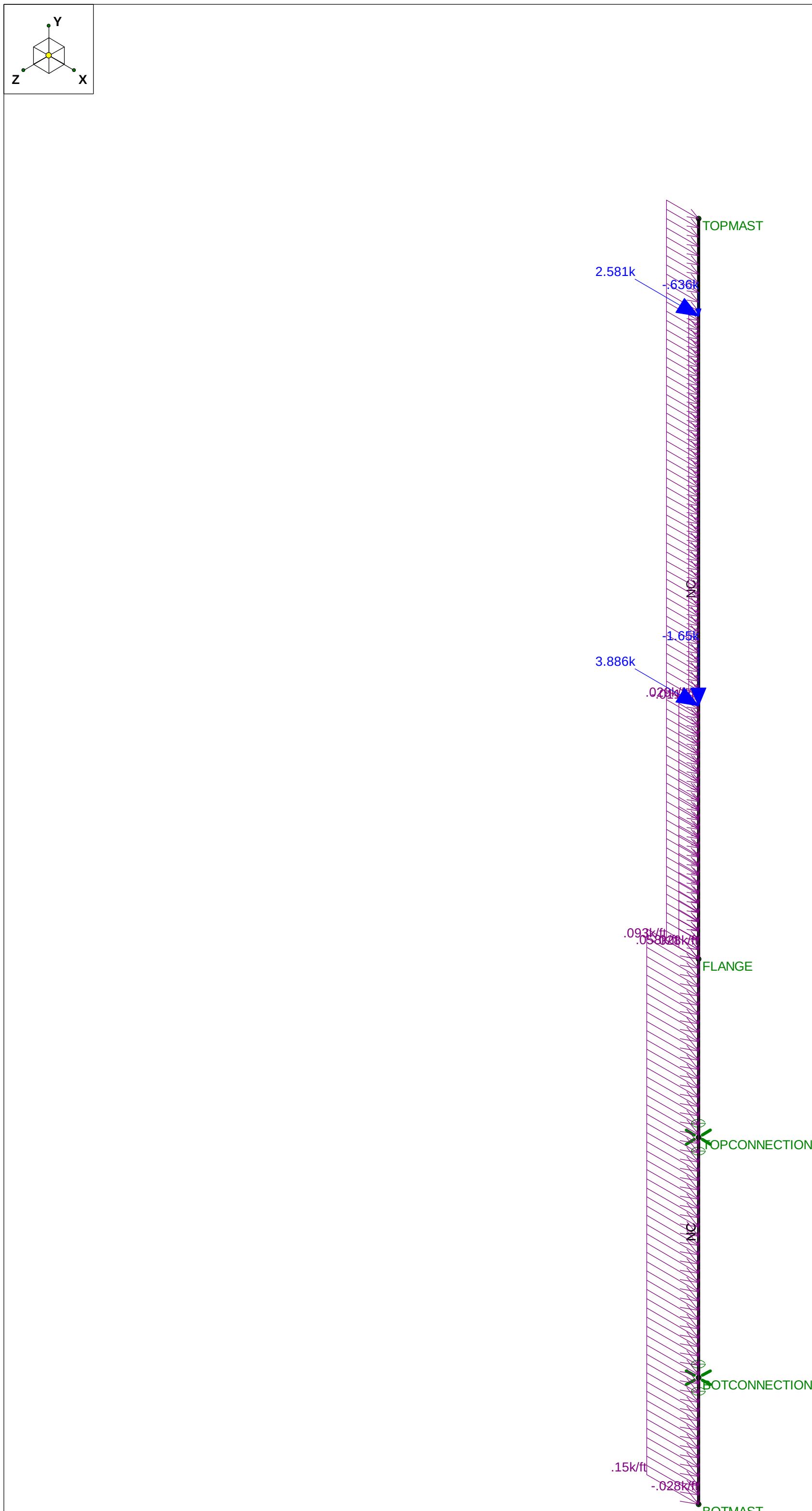


Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #10255 - Mast	Dec 3, 2018 at 9:24 AM
17159.08 / Sprint CT03XC...	LC #1 Loads	TIA.r3d

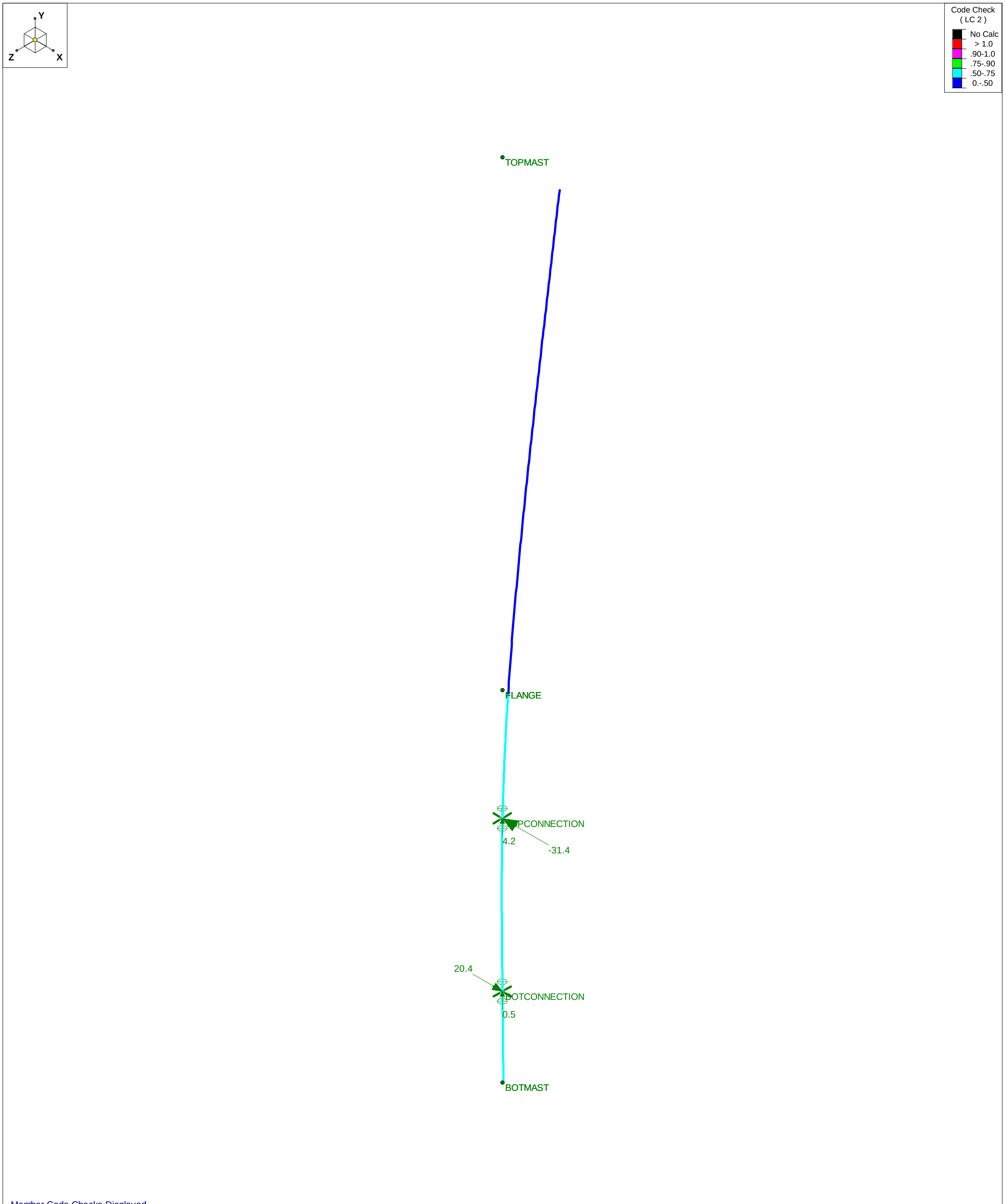


CENTEK Engineering, INC.		
tjl, cfc	Strcuture #10255 - Mast	Dec 3, 2018 at 9:30 AM
17159.08 / Sprint CT03XC...	LC #1 Reactions and Deflected Shape	TIA.r3d



Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W

CENTEK Engineering, INC.	Strcuture #10255 - Mast LC #2 Loads	
tjl, cfc		Dec 3, 2018 at 9:24 AM
17159.08 / Sprint CT03XC...		TIA.r3d

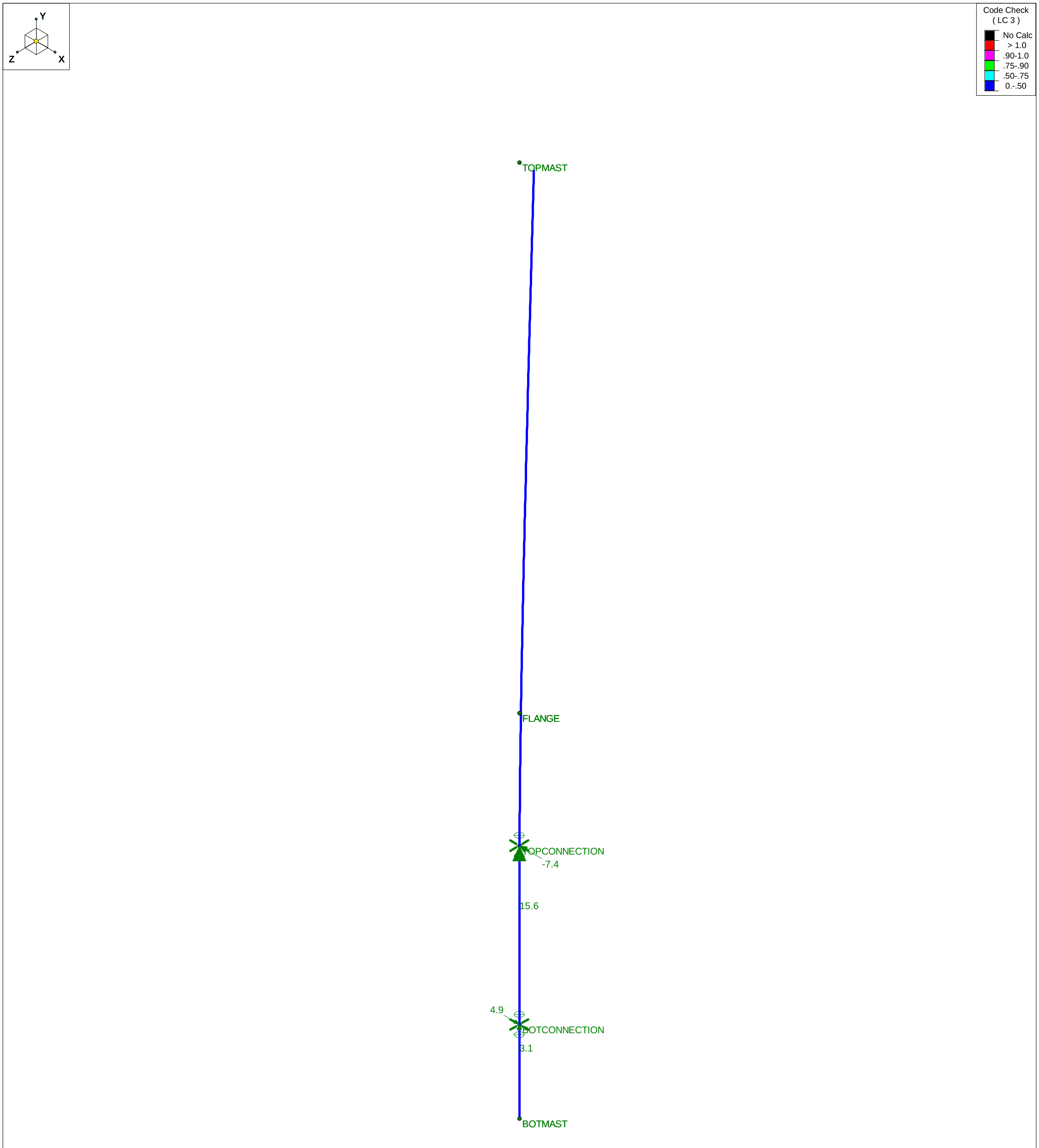


Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #10255 - Mast	Dec 3, 2018 at 9:30 AM
17159.08 / Sprint CT03XC...	LC #2 Reactions and Deflected Shape	TIA.r3d

Member Code Checks Displayed
Loads: LC 3, 1.2D +1.0Di + 1.0Wi

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #10255 - Mast	Dec 3, 2018 at 9:25 AM
17159.08 / Sprint CT03XC...	LC #3 Loads	TIA.r3d



Member Code Checks Displayed
Results for LC 3, 1.2D +1.0Di + 1.0Wi
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
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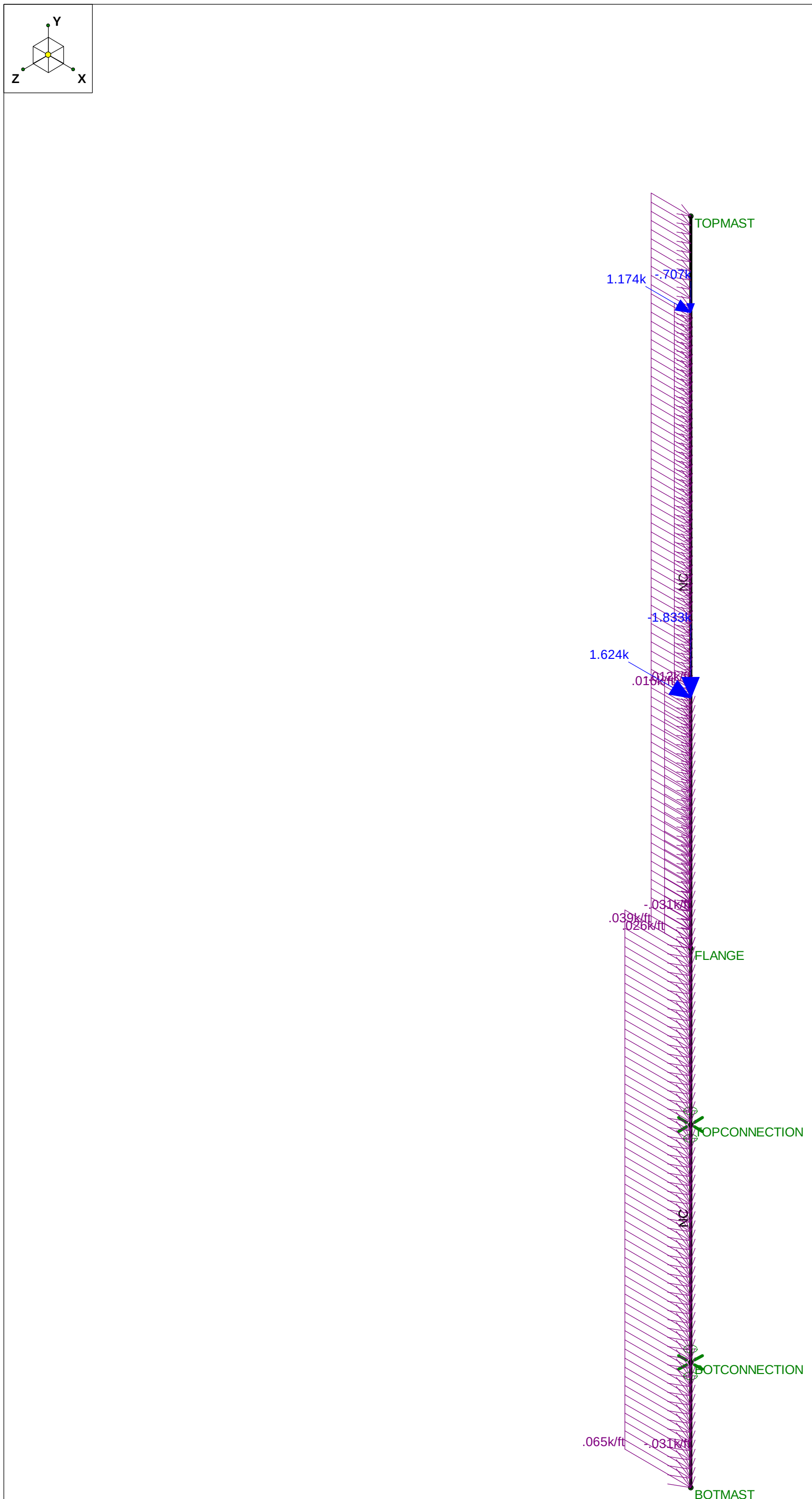
17159.08 / Sprint CT03XC...	LC #3 Reactions and Deflected Shape	TIA.r3d



Member Code Checks Displayed
Loads: LC 4, 1.0D + 1.0WService

CENTEK Engineering, INC.		
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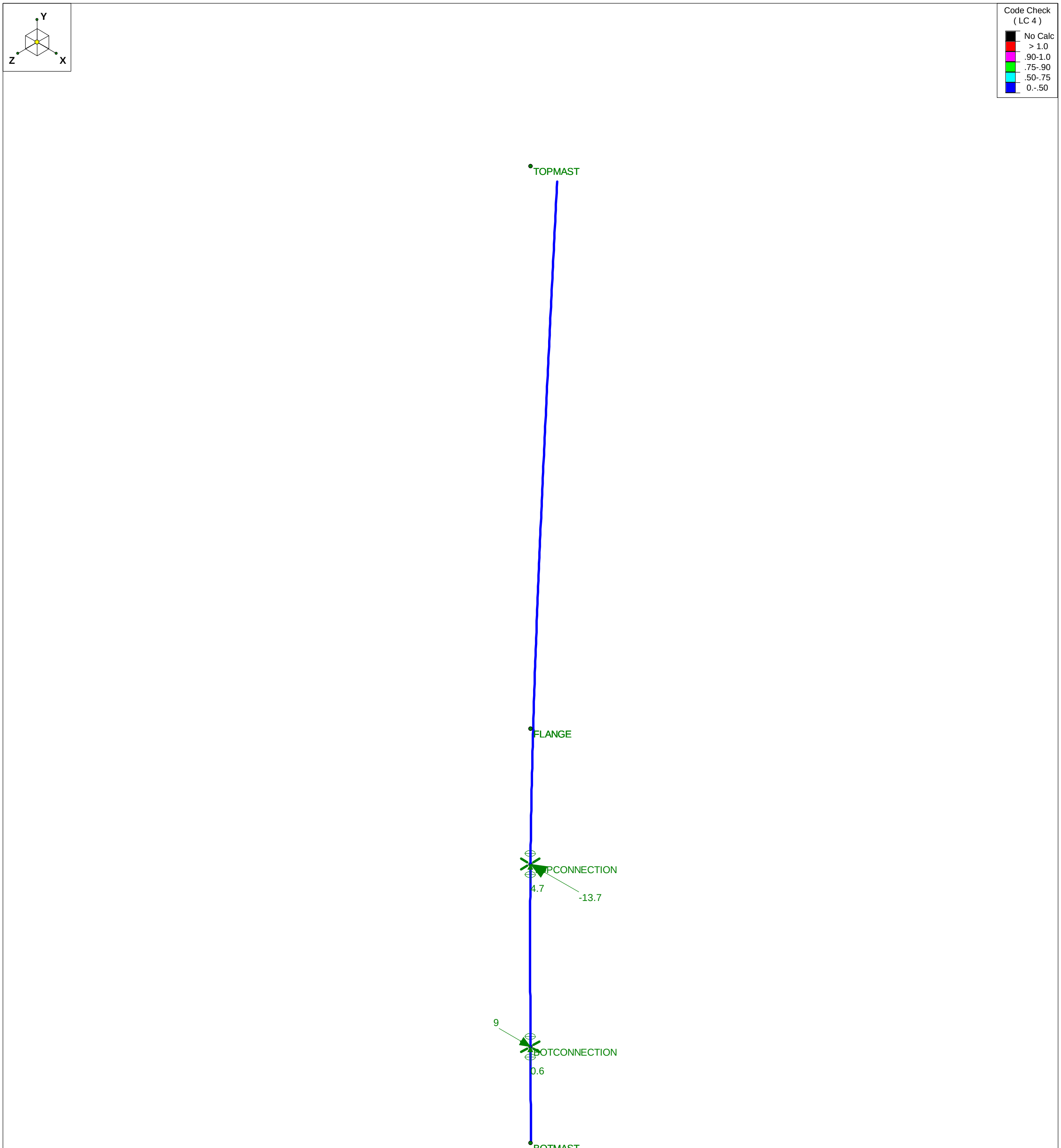
17159.08 / Sprint CT03XC...	LC #4 Loads	TIA.r3d

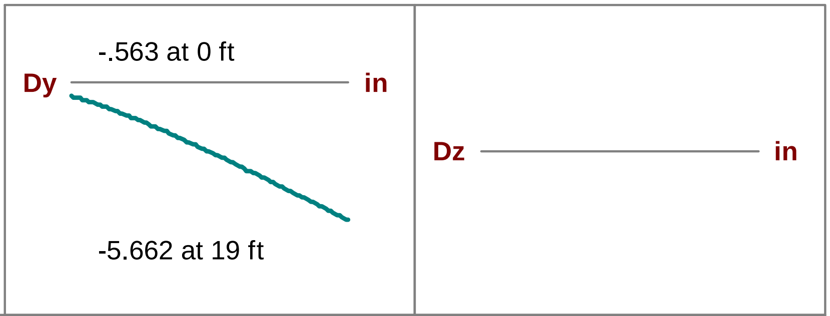


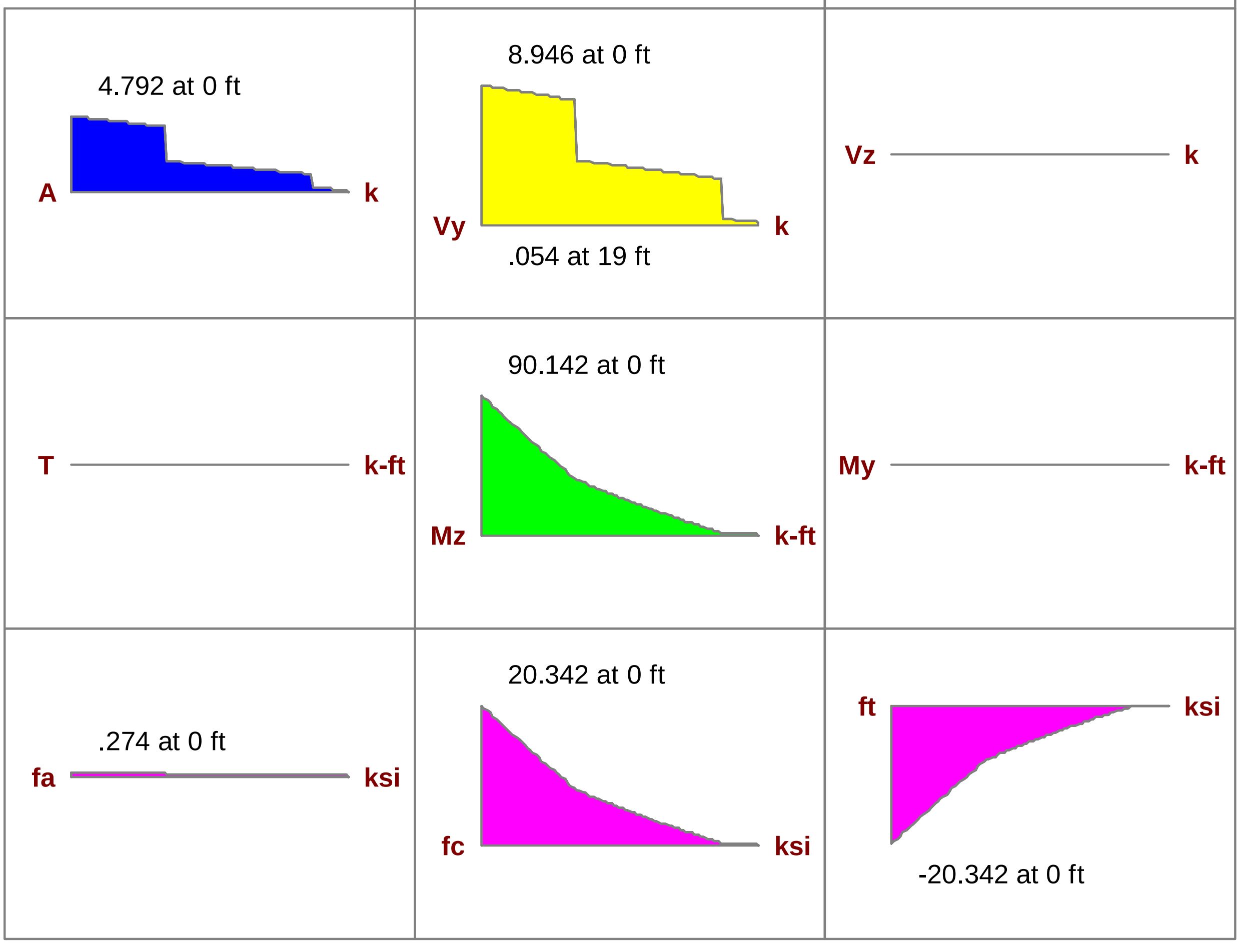
Member Code Checks Displayed
Results for LC 4, 1.0D + 1.0WService
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Strcuture #10255 - Mast	Dec 3, 2018 at 9:32 AM
17159.08 / Sprint CT03XC...	LC #4 Reactions and Deflected Shape	TIA.r3d

Column: ***M2***

Shape: **PIPE_12.0X**
Material: **A53 Gr. B**
Length: **19 ft**
I Joint: **FLANGE**
J Joint: **TOPMAST**
LC 1: 1.2D + 1.6W
Code Check: **0.494 (bending)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.494**	Max Shear Check	**0.054 (s)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/44**
Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**19 ft**	**19 ft**
phi*Pnc	**480.506 k**	KL/r	**51.803**	**51.803**
phi*Pnt	**551.25 k**			
phi*Mny	**184.275 k-ft**	L Comp Flange	**19 ft**	
phi*Mnz	**184.275 k-ft**	L-torque	**19 ft**	
phi*Vny	**165.375 k**	Tau_b	**1**	
phi*Vnz	**165.375 k**			
phi*Tn	**173.622 k-ft**			
Cb	**2.305**			

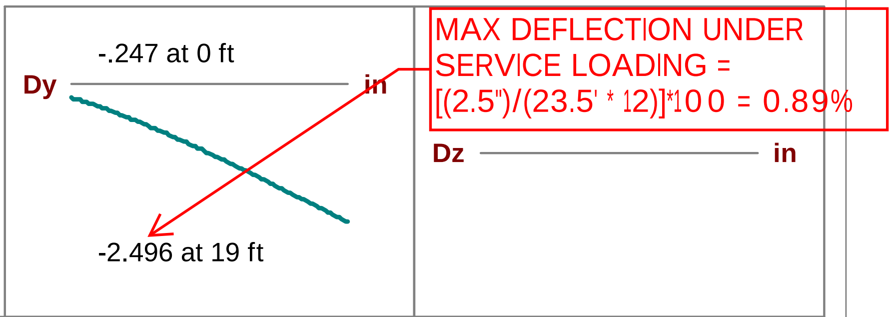
Column: ***M2***

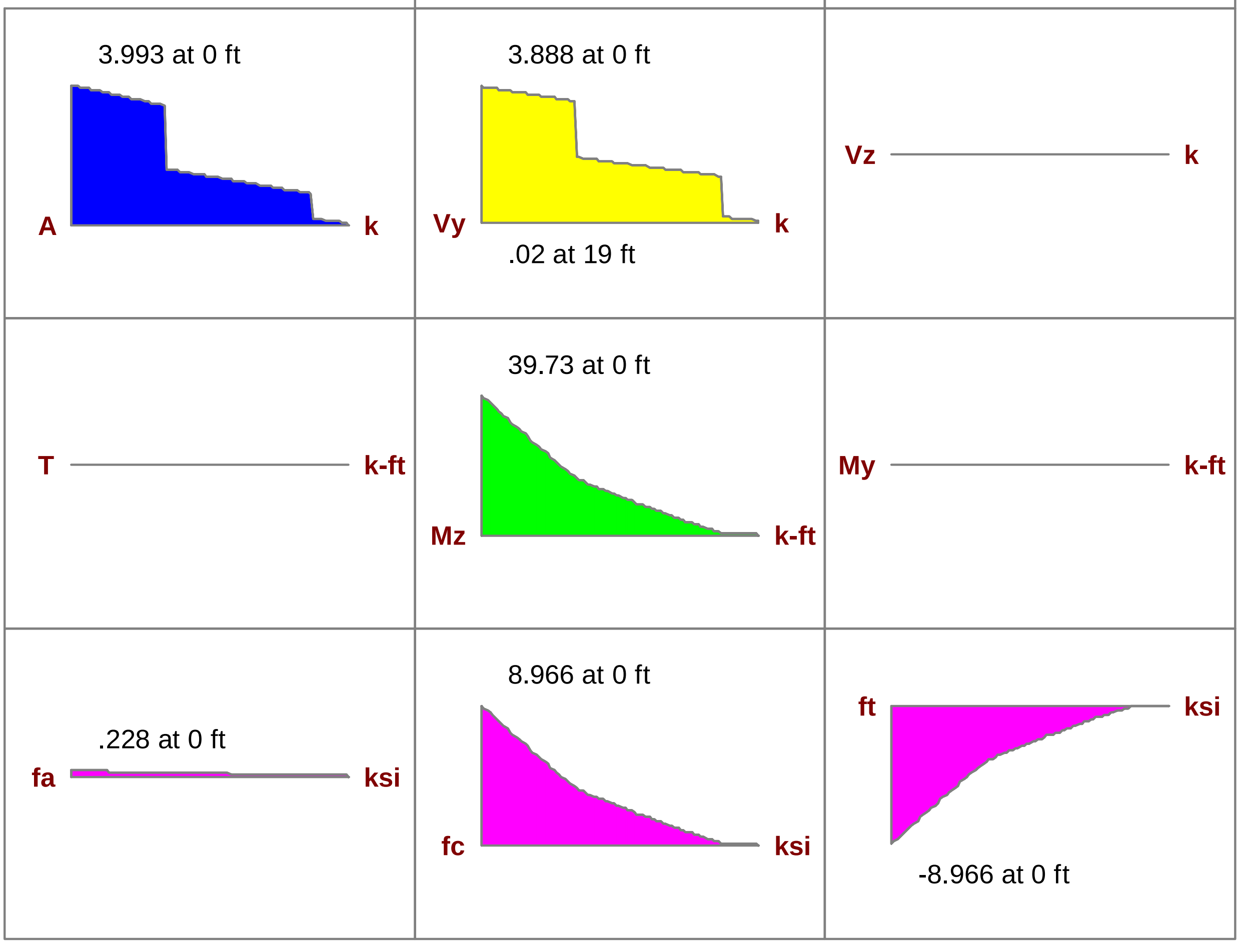
Shape:	**PIPE_12.0X**
Material:	**A53 Gr. B**
Length:	**19 ft**
I Joint:	**FLANGE**
J Joint:	**TOPMAST**

LC 4: 1.0D + 1.0WService

Code Check: **0.220 (bending)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.220**	Max Shear Check	**0.024 (s)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/101**
Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**19 ft**	**19 ft**
phi*Pnc	**480.506 k**	KL/r	**51.803**	**51.803**
phi*Pnt	**551.25 k**			
phi*Mny	**184.275 k-ft**	L Comp Flange	**19 ft**	
phi*Mnz	**184.275 k-ft**	L-torque	**19 ft**	
phi*Vny	**165.375 k**	Tau_b	**1**	
phi*Vnz	**165.375 k**			
phi*Tn	**173.622 k-ft**			
Cb	**2.287**			

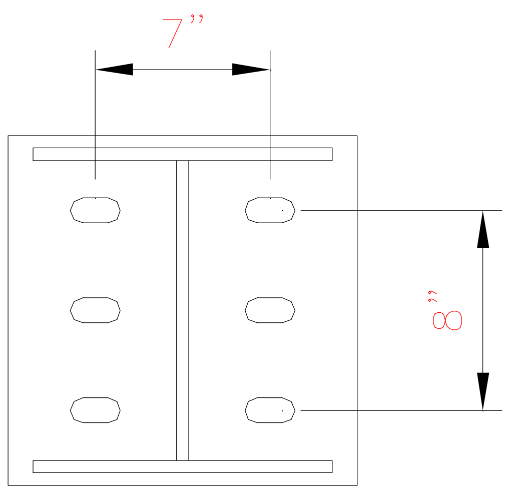
Mast Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 5.7 \cdot kips$	(User Input)
Horizontal =	$Horz := 31.5 \cdot kips$	(User Input)
Moment =	$Moment := 0$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 1.0in$	(User Input)
Nominal Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nominal Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 12 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 8 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 7 \cdot in$	(User Input)
Bolt Area =	$a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.785 \cdot in^2$	



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 1.21 \cdot ksi$

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

Condition1 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 3 \cdot \%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \left| \begin{array}{ll} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{array} \right. = 90 \cdot ksi$

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 9.525 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 12.1 \cdot ksi$

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

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 18 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 6.793 \cdot ksi$

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

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 16.8 \cdot \%$

Tensile Stress Adjusted for Shear = $F'_{nt} := \left| \begin{array}{ll} \left(1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) & \text{if } 1.3 \cdot F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v \le F_{nt} \\ F_{nt} & \text{otherwise} \end{array} \right. = 90 \cdot ksi$

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 22.275 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 28.361 \cdot ksi$

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

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 42 \cdot \%$

Flange Bolt and Flange Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$OM := 90.2 \cdot ft \cdot kips$	(Input From Risa3D)
Shear Force =	$Shear := 9.0 \cdot kips$	(Input From Risa3D)
Axial Force =	$Axial := 4.8 \cdot kips$	(Input From Risa3D)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	$N := 8$	(User Input)
Diameter of Bolt Circle =	$D_{bc} := 17 \cdot in$	(User Input)
Bolt Minimum Tensile Strength =	$F_{ub} := 120 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Flange Bolts =	$D := 1.00 \cdot in$	(User Input)
Threads per Inch =	$n := 8$	(User Input)

Flange Plate Data:

Use ASTM A36

Plate Yield Strength =	$Fy_{bp} := 36 \cdot ksi$	(User Input)
Flange Plate Thickness =	$t_{bp} := 1.0 \cdot in$	(User Input)
Flange Plate Diameter =	$D_{bp} := 20 \cdot in$	(User Input)
Outer Pole Diameter =	$D_{pole} := 12.8 \cdot in$	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 8.5 \cdot in$

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

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

$d_1 = 6.01 \cdot in$	$d_7 = -6.01 \cdot in$
$d_2 = 8.50 \cdot in$	$d_8 = -0.00 \cdot in$
$d_3 = 6.01 \cdot in$	$d_9 = ▪ \cdot in$
$d_4 = 0.00 \cdot in$	$d_{10} = ▪ \cdot in$
$d_5 = -6.01 \cdot in$	$d_{11} = ▪ \cdot in$
$d_6 = -8.50 \cdot in$	$d_{12} = ▪ \cdot in$

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 6.4 \cdot in$

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

$MA_1 = 0.00 \cdot in$	$MA_7 = 0.00 \cdot in$
$MA_2 = 2.10 \cdot in$	$MA_8 = 0.00 \cdot in$
$MA_3 = 0.00 \cdot in$	$MA_9 = ▪ \cdot in$
$MA_4 = 0.00 \cdot in$	$MA_{10} = ▪ \cdot in$
$MA_5 = 0.00 \cdot in$	$MA_{11} = ▪ \cdot in$
$MA_6 = 0.00 \cdot in$	$MA_{12} = ▪ \cdot in$

Effective Width of Flangeplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 12.3 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i (d_i)^2 = 289 \cdot in^2$

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

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

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

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

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

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 31.2 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 1.1 \cdot kips$

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

Bolt Tension % of Capacity = $\frac{T_{Max}}{\Phi R_{nt}} = 58.92 \cdot \%$

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

Condition1 = "OK"

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

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

Condition2 = "OK"

Flange Plate Analysis:

Force from Bolts =

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

$C_1 = 23.1 \cdot kips$

$C_2 = 32.4 \cdot kips$

$C_3 = 23.1 \cdot kips$

$C_4 = 0.6 \cdot kips$

$C_5 = -21.9 \cdot kips$

$C_6 = -31.2 \cdot kips$

$C_7 = -21.9 \cdot kips$

$C_8 = 0.6 \cdot kips$

$C_9 = \blacksquare \cdot kips$

$C_{10} = \blacksquare \cdot kips$

$C_{11} = \blacksquare \cdot kips$

$C_{12} = \blacksquare \cdot kips$

Maximum Bending Stress in Plate =

$$f_{bp} := \sum_i \frac{4 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^{\,2}\right)} = 22.2 \cdot ksi$$

Allowable Bending Stress in Plate =

$$F_{bp} := 0.9 \cdot Fy_{bp} = 32.4 \cdot ksi$$

Plate Bending Stress % of Capacity =

$$\frac{f_{bp}}{F_{bp}} = 68.4 \cdot \%$$

Condition3 =

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

Condition3 = "Ok"

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 100$	mph	(User Input NESC 2012 Figure 250-2(e))
Radial Ice Thickness =	$Ir := 0.50$	in	(User Input)
Radial Ice Density =	$Id := 56.0$	pcf	(User Input)

Factors for Extreme Wind Calculation

Elevation of Top of Mast Above Grade = $TME := 170$ 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 2012 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.415$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.29$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.775$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.826$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 29.9$ psf (NESC 2007 Section 250.C.2)

Shape Factors

Eversource Design Criteria

Shape Factor for Round Members = $Cd_R := 1.3$ (User Input)

Shape Factor for Flat Members = $Cd_F := 1.6$ (User Input)

Shape Factor for Coax Cables Attached to Outside of Pole = $Cd_{coax} := 1.6$ (User Input)

Overload Factors

Eversource 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

Mast Data: (Pipe 12" Sch. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)
Mast Length =	$L_{mast} := 33$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 1.063$	sf/ft	
Total Mast Wind Force (Above NU Structure) =	$qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 64$	plf	**BLC 5**
Total Mast Wind Force (Below NU Structure) =	$qz \cdot Cd_{coax} \cdot A_{mast} = 51$	plf	**BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.146$	sf/ft	
Total Mast Wind Force w/ Ice =	$p \cdot Cd_{coax} \cdot AICE_{mast} = 7$	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 =	$Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + Ir \cdot 2\right)^2 - D_{mast}^{\,2}\right] = 20.8$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$	plf	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model = Andrew LNX-6513DS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 54.7$ in (User Input)

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

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

Antenna Weight = $WT_{ant} := 31.1$ 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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.5$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 13.6$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 812$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 15$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 96$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 93$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 4622$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 1198$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 39$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 117$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data: (Verizon)

Antenna Model = Andrew HBX-6516DS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 51.4$ in (User Input)

Antenna Width = $W_{ant} := 6.5$ in (User Input)

Antenna Thickness = $T_{ant} := 3.3$ in (User Input)

Antenna Weight = $WT_{ant} := 11$ 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 = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 2.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 7$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 417$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 1) \cdot (W_{ant} + 1)}{144} = 2.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 8.2$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 52$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 33$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1103$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 1)(W_{ant} + 1) \cdot (T_{ant} + 1) - V_{ant} = 587$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 19$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 57$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:	(Verizon)		
Antenna Model =	Bias Tee		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 26$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

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

Gravity Load (without ice)

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

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 5$ lbs **BLC 3**

Development of Wind & Ice Load on Mounts

Mount Data: (Verizon)

Mount Type = Dual Standoff Mount B1827 w/ 6 Pipe Mounts

Platform Shape = Flat (User Input)

Platform Area = $A_{plt} := 7$ sq ft (User Input) (Shape Factor Included)

Platform Area w/ Ice = $A_{ICEplt} := 10$ sq ft (User Input) (Shape Factor Included)

Platform Weight = $WT_{plt} := 575$ lbs (User Input)

Platform Weight w/ Ice = $WT_{ICEplt} := 800$ lbs (User Input)

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt} := qz \cdot A_{plt} \cdot m = 262$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt} := p \cdot A_{ICEplt} = 40$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 575$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 225$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas (Sprint)

Antenna Data:

Antenna Model =	Commscope DHHTT65B-3XR		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72.1$	in	(User Input)
Antenna Width =	$W_{ant} := 11.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.1$	in	(User Input)
Antenna Weight =	$WT_{ant} := 46$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas =	$Wt_{ant1} := WT_{ant} \cdot N_{ant} = 138$	lbs	**BLC 2**

Gravity Load (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6092$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := \left(L_{ant} + 2 \cdot Ir\right)\left(W_{ant} + 2 \cdot Ir\right)\left(T_{ant} + 2 \cdot Ir\right) - V_{ant} = 1546$	cu in	
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 50$	lbs	
Weight of Ice on All Antennas =	$Wt_{ice.ant1} := W_{ICEant} \cdot N_{ant} = 150$	lbs	**BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{\left(L_{ant} + 2 \cdot Ir\right) \cdot \left(W_{ant} + 2 \cdot Ir\right)}{144} = 6.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.6$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant1} := p \cdot Cd_F \cdot A_{ICEant} = 126$	lbs	**BLC 4**

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 =	$A_{ant} := SA_{ant} \cdot N_{ant} = 17.9$	sf	
Total Antenna Wind Force =	$F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1070$	lbs	**BLC 5**

Development of Wind & Ice Load on Antennas

(Sprint)

Antenna Data:

Antenna Model =	RFS KIT-FD9R6004/1C-DL Diplexer		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.8$	in	(User Input)
Antenna Width =	$W_{ant} := 6.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 4.6$	in	(User Input)
Antenna Weight =	$WT_{ant} := 7$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant2} := WT_{ant} \cdot N_{ant} = 21$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 173$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 112$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant2} := W_{ICEant} \cdot N_{ant} = 11$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.4$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.1$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant2} := p \cdot Cd_F \cdot A_{ICEant} = 7$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.3$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 0.8$ sf

Total Antenna Wind Force = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 47$ lbs **BLC 5**

Development of Wind & Ice Load on Antennas (Sprint)

Antenna Data:

Antenna Model =	CCI DPO-7126Y-0-T1 Diplexer		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 4.07$	in	(User Input)
Antenna Width =	$W_{ant} := 7.42$	in	(User Input)
Antenna Thickness =	$T_{ant} := 6.26$	in	(User Input)
Antenna Weight =	$WT_{ant} := 8$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Gravity Load (without ice)

Weight of All Antennas = $Wt_{ant3} := WT_{ant} \cdot N_{ant} = 24$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 189$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 121$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 4$ lbs

Weight of Ice on All Antennas = $Wt_{ice.ant3} := W_{ICEant} \cdot N_{ant} = 12$ lbs **BLC 3**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 0.3$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 0.9$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant3} := p \cdot Cd_F \cdot A_{ICEant} = 6$ lbs **BLC 4**

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.2$ sf

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

Total Antenna Wind Force = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 38$ lbs **BLC 5**

Development of Wind & Ice Load on Mounts

Mount Data:	(Sprint)		
Mount Type =	13-ft Low Profile Platform w/ Handrail		
Platform Shape =	Flat		(User Input)
Platform Area =	$A_{plt} := 27$	sq ft	(User Input)
Platform Area w/ Ice =	$A_{ICEplt} := 32$	sq ft	(User Input)
Platform Weight =	$WT_{plt} := 1650$	lbs	(User Input)
Platform Weight w/ Ice =	$WT_{ICEplt} := 2250$	lbs	(User Input)

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt} := qz \cdot Cd_F \cdot A_{plt} \cdot m = 1616$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt} := p \cdot Cd_F \cdot A_{ICEplt} = 205$ lbs **BLC 4**

Gravity Load (without ice)

Weight of Platform = $WT_{plt} = 1650$ lbs **BLC 2**

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 600$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (Bottom Mast to Sprint Antennas)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 31$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

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

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 4$ (User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 0.7$ sf/ft

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

Total Coax Wind Force (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 40$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 1$ sf/ft

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

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 31$ plf **BLC 2**

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 45$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables

Coax Cable Data: (Above Sprint Antennas)

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

Coax Outside Diameter = $D_{coax} := 1.98$ in (User Input)

Coax Cable Length = $L_{coax} := 31$ ft (User Input)

Weight of Coax per foot = $Wt_{coax} := 1.04$ plf (User Input)

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

No. of Coax Projecting Outside Face of PCS Mast = $NP_{coax} := 2$ (User Input)

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 20$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 0.5$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 3$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Load (ice only)

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

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 18$ plf **BLC 3**

Coax Cable on CL&P Pole

Heavy Wind Pressure =	$p := 4 \cdot psf$		(User Input)
Radial Ice Thickness =	$Ir := 0.5 \cdot in$		(User Input)
Radial Ice Density =	$Id := 56 \cdot pcf$		(User Input)
Basic Windspeed =	$V := 100$	mph	(User Input NESC 2012 Figure 250-2(e))
Height to Top of Coax Above Grade =	$TC := 167.5$	ft	(User Input)
NESC Factor =	$kv := 1.43$		(User Input from NESC 2012 Table 250-3 equation)
Importance Factor =	$I := 1.0$		(User Input from NESC 2012 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.297$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.29$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.778$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.827$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 27.5$ psf (NESC 2012 Section 250.C.2)

Distance Between Coax Cable Attach Points =

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

Diameter of Coax Cable =	$D_{coax} := 1.98 \cdot in$	(User Input)
Weight of Coax Cable =	$W_{coax} := 1.04 \cdot plf$	(User Input)
Number of Coax Cables =	$N_{coax} := 30$	(User Input)
Number of Projected Coax Cables =	$NP_{coax} := 3$	(User Input)

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

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

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

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

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

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

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

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 45.448 \cdot plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \\ 1150 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \\ 93 \end{pmatrix} lb$$

Extreme Wind Vertical Load =

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

Extreme Wind Transverse Load =

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

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \\ 312 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \\ 218 \end{pmatrix} ft^2$$

(Global) Model Settings

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

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

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

(Global) Model Settings, Continued

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

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0X	Column	Pipe	A53 Gr. B	Typical	17.5	339	339	678

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	14			Lbyy						Lateral
2	M2	Mast	19			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	BOTMA...	FLANGE			Mast	Column	Pipe	A53 Gr. B	Typical
2	M2	FLANGE	TOPMA...			Mast	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	BOTMAST	0	0	0	0	
2	BOTCONNECTION	0	3.25	0	0	
3	TOPCONNECTION	0	9.42	0	0	
4	FLANGE	0	14	0	0	
5	TOPMAST	0	33	0	0	

Joint Boundary Conditions

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

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.093	16.5
2	M2	Y	-.033	16.5
3	M2	Y	-.006	16.5
4	M2	Y	-.575	16.5
5	M2	Y	-.138	6.5
6	M2	Y	-.021	6.5
7	M2	Y	-.024	6.5
8	M2	Y	-1.65	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	Y	-.117	16.5
2	M2	Y	-.057	16.5
3	M2	Y	-.005	16.5
4	M2	Y	-.225	16.5
5	M2	Y	-.15	6.5
6	M2	Y	-.011	6.5

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
7	M2	Y	-.012	6.5
8	M2	Y	-.6	6.5

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.096	16.5
2	M2	X	.052	16.5
3	M2	X	.004	16.5
4	M2	X	.04	16.5
5	M2	X	.126	6.5
6	M2	X	.007	6.5
7	M2	X	.006	6.5
8	M2	X	.205	6.5

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M2	X	.812	16.5
2	M2	X	.417	16.5
3	M2	X	.026	16.5
4	M2	X	.262	16.5
5	M2	X	1.07	6.5
6	M2	X	.047	6.5
7	M2	X	.038	6.5
8	M2	X	1.616	6.5

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.031	-.031	0	0
2	M2	Y	-.031	-.031	0	6.5
3	M2	Y	-.012	-.012	6.5	14

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M2	Y	-.008	-.008	0	0
3	M1	Y	-.045	-.045	0	0
4	M2	Y	-.045	-.045	0	6.5
5	M2	Y	-.018	-.018	6.5	14

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.007	.007	0	0
2	M2	X	.007	.007	0	14
3	M1	X	.006	.006	0	0
4	M2	X	.006	.006	0	6.5
5	M2	X	.003	.003	6.5	14

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.051	.051	0	0
2	M2	X	.051	.051	0	6.5
3	M2	X	.064	.064	6.5	14
4	M1	X	.032	.032	0	0
5	M2	X	.04	.04	0	6.5
6	M2	X	.02	.02	6.5	14

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None					8	3		
3	Weight of Ice Only	None					8	5		
4	NESC Heavy Wind	None					8	5		
5	NESC Extreme Wind	None					8	6		

Load Combinations

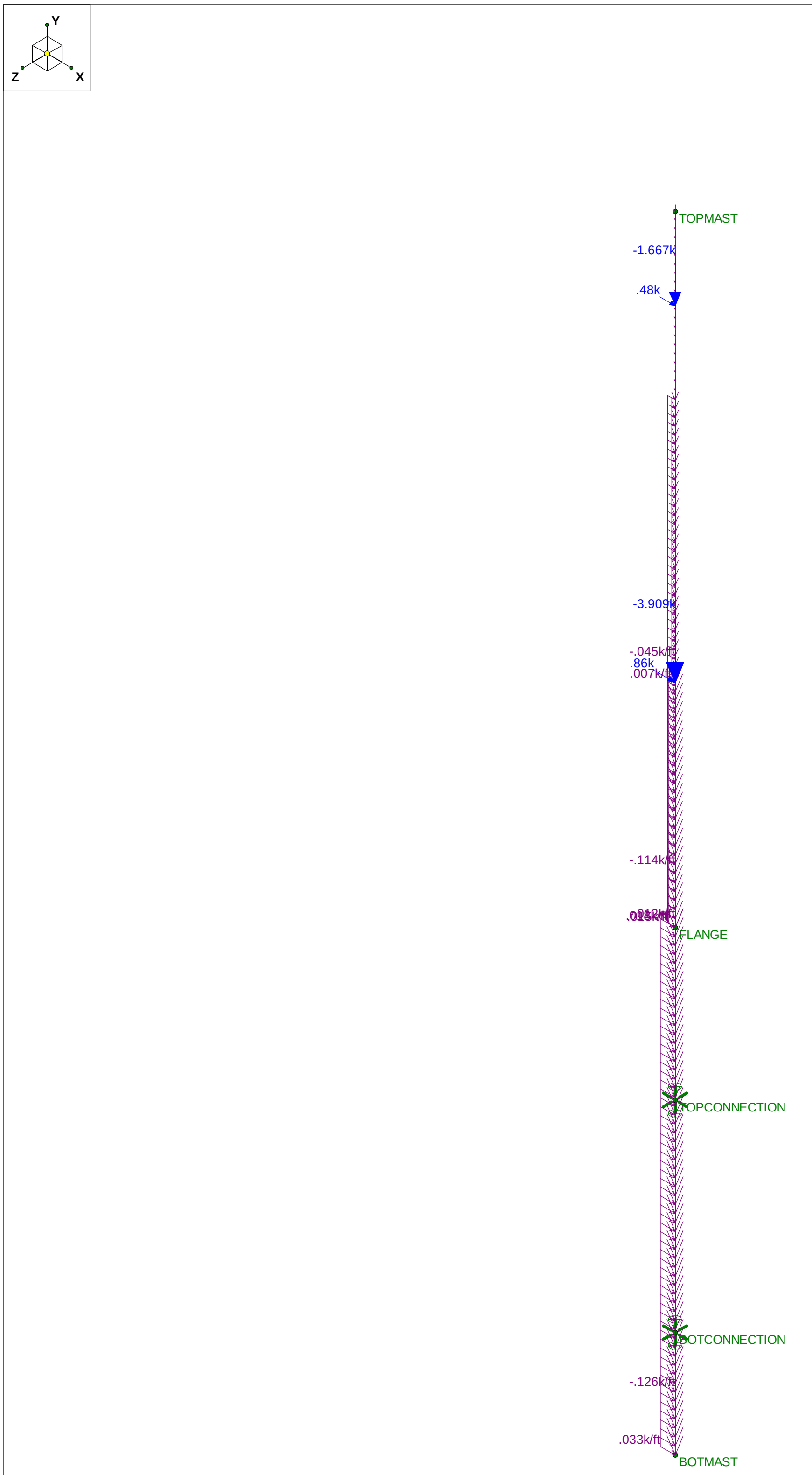
	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind	Yes	Y		1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind	Yes	Y		1	1	2	1	5	1														
3	Self Weight				1	1																		

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	BOTCONNECTION	3.832	1.364	0	0	0	0
2	1	TOPCONNECTION	-6.026	10.23	0	0	0	0
3	1	Totals:	-2.194	11.594	0			
4	1	COG (ft):	X: 0	Y: 18.827	Z: 0			

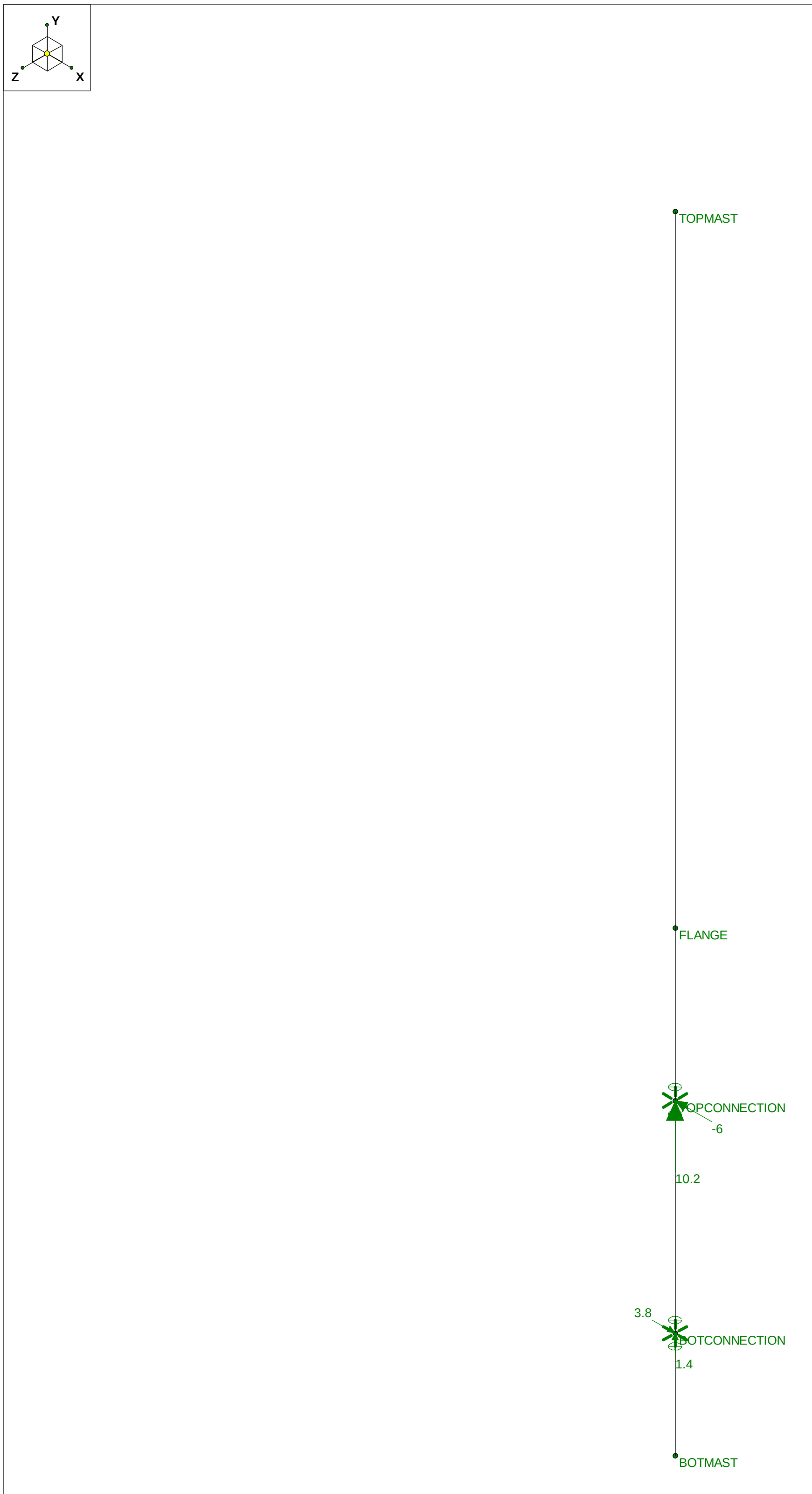
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	BOTCONNECTION	12.124	.574	0	0	0	0
2	2	TOPCONNECTION	-18.795	4.657	0	0	0	0
3	2	Totals:	-6.671	5.231	0			
4	2	COG (ft):	X: 0	Y: 19.168	Z: 0			



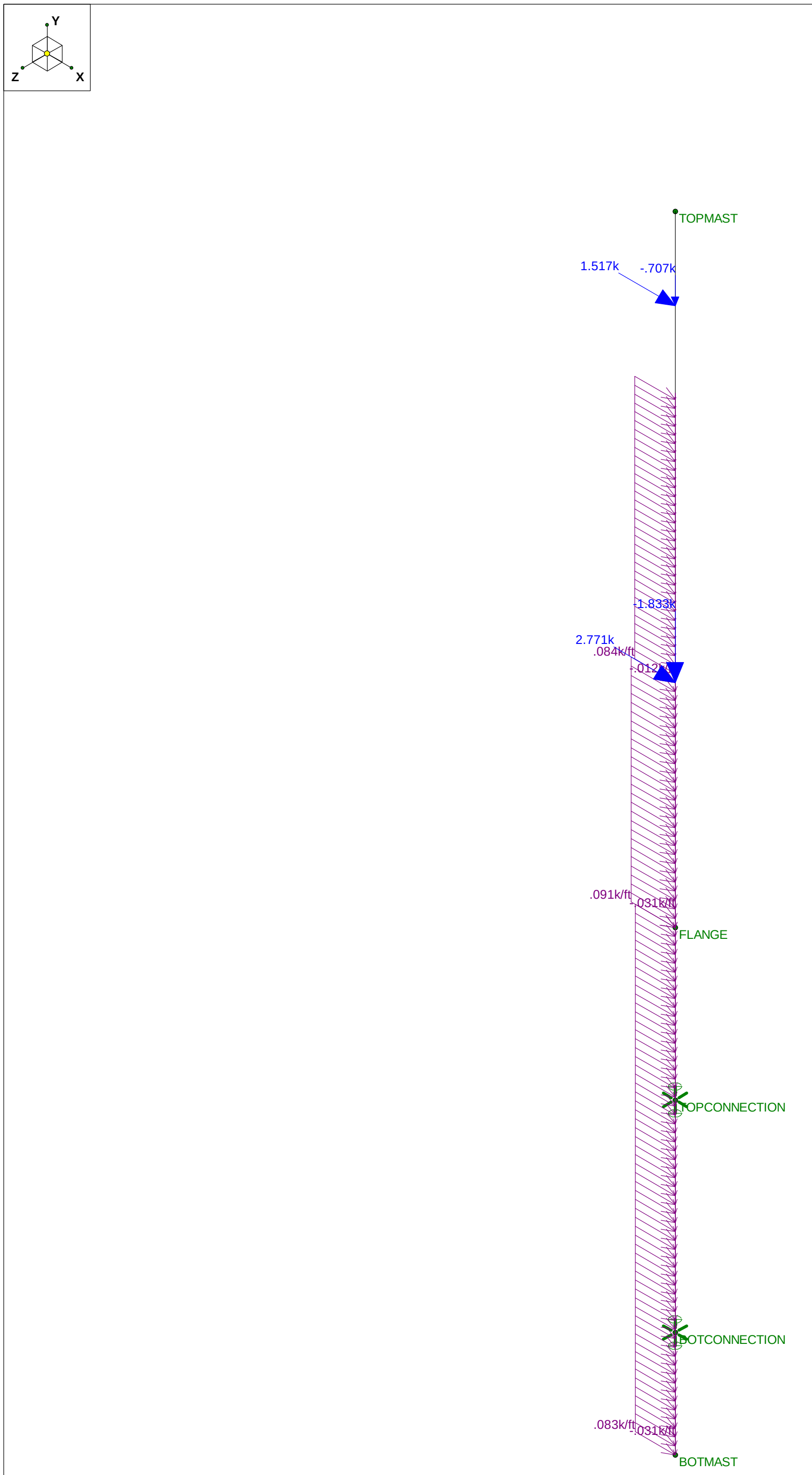
Loads: LC 1, NESC Heavy Wind

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10255 - Mast	Nov 30, 2018 at 12:14 PM
17159.08 / Sprint CT03XC...	LC #1 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10255 - Mast	Nov 30, 2018 at 12:15 PM
17159.08 / Sprint CT03XC...	LC #1 Reactions	NESC.r3d



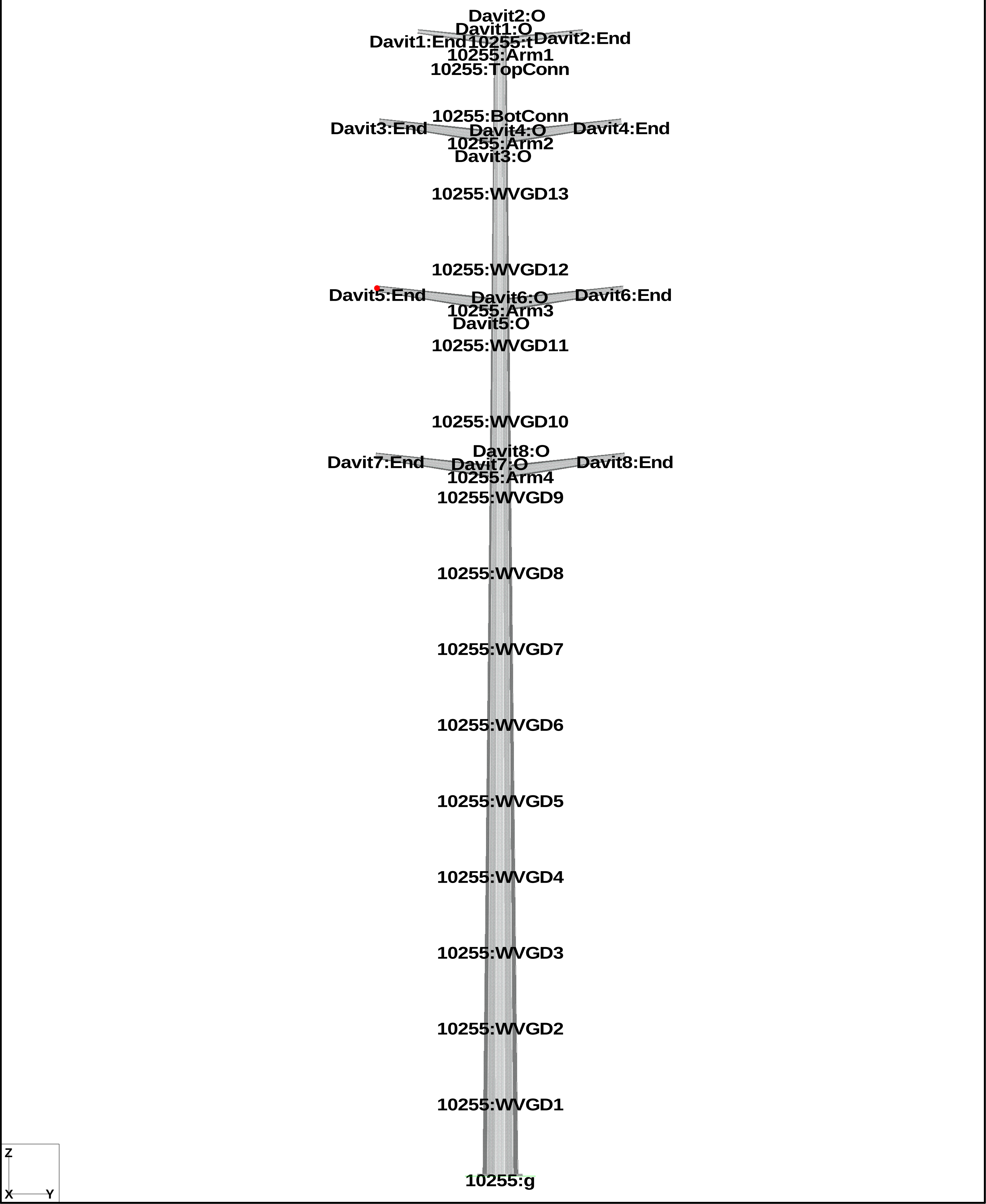
Loads: LC 2, NESC Extreme Wind

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10255 - Mast	Nov 30, 2018 at 12:14 PM
17159.08 / Sprint CT03XC...	LC #2 Loads	NESC.r3d

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

CENTEK Engineering, Inc.		
tjl, cfc	Structure # 10255 - Mast	Nov 30, 2018 at 12:16 PM
17159.08 / Sprint CT03XC...	LC #2 Reactions	NESC.r3d

Centek Engineering Inc, Project: "cl&p structure # 10255"
PLS-POLE Version 12.50, 10:47:16 AM Monday, August 20, 2018
Undeformed geometry displayed



Project Name : 17159.08 - Bethel, CT
Project Notes: Structure # 10255/ Sprint CT03XC351
Project File : J:\Jobs\1715900.WI\08_CT03XC351 Bethel\04_Structural\Backup Documentation\Rev (2)\Calcs\PLS-Pole\cl&p structure # 10255.pol
Date run : 12:17:08 PM Friday, November 30, 2018
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\1715900.wi\08_ct03xc351 bethel\04_structural\backup documentation\rev (2)\calcs\pls-pole\cl&p #10255.lca

*** Analysis Results:

Maximum element usage is 98.37% for Base Plate "10255" in load case "NESC Extreme"
Maximum insulator usage is 24.20% for Clamp "Clamp9" 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	10255:g	-0.21	-36.41	-131.10	36.41	4478.49	-14.85	4478.52	-0.02	0.00
NESC Extreme	10255:g	-0.05	-53.84	-63.68	53.84	6091.39	-3.68	6091.39	-0.01	0.00

Summary of Tip Deflections For All Load Cases:

Note: postive 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	10255:t	0.27	107.90	-4.47	107.99	0.01	-6.39	0.00
NESC Extreme	10255:t	0.06	144.32	-7.89	144.54	0.00	-8.68	0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
10255	1	5022	NESC Extreme	84.36	1204.53
10255	2	10058	NESC Extreme	94.56	3447.71
10255	3	12901	NESC Extreme	96.53	5823.04

*** 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)
10255	96.53	NESC Extreme	37	30952.3

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	11.74	NESC Heavy	1	182.3
Davit2	14.63	NESC Heavy	1	182.3
Davit3	30.91	NESC Heavy	1	575.0
Davit4	35.67	NESC Heavy	1	575.0
Davit5	31.23	NESC Heavy	1	575.0
Davit6	35.86	NESC Heavy	1	575.0
Davit7	31.68	NESC Heavy	1	575.0
Davit8	36.14	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	74.74	10255	Base Plate
NESC Extreme	98.37	10255	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	73.32	10255	27
NESC Extreme	96.53	10255	37

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	10255	12	36.011	128.131	4478.495	-14.853	44.843	201.855	5	107.788	2.594	74.74
NESC Extreme	10255	12	36.011	60.707	6091.393	-3.684	59.020	265.669	5	141.595	2.975	98.37

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	36.14	Davit8	1
NESC Extreme	15.11	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	2.15	NESC Heavy	0.0
Clamp2	Clamp	2.06	NESC Heavy	0.0
Clamp3	Clamp	10.99	NESC Heavy	0.0

Clamp4	Clamp	10.99	NESC Heavy	0.0
Clamp5	Clamp	10.99	NESC Heavy	0.0
Clamp6	Clamp	10.99	NESC Heavy	0.0
Clamp7	Clamp	10.99	NESC Heavy	0.0
Clamp8	Clamp	10.99	NESC Heavy	0.0
Clamp9	Clamp	24.20	NESC Extreme	0.0
Clamp10	Clamp	15.17	NESC Extreme	0.0
Clamp11	Clamp	1.44	NESC Heavy	0.0
Clamp12	Clamp	1.44	NESC Heavy	0.0
Clamp13	Clamp	1.44	NESC Heavy	0.0
Clamp14	Clamp	1.44	NESC Heavy	0.0
Clamp15	Clamp	1.44	NESC Heavy	0.0
Clamp16	Clamp	1.44	NESC Heavy	0.0
Clamp17	Clamp	1.44	NESC Heavy	0.0
Clamp18	Clamp	1.44	NESC Heavy	0.0
Clamp19	Clamp	1.44	NESC Heavy	0.0
Clamp20	Clamp	1.44	NESC Heavy	0.0
Clamp21	Clamp	1.44	NESC Heavy	0.0
Clamp22	Clamp	1.44	NESC Heavy	0.0
Clamp23	Clamp	1.44	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	3814.7
Weight of Steel Poles:	30952.3
Total:	34767.0

*** End of Report

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***************************************************************************
*                                                                         *
*                                PLS-POLE                                 *
*                  POLE AND FRAME ANALYSIS AND DESIGN                     *
*              Copyright Power Line Systems, Inc. 1999-2011               *
*                                                                         *
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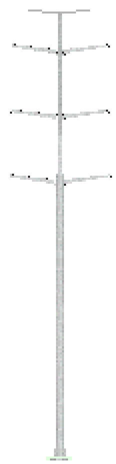
Project Name : 17159.08 - Bethel, CT
Project Notes: Structure # 10255/ Sprint CT03XC351
Project File : J:\Jobs\1715900.WI\08_CT03XC351 Bethel\04_Structural\Backup Documentation\Rev (2)\Calcs\PLS-Pole\cl&p structure # 10255.pol
Date run   : 12:17:07 PM Friday, November 30, 2018
by   : PLS-POLE Version 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 Property	Stock Number	Length	Default Embedded	Base Plate	Shape	Tip Diameter	Base Diameter	Taper	Default Drag	Tubes	Modulus of Elasticity	Weight Density	Shape At	Ultimate	Ultimate	Strength Check	Distance From

Label		(ft)	Length (ft)			(in)	(in)	(in/ft)	Coef.		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
CL&P10255	10255	150.00	0	Yes	12F	20.18	55.99	0	1.6	3 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

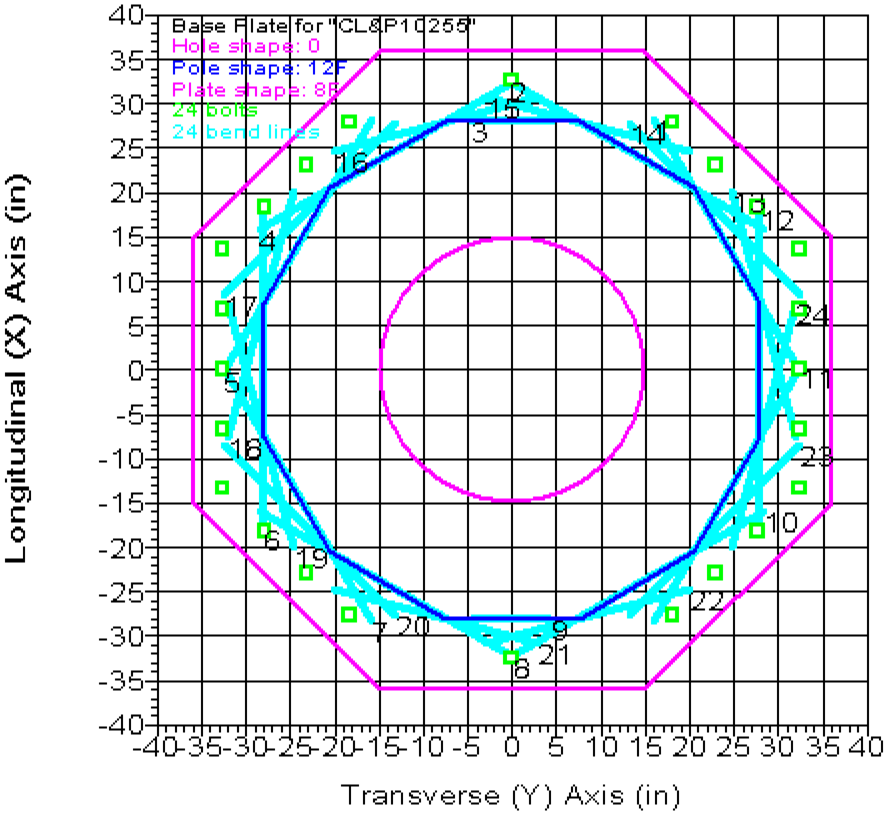
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CL&P10255	1	55	0.3125	4.670	0.000	0.000	65.000	0.000	5022	29.85	0.24873	20.18	33.86	4.154	4.670
CL&P10255	2	54.67	0.4375	6.170	0.000	0.000	65.000	0.000	10058	28.95	0.24873	32.07	45.67	5.600	6.170
CL&P10255	3	51.17	0.46875	0.000	0.000	0.000	65.000	0.000	12901	26.69	0.24873	43.26	55.99	0.000	0.000

Base Plate Properties:

Pole Property	Plate Diam. (in)	Plate Shape	Plate Thick. (in)	Plate Weight (lbs)	Bend Line Length Override (in)	Hole Diam. (in)	Hole Shape	Steel Density (lbs/ft^3)	Steel Yield Stress (ksi)	Bolt Diam. (in)	Bolt Pattern Diam. (in)	Num. Of Bolts	Bolt Cage X Inertia (in^4)	Bolt Cage Y Inertia (in^4)
CL&P10255	72.000	8F	3.000	2971	0.000	30.000	0	490.00	60.000	2.250	65.000	24	67953.29	37978.89

Base Plate Bolt Coordinates for Property "CL&P10255":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0	1	0
0.8538	0.5615	0
0.7077	0.7077	0
0.5615	0.8538	0
0.4154	1	0
0.2077	1	0
1	0	0



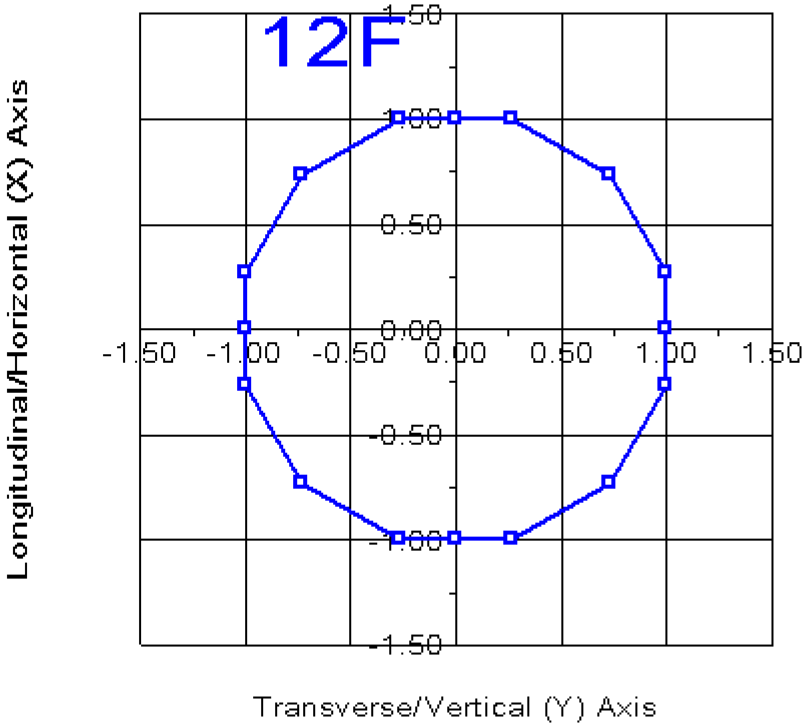
Steel Pole Connectivity:

Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Property Set	Attach. Labels	Base Connect	Embed % Override	Embed C. Override (ft)
10255			0	0	0	0	0	CL&P10255	19 labels		0.00	0

Relative Attachment Labels for Steel Pole "10255":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
10255:Arm1	0.00	149.30
10255:Arm2	0.00	136.63
10255:Arm3	0.00	114.63
10255:Arm4	0.00	92.63
10255:TopConn	0.00	146.42

10255:BotConn	0.00	140.25
10255:WVGD1	0.00	10.00
10255:WVGD2	0.00	20.00
10255:WVGD3	0.00	30.00
10255:WVGD4	0.00	40.00
10255:WVGD5	0.00	50.00
10255:WVGD6	0.00	60.00
10255:WVGD7	0.00	70.00
10255:WVGD8	0.00	80.00
10255:WVGD9	0.00	90.00
10255:WVGD10	0.00	100.00
10255:WVGD11	0.00	110.00
10255:WVGD12	0.00	120.00
10255:WVGD13	0.00	130.00



Pole Steel Properties:

Warning: Capacities and usages printed in splices are listed for the inner tube except at the splice top which uses the outer tube. ??

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
10255	10255:t	10255:t Ori	0.00	20.18	19.96	1008.79	1008.79	0.00	14.6	65.00	65.00	541.55	541.55

10255	10255:Arm1	10255:Arm1	End	0.70	20.35	20.14	1035.54	1035.54	0.00	14.8	65.00	65.00	551.16	551.16
10255	10255:Arm1	10255:Arm1	Ori	0.70	20.35	20.14	1035.54	1035.54	0.00	14.8	65.00	65.00	551.16	551.16
10255	10255:TopConn	10255:TopConn	End	3.58	21.07	20.86	1150.58	1150.58	0.00	15.4	65.00	65.00	591.56	591.56
10255	10255:TopConn	10255:TopConn	Ori	3.58	21.07	20.86	1150.58	1150.58	0.00	15.4	65.00	65.00	591.56	591.56
10255	#10255:0	Tube 1	End	6.67	21.84	21.63	1282.93	1282.93	0.00	16.0	65.00	65.00	636.44	636.44
10255	#10255:0	Tube 1	Ori	6.67	21.84	21.63	1282.93	1282.93	0.00	16.0	65.00	65.00	636.44	636.44
10255	10255:BotConn	10255:BotConn	End	9.75	22.61	22.40	1425.06	1425.06	0.00	16.7	65.00	65.00	682.95	682.95
10255	10255:BotConn	10255:BotConn	Ori	9.75	22.61	22.40	1425.06	1425.06	0.00	16.7	65.00	65.00	682.95	682.95
10255	10255:Arm2	10255:Arm2	End	13.38	23.51	23.31	1605.04	1605.04	0.00	17.5	65.00	65.00	739.70	739.70
10255	10255:Arm2	10255:Arm2	Ori	13.38	23.51	23.31	1605.04	1605.04	0.00	17.5	65.00	65.00	739.70	739.70
10255	#10255:1	Tube 1	End	16.69	24.33	24.13	1782.21	1782.21	0.00	18.2	65.00	65.00	793.54	793.54
10255	#10255:1	Tube 1	Ori	16.69	24.33	24.13	1782.21	1782.21	0.00	18.2	65.00	65.00	793.54	793.54
10255	10255:WVGD13	10255:WVGD13	End	20.00	25.15	24.96	1971.97	1971.97	0.00	18.9	65.00	65.00	849.26	849.26
10255	10255:WVGD13	10255:WVGD13	Ori	20.00	25.15	24.96	1971.97	1971.97	0.00	18.9	65.00	65.00	849.27	849.27
10255	#10255:2	Tube 1	End	25.00	26.40	26.21	2283.18	2283.18	0.00	20.0	65.00	65.00	936.97	936.97
10255	#10255:2	Tube 1	Ori	25.00	26.40	26.21	2283.18	2283.18	0.00	20.0	65.00	65.00	936.97	936.97
10255	10255:WVGD12	10255:WVGD12	End	30.00	27.64	27.46	2625.52	2625.52	0.00	21.0	65.00	65.00	1028.98	1028.98
10255	10255:WVGD12	10255:WVGD12	Ori	30.00	27.64	27.46	2625.52	2625.52	0.00	21.0	65.00	65.00	1028.98	1028.98
10255	#10255:3	Tube 1	End	32.69	28.31	28.13	2822.91	2822.91	0.00	21.6	65.00	65.00	1080.22	1080.22
10255	#10255:3	Tube 1	Ori	32.69	28.31	28.13	2822.91	2822.91	0.00	21.6	65.00	65.00	1080.22	1080.22
10255	10255:Arm3	10255:Arm3	End	35.38	28.98	28.80	3029.96	3029.96	0.00	22.2	65.00	65.00	1132.70	1132.70
10255	10255:Arm3	10255:Arm3	Ori	35.38	28.98	28.80	3029.96	3029.96	0.00	22.2	65.00	65.00	1132.70	1132.70
10255	10255:WVGD11	10255:WVGD11	End	40.00	30.13	29.96	3409.54	3409.54	0.00	23.2	65.00	65.00	1225.94	1225.94
10255	10255:WVGD11	10255:WVGD11	Ori	40.00	30.13	29.96	3409.54	3409.54	0.00	23.2	65.00	65.00	1225.94	1225.94
10255	#10255:4	Tube 1	End	45.00	31.37	31.21	3854.19	3854.19	0.00	24.2	65.00	65.00	1330.88	1330.88
10255	#10255:4	Tube 1	Ori	45.00	31.37	31.21	3854.19	3854.19	0.00	24.2	65.00	65.00	1330.88	1330.88
10255	10255:WVGD10	10255:WVGD10	End	50.00	32.62	32.46	4335.91	4335.91	0.00	25.3	65.00	65.00	1440.13	1440.13
10255	10255:WVGD10	10255:WVGD10	Ori	50.00	32.62	32.46	4335.91	4335.91	0.00	25.3	65.00	65.00	1440.13	1440.13
10255	#10255:5	SpliceT	End	50.33	32.70	32.54	4369.04	4369.04	0.00	25.4	65.00	65.00	1447.49	1447.49
10255	#10255:5	SpliceT	Ori	50.33	32.70	32.54	4369.04	4369.04	0.00	25.4	65.00	65.00	1447.49	1447.49
10255	#10255:6	SpliceB	End	55.00	33.24	46.14	6353.36	6353.36	0.00	17.7	65.00	65.00	2070.93	2070.93
10255	#10255:6	SpliceB	Ori	55.00	33.24	46.14	6353.36	6353.36	0.00	17.7	65.00	65.00	2070.93	2070.93
10255	10255:Arm4	10255:Arm4	End	57.38	33.83	46.97	6702.85	6702.85	0.00	18.0	65.00	65.00	2146.69	2146.69
10255	10255:Arm4	10255:Arm4	Ori	57.38	33.83	46.97	6702.85	6702.85	0.00	18.0	65.00	65.00	2146.69	2146.69
10255	10255:WVGD9	10255:WVGD9	End	60.00	34.48	47.89	7103.77	7103.77	0.00	18.4	65.00	65.00	2232.01	2232.01
10255	10255:WVGD9	10255:WVGD9	Ori	60.00	34.48	47.89	7103.77	7103.77	0.00	18.4	65.00	65.00	2232.01	2232.01
10255	#10255:7	Tube 2	End	65.00	35.72	49.64	7911.06	7911.06	0.00	19.2	65.00	65.00	2399.12	2399.12
10255	#10255:7	Tube 2	Ori	65.00	35.72	49.64	7911.06	7911.06	0.00	19.2	65.00	65.00	2399.12	2399.12
10255	10255:WVGD8	10255:WVGD8	End	70.00	36.97	51.39	8777.30	8777.30	0.00	20.0	65.00	65.00	2572.27	2572.27
10255	10255:WVGD8	10255:WVGD8	Ori	70.00	36.97	51.39	8777.31	8777.31	0.00	20.0	65.00	65.00	2572.27	2572.27
10255	#10255:8	Tube 2	End	75.00	38.21	53.14	9704.59	9704.59	0.00	20.7	65.00	65.00	2751.45	2751.45
10255	#10255:8	Tube 2	Ori	75.00	38.21	53.14	9704.59	9704.59	0.00	20.7	65.00	65.00	2751.45	2751.45
10255	10255:WVGD7	10255:WVGD7	End	80.00	39.45	54.89	10694.98	10694.98	0.00	21.5	65.00	65.00	2936.66	2936.66
10255	10255:WVGD7	10255:WVGD7	Ori	80.00	39.45	54.89	10694.98	10694.98	0.00	21.5	65.00	65.00	2936.66	2936.66
10255	#10255:9	Tube 2	End	85.00	40.70	56.63	11750.57	11750.57	0.00	22.2	65.00	65.00	3127.91	3127.91
10255	#10255:9	Tube 2	Ori	85.00	40.70	56.63	11750.57	11750.57	0.00	22.2	65.00	65.00	3127.91	3127.91
10255	10255:WVGD6	10255:WVGD6	End	90.00	41.94	58.38	12873.43	12873.43	0.00	23.0	65.00	65.00	3325.19	3325.19
10255	10255:WVGD6	10255:WVGD6	Ori	90.00	41.94	58.38	12873.43	12873.43	0.00	23.0	65.00	65.00	3325.19	3325.19
10255	#10255:10	Tube 2	End	94.42	43.04	59.93	13922.50	13922.50	0.00	23.7	65.00	65.00	3504.41	3504.41
10255	#10255:10	Tube 2	Ori	94.42	43.04	59.93	13922.50	13922.50	0.00	23.7	65.00	65.00	3504.41	3504.41
10255	#10255:11	SpliceT	End	98.83	44.14	61.47	15027.07	15027.07	0.00	24.4	65.00	65.00	3688.33	3688.33
10255	#10255:11	SpliceT	Ori	98.83	44.14	61.47	15027.07	15027.07	0.00	24.4	65.00	65.00	3688.33	3688.33
10255	10255:WVGD5	10255:WVGD5	End	100.00	43.55	64.94	15430.22	15430.22	0.00	22.2	65.00	65.00	3838.06	3838.06
10255	10255:WVGD5	10255:WVGD5	Ori	100.00	43.55	64.94	15430.22	15430.22	0.00	22.2	65.00	65.00	3838.06	3838.06
10255	#10255:12	SpliceB	End	105.00	44.80	66.81	16805.27	16805.27	0.00	22.9	65.00	65.00	4064.04	4064.04
10255	#10255:12	SpliceB	Ori	105.00	44.80	66.81	16805.27	16805.27	0.00	22.9	65.00	65.00	4064.04	4064.04
10255	10255:WVGD4	10255:WVGD4	End	110.00	46.04	68.69	18259.67	18259.67	0.00	23.6	65.00	65.00	4296.48	4296.48
10255	10255:WVGD4	10255:WVGD4	Ori	110.00	46.04	68.69	18259.67	18259.67	0.00	23.6	65.00	65.00	4296.48	4296.48
10255	#10255:13	Tube 3	End	115.00	47.28	70.56	19795.66	19795.66	0.00	24.3	65.00	65.00	4535.39	4535.39

10255	#10255:13	Tube 3	Ori	115.00	47.28	70.56	19795.66	19795.66	0.00	24.3	65.00	65.00	4535.39	4535.39
10255	10255:WVGD3	10255:WVGD3	End	120.00	48.53	72.44	21415.47	21415.47	0.00	25.1	65.00	65.00	4780.76	4780.76
10255	10255:WVGD3	10255:WVGD3	Ori	120.00	48.53	72.44	21415.47	21415.47	0.00	25.1	65.00	65.00	4780.76	4780.76
10255	#10255:14	Tube 3	End	125.00	49.77	74.31	23121.31	23121.31	0.00	25.8	65.00	65.00	5032.59	5032.59
10255	#10255:14	Tube 3	Ori	125.00	49.77	74.31	23121.31	23121.31	0.00	25.8	65.00	65.00	5032.59	5032.59
10255	10255:WVGD2	10255:WVGD2	End	130.00	51.02	76.18	24915.41	24915.41	0.00	26.5	65.00	65.00	5290.89	5290.89
10255	10255:WVGD2	10255:WVGD2	Ori	130.00	51.02	76.18	24915.42	24915.42	0.00	26.5	65.00	65.00	5290.89	5290.89
10255	#10255:15	Tube 3	End	135.00	52.26	78.06	26800.01	26800.01	0.00	27.2	65.00	65.00	5555.66	5555.66
10255	#10255:15	Tube 3	Ori	135.00	52.26	78.06	26800.01	26800.01	0.00	27.2	65.00	65.00	5555.66	5555.66
10255	10255:WVGD1	10255:WVGD1	End	140.00	53.50	79.93	28777.33	28777.33	0.00	27.9	65.00	65.00	5826.89	5826.89
10255	10255:WVGD1	10255:WVGD1	Ori	140.00	53.50	79.93	28777.33	28777.33	0.00	27.9	65.00	65.00	5826.89	5826.89
10255	#10255:16	Tube 3	End	145.00	54.75	81.81	30849.59	30849.59	0.00	28.6	65.00	65.00	6104.58	6104.58
10255	#10255:16	Tube 3	Ori	145.00	54.75	81.81	30849.59	30849.59	0.00	28.6	65.00	65.00	6104.58	6104.58
10255	10255:g	10255:g	End	150.00	55.99	83.68	33019.02	33019.02	0.00	29.3	65.00	65.00	6388.74	6388.74

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density Override (lbs/ft^3)	Steel Shape At End
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":

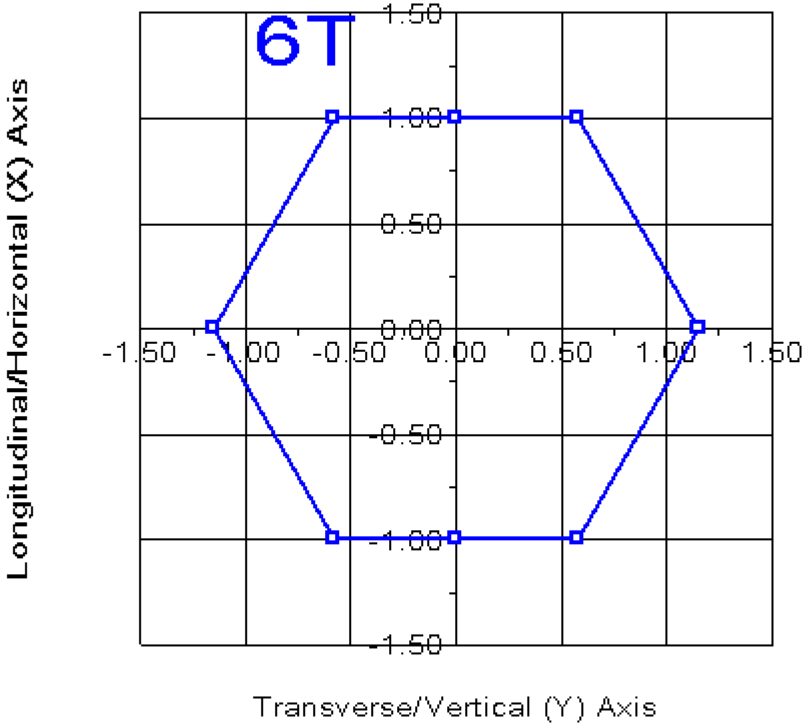
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	10	-1.2

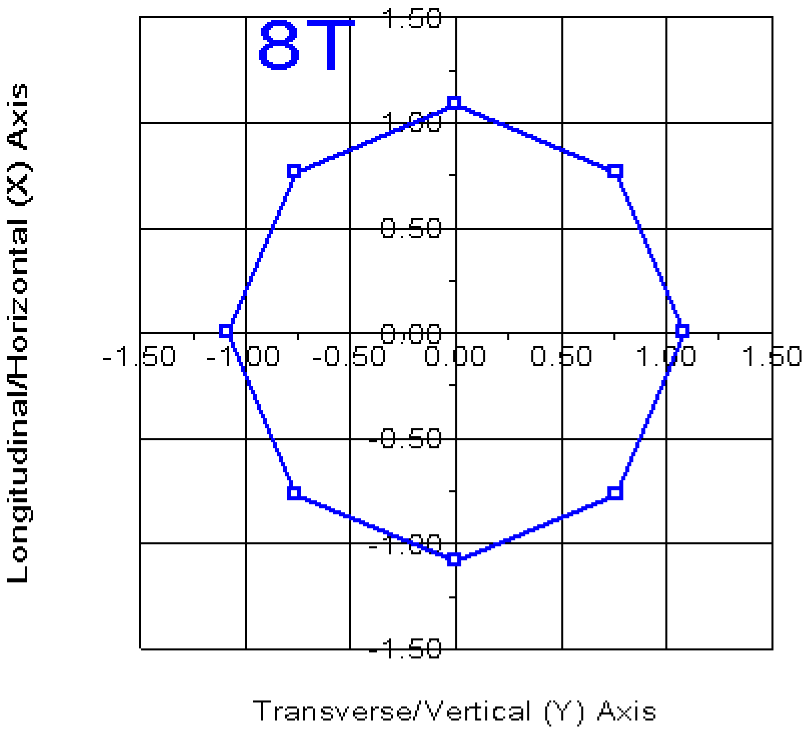
Intermediate Joints for Davit Property "ARM2":

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	10255:Arm1	ARM1	180
Davit2	10255:Arm1	ARM1	0
Davit3	10255:Arm2	ARM2	180
Davit4	10255:Arm2	ARM2	0
Davit5	10255:Arm3	ARM2	180
Davit6	10255:Arm3	ARM2	0
Davit7	10255:Arm4	ARM2	180


6T
1.50
1.00
0.50
0.00
-0.50
-1.00
-1.50
-1.50 -1.00 -0.50 0.00 0.50 1.00 1.50
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^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Davit1	Davit1:O	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:O	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:O	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:O	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:O	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:O	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:O	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:O	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 Number	Holding Capacity (lbs)

clamp clamp1 8e+004

Clamp Insulator Connectivity:

Clamp Label	Structure And Tip Attach	Property Set	Min. Required Vertical Load (uplift) (lbs)
Clamp1	Davit1:End	clamp	No Limit
Clamp2	Davit2:End	clamp	No Limit
Clamp3	Davit3:End	clamp	No Limit
Clamp4	Davit4:End	clamp	No Limit
Clamp5	Davit5:End	clamp	No Limit
Clamp6	Davit6:End	clamp	No Limit
Clamp7	Davit7:End	clamp	No Limit
Clamp8	Davit8:End	clamp	No Limit
Clamp9	10255:TopConn	clamp	No Limit
Clamp10	10255:BotConn	clamp	No Limit
Clamp11	10255:WVGD1	clamp	No Limit
Clamp12	10255:WVGD2	clamp	No Limit
Clamp13	10255:WVGD3	clamp	No Limit
Clamp14	10255:WVGD4	clamp	No Limit
Clamp15	10255:WVGD5	clamp	No Limit
Clamp16	10255:WVGD6	clamp	No Limit
Clamp17	10255:WVGD7	clamp	No Limit
Clamp18	10255:WVGD8	clamp	No Limit
Clamp19	10255:WVGD9	clamp	No Limit
Clamp20	10255:WVGD10	clamp	No Limit
Clamp21	10255:WVGD11	clamp	No Limit
Clamp22	10255:WVGD12	clamp	No Limit
Clamp23	10255:WVGD13	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1715900.wi\08_ct03xc351 bethel\04_structural\backup documentation\rev (2)\calcs\pls-pole\cl&p #10255.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)	150.50 (ft)	
Structure height	150.50 (ft)	
Structure height above ground	150.50 (ft)	

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular Arms and Towers	SF for Wood Poles	SF for Conc. Ult.	SF for Conc. First Crack	SF for Conc. Zero Tens.	SF for Guys and Cables	SF for Non Tubular Arms	SF for Braces	SF for Insuls.	SF For Found.	Point Loads	Wind/Ice Model	Trans. Wind Pressure (psf)	Longit. Wind Pressure (psf)	Ice Thick. (in)	Ice Density (lbs/ft^3)	Temperature (deg F)	Pole Deflection Check	Pole Deflection Limit % or (ft)
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	23 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	23 loads	NESC 2012	25.6	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	1235	1202	0	Shield Wire
Davit2:End	1194	1133	0	Shield Wire
Davit3:End	7920	3813	0	Conductor
Davit4:End	7920	3813	0	Conductor
Davit5:End	7920	3813	0	Conductor
Davit6:End	7920	3813	0	Conductor
Davit7:End	7920	3813	0	Conductor
Davit8:End	7920	3813	0	Conductor
10255:TopConn	10230	6026	0	Top Connection
10255:BotConn	1364	-3832	0	Bottom Connection
10255:WVGD1	1150	93	0	Coax Cables
10255:WVGD2	1150	93	0	Coax Cables
10255:WVGD3	1150	93	0	Coax Cables
10255:WVGD4	1150	93	0	Coax Cables
10255:WVGD5	1150	93	0	Coax Cables
10255:WVGD6	1150	93	0	Coax Cables

10255:WVGD7	1150	93	0	Coax Cables
10255:WVGD8	1150	93	0	Coax Cables
10255:WVGD9	1150	93	0	Coax Cables
10255:WVGD10	1150	93	0	Coax Cables
10255:WVGD11	1150	93	0	Coax Cables
10255:WVGD12	1150	93	0	Coax Cables
10255:WVGD13	1150	93	0	Coax Cables

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 Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
10255	10255:t	10255:Arm1	150.00	149.30	149.65	20.267	9.6e+005	1.600	10.00	0.50	71.64	18.92	8.87	0.93	19.85	0.00
10255	10255:Arm1	10255:TopConn	149.30	146.42	147.86	20.712	9.81e+005	1.600	10.00	0.50	301.32	79.54	37.29	3.84	83.38	0.00
10255	10255:TopConn		146.42	143.34	144.88	21.454	1.02e+006	1.600	10.00	0.50	334.50	88.25	41.38	4.11	92.37	0.00
10255		10255:BotConn	143.34	140.25	141.79	22.221	1.05e+006	1.600	10.00	0.50	346.65	91.41	42.86	4.11	95.52	0.00
10255	10255:BotConn	10255:Arm2	140.25	136.63	138.44	23.056	1.09e+006	1.600	10.00	0.50	422.84	111.44	52.25	4.83	116.28	0.00
10255	10255:Arm2		136.63	133.31	134.97	23.919	1.13e+006	1.600	10.00	0.50	401.04	105.65	49.54	4.42	110.06	0.00
10255		10255:WVGD13	133.31	130.00	131.66	24.743	1.17e+006	1.600	10.00	0.50	415.04	109.29	51.24	4.42	113.70	0.00
10255	10255:WVGD13		130.00	125.00	127.50	25.777	1.22e+006	1.600	10.00	0.50	652.99	171.85	80.58	6.67	178.52	0.00
10255		10255:WVGD12	125.00	120.00	122.50	27.020	1.28e+006	1.600	10.00	0.50	684.88	180.14	84.47	6.67	186.81	0.00
10255	10255:WVGD12		120.00	117.31	118.66	27.976	1.32e+006	1.600	10.00	0.50	381.30	100.25	47.01	3.58	103.84	0.00
10255		10255:Arm3	117.31	114.63	115.97	28.645	1.36e+006	1.600	10.00	0.50	390.51	102.65	48.13	3.58	106.23	0.00
10255	10255:Arm3	10255:WVGD11	114.63	110.00	112.31	29.554	1.4e+006	1.600	10.00	0.50	693.62	182.26	85.46	6.17	188.43	0.00
10255	10255:WVGD11		110.00	105.00	107.50	30.751	1.46e+006	1.600	10.00	0.50	780.56	205.02	96.13	6.67	211.69	0.00
10255		10255:WVGD10	105.00	100.00	102.50	31.995	1.51e+006	1.600	10.00	0.50	812.45	213.31	100.02	6.67	219.98	0.00
10255	10255:WVGD10		100.00	99.67	99.84	32.658	1.55e+006	1.600	10.00	0.50	54.74	14.37	6.74	0.44	14.81	0.00
10255			99.67	95.00	97.34	32.967	1.56e+006	1.600	10.00	0.50	1869.88	205.29	96.26	6.23	211.51	0.00
10255		10255:Arm4	95.00	92.63	93.81	33.531	1.59e+006	1.600	10.00	0.50	564.48	106.19	49.79	3.17	109.35	0.00
10255	10255:Arm4	10255:WVGD9	92.63	90.00	91.31	34.153	1.62e+006	1.600	10.00	0.50	635.46	119.54	56.05	3.50	123.04	0.00
10255	10255:WVGD9		90.00	85.00	87.50	35.101	1.66e+006	1.600	10.00	0.50	1244.45	234.02	109.73	6.67	240.68	0.00
10255		10255:WVGD8	85.00	80.00	82.50	36.345	1.72e+006	1.600	10.00	0.50	1289.10	242.31	113.62	6.67	248.98	0.00
10255	10255:WVGD8		80.00	75.00	77.50	37.588	1.78e+006	1.600	10.00	0.50	1333.75	250.60	117.50	6.67	257.27	0.00
10255		10255:WVGD7	75.00	70.00	72.50	38.832	1.84e+006	1.600	10.00	0.50	1378.39	258.89	121.39	6.67	265.56	0.00
10255	10255:WVGD7		70.00	65.00	67.50	40.076	1.9e+006	1.600	10.00	0.50	1423.04	267.18	125.28	6.67	273.85	0.00
10255		10255:WVGD6	65.00	60.00	62.50	41.319	1.96e+006	1.600	10.00	0.50	1467.69	275.48	129.17	6.67	282.14	0.00
10255	10255:WVGD6		60.00	55.59	57.79	42.490	2.01e+006	1.600	10.00	0.50	1333.09	250.14	117.29	5.89	256.03	0.00
10255			55.59	51.17	53.38	43.588	2.06e+006	1.600	10.00	0.50	1367.90	256.60	120.32	5.89	262.49	0.00
10255		10255:WVGD5	51.17	50.00	50.59	43.845	2.08e+006	1.600	10.00	0.50	754.83	68.40	32.07	1.56	69.96	0.00
10255	10255:WVGD5		50.00	45.00	47.50	44.175	2.09e+006	1.600	10.00	0.50	3282.82	294.52	138.09	6.67	301.18	0.00
10255		10255:WVGD4	45.00	40.00	42.50	45.419	2.15e+006	1.600	10.00	0.50	1729.02	302.81	141.98	6.67	309.48	0.00
10255	10255:WVGD4		40.00	35.00	37.50	46.662	2.21e+006	1.600	10.00	0.50	1776.86	311.10	145.87	6.67	317.77	0.00
10255		10255:WVGD3	35.00	30.00	32.50	47.906	2.27e+006	1.600	10.00	0.50	1824.70	319.39	149.76	6.67	326.06	0.00
10255	10255:WVGD3		30.00	25.00	27.50	49.150	2.33e+006	1.600	10.00	0.50	1872.54	327.68	153.65	6.67	334.35	0.00
10255		10255:WVGD2	25.00	20.00	22.50	50.394	2.39e+006	1.600	10.00	0.50	1920.37	335.97	157.53	6.67	342.64	0.00
10255	10255:WVGD2		20.00	15.00	17.50	51.637	2.44e+006	1.600	10.00	0.50	1968.21	344.27	161.42	6.67	350.93	0.00
10255		10255:WVGD1	15.00	10.00	12.50	52.881	2.5e+006	1.600	10.00	0.50	2016.05	352.56	165.31	6.67	359.22	0.00
10255	10255:WVGD1		10.00	5.00	7.50	54.125	2.56e+006	1.600	10.00	0.50	2063.89	360.85	169.20	6.67	367.52	0.00
10255		10255:g	5.00	0.00	2.50	55.368	2.62e+006	1.600	10.00	0.50	2111.73	369.14	173.08	6.67	375.81	0.00

Point Loads for Load Case "NESC Extreme":

Joint	Vertical	Transverse	Longitudinal	Load

Label	Load (lbs)	Load (lbs)	Load (lbs)	Comment
Davit1:End	236	881	0	Shield Wire
Davit2:End	254	742	0	Shield Wire
Davit3:End	3062	4981	0	Conductor
Davit4:End	3062	4981	0	Conductor
Davit5:End	3062	4981	0	Conductor
Davit6:End	3062	4981	0	Conductor
Davit7:End	3062	4981	0	Conductor
Davit8:End	3062	4981	0	Conductor
10255:TopConn	4657	18795	0	Top Connection
10255:BotConn	574	-12124	0	Bottom Connection
10255:WVGD1	312	218	0	Coax Cables
10255:WVGD2	312	218	0	Coax Cables
10255:WVGD3	312	218	0	Coax Cables
10255:WVGD4	312	218	0	Coax Cables
10255:WVGD5	312	218	0	Coax Cables
10255:WVGD6	312	218	0	Coax Cables
10255:WVGD7	312	218	0	Coax Cables
10255:WVGD8	312	218	0	Coax Cables
10255:WVGD9	312	218	0	Coax Cables
10255:WVGD10	312	218	0	Coax Cables
10255:WVGD11	312	218	0	Coax Cables
10255:WVGD12	312	218	0	Coax Cables
10255:WVGD13	312	218	0	Coax Cables

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

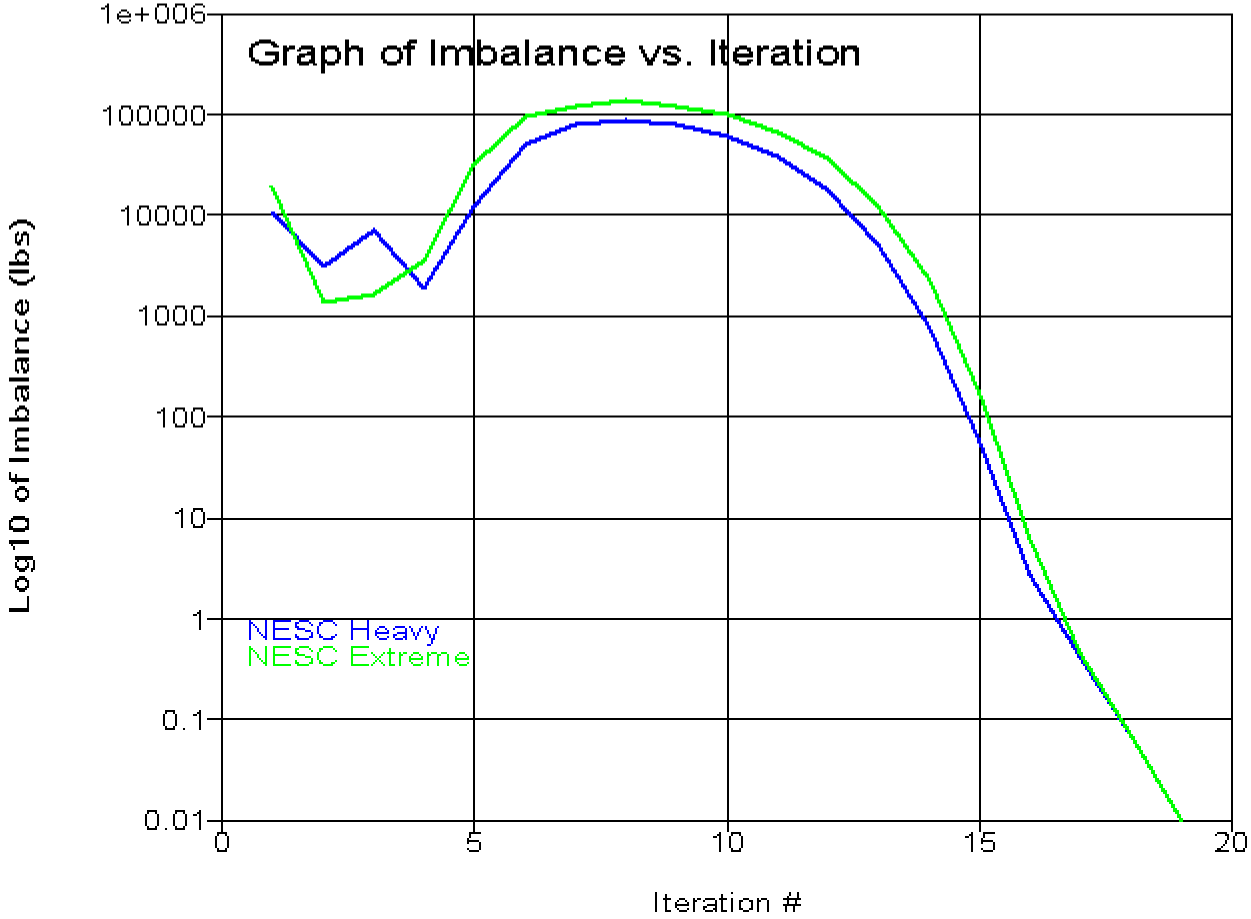
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top Z (ft)	Section Bottom Z (ft)	Section Average Elevation (ft)	Outer Diameter (in)	Reynolds Number	Drag Coef.	Adjusted Wind Pressure (psf)	Adjusted Ice Thickness (in)	Pole Vert. Load (lbs)	Pole Wind Load (lbs)	Pole Ice Vertical Load (lbs)	Pole Ice Wind Load (lbs)	Tran. Wind Load (lbs)	Long. Wind Load (lbs)
10255	10255:t	10255:Arm1	150.00	149.30	149.65	20.267	1.58e+006	1.000	27.12	0.00	47.76	32.07	0.00	0.00	32.07	0.00
10255	10255:Arm1	10255:TopConn	149.30	146.42	147.86	20.712	1.62e+006	1.000	27.12	0.00	200.88	134.83	0.00	0.00	134.83	0.00
10255	10255:TopConn		146.42	143.34	144.88	21.454	1.67e+006	1.000	27.12	0.00	223.00	149.61	0.00	0.00	149.61	0.00
10255		10255:BotConn	143.34	140.25	141.79	22.221	1.73e+006	1.000	27.12	0.00	231.10	154.96	0.00	0.00	154.96	0.00
10255	10255:BotConn	10255:Arm2	140.25	136.63	138.44	23.056	1.8e+006	1.000	27.12	0.00	281.89	188.92	0.00	0.00	188.92	0.00
10255	10255:Arm2		136.63	133.31	134.97	23.919	1.87e+006	1.000	27.12	0.00	267.36	179.09	0.00	0.00	179.09	0.00
10255		10255:WVGD13	133.31	130.00	131.66	24.743	1.93e+006	1.000	27.12	0.00	276.69	185.26	0.00	0.00	185.26	0.00
10255	10255:WVGD13		130.00	125.00	127.50	25.777	2.01e+006	1.000	27.12	0.00	435.33	291.32	0.00	0.00	291.32	0.00
10255		10255:WVGD12	125.00	120.00	122.50	27.020	2.11e+006	1.000	27.12	0.00	456.59	305.38	0.00	0.00	305.38	0.00
10255	10255:WVGD12		120.00	117.31	118.66	27.976	2.18e+006	1.000	27.12	0.00	254.20	169.95	0.00	0.00	169.95	0.00
10255		10255:Arm3	117.31	114.63	115.97	28.645	2.23e+006	1.000	27.12	0.00	260.34	174.01	0.00	0.00	174.01	0.00
10255	10255:Arm3	10255:WVGD11	114.63	110.00	112.31	29.554	2.3e+006	1.000	27.12	0.00	462.41	308.97	0.00	0.00	308.97	0.00
10255	10255:WVGD11		110.00	105.00	107.50	30.751	2.4e+006	1.000	27.12	0.00	520.37	347.55	0.00	0.00	347.55	0.00
10255		10255:WVGD10	105.00	100.00	102.50	31.995	2.49e+006	1.000	27.12	0.00	541.63	361.60	0.00	0.00	361.60	0.00
10255	10255:WVGD10		100.00	99.67	99.84	32.658	2.55e+006	1.000	27.12	0.00	36.50	24.36	0.00	0.00	24.36	0.00
10255			99.67	95.00	97.34	32.967	2.57e+006	1.000	27.12	0.00	1246.59	348.00	0.00	0.00	348.00	0.00
10255		10255:Arm4	95.00	92.63	93.81	33.531	2.61e+006	1.000	27.12	0.00	376.32	180.01	0.00	0.00	180.01	0.00
10255	10255:Arm4	10255:WVGD9	92.63	90.00	91.31	34.153	2.66e+006	1.000	27.12	0.00	423.64	202.64	0.00	0.00	202.64	0.00
10255	10255:WVGD9		90.00	85.00	87.50	35.101	2.74e+006	1.000	27.12	0.00	829.63	396.71	0.00	0.00	396.71	0.00
10255		10255:WVGD8	85.00	80.00	82.50	36.345	2.83e+006	1.000	27.12	0.00	859.40	410.76	0.00	0.00	410.76	0.00
10255	10255:WVGD8		80.00	75.00	77.50	37.588	2.93e+006	1.000	27.12	0.00	889.16	424.82	0.00	0.00	424.82	0.00
10255		10255:WVGD7	75.00	70.00	72.50	38.832	3.03e+006	1.000	27.12	0.00	918.93	438.87	0.00	0.00	438.87	0.00

10255	10255:WVGD7		70.00	65.00	67.50	40.076	3.12e+006	1.000	27.12	0.00	948.70	452.93	0.00	0.00	452.93	0.00
10255		10255:WVGD6	65.00	60.00	62.50	41.319	3.22e+006	1.000	27.12	0.00	978.46	466.98	0.00	0.00	466.98	0.00
10255	10255:WVGD6		60.00	55.59	57.79	42.490	3.31e+006	1.000	27.12	0.00	888.73	424.03	0.00	0.00	424.03	0.00
10255			55.59	51.17	53.38	43.588	3.4e+006	1.000	27.12	0.00	911.94	434.99	0.00	0.00	434.99	0.00
10255		10255:WVGD5	51.17	50.00	50.59	43.845	3.42e+006	1.000	27.12	0.00	503.22	115.96	0.00	0.00	115.96	0.00
10255	10255:WVGD5		50.00	45.00	47.50	44.175	3.44e+006	1.000	27.12	0.00	2188.55	499.26	0.00	0.00	499.26	0.00
10255		10255:WVGD4	45.00	40.00	42.50	45.419	3.54e+006	1.000	27.12	0.00	1152.68	513.32	0.00	0.00	513.32	0.00
10255	10255:WVGD4		40.00	35.00	37.50	46.662	3.64e+006	1.000	27.12	0.00	1184.57	527.37	0.00	0.00	527.37	0.00
10255		10255:WVGD3	35.00	30.00	32.50	47.906	3.74e+006	1.000	27.12	0.00	1216.46	541.43	0.00	0.00	541.43	0.00
10255	10255:WVGD3		30.00	25.00	27.50	49.150	3.83e+006	1.000	27.12	0.00	1248.36	555.49	0.00	0.00	555.49	0.00
10255		10255:WVGD2	25.00	20.00	22.50	50.394	3.93e+006	1.000	27.12	0.00	1280.25	569.54	0.00	0.00	569.54	0.00
10255	10255:WVGD2		20.00	15.00	17.50	51.637	4.03e+006	1.000	27.12	0.00	1312.14	583.60	0.00	0.00	583.60	0.00
10255		10255:WVGD1	15.00	10.00	12.50	52.881	4.12e+006	1.000	27.12	0.00	1344.03	597.65	0.00	0.00	597.65	0.00
10255	10255:WVGD1		10.00	5.00	7.50	54.125	4.22e+006	1.000	27.12	0.00	1375.92	611.71	0.00	0.00	611.71	0.00
10255		10255:g	5.00	0.00	2.50	55.368	4.32e+006	1.000	27.12	0.00	1407.82	625.76	0.00	0.00	625.76	0.00

*** Analysis Results:

Maximum element usage is 98.37% for Base Plate "10255" in load case "NESC Extreme"
Maximum insulator usage is 24.20% for Clamp "Clamp9" in load case "NESC Extreme"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 19

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)
10255:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10255:t	0.02215	8.992	-0.3725	-6.3942	0.0140	0.0004	0.02215	8.992	149.6
10255:Arm1	0.02198	8.914	-0.3681	-6.3942	0.0140	0.0004	0.02198	8.914	148.9

10255:TopConn	0.02127	8.593	-0.3502	-6.3891	0.0140	0.0004	0.02127	8.593	146.1
10255:BotConn	0.01977	7.909	-0.312	-6.3334	0.0140	0.0003	0.01977	7.909	139.9
10255:Arm2	0.01889	7.51	-0.29	-6.2757	0.0139	0.0003	0.01889	7.51	136.3
10255:WVGD13	0.01729	6.795	-0.2509	-6.0990	0.0137	0.0003	0.01729	6.795	129.7
10255:WVGD12	0.01494	5.763	-0.197	-5.7207	0.0132	0.0002	0.01494	5.763	119.8
10255:Arm3	0.01372	5.238	-0.1711	-5.4848	0.0128	0.0002	0.01372	5.238	114.5
10255:WVGD11	0.01271	4.804	-0.1504	-5.2555	0.0124	0.0002	0.01271	4.804	109.8
10255:WVGD10	0.01062	3.935	-0.1118	-4.6994	0.0115	0.0002	0.01062	3.935	99.89
10255:Arm4	0.009182	3.354	-0.08856	-4.3322	0.0108	0.0001	0.009182	3.354	92.54
10255:WVGD9	0.008693	3.158	-0.0811	-4.2074	0.0106	0.0001	0.008693	3.158	89.92
10255:WVGD8	0.006932	2.467	-0.05654	-3.7115	0.0096	0.0001	0.006932	2.467	79.94
10255:WVGD7	0.005348	1.863	-0.03769	-3.2009	0.0085	0.0001	0.005348	1.863	69.96
10255:WVGD6	0.003955	1.348	-0.02385	-2.6911	0.0074	0.0000	0.003955	1.348	59.98
10255:WVGD5	0.002763	0.9214	-0.01417	-2.1917	0.0062	0.0000	0.002763	0.9214	49.99
10255:WVGD4	0.001778	0.5803	-0.007799	-1.7118	0.0050	0.0000	0.001778	0.5803	39.99
10255:WVGD3	0.001006	0.3213	-0.003892	-1.2519	0.0038	0.0000	0.001006	0.3213	30
10255:WVGD2	0.0004503	0.1407	-0.001712	-0.8133	0.0025	0.0000	0.0004503	0.1407	20
10255:WVGD1	0.0001143	0.03486	-0.0006057	-0.3961	0.0013	0.0000	0.0001143	0.03486	9.999
Davit1:O	0.022	8.919	-0.2737	-6.3942	0.0140	0.0004	0.022	8.071	149
Davit1:End	0.02263	9.109	0.8079	-6.1499	0.0141	0.0004	0.02263	-1.739	151.3
Davit2:O	0.02195	8.909	-0.4626	-6.3942	0.0140	0.0004	0.02195	9.757	148.8
Davit2:End	0.0219	8.98	-1.616	-6.7039	0.0140	0.0004	0.0219	19.83	148.9
Davit3:O	0.01892	7.516	-0.1829	-6.2757	0.0139	0.0003	0.01892	6.537	136.4
Davit3:End	0.01987	7.801	1.343	-5.5658	0.0140	0.0004	0.01987	-8.179	140
Davit4:O	0.01885	7.505	-0.397	-6.2757	0.0139	0.0003	0.01885	8.484	136.2
Davit4:End	0.01882	7.636	-2.17	-7.1012	0.0139	0.0003	0.01882	23.62	136.5
Davit5:O	0.01376	5.243	-0.05566	-5.4848	0.0128	0.0002	0.01376	4.036	114.6
Davit5:End	0.01457	5.48	1.266	-4.7671	0.0129	0.0003	0.01457	-10.73	117.9
Davit6:O	0.01369	5.232	-0.2865	-5.4848	0.0128	0.0002	0.01369	6.44	114.3
Davit6:End	0.01373	5.359	-1.851	-6.3153	0.0128	0.0002	0.01373	21.57	114.8
Davit7:O	0.009205	3.358	0.01791	-4.3322	0.0108	0.0001	0.009205	1.949	92.64
Davit7:End	0.009817	3.531	1.04	-3.6034	0.0108	0.0002	0.009817	-12.88	95.67
Davit8:O	0.009159	3.35	-0.195	-4.3322	0.0108	0.0001	0.009159	4.759	92.43
Davit8:End	0.009266	3.465	-1.457	-5.1698	0.0108	0.0001	0.009266	19.87	93.17

Joint Support Reactions for Load Case "NESC Heavy":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
10255:g	-0.21	0.0	-36.41	0.0	0.0	-131.10	0.0	0.0	136.06	0.0	4478.49	0.0	-14.9	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.
10255	10255:t	Origin	0.00	107.90	0.27	-4.47	-0.00	-0.00	0.0	-0.04	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.05
10255	10255:Arm1	End	0.70	106.97	0.26	-4.42	0.01	-0.00	0.0	-0.04	0.01	-0.00	-0.00	0.00	0.00	0.00	0.00	0.03
10255	10255:Arm1	Origin	0.70	106.97	0.26	-4.42	2.74	-0.00	0.0	-2.94	2.74	-0.00	-0.15	0.09	0.27	0.00	0.52	0.84

10255	10255:TopConn	End	3.58	103.12	0.26	-4.20	10.63	-0.01	0.0	-2.94	2.74	-0.00	-0.14	1.17	0.07	0.00	1.32	2.0	2
10255	10255:TopConn	Origin	3.58	103.12	0.26	-4.20	10.63	-0.01	0.0	-12.79	9.99	-0.01	-0.61	0.86	0.69	0.00	1.90	2.9	3
10255	Tube 1	End	6.67	99.00	0.25	-3.97	41.46	-0.03	0.0	-12.79	9.99	-0.01	-0.59	4.24	0.25	0.00	4.85	7.5	2
10255	Tube 1	Origin	6.67	99.00	0.25	-3.97	41.46	-0.03	0.0	-13.18	10.12	-0.01	-0.61	4.24	0.25	0.00	4.86	7.5	2
10255	10255:BotConn	End	9.75	94.90	0.24	-3.74	72.69	-0.07	0.0	-13.18	10.12	-0.01	-0.59	6.92	0.24	0.00	7.52	11.6	2
10255	10255:BotConn	Origin	9.75	94.90	0.24	-3.74	72.69	-0.07	0.0	-15.39	6.60	-0.01	-0.69	6.92	0.16	0.00	7.61	11.7	2
10255	10255:Arm2	End	13.38	90.12	0.23	-3.48	96.63	-0.11	0.0	-15.39	6.60	-0.01	-0.66	8.49	0.15	0.00	9.16	14.1	2
10255	10255:Arm2	Origin	13.38	90.12	0.23	-3.48	114.46	-0.12	0.0	-32.48	16.24	-0.02	-1.39	10.06	0.37	0.00	11.47	17.7	2
10255	Tube 1	End	16.69	85.80	0.22	-3.24	168.26	-0.20	0.0	-32.48	16.24	-0.02	-1.35	13.79	0.36	0.00	15.15	23.3	2
10255	Tube 1	Origin	16.69	85.80	0.22	-3.24	168.26	-0.20	0.0	-32.97	16.35	-0.02	-1.37	13.79	0.36	0.00	15.17	23.3	2
10255	10255:WVGD13	End	20.00	81.54	0.21	-3.01	222.41	-0.28	0.0	-32.97	16.35	-0.02	-1.32	17.03	0.35	0.00	18.36	28.2	2
10255	10255:WVGD13	Origin	20.00	81.54	0.21	-3.01	222.41	-0.28	0.0	-34.73	16.69	-0.03	-1.39	17.03	0.35	0.00	18.43	28.4	2
10255	Tube 1	End	25.00	75.25	0.19	-2.68	305.87	-0.42	0.0	-34.73	16.69	-0.03	-1.33	21.23	0.34	0.00	22.56	34.7	2
10255	Tube 1	Origin	25.00	75.25	0.19	-2.68	305.87	-0.42	0.0	-35.54	16.83	-0.03	-1.36	21.23	0.34	0.00	22.59	34.8	2
10255	10255:WVGD12	End	30.00	69.16	0.18	-2.36	390.04	-0.59	0.0	-35.54	16.83	-0.03	-1.29	24.65	0.32	0.00	25.95	39.9	2
10255	10255:WVGD12	Origin	30.00	69.16	0.18	-2.36	390.04	-0.59	0.0	-37.32	17.14	-0.04	-1.36	24.65	0.33	0.00	26.01	40.0	2
10255	Tube 1	End	32.69	65.97	0.17	-2.21	436.11	-0.69	0.0	-37.32	17.14	-0.04	-1.33	26.25	0.32	0.00	27.59	42.4	2
10255	Tube 1	Origin	32.69	65.97	0.17	-2.21	436.11	-0.69	0.0	-37.78	17.21	-0.04	-1.34	26.25	0.32	0.00	27.60	42.5	2
10255	10255:Arm3	End	35.38	62.86	0.16	-2.05	482.37	-0.80	0.0	-37.78	17.21	-0.04	-1.31	27.69	0.32	0.00	29.01	44.6	2
10255	10255:Arm3	Origin	35.38	62.86	0.16	-2.05	499.78	-0.81	0.0	-55.20	26.54	-0.05	-1.92	28.69	0.49	0.00	30.62	47.1	2
10255	10255:WVGD11	End	40.00	57.65	0.15	-1.80	622.53	-1.04	0.0	-55.20	26.54	-0.05	-1.84	33.02	0.47	0.00	34.87	53.7	2
10255	10255:WVGD11	Origin	40.00	57.65	0.15	-1.80	622.53	-1.04	0.0	-57.28	26.77	-0.05	-1.91	33.02	0.47	0.00	34.94	53.8	2
10255	Tube 1	End	45.00	52.29	0.14	-1.56	756.37	-1.31	0.0	-57.28	26.77	-0.05	-1.84	36.96	0.45	0.00	38.80	59.7	2
10255	Tube 1	Origin	45.00	52.29	0.14	-1.56	756.37	-1.31	0.0	-58.30	26.78	-0.06	-1.87	36.96	0.45	0.00	38.83	59.7	2
10255	10255:WVGD10	End	50.00	47.22	0.13	-1.34	890.27	-1.61	0.0	-58.30	26.78	-0.06	-1.80	40.20	0.44	0.00	42.00	64.6	2
10255	10255:WVGD10	Origin	50.00	47.22	0.13	-1.34	890.27	-1.61	0.0	-60.00	26.96	-0.06	-1.85	40.20	0.44	0.00	42.06	64.7	2
10255	SpliceT	End	50.33	46.89	0.13	-1.33	899.17	-1.63	0.0	-60.00	26.96	-0.06	-1.84	40.40	0.44	0.00	42.25	65.0	2
10255	SpliceT	Origin	50.33	46.89	0.13	-1.33	899.17	-1.63	0.0	-61.07	27.02	-0.07	-1.88	40.40	0.44	0.00	42.28	65.0	2
10255	SpliceB	End	55.00	42.43	0.12	-1.15	1025.37	-1.94	0.0	-61.07	27.02	-0.07	-1.32	32.20	0.31	0.00	33.53	51.6	2
10255	SpliceB	Origin	55.00	42.43	0.12	-1.15	1025.37	-1.94	0.0	-62.44	27.09	-0.07	-1.35	32.20	0.31	0.00	33.56	51.6	

2	10255	10255:Arm4	End	57.38	40.25	0.11	-1.06	1089.71	-2.10	0.0	-62.44	27.09	-0.07	-1.33	33.01	0.31	0.00	34.35	52.8
2	10255	10255:Arm4	Origin	57.38	40.25	0.11	-1.06	1106.50	-2.11	0.0	-80.09	36.05	-0.08	-1.71	33.52	0.41	0.00	35.23	54.2
2	10255	10255:WVGD9	End	60.00	37.90	0.10	-0.97	1201.12	-2.31	0.0	-80.09	36.05	-0.08	-1.67	35.00	0.40	0.00	36.68	56.4
2	10255	10255:WVGD9	Origin	60.00	37.90	0.10	-0.97	1201.12	-2.31	0.0	-82.36	36.22	-0.08	-1.72	35.00	0.40	0.00	36.72	56.5
2	10255	Tube 2	End	65.00	33.62	0.09	-0.82	1382.21	-2.72	0.0	-82.36	36.22	-0.08	-1.66	37.47	0.39	0.00	39.13	60.2
2	10255	Tube 2	Origin	65.00	33.62	0.09	-0.82	1382.21	-2.72	0.0	-83.90	36.20	-0.09	-1.69	37.47	0.39	0.00	39.16	60.3
2	10255	10255:WVGD8	End	70.00	29.60	0.08	-0.68	1563.20	-3.16	0.0	-83.90	36.20	-0.09	-1.63	39.52	0.37	0.00	41.16	63.3
2	10255	10255:WVGD8	Origin	70.00	29.60	0.08	-0.68	1563.20	-3.16	0.0	-86.62	36.33	-0.09	-1.69	39.52	0.37	0.00	41.21	63.4
2	10255	Tube 2	End	75.00	25.84	0.07	-0.56	1744.86	-3.63	0.0	-86.62	36.33	-0.09	-1.63	41.24	0.36	0.00	42.88	66.0
2	10255	Tube 2	Origin	75.00	25.84	0.07	-0.56	1744.86	-3.63	0.0	-88.26	36.29	-0.10	-1.66	41.24	0.36	0.00	42.91	66.0
2	10255	10255:WVGD7	End	80.00	22.35	0.06	-0.45	1926.32	-4.13	0.0	-88.26	36.29	-0.10	-1.61	42.66	0.35	0.00	44.27	68.1
2	10255	10255:WVGD7	Origin	80.00	22.35	0.06	-0.45	1926.32	-4.13	0.0	-91.08	36.40	-0.11	-1.66	42.66	0.35	0.00	44.33	68.2
2	10255	Tube 2	End	85.00	19.13	0.06	-0.36	2108.33	-4.66	0.0	-91.08	36.40	-0.11	-1.61	43.84	0.34	0.00	45.45	69.9
2	10255	Tube 2	Origin	85.00	19.13	0.06	-0.36	2108.33	-4.66	0.0	-92.82	36.35	-0.11	-1.64	43.84	0.34	0.00	45.48	70.0
2	10255	10255:WVGD6	End	90.00	16.17	0.05	-0.29	2290.08	-5.22	0.0	-92.82	36.35	-0.11	-1.59	44.79	0.33	0.00	46.39	71.4
2	10255	10255:WVGD6	Origin	90.00	16.17	0.05	-0.29	2290.08	-5.22	0.0	-95.63	36.45	-0.12	-1.64	44.79	0.33	0.00	46.43	71.4
2	10255	Tube 2	End	94.42	13.79	0.04	-0.23	2450.99	-5.75	0.0	-95.63	36.45	-0.12	-1.60	45.49	0.32	0.00	47.09	72.4
2	10255	Tube 2	Origin	94.42	13.79	0.04	-0.23	2450.99	-5.75	0.0	-97.24	36.40	-0.13	-1.62	45.49	0.32	0.00	47.12	72.5
2	10255	SpliceT	End	98.83	11.60	0.03	-0.18	2611.68	-6.31	0.0	-97.24	36.40	-0.13	-1.58	46.06	0.31	0.00	47.64	73.3
2	10255	SpliceT	Origin	98.83	11.60	0.03	-0.18	2611.68	-6.31	0.0	-98.47	36.37	-0.13	-1.60	46.06	0.31	0.00	47.66	73.3
2	10255	10255:WVGD5	End	100.00	11.06	0.03	-0.17	2654.23	-6.46	0.0	-98.47	36.37	-0.13	-1.52	44.98	0.30	0.00	46.50	71.5
2	10255	10255:WVGD5	Origin	100.00	11.06	0.03	-0.17	2654.23	-6.46	0.0	-101.81	36.51	-0.13	-1.57	44.98	0.30	0.00	46.55	71.6
2	10255	SpliceB	End	105.00	8.88	0.03	-0.13	2836.77	-7.13	0.0	-101.81	36.51	-0.13	-1.52	45.40	0.29	0.00	46.93	72.2
2	10255	SpliceB	Origin	105.00	8.88	0.03	-0.13	2836.77	-7.13	0.0	-104.61	36.47	-0.14	-1.57	45.40	0.29	0.00	46.97	72.3
2	10255	10255:WVGD4	End	110.00	6.96	0.02	-0.09	3019.13	-7.83	0.0	-104.61	36.47	-0.14	-1.52	45.71	0.28	0.00	47.23	72.7
2	10255	10255:WVGD4	Origin	110.00	6.96	0.02	-0.09	3019.13	-7.83	0.0	-107.80	36.53	-0.15	-1.57	45.71	0.28	0.00	47.28	72.7
2	10255	Tube 3	End	115.00	5.29	0.02	-0.07	3201.79	-8.57	0.0	-107.80	36.53	-0.15	-1.53	45.92	0.27	0.00	47.45	73.0
2	10255	Tube 3	Origin	115.00	5.29	0.02	-0.07	3201.79	-8.57	0.0	-109.89	36.47	-0.16	-1.56	45.92	0.27	0.00	47.48	73.0
2	10255	10255:WVGD3	End	120.00	3.86	0.01	-0.05	3384.13	-9.35	0.0	-109.89	36.47	-0.16	-1.52	46.05	0.27	0.00	47.56	73.2
2																			

10255	10255:WVGD3	Origin	120.00	3.86	0.01	-0.05	3384.13	-9.35	0.0	-113.19	36.52	-0.16	-1.56	46.05	0.27	0.00	47.61	73.2	2
10255	Tube 3	End	125.00	2.66	0.01	-0.03	3566.74	-10.17	0.0	-113.19	36.52	-0.16	-1.52	46.10	0.26	0.00	47.63	73.3	2
10255	Tube 3	Origin	125.00	2.66	0.01	-0.03	3566.74	-10.17	0.0	-115.38	36.46	-0.17	-1.55	46.10	0.26	0.00	47.66	73.3	2
10255	10255:WVGD2	End	130.00	1.69	0.01	-0.02	3749.04	-11.03	0.0	-115.38	36.46	-0.17	-1.51	46.09	0.25	0.00	47.61	73.2	2
10255	10255:WVGD2	Origin	130.00	1.69	0.01	-0.02	3749.04	-11.03	0.0	-118.77	36.51	-0.18	-1.56	46.09	0.25	0.00	47.66	73.3	2
10255	Tube 3	End	135.00	0.94	0.00	-0.01	3931.59	-11.92	0.0	-118.77	36.51	-0.18	-1.52	46.04	0.25	0.00	47.56	73.2	2
10255	Tube 3	Origin	135.00	0.94	0.00	-0.01	3931.59	-11.92	0.0	-121.05	36.45	-0.19	-1.55	46.04	0.25	0.00	47.59	73.2	2
10255	10255:WVGD1	End	140.00	0.42	0.00	-0.01	4113.83	-12.86	0.0	-121.05	36.45	-0.19	-1.51	45.93	0.24	0.00	47.45	73.0	2
10255	10255:WVGD1	Origin	140.00	0.42	0.00	-0.01	4113.83	-12.86	0.0	-124.54	36.50	-0.20	-1.56	45.93	0.24	0.00	47.49	73.1	2
10255	Tube 3	End	145.00	0.11	0.00	-0.00	4296.30	-13.83	0.0	-124.54	36.50	-0.20	-1.52	45.79	0.24	0.00	47.31	72.8	2
10255	Tube 3	Origin	145.00	0.11	0.00	-0.00	4296.30	-13.83	0.0	-126.92	36.44	-0.20	-1.55	45.79	0.24	0.00	47.34	72.8	2
10255	10255:g	End	150.00	0.00	0.00	0.00	4478.49	-14.85	0.0	-126.92	36.44	-0.20	-1.52	45.61	0.23	0.00	47.12	72.5	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	107.03	0.26	-3.28	-10.59	0.01	0.0	-1.50	1.12	-0.00	-0.22	7.42	0.00	0.00	7.63	11.7	1
Davit1	#Davit1:0	End	5.00	108.18	0.27	3.22	-5.00	0.00	0.0	-1.50	1.12	-0.00	-0.28	5.84	0.00	0.00	6.12	9.4	1
Davit1	#Davit1:0	Origin	5.00	108.18	0.27	3.22	-5.00	0.00	0.0	-1.47	1.01	-0.00	-0.28	5.84	0.00	0.00	6.11	9.4	1
Davit1	#Davit1:1	End	7.54	108.75	0.27	6.47	-2.43	0.00	0.0	-1.47	1.01	-0.00	-0.32	3.90	0.00	0.00	4.22	6.5	1
Davit1	#Davit1:1	Origin	7.54	108.75	0.27	6.47	-2.43	0.00	0.0	-1.46	0.96	-0.00	-0.32	3.90	0.00	0.00	4.22	6.5	1
Davit1	Davit1:End	End	10.07	109.31	0.27	9.69	-0.00	0.00	0.0	-1.46	0.96	-0.00	-0.39	0.00	0.54	0.00	1.01	1.6	3
Davit2	Davit2:O	Origin	0.00	106.90	0.26	-5.55	-13.34	-0.00	-0.0	1.12	1.40	0.00	0.16	9.35	0.00	0.00	9.51	14.6	1
Davit2	#Davit2:0	End	5.00	107.33	0.26	-12.34	-6.36	-0.00	-0.0	1.12	1.40	0.00	0.21	7.42	0.00	0.00	7.63	11.7	1
Davit2	#Davit2:0	Origin	5.00	107.33	0.26	-12.34	-6.36	-0.00	-0.0	1.13	1.28	0.00	0.21	7.42	0.00	0.00	7.63	11.7	1
Davit2	#Davit2:1	End	7.54	107.55	0.26	-15.84	-3.10	-0.00	-0.0	1.13	1.28	0.00	0.25	4.98	0.00	0.00	5.23	8.0	1
Davit2	#Davit2:1	Origin	7.54	107.55	0.26	-15.84	-3.10	-0.00	0.0	1.13	1.22	0.00	0.25	4.98	0.00	0.00	5.23	8.0	1
Davit2	Davit2:End	End	10.07	107.76	0.26	-19.39	0.00	0.00	0.0	1.13	1.22	0.00	0.30	0.00	0.69	0.00	1.23	1.9	3
Davit3	Davit3:O	Origin	0.00	90.20	0.23	-2.19	-108.70	0.04	0.0	-5.75	7.45	-0.00	-0.38	19.71	0.00	0.00	20.09	30.9	1
Davit3	#Davit3:0	End	5.00	91.39	0.23	4.12	-71.46	0.02	0.0	-5.75	7.45	-0.00	-0.46	18.94	0.00	0.00	19.40	29.8	1
Davit3	#Davit3:0	Origin	5.00	91.39	0.23	4.12	-71.46	0.02	0.0	-5.64	7.17	-0.00	-0.45	18.94	0.00	0.00	19.39	29.8	1
Davit3	#Davit3:1	End	10.00	92.51	0.23	10.17	-35.63	0.01	0.0	-5.64	7.17	-0.00	-0.57	15.08	0.00	0.00	15.65	24.1	1
Davit3	#Davit3:1	Origin	10.00	92.51	0.23	10.17	-35.63	0.01	0.0	-5.57	6.99	-0.00	-0.56	15.08	0.00	0.00	15.64	24.1	1
Davit3	#Davit3:2	End	12.57	93.06	0.24	13.17	-17.69	0.00	0.0	-5.57	6.99	-0.00	-0.65	10.02	0.00	0.00	10.67	16.4	1
Davit3	#Davit3:2	Origin	12.57	93.06	0.24	13.17	-17.69	0.00	0.0	-5.53	6.89	-0.00	-0.64	10.02	0.00	0.00	10.66	16.4	1
Davit3	Davit3:End	End	15.13	93.61	0.24	16.12	-0.00	0.00	0.0	-5.53	6.89	-0.00	-0.76	0.00	1.97	0.00	3.50	5.4	3
Davit4	Davit4:O	Origin	0.00	90.05	0.23	-4.76	-126.53	-0.03	-0.0	3.64	8.68	0.00	0.24	22.94	0.00	0.00	23.18	35.7	1
Davit4	#Davit4:0	End	5.00	90.57	0.23	-11.48	-83.12	-0.02	-0.0	3.64	8.68	0.00	0.29	22.02	0.00	0.00	22.31	34.3	1
Davit4	#Davit4:0	Origin	5.00	90.57	0.23	-11.48	-83.12	-0.02	-0.0	3.69	8.34	0.00	0.30	22.02	0.00	0.00	22.32	34.3	1
Davit4	#Davit4:1	End	10.00	91.09	0.23	-18.51	-41.40	-0.01	-0.0	3.69	8.34	0.00	0.37	17.52	0.00	0.00	17.90	27.5	1

Davit4	#Davit4:1	Origin	10.00	91.09	0.23	-18.51	-41.40	-0.01	-0.0	3.72	8.13	0.00	0.38	17.52	0.00	0.00	17.90	27.5	1
Davit4	#Davit4:2	End	12.57	91.36	0.23	-22.25	-20.55	-0.01	-0.0	3.72	8.13	0.00	0.43	11.64	0.00	0.00	12.07	18.6	1
Davit4	#Davit4:2	Origin	12.57	91.36	0.23	-22.25	-20.55	-0.01	0.0	3.74	8.01	0.00	0.44	11.64	0.00	0.00	12.07	18.6	1
Davit4	Davit4:End	End	15.13	91.63	0.23	-26.04	-0.00	0.00	0.0	3.74	8.01	0.00	0.52	0.00	2.29	0.00	4.00	6.2	3
Davit5	Davit5:O	Origin	0.00	62.92	0.17	-0.67	-109.88	0.03	0.0	-5.64	7.53	-0.00	-0.37	19.92	0.00	0.00	20.30	31.2	1
Davit5	#Davit5:0	End	5.00	63.92	0.17	4.84	-72.25	0.02	0.0	-5.64	7.53	-0.00	-0.45	19.14	0.00	0.00	19.59	30.1	1
Davit5	#Davit5:0	Origin	5.00	63.92	0.17	4.84	-72.25	0.02	0.0	-5.54	7.25	-0.00	-0.44	19.14	0.00	0.00	19.59	30.1	1
Davit5	#Davit5:1	End	10.00	64.86	0.17	10.08	-36.02	0.01	0.0	-5.54	7.25	-0.00	-0.56	15.25	0.00	0.00	15.81	24.3	1
Davit5	#Davit5:1	Origin	10.00	64.86	0.17	10.08	-36.02	0.01	0.0	-5.47	7.07	-0.00	-0.55	15.25	0.00	0.00	15.80	24.3	1
Davit5	#Davit5:2	End	12.57	65.32	0.17	12.66	-17.88	0.00	0.0	-5.47	7.07	-0.00	-0.64	10.13	0.00	0.00	10.77	16.6	1
Davit5	#Davit5:2	Origin	12.57	65.32	0.17	12.66	-17.88	0.00	0.0	-5.43	6.97	-0.00	-0.63	10.13	0.00	0.00	10.76	16.6	1
Davit5	Davit5:End	End	15.13	65.76	0.17	15.19	-0.00	0.00	0.0	-5.43	6.97	-0.00	-0.75	0.00	1.99	0.00	3.53	5.4	3
Davit6	Davit6:O	Origin	0.00	62.79	0.16	-3.44	-127.29	-0.03	-0.0	3.52	8.73	0.00	0.23	23.08	0.00	0.00	23.31	35.9	1
Davit6	#Davit6:0	End	5.00	63.28	0.16	-9.32	-83.63	-0.02	-0.0	3.52	8.73	0.00	0.28	22.16	0.00	0.00	22.44	34.5	1
Davit6	#Davit6:0	Origin	5.00	63.28	0.16	-9.32	-83.63	-0.02	-0.0	3.57	8.39	0.00	0.29	22.16	0.00	0.00	22.44	34.5	1
Davit6	#Davit6:1	End	10.00	63.78	0.16	-15.54	-41.66	-0.01	-0.0	3.57	8.39	0.00	0.36	17.63	0.00	0.00	18.00	27.7	1
Davit6	#Davit6:1	Origin	10.00	63.78	0.16	-15.54	-41.66	-0.01	-0.0	3.61	8.18	0.00	0.36	17.63	0.00	0.00	18.00	27.7	1
Davit6	#Davit6:2	End	12.57	64.04	0.16	-18.84	-20.68	-0.00	-0.0	3.61	8.18	0.00	0.42	11.71	0.00	0.00	12.13	18.7	1
Davit6	#Davit6:2	Origin	12.57	64.04	0.16	-18.84	-20.68	-0.00	0.0	3.63	8.06	0.00	0.42	11.71	0.00	0.00	12.13	18.7	1
Davit6	Davit6:End	End	15.13	64.31	0.16	-22.22	-0.00	0.00	0.0	3.63	8.06	0.00	0.50	0.00	2.30	0.00	4.02	6.2	3
Davit7	Davit7:O	Origin	0.00	40.30	0.11	0.21	-111.57	0.03	0.0	-5.49	7.64	-0.00	-0.36	20.23	0.00	0.00	20.59	31.7	1
Davit7	#Davit7:0	End	5.00	41.04	0.11	4.54	-73.37	0.02	0.0	-5.49	7.64	-0.00	-0.44	19.44	0.00	0.00	19.88	30.6	1
Davit7	#Davit7:0	Origin	5.00	41.04	0.11	4.54	-73.37	0.02	0.0	-5.39	7.36	-0.00	-0.43	19.44	0.00	0.00	19.87	30.6	1
Davit7	#Davit7:1	End	10.00	41.72	0.12	8.59	-36.58	0.01	0.0	-5.39	7.36	-0.00	-0.54	15.49	0.00	0.00	16.03	24.7	1
Davit7	#Davit7:1	Origin	10.00	41.72	0.12	8.59	-36.58	0.01	0.0	-5.33	7.18	-0.00	-0.54	15.49	0.00	0.00	16.02	24.7	1
Davit7	#Davit7:2	End	12.57	42.05	0.12	10.57	-18.16	0.00	0.0	-5.33	7.18	-0.00	-0.62	10.29	0.00	0.00	10.91	16.8	1
Davit7	#Davit7:2	Origin	12.57	42.05	0.12	10.57	-18.16	0.00	0.0	-5.29	7.08	-0.00	-0.62	10.29	0.00	0.00	10.90	16.8	1
Davit7	Davit7:End	End	15.13	42.37	0.12	12.49	-0.00	0.00	0.0	-5.29	7.08	-0.00	-0.73	0.00	2.02	0.00	3.58	5.5	3
Davit8	Davit8:O	Origin	0.00	40.20	0.11	-2.34	-128.34	-0.03	-0.0	3.34	8.80	0.00	0.22	23.27	0.00	0.00	23.49	36.1	1
Davit8	#Davit8:0	End	5.00	40.64	0.11	-7.02	-84.34	-0.02	-0.0	3.34	8.80	0.00	0.27	22.35	0.00	0.00	22.61	34.8	1
Davit8	#Davit8:0	Origin	5.00	40.64	0.11	-7.02	-84.34	-0.02	-0.0	3.41	8.46	0.00	0.27	22.35	0.00	0.00	22.62	34.8	1
Davit8	#Davit8:1	End	10.00	41.09	0.11	-12.03	-42.02	-0.01	-0.0	3.41	8.46	0.00	0.34	17.79	0.00	0.00	18.13	27.9	1
Davit8	#Davit8:1	Origin	10.00	41.09	0.11	-12.03	-42.02	-0.01	-0.0	3.45	8.25	0.00	0.35	17.79	0.00	0.00	18.14	27.9	1
Davit8	#Davit8:2	End	12.57	41.33	0.11	-14.72	-20.86	-0.00	-0.0	3.45	8.25	0.00	0.40	11.81	0.00	0.00	12.21	18.8	1
Davit8	#Davit8:2	Origin	12.57	41.33	0.11	-14.72	-20.86	-0.00	0.0	3.47	8.13	0.00	0.40	11.81	0.00	0.00	12.22	18.8	1
Davit8	Davit8:End	End	15.13	41.58	0.11	-17.48	-0.00	0.00	0.0	3.47	8.13	0.00	0.48	0.00	2.32	0.00	4.05	6.2	3

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

Clamp Label	Force (kips)	Input Holding Capacity (kips)	Factored Holding Capacity (kips)	Usage %
Clamp1	1.723	80.00	80.00	2.15
Clamp2	1.646	80.00	80.00	2.06
Clamp3	8.790	80.00	80.00	10.99
Clamp4	8.790	80.00	80.00	10.99
Clamp5	8.790	80.00	80.00	10.99
Clamp6	8.790	80.00	80.00	10.99
Clamp7	8.790	80.00	80.00	10.99
Clamp8	8.790	80.00	80.00	10.99
Clamp9	11.873	80.00	80.00	14.84
Clamp10	4.068	80.00	80.00	5.08

Clamp11	1.154	80.00	80.00	1.44
Clamp12	1.154	80.00	80.00	1.44
Clamp13	1.154	80.00	80.00	1.44
Clamp14	1.154	80.00	80.00	1.44
Clamp15	1.154	80.00	80.00	1.44
Clamp16	1.154	80.00	80.00	1.44
Clamp17	1.154	80.00	80.00	1.44
Clamp18	1.154	80.00	80.00	1.44
Clamp19	1.154	80.00	80.00	1.44
Clamp20	1.154	80.00	80.00	1.44
Clamp21	1.154	80.00	80.00	1.44
Clamp22	1.154	80.00	80.00	1.44
Clamp23	1.154	80.00	80.00	1.44

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 19

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)
10255:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10255:t	0.005258	12.03	-0.6579	-8.6834	0.0033	0.0002	0.005258	12.03	149.3
10255:Arm1	0.005218	11.92	-0.6499	-8.6834	0.0033	0.0002	0.005218	11.92	148.7
10255:TopConn	0.005054	11.49	-0.6168	-8.6795	0.0033	0.0002	0.005054	11.49	145.8
10255:BotConn	0.004704	10.56	-0.5467	-8.5808	0.0033	0.0002	0.004704	10.56	139.7
10255:Arm2	0.004499	10.02	-0.5065	-8.4735	0.0033	0.0001	0.004499	10.02	136.1
10255:WVGD13	0.004127	9.059	-0.4362	-8.1935	0.0032	0.0001	0.004127	9.059	129.6
10255:WVGD12	0.003578	7.678	-0.3403	-7.6434	0.0031	0.0001	0.003578	7.678	119.7
10255:Arm3	0.003292	6.978	-0.2944	-7.3113	0.0030	0.0001	0.003292	6.978	114.3
10255:WVGD11	0.003052	6.402	-0.2582	-6.9952	0.0029	0.0001	0.003052	6.402	109.7
10255:WVGD10	0.002558	5.246	-0.1909	-6.2439	0.0027	0.0001	0.002558	5.246	99.81
10255:Arm4	0.002218	4.475	-0.1504	-5.7535	0.0026	0.0001	0.002218	4.475	92.47
10255:WVGD9	0.002102	4.216	-0.1374	-5.5877	0.0025	0.0001	0.002102	4.216	89.86
10255:WVGD8	0.001681	3.297	-0.09487	-4.9329	0.0023	0.0000	0.001681	3.297	79.91
10255:WVGD7	0.001301	2.494	-0.06232	-4.2612	0.0021	0.0000	0.001301	2.494	69.94
10255:WVGD6	0.0009652	1.809	-0.0385	-3.5907	0.0018	0.0000	0.0009652	1.809	59.96
10255:WVGD5	0.0006762	1.239	-0.02198	-2.9322	0.0015	0.0000	0.0006762	1.239	49.98
10255:WVGD4	0.0004365	0.7821	-0.01126	-2.2970	0.0012	0.0000	0.0004365	0.7821	39.99
10255:WVGD3	0.0002476	0.4341	-0.004929	-1.6853	0.0009	0.0000	0.0002476	0.4341	30
10255:WVGD2	0.0001112	0.1906	-0.00169	-1.0985	0.0006	0.0000	0.0001112	0.1906	20
10255:WVGD1	2.83e-005	0.04735	-0.0003885	-0.5368	0.0003	0.0000	2.83e-005	0.04735	10
Davit1:O	0.005228	11.93	-0.5218	-8.6834	0.0033	0.0002	0.005228	11.08	148.8
Davit1:End	0.005413	12.23	0.9731	-8.6746	0.0033	0.0002	0.005413	1.378	151.5
Davit2:O	0.005209	11.91	-0.7779	-8.6834	0.0033	0.0002	0.005209	12.76	148.5
Davit2:End	0.005162	11.98	-2.309	-8.7513	0.0033	0.0002	0.005162	22.83	148.2
Davit3:O	0.004509	10.03	-0.3622	-8.4735	0.0033	0.0001	0.004509	9.052	136.3
Davit3:End	0.00479	10.48	1.802	-8.3017	0.0033	0.0002	0.00479	-5.496	140.4
Davit4:O	0.004488	10.01	-0.6508	-8.4735	0.0033	0.0001	0.004488	10.99	136
Davit4:End	0.004434	10.14	-2.929	-8.7868	0.0033	0.0001	0.004434	26.12	135.7
Davit5:O	0.003302	6.988	-0.1407	-7.3113	0.0030	0.0001	0.003302	5.781	114.5
Davit5:End	0.003536	7.358	1.726	-7.1277	0.0030	0.0001	0.003536	-8.85	118.4
Davit6:O	0.003282	6.969	-0.448	-7.3113	0.0030	0.0001	0.003282	8.176	114.2
Davit6:End	0.003258	7.101	-2.421	-7.6348	0.0030	0.0001	0.003258	23.31	114.2
Davit7:O	0.002226	4.483	-0.009061	-5.7535	0.0026	0.0001	0.002226	3.073	92.62
Davit7:End	0.002399	4.752	1.456	-5.5542	0.0026	0.0001	0.002399	-11.66	96.08
Davit8:O	0.00221	4.468	-0.2916	-5.7535	0.0026	0.0001	0.00221	5.878	92.33
Davit8:End	0.002216	4.595	-1.855	-6.0905	0.0026	0.0001	0.002216	21	92.77

Joint Support Reactions for Load Case "NESC Extreme":

Joint Label	X Force (kips)	X Usage %	Y Force (kips)	Y Usage %	H-Shear Usage %	Z Force (kips)	Comp. Usage %	Uplift Usage %	Result. Force (kips)	Result. Usage %	X Moment (ft-k)	X-M. Usage %	Y Moment (ft-k)	Y-M. Usage %	H-Bend-M Usage %	Z Moment (ft-k)	Z-M. Usage %	Max. Usage %
10255:g	-0.05	0.0	-53.84	0.0	0.0	-63.68	0.0	0.0	83.39	0.0	6091.39	0.0	-3.7	0.0	0.0	-0.01	0.0	0.0

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

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

Label	Label	Position	Dist. (ft)	Defl. (in)	Defl. (in)	Defl. (in)	(Local Mx) (ft-k)	(Local My) (ft-k)	Mom. (ft-k)	Force (kips)	Shear (kips)	Shear (kips)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	Usage %	Pt.
10255	10255:t	Origin	0.00	144.32	0.06	-7.89	-0.00	-0.00	-0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	5
10255	10255:Arm1	End	0.70	143.05	0.06	-7.80	0.01	-0.00	-0.0	-0.02	0.02	-0.00	-0.00	0.00	0.00	0.00	0.00	0.0	4
10255	10255:Arm1	Origin	0.70	143.05	0.06	-7.80	2.55	-0.00	0.0	-0.73	1.85	-0.00	-0.04	0.30	0.05	0.00	0.35	0.5	2
10255	10255:TopConn	End	3.58	137.84	0.06	-7.40	7.89	-0.00	0.0	-0.73	1.85	-0.00	-0.04	0.87	0.05	0.00	0.91	1.4	2
10255	10255:TopConn	Origin	3.58	137.84	0.06	-7.40	7.89	-0.00	0.0	-2.71	21.31	-0.00	-0.13	0.00	2.08	0.00	3.61	5.5	5
10255	Tube 1	End	6.67	132.25	0.06	-6.98	73.62	-0.01	0.0	-2.71	21.31	-0.00	-0.13	7.52	0.52	0.00	7.70	11.8	2
10255	Tube 1	Origin	6.67	132.25	0.06	-6.98	73.62	-0.01	0.0	-2.95	21.49	-0.00	-0.14	7.52	0.53	0.00	7.71	11.9	2
10255	10255:BotConn	End	9.75	126.70	0.06	-6.56	139.91	-0.01	0.0	-2.95	21.49	-0.00	-0.13	13.32	0.51	0.00	13.48	20.7	2
10255	10255:BotConn	Origin	9.75	126.70	0.06	-6.56	139.91	-0.01	0.0	-5.61	9.78	-0.00	-0.25	13.32	0.23	0.00	13.57	20.9	2
10255	10255:Arm2	End	13.38	120.25	0.05	-6.08	175.38	-0.02	0.0	-5.61	9.78	-0.00	-0.24	15.41	0.22	0.00	15.66	24.1	2
10255	10255:Arm2	Origin	13.38	120.25	0.05	-6.08	196.94	-0.03	0.0	-11.60	20.92	-0.00	-0.50	17.31	0.48	0.00	17.82	27.4	2
10255	Tube 1	End	16.69	114.43	0.05	-5.65	266.23	-0.04	0.0	-11.60	20.92	-0.00	-0.48	21.81	0.46	0.00	22.30	34.3	2
10255	Tube 1	Origin	16.69	114.43	0.05	-5.65	266.23	-0.04	0.0	-11.92	21.11	-0.01	-0.49	21.81	0.46	0.00	22.32	34.3	2
10255	10255:WVGD13	End	20.00	108.71	0.05	-5.23	336.15	-0.06	0.0	-11.92	21.11	-0.01	-0.48	25.73	0.45	0.00	26.22	40.3	2
10255	10255:WVGD13	Origin	20.00	108.71	0.05	-5.23	336.15	-0.06	0.0	-12.63	21.61	-0.01	-0.51	25.73	0.46	0.00	26.25	40.4	2
10255	Tube 1	End	25.00	100.28	0.05	-4.64	444.18	-0.09	0.0	-12.63	21.61	-0.01	-0.48	30.82	0.44	0.00	31.31	48.2	2
10255	Tube 1	Origin	25.00	100.28	0.05	-4.64	444.18	-0.09	0.0	-13.18	21.90	-0.01	-0.50	30.82	0.44	0.00	31.33	48.2	2
10255	10255:WVGD12	End	30.00	92.14	0.04	-4.08	553.68	-0.13	0.0	-13.18	21.90	-0.01	-0.48	34.98	0.42	0.00	35.47	54.6	2
10255	10255:WVGD12	Origin	30.00	92.14	0.04	-4.08	553.68	-0.13	0.0	-13.90	22.38	-0.01	-0.51	34.98	0.43	0.00	35.49	54.6	2
10255	Tube 1	End	32.69	87.89	0.04	-3.80	613.84	-0.15	0.0	-13.90	22.38	-0.01	-0.49	36.94	0.42	0.00	37.44	57.6	2
10255	Tube 1	Origin	32.69	87.89	0.04	-3.80	613.84	-0.15	0.0	-14.22	22.55	-0.01	-0.51	36.94	0.42	0.00	37.45	57.6	2
10255	10255:Arm3	End	35.38	83.74	0.04	-3.53	674.43	-0.18	0.0	-14.22	22.55	-0.01	-0.49	38.70	0.41	0.00	39.20	60.3	2
10255	10255:Arm3	Origin	35.38	83.74	0.04	-3.53	695.73	-0.18	0.0	-20.61	33.57	-0.01	-0.72	39.93	0.62	0.00	40.66	62.5	2
10255	10255:WVGD11	End	40.00	76.82	0.04	-3.10	850.97	-0.23	0.0	-20.61	33.57	-0.01	-0.69	45.12	0.59	0.00	45.82	70.5	2
10255	10255:WVGD11	Origin	40.00	76.82	0.04	-3.10	850.97	-0.23	0.0	-21.59	34.08	-0.01	-0.72	45.12	0.60	0.00	45.85	70.5	2
10255	Tube 1	End	45.00	69.69	0.03	-2.67	1021.35	-0.29	0.0	-21.59	34.08	-0.01	-0.69	49.89	0.58	0.00	50.59	77.8	2
10255	Tube 1	Origin	45.00	69.69	0.03	-2.67	1021.35	-0.29	0.0	-22.34	34.34	-0.01	-0.72	49.89	0.58	0.00	50.61	77.9	2
10255	10255:WVGD10	End	50.00	62.95	0.03	-2.29	1193.07	-0.36	0.0	-22.34	34.34	-0.01	-0.69	53.85	0.56	0.00	54.55	83.9	2
10255	10255:WVGD10	Origin	50.00	62.95	0.03	-2.29	1193.07	-0.36	0.0	-23.04	34.73	-0.01	-0.71	53.85	0.57	0.00	54.57	84.0	2
10255	SpliceT	End	50.33	62.52	0.03	-2.27	1204.53	-0.37	0.0	-23.04	34.73	-0.01	-0.71	54.09	0.56	0.00	54.81	84.3	2
10255	SpliceT	Origin	50.33	62.52	0.03	-2.27	1204.53	-0.37	0.0	-23.78	34.92	-0.02	-0.73	54.09	0.57	0.00	54.83	84.4	2
10255	SpliceB	End	55.00	56.60	0.03	-1.95	1367.59	-0.44	0.0	-23.78	34.92	-0.02	-0.52	42.93	0.40	0.00	43.45	66.8	2
10255	SpliceB	Origin	55.00	56.60	0.03	-1.95	1367.59	-0.44	0.0	-24.73	35.16	-0.02	-0.54	42.93	0.40	0.00	43.47	66.9	2
10255	10255:Arm4	End	57.38	53.71	0.03	-1.80	1451.10	-0.48	0.0	-24.73	35.16	-0.02	-0.53	43.94	0.40	0.00	44.47	68.4	2
10255	10255:Arm4	Origin	57.38	53.71	0.03	-1.80	1472.06	-0.48	0.0	-31.45	45.96	-0.02	-0.67	44.58	0.52	0.00	45.26	69.6	2
10255	10255:WVGD9	End	60.00	50.59	0.03	-1.65	1592.70	-0.53	0.0	-31.45	45.96	-0.02	-0.66	46.39	0.51	0.00	47.05	72.4	2
10255	10255:WVGD9	Origin	60.00	50.59	0.03	-1.65	1592.70	-0.53	0.0	-32.56	46.43	-0.02	-0.68	46.39	0.51	0.00	47.07	72.4	2
10255	Tube 2	End	65.00	44.91	0.02	-1.38	1824.85	-0.62	0.0	-32.56	46.43	-0.02	-0.66	49.45	0.50	0.00	50.11	77.1	2
10255	Tube 2	Origin	65.00	44.91	0.02	-1.38	1824.85	-0.62	0.0	-33.67	46.72	-0.02	-0.68	49.45	0.50	0.00	50.13	77.1	2
10255	10255:WVGD8	End	70.00	39.57	0.02	-1.14	2058.44	-0.73	0.0	-33.67	46.72	-0.02	-0.66	52.02	0.48	0.00	52.68	81.1	2
10255	10255:WVGD8	Origin	70.00	39.57	0.02	-1.14	2058.44	-0.73	0.0	-35.10	47.25	-0.02	-0.68	52.02	0.49	0.00	52.71	81.1	2
10255	Tube 2	End	75.00	34.58	0.02	-0.93	2294.70	-0.84	0.0	-35.10	47.25	-0.02	-0.66	54.22	0.47	0.00	54.88	84.4	2
10255	Tube 2	Origin	75.00	34.58	0.02	-0.93	2294.70	-0.84	0.0	-36.28	47.55	-0.02	-0.68	54.22	0.47	0.00	54.90	84.5	2
10255	10255:WVGD7	End	80.00	29.93	0.02	-0.75	2532.42	-0.96	0.0	-36.28	47.55	-0.02	-0.66	56.06	0.46	0.00	56.72	87.3	2
10255	10255:WVGD7	Origin	80.00	29.93	0.02	-0.75	2532.42	-0.96	0.0	-37.79	48.08	-0.03	-0.69	56.06	0.46	0.00	56.75	87.3	2
10255	Tube 2	End	85.00	25.64	0.01	-0.59	2772.83	-1.09	0.0	-37.79	48.08	-0.03	-0.67	57.63	0.45	0.00	58.30	89.7	2
10255	Tube 2	Origin	85.00	25.64	0.01	-0.59	2772.83	-1.09	0.0	-39.04	48.38	-0.03	-0.69	57.63	0.45	0.00	58.32	89.7	2
10255	10255:WVGD6	End	90.00	21.70	0.01	-0.46	3014.72	-1.23	0.0	-39.04	48.38	-0.03	-0.67	58.94	0.44	0.00	59.61	91.7	2
10255	10255:WVGD6	Origin	90.00	21.70	0.01	-0.46	3014.72	-1.23	0.0	-40.53	48.90	-0.03	-0.69	58.94	0.44	0.00	59.64	91.7	2
10255	Tube 2	End	94.42	18.52	0.01	-0.36	3230.62	-1.36	0.0	-40.53	48.90	-0.03	-0.68	59.93	0.43	0.00	60.61	93.2	2
10255	Tube 2	Origin	94.42	18.52	0.01	-0.36	3230.62	-1.36	0.0	-41.68	49.17	-0.03	-0.70	59.93	0.43	0.00	60.63	93.3	2
10255	SpliceT	End	98.83	15.60	0.01	-0.28	3447.71	-1.50	0.0	-41.68	49.17	-0.03	-0.68	60.77	0.42	0.00	61.45	94.5	2
10255	SpliceT	Origin	98.83	15.60	0.01	-0.28	3447.71	-1.50	0.0	-42.55	49.35	-0.03	-0.69	60.77	0.42	0.00	61.46	94.6	2
10255	10255:WVGD5	End	100.00	14.87	0.01	-0.26	3505.44	-1.53	0.0	-42.55	49.35	-0.03	-0.66	59.37	0.40	0.00	60.03	92.4	2
10255	10255:WVGD5	Origin	100.00	14.87	0.01	-0.26	3505.44	-1.53	0.0	-44.36	49.81	-0.03	-0.68	59.37	0.41	0.00	60.06	92.4	2
10255	SpliceB	End	105.00	11.96	0.01	-0.19	3754.48	-1.70	0.0	-44.36	49.81	-0.03	-0.66	60.06	0.39	0.00	60.72	93.4	2

10255	SpliceB	Origin	105.00	11.96	0.01	-0.19	3754.48	-1.70	0.0	-46.31	50.14	-0.04	-0.69	60.06	0.40	0.00	60.75	93.5	2
10255	10255:WVGD4	End	110.00	9.39	0.01	-0.14	4005.16	-1.88	0.0	-46.31	50.14	-0.04	-0.67	60.60	0.39	0.00	61.28	94.3	2
10255	10255:WVGD4	Origin	110.00	9.39	0.01	-0.14	4005.16	-1.88	0.0	-48.05	50.68	-0.04	-0.70	60.60	0.39	0.00	61.30	94.3	2
10255	Tube 3	End	115.00	7.14	0.00	-0.09	4258.55	-2.07	0.0	-48.05	50.68	-0.04	-0.68	61.04	0.38	0.00	61.72	95.0	2
10255	Tube 3	Origin	115.00	7.14	0.00	-0.09	4258.55	-2.07	0.0	-49.52	50.99	-0.04	-0.70	61.04	0.38	0.00	61.75	95.0	2
10255	10255:WVGD3	End	120.00	5.21	0.00	-0.06	4513.51	-2.26	0.0	-49.52	50.99	-0.04	-0.68	61.37	0.37	0.00	62.06	95.5	2
10255	10255:WVGD3	Origin	120.00	5.21	0.00	-0.06	4513.51	-2.26	0.0	-51.33	51.54	-0.04	-0.71	61.37	0.38	0.00	62.09	95.5	2
10255	Tube 3	End	125.00	3.59	0.00	-0.04	4771.20	-2.47	0.0	-51.33	51.54	-0.04	-0.69	61.63	0.37	0.00	62.33	95.9	2
10255	Tube 3	Origin	125.00	3.59	0.00	-0.04	4771.20	-2.47	0.0	-52.86	51.87	-0.04	-0.71	61.63	0.37	0.00	62.35	95.9	2
10255	10255:WVGD2	End	130.00	2.29	0.00	-0.02	5030.53	-2.69	0.0	-52.86	51.87	-0.04	-0.69	61.81	0.36	0.00	62.51	96.2	2
10255	10255:WVGD2	Origin	130.00	2.29	0.00	-0.02	5030.53	-2.69	0.0	-54.72	52.42	-0.05	-0.72	61.81	0.36	0.00	62.53	96.2	2
10255	Tube 3	End	135.00	1.28	0.00	-0.01	5292.64	-2.92	0.0	-54.72	52.42	-0.05	-0.70	61.93	0.35	0.00	62.64	96.4	2
10255	Tube 3	Origin	135.00	1.28	0.00	-0.01	5292.64	-2.92	0.0	-56.31	52.76	-0.05	-0.72	61.93	0.36	0.00	62.66	96.4	2
10255	10255:WVGD1	End	140.00	0.57	0.00	-0.00	5556.43	-3.17	0.0	-56.31	52.76	-0.05	-0.70	61.99	0.35	0.00	62.70	96.5	2
10255	10255:WVGD1	Origin	140.00	0.57	0.00	-0.00	5556.43	-3.16	0.0	-58.23	53.32	-0.05	-0.73	61.99	0.35	0.00	62.72	96.5	2
10255	Tube 3	End	145.00	0.14	0.00	-0.00	5823.04	-3.42	0.0	-58.23	53.32	-0.05	-0.71	62.01	0.34	0.00	62.73	96.5	2
10255	Tube 3	Origin	145.00	0.14	0.00	-0.00	5823.04	-3.42	0.0	-59.87	53.67	-0.05	-0.73	62.01	0.35	0.00	62.75	96.5	2
10255	10255:g	End	150.00	0.00	0.00	0.00	6091.39	-3.68	0.0	-59.87	53.67	-0.05	-0.72	61.98	0.34	0.00	62.70	96.5	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
Davit1	Davit1:O	Origin	0.00	143.17	0.06	-6.26	-0.66	0.00	0.0	-0.95	0.11	-0.00	-0.14	0.47	0.00	0.00	0.60	0.9	1
Davit1	#Davit1:0	End	5.00	144.93	0.06	2.65	-0.13	0.00	0.0	-0.95	0.11	-0.00	-0.18	0.15	0.00	0.00	0.33	0.5	1
Davit1	#Davit1:0	Origin	5.00	144.93	0.06	2.65	-0.13	0.00	0.0	-0.93	0.04	-0.00	-0.17	0.15	0.00	0.00	0.32	0.5	1
Davit1	#Davit1:1	End	7.54	145.82	0.06	7.16	-0.02	0.00	0.0	-0.93	0.04	-0.00	-0.20	0.03	0.00	0.00	0.23	0.4	1
Davit1	#Davit1:1	Origin	7.54	145.82	0.06	7.16	-0.02	0.00	0.0	-0.92	0.01	-0.00	-0.20	0.03	0.00	0.00	0.23	0.4	1
Davit1	Davit1:End	End	10.07	146.72	0.06	11.68	-0.00	0.00	0.0	-0.92	0.01	-0.00	-0.24	0.00	0.00	0.00	0.24	0.4	3
Davit2	Davit2:O	Origin	0.00	142.94	0.06	-9.33	-3.15	-0.00	-0.0	0.75	0.36	0.00	0.11	2.21	0.00	0.00	2.32	3.6	1
Davit2	#Davit2:0	End	5.00	143.33	0.06	-18.44	-1.35	-0.00	-0.0	0.75	0.36	0.00	0.14	1.58	0.00	0.00	1.72	2.6	1
Davit2	#Davit2:0	Origin	5.00	143.33	0.06	-18.44	-1.35	-0.00	-0.0	0.75	0.29	0.00	0.14	1.58	0.00	0.00	1.72	2.6	1
Davit2	#Davit2:1	End	7.54	143.53	0.06	-23.07	-0.63	-0.00	-0.0	0.75	0.29	0.00	0.17	1.01	0.00	0.00	1.17	1.8	1
Davit2	#Davit2:1	Origin	7.54	143.53	0.06	-23.07	-0.63	-0.00	0.0	0.75	0.25	0.00	0.16	1.01	0.00	0.00	1.17	1.8	1
Davit2	Davit2:End	End	10.07	143.73	0.06	-27.70	0.00	0.00	0.0	0.75	0.25	0.00	0.20	0.00	0.14	0.00	0.31	0.5	3
Davit3	Davit3:O	Origin	0.00	120.38	0.05	-4.35	-27.30	0.01	0.0	-5.76	1.98	-0.00	-0.38	4.95	0.00	0.00	5.33	8.2	1
Davit3	#Davit3:0	End	5.00	122.18	0.06	4.30	-17.41	0.00	0.0	-5.76	1.98	-0.00	-0.46	4.61	0.00	0.00	5.07	7.8	1
Davit3	#Davit3:0	Origin	5.00	122.18	0.06	4.30	-17.41	0.00	0.0	-5.70	1.79	-0.00	-0.46	4.61	0.00	0.00	5.07	7.8	1
Davit3	#Davit3:1	End	10.00	123.98	0.06	12.87	-8.44	0.00	0.0	-5.70	1.79	-0.00	-0.58	3.57	0.00	0.00	4.15	6.4	1
Davit3	#Davit3:1	Origin	10.00	123.98	0.06	12.87	-8.44	0.00	0.0	-5.66	1.68	-0.00	-0.57	3.57	0.00	0.00	4.14	6.4	1
Davit3	#Davit3:2	End	12.57	124.89	0.06	17.25	-4.14	0.00	0.0	-5.66	1.68	-0.00	-0.66	2.34	0.00	0.00	3.00	4.6	1
Davit3	#Davit3:2	Origin	12.57	124.89	0.06	17.25	-4.14	0.00	0.0	-5.64	1.61	-0.00	-0.66	2.34	0.00	0.00	3.00	4.6	1
Davit3	Davit3:End	End	15.13	125.80	0.06	21.62	-0.00	0.00	0.0	-5.64	1.61	-0.00	-0.78	0.00	0.46	0.00	1.11	1.7	3
Davit4	Davit4:O	Origin	0.00	120.12	0.05	-7.81	-48.82	-0.00	-0.0	5.04	3.44	0.00	0.33	8.85	0.00	0.00	9.19	14.1	1
Davit4	#Davit4:0	End	5.00	120.64	0.05	-16.72	-31.64	-0.00	-0.0	5.04	3.44	0.00	0.40	8.38	0.00	0.00	8.79	13.5	1
Davit4	#Davit4:0	Origin	5.00	120.64	0.05	-16.72	-31.64	-0.00	-0.0	5.04	3.21	0.00	0.40	8.38	0.00	0.00	8.79	13.5	1
Davit4	#Davit4:1	End	10.00	121.16	0.05	-25.76	-15.56	-0.00	-0.0	5.04	3.21	0.00	0.51	6.59	0.00	0.00	7.10	10.9	1
Davit4	#Davit4:1	Origin	10.00	121.16	0.05	-25.76	-15.56	-0.00	-0.0	5.04	3.07	0.00	0.51	6.59	0.00	0.00	7.10	10.9	1
Davit4	#Davit4:2	End	12.57	121.42	0.05	-30.44	-7.68	-0.00	-0.0	5.04	3.07	0.00	0.59	4.35	0.00	0.00	4.94	7.6	1
Davit4	#Davit4:2	Origin	12.57	121.42	0.05	-30.44	-7.68	-0.00	0.0	5.04	2.99	0.00	0.59	4.35	0.00	0.00	4.94	7.6	1
Davit4	Davit4:End	End	15.13	121.68	0.05	-35.15	-0.00	0.00	0.0	5.04	2.99	0.00	0.70	0.00	0.86	0.00	1.64	2.5	3
Davit5	Davit5:O	Origin	0.00	83.86	0.04	-1.69	-29.09	0.01	0.0	-5.72	2.10	-0.00	-0.38	5.27	0.00	0.00	5.65	8.7	1

Davit5	#Davit5:0	End	5.00	85.34	0.04	5.78	-18.59	0.00	0.0	-5.72	2.10	-0.00	-0.46	4.93	0.00	0.00	5.38	8.3	1
Davit5	#Davit5:0	Origin	5.00	85.34	0.04	5.78	-18.59	0.00	0.0	-5.66	1.91	-0.00	-0.45	4.93	0.00	0.00	5.38	8.3	1
Davit5	#Davit5:1	End	10.00	86.81	0.04	13.18	-9.03	0.00	0.0	-5.66	1.91	-0.00	-0.57	3.82	0.00	0.00	4.39	6.8	1
Davit5	#Davit5:1	Origin	10.00	86.81	0.04	13.18	-9.03	0.00	0.0	-5.62	1.79	-0.00	-0.57	3.82	0.00	0.00	4.39	6.8	1
Davit5	#Davit5:2	End	12.57	87.55	0.04	16.95	-4.43	0.00	0.0	-5.62	1.79	-0.00	-0.66	2.51	0.00	0.00	3.17	4.9	1
Davit5	#Davit5:2	Origin	12.57	87.55	0.04	16.95	-4.43	0.00	0.0	-5.60	1.73	-0.00	-0.65	2.51	0.00	0.00	3.16	4.9	1
Davit5	Davit5:End	End	15.13	88.30	0.04	20.71	-0.00	0.00	0.0	-5.60	1.73	-0.00	-0.77	0.00	0.49	0.00	1.15	1.8	3
Davit6	Davit6:O	Origin	0.00	83.62	0.04	-5.38	-50.36	-0.00	-0.0	4.97	3.54	0.00	0.33	9.13	0.00	0.00	9.46	14.6	1
Davit6	#Davit6:0	End	5.00	84.15	0.04	-13.07	-32.66	-0.00	-0.0	4.97	3.54	0.00	0.40	8.65	0.00	0.00	9.05	13.9	1
Davit6	#Davit6:0	Origin	5.00	84.15	0.04	-13.07	-32.66	-0.00	-0.0	4.98	3.32	0.00	0.40	8.65	0.00	0.00	9.05	13.9	1
Davit6	#Davit6:1	End	10.00	84.68	0.04	-20.90	-16.08	-0.00	-0.0	4.98	3.32	0.00	0.50	6.81	0.00	0.00	7.31	11.2	1
Davit6	#Davit6:1	Origin	10.00	84.68	0.04	-20.90	-16.08	-0.00	-0.0	4.98	3.17	0.00	0.50	6.81	0.00	0.00	7.31	11.2	1
Davit6	#Davit6:2	End	12.57	84.95	0.04	-24.96	-7.94	-0.00	-0.0	4.98	3.17	0.00	0.58	4.50	0.00	0.00	5.08	7.8	1
Davit6	#Davit6:2	Origin	12.57	84.95	0.04	-24.96	-7.94	-0.00	0.0	4.98	3.09	0.00	0.58	4.50	0.00	0.00	5.08	7.8	1
Davit6	Davit6:End	End	15.13	85.22	0.04	-29.05	-0.00	0.00	0.0	4.98	3.09	0.00	0.69	0.00	0.88	0.00	1.68	2.6	3
Davit7	Davit7:O	Origin	0.00	53.79	0.03	-0.11	-31.46	0.01	0.0	-5.66	2.26	-0.00	-0.38	5.70	0.00	0.00	6.08	9.4	1
Davit7	#Davit7:0	End	5.00	54.88	0.03	5.77	-20.17	0.00	0.0	-5.66	2.26	-0.00	-0.45	5.34	0.00	0.00	5.80	8.9	1
Davit7	#Davit7:0	Origin	5.00	54.88	0.03	5.77	-20.17	0.00	0.0	-5.61	2.07	-0.00	-0.45	5.34	0.00	0.00	5.79	8.9	1
Davit7	#Davit7:1	End	10.00	55.95	0.03	11.58	-9.82	0.00	0.0	-5.61	2.07	-0.00	-0.57	4.16	0.00	0.00	4.72	7.3	1
Davit7	#Davit7:1	Origin	10.00	55.95	0.03	11.58	-9.82	0.00	0.0	-5.57	1.95	-0.00	-0.56	4.16	0.00	0.00	4.72	7.3	1
Davit7	#Davit7:2	End	12.57	56.49	0.03	14.53	-4.83	0.00	0.0	-5.57	1.95	-0.00	-0.65	2.73	0.00	0.00	3.38	5.2	1
Davit7	#Davit7:2	Origin	12.57	56.49	0.03	14.53	-4.83	0.00	0.0	-5.55	1.88	-0.00	-0.65	2.73	0.00	0.00	3.38	5.2	1
Davit7	Davit7:End	End	15.13	57.03	0.03	17.47	-0.00	0.00	0.0	-5.55	1.88	-0.00	-0.77	0.00	0.54	0.00	1.21	1.9	3
Davit8	Davit8:O	Origin	0.00	53.62	0.03	-3.50	-52.38	-0.00	-0.0	4.87	3.67	0.00	0.32	9.50	0.00	0.00	9.82	15.1	1
Davit8	#Davit8:0	End	5.00	54.12	0.03	-9.57	-34.01	-0.00	-0.0	4.87	3.67	0.00	0.39	9.01	0.00	0.00	9.40	14.5	1
Davit8	#Davit8:0	Origin	5.00	54.12	0.03	-9.57	-34.01	-0.00	-0.0	4.88	3.45	0.00	0.39	9.01	0.00	0.00	9.40	14.5	1
Davit8	#Davit8:1	End	10.00	54.62	0.03	-15.77	-16.77	-0.00	-0.0	4.88	3.45	0.00	0.49	7.10	0.00	0.00	7.59	11.7	1
Davit8	#Davit8:1	Origin	10.00	54.62	0.03	-15.77	-16.77	-0.00	-0.0	4.89	3.31	0.00	0.49	7.10	0.00	0.00	7.59	11.7	1
Davit8	#Davit8:2	End	12.57	54.88	0.03	-19.00	-8.28	-0.00	-0.0	4.89	3.31	0.00	0.57	4.69	0.00	0.00	5.26	8.1	1
Davit8	#Davit8:2	Origin	12.57	54.88	0.03	-19.00	-8.28	-0.00	0.0	4.90	3.23	0.00	0.57	4.69	0.00	0.00	5.26	8.1	1
Davit8	Davit8:End	End	15.13	55.14	0.03	-22.26	-0.00	0.00	0.0	4.90	3.23	0.00	0.68	0.00	0.92	0.00	1.74	2.7	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	0.912	80.00	80.00	1.14
Clamp2	0.784	80.00	80.00	0.98
Clamp3	5.847	80.00	80.00	7.31
Clamp4	5.847	80.00	80.00	7.31
Clamp5	5.847	80.00	80.00	7.31
Clamp6	5.847	80.00	80.00	7.31
Clamp7	5.847	80.00	80.00	7.31
Clamp8	5.847	80.00	80.00	7.31
Clamp9	19.363	80.00	80.00	24.20
Clamp10	12.138	80.00	80.00	15.17
Clamp11	0.381	80.00	80.00	0.48
Clamp12	0.381	80.00	80.00	0.48
Clamp13	0.381	80.00	80.00	0.48
Clamp14	0.381	80.00	80.00	0.48
Clamp15	0.381	80.00	80.00	0.48
Clamp16	0.381	80.00	80.00	0.48

Clamp17	0.381	80.00	80.00	0.48
Clamp18	0.381	80.00	80.00	0.48
Clamp19	0.381	80.00	80.00	0.48
Clamp20	0.381	80.00	80.00	0.48
Clamp21	0.381	80.00	80.00	0.48
Clamp22	0.381	80.00	80.00	0.48
Clamp23	0.381	80.00	80.00	0.48

*** 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)
10255	96.53	NESC Extreme	37	30952.3

Base Plate Results by Bend Line:

Pole Label	Load Case	Bend Line #	Start X (ft)	Start Y (ft)	End X (ft)	End Y (ft)	Length (in)	Bending Stress (ksi)	Bolt Mom. Sum (ft-k)	# Bolts Acting	Bolt Max Load (kips)	Min Plate Thickness (in)	Actual Thickness (in)	Usage %
10255	NESC Heavy	1	2.364	1.329	-0.017	2.704	32.990	40.022	165.044	6	107.537	2.450	3.000	66.70
10255	NESC Heavy	2	2.704	-0.017	1.329	2.364	32.990	14.983	61.787	4	92.255	1.499	3.000	24.97
10255	NESC Heavy	3	2.333	-0.375	2.333	0.375	9.010	1.577	1.777	1	4.732	0.486	3.000	2.63
10255	NESC Heavy	4	1.329	-2.364	2.704	0.017	32.990	12.958	53.437	4	-82.258	1.394	3.000	21.60
10255	NESC Heavy	5	-0.017	-2.704	2.364	-1.329	32.990	35.778	147.543	6	-97.111	2.317	3.000	59.63
10255	NESC Heavy	6	-1.500	-2.333	1.500	-2.333	36.011	40.390	181.812	5	-97.111	2.461	3.000	67.32
10255	NESC Heavy	7	-2.364	-1.329	0.017	-2.704	32.990	35.524	146.496	6	-96.859	2.308	3.000	59.21
10255	NESC Heavy	8	-2.704	0.017	-1.329	-2.364	32.990	12.771	52.666	4	-81.577	1.384	3.000	21.29
10255	NESC Heavy	9	-2.333	0.375	-2.333	-0.375	9.010	1.982	2.232	1	5.945	0.545	3.000	3.30
10255	NESC Heavy	10	-1.329	2.364	-2.704	-0.017	32.990	15.177	62.588	4	92.936	1.509	3.000	25.30
10255	NESC Heavy	11	0.017	2.704	-2.364	1.329	32.990	40.276	166.091	6	107.788	2.458	3.000	67.13
10255	NESC Heavy	12	1.500	2.333	-1.500	2.333	36.011	44.843	201.855	5	107.788	2.594	3.000	74.74
10255	NESC Heavy	13	1.671	2.053	-0.630	2.669	28.583	38.371	137.095	5	107.662	2.399	3.000	63.95
10255	NESC Heavy	14	2.312	1.103	0.707	2.708	27.239	29.400	100.103	4	107.285	2.100	3.000	49.00
10255	NESC Heavy	15	2.566	-0.246	2.053	1.671	23.810	4.749	14.136	2	62.205	0.844	3.000	7.92
10255	NESC Heavy	16	2.053	-1.671	2.566	0.246	23.810	4.063	12.092	2	-52.563	0.781	3.000	6.77
10255	NESC Heavy	17	0.707	-2.708	2.312	-1.103	27.239	25.963	88.400	4	-97.111	1.973	3.000	43.27
10255	NESC Heavy	18	-0.630	-2.669	1.671	-2.053	28.583	34.596	123.611	5	-97.111	2.278	3.000	57.66
10255	NESC Heavy	19	-1.671	-2.053	0.630	-2.669	28.583	34.466	123.145	5	-96.985	2.274	3.000	57.44
10255	NESC Heavy	20	-2.312	-1.103	-0.707	-2.708	27.239	25.696	87.491	4	-96.607	1.963	3.000	42.83
10255	NESC Heavy	21	-2.566	0.246	-2.053	-1.671	23.810	4.071	12.116	2	-51.527	0.781	3.000	6.78
10255	NESC Heavy	22	-2.053	1.671	-2.566	-0.246	23.810	4.905	14.599	2	63.241	0.858	3.000	8.18
10255	NESC Heavy	23	-0.707	2.708	-2.312	1.103	27.239	29.667	101.012	4	107.788	2.110	3.000	49.44
10255	NESC Heavy	24	0.630	2.669	-1.671	2.053	28.583	38.501	137.561	5	107.788	2.403	3.000	64.17
10255	NESC Extreme	1	2.364	1.329	-0.017	2.704	32.990	52.584	216.846	6	141.533	2.808	3.000	87.64
10255	NESC Extreme	2	2.704	-0.017	1.329	2.364	32.990	19.491	80.376	4	121.126	1.710	3.000	32.48
10255	NESC Extreme	3	2.333	-0.375	2.333	0.375	9.010	0.793	0.893	1	2.379	0.345	3.000	1.32
10255	NESC Extreme	4	1.329	-2.364	2.704	0.017	32.990	18.488	76.242	4	-116.236	1.665	3.000	30.81
10255	NESC Extreme	5	-0.017	-2.704	2.364	-1.329	32.990	50.516	208.317	6	-136.537	2.753	3.000	84.19
10255	NESC Extreme	6	-1.500	-2.333	1.500	-2.333	36.011	56.910	256.173	5	-136.537	2.922	3.000	94.85
10255	NESC Extreme	7	-2.364	-1.329	0.017	-2.704	32.990	50.453	208.058	6	-136.474	2.751	3.000	84.09
10255	NESC Extreme	8	-2.704	0.017	-1.329	-2.364	32.990	18.442	76.051	4	-116.067	1.663	3.000	30.74
10255	NESC Extreme	9	-2.333	0.375	-2.333	-0.375	9.010	0.893	1.006	1	2.680	0.366	3.000	1.49
10255	NESC Extreme	10	-1.329	2.364	-2.704	-0.017	32.990	19.539	80.575	4	121.295	1.712	3.000	32.56
10255	NESC Extreme	11	0.017	2.704	-2.364	1.329	32.990	52.647	217.105	6	141.595	2.810	3.000	87.74
10255	NESC Extreme	12	1.500	2.333	-1.500	2.333	36.011	59.020	265.669	5	141.595	2.975	3.000	98.37
10255	NESC Extreme	13	1.671	2.053	-0.630	2.669	28.583	50.532	180.545	5	141.564	2.753	3.000	84.22
10255	NESC Extreme	14	2.312	1.103	0.707	2.708	27.239	38.495	131.071	4	141.470	2.403	3.000	64.16
10255	NESC Extreme	15	2.566	-0.246	2.053	1.671	23.810	5.890	17.531	2	80.451	0.940	3.000	9.82
10255	NESC Extreme	16	2.053	-1.671	2.566	0.246	23.810	5.548	16.513	2	-75.649	0.912	3.000	9.25
10255	NESC Extreme	17	0.707	-2.708	2.312	-1.103	27.239	36.806	125.321	4	-136.537	2.350	3.000	61.34

10255	NESC Extreme	18	-0.630	-2.669	1.671	-2.053	28.583	48.714	174.052	5	-136.537	2.703	3.000	81.19
10255	NESC Extreme	19	-1.671	-2.053	0.630	-2.669	28.583	48.682	173.936	5	-136.505	2.702	3.000	81.14
10255	NESC Extreme	20	-2.312	-1.103	-0.707	-2.708	27.239	36.740	125.095	4	-136.412	2.348	3.000	61.23
10255	NESC Extreme	21	-2.566	0.246	-2.053	-1.671	23.810	5.550	16.519	2	-75.393	0.912	3.000	9.25
10255	NESC Extreme	22	-2.053	1.671	-2.566	-0.246	23.810	5.929	17.645	2	80.708	0.943	3.000	9.88
10255	NESC Extreme	23	-0.707	2.708	-2.312	1.103	27.239	38.561	131.296	4	141.595	2.405	3.000	64.27
10255	NESC Extreme	24	0.630	2.669	-1.671	2.053	28.583	50.564	180.661	5	141.595	2.754	3.000	84.27

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	11.74	NESC Heavy	1	182.3
Davit2	14.63	NESC Heavy	1	182.3
Davit3	30.91	NESC Heavy	1	575.0
Davit4	35.67	NESC Heavy	1	575.0
Davit5	31.23	NESC Heavy	1	575.0
Davit6	35.86	NESC Heavy	1	575.0
Davit7	31.68	NESC Heavy	1	575.0
Davit8	36.14	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	74.74	10255	Base Plate
NESC Extreme	98.37	10255	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	73.32	10255	27
NESC Extreme	96.53	10255	37

Summary of Base Plate Usages by Load Case:

Load Case	Pole Label	Bend Line #	Length (in)	Vertical Load (kips)	X Moment (ft-k)	Y Moment (ft-k)	Bending Stress (ksi)	Bolt Moment Sum (ft-k)	# Bolts Acting On Bend Line	Max Bolt Load For Bend Line (kips)	Minimum Plate Thickness (in)	Usage %
NESC Heavy	10255	12	36.011	128.131	4478.495	-14.853	44.843	201.855	5	107.788	2.594	74.74
NESC Extreme	10255	12	36.011	60.707	6091.393	-3.684	59.020	265.669	5	141.595	2.975	98.37

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	36.14	Davit8	1
NESC Extreme	15.11	Davit8	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	2.15	NESC Heavy	0.0
Clamp2	Clamp	2.06	NESC Heavy	0.0
Clamp3	Clamp	10.99	NESC Heavy	0.0
Clamp4	Clamp	10.99	NESC Heavy	0.0
Clamp5	Clamp	10.99	NESC Heavy	0.0
Clamp6	Clamp	10.99	NESC Heavy	0.0
Clamp7	Clamp	10.99	NESC Heavy	0.0
Clamp8	Clamp	10.99	NESC Heavy	0.0
Clamp9	Clamp	24.20	NESC Extreme	0.0
Clamp10	Clamp	15.17	NESC Extreme	0.0
Clamp11	Clamp	1.44	NESC Heavy	0.0
Clamp12	Clamp	1.44	NESC Heavy	0.0
Clamp13	Clamp	1.44	NESC Heavy	0.0
Clamp14	Clamp	1.44	NESC Heavy	0.0
Clamp15	Clamp	1.44	NESC Heavy	0.0
Clamp16	Clamp	1.44	NESC Heavy	0.0
Clamp17	Clamp	1.44	NESC Heavy	0.0
Clamp18	Clamp	1.44	NESC Heavy	0.0
Clamp19	Clamp	1.44	NESC Heavy	0.0
Clamp20	Clamp	1.44	NESC Heavy	0.0
Clamp21	Clamp	1.44	NESC Heavy	0.0
Clamp22	Clamp	1.44	NESC Heavy	0.0
Clamp23	Clamp	1.44	NESC Heavy	0.0

Loads At Insulator Attachments For All Load Cases:

Load Case	Insulator Label	Insulator Type	Structure Attach Label	Structure Attach Load X (kips)	Structure Attach Load Y (kips)	Structure Attach Load Z (kips)	Structure Attach Load Res. (kips)
NESC Heavy	Clamp1	Clamp	Davit1:End	0.000	1.202	1.235	1.723
NESC Heavy	Clamp2	Clamp	Davit2:End	0.000	1.133	1.194	1.646
NESC Heavy	Clamp3	Clamp	Davit3:End	0.000	3.813	7.920	8.790
NESC Heavy	Clamp4	Clamp	Davit4:End	0.000	3.813	7.920	8.790
NESC Heavy	Clamp5	Clamp	Davit5:End	0.000	3.813	7.920	8.790
NESC Heavy	Clamp6	Clamp	Davit6:End	0.000	3.813	7.920	8.790
NESC Heavy	Clamp7	Clamp	Davit7:End	0.000	3.813	7.920	8.790
NESC Heavy	Clamp8	Clamp	Davit8:End	0.000	3.813	7.920	8.790
NESC Heavy	Clamp9	Clamp	10255:TopConn	0.000	6.026	10.230	11.873
NESC Heavy	Clamp10	Clamp	10255:BotConn	0.000	-3.832	1.364	4.068
NESC Heavy	Clamp11	Clamp	10255:WVGD1	0.000	0.093	1.150	1.154
NESC Heavy	Clamp12	Clamp	10255:WVGD2	0.000	0.093	1.150	1.154
NESC Heavy	Clamp13	Clamp	10255:WVGD3	0.000	0.093	1.150	1.154
NESC Heavy	Clamp14	Clamp	10255:WVGD4	0.000	0.093	1.150	1.154
NESC Heavy	Clamp15	Clamp	10255:WVGD5	0.000	0.093	1.150	1.154
NESC Heavy	Clamp16	Clamp	10255:WVGD6	0.000	0.093	1.150	1.154
NESC Heavy	Clamp17	Clamp	10255:WVGD7	0.000	0.093	1.150	1.154
NESC Heavy	Clamp18	Clamp	10255:WVGD8	0.000	0.093	1.150	1.154
NESC Heavy	Clamp19	Clamp	10255:WVGD9	0.000	0.093	1.150	1.154
NESC Heavy	Clamp20	Clamp	10255:WVGD10	0.000	0.093	1.150	1.154
NESC Heavy	Clamp21	Clamp	10255:WVGD11	0.000	0.093	1.150	1.154

NESC Heavy	Clamp22	Clamp	10255:WVGD12	0.000	0.093	1.150	1.154
NESC Heavy	Clamp23	Clamp	10255:WVGD13	0.000	0.093	1.150	1.154
NESC Extreme	Clamp1	Clamp	Davit1:End	0.000	0.881	0.236	0.912
NESC Extreme	Clamp2	Clamp	Davit2:End	0.000	0.742	0.254	0.784
NESC Extreme	Clamp3	Clamp	Davit3:End	0.000	4.981	3.062	5.847
NESC Extreme	Clamp4	Clamp	Davit4:End	0.000	4.981	3.062	5.847
NESC Extreme	Clamp5	Clamp	Davit5:End	0.000	4.981	3.062	5.847
NESC Extreme	Clamp6	Clamp	Davit6:End	0.000	4.981	3.062	5.847
NESC Extreme	Clamp7	Clamp	Davit7:End	0.000	4.981	3.062	5.847
NESC Extreme	Clamp8	Clamp	Davit8:End	0.000	4.981	3.062	5.847
NESC Extreme	Clamp9	Clamp	10255:TopConn	0.000	18.795	4.657	19.363
NESC Extreme	Clamp10	Clamp	10255:BotConn	0.000	-12.124	0.574	12.138
NESC Extreme	Clamp11	Clamp	10255:WVGD1	0.000	0.218	0.312	0.381
NESC Extreme	Clamp12	Clamp	10255:WVGD2	0.000	0.218	0.312	0.381
NESC Extreme	Clamp13	Clamp	10255:WVGD3	0.000	0.218	0.312	0.381
NESC Extreme	Clamp14	Clamp	10255:WVGD4	0.000	0.218	0.312	0.381
NESC Extreme	Clamp15	Clamp	10255:WVGD5	0.000	0.218	0.312	0.381
NESC Extreme	Clamp16	Clamp	10255:WVGD6	0.000	0.218	0.312	0.381
NESC Extreme	Clamp17	Clamp	10255:WVGD7	0.000	0.218	0.312	0.381
NESC Extreme	Clamp18	Clamp	10255:WVGD8	0.000	0.218	0.312	0.381
NESC Extreme	Clamp19	Clamp	10255:WVGD9	0.000	0.218	0.312	0.381
NESC Extreme	Clamp20	Clamp	10255:WVGD10	0.000	0.218	0.312	0.381
NESC Extreme	Clamp21	Clamp	10255:WVGD11	0.000	0.218	0.312	0.381
NESC Extreme	Clamp22	Clamp	10255:WVGD12	0.000	0.218	0.312	0.381
NESC Extreme	Clamp23	Clamp	10255:WVGD13	0.000	0.218	0.312	0.381

Overturning Moments For User Input Concentrated Loads:

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

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)	Torsional Moment (ft-k)
NESC Heavy	28.616	0.000	76.493	3448.638	-0.000	-0.000
NESC Extreme	41.014	0.000	28.149	4979.864	-0.000	-0.000

*** Weight of structure (lbs):
Weight of Tubular Davit Arms: 3814.7
Weight of Steel Poles: 30952.3
Total: 34767.0

*** End of Report

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tension Force per Bolt = $T_{Max} := 142 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 54 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 24$ (User Input)

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

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

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

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

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

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

Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.3 \times 10^3 \, lbf$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 692.8 \, psi$

Tensile Stress Permitted = $F_t := 0.75 \cdot F_u = 75 \cdot ksi$

Shear Stress Permitted = $F_v := 0.35 F_y = 26.25 \cdot ksi$

Permitted Axial Tensile Stress in Conjuction with Shear = $F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 74.97 \cdot ksi$

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 58.32 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{F_{tv} \cdot A_s} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$

Condition1 = "OK"

Foundation:

Input Data:

Tower Data

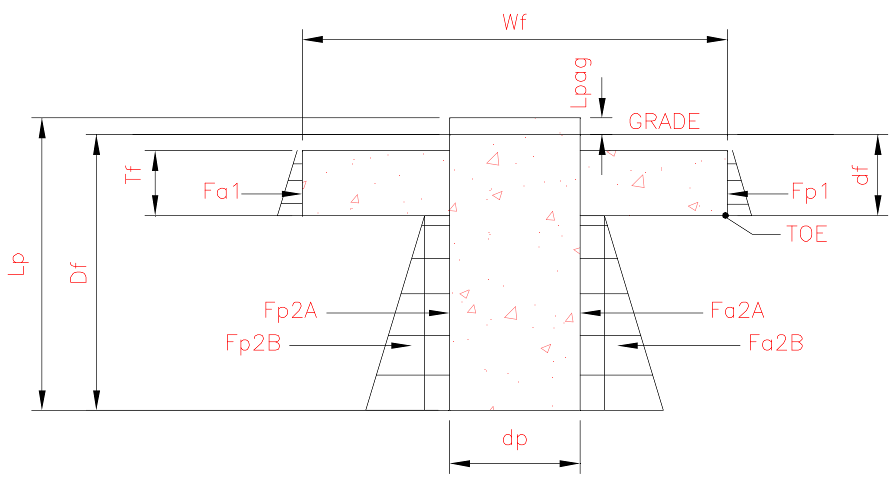
Overturning Moment =	$OM := 6091.39 \cdot ft \cdot kips \cdot 1.1 = 6701 \cdot ft \cdot kips$	(User Input)	
Shear Force =	$Shear := 53.84 \cdot kip \cdot 1.1 = 59 \cdot kips$	(User Input)	
Axial Force =	$Axial := 63.68 \cdot kip \cdot 1.1 = 70 \cdot kips$	(User Input)	
Tower Height =	$H_t := 150 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 20 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 20.5 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Cassion =	$d_p := 8 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 4 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 24 \cdot ft$	(User Input)	
Water Depth =	$D_{water} := 0 \cdot ft$	(User Input)	
Distance From Grade to Bottom of Pad =	$d_f := 5 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil (mat) =	$\Phi_{s1} := 30 \cdot deg$	(User Input)	
Internal Friction Angle of Soil (below mat) =	$\Phi_{s2} := 30 \cdot deg$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil1} := 100 \cdot pcf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil2} := 100 \cdot pcf$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 4000 \cdot psf$	(User Input)	(Conservative)
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)



Calculated Factors:

Coefficient of Lateral Soil Pressure =

$$K_{p1} := \frac{1 + \sin(\Phi_{s1})}{1 - \sin(\Phi_{s1})} = 3 \qquad Ka1 := \frac{(1 - \sin(\Phi_{s1}))}{(1 + \sin(\Phi_{s1}))} = 0.333$$

$$K_{p2} := \frac{1 + \sin(\Phi_{s2})}{1 - \sin(\Phi_{s2})} = 3 \qquad Ka2 := \frac{(1 - \sin(\Phi_{s2}))}{(1 + \sin(\Phi_{s2}))} = 0.333$$

Stability of Footing:

Passive Pressure 1 =

$$P_{p1.top} := K_{p1} \cdot \gamma_{soil1} \cdot (0) = 0 \cdot ksf$$

$$P_{p1.bot} := K_{p1} \cdot \gamma_{soil1} \cdot d_f = 1.5 \cdot ksf$$

$$P_{p1.ave} := \frac{P_{p1.top} + P_{p1.bot}}{2} = 0.75 \cdot ksf$$

Active Pressure 1 =

$$P_{a1.top} := Ka1 \cdot \gamma_{soil1} \cdot (0) = 0 \cdot ksf$$

$$P_{a1.bot} := Ka1 \cdot \gamma_{soil1} \cdot d_f = 0.167 \cdot ksf$$

$$P_{a1.ave} := \frac{P_{a1.top} + P_{a1.bot}}{2} = 0.083 \cdot ksf$$

Area of Pressure 1 =

$$A_{p1} := T_f \cdot W_f = 96 ft^2$$

Forces 1 =

$$F_{p1} := P_{p1.ave} \cdot A_{p1} = 72 \cdot kip$$

$$F_{a1} := P_{a1.ave} \cdot A_{p1} = 8 \cdot kip$$

Ultimate Shear 1 =

$$S_{u1} := (F_{p1} - F_{a1}) = 64 \cdot kip$$

Passive Pressure 2 = $P_{p2.top} := K_{p2} \cdot \gamma_{soil2} \cdot d_f = 1.5 \cdot ksf$

$P_{p2.bot} := K_{p2} \cdot \gamma_{soil2} \cdot D_f = 6 \cdot ksf$

Active Pressure 2 = $P_{a2.top} := Ka2 \cdot \gamma_{soil2} \cdot d_f = 0.167 \cdot ksf$

$P_{a2.bot} := Ka2 \cdot \gamma_{soil2} \cdot D_f = 0.667 \cdot ksf$

Area of Pressure 2 = $A_{p2} := (D_f - d_f) \cdot d_p = 120ft^2$

Forces 2 = $F_{p2A} := P_{p2.top} \cdot A_{p2} = 180 \cdot kips$

$F_{a2A} := P_{a2.top} \cdot A_{p2} = 20 \cdot kips$

$F_{p2B} := \frac{1}{2} \cdot (P_{p2.bot} - P_{p2.top}) \cdot A_{p2} = 270 \cdot kips$

$F_{a2B} := \frac{1}{2} \cdot (P_{a2.bot} - P_{a2.top}) \cdot A_{p2} = 30 \cdot kips$

Ultimate Shear 2 = $S_{u2A} := F_{p2A} - F_{a2A} = 160 \cdot kip$

$S_{u2B} := F_{p2B} - F_{a2B} = 240 \cdot kip$

Weight of Concrete Mat = $WT_{mat} := \left(W_f^2 - \frac{d_p^2 \cdot \pi}{4} \right) \cdot T_f \cdot \gamma_{conc} = 315.44 \cdot kip$

Weight of Concrete Caission = $WT_{caission} := \left(\frac{d_p^2 \cdot \pi}{4} \cdot L_p \right) \cdot \gamma_{conc} = 154.57 \cdot kip$

Weight of Soil Above Mat = $WT_s := \left[\left(W_f^2 - \frac{d_p^2 \cdot \pi}{4} \right) \cdot (d_f - T_f) \right] \cdot \gamma_{soil1} = 52.57 \cdot kip$

Total Weight = $W_{tot} := WT_{mat} + WT_{caission} + WT_s + Axial = 592.629 \cdot kips$

Overturning Moment = $M_{ot} := OM + Shear \cdot (d_f + L_{pag}) = 7026 \cdot kip \cdot ft$

Resisting Moment = $M_r := (W_{tot}) \cdot \frac{W_f}{2} + S_{u1} \cdot T_f \cdot \frac{1}{3} + S_{u2A} \cdot \frac{(D_f - d_f)}{2} + S_{u2B} \cdot \frac{2 \cdot (D_f - d_f)}{3} = 10797 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.54$

Factor of Safety Required = $FS_{req} := 1.0$

Overturing_Check := if($FS \ge FS_{req}$,"Okay" ,"No Good")

Overturing_Check = "Okay"

Bearing Pressure Check:

Area of Mat = $A_{mat} := W_f^2 - \frac{d_p^2 \cdot \pi}{4} = 525.735\,ft^2$

Section Modulus of Mat = $S_{mat} := \frac{W_f^3}{6} - \frac{d_p^3 \cdot \pi}{32} = 2254 \cdot ft^3$

Axial Force @ Base of Mat = $P_{mat} := WT_{mat} + WT_s = 368.014 \cdot kips$

Resisting Moment Capacity of Caissson = $M_{cap} := S_{u2A} \cdot \left[\frac{1}{2} \cdot (D_f - d_f) + d_f + L_{pag}\right] + S_{u2B} \cdot \left[\frac{2}{3} \cdot (D_f - d_f) + d_f + L_{pag}\right] = 5800 \cdot kip \cdot ft$

Residual Moment @ Base of Mat = $M_{mat} := (OM - M_{cap}) + Shear \cdot (d_f + L_{pag}) - \left(S_{u1} \cdot T_f \cdot \frac{1}{3}\right) = 1141 \cdot kip \cdot ft$

Maximum Pressure in Mat = $P_{max} := \frac{P_{mat}}{A_{mat}} + \frac{M_{mat}}{S_{mat}} = 1.206 \cdot ksf$

Max_Pressure_Check := if($P_{max} < q_s$, "Okay", "No Good")

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{P_{mat}}{A_{mat}} - \frac{M_{mat}}{S_{mat}} = 0.194 \cdot ksf$

Min_Pressure_Check := if[($P_{min} \geq 0$)·($P_{min} < q_s$), "Okay", "No Good"]

Min_Pressure_Check = "Okay"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 9.531\,ft$

Distance to Kern = $X_k := \frac{W_f}{6} = 4\,ft$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{mat}}{P_{mat}} = 3.1\,ft$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot P_{mat}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.149 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.206 \cdot ksf$

Pressure_Check := if($q_{adj} < q_s$, "Okay", "No Good")

Pressure_Check = "Okay"

Product Specifications

DHHTT65B-3XR

Multiband Antenna, 790–960, 2 x 1710–2180 and 2 x 2490-2690 MHz, 65° horizontal beamwidth, internal electrical tilt with individual tilt available for the 850 MHz band, 1900 MHz bands and 2500 MHz bands.

Electrical Specifications

Frequency Band, MHz	790–896	870–960	1710–1880	1850–1990	1920–2180	2490–2690
Connector Interface	7-16 DIN Female	7-16 DIN Female	7-16 DIN Female	7-16 DIN Female	7-16 DIN Female	4.1-9.5 DIN Female
Connector Location	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
Gain, dBi	15.5	15.5	17.3	17.4	17.5	17.2
Beamwidth, Horizontal, degrees	64	63	71	69	66	60
Beamwidth, Vertical, degrees	11.2	10.3	5.6	5.4	5.1	4.3
Beam Tilt, degrees	0–10	0–10	0–8	0–8	0–8	0–8
USLS (First Lobe), dB	15	16	15	16	15	18
Front-to-Back Ratio at 180°, dB	28	31	31	29	25	26
CPR at Boresight, dB	20	19	20	20	18	16
CPR at Sector, dB	9	9	9	9	7	4
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR | Return Loss, dB	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0	1.5 | 14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-150
Input Power per Port, maximum, watts	350	350	300	300	300	250
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

Electrical Specifications, BASTA*

Frequency Band, MHz	790–896	870–960	1710–1880	1850–1990	1920–2180	2490–2690
Gain by all Beam Tilts, average, dBi	15.0	15.1	17.0	17.1	17.1	17.1
Gain by all Beam Tilts Tolerance, dB	±0.4	±0.3	±0.3	±0.3	±0.3	±0.6
Gain by Beam Tilt, average, dBi	0 ° | 15.0 5 ° | 15.1 10 ° | 15.0	0 ° | 15.0 5 ° | 15.1 10 ° | 15.0	0 ° | 16.8 4 ° | 17.0 8 ° | 17.0	0 ° | 17.0 4 ° | 17.1 8 ° | 17.1	0 ° | 17.0 4 ° | 17.1 8 ° | 17.1	0 ° | 17.1 4 ° | 17.2 8 ° | 17.0
Beamwidth, Horizontal Tolerance, degrees	±2.5	±1.8	±3.2	±2.7	±5	±6.6
Beamwidth, Vertical Tolerance, degrees	±0.8	±0.6	±0.2	±0.2	±0.4	±0.3
USLS, beampeak to 20° above beampeak, dB	16	17	16	17	16	19
Front-to-Back Total Power at 180° ± 30°, dB	24	26	26	25	23	23
CPR at Boresight, dB	21	20	22	22	21	16
CPR at Sector, dB	9	10	13	10	8	5

* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, download the whitepaper Time to Raise the Bar on BSAs.

General Specifications

Antenna Brand	Andrew®
Antenna Type	DualPol® multiband with internal RET
Band	Multiband
Brand	DualPol®

Operating Frequency Band	1710 – 2180 MHz | 2490 – 2690 MHz | 790 – 960 MHz
Performance Note	Outdoor usage

Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground
Radiator Material	Copper | Low loss circuit board
Radome Material	ASA, UV stabilized
Reflector Material	Aluminum
RF Connector Interface	4.1-9.5 DIN Female | 7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	10
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Speed, maximum	241 km/h | 150 mph

Dimensions

Depth	181.0 mm | 7.1 in
Length	1832.0 mm | 72.1 in
Width	301.0 mm | 11.9 in
Net Weight	20.6 kg | 45.4 lb

Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female | 8-pin DIN Male
RET Interface, quantity	1 female | 1 male

Packed Dimensions

Depth	299.0 mm | 11.8 in
Length	1954.0 mm | 76.9 in
Width	409.0 mm | 16.1 in
Shipping Weight	33.2 kg | 73.2 lb

Regulatory Compliance/Certifications

Agency	**Classification**
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	

Filters & Combiners

DATA SHEET

Outdoor Diplexer

DPO-7126Y-0x1

- Combines the frequencies covering PCS/AWS (1695-2180 MHz) with BRS (2496-2690 MHz)
- High power 250 W per port with low insertion loss in a small, lightweight enclosure
- Low intermodulation with isolation of >50 dB port to port
- High reliability of >500K Hours MTBF and multi-strike lightning protection
- Designed and produced to ISO 9001:2008 certification standards
- Weatherproof enclosure (IP67) with available outdoor pole or wall mounting options

Overview

The CCI Outdoor Diplexer passes the PCS and AWS bands covering 1695-2180 MHz on its low band input port and the full BRS band which covers 2496-2690 MHz on its high band input port. The Diplexer combines the low band and high band signals on to a common port and is specifically intended for use in multi-band systems with limited feeder lines. The Diplexer facilitates the addition of new technologies including LTE and new spectrum to existing sites while providing a high degree of isolation between systems. Decreasing the number of feeder lines lowers tower loading, leasing and installation expenditures and significantly reduces the total cost to upgrade a site.

The CCI Outdoor Diplexer provides full band performance for each band with low insertion loss, low Intermodulation, and high 250 W per port power handling. Excellent return loss performance delivers the best match to the antennas and base station, saving precious transmit power. The CCI Diplexer is available in a single, twin or quad unit configuration.

Technical Description:

The CCI Outdoor Diplexer consists of multiple filters and can be used as either a splitter or combiner to aggregate the PCS/AWS with the BRS bands on to a common feeder line. The fully weatherproof tower mount Diplexer has internal multi-strike lightning protection using a multi-stage surge protection circuit.

The unit has been designed to minimize insertion loss while maximizing isolation. Particular attention has been given to the intermodulation performance of the Diplexer to minimize any passive intermodulation products from occurring. The Diplexer housing is constructed from die cast aluminum and consists of an IP67 moisture proof enclosure, with IP68 immersion proof connectors suited to long-life masthead mounting. The Diplexer can be pole or wall mounted with the included bracket. The RF ports are available with DIN 7-16 or 4.3-10 connectors.

CCI filter and combiner products are designed and produced to ISO 9001:2008 certification standards for reliability and quality at our state-of-the-art engineering and manufacturing facilities.

Filters & Combiners

SPECIFICATIONS

Outdoor Diplexer

DPO-7126Y-0x1

Electrical

RF Parameters	Ports	Frequency(MHz)	Specification
Return Loss	COMMON	1695 - 2180	18 dB minimum, 20 dB typical
		2496 - 2690	18 dB minimum, 20 dB typical
	PCS/AWS	1695 - 2180	18 dB minimum, 20 dB typical
	BRS	2496 - 2690	18 dB minimum, 20 dB typical
Insertion Loss	COMMON to PCS/AWS	1695 - 2180	0.2 dB typical, 0.25 dB maximum
	COMMON to BRS	2496 - 2690	0.2 dB typical, 0.25 dB maximum
Rejection	COMMON to PCS/AWS	2496 - 2690	50 dB minimum
	COMMON to BRS	1695 - 2180	50 dB minimum
Isolation	PCS/AWS to BRS	1695 - 2180	50 dB minimum
	BRS to PCS/AWS	2496 - 2690	50 dB minimum

General Characteristics	
General Impedance	50 ohms
Continuous Average Power	250 W maximum (input ports), 500 W maximum (Common port)
Peak Envelope Power	1 kW maximum (input ports), 3 kW maximum (Common port)
Intermodulation Performance	<-117 dBm (-160 dBc) at 2 x +43 dBm tones all bands

Environmental

Operating Temperature	-40˚C to +65˚C
Enclosure	Enclosure IP67, Connectors IP68
MTBF	>500,000 hours
Lightning Protection	8/20us, ±10KA maximum, 10 strikes per IEC61000-4-5

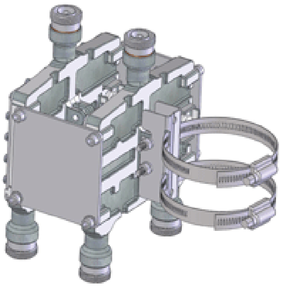
Mechanical

Model	DPO-7126Y-0-S1	DPO-7126Y-0-T1	DPO-7126Y-0-Q1
Modularity	Single	Twin	Quad
Weight with brackets	3.7 lbs (1.6 Kg)	7.3 lbs (3.3 Kg)	14.4 lbs (6.6 Kg)
Dimensions with brackets	5.94 x 7.94 x 2.02 in. (151 x 201.8 x 51.4 mm)	5.94 x 7.94 x 4.07 in. (151 x 201.8 x 103.4 mm)	5.94 x 7.94 x 8.17 in. (151 x 201.8 x 207.4 mm)
Dimensions enclosure only	3.03 x 7.42 x 1.92 in. (77.0 x 188.5 x 48.8 mm)		
Connectors	3 x 7-16 DIN female or 4.3-10 female (per diplexer)		
Mounting	Pole/Wall mounting bracket		

RADIO FREQUENCY SYSTEMS
The Clear Choice®

ShareLite™ Wideband Diplexer Kit – In-line 698-960 MHz/1710-2200 MHz, full DC/AISG pass

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range, including all the new AWS-3 paired spectrum blocks (G, H, I, J).. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



FEATURES / BENEFITS

- LTE and AWS-3 ready design
- Extremely Low Insertion Loss
- High level of Rejection between bands – Protection against interferences
- Extremely High Power Handling Capability
- DC/AISG 1.1/2.0 pass through all ports
- Very compact & small size design – Easy installation and reduced tower load
- In-line long-neck connectors for easy connection & waterproofing
- Exceptional reliability & environmental protection (IP 67)
- Equipped with 1 * Breathable Vent – Prevent any humidity inside the product
- Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)
- Grounding already provided through the mounting bracket

Technical Features

GENERAL SPECIFICATIONS		
Product Type		Diplexer/Cross Band Combiner
Application		LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS, AWS-1, AWS-3
Configuration		ShareLite Kit consisting of (2) in-line long neck connector diplexers (Full DC Pass), (1) mounting hardware SEM2-1A, & (1) assembly kit SEM2-3 disassembled
ELECTRICAL SPECIFICATIONS		
Frequency Range 1	MHz	698 - 960
Frequency Range 2	MHz	1710 - 2200
Return Loss All Ports	dB	19 Min/23 Typ.
Power Handling Continuous, Max	W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max	W	15000 in low frequency path & 8000 in high frequency path
Impedance	Ω	50.0
Insertion Loss, Path 1	dB	0.07 typ.
Insertion Loss, Path 2	dB	0.13 typ.
Rejection Between Bands Min/Typ	dB	58/64@698-960MHz 57/70@1710-2200MHz
Group Delay, Path 1	ns	3 Max.
Group Delay, Path 2	ns	3 Max.
IMP Level at the COM Port	dBm (dBc)	-112 (-155) @2x43 typ.
DC Pass in Path 1		Yes
DC Pass in Path 2		Yes

MECHANICAL SPECIFICATIONS		
Mounting		Wall Mounting: With 4 screws (maximum 6mm diameter) Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
RF Connectors		In-line long-neck 7-16-Female
Weight	kg (lb)	2.9 (6.4)
Dimensions, H x W x D	mm (in)	147 x 164 x 118 (5.8 x 6.5 x 4.6)
Shipping Dimensions, H x W x D	mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 1 * Dual unit in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 3 * Dual units = 3 * Boxes in 1 * overwrap
Housing		Aluminum
TESTING AND ENVIRONMENTAL		
Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Environmental		ETSI 300-019-2-4 Class 4.1E
Ingress Protection		IP 67
Lightning Protection		EN/IEC61000-4-5 Level 4

External Document Links

RFS Diplexer Field Test Procedure

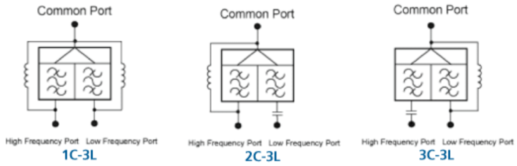
KIT-FD9R6004/1C-DL Installation Instructions

Notes

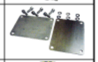
RADIO FREQUENCY SYSTEMS
The Clear Choice®

ShareLite™ Wideband Diplexer Kit – In-line 698-960 MHz/1710-2200 MHz, full DC/AISG pass

Selection Guide Diplexer	698-960 / 1710-2200MHz				
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information		
Model Number	**Description**	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 3m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	