10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

October 4, 2019

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

RE: Notice of Exempt Modification
20 Vail Road Brookfield, CT 06804
Latitude: 41.432317
Longitude: -73.402797
Sprint Site#: CT33XC525 – DO Macro

Dear Ms. Bachman:

Sprint currently maintains three (3) antennas at the 132.5-foot level of the existing 135-foot transmission tower at 20 Vail Road Brookfield, CT. The 135-foot transmission tower is owned by The Connecticut Light & Power Company, d/b/a Eversource Energy and the property is owned by Berkshire North LLC. 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 132.5-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 (3) 2500 MHz RRHs

This facility was approved by the CSC for Sprint use in Petition No. 588 dated October 23, 2002. 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 – Stephen C. Dunn, Elected Official, and Francis Lollie, Zoning Enforcement Officer for the Town of Brookfield, as well as the owners.

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: Stephen C. Dunn – Town of Brookfield First Selectman
Francis Lollie – Town of Brookfield Zoning Enforcement Officer
Berkshire North LLC – property owner
The Connecticut Light & Power Company, d/b/a Eversource Energy – tower owner

EVERSOURCE
ENERGY

56 Prospect Street,
Hartford, CT 06103

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

September 10, 2019

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

RE: Sprint Antenna Site, CT-33XC525, Vail Road, Brookfield, CT, structure 10246

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: 17159.24 - CT33XC525 - Structural Analysis Rev3 19.01.02
17159.24 CT33XC525 Brookfield - CD Rev.0 19.01.03 SS

Petition No. 588
Sprint Spectrum, L.P. d/b/a Sprint PCS
Brookfield, Connecticut
Staff Report
October 23, 2002

On October 21, 2002, Connecticut Siting Council (Council) member Gerald J. Heffernan and Christina Lepage of the Council staff met with Sprint PCS (Sprint) representatives Tom Regan and Carlos Santori at 20 Vale Road, Brookfield, Connecticut for inspection of an electric transmission structure. The structure is owned by Connecticut Light and Power (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 six panel antennas on a ten-foot attachment above the existing monopole. The installation of the proposed antennas on the existing 125-foot transmission line structure (#10246) to make the overall height at the top of the antennas 135-feet above ground level (agl) with a centerline 132 feet 6 inches agl.

The equipment cabinet would sit on a 10-foot by 25-foot concrete pad within a 25-foot by 30-foot lease area. An ice canopy would cover the equipment cabinet and an ice bridge will span from the equipment cabinet to the pole. An 8-foot high chain link fence would surround the equipment compound. Access to the proposed site would be via an existing dirt road. An underground conduit from an existing utility pole will provide power and telephone service to the site.

The transmission structure is located on a CL&P easement owned by Berkshire Industrial Corporation. CL&P's easement rights allow for the provision of electric and communication services. The zoning designation of this site is ILC-80SE (industrial-commercial). The nearest residential property line is located approximately 660 feet from the transmission structure.

The worst-case power density for the telecommunications operations at the site has been calculated to be 14.47% of the applicable standard for uncontrolled environments.

The proposed project is designed to provide coverage to Route 7, Route 202, and Candlewood Lake Road in Brookfield. Sprint contends that the proposed modification of the structure would not cause a substantial adverse environmental impact, and would prevent the construction of a new tower in the area.

Town of Brookfield, Connecticut - Assessment Parcel Map

Parcel: **D16001** **Address:** 101 PARK RIDGE RD

Map Produced Aug 2017

Approximate Scale: 1 inch = 600 feet

101A PARK RIDGE RD

Location	101A PARK RIDGE RD	**Mblu**	D16/ / 011/ /
Acct#	00460010	**Owner**	BERKSHIRE NORTH LLC
Assessment	$88,030	**Appraisal**	$125,750
PID	103883	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$125,750	$125,750

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$88,030	$88,030

Owner of Record

Owner BERKSHIRE NORTH LLC
Co-Owner
Address 2 PARKLAWN DRIVE
BETHEL, CT 06801

Sale Price $0
Certificate
Book & Page 291/ 850
Sale Date 12/12/1994

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
BERKSHIRE NORTH LLC	$0		291/ 850	12/12/1994

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Stories:	
Occupancy	

Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bathrooms	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Kitchens	
Whirlpool Tub	
Hot Tubs	
Fireplaces	
Fin Bsmt Area	
Fin Bsmt Quality	
Bsmt Garages	

Building Photo

(http://images.vgsi.com/photos2/BrookfieldCTPhotos//default.jpg

Building Layout

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

Extra Features

Extra Features
No Data for Extra Features

Land

Land Use

Use Code 390
Description Com Ld Dv
Zone IL80

Land Line Valuation

Size (Acres) 1.15
Depth
Assessed Value $88,030
Appraised Value $125,750

Outbuildings

Outbuildings

No Data for Outbuildings

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$125,750	$125,750
2017	$0	$125,750	$125,750
2015	$0	$125,750	$125,750

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$88,030	$88,030
2017	$0	$88,030	$88,030
2015	$0	$88,030	$88,030

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™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
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 9101 5235

BILLING: P/P

Reference#1: CT33XC525

UIS 21.5.42. 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.

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™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
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:
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 9211 3243

BILLING: P/P

Reference#1: CT33XC525

UIS 21.5.42. 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.

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™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
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:
BERKSHIRE NORTH LLC
2 PARKLAWN DRIVE
BETHEL CT 06801-1042

CT 068 0-02

UPS GROUND
TRACKING #: 1Z V25 742 03 9241 5257

BILLING: P/P

Reference#1: CT33XC525

UIS 21.5.42. 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.

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™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
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:
STEPHEN C. DUNN
TOWN OF BROOKFIELD
100 POCONO ROAD
BROOKFIELD CT 06804-3322

CT 068 0-03

UPS GROUND
TRACKING #: 1Z V25 742 03 9352 1265

BILLING: P/P

Reference#1: CT33XC525

UIS 21.5.42. 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.

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™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
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:
FRANCIS LOLLIE
TOWN OF BROOKFIELD
PO BOX 5106
100 POCONO ROAD
BROOKFIELD CT 06804-3322

CT 068 0-03

UPS GROUND
TRACKING #: 1Z V25 742 03 9203 1279

BILLING: P/P

Reference#1: CT33XC525

UIS 21.5.42. WNTNV50 15.0A 07/2019

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT33XC525

Eversource Struct.: 10246
Vail Road
Brookfield, Connecticut 06804

May 29, 2019

EBI Project Number: 6219001743

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**2.71%**

21 B Street, Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

May 29, 2019

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, New Jersey 07495

Emissions Analysis for Site: CT33XC525 - Eversource Struct.: 10246

EBI Consulting was directed to analyze the proposed Sprint facility located at **Vail Road** in **Brookfield, Connecticut** for the purpose of determining whether the emissions from the Proposed Sprint Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu W/cm^2$). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Sprint Wireless antenna facility located at Vail Road in Brookfield, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Sprint is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 CDMA channels (800 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 50 Watts per Channel.

2) 4 PCS channels (1900 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 3 BRS channels (2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antennas used in this modeling are the Commscope DHHTT65B-3XR for the 800 MHz / 1900 MHz / 2500 MHz channel(s) in Sector A, the Commscope DHHTT65B-3XR for the 800 MHz / 1900 MHz / 2500 MHz channel(s) in Sector B, the Commscope DHHTT65B-3XR for the 800 MHz / 1900 MHz / 2500 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline of the proposed antennas is 132.5 feet above ground level (AGL).

8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

9) Emissions from additional carriers were not included because emissions data for the site location are not available.

10) All calculations were done with respect to uncontrolled / general population threshold limits.

Sprint Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR	Make / Model:	Commscope DHHTT65B-3XR
Frequency Bands:	800 MHz / 1900 MHz / 2500 MHz	Frequency Bands:	800 MHz / 1900 MHz / 2500 MHz	Frequency Bands:	800 MHz / 1900 MHz / 2500 MHz
Gain:	13.35 dBd / 15.25 dBd / 15.05 dBd	Gain:	13.35 dBd / 15.25 dBd / 15.05 dBd	Gain:	13.35 dBd / 15.25 dBd / 15.05 dBd
Height (AGL):	132.5 feet	Height (AGL):	132.5 feet	Height (AGL):	132.5 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,360.84	ERP (W):	11,360.84	ERP (W):	11,360.84
Antenna A1 MPE %:	**2.71%**	Antenna B1 MPE %:	**2.71%**	Antenna C1 MPE %:	**2.71%**

Site Composite MPE %	
Carrier	**MPE %**
Sprint (Max at Sector A):	2.71%
No additional carriers	N/A
Site Total MPE % :	2.71%

Sprint Sector A Total:	2.71%
Sprint Sector B Total:	2.71%
Sprint Sector C Total:	2.71%
Site Total:	2.71%

Sprint Maximum MPE Power Values (Sector A)

Sprint Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Sprint 800 MHz CDMA	2	1081.36	132.5	4.43	800 MHz CDMA	533	0.83%
Sprint 1900 MHz PCS	4	1339.86	132.5	10.98	1900 MHz PCS	1000	1.10%
Sprint 2500 MHz BRS	3	1279.56	132.5	7.86	2500 MHz BRS	1000	0.79%
						Total:	**2.71%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the Sprint facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

Sprint Sector	Power Density Value (%)
Sector A:	2.71%
Sector B:	2.71%
Sector C:	2.71%
Sprint Maximum MPE % (Sector A):	2.71%
Site Total:	2.71%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **2.71%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.

Sprint

WIRELESS COMMUNICATIONS FACILITY

EVERSOURCE STRUCT.: 10246
SITE ID: CT33XC525
VAIL ROAD
BROOKFIELD, CT 06804

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

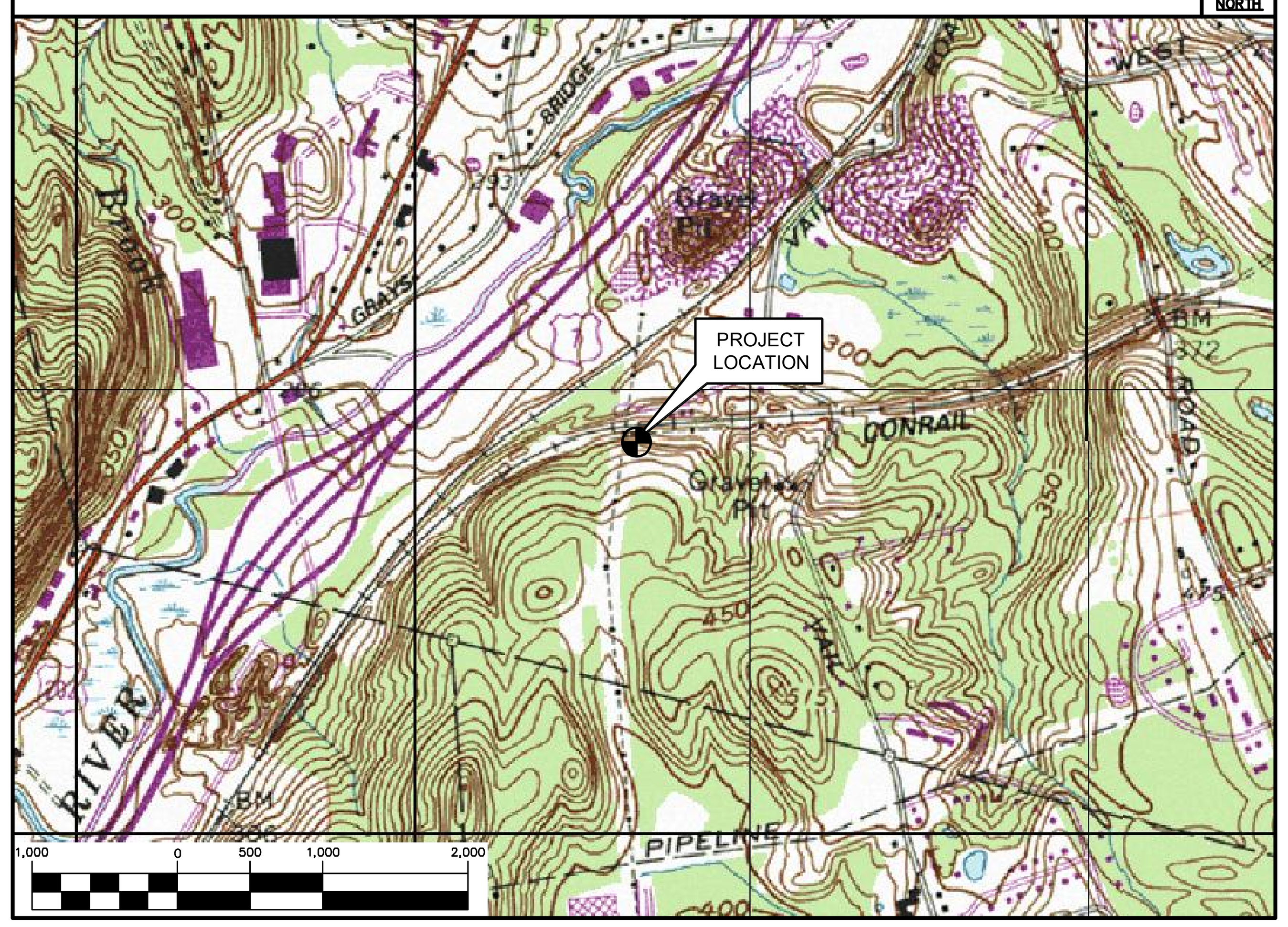
TO: VAIL ROAD
BROOKFIELD, CT 06804

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/MA-128 S/YANKEE DIVISION HWY S TOWARD WALTHAM/LOWELL	0.27 MI.
4.	TAKE THE I-90/MASS PIKE EXIT, EXIT 25, TOWARD BOSTON/ALBANY NY.	12.32 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).	94.40 MI.
7.	TAKE EXIT 9 FOR CT-25 TOWARD BROOFIELD.	0.30 MI.
8.	TURN RIGHT ONTO CT-25 N.	1.80 MI.
9.	TURN LEFT ONTO W WHISCONIER ROAD.	1.00 MI.
10.	TURN RIGHT ONTO STONY HILL ROAD.	0.30 MI.
11.	TURN LEFT ONTO VAIL ROAD.	1.00 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. INSTALLATION OF A PROPOSED UNISTRUT EQUIPMENT RACK MOUNTED AT GRADE.
   B. REMOVE (3) EXISTING PANEL ANTENNAS FROM EXISTING TOWER MOUNT.
   C. INSTALL (3) PROPOSED 10-PORT PANEL ANTENNAS, (1) PER SECTOR.
   D. INSTALL (6) PROPOSED DIPLEXERS ON TOWER.
   E. INSTALL (6) PROPOSED DIPLEXERS ON PROPOSED UNISTRUT RACK.
   F. INSTALL (3) PROPOSED RRH'S ON PROPOSED UNISTRUT RACK.

PROJECT INFORMATION

SITE NAME:	EVERSOURCE STRUCT.: 10246
SITE ID:	CT33XC525
SITE ADDRESS:	VAIL ROAD BROOKFIELD, CT 06804
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° 25' 56.34"N LONGITUDE: 73° 24' 10.07"W GROUND ELEVATION: 360' 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	01/03/19	TJL	CAG	CONSTRUCTION DRAWINGS – ISSUED FOR REVIEW

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT TIMOTHY J. LYNN No. 29336 LICENSED PROFESSIONAL ENGINEER

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.: 10246
SITE ID: CT33XC525
VAIL ROAD
BROOKFIELD, CT 06804

DATE: 02/20/18
SCALE: AS NOTED
JOB NO. 17159.24

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.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/03/19	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

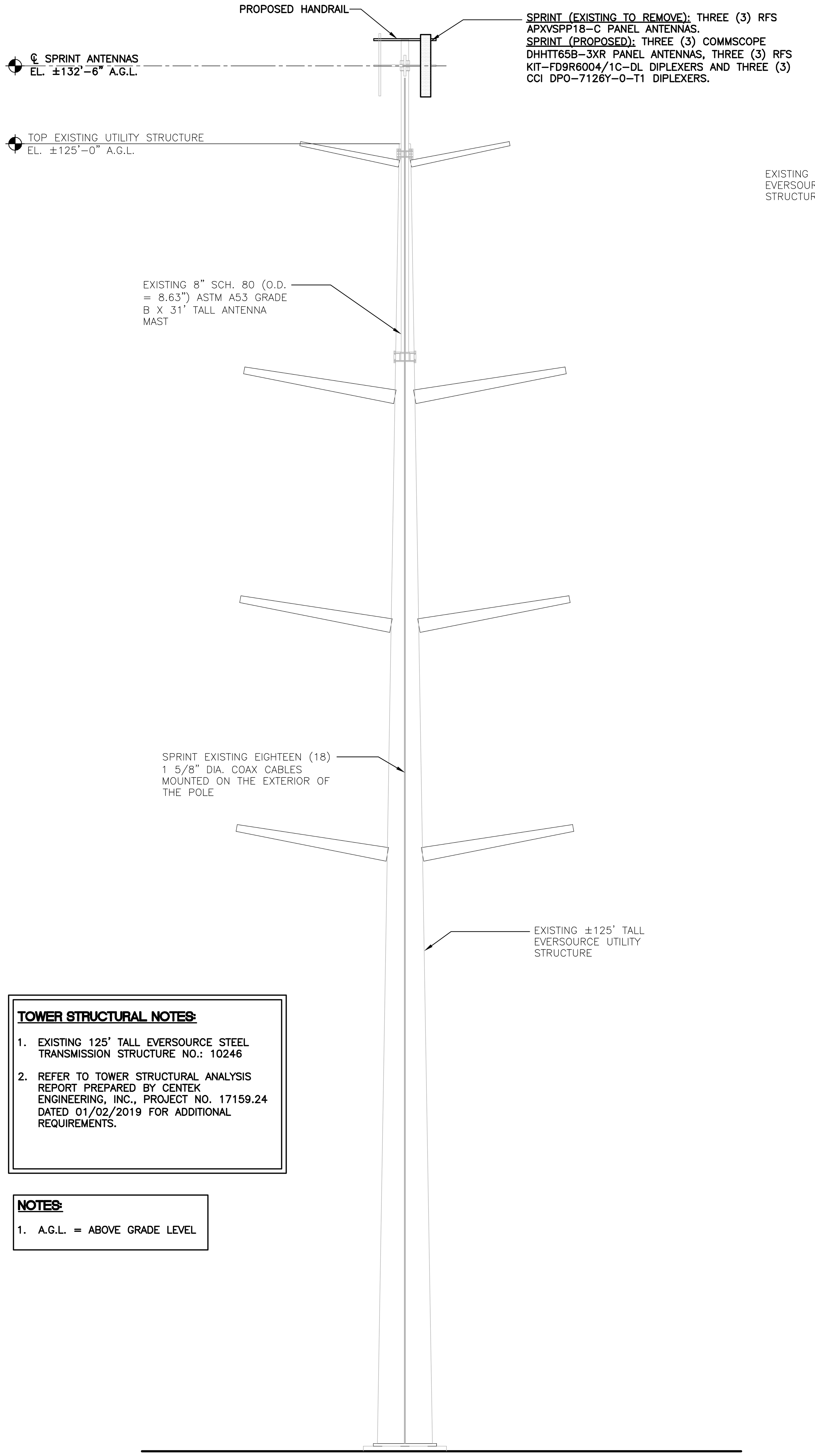
SPRINT
WIRELESS COMMUNICATIONS FACILITY
EVERSOURCE STRUCT.: 10246
SITE ID: CT33XC525
VAIL ROAD
BROOKFIELD, CT 06804

DATE:	02/20/18
SCALE:	AS NOTED
JOB NO.	17159.24

DESIGN BASIS AND SITE NOTES

N-1

Sheet No. 2 of 5



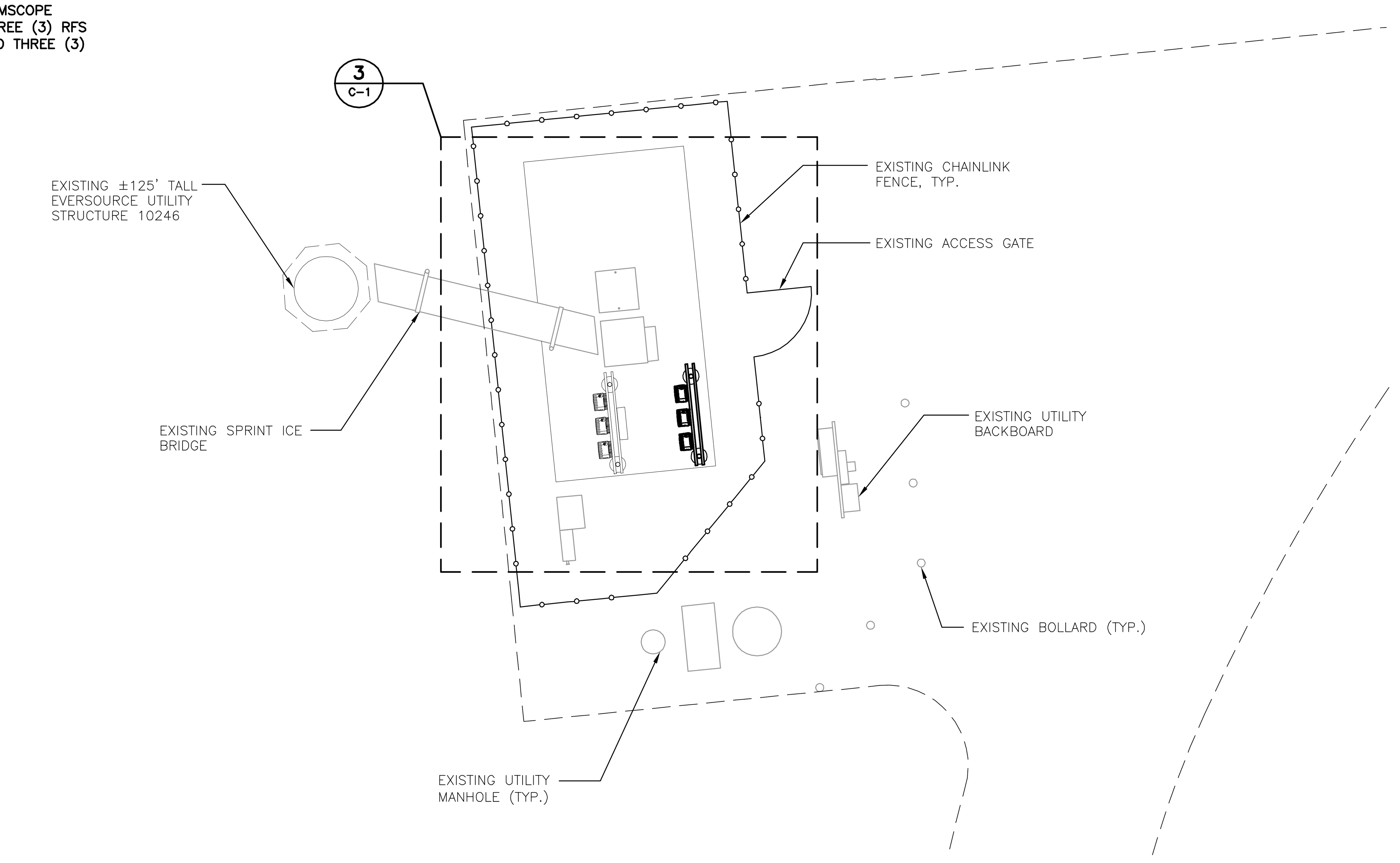
TOWER STRUCTURAL NOTES:

1. EXISTING 125' TALL EVERSOURCE STEEL TRANSMISSION STRUCTURE NO.: 10246
2. REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 17159.24 DATED 01/02/2019 FOR ADDITIONAL REQUIREMENTS.

NOTES:

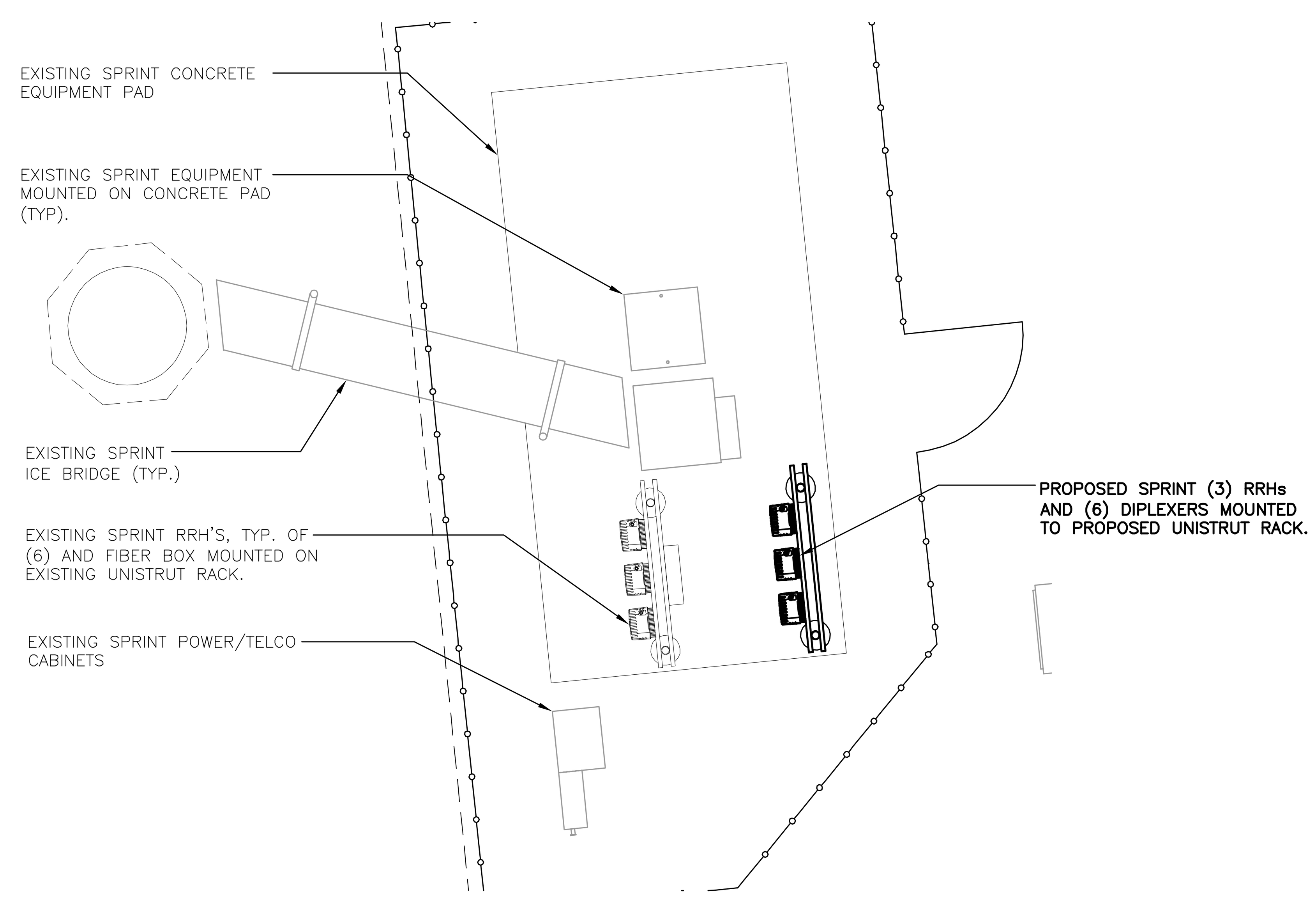
1. A.G.L. = ABOVE GRADE LEVEL

1 C-1 **TOWER ELEVATION**
SCALE: 1" = 7'-0"



2 C-1 **COMPOUND PLAN**
SCALE: 1" = 6'-0"

TRUE NORTH



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

TRUE NORTH

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/03/19	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

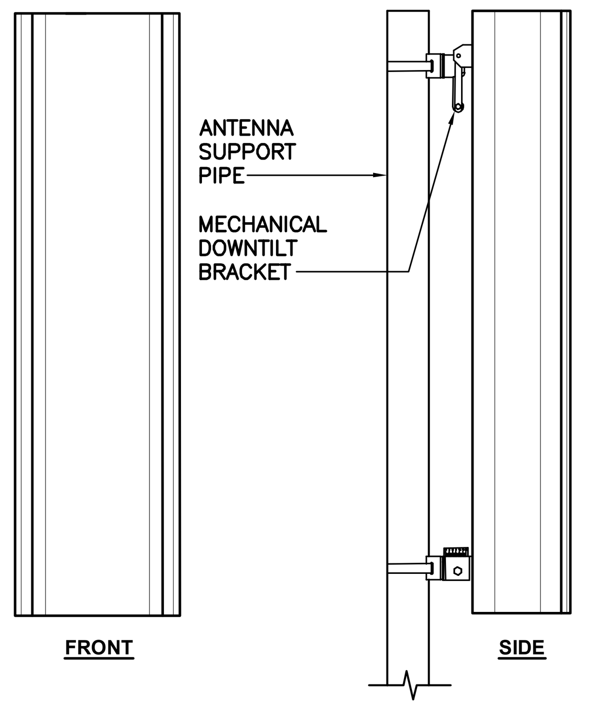
SPRINT
WIRELESS COMMUNICATIONS FACILITY
EVERSOURCE STRUCT: 10246
SITE ID: CT33XC525
VAIL ROAD
BROOKFIELD, CT 06804

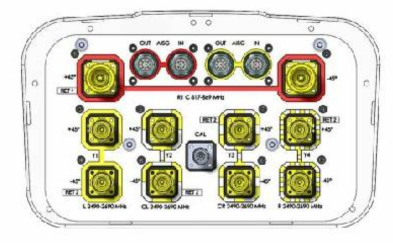
DATE: 02/20/18
SCALE: AS NOTED
JOB NO. 17159.24

COMPOUND PLANS AND ELEVATION

C-1

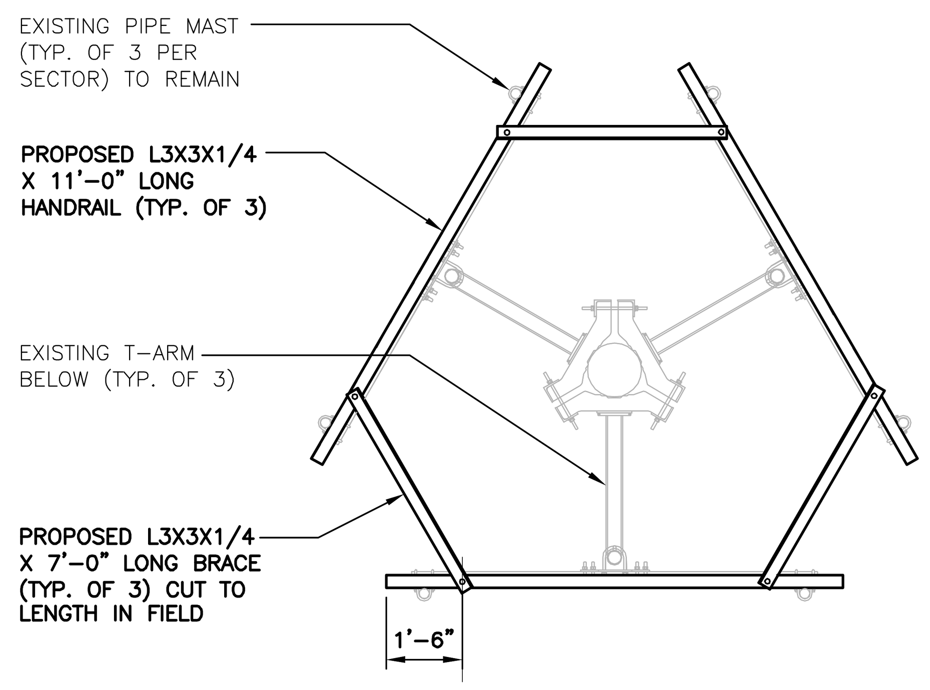
Sheet No. 3 of 5



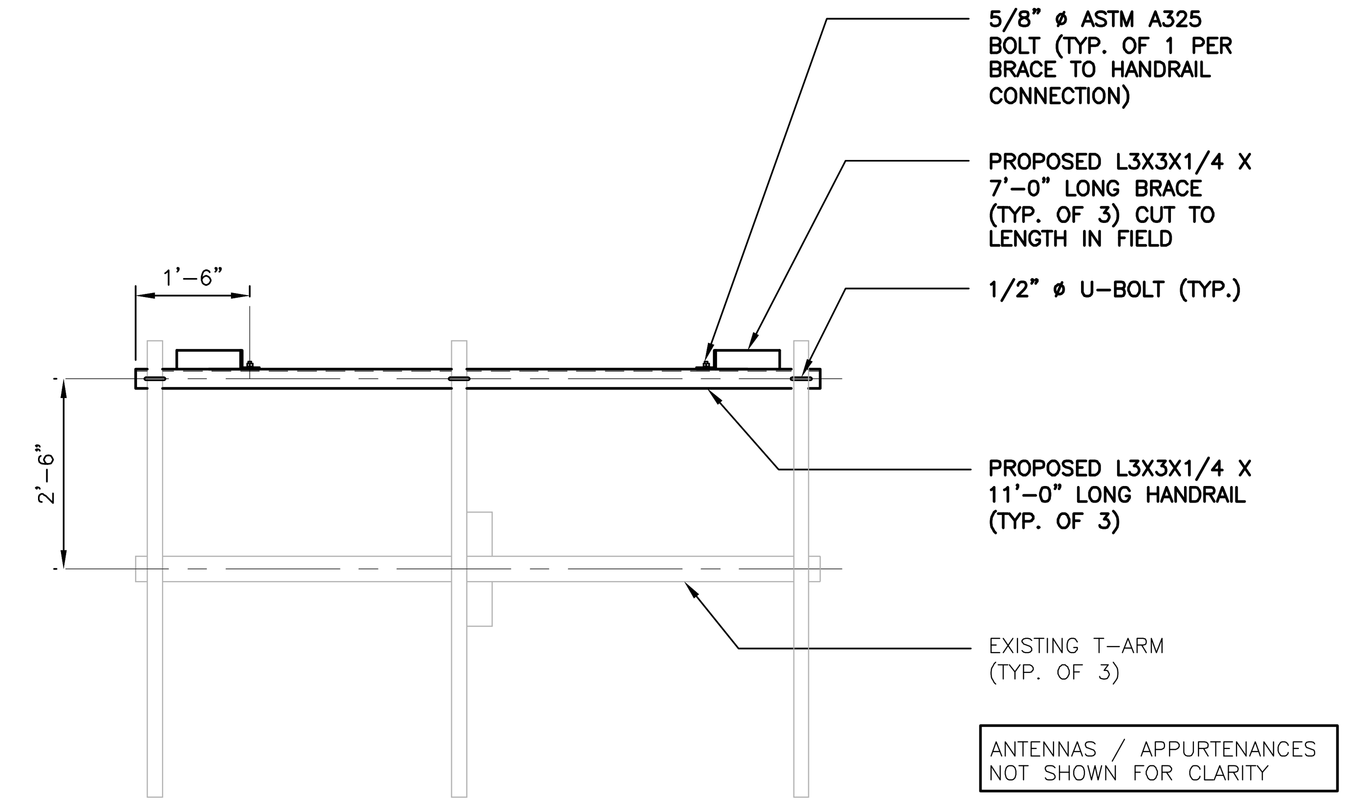


ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: DHHT65B–3XR	71.9"L x 13.8"W x 8.2"D	58 LBS.

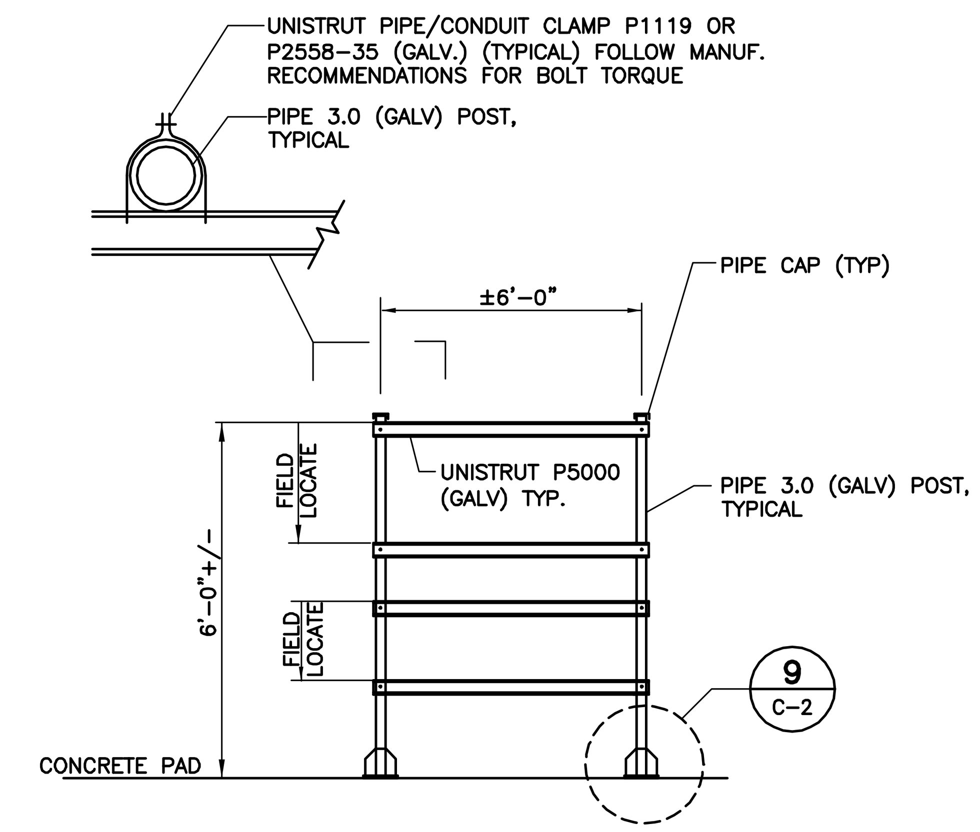
1 C–2 **PROPOSED ANTENNA DETAIL**
SCALE: 1/2" = 1'–0"



4 C–2 MOUNT MOD PLAN
SCALE: NOT TO SCALE



5 C–2 MOUNT MOD ELEVATION
SCALE: NOT TO SCALE



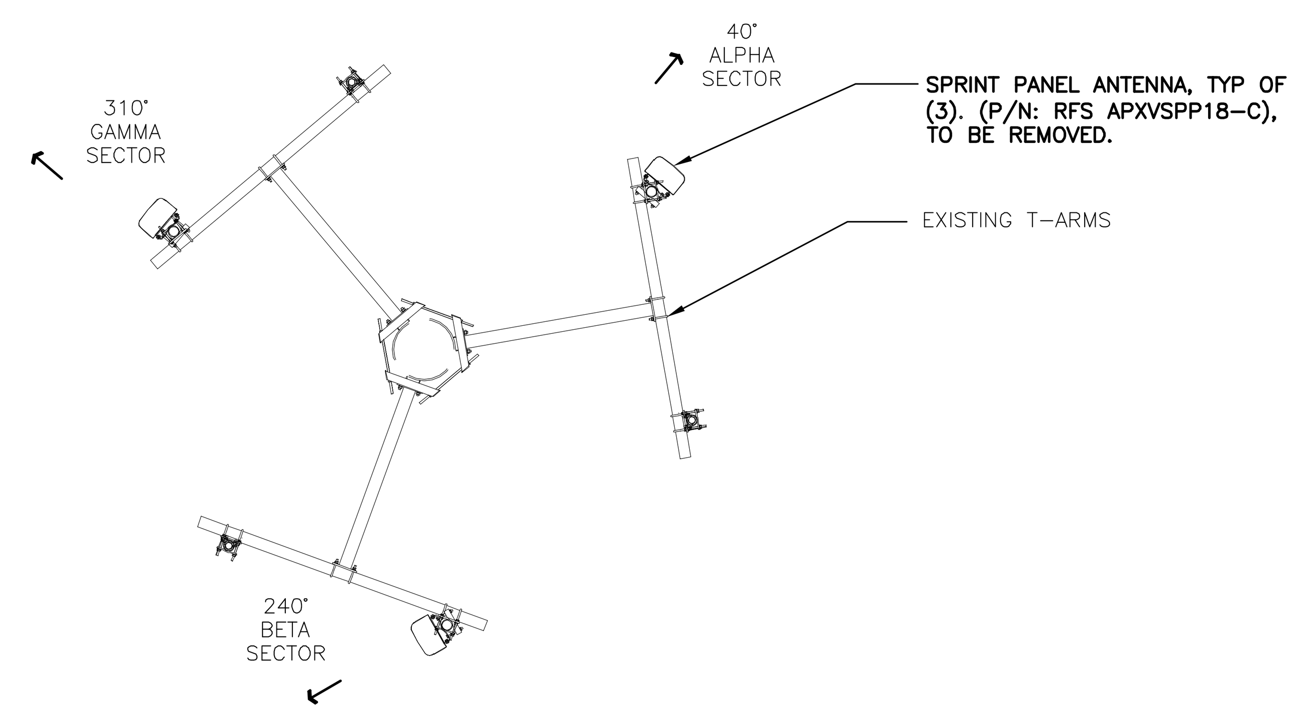
8 C–2 **PROPOSED EQUIPMENT MOUNTING FRAME DETAIL**
SCALE: NOT TO SCALE

TD-RRH8x20-25

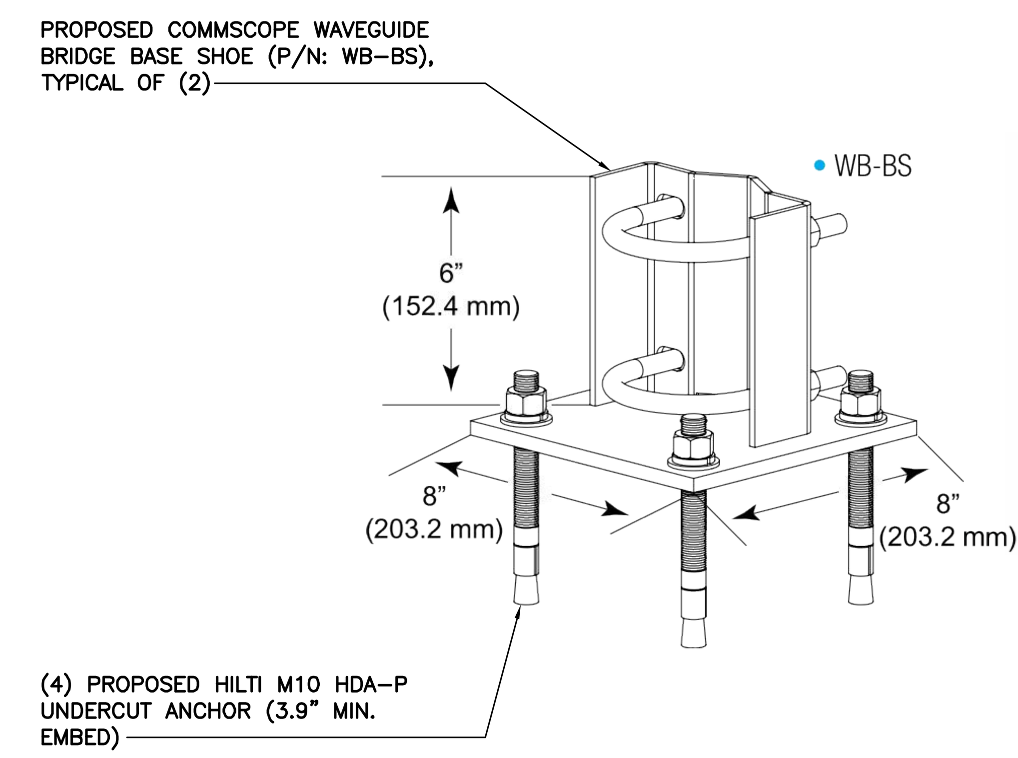
RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ALCATEL–LUCENT MODEL: TD–RRH8x20–25	25.3"L x 17.5"W x 5.7"D	66 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

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

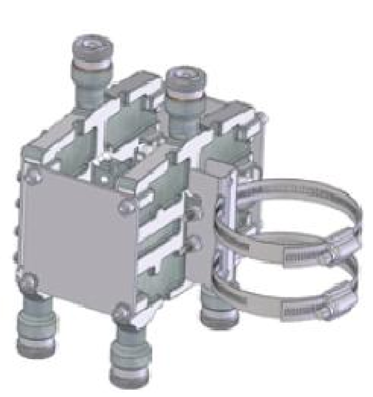


6 C–2 **EXISTING ANTENNA PLAN**
SCALE: = 1/4" = 1'



9 C–2 **EQUIPMENT FRAME POST ATTACHMENT DETAIL**
SCALE: NOT TO SCALE

DOP-7126Y-0-T1

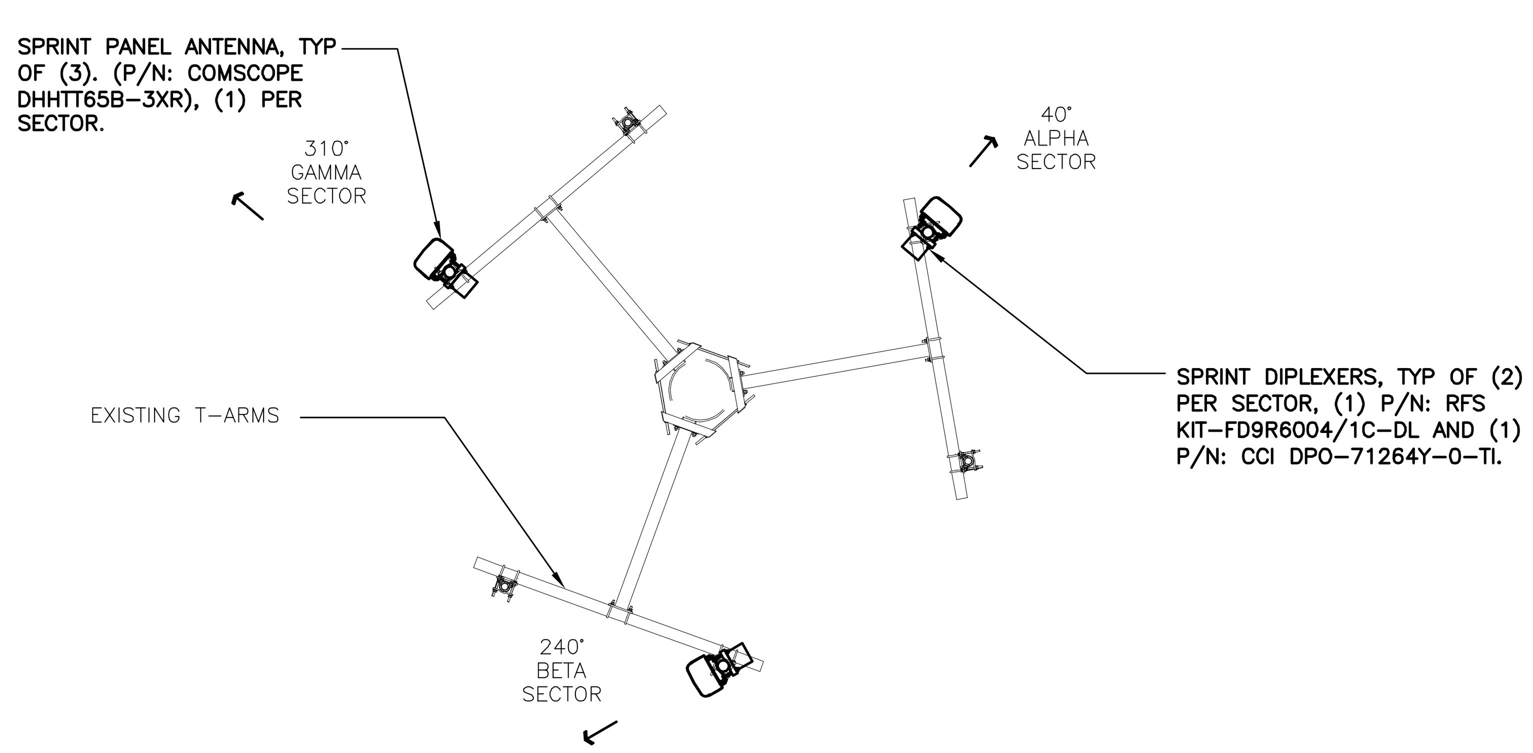


KIT-FD9R6004/1C-DL

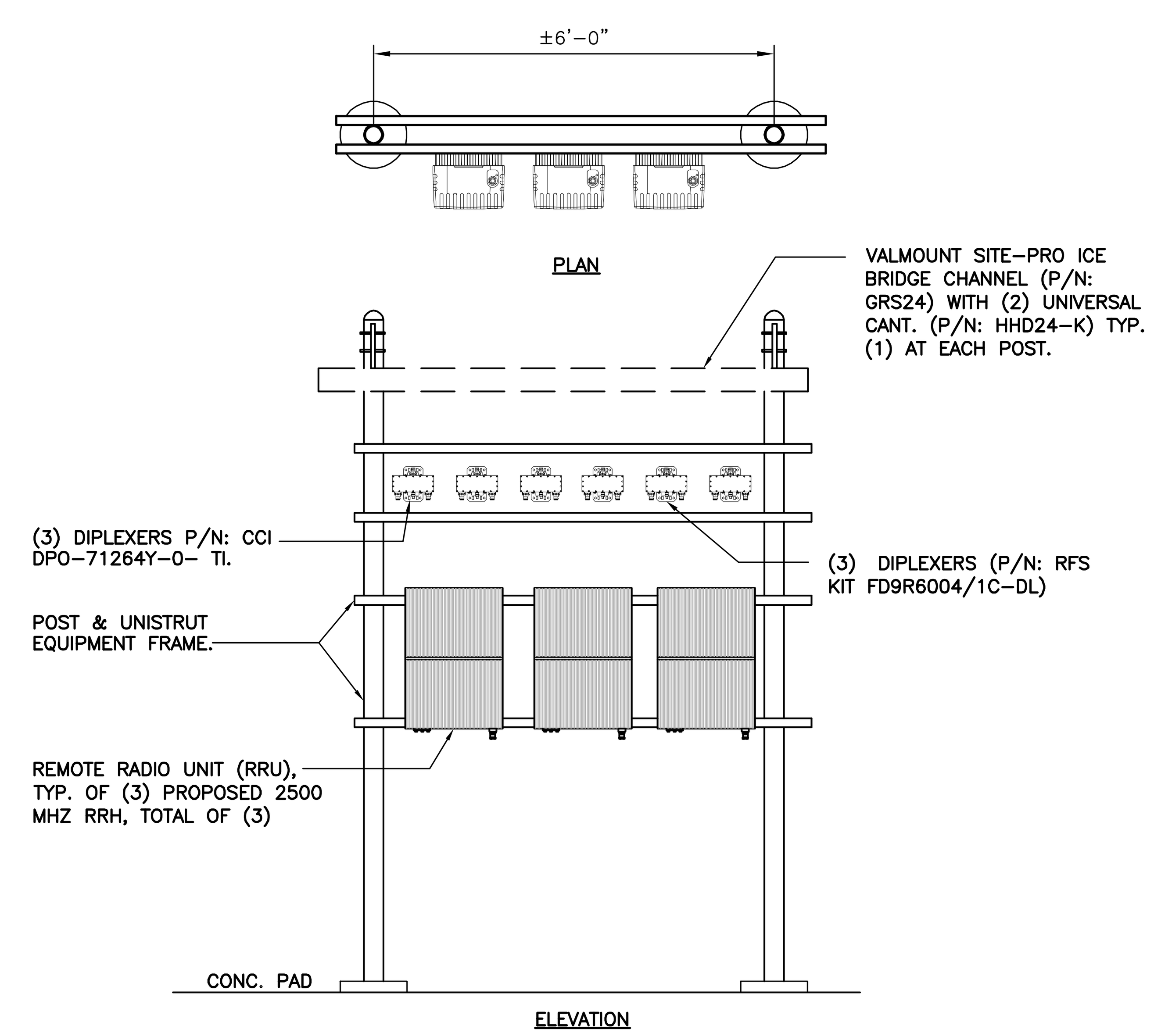
DIPLEXERS		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: KIT–FD9R6004/1C–DL	5.8"L x 6.5"W x 4.6"D	6.4 LBS.
MAKE: CCI MODEL: DPO–7126Y–0–T1	6.26"L x 7.42"W x 4.07"D	7.3 LBS.

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

3 C–2 **DIPLEXER DETAIL**
SCALE: NOT TO SCALE



7 C–2 **PROPOSED ANTENNA PLAN**
SCALE: = 1/4" = 1'



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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/03/19	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: 10246
SITE ID: CT33XC525
VAIL ROAD
BROOKFIELD, CT 06804

DATE: 02/20/18
SCALE: AS NOTED
JOB NO. 17159.24

TYPICAL DETAILS

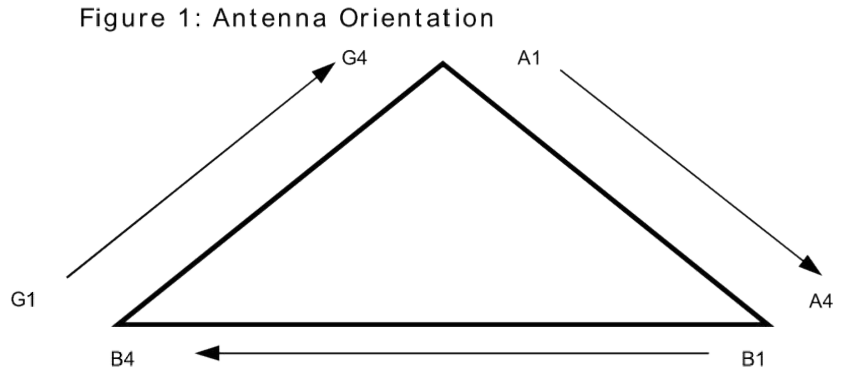
C-2

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

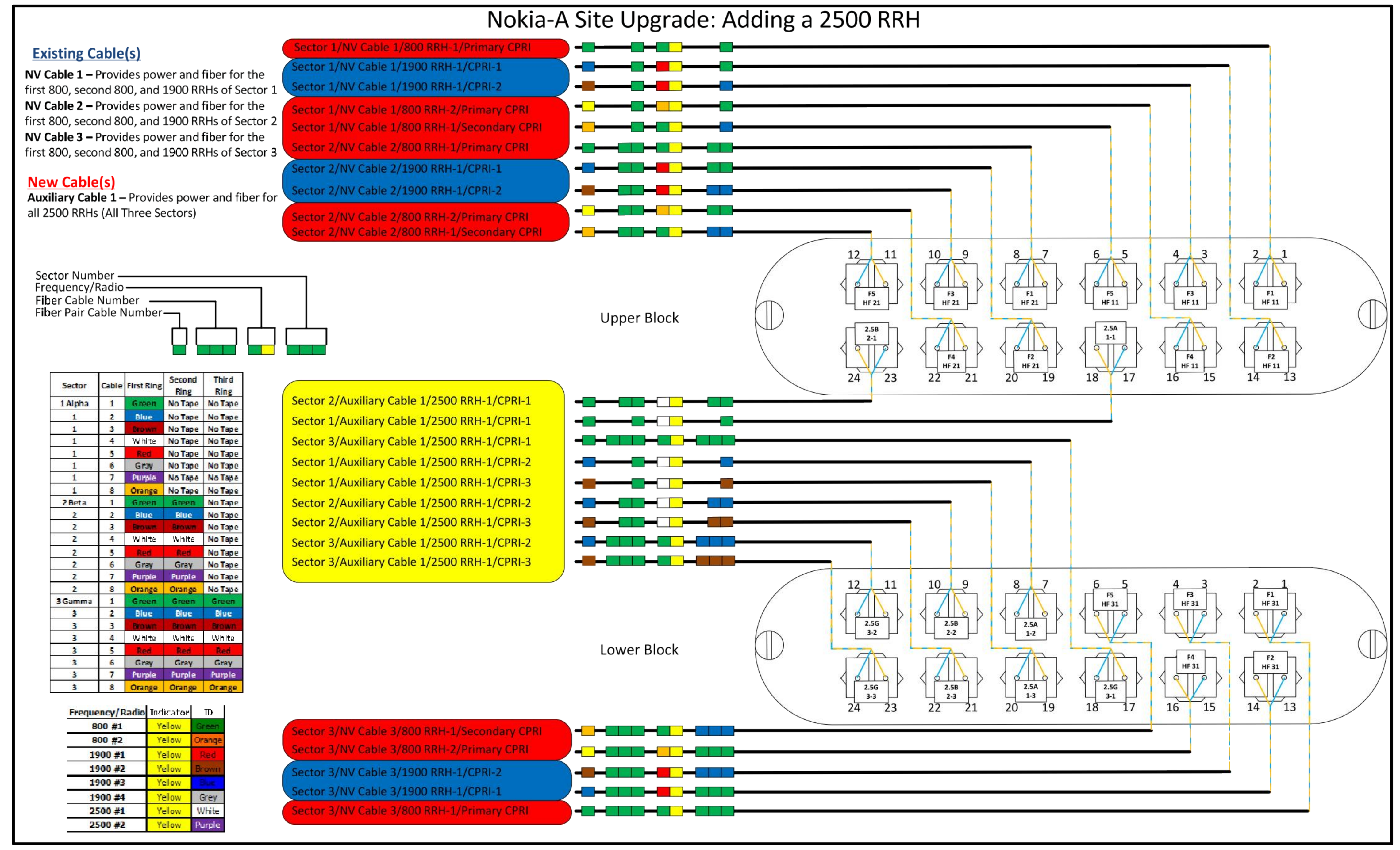
FREQUE	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

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

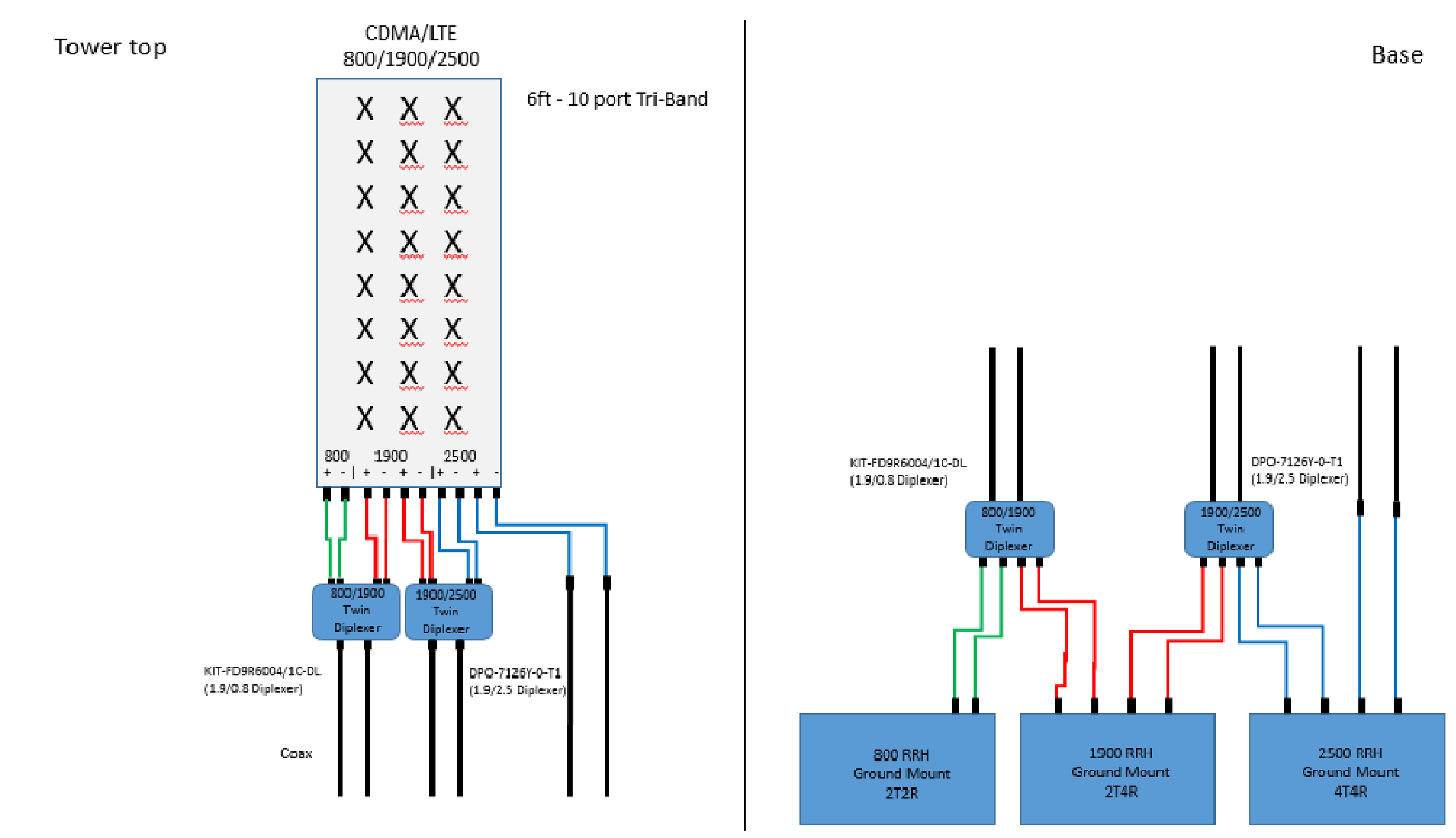
Example – Sector 3, Cable 1, 1900mhz Radio #1

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**
NOT TO SCALE



3 / C-3 **PLUMBING DIAGRAM**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	01/03/19	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.: 10246
SITE ID: CT33XC525
VAIL ROAD
BROOKFIELD, CT 06804

DATE: 02/20/18
SCALE: AS NOTED
JOB NO. 17159.24

COLOR CODE AND CPRI DETAILS

C-3

Sheet No. 5 of 5

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Pole

Sprint Site Ref: CT33XC525

Eversource Structure No. 10246
125' Electric Transmission Pole

Vail Road
Brookfield, CT

CENTEK Project No. 17159.24

~~Date: February 20, 2018~~
Rev 3: January 2, 2019

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 125' utility pole located off Vail Road in Brookfield, CT for the proposed antenna and equipment upgrade by Sprint.

The existing/proposed loads consist of the following:

- SPRINT (Existing to Remain):
  Coax Cables: Eighteen (18) 1-5/8" ∅ 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 T-arms with RAD center elevation of 132-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 T-arms with RAD center elevation of 132-ft 6-in above grade. (Handrail to be installed on existing T-Arms. Refer to section 4 for details)

Primary assumptions used in the analysis

- ASCE 48-11, "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 8-in x 31-ft long SCH. 80 pipe (O.D. = 8.63") 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 48-11, "Design of Steel Transmission Pole Structures", NESC C2-2012 and Northeast Utilities Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE 48-11.

  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"

Results

- MAST ASSEMBLY

  The existing pipe mast was determined to be structurally adequate.

Component	Stress Ratio (percentage of capacity)	Result
8" Sch. 80 Pipe	43.2%	**PASS**
Connection to Tower	68.1%	**PASS**

Horizontal Displacement (% of Cantilever Height)	Allowable	Result
0.33 %	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 48-11, "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 **57.10%** occurs in the utility pole base plate under the **NESC Heavy** loading condition.

  POLE SECTION:

  The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Tube Number 4	0.00' -40.0' (AGL)	51.98%	**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	57.10%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 8-ft ∅ x 20.5-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8.25-ft into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01143-60001 Sh. 6.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	41.38 kips	84.36 kips	3741.34 ft-kips
NESC Extreme Wind	40.53 kips	48.55 kips	3340.41 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	38.8%	**PASS**

FOUNDATION:

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	38.5%	**PASS**

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

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL 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.

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

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

Modeling Features:

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

Analysis Features:

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

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

Results Features:

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

Tool for interactive angle member sizing and bolt quantity determination.

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

Introduction

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

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

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

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

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

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

Note 1: Prepared from documentation provide from Northeast Utilities.

P C S   M a s t

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

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

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

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

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

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

Attachment A
Eversource Design Criteria

		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 Lines, Structure 10246
Date: 10/9/18
Engineer: JS
Purpose: Recalculate wire loads for Sprint site.

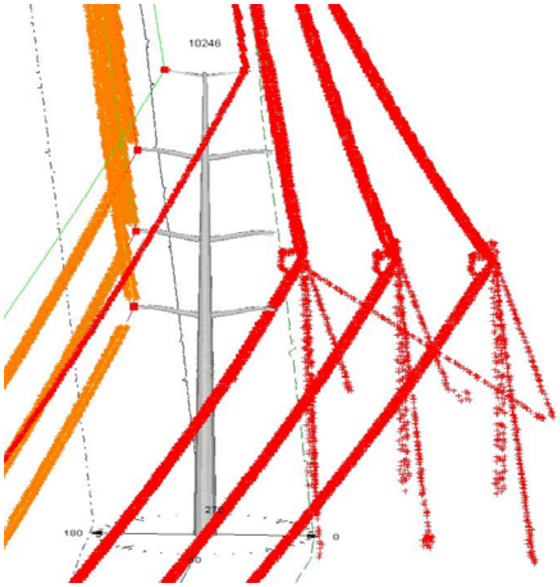
Shield Wires:
321: AFL DNO-4963 0.457" OPGW, sagged to 4200# NESC 250B Final
1618: 7#8 Alumoweld, sagged in PLS-CADD

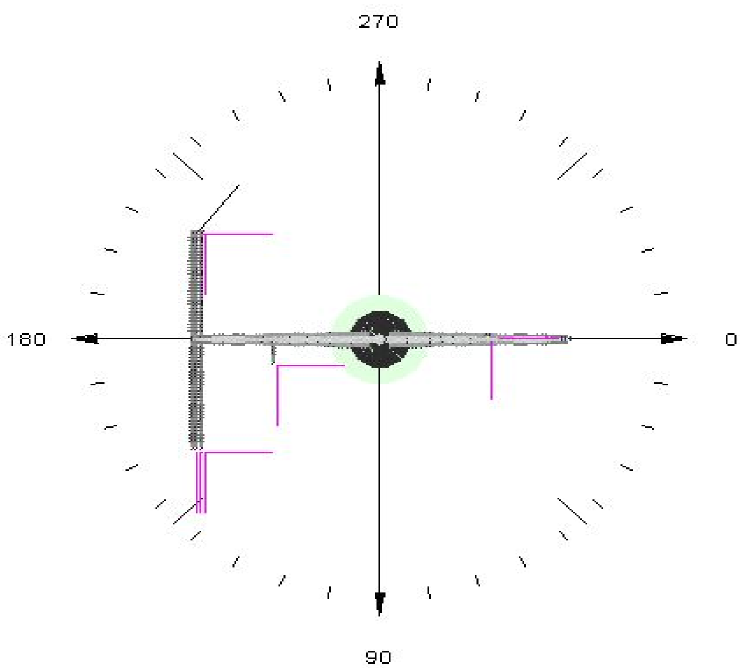
Conductors:
321: Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD
1618: Line located on adjacent structure

NESC 250B

321 Line

321 Line			1618 Line		
OPGW			**Alumoweld**		
	V:	727		V:	677
	T:	-2459		T:	-2227
	L:	-271		L:	-1041
Conductors			**Conductors**		
	V:	5591	Open		
	T:	-9347			
	L:	1819			
	V:	5455			
	T:	-8973			
	L:	-898			
	V:	5518			
	T:	-9335			
	L:	-1073			


10246
180
0


270
180
0
90

Project: 321/1618 Lines, Structure 10246
Date: 10/9/18
Engineer: JS
Purpose: Recalculate wire loads for Sprint site.

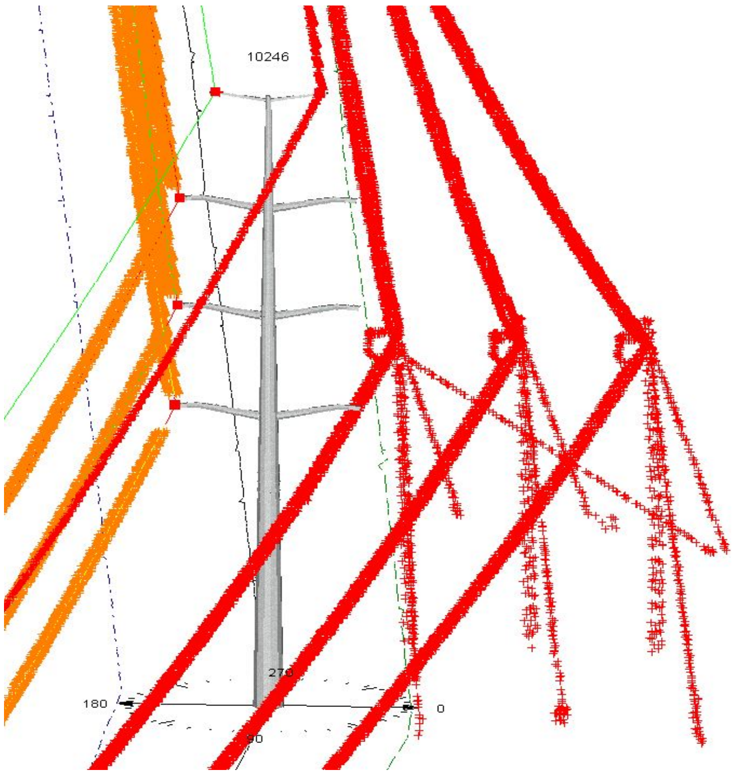
Shield Wires:
321: AFL DNO-4963 0.457" OPGW, sagged to 4200# NESC 250B Final
1618: 7#8 Alumoweld, sagged in PLS-CADD

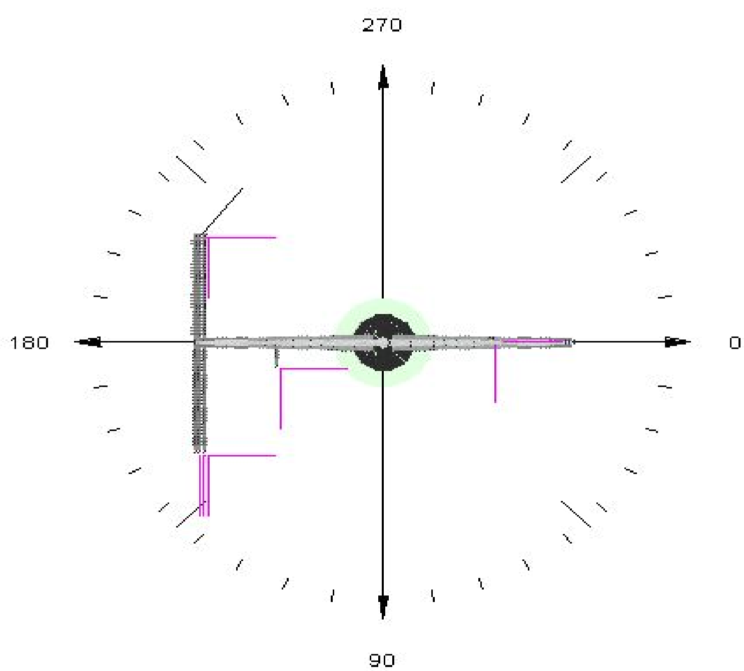
Conductors:
321: Bundled 1272 "Bittern" ACSR, sagged in PLS-CADD
1618: Line located on adjacent structure

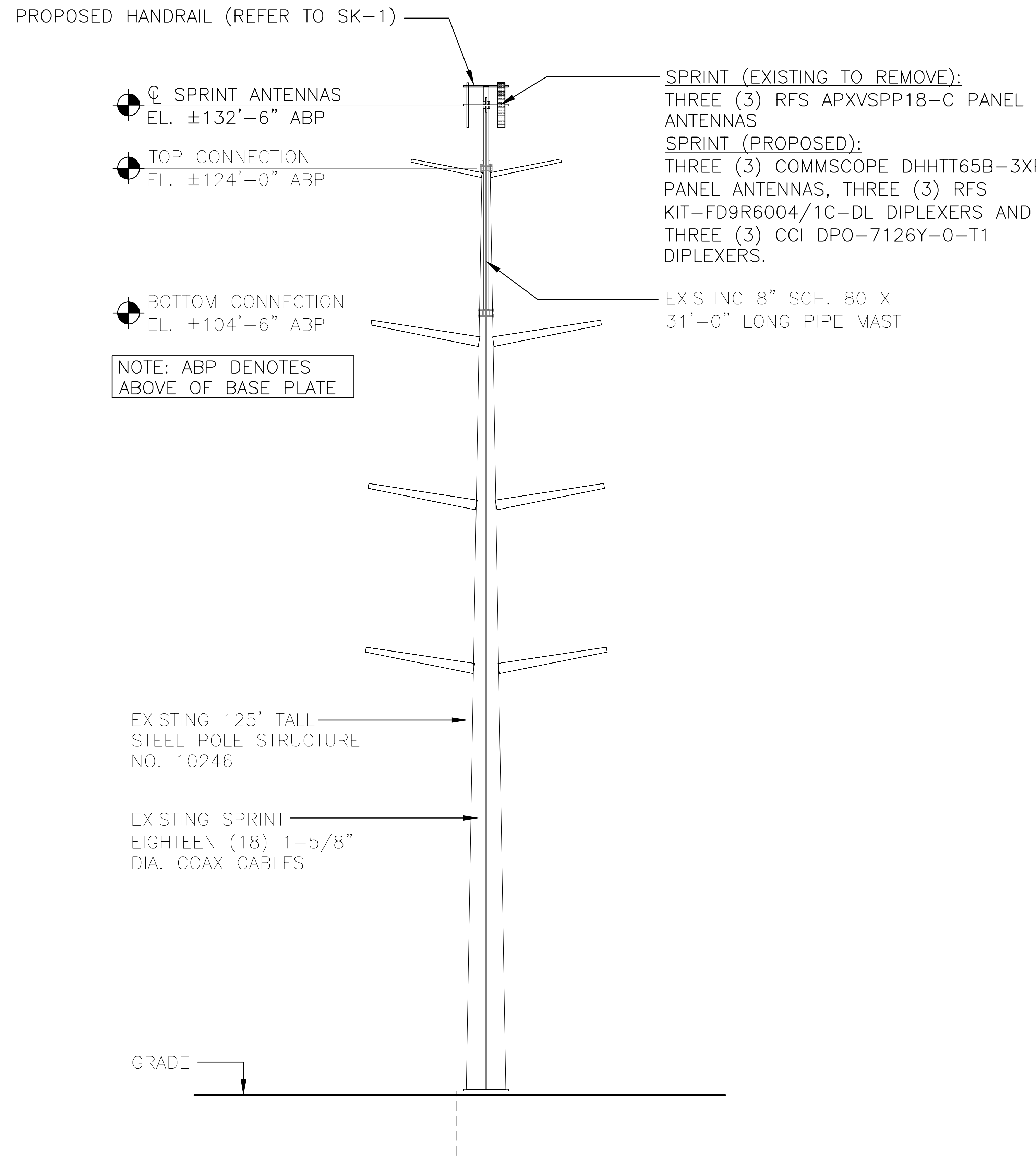
NESC 250C

321 Line

OPGW			**Alumoweld**		
	V:	100		V:	100
	T:	-1369		T:	-1100
	L:	-164		L:	-502
Conductors			**Conductors**		
	V:	2169	Open		
	T:	-7122			
	L:	757			
	V:	2100			
	T:	-6728			
	L:	-507			
	V:	2159			
	T:	-6627			
	L:	-561			


10246
270
180
0
90


270
180
0
90



1 / EL-1

TOWER & MAST ELEVATION

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/17/18	TJL	CAG	ISSUED FOR CONSTRUCTION
0	10/31/18	TJL	CAG	ISSUED FOR REVIEW

PROFESSIONAL ENGINEER SEAL

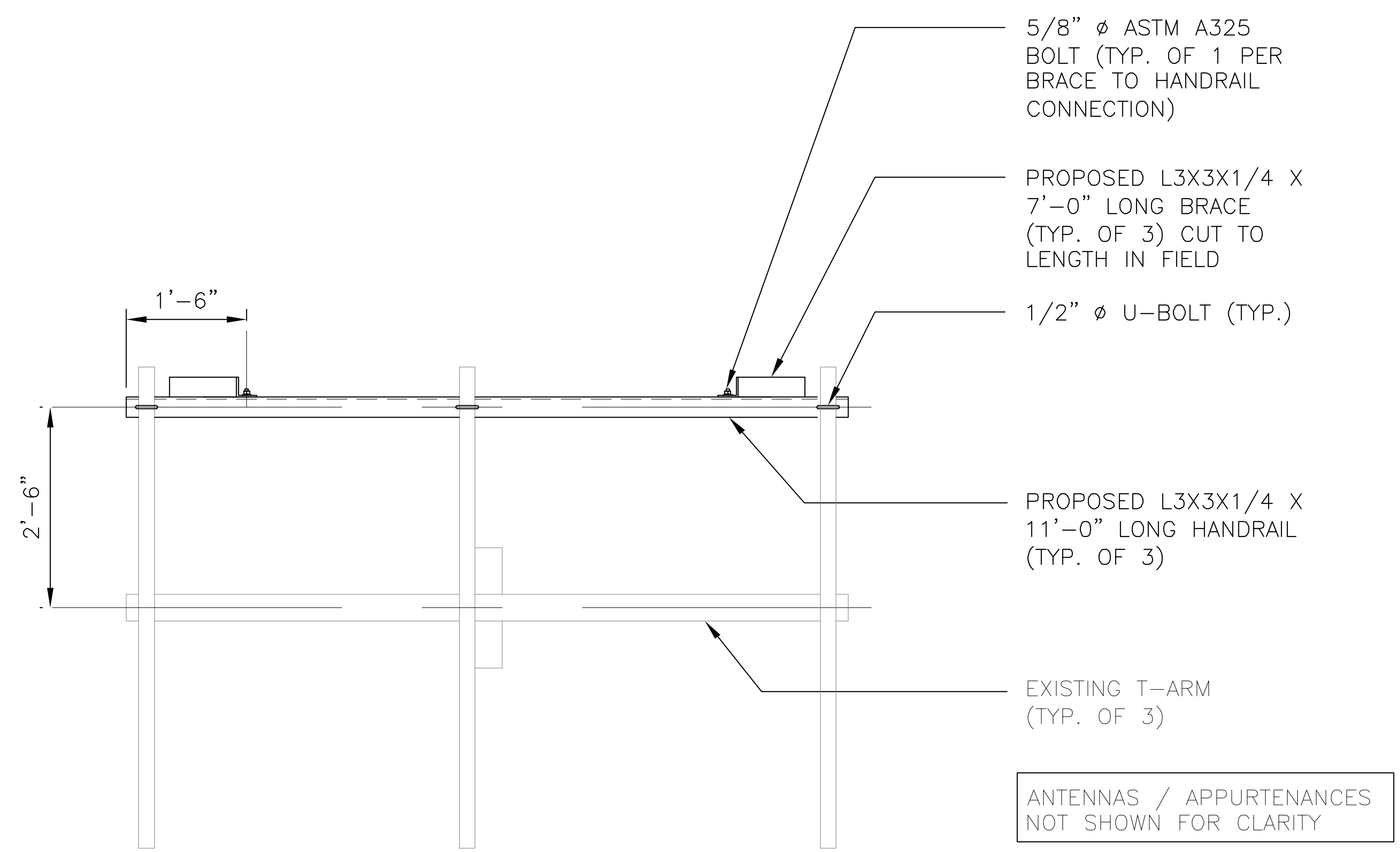
CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

SPRINT
CT33XC525
STRUCTURE 10246
VAIL ROAD
BROOKFIELD CT, 06804

DATE: 10/31/18
SCALE: AS SHOWN
JOB NO. 17159.24

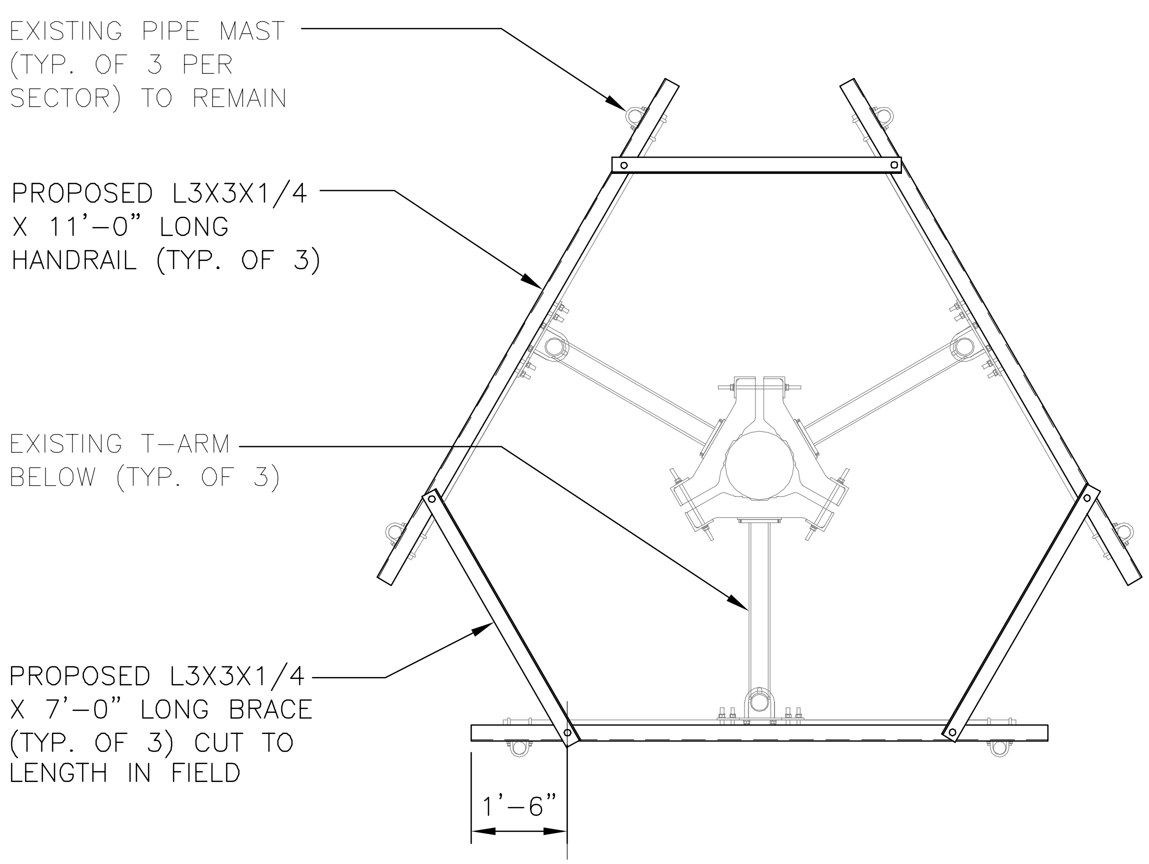
TOWER / MAST ELEVATION AND FEEDLINE PLANS

SHEET NO.
EL-1
Sheet No. 1 of 2



2 SK-1 MOUNT MOD ELEVATION

SCALE: NOT TO SCALE



1 SK-1 MOUNT MOD PLAN

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/17/18	TJL	CAG	ISSUED FOR CONSTRUCTION
0	10/31/18	TJL	CAG	ISSUED FOR REVIEW

PROFESSIONAL ENGINEER SEAL

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

SPRINT

CT33XC525
STRUCTURE 10246
VAIL ROAD
BROOKFIELD CT, 06804

DATE: 10/31/18
SCALE: AS SHOWN
JOB NO. 17159.24

MOUNT MODIFICATION

SHEET NO.
SK-1
Sheet No. 2 of 2

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 =	$h := 125$	ft	(User Input)
Height to Center of Antennas =	$z_{Sprint} := 132.5$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 120$	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)

$K_{iz} := \left(\frac{z_{Sprint}}{33}\right)^{0.1} = 1.149$ $t_{izSprint} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.155$

Velocity Pressure Coefficient Antennas = $Kz_{Sprint} := 2.01\left(\left(\frac{z_{Sprint}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.343$

Velocity Pressure w/o Ice Antennas = $qz_{Sprint} := 0.00256 \cdot K_d \cdot Kz_{Sprint} \cdot V^2 \cdot I_{Wind} = 32.483$

Velocity Pressure with Ice Antennas = $qz_{ice.Sprint} := 0.00256 \cdot K_d \cdot Kz_{Sprint} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 8.165$

Velocity Pressure Service = $qz_{Sprint.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Sprint} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.519$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.138$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.133$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.315$

Velocity Pressure w/o Ice Mast = $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 31.813$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.996$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.302$

Development of Wind & Ice Load on Mast

Mast Data: (Pipe 8" SCH. 80) (User Input)

Mast Shape = Round (User Input)

Mast Diameter = $D_{mast} := 8.63$ in (User Input)

Mast Length = $L_{mast} := 31$ ft (User Input)

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

Mast Aspect Ratio = $Ar_{mast} := \frac{12L_{mast}}{D_{mast}} = 43.1$

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

Wind Load (without ice)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 37$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.075$ sf/ft

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

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 12$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^{\ 2}\right] = 72.1$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 28$ plf **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 =	$F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1065$	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 =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 25.8$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 386$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 345$	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 =	$V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 8039$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 261$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 782$	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 = $F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 41$ 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 = $Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 30$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 13$ 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 = $V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 800$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 26$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 78$ 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 =	$L_{ant} := 4.07$	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)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 0.5$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.2$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.6$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 33$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izSprint}) \cdot (W_{ant} + 2 \cdot t_{izSprint})}{144} = 0.7$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 2$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Sprint} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 27$	lbs	**BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads =	$F_{ant.Ser} := qz_{Sprint.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 11$	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 =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 189$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izSprint})(W_{ant} + 2 \cdot t_{izSprint}) \cdot (T_{ant} + 2 \cdot t_{izSprint}) - V_{ant} = 850$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 28$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 83$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:	(Sprint)			
Mount Type:	T-Arms w/ Handrail			
Platform Shape =	Flat		(User Input)	
Platform Area =	$A_{plt} := 23$	sq ft	(User Input)	(Force Coefficient Included)
Platform Area w/ Ice =	$A_{ICE.plt} := 26$	sq ft	(User Input)	(Force Coefficient Included)
Platform Weight =	$WT_{plt} := 1160$	lbs	(User Input)	
Platform Weight w/ Ice =	$WT_{ICE.plt} := 1400$	lbs	(User Input)	

Wind Load (without ice)

Total Platform Wind Force =	$F_{plt} := qz_{Sprint} \cdot G_H \cdot A_{plt} = 1009$	lbs	**BLC 5**

Wind Load (with ice)

Total Platform Wind Force w/ Ice =	$Fi_{plt} := qz_{ice.Sprint} \cdot G_H \cdot A_{ICE.plt} = 287$	lbs	**BLC 4**

Wind Load (Service)

Total Platform Wind Force Service Loads =	$F_{plt.ser} := qz_{Sprint.Ser} \cdot G_H \cdot A_{plt} = 327$	lbs	**BLC 5**

Gravity Load (without ice)

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

Gravity Loads (ice only)

Weight of Ice on Platform =	$WT_{ICE.plt} - WT_{plt} = 240$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables — Bottom of Mast to Top of Transmission Pole

Coax Cable Data:

Coax Type = HELIAX 1-5/8"

Shape = Round (User Input)

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

Coax Cable Length = $L_{coax} := 20$ ft (User Input)

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

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

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

Coax aspect ratio, $Ar_{coax} := \dfrac{(L_{coax} \cdot 12)}{D_{coax}} = 121.2$

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

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 17$ plf **BLC 5**

Wind Load (with ice)

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

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 9$ 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 $WT_{coax} := Wt_{coax} \cdot N_{coax} = 6$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \dfrac{\pi}{4}\left[\left(D_{coax} + 2 \cdot t_{izMast1}\right)^2 - D_{coax}{}^2\right] = 27.6$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \dfrac{Ai_{coax}}{144} = 64$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables Top of Transmission Pole to Antennas

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 8$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of PCS Mast =	$NP_{coax} := 4$		(User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 48.5$

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

Wind Load (without ice)

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

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 34$ 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 = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 13$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 11$ plf **BLC 6**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{izMast1})^2 - D_{coax}^2\right] = 27.6$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 193$ 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	Standard 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_8.0X	Column	Pipe	A53 Gr. B	Typical	11.9	100	100	199

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Mast	30.5			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N3			Mast	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	0	19.5	0	0	
3	N3	0	30.5	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2	Reaction		Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.138	28
2	M1	Y	-.021	28
3	M1	Y	-.024	28
4	M1	Y	-1.16	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.782	28
2	M1	Y	-.078	28
3	M1	Y	-.083	28
4	M1	Y	-.24	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.386	28
2	M1	X	.03	28
3	M1	X	.027	28
4	M1	X	.287	28

Member Point Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.065	28
2	M1	X	.041	28
3	M1	X	.033	28
4	M1	X	1.009	28

Member Point Loads (BLC 6 : TIA Service)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.345	28
2	M1	X	.013	28
3	M1	X	.011	28
4	M1	X	.327	28

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	-.006	-.006	0	20
2	M1	Y	-.019	-.019	20	28

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	-.028	-.028	0	0
2	M1	Y	-.064	-.064	0	20
3	M1	Y	-.193	-.193	20	28

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	.014	.014	0	0
2	M1	X	.009	.009	0	20
3	M1	X	.013	.013	20	28

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	.037	.037	0	0
2	M1	X	.017	.017	0	20
3	M1	X	.034	.034	20	28

Member Distributed Loads (BLC 6 : TIA Service)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.012	.012	0	0
2	M1	X	.006	.006	0	20
3	M1	X	.011	.011	20	28

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					4	2		
3	Weight of Ice Only	None					4	3		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
4	TIA Wind with Ice	None					4	3		
5	TIA Wind	None					4	3		
6	TIA Service	None					4	3		

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														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	1.632	1	8.281	3	0	4	0	4	0	4	-2.664	4
2		min	.305	3	2.565	2	0	1	0	1	0	1	-13.291	1
3	N2	max	-1.594	4	0	4	0	4	0	4	0	4	0	4
4		min	-7.854	1	0	1	0	1	0	1	0	1	0	1
5	Totals:	max	-1.27	4	8.281	3	0	4						
6		min	-6.222	1	2.565	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	4	0	4	0	4	0	4	0	4	0	4
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N2	max	0	4	-.002	2	0	4	0	4	0	4	-1.979e-03	4
4		min	0	1	-.006	3	0	1	0	1	0	1	-9.805e-03	1
5	N3	max	2.18	1	-.002	2	0	4	0	4	0	4	-3.786e-03	4
6		min	.44	4	-.007	3	0	1	0	1	0	1	-1.874e-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_8.0X	.432	19....	1	.040	19....		1	165.777	374.85	81.375	81.375	1..	H1-1b

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	1.632	3.42	0	0	0	-13.291
2	1	N2	-7.854	0	0	0	0	0
3	1	Totals:	-6.222	3.42	0			
4	1	COG (ft):	X: 0	Y: 21.504	Z: 0			

Joint Reactions

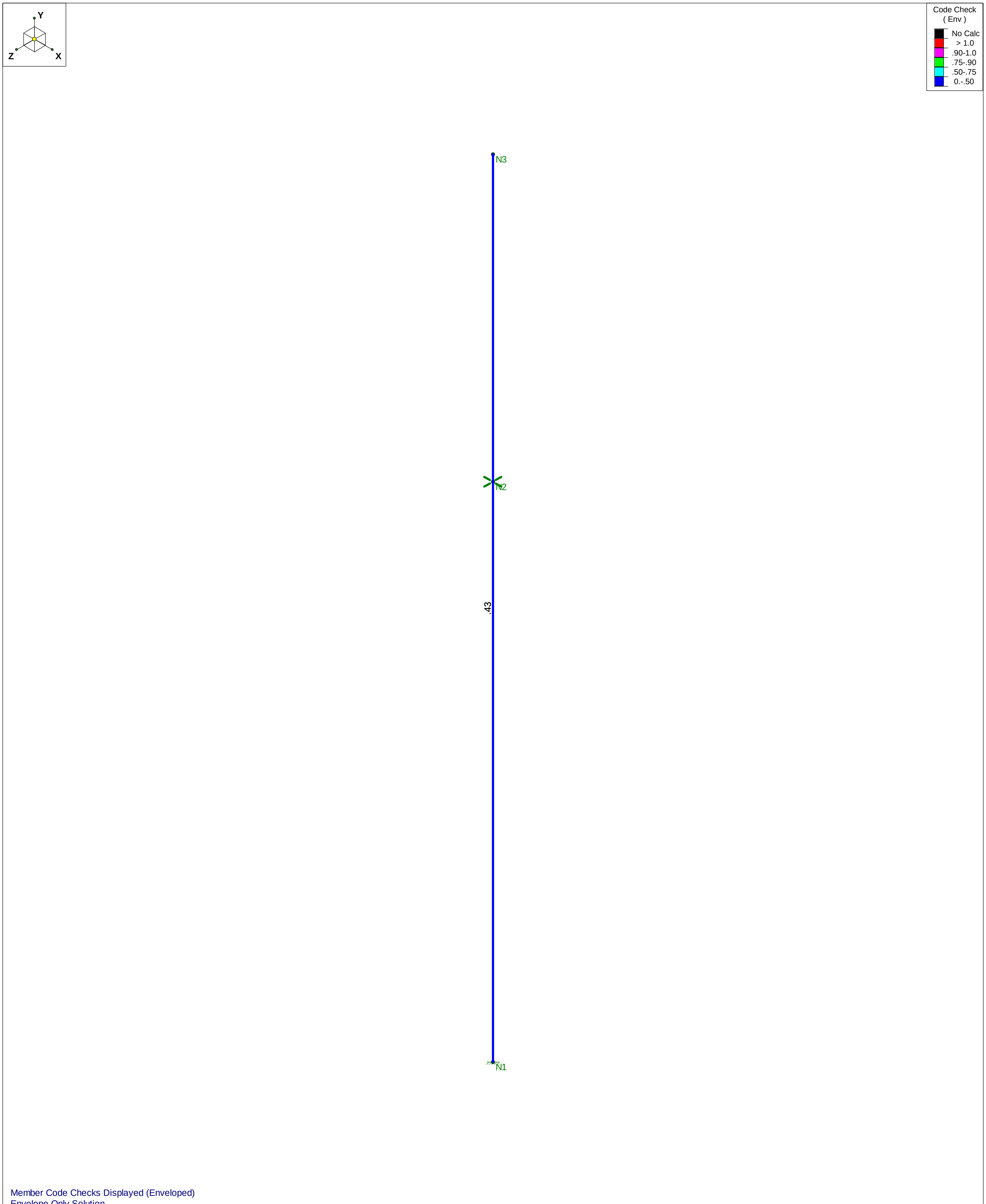
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	1.628	2.565	0	0	0	-13.264
2	2	N2	-7.85	0	0	0	0	0
3	2	Totals:	-6.222	2.565	0			
4	2	COG (ft):	X: 0	Y: 21.504	Z: 0			

Joint Reactions

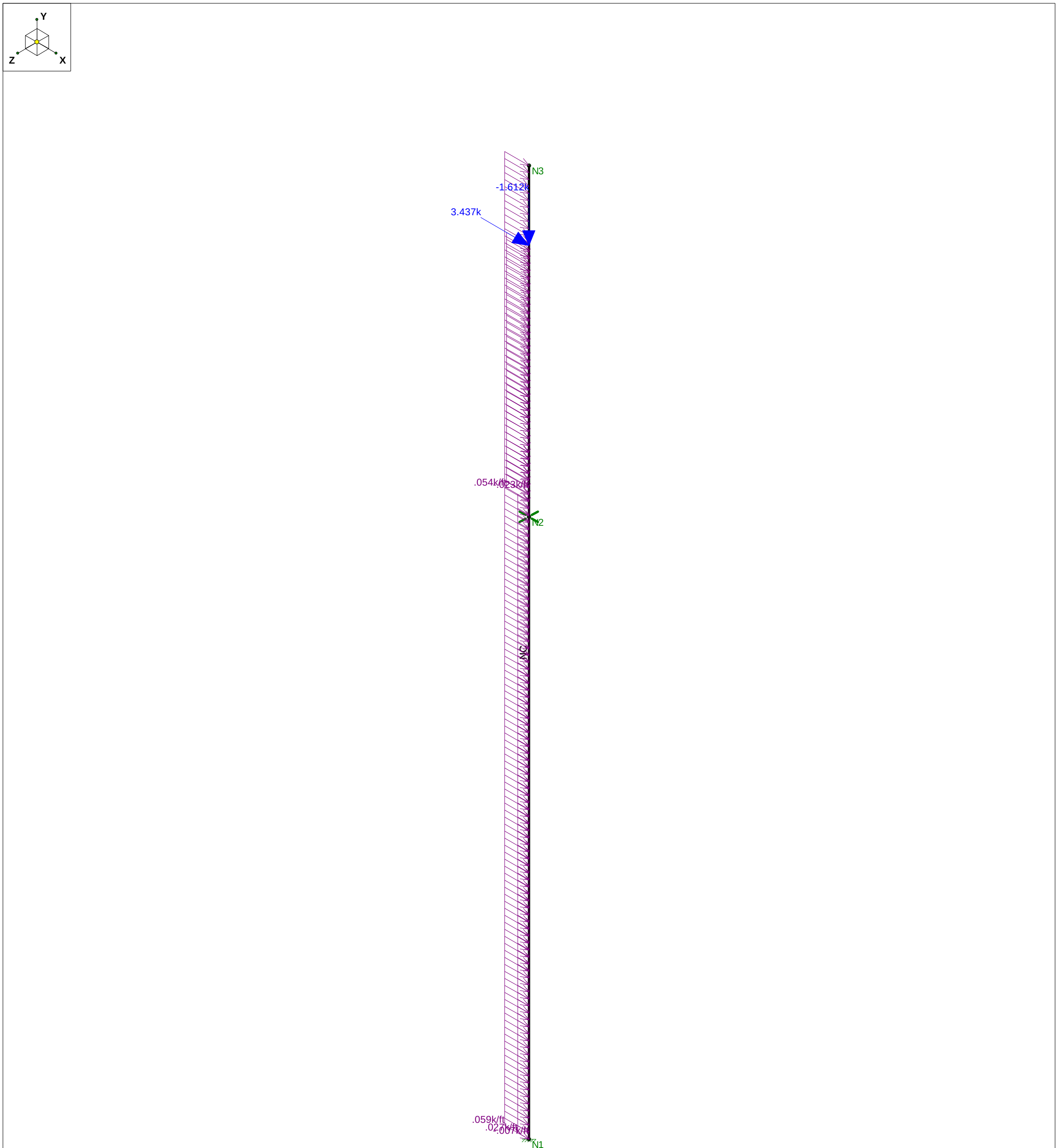
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N1	.305	8.281	0	0	0	-2.702
2	3	N2	-1.746	0	0	0	0	0
3	3	Totals:	-1.441	8.281	0			
4	3	COG (ft):	X: 0	Y: 20.474	Z: 0			

Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	4	N1	.324	2.85	0	0	0	-2.664
2	4	N2	-1.594	0	0	0	0	0
3	4	Totals:	-1.27	2.85	0			
4	4	COG (ft):	X: 0	Y: 21.504	Z: 0			

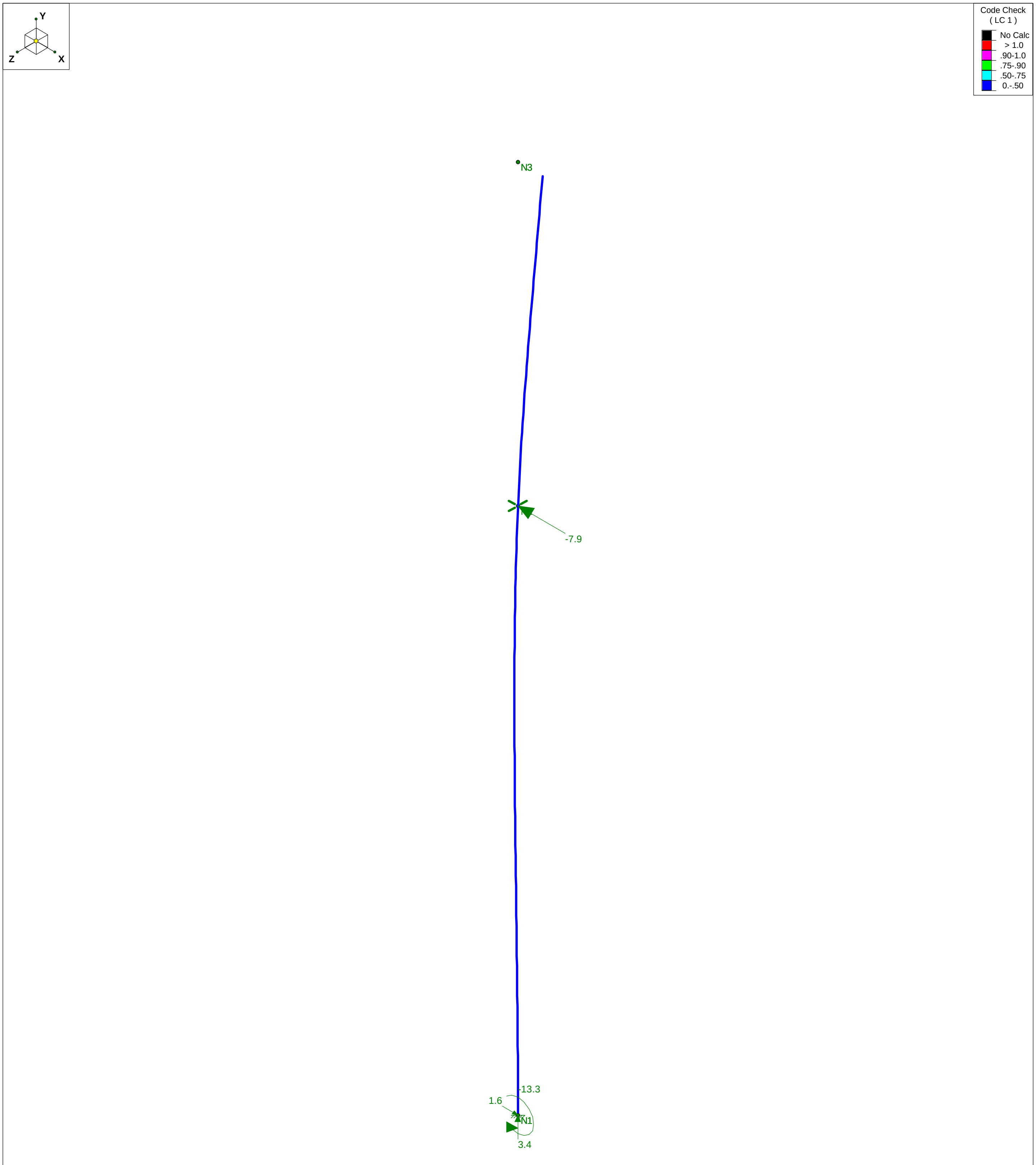


CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:50 PM
17159.24 - CT33XC525	Unity Check	TIA.r3d



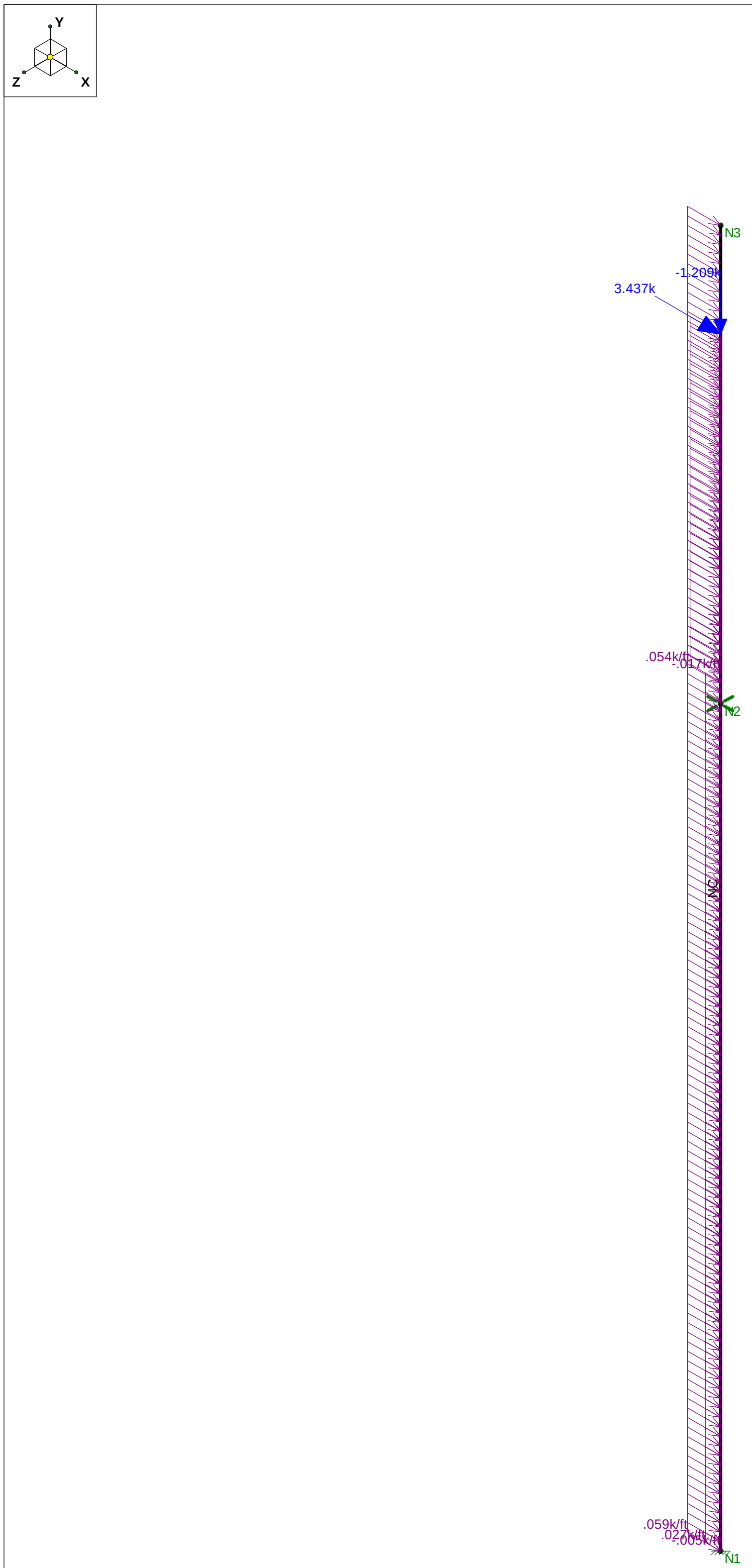
Member Code Checks Displayed
Loads: LC 1, 1.2D + 1.6W

CENTEK Engineering, INC.	Pole # 10246 - Mast	
tjl, cfc		Dec 17, 2018 at 3:51 PM
17159.24 - CT33XC525	LC #1 Loads	TIA.r3d



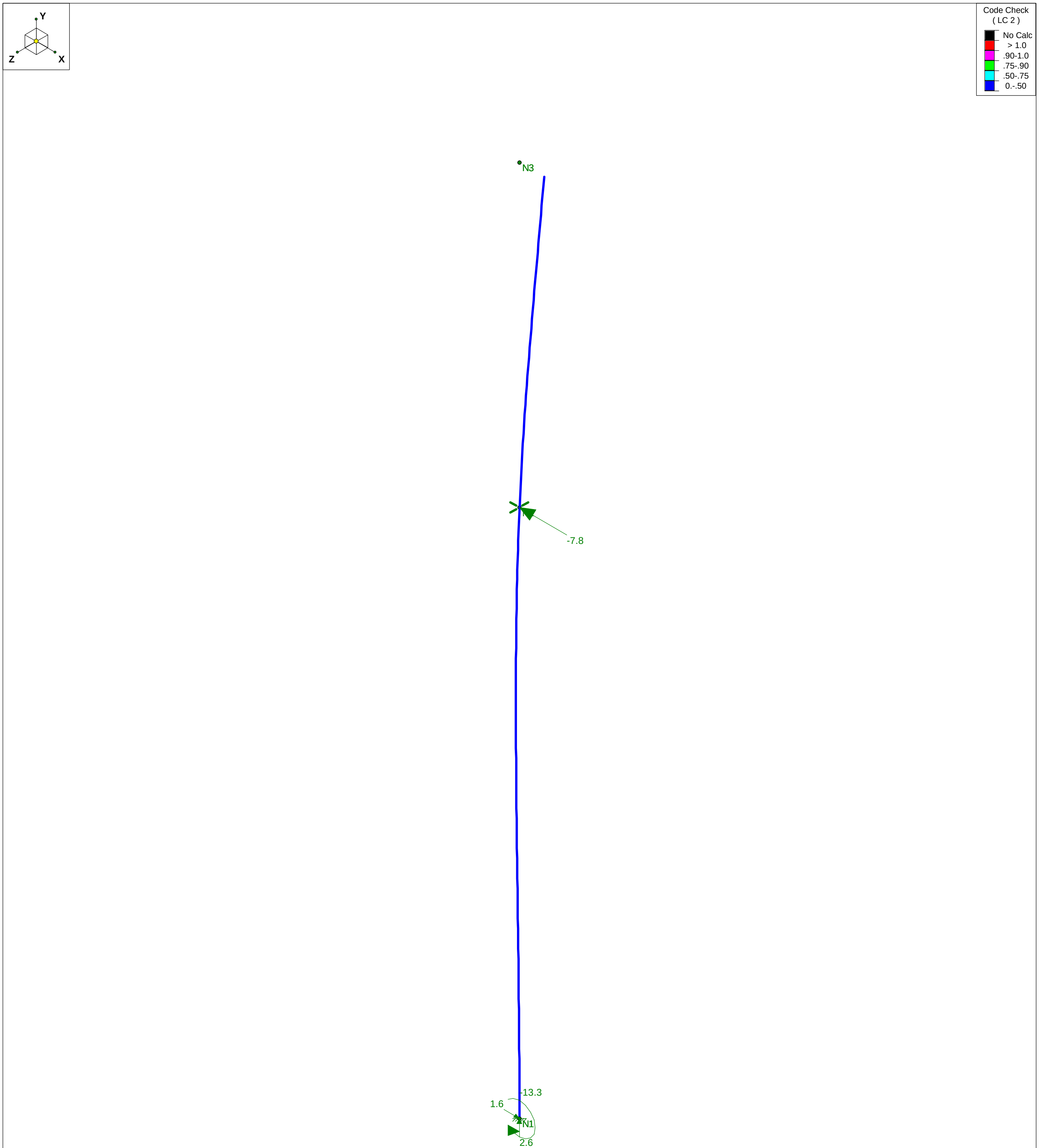
Member Code Checks Displayed
Results for LC 1, 1.2D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:52 PM
17159.24 - CT33XC525	LC #1 Reactions and Deflected Shape	TIA.r3d



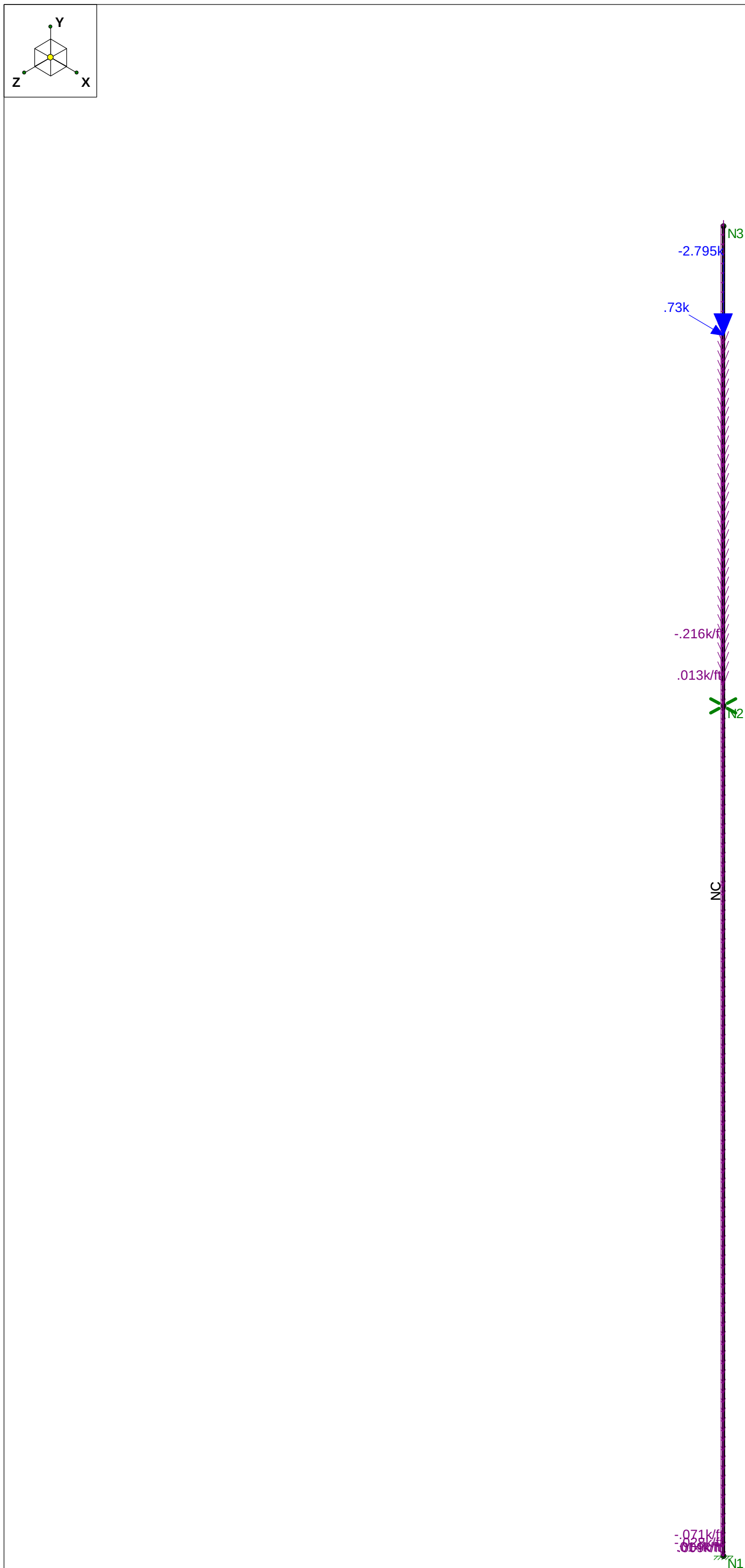
Member Code Checks Displayed
Loads: LC 2, 0.9D + 1.6W

CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:51 PM
17159.24 - CT33XC525	LC #2 Loads	TIA.r3d



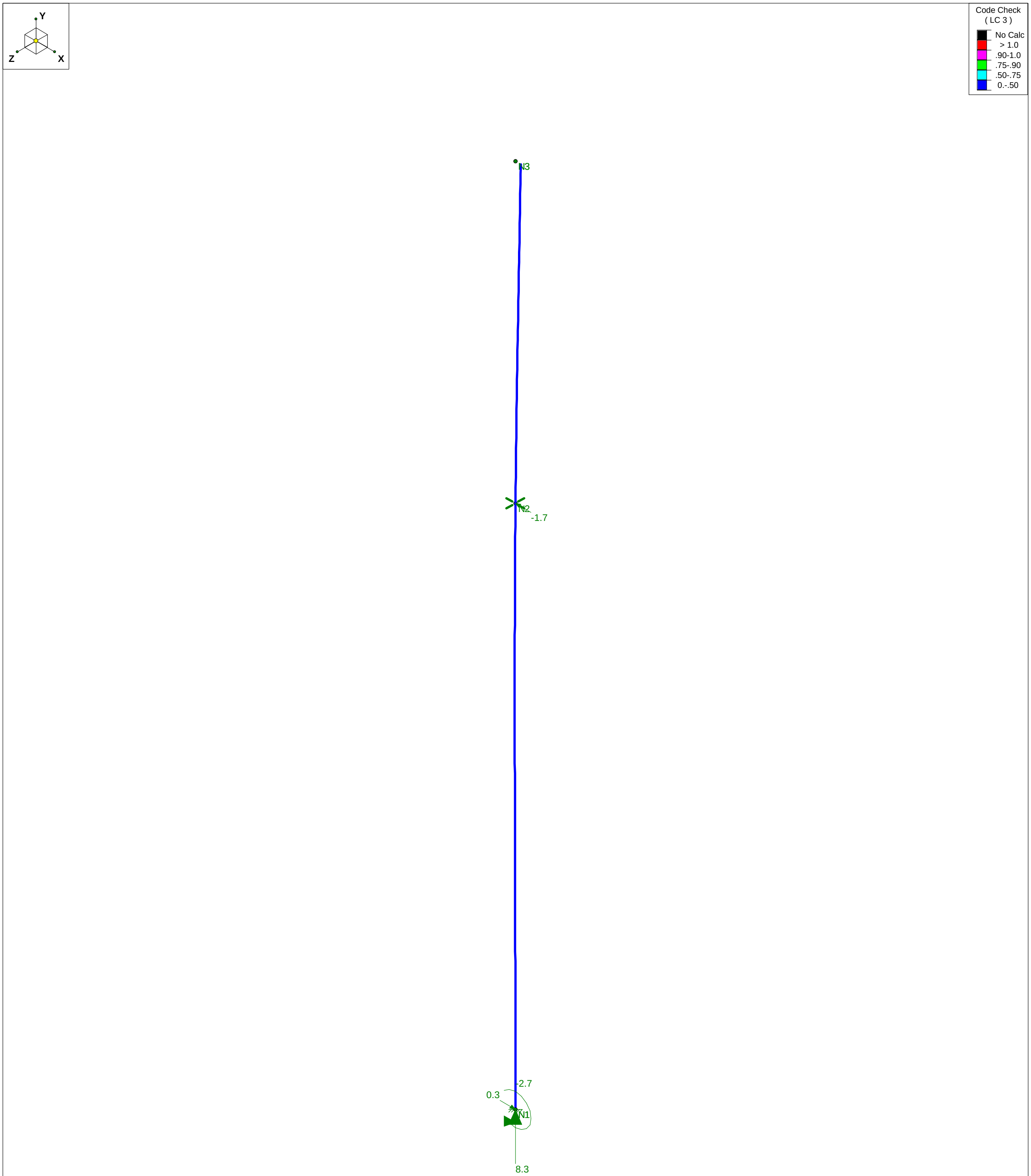
Member Code Checks Displayed
Results for LC 2, 0.9D + 1.6W
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:52 PM
17159.24 - CT33XC525	LC #2 Reactions and Deflected Shape	TIA.r3d



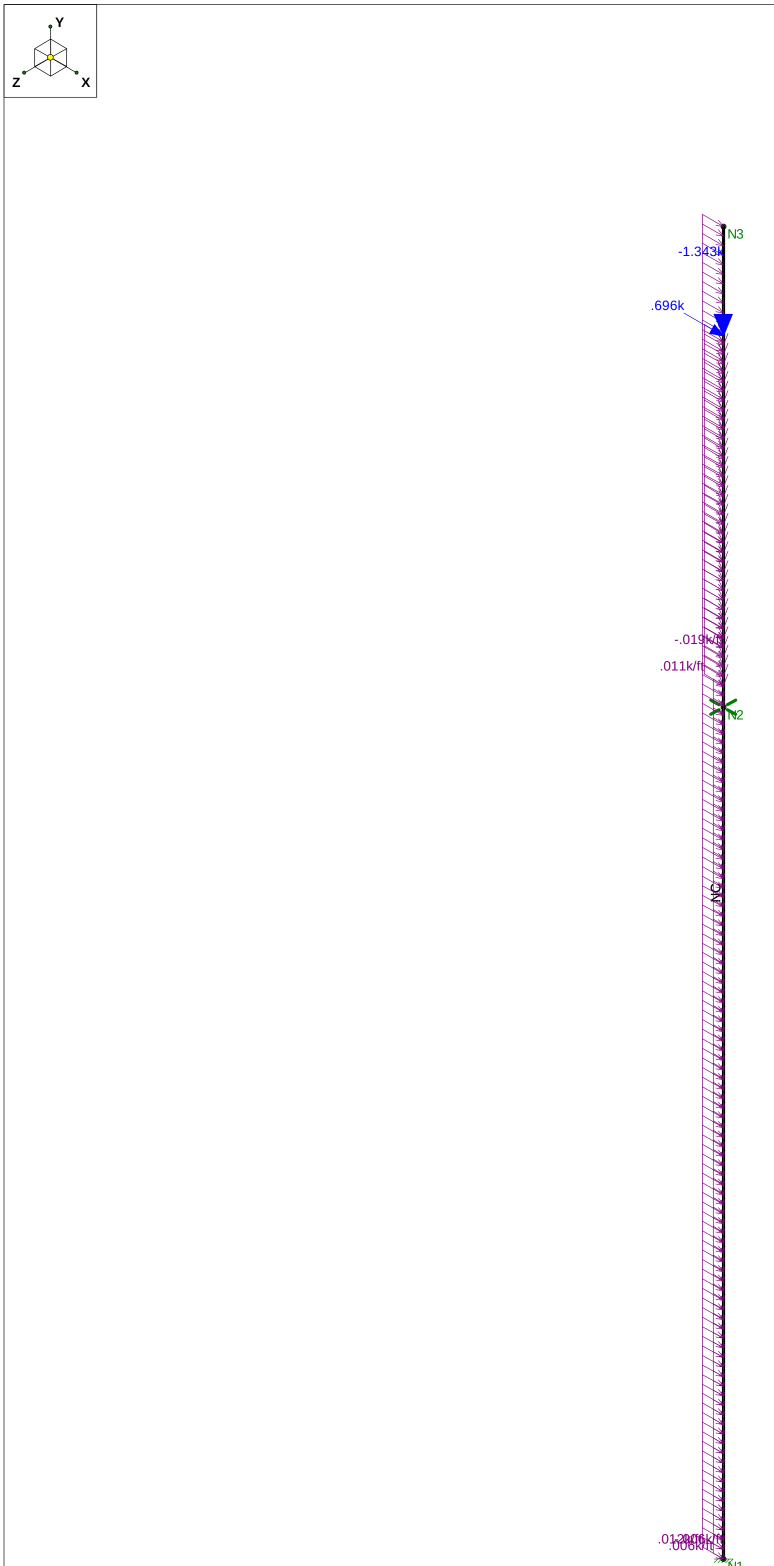
Member Code Checks Displayed
Loads: LC 3, 1.2D +1.0Di + 1.0Wi

CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:51 PM
17159.24 - CT33XC525	LC #3 Loads	TIA.r3d



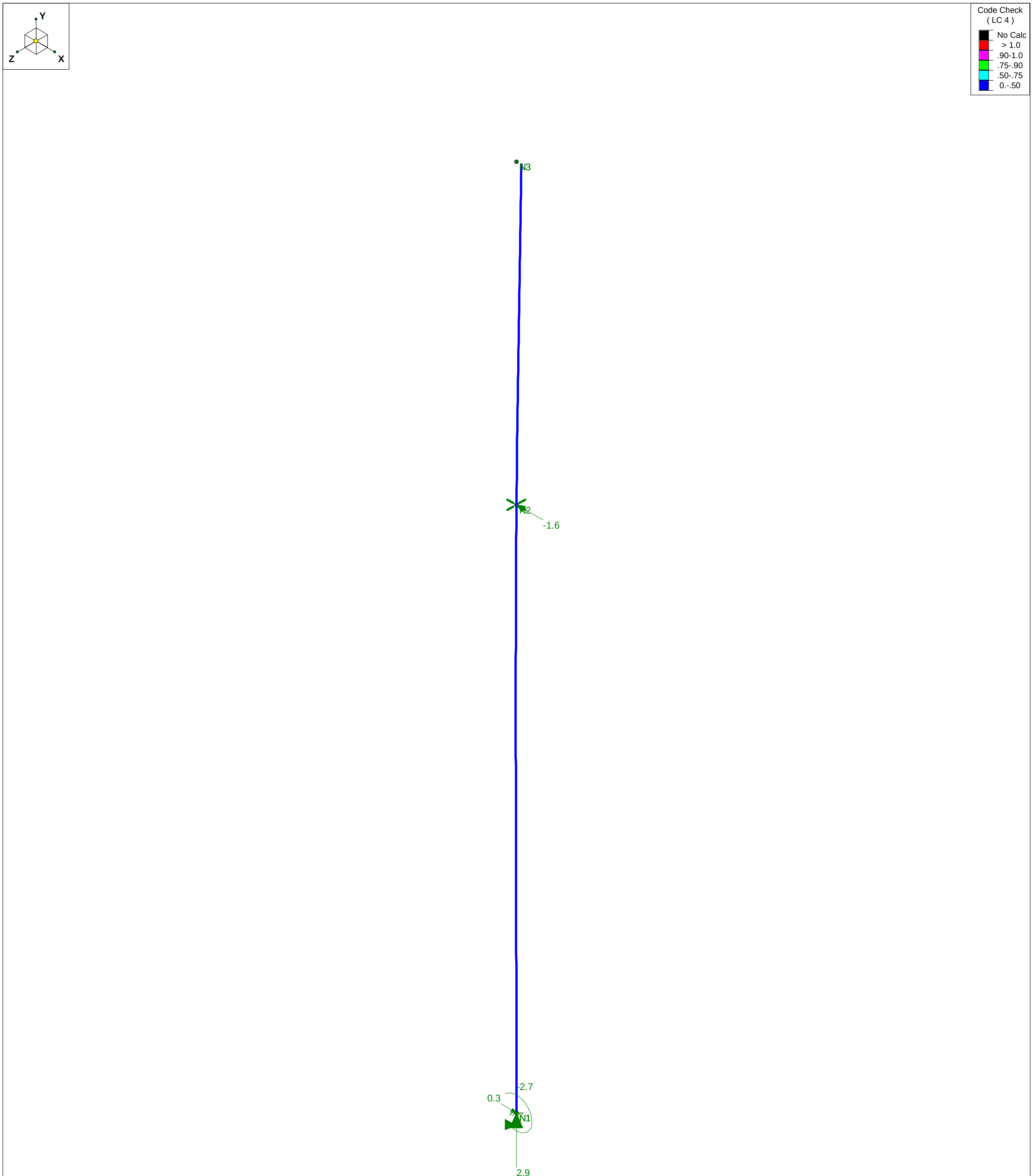
Member Code Checks Displayed
Results for LC 3, 1.2D +1.0Di + 1.0Wi
Reaction and Moment Units are k and k-ft

CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:53 PM
17159.24 - CT33XC525	LC #3 Reactions and Deflected Shape	TIA.r3d



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

CENTEK Engineering, INC.		
tjl, cfc	Pole # 10246 - Mast	Dec 17, 2018 at 3:51 PM
17159.24 - CT33XC525	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	Pole # 10246 - Mast	Dec 17, 2018 at 3:53 PM
17159.24 - CT33XC525	LC #4 Reactions and Deflected Shape	TIA.r3d

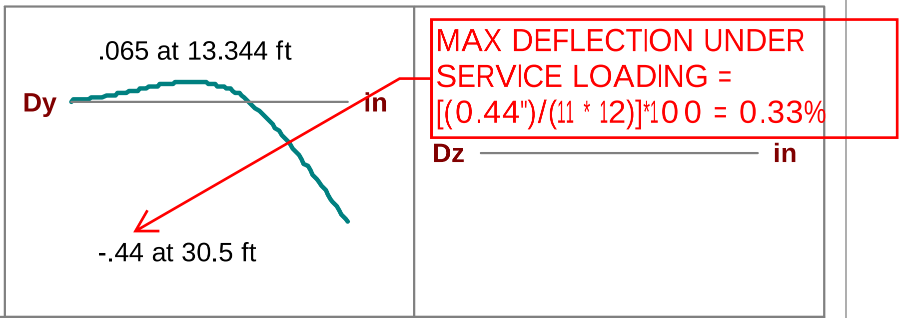
Column: ***M1***

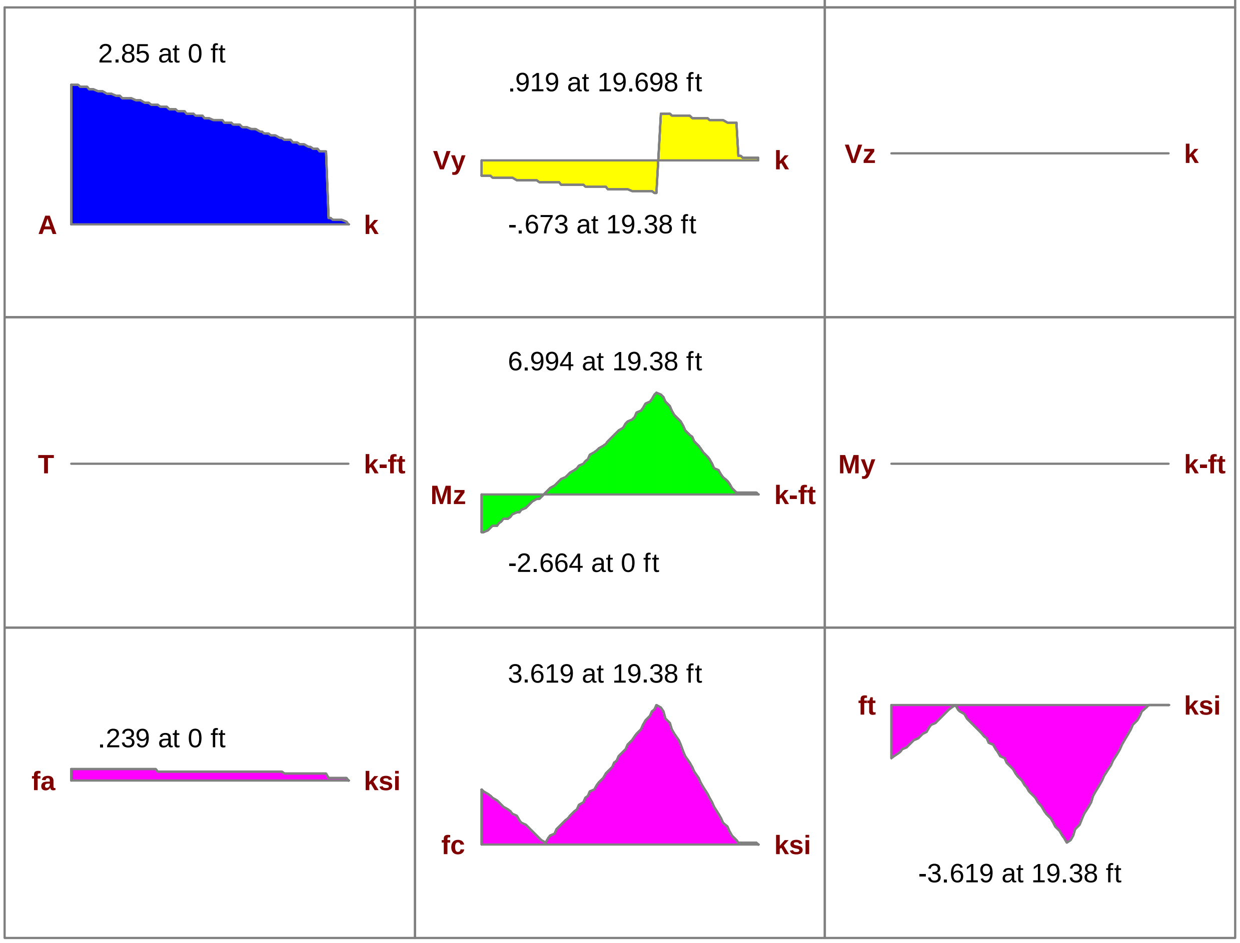
Shape:	**PIPE_8.0X**
Material:	**A53 Gr. B**
Length:	**30.5 ft**
I Joint:	**N1**
J Joint:	**N3**

LC 4: 1.0D + 1.0WService

Code Check: **0.092 (bending)**

Report Based On 97 Sections





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

Direct Analysis Method

Max Bending Check	**0.092**	Max Shear Check	**0.008 (s)**
Location	**19.38 ft**	Location	**19.698 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/831**
Bending	**Compact**	Compression	**Non-Slender**

Fy	**35 ksi**		y-y	z-z
phi*Pnc	**165.777 k**	Lb	**30.5 ft**	**30.5 ft**
phi*Pnt	**374.85 k**	KL/r	**126.257**	**126.257**
phi*Mny	**81.375 k-ft**	L Comp Flange	**30.5 ft**	
phi*Mnz	**81.375 k-ft**	L-torque	**30.5 ft**	
phi*Vny	**112.455 k**	Tau_b	**1**	
phi*Vnz	**112.455 k**			
phi*Tn	**76.601 k-ft**			
Cb	**1.814**			

Mast Top Connection:

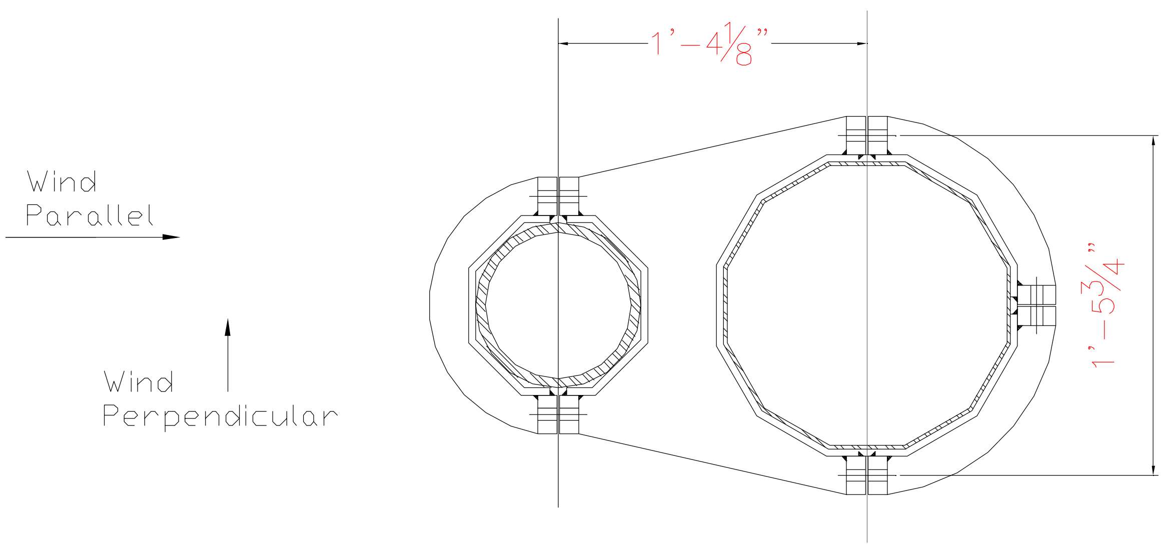
Maximum Design Reactions at Brace:

Vertical =	$Vert := 0 \cdot kips$	(User Input)
Horizontal =	$Horz := 7.9 \cdot kips$	(User Input)
Moment =	$Moment := 0$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 16.125 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 17.75 \cdot in$	(User Input)

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{\,2} = 0.442 \cdot in^2$



Check Bolt Stresses:

Wind Acting Parallel to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 0 \cdot ksi$

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

$Condition1 = "OK"$

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

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

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 1.317 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 3 \cdot ksi$

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

$Condition2 = "OK"$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 4.4 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 2.98 \cdot ksi$

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

$Condition3 = "OK"$

$\frac{f_v}{(\phi \cdot F_{nv})} = 7.4 \cdot \%$

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

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 2.392 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 5.415 \cdot ksi$

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

$Condition4 = "OK"$

$\frac{f_t}{(\phi \cdot F'_{nt})} = 8 \cdot \%$

Mast Connection to Bottom Bracket:

Design Reactions at Brace:

Axial =	$Axial := 3.4 \cdot kips$	(User Input)
Shear =	$Shear := 1.6 \cdot kips$	(User Input)
Moment =	$Moment := 13.3 \cdot ft \cdot kips$	(User Input)

Anchor Bolt Data:

Bolt Grade =	A325	(User Input)
Design Shear Stress =	$F_V := 40.5 \cdot ksi$	(User Input)
Design Tension Stress =	$F_T := 67.5 \cdot ksi$	(User Input)
Total Number of Bolts =	$n_b := 4$	(User Input)
Number of Bolts Tension Side Parallel =	$n_{b.par} := 2$	(User Input)
Number of Bolts Tension Side Diagonal =	$n_{b.diag} := 1$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Bolt Spacing X Direction =	$S_x := 7.5 \cdot in$	(User Input)
Bolt Spacing Z Direction =	$S_z := 7.5 \cdot in$	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 10.5 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 0.75 \cdot in$	(User Input)
Bolt Edge Distance =	$B_E := 1.5 \cdot in$	(User Input)
Pole Diameter =	$D_p := 8.863 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := 0.3125 \cdot in$	(User Input)

Anchor Bolt Check:

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^{2} = 0.442 \cdot in^2$

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^{2} + S_z^{2}} = 10.61 \cdot in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x \cdot n_{b.par}} - \frac{Axial}{n_b} = 9.79 \cdot kips$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag} \cdot n_{b.diag}} - \frac{Axial}{n_b} = 14.2 \cdot kips$

Tension per bolt = $T := if\left(T_{par} > T_{diag}, T_{par}, T_{diag}\right) = 14.197 \cdot kips$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = 32.14 \cdot ksi$

$Condition2 := if\left(f_t < F_T, \text{"OK"}, \text{"Overstressed"}\right)$

$Condition2 = \text{"OK"}$

Base Plate Check:

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

Plate Bending Width = $Z := \left(Pl_w \cdot \sqrt{2} - D_p\right) = 5.99 \cdot in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 0.87 \cdot in$

Moment in Base Plate = $M := K \cdot T = 12.38 \cdot kips \cdot in$

Section Modulus = $S_Z := \frac{1}{6} \cdot Z \cdot Pl_t^{2} = 0.56 \cdot in^3$

Bending Stress = $f_b := \frac{M}{S_Z} = 22.05 \cdot ksi$

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

$Condition3 = \text{"OK"}$

Base Plate to PCS Mast Weld Check:

Design Weld Stress = $F_w := 0.45 \cdot F_{yw} = 31.5 \cdot ksi$

Weld Area = $A_w := \frac{\pi}{4} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^2 - D_p^{\,2}\right] = 6.31 \cdot in^2$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^4 - D_p^{\,4}\right] = 65.07 \cdot in^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 4.65 \cdot in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 13.99 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Shear}{A_w} = 11.66 \cdot ksi$

Condition4 := if$\left(f_w < F_w, \text{"OK"}, \text{"Overstressed"}\right)$

Condition4 = "OK"

Mast Bottom Connection:

Maximum Design Reactions at Brace:

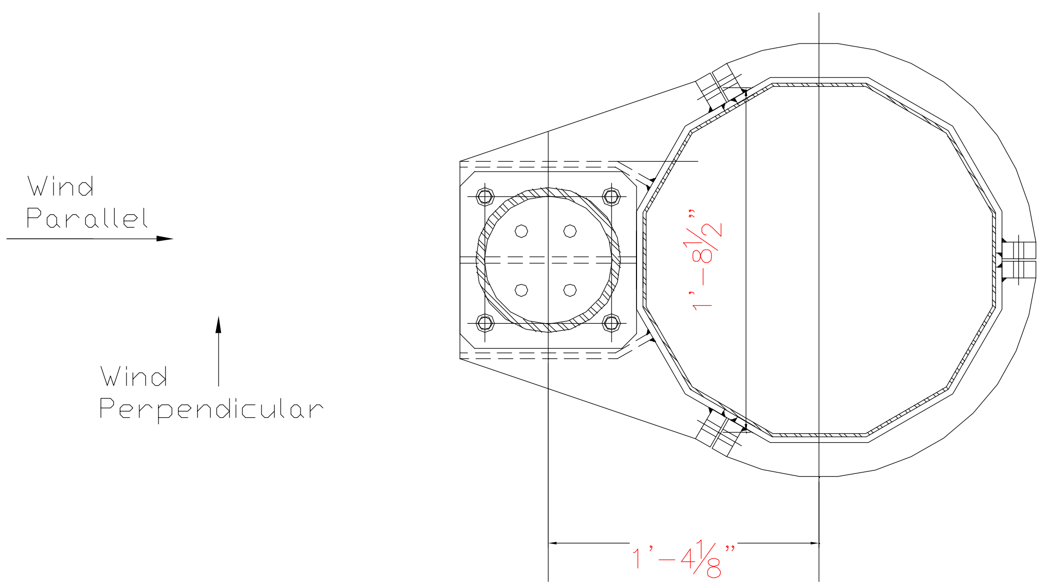
Vertical =	$Vert := 3.4 \cdot kips$	(User Input)
Horizontal =	$Horz := 1.6 \cdot kips$	(User Input)
Moment =	$Moment := 13.3 \cdot ft \cdot kips$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 8$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(User Input)
Nomianl Tensile Strength =	$F_{nt} := 90 \cdot ksi$	(User Input)
Nomianl Shear Strength =	$F_{nv} := 54 \cdot ksi$	(User Input)
Resistance Factor =	$\phi := 0.75$	(User Input)
Bolt Eccentricity from C.L. Mast =	$e := 16.125 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 20.5 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 1 =	$S_{vert1} := 2.6875 \cdot in$	(User Input)
Vetical Spacing From Plate CL to Bolt 2 =	$S_{vert2} := 5.6875 \cdot in$	(User Input)

Bolt Polar Moment of Inertia = $I_p := 2 \cdot S_{vert1}^2 + 2 \cdot S_{vert2}^2 = 79.141 \cdot in^2$

Bolt Area = $a_b := \frac{1}{4} \cdot \pi \cdot d_b^2 = 0.442 \cdot in^2$



Check Bolt Stresses:

Wind Acting Parallel to Stiffener Plate:

Shear Stress per Bolt = $f_v := \frac{Vert}{n_b \cdot a_b} = 0.962 \cdot ksi$

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

Condition1 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 2.4 \cdot \%$

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

Tension Force Each Bolt = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment) \cdot S_{vert2}}{2 \cdot I_p} = 7.905 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 17.9 \cdot ksi$

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

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 26.5 \cdot \%$

Wind Acting Perpendicular to Stiffener Plate:

Shear Stress per Bolt = $f_v := \sqrt{\left(\frac{Vert}{n_b \cdot a_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b \cdot a_b}\right)^2 + \left(\frac{Horz}{n_b \cdot a_b}\right)^2} = 5.387 \cdot ksi$

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

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 13.3 \cdot \%$

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

Tension Force per Bolt = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e \cdot S_{vert2}}{2 \cdot I_p} = 2.285 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 5.171 \cdot ksi$

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

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 7.7 \cdot \%$

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 =	$TME := 135$	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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.348$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.3$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.813$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.846$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 29.2$ psf (NESC 2012 Section 250.C.2)

Shape Factors

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

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 8" Sch. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 8.63$	in	(User Input)
Mast Length =	$L_{mast} := 31$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area = $A_{mast} := \frac{D_{mast}}{12} = 0.719$ sf/ft

Total Mast Wind Force (Above NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 42$ plf **BLC 5**

Total Mast Wind Force (Below NU Structure) = $qz \cdot Cd_{coax} \cdot A_{mast} = 34$ plf **BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 0.803$ sf/ft

Total Mast Wind Force w/ Ice = $p \cdot Cd_{coax} \cdot AICE_{mast} = 5$ plf **BLC 4**

Gravity Loads (without ice)

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

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\,2}\right] = 14.3$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 6$ plf **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 = $V_{ice} := (L_{ant} + 2 \cdot Ir)(W_{ant} + 2 \cdot Ir)(T_{ant} + 2 \cdot Ir) - V_{ant} = 1546$ 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 = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot Ir) \cdot (W_{ant} + 2 \cdot Ir)}{144} = 6.5$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 19.6$ 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 = $F_{ant1} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1043$ 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 = $F_{ant2} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 46$ 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 = $F_{ant3} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 37$ lbs **BLC 5**

Development of Wind & Ice Load on Mounts

Mount Data:	(Sprint)			
Mount Type =	T-Amrs w/ Handrail			
Platform Shape =	Round		(User Input)	
Platform Area =	$A_{plt} := 23$	sq ft	(User Input)	(Shape Factor Included)
Platform Area w/ Ice =	$A_{ICEplt} := 26$	sq ft	(User Input)	(Shape Factor Included)
Platform Weight =	$WT_{plt} := 1160$	lbs	(User Input)	
Platform Weight w/ Ice =	$WT_{ICEplt} := 1400$	lbs	(User Input)	

Wind Load (NESC Extreme)

Total Platform Wind Force = $F_{plt} := qz \cdot A_{plt} \cdot m = 839$ lbs **BLC 5**

Wind Load (NESC Heavy)

Total Platform Wind Force w/ Ice = $Fi_{plt} := p \cdot A_{ICEplt} = 104$ lbs **BLC 4**

Gravity Load (without ice)

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

Gravity Load (ice only)

Weight of Ice on Platform = $WT_{ICEplt} - WT_{plt} = 240$ lbs **BLC 3**

Development of Wind & Ice Load on Coax Cables

Bottom of Mast to Top of Transmission Pole

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 20$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 6$		(User Input)
No. of Coax Projecting Outside Face of 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 (Below NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 15$ 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 $WT_{coax} := Wt_{coax} \cdot N_{coax} = 6$ 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 = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 9$ plf **BLC 3**

Development of Wind & Ice Load on Coax Cables

Top of Transmission Pole to Antennas

Coax Cable Data:

Coax Type =	HELIAX 1-5/8"		
Shape =	Round		(User Input)
Coax Outside Diameter =	$D_{coax} := 1.98$	in	(User Input)
Coax Cable Length =	$L_{coax} := 8$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 18$		(User Input)
No. of Coax Projecting Outside Face of Mast =	$NP_{coax} := 4$		(User Input)

Wind Load (NESC Extreme)

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

Total Coax Wind Force (Above NU Structure) = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 39$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \dfrac{NP_{coax} \cdot (D_{coax} + 2 \cdot Ir)}{12} = 1$ 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 $WT_{coax} := Wt_{coax} \cdot N_{coax} = 19$ plf **BLC 2**

Gravity Load (ice only)

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

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

Coax Cable on 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 2007 Figure 250-2(e))

Height to Top of Coax Above Grade = $TC := 135$ ft (User Input)

NESC Factor = $kv := 1.43$ (User Input from NESC 2007 Table 250-3 equation)

Importance Factor = $I := 1.0$ (User Input from NESC 2007 Section 250.C.2)

Velocity Pressure Coefficient = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.239$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.3$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.813$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.846$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 26.8$ psf (NESC 2007 Section 250.C.2)

Distance Between Coax Cable Attach Points =

Coaxial Cable Span $Coax_{Span} := \begin{pmatrix} 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \\ 10 \end{pmatrix} \cdot ft$ *(User Input 0 to 100-ft)*

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 = $N_{coax} := 18$ *(User Input)*

Number of Projected Coax Cables = $NP_{coax} := 4$ *(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 = $A := (NP_{coax} \cdot D_{coax}) = 7.92 \cdot in$

Wind Area with Ice = $A_{ice} := (NP_{coax} \cdot D_{coax} + 2 \cdot Ir) = 8.92 \cdot in$

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

Weight of Ice on All Coax Cables = $W_{ice} := Ai_{coax} \cdot Id \cdot N_{coax} = 27.269 \cdot plf$

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$$Heavy\_WInd_{Vert} = \begin{pmatrix} 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \\ 690 \end{pmatrix} lb \qquad Heavy\_Wind_{Trans} = \begin{pmatrix} 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \\ 119 \end{pmatrix} lb$$

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 =

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

$$Extreme\_Wind_{Vert} = \begin{pmatrix} 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \\ 187 \end{pmatrix} lb \qquad Extreme\_Wind_{Trans} = \begin{pmatrix} 283 \\ 283 \\ 283 \\ 283 \\ 283 \\ 283 \\ 283 \\ 283 \\ 283 \\ 283 \end{pmatrix} ft^2$$

Distance Between Coax Cable Attach Points =

Coaxial Cable Span $Coax_{Span} := \begin{pmatrix} 15 \\ 10 \end{pmatrix} \cdot ft$ *(User Input 0 to 100-ft)*

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

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

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

Number of Projected Coax Cables = $NP_{coax} := 4$ *(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 = $A := (NP_{coax} \cdot D_{coax}) = 7.92 \cdot in$

Wind Area with Ice = $A_{ice} := (NP_{coax} \cdot D_{coax} + 2 \cdot Ir) = 8.92 \cdot in$

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

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

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$Heavy\_WInd_{Vert} = \begin{pmatrix} 690 \\ 460 \end{pmatrix} lb$ $Heavy\_Wind_{Trans} = \begin{pmatrix} 178 \\ 119 \end{pmatrix} lb$

Extreme Wind Vertical Load =

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

Extreme Wind Transverse Load =

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

$Extreme\_Wind_{Vert} = \begin{pmatrix} 187 \\ 125 \end{pmatrix} lb$ $Extreme\_Wind_{Trans} = \begin{pmatrix} 425 \\ 283 \end{pmatrix} ft^2$

(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	Standard Solver

Hot Rolled Steel Code	AISC 9th: ASD
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI 1999: ASD
Wood Code	AF&PA NDS-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_8.0X	Column	Pipe	A53 Gr. B	Typical	11.9	100	100	199

Hot Rolled Steel Design Parameters

	Label	Shape	Length...	Lbyy[ft]	Lbzz[ft]	Lcomp to...	Lcomp bo...	Kyy	Kzz	Cm-yy	Cm-zz	Cb	y sway	z sway	Function
1	M1	Mast	30.5			Lbyy									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N3			Mast	Column	Pipe	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	0	19.5	0	0	
3	N3	0	30.5	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	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2	Reaction		Reaction			

Member Point Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.138	28
2	M1	Y	-.021	28
3	M1	Y	-.024	28
4	M1	Y	-1.16	28

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

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	Y	-.15	28
2	M1	Y	-.011	28
3	M1	Y	-.012	28
4	M1	Y	-.24	28

Member Point Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	.126	28
2	M1	X	.007	28
3	M1	X	.006	28
4	M1	X	.104	28

Member Point Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M1	X	1.043	28
2	M1	X	.046	28
3	M1	X	.037	28
4	M1	X	.839	28

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	-.006	-.006	0	20
2	M1	Y	-.019	-.019	20	28

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	-.006	-.006	0	0
2	M1	Y	-.009	-.009	0	20
3	M1	Y	-.027	-.027	20	28

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	.005	.005	0	0
2	M1	X	.003	.003	0	20
3	M1	X	.006	.006	20	28

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	.034	.034	0	20
2	M1	X	.042	.042	20	0
3	M1	X	.015	.015	0	20
4	M1	X	.039	.039	20	28

Basic Load Cases

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

Load Combinations

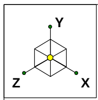
	Description	So..	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	NESC Heavy Wind on PC...	Yes			1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind on ...	Yes			1	1	2	1	5	1														
3	Self Weight				1	1																		

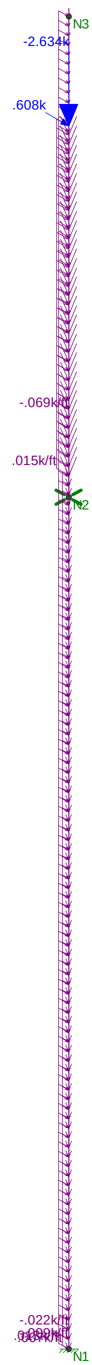
Joint Reactions

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N1	.252	5.763	0	0	0	-2.26
2	1	N2	-1.511	0	0	0	0	0
3	1	Totals:	-1.259	5.763	0			
4	1	COG (ft):	X: 0	Y: 21.506	Z: 0			

Joint Reactions

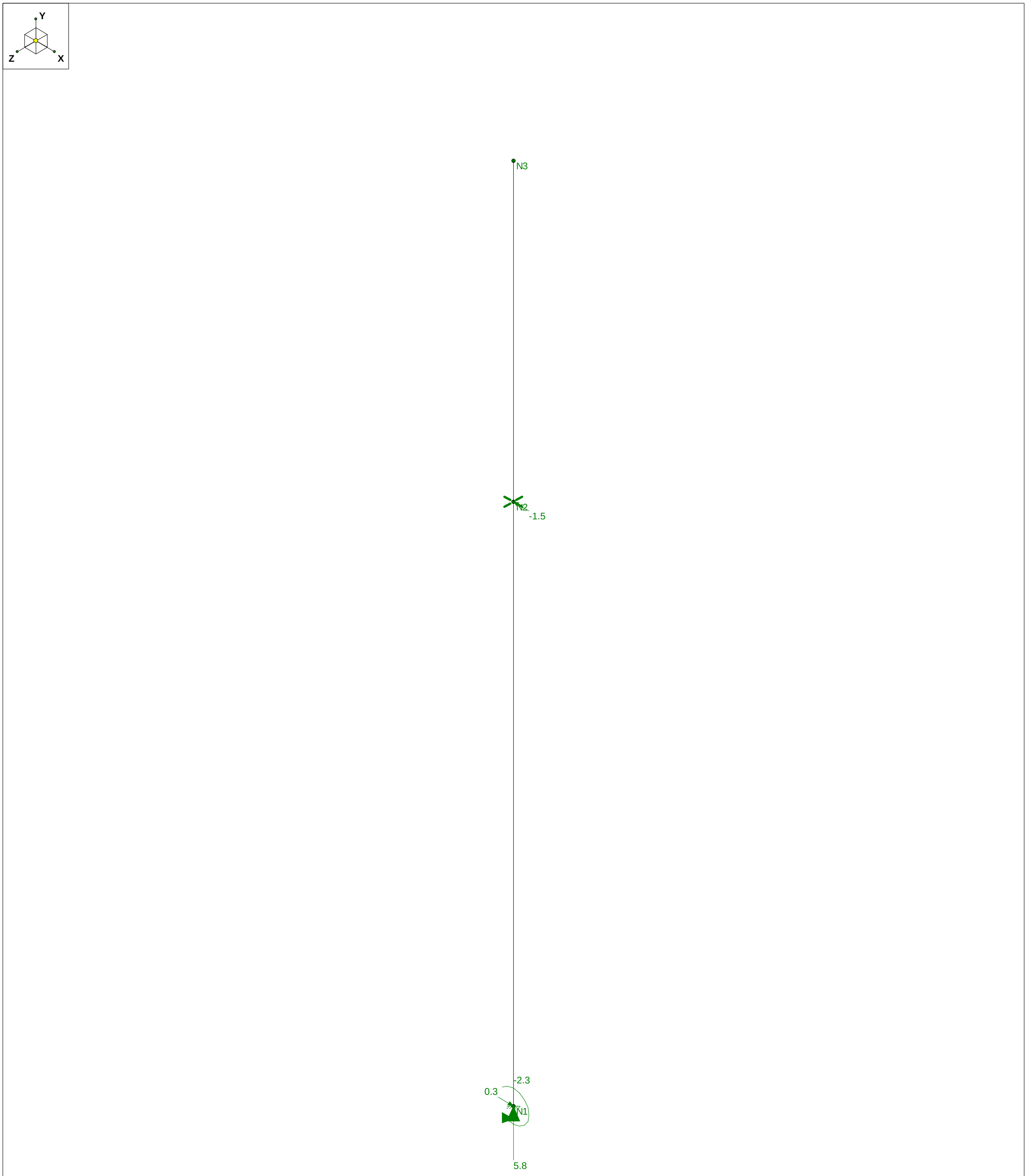
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N1	.988	2.85	0	0	0	-7.931
2	2	N2	-4.686	0	0	0	0	0
3	2	Totals:	-3.698	2.85	0			
4	2	COG (ft):	X: 0	Y: 21.504	Z: 0			





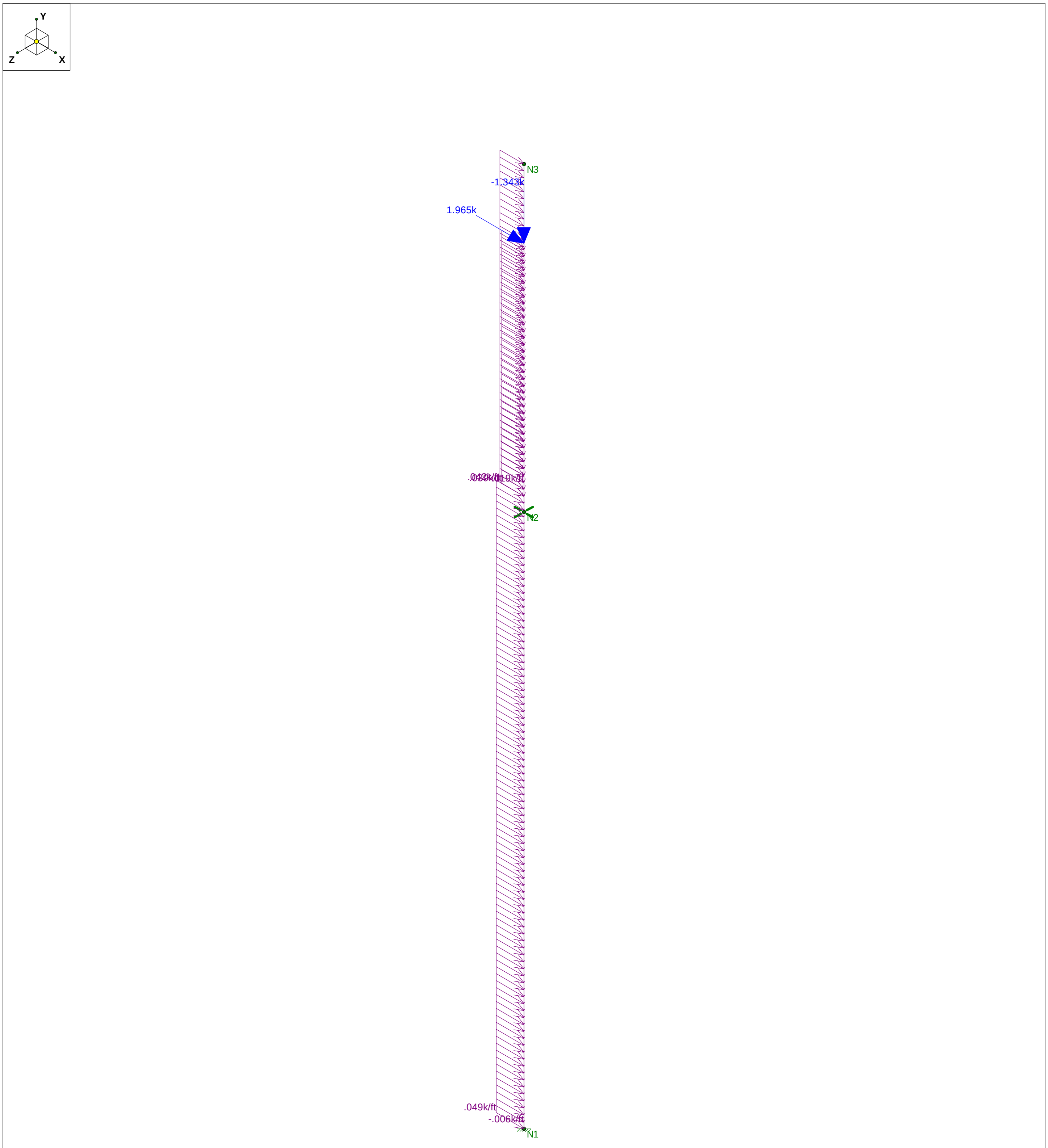
Loads: LC 1, NESC Heavy Wind on PCS Structure

CENTEK Engineering, Inc.	Tower # 10246 - Mast	
tjl, cfc		Dec 17, 2018 at 2:39 PM
17159.24 - CT33XC525	LC #1 Loads	NESC.r3d



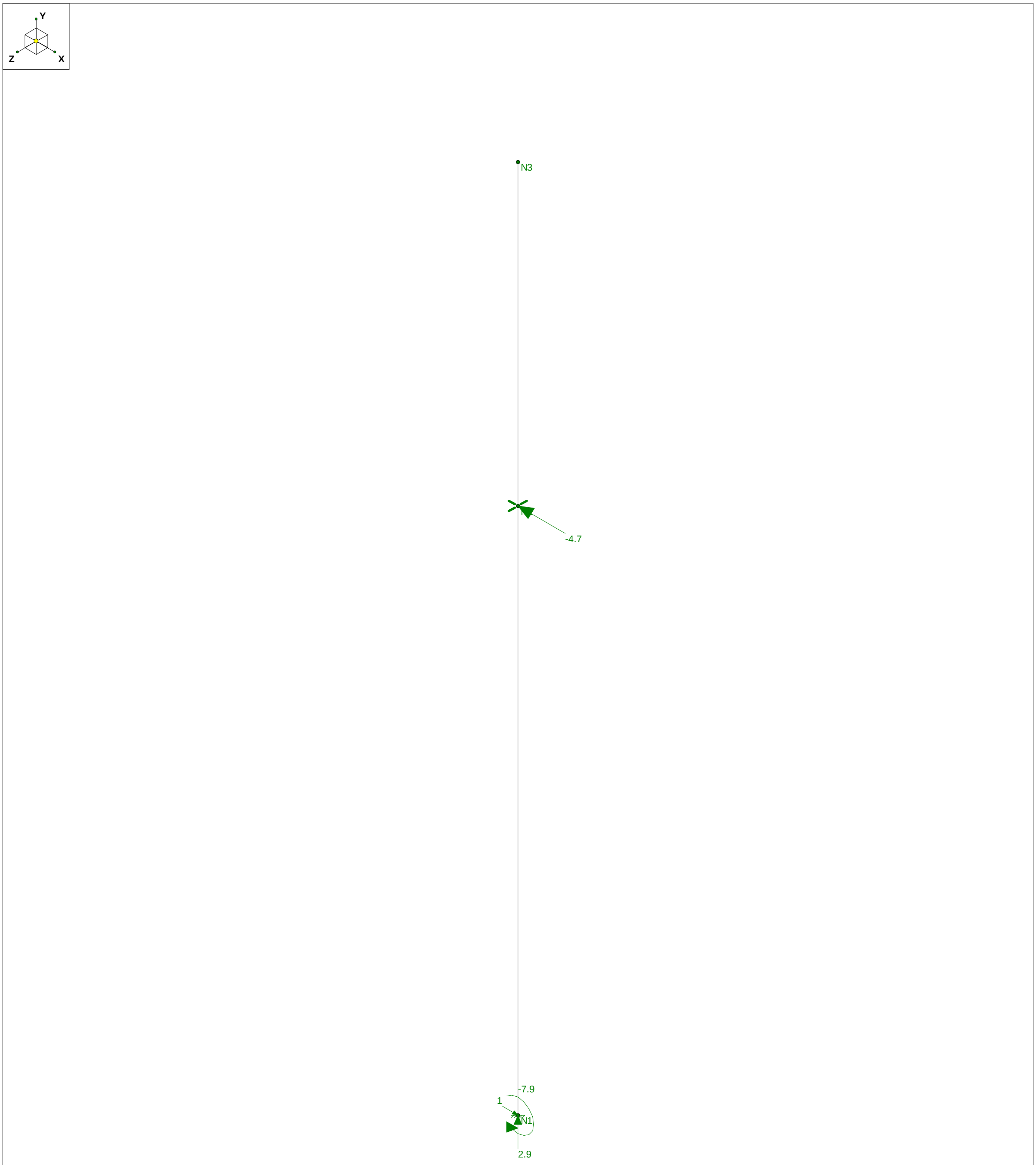
Results for LC 1, NESC Heavy Wind on PCS Structure
Reaction and Moment Units are k and k-ft

CENTEK Engineering, Inc.		
tjl, cfc	Tower # 10246 - Mast	Dec 17, 2018 at 2:40 PM
17159.24 - CT33XC525	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind on PCS Structure

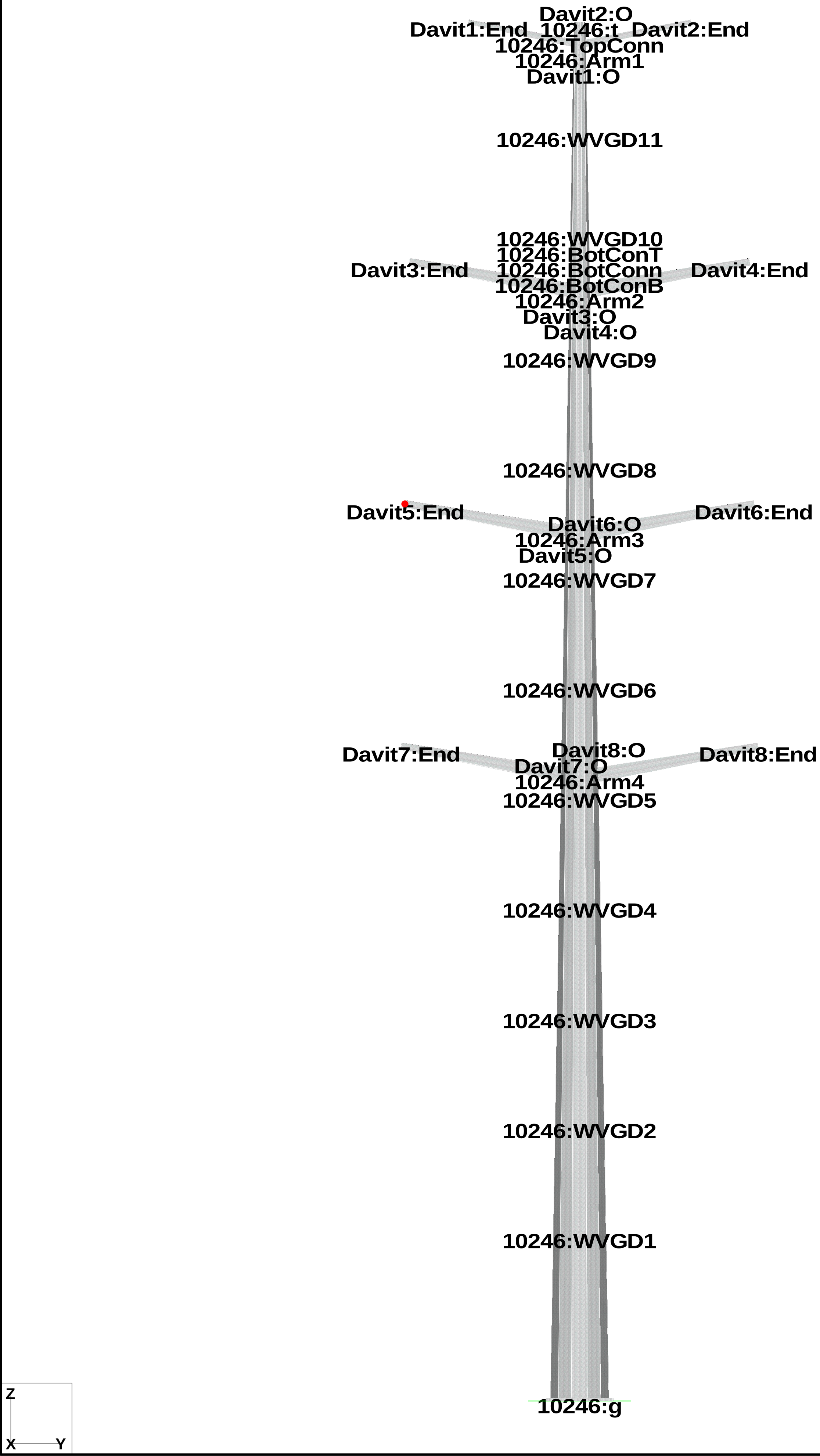
CENTEK Engineering, Inc.		
tjl, cfc	Tower # 10246 - Mast	Dec 17, 2018 at 2:40 PM
17159.24 - CT33XC525	LC #2 Loads	NESC.r3d



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

CENTEK Engineering, Inc.		
tjl, cfc	Tower # 10246 - Mast	Dec 17, 2018 at 2:42 PM
17159.24 - CT33XC525	LC #2 Reactions	NESC.r3d

Centek Engineering Inc, Project: "cl&p structure # 10246"
PLS-POLE Version 12.50, 8:19:28 AM Wednesday, October 31, 2018
Undeformed geometry displayed



Project Name : 12047.CO9 - Brookfield, CT
Project Notes: CL&P # 10246/ Sprint CT33XC525
Project File : J:\Jobs\1715900.WI\24_CT33XC525 Brookfield\04_Structural\Backup Documentation\Rev (3)\Calcs\PLS-Pole\cl&p structure # 10246.pol
Date run : 7:57:08 AM Wednesday, January 02, 2019
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\24_ct33xc525 brookfield\04_structural\backup documentation\rev (3)\calcs\pls-pole\cl&p #10246.lca

*** Analysis Results:

Maximum element usage is 57.10% for Base Plate "10246" in load case "NESC Heavy"
Maximum insulator usage is 13.80% for Clamp "Clamp4" in load case "NESC Heavy"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	10246:g	1.46	-41.36	-84.36	41.38	3739.54	116.19	3741.34	3.54	0.00
NESC Extreme	10246:g	0.98	-40.52	-48.55	40.53	3339.44	80.73	3340.41	-2.22	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	10246:t	-1.56	46.25	-1.04	46.29	-0.27	-3.81	-0.24
NESC Extreme	10246:t	-1.07	40.82	-0.81	40.84	-0.15	-3.52	-0.10

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
10246	1	638	NESC Extreme	41.47	117.01
10246	2	5242	NESC Heavy	46.80	899.76
10246	3	9064	NESC Heavy	49.91	2131.80
10246	4	11962	NESC Heavy	51.98	2327.76

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

Summary of Steel Pole Usages:

Steel Pole Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
10246	51.98	NESC Heavy	30	31359.1

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	16.76	NESC Heavy	1	156.1
Davit2	19.24	NESC Heavy	1	156.1
Davit3	1.43	NESC Heavy	1	873.6
Davit4	22.90	NESC Heavy	1	873.6
Davit5	1.44	NESC Heavy	1	873.6
Davit6	20.54	NESC Heavy	1	873.6
Davit7	1.44	NESC Heavy	1	873.6
Davit8	21.51	NESC Heavy	1	873.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	57.10	10246	Base Plate
NESC Extreme	49.84	10246	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	51.98	10246	30
NESC Extreme	44.30	10246	32

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	10246	11	17.048	79.908	3739.539	116.189	34.262	73.011	3	94.459	2.267	57.10
NESC Extreme	10246	11	17.048	44.098	3339.436	80.736	29.903	63.722	3	82.892	2.118	49.84

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	22.90	Davit4	1
NESC Extreme	10.84	Davit4	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.19	NESC Heavy	0.0
Clamp2	Clamp	3.22	NESC Heavy	0.0

Clamp3	Clamp	0.00	NESC Heavy	0.0
Clamp4	Clamp	13.80	NESC Heavy	0.0
Clamp5	Clamp	0.00	NESC Heavy	0.0
Clamp6	Clamp	13.17	NESC Heavy	0.0
Clamp7	Clamp	0.00	NESC Heavy	0.0
Clamp8	Clamp	13.62	NESC Heavy	0.0
Clamp9	Clamp	0.88	NESC Heavy	0.0
Clamp10	Clamp	0.88	NESC Heavy	0.0
Clamp11	Clamp	0.88	NESC Heavy	0.0
Clamp12	Clamp	0.88	NESC Heavy	0.0
Clamp13	Clamp	0.88	NESC Heavy	0.0
Clamp14	Clamp	0.88	NESC Heavy	0.0
Clamp15	Clamp	0.88	NESC Heavy	0.0
Clamp16	Clamp	0.88	NESC Heavy	0.0
Clamp17	Clamp	0.88	NESC Heavy	0.0
Clamp18	Clamp	0.59	NESC Heavy	0.0
Clamp21	Clamp	5.86	NESC Extreme	0.0
Clamp22	Clamp	9.91	NESC Extreme	0.0
Clamp23	Clamp	7.21	NESC Heavy	0.0
Clamp24	Clamp	9.91	NESC Extreme	0.0
Clamp25	Clamp	0.89	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	5553.7
Weight of Steel Poles:	31359.1
Total:	36912.8

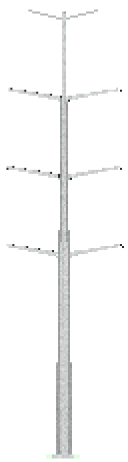
*** End of Report

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

Project Name : 12047.CO9 - Brookfield, CT
Project Notes: CL&P # 10246/ Sprint CT33XC525
Project File : J:\Jobs\1715900.WI\24_CT33XC525 Brookfield\04_Structural\Backup Documentation\Rev (3)\Calcs\PLS-Pole\cl&p structure # 10246.pol
Date run   : 7:57:07 AM Wednesday, January 02, 2019
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 48-11

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	Strength Check	Distance From	Ultimate	Ultimate

Label		Length (ft)	(ft)			(in)	(in)	(in/ft)	Coef.		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
CL&P10246	10246	125.00	0	Yes	12T	13	63.63	0	1.6	4 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

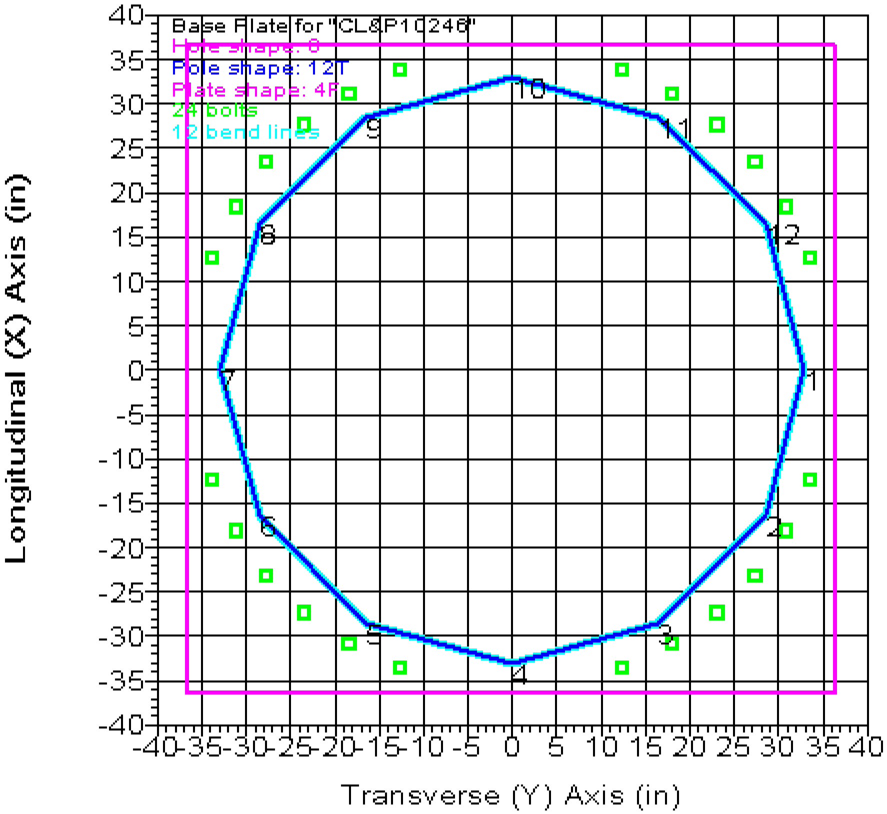
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CL&P10246	1	18.583	0.1875	2.670	0.000	0.000	60.000	0.000	638	10.02	0.42300	13.00	20.86	2.561	2.670
CL&P10246	2	40	0.4375	4.583	0.000	0.000	60.000	0.000	5242	22.06	0.42300	19.36	36.28	4.425	4.583
CL&P10246	3	40	0.5	6.330	0.000	0.000	60.000	0.000	9064	21.36	0.42300	33.46	50.38	6.173	6.330
CL&P10246	4	40	0.5	0.000	0.000	0.000	60.000	0.000	11962	21.03	0.42300	46.70	63.62	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&P10246	73.000	4F	3.000	4452	0.000	0.000	0	490.00	60.000	2.250	72.000	24	61804.96	61804.96

Base Plate Bolt Coordinates for Property "CL&P10246":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.3472	0.9375	0
0.5069	0.8611	0
0.6458	0.7639	0
0.7639	0.6458	0
0.8611	0.5069	0
0.9375	0.3472	0



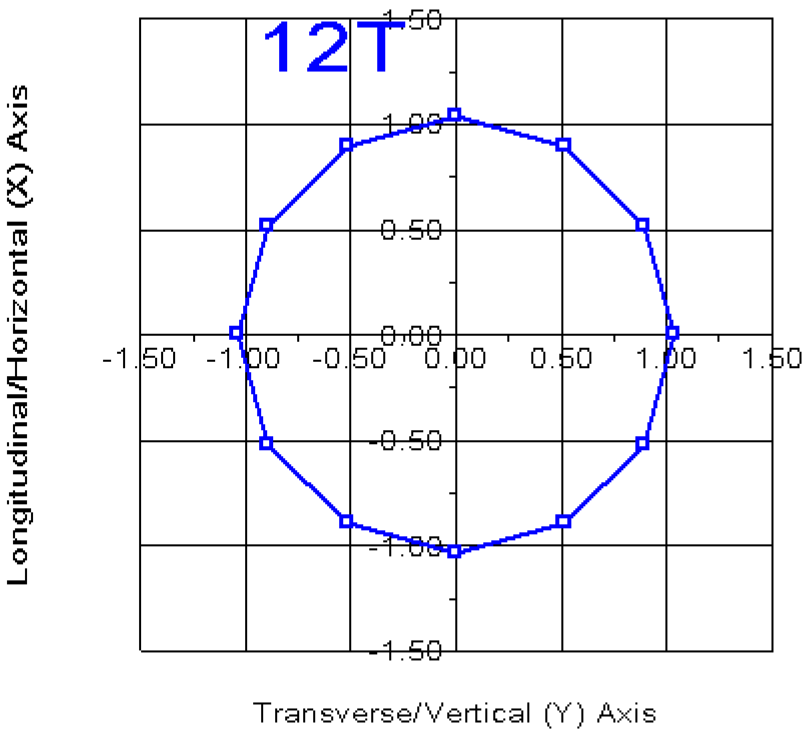
Steel Pole Connectivity:

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)
10246			0	0	0	0	0	CL&P10246	19 labels		0.00	0

Relative Attachment Labels for Steel Pole "10246":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
10246:Arm1	0.00	123.08
10246:Arm2	0.00	100.66
10246:Arm3	0.00	78.66
10246:Arm4	0.00	56.66
10246:WVGD1	0.00	15.00

10246:WVGD2	0.00	25.00
10246:WVGD3	0.00	35.00
10246:WVGD4	0.00	45.00
10246:WVGD5	0.00	55.00
10246:WVGD6	0.00	65.00
10246:WVGD7	0.00	75.00
10246:WVGD8	0.00	85.00
10246:WVGD9	0.00	95.00
10246:WVGD10	0.00	106.00
10246:TopConn	0.00	124.00
10246:BotConT	0.00	105.00
10246:BotConn	0.00	104.50
10246:BotConB	0.00	104.00
10246:WVGD11	0.00	115.00



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)
10246	10246:t	10246:t Ori	0.00	13.00	7.72	162.33	162.33	0.00	15.9	60.00	60.00	120.61	120.61

10246	10246:TopConn	10246:TopConn	End	1.00	13.42	7.98	178.94	178.94	0.00	16.5	60.00	60.00	128.77	128.77
10246	10246:TopConn	10246:TopConn	Ori	1.00	13.42	7.98	178.94	178.94	0.00	16.5	60.00	60.00	128.77	128.77
10246	10246:Arm1	10246:Arm1	End	1.92	13.81	8.21	195.14	195.14	0.00	17.1	60.00	60.00	136.48	136.48
10246	10246:Arm1	10246:Arm1	Ori	1.92	13.81	8.21	195.14	195.14	0.00	17.1	60.00	60.00	136.48	136.48
10246	#10246:0	Tube 1	End	5.96	15.52	9.24	278.20	278.20	0.00	19.5	60.00	60.00	173.14	173.14
10246	#10246:0	Tube 1	Ori	5.96	15.52	9.24	278.20	278.20	0.00	19.5	60.00	60.00	173.14	173.14
10246	10246:WVGD11	10246:WVGD11	End	10.00	17.23	10.27	382.00	382.00	0.00	21.9	60.00	60.00	214.15	214.15
10246	10246:WVGD11	10246:WVGD11	Ori	10.00	17.23	10.27	382.00	382.00	0.00	21.9	60.00	60.00	214.15	214.15
10246	#10246:1	Tube 1	End	12.96	18.48	11.03	472.41	472.41	0.00	23.7	60.00	60.00	246.91	246.91
10246	#10246:1	Tube 1	Ori	12.96	18.48	11.03	472.41	472.41	0.00	23.7	60.00	60.00	246.91	246.91
10246	#10246:2	SpliceT	End	15.91	19.73	11.78	576.07	576.07	0.00	25.5	60.00	60.00	282.01	282.01
10246	#10246:2	SpliceT	Ori	15.91	19.73	11.78	576.07	576.07	0.00	25.5	60.00	60.00	282.01	282.01
10246	#10246:3	SpliceB	End	18.58	20.49	28.20	1451.42	1451.42	0.00	9.9	60.00	60.00	684.36	684.36
10246	#10246:3	SpliceB	Ori	18.58	20.49	28.20	1451.42	1451.42	0.00	9.9	60.00	60.00	684.36	684.36
10246	10246:WVGD10	10246:WVGD10	End	19.00	20.66	28.45	1490.06	1490.06	0.00	10.0	60.00	60.00	696.58	696.58
10246	10246:WVGD10	10246:WVGD10	Ori	19.00	20.66	28.45	1490.06	1490.06	0.00	10.0	60.00	60.00	696.58	696.58
10246	10246:BotConT	10246:BotConT	End	20.00	21.08	29.05	1585.50	1585.50	0.00	10.2	60.00	60.00	726.33	726.33
10246	10246:BotConT	10246:BotConT	Ori	20.00	21.09	29.05	1585.50	1585.50	0.00	10.2	60.00	60.00	726.33	726.33
10246	10246:BotConn	10246:BotConn	End	20.50	21.30	29.34	1634.71	1634.71	0.00	10.4	60.00	60.00	741.44	741.44
10246	10246:BotConn	10246:BotConn	Ori	20.50	21.30	29.34	1634.71	1634.71	0.00	10.4	60.00	60.00	741.44	741.44
10246	10246:BotConB	10246:BotConB	End	21.00	21.51	29.64	1684.93	1684.93	0.00	10.5	60.00	60.00	756.70	756.70
10246	10246:BotConB	10246:BotConB	Ori	21.00	21.51	29.64	1684.93	1684.93	0.00	10.5	60.00	60.00	756.70	756.70
10246	10246:Arm2	10246:Arm2	End	24.34	22.92	31.63	2047.47	2047.47	0.00	11.4	60.00	60.00	862.77	862.77
10246	10246:Arm2	10246:Arm2	Ori	24.34	22.92	31.63	2047.47	2047.47	0.00	11.4	60.00	60.00	862.77	862.77
10246	#10246:4	Tube 2	End	27.17	24.12	33.31	2391.88	2391.88	0.00	12.1	60.00	60.00	957.91	957.91
10246	#10246:4	Tube 2	Ori	27.17	24.12	33.31	2391.88	2391.88	0.00	12.1	60.00	60.00	957.91	957.91
10246	10246:WVGD9	10246:WVGD9	End	30.00	25.31	35.00	2772.89	2772.89	0.00	12.8	60.00	60.00	1058.03	1058.03
10246	10246:WVGD9	10246:WVGD9	Ori	30.00	25.32	35.00	2772.89	2772.89	0.00	12.8	60.00	60.00	1058.03	1058.03
10246	#10246:5	Tube 2	End	35.00	27.43	37.97	3541.81	3541.81	0.00	14.1	60.00	60.00	1247.21	1247.21
10246	#10246:5	Tube 2	Ori	35.00	27.43	37.97	3541.81	3541.81	0.00	14.1	60.00	60.00	1247.21	1247.21
10246	10246:WVGD8	10246:WVGD8	End	40.00	29.54	40.95	4441.16	4441.16	0.00	15.4	60.00	60.00	1451.96	1451.96
10246	10246:WVGD8	10246:WVGD8	Ori	40.00	29.55	40.95	4441.16	4441.16	0.00	15.4	60.00	60.00	1451.96	1451.96
10246	#10246:6	Tube 2	End	43.17	30.89	42.83	5083.98	5083.98	0.00	16.2	60.00	60.00	1589.91	1589.91
10246	#10246:6	Tube 2	Ori	43.17	30.89	42.83	5083.99	5083.99	0.00	16.2	60.00	60.00	1589.91	1589.91
10246	10246:Arm3	10246:Arm3	End	46.34	32.23	44.72	5786.03	5786.03	0.00	17.1	60.00	60.00	1734.13	1734.13
10246	10246:Arm3	10246:Arm3	Ori	46.34	32.23	44.72	5786.03	5786.03	0.00	17.1	60.00	60.00	1734.13	1734.13
10246	10246:WVGD7	10246:WVGD7	End	50.00	33.77	46.90	6672.06	6672.06	0.00	18.0	60.00	60.00	1908.12	1908.12
10246	10246:WVGD7	10246:WVGD7	Ori	50.00	33.78	46.90	6672.06	6672.06	0.00	18.0	60.00	60.00	1908.12	1908.12
10246	#10246:7	SpliceT	End	51.33	34.34	47.69	7015.54	7015.54	0.00	18.4	60.00	60.00	1973.48	1973.48
10246	#10246:7	SpliceT	Ori	51.33	34.34	47.69	7015.54	7015.54	0.00	18.4	60.00	60.00	1973.48	1973.48
10246	#10246:8	SpliceB	End	55.91	35.40	56.11	8749.57	8749.57	0.00	16.3	60.00	60.00	2387.32	2387.32
10246	#10246:8	SpliceB	Ori	55.91	35.40	56.11	8749.57	8749.57	0.00	16.3	60.00	60.00	2387.32	2387.32
10246	10246:WVGD6	10246:WVGD6	End	60.00	37.13	58.89	10115.07	10115.07	0.00	17.2	60.00	60.00	2631.39	2631.39
10246	10246:WVGD6	10246:WVGD6	Ori	60.00	37.13	58.89	10115.08	10115.08	0.00	17.2	60.00	60.00	2631.39	2631.39
10246	#10246:9	Tube 3	End	64.17	38.89	61.73	11648.43	11648.43	0.00	18.2	60.00	60.00	2892.80	2892.80
10246	#10246:9	Tube 3	Ori	64.17	38.89	61.73	11648.44	11648.44	0.00	18.2	60.00	60.00	2892.80	2892.80
10246	10246:Arm4	10246:Arm4	End	68.34	40.66	64.56	13329.43	13329.43	0.00	19.1	60.00	60.00	3166.58	3166.58
10246	10246:Arm4	10246:Arm4	Ori	68.34	40.66	64.56	13329.43	13329.43	0.00	19.1	60.00	60.00	3166.58	3166.58
10246	10246:WVGD5	10246:WVGD5	End	70.00	41.36	65.69	14039.10	14039.10	0.00	19.5	60.00	60.00	3278.69	3278.69
10246	10246:WVGD5	10246:WVGD5	Ori	70.00	41.36	65.69	14039.10	14039.10	0.00	19.5	60.00	60.00	3278.69	3278.69
10246	#10246:10	Tube 3	End	75.00	43.47	69.09	16333.76	16333.76	0.00	20.6	60.00	60.00	3629.01	3629.01
10246	#10246:10	Tube 3	Ori	75.00	43.48	69.09	16333.76	16333.76	0.00	20.6	60.00	60.00	3629.01	3629.01
10246	10246:WVGD4	10246:WVGD4	End	80.00	45.59	72.49	18865.76	18865.76	0.00	21.8	60.00	60.00	3997.11	3997.11
10246	10246:WVGD4	10246:WVGD4	Ori	80.00	45.59	72.49	18865.76	18865.76	0.00	21.8	60.00	60.00	3997.11	3997.11
10246	#10246:11	SpliceT	End	85.00	47.70	75.89	21646.78	21646.78	0.00	22.9	60.00	60.00	4382.99	4382.99
10246	#10246:11	SpliceT	Ori	85.00	47.71	75.89	21646.78	21646.78	0.00	22.9	60.00	60.00	4382.99	4382.99
10246	10246:WVGD3	10246:WVGD3	End	90.00	48.82	77.68	23217.10	23217.10	0.00	23.5	60.00	60.00	4593.58	4593.58
10246	10246:WVGD3	10246:WVGD3	Ori	90.00	48.82	77.68	23217.11	23217.11	0.00	23.5	60.00	60.00	4593.59	4593.59
10246	#10246:12	SpliceB	End	91.33	49.38	78.59	24037.48	24037.48	0.00	23.8	60.00	60.00	4701.72	4701.72

10246	#10246:12	SpliceB	Ori	91.33	49.38	78.59	24037.48	24037.48	0.00	23.8	60.00	60.00	4701.72	4701.72
10246	#10246:13	Tube 4	End	95.66	51.22	81.54	26845.15	26845.15	0.00	24.8	60.00	60.00	5062.90	5062.90
10246	#10246:13	Tube 4	Ori	95.66	51.22	81.54	26845.16	26845.16	0.00	24.8	60.00	60.00	5062.90	5062.90
10246	10246:WVGD2	10246:WVGD2	End	100.00	53.05	84.48	29863.37	29863.37	0.00	25.8	60.00	60.00	5437.45	5437.45
10246	10246:WVGD2	10246:WVGD2	Ori	100.00	53.05	84.48	29863.37	29863.37	0.00	25.8	60.00	60.00	5437.45	5437.45
10246	#10246:14	Tube 4	End	105.00	55.16	87.88	33615.99	33615.99	0.00	26.9	60.00	60.00	5886.05	5886.05
10246	#10246:14	Tube 4	Ori	105.00	55.17	87.88	33616.00	33616.00	0.00	26.9	60.00	60.00	5886.05	5886.05
10246	10246:WVGD1	10246:WVGD1	End	110.00	57.28	91.28	37670.52	37670.52	0.00	28.0	60.00	60.00	6352.43	6352.43
10246	10246:WVGD1	10246:WVGD1	Ori	110.00	57.28	91.28	37670.52	37670.52	0.00	28.0	60.00	60.00	6352.43	6352.43
10246	#10246:15	Tube 4	End	115.00	59.39	94.69	42038.62	42038.62	0.00	29.2	60.00	60.00	6836.60	6836.60
10246	#10246:15	Tube 4	Ori	115.00	59.40	94.69	42038.63	42038.63	0.00	29.2	60.00	60.00	6836.60	6836.60
10246	#10246:16	Tube 4	End	120.00	61.51	98.09	46731.99	46731.99	0.00	30.3	60.00	60.00	7338.55	7338.55
10246	#10246:16	Tube 4	Ori	120.00	61.51	98.09	46732.00	46732.00	0.00	30.3	60.00	60.00	7338.55	7338.55
10246	10246:g	10246:g	End	125.00	63.62	101.49	51762.30	51762.30	0.00	31.4	60.00	59.69	7817.42	7817.42

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
ARM A		4F	0.1875	8	5	0	1.6	29000	1 point	Calculated	0	0	0	0	60	0	
ARM B		4F	0.375	16	8	0	1.6	29000	1 point	Calculated	0	0	0	0	60	0	

Intermediate Joints for Davit Property "ARM A":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	9.5	-1.917

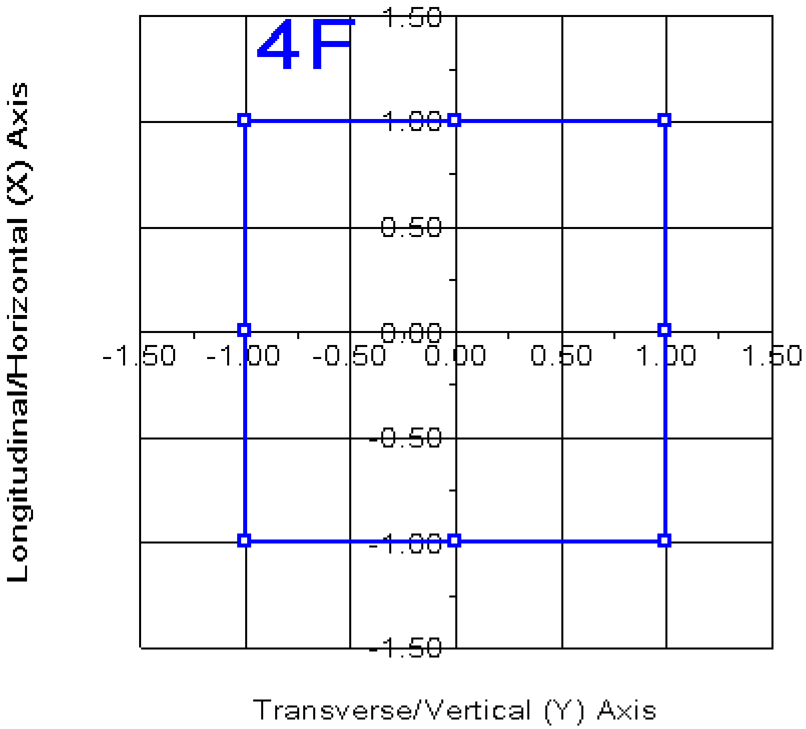
Intermediate Joints for Davit Property "ARM B":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	14.5	-2.55

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
Davit1	10246:Arm1	ARM A	180
Davit2	10246:Arm1	ARM A	0
Davit3	10246:Arm2	ARM B	180
Davit4	10246:Arm2	ARM B	0
Davit5	10246:Arm3	ARM B	180
Davit6	10246:Arm3	ARM B	0
Davit7	10246:Arm4	ARM B	180

Davit8 10246:Arm4   ARM B   0



Tubular Davit Arm Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	V-Moment Inertia (in^4)	H-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	V-Moment Capacity (ft-k)	H-Moment Capacity (ft-k)
Davit1	Davit1:O	Origin	0.00	8.00	5.86	59.64	59.64	0.00	32.7	60.00	60.00	74.55	74.55
Davit1	#Davit1:0	End	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Davit1	#Davit1:0	Origin	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Davit1	Davit1:End	End	9.69	5.00	3.61	13.95	13.95	0.00	16.7	60.00	60.00	27.91	27.91
Davit2	Davit2:O	Origin	0.00	8.00	5.86	59.64	59.64	0.00	32.7	60.00	60.00	74.55	74.55
Davit2	#Davit2:0	End	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Davit2	#Davit2:0	Origin	4.85	6.50	4.73	31.47	31.47	0.00	24.7	60.00	60.00	48.42	48.42
Davit2	Davit2:End	End	9.69	5.00	3.61	13.95	13.95	0.00	16.7	60.00	60.00	27.91	27.91
Davit3	Davit3:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Davit3	#Davit3:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit3	#Davit3:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit3	#Davit3:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit3	#Davit3:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit3	Davit3:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87

Davit4	Davit4:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Davit4	#Davit4:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit4	#Davit4:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit4	#Davit4:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit4	#Davit4:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit4	Davit4:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Davit5	Davit5:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Davit5	#Davit5:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit5	#Davit5:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit5	#Davit5:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit5	#Davit5:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit5	Davit5:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Davit6	Davit6:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Davit6	#Davit6:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit6	#Davit6:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit6	#Davit6:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit6	#Davit6:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit6	Davit6:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Davit7	Davit7:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Davit7	#Davit7:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit7	#Davit7:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit7	#Davit7:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit7	#Davit7:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit7	Davit7:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87
Davit8	Davit8:O	Origin	0.00	16.00	23.44	954.22	954.22	0.00	32.7	60.00	60.00	596.39	596.39
Davit8	#Davit8:0	End	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit8	#Davit8:0	Origin	5.00	13.28	19.36	538.13	538.13	0.00	25.4	60.00	60.00	405.13	405.13
Davit8	#Davit8:1	End	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit8	#Davit8:1	Origin	9.86	10.64	15.40	270.89	270.89	0.00	18.4	60.00	60.00	254.56	254.56
Davit8	Davit8:End	End	14.72	8.00	11.44	111.10	111.10	0.00	11.3	60.00	60.00	138.87	138.87

*** 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	10246:WVGD1	clamp	No Limit
Clamp10	10246:WVGD2	clamp	No Limit
Clamp11	10246:WVGD3	clamp	No Limit
Clamp12	10246:WVGD4	clamp	No Limit
Clamp13	10246:WVGD5	clamp	No Limit
Clamp14	10246:WVGD6	clamp	No Limit
Clamp15	10246:WVGD7	clamp	No Limit
Clamp16	10246:WVGD8	clamp	No Limit
Clamp17	10246:WVGD9	clamp	No Limit
Clamp18	10246:WVGD10	clamp	No Limit
Clamp21	10246:TopConn	clamp	No Limit
Clamp22	10246:BotConT	clamp	No Limit
Clamp23	10246:BotConn	clamp	No Limit
Clamp24	10246:BotConB	clamp	No Limit
Clamp25	10246:WVGD11	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\1715900.wi\24_ct33xc525 brookfield\04_structural\backup documentation\rev (3)\calcs\pls-pole\cl&p #10246.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)	125.00 (ft)	
Structure height	125.00 (ft)	
Structure height above ground	125.00 (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	20 loads	Wind on All	4	0	0.000	56.000	0.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	0.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	20 loads	NESC 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	677	2227	-1041	Shield Wire
Davit2:End	727	2459	-271	Shield Wire
Davit4:End	5591	9347	1819	Conductor
Davit6:End	5455	8973	-898	Conductor
Davit8:End	5518	9335	-1073	Conductor
10246:TopConn	0	1511	0	Top Connection
10246:BotConT	0	2260	0	Bottom Connection
10246:BotConn	5763	-252	0	Bottom Connection
10246:BotConB	0	-2260	0	Bottom Connection
10246:WVGD11	690	178	0	Coax Cables
10246:WVGD10	460	119	0	Coax Cables
10246:WVGD9	690	119	0	Coax Cables
10246:WVGD8	690	119	0	Coax Cables
10246:WVGD7	690	119	0	Coax Cables
10246:WVGD6	690	119	0	Coax Cables
10246:WVGD5	690	119	0	Coax Cables

10246:WVGD4	690	119	0	Coax Cables
10246:WVGD3	690	119	0	Coax Cables
10246:WVGD2	690	119	0	Coax Cables
10246:WVGD1	690	119	0	Coax Cables

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
Davit1:End	100	1100	-502	Shield Wire
Davit2:End	100	1369	-164	Shield Wire
Davit4:End	2169	7122	757	Conductor
Davit6:End	2100	6728	-507	Conductor
Davit8:End	2159	6627	-561	Conductor
10246:TopConn	0	4686	0	Top Connection
10246:BotConT	0	7931	0	Bottom Connection
10246:BotConn	2850	-988	0	Bottom Connection
10246:BotConB	0	-7931	0	Bottom Connection
10246:WVGD11	187	425	0	Coax Cables
10246:WVGD10	125	283	0	Coax Cables
10246:WVGD9	187	283	0	Coax Cables
10246:WVGD8	187	283	0	Coax Cables
10246:WVGD7	187	283	0	Coax Cables
10246:WVGD6	187	283	0	Coax Cables
10246:WVGD5	187	283	0	Coax Cables
10246:WVGD4	187	283	0	Coax Cables
10246:WVGD3	187	283	0	Coax Cables
10246:WVGD2	187	283	0	Coax Cables
10246:WVGD1	187	283	0	Coax Cables

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

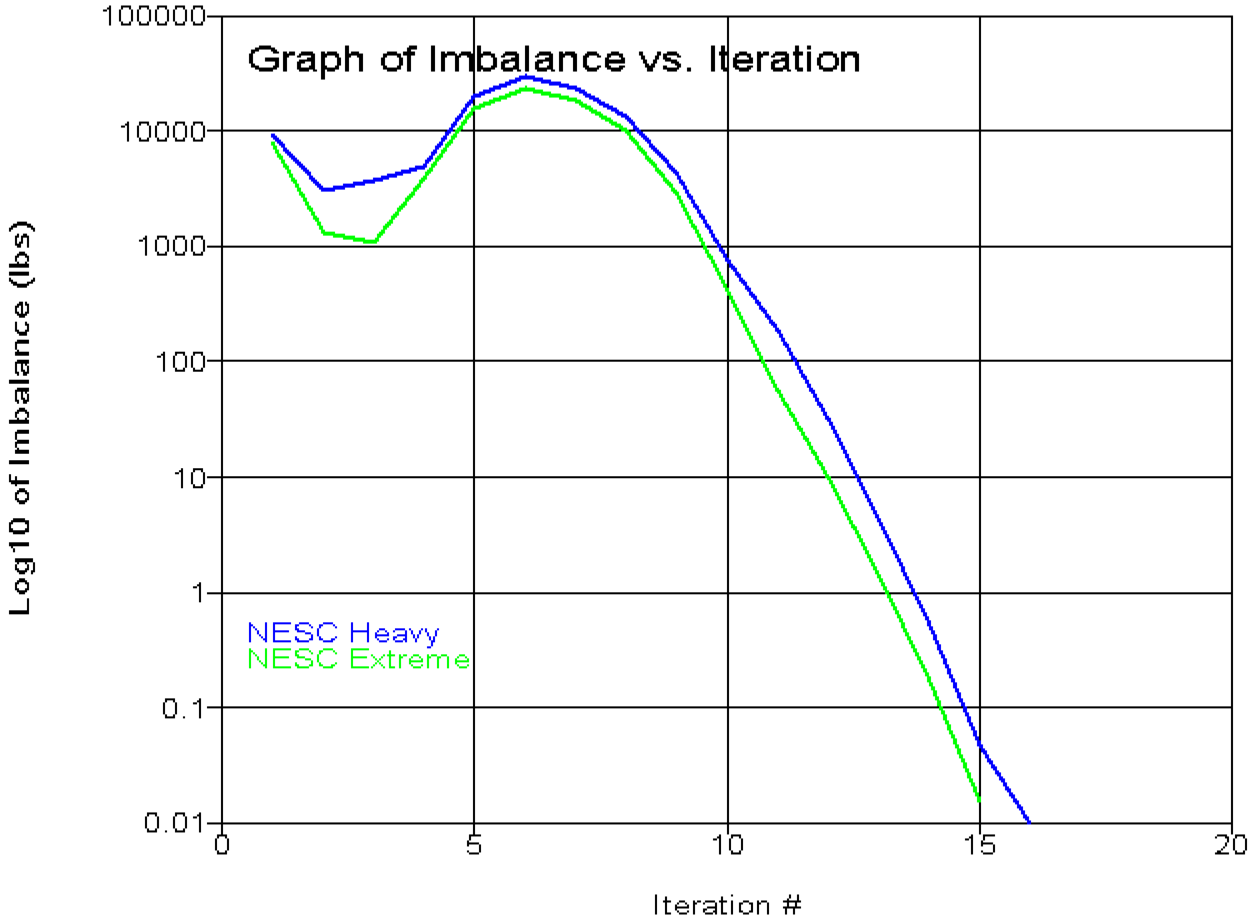
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

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)
10246	10246:t	10246:TopConn	125.00	124.00	124.50	13.211	1.02e+006	1.000	26.57	0.00	26.72	29.26	0.00	0.00	29.26	0.00
10246	10246:TopConn	10246:Arm1	124.00	123.08	123.54	13.617	1.05e+006	1.000	26.57	0.00	25.26	27.65	0.00	0.00	27.65	0.00
10246	10246:Arm1		123.08	119.04	121.06	14.666	1.13e+006	1.000	26.57	0.00	120.04	131.25	0.00	0.00	131.25	0.00
10246		10246:WVGD11	119.04	115.00	117.02	16.375	1.26e+006	1.000	26.57	0.00	134.21	146.55	0.00	0.00	146.55	0.00
10246	10246:WVGD11		115.00	112.04	113.52	17.855	1.38e+006	1.000	26.57	0.00	107.16	116.90	0.00	0.00	116.90	0.00
10246			112.04	109.09	110.57	19.106	1.47e+006	1.000	26.57	0.00	114.74	125.09	0.00	0.00	125.09	0.00
10246			109.09	106.42	107.75	20.108	1.55e+006	1.000	26.57	0.00	359.07	118.89	0.00	0.00	118.89	0.00
10246		10246:WVGD10	106.42	106.00	106.21	20.574	1.59e+006	1.000	26.57	0.00	40.25	19.00	0.00	0.00	19.00	0.00
10246	10246:WVGD10	10246:BotConT	106.00	105.00	105.50	20.874	1.61e+006	1.000	26.57	0.00	97.82	46.22	0.00	0.00	46.22	0.00
10246	10246:BotConT	10246:BotConn	105.00	104.50	104.75	21.191	1.64e+006	1.000	26.57	0.00	49.67	23.46	0.00	0.00	23.46	0.00
10246	10246:BotConn	10246:BotConB	104.50	104.00	104.25	21.402	1.65e+006	1.000	26.57	0.00	50.18	23.70	0.00	0.00	23.70	0.00
10246	10246:BotConB	10246:Arm2	104.00	100.66	102.33	22.215	1.71e+006	1.000	26.57	0.00	348.60	164.51	0.00	0.00	164.51	0.00
10246	10246:Arm2		100.66	97.83	99.24	23.521	1.82e+006	1.000	26.57	0.00	312.48	147.30	0.00	0.00	147.30	0.00
10246		10246:WVGD9	97.83	95.00	96.41	24.717	1.91e+006	1.000	26.57	0.00	328.67	154.79	0.00	0.00	154.79	0.00
10246	10246:WVGD9		95.00	90.00	92.50	26.372	2.04e+006	1.000	26.57	0.00	620.73	292.00	0.00	0.00	292.00	0.00
10246		10246:WVGD8	90.00	85.00	87.50	28.487	2.2e+006	1.000	26.57	0.00	671.35	315.42	0.00	0.00	315.42	0.00
10246	10246:WVGD8		85.00	81.83	83.41	30.216	2.33e+006	1.000	26.57	0.00	452.15	212.24	0.00	0.00	212.24	0.00

10246		10246:Arm3	81.83	78.66	80.24	31.558	2.44e+006	1.000	26.57	0.00	472.52	221.67	0.00	0.00	221.67	0.00
10246	10246:Arm3	10246:WVGD7	78.66	75.00	76.83	33.002	2.55e+006	1.000	26.57	0.00	569.89	267.18	0.00	0.00	267.18	0.00
10246	10246:WVGD7		75.00	73.67	74.34	34.056	2.63e+006	1.000	26.57	0.00	214.03	100.30	0.00	0.00	100.30	0.00
10246			73.67	69.09	71.38	34.869	2.69e+006	1.000	26.57	0.00	1615.70	353.88	0.00	0.00	353.88	0.00
10246		10246:WVGD6	69.09	65.00	67.04	36.266	2.8e+006	1.000	26.57	0.00	799.82	328.22	0.00	0.00	328.22	0.00
10246	10246:WVGD6		65.00	60.83	62.91	38.012	2.93e+006	1.000	26.57	0.00	856.16	351.18	0.00	0.00	351.18	0.00
10246		10246:Arm4	60.83	56.66	58.74	39.777	3.07e+006	1.000	26.57	0.00	896.44	367.49	0.00	0.00	367.49	0.00
10246	10246:Arm4	10246:WVGD5	56.66	55.00	55.83	41.010	3.17e+006	1.000	26.57	0.00	366.99	150.39	0.00	0.00	150.39	0.00
10246	10246:WVGD5		55.00	50.00	52.50	42.417	3.27e+006	1.000	26.57	0.00	1146.57	469.65	0.00	0.00	469.65	0.00
10246		10246:WVGD4	50.00	45.00	47.50	44.532	3.44e+006	1.000	26.57	0.00	1204.43	493.07	0.00	0.00	493.07	0.00
10246	10246:WVGD4		45.00	40.00	42.50	46.648	3.6e+006	1.000	26.57	0.00	1262.28	516.49	0.00	0.00	516.49	0.00
10246		10246:WVGD3	40.00	35.00	37.50	48.262	3.72e+006	1.000	26.57	0.00	2612.91	534.37	0.00	0.00	534.37	0.00
10246	10246:WVGD3		35.00	33.67	34.33	49.101	3.79e+006	1.000	26.57	0.00	714.51	144.61	0.00	0.00	144.61	0.00
10246			33.67	29.34	31.50	50.299	3.88e+006	1.000	26.57	0.00	1181.18	482.85	0.00	0.00	482.85	0.00
10246		10246:WVGD2	29.34	25.00	27.17	52.133	4.02e+006	1.000	26.57	0.00	1224.49	500.46	0.00	0.00	500.46	0.00
10246	10246:WVGD2		25.00	20.00	22.50	54.107	4.18e+006	1.000	26.57	0.00	1466.33	599.09	0.00	0.00	599.09	0.00
10246		10246:WVGD1	20.00	15.00	17.50	56.222	4.34e+006	1.000	26.57	0.00	1524.18	622.50	0.00	0.00	622.50	0.00
10246	10246:WVGD1		15.00	10.00	12.50	58.337	4.5e+006	1.000	26.57	0.00	1582.04	645.92	0.00	0.00	645.92	0.00
10246			10.00	5.00	7.50	60.452	4.67e+006	1.000	26.57	0.00	1639.89	669.34	0.00	0.00	669.34	0.00
10246		10246:g	5.00	0.00	2.50	62.568	4.83e+006	1.000	26.57	0.00	1697.74	692.76	0.00	0.00	692.76	0.00

*** Analysis Results:

Maximum element usage is 57.10% for Base Plate "10246" in load case "NESC Heavy"
Maximum insulator usage is 13.80% for Clamp "Clamp4" in load case "NESC Heavy"



*** Analysis Results for Load Case No. 1 "NESC Heavy" - Number of iterations in SAPS 16

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)
10246:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10246:t	-0.1303	3.854	-0.08695	-3.8144	-0.2674	-0.2378	-0.1303	3.854	124.9
10246:TopConn	-0.1259	3.788	-0.08472	-3.8144	-0.2674	-0.2378	-0.1259	3.788	123.9

10246:Arm1	-0.1219	3.727	-0.08268	-3.8134	-0.2674	-0.2378	-0.1219	3.727	123
10246:WVGD11	-0.09474	3.206	-0.06575	-3.5241	-0.2054	-0.1552	-0.09474	3.206	114.9
10246:WVGD10	-0.07275	2.685	-0.05056	-3.1367	-0.1258	-0.1139	-0.07275	2.685	105.9
10246:BotConT	-0.07079	2.63	-0.04906	-3.1130	-0.1210	-0.1122	-0.07079	2.63	105
10246:BotConn	-0.06984	2.603	-0.04832	-3.1011	-0.1186	-0.1114	-0.06984	2.603	104.5
10246:BotConB	-0.0689	2.576	-0.04758	-3.0892	-0.1163	-0.1106	-0.0689	2.576	104
10246:Arm2	-0.0631	2.398	-0.0428	-3.0108	-0.1010	-0.1061	-0.0631	2.398	100.6
10246:WVGD9	-0.05574	2.111	-0.03539	-2.7978	-0.0833	-0.0756	-0.05574	2.111	94.96
10246:WVGD8	-0.04465	1.654	-0.02473	-2.4351	-0.0649	-0.0389	-0.04465	1.654	84.98
10246:Arm3	-0.03843	1.396	-0.01935	-2.2224	-0.0582	-0.0226	-0.03843	1.396	78.64
10246:WVGD7	-0.03498	1.258	-0.01666	-2.0868	-0.0548	-0.0180	-0.03498	1.258	74.98
10246:WVGD6	-0.02639	0.9237	-0.01082	-1.7451	-0.0467	-0.0086	-0.02639	0.9237	64.99
10246:Arm4	-0.02009	0.688	-0.007301	-1.4888	-0.0412	-0.0030	-0.02009	0.688	56.65
10246:WVGD5	-0.01892	0.6456	-0.006715	-1.4365	-0.0400	-0.0028	-0.01892	0.6456	54.99
10246:WVGD4	-0.01255	0.4209	-0.003918	-1.1335	-0.0327	-0.0020	-0.01255	0.4209	45
10246:WVGD3	-0.007476	0.2473	-0.002141	-0.8493	-0.0252	-0.0013	-0.007476	0.2473	35
10246:WVGD2	-0.003746	0.1225	-0.001082	-0.5774	-0.0174	-0.0008	-0.003746	0.1225	25
10246:WVGD1	-0.001328	0.04305	-0.0004884	-0.3302	-0.0101	-0.0004	-0.001328	0.04305	15
Davit1:O	-0.1245	3.728	-0.04306	-3.8134	-0.2674	-0.2378	-0.1245	3.132	123
Davit1:End	-0.2153	3.876	0.5786	-3.7617	-0.3703	-0.6152	-0.2153	-6.22	125.6
Davit2:O	-0.1192	3.726	-0.1223	-3.8134	-0.2674	-0.2378	-0.1192	4.321	123
Davit2:End	-0.09541	3.838	-0.7997	-4.2200	-0.2793	-0.1372	-0.09541	13.93	124.2
Davit3:O	-0.06502	2.399	0.00914	-3.0108	-0.1010	-0.1061	-0.06502	1.411	100.7
Davit3:End	-0.09746	2.553	0.7637	-2.9898	-0.1010	-0.1061	-0.09746	-12.94	104
Davit4:O	-0.06118	2.397	-0.09473	-3.0108	-0.1010	-0.1061	-0.06118	3.385	100.6
Davit4:End	-0.02021	2.519	-0.9254	-3.4690	-0.0860	-0.2231	-0.02021	18.01	102.3
Davit5:O	-0.03903	1.397	0.03456	-2.2224	-0.0582	-0.0226	-0.03903	0.00667	78.69
Davit5:End	-0.04786	1.506	0.5914	-2.2012	-0.0582	-0.0226	-0.04786	-14.38	81.8
Davit6:O	-0.03783	1.395	-0.07326	-2.2224	-0.0582	-0.0226	-0.03783	2.785	78.58
Davit6:End	-0.04245	1.492	-0.7024	-2.6763	-0.0660	0.0358	-0.04245	17.38	80.5
Davit7:O	-0.02022	0.6886	0.03827	-1.4888	-0.0412	-0.0030	-0.02022	-1.065	56.69
Davit7:End	-0.02306	0.759	0.4106	-1.4676	-0.0412	-0.0030	-0.02306	-15.49	59.62
Davit8:O	-0.01997	0.6874	-0.05287	-1.4888	-0.0412	-0.0030	-0.01997	2.441	56.6
Davit8:End	-0.03075	0.7588	-0.4973	-1.9569	-0.0515	0.0664	-0.03075	17.01	58.71

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 %
10246:g	1.46	0.0	-41.36	0.0	0.0	-84.36	0.0	0.0	93.96	0.0	3739.54	0.0	116.2	0.0	0.0	3.54	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.
10246	10246:t	Origin	0.00	46.25	-1.56	-1.04	-0.00	-0.00	-0.0	-0.02	0.01	0.00	-0.00	0.00	0.00	0.00	0.01	0.0	4
10246	10246:TopConn	End	1.00	45.45	-1.51	-1.02	0.01	0.00	-0.0	-0.02	0.01	0.00	-0.00	0.00	0.00	0.00	0.01	0.0	1
10246	10246:TopConn	Origin	1.00	45.45	-1.51	-1.02	0.01	0.00	-0.0	0.04	1.54	0.01	0.01	0.00	0.39	0.00	0.68	1.1	4
10246	10246:Arm1	End	1.92	44.72	-1.46	-0.99	1.42	0.01	-0.0	0.04	1.54	0.01	0.01	0.00	0.38	0.00	0.66	1.1	4
10246	10246:Arm1	Origin	1.92	44.72	-1.46	-0.99	10.88	2.59	-7.9	-1.62	6.39	1.35	-0.20	4.71	0.85	1.73	6.64	11.1	2
10246	Tube 1	End	5.96	41.53	-1.29	-0.89	36.70	8.00	-7.9	-1.62	6.39	1.35	-0.18	12.72	0.30	1.37	13.21	22.0	1
10246	Tube 1	Origin	5.96	41.53	-1.29	-0.89	36.70	8.02	-7.9	-1.83	6.48	1.34	-0.20	12.72	0.29	1.36	13.23	22.1	1
10246	10246:WVGD11	End	10.00	38.47	-1.14	-0.79	62.89	13.40	-7.9	-1.83	6.48	1.34	-0.18	17.62	0.27	1.10	17.96	29.9	1
10246	10246:WVGD11	Origin	10.00	38.47	-1.14	-0.79	62.89	13.42	-7.9	-2.70	6.78	1.34	-0.26	17.62	0.26	1.10	18.04	30.1	1

10246	Tube 1	End	12.96	36.33	-1.04	-0.72	82.95	17.36	-7.9	-2.70	6.78	1.34	-0.25	20.16	0.25	0.96	20.51	34.2	1
10246	Tube 1	Origin	12.96	36.33	-1.04	-0.72	82.95	17.38	-7.9	-2.89	6.86	1.34	-0.26	20.16	0.25	0.95	20.52	34.2	1
10246	SpliceT	End	15.91	34.28	-0.95	-0.66	103.23	21.30	-7.9	-2.89	6.86	1.34	-0.25	21.96	0.23	0.84	22.29	37.1	1
10246	SpliceT	Origin	15.91	34.28	-0.95	-0.66	103.23	21.31	-7.8	-3.26	6.95	1.33	-0.28	21.96	0.23	0.83	22.32	37.2	1
10246	SpliceB	End	18.58	32.49	-0.88	-0.61	121.78	24.86	-7.8	-3.26	6.95	1.33	-0.12	10.68	0.10	0.34	10.82	18.0	1
10246	SpliceB	Origin	18.58	32.49	-0.88	-0.61	121.78	24.87	-7.8	-3.56	7.00	1.33	-0.13	10.68	0.10	0.34	10.83	18.1	1
10246	10246:WVGD10	End	19.00	32.22	-0.87	-0.61	124.70	25.42	-7.8	-3.56	7.00	1.33	-0.13	10.74	0.10	0.34	10.89	18.2	1
10246	10246:WVGD10	Origin	19.00	32.22	-0.87	-0.61	124.70	25.42	-7.8	-4.12	7.17	1.34	-0.14	10.74	0.10	0.34	10.91	18.2	1
10246	10246:BotConT	End	20.00	31.56	-0.85	-0.59	131.87	26.76	-7.8	-4.12	7.17	1.34	-0.14	10.89	0.09	0.32	11.06	18.4	1
10246	10246:BotConT	Origin	20.00	31.56	-0.85	-0.59	131.87	26.76	-7.8	-4.11	9.45	1.34	-0.14	10.89	0.09	0.32	11.06	18.4	1
10246	10246:BotConn	End	20.50	31.24	-0.84	-0.58	136.60	27.43	-7.8	-4.11	9.45	1.34	-0.14	11.05	0.09	0.32	11.22	18.7	1
10246	10246:BotConn	Origin	20.50	31.24	-0.84	-0.58	136.60	27.43	-7.8	-9.96	9.53	1.35	-0.34	11.05	0.09	0.32	11.42	19.0	1
10246	10246:BotConB	End	21.00	30.91	-0.83	-0.57	141.36	28.10	-7.8	-9.96	9.53	1.35	-0.34	11.21	0.09	0.31	11.57	19.3	1
10246	10246:BotConB	Origin	21.00	30.91	-0.83	-0.57	141.36	28.11	-7.8	-10.38	7.34	1.35	-0.35	11.21	0.09	0.31	11.58	19.3	1
10246	10246:Arm2	End	24.34	28.78	-0.76	-0.51	165.90	32.59	-7.8	-10.38	7.34	1.35	-0.33	11.54	0.09	0.27	11.88	19.8	1
10246	10246:Arm2	Origin	24.34	28.78	-0.76	-0.51	269.08	28.08	-35.5	-18.60	17.21	-0.45	-0.59	18.71	0.03	1.23	19.42	32.4	1
10246	Tube 2	End	27.17	27.02	-0.71	-0.47	317.74	26.72	-35.5	-18.60	17.21	-0.45	-0.56	19.90	0.03	1.11	20.56	34.3	1
10246	Tube 2	Origin	27.17	27.02	-0.71	-0.47	317.74	26.79	-35.5	-19.12	17.29	-0.45	-0.57	19.90	0.03	1.11	20.57	34.3	1
10246	10246:WVGD9	End	30.00	25.33	-0.67	-0.42	366.63	25.41	-35.5	-19.12	17.29	-0.45	-0.55	20.79	0.03	1.01	21.41	35.7	1
10246	10246:WVGD9	Origin	30.00	25.33	-0.67	-0.42	366.62	25.50	-35.4	-20.55	17.56	-0.46	-0.59	20.79	0.03	1.00	21.45	35.8	1
10246	Tube 2	End	35.00	22.49	-0.60	-0.36	454.41	23.04	-35.4	-20.55	17.56	-0.46	-0.54	21.86	0.02	0.85	22.45	37.4	1
10246	Tube 2	Origin	35.00	22.49	-0.60	-0.36	454.41	23.15	-35.4	-21.58	17.72	-0.47	-0.57	21.86	0.02	0.85	22.48	37.5	1
10246	10246:WVGD8	End	40.00	19.85	-0.54	-0.30	542.99	20.67	-35.4	-21.58	17.72	-0.47	-0.53	22.44	0.02	0.73	23.00	38.3	1
10246	10246:WVGD8	Origin	40.00	19.85	-0.54	-0.30	542.99	20.76	-35.4	-23.15	18.00	-0.47	-0.57	22.44	0.02	0.73	23.04	38.4	1
10246	Tube 2	End	43.17	18.26	-0.50	-0.26	600.10	19.17	-35.4	-23.15	18.00	-0.47	-0.54	22.65	0.02	0.67	23.22	38.7	1
10246	Tube 2	Origin	43.17	18.26	-0.50	-0.26	600.10	19.24	-35.4	-23.88	18.12	-0.47	-0.56	22.65	0.02	0.67	23.23	38.7	1
10246	10246:Arm3	End	46.34	16.75	-0.46	-0.23	657.57	17.65	-35.4	-23.88	18.12	-0.47	-0.53	22.75	0.02	0.61	23.31	38.9	1
10246	10246:Arm3	Origin	46.34	16.75	-0.46	-0.23	761.74	20.01	-21.0	-32.42	27.52	0.43	-0.72	26.36	0.02	0.36	27.09	45.1	1
10246	10246:WVGD7	End	50.00	15.10	-0.42	-0.20	862.35	21.52	-21.0	-32.42	27.52	0.43	-0.69	27.12	0.02	0.33	27.81	46.4	1
10246	10246:WVGD7	Origin	50.00	15.10	-0.42	-0.20	862.34	21.56	-21.0	-33.74	27.74	0.43	-0.72	27.12	0.02	0.33	27.84	46.4	1
10246	SpliceT	End	51.33	14.52	-0.41	-0.19	899.24	22.11	-21.0	-33.74	27.74	0.43	-0.71	27.34	0.02	0.32	28.05	46.8	1
10246	SpliceT	Origin	51.33	14.52	-0.41	-0.19	899.24	22.14	-21.0	-35.16	27.86	0.43	-0.74	27.34	0.02	0.32	28.08	46.8	1
10246	SpliceB	End	55.91	12.64	-0.36	-0.16	1026.93	24.04	-21.0	-35.16	27.86	0.43	-0.63	25.81	0.02	0.26	26.44	44.1	1
10246	SpliceB	Origin	55.91	12.64	-0.36	-0.16	1026.93	24.09	-21.0	-37.04	28.04	0.43	-0.66	25.81	0.02	0.26	26.47	44.1	1
10246	10246:WVGD6	End	60.00	11.08	-0.32	-0.13	1141.51	25.77	-21.0	-37.04	28.04	0.43	-0.63	26.03	0.01	0.24	26.66	44.4	1
10246	10246:WVGD6	Origin	60.00	11.08	-0.32	-0.13	1141.51	25.82	-21.0	-39.03	28.33	0.43	-0.66	26.03	0.01	0.24	26.69	44.5	1
10246	Tube 3	End	64.17	9.61	-0.28	-0.11	1259.70	27.53	-21.0	-39.03	28.33	0.43	-0.63	26.13	0.01	0.22	26.76	44.6	1
10246	Tube 3	Origin	64.17	9.61	-0.28	-0.11	1259.70	27.58	-21.0	-40.41	28.49	0.42	-0.65	26.13	0.01	0.22	26.79	44.6	1
10246	10246:Arm4	End	68.34	8.26	-0.24	-0.09	1378.57	29.29	-21.0	-40.41	28.49	0.42	-0.63	26.12	0.01	0.20	26.75	44.6	1
10246	10246:Arm4	Origin	68.34	8.26	-0.24	-0.09	1488.07	32.04	-3.5	-49.29	38.15	1.50	-0.76	28.20	0.05	0.03	28.96	48.3	1
10246	10246:WVGD5	End	70.00	7.75	-0.23	-0.08	1551.25	34.53	-3.5	-49.29	38.15	1.50	-0.75	28.39	0.05	0.03	29.14	48.6	1
10246	10246:WVGD5	Origin	70.00	7.75	-0.23	-0.08	1551.25	34.53	-3.5	-51.18	38.41	1.50	-0.78	28.39	0.05	0.03	29.17	48.6	1
10246	Tube 3	End	75.00	6.32	-0.19	-0.06	1743.32	42.02	-3.5	-51.18	38.41	1.50	-0.74	28.82	0.04	0.03	29.56	49.3	1
10246	Tube 3	Origin	75.00	6.32	-0.19	-0.06	1743.32	42.03	-3.5	-53.05	38.61	1.50	-0.77	28.82	0.04	0.03	29.59	49.3	1
10246	10246:WVGD4	End	80.00	5.05	-0.15	-0.05	1936.34	49.51	-3.5	-53.05	38.61	1.50	-0.73	29.07	0.04	0.03	29.80	49.7	1
10246	10246:WVGD4	Origin	80.00	5.05	-0.15	-0.05	1936.34	49.52	-3.5	-55.69	38.94	1.50	-0.77	29.07	0.04	0.03	29.83	49.7	1
10246	SpliceT	End	85.00	3.93	-0.12	-0.04	2131.04	56.98	-3.5	-55.69	38.94	1.50	-0.73	29.17	0.04	0.02	29.91	49.8	1
10246	SpliceT	Origin	85.00	3.93	-0.12	-0.04	2131.04	56.99	-3.5	-58.69	39.17	1.49	-0.77	29.17	0.04	0.02	29.95	49.9	1
10246	10246:WVGD3	End	90.00	2.97	-0.09	-0.03	2326.86	64.44	-3.5	-58.69	39.17	1.49	-0.76	30.39	0.04	0.02	31.15	51.9	1
10246	10246:WVGD3	Origin	90.00	2.97	-0.09	-0.03	2326.86	64.45	-3.5	-61.93	39.44	1.49	-0.80	30.39	0.04	0.02	31.19	52.0	1
10246	SpliceB	End	91.33	2.74	-0.08	-0.02	2379.32	66.43	-3.5	-61.93	39.44	1.49	-0.79	30.36	0.04	0.02	31.15	51.9	1
10246	SpliceB	Origin	91.33	2.74	-0.08	-0.02	2379.32	66.43	-3.5	-63.41	39.57	1.49	-0.81	30.36	0.04	0.02	31.17	52.0	1
10246	Tube 4	End	95.66	2.05	-0.06	-0.02	2550.83	72.88	-3.5	-63.41	39.57	1.49	-0.78	30.23	0.04	0.02	31.01	51.7	1
10246	Tube 4	Origin	95.66	2.05	-0.06	-0.02	2550.83	72.89	-3.5	-65.29	39.75	1.49	-0.80	30.23	0.04	0.02	31.03	51.7	1
10246	10246:WVGD2	End	100.00	1.47	-0.04	-0.01	2723.15	79.33	-3.5	-65.29	39.75	1.49	-0.77	30.05	0.04	0.02	30.82	51.4	1
10246	10246:WVGD2	Origin	100.00	1.47	-0.04	-0.01	2723.15	79.33	-3.5	-68.09	40.09	1.48	-0.81	30.05	0.04	0.02	30.85	51.4	1
10246	Tube 4	End	105.00	0.93	-0.03	-0.01	2923.59	86.74	-3.5	-68.09	40.09	1.48	-0.77	29.80	0.03	0.02	30.58	51.0	1
10246	Tube 4	Origin	105.00	0.93	-0.03	-0.01	2923.59	86.74	-3.5	-70.42	40.32	1.48	-0.80	29.80	0.03	0.02	30.60	51.0	1
10246	10246:WVGD1	End	110.00	0.52	-0.02	-0.01	3125.20	94.13	-3.5	-70.42	40.32	1.48	-0.77	29.52	0.03	0.02	30.29	50.5	1

10246	10246:WVGD1	Origin	110.00	0.52	-0.02	-0.01	3125.20	94.14	-3.5	-73.52	40.69	1.48	-0.81	29.52	0.03	0.02	30.32	50.5	1
10246	Tube 4	End	115.00	0.23	-0.01	-0.00	3328.67	101.51	-3.5	-73.52	40.69	1.48	-0.78	29.21	0.03	0.02	29.99	50.0	1
10246	Tube 4	Origin	115.00	0.23	-0.01	-0.00	3328.67	101.51	-3.5	-76.01	40.95	1.47	-0.80	29.21	0.03	0.02	30.02	50.0	1
10246	Tube 4	End	120.00	0.06	-0.00	-0.00	3533.43	108.86	-3.5	-76.01	40.95	1.47	-0.77	28.89	0.03	0.01	29.66	49.4	1
10246	Tube 4	Origin	120.00	0.06	-0.00	-0.00	3533.43	108.86	-3.5	-78.59	41.22	1.47	-0.80	28.89	0.03	0.01	29.69	49.5	1
10246	10246:g	End	125.00	0.00	0.00	0.00	3739.54	116.19	-3.5	-78.59	41.22	1.47	-0.77	28.55	0.03	0.01	29.33	49.1	1

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	44.74	-1.49	-0.52	-1.68	-10.30	-0.0	-2.36	0.23	1.06	-0.40	9.64	0.28	0.00	10.06	16.8	2
Davit1	#Davit1:0	End	4.85	45.63	-1.93	3.23	-0.58	-5.17	-0.0	-2.36	0.23	1.06	-0.50	7.12	0.35	0.00	7.64	12.7	2
Davit1	#Davit1:0	Origin	4.85	45.63	-1.93	3.23	-0.58	-5.17	-0.0	-2.33	0.12	1.07	-0.49	7.13	0.35	0.00	7.65	12.7	2
Davit1	Davit1:End	End	9.69	46.51	-2.58	6.94	-0.00	-0.00	-0.0	-2.33	0.12	1.07	-0.65	0.00	0.68	0.00	1.34	2.2	1
Davit2	Davit2:O	Origin	0.00	44.71	-1.43	-1.47	-11.08	2.75	0.0	2.32	1.21	-0.29	0.40	11.14	0.32	0.00	11.55	19.2	2
Davit2	#Davit2:0	End	4.85	45.36	-1.26	-5.42	-5.24	1.37	0.0	2.32	1.21	-0.29	0.49	8.19	0.40	0.00	8.71	14.5	2
Davit2	#Davit2:0	Origin	4.85	45.36	-1.26	-5.42	-5.24	1.37	-0.0	2.34	1.08	-0.28	0.49	8.19	0.36	0.00	8.70	14.5	2
Davit2	Davit2:End	End	9.69	46.05	-1.14	-9.60	0.00	-0.00	-0.0	2.34	1.08	-0.28	0.65	0.00	0.69	0.00	1.36	2.3	3
Davit3	Davit3:O	Origin	0.00	28.79	-0.78	0.11	-8.36	-0.01	-0.0	-0.23	1.00	0.00	-0.01	0.84	0.07	0.00	0.86	1.4	2
Davit3	#Davit3:0	End	5.00	29.42	-0.91	3.19	-3.36	-0.00	-0.0	-0.23	1.00	0.00	-0.01	0.50	0.08	0.00	0.53	0.9	2
Davit3	#Davit3:0	Origin	5.00	29.42	-0.91	3.19	-3.36	-0.00	-0.0	-0.12	0.53	0.00	-0.01	0.50	0.04	0.00	0.51	0.8	2
Davit3	#Davit3:1	End	9.86	30.03	-1.04	6.18	-0.78	-0.00	-0.0	-0.12	0.53	0.00	-0.01	0.18	0.05	0.00	0.21	0.4	2
Davit3	#Davit3:1	Origin	9.86	30.03	-1.04	6.18	-0.78	-0.00	0.0	-0.04	0.16	0.00	-0.00	0.18	0.02	0.00	0.19	0.3	2
Davit3	Davit3:End	End	14.72	30.63	-1.17	9.16	0.00	-0.00	0.0	-0.04	0.16	0.00	-0.00	0.00	0.03	0.00	0.06	0.1	3
Davit4	Davit4:O	Origin	0.00	28.76	-0.73	-1.14	-106.52	-26.14	0.0	8.49	7.71	1.78	0.36	13.35	0.52	0.00	13.74	22.9	2
Davit4	#Davit4:0	End	5.00	29.24	-0.61	-4.35	-67.98	-17.24	0.0	8.49	7.71	1.78	0.44	12.62	0.63	0.00	13.11	21.8	2
Davit4	#Davit4:0	Origin	5.00	29.24	-0.61	-4.35	-67.99	-17.22	0.0	8.57	7.19	1.77	0.44	12.62	0.59	0.00	13.10	21.8	2
Davit4	#Davit4:1	End	9.86	29.72	-0.45	-7.65	-33.01	-8.60	0.0	8.57	7.19	1.77	0.56	9.81	0.75	0.00	10.44	17.4	2
Davit4	#Davit4:1	Origin	9.86	29.72	-0.45	-7.65	-33.01	-8.59	0.0	8.64	6.79	1.77	0.56	9.81	0.71	0.00	10.44	17.4	2
Davit4	Davit4:End	End	14.72	30.22	-0.24	-11.10	-0.00	-0.00	0.0	8.64	6.79	1.77	0.76	0.00	1.38	0.00	2.50	4.2	3
Davit5	Davit5:O	Origin	0.00	16.76	-0.47	0.41	-8.40	-0.01	-0.0	-0.22	1.01	0.00	-0.01	0.85	0.07	0.00	0.86	1.4	2
Davit5	#Davit5:0	End	5.00	17.21	-0.50	2.69	-3.37	-0.00	-0.0	-0.22	1.01	0.00	-0.01	0.50	0.08	0.00	0.53	0.9	2
Davit5	#Davit5:0	Origin	5.00	17.21	-0.50	2.69	-3.37	-0.00	-0.0	-0.12	0.53	0.00	-0.01	0.50	0.04	0.00	0.51	0.9	2
Davit5	#Davit5:1	End	9.86	17.64	-0.54	4.90	-0.78	-0.00	-0.0	-0.12	0.53	0.00	-0.01	0.19	0.05	0.00	0.21	0.4	2
Davit5	#Davit5:1	Origin	9.86	17.64	-0.54	4.90	-0.78	-0.00	0.0	-0.04	0.16	0.00	-0.00	0.19	0.02	0.00	0.19	0.3	2
Davit5	Davit5:End	End	14.72	18.07	-0.57	7.10	0.00	-0.00	0.0	-0.04	0.16	0.00	-0.00	0.00	0.03	0.00	0.06	0.1	3
Davit6	Davit6:O	Origin	0.00	16.74	-0.45	-0.88	-105.46	13.30	0.0	8.03	7.63	-0.91	0.34	11.95	0.50	0.00	12.32	20.5	2
Davit6	#Davit6:0	End	5.00	17.11	-0.45	-3.27	-67.30	8.76	0.0	8.03	7.63	-0.91	0.41	11.26	0.61	0.00	11.73	19.5	2
Davit6	#Davit6:0	Origin	5.00	17.11	-0.45	-3.27	-67.30	8.76	0.0	8.11	7.12	-0.90	0.42	11.26	0.57	0.00	11.73	19.5	2
Davit6	#Davit6:1	End	9.86	17.49	-0.47	-5.77	-32.67	4.37	0.0	8.11	7.12	-0.90	0.53	8.73	0.72	0.00	9.34	15.6	2
Davit6	#Davit6:1	Origin	9.86	17.49	-0.47	-5.77	-32.67	4.37	-0.0	8.18	6.72	-0.90	0.53	8.73	0.68	0.00	9.34	15.6	2
Davit6	Davit6:End	End	14.72	17.90	-0.51	-8.43	-0.00	-0.00	-0.0	8.18	6.72	-0.90	0.72	0.00	1.36	0.00	2.46	4.1	3
Davit7	Davit7:O	Origin	0.00	8.26	-0.24	0.46	-8.43	-0.01	-0.0	-0.21	1.01	0.00	-0.01	0.85	0.07	0.00	0.86	1.4	2
Davit7	#Davit7:0	End	5.00	8.55	-0.25	1.98	-3.38	-0.00	-0.0	-0.21	1.01	0.00	-0.01	0.50	0.08	0.00	0.53	0.9	2
Davit7	#Davit7:0	Origin	5.00	8.55	-0.25	1.98	-3.38	-0.00	-0.0	-0.11	0.53	0.00	-0.01	0.50	0.04	0.00	0.51	0.9	2
Davit7	#Davit7:1	End	9.86	8.83	-0.27	3.46	-0.79	-0.00	-0.0	-0.11	0.53	0.00	-0.01	0.19	0.05	0.00	0.21	0.4	2
Davit7	#Davit7:1	Origin	9.86	8.83	-0.27	3.46	-0.79	-0.00	0.0	-0.03	0.16	0.00	-0.00	0.19	0.02	0.00	0.19	0.3	2
Davit7	Davit7:End	End	14.72	9.11	-0.28	4.93	0.00	-0.00	0.0	-0.03	0.16	0.00	-0.00	0.00	0.03	0.00	0.06	0.1	3

Davit8	Davit8:O	Origin	0.00	8.25	-0.24	-0.63	-108.65	15.79	0.0	8.28	7.85	-1.08	0.35	12.52	0.52	0.00	12.90	21.5	2
Davit8	#Davit8:0	End	5.00	8.51	-0.26	-2.27	-69.40	10.40	0.0	8.28	7.85	-1.08	0.43	11.82	0.63	0.00	12.30	20.5	2
Davit8	#Davit8:0	Origin	5.00	8.51	-0.26	-2.27	-69.40	10.40	0.0	8.37	7.34	-1.07	0.43	11.82	0.59	0.00	12.29	20.5	2
Davit8	#Davit8:1	End	9.86	8.80	-0.30	-4.04	-33.72	5.19	0.0	8.37	7.34	-1.07	0.54	9.17	0.75	0.00	9.80	16.3	2
Davit8	#Davit8:1	Origin	9.86	8.80	-0.30	-4.04	-33.72	5.19	-0.0	8.45	6.94	-1.07	0.55	9.17	0.71	0.00	9.80	16.3	2
Davit8	Davit8:End	End	14.72	9.11	-0.37	-5.97	-0.00	-0.00	-0.0	8.45	6.94	-1.07	0.74	0.00	1.40	0.00	2.54	4.2	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	2.550	80.00	80.00	3.19
Clamp2	2.578	80.00	80.00	3.22
Clamp3	0.000	80.00	80.00	0.00
Clamp4	11.042	80.00	80.00	13.80
Clamp5	0.000	80.00	80.00	0.00
Clamp6	10.539	80.00	80.00	13.17
Clamp7	0.000	80.00	80.00	0.00
Clamp8	10.897	80.00	80.00	13.62
Clamp9	0.700	80.00	80.00	0.88
Clamp10	0.700	80.00	80.00	0.88
Clamp11	0.700	80.00	80.00	0.88
Clamp12	0.700	80.00	80.00	0.88
Clamp13	0.700	80.00	80.00	0.88
Clamp14	0.700	80.00	80.00	0.88
Clamp15	0.700	80.00	80.00	0.88
Clamp16	0.700	80.00	80.00	0.88
Clamp17	0.700	80.00	80.00	0.88
Clamp18	0.475	80.00	80.00	0.59
Clamp21	1.511	80.00	80.00	1.89
Clamp22	2.260	80.00	80.00	2.82
Clamp23	5.769	80.00	80.00	7.21
Clamp24	2.260	80.00	80.00	2.82
Clamp25	0.713	80.00	80.00	0.89

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 15

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)
10246:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
10246:t	-0.08949	3.401	-0.06772	-3.5150	-0.1519	-0.0978	-0.08949	3.401	124.9
10246:TopConn	-0.08694	3.34	-0.06584	-3.5150	-0.1519	-0.0978	-0.08694	3.34	123.9
10246:Arm1	-0.08461	3.284	-0.06411	-3.5120	-0.1519	-0.0978	-0.08461	3.284	123
10246:WVGD11	-0.06764	2.805	-0.0499	-3.2096	-0.1206	-0.0617	-0.06764	2.805	115
10246:WVGD10	-0.05342	2.338	-0.03769	-2.7766	-0.0803	-0.0434	-0.05342	2.338	106
10246:BotConT	-0.05211	2.289	-0.03652	-2.7495	-0.0779	-0.0427	-0.05211	2.289	105
10246:BotConn	-0.05146	2.265	-0.03594	-2.7358	-0.0767	-0.0423	-0.05146	2.265	104.5
10246:BotConB	-0.05083	2.242	-0.03537	-2.7218	-0.0755	-0.0420	-0.05083	2.242	104
10246:Arm2	-0.04683	2.085	-0.0317	-2.6299	-0.0678	-0.0400	-0.04683	2.085	100.6
10246:WVGD9	-0.04123	1.835	-0.02609	-2.4392	-0.0582	-0.0271	-0.04123	1.835	94.97
10246:WVGD8	-0.03268	1.437	-0.01808	-2.1125	-0.0472	-0.0115	-0.03268	1.437	84.98
10246:Arm3	-0.0279	1.214	-0.01408	-1.9193	-0.0426	-0.0046	-0.0279	1.214	78.64
10246:WVGD7	-0.0253	1.095	-0.0121	-1.8039	-0.0401	-0.0031	-0.0253	1.095	74.99
10246:WVGD6	-0.01889	0.8053	-0.007789	-1.5105	-0.0341	-0.0000	-0.01889	0.8053	64.99
10246:Arm4	-0.01426	0.6013	-0.005195	-1.2878	-0.0296	0.0018	-0.01426	0.6013	56.65
10246:WVGD5	-0.01342	0.5647	-0.004767	-1.2437	-0.0287	0.0017	-0.01342	0.5647	55
10246:WVGD4	-0.008848	0.3695	-0.002724	-0.9868	-0.0233	0.0012	-0.008848	0.3695	45
10246:WVGD3	-0.005245	0.218	-0.001433	-0.7436	-0.0177	0.0008	-0.005245	0.218	35
10246:WVGD2	-0.002618	0.1085	-0.000683	-0.5085	-0.0122	0.0005	-0.002618	0.1085	25
10246:WVGD1	-0.0009253	0.03828	-0.000286	-0.2924	-0.0071	0.0003	-0.0009253	0.03828	15
Davit1:O	-0.08572	3.285	-0.02761	-3.5120	-0.1519	-0.0978	-0.08572	2.689	123.1
Davit1:End	-0.1274	3.422	0.5556	-3.5648	-0.1998	-0.2778	-0.1274	-6.674	125.6
Davit2:O	-0.0835	3.283	-0.1006	-3.5120	-0.1519	-0.0978	-0.0835	3.878	123
Davit2:End	-0.07676	3.384	-0.6988	-3.6352	-0.1601	-0.0379	-0.07676	13.48	124.3
Davit3:O	-0.04758	2.086	0.01367	-2.6299	-0.0678	-0.0400	-0.04758	1.098	100.7
Davit3:End	-0.06142	2.218	0.674	-2.6162	-0.0678	-0.0400	-0.06142	-13.27	103.9
Davit4:O	-0.04609	2.084	-0.07707	-2.6299	-0.0678	-0.0400	-0.04609	3.073	100.6
Davit4:End	-0.03102	2.19	-0.7759	-2.8447	-0.0614	-0.0889	-0.03102	17.68	102.4
Davit5:O	-0.02805	1.214	0.03248	-1.9193	-0.0426	-0.0046	-0.02805	-0.1758	78.69
Davit5:End	-0.03147	1.308	0.5144	-1.9055	-0.0426	-0.0046	-0.03147	-14.58	81.72
Davit6:O	-0.02776	1.213	-0.06064	-1.9193	-0.0426	-0.0046	-0.02776	2.603	78.6
Davit6:End	-0.03284	1.295	-0.5782	-2.1317	-0.0473	0.0282	-0.03284	17.18	80.63
Davit7:O	-0.01423	0.6018	0.03422	-1.2878	-0.0296	0.0018	-0.01423	-1.152	56.69
Davit7:End	-0.01526	0.6623	0.3571	-1.2739	-0.0296	0.0018	-0.01526	-15.59	59.56
Davit8:O	-0.0143	0.6009	-0.04461	-1.2878	-0.0296	0.0018	-0.0143	2.355	56.61
Davit8:End	-0.02114	0.6595	-0.4026	-1.5076	-0.0352	0.0381	-0.02114	16.91	58.8

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 %
10246:g	0.98	0.0	-40.52	0.0	0.0	-48.55	0.0	0.0	63.24	0.0	3339.44	0.0	80.7	0.0	0.0	-2.22	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.
10246	10246:t	Origin	0.00	40.82	-1.07	-0.81	0.00	-0.00	-0.0	-0.01	0.02	0.00	-0.00	0.00	0.00	0.00	0.01	0.0	4
10246	10246:TopConn	End	1.00	40.08	-1.04	-0.79	0.02	0.00	-0.0	-0.01	0.02	0.00	-0.00	0.01	0.00	0.00	0.01	0.0	1
10246	10246:TopConn	Origin	1.00	40.08	-1.04	-0.79	0.02	0.00	-0.0	0.25	4.72	0.01	0.03	0.00	1.20	0.00	2.09	3.5	4
10246	10246:Arm1	End	1.92	39.41	-1.02	-0.77	4.35	0.01	-0.0	0.25	4.72	0.01	0.03	0.00	1.17	0.00	2.03	3.4	4
10246	10246:Arm1	Origin	1.92	39.41	-1.02	-0.77	9.04	1.30	-3.4	-0.18	7.30	0.68	-0.02	2.48	1.58	0.76	4.75	7.9	3
10246	Tube 1	End	5.96	36.47	-0.91	-0.68	38.56	4.03	-3.4	-0.18	7.30	0.68	-0.02	13.36	0.15	0.60	13.44	22.4	1
10246	Tube 1	Origin	5.96	36.47	-0.91	-0.68	38.56	4.04	-3.4	-0.32	7.45	0.68	-0.04	13.36	0.15	0.60	13.46	22.4	1
10246	10246:WVGD11	End	10.00	33.66	-0.81	-0.60	68.67	6.76	-3.4	-0.32	7.45	0.68	-0.03	19.24	0.13	0.48	19.30	32.2	1
10246	10246:WVGD11	Origin	10.00	33.66	-0.81	-0.60	68.67	6.77	-3.4	-0.63	8.02	0.68	-0.06	19.24	0.13	0.48	19.33	32.2	1
10246	Tube 1	End	12.96	31.72	-0.75	-0.55	92.38	8.76	-3.4	-0.63	8.02	0.68	-0.06	22.45	0.12	0.42	22.53	37.5	1
10246	Tube 1	Origin	12.96	31.72	-0.75	-0.55	92.38	8.77	-3.4	-0.77	8.15	0.68	-0.07	22.45	0.12	0.42	22.54	37.6	1
10246	SpliceT	End	15.91	29.88	-0.69	-0.50	116.47	10.75	-3.4	-0.77	8.15	0.68	-0.07	24.78	0.12	0.36	24.86	41.4	1
10246	SpliceT	Origin	15.91	29.88	-0.69	-0.50	116.47	10.76	-3.4	-1.02	8.28	0.68	-0.09	24.78	0.12	0.36	24.88	41.5	1
10246	SpliceB	End	18.58	28.29	-0.65	-0.46	138.57	12.56	-3.4	-1.02	8.28	0.68	-0.04	12.15	0.05	0.15	12.19	20.3	1
10246	SpliceB	Origin	18.58	28.29	-0.65	-0.46	138.57	12.56	-3.4	-1.23	8.36	0.67	-0.04	12.15	0.05	0.15	12.20	20.3	1
10246	10246:WVGD10	End	19.00	28.05	-0.64	-0.45	142.05	12.84	-3.4	-1.23	8.36	0.67	-0.04	12.24	0.05	0.15	12.28	20.5	1
10246	10246:WVGD10	Origin	19.00	28.05	-0.64	-0.45	142.05	12.84	-3.4	-1.41	8.68	0.68	-0.05	12.24	0.05	0.15	12.29	20.5	1
10246	10246:BotConT	End	20.00	27.47	-0.63	-0.44	150.73	13.51	-3.4	-1.41	8.68	0.68	-0.05	12.45	0.05	0.14	12.50	20.8	1
10246	10246:BotConT	Origin	20.00	27.47	-0.63	-0.44	150.73	13.51	-3.4	-1.11	16.64	0.68	-0.04	12.45	0.05	0.14	12.49	20.8	1
10246	10246:BotConn	End	20.50	27.18	-0.62	-0.43	159.05	13.85	-3.4	-1.11	16.64	0.68	-0.04	12.87	0.05	0.14	12.91	21.5	1
10246	10246:BotConn	Origin	20.50	27.18	-0.62	-0.43	159.05	13.85	-3.4	-4.06	15.81	0.68	-0.14	12.87	0.05	0.14	13.01	21.7	1
10246	10246:BotConB	End	21.00	26.90	-0.61	-0.42	166.96	14.20	-3.4	-4.06	15.81	0.68	-0.14	13.24	0.05	0.14	13.38	22.3	1
10246	10246:BotConB	Origin	21.00	26.90	-0.61	-0.42	166.96	14.20	-3.4	-4.64	7.99	0.68	-0.16	13.24	0.05	0.14	13.40	22.3	1
10246	10246:Arm2	End	24.34	25.02	-0.56	-0.38	193.68	16.46	-3.4	-4.64	7.99	0.68	-0.15	13.47	0.04	0.12	13.62	22.7	1
10246	10246:Arm2	Origin	24.34	25.02	-0.56	-0.38	240.77	14.57	-15.0	-8.56	15.45	-0.07	-0.27	16.74	0.00	0.52	17.04	28.4	1
10246	Tube 2	End	27.17	23.49	-0.53	-0.35	284.47	14.34	-15.0	-8.56	15.45	-0.07	-0.26	17.82	0.00	0.47	18.09	30.2	1
10246	Tube 2	Origin	27.17	23.49	-0.53	-0.35	284.47	14.36	-15.0	-8.90	15.60	-0.07	-0.27	17.82	0.00	0.47	18.10	30.2	1
10246	10246:WVGD9	End	30.00	22.02	-0.49	-0.31	328.60	14.12	-15.0	-8.90	15.60	-0.07	-0.25	18.63	0.00	0.42	18.90	31.5	1
10246	10246:WVGD9	Origin	30.00	22.02	-0.49	-0.31	328.60	14.16	-15.0	-9.59	16.12	-0.07	-0.27	18.63	0.00	0.42	18.92	31.5	1
10246	Tube 2	End	35.00	19.55	-0.44	-0.26	409.18	13.72	-15.0	-9.59	16.12	-0.07	-0.25	19.68	0.00	0.36	19.95	33.2	1
10246	Tube 2	Origin	35.00	19.55	-0.44	-0.26	409.18	13.77	-15.0	-10.28	16.42	-0.08	-0.27	19.68	0.00	0.36	19.97	33.3	1
10246	10246:WVGD8	End	40.00	17.25	-0.39	-0.22	491.26	13.32	-15.0	-10.28	16.42	-0.08	-0.25	20.30	0.00	0.31	20.56	34.3	1
10246	10246:WVGD8	Origin	40.00	17.25	-0.39	-0.22	491.26	13.36	-15.0	-11.06	16.97	-0.08	-0.27	20.30	0.00	0.31	20.58	34.3	1
10246	Tube 2	End	43.17	15.87	-0.36	-0.19	545.08	13.07	-15.0	-11.06	16.97	-0.08	-0.26	20.57	0.00	0.28	20.83	34.7	1
10246	Tube 2	Origin	43.17	15.87	-0.36	-0.19	545.08	13.10	-15.0	-11.55	17.18	-0.08	-0.27	20.57	0.00	0.28	20.85	34.7	1
10246	10246:Arm3	End	46.34	14.56	-0.33	-0.17	599.57	12.81	-15.0	-11.55	17.18	-0.08	-0.26	20.74	0.00	0.26	21.01	35.0	1
10246	10246:Arm3	Origin	46.34	14.56	-0.33	-0.17	646.84	14.13	-6.9	-15.71	24.28	0.43	-0.35	22.38	0.02	0.12	22.73	37.9	1
10246	10246:WVGD7	End	50.00	13.14	-0.30	-0.15	735.60	15.68	-6.9	-15.71	24.28	0.43	-0.34	23.13	0.02	0.11	23.47	39.1	1
10246	10246:WVGD7	Origin	50.00	13.14	-0.30	-0.15	735.60	15.69	-6.9	-16.31	24.74	0.43	-0.35	23.13	0.02	0.11	23.48	39.1	1
10246	SpliceT	End	51.33	12.64	-0.29	-0.14	768.50	16.25	-6.9	-16.31	24.74	0.43	-0.34	23.36	0.02	0.10	23.71	39.5	1
10246	SpliceT	Origin	51.33	12.64	-0.29	-0.14	768.50	16.26	-6.9	-17.27	24.97	0.43	-0.36	23.36	0.02	0.10	23.73	39.5	1
10246	SpliceB	End	55.91	11.01	-0.26	-0.11	882.93	18.21	-6.9	-17.27	24.97	0.43	-0.31	22.19	0.02	0.09	22.50	37.5	1
10246	SpliceB	Origin	55.91	11.01	-0.26	-0.11	882.93	18.22	-6.9	-18.53	25.30	0.43	-0.33	22.19	0.02	0.09	22.52	37.5	1
10246	10246:WVGD6	End	60.00	9.66	-0.23	-0.09	986.34	19.95	-6.9	-18.53	25.30	0.43	-0.31	22.49	0.01	0.08	22.81	38.0	1
10246	10246:WVGD6	Origin	60.00	9.66	-0.23	-0.09	986.34	19.97	-6.9	-19.59	25.91	0.43	-0.33	22.49	0.01	0.08	22.82	38.0	1
10246	Tube 3	End	64.17	8.39	-0.20	-0.08	1094.46	21.73	-6.9	-19.59	25.91	0.43	-0.32	22.70	0.01	0.07	23.02	38.4	1
10246	Tube 3	Origin	64.17	8.39	-0.20	-0.08	1094.46	21.74	-6.9	-20.52	26.26	0.43	-0.33	22.70	0.01	0.07	23.03	38.4	1
10246	10246:Arm4	End	68.34	7.22	-0.17	-0.06	1204.00	23.51	-6.9	-20.52	26.26	0.43	-0.32	22.81	0.01	0.07	23.13	38.6	1
10246	10246:Arm4	Origin	68.34	7.22	-0.17	-0.06	1253.84	24.94	2.2	-24.93	33.22	0.99	-0.39	23.76	0.03	0.02	24.14	40.2	1
10246	10246:WVGD5	End	70.00	6.78	-0.16	-0.06	1308.85	26.58	2.2	-24.93	33.22	0.99	-0.38	23.95	0.03	0.02	24.33	40.6	1
10246	10246:WVGD5	Origin	70.00	6.78	-0.16	-0.06	1308.85	26.58	2.2	-25.92	33.79	0.99	-0.39	23.95	0.03	0.02	24.35	40.6	1
10246	Tube 3	End	75.00	5.54	-0.13	-0.04	1477.82	31.53	2.2	-25.92	33.79	0.99	-0.38	24.43	0.03	0.02	24.81	41.3	1
10246	Tube 3	Origin	75.00	5.54	-0.13	-0.04	1477.82	31.52	2.2	-27.17	34.24	0.99	-0.39	24.43	0.03	0.02	24.83	41.4	1
10246	10246:WVGD4	End	80.00	4.43	-0.11	-0.03	1649.02	36.47	2.2	-27.17	34.24	0.99	-0.37	24.75	0.03	0.02	25.13	41.9	1
10246	10246:WVGD4	Origin	80.00	4.43	-0.11	-0.03	1649.02	36.47	2.2	-28.66	34.99	0.99	-0.40	24.75	0.03	0.02	25.15	41.9	1
10246	SpliceT	End	85.00	3.46	-0.08	-0.02	1823.97	41.41	2.2	-28.66	34.99	0.99	-0.38	24.97	0.03	0.02	25.35	42.2	1

10246	SpliceT	Origin	85.00	3.46	-0.08	-0.02	1823.97	41.41	2.2	-30.67	35.48	0.99	-0.40	24.97	0.03	0.02	25.37	42.3	1
10246	10246:WVGD3	End	90.00	2.62	-0.06	-0.02	2001.38	46.35	2.2	-30.67	35.48	0.99	-0.39	26.14	0.03	0.01	26.54	44.2	1
10246	10246:WVGD3	Origin	90.00	2.62	-0.06	-0.02	2001.38	46.34	2.2	-32.57	36.09	0.99	-0.42	26.14	0.03	0.01	26.56	44.3	1
10246	SpliceB	End	91.33	2.41	-0.06	-0.02	2049.37	47.66	2.2	-32.57	36.09	0.99	-0.41	26.15	0.03	0.01	26.57	44.3	1
10246	SpliceB	Origin	91.33	2.41	-0.06	-0.02	2049.37	47.65	2.2	-33.56	36.37	0.99	-0.43	26.15	0.03	0.01	26.58	44.3	1
10246	Tube 4	End	95.66	1.81	-0.04	-0.01	2207.05	51.93	2.2	-33.56	36.37	0.99	-0.41	26.16	0.02	0.01	26.57	44.3	1
10246	Tube 4	Origin	95.66	1.81	-0.04	-0.01	2207.05	51.93	2.2	-34.83	36.82	0.99	-0.43	26.16	0.02	0.01	26.58	44.3	1
10246	10246:WVGD2	End	100.00	1.30	-0.03	-0.01	2366.65	56.21	2.2	-34.83	36.82	0.99	-0.41	26.11	0.02	0.01	26.53	44.2	1
10246	10246:WVGD2	Origin	100.00	1.30	-0.03	-0.01	2366.65	56.20	2.2	-36.42	37.60	0.98	-0.43	26.11	0.02	0.01	26.55	44.2	1
10246	Tube 4	End	105.00	0.82	-0.02	-0.01	2554.63	61.13	2.2	-36.42	37.60	0.98	-0.41	26.04	0.02	0.01	26.46	44.1	1
10246	Tube 4	Origin	105.00	0.82	-0.02	-0.01	2554.64	61.12	2.2	-37.99	38.15	0.98	-0.43	26.04	0.02	0.01	26.47	44.1	1
10246	10246:WVGD1	End	110.00	0.46	-0.01	-0.00	2745.38	66.04	2.2	-37.99	38.15	0.98	-0.42	25.93	0.02	0.01	26.35	43.9	1
10246	10246:WVGD1	Origin	110.00	0.46	-0.01	-0.00	2745.38	66.03	2.2	-39.80	39.01	0.98	-0.44	25.93	0.02	0.01	26.37	43.9	1
10246	Tube 4	End	115.00	0.20	-0.00	-0.00	2940.40	70.95	2.2	-39.80	39.01	0.98	-0.42	25.81	0.02	0.01	26.23	43.7	1
10246	Tube 4	Origin	115.00	0.20	-0.00	-0.00	2940.40	70.94	2.2	-41.48	39.60	0.98	-0.44	25.81	0.02	0.01	26.24	43.7	1
10246	Tube 4	End	120.00	0.05	-0.00	-0.00	3138.39	75.84	2.2	-41.48	39.60	0.98	-0.42	25.66	0.02	0.01	26.08	43.5	1
10246	Tube 4	Origin	120.00	0.05	-0.00	-0.00	3138.39	75.84	2.2	-43.21	40.21	0.98	-0.44	25.66	0.02	0.01	26.10	43.5	1
10246	10246:g	End	125.00	0.00	0.00	0.00	3339.44	80.74	2.2	-43.21	40.21	0.98	-0.43	25.50	0.02	0.01	25.92	43.4	1

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	39.42	-1.03	-0.33	1.20	-4.91	-0.0	-1.12	-0.09	0.51	-0.19	4.92	0.13	0.00	5.11	8.5	2
Davit1	#Davit1:0	End	4.85	40.24	-1.23	3.15	0.76	-2.46	-0.0	-1.12	-0.09	0.51	-0.24	4.00	0.17	0.00	4.24	7.1	2
Davit1	#Davit1:0	Origin	4.85	40.24	-1.23	3.15	0.76	-2.46	-0.0	-1.09	-0.16	0.51	-0.23	3.99	0.17	0.00	4.24	7.1	2
Davit1	Davit1:End	End	9.69	41.06	-1.53	6.67	-0.00	-0.00	-0.0	-1.09	-0.16	0.51	-0.30	0.00	0.32	0.00	0.64	1.1	1
Davit2	Davit2:O	Origin	0.00	39.39	-1.00	-1.21	-3.48	1.61	0.0	1.33	0.40	-0.17	0.23	4.10	0.11	0.00	4.33	7.2	2
Davit2	#Davit2:0	End	4.85	40.00	-0.95	-4.76	-1.55	0.80	0.0	1.33	0.40	-0.17	0.28	2.91	0.14	0.00	3.20	5.3	2
Davit2	#Davit2:0	Origin	4.85	40.00	-0.95	-4.76	-1.55	0.80	-0.0	1.34	0.32	-0.17	0.28	2.91	0.12	0.00	3.20	5.3	2
Davit2	Davit2:End	End	9.69	40.61	-0.92	-8.39	0.00	-0.00	-0.0	1.34	0.32	-0.17	0.37	0.00	0.20	0.00	0.51	0.9	3
Davit3	Davit3:O	Origin	0.00	25.04	-0.57	0.16	-5.44	-0.01	-0.0	-0.15	0.65	0.00	-0.01	0.55	0.04	0.00	0.56	0.9	2
Davit3	#Davit3:0	End	5.00	25.57	-0.63	2.86	-2.18	-0.00	-0.0	-0.15	0.65	0.00	-0.01	0.32	0.05	0.00	0.34	0.6	2
Davit3	#Davit3:0	Origin	5.00	25.57	-0.63	2.86	-2.18	-0.00	-0.0	-0.08	0.34	0.00	-0.00	0.32	0.03	0.00	0.33	0.6	2
Davit3	#Davit3:1	End	9.86	26.10	-0.68	5.48	-0.51	-0.00	-0.0	-0.08	0.34	0.00	-0.01	0.12	0.03	0.00	0.14	0.2	2
Davit3	#Davit3:1	Origin	9.86	26.10	-0.68	5.48	-0.51	-0.00	-0.0	-0.02	0.10	0.00	-0.00	0.12	0.01	0.00	0.12	0.2	2
Davit3	Davit3:End	End	14.72	26.62	-0.74	8.09	-0.00	-0.00	-0.0	-0.02	0.10	0.00	-0.00	0.00	0.02	0.00	0.04	0.1	3
Davit4	Davit4:O	Origin	0.00	25.01	-0.55	-0.92	-50.67	-10.97	0.0	6.70	3.75	0.75	0.29	6.20	0.25	0.00	6.50	10.8	2
Davit4	#Davit4:0	End	5.00	25.43	-0.51	-3.69	-31.92	-7.23	0.0	6.70	3.75	0.75	0.35	5.80	0.30	0.00	6.17	10.3	2
Davit4	#Davit4:0	Origin	5.00	25.43	-0.51	-3.69	-31.92	-7.23	-0.0	6.75	3.41	0.74	0.35	5.80	0.28	0.00	6.17	10.3	2
Davit4	#Davit4:1	End	9.86	25.85	-0.45	-6.46	-15.32	-3.61	-0.0	6.75	3.41	0.74	0.44	4.46	0.35	0.00	4.94	8.2	2
Davit4	#Davit4:1	Origin	9.86	25.85	-0.45	-6.46	-15.32	-3.61	0.0	6.78	3.15	0.74	0.44	4.46	0.33	0.00	4.93	8.2	2
Davit4	Davit4:End	End	14.72	26.28	-0.37	-9.31	-0.00	-0.00	0.0	6.78	3.15	0.74	0.59	0.00	0.64	0.00	1.25	2.1	3
Davit5	Davit5:O	Origin	0.00	14.57	-0.34	0.39	-5.48	-0.00	-0.0	-0.14	0.66	0.00	-0.01	0.55	0.04	0.00	0.56	0.9	2
Davit5	#Davit5:0	End	5.00	14.95	-0.35	2.36	-2.20	-0.00	-0.0	-0.14	0.66	0.00	-0.01	0.33	0.05	0.00	0.35	0.6	2
Davit5	#Davit5:0	Origin	5.00	14.95	-0.35	2.36	-2.20	-0.00	-0.0	-0.08	0.35	0.00	-0.00	0.33	0.03	0.00	0.33	0.6	2
Davit5	#Davit5:1	End	9.86	15.32	-0.36	4.27	-0.51	-0.00	-0.0	-0.08	0.35	0.00	-0.00	0.12	0.03	0.00	0.14	0.2	2
Davit5	#Davit5:1	Origin	9.86	15.32	-0.36	4.27	-0.51	-0.00	-0.0	-0.02	0.11	0.00	-0.00	0.12	0.01	0.00	0.12	0.2	2
Davit5	Davit5:End	End	14.72	15.69	-0.38	6.17	-0.00	-0.00	-0.0	-0.02	0.11	0.00	-0.00	0.00	0.02	0.00	0.04	0.1	3
Davit6	Davit6:O	Origin	0.00	14.55	-0.33	-0.73	-50.09	7.47	0.0	6.27	3.71	-0.51	0.27	5.79	0.25	0.00	6.07	10.1	2
Davit6	#Davit6:0	End	5.00	14.88	-0.34	-2.76	-31.53	4.92	0.0	6.27	3.71	-0.51	0.32	5.40	0.30	0.00	5.75	9.6	2

Davit6	#Davit6:0	Origin	5.00	14.88	-0.34	-2.76	-31.53	4.92	0.0	6.32	3.38	-0.51	0.33	5.40	0.27	0.00	5.75	9.6	2
Davit6	#Davit6:1	End	9.86	15.20	-0.36	-4.81	-15.13	2.46	0.0	6.32	3.38	-0.51	0.41	4.14	0.34	0.00	4.59	7.7	2
Davit6	#Davit6:1	Origin	9.86	15.20	-0.36	-4.81	-15.13	2.46	-0.0	6.36	3.11	-0.51	0.41	4.14	0.32	0.00	4.59	7.7	2
Davit6	Davit6:End	End	14.72	15.54	-0.39	-6.94	-0.00	-0.00	-0.0	6.36	3.11	-0.51	0.56	0.00	0.63	0.00	1.23	2.0	3
Davit7	Davit7:O	Origin	0.00	7.22	-0.17	0.41	-5.51	-0.00	-0.0	-0.13	0.66	0.00	-0.01	0.55	0.04	0.00	0.56	0.9	2
Davit7	#Davit7:0	End	5.00	7.47	-0.17	1.73	-2.21	-0.00	-0.0	-0.13	0.66	0.00	-0.01	0.33	0.05	0.00	0.35	0.6	2
Davit7	#Davit7:0	Origin	5.00	7.47	-0.17	1.73	-2.21	-0.00	-0.0	-0.07	0.35	0.00	-0.00	0.33	0.03	0.00	0.33	0.6	2
Davit7	#Davit7:1	End	9.86	7.71	-0.18	3.01	-0.51	-0.00	-0.0	-0.07	0.35	0.00	-0.00	0.12	0.04	0.00	0.14	0.2	2
Davit7	#Davit7:1	Origin	9.86	7.71	-0.18	3.01	-0.51	-0.00	0.0	-0.02	0.11	0.00	-0.00	0.12	0.01	0.00	0.12	0.2	2
Davit7	Davit7:End	End	14.72	7.95	-0.18	4.29	-0.00	-0.00	0.0	-0.02	0.11	0.00	-0.00	0.00	0.02	0.00	0.04	0.1	3
Davit8	Davit8:O	Origin	0.00	7.21	-0.17	-0.54	-51.76	8.24	0.0	6.12	3.82	-0.56	0.26	6.04	0.25	0.00	6.31	10.5	2
Davit8	#Davit8:0	End	5.00	7.44	-0.19	-1.91	-32.63	5.44	0.0	6.12	3.82	-0.56	0.32	5.64	0.31	0.00	5.98	10.0	2
Davit8	#Davit8:0	Origin	5.00	7.44	-0.19	-1.91	-32.63	5.44	0.0	6.18	3.49	-0.56	0.32	5.64	0.28	0.00	5.98	10.0	2
Davit8	#Davit8:1	End	9.86	7.67	-0.21	-3.33	-15.67	2.71	0.0	6.18	3.49	-0.56	0.40	4.33	0.36	0.00	4.78	8.0	2
Davit8	#Davit8:1	Origin	9.86	7.67	-0.21	-3.33	-15.67	2.71	-0.0	6.22	3.22	-0.56	0.40	4.33	0.33	0.00	4.77	8.0	2
Davit8	Davit8:End	End	14.72	7.91	-0.25	-4.83	-0.00	-0.00	-0.0	6.22	3.22	-0.56	0.54	0.00	0.65	0.00	1.25	2.1	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	1.213	80.00	80.00	1.52
Clamp2	1.382	80.00	80.00	1.73
Clamp3	0.000	80.00	80.00	0.00
Clamp4	7.483	80.00	80.00	9.35
Clamp5	0.000	80.00	80.00	0.00
Clamp6	7.066	80.00	80.00	8.83
Clamp7	0.000	80.00	80.00	0.00
Clamp8	6.992	80.00	80.00	8.74
Clamp9	0.339	80.00	80.00	0.42
Clamp10	0.339	80.00	80.00	0.42
Clamp11	0.339	80.00	80.00	0.42
Clamp12	0.339	80.00	80.00	0.42
Clamp13	0.339	80.00	80.00	0.42
Clamp14	0.339	80.00	80.00	0.42
Clamp15	0.339	80.00	80.00	0.42
Clamp16	0.339	80.00	80.00	0.42
Clamp17	0.339	80.00	80.00	0.42
Clamp18	0.309	80.00	80.00	0.39
Clamp21	4.686	80.00	80.00	5.86
Clamp22	7.931	80.00	80.00	9.91
Clamp23	3.016	80.00	80.00	3.77
Clamp24	7.931	80.00	80.00	9.91
Clamp25	0.464	80.00	80.00	0.58

*** 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)
10246	51.98	NESC Heavy	30	31359.1

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 %
10246	NESC Heavy	1	-0.000	2.745	-1.372	2.377	17.048	21.114	44.994	1.5	99.641	1.780	3.000	35.19
10246	NESC Heavy	2	-1.372	2.377	-2.377	1.372	17.048	32.285	68.798	3	91.185	2.201	3.000	53.81
10246	NESC Heavy	3	-2.377	1.372	-2.745	-0.000	17.048	8.899	18.965	1.5	53.230	1.155	3.000	14.83
10246	NESC Heavy	4	-2.745	-0.000	-2.377	-1.372	17.048	8.739	18.622	1.5	-52.132	1.145	3.000	14.56
10246	NESC Heavy	5	-2.377	-1.372	-1.372	-2.377	17.048	31.346	66.798	3	-87.800	2.168	3.000	52.24
10246	NESC Heavy	6	-1.372	-2.377	0.000	-2.745	17.048	20.217	43.083	1.5	-95.224	1.741	3.000	33.69
10246	NESC Heavy	7	0.000	-2.745	1.372	-2.377	17.048	19.669	41.915	1.5	-92.982	1.718	3.000	32.78
10246	NESC Heavy	8	1.372	-2.377	2.377	-1.372	17.048	29.369	62.585	3	-84.526	2.099	3.000	48.95
10246	NESC Heavy	9	2.377	-1.372	2.745	0.000	17.048	7.454	15.886	1.5	-46.571	1.057	3.000	12.42
10246	NESC Heavy	10	2.745	0.000	2.377	1.372	17.048	10.183	21.701	1.5	58.791	1.236	3.000	16.97
10246	NESC Heavy	11	2.377	1.372	1.372	2.377	17.048	34.262	73.011	3	94.459	2.267	3.000	57.10
10246	NESC Heavy	12	1.372	2.377	0.000	2.745	17.048	21.662	46.162	1.5	101.883	1.803	3.000	36.10
10246	NESC Extreme	1	-0.000	2.745	-1.372	2.377	17.048	18.662	39.770	1.5	88.066	1.673	3.000	31.10
10246	NESC Extreme	2	-1.372	2.377	-2.377	1.372	17.048	28.529	60.795	3	80.618	2.069	3.000	47.55
10246	NESC Extreme	3	-2.377	1.372	-2.745	-0.000	17.048	7.828	16.681	1.5	46.950	1.084	3.000	13.05
10246	NESC Extreme	4	-2.745	-0.000	-2.377	-1.372	17.048	7.923	16.884	1.5	-47.139	1.090	3.000	13.20
10246	NESC Extreme	5	-2.377	-1.372	-1.372	-2.377	17.048	28.294	60.294	3	-79.217	2.060	3.000	47.16
10246	NESC Extreme	6	-1.372	-2.377	0.000	-2.745	17.048	18.246	38.883	1.5	-85.950	1.654	3.000	30.41
10246	NESC Extreme	7	0.000	-2.745	1.372	-2.377	17.048	17.865	38.071	1.5	-84.392	1.637	3.000	29.78
10246	NESC Extreme	8	1.372	-2.377	2.377	-1.372	17.048	26.920	57.366	3	-76.943	2.009	3.000	44.87
10246	NESC Extreme	9	2.377	-1.372	2.745	0.000	17.048	7.031	14.982	1.5	-43.275	1.027	3.000	11.72
10246	NESC Extreme	10	2.745	0.000	2.377	1.372	17.048	8.720	18.583	1.5	50.814	1.144	3.000	14.53
10246	NESC Extreme	11	2.377	1.372	1.372	2.377	17.048	29.903	63.722	3	82.892	2.118	3.000	49.84
10246	NESC Extreme	12	1.372	2.377	0.000	2.745	17.048	19.043	40.582	1.5	89.625	1.690	3.000	31.74

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
Davit1	16.76	NESC Heavy	1	156.1
Davit2	19.24	NESC Heavy	1	156.1
Davit3	1.43	NESC Heavy	1	873.6
Davit4	22.90	NESC Heavy	1	873.6
Davit5	1.44	NESC Heavy	1	873.6
Davit6	20.54	NESC Heavy	1	873.6
Davit7	1.44	NESC Heavy	1	873.6
Davit8	21.51	NESC Heavy	1	873.6

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	57.10	10246	Base Plate
NESC Extreme	49.84	10246	Base Plate

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	51.98	10246	30
NESC Extreme	44.30	10246	32

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	10246	11	17.048	79.908	3739.539	116.189	34.262	73.011	3	94.459	2.267	57.10
NESC Extreme	10246	11	17.048	44.098	3339.436	80.736	29.903	63.722	3	82.892	2.118	49.84

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	22.90	Davit4	1
NESC Extreme	10.84	Davit4	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
Clamp1	Clamp	3.19	NESC Heavy	0.0
Clamp2	Clamp	3.22	NESC Heavy	0.0
Clamp3	Clamp	0.00	NESC Heavy	0.0
Clamp4	Clamp	13.80	NESC Heavy	0.0
Clamp5	Clamp	0.00	NESC Heavy	0.0
Clamp6	Clamp	13.17	NESC Heavy	0.0
Clamp7	Clamp	0.00	NESC Heavy	0.0
Clamp8	Clamp	13.62	NESC Heavy	0.0
Clamp9	Clamp	0.88	NESC Heavy	0.0
Clamp10	Clamp	0.88	NESC Heavy	0.0
Clamp11	Clamp	0.88	NESC Heavy	0.0
Clamp12	Clamp	0.88	NESC Heavy	0.0
Clamp13	Clamp	0.88	NESC Heavy	0.0
Clamp14	Clamp	0.88	NESC Heavy	0.0
Clamp15	Clamp	0.88	NESC Heavy	0.0
Clamp16	Clamp	0.88	NESC Heavy	0.0
Clamp17	Clamp	0.88	NESC Heavy	0.0

Clamp18	Clamp	0.59	NESC Heavy	0.0
Clamp21	Clamp	5.86	NESC Extreme	0.0
Clamp22	Clamp	9.91	NESC Extreme	0.0
Clamp23	Clamp	7.21	NESC Heavy	0.0
Clamp24	Clamp	9.91	NESC Extreme	0.0
Clamp25	Clamp	0.89	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	-1.041	2.227	0.677	2.550
NESC Heavy	Clamp2	Clamp	Davit2:End	-0.271	2.459	0.727	2.578
NESC Heavy	Clamp3	Clamp	Davit3:End	0.000	0.000	-0.000	0.000
NESC Heavy	Clamp4	Clamp	Davit4:End	1.819	9.347	5.591	11.042
NESC Heavy	Clamp5	Clamp	Davit5:End	0.000	0.000	-0.000	0.000
NESC Heavy	Clamp6	Clamp	Davit6:End	-0.898	8.973	5.455	10.539
NESC Heavy	Clamp7	Clamp	Davit7:End	0.000	0.000	-0.000	0.000
NESC Heavy	Clamp8	Clamp	Davit8:End	-1.073	9.335	5.518	10.897
NESC Heavy	Clamp9	Clamp	10246:WVGD1	0.000	0.119	0.690	0.700
NESC Heavy	Clamp10	Clamp	10246:WVGD2	0.000	0.119	0.690	0.700
NESC Heavy	Clamp11	Clamp	10246:WVGD3	0.000	0.119	0.690	0.700
NESC Heavy	Clamp12	Clamp	10246:WVGD4	0.000	0.119	0.690	0.700
NESC Heavy	Clamp13	Clamp	10246:WVGD5	0.000	0.119	0.690	0.700
NESC Heavy	Clamp14	Clamp	10246:WVGD6	0.000	0.119	0.690	0.700
NESC Heavy	Clamp15	Clamp	10246:WVGD7	0.000	0.119	0.690	0.700
NESC Heavy	Clamp16	Clamp	10246:WVGD8	0.000	0.119	0.690	0.700
NESC Heavy	Clamp17	Clamp	10246:WVGD9	0.000	0.119	0.690	0.700
NESC Heavy	Clamp18	Clamp	10246:WVGD10	0.000	0.119	0.460	0.475
NESC Heavy	Clamp21	Clamp	10246:TopConn	0.000	1.511	0.000	1.511
NESC Heavy	Clamp22	Clamp	10246:BotConT	0.000	2.260	0.000	2.260
NESC Heavy	Clamp23	Clamp	10246:BotConn	0.000	-0.252	5.763	5.769
NESC Heavy	Clamp24	Clamp	10246:BotConB	0.000	-2.260	0.000	2.260
NESC Heavy	Clamp25	Clamp	10246:WVGD11	0.000	0.178	0.690	0.713
NESC Extreme	Clamp1	Clamp	Davit1:End	-0.502	1.100	0.100	1.213
NESC Extreme	Clamp2	Clamp	Davit2:End	-0.164	1.369	0.100	1.382
NESC Extreme	Clamp3	Clamp	Davit3:End	0.000	0.000	-0.000	0.000
NESC Extreme	Clamp4	Clamp	Davit4:End	0.757	7.122	2.169	7.483
NESC Extreme	Clamp5	Clamp	Davit5:End	0.000	0.000	-0.000	0.000
NESC Extreme	Clamp6	Clamp	Davit6:End	-0.507	6.728	2.100	7.066
NESC Extreme	Clamp7	Clamp	Davit7:End	0.000	0.000	-0.000	0.000
NESC Extreme	Clamp8	Clamp	Davit8:End	-0.561	6.627	2.159	6.992
NESC Extreme	Clamp9	Clamp	10246:WVGD1	0.000	0.283	0.187	0.339
NESC Extreme	Clamp10	Clamp	10246:WVGD2	0.000	0.283	0.187	0.339
NESC Extreme	Clamp11	Clamp	10246:WVGD3	0.000	0.283	0.187	0.339
NESC Extreme	Clamp12	Clamp	10246:WVGD4	0.000	0.283	0.187	0.339
NESC Extreme	Clamp13	Clamp	10246:WVGD5	0.000	0.283	0.187	0.339
NESC Extreme	Clamp14	Clamp	10246:WVGD6	0.000	0.283	0.187	0.339
NESC Extreme	Clamp15	Clamp	10246:WVGD7	0.000	0.283	0.187	0.339
NESC Extreme	Clamp16	Clamp	10246:WVGD8	0.000	0.283	0.187	0.339
NESC Extreme	Clamp17	Clamp	10246:WVGD9	0.000	0.283	0.187	0.339
NESC Extreme	Clamp18	Clamp	10246:WVGD10	0.000	0.283	0.125	0.309
NESC Extreme	Clamp21	Clamp	10246:TopConn	0.000	4.686	0.000	4.686
NESC Extreme	Clamp22	Clamp	10246:BotConT	0.000	7.931	0.000	7.931
NESC Extreme	Clamp23	Clamp	10246:BotConn	0.000	-0.988	2.850	3.016
NESC Extreme	Clamp24	Clamp	10246:BotConB	0.000	-7.931	0.000	7.931

NESC Extreme	Clamp25	Clamp	10246:WVGD11	0.000	0.425	0.187	0.464

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	34.968	-1.464	31.091	3350.518	-112.719	-4.238
NESC Extreme	29.899	-0.977	11.473	2789.134	-79.509	2.037

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	5553.7
Weight of Steel Poles:	31359.1
Total:	36912.8

*** End of Report

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tension Force per Bolt = $T_{Max} := 94.5 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 41.4 \cdot kips$ (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 = $V_{Max} := \frac{V_{base}}{N} = 1.7 \times 10^3 \, lbf$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 531.1 \, psi$

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 = $F_{tv} := F_t \cdot \sqrt{1 - \left(\frac{f_v}{F_v}\right)^2} = 74.98 \cdot ksi$

Bolt Tension % of Capacity = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 38.8 \cdot \%$

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

Condition1 = "OK"

Caisson Foundation:

Input Data:

Shear Force =	$S := 41.4 \cdot 1.1k = 45.5 \cdot k$	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	$M := 3741.4 \cdot 1.1ft \cdot k = 4116 \cdot ft \cdot k$	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	$A1 := 84.4 \cdot 1.1k = 92.84 \cdot k$	*USER INPUT-FROM PLS-Pole*
Bending Moment =	$Mu := 4258ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 12225ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 8.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 20.5ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 39$	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9 \cdot Mn}{Mu} = 2.6$

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

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

$FOSCheck = "OK"$

===

LPILE Plus for Windows, Version 5.0 (5.0.47)

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

===

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1715900.WI\24_CT33XC525 Brookfield\04_Structural\Backup Documentation\Rev (3)\Calcs\L-Pile\
Name of input data file: 10246 Caisson Analysis.lpd
Name of output file: 10246 Caisson Analysis.lpo
Name of plot output file: 10246 Caisson Analysis.lpp
Name of runtime file: 10246 Caisson Analysis.lpr

Time and Date of Analysis

Date: January 2, 2019   Time: 8:01:10

Problem Title

17159.24/CT33XC525 - Brookfield/Structure # 10246

Program Options

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

Basic Program Options:

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

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

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

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 246.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	96.00000000	4169220.	7238.2000	3600000.
2	246.0000	96.00000000	4169220.	7238.2000	3600000.

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

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 78.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 78.000 in
Distance from top of pile to bottom of layer = 150.000 in
p-y subgrade modulus k for top of soil layer = 170.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 170.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 150.000 in
Distance from top of pile to bottom of layer = 210.000 in
p-y subgrade modulus k for top of soil layer = 225.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 225.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 210.000 in
Distance from top of pile to bottom of layer = 246.000 in
p-y subgrade modulus k for top of soil layer = 125.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 125.000 lbs/in**3

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

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

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

2	78.00	0.06700
3	78.00	0.07200
4	150.00	0.07200
5	150.00	0.07500
6	210.00	0.07500
7	210.00	0.03900
8	246.00	0.03900

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	0.00000	33.00	------	------
2	78.000	0.00000	33.00	------	------
3	78.000	0.00000	36.00	------	------
4	150.000	0.00000	36.00	------	------
5	150.000	0.00000	40.00	------	------
6	210.000	0.00000	40.00	------	------
7	210.000	0.00000	40.00	------	------
8	246.000	0.00000	40.00	------	------

Notes:

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

Loading Type

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

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head   =   45500.000 lbs
Bending moment at pile head =   49392000.000 in-lbs
Axial load at pile head   =   92840.000 lbs

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

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
----

Number of sections = 1

Pile Section No. 1

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

Outside Diameter   =   96.0000 in

Material Properties:

Compressive Strength of Concrete   =   3.000 kip/in**2
Yield Stress of Reinforcement   =   60. kip/in**2
Modulus of Elasticity of Reinforcement =   29000. kip/in**2
Number of Reinforcing Bars   =   39
Area of Single Bar   =   1.56000 in**2
Number of Rows of Reinforcing Bars   =   39
Area of Steel   =   60.840 in**2
Area of Shaft   =   7238.229 in**2
Percentage of Steel Reinforcement   =   0.841 percent
Cover Thickness (edge to bar center)   =   4.000 in

Unfactored Axial Squash Load Capacity   =   21952.74 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement	Distance to Centroidal Axis

	in**2	in
1	1.560	43.964
2	1.560	43.679
3	1.560	43.111
4	1.560	42.263
5	1.560	41.141
6	1.560	39.752
7	1.560	38.105
8	1.560	36.211
9	1.560	34.083
10	1.560	31.733
11	1.560	29.177
12	1.560	26.433
13	1.560	23.516
14	1.560	20.448
15	1.560	17.247
16	1.560	13.933
17	1.560	10.530
18	1.560	7.058
19	1.560	3.541
20	1.560	0.000
21	1.560	-3.541
22	1.560	-7.058
23	1.560	-10.530
24	1.560	-13.933
25	1.560	-17.247
26	1.560	-20.448
27	1.560	-23.516
28	1.560	-26.433
29	1.560	-29.177
30	1.560	-31.733
31	1.560	-34.083
32	1.560	-36.211
33	1.560	-38.105
34	1.560	-39.752
35	1.560	-41.141
36	1.560	-42.263
37	1.560	-43.111
38	1.560	-43.679
39	1.560	-43.964

Axial Thrust Force = 92840.00 lbs

Bending Moment	Bending Stiffness	Bending Curvature	Maximum Strain	Neutral Axis Position	Max. Concrete Stress	Max. Steel Stress

in-lbs	lb-in2	rad/in	in/in	inches	psi	psi
9242630.	1.478821E+13	6.250000E-07	0.00003393	54.29375124	104.20894	910.92747
18379525.	1.470362E+13	0.00000125	0.00006404	51.23139238	194.67171	1710.84443
27417245.	1.462253E+13	0.00000188	0.00009419	50.23230600	283.55064	2511.94132
36348272.	1.453931E+13	0.00000250	0.00012429	49.71628618	370.60030	3311.84365
36348272.	1.163145E+13	0.00000313	0.00008948	28.63510180	266.59230	5739.21003
36348272.	9.692873E+12	0.00000375	0.00010478	27.94204473	310.48076	6962.42199
36348272.	8.308176E+12	0.00000438	0.00012010	27.45191431	354.00612	8185.01095
36348272.	7.269654E+12	0.00000500	0.00013568	27.13516188	397.83998	9400.22734
36348272.	6.461915E+12	0.00000563	0.00015096	26.83776140	440.40965	10623.76921
36348272.	5.815724E+12	0.00000625	0.00016627	26.60351801	482.61925	11846.64462
36348272.	5.287021E+12	0.00000688	0.00018160	26.41523981	524.46745	13068.84705
36348272.	4.846436E+12	0.00000750	0.00019696	26.26145411	565.95261	14290.37244
36348272.	4.473633E+12	0.00000813	0.00021234	26.13423014	607.07336	15511.21396
36348272.	4.154088E+12	0.00000875	0.00022774	26.02789736	647.82816	16731.36621
36348272.	3.877149E+12	0.00000938	0.00024317	25.93829584	688.21540	17950.82421
36348272.	3.634827E+12	0.00001000	0.00025862	25.86230993	728.23358	19169.58174
37809429.	3.558535E+12	0.00001063	0.00027410	25.79755640	767.88113	20387.63278
39873964.	3.544352E+12	0.00001125	0.00028960	25.74218130	807.15644	21604.97142
41935520.	3.531412E+12	0.00001188	0.00030512	25.69472265	846.05796	22821.59118
43994066.	3.519525E+12	0.00001250	0.00032068	25.65400457	884.58387	24037.48786
46049599.	3.508541E+12	0.00001313	0.00033625	25.61908865	922.73279	25252.65213
48015878.	3.492064E+12	0.00001375	0.00035200	25.59999990	960.87228	26462.77101
50114091.	3.486198E+12	0.00001438	0.00036800	25.59999990	999.17491	

						27665.62424
52199129.	3.479942E+12	0.00001500	0.00038396	25.59708166	1036.90409	28869.74690
54242129.	3.471496E+12	0.00001563	0.00039965	25.57763529	1073.54110	30081.46466
56281992.	3.463507E+12	0.00001625	0.00041537	25.56143332	1109.79635	31292.35843
58318694.	3.455923E+12	0.00001688	0.00043112	25.54813242	1145.66800	32502.41980
60352204.	3.448697E+12	0.00001750	0.00044691	25.53743505	1181.15404	33711.64204
62382495.	3.441793E+12	0.00001813	0.00046271	25.52908659	1216.25248	34920.01742
64409552.	3.435176E+12	0.00001875	0.00047855	25.52287245	1250.96159	36127.53489
66433342.	3.428818E+12	0.00001938	0.00049442	25.51859808	1285.27922	37334.18771
68453833.	3.422692E+12	0.00002000	0.00051032	25.51609468	1319.20328	38539.96832
70471005.	3.416776E+12	0.00002063	0.00052625	25.51521921	1352.73185	39744.86597
72484832.	3.411051E+12	0.00002125	0.00054221	25.51584291	1385.86288	40948.87149
74495286.	3.405499E+12	0.00002188	0.00055820	25.51785135	1418.59423	42151.97596
76502331.	3.400104E+12	0.00002250	0.00057423	25.52114153	1450.92368	43354.17129
78505942.	3.394852E+12	0.00002313	0.00059028	25.52562475	1482.84909	44555.44726
80506089.	3.389730E+12	0.00002375	0.00060637	25.53122091	1514.36827	45755.79419
82502744.	3.384728E+12	0.00002438	0.00062249	25.53785849	1545.47897	46955.20210
86485455.	3.375042E+12	0.00002563	0.00065482	25.55400896	1606.46591	49351.15936
90453813.	3.365723E+12	0.00002688	0.00068729	25.57363272	1665.79110	51743.23872
94407568.	3.356714E+12	0.00002813	0.00071990	25.59637499	1723.43544	54131.35182
98271382.	3.345409E+12	0.00002938	0.00075200	25.59999990	1778.26270	56534.10171
1.020938E+08	3.333676E+12	0.00003063	0.00078400	25.59999990	1831.03816	58939.80816
1.056835E+08	3.315562E+12	0.00003188	0.00081600	25.59999990	1881.94461	60000.00000
1.087161E+08	3.281995E+12	0.00003313	0.00084770	25.59080744	1930.50948	60000.00000
1.111218E+08	3.232634E+12	0.00003438	0.00087649	25.49782705	1972.90037	60000.00000

1.132285E+08 3.178343E+12 0.00003563 0.00090442 25.38724279 2012.54690
60000.00000
1.151127E+08 3.121699E+12 0.00003688 0.00093170 25.26653337 2049.87676
60000.00000
1.168214E+08 3.064168E+12 0.00003813 0.00095847 25.14015341 2085.16691
60000.00000
1.183620E+08 3.006018E+12 0.00003938 0.00098471 25.00857496 2118.49176
60000.00000
1.197537E+08 2.947782E+12 0.00004063 0.00101047 24.87322569 2149.97603
60000.00000
1.210724E+08 2.891282E+12 0.00004188 0.00103604 24.74122095 2180.02990
60000.00000
1.222482E+08 2.834741E+12 0.00004313 0.00106110 24.60527086 2208.33395
60000.00000
1.233755E+08 2.780293E+12 0.00004438 0.00108604 24.47417593 2235.37417
60000.00000
1.243895E+08 2.726345E+12 0.00004563 0.00111057 24.34119272 2260.86106
60000.00000
1.253890E+08 2.674965E+12 0.00004688 0.00113511 24.21565962 2285.28860
60000.00000
1.262571E+08 2.623525E+12 0.00004813 0.00115911 24.08545446 2308.11601
60000.00000
1.269439E+08 2.571016E+12 0.00004938 0.00118500 23.99999857 2331.65398
60000.00000
1.279924E+08 2.528245E+12 0.00005063 0.00121056 23.91220236 2353.69722
60000.00000
1.287145E+08 2.481243E+12 0.00005188 0.00123354 23.77907324 2372.43745
60000.00000
1.294329E+08 2.436385E+12 0.00005313 0.00125658 23.65329695 2390.28328
60000.00000
1.301097E+08 2.392822E+12 0.00005438 0.00127945 23.53006697 2407.05300
60000.00000
1.307123E+08 2.349885E+12 0.00005563 0.00130193 23.40554667 2422.62562
60000.00000
1.313116E+08 2.308776E+12 0.00005688 0.00132447 23.28746939 2437.33691
60000.00000
1.319075E+08 2.269376E+12 0.00005813 0.00134707 23.17543173 2451.18036
60000.00000
1.324321E+08 2.230435E+12 0.00005938 0.00136926 23.06125689 2463.88127
60000.00000
1.329275E+08 2.192618E+12 0.00006063 0.00139133 22.94974566 2475.64224
60000.00000
1.334198E+08 2.156279E+12 0.00006188 0.00141345 22.84360456 2486.56670
60000.00000
1.339089E+08 2.121329E+12 0.00006313 0.00143562 22.74252748 2496.64842
60000.00000
1.343648E+08 2.087219E+12 0.00006438 0.00145762 22.64266920 2505.78595
60000.00000
1.347678E+08 2.053605E+12 0.00006563 0.00147930 22.54164934 2513.94389

```
60000.00000
1.351680E+08  2.021204E+12    0.00006688    0.00150102   22.44518709    2521.28804
60000.00000
1.359016E+08  1.994885E+12    0.00006813    0.00152600   22.40000010    2528.74214
60000.00000
1.360467E+08  1.961033E+12    0.00006938    0.00155071   22.35264730    2535.01455
60000.00000
1.364274E+08  1.931715E+12    0.00007063    0.00157196   22.25782442    2539.50357
60000.00000
1.367383E+08  1.902445E+12    0.00007188    0.00159261   22.15802336    2543.09842
60000.00000
1.370453E+08  1.874124E+12    0.00007313    0.00161329   22.06214190    2545.94706
60000.00000
1.373499E+08  1.846721E+12    0.00007438    0.00163403   21.97016573    2548.04640
60000.00000
1.379515E+08  1.794491E+12    0.00007688    0.00167566   21.79721117    2549.97385
60000.00000
1.385027E+08  1.744916E+12    0.00007938    0.00171713   21.63307714    2543.98864
60000.00000
1.389688E+08  1.697329E+12    0.00008188    0.00175793   21.47083998    2546.73687
60000.00000
1.394293E+08  1.652495E+12    0.00008438    0.00179893   21.32064486    2549.48904
60000.00000
1.398825E+08  1.610158E+12    0.00008688    0.00184018   21.18190527    2547.83838
60000.00000
1.402991E+08  1.569780E+12    0.00008938    0.00188129   21.04945421    2541.67863
60000.00000
1.406522E+08  1.530908E+12    0.00009188    0.00192180   20.91753817    2545.88463
60000.00000
1.406522E+08  1.490354E+12    0.00009438    0.00196300   20.79999876    2548.88559
60000.00000
1.414497E+08  1.460126E+12    0.00009688    0.00201456   20.79541254    2548.64918
60000.00000
1.417724E+08  1.426640E+12    0.00009938    0.00205426   20.67181349    2543.43857
60000.00000
1.420837E+08  1.394687E+12    0.00010188    0.00209393   20.55396223    2541.05335
60000.00000
1.423303E+08  1.363643E+12    0.00010438    0.00213260   20.43205976    2545.06245
60000.00000
1.425749E+08  1.334034E+12    0.00010688    0.00217138   20.31701803    2547.89994
60000.00000
1.428176E+08  1.305761E+12    0.00010938    0.00221029   20.20838213    2549.54798
60000.00000
1.430578E+08  1.278729E+12    0.00011188    0.00224935   20.10592890    2549.38673
60000.00000
1.432937E+08  1.252841E+12    0.00011438    0.00228864   20.01000452    2544.95009
60000.00000
1.435283E+08  1.228050E+12    0.00011688    0.00232803   19.91896963    2540.49733
60000.00000
```

1.437254E+08	1.203982E+12	0.00011938	0.00236669	19.82570887	2537.76714	60000.00000
1.439038E+08	1.180749E+12	0.00012188	0.00240505	19.73375845	2541.80486	60000.00000
1.440812E+08	1.158442E+12	0.00012438	0.00244350	19.64619970	2545.04857	60000.00000
1.442576E+08	1.137006E+12	0.00012688	0.00248203	19.56278372	2547.48807	60000.00000
1.444329E+08	1.116390E+12	0.00012938	0.00252065	19.48327589	2549.11289	60000.00000
1.446072E+08	1.096547E+12	0.00013188	0.00255936	19.40746450	2549.91242	60000.00000
1.447791E+08	1.077426E+12	0.00013438	0.00259824	19.33572149	2548.00334	60000.00000
1.449406E+08	1.058927E+12	0.00013688	0.00263762	19.27030134	2544.25228	60000.00000
1.450898E+08	1.041003E+12	0.00013938	0.00267749	19.21070337	2540.41626	60000.00000
1.456012E+08	1.026264E+12	0.00014188	0.00272400	19.20000029	2535.41572	60000.00000
1.461871E+08	1.012551E+12	0.00014438	0.00277200	19.20000029	2536.49357	60000.00000
1.466961E+08	9.987817E+11	0.00014688	0.00282000	19.20000029	2541.79562	60000.00000
1.466961E+08	9.820656E+11	0.00014938	0.00286033	19.14867640	2544.74390	60000.00000
1.466961E+08	9.659000E+11	0.00015188	0.00289941	19.09077215	2546.90214	60000.00000
1.466961E+08	9.502579E+11	0.00015438	0.00293857	19.03525686	2548.49924	60000.00000
1.466961E+08	9.351143E+11	0.00015688	0.00297812	18.98400164	2549.54054	60000.00000
1.466961E+08	9.204458E+11	0.00015938	0.00301832	18.93849134	2549.98794	60000.00000
1.466961E+08	9.062305E+11	0.00016188	0.00305880	18.89603662	2547.37918	60000.00000
1.466961E+08	8.924475E+11	0.00016438	0.00309937	18.85549307	2544.12087	60000.00000
1.466961E+08	8.790775E+11	0.00016688	0.00314001	18.81651449	2540.85231	60000.00000
1.466961E+08	8.661022E+11	0.00016938	0.00318070	18.77903795	2537.57331	60000.00000
1.466961E+08	8.535043E+11	0.00017188	0.00322145	18.74300051	2534.28379	60000.00000
1.466961E+08	8.412677E+11	0.00017438	0.00326106	18.70142126	2531.19538	60000.00000
1.466961E+08	8.178177E+11	0.00017938	0.00334171	18.62976408	2530.07603	60000.00000
1.466961E+08	7.956396E+11	0.00018438	0.00342278	18.56424093	2537.34650	

```
  60000.00000
  1.466961E+08  7.746326E+11    0.00018938    0.00350411   18.50356436    2543.01701
  60000.00000
  1.466961E+08  7.547064E+11    0.00019438    0.00358572   18.44741678    2547.04380
  60000.00000
  1.466961E+08  7.357796E+11    0.00019938    0.00366760   18.39550066    2549.38005
  60000.00000
  1.466961E+08  7.177789E+11    0.00020438    0.00374986   18.34794474    2549.12180
  60000.00000
  1.466961E+08  7.006379E+11    0.00020938    0.00383443   18.31369543    2543.40901
  60000.00000
```

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 146696.05572 in-kip

----

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

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head = 45500.000 lbs
Specified moment at pile head = 49392000.000 in-lbs
Specified axial load at pile head = 92840.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in	Es*h F/L
0.000	1.450	4.94E+07	45500.	-0.009396	581.474	3.49E+12	0.000	0.000
19.680	1.268	5.03E+07	41507.	-0.009115	591.773	3.49E+12	-586.040	1137.114
39.360	1.091	5.10E+07	21279.	-0.008829	599.415	3.48E+12	-1473.000	3320.593
59.040	0.920326	5.10E+07	-16354.	-0.008541	600.490	3.48E+12	-2345.854	6270.384
78.720	0.755074	5.02E+07	-71027.	-0.008254	591.121	3.49E+12	-3472.711	11314.
98.400	0.595391	4.81E+07	-1.49E+05	-0.007976	566.742	3.49E+12	-4399.181	18176.
118.080	0.441025	4.43E+07	-2.43E+05	-0.007716	522.834	3.52E+12	-5077.599	28322.

```
 137.760  0.291517  3.85E+07 -3.46E+05 -0.007484   456.423  3.55E+12 -5371.027
45324.
 157.440  0.145094  3.07E+07 -4.47E+05 -0.007416   366.390  1.46E+13 -4173.833
70766.
 177.120 -0.000486  2.14E+07 -4.90E+05 -0.007381   258.849  1.47E+13    16.144
81658.
 196.800 -0.145502  1.21E+07 -4.38E+05 -0.007359   151.844  1.47E+13  5474.140
92551.
 216.480 -0.290195  4.85E+06 -2.96E+05 -0.007348    68.712  1.48E+13  6743.303
57163.
 236.160 -0.434756  6.09E+05 -1.21E+05 -0.007344    19.844  1.48E+13    11172.
63215.
```

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =     1.44998615 in
Computed slope at pile head      =    -0.00939647
Maximum bending moment           =      51097226. lbs-in
Maximum shear force              =  -489714.54214 lbs
Depth of maximum bending moment  =    51.66000000 in
Depth of maximum shear force     =      177.12000 in
Number of iterations             =             30
Number of zero deflection points =              1
```

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

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

Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 45500.	M= 4.94E+07	92840.0000	1.4500	5.1097E+07	-489715.

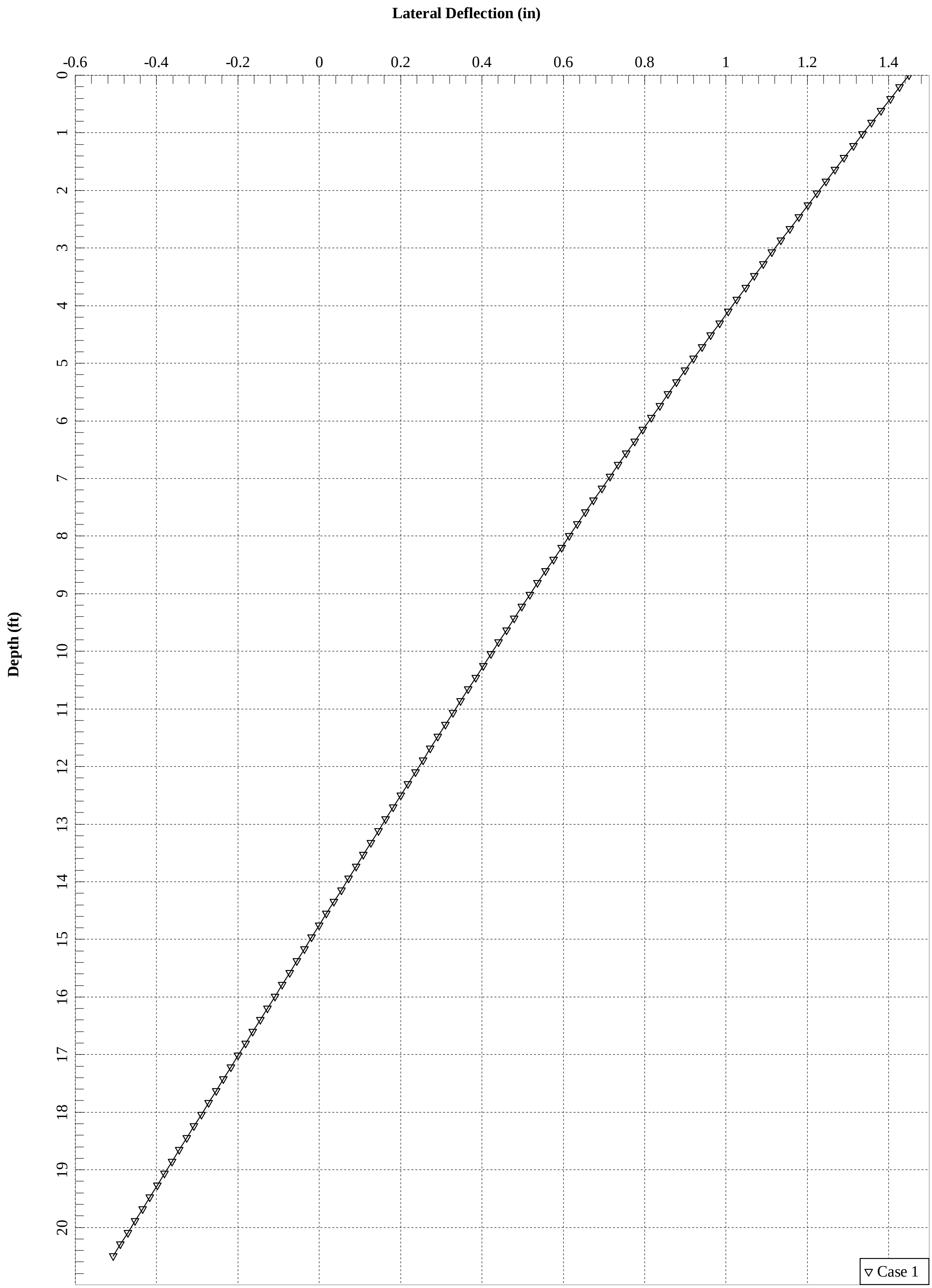
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

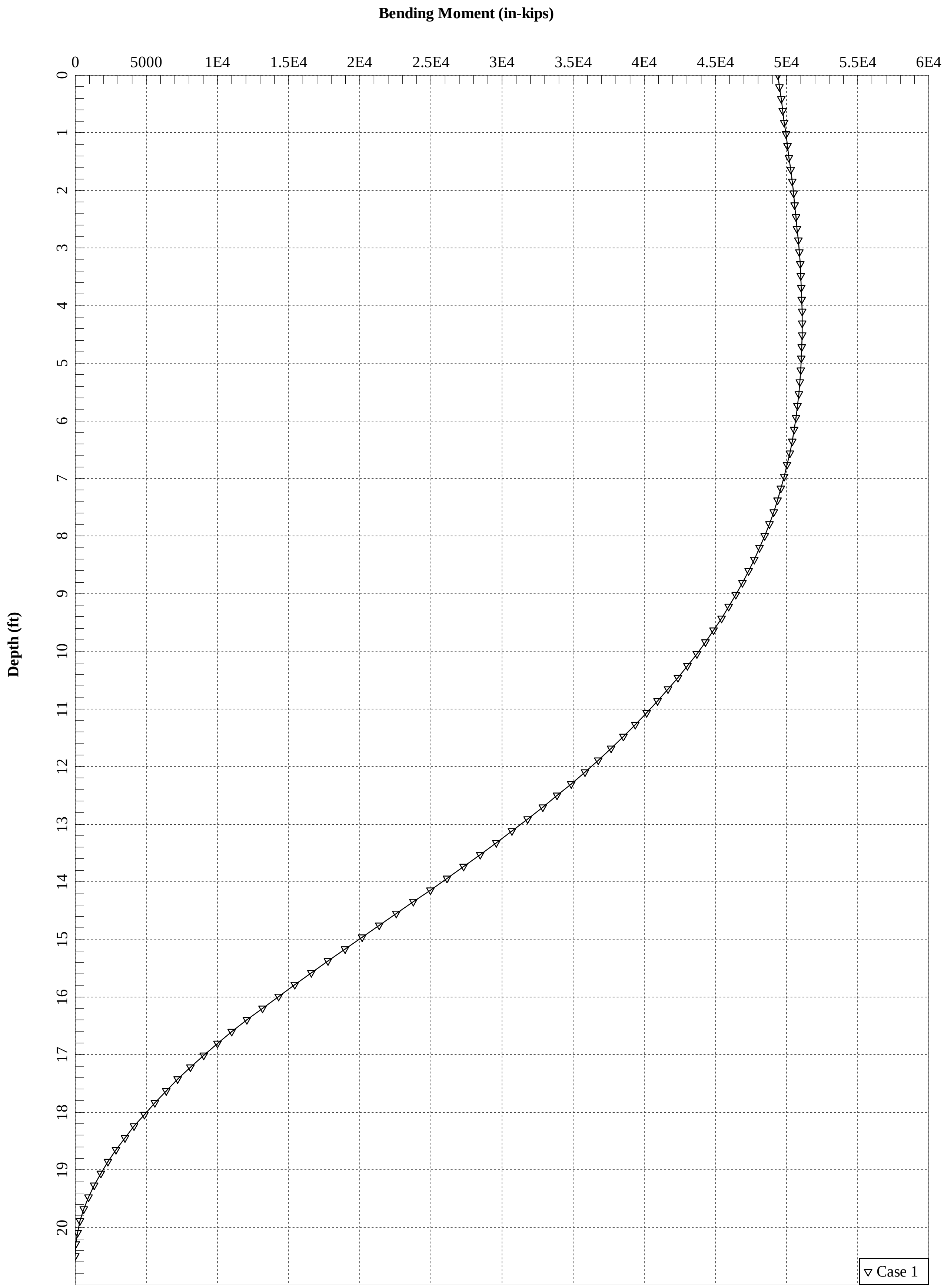
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00148329	4550.00007	715410.04308	3067503.	4.823126E+08
0.00446515	13696.86480	2153599.	3067503.	4.823126E+08
0.00707710	21709.01709	3413373.	3067503.	4.823126E+08
0.00893030	27393.72961	4307198.	3067503.	4.823126E+08
0.01036776	31803.13520	5000502.	3067503.	4.823126E+08
0.01154225	35405.88189	5566972.	3067503.	4.823126E+08
0.01253526	38451.96082	6045916.	3067503.	4.823126E+08
0.01339545	41090.59441	6460796.	3067503.	4.823126E+08
0.01415420	43418.03418	6826747.	3067503.	4.823126E+08
0.01483291	45500.00000	7154100.	3067503.	4.823126E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00005747	27719.99687	4939200.	4.823126E+08	8.593935E+10
0.00017314	83446.67637	14868474.	4.819572E+08	8.587481E+10
0.00027477	132265.68511	23565973.	4.813618E+08	8.576494E+10
0.00034705	166906.52786	29736947.	4.809236E+08	8.568388E+10
0.00040323	193777.88925	34523526.	4.805611E+08	8.561690E+10
0.00045193	215737.98163	38434447.	4.773678E+08	8.504468E+10
0.00050740	234349.51807	41741082.	4.618629E+08	8.226456E+10
0.00071984	251289.32468	44605421.	3.490924E+08	6.196607E+10
0.00082716	266304.62096	47131946.	3.219505E+08	5.698043E+10
0.00091418	279817.65968	49392000.	3.060859E+08	5.402874E+10

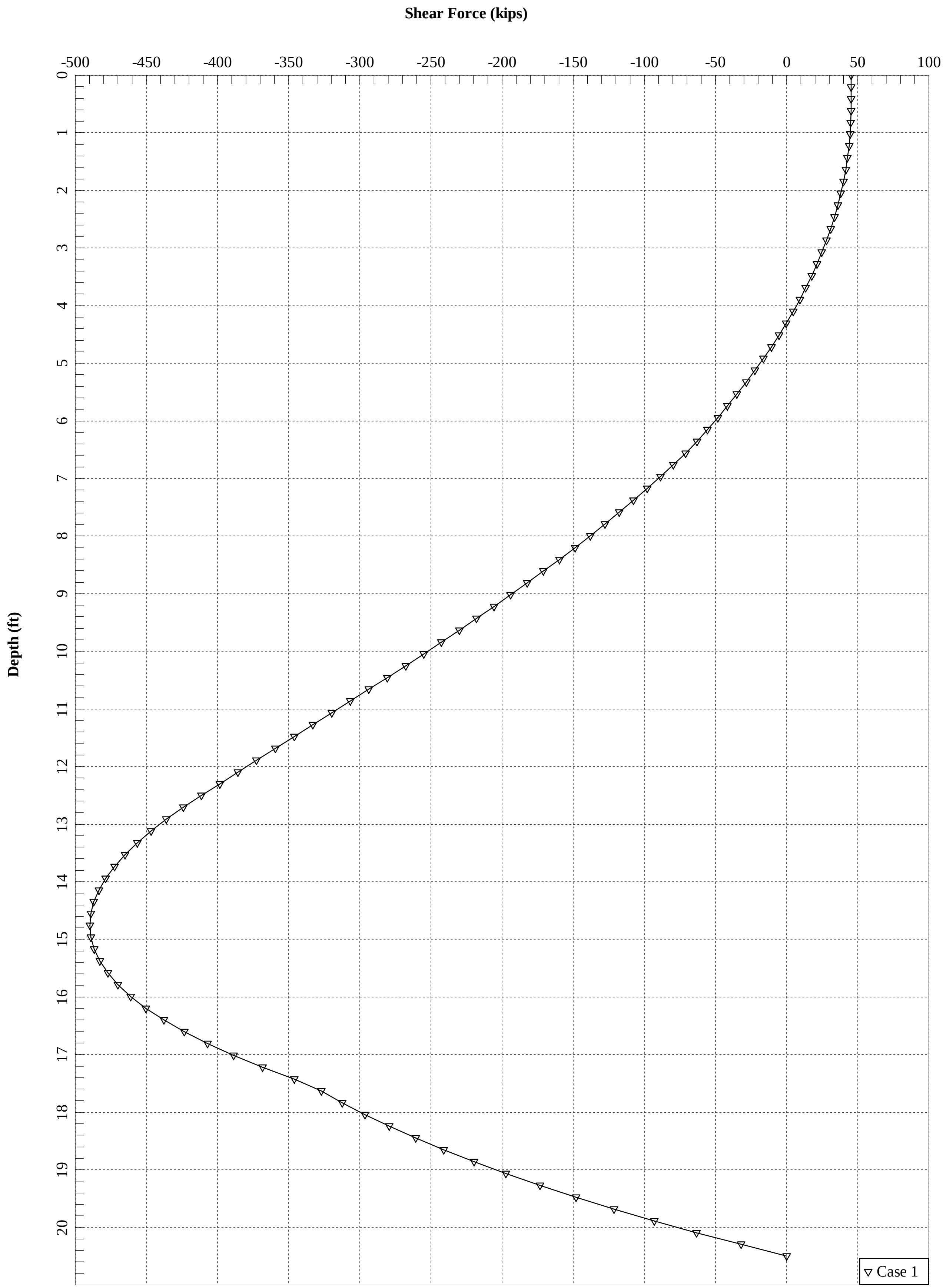
K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1



Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
5.5E4
6E4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1



Shear Force (kips)
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1

Augment ID: CT33XC525Q17.1

RFDS ID: 111265

SprintVision

RF Design Sheet

Site Identification	
Cascade	CT33XC525
SMS Schedule ID	12456355
SMS Schedule Name	DO Macro Upgrade
PID	
RRU OEM	ALU
Switch OEM	Alcatel Lucent
RFDS Issue Date	2017-08-15 00:00:00.0
RFDS Revision Date	2017-11-08 00:00:00.0
RFDS Revision	3

Filter Analysis Complete	YES
RFDS - Issue Date	08/15/2017
Design Status	Complete
Project Description	DO Macro Upgrade - Add 2500 MHz

Contact Information	
Engineer Email	Bill.M.Hastings@sprint.com
Sprint Badged RF Engineer	Bill Hastings
RF Engineer Email	Bill.M.Hastings@sprint.com
RF Engineer Phone	978-590-9700
RF Manager	Jonathan Hull
RF Manager Email	Jonathan.B.Hull@Sprint.com
RF Manager Phone	617-233-2920

Carrier Count	
2500 LTE	2
1900 LTE	1
1900 EVDO	
1900 Voice	1
800 LTE	1
800 Voice	1

Location Details	
Latitude	41.43231666
Longitude	-73.4028
Market	Southern Connecticut
Region	Northeast
City	Brookfield
State	CT
Zip Code	CT/06084
County	Fairfield

2500MHz	3
1900MHz	3
800MHz	3

Battery Backup Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

UE Relay Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
UE Relay Azimuth	
Manufacturer	
UE Relay CL Height (meters)	

GPS Antenna Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
GPS Antenna needed at site	

Repeater Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

Junction Box Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Junction Boxes needed at site	

ALU Top Hat Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Top Hat Quantity	

Growth Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	

BTS #2 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Needed at site	

Power Protection Cabinet Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Power Protection Cabinet	

BTS #1 Model	
Model Number	
Weight (Lbs.)	
Dimensions (In.)	
Manufacturer	
Number of BTS #1	

A&E Drawing Requirements

10/19/2017 (WR): RFDS revised to replace existing NV dual band antenna with Commscope 10 port tri-band antenna and add 6 twin diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes Special Construction Requirements

10/19/2017 (WR): RFDS revised to replace existing NV dual band antenna with Commscope 10 port tri-band antenna and add 6 twin diplexers for ground mount 1900/800/2500 RRUs.

Additional RF Notes

Keep Existing NV Antenna for 800/1900 and add 1 800/2500 antenna for LTE2.5 8T8R and enhance 2R for 800 MHz

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	TD-RRH8x20-25	TD-RRH8x20-25	TD-RRH8x20-25	N/A	N/A	N/A
Weight (lbs)	76.2	76.2	76.2	N/A	N/A	N/A
Dimensions	26 x 18.6 x 6.7	26 x 18.6 x 6.7	26 x 18.6 x 6.7	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	Hybriflex	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	1	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	1.54	N/A	N/A	N/A	N/A	N/A
Manufacturer	ALU	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

RF Design Sheet

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Number of RRUs needed	0	0	0	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-2x50-800	RRH-2x50-800	RRH-2x50-800	N/A	N/A	N/A
Weight (lbs)	69.1	69.1	69.1	N/A	N/A	N/A
Dimensions	16 x 13 x 10	16 x 13 x 10	16 x 13 x 10	N/A	N/A	N/A
Manufacturer	ALU	ALU	ALU	N/A	N/A	N/A
Number of RRUs needed	1	1	1	0	0	0
Filter Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 2						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A		N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Filter Model 3						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions		N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Trunk Cable 1 Qty						
Power Junction Cylinder Model						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	0	0	0	0	0	0
Optical Junction Cylinder Qty needed						
Model Number	N/A	N/A	N/A	N/A	N/A	N/A
Weight (Lbs.)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions (In.)	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed	0	0	0	0	0	0

Band: 2500	Alpha		Beta		Gamma		Delta		Epsilon		Zeta	
Antenna1												
Model Number	Antenna assigned on a different band		Antenna assigned on a different band		Antenna assigned on a different band							
Weight (lbs)	0		0		0		N/A		N/A		N/A	
Dimensions	0 x 0 x 0		0 x 0 x 0		0 x 0 x 0		N/A		N/A		N/A	
Manufacturer	-		-		-		N/A		N/A		N/A	
Ant1 Top Jumper Make/Mode/Qtyl	2.5 Jumper	8	2.5 Jumper	8	2.5 Jumper	8	N/A	0	N/A	0	N/A	0
Ant 1 RF requested Diameter	1/2"		1/2"		1/2"		N/A		N/A		N/A	
Ant 1 RF requested Top Jumper Length(ft)	8		8		8		N/A		N/A		N/A	
Antenna 1 Azimuth	40		240		310		N/A		N/A		N/A	
Antenna 1 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Center Line (ft)	133.0052536		133.0052536		133.0052536		N/A		N/A		N/A	
Antenna 1 Electrical DT	2		2		2		N/A		N/A		N/A	
Antenna 1 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 1 Twist	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna2												
Model Number												
Weight (lbs)	N/A		N/A		N/A		N/A		N/A		N/A	
Dimensions	N/A		N/A		N/A		N/A		N/A		N/A	
Manufacturer	N/A		N/A		N/A		N/A		N/A		N/A	
Ant2 Top Jumper Make/Mode/Qtyl	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0
Ant 2 RF Top Jumper Diameter	N/A		N/A		N/A		N/A		N/A		N/A	
Ant 2 RF Top Jumper Length(ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Azimuth	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Mechanical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Center Line (ft)	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 2	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Electrical DT 3	N/A		N/A		N/A		N/A		N/A		N/A	
Antenna 2 Twist	N/A		N/A		N/A		N/A		N/A		N/A	

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	DHHTT65B-3XR	DHHTT65B-3XR	DHHTT65B-3XR			
Weight (lbs)	48.5	48.5	48.5	N/A	N/A	N/A
Dimensions	72 x 12 x 7.1	72 x 12 x 7.1	72 x 12 x 7.1	N/A	N/A	N/A
Manufacturer	CommScope	CommScope	CommScope	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper 8	800/1900 Jumper 8	800/1900 Jumper 8	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	40	240	310	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	0	N/A	N/A	N/A
Antenna 1 Center Line (ft)	133.0052536	133.0052536	133.0052536	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	3	N/A	N/A	N/A
Antenna 1 Electrical DT 2	0	0	0	N/A	N/A	N/A
Antenna 1 Electrical DT 3	0	0	0	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	
Ant2 Top Jumper Make/Mode/Qtyl	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0	N/A
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

RF Design Sheet

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band	Antenna assigned on a different band			
Weight (lbs)	0	0	0	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A
Manufacturer	-	-	-	N/A	N/A	N/A
Ant1 Top Jumper Make/Mode/Qtyl	800/1900 Jumper 4	800/1900 Jumper 4	800/1900 Jumper 4	N/A 0	N/A 0	N/A 0
Ant 1 RF requested Diameter	1/2"	1/2"	1/2"	N/A	N/A	N/A
Ant 1 RF requested Top Jumper Length(ft)	8	8	8	N/A	N/A	N/A
Antenna 1 Azimuth	40	240	310	N/A	N/A	N/A
Antenna 1 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	133.0052536	133.0052536	133.0052536	N/A	N/A	N/A
Antenna 1 Electrical DT	5	5	5	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Twist	N/A	N/A	N/A	N/A	N/A	N/A
Antenna2						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	
Ant2 Top Jumper Make/Mode/Qtyl	N/A 0	N/A 0	N/A 0	N/A 0	N/A 0	N/A
Ant 2 RF Top Jumper Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant 2 RF Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Azimuth	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Mechanical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Center Line (ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 2	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Electrical DT 3	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 Twist	N/A	N/A	N/A	N/A	N/A	N/A

SprintVision **RF Design Sheet**

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	1900MHz	1900MHz	1900MHz			
Antenna 1 Lower Passive Component Model						
Model Number	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)	DPO-7126Y-0-T1 (1.9/2.5 4:2 Diplexer)			
Weight (lbs)	7.3	7.3	7.3	N/A	N/A	N/A
Dimensions	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	6.26 x 4.07 x 7.42	N/A	N/A	N/A
Manufacturer	CCI	CCI	CCI	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	1900MHz	1900MHz	1900MHz			
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

SprintVision **RF Design Sheet**

Band: 1900	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL			
Weight (lbs)	6.4	6.4	6.4	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Upper Pass Comp band combi with	800MHz	800MHz	800MHz			
Antenna 1 Lower Passive Component Model						
Model Number	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL	KIT-FD9R6004/1C-DL			
Weight (lbs)	6.4	6.4	6.4	N/A	N/A	N/A
Dimensions	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	5.8 x 6.5 x 4.6	N/A	N/A	N/A
Manufacturer	RFS	RFS	RFS	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	1	1	1	0	0	0
Ant1 Low Pass Comp band comb with	800MHz	800MHz	800MHz			
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant1 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 band combined with	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Upper Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Upper Pass Comp band combi with						
Antenna 1 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Low Pass Comp band comb with						
Position Ant 1						
Antenna2 Split						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Accept Proposed Ant2 Model Change?	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 2 band combined with						
Antenna 2 Upper Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant2 Upper Passive Comp Qty needed	0	0	0	0	0	0
Antenna 2 Lower Passive Component Model						
Model Number						
Weight (lbs)	N/A	N/A	N/A	N/A	N/A	N/A
Dimensions	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturer	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 Lower Passive Comp Qty needed	0	0	0	0	0	0
Ant1 Lower Passive Component band combined with						
Position Ant 2						

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

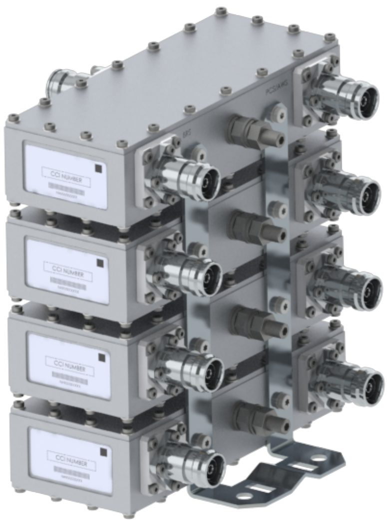
Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption
China RoHS SJ/T 11364-2006	Above Maximum Concentration Value (MCV)
ISO 9001:2008	

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 configured with DIN 7-16.

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.

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, ±20KA maximum, 10 strikes per IEC61000-4-5

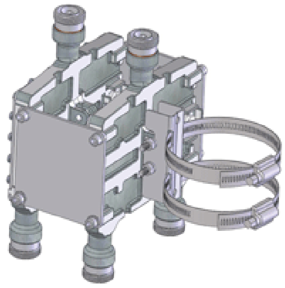
Mechanical

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	6.26 x 7.42 x 2.02 in. (159 x 188.5 x 51.4 mm)	6.26 x 7.42 x 4.07 in. (159 x 188.5 x 103.4 mm)	6.26x 7.42 x 8.17 in. (159 x 188.5 x 207.4 mm)
Dimensions enclosure only	2.95 x 7.42 x 1.95 in. (75 x 188.5 x 48.8 mm)		
Connectors	3 x 7-16 DIN female long neck		
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

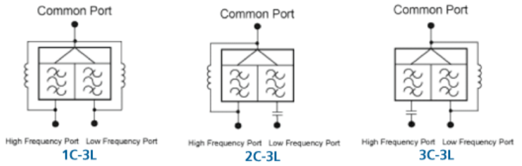
KIT-FD9R6004/1C-DL Installation Instructions

Notes

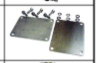
RADIO FREQUENCY SYSTEMS
The Clear Choice®

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)	

CLARENCE WELTI ASSOC., INC.
988 NEW LONDON TURNPIKE
GLASTONBURY, CONN. 06033

"BORING LOG"

PROJ. LONG MT.PLUM TREE TRANS-LINE NEW MILFORD,BROOKFIELD, ~~DANBURY,BETHEL~~

CLIENT NUSCO

BORING NO. → Pressuremeter
LINE & STA.
OFFSET
GR. ELEV. MB 400TSF

BORING NO. 68
LINE & STA.
OFFSET 15' WEST #1024 6
GR. ELEV.

A	STRATUM DESCRIPTION	BLOWS PER	B
	MB =125TSF	Ks=94 Kcf	
	MB 225TSF	Ks=169. Kcf	
	MB= 300TSF	Ks=225 Kcf	
	Ks=120 Z/B	ks=15 Z (8')	

A	STRATUM DESCRIPTION	BLOWS PER 6"	B
0.7	TOPSOIL		
	BR.FINE-MED.SAND TR.SILT,SOME FINE-CRS.GRAVEL, COBBLES AND BOULDERS	9-11-15	
9.0	GR.FINE-MED.SAND SOME FINE-CRS. GRAVEL,TR.COBBLES & SILT	14-22-27	
		22-39-47	
20.0	DRILLED ROCK RUN #1 20.0-25.0 REC.60"		
25.0			
	BOTTOM OF BORING	25.0	
	WATER AT 17.0 @	0 HRS.	
	DATE: 1/22/77 DRILLER: MOODIE		

1. COL. A STRATA DEPTH
2. COL. B
3. HAMMER = 140#; FALL 30"
4. SAMPLER = _____ O.D. SPLIT SPOON
5. GWT = GROUND WATER

AND - 40 to 50%
SOME - 10 to 40%
TRACE - 0 to 10%