NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Victoria Masse
420 Main Street #2, Sturbridge, MA 01566
860-306-2326
victoria@northeastsitesolutions.com

August 5, 2021

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

RE: Notice of Exempt Modification
160 Sound Beach Ave (aka Arcadia Road), Greenwich CT 06870
Latitude: 41.03302600
Longitude: -73.56729100
T-Mobile Site#: CT11001B_L600

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 105-foot mount on the existing 95-foot Utility Lattice Tower, located at 160 Sound Beach Ave (aka Arcadia Road), Greenwich CT. The tower is owned by owned by CL&P and the property is owned by Connecticut Department of Transportation. T-Mobile now intends to replace six (6) existing antennas with three (3) new 600/700/1900 MHz antenna and three (3) new 2100 MHz antenna. The new antennas would be installed at the 105-foot level of the Utility Lattice Tower. T-Mobile is also proposing mount modifications. As shown on the enclosed mount analysis dated July 8, 2021 by Centek Engineering. This modification includes B2, B5 hardware that is both 4G (LTE), and 5G capable.
T-Mobile Planned Modifications:
Remove:
(3) EMS RR90-17-XXDP Antenna

Remove and Replace:
(3) EMS RR90-17-XXDP Antenna (Remove) - (3) RFS APXVAALL18- 600/700/1900 MHz Antenna (Replace)
Platform Mount (Remove) – SitePro-RDS-284 Antenna Mast (Replace)

Install New:
(6) Smart Bias-T

Existing to Remain:
(3) RFS APX16DWV-16DWVS-E-A20 2100 MHz Antenna
(24) Coax

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Ground Work:
Install (1) H-Frame
Install (3) Radio 4449 B71+B85
Remove (1) Nortel Cabinet

This facility was approved by the CT Siting Council. Per the attached Petition No. 526 – Dated October 3, 2001. T-Mobile (formally Voicestream) received approval to install on the existing transmission tower, with a total height of 112.5". Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the Honorable Fred Camillo, First Selectman of Greenwich, Katie DeLuca, AICP, Planning and Zoning Director and Eversource (CL&P) is the tower owner and property owner.

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

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

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

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

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

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

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

Sincerely,

Victoria Masse
Mobile: 860-306-2326
Fax: 413-521-0558
Office: 420 Main Street, Unit 2, Sturbridge MA 01566

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Email: victoria@northeastsitesolutions.com

Attachments cc:

The Honorable Fred Camillo, First Selectman
101 Field Point Road
First Floor
Greenwich, CT 06830

Katie DeLuca, AICP, Planning and Zoning Director
101 Field Point Road
2nd Floor
Greenwich, CT 06830

John A. Vitale- as property owner
Transportation Rail Officer II
Connecticut Department of Transportation
Bureau of Public Transportation
Office of Rails-Property Management Unit
4 Brewery Street, 4th Floor
New Haven, Connecticut 06511

Eversource (CL&P)- as tower owner
107 Selden Street
Berlin, CT 06037

Exhibit A

Original Facility Approval

Petition No. 526
VoiceStream Wireless
Greenwich, Connecticut
Staff Report
October 3, 2001

On October 1, 2001, Connecticut Siting Council (Council) member Edward S. Wilensky with Fred Cunliffe of Council staff met Voicestream Wireless (Voicestream) representatives Stephen Humes, Esq., Kurt Sheathelm, Haider Syed, and David Wicanpole for inspection of a Connecticut Light & Power Company (CL&P) electric transmission line structure (no. 1256) located at the Old Greenwich Metro North Railroad Station off Sound Beach Avenue, Greenwich. VoiceStream, 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.

VoiceStream proposes to install 12 antennas on a platform attached to an 18-inch by 18-inch lattice extension to the top of the existing 95-foot high transmission structure. The extension with antennas would rise 17.5 feet above the existing structure (112.5 feet above ground level). Also, a microwave dish antenna would be mounted four feet below the 12-antenna array for telephone switching from an adjacent site. Voicestream has agreed to move its antennas five feet lower or 12.5 feet above the existing structure (107.5 feet above ground level). This adjustment complies with CL&P's design requiring a minimum of six feet above the shield wire.

An alternative structure located east of the proposed site contains dense vegetation that would require clearing and is adjacent to railroad tracks, which would create difficult construction access. An alternative structure located to the west is being used by AT&T, approved by the Council in Petition No. 467, and is not structurally sound for sharing. Use of flush-mounted antennas on a pipe extension at the proposed site would not provide sufficient capacity for demand in the area.

Equipment cabinets will be mounted on a 16.5-foot x 5-foot concrete slab within a 10.6-foot x 24-foot fenced compound at the base of the tower. An underground conduit from an adjacent utility pole will provide power to the site. This fence would be architecturally treated with plastic slats in the chain-link fence. In addition, no vegetation would be cleared at this site.

Voicestream would access the site via the parking lot at the Old Greenwich Metro North Railroad Station. Voice stream has an agreement with the Connecticut Department of Transportation for the lease area at the base of the structure and access.

The zoning designation of this site is R-12 (residential); however, a Local Retail Business zone is located south beyond the parking lot. In addition to the railroad tracks and the high-voltage transmission right-of-way, other land uses across the railroad tracks are a General Business zone with an Industrial Re-Use overlay containing multi-family residential units.

The worst-case power density for the telecommunications operations at the site has been calculated to be 5.7% of the applicable standard for uncontrolled environments.

VoiceStream contends that the proposed modification of the structure would not require a Certificate because the increase in height of this monopole structure will not result in a substantial environmental effect nor will there be damage to existing scenic, historical or recreational values.and the proposed project will prevent the construction of a new tower in the area.

Exhibit B

Property Card

ADMINISTRATIVE INFORMATION

PARCEL NUMBER
06-4687/S

Parent Parcel Number

Property Address
ARCADIA ROAD 0000

Neighborhood
111060 DISTRICT 6 S OLD GREENWICH [1]

Property Class
299 Exempt Commercial

TAXING DISTRICT INFORMATION

Jurisdiction	57	Greenwich, CT
Area	001	
Corporation	057	
District	06	
Section & Plat	392	
Routing Number	0220N0005	

OWNERSHIP

Tax ID 440/039

TOWN OF GREENWICH C/O FINANCE DEPT
101 FIELD POINT RD
GREENWICH, CT 06830

LOT NO 11A 8A ARCADIA RD N5

Printed 01/12/2021 Card No. 1 of 1

TRANSFER OF OWNERSHIP

Date		
12/09/1954	NA	$0

EXEMPT

VALUATION RECORD

Assessment Year		10/01/2015	10/01/2015	10/01/2016	10/01/2017	10/01/2018	10/01/2019	10/01/2020
Reason for Change		2015 Prelim	2015 Final	2016 List	2017 List	2018 List	2019 List	2020 List
VALUATION	L	4648300	4648300	4654300	4654300	4654300	4654300	4654300
Market	B	453100	453100	453100	453100	453100	453100	453100
	T	5101400	5101400	5107400	5107400	5107400	5107400	5107400
VALUATION	L	3253810	3253810	3258010	3258010	3258010	3258010	3258010
70% Assessed	B	317170	317170	317170	317170	317170	317170	317170
	T	3570980	3570980	3575180	3575180	3575180	3575180	3575180

Site Description

Topography:

Public Utilities:
Sewer, Electric

Street or Road:

Neighborhood:

Zoning:
R-12 Single Fam 12,000 sf

Legal Acres:
1.6168

LAND DATA AND CALCULATIONS

Land Type	Rating Soil ID -or- Actual Frontage	Measured Acreage -or- Effective Frontage	Table Effective Depth	Prod. Factor -or- Depth Factor -or- Square Feet	Base Rate	Adjusted Rate	Extended Value	Influence Factor	Value
1 Residential Land		1.6168		1.00	1683448.00	1683448.00	2721800 B	71%	4654300

CKMP: 3484, 8701, 8702, 8725 & 8726
DBA: Railroad parking w/ access off Sound Beach Ave.
P: 213 spcs

Permit Number Type	FilingDate	Est. Cost Est. SqFt	Field Visit

Supplemental Cards
TRUE TAX VALUE 4654300

Supplemental Cards
TOTAL LAND VALUE 4654300

IMPROVEMENT DATA

PHYSICAL CHARACTERISTICS

Item Description	Units	Cost	Total	Pct

01

(LCM: 150.00)

SPECIAL FEATURES

Description	Value

SUMMARY OF IMPROVEMENTS

ID	Use	Stry Hgt	Const Type	Grade	Year Const	Eff Year	Cond	Base Rate	Feat-ures	Adj Rate	Size or Area	Computed Value	Phys Depr	Obsol Depr	Market Adj	% Comp	Value
01	PAVING	0.00	85	Good	1990	2000	VG	2.90	N	6.53	69500	453840	0	0	100	100	453800

Data Collector/Date	Appraiser/Date	Neighborhood	Supplemental Cards	
JB 09/07/1999	TOG 10/01/2015	Neigh 111060 AV	**TOTAL IMPROVEMENT VALUE**	453800

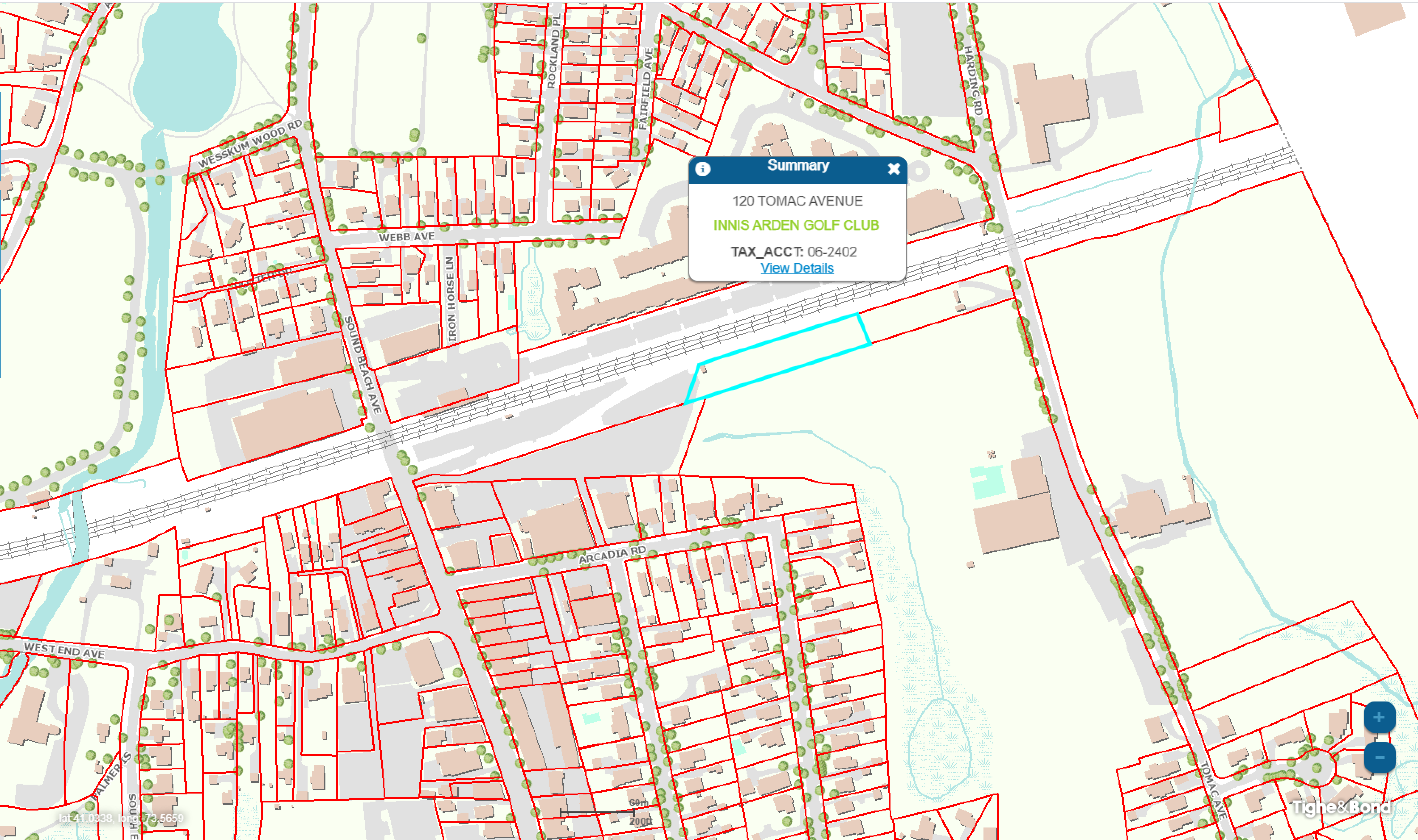

Summary
120 TOMAC AVENUE
INNIS ARDEN GOLF CLUB
TAX_ACCT: 06-2402
View Details
WESSKUM WOOD RD
ROCKLAND PL
FAIRFIELD AVE
HARDING RD
WEBB AVE
IRON HORSE LN
SOUND BEACH AVE
ARCADIA RD
WEST END AVE
PALMER IS
TOMAC AVE
60m
200ft
lat 41.0338, long -73.5659
Tighe&Bond

Exhibit C

Construction Drawings

T-Mobile

SITE NAME: GREENWICH/RIVERSIDE

SITE ID: CT11001B

160 SOUND BEACH ROAD

GREENWICH, CT 06870

T-MOBILE A&L TEMPLATE (PROVIDED BY RFDS)
67D94B_1DP+1OP

T-MOBILE RAN TEMPLATE (PROVIDED BY RFDS)
67D94B OUTDOOR

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." 2017 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 MANUFACTURER'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 T–MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
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 CONDUITS 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 THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

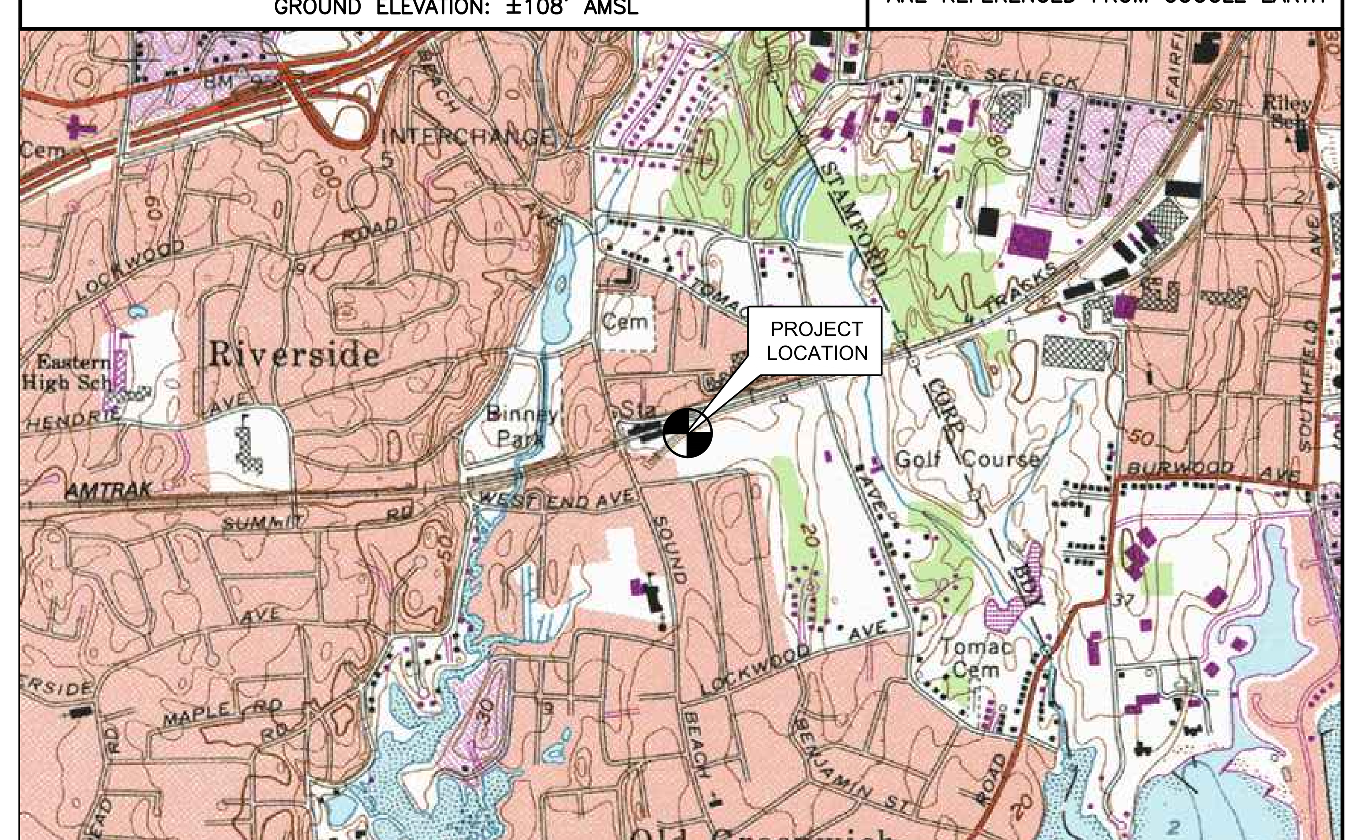
SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH, BLOOMFIELD, CT 06002
TO: 160 SOUND BEACH ROAD, GREENWICH, CT 06870

1. START OUT GOING NORTH ON GRIFFIN RD TOWARD HARTMAN RD.	0.30 MI.
2. TAKE THE SECOND RIGHT ONTO DAY HILL RD.	0.14 MI.
3. TAKE THE FIRST RIGHT ONTO BLUE HILLS AVENUE EXT/CT–187. CONTINUE TO FOLLOW CT–187	0.64 MI.
4. STAY STRAIGHT TO GO ONTO BLUE ILLS AVE/CT–187.	1.24 MI.
5. TURN LEFT ONTO OLD WINDSOR RD/CT–305. CONTINUE TO FOLLOW CT–305.	2.33 MI.
6. MERGE ONTO I–91 S TOWARD HARTFORD.	44.03 MI.
7. KEEP RIGHT TOWARD NY CITY	0.21 MI.
8. MERGE ONTO 1–95 S VIA THE EXIT ON THE LEFT TOWARD NY CITY	42.20 MI.
9. TAKE THE US–1 EXIT, EXIT 5 TOWARD OLD GREENWICH/RIVERSIDE.	0.13 MI.
10. MERGE ONTO E PUTNAM AVE/US–1 N TOWARD OLD GREENWICH/RR STATION/STAMFORD/CIVIC CENTER	0.22 MI.
11. TURN RIGHT ONTO SOUND BEACH AVE.	0.82 MI.
12. 160 SOUND BEACH AVE, OLD GREENWICH, CT 06870–1712, 160 SOUND BEACH AVE IS ON THE LEFT	

SITE COORDINATES: LATITUDE: 41° 01' 58.92" N; LONGITUDE: 73° 34' 02.31" W; GROUND ELEVATION: ±108' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP

NORTH

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. EXISTING LATTICE EXTENSION TO BE REMOVED.
2. EXISTING EMS–RR90–17–XXDP ANTENNA, TYP. (2) PER SECTOR. TOTAL (6) TO BE REMOVED.
3. INSTALL (1) APXVAARR18_43–U–NA20 ANTENNA PER SECTOR. TOTAL (3)
4. INSTALL (1) EQUIPMENT FRAME
5. INSTALL (1) RADIO 4449 B71+B85 PER SECTOR. TOTAL (3) MOUNTED TO NEW EQUIPMENT FRAME AT GRADE.
6. INSTALL NEW ANTENNA MAST
7. INSTALL NEW ANTENNA MOUNT TYP. (2). TOTAL (2).
8. INSTALL BIAS–T AT ANTENNA TYP. (1) PER ANTENNA. TOTAL (6)

PROJECT SUMMARY (STRUCTURAL)

FOR REQUIRED STRUCTURAL MODIFICATIONS, SEE SHEET(S) S–1 FOR ADDITIONAL DETAILS. INSTALL NEW ANTENNA MOUNT AND MAST.

PROJECT INFORMATION

SITE NAME:	GREENWICH/RIVERSIDE
SITE ID:	CT11001B
SITE ADDRESS:	160 SOUND BEACH ROAD GREENWICH, CT 06870
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	SHELDON FREINCLE (PROJECT MANAGER) NORTHEAST SITE SOLUTIONS (203) 776–8521
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488–0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41° 01' 58.92" N LONGITUDE: 73° 34' 02.31" W GROUND ELEVATION: ±108' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
1	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile · NSS NORTHEAST SITE SOLUTIONS

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

T-MOBILE NORTHEAST LLC

SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE:	06/14/21
SCALE:	AS NOTED
JOB NO.	21051.03

TITLE SHEET

T–1

Sheet No. 1 of 9

NOTES AND SPECIFICATIONS

DESIGN BASIS:

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

1. DESIGN CRITERIA:

- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE B/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

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." 2017 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 IT'S 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 SITE OWNER'S 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.

18\. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

19\. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.

20\. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

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	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST

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

T-MOBILE NORTHEAST LLC
SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

GENERAL NOTES AND SPECIFICATIONS

N-1

Sheet No. 2 of 9

NOTE:
ALL COAX LENGTHS TO BE MEASURED AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) TMA (QTY)	(QTY) PROPOSED COAX
A1	PROPOSED	RFS (APXVAARR18_43-U-NA20)	72 x 24 x 8.5	105'	60°	(P) RADIO 4449 B71+B85 (AT CABINET) (1)	(P) ANDREW-SMART BIAS-T (AT ANTENNA) (1)	
A2	EXISTING	RFS (APX16DWV-16DWV-S-E-A20)	55.9 x 13 x 3.15	105'	60°		(P) ANDREW-SMART BIAS-T (AT ANTENNA) (1)	
B1	PROPOSED	RFS (APXVAARR18_43-U-NA20)	72 x 24 x 8.5	105'	180°	(P) RADIO 4449 B71+B85 (AT CABINET) (1)	(P) ANDREW-SMART BIAS-T (AT ANTENNA) (1)	
B2	EXISTING	RFS (APX16DWV-16DWV-S-E-A20)	55.9 x 13 x 3.15	105'	180°		(P) ANDREW-SMART BIAS-T (AT ANTENNA) (1)	
C1	PROPOSED	RFS (APXVAARR18_43-U-NA20)	72 x 24 x 8.5	105'	300°	(P) RADIO 4449 B71+B85 (AT CABINET) (1)	(P) ANDREW-SMART BIAS-T (AT ANTENNA) (1)	
C2	EXISTING	RFS (APX16DWV-16DWV-S-E-A20)	55.9 x 13 x 3.15	105'	300°		(P) ANDREW-SMART BIAS-T (AT ANTENNA) (1)	

1 C-1 SITE LOCATION PLAN
SCALE: NOT TO SCALE

TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST

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

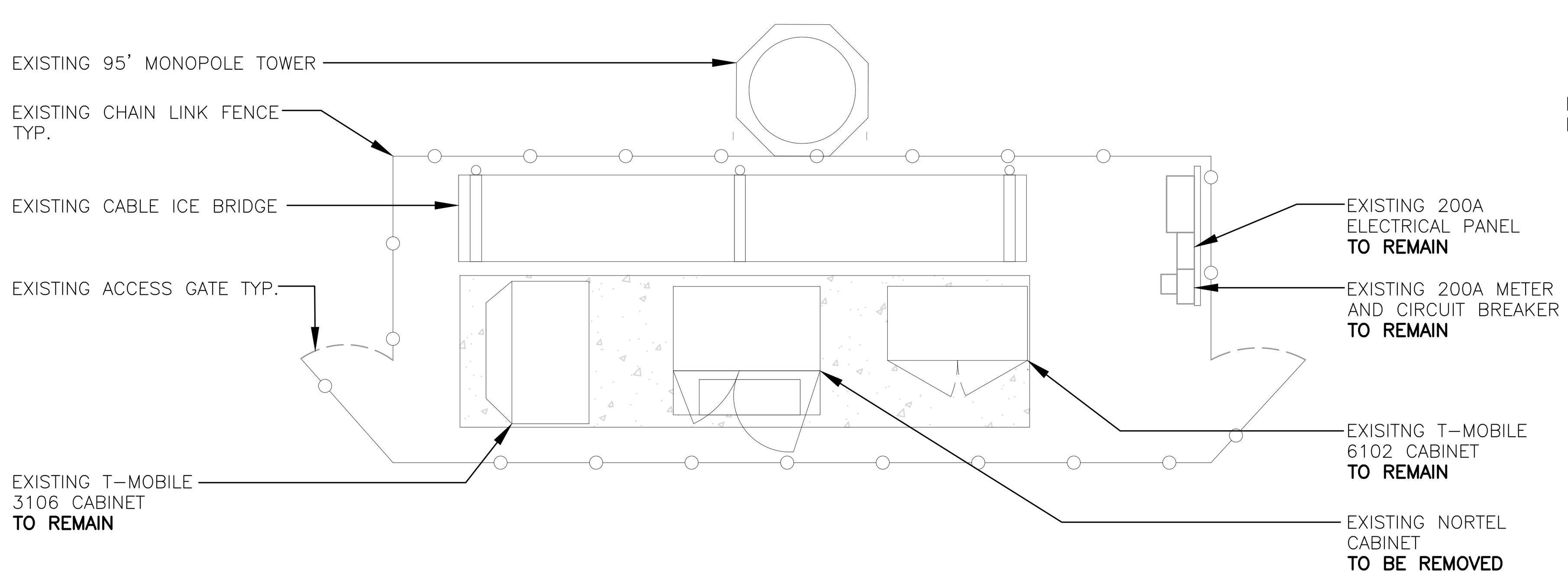
T-MOBILE NORTHEAST LLC
SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

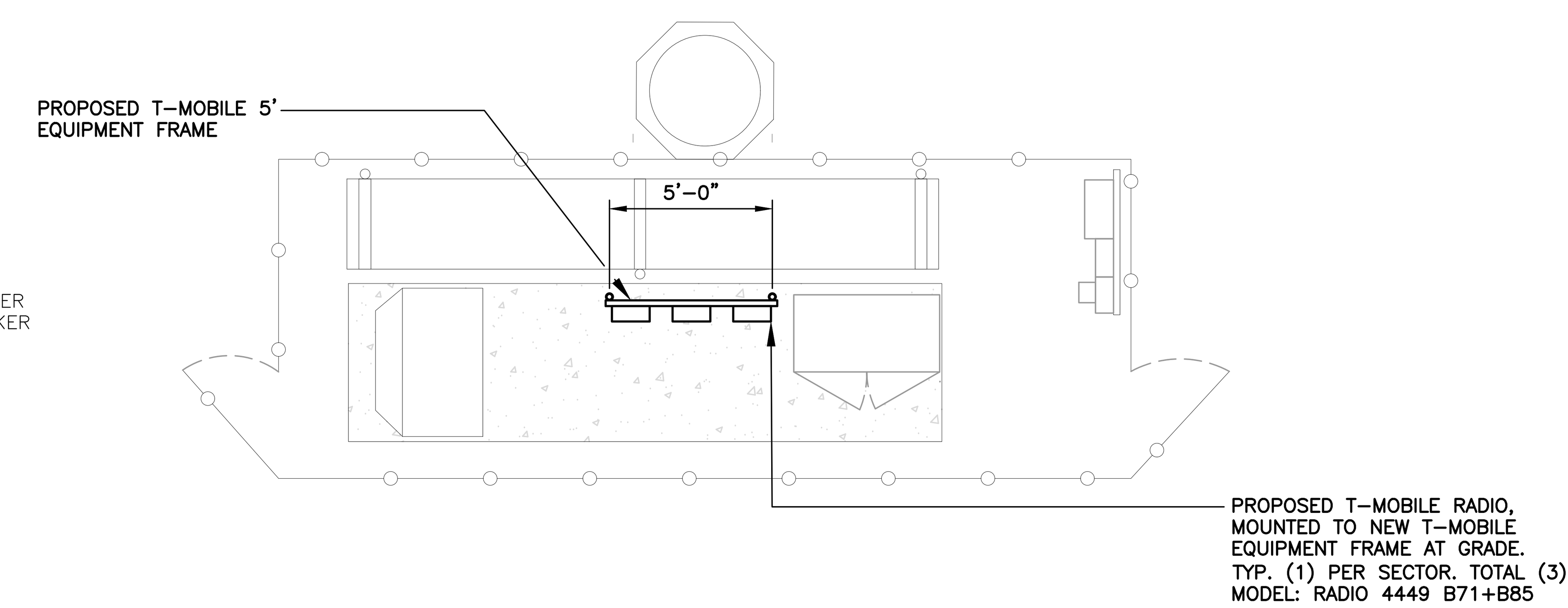
SITE LOCATION PLAN

C-1

Sheet No. 3 of 9



1 / C-2 **EXISTING EQUIPMENT PLAN** SCALE: 1/4" = 1' TRUE NORTH



2 / C-2 **PROPOSED EQUIPMENT PLAN** SCALE: 1/4" = 1' TRUE NORTH

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING..

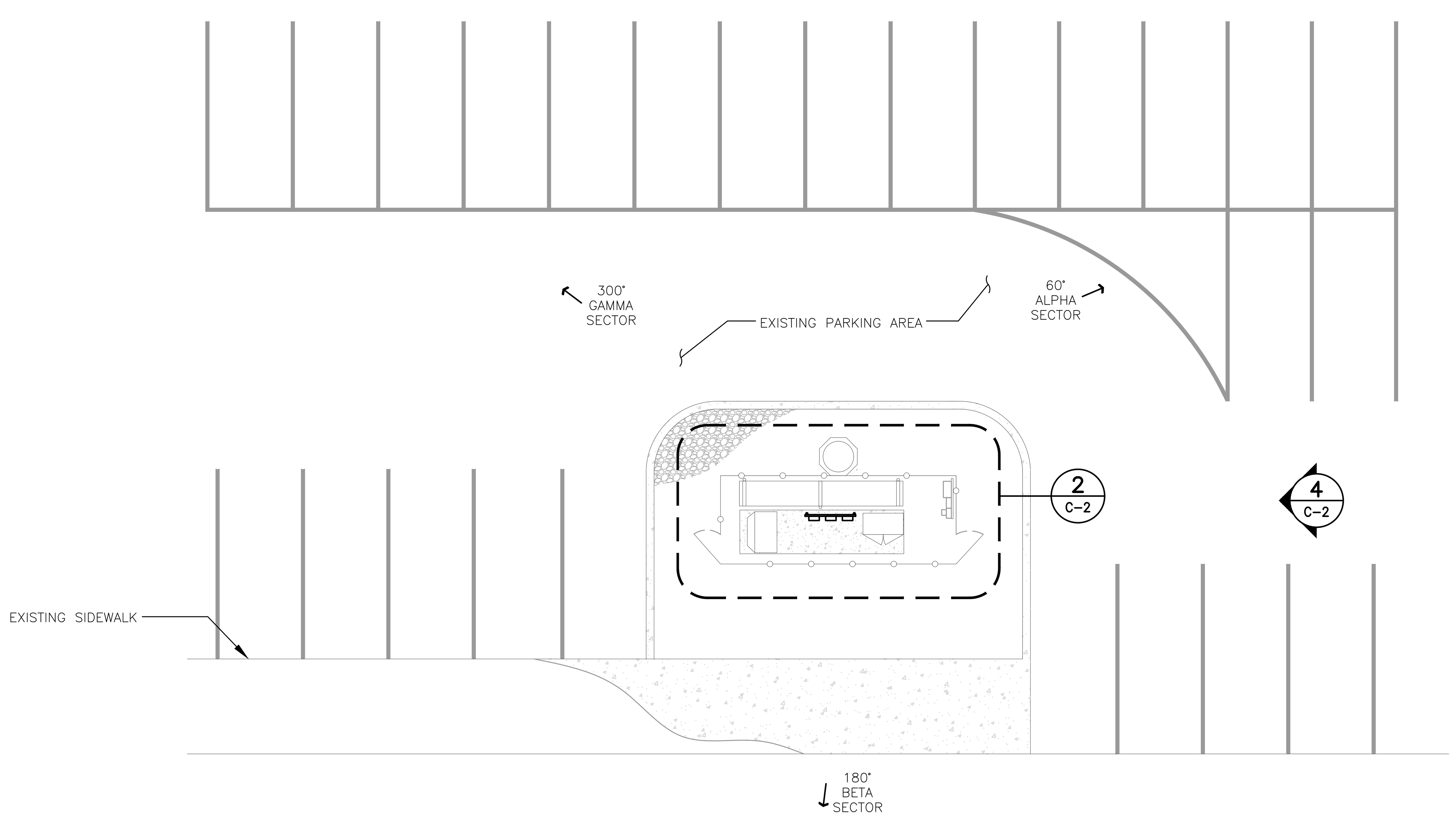
REFER TO THE ANTENNA MOUNT ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21051.03) DATED 07/08/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER AND TOWER FOUNDATION

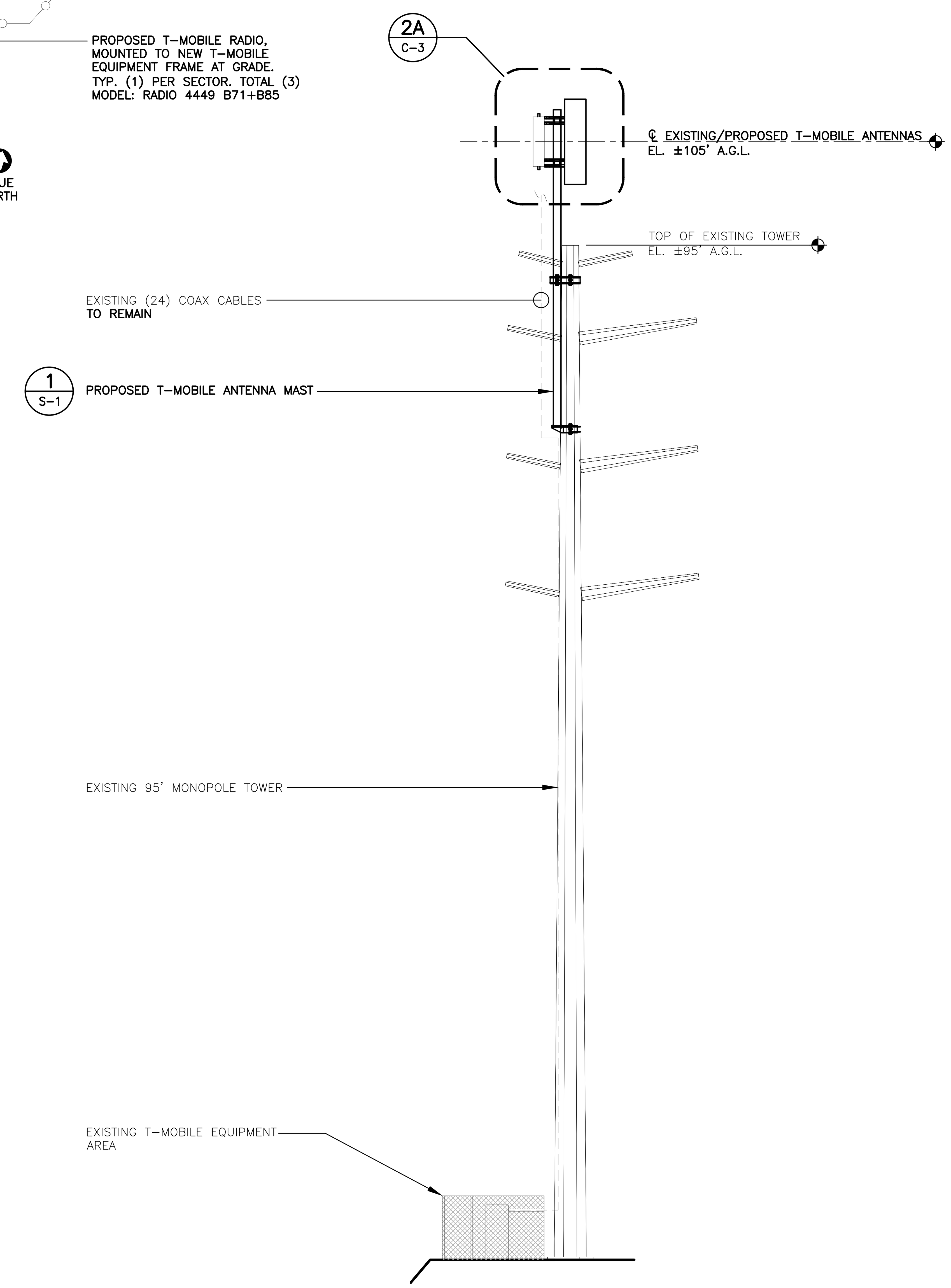
A STRUCTURAL ANALYSIS OF THE TOWER AND TOWER FOUNDATION WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 21051.03) DATED 07/08/21 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.



3 / C-2 **PROPOSED COMPOUND PLAN** SCALE: 1/4" = 1' TRUE NORTH



4 / C-2 **PROPOSED TOWER ELEVATION** SCALE: 1" = 8'

GRAPHIC SCALE 8 0 4 8 16 32 1" = 8'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST

CENTEK engineering Centered on Solutions™

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

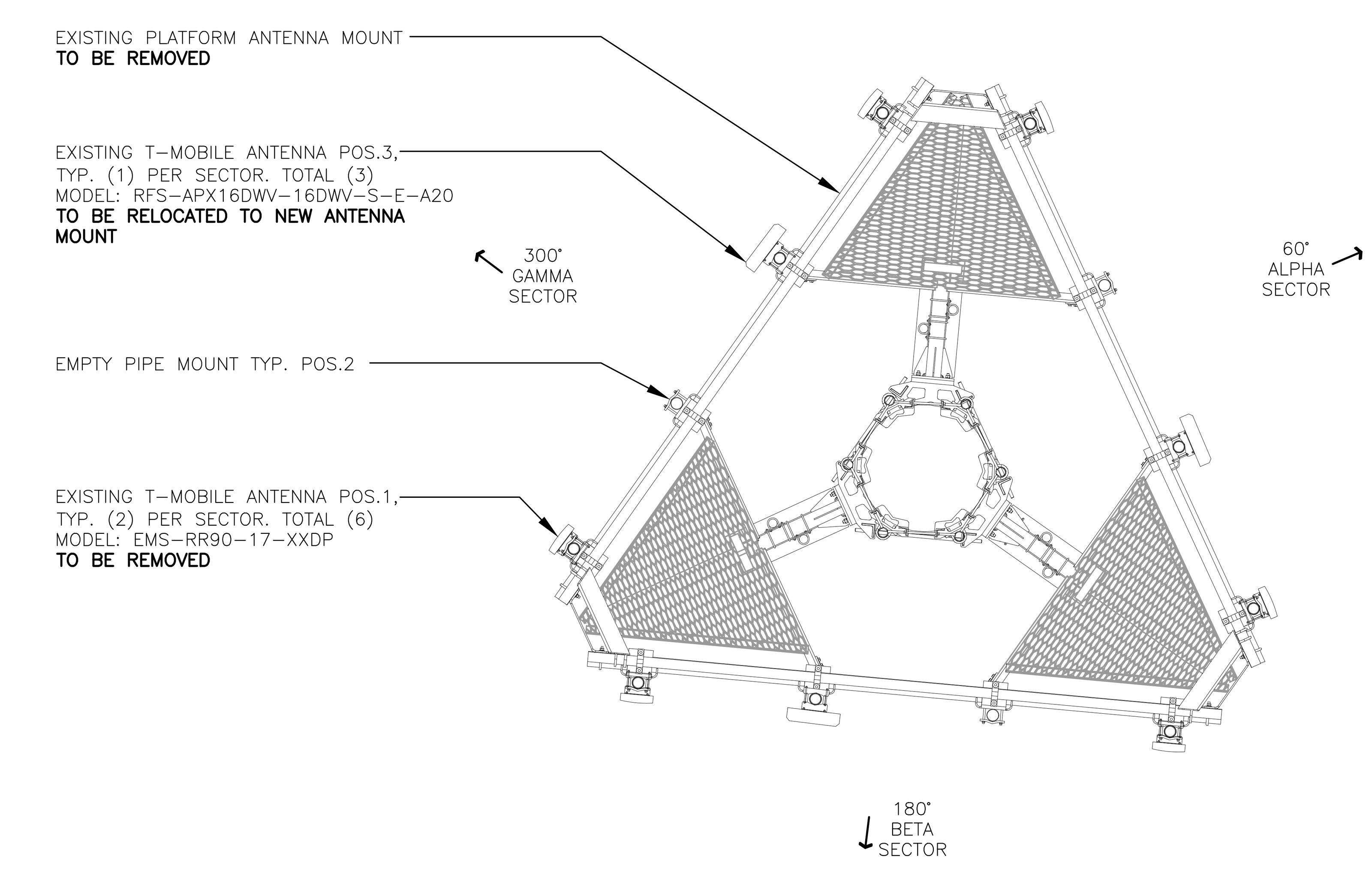
T-MOBILE NORTHEAST LLC
SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

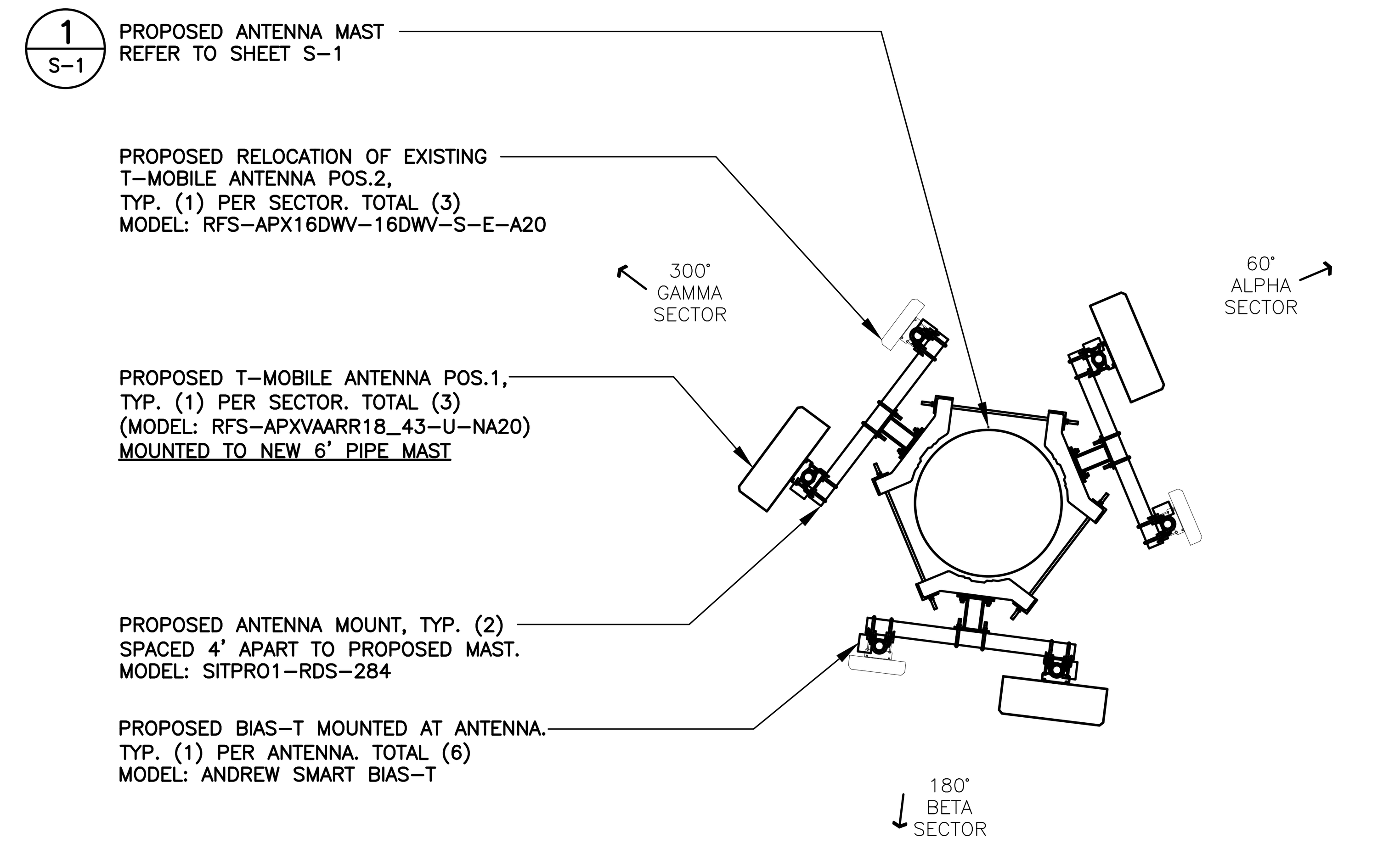
COMPOUND PLAN, EQUIPMENT PLANS, AND ELEVATION

C-2

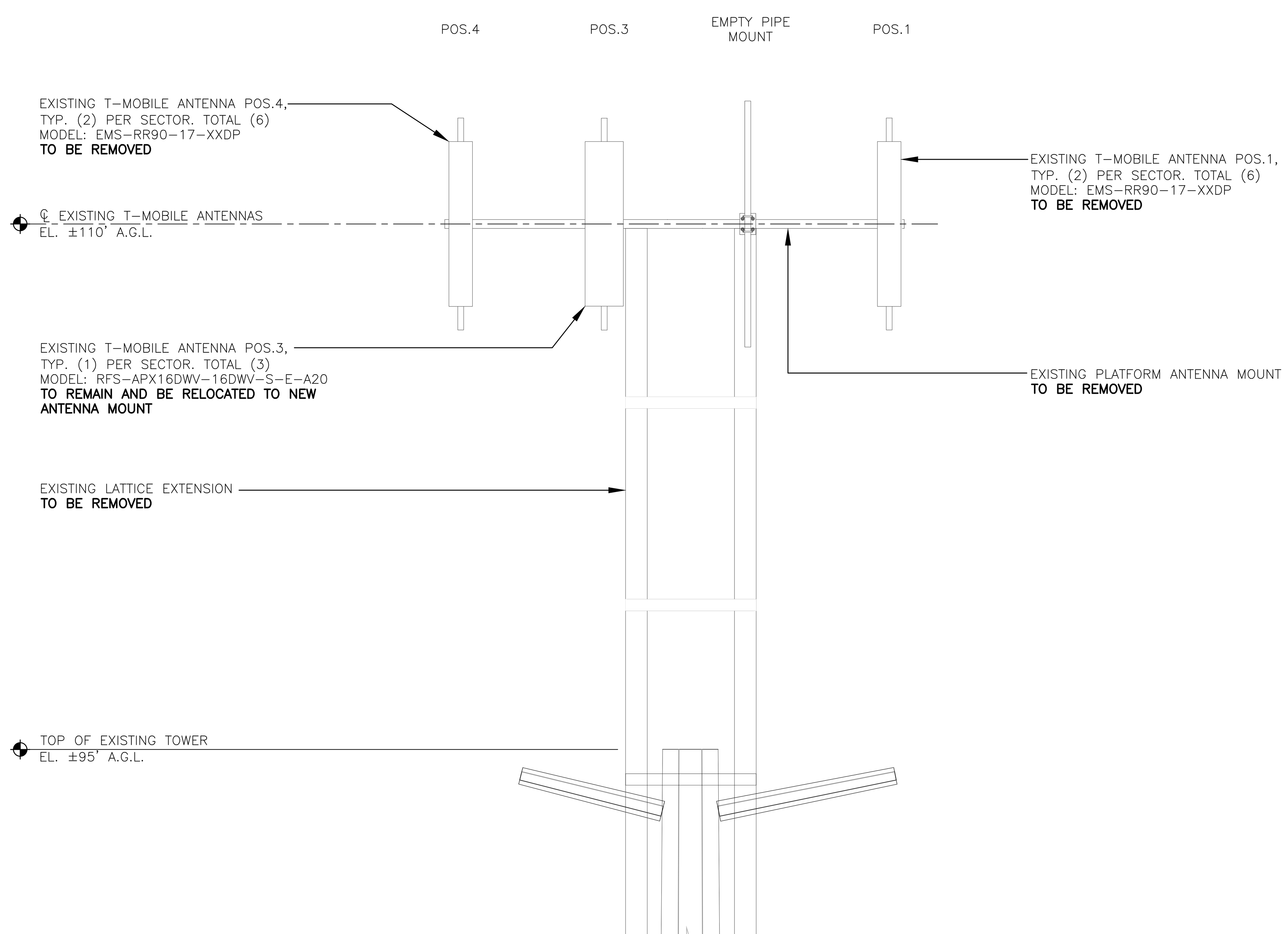
Sheet No. 4 of 9



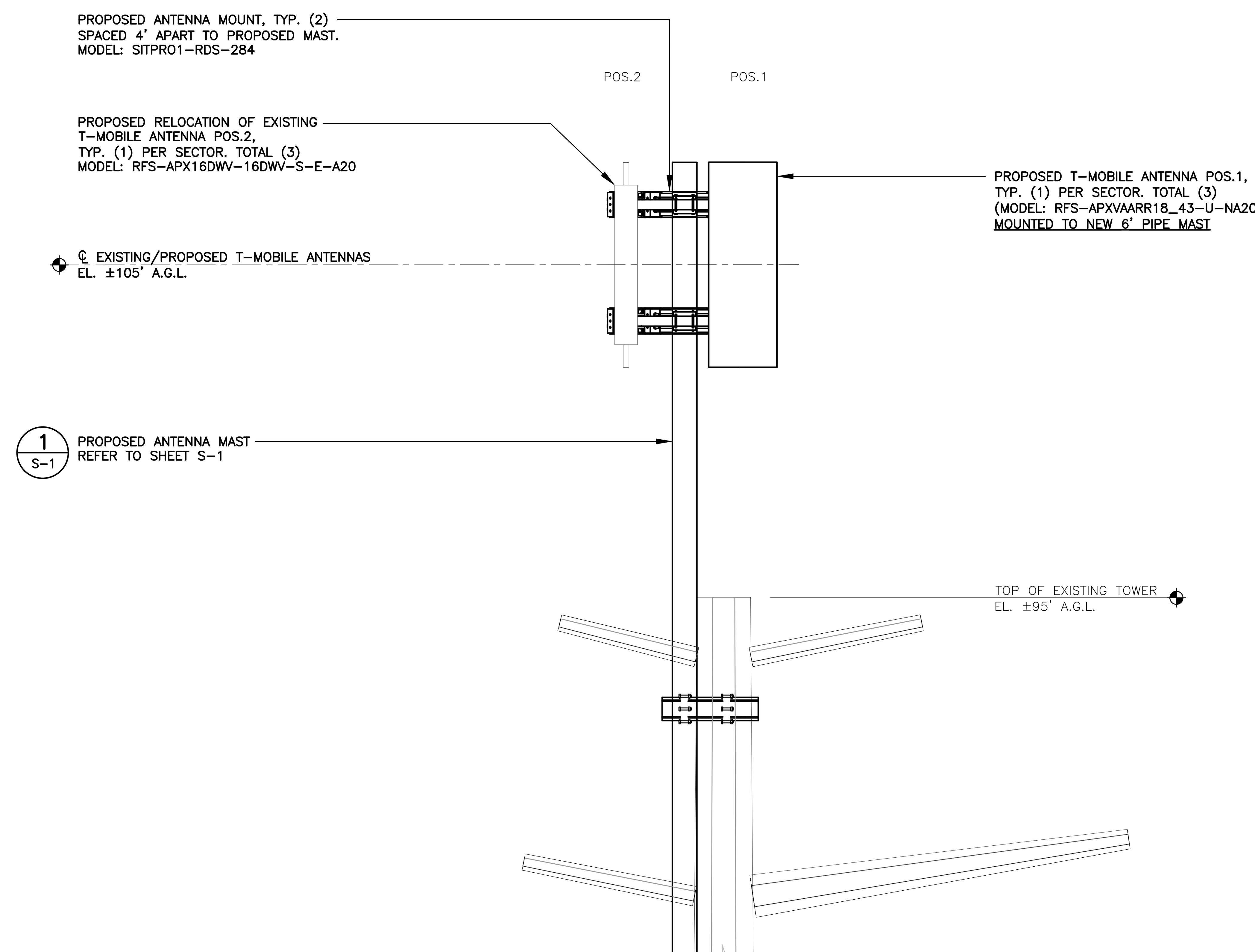
1 C-3 **EXISTING ANTENNA PLAN**
SCALE: 3/8" = 1'
TRUE NORTH



2 C-3 **PROPOSED ANTENNA PLAN**
SCALE: 3/8" = 1'
TRUE NORTH



1A C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST SITE SOLUTIONS

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

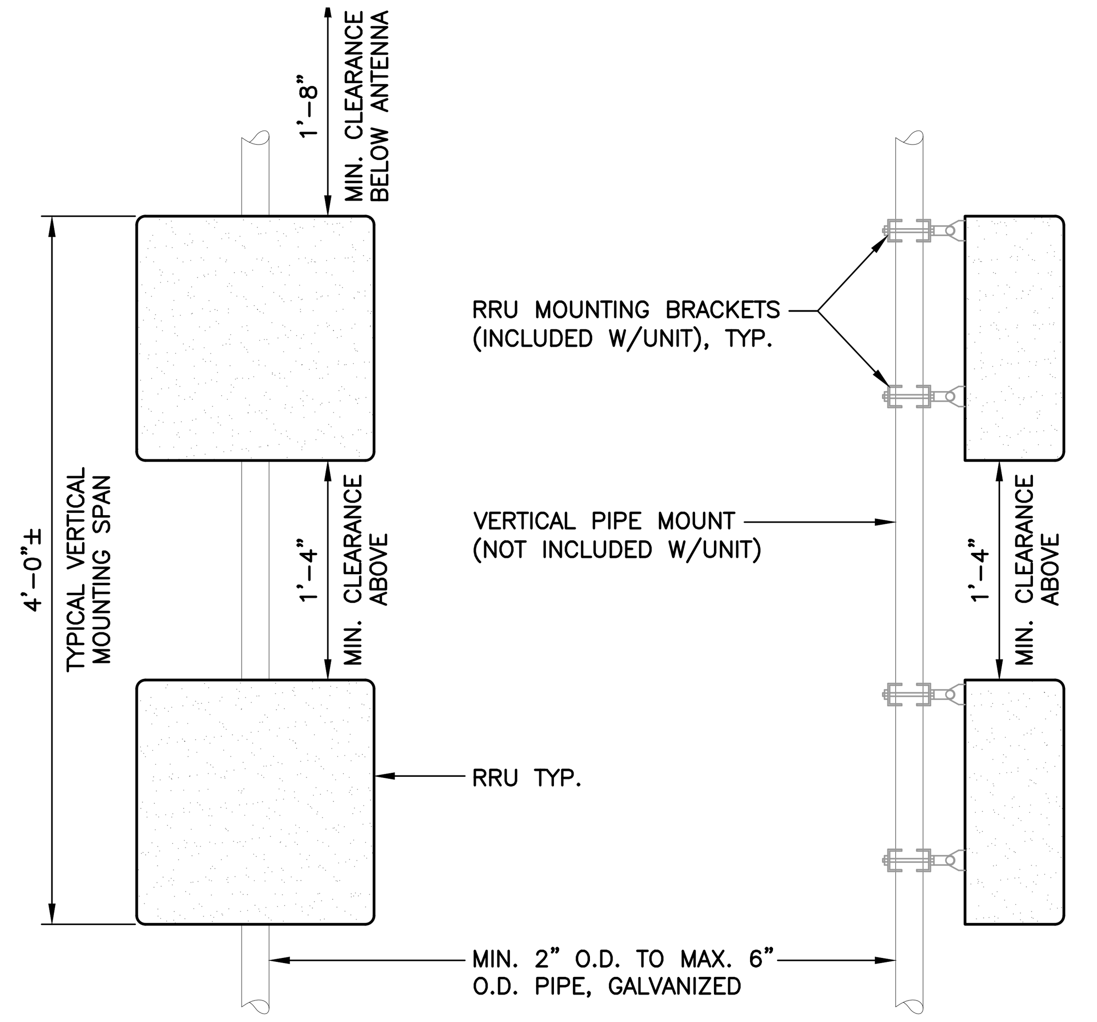
T-MOBILE NORTHEAST LLC
SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

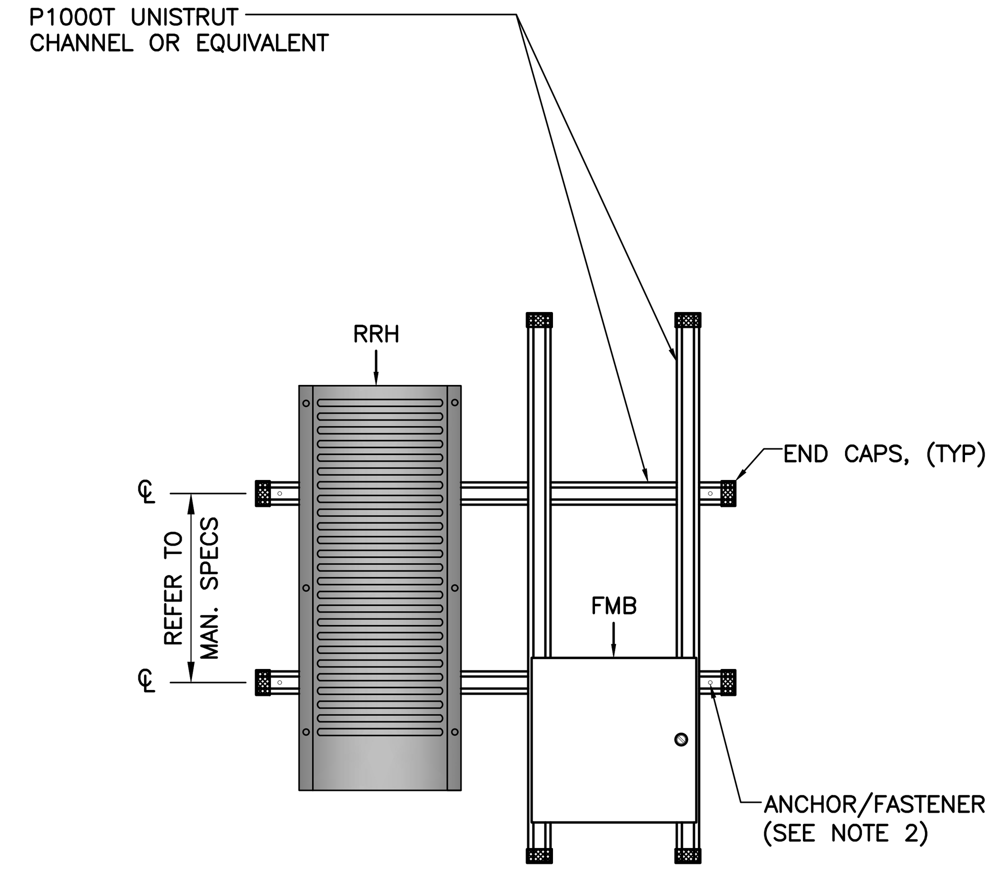
DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

ANTENNA PLANS AND ELEVATIONS

C-3

Sheet No. 5 of 9





NOTES: (POLE MOUNTING)

1. T-MOBILE SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

NOTES: (UNISTRUT MOUNTING)

1. INSTALL A MINIMUM OF (2) ANCHORS PER UNISTRUT (± 16"o/c MIN).
2. MOUNT RRU TO UNISTRUT WITH 3/8"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS. TYPICAL FOUR PER BRACKET.
3. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 / C-4 TYPICAL RRU MOUNTING DETAILS

SCALE: NOT TO SCALE

RADIO 4449 B71+B85

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71+B85	14.9"L x 13.2"W x 5.4"D	±74 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.

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

2 / C-4 PROPOSED RRU DETAIL

SCALE: NOT TO SCALE

APXVAARR18_43-U-NA20

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: RFS MODEL: APXVAARR18_43-U-NA20	72"L x 24"W x 8.5"D	±106 LBS.

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

3 / C-4 PROPOSED ANTENNA DETAIL

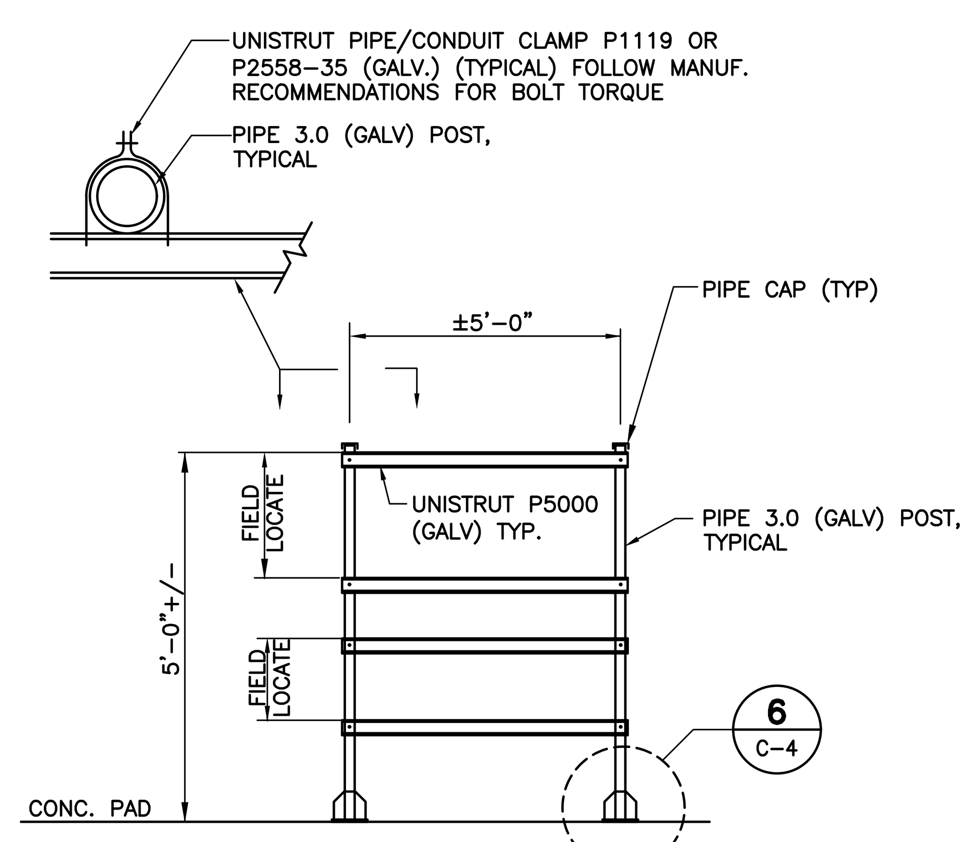
SCALE: NOT TO SCALE

ANDREW SMART BIAS TEE		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: ATSBT-TOP-FF-4G	5.63"L x 3.7"W x 2"D	±1.7 LBS.

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

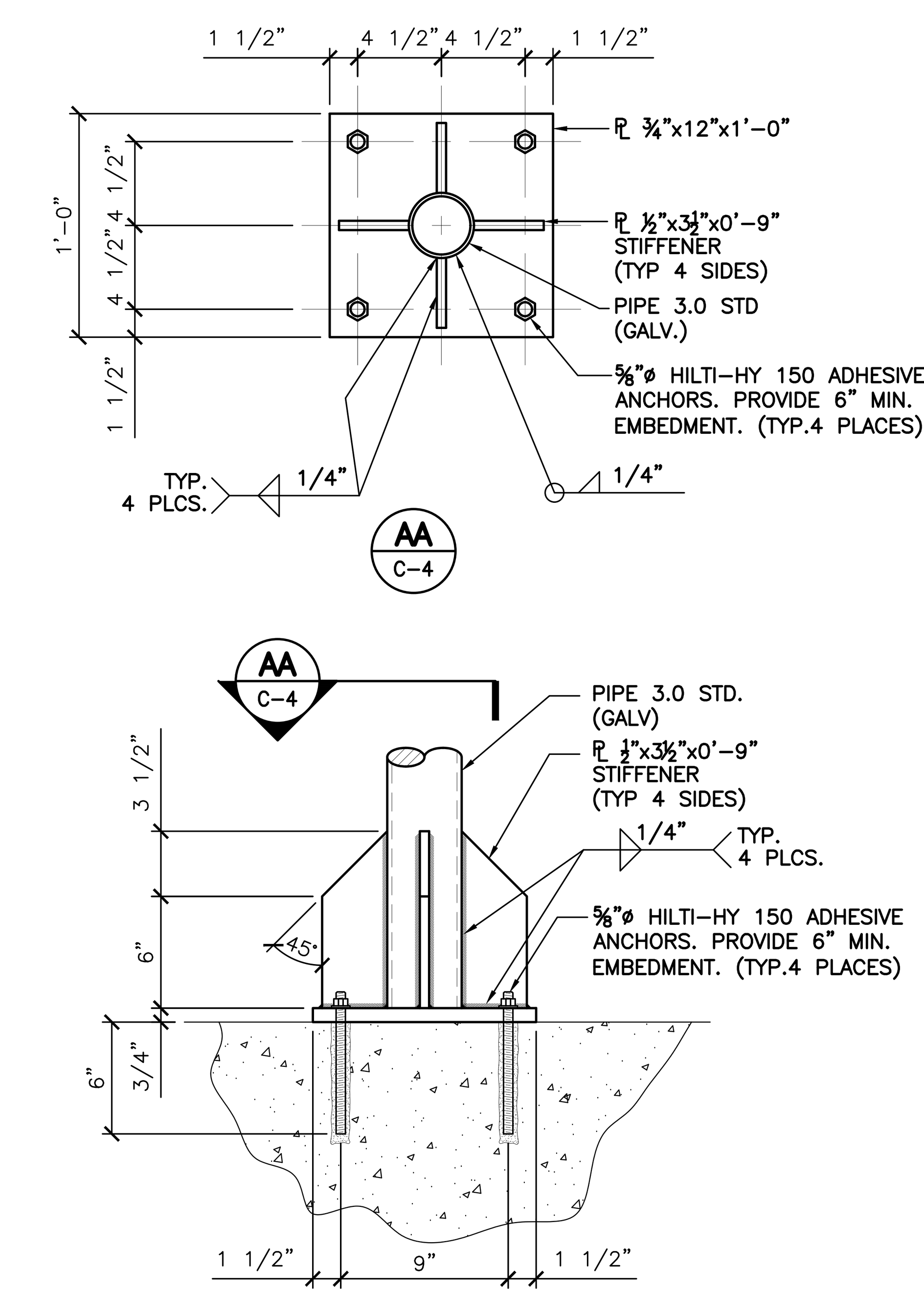
4 / C-4 PROPOSED BIAS-T DETAIL

SCALE: NOT TO SCALE



5 / C-4 EQUIPMENT MOUNTING FRAME DETAIL

SCALE: NOT TO SCALE



6 / C-4 FRAME TO CONCRETE CONNECTION DETAIL

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION
1	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS - ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST

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

T-MOBILE NORTHEAST LLC

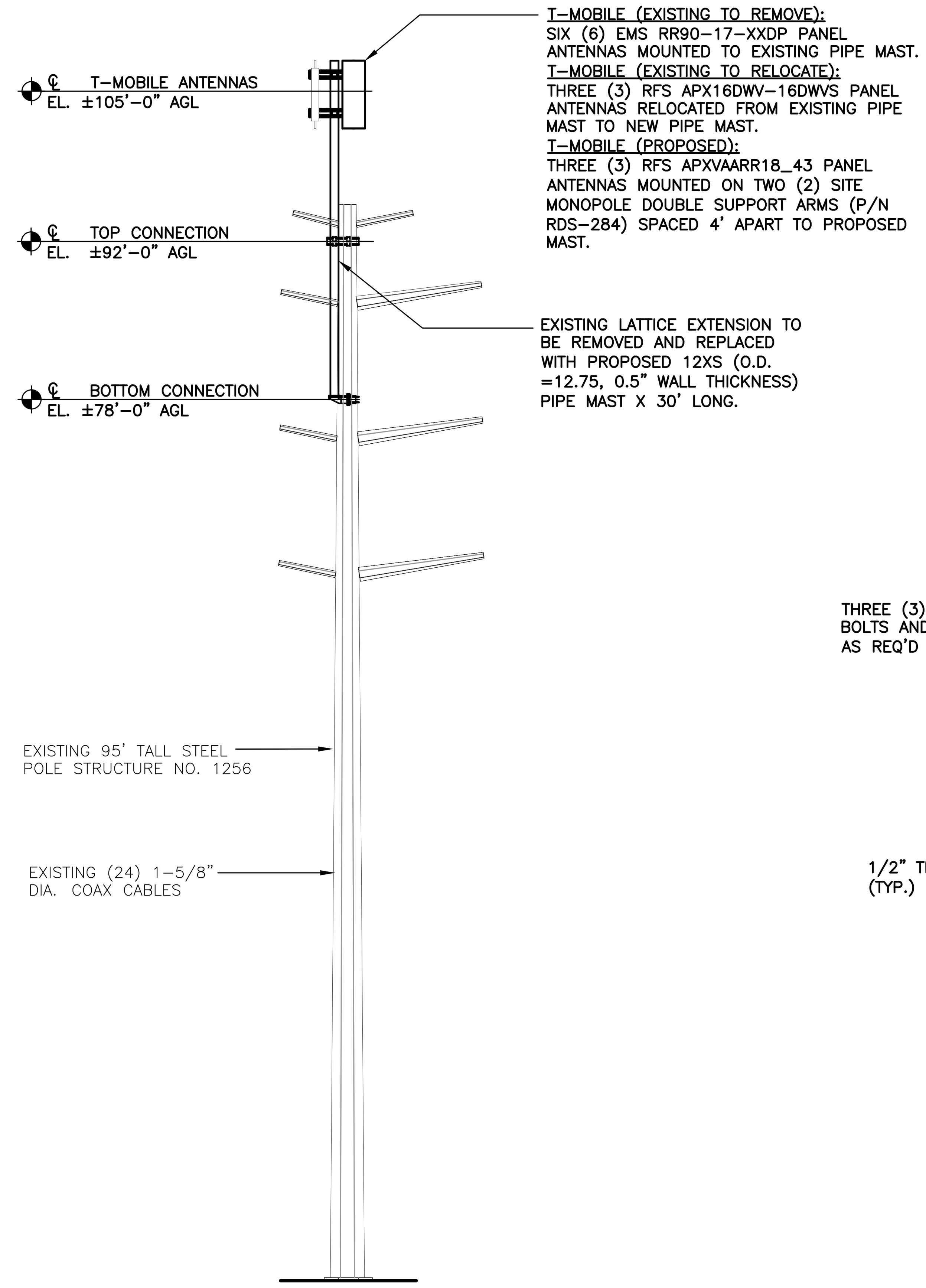
SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

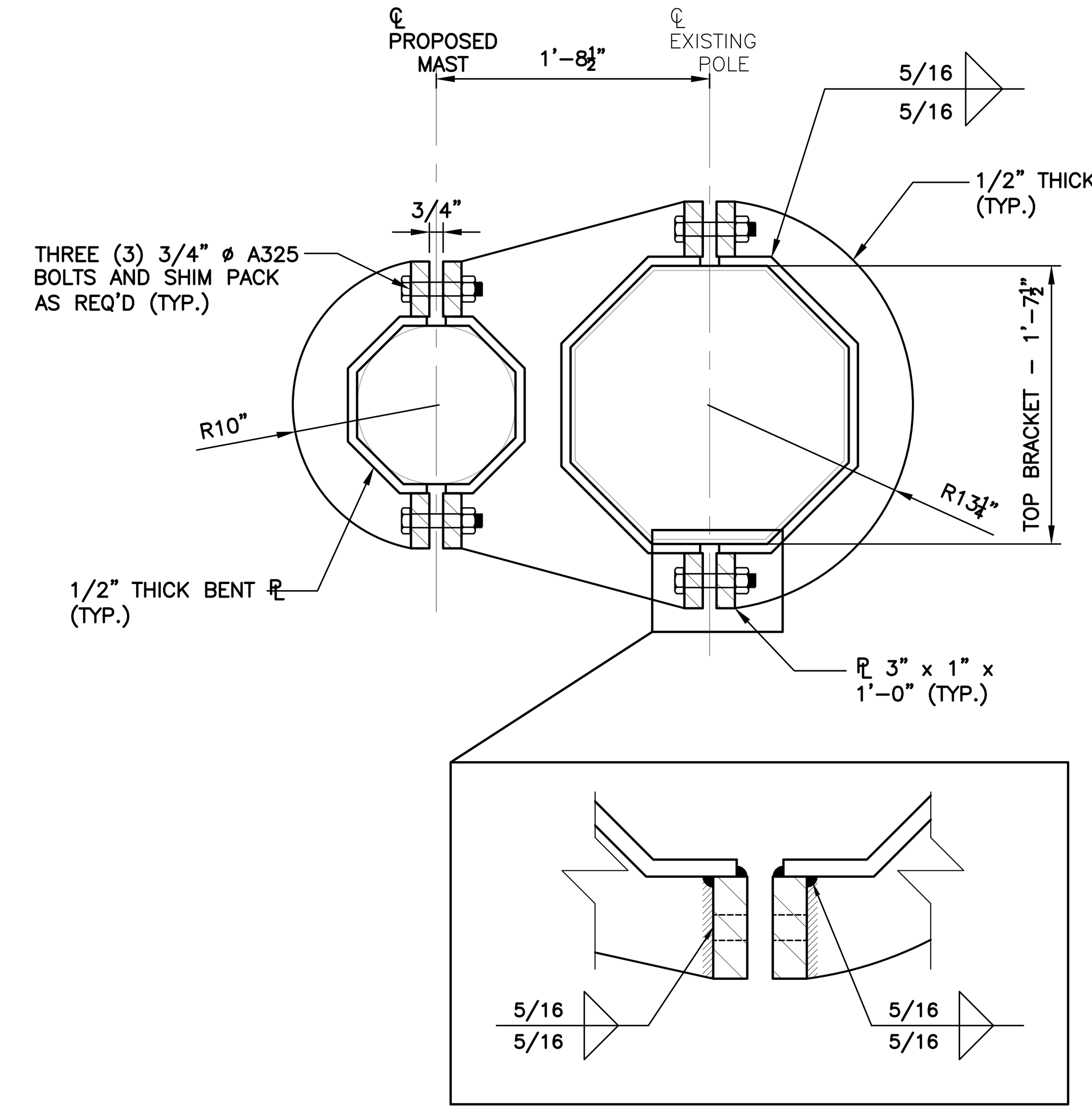
TYPICAL EQUIPMENT DETAILS

C-4

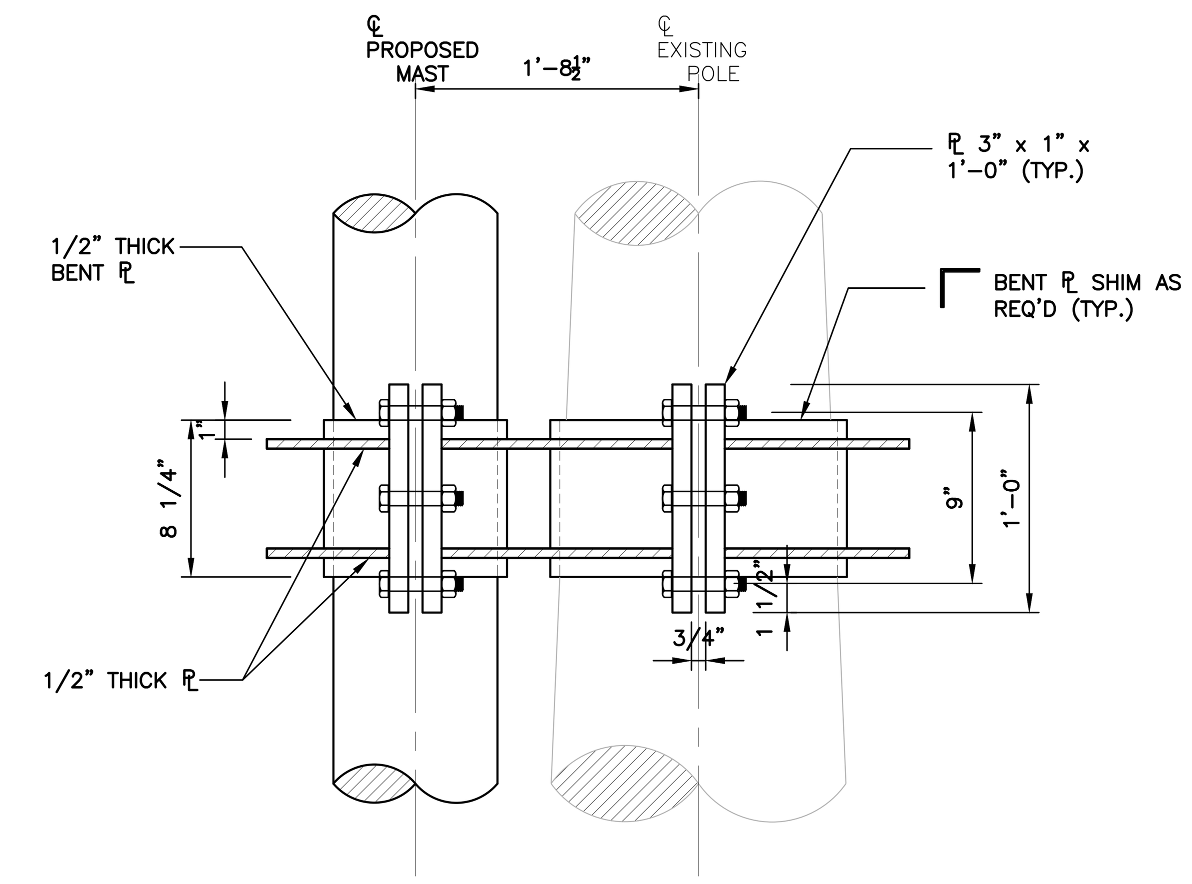
Sheet No. 6 of 9



1 — S-1 TOWER AND MAST ELEVATION
SCALE: NTS

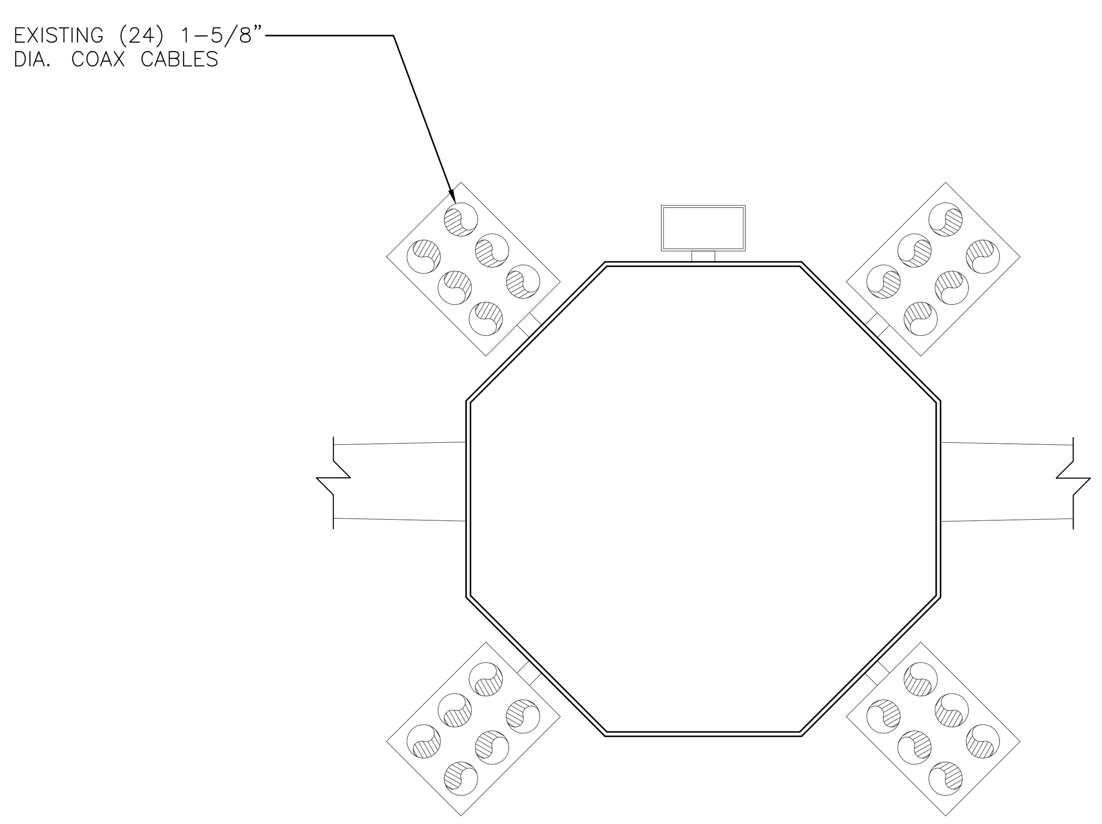


2 — S-1 TOP BRACKET PLAN VIEW
SCALE: NTS

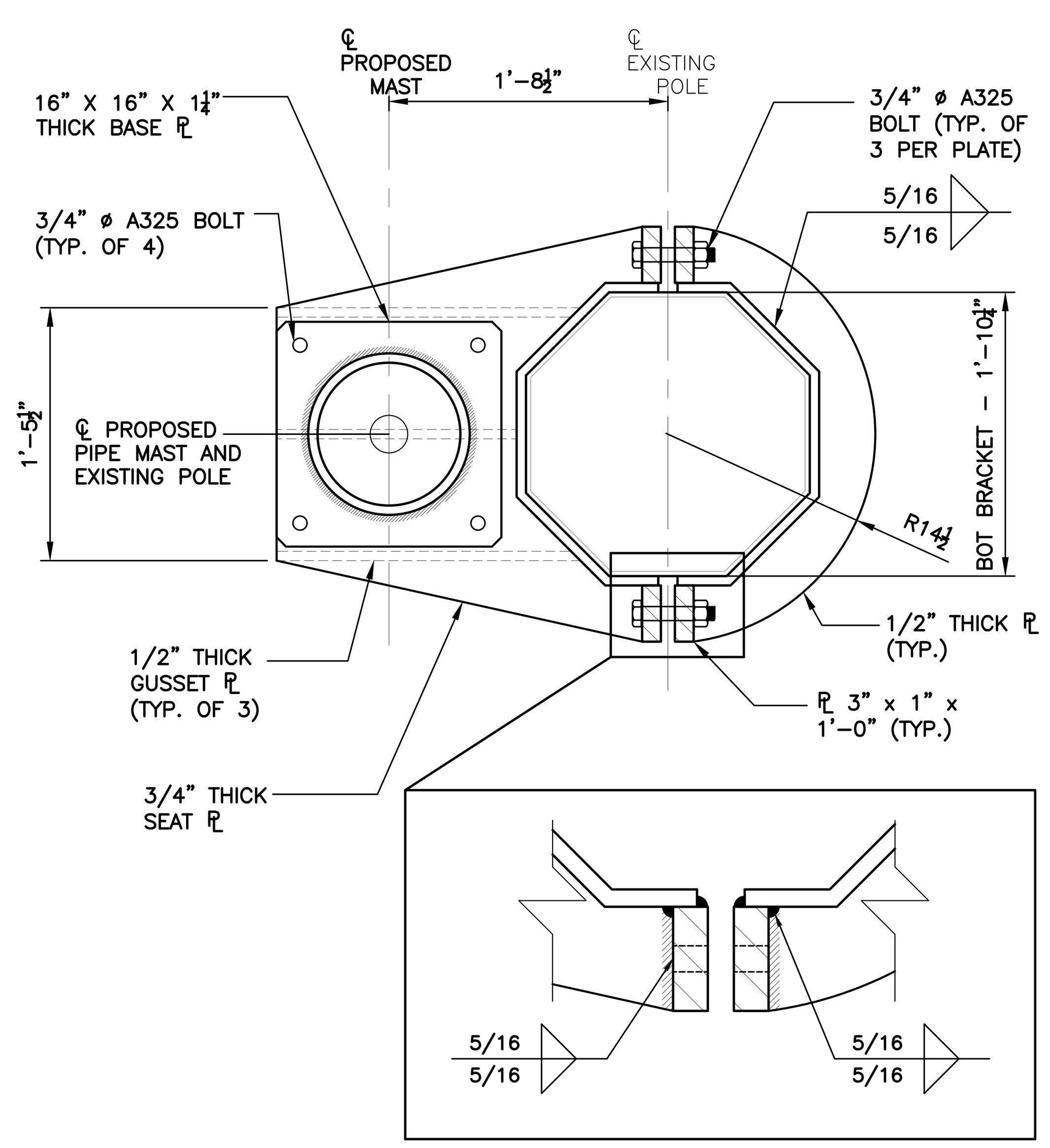


3 — S-1 TOP BRACKET DETAIL
SCALE: NTS

NOTE:
1. POLE TAPER = 0.20"/FT (V.I.F.)

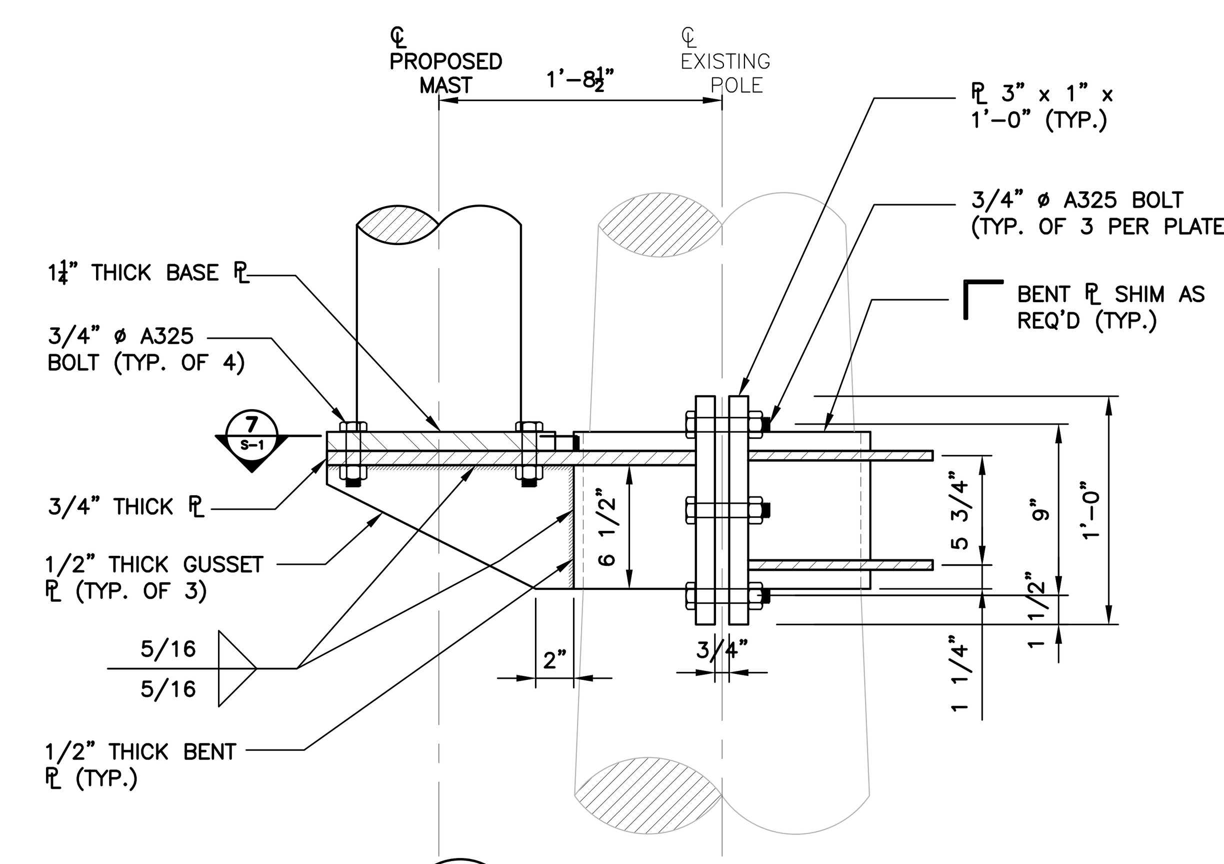


4 — S-1 COAX CABLE RUN PLAN
SCALE: NTS

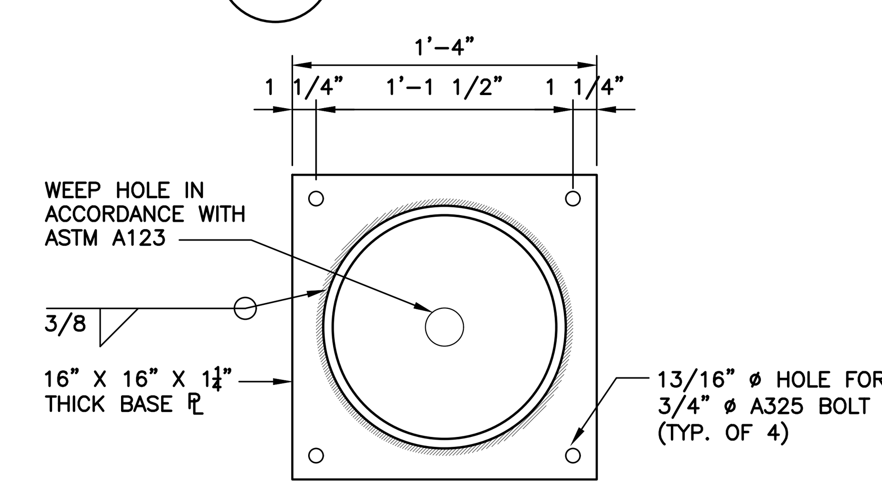


5 — S-1 BOTTOM BRACKET PLAN VIEW
SCALE: NTS

NOTE:
1. POLE TAPER = 0.20"/FT (V.I.F.)



6 — S-1 BOTTOM BRACKET DETAIL
SCALE: NTS



7 — S-1 BOTTOM PLATE DETAIL
SCALE: 1" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
1	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST

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

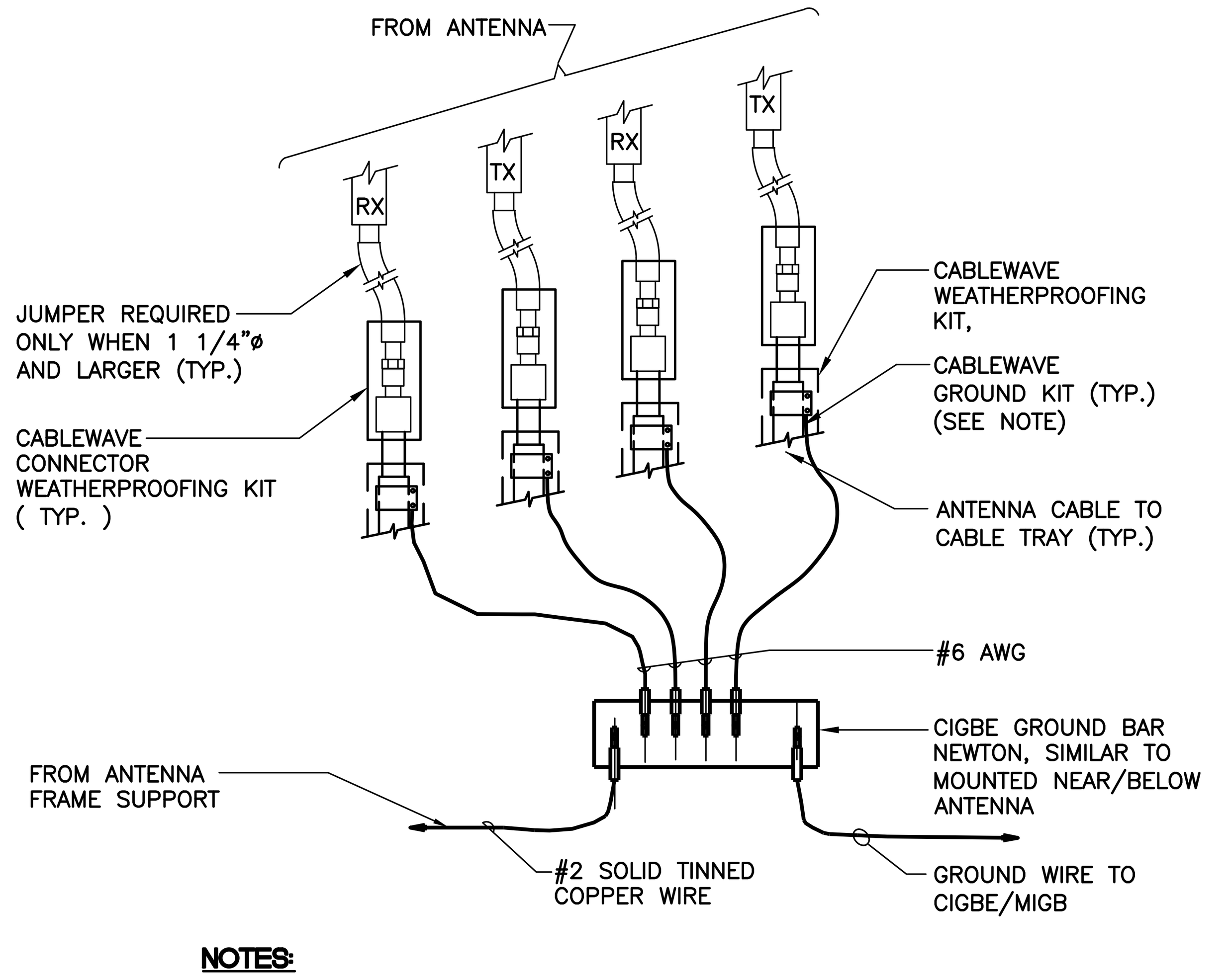
T-MOBILE NORTHEAST LLC
SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

STRUCTURAL DETAILS

S-1

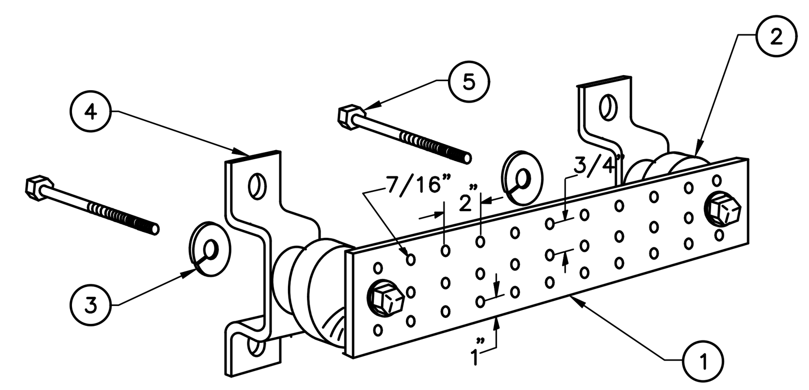
Sheet No. 7 of 9



NOTES:

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

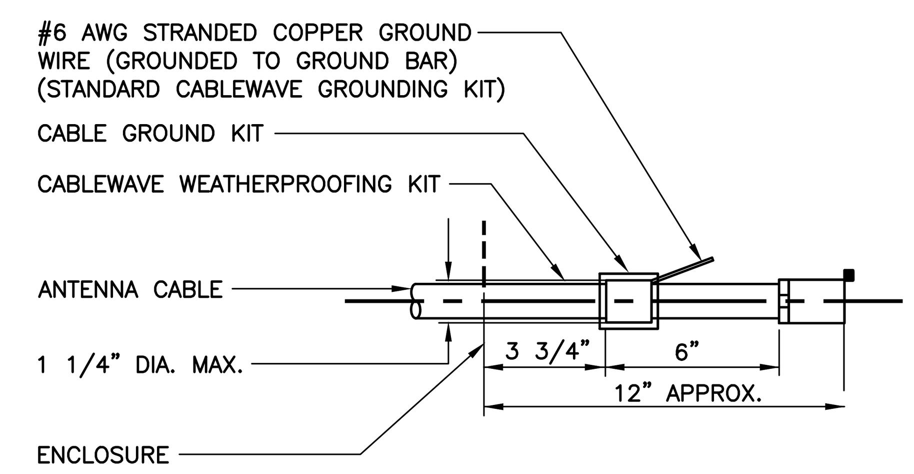
1 CONNECTION OF GROUND WIRES TO GROUND BAR
E-1 SCALE: NOT TO SCALE



NOTES

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

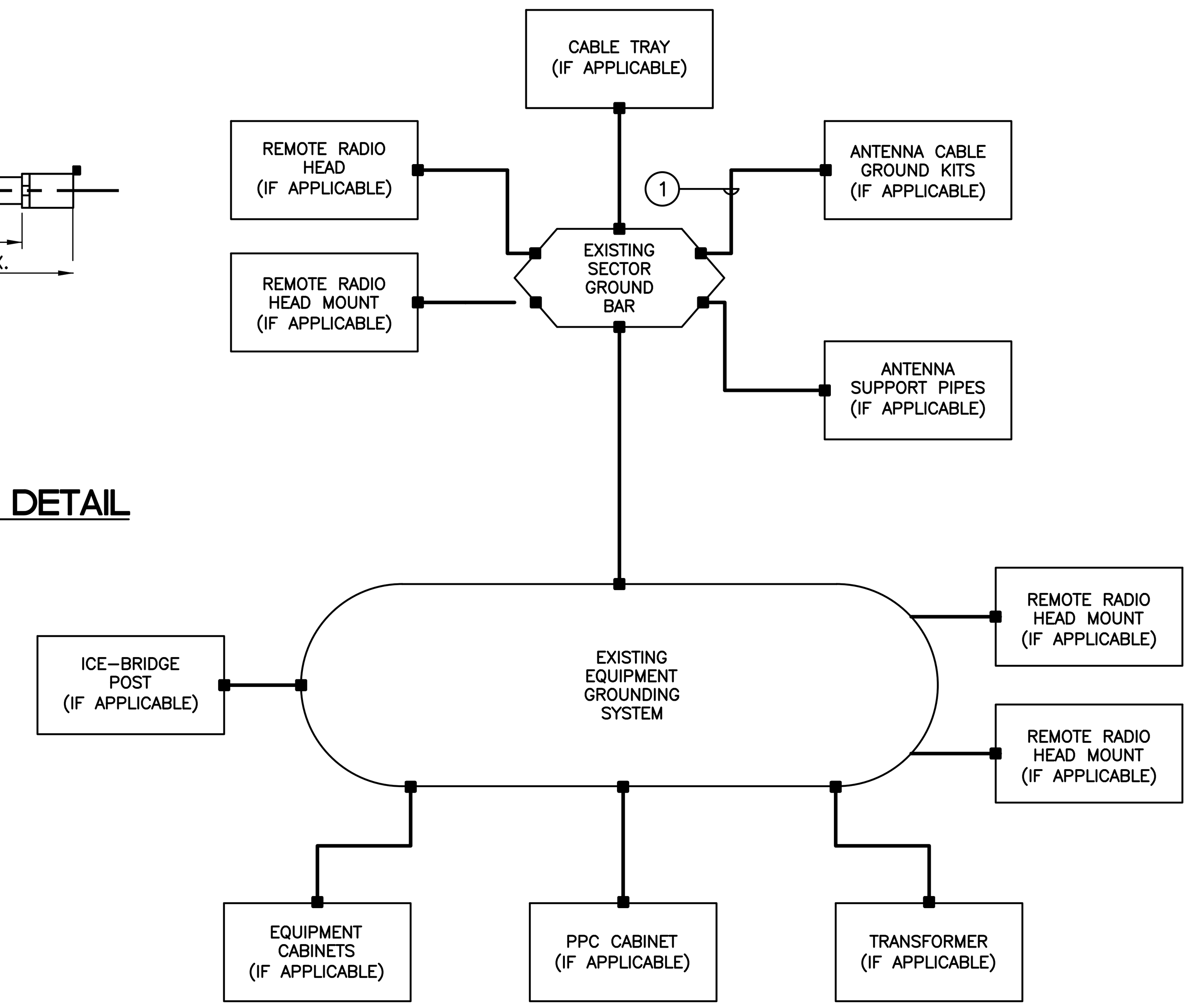
2 GROUND BAR DETAIL
E-1 SCALE: NOT TO SCALE



NOTES:

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

3 ANTENNA CABLE GROUNDING DETAIL
E-1 SCALE: NOT TO SCALE

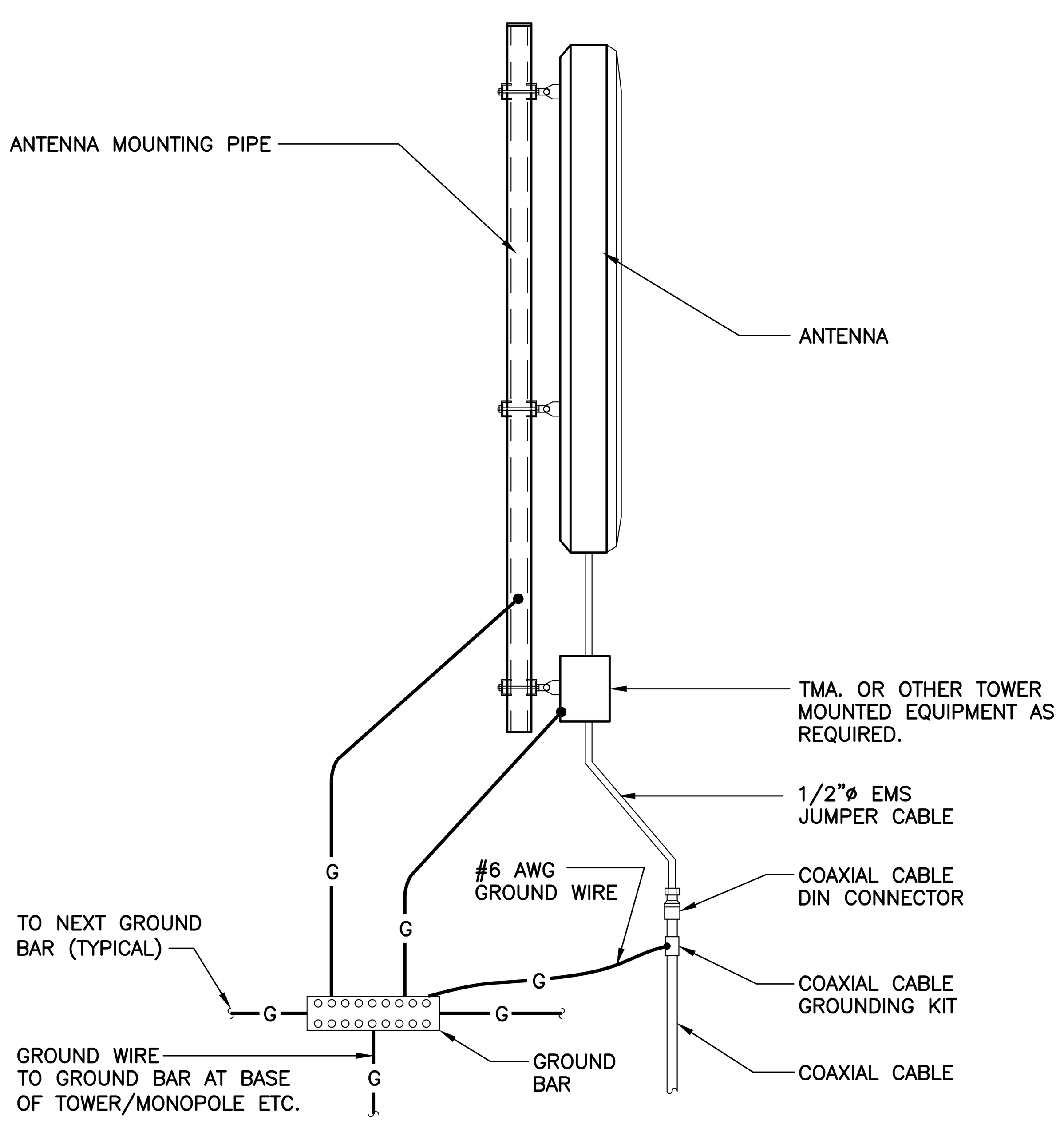


GROUNDING SCHEMATIC NOTES

(1) #6 AWG

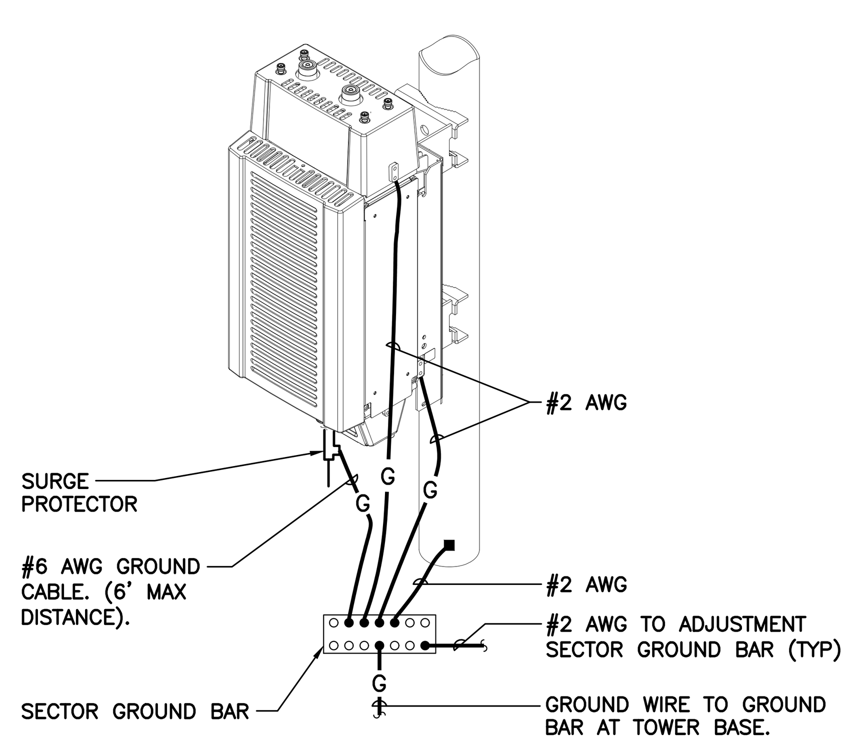
GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. BOND CABLE TRAY SECTIONS TOGETHER WITH #6 AWG STRANDED GREEN INSULATED JUMPERS.
4. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
5. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
6. REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
7. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
8. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
9. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

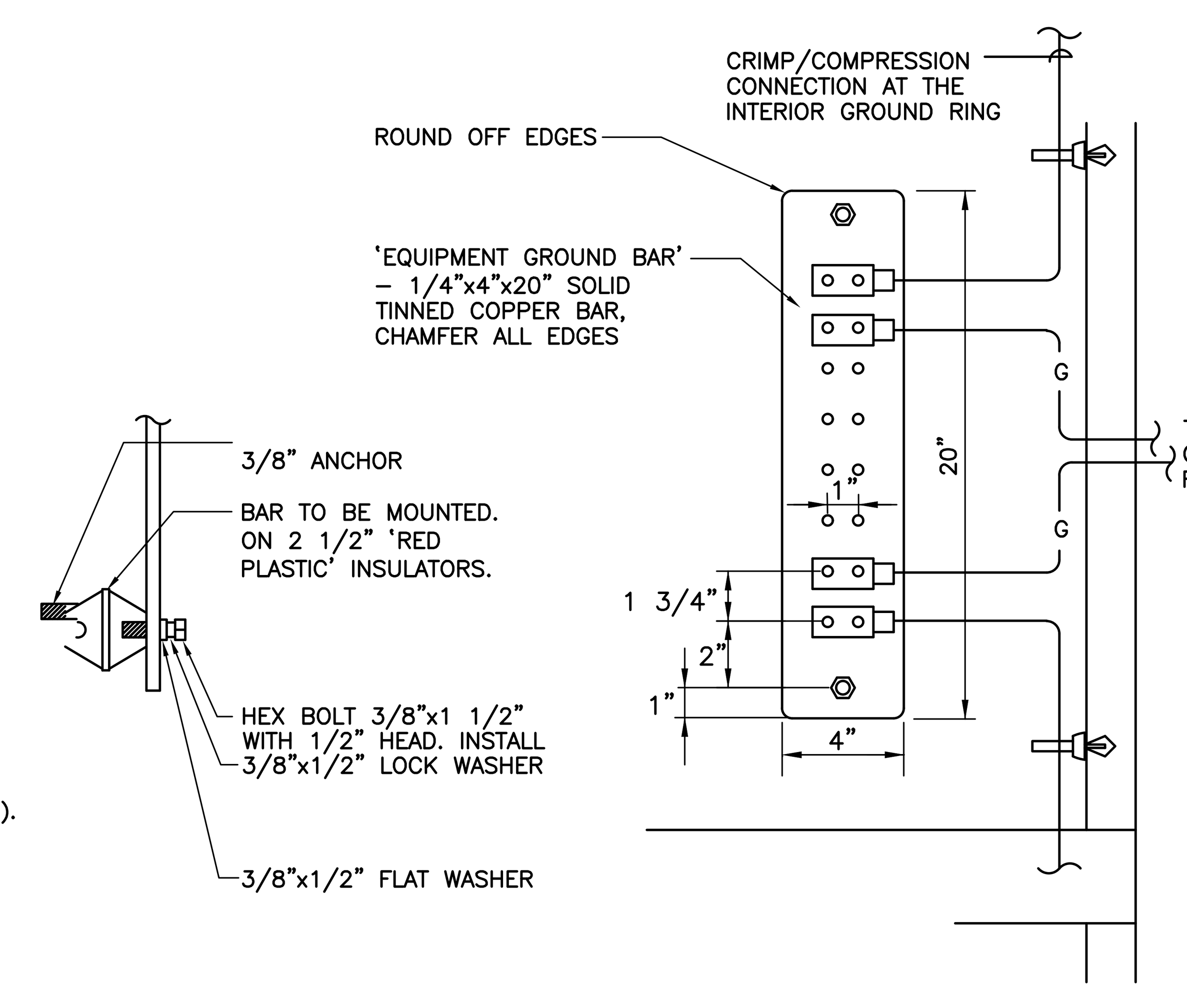


4 TYPICAL ANTENNA GROUNDING DETAIL
E-1 SCALE: NOT TO SCALE

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



5 RRH POLE MOUNT GROUNDING
E-1 SCALE: NOT TO SCALE



6 EQUIPMENT GROUND BAR DETAIL
E-1 SCALE: NOT TO SCALE

7 ELECTRICAL SCHEMATIC DIAGRAM
E-1 SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
1	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST SITE SOLUTIONS

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

T-MOBILE NORTHEAST LLC

SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

TYPICAL ELECTRICAL DETAILS

E-1

ELECTRICAL SPECIFICATIONS

SECTION 16010

1.01. GENERAL REQUIREMENTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.

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

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

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

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

F. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.

G. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL, WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.

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

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

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

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

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

M. SHOP DRAWINGS:

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

2. CONTRACTOR SHALL SUBMIT SIX (6) COPIES OF ALL TEST REPORTS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

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

SECTION 16111

1.01. CONDUIT

A. MINIMUM CONDUIT SIZE FOR BRANCH CIRCUITS, LOW VOLTAGE CONTROL AND ALARM CIRCUITS SHALL BE 3/4". CONDUITS SHALL BE PROPERLY FASTENED AS REQUIRED BY THE N.E.C.

B. THE INTERIOR OF RACEWAYS/ENCLOSURES INSTALLED UNDERGROUND SHALL BE CONSIDERED TO BE WET LOCATION, INSULATED CONDUCTORS SHALL BE LISTED FOR USE IN WET LOCATIONS. PROVIDE WEATHERPROOF CONSTRUCTION IN WET LOCATIONS.

C. CONDUIT INSTALLED UNDERGROUND SHALL BE INSTALLED TO MEET MINIMUM COVER REQUIREMENTS OF TABLE 300.5.

D. PROVIDE RIGID GALVANIZED STEEL CONDUIT (RMC) FOR THE FIRST 10 FOOT SECTION WHEN LEAVING A BUILDING OR SECTIONS PASSING THROUGH FLOOR SLABS

E. ONLY LISTED PVC CONDUIT AND FITTINGS ARE PERMITTED FOR THE INSTALLATION OF ELECTRICAL CONDUCTORS, SUITABLE FOR UNDERGROUND APPLICATIONS.

CONDUIT SCHEDULE SECTION 16111

CONDUIT TYPE	NEC REFERENCE	APPLICATION	MIN. BURIAL DEPTH (PER NEC TABLE 300.5) [2,3]
EMT	ARTICLE 358	INTERIOR CIRCUITING, EQUIPMENT ROOMS, SHELTERS	N/A
RMC, RIGID GALV. STEEL	ARTICLE 344, 300.5, 300.50	ALL INTERIOR/ EXTERIOR CIRCUITING, ALL UNDERGROUND INSTALLATIONS.	6 INCHES
PVC, SCHEDULE 40	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE NOT SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
PVC, SCHEDULE 80	ARTICLE 352, 300.5, 300.50	INTERIOR/ EXTERIOR CIRCUITING AND GROUNDING SYSTEMS, UNDERGROUND INSTALLATIONS, WHERE SUBJECT TO PHYSICAL DAMAGE. [1]	18 INCHES
LIQUID TIGHT FLEX. METAL	ARTICLE 350	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A
FLEX. METAL	ARTICLE 348	SHORT LENGTHS (MAX. 3FT.) WIRING TO VIBRATING EQUIPMENT IN WET LOCATIONS.	N/A

[1] PHYSICAL DAMAGE IS SUBJECT TO THE AUTHORITY HAVING JURISDICTION.

[2] UNDERGROUND CONDUIT INSTALLED UNDER ROADS, HIGHWAYS, DRIVEWAYS, PARKING LOTS SHALL HAVE MINIMUM DEPTH OF 24'.

[3] WHERE SOLID ROCK PREVENTS COMPLIANCE WITH MINIMUM COVER DEPTHS, WIRING SHALL BE INSTALLED IN PERMITTED RACEWAY FOR DIRECT BURIAL. THE RACEWAY SHALL BE COVERED BY A MINIMUM OF 2' OF CONCRETE EXTENDING DOWN TO ROCK.

SECTION 16123

1.01. CONDUCTORS

A. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS. #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:

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

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

SECTION 16130

1.01. BOXES

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

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

SECTION 16140

1.01. WIRING DEVICES

A. THE FOLLOWING LIST IS PROVIDED TO CONVEY THE QUALITY AND RATING OF WIRING DEVICES WHICH ARE TO BE INSTALLED. A COMPLETE LIST OF ALL DEVICES MUST BE SUBMITTED BEFORE INSTALLATION FOR APPROVAL.

1. 15 MINUTE TIMER SWITCH – INTERMATIC #FF15M (INTERIOR LIGHTS)

2. DUPLEX RECEPTACLE – P&S #2095 (GFCI) SPECIFICATION GRADE

3. SINGLE POLE SWITCH – P&S #CSB20AC2 (20A-120V HARD USE) SPECIFICATION GRADE

4. DUPLEX RECEPTACLE – P&S #5362 (20A-120V HARD USE) SPECIFICATION GRADE

B. PLATES – ALL PLATES USED SHALL BE CORROSION RESISTANT TYPE 304 STAINLESS STEEL. PLATES SHALL BE FROM SAME MANUFACTURER AS SWITCHES AND RECEPTACLES. PROVIDE WEATHERPROOF HOUSING FOR DEVICES LOCATED IN WET LOCATIONS.

C. OTHER MANUFACTURERS OF THE SWITCHES, RECEPTACLES AND PLATES MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER.

SECTION 16170

1.01. DISCONNECT SWITCHES

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

SECTION 16190

1.01. SEISMIC RESTRAINT

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

SECTION 16195

1.01. LABELING AND IDENTIFICATION NOMENCLATURE FOR ELECTRICAL EQUIPMENT

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

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

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

SECTION 16450

1.01. GROUNDING

A. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.

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

C. GROUNDING OF PANELBOARDS:

1. PANELBOARD SHALL BE GROUNDED BY TERMINATING THE PANELBOARD FEEDER'S EQUIPMENT GROUND CONDUCTOR TO THE EQUIPMENT GROUND BAR KIT(S) LUGGED TO THE CABINET. ENSURE THAT THE SURFACE BETWEEN THE KIT AND CABINET ARE BARE METAL TO BARE METAL. PRIME AND PAINT OVER TO PREVENT CORROSION.

2. CONDUIT(S) TERMINATING INTO THE PANELBOARD SHALL HAVE GROUNDING TYPE BUSHINGS. THE BUSHINGS SHALL BE BONDED TOGETHER WITH BARE #10 AWG COPPER CONDUCTOR WHICH IN TURN IS TERMINATED INTO THE PANELBOARD'S EQUIPMENT GROUND BAR KIT(S).

D. EQUIPMENT GROUNDING CONDUCTOR:

1. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122.

2. THE MINIMUM SIZE OF EQUIPMENT GROUND CONDUCTOR SHALL BE #12 AWG COPPER.

3. EACH FEEDER OR BRANCH CIRCUIT SHALL HAVE EQUIPMENT GROUND CONDUCTOR(S) INSTALLED IN THE SAME RACEWAY(S).

E. CELLULAR GROUNDING SYSTEM:

CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 10 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

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

1. GROUND BARS

2. EXTERIOR GROUNDING (WHERE REQUIRED DUE TO MEASURED AC RESISTANCE GREATER THAN SPECIFIED).

3. ANTENNA GROUND CONNECTIONS AND PLATES.

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

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

SECTION 16470

1.01. DISTRIBUTION EQUIPMENT

A. REFER TO CONTRACT DRAWINGS FOR DETAILS AND SCHEDULES.

SECTION 16477

1.01. FUSES

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

SECTION 16960

1.01. TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

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

TEST 1: THERMAL OVERLOAD AND MAGNETIC TRIP TEST, AND CABLE INSULATION TEST FOR ALL CIRCUIT BREAKERS RATED 100 AMPS OR GREATER.

TEST 2: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

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

1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.

2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.

3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

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

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

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

SECTION 16961

1.01. TESTS BY CONTRACTOR

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

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

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/29/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION
1	08/05/21	RTS	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

T-Mobile

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

T-MOBILE NORTHEAST LLC

SITE NAME: GREENWICH/RIVERSIDE
SITE ID: CT11001B
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 06/14/21
SCALE: AS NOTED
JOB NO. 21051.03

ELECTRICAL SPECIFICATIONS

E-2

Exhibit D

Structural Analysis Report

CENTEK engineering

Centered on Solutions℠

Structural Analysis of Antenna Mast and Tower

T-Mobile Site Ref: CT11001B

Eversource Structure No. 1256

95' Electric Transmission Lattice Tower

160 Sound Beach Road
Greenwich, CT

CENTEK Project No. 21051.03

Date: July 8, 2021

Max Stress Ratio = 96.8%

Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to analyze the existing 26'-5"' PCS lattice structure and 95' utility pole located at 160 Sound Beach Road in Greenwich, CT for the proposed antenna and equipment upgrade by T-Mobile.

The proposed loads consist of the following:

- T-MOBILE (Existing to Relocate):
  Antennas: Three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas to be relocated to the new mast with a RAD center elevation of 105-ft above grade.
  Coax Cables: Twenty-Four (24) 1-5/8" ∅ coax cables mounted to the exterior of the existing pole and antenna mast.
- **T-MOBILE (Existing to Remove):**
  Antennas: Six (6) EMS RR90-17-XXDP panel antennas mounted on an existing low profile platform with a RAD center elevation of 105-ft above grade.
- **T-MOBILE (Proposed):**
  Antennas: Three (3) RFS APXVAALL18_43 panel antennas and six (6) Andrew ATSBT-TOP-FM-4G Smart Bias Tees mounted on a proposed mast with a RAD center elevation of 105-ft above grade.

Primary assumptions used in the analysis

- Design steel stresses are defined by AISC-LRFD 14th edition for design of the antenna Mast and antenna supporting elements.
- ASCE Manual No. 48-11, "Design of Steel Transmission Pole Structures", defines allowable steel stresses for evaluation of the utility pole.
- All utility pole members are adequately protected to prevent corrosion of steel members.
- All proposed antenna mounts are modeled as listed above.
- Pipe mast will be properly installed and maintained.
- No residual stresses exist due to incorrect pole erection.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds conform to the requirements of AWS D1.1.
- Pipe mast and utility pole will be in plumb condition.
- Utility pole was properly installed and maintained and all members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
- Any deviation from the analyzed loading will require a new analysis for verification of structural adequacy.

Analysis

The existing mast assembly will be replaced with a 12 SCH. 80 (O.D. = 12.75") x 30' long pipe connected at two points to the existing tower. The proposed mast was designed 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.

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 Eversource Design Criteria.

- UTILITY POLE ANALYSIS

  The purpose of this analysis is to determine the adequacy of the existing utility pole to support the proposed antenna loads. The loading and design requirements were analyzed in accordance with the Eversource Design Criteria Table, NESC C2-2012 ~ Construction Grade B, and ASCE Manual No. 48-11.

  Load cases considered:

  Load Case 1: NESC Heavy Wind
  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
  Wind Speed..………………………………. 110 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 (2018 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 proposed pipe mast was determined to be structurally adequate.

Component	Stress Ratio	Result
12" Sch. X-Strong	38.4%	**PASS**
Connection	53.8%	**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 Manual No. 48-11, "Design of Steel Transmission Pole Structures", for the applied NESC Heavy and Hi-Wind load cases. The detailed analysis results are provided in Section 6 of this report. The analysis results are summarized as follows:

A maximum usage of **96.82%** occurs in the utility pole under the **NESC Extreme** loading condition.

POLE SECTION:

The utility pole was found to be within allowable limits.

Tower Section	Elevation	Stress Ratio (% of capacity)	Result
Section 2	15.00' -53.67' (AGL)	96.82%	**PASS**

BASE PLATE:

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Base Plate	Bending	88.64%	**PASS**

- FOUNDATION AND ANCHORS

The existing foundation consists of a 10-ft ∅ x 18.5-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (16) 2.25"∅, ASTM A615-75 anchor bolts embedded into the concrete foundation structure. Foundation information was obtained from NUSCO drawing # 01037-60005.

BASE REACTIONS:

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

Load Case	Shear	Axial	Moment
NESC Heavy Wind	27.34 kips	53.30 kips	2204.84 ft-kips
NESC Extreme Wind	32.99 kips	28.00 kips	2442.02 ft-kips

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

ANCHOR BOLTS:

The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (% of capacity)	Result
Anchor Bolts	Tension	62.1%	**PASS**

FOUNDATION:

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	25.6%	**PASS**

Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES

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

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

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

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

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

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

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ RISA-3D

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

Modeling Features

- Comprehensive CAD-like drawing/editing environment: draw, generate, modify and load elements as well as snap, move, rotate, copy, mirror, scale, split, merge, mesh, delete, apply, trim, extend, etc.
- Versatile drawing grids (orthogonal, radial, skewed, DXF underlay)
- Universal snaps and object snaps allow drawing without grids
- Powerful graphic select/unselect tools including box, line, polygon, invert, criteria, spreadsheet based, save/recall selections with locking
- True spreadsheet editing with cut, paste, fill, math, sort, find, etc.
- Dynamic synchronization between spreadsheets and graphics
- Open multiple spreadsheets simultaneously
- Constant in-stream error checking and data validation
- Unlimited undo/redo capability, automatic timed backup
- Generation templates for grids, disks, cylinders, cones, arcs, trusses, tanks, hydrostatic loads, geodesic domes, etc.
- Support for all units systems & conversions at any time
- Automatic interaction with RISASection custom shape libraries
- Steel Shapes: AISC, Historic, Australian, British, Canadian, Chilean, Chinese, European, Indian, Mexican
- Light Gage Shapes: AISI, SSMA, Dale/Incor, Dietrich, Marino\WARE
- Import DXF, RISA-2D, STAAD and CIS/2 files
- Export DXF, SDNF and CIS/2 files
- Robust two-way link with Revit Structure 2019
- Link with Tekla Structures 2018

Analysis Features

- Analysis of 1D members (beams, columns, braces, etc.) using Finite Element Method
- Analysis of 2D elements (plates, walls) using Finite Element Method
- Analysis of 3D elements (solids) using Finite Element Method
- Partial fixity member end releases using rotational spring constants
- Time History Analysis
- Accelerated true sparse solver for static analysis
- Flexible modeling of P-Delta effects
- Accelerated Sparse Lanczos dynamics solver, very fast and robust
- Multiple simultaneous dynamic and response spectra analysis using Gupta, CQC or SRSS with automatic calc of scaling factors
- Automatic inclusion of mass offset (5% or user defined) for dynamics when integrated with RISAFloor
- Ritz vector dynamic solver
- True physical member modeling (members are aware of interior joints)
- Plate/shell elements with plane stress only option
- 8 node solid elements
- High end mesh generation — draw a polygon with any number of sides to create a mesh of well formed quadrilateral (NO triangular) elements
- Automatic rigid diaphragm modeling with detachable joints

- Area loads with one-way or two-way distributions with optional "blow through" distribution for loading open structures
- Plate thermal loads
- Simultaneous moving loads, AASHTO/custom for bridges, cranes…
- Torsional warping calculations for stiffness, stress and design of hot rolled steel
- Member end releases, rigid end offsets, analysis offsets
- Enforced joint displacements
- One Way members, for tension only bracing, slipping, etc.
- One Way springs, for modeling soils and other effects
- Euler members: Compression up to buckling load, then disable
- Stress calculations on any arbitrary shape
- Inactivate members, plates, solids and diaphragms without deleting them
- Story drift calculations provide relative drift and ratio to height
- Automatic self-weight calculations for members, plates and solids

Graphics Features

- Unlimited simultaneous model view windows
- "True to scale" rendering with translucency, even when drawing
- High-speed redraw algorithm for instant refreshing
- Dynamically zoom, pan, rotate, scroll, snap views
- Font and color control
- Saved views to quickly restore frequent or desired views
- Rendered or wire-frame animations of deflected model and mode shapes
- Animation of moving loads with speed control
- Distance tool for measuring between points
- Force/moment summation about any arbitrary cut line
- High quality customizable graphics printing

Design Codes

- Steel Design Codes: AISC 360-16/10/05: ASD & LRFD, AISC 2nd & 3rd: LRFD, AISC 9th: ASD, CSA S16-14/09/05/01/CSA-S16.1-94, BS 5950-1: 2000, EN 1993-1-1:2014/2005, ENV 1993-1-1:1992, IS 800: 2007/1998, AS 4100-1998, NZS 3404: 1997
- Seismic design per AISC 341-10/05, including 358 prequalified connections
- Concrete Design Codes: ACI 318-14/11/08/05/02/99, CSA A23.3-14/04/94, NTC-DF 2004, BS 8110-1: 1997, BS EN 1992-1-1: 2004+A1: 2014/2004, EN 1992-1-1:1992, IS 456: 2000, AS 3600-2001, NZS 3101: 1995, SBC 304-2007
- Cold Formed Steel Design Codes: AISI S100-16/12/10/07: ASD & LRFD, AISI NAS-04/01: ASD & LRFD, AISI 1999: ASD & LRFD, CSA S136-16/12/10/07/04/01: LSD, CANACERO 16: ASD, CANACERO 12/10/07/04/01: ASD & LRFD
- Aluminum Design Codes: AA ADM1-15/10: ASD & LRFD, AA ADM1-05: ASD
- Wood Design Codes: AWC NDS-18/15/12: ASD, AF&PA NDS-08/05/01/97/91: ASD, CSA 086-14/09 Ultimate, Structural Composite Lumber, multi-ply, full sawn, Glulam, shear walls
- Masonry Design Codes: TMS 402-16: ASD & Strength, ACI 530-13/11/08/05/02: ASD & Strength, ACI 530-99: ASD, UBC 1997: ASD & Strength
- Stainless Steel Design Code: AISC 360-10: ASD & LRFD
- Wind loads are generated automatically (ASCE 7-16/10/05/02/98/95, NBC 15/10/05, NTC 2004, & IS 875: 1987) for building-type structures, including partial wind cases
- Seismic loads are generated automatically (ASCE 7-16/10/05/02, CBC 2001, IBC 2000, UBC 1997, NBC 15/10/05, NTC 2004, & IS 1893: 2002) for building-type structures, including accidental torsion

Design Features

- Designs/optimizes concrete, hot rolled & cold formed steel, masonry, wood and aluminum

- Program selected or user-defined rebar layouts for flexure and shear
- Concrete beam detailing (Rectangular, T and L).
- Concrete column interaction diagrams
- Concrete wall design including in-plane, out-of-plane & bearing loads
- Automatic spectra generation for ASCE 7, NBC, IS 1893, NTC
- Extensive user controlled generation of load combinations
- Intelligent unbraced length calculations for physical members
- Tapered wide flange design per AISC Design Guide 25
- Masonry wall design for in-plane and out-of-plane
- Wood Shapes: Complete NDS species/grade and Glulam database
- Complete wood wall design for bearing & shear walls: Segmented, Perforated & Force Transfer Around Openings design methods
- Strap and Hold Down design for Wood Shear Walls
- Seismic design of concrete walls using ACI 318-14 Chapter 18
- Concrete seismic coupling beams for multi-story walls with diaphragms

Results Features

- Graphic presentation of color-coded results and plotted designs
- Color contours on plates, solid stresses/forces with smoothing and animation
- Spreadsheet results with sorting and filtering of: deflections, forces, stresses, optimized sizes for strength or deflection, code designs, concrete reinforcing, material takeoffs, etc.
- Standard and user-defined reports
- Graphic member detail reports with force/stress/deflection diagrams and detailed design calculations and expanded diagrams

Integrated Building Design

RISA-3D, RISAFloor, RISAFoundation and RISAConnection are so tightly integrated that they operate as one program on the same building model. Optimize the gravity system in RISAFloor, the lateral system in RISA-3D, the connection design in RISAConnection and the foundation system in RISAFoundation, with a complete flow of information both ways.

General Features

- Compatible with Windows 7/8.1/10 (64-bit Windows)
- Program technical support provided by Professional Engineers

GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM ~ PLS-POLE

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

Modeling Features:

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

Analysis Features:

- Automatic distribution of loads in 2-part suspension insulators (v-strings, horizontal vees, etc.)
- Design checks for ASCE, ANSI/TIA/EIA 222 (Revisions F and G) or other requirements
- Automatic calculation of dead and wind loads
- Automated loading on structure (wind, ice and drag coefficients) according to:
    - ASCE 74-1991
    - NESC 2002
    - NESC 2007
    - IEC 60826:2003
    - EN50341-1:2001 (CENELEC)
    - EN50341-3-9:2001 (UK NNA)
    - EN50341-3-17:2001 (Portugal NNA)
    - ESAA C(b)1-2003 (Australia)
    - TPNZ (New Zealand)
    - REE (Spain)
    - EIA/TIA 222-F
    - ANSI/TIA 222-G
    - CSA S37-01
- Automated microwave antenna loading as per EIA/TIA 222-F and ANSI/TIA 222-G
- Detects buckling by nonlinear analysis

Results Features:

- Detects buckling by nonlinear analysis
- Easy to interpret text, spreadsheet and graphics design summaries
- Automatic determination of allowable wind and weight spans
- Automatic determination of interaction diagrams between allowable wind and weight spans
- Automatic tracking of part numbers and costs

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

Introduction

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

ANSI Standard TIA-222-G covering the design of telecommunications structures specifies a limit state design approach. This approach applies the loads from extreme weather loading conditions, and designs the structure so that the design strength exceeds the required strength.

ANSI Standard C2-2012 (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 ES 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	2.5	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	2.5	1.6 Flat Surfaces 1.3 Round Surfaces
Ice Condition	NESC Heavy	Conductors:	Conductor Loads Provided by ES					
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 ES					
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 ES					
		*Only for structures installed after 2007						

determined from NESC applied loading conditions (not TIA Loads) on the structure and 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)
   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	See Below Table

   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.

Project: 1740/1750 Lines, Structure 1256
Date: 7/23/19
Engineer: JS
Purpose: Recalculate wire loads for T-Mobile site.

Shield Wires:
1740: 336 "Linnet" ACSR, sagged in PLS-CADD
1750: AFL DNO-8363 OPGW, sagged in PLS-CADD

Conductors:
1272 "Bittern" ACSR, sagged in PLS-CADD

NESC 250B

1740 Line			1750 Line	
Linnet	V	1148	1128	V OPGW
	T	-1936	-1723	T
	L	0	0	L
Top Phase:	V	2515	2523	V
	T	-2802	-2844	T
	L	0	0	L
Mid Phase:	V	2528	2523	V
	T	-2868	-2877	T
	L	0	0	L
Bot Phase:	V	2522	2540	V
	T	-2841	-2965	T
	L	0	0	L

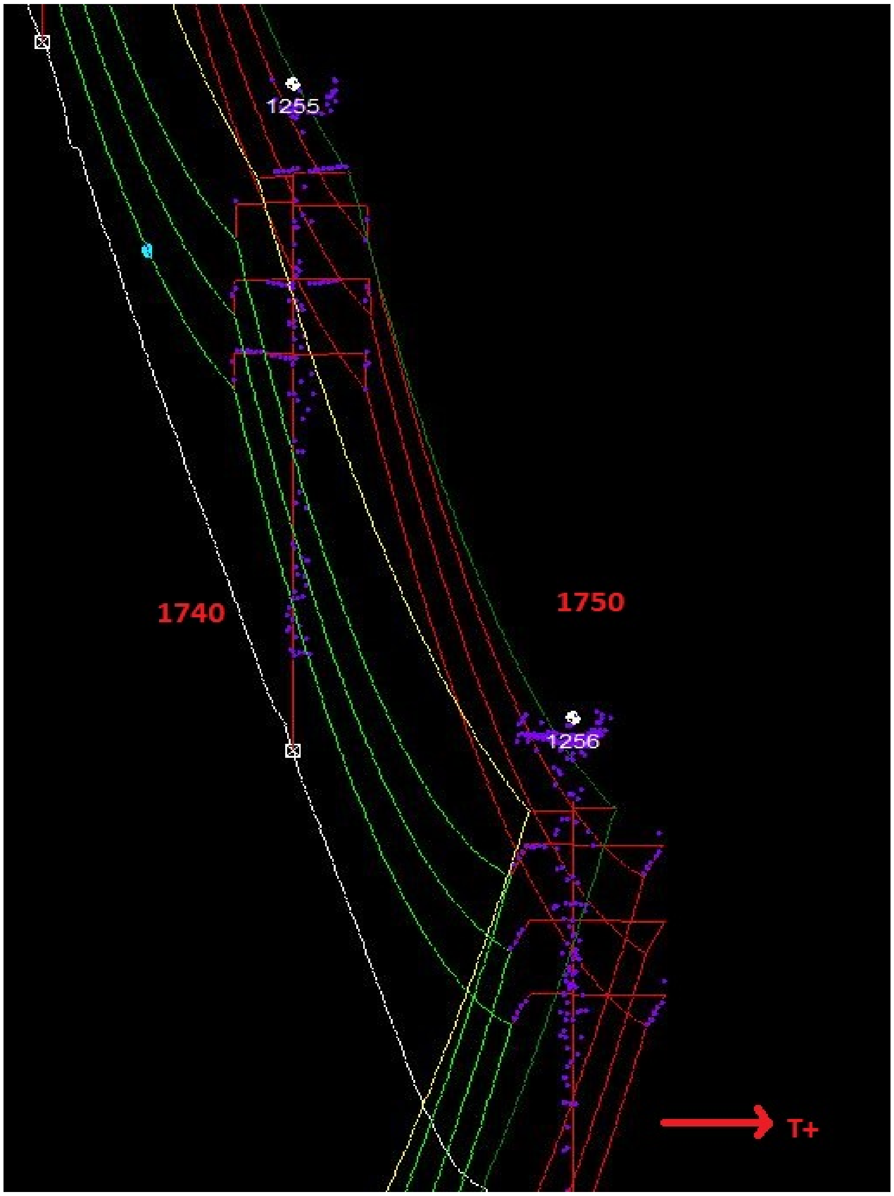
Project: 1740/1750 Lines, Structure 1256
Date: 7/23/19
Engineer: JS
Purpose: Recalculate wire loads for T-Mobile site.

Shield Wires:
1740: 336 "Linnet" ACSR, sagged in PLS-CADD
1750: AFL DNO-8363 OPGW, sagged in PLS-CADD

Conductors:
1272 "Bittern" ACSR, sagged in PLS-CADD

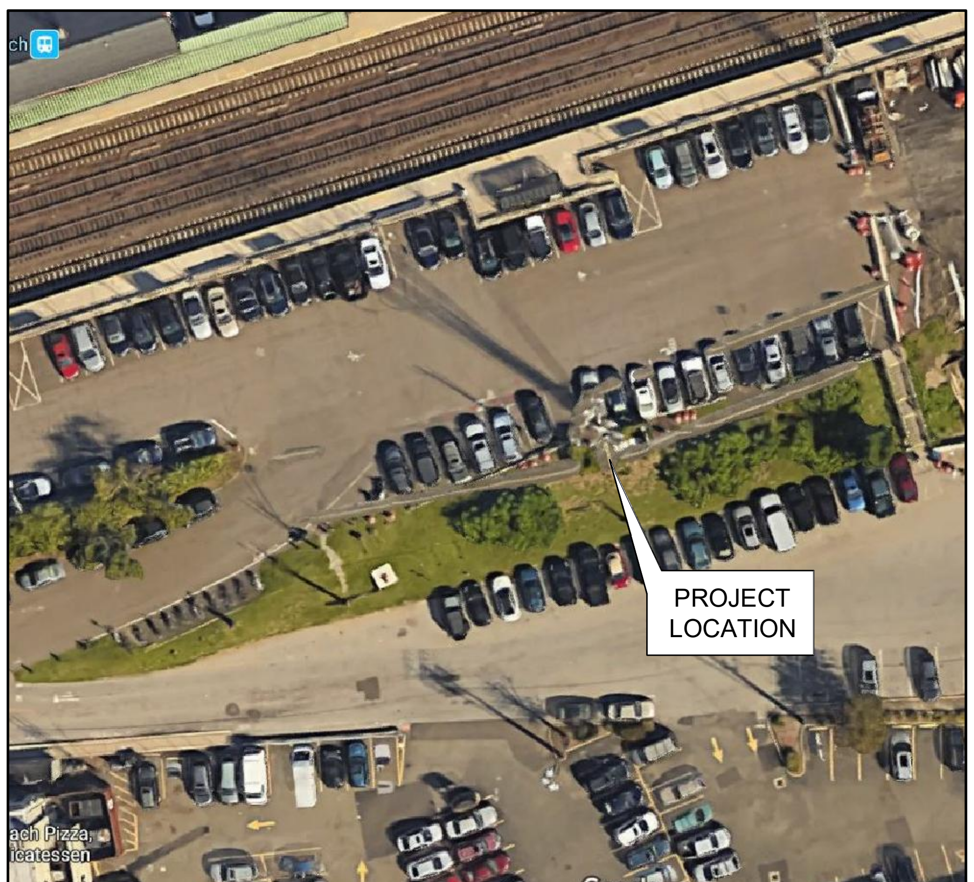
NESC 250C - 23 PSF

1740 Line			1750 Line	
Linnet	**V**	392	374	**V OPGW**
	T	-1239	-1120	**T**
	L	0	7	**L**
Top Phase:	**V**	1116	1119	**V**
	T	-2247	-2266	**T**
	L	0	0	**L**
Mid Phase:	**V**	1122	1119	**V**
	T	-2274	-2280	**T**
	L	0	0	**L**
Bot Phase:	**V**	1120	1127	**V**
	T	-2265	-2319	**T**
	L	0	0	**L**


1255
1740
1750
1256
T+

ANTENNA MAST DESIGN

T-MOBILE - CT11001B
STRUCT NO. 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870



VICINITY MAP

PROJECT SUMMARY

SITE ADDRESS:	160 SOUND BEACH ROAD GREENWICH, CT 06870
PROJECT COORDINATES:	LAT: 41°-01'-58.86N LON: 73°-34'-02.30W ELEV:±30' AMSL
EVERSOURCE STRUCT NO:	1256
EVERSOURCE CONTACT:	RICHARD BADON 860.728.4852
T-MOBILE SITE REF.:	CT11001B
T-MOBILE CONTACT:	SHELDON FREINCLE 201.776.8521
ANTENNA CL HEIGHT:	105'-0"
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD ROAD BRANFORD, CT 06405
CENTEK CONTACT:	TIMOTHY J LYNN, PE 203.433.7507

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS & GENERAL NOTES	0
N-2	STRUCTURAL STEEL NOTES	0
MI-1	MODIFICATION INSPECTION REQUIREMENTS	0
S-1	TOWER ELEVATION & FEEDLINE PLAN	0
S-2	TOP CONNECTION DETAILS	0
S-3	BOTTOM CONNECTION DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

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

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

TITLE SHEET

SHEET NO. T-1

DESIGN BASIS

1. GOVERNING CODE: 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CT STATE SUPPLEMENT.

2. TIA-222-G, ASCE MANUAL NO. 48-11 - "DESIGN OF STEEL TRANSMISSION POLE STRUCTURES SECOND EDITION", NESC C2-2012 AND NORTHEAST UTILITIES DESIGN CRITERIA.

3. DESIGN CRITERIA

   WIND LOAD: (ANTENNA MAST)
   NOMINAL DESIGN WIND SPEED (V) = 93 MPH (2018 CSBC: APPENDIX 'N')

   WIND LOAD: (UTILITY POLE & FOUNDATION)
   BASIC WIND SPEED (V) =110 MPH (3-SECOND GUST) BASED ON NESC C2-2012, SECTION 25 RULE 250C.

GENERAL NOTES

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., FOR T-MOBILE, DATED 7/8/21.

2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM THE TOWER DESIGN DRAWINGS PREPARED BY A. B. CHANCE CO.

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

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

5. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK. THIS INCLUDES VERIFYING ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

6. PCS MAST INSTALLATION SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF TRANSMISSION STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA.

7. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

8. 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.

9. NO DRILLING WELDING OR TAPING IS PERMITTED ON CL&P OWNED EQUIPMENT.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

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

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

DESIGN BASIS AND GENERAL NOTES

SHEET NO.
N-1
Sheet No. 2 of 7

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY LOAD AND RESISTANCE FACTOR DESIGN (LRFD).

2. MATERIAL SPECIFICATIONS

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI).
   A. STRUCTURAL STEEL (TOWER REINF. SOLID ROUND BAR)--- ASTM A572_GR50 (50 KSI)
   D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)

3. FASTENER SPECIFICATIONS

   A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
   B U-BOLTS---ASTM A307
   C. ANCHOR RODS---ASTM F1554
   D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572_GR50 STEELS, ASTM E80XX FOR A572_GR65 STEEL.
   E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (FU=120 KSI).

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

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

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

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

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

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

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

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

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

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

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

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

16. ALL BOLTS SHALL BE INSTALLED PER THE REQUIREMENTS OF AISC 14TH EDITION & RCSC "SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH STRENGTH BOLTS".

17. ALL BOLTS SHALL BE INSTALLED AS SNUG-TIGHT CONNECTIONS UNLESS OTHERWISE INDICATED. CONNECTIONS SPECIFIED AS PRETENSIONED OR SLIP-CRITICAL SHALL BE TIGHTENED TO A BOLT TENSION NOT LESS THAN THAT GIVEN IN TABLE J3.1 OF AISC 14TH EDITION.

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

19. LOAD INDICATOR WASHERS SHALL BE UTILIZED ON ALL PRETENSIONED OR SLIP-CRITICAL CONNECTIONS.

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

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

22. FABRICATE BEAMS WITH MILL CAMBER UP.

23. 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.

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

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

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
180 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

STRUCTURAL STEEL NOTES

SHEET NO. N-2

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	–	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	–	EARTHWORK: BACKFILL MATERIAL & COMPACTION	–	POST–INSTALLED ANCHOR ROD PULL–OUT TEST
–	EOR APPROVED POST–INSTALLED ANCHOR MPII	–	REBAR & FORMWORK GEOMETRY VERIFICATION	X	PHOTOGRAPHS
–	FABRICATION INSPECTION	–	CONCRETE TESTING		
–	FABRICATOR CERTIFIED WELDER INSPECTION	X	STEEL INSPECTION		
X	MATERIAL CERTIFICATIONS	–	POST INSTALLED ANCHOR ROD VERIFICATION		
		–	BASE PLATE GROUT VERIFICATION		
		–	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON–SITE COLD GALVANIZING VERIFICATION		
		X	CONTRACTOR AS–BUILT REDLINE DRAWINGS		

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

GENERAL

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

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

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

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

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

MODIFICATION INSPECTOR (MI)

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

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

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

GENERAL CONTRACTOR (GC)

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

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

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

CORRECTION OF FAILING MODIFICATION INSPECTION

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

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

REQUIRED PHOTOGRAPHS

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

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

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

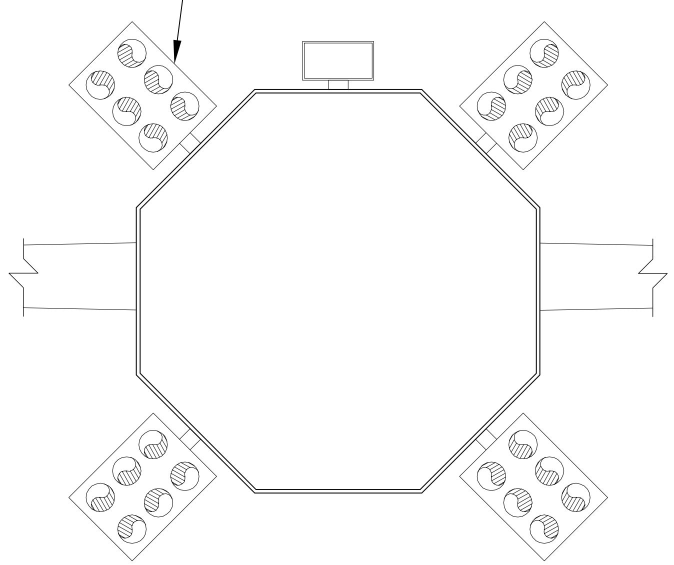
CENTEK engineering
Centered on Solutions
www.CentekEng.com

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

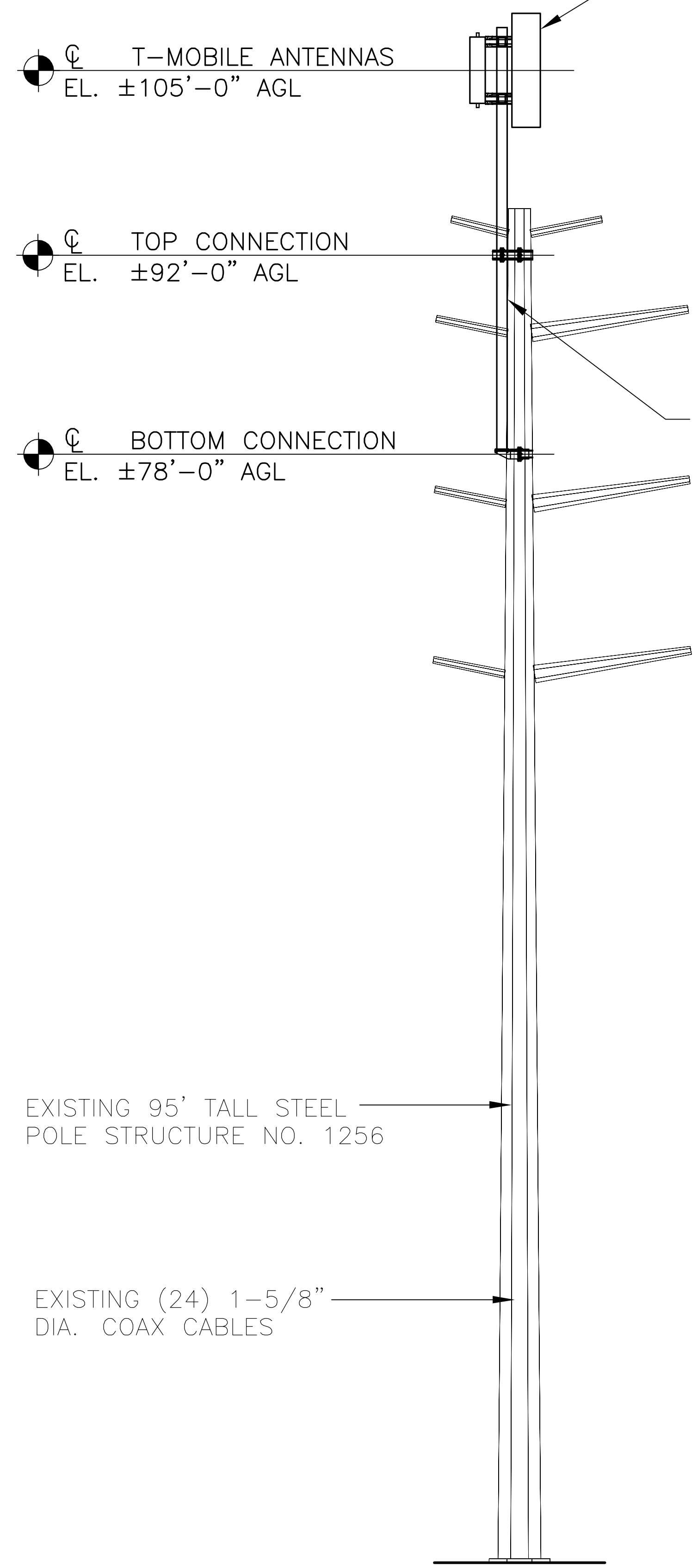
MODIFICATION INSPECTION REQUIREMENTS

SHEET NO.
MI-1
Sheet No. 4 of 7



3 / S-1 **COAX CABLE PLAN**

SCALE: NTS



1 / S-1 **TOWER + MAST ELEVATION**

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

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

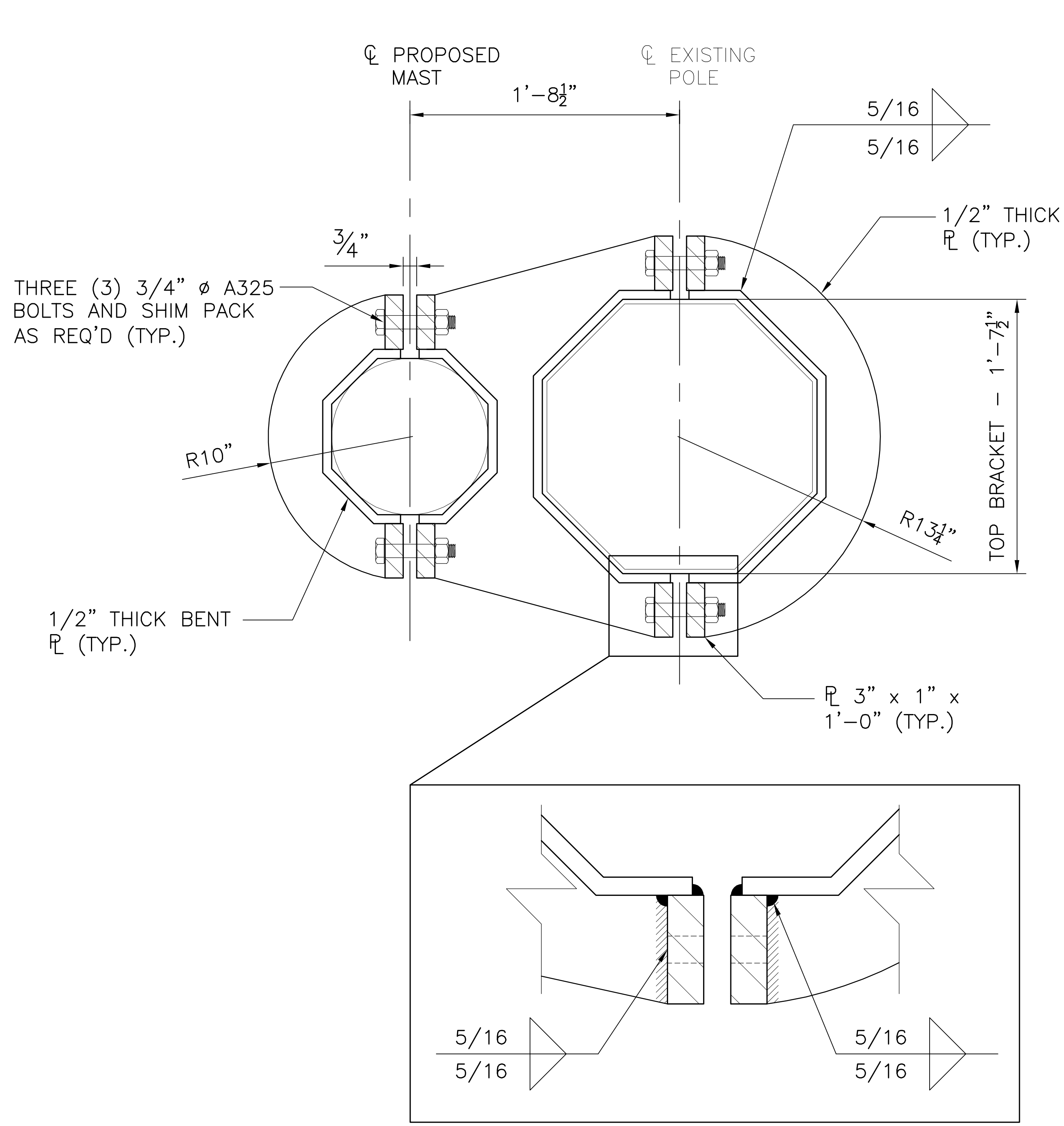
T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

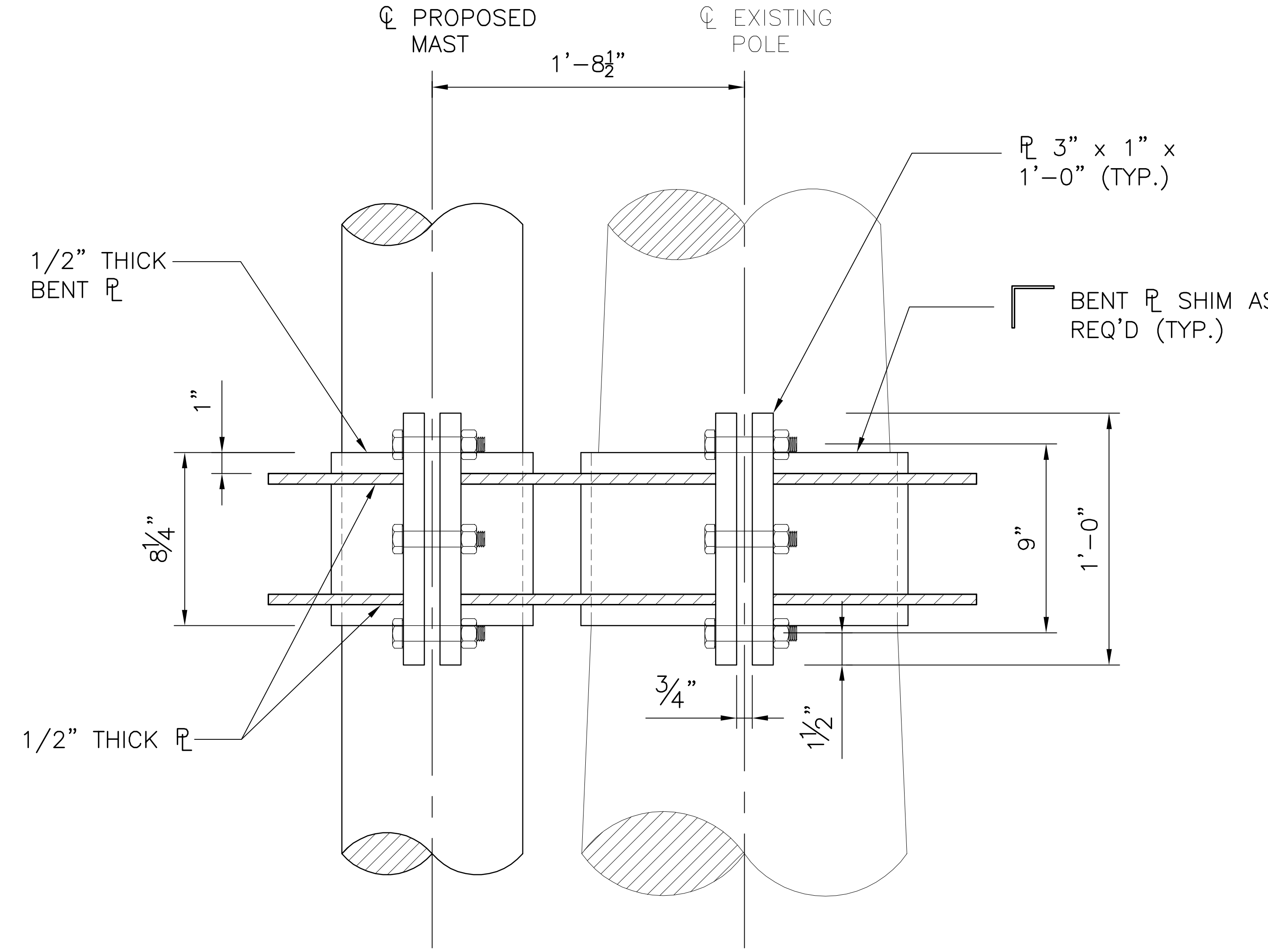
TOWER ELEVATION AND FEEDLINE PLAN

SHEET NO. S-1

Sheet No. 5 of 7



2
S-2
TOP BRACKET PLAN VIEW
SCALE: NTS



1
S-2
TOP BRACKET DETAIL
SCALE: NTS

NOTE:

1. POLE TAPER = 0.20"/FT (V.I.F.)

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

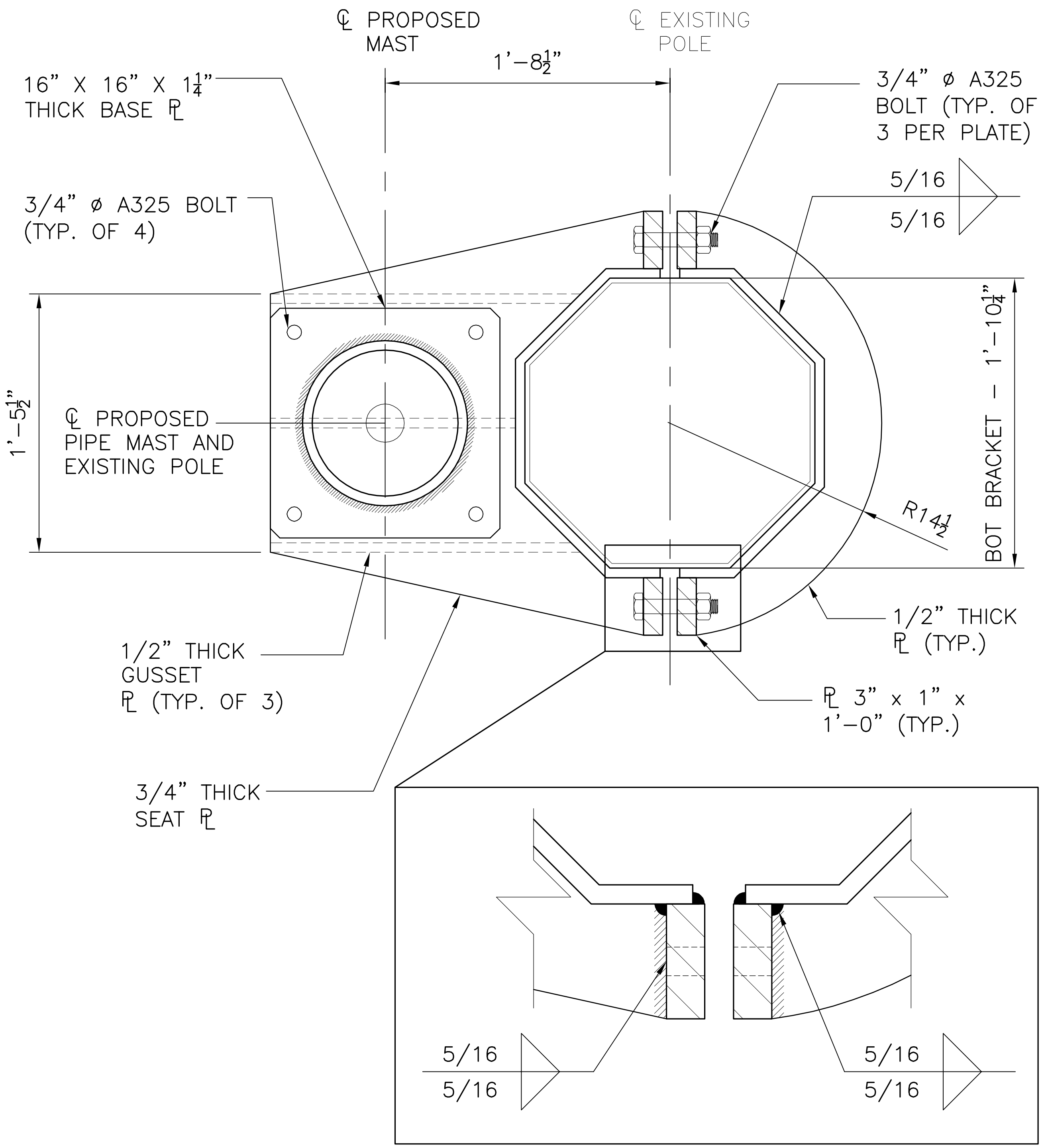
CENTEK engineering
Centered on Solutions
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

TOP CONNECTION DETAILS

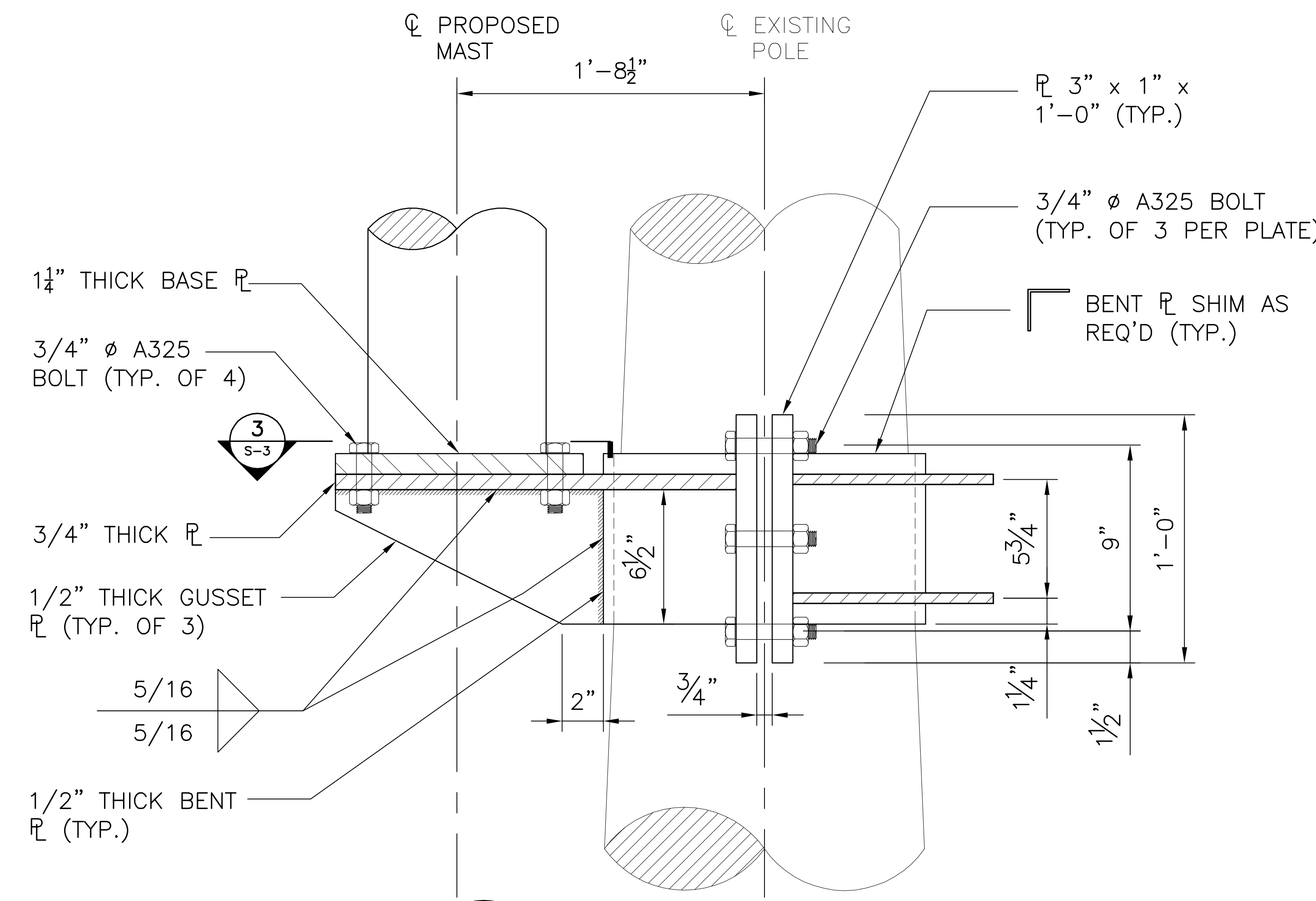
SHEET NO.
S-2



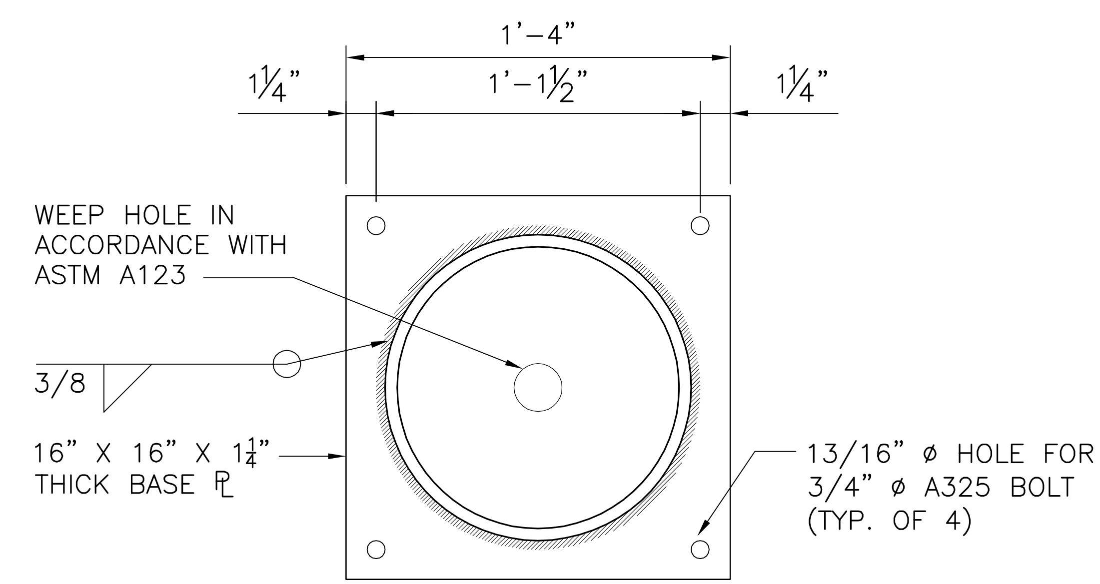
2 / S–3
BOTTOM BRACKET PLAN VIEW
SCALE: NTS

NOTE:

1. POLE TAPER = 0.20"/FT (V.I.F.)



1 / S–3
BOTTOM BRACKET DETAIL
SCALE: NTS



3 / S–3
BOTTOM PLATE DETAIL
SCALE: 1" = 1'–0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	7/8/21	TJL	CAG	ISSUED FOR CONSTRUCTION

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

T-MOBILE
PROPOSED WIRELESS COMMUNICATIONS FACILITY
CT11001B
EVERSOURCE STRUCTURE 1256
160 SOUND BEACH ROAD
GREENWICH, CT 06870

DATE: 7/8/21
SCALE: AS SHOWN
JOB NO. 21051.03

BOTTOM CONNECTION DETAILS

SHEET NO.
S-3
Sheet No. 7 of 7

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

Wind Speeds

Basic Wind Speed	$V := 93$	mph	(User Input - 2018 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 =	$h := 95$	ft	(User Input)
Height to Center of Antennas =	$z_{T\text{-}Mo} := 105$	ft	(User Input)
Height to Center of Mast =	$z_{Mast1} := 93$	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)

$K_{iz} := \left(\frac{z_{T\text{-}Mo}}{33}\right)^{0.1} = 1.123$ $t_{izT\text{-}Mo} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.105$

Velocity Pressure Coefficient Antennas = $Kz_{T\text{-}Mo} := 2.01\left(\left(\frac{z_{T\text{-}Mo}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.279$

Velocity Pressure w/o Ice Antennas = $qz_{T\text{-}Mo} := 0.00256 \cdot K_d \cdot Kz_{T\text{-}Mo} \cdot V^2 \cdot I_{Wind} = 30.931$

Velocity Pressure with Ice Antennas = $qz_{ice.T\text{-}Mo} := 0.00256 \cdot K_d \cdot Kz_{T\text{-}Mo} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.774$

Velocity Pressure Service = $qz_{T\text{-}Mo.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{T\text{-}Mo} \cdot V_{Ser}^2 \cdot I_{Ser} = 10.017$

$K_{izMast1} := \left(\frac{z_{Mast1}}{33}\right)^{0.1} = 1.109$ $t_{izMast1} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{izMast1} \cdot K_{zt}^{0.35} = 2.08$

Velocity Pressure Coefficient Mast = $Kz_{Mast1} := 2.01\left(\left(\frac{z_{Mast1}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.246$

Velocity Pressure w/o Ice Mast = $qz_{Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V^2 \cdot I_{Wind} = 30.151$

Velocity Pressure with Ice Mast = $qz_{ice.Mast1} := 0.00256 \cdot K_d \cdot Kz_{Mast1} \cdot V_i^2 \cdot I_{Wind\_w\_Ice} = 7.578$

Velocity Pressure Service = $qz_{Mast1.Ser} := 0.00256 \cdot K_{dSer} \cdot Kz_{Mast1} \cdot V_{Ser}^2 \cdot I_{Ser} = 9.764$

CENTEK engineering — Centered on Solutions™ — www.centekeng.com — 63-2 North Branford Road, Branford, CT 06405 — P: (203) 488-0580 — F: (203) 488-8587	Subject:	Loads on T-Mobile Mast - Structure 1256
	Location:	Greenwich, CT
	Rev. 0: 7/8/21	Prepared by: T.J.L. Checked by: C.F.C. Job No. 21051.03

Development of Wind & Ice Load on Mast

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

Mast Shape = Round (User Input)

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

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

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

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

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

Wind Load (without ice)

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

Total Mast Wind Force = $qz_{Mast1} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 52$ plf **BLC 5**

Wind Load (with ice)

Mast Projected Surface Area w/ Ice = $AICE_{mast} := \frac{\left(D_{mast} + 2 \cdot t_{izMast1}\right)}{12} = 1.409$ sf/ft

Total Mast Wind Force w/ Ice = $qz_{ice.Mast1} \cdot G_H \cdot Ca_{mast} \cdot AICE_{mast} = 17$ plf **BLC 4**

Wind Load (Service)

Total Mast Wind Force Service Loads = $qz_{Mast1.Ser} \cdot G_H \cdot Ca_{mast} \cdot A_{mast} = 17$ 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 = $Ai_{mast} := \frac{\pi}{4}\left[\left(D_{mast} + t_{izMast1} \cdot 2\right)^2 - D_{mast}^2\right] = 96.9$ sq in

Weight of Ice on Mast = $W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 38$ plf **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFSAPXVAALL18_43

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72$ in (User Input)

Antenna Width = $W_{ant} := 24$ in (User Input)

Antenna Thickness = $T_{ant} := 8.5$ in (User Input)

Antenna Weight = $WT_{ant} := 132$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.0$

Antenna Force Coefficient = $Ca_{ant} = 1.22$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 36$ sf

Total Antenna Wind Force = $F_{ant} := qz_{T\text{-}Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 1837$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izT\text{-}Mo}) \cdot (W_{ant} + 2 \cdot t_{izT\text{-}Mo})}{144} = 14.9$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 44.8$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.T\text{-}Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 575$ lbs **BLC 4**

Wind Load (Service)

Total Antenna Wind Force Service Loads = $F_{ant.Ser} := qz_{T\text{-}Mo.Ser} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 595$ lbs **BLC 6**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 396$ lbs **BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izT\text{-}Mo})(W_{ant} + 2 \cdot t_{izT\text{-}Mo}) \cdot (T_{ant} + 2 \cdot t_{izT\text{-}Mo}) - V_{ant} = 1 \times 10^4$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 410$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 1229$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFSAPX16DWV-16DWVS

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 55.9$ in (User Input)

Antenna Width = $W_{ant} := 13$ in (User Input)

Antenna Thickness = $T_{ant} := 3.15$ in (User Input)

Antenna Weight = $WT_{ant} := 41$ lbs (User Input)

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

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$

Antenna Force Coefficient = $Ca_{ant} = 1.28$

Wind Load (without ice)

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

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$ sf

Total Antenna Wind Force = $F_{ant} := qz_{T\text{-}Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 809$ lbs **BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izT\text{-}Mo}) \cdot (W_{ant} + 2 \cdot t_{izT\text{-}Mo})}{144} = 7.2$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 21.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := qz_{ice.T\text{-}Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 290$ lbs **BLC 4**

Wind Load (Service)

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

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 123$ lbs **BLC 2**

Gravity Loads (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{izT\text{-}Mo})(W_{ant} + 2 \cdot t_{izT\text{-}Mo}) \cdot (T_{ant} + 2 \cdot t_{izT\text{-}Mo}) - V_{ant} = 5325$

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 173$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 518$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Commscope ATSBT-TOP-FM-4G Bias Tee		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.5$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 0.1$	sf	
Antenna Projected Surface Area =	$A_{ant} := SA_{ant} \cdot N_{ant} = 0.9$	sf	
Total Antenna Wind Force =	$F_{ant} := qz_{T\text{-}Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ant} = 43$	lbs	**BLC 5**

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEant} := \frac{(L_{ant} + 2 \cdot t_{izT\text{-}Mo}) \cdot (W_{ant} + 2 \cdot t_{izT\text{-}Mo})}{144} = 0.5$	sf	
Antenna Projected Surface Area w/ Ice =	$A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 3.2$	sf	
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.T\text{-}Mo} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot A_{ICEant} = 41$	lbs	**BLC 4**

Wind Load (Service)

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

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 12$	lbs	**BLC 2**

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 42$	cu in	
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{izT\text{-}Mo})(W_{ant} + 2 \cdot t_{izT\text{-}Mo}) \cdot (T_{ant} + 2 \cdot t_{izT\text{-}Mo}) - V_{ant} = 442$		
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 14$	lbs	
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 86$	lbs	**BLC 3**

Development of Wind & Ice Load on Antenna Mounts

Mount Data:

Mount Type:	SitePro Double Support Arm RDS-284 (x2)		
Mount Shape =	Flat		(User Input)
Mount Projected Surface Area =	$CaAa := 7$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CaAa_{ice} := 11$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1080$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1250$	lbs	

Wind Load (without ice)

Total Mount Wind Force =	$F_{mnt} := qz_{T\text{-}Mo} \cdot G_H \cdot CaAa = 292$	lbs	**BLC 5**

Wind Load (with ice)

Total Mount Wind Force =	$Fi_{mnt} := qz_{ice.T\text{-}Mo} \cdot G_H \cdot CaAa_{ice} = 115$	lbs	**BLC 4**

Wind Load (Service)

Total Mount Wind Force =	$F_{mnt.Ser} := qz_{T\text{-}Mo.Ser} \cdot G_H \cdot CaAa = 95$	lbs	**BLC 6**

Gravity Loads (without ice)

Weight of All Mounts =	$WT_{mnt} = 1080$	lbs	**BLC 2**

Gravity Loads (ice only)

Weight of Ice on All Mounts =	$WT_{mnt.ice} - WT_{mnt} = 170$	lbs	**BLC 3**

Development of Wind & Ice Load on Coax Cables

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 = $L_{coax} := 14$ ft (User Input)

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

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

No. of Coax Projecting Outside Face of Memeber = $NP_{coax} := 6$ (User Input)

Coax aspect ratio, $Ar_{coax} := \frac{(L_{coax} \cdot 12)}{D_{coax}} = 84.8$

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

Wind Load (without ice)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 1$ sf/ft

Total Coax Wind Force = $F_{coax} := Ca_{coax} \cdot qz_{Mast1} \cdot G_H \cdot A_{coax} = 48$ plf **BLC 5**

Wind Load (with ice)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot t_{izMast1})}{12} = 1.3$ sf/ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := Ca_{coax} \cdot qz_{ice.Mast1} \cdot G_H \cdot AICE_{coax} = 16$ plf **BLC 4**

Wind Load (Service)

Total Coax Wind Force Service Loads = $F_{coax} := Ca_{coax} \cdot qz_{Mast1.Ser} \cdot G_H \cdot A_{coax} = 16$ plf **BLC 6**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 25$ plf **BLC 2**

Gravity Loads (ice only)

Ice Area per Linear Foot = $Ai_{coax} := \frac{\pi}{4}\left[(D_{coax} + 2 \cdot t_{izMast1})^2 - D_{coax}{}^2\right] = 26.5$ sq in

Ice Weight All Coax per foot = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 248$ 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)	24
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 530-13: ASD
Aluminum Code	AA ADM1-15: 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 (\...	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 Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0X	Column	Wide Flange	A53 Gr. B	Typical	17.5	339	339	678

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Mast	30			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N1	N4			Mast	Column	Wide Flange	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	14	0	0	
3	N3	0	27	0	0	
4	N4	0	30	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	N2	Reaction		Reaction			
2	N1	Reaction	Reaction	Reaction		Reaction	

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.025	-.025	0	24

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.038	-.038	0	0
2	M1	Y	-.248	-.248	0	24

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.017	.017	0	24
2	M1	X	.016	.016	0	24

Member Distributed Loads (BLC 5 : TIA Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.052	.052	0	24
2	M1	X	.048	.048	0	24

Member Distributed Loads (BLC 6 : Service Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.017	.017	0	24
2	M1	X	.016	.016	0	24

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib...	Area(...	Surfa...
1	Self Weight	None		-1						
2	Weight of Appurtenances	None				4		1		
3	Weight of Ice Only	None				4		2		
4	TIA Wind with Ice	None				4		2		
5	TIA Wind	None				4		2		
6	Service Wind	None				4		2		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.0D + 1.0W Service	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	N2	max	-2.547	4	0	4	0	4	0	4	0	4	0	4
2		min	-12.519	1	0	1	0	1	0	1	0	1	0	1
3	N1	max	3.909	1	13.892	3	0	4	0	4	0	4	0	4
4		min	.789	4	3.598	2	0	1	0	1	0	1	0	1
5	Totals:	max	-1.758	4	13.892	3	0	4						
6		min	-8.61	1	3.598	2	0	1						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
1	N1	max	0	4	0	4	0	4	0	4	0	4	2.625e-03	1
2		min	0	1	0	1	0	1	0	1	0	1	5.31e-04	4
3	N2	max	0	4	-.001	2	0	4	0	4	0	4	-1.161e-03	4
4		min	0	1	-.005	3	0	1	0	1	0	1	-5.73e-03	1
5	N3	max	1.736	1	-.002	2	0	4	0	4	0	4	-2.764e-03	4
6		min	.352	4	-.007	3	0	1	0	1	0	1	-1.365e-02	1
7	N4	max	2.227	1	-.002	2	0	4	0	4	0	4	-2.764e-03	4
8		min	.451	4	-.007	3	0	1	0	1	0	1	-1.365e-02	1

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

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	M1	PIPE_12.0X	.384	14...	1	.039	14...		1	391....	551.25	184....	184....	1.4...	H1-...

Joint Reactions (By Combination)

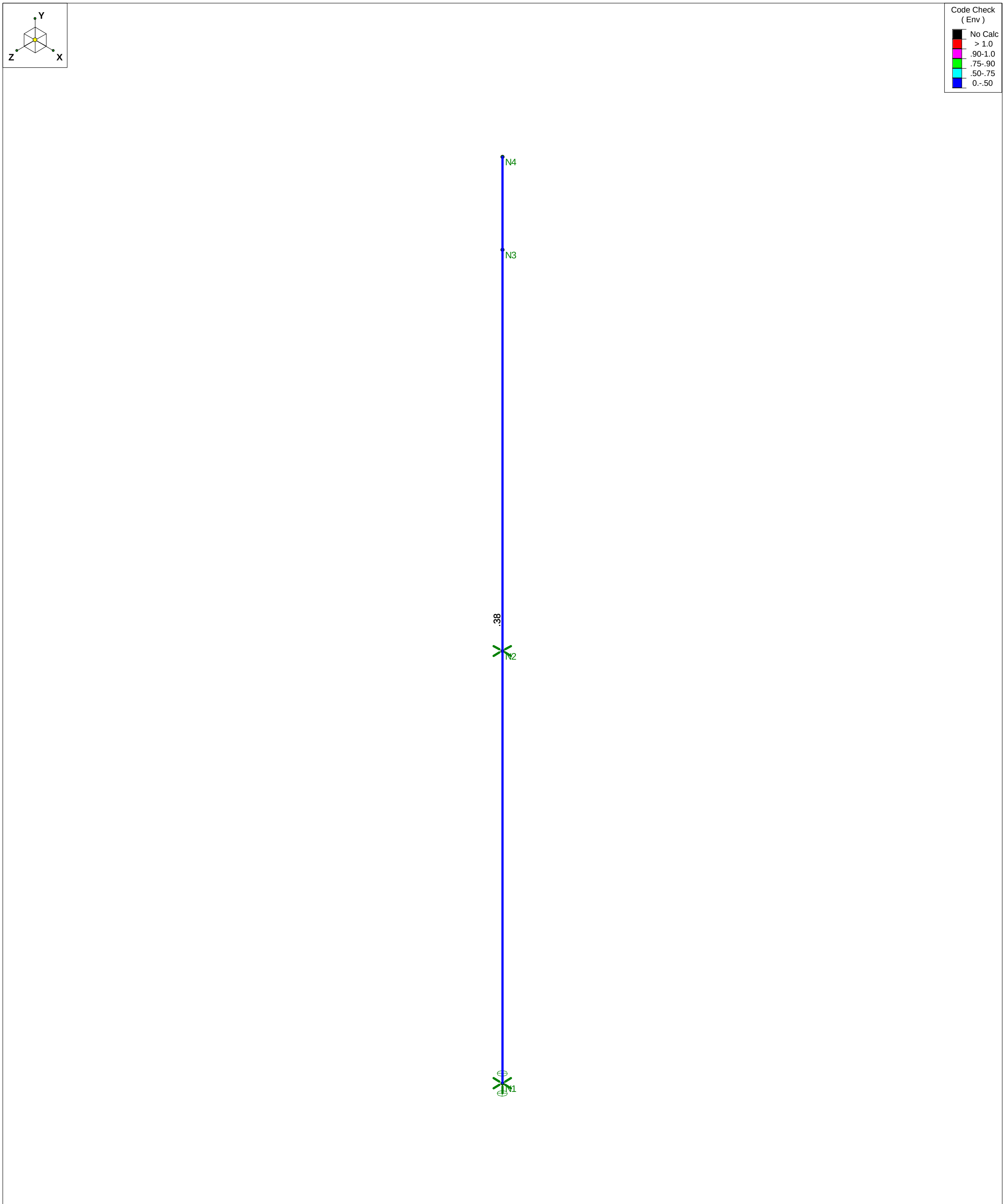
	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	-12.519	0	0	0	0	0
2	1	N1	3.909	4.797	0	0	0	0
3	1	Totals:	-8.61	4.797	0			
4	1	COG (ft):	X: 0	Y: 19.386	Z: 0			

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	-12.511	0	0	0	0	0
2	2	N1	3.902	3.598	0	0	0	0
3	2	Totals:	-8.61	3.598	0			
4	2	COG (ft):	X: 0	Y: 19.386	Z: 0			

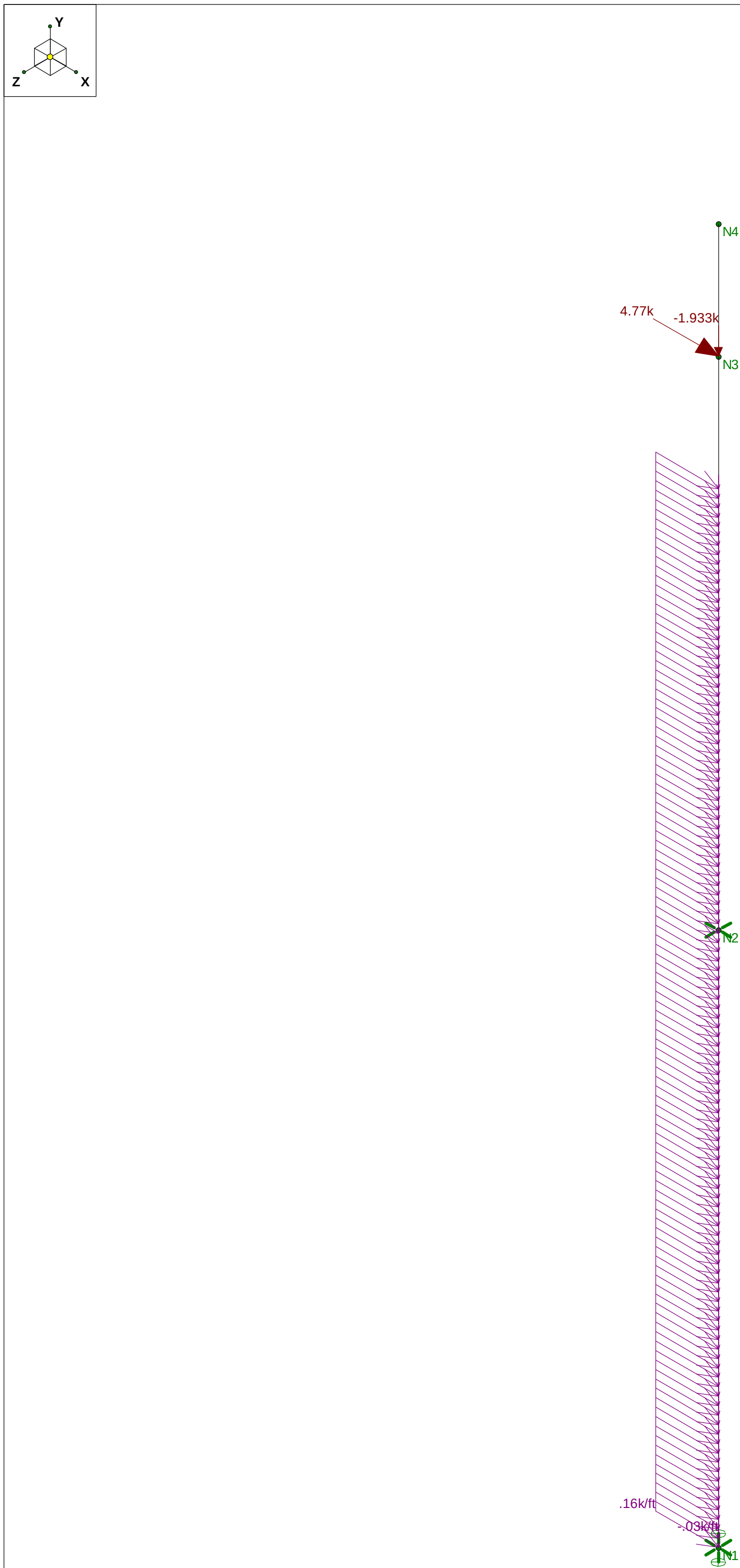
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	3	N2	-2.662	0	0	0	0	0
2	3	N1	.849	13.892	0	0	0	0
3	3	Totals:	-1.813	13.892	0			
4	3	COG (ft):	X: 0	Y: 16.959	Z: 0			



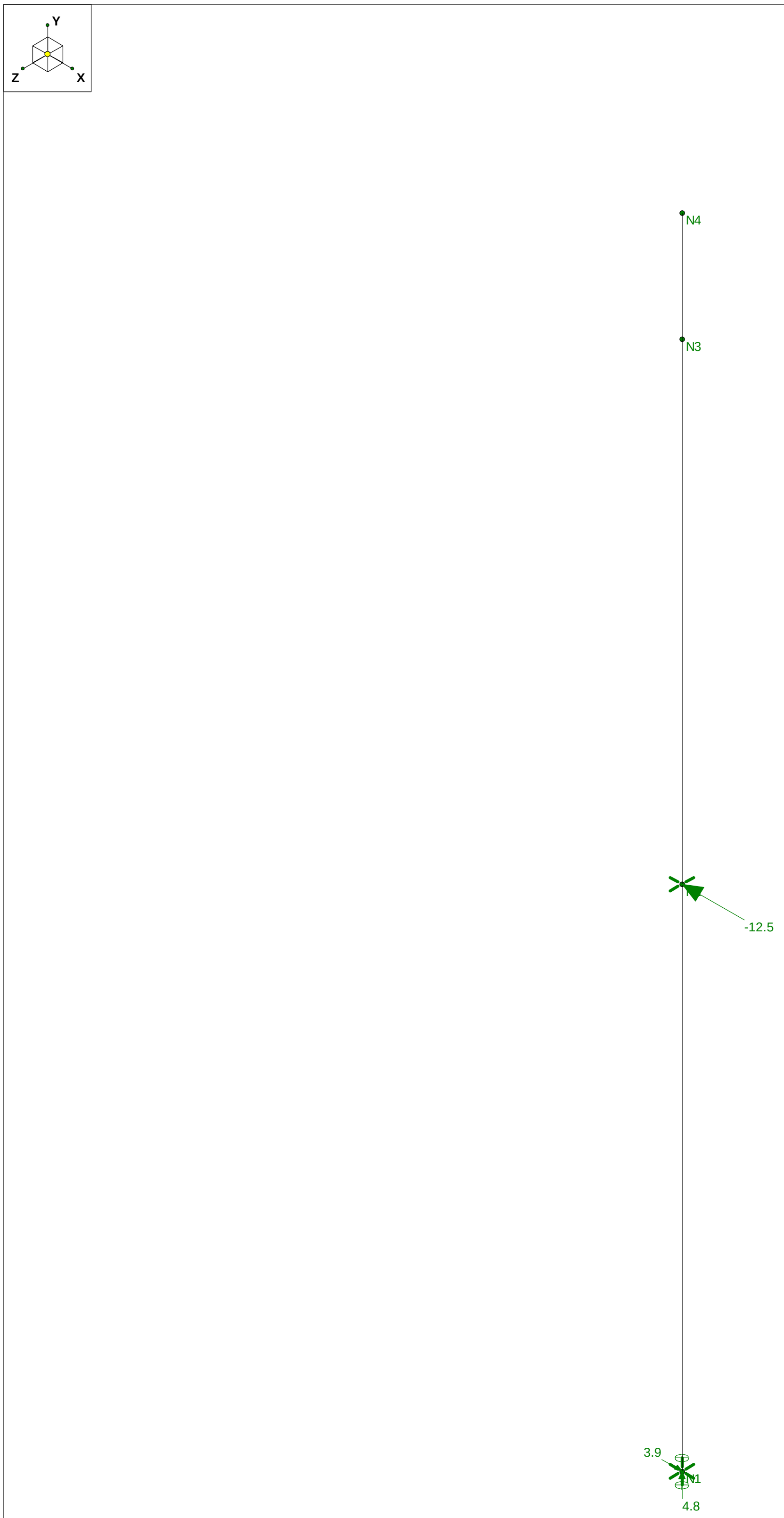
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek	Structure # 1256 - Mast	
TJL		July 8, 2021 at 2:17 PM
21051.03 - CT11001B	Unity Check	TIA.r3d



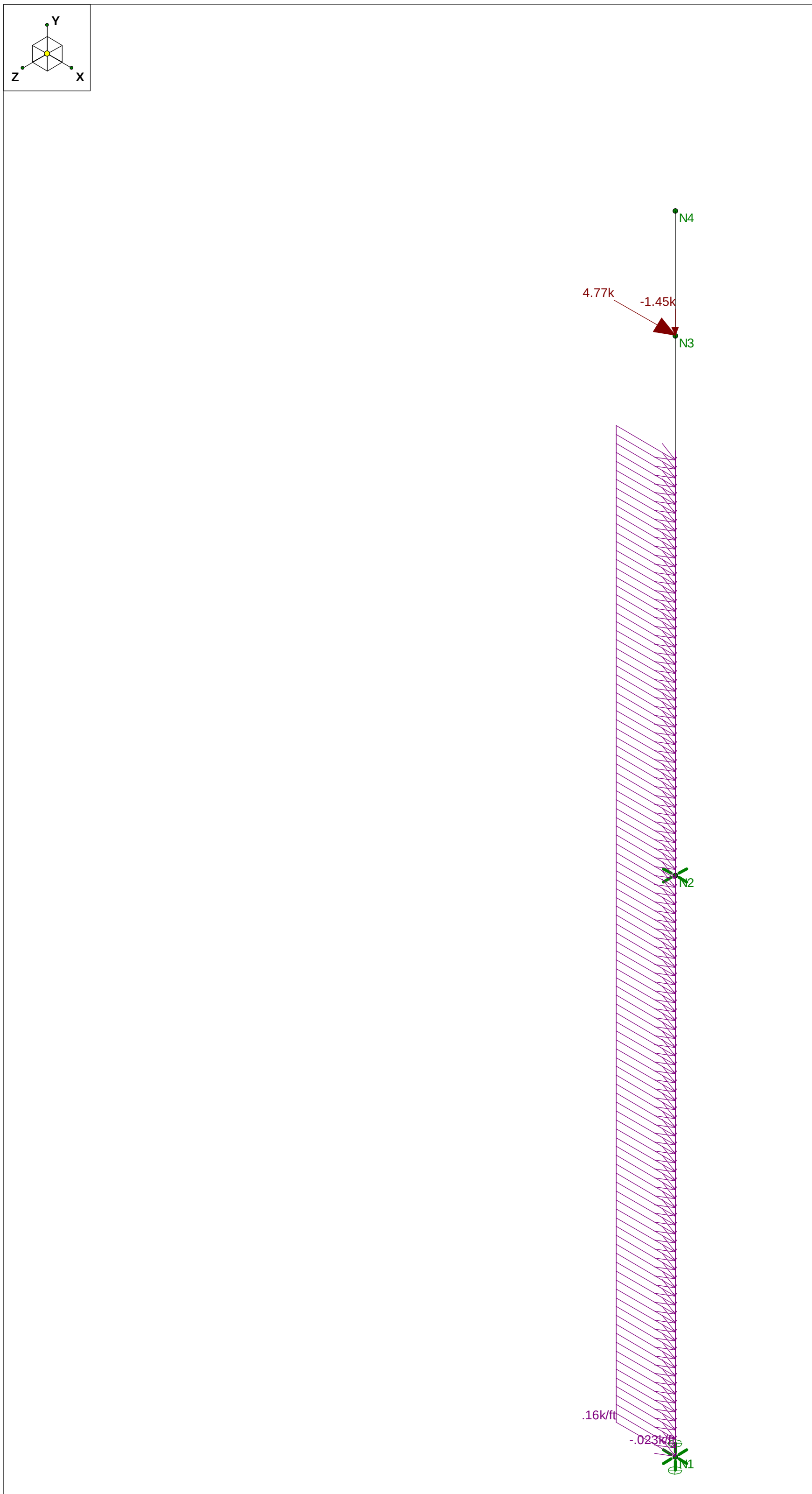
Loads: LC 1, 1.2D + 1.6W (X-direction)
Envelope Only Solution

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:13 PM
21051.03 - CT11001B	LC #1 Loads	TIA.r3d



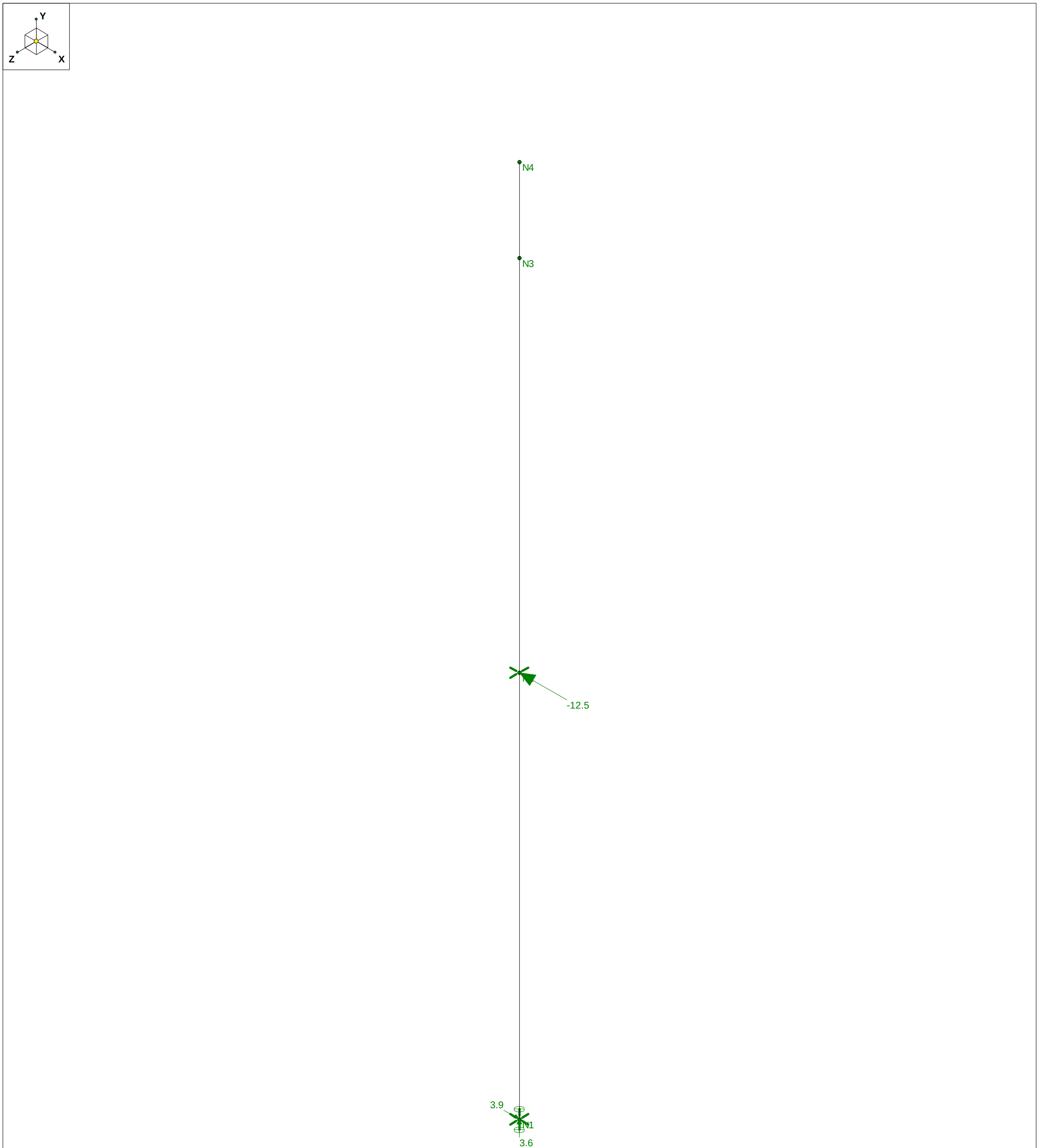
Results for LC 1, 1.2D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:14 PM
21051.03 - CT11001B	LC #1 Reactions	TIA.r3d



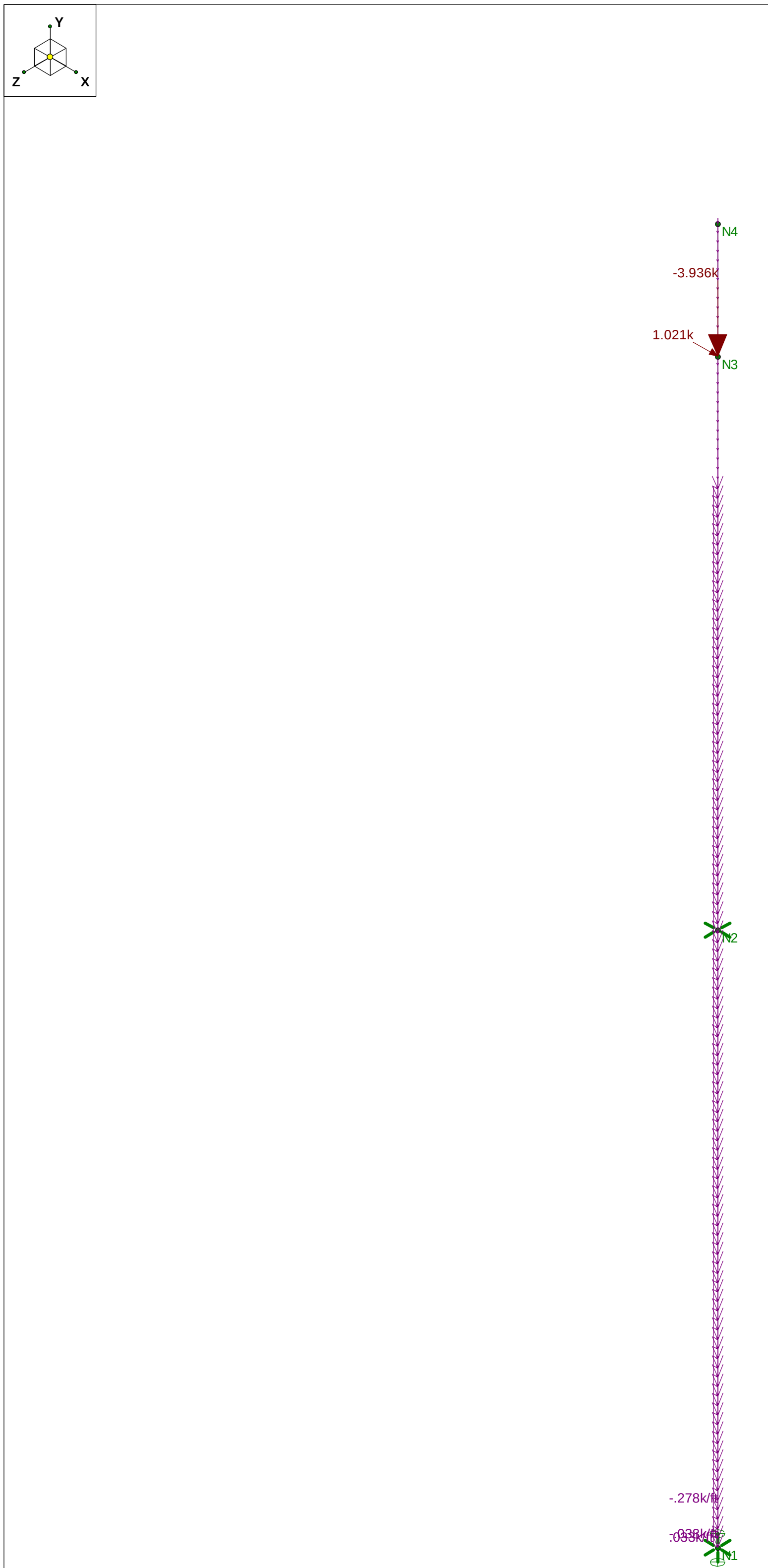
Loads: LC 2, 0.9D + 1.6W (X-direction)
Envelope Only Solution

Centek	Structure # 1256 - Mast	
TJL		July 8, 2021 at 2:13 PM
21051.03 - CT11001B	LC #2 Loads	TIA.r3d



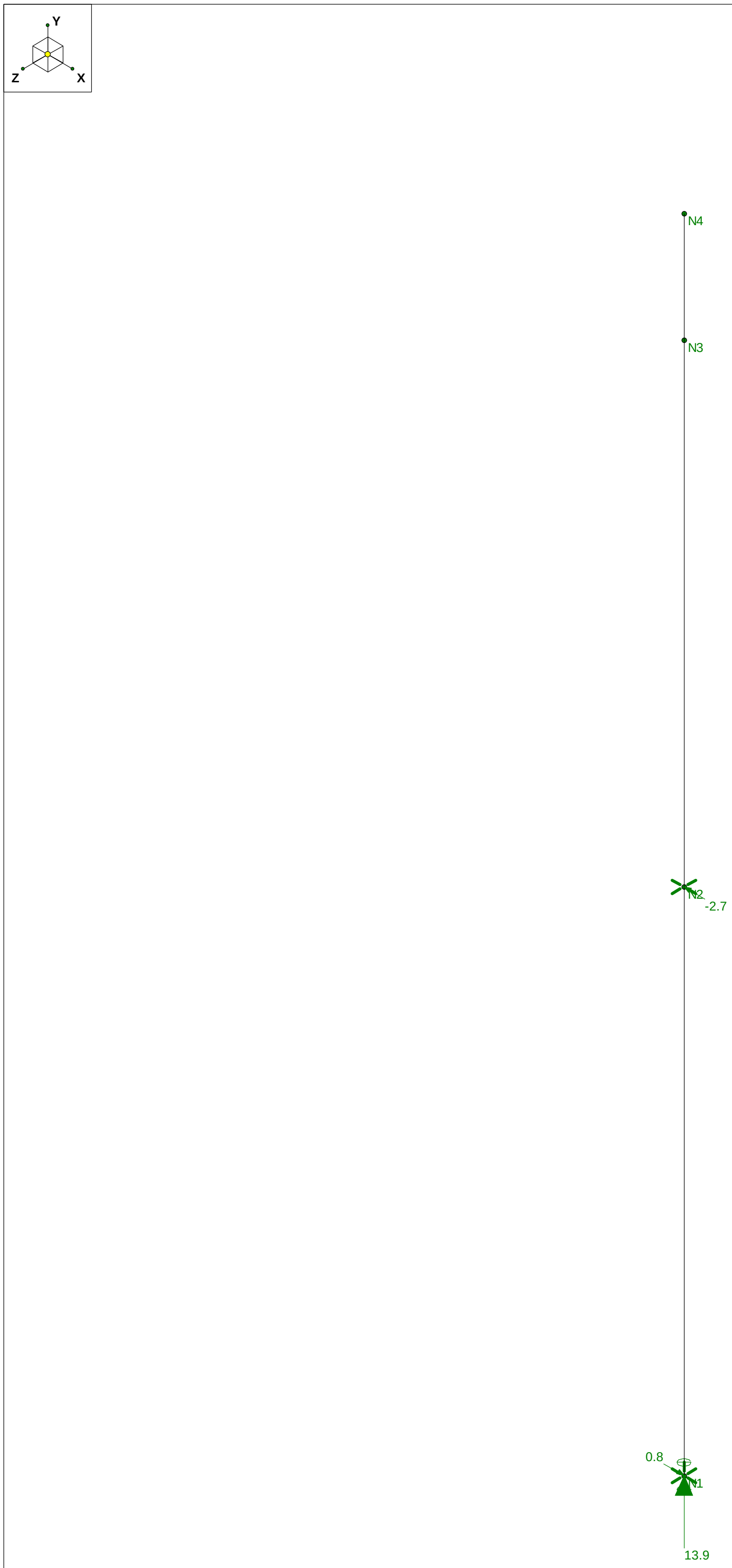
Results for LC 2, 0.9D + 1.6W (X-direction)
Reaction and Moment Units are k and k-ft

Centek	Structure # 1256 - Mast	
TJL		July 8, 2021 at 2:15 PM
21051.03 - CT11001B	LC #2 Reactions	TIA.r3d



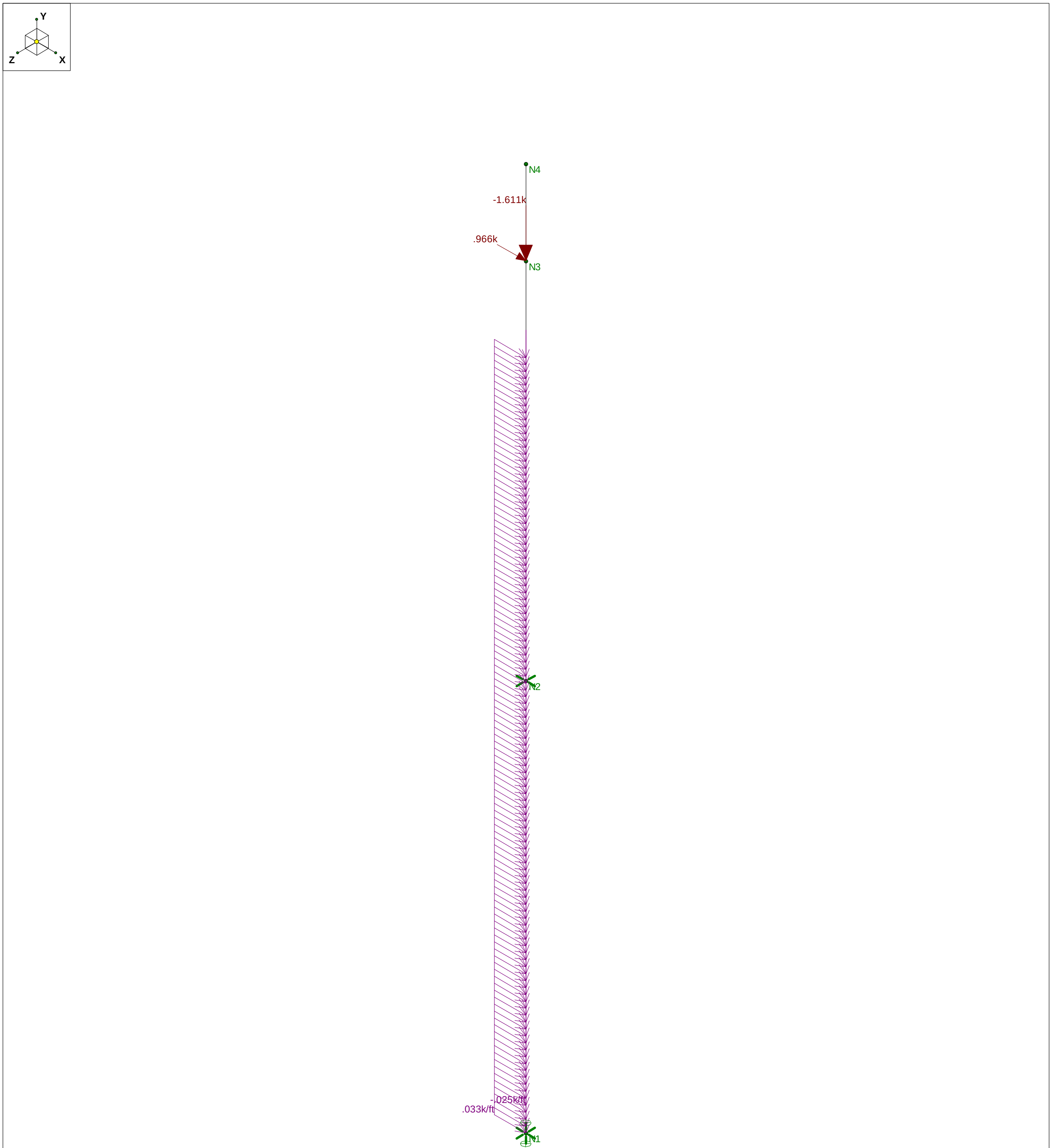
Loads: LC 3, 1.2D + 1.0Di + 1.0Wi (X-direction)
Envelope Only Solution

Centek	Structure # 1256 - Mast	
TJL		July 8, 2021 at 2:13 PM
21051.03 - CT11001B	LC #3 Loads	TIA.r3d



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

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:15 PM
21051.03 - CT11001B	LC #3 Reactions	TIA.r3d

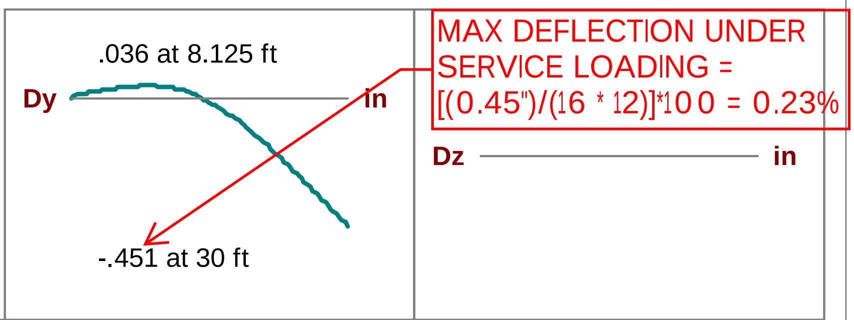


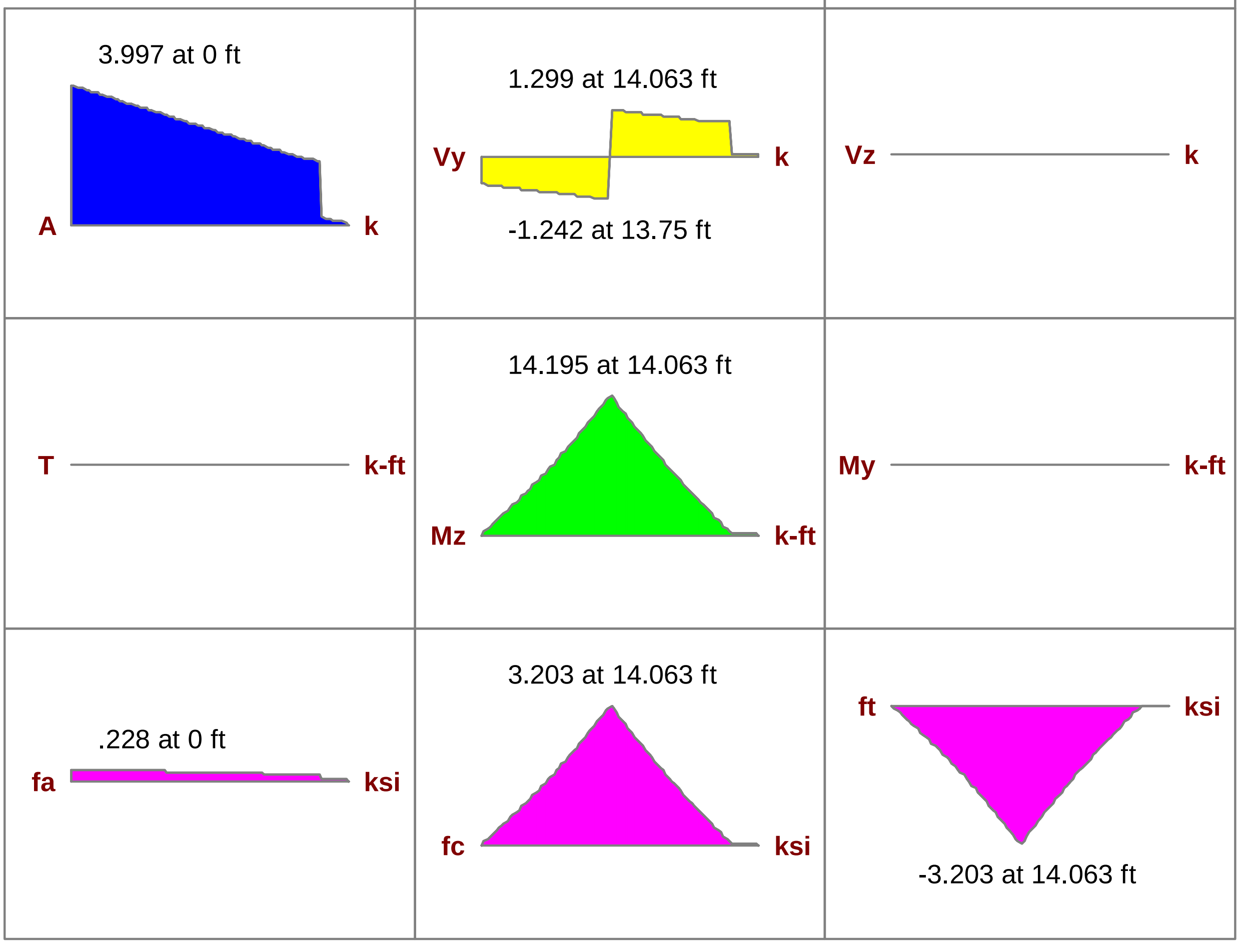
Loads: LC 4, 1.0D + 1.0WService
Envelope Only Solution

Centek	Structure # 1256 - Mast	
TJL		July 8, 2021 at 2:14 PM
21051.03 - CT11001B	LC #4 Loads	TIA.r3d

Column: ***M1***

Shape: **PIPE_12.0X**
Material: **A53 Gr. B**
Length: **30 ft**
I Joint: **N1**
J Joint: **N4**
LC 4: 1.0D + 1.0WService
Code Check: **0.081 (bending)**
Report Based On 97 Sections





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

Direct Analysis Method

Max Bending Check	**0.081**	Max Shear Check	**0.008 (s)**
Location	**14.063 ft**	Location	**14.063 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/798**

Bending	**Compact**	Compression	**Non-Slender**

			y-y	z-z
Fy	**35 ksi**	Lb	**30 ft**	**30 ft**
phi*Pnc	**391.414 k**	KL/r	**81.794**	**81.794**
phi*Pnt	**551.25 k**			
phi*Mny	**184.275 k-ft**	L Comp Flange	**30 ft**	
phi*Mnz	**184.275 k-ft**	L-torque	**30 ft**	
phi*Vny	**165.375 k**	Tau_b	**1**	
phi*Vnz	**165.375 k**			
phi*Tn	**173.622 k-ft**			
Cb	**1.464**			

Mast Top Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 0 \cdot kips$	(User Input)
Horizontal =	$Horz := 12.5 \cdot kips$	(User Input)
Moment =	$Moment := 0$	(User Input)

Bolt Data:

Bolt Grade =	A325	(User Input)
Number of Bolts =	$n_b := 6$	(User Input)
Bolt Diameter =	$d_b := 0.75in$	(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 =	$e := 20.5 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 23.5 \cdot in$	(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 = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 2.083 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 4.7 \cdot ksi$

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

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 7 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \frac{\sqrt{Vert^2 + Horz^2}}{n_b \cdot a_b} = 4.716 \cdot ksi$

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

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 11.6 \cdot \%$

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 = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{S_{vert} \cdot 2} = 3.635 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 8.227 \cdot ksi$

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

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 12.2 \cdot \%$

Mast Connection to Bottom Bracket:

Design Reactions at Brace:

Axial (Max) =	$Axial_{max} := 13.9 \cdot kips$	(User Input)
Axial (Min) =	$Axial_{min} := 3.6 \cdot kips$	(User Input)
Shear =	$Shear := 3.9 \cdot kips$	(User Input)
Moment =	$Moment := 0 \cdot kips \cdot ft$	(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 =	$S_x := 13.5 \cdot in$	(User Input)
Bolt Spacing Z Direction =	$S_z := 13.5 \cdot in$	(User Input)

Base Plate Data:

Base Plate Steel =	A36	(User Input)
Allowable Yield Stress =	$F_y := 36 \cdot ksi$	(User Input)
Base Plate Width =	$Pl_w := 16 \cdot in$	(User Input)
Base Plate Thickness =	$Pl_t := 1.25 \cdot in$	(User Input)
Bolt Edge Distance =	$B_E := 1.25 \cdot in$	(User Input)
Pole Diameter =	$D_p := 12.75 \cdot in$	(User Input)

Base Plate Data:

Weld Grade	E70XX	(User Input)
Weld Yield Stress =	$F_{yw} := 70 \cdot ksi$	(User Input)
Weld Size =	$sw := 0.375 \cdot in$	(User Input)

Anchor Bolt Check:

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

Shear per bolt = $V_{bolt} := \frac{Shear}{n_b} = 0.98\cdot kips$

Actual Shear Stress = $f_v := \frac{V_{bolt}}{a_b} = 2.21\cdot ksi$

$Condition1 := if\left(f_v < F_v, "OK", "Overstressed"\right)$

$Condition1 = "OK"$

Bolt Spacing Diag. Direction = $S_{diag} := \sqrt{S_x^{\,2} + S_z^{\,2}} = 19.09\cdot in$

Tension Load per Bolt Parallel = $T_{par} := \frac{Moment}{S_x\cdot n_{b.par}} - \frac{Axial_{min}}{n_b} = -0.9\cdot kips$

Tension Load per Bolt Diagonal = $T_{diag} := \frac{Moment}{S_{diag}\cdot n_{b.diag}} - \frac{Axial_{min}}{n_b} = -0.9\cdot kips$

Tension per bolt = $T := if\left(T_{par} > T_{diag}, T_{par}, T_{diag}\right) = -0.9\cdot kips$

Actual Tensile Stress = $f_t := \frac{T}{a_b} = -2.04\cdot ksi$

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

$Condition2 = "OK"$

Base Plate Check:

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

Plate Bending Width = $Z := \left(Pl_w\cdot\sqrt{2} - D_p\right) = 9.88\cdot in$

Moment Arm = $K := \frac{\left(S_{diag} - D_p\right)}{2} = 3.17\cdot in$

Load per Bolt Diagonal = $P_{diag} := \frac{Moment}{S_{diag}\cdot n_{b.diag}} + \frac{Axial_{max}}{n_b} = 3.48\cdot kips$

Moment in Base Plate = $M := K\cdot P_{diag} = 11.02\cdot kips\cdot in$

Plastic Section Modulus = $Z := \frac{1}{4}\cdot Z\cdot Pl_t^{\,2} = 3.86\cdot in^3$

Bending Stress = $f_b := \frac{M}{Z} = 2.86\cdot ksi$

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

$Condition3 = "OK"$

Base Plate to PCS Mast Weld Check:

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

Weld Area = $A_w := \frac{\pi}{4} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^2 - D_p^{\ 2}\right] = 10.84 \cdot in^2$

Weld Moment of Inertia = $I_w := \frac{\pi}{64} \cdot \left[\left(D_p + 2sw \cdot 0.707\right)^4 - D_p^{\ 4}\right] = 229.63 \cdot in^4$

$c := \frac{D_p}{2} + sw \cdot 0.707 = 6.64 \cdot in$

Section Modulus of Weld = $S_w := \frac{I_w}{c} = 34.58 \cdot in^3$

Weld Stress = $f_w := \frac{Moment}{S_w} + \frac{Shear}{A_w} = 0.36 \cdot ksi$

Condition4 := if($f_w < F_w$, "OK", "Overstressed")

Condition4 = "OK"

Check Gusset Plates Below Base Plates:

Gusset Plate Data:

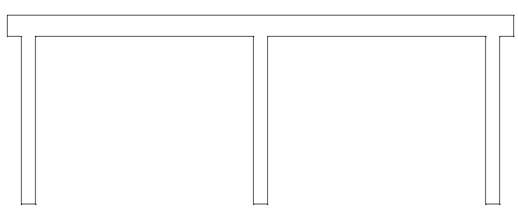
Allowable Yield Stress = $F_y := 36 \cdot ksi$ (User Input)

Plate Height = $Pl_h := 6 \cdot in$ (User Input)

Plate Thickness = $Pl_t := 0.5 \cdot in$ (User Input)

Distance from CL Pole to Face of Collar = $d := 10 \cdot in$ (User Input)

Section Modulus Gusset Assembly = $S_x := 17.73 \cdot in^3$ (User Input)



Max Moment = $Moment_{max} := Moment + Axial_{max} \cdot d = 139 \cdot in \cdot kips$

Bending Stress = $f_b := \frac{Moment_{max}}{S_x} = 7.84 \cdot ksi$

Condition5 := if($f_b < F_b$, "OK", "Overstressed")

Condition5 = "OK"

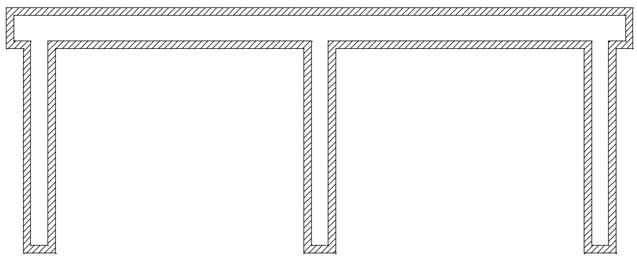
Weld Data:

Weld Yield Stress = $F_{yw} := 70 \cdot ksi$ (User Input)

Weld Size = $sw := 0.3125 \cdot in$ (User Input)

Weld Area = $A_w := 16.4 \cdot in^2$ (User Input)

Section Modulus of Weld = $S_w := 17.1 \cdot in^3$ (User Input)



Weld Stress = $f_w := \frac{Moment_{max}}{S_w} + \frac{Axial_{max}}{A_w} = 8.98 \cdot ksi$

Condition6 := if($f_w < F_w$, "OK", "Overstressed")

Condition6 = "OK"

Mast Bottom Connection:

Maximum Design Reactions at Brace:

Vertical =	$Vert := 13.9 \cdot kips$	(User Input)
Horizontal =	$Horz := 0.85 \cdot kips$	(User Input)
Moment =	$Moment := 0 \cdot ft \cdot kips$	(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 =	$e := 20.5 \cdot in$	(User Input)
Horizontal Spacing Between Bolts =	$S_{horz} := 26.25 \cdot in$	(User Input)
Vetical Spacing Between Top and Bottom Bolts =	$S_{vert} := 9 \cdot in$	(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 = $f_v := \frac{Vert}{n_b \cdot a_b} = 5.244 \cdot ksi$

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

Condition1 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 12.9 \cdot \%$

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 = $F_{tension.bolt} := \frac{Horz}{n_b} + \frac{(Vert \cdot e + Moment)}{2 \cdot S_{vert}} = 15.972 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.bolt}}{a_b} = 36.2 \cdot ksi$

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

Condition2 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 53.6 \cdot \%$

Wind Acting Perpendicular to Stiffiner Plate:

Shear Stress per Bolt = $f_v := \sqrt{\left(\frac{Vert}{n_b \cdot a_b} + \frac{Moment \cdot 2}{S_{horz} \cdot n_b \cdot a_b}\right)^2 + \left(\frac{Horz}{n_b \cdot a_b}\right)^2} = 5.254 \cdot ksi$

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

Condition3 = "OK"

$\frac{f_v}{(\phi \cdot F_{nv})} = 13 \cdot \%$

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 = $F_{tension.conn} := \frac{Horz \cdot e}{S_{horz} \cdot \frac{n_b}{2}} + \frac{Vert \cdot e}{2 \cdot S_{vert}} = 16.052 \cdot kips$

Tension Stress Each Bolt = $f_t := \frac{F_{tension.conn}}{a_b} = 36.334 \cdot ksi$

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

Condition4 = "OK"

$\frac{f_t}{(\phi \cdot F'_{nt})} = 53.8 \cdot \%$

Basic Components

Heavy Wind Pressure =	$p := 4.00$	psf	(User Input NESC 2012 Figure 250-1 & Table 250-1)
Basic Windspeed =	$V := 110$	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 =	$TME := 108$	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 = $Kz := 2.01 \cdot \left(\frac{TME}{900}\right)^{\frac{2}{9.5}} = 1.286$ (NESC 2012 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TME)}\right]^{\frac{1}{7}} = 0.309$ (NESC 2012 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TME}{220}\right)} = 0.845$ (NESC 2012 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.864$ (NESC 2012 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 34.4$ 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 Open Lattice =	$Cd_{OL} := 3.2$	(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 Mast

Mast Data: (Pipe 12.0 SCH. 80)

Mast Shape =	Round		(User Input)
Mast Diameter =	$D_{mast} := 12.75$	in	(User Input)
Mast Length =	$L_{mast} := 30$	ft	(User Input)
Mast Thickness =	$t_{mast} := 0.5$	in	(User Input)

Wind Load (NESC Extreme)

Mast Projected Surface Area =	$A_{mast} := \frac{D_{mast}}{12} = 1.063$	sf/ft	
Total Mast Wind Force (Above NU Structure) =	$qz \cdot Cd_{coax} \cdot A_{mast} \cdot m = 73$	plf	**BLC 5**
Total Mast Wind Force (Below NU Structure) =	$qz \cdot Cd_{coax} \cdot A_{mast} = 59$	plf	**BLC 5**

Wind Load (NESE Heavy)

Mast Projected Surface Area w/ Ice =	$AICE_{mast} := \frac{(D_{mast} + 2 \cdot Ir)}{12} = 1.146$	sf/ft	
Total Mast Wind Force w/ Ice =	$p \cdot Cd_R \cdot AICE_{mast} = 6$	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 =	$Ai_{mast} := \frac{\pi}{4}\left[(D_{mast} + Ir \cdot 2)^2 - D_{mast}^{\ 2}\right] = 20.8$	sq in	
Weight of Ice on Mast =	$W_{ICEmast} := Id \cdot \frac{Ai_{mast}}{144} = 8$	plf	**BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAALL18_43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 72$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.5$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna = $SA_{ant} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$ sf

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 36$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 2480$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

Surface Area for One Antenna w/ Ice = $SA_{ICEant} := \frac{(L_{ant}+1)\cdot(W_{ant}+1)}{144} = 12.7$ sf

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 38$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 243$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 396$ lbs **BLC 2**

Gravity Load (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \times 10^4$ cu in

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant}+1)(W_{ant}+1)\cdot(T_{ant}+1) - V_{ant} = 2650$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 86$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 258$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APX16DWV-16DWVS		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 41$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 3$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

Antenna Projected Surface Area = $A_{ant} := SA_{ant} \cdot N_{ant} = 15.1$ sf

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 1043$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 16.6$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 106$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 123$ lbs **BLC 2**

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 99$ lbs **BLC 3**

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Andrew ATSBT-TOP-FM-4G		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 5.63$	in	(User Input)
Antenna Width =	$W_{ant} := 3.7$	in	(User Input)
Antenna Thickness =	$T_{ant} := 2.0$	in	(User Input)
Antenna Weight =	$WT_{ant} := 2$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 6$		(User Input)

Wind Load (NESC Extreme)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

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

Total Antenna Wind Force = $F_{ant} := qz \cdot Cd_F \cdot A_{ant} \cdot m = 60$ lbs **BLC 5**

Wind Load (NESC Heavy)

Assumes Maximum Possible Wind Pressure Applied to all Antennas Simultaneously

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

Antenna Projected Surface Area w/ Ice = $A_{ICEant} := SA_{ICEant} \cdot N_{ant} = 1.3$ sf

Total Antenna Wind Force w/ Ice = $Fi_{ant} := p \cdot Cd_F \cdot A_{ICEant} = 8$ lbs **BLC 4**

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 12$ lbs **BLC 2**

Gravity Load (ice only)

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

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

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

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 10$ lbs **BLC 3**

Development of Wind & Ice Load on Platform

Platform Data:

Platform Model =	SitePro Double Support Arm RDS-284 (x2)		
Mount Shape =	Flat		
Mount Projected Surface Area =	$CdAa := 7$	sf	(User Input)
Mount Projected Surface Area w/ Ice =	$CdAa_{ice} := 11$	sf	(User Input)
Mount Weight =	$WT_{mnt} := 1080$	lbs	(User Input)
Mount Weight w/ Ice =	$WT_{mnt.ice} := 1250$	lbs	(User Input)

Gravity Loads (without ice)

Weight of All Mounts =	$Wt_{mnt1} := WT_{mnt} = 1080$	lbs	**BLC 2**

Gravity Load (ice only)

Weight of Ice on All Mounts =	$Wt_{ice.mnt1} := \left(WT_{mnt.ice} - WT_{mnt}\right) = 170$	lbs	**BLC 3**

Wind Load (NESC Heavy)

Total Mount Wind Force w/ Ice =	$Fi_{mnt1} := p \cdot CdAa_{ice} = 44$	lbs	**BLC 4**

Wind Load (NESC Extreme)

Total Mount Wind Force =	$F_{mnt1} := qz \cdot CdAa \cdot m = 301$	lbs	**BLC 5**

Development of Wind & Ice Load on Coax Cables

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 =	$L_{coax} := 14$	ft	(User Input)
Weight of Coax per foot =	$Wt_{coax} := 1.04$	plf	(User Input)
Total Number of Coax =	$N_{coax} := 24$		(User Input)
No. of Coax Projecting Outside Face of Member =	$NP_{coax} := 6$		(User Input)

Wind Load (NESC Extreme)

Coax projected surface area = $A_{coax} := \frac{(NP_{coax} D_{coax})}{12} = 1$ ft

Total Coax Wind Force = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} \cdot m = 68$ plf **BLC 5**

Total Coax Wind Force = $F_{coax} := qz \cdot Cd_{coax} \cdot A_{coax} = 55$ plf **BLC 5**

Wind Load (NESC Heavy)

Coax projected surface area w/ Ice = $AICE_{coax} := \frac{(NP_{coax} \cdot D_{coax} + 2 \cdot Ir)}{12} = 1.1$ ft

Total Coax Wind Force w/ Ice = $Fi_{coax} := p \cdot Cd_{coax} \cdot AICE_{coax} = 7$ plf **BLC 4**

Gravity Loads (without ice)

Weight of all cables w/o ice $WT_{coax} := Wt_{coax} \cdot N_{coax} = 25$ 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 = $WTi_{coax} := N_{coax} \cdot Id \cdot \frac{Ai_{coax}}{144} = 36$ 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)	24
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 530-13: ASD
Aluminum Code	AA ADM1-15: 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 (\...	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 Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Mast	PIPE_12.0X	Column	Wide Flange	A53 Gr. B	Typical	17.5	339	339	678

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Mast	30									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N1	N4			Mast	Column	Wide Flange	A53 Gr. B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	0	0	
2	N2	0	14	0	0	
3	N3	0	27	0	0	
4	N4	0	30	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	N2	Reaction		Reaction			
2	N1	Reaction	Reaction	Reaction		Reaction	

Member Point Loads

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
No Data to Print ...			

Member Distributed Loads (BLC 2 : Weight of Appurtenances)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.025	-.025	0	24

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.008	-.008	0	0
2	M1	Y	-.036	-.036	0	24

Member Distributed Loads (BLC 4 : NESC Heavy Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.006	.006	0	24
2	M1	X	.007	.007	0	24

Member Distributed Loads (BLC 5 : NESC Extreme Wind)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]

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

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.059	.059	0	17
2	M1	X	.073	.073	17	24
3	M1	X	.055	.055	0	17
4	M1	X	.068	.068	17	24

Basic Load Cases

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

Load Combinations

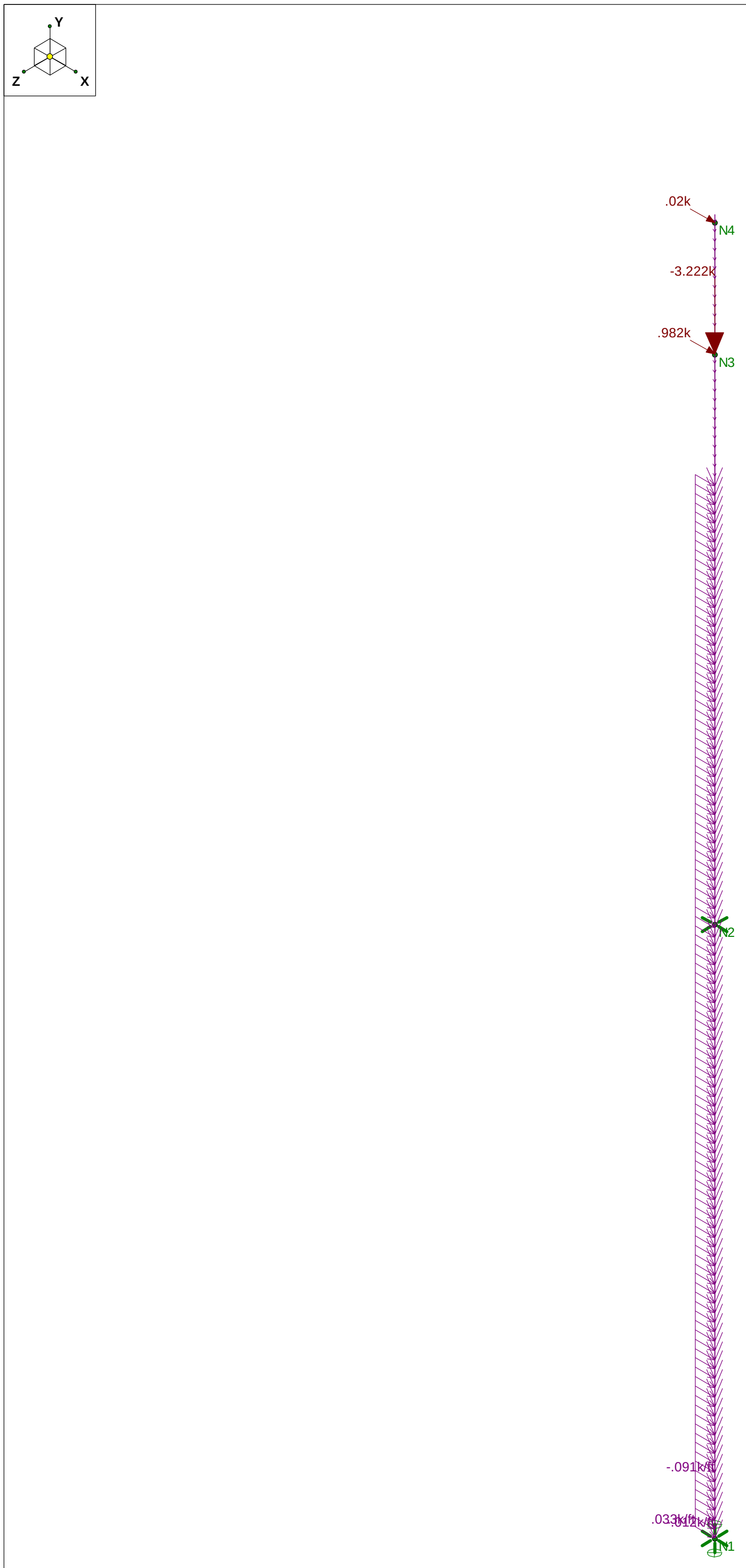
	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	NESC Heavy Wind	Yes	Y		1	1.5	2	1.5	3	1.5	4	2.5												
2	NESC Extreme Wind	Yes	Y		1	1	2	1	5	1														

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	1	N2	-2.616	0	0	0	0	0
2	1	N1	.834	8.458	0	0	0	0
3	1	Totals:	-1.783	8.458	0			
4	1	COG (ft):	X: 0	Y: 18.793	Z: 0			

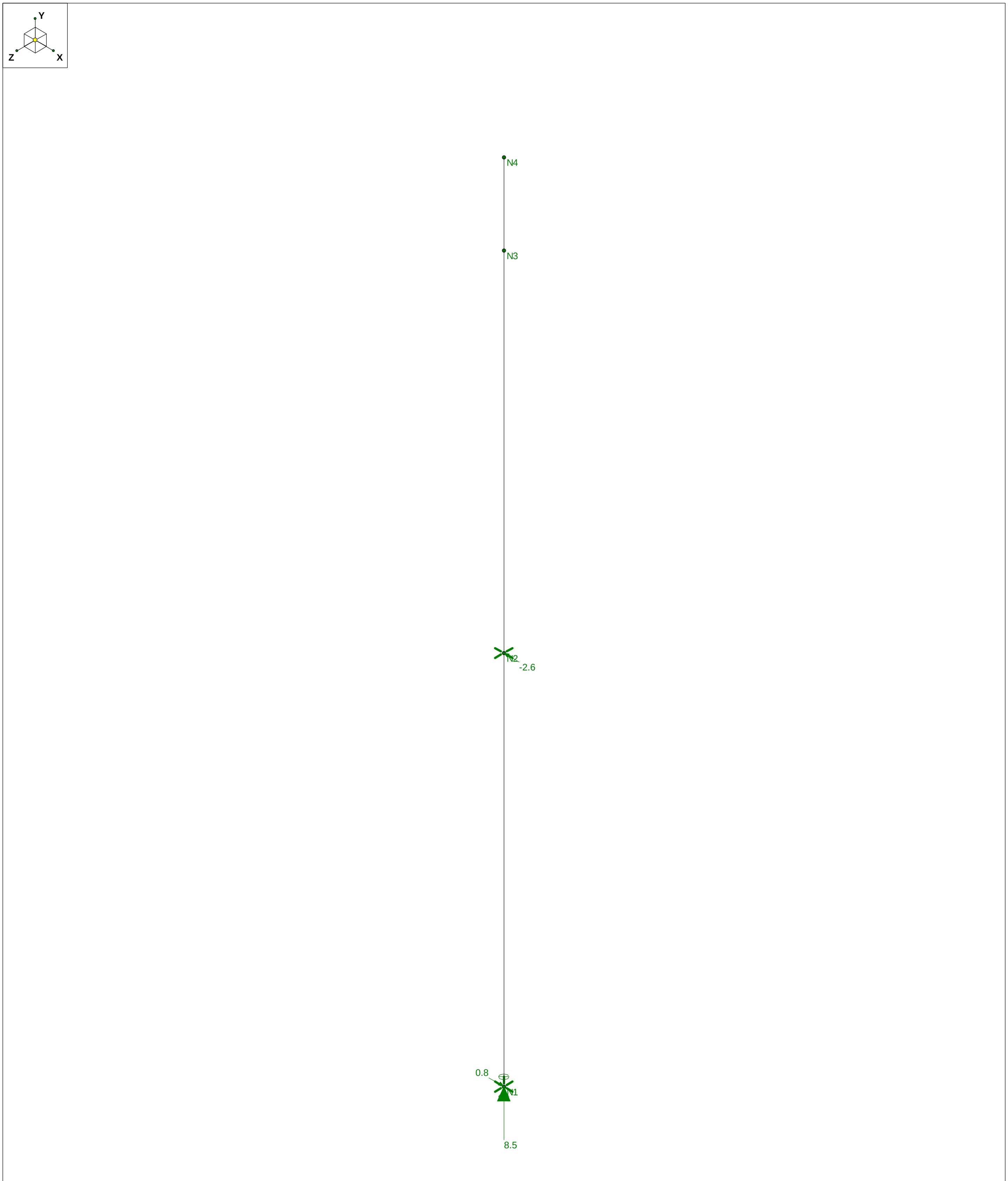
Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	Z [k]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	2	N2	-10.132	0	0	0	0	0
2	2	N1	3.323	3.997	0	0	0	0
3	2	Totals:	-6.809	3.997	0			
4	2	COG (ft):	X: 0	Y: 19.386	Z: 0			



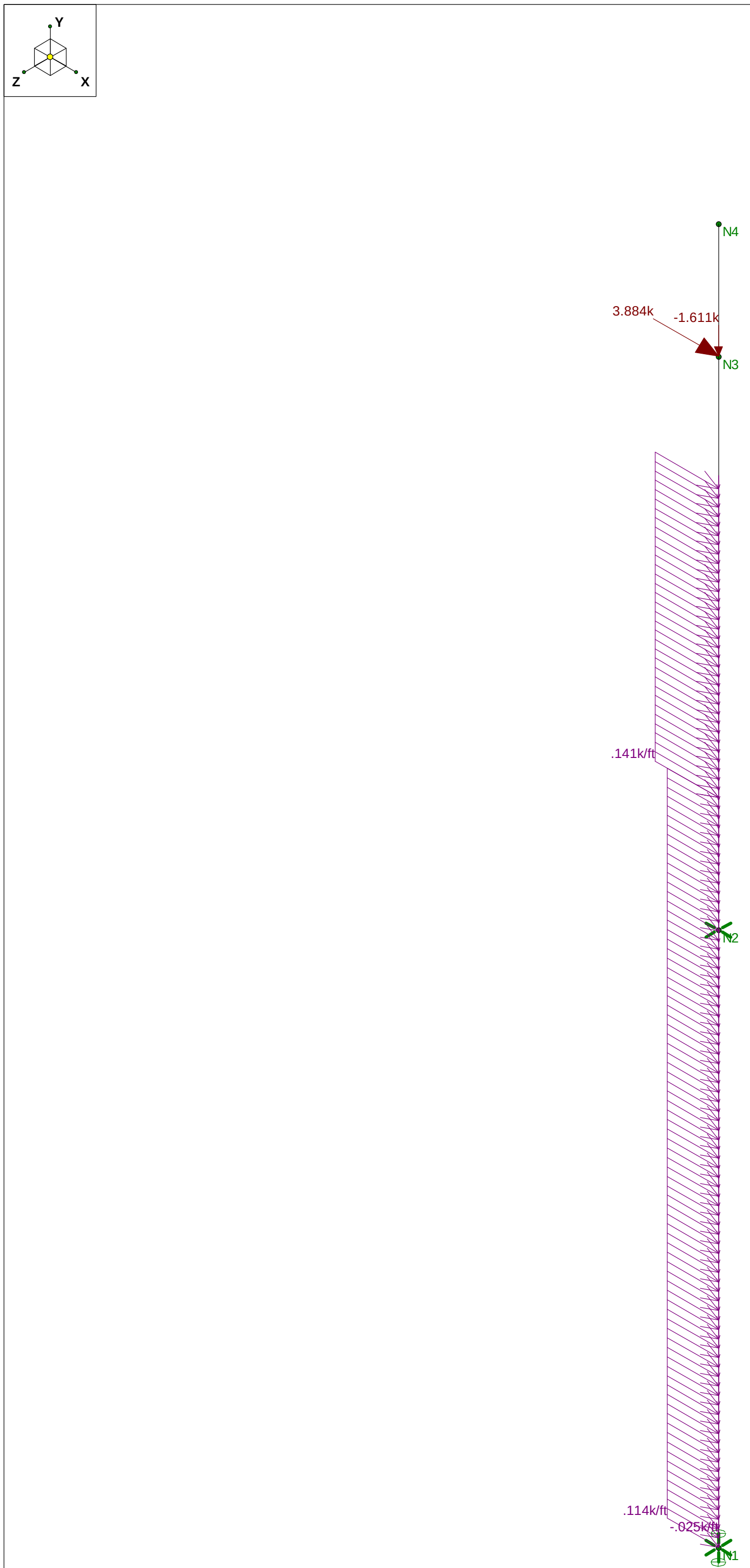
Loads: LC 1, NESC Heavy Wind
Envelope Only Solution

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:06 PM
21051.03 - CT11001B	LC #1 Loads	NESC.r3d



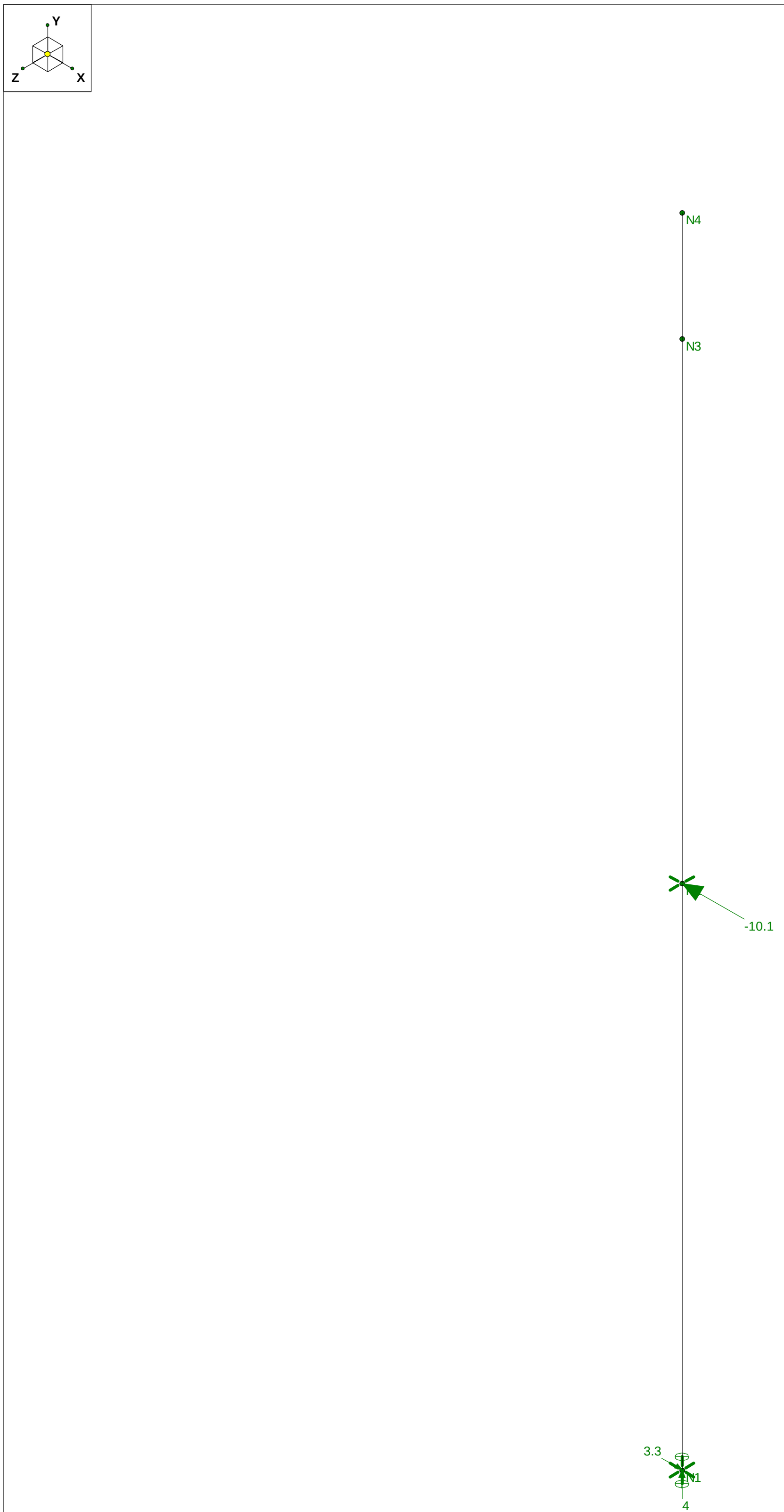
Results for LC 1, NESC Heavy Wind
Reaction and Moment Units are k and k-ft

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:07 PM
21051.03 - CT11001B	LC #1 Reactions	NESC.r3d



Loads: LC 2, NESC Extreme Wind
Envelope Only Solution

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:06 PM
21051.03 - CT11001B	LC #2 Loads	NESC.r3d



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

Centek		
TJL	Structure # 1256 - Mast	July 8, 2021 at 2:07 PM
21051.03 - CT11001B	LC #2 Reactions	NESC.r3d

Coax Cable on CL&P Pole

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

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

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

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

Basic Windspeed = $V := 110$ mph (User Input NESC 2007 Figure 250-2(e))

Height to Top of Coax Above Grade = $TC := 75$ 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 = $Kz := 2.01 \cdot \left(\frac{0.67TC}{900}\right)^{\frac{2}{9.5}} = 1.095$ (NESC 2007 Table 250-2)

Exposure Factor = $Es := 0.346 \left[\frac{33}{(0.67 \cdot TC)}\right]^{\frac{1}{7}} = 0.326$ (NESC 2007 Table 250-3)

Response Term = $Bs := \frac{1}{\left(1 + 0.375 \cdot \frac{TC}{220}\right)} = 0.887$ (NESC 2007 Table 250-3)

Gust Response Factor = $Grf := \frac{\left[1 + \left(2.7 \cdot Es \cdot Bs^{\frac{1}{2}}\right)\right]}{kv^2} = 0.894$ (NESC 2007 Table 250-3)

Wind Pressure = $qz := 0.00256 \cdot Kz \cdot V^2 \cdot Grf \cdot I = 30.3$ psf (NESC 2007 Section 250.C.2)

Diameter of Coax Cable =	$D_{coax} := 1.98 \cdot in$	*(User Input)*
Weight of Coax Cable =	$W_{coax} := 1.04 \cdot plf$	*(User Input)*
Number of Coax Cables =	$N_{coax} := 24$	*(User Input)*
Number of Projected Coax Cables =	$NP_{coax} := 6$	*(User Input)*
Shape Factor =	$Cd_{coax} := 1.6$	*(User Input)*
Overload Factor for NESC Heavy Wind Transverse Load =	$OF_{HWT} := 2.5$	*(User Input)*
Overload Factor for NESC Heavy Wind Vertical Load =	$OF_{HWV} := 1.5$	*(User Input)*
Overload Factor for NESC Extreme Wind Transverse Load =	$OF_{EWT} := 1.0$	*(User Input)*
Overload Factor for NESC Extreme Wind Vertical Load =	$OF_{EWV} := 1.0$	*(User Input)*

Wind Area without Ice = $A := \left(NP_{coax} \cdot D_{coax}\right) = 11.88 \cdot in$

Wind Area with Ice = $A_{ice} := \left(NP_{coax} \cdot D_{coax} + 2 \cdot Ir\right) = 12.88 \cdot in$

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

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

Heavy Wind Vertical Load =

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

Heavy Wind Transverse Load =

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

$Heavy\_WInd_{Vert} = 920 lb$ $Heavy\_Wind_{Trans} = 172 lb$

Extreme Wind Vertical Load =

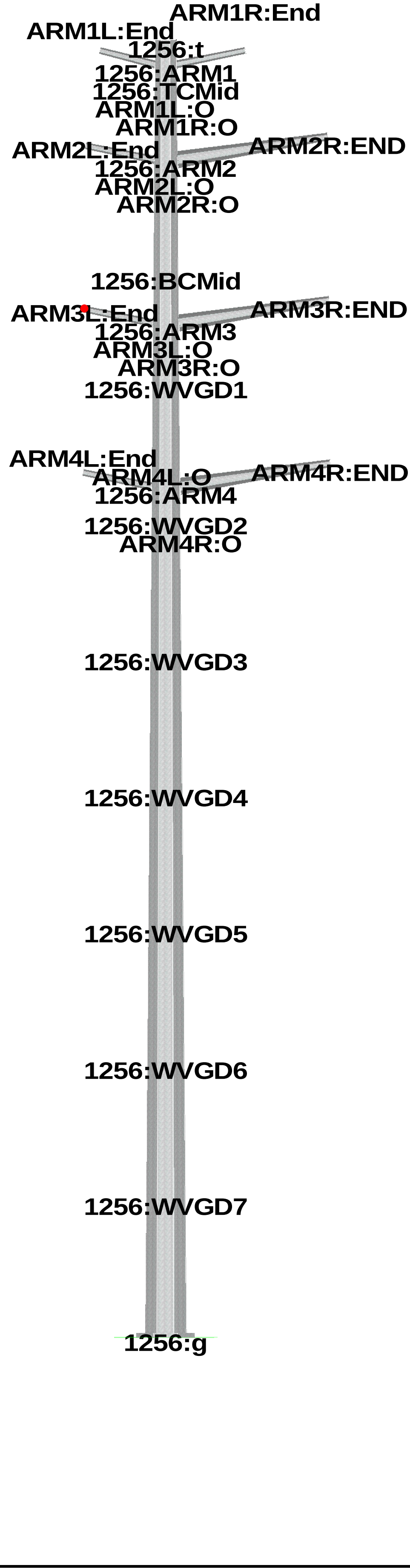
$$Extreme\_Wind_{Vert} := \overrightarrow{\left(N_{coax} \cdot W_{coax} \cdot Coax_{Span} \cdot OF_{EWV}\right)}$$

Extreme Wind Transverse Load =

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

$Extreme\_Wind_{Vert} = 250 lb$ $Extreme\_Wind_{Trans} = 480 lb$

Centek Engineering Inc, Project: "cl&p pole #1256"
PLS-POLE Version 12.50, 1:58:21 PM Thursday, July 08, 2021
Undeformed geometry displayed



Project Name : Eversoucre #1256
Project Notes: T-Mobile - CT11001B
Project File : J:\Jobs\2105100.WI\03_CT11001B\05_Structural\Tower\Calcs\PLS Tower\cl&p pole #1256.pol
Date run : 1:57:39 PM Thursday, July 08, 2021
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\2105100.wi\03_ct11001b\05_structural\tower\calcs\pls tower\cl&p pole #1256.lca

*** Analysis Results:

Maximum element usage is 96.82% for Steel Pole "1256" in load case "NESC Extreme"
Maximum insulator usage is 12.66% for Clamp "CL16" in load case "NESC Extreme"

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint Label	Long. Force (kips)	Tran. Force (kips)	Vert. Force (kips)	Shear Force (kips)	Tran. Moment (ft-k)	Long. Moment (ft-k)	Bending Moment (ft-k)	Vert. Moment (ft-k)	Found. Usage %
NESC Heavy	1256:g	-0.09	-27.34	-53.30	27.34	2204.84	-4.23	2204.84	0.01	0.00
NESC Extreme	1256:g	-0.03	-32.99	-28.00	32.99	2442.02	-1.73	2442.02	0.04	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	1256:t	0.10	70.15	-2.84	70.21	0.01	-5.97	0.00
NESC Extreme	1256:t	0.05	76.98	-3.40	77.05	0.00	-6.66	-0.00

Tubes Summary:

Pole Label	Tube Num.	Weight (lbs)	Load Case	Maximum Usage %	Resultant Moment (ft-k)
1256	1	3650	NESC Extreme	78.07	811.56
1256	2	4878	NESC Extreme	96.82	1801.03
1256	3	3318	NESC Extreme	93.91	2442.02

*** 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)
1256	96.82	NESC Extreme	22	13405.8

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1L	7.62	NESC Heavy	1	48.4
ARM1R	24.95	NESC Heavy	1	59.9
ARM2L	31.35	NESC Heavy	1	59.9
ARM2R	25.37	NESC Heavy	1	229.0
ARM3L	31.67	NESC Heavy	1	59.9
ARM3R	25.55	NESC Heavy	1	229.0
ARM4L	32.44	NESC Heavy	1	59.9
ARM4R	26.04	NESC Heavy	1	229.0

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	93.52	1256	Steel Pole
NESC Extreme	96.82	1256	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	93.52	1256	22
NESC Extreme	96.82	1256	22

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	1256	8	31.000	51.742	2204.837	-4.230	44.580	202.736	4	138.333	2.926	81.05
NESC Extreme	1256	8	31.000	26.442	2442.018	-1.725	48.753	221.716	4	151.212	3.060	88.64

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	32.44	ARM4L	1
NESC Extreme	12.51	ARM4R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
CL1	Clamp	2.81	NESC Heavy	0.0
CL2	Clamp	2.57	NESC Heavy	0.0
CL3	Clamp	4.71	NESC Heavy	0.0

CL4	Clamp	4.75	NESC Heavy	0.0
CL5	Clamp	4.78	NESC Heavy	0.0
CL6	Clamp	4.78	NESC Heavy	0.0
CL7	Clamp	4.75	NESC Heavy	0.0
CL8	Clamp	4.88	NESC Heavy	0.0
CL9	Clamp	1.17	NESC Heavy	0.0
CL10	Clamp	1.17	NESC Heavy	0.0
CL11	Clamp	1.17	NESC Heavy	0.0
CL12	Clamp	1.17	NESC Heavy	0.0
CL13	Clamp	1.17	NESC Heavy	0.0
CL14	Clamp	1.17	NESC Heavy	0.0
CL15	Clamp	1.17	NESC Heavy	0.0
CL16	Clamp	12.66	NESC Extreme	0.0
CL17	Clamp	10.62	NESC Heavy	0.0

*** Weight of structure (lbs):

Weight of Tubular Davit Arms:	974.9
Weight of Steel Poles:	13405.8
Total:	14380.7

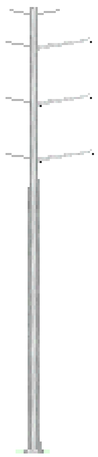
*** End of Report

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

Project Name : Eversoucre #1256
Project Notes: T-Mobile - CT11001B
Project File : J:\Jobs\2105100.WI\03_CT11001B\05_Structural\Tower\Calcs\PLS Tower\cl&p pole #1256.pol
Date run : 1:57:39 PM Thursday, July 08, 2021
by : PLS-POLE Version 12.50
Licensed to : Centek Engineering Inc

Successfully performed nonlinear analysis

The model has 0 warnings.



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

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

Steel Pole Properties:

Steel Pole Property	Stock Number	Length	Default Embedded	Base Plate	Shape	Tip Diameter	Base Diameter	Taper	Default Drag	Tubes	Modulus of Elasticity	Weight Density	Shape At	Strength Check	Distance From	Ultimate	Ultimate

Label		(ft)	Length (ft)			(in)	(in)	(in/ft)	Coef.		Override (ksi)	Override (lbs/ft^3)	Base	Type	Tip (ft)	Trans. Load (kips)	Long. Load (kips)
CL&P1256	1256	95.00	0	Yes	8F	18.83	36.2	0	1.6	3 tubes	0	0		Calculated	0.000	0.0000	0.0000

Steel Tubes Properties:

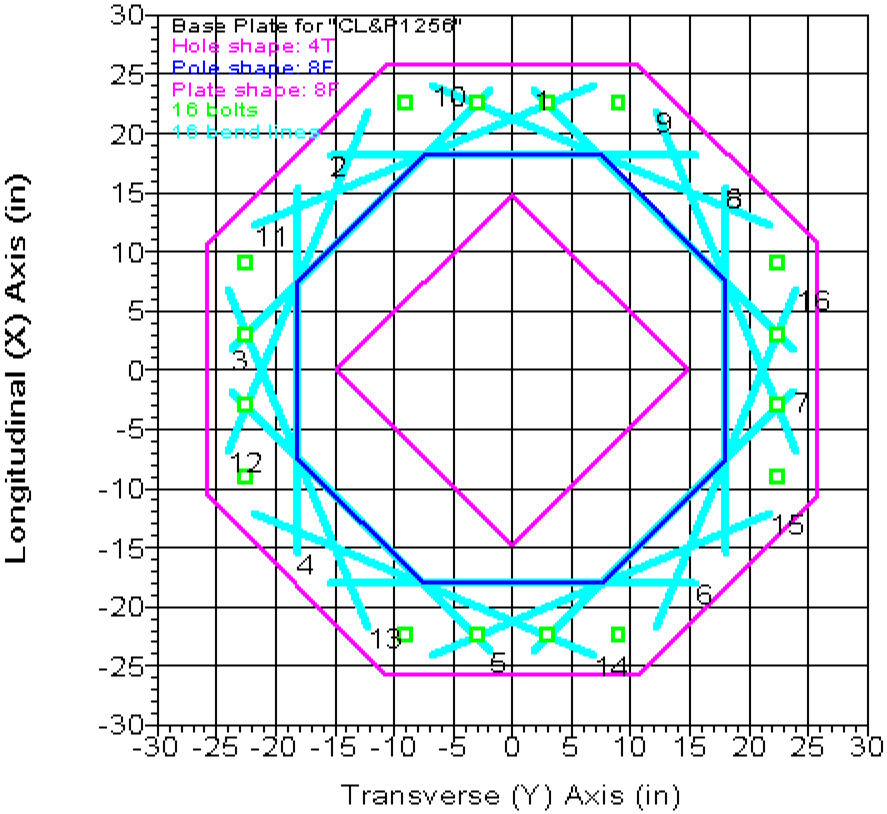
Pole Property	Tube No.	Length (ft)	Thickness (in)	Lap Length (ft)	Lap Factor	Lap Gap (in)	Yield Stress (ksi)	Moment Cap. Override (ft-k)	Tube Weight (lbs)	Center of Gravity (ft)	Calculated Taper (in/ft)	Tube Top Diameter (in)	Tube Bot. Diameter (in)	1.5x Diam. Lap Length (ft)	Actual Overlap (ft)
CL&P1256	1	45	0.3125	3.667	0.000	0.063	65.000	0.000	3650	23.97	0.19995	18.83	27.83	3.400	3.667
CL&P1256	2	38.667	0.375	4.917	0.000	0.063	65.000	0.000	4878	20.17	0.19995	26.34	34.08	4.166	4.917
CL&P1256	3	19.917	0.4375	0.000	0.000	0.000	65.000	0.000	3318	10.15	0.19995	32.22	36.20	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&P1256	51.500	8F	3.250	1560	31.000	21.000	4T	490.00	55.000	2.250	45.000	16	17533.79	17533.79

Base Plate Bolt Coordinates for Property "CL&P1256":

Bolt X Coord.	Bolt Y Coord.	Bolt Angle (deg)
0.133	1	0
0.4	1	0
1	0.4	0
1	0.133	0



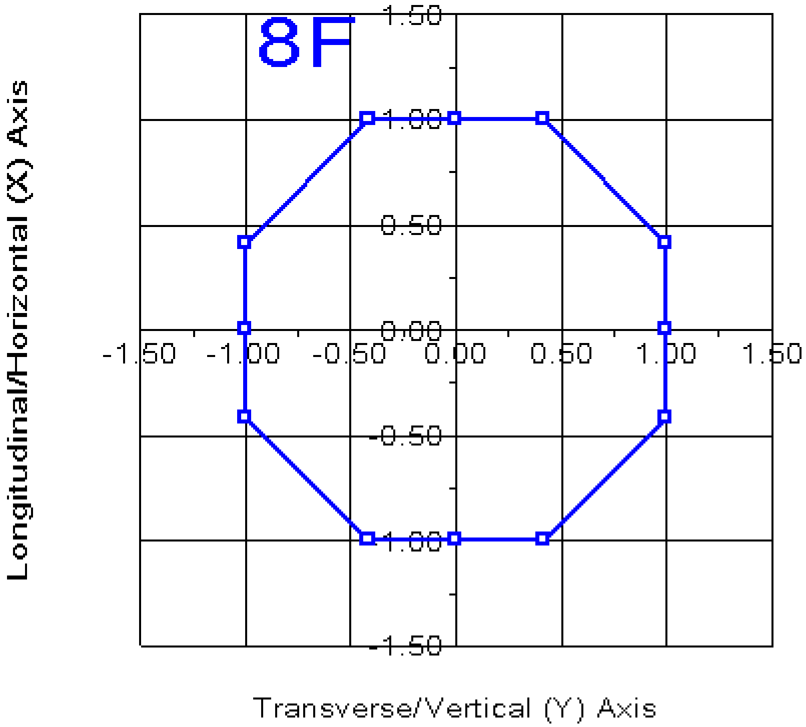
Steel Pole Connectivity:

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)
1256			0	0	0	0	0	CL&P1256	13 labels		0.00	0

Relative Attachment Labels for Steel Pole "1256":

Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)
1256:ARM1	1.75	0.00
1256:ARM2	8.75	0.00
1256:ARM3	20.75	0.00
1256:ARM4	32.75	0.00
1256:WVGD1	25.00	0.00

1256:WVGD2	35.00	0.00
1256:WVGD3	45.00	0.00
1256:WVGD4	55.00	0.00
1256:WVGD5	65.00	0.00
1256:WVGD6	75.00	0.00
1256:WVGD7	85.00	0.00
1256:TCMid	3.00	0.00
1256:BCMid	17.00	0.00



Pole Steel Properties:

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Outer Diam. (in)	Area (in^2)	T-Moment Inertia (in^4)	L-Moment Inertia (in^4)	D/t	W/t Max.	Fy (ksi)	Fa Min. (ksi)	T-Moment Capacity (ft-k)	L-Moment Capacity (ft-k)
1256	1256:t	1256:t Ori	0.00	18.83	19.18	869.15	869.15	0.00	20.8	65.00	65.00	500.04	500.04
1256	1256:ARM1	1256:ARM1 End	1.75	19.18	19.54	919.35	919.35	0.00	21.3	65.00	65.00	519.27	519.27
1256	1256:ARM1	1256:ARM1 Ori	1.75	19.18	19.54	919.35	919.35	0.00	21.3	65.00	65.00	519.27	519.27
1256	1256:TCMid	1256:TCMid End	3.00	19.43	19.80	956.37	956.37	0.00	21.6	65.00	65.00	533.23	533.23
1256	1256:TCMid	1256:TCMid Ori	3.00	19.43	19.80	956.37	956.37	0.00	21.6	65.00	65.00	533.23	533.23
1256	#1256:0	Tube 1 End	5.87	20.00	20.39	1045.24	1045.24	0.00	22.4	65.00	65.00	566.04	566.04
1256	#1256:0	Tube 1 Ori	5.87	20.00	20.39	1045.24	1045.24	0.00	22.4	65.00	65.00	566.04	566.04
1256	1256:ARM2	1256:ARM2 End	8.75	20.58	20.99	1139.46	1139.46	0.00	23.1	65.00	65.00	599.83	599.83
1256	1256:ARM2	1256:ARM2 Ori	8.75	20.58	20.99	1139.46	1139.46	0.00	23.1	65.00	65.00	599.83	599.83

1256	#1256:1	Tube 1	End	12.87	21.40	21.84	1284.29	1284.29	0.00	24.2	65.00	65.00	650.01	650.01
1256	#1256:1	Tube 1	Ori	12.87	21.40	21.84	1284.29	1284.29	0.00	24.2	65.00	65.00	650.01	650.01
1256	1256:BCMid	1256:BCMid	End	17.00	22.23	22.70	1440.90	1440.90	0.00	25.3	65.00	65.00	702.22	702.22
1256	1256:BCMid	1256:BCMid	Ori	17.00	22.23	22.70	1440.90	1440.90	0.00	25.3	65.00	65.00	702.22	702.22
1256	1256:ARM3	1256:ARM3	End	20.75	22.98	23.47	1593.88	1593.88	0.00	26.3	65.00	65.00	751.43	751.43
1256	1256:ARM3	1256:ARM3	Ori	20.75	22.98	23.47	1593.88	1593.88	0.00	26.3	65.00	65.00	751.43	751.43
1256	1256:WVGD1	1256:WVGD1	End	25.00	23.83	24.35	1779.93	1779.93	0.00	27.4	65.00	65.00	809.22	809.22
1256	1256:WVGD1	1256:WVGD1	Ori	25.00	23.83	24.35	1779.93	1779.93	0.00	27.4	65.00	65.00	809.22	809.22
1256	#1256:2	Tube 1	End	28.88	24.60	25.15	1961.70	1961.70	0.00	28.5	65.00	65.00	863.77	863.77
1256	#1256:2	Tube 1	Ori	28.88	24.60	25.15	1961.70	1961.70	0.00	28.5	65.00	65.00	863.77	863.77
1256	1256:ARM4	1256:ARM4	End	32.75	25.38	25.96	2155.44	2155.44	0.00	29.5	65.00	65.00	920.10	920.10
1256	1256:ARM4	1256:ARM4	Ori	32.75	25.38	25.96	2155.44	2155.44	0.00	29.5	65.00	65.00	920.10	920.10
1256	1256:WVGD2	1256:WVGD2	End	35.00	25.83	26.42	2273.59	2273.59	0.00	30.1	65.00	65.00	953.63	953.63
1256	1256:WVGD2	1256:WVGD2	Ori	35.00	25.83	26.42	2273.59	2273.59	0.00	30.1	65.00	65.00	953.63	953.63
1256	#1256:3	Tube 1	End	38.17	26.46	27.08	2447.05	2447.05	0.00	30.9	65.00	65.00	1001.83	1001.83
1256	#1256:3	Tube 1	Ori	38.17	26.46	27.08	2447.05	2447.05	0.00	30.9	65.00	65.00	1001.83	1001.83
1256	#1256:4	SpliceT	End	41.33	27.09	27.73	2629.12	2629.12	0.00	31.8	65.00	65.00	1051.22	1051.22
1256	#1256:4	SpliceT	Ori	41.33	27.09	27.73	2629.12	2629.12	0.00	31.8	65.00	65.00	1051.22	1051.22
1256	1256:WVGD3	1256:WVGD3	End	45.00	27.08	33.18	3127.19	3127.19	0.00	25.8	65.00	65.00	1251.14	1251.14
1256	1256:WVGD3	1256:WVGD3	Ori	45.00	27.08	33.18	3127.19	3127.19	0.00	25.8	65.00	65.00	1251.14	1251.14
1256	#1256:5	Tube 2	End	50.00	28.08	34.42	3491.70	3491.70	0.00	26.9	65.00	65.00	1347.23	1347.23
1256	#1256:5	Tube 2	Ori	50.00	28.08	34.42	3491.70	3491.70	0.00	26.9	65.00	65.00	1347.23	1347.23
1256	1256:WVGD4	1256:WVGD4	End	55.00	29.08	35.67	3883.49	3883.49	0.00	28.0	65.00	65.00	1446.88	1446.88
1256	1256:WVGD4	1256:WVGD4	Ori	55.00	29.08	35.67	3883.49	3883.49	0.00	28.0	65.00	65.00	1446.88	1446.88
1256	#1256:6	Tube 2	End	60.00	30.08	36.91	4303.55	4303.55	0.00	29.1	65.00	65.00	1550.09	1550.09
1256	#1256:6	Tube 2	Ori	60.00	30.08	36.91	4303.55	4303.55	0.00	29.1	65.00	65.00	1550.09	1550.09
1256	1256:WVGD5	1256:WVGD5	End	65.00	31.08	38.15	4752.85	4752.85	0.00	30.2	65.00	65.00	1656.85	1656.85
1256	1256:WVGD5	1256:WVGD5	Ori	65.00	31.08	38.15	4752.85	4752.85	0.00	30.2	65.00	65.00	1656.85	1656.85
1256	#1256:7	Tube 2	End	70.00	32.08	39.39	5232.39	5232.39	0.00	31.3	65.00	65.00	1767.16	1767.16
1256	#1256:7	Tube 2	Ori	70.00	32.08	39.39	5232.39	5232.39	0.00	31.3	65.00	65.00	1767.16	1767.16
1256	1256:WVGD6	1256:WVGD6	End	75.00	33.08	40.64	5743.14	5743.14	0.00	32.4	65.00	64.82	1875.83	1875.83
1256	1256:WVGD6	1256:WVGD6	Ori	75.00	33.08	40.64	5743.14	5743.14	0.00	32.4	65.00	64.82	1875.83	1875.83
1256	#1256:8	SpliceT	End	75.08	33.09	40.66	5751.89	5751.89	0.00	32.4	65.00	64.80	1877.30	1877.30
1256	#1256:8	SpliceT	Ori	75.08	33.09	40.66	5751.89	5751.89	0.00	32.4	65.00	64.80	1877.30	1877.30
1256	#1256:9	SpliceB	End	80.00	33.20	47.50	6738.97	6738.97	0.00	27.3	65.00	65.00	2198.91	2198.91
1256	#1256:9	SpliceB	Ori	80.00	33.20	47.50	6738.97	6738.97	0.00	27.3	65.00	65.00	2198.91	2198.91
1256	1256:WVGD7	1256:WVGD7	End	85.00	34.20	48.95	7374.81	7374.81	0.00	28.2	65.00	65.00	2336.04	2336.04
1256	1256:WVGD7	1256:WVGD7	Ori	85.00	34.20	48.95	7374.81	7374.81	0.00	28.2	65.00	65.00	2336.04	2336.04
1256	#1256:10	Tube 3	End	90.00	35.20	50.40	8049.44	8049.44	0.00	29.2	65.00	65.00	2477.31	2477.31
1256	#1256:10	Tube 3	Ori	90.00	35.20	50.40	8049.44	8049.44	0.00	29.2	65.00	65.00	2477.31	2477.31
1256	1256:g	1256:g	End	95.00	36.20	51.85	8764.00	8764.00	0.00	30.1	65.00	65.00	2622.74	2622.74

Tubular Davit Properties:

Davit Property Label	Stock Number	Steel Shape	Thickness (in)	Base Diameter or Depth (in)	Tip Diameter or Depth (in)	Taper (in/ft)	Drag Coef.	Modulus of Elasticity (ksi)	Geometry	Strength Check Type	Vertical Capacity (lbs)	Tension Capacity (lbs)	Compres. Capacity (lbs)	Long. Capacity (lbs)	Yield Stress (ksi)	Weight Density Override (lbs/ft^3)	Steel Shape At End
ARM1		6T	0.1875	6	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
ARM2		6T	0.1875	6	5	0	1.3	29000	1 point	Calculated	0	0	0	0	65	0	
ARM3		6T	0.1875	13	6	0	1.3	29000	1 point	Calculated	0	0	0	0	60	0	

Intermediate Joints for Davit Property "ARM1":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	4	-1

Intermediate Joints for Davit Property "ARM2":

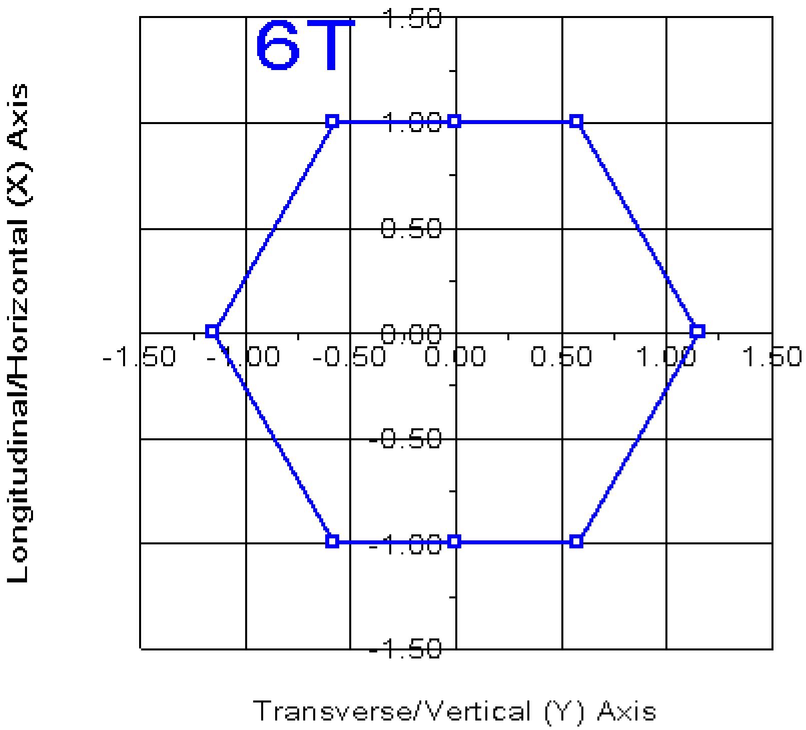
Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
End	5	-1

Intermediate Joints for Davit Property "ARM3":

Joint Label	Horz. Offset (ft)	Vert. Offset (ft)
END	11	-1.67

Tubular Davit Arm Connectivity:

Davit Label	Attach Label	Davit Property Set	Azimuth (deg)
ARM1L	1256:ARM1	ARM1	180
ARM1R	1256:ARM1	ARM2	0
ARM2L	1256:ARM2	ARM2	180
ARM2R	1256:ARM2	ARM3	0
ARM3L	1256:ARM3	ARM2	180
ARM3R	1256:ARM3	ARM3	0
ARM4L	1256:ARM4	ARM2	180
ARM4R	1256:ARM4	ARM3	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)
ARM1L	ARM1L:O	Origin	0.00	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
ARM1L	ARM1L:End	End	4.12	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
ARM1R	ARM1R:O	Origin	0.00	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
ARM1R	#ARM1R:0	End	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM1R	#ARM1R:0	Origin	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM1R	ARM1R:End	End	5.10	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
ARM2L	ARM2L:O	Origin	0.00	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
ARM2L	#ARM2L:0	End	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM2L	#ARM2L:0	Origin	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM2L	ARM2L:End	End	5.10	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
ARM2R	ARM2R:O	Origin	0.00	13.00	8.32	189.77	189.77	0.00	34.3	60.00	59.43	125.21	144.58
ARM2R	#ARM2R:0	End	5.00	9.85	6.28	81.52	81.52	0.00	24.6	60.00	60.00	71.64	82.72
ARM2R	#ARM2R:0	Origin	5.00	9.85	6.28	81.52	81.52	0.00	24.6	60.00	60.00	71.64	82.72
ARM2R	#ARM2R:1	End	8.06	7.93	5.03	41.85	41.85	0.00	18.6	60.00	60.00	45.72	52.79

ARM2R	#ARM2R:1	Origin	8.06	7.93	5.03	41.85	41.85	0.00	18.6	60.00	60.00	45.72	52.79
ARM2R	ARM2R:END	End	11.13	6.00	3.78	17.73	17.73	0.00	12.7	60.00	60.00	25.60	29.55
ARM3L	ARM3L:O	Origin	0.00	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
ARM3L	#ARM3L:0	End	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM3L	#ARM3L:0	Origin	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM3L	ARM3L:End	End	5.10	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
ARM3R	ARM3R:O	Origin	0.00	13.00	8.32	189.77	189.77	0.00	34.3	60.00	59.43	125.21	144.58
ARM3R	#ARM3R:0	End	5.00	9.85	6.28	81.52	81.52	0.00	24.6	60.00	60.00	71.64	82.72
ARM3R	#ARM3R:0	Origin	5.00	9.85	6.28	81.52	81.52	0.00	24.6	60.00	60.00	71.64	82.72
ARM3R	#ARM3R:1	End	8.06	7.93	5.03	41.85	41.85	0.00	18.6	60.00	60.00	45.72	52.79
ARM3R	#ARM3R:1	Origin	8.06	7.93	5.03	41.85	41.85	0.00	18.6	60.00	60.00	45.72	52.79
ARM3R	ARM3R:END	End	11.13	6.00	3.78	17.73	17.73	0.00	12.7	60.00	60.00	25.60	29.55
ARM4L	ARM4L:O	Origin	0.00	6.00	3.78	17.73	17.73	0.00	12.7	65.00	65.00	27.73	32.02
ARM4L	#ARM4L:0	End	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM4L	#ARM4L:0	Origin	2.55	5.50	3.45	13.54	13.54	0.00	11.2	65.00	65.00	23.10	26.67
ARM4L	ARM4L:End	End	5.10	5.00	3.13	10.07	10.07	0.00	9.6	65.00	65.00	18.89	21.82
ARM4R	ARM4R:O	Origin	0.00	13.00	8.32	189.77	189.77	0.00	34.3	60.00	59.43	125.21	144.58
ARM4R	#ARM4R:0	End	5.00	9.85	6.28	81.52	81.52	0.00	24.6	60.00	60.00	71.64	82.72
ARM4R	#ARM4R:0	Origin	5.00	9.85	6.28	81.52	81.52	0.00	24.6	60.00	60.00	71.64	82.72
ARM4R	#ARM4R:1	End	8.06	7.93	5.03	41.85	41.85	0.00	18.6	60.00	60.00	45.72	52.79
ARM4R	#ARM4R:1	Origin	8.06	7.93	5.03	41.85	41.85	0.00	18.6	60.00	60.00	45.72	52.79
ARM4R	ARM4R:END	End	11.13	6.00	3.78	17.73	17.73	0.00	12.7	60.00	60.00	25.60	29.55

*** 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)
CL1	ARM1L:End	clamp	No Limit
CL2	ARM1R:End	clamp	No Limit
CL3	ARM2L:End	clamp	No Limit
CL4	ARM2R:END	clamp	No Limit
CL5	ARM3L:End	clamp	No Limit
CL6	ARM3R:END	clamp	No Limit
CL7	ARM4L:End	clamp	No Limit
CL8	ARM4R:END	clamp	No Limit
CL9	1256:WVGD1	clamp	No Limit
CL10	1256:WVGD2	clamp	No Limit
CL11	1256:WVGD3	clamp	No Limit
CL12	1256:WVGD4	clamp	No Limit
CL13	1256:WVGD5	clamp	No Limit
CL14	1256:WVGD6	clamp	No Limit
CL15	1256:WVGD7	clamp	No Limit

CL16	1256:TCMid	clamp	No Limit
CL17	1256:BCMid	clamp	No Limit

*** Loads Data

Loads from file: j:\jobs\2105100.wi\03_ct11001b\05_structural\tower\calcs\pls tower\cl&p pole #1256.lca

Insulator dead and wind loads are already included in the point loads printed below.

Loading Method Parameters:

Structure Height Summary (used for calculating wind/ice adjust with height):
  Z of ground for wind height adjust   0.00 (ft) and structure Z coordinate that will be put on the centerline ground profile in PLS-CADD.
  Ground elevation shift   0.00 (ft)
  Z of ground with shift   0.00 (ft)
  Z of structure top (highest joint)   95.00 (ft)
  Structure height   95.00 (ft)
  Structure height above ground   95.00 (ft)

Vector Load Cases:

Load Case Description	Dead Load Factor	Wind Area Factor	SF for Steel Poles Tubular 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	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	17 loads	Wind on All	4	0	0.000	0.000	60.0	No Limit	0
NESC Extreme	1.0000	1.0000	1.00000	0.6500	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	17 loads	NESC 2012	31	0	0.000	0.000	60.0	No Limit	0

Point Loads for Load Case "NESC Heavy":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
ARM1L:End	1148	1936	0	
ARM1R:End	1128	1723	0	
ARM2L:End	2515	2802	0	
ARM2R:END	2523	2844	0	
ARM3L:End	2528	2868	0	
ARM3R:END	2523	2877	0	
ARM4L:End	2522	2841	0	
ARM4R:END	2540	2965	0	
1256:WVGD1	920	172	0	
1256:WVGD2	920	172	0	
1256:WVGD3	920	172	0	
1256:WVGD4	920	172	0	
1256:WVGD5	920	172	0	
1256:WVGD6	920	172	0	
1256:WVGD7	920	172	0	
1256:TCMid	0	2616	0	

1256:BCMid	8458	-834	0

Point Loads for Load Case "NESC Extreme":

Joint Label	Vertical Load (lbs)	Transverse Load (lbs)	Longitudinal Load (lbs)	Load Comment
ARM1L:End	392	1239	0	
ARM1R:End	374	1120	7	
ARM2L:End	1116	2247	0	
ARM2R:END	1119	2266	0	
ARM3L:End	1122	2274	0	
ARM3R:END	1119	2280	0	
ARM4L:End	1120	2265	0	
ARM4R:END	1127	2319	0	
1256:WVGD1	250	480	0	
1256:WVGD2	250	480	0	
1256:WVGD3	250	480	0	
1256:WVGD4	250	480	0	
1256:WVGD5	250	480	0	
1256:WVGD6	250	480	0	
1256:WVGD7	250	480	0	
1256:TCMid	0	10132	0	
1256:BCMid	3997	-3323	0	

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

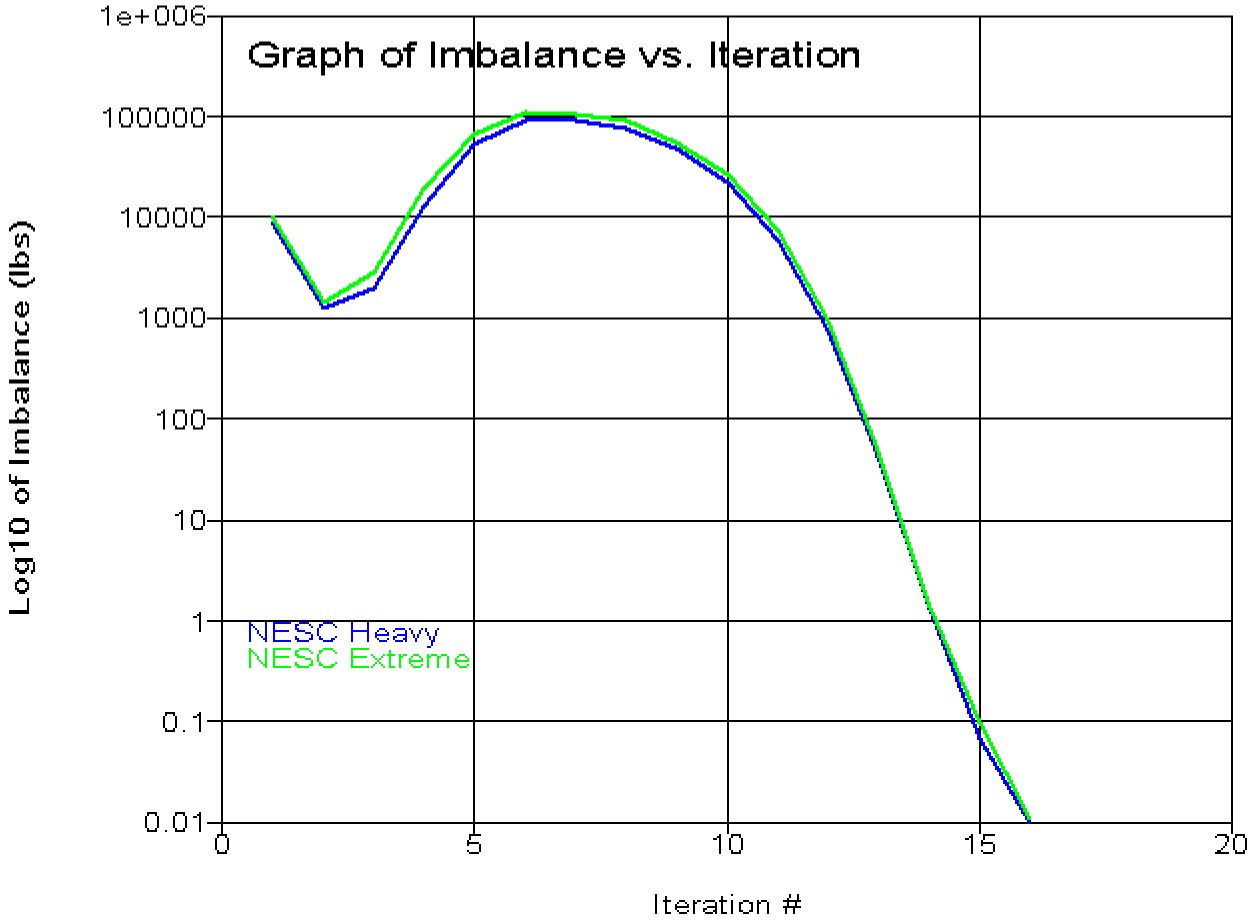
Notes: Does not include loads from equipment, arms, guys, braces, etc. or user input loads.
Wind load is calculated for the undeformed shape of a pole.

Pole Label	Top Joint	Bottom Joint	Section Top 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)
1256	1256:t	1256:ARM1	95.00	93.25	94.13	19.005	1.59e+006	1.000	31.18	0.00	115.27	86.42	0.00	0.00	86.42	0.00
1256	1256:ARM1	1256:TCMid	93.25	92.00	92.63	19.305	1.61e+006	1.000	31.18	0.00	83.65	62.71	0.00	0.00	62.71	0.00
1256	1256:TCMid		92.00	89.13	90.56	19.717	1.65e+006	1.000	31.18	0.00	196.58	147.30	0.00	0.00	147.30	0.00
1256		1256:ARM2	89.13	86.25	87.69	20.292	1.7e+006	1.000	31.18	0.00	202.41	151.60	0.00	0.00	151.60	0.00
1256	1256:ARM2		86.25	82.13	84.19	20.992	1.75e+006	1.000	31.18	0.00	300.58	225.01	0.00	0.00	225.01	0.00
1256		1256:BCMid	82.13	78.00	80.06	21.817	1.82e+006	1.000	31.18	0.00	312.57	233.85	0.00	0.00	233.85	0.00
1256	1256:BCMid	1256:ARM3	78.00	74.25	76.13	22.604	1.89e+006	1.000	31.18	0.00	294.56	220.27	0.00	0.00	220.27	0.00
1256	1256:ARM3	1256:WVGD1	74.25	70.00	72.13	23.404	1.96e+006	1.000	31.18	0.00	345.81	258.47	0.00	0.00	258.47	0.00
1256	1256:WVGD1		70.00	66.13	68.06	24.216	2.02e+006	1.000	31.18	0.00	326.39	243.84	0.00	0.00	243.84	0.00
1256		1256:ARM4	66.13	62.25	64.19	24.991	2.09e+006	1.000	31.18	0.00	336.97	251.64	0.00	0.00	251.64	0.00
1256	1256:ARM4	1256:WVGD2	62.25	60.00	61.12	25.603	2.14e+006	1.000	31.18	0.00	200.51	149.69	0.00	0.00	149.69	0.00
1256	1256:WVGD2		60.00	56.83	58.42	26.145	2.19e+006	1.000	31.18	0.00	288.23	215.13	0.00	0.00	215.13	0.00
1256			56.83	53.67	55.25	26.778	2.24e+006	1.000	31.18	0.00	295.29	220.34	0.00	0.00	220.34	0.00
1256		1256:WVGD3	53.67	50.00	51.83	27.086	2.26e+006	1.000	31.18	0.00	759.15	258.10	0.00	0.00	258.10	0.00
1256	1256:WVGD3		50.00	45.00	47.50	27.577	2.31e+006	1.000	31.18	0.00	575.22	358.31	0.00	0.00	358.31	0.00
1256		1256:WVGD4	45.00	40.00	42.50	28.577	2.39e+006	1.000	31.18	0.00	596.26	371.30	0.00	0.00	371.30	0.00
1256	1256:WVGD4		40.00	35.00	37.50	29.577	2.47e+006	1.000	31.18	0.00	617.39	384.28	0.00	0.00	384.28	0.00
1256		1256:WVGD5	35.00	30.00	32.50	30.577	2.56e+006	1.000	31.18	0.00	638.53	397.27	0.00	0.00	397.27	0.00
1256	1256:WVGD5		30.00	25.00	27.50	31.576	2.64e+006	1.000	31.18	0.00	659.66	410.26	0.00	0.00	410.26	0.00
1256		1256:WVGD6	25.00	20.00	22.50	32.576	2.72e+006	1.000	31.18	0.00	680.80	423.25	0.00	0.00	423.25	0.00
1256	1256:WVGD6		20.00	19.92	19.96	33.084	2.77e+006	1.000	31.18	0.00	11.48	7.14	0.00	0.00	7.14	0.00
1256			19.92	15.00	17.46	33.147	2.77e+006	1.000	31.18	0.00	1473.25	423.52	0.00	0.00	423.52	0.00
1256		1256:WVGD7	15.00	10.00	12.50	33.701	2.82e+006	1.000	31.18	0.00	820.60	437.86	0.00	0.00	437.86	0.00

1256	1256:WVGD7		10.00	5.00	7.50	34.700	2.9e+006	1.000	31.18	0.00	845.12	450.85	0.00	0.00	450.85	0.00
1256		1256:g	5.00	0.00	2.50	35.700	2.98e+006	1.000	31.18	0.00	869.78	463.84	0.00	0.00	463.84	0.00

*** Analysis Results:

Maximum element usage is 96.82% for Steel Pole "1256" in load case "NESC Extreme"
Maximum insulator usage is 12.66% for Clamp "CL16" in load case "NESC Extreme"



*** 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)
1256:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
1256:t	0.008308	5.846	-0.2363	-5.9679	0.0076	0.0001	0.008308	5.846	94.76
1256:ARM1	0.008075	5.664	-0.2268	-5.9679	0.0076	0.0001	0.008075	5.664	93.02

1256:TCMid	0.00791	5.534	-0.22	-5.9651	0.0076	0.0001	0.00791	5.534	91.78
1256:ARM2	0.007148	4.938	-0.189	-5.9201	0.0076	0.0001	0.007148	4.938	86.06
1256:BCMid	0.006064	4.101	-0.1464	-5.6933	0.0075	0.0001	0.006064	4.101	77.85
1256:ARM3	0.00558	3.733	-0.1282	-5.5492	0.0073	0.0001	0.00558	3.733	74.12
1256:WVGD1	0.00504	3.33	-0.1088	-5.3377	0.0072	0.0000	0.00504	3.33	69.89
1256:ARM4	0.004095	2.638	-0.07765	-4.8734	0.0068	0.0000	0.004095	2.638	62.17
1256:WVGD2	0.003832	2.45	-0.06967	-4.7156	0.0066	0.0000	0.003832	2.45	59.93
1256:WVGD3	0.002741	1.693	-0.04052	-3.9428	0.0058	0.0000	0.002741	1.693	49.96
1256:WVGD4	0.001799	1.073	-0.02083	-3.1485	0.0049	0.0000	0.001799	1.073	39.98
1256:WVGD5	0.001032	0.5936	-0.008935	-2.3248	0.0038	-0.0000	0.001032	0.5936	29.99
1256:WVGD6	0.0004668	0.2589	-0.002899	-1.4992	0.0026	-0.0000	0.0004668	0.2589	20
1256:WVGD7	0.0001201	0.06425	-0.0006012	-0.7303	0.0013	-0.0000	0.0001201	0.06425	9.999
ARM1L:O	0.008087	5.668	-0.1437	-5.9679	0.0076	0.0001	0.008087	4.869	93.11
ARM1L:End	0.008282	5.793	0.2631	-5.8894	0.0076	0.0001	0.008282	0.9936	94.51
ARM1R:O	0.008063	5.66	-0.3099	-5.9679	0.0076	0.0001	0.008063	6.459	92.94
ARM1R:End	0.008118	5.738	-0.8544	-6.3023	0.0076	0.0001	0.008118	11.54	93.4
ARM2L:O	0.00716	4.943	-0.1006	-5.9201	0.0076	0.0001	0.00716	4.085	86.15
ARM2L:End	0.007368	5.066	0.3869	-5.5056	0.0076	0.0001	0.007368	-0.7918	87.64
ARM2R:O	0.007135	4.934	-0.2775	-5.9201	0.0076	0.0001	0.007135	5.791	85.97
ARM2R:END	0.007185	5.05	-1.479	-6.4643	0.0076	0.0001	0.007185	16.91	86.44
ARM3L:O	0.005592	3.738	-0.03561	-5.5492	0.0073	0.0001	0.005592	2.78	74.21
ARM3L:End	0.005787	3.851	0.42	-5.1306	0.0074	0.0001	0.005787	-2.106	75.67
ARM3R:O	0.005567	3.729	-0.2208	-5.5492	0.0073	0.0001	0.005567	4.686	74.03
ARM3R:END	0.005627	3.842	-1.351	-6.0973	0.0073	0.0000	0.005627	15.8	74.57
ARM4L:O	0.004106	2.642	0.01218	-4.8734	0.0068	0.0000	0.004106	1.585	62.26
ARM4L:End	0.004277	2.738	0.4095	-4.4437	0.0068	0.0001	0.004277	-3.319	63.66
ARM4R:O	0.004084	2.634	-0.1675	-4.8734	0.0068	0.0000	0.004084	3.692	62.08
ARM4R:END	0.004158	2.74	-1.167	-5.4322	0.0068	0.0000	0.004158	14.8	62.75

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 %
1256:g	-0.09	0.0	-27.34	0.0	0.0	-53.30	0.0	0.0	59.90	0.0	2204.84	0.0	-4.2	0.0	0.0	0.01	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.
1256	1256:t	Origin	0.00	70.15	0.10	-2.84	-0.00	-0.00	0.0	-0.09	0.03	-0.00	-0.00	0.00	0.00	0.00	0.01	0.0	4
1256	1256:ARM1	End	1.75	67.97	0.10	-2.72	0.05	-0.00	0.0	-0.09	0.03	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
1256	1256:ARM1	Origin	1.75	67.97	0.10	-2.72	4.95	-0.00	0.0	-2.28	3.98	-0.00	-0.12	0.62	0.16	0.00	0.79	1.2	2
1256	1256:TCMid	End	3.00	66.41	0.09	-2.64	9.92	-0.00	0.0	-2.28	3.98	-0.00	-0.12	1.21	0.16	0.00	1.35	2.1	2
1256	1256:TCMid	Origin	3.00	66.41	0.09	-2.64	9.92	-0.00	0.0	-2.21	6.65	-0.00	-0.11	1.21	0.27	0.00	1.40	2.2	2
1256	Tube 1	End	5.87	62.83	0.09	-2.45	29.05	-0.01	0.0	-2.21	6.65	-0.00	-0.11	3.34	0.26	0.00	3.47	5.3	2
1256	Tube 1	Origin	5.87	62.83	0.09	-2.45	29.05	-0.01	0.0	-2.51	6.76	-0.01	-0.12	3.34	0.26	0.00	3.49	5.4	2
1256	1256:ARM2	End	8.75	59.26	0.09	-2.27	48.49	-0.03	0.0	-2.51	6.76	-0.01	-0.12	5.26	0.26	0.00	5.39	8.3	2
1256	1256:ARM2	Origin	8.75	59.26	0.09	-2.27	71.49	-0.03	-0.0	-7.76	13.07	-0.01	-0.37	7.75	0.50	0.00	8.16	12.6	2
1256	Tube 1	End	12.87	54.19	0.08	-2.01	125.40	-0.07	-0.0	-7.76	13.07	-0.01	-0.36	12.54	0.48	0.00	12.92	19.9	2
1256	Tube 1	Origin	12.87	54.19	0.08	-2.01	125.40	-0.07	-0.0	-8.24	13.22	-0.01	-0.38	12.54	0.48	0.00	12.95	19.9	2
1256	1256:BCMid	End	17.00	49.21	0.07	-1.76	179.91	-0.12	-0.0	-8.24	13.22	-0.01	-0.36	16.66	0.46	0.00	17.04	26.2	2
1256	1256:BCMid	Origin	17.00	49.21	0.07	-1.76	179.91	-0.12	-0.0	-17.23	13.36	-0.02	-0.76	16.66	0.47	0.00	17.44	26.8	2
1256	1256:ARM3	End	20.75	44.80	0.07	-1.54	230.00	-0.18	-0.0	-17.23	13.36	-0.02	-0.73	19.90	0.45	0.00	20.65	31.8	2
1256	1256:ARM3	Origin	20.75	44.80	0.07	-1.54	253.14	-0.19	-0.0	-22.66	19.71	-0.02	-0.97	21.90	0.67	0.00	22.90	35.2	2

1256	1256:WVGD1	End	25.00	39.95	0.06	-1.31	336.92	-0.27	-0.0	-22.66	19.71	-0.02	-0.93	27.07	0.64	0.00	28.02	43.1	2
1256	1256:WVGD1	Origin	25.00	39.95	0.06	-1.31	336.92	-0.27	-0.0	-24.13	20.05	-0.02	-0.99	27.07	0.65	0.00	28.09	43.2	2
1256	Tube 1	End	28.88	35.71	0.05	-1.11	414.62	-0.37	-0.0	-24.13	20.05	-0.02	-0.96	31.21	0.63	0.00	32.19	49.5	2
1256	Tube 1	Origin	28.88	35.71	0.05	-1.11	414.62	-0.37	-0.0	-24.71	20.13	-0.03	-0.98	31.21	0.63	0.00	32.21	49.6	2
1256	1256:ARM4	End	32.75	31.66	0.05	-0.93	492.61	-0.48	-0.0	-24.71	20.13	-0.03	-0.95	34.81	0.62	0.00	35.78	55.0	2
1256	1256:ARM4	Origin	32.75	31.66	0.05	-0.93	516.18	-0.48	-0.0	-30.17	26.42	-0.03	-1.16	36.48	0.81	0.00	37.67	57.9	2
1256	1256:WVGD2	End	35.00	29.40	0.05	-0.84	575.62	-0.55	-0.0	-30.17	26.42	-0.03	-1.14	39.25	0.79	0.00	40.42	62.4	2
1256	1256:WVGD2	Origin	35.00	29.40	0.05	-0.84	575.62	-0.55	-0.0	-31.53	26.69	-0.03	-1.19	39.25	0.80	0.00	40.47	62.5	2
1256	Tube 1	End	38.17	26.35	0.04	-0.71	660.12	-0.65	-0.0	-31.53	26.69	-0.03	-1.16	42.85	0.78	0.00	44.03	68.9	2
1256	Tube 1	Origin	38.17	26.35	0.04	-0.71	660.12	-0.65	-0.0	-32.08	26.70	-0.04	-1.18	42.85	0.78	0.00	44.05	68.9	2
1256	SpliceT	End	41.33	23.46	0.04	-0.60	744.64	-0.77	-0.0	-32.08	26.70	-0.04	-1.16	46.06	0.76	0.00	47.24	74.9	2
1256	SpliceT	Origin	41.33	23.46	0.04	-0.60	744.64	-0.77	-0.0	-32.99	26.72	-0.04	-1.19	46.06	0.76	0.00	47.27	74.9	2
1256	1256:WVGD3	End	45.00	20.32	0.03	-0.49	842.63	-0.92	-0.0	-32.99	26.72	-0.04	-0.99	43.80	0.64	0.00	44.80	68.9	2
1256	1256:WVGD3	Origin	45.00	20.32	0.03	-0.49	842.63	-0.91	-0.0	-35.06	26.98	-0.04	-1.06	43.80	0.65	0.00	44.87	69.0	2
1256	Tube 2	End	50.00	16.38	0.03	-0.36	977.55	-1.13	-0.0	-35.06	26.98	-0.04	-1.02	47.19	0.62	0.00	48.22	74.2	2
1256	Tube 2	Origin	50.00	16.38	0.03	-0.36	977.55	-1.13	-0.0	-36.12	26.98	-0.05	-1.05	47.19	0.62	0.00	48.25	74.2	2
1256	1256:WVGD4	End	55.00	12.87	0.02	-0.25	1112.43	-1.38	-0.0	-36.12	26.98	-0.05	-1.01	50.00	0.60	0.00	51.02	78.5	2
1256	1256:WVGD4	Origin	55.00	12.87	0.02	-0.25	1112.43	-1.37	-0.0	-38.13	27.18	-0.05	-1.07	50.00	0.60	0.00	51.08	78.6	2
1256	Tube 2	End	60.00	9.78	0.02	-0.17	1248.32	-1.64	-0.0	-38.13	27.18	-0.05	-1.03	52.37	0.58	0.00	53.42	82.2	2
1256	Tube 2	Origin	60.00	9.78	0.02	-0.17	1248.32	-1.64	-0.0	-39.27	27.15	-0.06	-1.06	52.37	0.58	0.00	53.45	82.2	2
1256	1256:WVGD5	End	65.00	7.12	0.01	-0.11	1384.04	-1.93	-0.0	-39.27	27.15	-0.06	-1.03	54.33	0.56	0.00	55.37	85.6	2
1256	1256:WVGD5	Origin	65.00	7.12	0.01	-0.11	1384.04	-1.93	-0.0	-41.35	27.31	-0.06	-1.08	54.33	0.57	0.00	55.42	85.7	2
1256	Tube 2	End	70.00	4.90	0.01	-0.06	1520.59	-2.25	-0.0	-41.35	27.31	-0.06	-1.05	55.96	0.55	0.00	57.02	89.7	2
1256	Tube 2	Origin	70.00	4.90	0.01	-0.06	1520.59	-2.25	-0.0	-42.55	27.25	-0.07	-1.08	55.96	0.55	0.00	57.05	89.7	2
1256	1256:WVGD6	End	75.00	3.11	0.01	-0.03	1656.86	-2.59	-0.0	-42.55	27.25	-0.07	-1.05	57.29	0.53	0.00	58.34	93.4	2
1256	1256:WVGD6	Origin	75.00	3.11	0.01	-0.03	1656.86	-2.59	-0.0	-44.09	27.42	-0.07	-1.08	57.29	0.53	0.00	58.38	93.4	2
1256	SpliceT	End	75.08	3.08	0.01	-0.03	1659.13	-2.60	-0.0	-44.09	27.42	-0.07	-1.08	57.31	0.53	0.00	58.40	93.5	2
1256	SpliceT	Origin	75.08	3.08	0.01	-0.03	1659.13	-2.60	-0.0	-45.29	27.40	-0.07	-1.11	57.31	0.53	0.00	58.43	93.5	2
1256	SpliceB	End	80.00	1.74	0.00	-0.02	1793.87	-2.96	-0.0	-45.29	27.40	-0.07	-0.95	53.06	0.46	0.00	54.02	83.1	2
1256	SpliceB	Origin	80.00	1.74	0.00	-0.02	1793.87	-2.96	-0.0	-47.20	27.35	-0.08	-0.99	53.06	0.46	0.00	54.06	83.2	2
1256	1256:WVGD7	End	85.00	0.77	0.00	-0.01	1930.61	-3.36	-0.0	-47.20	27.35	-0.08	-0.96	53.76	0.44	0.00	54.73	84.2	2
1256	1256:WVGD7	Origin	85.00	0.77	0.00	-0.01	1930.61	-3.36	-0.0	-49.54	27.46	-0.08	-1.01	53.76	0.45	0.00	54.78	84.3	2
1256	Tube 3	End	90.00	0.19	0.00	-0.00	2067.92	-3.78	-0.0	-49.54	27.46	-0.08	-0.98	54.30	0.43	0.00	55.29	85.1	2
1256	Tube 3	Origin	90.00	0.19	0.00	-0.00	2067.92	-3.78	-0.0	-51.00	27.39	-0.09	-1.01	54.30	0.43	0.00	55.32	85.1	2
1256	1256:g	End	95.00	0.00	0.00	0.00	2204.84	-4.23	-0.0	-51.00	27.39	-0.09	-0.98	54.69	0.42	0.00	55.67	85.7	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1L	ARM1L:O	Origin	0.00	68.02	0.10	-1.72	-1.86	0.00	0.0	-2.22	0.45	-0.00	-0.59	4.36	0.00	0.00	4.95	7.6	1
ARM1L	ARM1L:End	End	4.12	69.51	0.10	3.16	-0.00	0.00	0.0	-2.22	0.45	-0.00	-0.71	0.00	0.31	0.00	0.89	1.4	3
ARM1R	ARM1R:O	Origin	0.00	67.92	0.10	-3.72	-6.74	-0.00	-0.0	1.61	1.35	0.00	0.43	15.79	0.00	0.00	16.22	25.0	1
ARM1R	#ARM1R:0	End	2.55	68.38	0.10	-6.94	-3.31	-0.00	-0.0	1.61	1.35	0.00	0.47	9.30	0.00	0.00	9.77	15.0	1
ARM1R	#ARM1R:0	Origin	2.55	68.38	0.10	-6.94	-3.31	-0.00	0.0	1.62	1.30	0.00	0.47	9.30	0.00	0.00	9.77	15.0	1
ARM1R	ARM1R:End	End	5.10	68.86	0.10	-10.25	0.00	0.00	0.0	1.62	1.30	0.00	0.52	0.00	0.89	0.00	1.62	2.5	3
ARM2L	ARM2L:O	Origin	0.00	59.31	0.09	-1.21	-8.31	0.00	0.0	-3.44	1.64	-0.00	-0.91	19.47	0.00	0.00	20.38	31.4	1
ARM2L	#ARM2L:0	End	2.55	60.07	0.09	1.77	-4.12	0.00	0.0	-3.44	1.64	-0.00	-1.00	11.58	0.00	0.00	12.58	19.3	1
ARM2L	#ARM2L:0	Origin	2.55	60.07	0.09	1.77	-4.12	0.00	0.0	-3.42	1.61	-0.00	-0.99	11.58	0.00	0.00	12.57	19.3	1
ARM2L	ARM2L:End	End	5.10	60.79	0.09	4.64	-0.00	0.00	0.0	-3.42	1.61	-0.00	-1.09	0.00	1.10	0.00	2.20	3.4	3
ARM2R	ARM2R:O	Origin	0.00	59.20	0.09	-3.33	-31.08	-0.00	-0.0	2.72	2.90	0.00	0.33	14.75	0.00	0.00	15.08	25.4	1
ARM2R	#ARM2R:0	End	5.00	59.82	0.09	-9.64	-16.59	-0.00	-0.0	2.72	2.90	0.00	0.43	13.89	0.00	0.00	14.33	23.9	1
ARM2R	#ARM2R:0	Origin	5.00	59.82	0.09	-9.64	-16.59	-0.00	-0.0	2.73	2.75	0.00	0.44	13.89	0.00	0.00	14.33	23.9	1

ARM2R	#ARM2R:1	End	8.06	60.21	0.09	-13.64	-8.16	-0.00	-0.0	2.73	2.75	0.00	0.54	10.71	0.00	0.00	11.26	18.8	1
ARM2R	#ARM2R:1	Origin	8.06	60.21	0.09	-13.64	-8.16	-0.00	0.0	2.74	2.66	0.00	0.55	10.71	0.00	0.00	11.26	18.8	1
ARM2R	ARM2R:END	End	11.13	60.60	0.09	-17.75	0.00	0.00	0.0	2.74	2.66	0.00	0.73	0.00	1.50	0.00	2.71	4.5	3
ARM3L	ARM3L:O	Origin	0.00	44.85	0.07	-0.43	-8.39	0.00	0.0	-3.49	1.66	-0.00	-0.93	19.66	0.00	0.00	20.59	31.7	1
ARM3L	#ARM3L:0	End	2.55	45.55	0.07	2.36	-4.16	0.00	0.0	-3.49	1.66	-0.00	-1.01	11.70	0.00	0.00	12.71	19.6	1
ARM3L	#ARM3L:0	Origin	2.55	45.55	0.07	2.36	-4.16	0.00	0.0	-3.47	1.63	-0.00	-1.01	11.70	0.00	0.00	12.70	19.5	1
ARM3L	ARM3L:End	End	5.10	46.22	0.07	5.04	-0.00	0.00	0.0	-3.47	1.63	-0.00	-1.11	0.00	1.11	0.00	2.23	3.4	3
ARM3R	ARM3R:O	Origin	0.00	44.75	0.07	-2.65	-31.29	-0.00	-0.0	2.73	2.92	0.00	0.33	14.85	0.00	0.00	15.18	25.5	1
ARM3R	#ARM3R:0	End	5.00	45.35	0.07	-8.58	-16.71	-0.00	-0.0	2.73	2.92	0.00	0.43	13.99	0.00	0.00	14.43	24.0	1
ARM3R	#ARM3R:0	Origin	5.00	45.35	0.07	-8.58	-16.71	-0.00	-0.0	2.75	2.77	0.00	0.44	13.99	0.00	0.00	14.43	24.0	1
ARM3R	#ARM3R:1	End	8.06	45.72	0.07	-12.34	-8.22	-0.00	-0.0	2.75	2.77	0.00	0.55	10.79	0.00	0.00	11.34	18.9	1
ARM3R	#ARM3R:1	Origin	8.06	45.72	0.07	-12.34	-8.22	-0.00	0.0	2.76	2.68	0.00	0.55	10.79	0.00	0.00	11.34	18.9	1
ARM3R	ARM3R:END	End	11.13	46.10	0.07	-16.21	0.00	0.00	0.0	2.76	2.68	0.00	0.73	0.00	1.52	0.00	2.72	4.5	3
ARM4L	ARM4L:O	Origin	0.00	31.70	0.05	0.15	-8.61	0.00	0.0	-3.44	1.70	-0.00	-0.91	20.18	0.00	0.00	21.09	32.4	1
ARM4L	#ARM4L:0	End	2.55	32.30	0.05	2.59	-4.27	0.00	0.0	-3.44	1.70	-0.00	-1.00	12.01	0.00	0.00	13.00	20.0	1
ARM4L	#ARM4L:0	Origin	2.55	32.30	0.05	2.59	-4.27	0.00	0.0	-3.43	1.67	-0.00	-0.99	12.01	0.00	0.00	13.00	20.0	1
ARM4L	ARM4L:End	End	5.10	32.86	0.05	4.91	-0.00	0.00	0.0	-3.43	1.67	-0.00	-1.10	0.00	1.14	0.00	2.26	3.5	3
ARM4R	ARM4R:O	Origin	0.00	31.61	0.05	-2.01	-31.90	-0.00	-0.0	2.78	2.97	0.00	0.33	15.14	0.00	0.00	15.47	26.0	1
ARM4R	#ARM4R:0	End	5.00	32.17	0.05	-7.23	-17.04	-0.00	-0.0	2.78	2.97	0.00	0.44	14.27	0.00	0.00	14.71	24.5	1
ARM4R	#ARM4R:0	Origin	5.00	32.17	0.05	-7.23	-17.04	-0.00	-0.0	2.80	2.82	0.00	0.45	14.27	0.00	0.00	14.72	24.5	1
ARM4R	#ARM4R:1	End	8.06	32.53	0.05	-10.57	-8.39	-0.00	-0.0	2.80	2.82	0.00	0.56	11.01	0.00	0.00	11.56	19.3	1
ARM4R	#ARM4R:1	Origin	8.06	32.53	0.05	-10.57	-8.39	-0.00	0.0	2.81	2.74	0.00	0.56	11.01	0.00	0.00	11.57	19.3	1
ARM4R	ARM4R:END	End	11.13	32.88	0.05	-14.01	-0.00	0.00	0.0	2.81	2.74	0.00	0.75	0.00	1.55	0.00	2.78	4.6	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 %
CL1	2.251	80.00	80.00	2.81
CL2	2.059	80.00	80.00	2.57
CL3	3.765	80.00	80.00	4.71
CL4	3.802	80.00	80.00	4.75
CL5	3.823	80.00	80.00	4.78
CL6	3.827	80.00	80.00	4.78
CL7	3.799	80.00	80.00	4.75
CL8	3.904	80.00	80.00	4.88
CL9	0.936	80.00	80.00	1.17
CL10	0.936	80.00	80.00	1.17
CL11	0.936	80.00	80.00	1.17
CL12	0.936	80.00	80.00	1.17
CL13	0.936	80.00	80.00	1.17
CL14	0.936	80.00	80.00	1.17
CL15	0.936	80.00	80.00	1.17
CL16	2.616	80.00	80.00	3.27
CL17	8.499	80.00	80.00	10.62

*** Analysis Results for Load Case No. 2 "NESC Extreme" - Number of iterations in SAPS 16

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)
1256:g	0	0	0	0.0000	0.0000	0.0000	0	0	0
1256:t	0.004164	6.415	-0.2835	-6.6567	0.0042	-0.0005	0.004164	6.415	94.72
1256:ARM1	0.004033	6.212	-0.2717	-6.6567	0.0042	-0.0005	0.004033	6.212	92.98
1256:TCMid	0.003939	6.067	-0.2633	-6.6550	0.0042	-0.0005	0.003939	6.067	91.74
1256:ARM2	0.003507	5.403	-0.2248	-6.5892	0.0041	-0.0004	0.003507	5.403	86.03
1256:BCMid	0.002909	4.475	-0.1723	-6.2882	0.0039	-0.0003	0.002909	4.475	77.83
1256:ARM3	0.00265	4.07	-0.1503	-6.0979	0.0038	-0.0003	0.00265	4.07	74.1
1256:WVGD1	0.002367	3.627	-0.1272	-5.8427	0.0037	-0.0003	0.002367	3.627	69.87
1256:ARM4	0.001884	2.872	-0.09022	-5.3018	0.0033	-0.0002	0.001884	2.872	62.16
1256:WVGD2	0.001753	2.668	-0.08085	-5.1258	0.0032	-0.0002	0.001753	2.668	59.92
1256:WVGD3	0.001225	1.846	-0.04677	-4.2804	0.0027	-0.0001	0.001225	1.846	49.95
1256:WVGD4	0.0007868	1.172	-0.02381	-3.4233	0.0022	-0.0001	0.0007868	1.172	39.98
1256:WVGD5	0.0004423	0.6507	-0.009959	-2.5361	0.0017	-0.0001	0.0004423	0.6507	29.99
1256:WVGD6	0.0001962	0.2848	-0.003012	-1.6429	0.0011	-0.0000	0.0001962	0.2848	20
1256:WVGD7	4.959e-005	0.07095	-0.0004868	-0.8044	0.0006	-0.0000	4.959e-005	0.07095	10
ARM1L:O	0.004033	6.217	-0.179	-6.6567	0.0042	-0.0005	0.004033	5.418	93.07
ARM1L:End	0.004104	6.361	0.2783	-6.6660	0.0042	-0.0005	0.004104	1.561	94.53
ARM1R:O	0.004034	6.207	-0.3643	-6.6567	0.0042	-0.0005	0.004034	7.006	92.89
ARM1R:End	0.004216	6.29	-0.9578	-6.7803	0.0043	-0.0023	0.004216	12.09	93.29
ARM2L:O	0.003507	5.409	-0.1264	-6.5892	0.0041	-0.0004	0.003507	4.551	86.12
ARM2L:End	0.003584	5.555	0.4352	-6.4890	0.0041	-0.0004	0.003584	-0.3028	87.69
ARM2R:O	0.003506	5.397	-0.3231	-6.5892	0.0041	-0.0004	0.003506	6.255	85.93
ARM2R:END	0.003619	5.517	-1.623	-6.8389	0.0041	-0.0004	0.003619	17.37	86.3
ARM3L:O	0.002652	4.075	-0.04863	-6.0979	0.0038	-0.0003	0.002652	3.118	74.2
ARM3L:End	0.002729	4.208	0.471	-5.9928	0.0038	-0.0003	0.002729	-1.75	75.72
ARM3R:O	0.002648	4.064	-0.252	-6.0979	0.0038	-0.0003	0.002648	5.022	74
ARM3R:END	0.002739	4.181	-1.457	-6.3516	0.0038	-0.0003	0.002739	16.14	74.46
ARM4L:O	0.001886	2.877	0.007486	-5.3018	0.0033	-0.0002	0.001886	1.82	62.26
ARM4L:End	0.001954	2.989	0.4588	-5.1875	0.0034	-0.0002	0.001954	-3.068	63.71
ARM4R:O	0.001883	2.868	-0.1879	-5.3018	0.0033	-0.0002	0.001883	3.925	62.06
ARM4R:END	0.00196	2.977	-1.239	-5.5637	0.0033	-0.0002	0.00196	15.03	62.68

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 %
1256:g	-0.03	0.0	-32.99	0.0	0.0	-28.00	0.0	0.0	43.27	0.0	2442.02	0.0	-1.7	0.0	0.0	0.04	0.0	0.0

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Trans. Mom. (Local Mx) (ft-k)	Long. Mom. (Local My) (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Tran. Shear (kips)	Long. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
1256	1256:t	Origin	0.00	76.98	0.05	-3.40	-0.00	-0.00	0.0	-0.06	0.05	-0.00	-0.00	0.00	0.01	0.00	0.01	0.0	4
1256	1256:ARM1	End	1.75	74.55	0.05	-3.26	0.09	-0.00	0.0	-0.06	0.05	-0.00	-0.00	0.01	0.00	0.00	0.01	0.0	2
1256	1256:ARM1	Origin	1.75	74.55	0.05	-3.26	2.83	-0.01	-0.0	-0.74	2.58	-0.01	-0.04	0.15	0.25	0.00	0.48	0.7	3

1256	1256:TCMid	End	3.00	72.81	0.05	-3.16	6.05	-0.02	-0.0	-0.74	2.58	-0.01	-0.04	0.74	0.10	0.00	0.80	1.2	2
1256	1256:TCMid	Origin	3.00	72.81	0.05	-3.16	6.05	-0.02	-0.0	0.29	12.76	-0.01	0.01	0.00	1.33	0.00	2.32	3.6	4
1256	Tube 1	End	5.87	68.81	0.04	-2.93	42.75	-0.04	-0.0	0.29	12.76	-0.01	0.01	4.91	0.50	0.00	5.00	7.7	2
1256	Tube 1	Origin	5.87	68.81	0.04	-2.93	42.75	-0.04	-0.0	0.09	12.94	-0.01	0.00	4.91	0.50	0.00	4.99	7.7	2
1256	1256:ARM2	End	8.75	64.83	0.04	-2.70	79.94	-0.06	-0.0	0.09	12.94	-0.01	0.00	8.67	0.49	0.00	8.71	13.4	2
1256	1256:ARM2	Origin	8.75	64.83	0.04	-2.70	92.48	-0.06	-0.0	-2.17	17.92	-0.01	-0.10	10.02	0.68	0.00	10.20	15.7	2
1256	Tube 1	End	12.87	59.20	0.04	-2.38	166.42	-0.10	-0.0	-2.17	17.92	-0.01	-0.10	16.65	0.65	0.00	16.78	25.8	2
1256	Tube 1	Origin	12.87	59.20	0.04	-2.38	166.42	-0.10	-0.0	-2.52	18.18	-0.01	-0.12	16.65	0.66	0.00	16.80	25.8	2
1256	1256:BCMid	End	17.00	53.69	0.03	-2.07	241.40	-0.14	-0.0	-2.52	18.18	-0.01	-0.11	22.35	0.64	0.00	22.49	34.6	2
1256	1256:BCMid	Origin	17.00	53.69	0.03	-2.07	241.40	-0.14	-0.0	-7.21	15.55	-0.01	-0.32	22.35	0.54	0.00	22.69	34.9	2
1256	1256:ARM3	End	20.75	48.83	0.03	-1.80	299.73	-0.19	-0.0	-7.21	15.55	-0.01	-0.31	25.93	0.53	0.00	26.26	40.4	2
1256	1256:ARM3	Origin	20.75	48.83	0.03	-1.80	312.40	-0.19	-0.0	-9.63	20.59	-0.01	-0.41	27.03	0.70	0.00	27.47	42.3	2
1256	1256:WVGD1	End	25.00	43.52	0.03	-1.53	399.92	-0.24	-0.0	-9.63	20.59	-0.01	-0.40	32.13	0.67	0.00	32.55	50.1	2
1256	1256:WVGD1	Origin	25.00	43.52	0.03	-1.53	399.92	-0.24	-0.0	-10.25	21.33	-0.01	-0.42	32.13	0.70	0.00	32.57	50.1	2
1256	Tube 1	End	28.88	38.89	0.03	-1.29	482.58	-0.29	-0.0	-10.25	21.33	-0.01	-0.41	36.32	0.67	0.00	36.75	56.5	2
1256	Tube 1	Origin	28.88	38.89	0.03	-1.29	482.58	-0.29	-0.0	-10.69	21.56	-0.01	-0.42	36.32	0.68	0.00	36.77	56.6	2
1256	1256:ARM4	End	32.75	34.47	0.02	-1.08	566.12	-0.34	-0.0	-10.69	21.56	-0.01	-0.41	40.00	0.66	0.00	40.43	62.2	2
1256	1256:ARM4	Origin	32.75	34.47	0.02	-1.08	579.09	-0.34	-0.0	-13.14	26.54	-0.01	-0.51	40.92	0.81	0.00	41.45	63.8	2
1256	1256:WVGD2	End	35.00	32.01	0.02	-0.97	638.80	-0.38	-0.0	-13.14	26.54	-0.01	-0.50	43.55	0.80	0.00	44.07	67.8	2
1256	1256:WVGD2	Origin	35.00	32.01	0.02	-0.97	638.80	-0.38	-0.0	-13.69	27.19	-0.02	-0.52	43.55	0.82	0.00	44.09	67.8	2
1256	Tube 1	End	38.17	28.70	0.02	-0.82	724.90	-0.43	-0.0	-13.69	27.19	-0.02	-0.51	47.04	0.80	0.00	47.57	73.2	2
1256	Tube 1	Origin	38.17	28.70	0.02	-0.82	724.90	-0.43	-0.0	-14.11	27.37	-0.02	-0.52	47.04	0.80	0.00	47.59	73.2	2
1256	SpliceT	End	41.33	25.56	0.02	-0.69	811.56	-0.48	-0.0	-14.11	27.37	-0.02	-0.51	50.19	0.78	0.00	50.72	78.0	2
1256	SpliceT	Origin	41.33	25.56	0.02	-0.69	811.56	-0.48	-0.0	-14.78	27.57	-0.02	-0.53	50.19	0.79	0.00	50.74	78.1	2
1256	1256:WVGD3	End	45.00	22.15	0.01	-0.56	912.66	-0.54	-0.0	-14.78	27.57	-0.02	-0.45	47.43	0.66	0.00	47.89	73.7	2
1256	1256:WVGD3	Origin	45.00	22.15	0.01	-0.56	912.66	-0.54	-0.0	-15.83	28.33	-0.02	-0.48	47.43	0.68	0.00	47.92	73.7	2
1256	Tube 2	End	50.00	17.88	0.01	-0.41	1054.30	-0.63	-0.0	-15.83	28.33	-0.02	-0.46	50.88	0.65	0.00	51.35	79.0	2
1256	Tube 2	Origin	50.00	17.88	0.01	-0.41	1054.30	-0.63	-0.0	-16.63	28.61	-0.02	-0.48	50.88	0.66	0.00	51.38	79.0	2
1256	1256:WVGD4	End	55.00	14.07	0.01	-0.29	1197.35	-0.72	-0.0	-16.63	28.61	-0.02	-0.47	53.80	0.64	0.00	54.28	83.5	2
1256	1256:WVGD4	Origin	55.00	14.07	0.01	-0.29	1197.35	-0.72	-0.0	-17.68	29.39	-0.02	-0.50	53.80	0.65	0.00	54.31	83.6	2
1256	Tube 2	End	60.00	10.70	0.01	-0.19	1344.27	-0.83	-0.0	-17.68	29.39	-0.02	-0.48	56.38	0.63	0.00	56.87	87.5	2
1256	Tube 2	Origin	60.00	10.70	0.01	-0.19	1344.27	-0.83	-0.0	-18.54	29.67	-0.02	-0.50	56.38	0.64	0.00	56.90	87.5	2
1256	1256:WVGD5	End	65.00	7.81	0.01	-0.12	1492.60	-0.93	-0.0	-18.54	29.67	-0.02	-0.49	58.57	0.62	0.00	59.07	90.9	2
1256	1256:WVGD5	Origin	65.00	7.81	0.01	-0.12	1492.60	-0.93	-0.0	-19.65	30.44	-0.02	-0.51	58.57	0.63	0.00	59.10	90.9	2
1256	Tube 2	End	70.00	5.38	0.00	-0.07	1644.80	-1.05	-0.0	-19.65	30.44	-0.02	-0.50	60.52	0.61	0.00	61.02	93.9	2
1256	Tube 2	Origin	70.00	5.38	0.00	-0.07	1644.80	-1.05	-0.0	-20.56	30.72	-0.02	-0.52	60.52	0.62	0.00	61.05	93.9	2
1256	1256:WVGD6	End	75.00	3.42	0.00	-0.04	1798.42	-1.17	-0.0	-20.56	30.72	-0.02	-0.51	62.16	0.60	0.00	62.68	96.7	2
1256	1256:WVGD6	Origin	75.00	3.42	0.00	-0.04	1798.42	-1.17	-0.0	-21.26	31.35	-0.02	-0.52	62.16	0.61	0.00	62.69	96.7	2
1256	SpliceT	End	75.08	3.39	0.00	-0.04	1801.03	-1.17	-0.0	-21.26	31.35	-0.02	-0.52	62.19	0.61	0.00	62.72	96.8	2
1256	SpliceT	Origin	75.08	3.39	0.00	-0.04	1801.03	-1.17	-0.0	-22.12	31.51	-0.03	-0.54	62.19	0.61	0.00	62.74	96.8	2
1256	SpliceB	End	80.00	1.91	0.00	-0.02	1955.95	-1.30	-0.0	-22.12	31.51	-0.03	-0.47	57.83	0.53	0.00	58.31	89.7	2
1256	SpliceB	Origin	80.00	1.91	0.00	-0.02	1955.95	-1.30	-0.0	-23.50	31.80	-0.03	-0.49	57.83	0.53	0.00	58.34	89.7	2
1256	1256:WVGD7	End	85.00	0.85	0.00	-0.01	2114.94	-1.43	-0.0	-23.50	31.80	-0.03	-0.48	58.86	0.52	0.00	59.35	91.3	2
1256	1256:WVGD7	Origin	85.00	0.85	0.00	-0.01	2114.94	-1.43	-0.0	-24.80	32.57	-0.03	-0.51	58.86	0.53	0.00	59.38	91.4	2
1256	Tube 3	End	90.00	0.21	0.00	-0.00	2277.77	-1.58	-0.0	-24.80	32.57	-0.03	-0.49	59.78	0.51	0.00	60.28	92.7	2
1256	Tube 3	Origin	90.00	0.21	0.00	-0.00	2277.77	-1.58	-0.0	-25.89	32.85	-0.03	-0.51	59.78	0.52	0.00	60.30	92.8	2
1256	1256:g	End	95.00	0.00	0.00	0.00	2442.02	-1.73	-0.0	-25.89	32.85	-0.03	-0.50	60.54	0.50	0.00	61.04	93.9	2

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

Element Label	Joint Label	Joint Position	Rel. Dist. (ft)	Trans. Defl. (in)	Long. Defl. (in)	Vert. Defl. (in)	Vert. Mom. (ft-k)	Horz. Mom. (ft-k)	Tors. Mom. (ft-k)	Axial Force (kips)	Vert. Shear (kips)	Horz. Shear (kips)	P/A (ksi)	M/S. (ksi)	V/Q. (ksi)	T/R. (ksi)	Res. (ksi)	Max. Usage %	At Pt.
ARM1L	ARM1L:O	Origin	0.00	74.61	0.05	-2.15	0.22	0.00	0.0	-1.31	-0.05	-0.00	-0.35	0.52	0.00	0.00	0.86	1.3	1
ARM1L	ARM1L:End	End	4.12	76.33	0.05	3.34	-0.00	0.00	0.0	-1.31	-0.05	-0.00	-0.42	0.00	0.04	0.00	0.42	0.7	3
ARM1R	ARM1R:O	Origin	0.00	74.48	0.05	-4.37	-2.51	-0.04	-0.0	1.08	0.51	0.01	0.29	5.88	0.00	0.00	6.16	9.5	1

ARM1R	#ARM1R:0	End	2.55	74.98	0.05	-7.92	-1.21	-0.02	-0.0	1.08	0.51	0.01	0.31	3.41	0.00	0.00	3.73	5.7	1
ARM1R	#ARM1R:0	Origin	2.55	74.98	0.05	-7.92	-1.21	-0.02	0.0	1.09	0.48	0.01	0.31	3.41	0.00	0.00	3.73	5.7	1
ARM1R	ARM1R:End	End	5.10	75.47	0.05	-11.49	0.00	0.00	0.0	1.09	0.48	0.01	0.35	0.00	0.33	0.00	0.66	1.0	3
ARM2L	ARM2L:O	Origin	0.00	64.90	0.04	-1.52	-2.03	0.00	0.0	-2.49	0.41	-0.00	-0.66	4.75	0.00	0.00	5.41	8.3	1
ARM2L	#ARM2L:0	End	2.55	65.78	0.04	1.87	-0.99	0.00	0.0	-2.49	0.41	-0.00	-0.72	2.77	0.00	0.00	3.50	5.4	1
ARM2L	#ARM2L:0	Origin	2.55	65.78	0.04	1.87	-0.99	0.00	0.0	-2.49	0.39	-0.00	-0.72	2.77	0.00	0.00	3.49	5.4	1
ARM2L	ARM2L:End	End	5.10	66.66	0.04	5.22	-0.00	0.00	0.0	-2.49	0.39	-0.00	-0.80	0.00	0.26	0.00	0.92	1.4	3
ARM2R	ARM2R:O	Origin	0.00	64.77	0.04	-3.88	-14.42	-0.00	-0.0	2.22	1.36	0.00	0.27	6.84	0.00	0.00	7.11	12.0	1
ARM2R	#ARM2R:0	End	5.00	65.41	0.04	-10.81	-7.60	-0.00	-0.0	2.22	1.36	0.00	0.35	6.37	0.00	0.00	6.72	11.2	1
ARM2R	#ARM2R:0	Origin	5.00	65.41	0.04	-10.81	-7.60	-0.00	-0.0	2.23	1.27	0.00	0.35	6.37	0.00	0.00	6.72	11.2	1
ARM2R	#ARM2R:1	End	8.06	65.81	0.04	-15.12	-3.72	-0.00	-0.0	2.23	1.27	0.00	0.44	4.88	0.00	0.00	5.32	8.9	1
ARM2R	#ARM2R:1	Origin	8.06	65.81	0.04	-15.12	-3.72	-0.00	0.0	2.23	1.21	0.00	0.44	4.88	0.00	0.00	5.32	8.9	1
ARM2R	ARM2R:END	End	11.13	66.21	0.04	-19.48	0.00	0.00	0.0	2.23	1.21	0.00	0.59	0.00	0.68	0.00	1.33	2.2	3
ARM3L	ARM3L:O	Origin	0.00	48.90	0.03	-0.58	-2.13	0.00	0.0	-2.52	0.43	-0.00	-0.67	4.99	0.00	0.00	5.65	8.7	1
ARM3L	#ARM3L:0	End	2.55	49.70	0.03	2.55	-1.04	0.00	0.0	-2.52	0.43	-0.00	-0.73	2.91	0.00	0.00	3.64	5.6	1
ARM3L	#ARM3L:0	Origin	2.55	49.70	0.03	2.55	-1.04	0.00	0.0	-2.51	0.41	-0.00	-0.73	2.91	0.00	0.00	3.64	5.6	1
ARM3L	ARM3L:End	End	5.10	50.49	0.03	5.65	-0.00	0.00	0.0	-2.51	0.41	-0.00	-0.80	0.00	0.28	0.00	0.94	1.4	3
ARM3R	ARM3R:O	Origin	0.00	48.77	0.03	-3.02	-14.64	-0.00	-0.0	2.22	1.38	0.00	0.27	6.95	0.00	0.00	7.21	12.1	1
ARM3R	#ARM3R:0	End	5.00	49.39	0.03	-9.45	-7.72	-0.00	-0.0	2.22	1.38	0.00	0.35	6.47	0.00	0.00	6.82	11.4	1
ARM3R	#ARM3R:0	Origin	5.00	49.39	0.03	-9.45	-7.72	-0.00	-0.0	2.23	1.29	0.00	0.35	6.47	0.00	0.00	6.82	11.4	1
ARM3R	#ARM3R:1	End	8.06	49.78	0.03	-13.44	-3.78	-0.00	-0.0	2.23	1.29	0.00	0.44	4.95	0.00	0.00	5.40	9.0	1
ARM3R	#ARM3R:1	Origin	8.06	49.78	0.03	-13.44	-3.78	-0.00	0.0	2.23	1.23	0.00	0.44	4.95	0.00	0.00	5.40	9.0	1
ARM3R	ARM3R:END	End	11.13	50.17	0.03	-17.49	0.00	0.00	0.0	2.23	1.23	0.00	0.59	0.00	0.70	0.00	1.34	2.2	3
ARM4L	ARM4L:O	Origin	0.00	34.52	0.02	0.09	-2.31	0.00	0.0	-2.50	0.46	-0.00	-0.66	5.42	0.00	0.00	6.08	9.4	1
ARM4L	#ARM4L:0	End	2.55	35.20	0.02	2.81	-1.13	0.00	0.0	-2.50	0.46	-0.00	-0.73	3.17	0.00	0.00	3.90	6.0	1
ARM4L	#ARM4L:0	Origin	2.55	35.20	0.02	2.81	-1.13	0.00	0.0	-2.49	0.44	-0.00	-0.72	3.17	0.00	0.00	3.89	6.0	1
ARM4L	ARM4L:End	End	5.10	35.87	0.02	5.51	-0.00	0.00	0.0	-2.49	0.44	-0.00	-0.80	0.00	0.30	0.00	0.95	1.5	3
ARM4R	ARM4R:O	Origin	0.00	34.42	0.02	-2.26	-15.09	-0.00	-0.0	2.24	1.42	0.00	0.27	7.16	0.00	0.00	7.43	12.5	1
ARM4R	#ARM4R:0	End	5.00	35.00	0.02	-7.85	-7.97	-0.00	-0.0	2.24	1.42	0.00	0.36	6.68	0.00	0.00	7.03	11.7	1
ARM4R	#ARM4R:0	Origin	5.00	35.00	0.02	-7.85	-7.97	-0.00	-0.0	2.25	1.33	0.00	0.36	6.68	0.00	0.00	7.03	11.7	1
ARM4R	#ARM4R:1	End	8.06	35.36	0.02	-11.34	-3.90	-0.00	-0.0	2.25	1.33	0.00	0.45	5.12	0.00	0.00	5.57	9.3	1
ARM4R	#ARM4R:1	Origin	8.06	35.36	0.02	-11.34	-3.90	-0.00	0.0	2.25	1.27	0.00	0.45	5.12	0.00	0.00	5.57	9.3	1
ARM4R	ARM4R:END	End	11.13	35.72	0.02	-14.87	0.00	0.00	0.0	2.25	1.27	0.00	0.60	0.00	0.72	0.00	1.38	2.3	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 %
CL1	1.300	80.00	80.00	1.62
CL2	1.181	80.00	80.00	1.48
CL3	2.509	80.00	80.00	3.14
CL4	2.527	80.00	80.00	3.16
CL5	2.536	80.00	80.00	3.17
CL6	2.540	80.00	80.00	3.17
CL7	2.527	80.00	80.00	3.16
CL8	2.578	80.00	80.00	3.22
CL9	0.541	80.00	80.00	0.68
CL10	0.541	80.00	80.00	0.68
CL11	0.541	80.00	80.00	0.68

CL12	0.541	80.00	80.00	0.68
CL13	0.541	80.00	80.00	0.68
CL14	0.541	80.00	80.00	0.68
CL15	0.541	80.00	80.00	0.68
CL16	10.132	80.00	80.00	12.66
CL17	5.198	80.00	80.00	6.50

*** 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)
1256	96.82	NESC Extreme	22	13405.8

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 %
1256	NESC Heavy	1	1.980	0.153	0.153	1.980	31.000	14.922	67.860	2	138.126	1.693	3.250	27.13
1256	NESC Heavy	2	1.508	-1.292	1.508	1.292	31.000	11.603	52.765	4	56.973	1.493	3.250	21.10
1256	NESC Heavy	3	0.153	-1.980	1.980	-0.153	31.000	13.988	63.613	2	-131.865	1.639	3.250	25.43
1256	NESC Heavy	4	-1.292	-1.508	1.292	-1.508	31.000	42.494	193.250	4	-131.865	2.857	3.250	77.26
1256	NESC Heavy	5	-1.980	-0.153	-0.153	-1.980	31.000	13.932	63.361	2	-131.658	1.636	3.250	25.33
1256	NESC Heavy	6	-1.508	1.292	-1.508	-1.292	31.000	11.603	52.765	4	57.491	1.493	3.250	21.10
1256	NESC Heavy	7	-0.153	1.980	-1.980	0.153	31.000	14.977	68.113	2	138.333	1.696	3.250	27.23
1256	NESC Heavy	8	1.292	1.508	-1.292	1.508	31.000	44.580	202.736	4	138.333	2.926	3.250	81.05
1256	NESC Heavy	9	1.818	1.014	-0.569	2.003	31.000	17.802	80.958	3	138.264	1.849	3.250	32.37
1256	NESC Heavy	10	2.003	-0.569	1.014	1.818	31.000	5.756	26.177	3	56.973	1.051	3.250	10.47
1256	NESC Heavy	11	1.014	-1.818	2.003	0.569	31.000	5.000	22.741	3	-51.023	0.980	3.250	9.09
1256	NESC Heavy	12	-0.569	-2.003	1.818	-1.014	31.000	16.989	77.261	3	-131.865	1.806	3.250	30.89
1256	NESC Heavy	13	-1.818	-1.014	0.569	-2.003	31.000	16.968	77.168	3	-131.796	1.805	3.250	30.85
1256	NESC Heavy	14	-2.003	0.569	-1.014	-1.818	31.000	4.935	22.442	3	-50.505	0.973	3.250	8.97
1256	NESC Heavy	15	-1.014	1.818	-2.003	-0.569	31.000	5.822	26.476	3	57.491	1.057	3.250	10.59
1256	NESC Heavy	16	0.569	2.003	-1.818	1.014	31.000	17.822	81.051	3	138.333	1.850	3.250	32.40
1256	NESC Extreme	1	1.980	0.153	0.153	1.980	31.000	16.251	73.907	2	151.128	1.767	3.250	29.55
1256	NESC Extreme	2	1.508	-1.292	1.508	1.292	31.000	12.851	58.441	4	61.354	1.571	3.250	23.36
1256	NESC Extreme	3	0.153	-1.980	1.980	-0.153	31.000	15.768	71.710	2	-147.907	1.740	3.250	28.67
1256	NESC Extreme	4	-1.292	-1.508	1.292	-1.508	31.000	47.687	216.868	4	-147.907	3.026	3.250	86.70
1256	NESC Extreme	5	-1.980	-0.153	-0.153	-1.980	31.000	15.746	71.607	2	-147.823	1.739	3.250	28.63
1256	NESC Extreme	6	-1.508	1.292	-1.508	-1.292	31.000	12.851	58.441	4	61.565	1.571	3.250	23.36
1256	NESC Extreme	7	-0.153	1.980	-1.980	0.153	31.000	16.274	74.009	2	151.212	1.768	3.250	29.59
1256	NESC Extreme	8	1.292	1.508	-1.292	1.508	31.000	48.753	221.716	4	151.212	3.060	3.250	88.64
1256	NESC Extreme	9	1.818	1.014	-0.569	2.003	31.000	19.475	88.569	3	151.184	1.934	3.250	35.41
1256	NESC Extreme	10	2.003	-0.569	1.014	1.818	31.000	6.153	27.984	3	61.354	1.087	3.250	11.19
1256	NESC Extreme	11	1.014	-1.818	2.003	0.569	31.000	5.760	26.197	3	-58.260	1.052	3.250	10.47
1256	NESC Extreme	12	-0.569	-2.003	1.818	-1.014	31.000	19.058	86.670	3	-147.907	1.913	3.250	34.65
1256	NESC Extreme	13	-1.818	-1.014	0.569	-2.003	31.000	19.050	86.632	3	-147.879	1.913	3.250	34.64
1256	NESC Extreme	14	-2.003	0.569	-1.014	-1.818	31.000	5.734	26.075	3	-58.049	1.049	3.250	10.42
1256	NESC Extreme	15	-1.014	1.818	-2.003	-0.569	31.000	6.180	28.106	3	61.565	1.089	3.250	11.24
1256	NESC Extreme	16	0.569	2.003	-1.818	1.014	31.000	19.484	88.607	3	151.212	1.934	3.250	35.43

Summary of Tubular Davit Usages:

Tubular Davit Label	Maximum Usage %	Load Case	Segment Number	Weight (lbs)
ARM1L	7.62	NESC Heavy	1	48.4
ARM1R	24.95	NESC Heavy	1	59.9
ARM2L	31.35	NESC Heavy	1	59.9

ARM2R	25.37	NESC Heavy	1	229.0
ARM3L	31.67	NESC Heavy	1	59.9
ARM3R	25.55	NESC Heavy	1	229.0
ARM4L	32.44	NESC Heavy	1	59.9
ARM4R	26.04	NESC Heavy	1	229.0

*** Maximum Stress Summary for Each Load Case

Summary of Maximum Usages by Load Case:

Load Case	Maximum Usage %	Element Label	Element Type
NESC Heavy	93.52	1256	Steel Pole
NESC Extreme	96.82	1256	Steel Pole

Summary of Steel Pole Usages by Load Case:

Load Case	Maximum Usage %	Steel Pole Label	Segment Number
NESC Heavy	93.52	1256	22
NESC Extreme	96.82	1256	22

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	1256	8	31.000	51.742	2204.837	-4.230	44.580	202.736	4	138.333	2.926	81.05
NESC Extreme	1256	8	31.000	26.442	2442.018	-1.725	48.753	221.716	4	151.212	3.060	88.64

Summary of Tubular Davit Usages by Load Case:

Load Case	Maximum Usage %	Tubular Davit Label	Segment Number
NESC Heavy	32.44	ARM4L	1
NESC Extreme	12.51	ARM4R	1

Summary of Insulator Usages:

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
CL1	Clamp	2.81	NESC Heavy	0.0
CL2	Clamp	2.57	NESC Heavy	0.0
CL3	Clamp	4.71	NESC Heavy	0.0
CL4	Clamp	4.75	NESC Heavy	0.0
CL5	Clamp	4.78	NESC Heavy	0.0
CL6	Clamp	4.78	NESC Heavy	0.0
CL7	Clamp	4.75	NESC Heavy	0.0
CL8	Clamp	4.88	NESC Heavy	0.0
CL9	Clamp	1.17	NESC Heavy	0.0

CL10	Clamp	1.17	NESC Heavy	0.0
CL11	Clamp	1.17	NESC Heavy	0.0
CL12	Clamp	1.17	NESC Heavy	0.0
CL13	Clamp	1.17	NESC Heavy	0.0
CL14	Clamp	1.17	NESC Heavy	0.0
CL15	Clamp	1.17	NESC Heavy	0.0
CL16	Clamp	12.66	NESC Extreme	0.0
CL17	Clamp	10.62	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	CL1	Clamp	ARM1L:End	0.000	1.936	1.148	2.251
NESC Heavy	CL2	Clamp	ARM1R:End	0.000	1.723	1.128	2.059
NESC Heavy	CL3	Clamp	ARM2L:End	0.000	2.802	2.515	3.765
NESC Heavy	CL4	Clamp	ARM2R:END	0.000	2.844	2.523	3.802
NESC Heavy	CL5	Clamp	ARM3L:End	0.000	2.868	2.528	3.823
NESC Heavy	CL6	Clamp	ARM3R:END	0.000	2.877	2.523	3.827
NESC Heavy	CL7	Clamp	ARM4L:End	0.000	2.841	2.522	3.799
NESC Heavy	CL8	Clamp	ARM4R:END	0.000	2.965	2.540	3.904
NESC Heavy	CL9	Clamp	1256:WVGD1	0.000	0.172	0.920	0.936
NESC Heavy	CL10	Clamp	1256:WVGD2	0.000	0.172	0.920	0.936
NESC Heavy	CL11	Clamp	1256:WVGD3	0.000	0.172	0.920	0.936
NESC Heavy	CL12	Clamp	1256:WVGD4	0.000	0.172	0.920	0.936
NESC Heavy	CL13	Clamp	1256:WVGD5	0.000	0.172	0.920	0.936
NESC Heavy	CL14	Clamp	1256:WVGD6	0.000	0.172	0.920	0.936
NESC Heavy	CL15	Clamp	1256:WVGD7	0.000	0.172	0.920	0.936
NESC Heavy	CL16	Clamp	1256:TCMid	0.000	2.616	0.000	2.616
NESC Heavy	CL17	Clamp	1256:BCMid	0.000	-0.834	8.458	8.499
NESC Extreme	CL1	Clamp	ARM1L:End	0.000	1.239	0.392	1.300
NESC Extreme	CL2	Clamp	ARM1R:End	0.007	1.120	0.374	1.181
NESC Extreme	CL3	Clamp	ARM2L:End	0.000	2.247	1.116	2.509
NESC Extreme	CL4	Clamp	ARM2R:END	0.000	2.266	1.119	2.527
NESC Extreme	CL5	Clamp	ARM3L:End	0.000	2.274	1.122	2.536
NESC Extreme	CL6	Clamp	ARM3R:END	0.000	2.280	1.119	2.540
NESC Extreme	CL7	Clamp	ARM4L:End	0.000	2.265	1.120	2.527
NESC Extreme	CL8	Clamp	ARM4R:END	0.000	2.319	1.127	2.578
NESC Extreme	CL9	Clamp	1256:WVGD1	0.000	0.480	0.250	0.541
NESC Extreme	CL10	Clamp	1256:WVGD2	0.000	0.480	0.250	0.541
NESC Extreme	CL11	Clamp	1256:WVGD3	0.000	0.480	0.250	0.541
NESC Extreme	CL12	Clamp	1256:WVGD4	0.000	0.480	0.250	0.541
NESC Extreme	CL13	Clamp	1256:WVGD5	0.000	0.480	0.250	0.541
NESC Extreme	CL14	Clamp	1256:WVGD6	0.000	0.480	0.250	0.541
NESC Extreme	CL15	Clamp	1256:WVGD7	0.000	0.480	0.250	0.541
NESC Extreme	CL16	Clamp	1256:TCMid	0.000	10.132	0.000	10.132
NESC Extreme	CL17	Clamp	1256:BCMid	0.000	-3.323	3.997	5.198

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 23.842  0.000 32.325    1913.289       -0.000    -0.000
 NESC Extreme 26.179  0.007 13.236    2081.191        0.660    -0.041

*** Weight of structure (lbs):
    Weight of Tubular Davit Arms:       974.9
    Weight of Steel Poles:            13405.8
    Total:                            14380.7


*** End of Report
```

Anchor Bolt Analysis:

Input Data:

Bolt Force:

Maximum Tensile Force = $T_{Max} := 151 \cdot kips$ (User Input from PLS-Pole)

Maximum Shear Force at Base = $V_{base} := 33 \cdot kips$ (User Input from PLS-Pole)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts = $N := 16$ (User Input)

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

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

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

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

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

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

Anchor Bolt Analysis:

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

Maximum Shear Force per Bolt = $V_{Max} := \frac{V_{base}}{N} = 2.1 \cdot kips$

Shear Stress per Bolt = $f_v := \frac{V_{Max}}{A_s} = 635.1\, psi$

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 = $\frac{T_{Max}}{F_{tv} \cdot A_s} = 62.01 \cdot \%$

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 =	$S := 33 \cdot 1.1k = 36.3 \cdot k$	*USER INPUT-FROM PLS-Pole*
Overturning Moment =	$M := 2442 \cdot 1.1ft \cdot k = 2686 \cdot ft \cdot k$	*USER INPUT-FROM PLS-Pole*
Applied Axial Load =	$A1 := 28 \cdot 1.1k = 30.8 \cdot k$	*USER INPUT-FROM PLS-Pole*
Bending Moment =	$Mu := 2788ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 11957ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 10.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 18.5ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 28$	*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 = $FS := \frac{0.9 \cdot Mn}{Mu} = 3.9$

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

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

$FOSCheck = "OK"$

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

                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

                      (c) 1985-2010 by Ensoft, Inc.
                           All Rights Reserved

===============================================================================

This program is licensed to:

TJL
Centek Engineering

-------------------------------------------------------------------------------
                         Files Used for Analysis
-------------------------------------------------------------------------------

Path to file locations:
J:\Jobs\2105100.WI\03_CT11001B\05_Structural\Tower\Calcs\L-Pile\
Name of input data file:     1256 Caisson Analysis.lpd
Name of output file:         1256 Caisson Analysis.lpo
Name of plot output file:    1256 Caisson Analysis.lpp
Name of runtime file:        1256 Caisson Analysis.lpr


------------------------------------------------------------------------------
                       Time and Date of Analysis
------------------------------------------------------------------------------

               Date:  July  8, 2021     Time:  14:02:50


------------------------------------------------------------------------------
                             Problem Title
------------------------------------------------------------------------------

21051.03/CT11001B - Greenwich/Structure # 1256


------------------------------------------------------------------------------
                             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 = 222.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	120.00000	10178760.	11309.7000	3122018.
2	222.0000	120.00000	10178760.	11309.7000	3122018.

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 1 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 222.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

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

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 2 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	6.00	0.05800
2	222.00	0.05800

Shear Strength of Soils

Shear strength parameters with depth defined using 2 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	0.00000	30.00	------	------
2	222.000	0.00000	30.00	------	------

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    =       36300.000 lbs
Bending moment at pile head =    32232000.000 in-lbs
Axial load at pile head     =       30800.000 lbs

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



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

Number of sections =  1



Pile Section No.  1

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

Outside Diameter                       =     120.0000 in

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             =           28
Area of Single Bar                     =      1.56000 in**2
Number of Rows of Reinforcing Bars     =           15
```

Area of Steel = 43.680 in**2
Area of Shaft = 11309.734 in**2
Percentage of Steel Reinforcement = 0.386 percent
Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 31349.24 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	56.000
2	3.120	54.596
3	3.120	50.454
4	3.120	43.783
5	3.120	34.915
6	3.120	24.297
7	3.120	12.461
8	3.120	0.000
9	3.120	-12.461
10	3.120	-24.297
11	3.120	-34.915
12	3.120	-43.783
13	3.120	-50.454
14	3.120	-54.596
15	1.560	-56.000

Axial Thrust Force = 30800.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
16962413.	3.392483E+13	5.000000E-07	0.00003096	61.92730844	95.03993093	839.94597
33721968.	3.372197E+13	0.00000100	0.00006107	61.07175171	185.68114	1655.08080
50279104.	3.351940E+13	0.00000150	0.00009118	60.78630745	274.61627	2470.20437
66633823.	3.331691E+13	0.00000200	0.00012129	60.64338863	361.84536	3285.31654
66633823.	2.665353E+13	0.00000250	0.00006473	25.89227736	192.22376	6532.80989
66633823.	2.221127E+13	0.00000300	0.00007673	25.57679951	226.92059	

						7866.81844
66633823.	1.903824E+13	0.00000350	0.00008875	25.35595715	261.40720	9200.37035
66633823.	1.665846E+13	0.00000400	0.00010078	25.19428790	295.68285	10533.46260
66633823.	1.480752E+13	0.00000450	0.00011282	25.07209361	329.74681	11866.09178
66633823.	1.332676E+13	0.00000500	0.00012489	24.97755110	363.59830	13198.25509
66633823.	1.211524E+13	0.00000550	0.00013697	24.90314662	397.23667	14529.94811
66633823.	1.110564E+13	0.00000600	0.00014906	24.84386265	430.66112	15861.16790
66633823.	1.025136E+13	0.00000650	0.00016118	24.79622662	463.87084	17191.91128
66633823.	9.519118E+12	0.00000700	0.00017330	24.75776374	496.86516	18522.17396
66633823.	8.884510E+12	0.00000750	0.00018545	24.72665012	529.64317	19851.95360
66633823.	8.329228E+12	0.00000800	0.00019761	24.70153034	562.20423	21181.24496
66633823.	7.839273E+12	0.00000850	0.00020979	24.68135655	594.54745	22510.04561
66633823.	7.403758E+12	0.00000900	0.00022199	24.66531694	626.67196	23838.35228
66633823.	7.014087E+12	0.00000950	0.00023420	24.65277851	658.57712	25166.15952
66633823.	6.663382E+12	0.00001000	0.00024643	24.64322627	690.26203	26493.46438
66633823.	6.346078E+12	0.00001050	0.00025868	24.63624895	721.72593	27820.26220
66633823.	6.057620E+12	0.00001100	0.00027095	24.63150322	752.96785	29146.55047
66633823.	5.794245E+12	0.00001150	0.00028323	24.62871015	783.98694	30472.32516
66633823.	5.552819E+12	0.00001200	0.00029553	24.62764084	814.78246	31797.58099
66633823.	5.330706E+12	0.00001250	0.00030785	24.62809861	845.35352	33122.31425
66633823.	5.125679E+12	0.00001300	0.00032019	24.62991536	875.69913	34446.52191
66633823.	4.935839E+12	0.00001350	0.00033254	24.63295519	905.81855	35770.19804
66633823.	4.759559E+12	0.00001400	0.00034492	24.63709652	935.71086	37093.33881
66633823.	4.595436E+12	0.00001450	0.00035731	24.64223564	965.37514	38415.93991
66702192.	4.446813E+12	0.00001500	0.00036972	24.64827955	994.81035	39737.99840
68853072.	4.442134E+12	0.00001550	0.00038215	24.65515316	1024.01566	41059.50866

71001612.	4.437601E+12	0.00001600	0.00039460	24.66278851	1052.99014	42380.46613
73147805.	4.433200E+12	0.00001650	0.00040707	24.67112839	1081.73292	43700.86506
75291620.	4.428919E+12	0.00001700	0.00041956	24.68011558	1110.24287	45020.70302
77433052.	4.424746E+12	0.00001750	0.00043207	24.68970716	1138.51915	46339.97362
79572080.	4.420671E+12	0.00001800	0.00044460	24.69986022	1166.56069	47658.67297
81708691.	4.416686E+12	0.00001850	0.00045714	24.71053898	1194.36654	48976.79584
83842868.	4.412783E+12	0.00001900	0.00046971	24.72171128	1221.93568	50294.33709
85974599.	4.408954E+12	0.00001950	0.00048230	24.73334849	1249.26713	51611.29143
90230643.	4.401495E+12	0.00002050	0.00050754	24.75791395	1303.21269	54243.42016
94476669.	4.394264E+12	0.00002150	0.00053286	24.78405297	1356.19456	56873.14297
98712571.	4.387225E+12	0.00002250	0.00055826	24.81162965	1408.20448	59500.41165
1.022908E+08	4.352801E+12	0.00002350	0.00058245	24.78504002	1456.54611	60000.00000
1.051256E+08	4.290839E+12	0.00002450	0.00060519	24.70150888	1500.91864	60000.00000
1.075022E+08	4.215771E+12	0.00002550	0.00062702	24.58888471	1542.57364	60000.00000
1.096261E+08	4.136834E+12	0.00002650	0.00064832	24.46503818	1582.37113	60000.00000
1.113675E+08	4.049727E+12	0.00002750	0.00066880	24.31986272	1619.78042	60000.00000
1.131044E+08	3.968576E+12	0.00002850	0.00068931	24.18638885	1656.53269	60000.00000
1.146900E+08	3.887797E+12	0.00002950	0.00070948	24.05031860	1691.91671	60000.00000
1.165760E+08	3.822162E+12	0.00003050	0.00073200	24.00000036	1730.77418	60000.00000
1.171852E+08	3.720164E+12	0.00003150	0.00075120	23.84777248	1762.94916	60000.00000
1.183789E+08	3.642428E+12	0.00003250	0.00077003	23.69308054	1793.82023	60000.00000
1.195694E+08	3.569236E+12	0.00003350	0.00078888	23.54874194	1824.13662	60000.00000
1.205631E+08	3.494584E+12	0.00003450	0.00080710	23.39412868	1852.77405	60000.00000
1.213464E+08	3.418207E+12	0.00003550	0.00082461	23.22852910	1879.70655	60000.00000
1.221270E+08	3.345945E+12	0.00003650	0.00084216	23.07283223	1906.15646	60000.00000
1.229051E+08	3.277468E+12	0.00003750	0.00085973	22.92625487	1932.12136	

60000.00000					
1.236805E+08	3.212481E+12	0.00003850	0.00087734	22.78809249	1957.59867
60000.00000					
1.244534E+08	3.150719E+12	0.00003950	0.00089498	22.65771210	1982.58575
60000.00000					
1.252236E+08	3.091941E+12	0.00004050	0.00091265	22.53454149	2007.07984
60000.00000					
1.259509E+08	3.034962E+12	0.00004150	0.00093017	22.41382778	2030.82837
60000.00000					
1.264344E+08	2.974928E+12	0.00004250	0.00094667	22.27463186	2052.61847
60000.00000					
1.269158E+08	2.917605E+12	0.00004350	0.00096320	22.14244187	2073.97732
60000.00000					
1.273952E+08	2.862813E+12	0.00004450	0.00097975	22.01679647	2094.90317
60000.00000					
1.276907E+08	2.806390E+12	0.00004550	0.00100100	21.99999869	2121.44998
60000.00000					
1.284727E+08	2.762853E+12	0.00004650	0.00101900	21.91394269	2143.11560
60000.00000					
1.289300E+08	2.714315E+12	0.00004750	0.00103493	21.78791106	2161.67821
60000.00000					
1.293854E+08	2.667741E+12	0.00004850	0.00105088	21.66761935	2179.83903
60000.00000					
1.298390E+08	2.623010E+12	0.00004950	0.00106686	21.55272067	2197.59584
60000.00000					
1.302907E+08	2.580013E+12	0.00005050	0.00108287	21.44289672	2214.94644
60000.00000					
1.307404E+08	2.538649E+12	0.00005150	0.00109890	21.33786142	2231.88906
60000.00000					
1.311883E+08	2.498825E+12	0.00005250	0.00111496	21.23734295	2248.42144
60000.00000					
1.315927E+08	2.459677E+12	0.00005350	0.00113077	21.13589466	2264.24834
60000.00000					
1.318545E+08	2.419348E+12	0.00005450	0.00114566	21.02129996	2278.70507
60000.00000					
1.321147E+08	2.380445E+12	0.00005550	0.00116057	20.91124356	2292.80924
60000.00000					
1.323734E+08	2.342893E+12	0.00005650	0.00117551	20.80548227	2306.55888
60000.00000					
1.326307E+08	2.306621E+12	0.00005750	0.00119047	20.70380151	2319.95269
60000.00000					
1.328865E+08	2.271563E+12	0.00005850	0.00120545	20.60599029	2332.98868
60000.00000					
1.331407E+08	2.237658E+12	0.00005950	0.00122046	20.51185548	2345.66508
60000.00000					
1.336445E+08	2.173081E+12	0.00006150	0.00125054	20.33391058	2369.93222
60000.00000					
1.341421E+08	2.112475E+12	0.00006350	0.00128071	20.16866505	2392.73988
60000.00000					
1.346335E+08	2.055473E+12	0.00006550	0.00131098	20.01496732	2414.07307
60000.00000					

1.363535E+08	2.020051E+12	0.00006750	0.00135000	20.00000060	2439.65847	60000.00000
1.363535E+08	1.961920E+12	0.00006950	0.00138253	19.89252269	2458.75340	60000.00000
1.363535E+08	1.907042E+12	0.00007150	0.00141162	19.74290907	2474.17748	60000.00000
1.366317E+08	1.858935E+12	0.00007350	0.00144080	19.60276544	2488.22238	60000.00000
1.369129E+08	1.813416E+12	0.00007550	0.00146824	19.44692910	2500.06370	60000.00000
1.371405E+08	1.769555E+12	0.00007750	0.00149519	19.29277360	2510.45318	60000.00000
1.373637E+08	1.727845E+12	0.00007950	0.00152222	19.14740860	2519.66054	60000.00000
1.375823E+08	1.688127E+12	0.00008150	0.00154933	19.01019037	2527.67387	60000.00000
1.377964E+08	1.650257E+12	0.00008350	0.00157653	18.88055384	2534.48148	60000.00000
1.380059E+08	1.614104E+12	0.00008550	0.00160381	18.75797331	2540.07112	60000.00000
1.382106E+08	1.579550E+12	0.00008750	0.00163117	18.64197671	2544.43043	60000.00000
1.384107E+08	1.546488E+12	0.00008950	0.00165863	18.53214204	2547.54688	60000.00000
1.386059E+08	1.514819E+12	0.00009150	0.00168617	18.42807233	2549.40752	60000.00000
1.387958E+08	1.484447E+12	0.00009350	0.00171380	18.32940996	2549.83419	60000.00000
1.389714E+08	1.455198E+12	0.00009550	0.00174152	18.23583305	2545.32234	60000.00000
1.391453E+08	1.427131E+12	0.00009750	0.00176934	18.14703763	2540.79437	60000.00000
1.393175E+08	1.400175E+12	0.00009950	0.00179724	18.06275189	2536.24999	60000.00000
1.393175E+08	1.372586E+12	0.00010150	0.00182700	17.99999893	2540.87807	60000.00000
1.393175E+08	1.346062E+12	0.00010350	0.00186300	17.99999893	2545.65388	60000.00000
1.393277E+08	1.320642E+12	0.00010550	0.00189900	17.99999893	2548.67932	60000.00000
1.401287E+08	1.303522E+12	0.00010750	0.00193379	17.98878014	2549.93690	60000.00000
1.402784E+08	1.281081E+12	0.00010950	0.00196086	17.90738761	2547.71894	60000.00000
1.404260E+08	1.259426E+12	0.00011150	0.00198806	17.83012927	2544.00023	60000.00000
1.405728E+08	1.238527E+12	0.00011350	0.00201533	17.75623620	2540.26874	60000.00000
1.406938E+08	1.218128E+12	0.00011550	0.00204200	17.67968953	2536.64285	60000.00000
1.407475E+08	1.197851E+12	0.00011750	0.00206693	17.59090483	2533.32289	

60000.00000					
1.408007E+08	1.178249E+12	0.00011950	0.00209191	17.50556409	2534.82079
60000.00000					
1.408534E+08	1.159288E+12	0.00012150	0.00211696	17.42350638	2538.25559
60000.00000					
1.409056E+08	1.140936E+12	0.00012350	0.00214205	17.34457433	2541.26106
60000.00000					
1.409573E+08	1.123166E+12	0.00012550	0.00216721	17.26862133	2543.83216
60000.00000					
1.410084E+08	1.105948E+12	0.00012750	0.00219243	17.19551504	2545.96387
60000.00000					
1.410590E+08	1.089258E+12	0.00012950	0.00221770	17.12513387	2547.65107
60000.00000					
1.411090E+08	1.073072E+12	0.00013150	0.00224304	17.05734909	2548.88832
60000.00000					
1.411584E+08	1.057366E+12	0.00013350	0.00226844	16.99205697	2549.67034
60000.00000					
1.412073E+08	1.042120E+12	0.00013550	0.00229390	16.92915380	2549.99159
60000.00000					
1.412539E+08	1.027301E+12	0.00013750	0.00231955	16.86947286	2547.77269
60000.00000					
1.413000E+08	1.012903E+12	0.00013950	0.00234527	16.81199849	2545.01507
60000.00000					
1.413913E+08	9.853052E+11	0.00014350	0.00239682	16.70260370	2539.48102
60000.00000					
1.414816E+08	9.591974E+11	0.00014750	0.00244852	16.60012901	2533.92143
60000.00000					
1.415709E+08	9.344614E+11	0.00015150	0.00250036	16.50404155	2528.33591
60000.00000					
1.416591E+08	9.109912E+11	0.00015550	0.00255236	16.41386569	2526.48729
60000.00000					
1.417463E+08	8.886913E+11	0.00015950	0.00260450	16.32917225	2533.22279
60000.00000					
1.418323E+08	8.674759E+11	0.00016350	0.00265681	16.24957860	2538.85685
60000.00000					
1.419172E+08	8.472668E+11	0.00016750	0.00270927	16.17473423	2543.36773
60000.00000					
1.419978E+08	8.279758E+11	0.00017150	0.00276212	16.10563338	2546.75836
60000.00000					
1.420640E+08	8.094814E+11	0.00017550	0.00281611	16.04618490	2549.01991
60000.00000					
1.422372E+08	7.924078E+11	0.00017950	0.00287200	16.00000083	2549.98563
60000.00000					
1.428721E+08	7.785945E+11	0.00018350	0.00293600	16.00000083	2544.36144
60000.00000					
1.434856E+08	7.652563E+11	0.00018750	0.00300000	16.00000083	2538.04680
60000.00000					
1.440817E+08	7.523850E+11	0.00019150	0.00306400	16.00000083	2531.73216
60000.00000					
1.446480E+08	7.398876E+11	0.00019550	0.00312800	16.00000083	2525.41752
60000.00000					

1.450002E+08	7.268182E+11	0.00019950	0.00319200	16.00000083	2519.10287	60000.00000
1.453351E+08	7.141776E+11	0.00020350	0.00325600	16.00000083	2513.07909	60000.00000
1.456528E+08	7.019410E+11	0.00020750	0.00332000	16.00000083	2522.92762	60000.00000
1.459531E+08	6.900855E+11	0.00021150	0.00338400	16.00000083	2531.25140	60000.00000
1.462361E+08	6.785898E+11	0.00021550	0.00344800	16.00000083	2538.05041	60000.00000
1.465018E+08	6.674343E+11	0.00021950	0.00351200	16.00000083	2543.32465	60000.00000
1.467502E+08	6.566006E+11	0.00022350	0.00357600	16.00000083	2547.07413	60000.00000
1.469814E+08	6.460720E+11	0.00022750	0.00364000	16.00000083	2549.29884	60000.00000
1.473017E+08	6.362924E+11	0.00023150	0.00370400	16.00000083	2549.79904	60000.00000
1.473017E+08	6.254848E+11	0.00023550	0.00376222	15.97546041	2545.90138	60000.00000
1.473017E+08	6.150383E+11	0.00023950	0.00381594	15.93296349	2542.79250	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 143485.55769 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 = 36300.000 lbs
Specified moment at pile head = 32232000.000 in-lbs
Specified axial load at pile head = 30800.000 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	2.957	3.22E+07	36300.	-0.018707	192.719	3.37E+13	0.000	0.000
17.760	2.625	3.29E+07	33200.	-0.018690	196.509	3.37E+13	-525.542	444.499
35.520	2.293	3.34E+07	16710.	-0.018673	199.311	3.37E+13	-1331.614	

								1289.232
53.280	1.962	3.34E+07	-14005.	-0.018655	199.639	3.37E+13	-2121.945	2401.580
71.040	1.630	3.28E+07	-58311.	-0.018638	196.031	3.37E+13	-2855.393	3888.109
88.800	1.299	3.13E+07	-1.15E+05	-0.018621	187.129	3.37E+13	-3488.703	5959.946
106.560	0.968933	2.87E+07	-1.81E+05	-0.018605	171.766	3.38E+13	-3951.366	9053.287
124.320	0.638639	2.48E+07	-2.54E+05	-0.018591	149.097	3.38E+13	-4140.378	14393.
142.080	0.308574	1.97E+07	-3.25E+05	-0.018579	118.799	3.39E+13	-3779.173	27189.
159.840	-0.021307	1.35E+07	-3.58E+05	-0.018570	82.437	3.39E+13	295.009	30737.
177.600	-0.351063	7.47E+06	-3.09E+05	-0.018565	46.784	3.39E+13	4947.971	31289.
195.360	-0.680748	2.86E+06	-2.06E+05	-0.018562	19.598	3.39E+13	6618.674	21584.
213.120	-1.010	3.34E+05	-75187.	-0.018562	4.692	3.39E+13	8111.983	17823.

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             =     2.95685244 in
Computed slope at pile head      =    -0.01870732
Maximum bending moment           =      33450287. lbs-in
Maximum shear force              =  -357949.21362 lbs
Depth of maximum bending moment  =    46.62000000 in
Depth of maximum shear force     =      157.62000 in
Number of iterations             =             28
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= 36300.	M= 3.22E+07	30800.0000	2.9569	3.3450E+07	-357949.

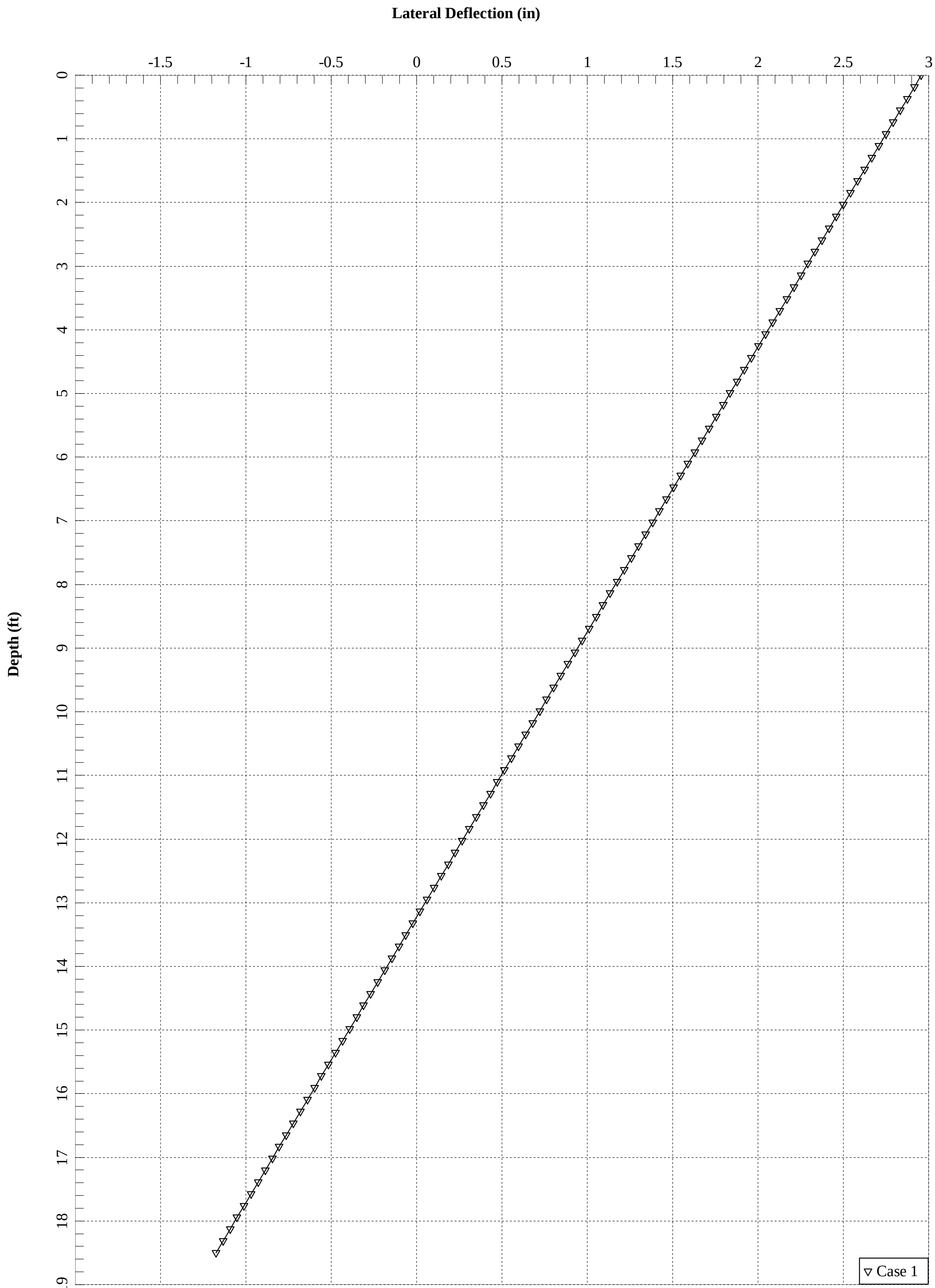
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

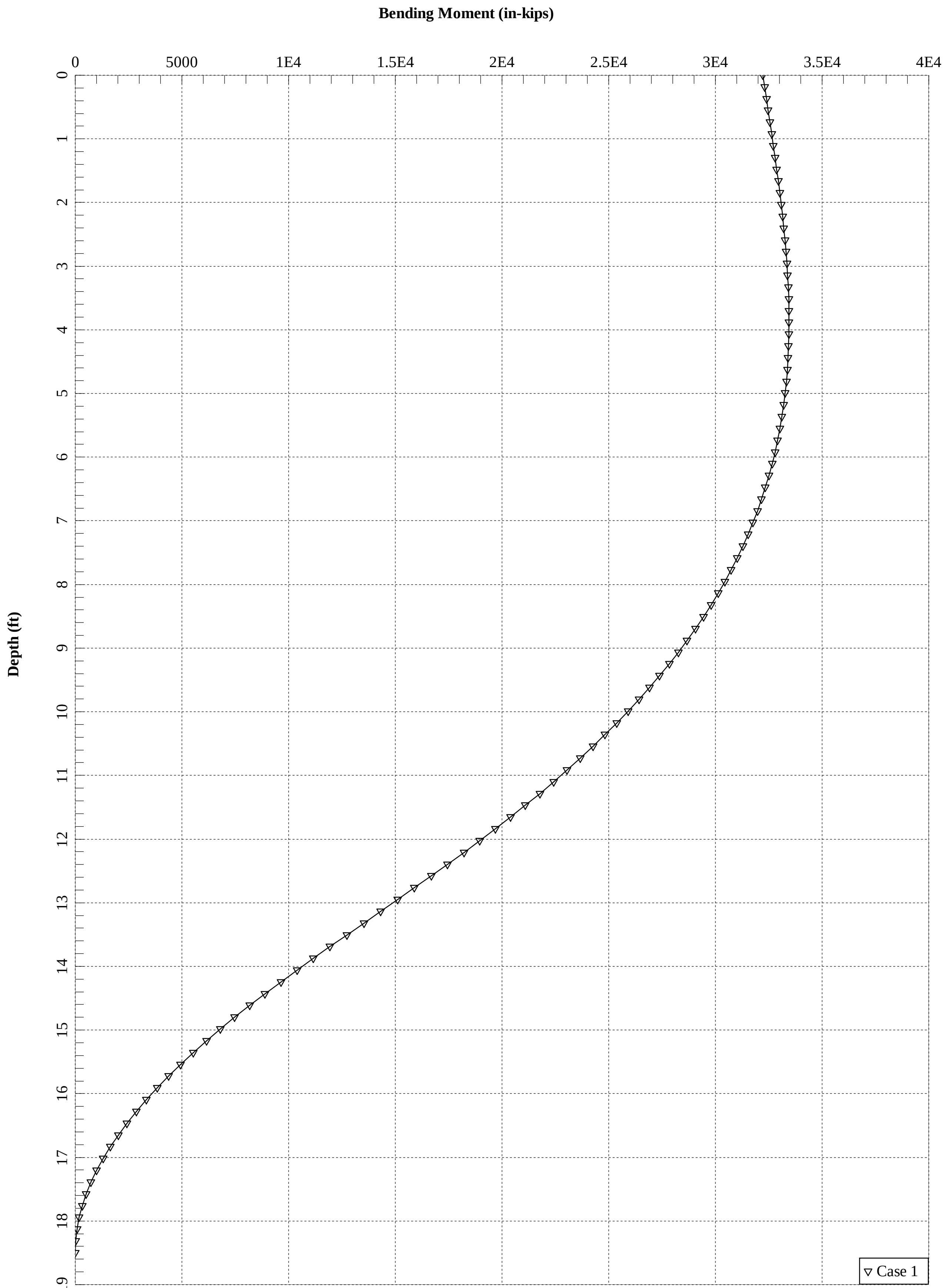
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00185372	3630.00005	538201.65562	1958225.	2.903361E+08
0.00558025	10927.38884	1620148.	1958225.	2.903361E+08
0.00884449	17319.50155	2567874.	1958225.	2.903361E+08
0.01116050	21854.77768	3240297.	1958225.	2.903361E+08
0.01295694	25372.61116	3761868.	1958225.	2.903361E+08
0.01442474	28246.89039	4188023.	1958225.	2.903361E+08
0.01566575	30677.05885	4548332.	1958225.	2.903361E+08
0.01674075	32782.16653	4860445.	1958225.	2.903361E+08
0.01768898	34639.00309	5135749.	1958225.	2.903361E+08
0.01853719	36300.00000	5382016.	1958225.	2.903361E+08

Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00006661	19339.60259	3223200.	2.903361E+08	4.838834E+10
0.00020052	58218.00398	9702799.	2.903361E+08	4.838834E+10
0.00031782	92273.35317	15378572.	2.903361E+08	4.838834E+10
0.00040105	116436.02190	19405598.	2.903297E+08	4.838727E+10
0.00046563	135178.13901	22529201.	2.903129E+08	4.838443E+10
0.00051840	150491.65326	25081371.	2.902975E+08	4.838182E+10
0.00056303	163439.10302	27239200.	2.902849E+08	4.837966E+10
0.00060169	174654.73168	29108396.	2.902745E+08	4.837788E+10
0.00063579	184547.64218	30757145.	2.902659E+08	4.837639E+10
0.00066629	193397.17019	32232000.	2.902586E+08	4.837514E+10

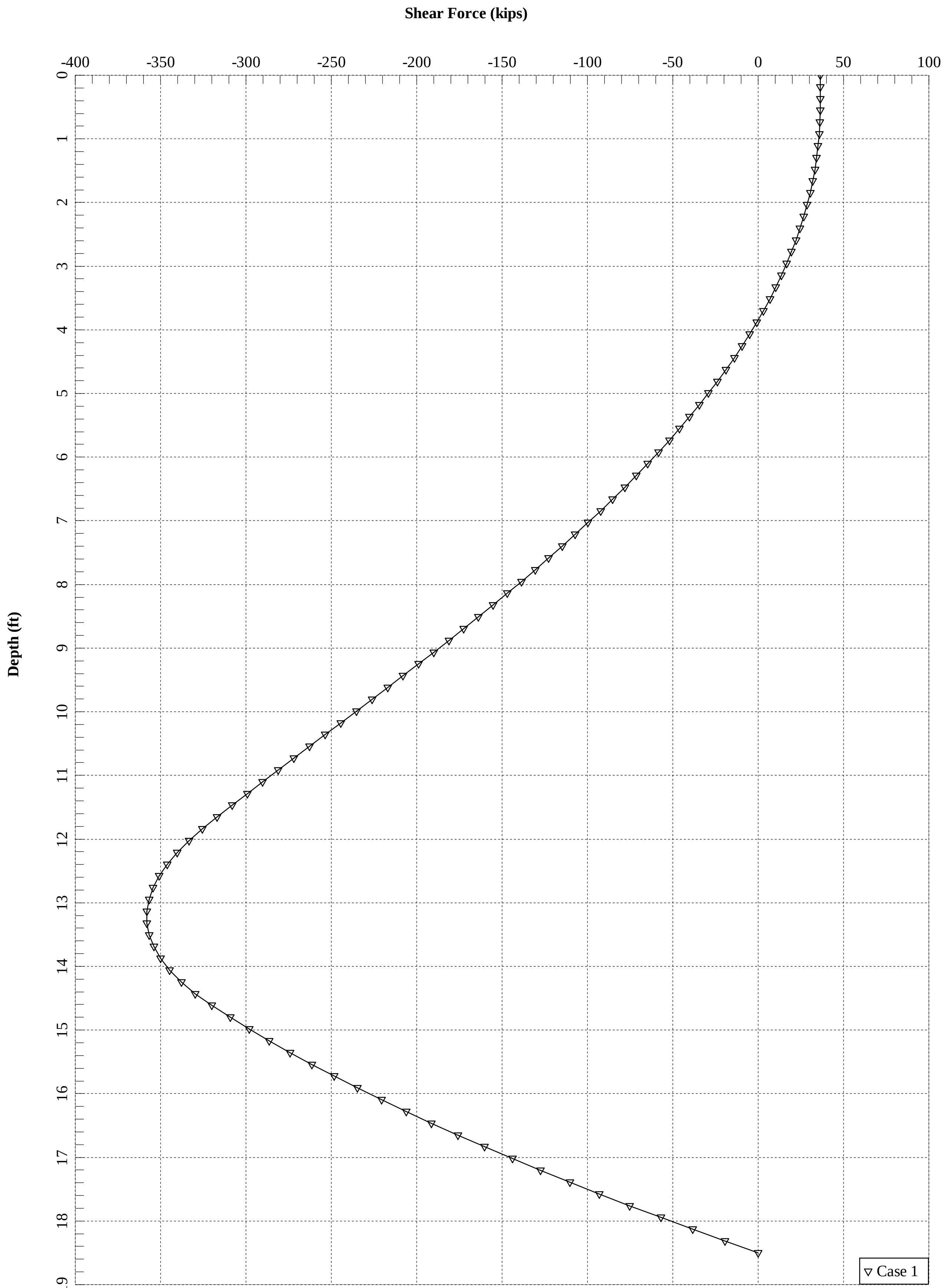
K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)

```
  K32 = abs(Moment Reaction/Top y)
  K33 = abs(Moment Reaction/Top Rotation)



The analysis ended normally.
```


Lateral Deflection (in)
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
3
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
Case 1



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



Shear Force (kips)
-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
Case 1

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Section 1 - Site Information

Site ID: CT11001B
Status: Final
Version: 6
Project Type: L600
Approved: 7/7/2021 9:25:40 AM
Approved By: Alex.Murillo9@T-Mobile.com
Last Modified: 7/7/2021 9:25:40 AM
Last Modified By: Alex.Murillo9@T-Mobile.com

Site Name: Greenwich/ Riverside
Site Class: Utility Lattice Tower
Site Type: Structure Non Building
Plan Year:
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: CL&P

Latitude: 41.03302600
Longitude: -73.56729100
Address: 160 SOUND BEACH ROAD
City, State: Greenwich, CT
Region: NORTHEAST

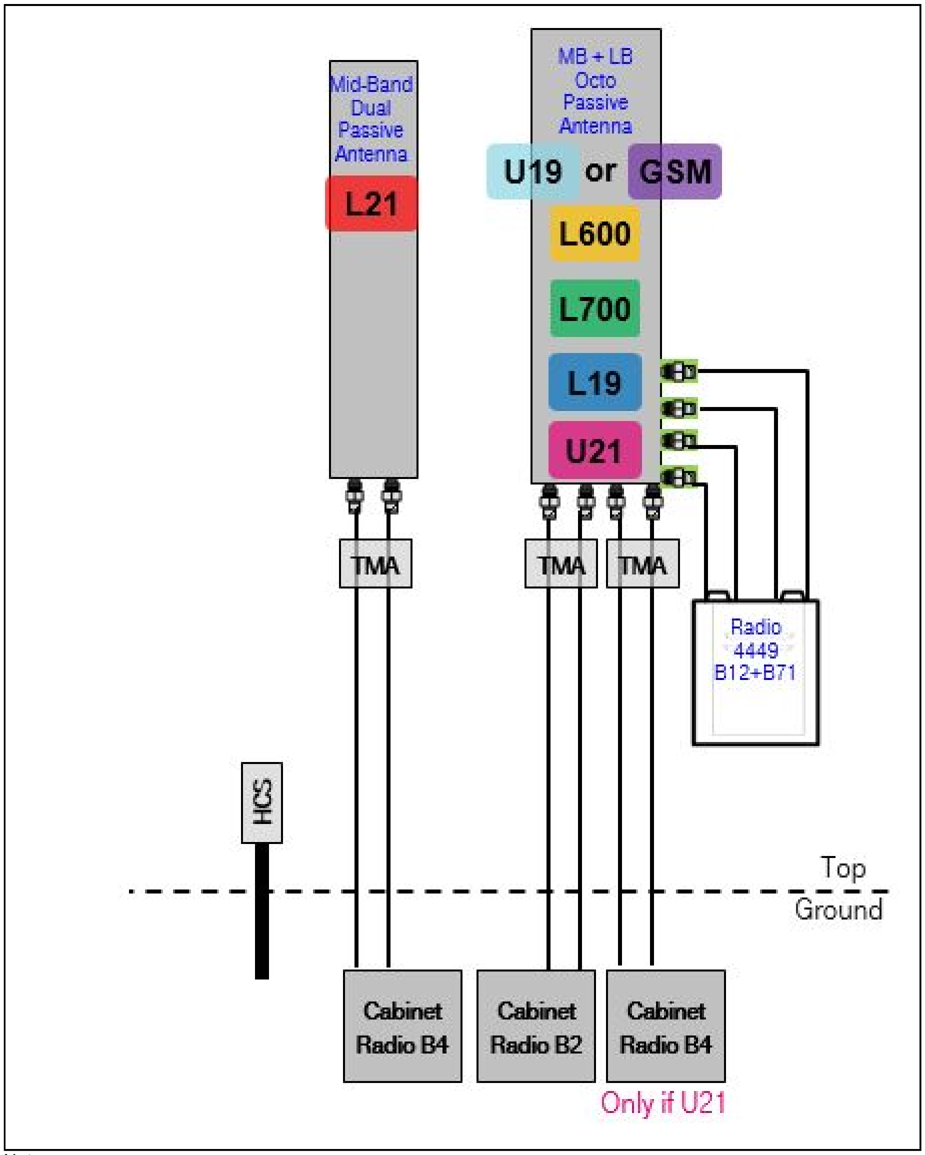
RAN Template: 67D94B Outdoor		AL Template: 67D94B_1DP+1OP		
Sector Count: 3	Antenna Count: 6	Coax Line Count: 24	TMA Count: 0	RRU Count: 3

Section 2 - Existing Template Images

----- This section is intentionally blank. -----

Section 3 - Proposed Template Images

67D94B_1DP+1OP.JPG



Notes:

Section 4 - Siteplan Images

----- This section is intentionally blank. -----

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 94DB Outdoor (evolved from 4B)

Enclosure	1
Enclosure Type	RBS 6102
Baseband	DUW30 (U2100); DUW30 (U1900 (DECOMMISSIONED)); DUG20 (G1900); BB 6630 (L1900, L2100)
Radio	RUS01 B2 **(x 3)** (L1900, G1900); RUS01 B2 **(x 3)** (L1900); RUS01 B4 **(x 3)** (U2100); RUS01 B4 **(x 3)** (L2100)

Proposed RAN Equipment

Template: 67D94B Outdoor

Enclosure	1
Enclosure Type	RBS 6102
Baseband	DUW30 (U2100); DUG20 (G1900); BB 6630 (L2100, L1900); BB 6648 (L700, L600, N600)
Radio	RUS01 B2 **(x 3)** (L1900, G1900); RUS01 B2 **(x 3)** (L1900); RUS01 B4 **(x 3)** (U2100); RUS01 B4 **(x 3)** (L2100)

RAN Scope of Work:

*** RBS6102 at Site ***

Existing: (24) Coaxial Lines

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Section 6 - A&L Equipment

Existing Template:
Proposed Template: 67D94B_1DP+1OP

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro				
Antenna	1	2	3		4
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		EMS - RR90-17-XXDP (Dual)
Azimuth			60		
M. Tilt			0		
Height			110		
Ports	P1		P2	P3	P4
Active Tech.			L1900 G1900	U2100 L2100	
Dark Tech.					
Restricted Tech.					
Decomm. Tech.			U1900		
E. Tilt			6	6	
Cables			1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**	
TMAs					
Diplexers / Combiners					
Radio					
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1	2				3		4
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAALL18_43-U-NA20 (Octo)				RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Empty Antenna Mount (Empty mount)
Azimuth		60				60		
M. Tilt		0				0		
Height		105				105		
Ports		P1	P2	P3	P4	P5	P6	
Active Tech.		L700, L600, N600	L700, L600, N600			L1900, G1900	U2100, L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt		6	6		6	6	6	
Cables		1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**			1-5/8" Coax - 152 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**	
TMAs								
Diplexers / Combiners								
Radio		Radio 4449 B71+B85 (At Cabinet)	SHARED Radio 4449 B71+B85 (At Cabinet)					
Sector Equipment					Andrew Smart Bias T (Ericsson) (At Antenna)		Andrew Smart Bias T (Ericsson) (At Antenna)	

Unconnected Equipment:

Scope of Work:

*** Empty Position 2. Quad in Position 3 ***
Remove unused EMS antennae in Positions 1 and 4.

Add (1) LB/MB Octo in Position 2.
Move lines for PCS (L1900 and GSM) to two Mid-Band Ports of LB/MB Octo.
Add (1) Radio 4449 B71+B12 at ground level.
Use Bias-T for RETs as appropriate and daisy chain if needed.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Sector 2 (Existing) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1	2	3		4
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		EMS - RR90-17-XXDP (Dual)
Azimuth			180		
M. Tilt			0		
Height			110		
Ports	P1		P2	P3	P4
Active Tech.			L1900 G1900	U2100 L2100	
Dark Tech.					
Restricted Tech.					
Decomm. Tech.			U1900		
E. Tilt			3	3	
Cables			1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**	
TMAs					
Diplexers / Combiners					
Radio					
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1	2				3		4
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAALL18_43-U-NA20 (Octo)				RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Empty Antenna Mount (Empty mount)
Azimuth		180				180		
M. Tilt		0				0		
Height		105				105		
Ports		P1	P2	P3	P4	P5	P6	
Active Tech.		L700 L600 N600	L700 L600 N600			L1900 G1900	U2100 L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt		6	6		6	6	6	
Cables		1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**			1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**	
TMAs								
Diplexers / Combiners								
Radio		Radio 4449 B71+B85 (At Cabinet)	SHARED Radio 4449 B71+B85 (At Cabinet)					
Sector Equipment					Andrew Smart Bias T (Ericsson) (At Antenna)		Andrew Smart Bias T (Ericsson) (At Antenna)	

Unconnected Equipment:

Scope of Work:

*** Empty Position 2. Quad in Position 3 ***
Remove unused EMS antennae in Positions 1 and 4.

Add (1) LB/MB Octo in Position 2.
Move lines for PCS (L1900 and GSM) to two Mid-Band Ports of LB/MB Octo.
Add (1) Radio 4449 B71+B12 at ground level.
Use Bias-T for RETs as appropriate and daisy chain if needed.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template: 67D94B Outdoor	A&L Template: 67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro				
Antenna	**1**	**2**	**3**		**4**
Antenna Model	EMS - RR90-17-XXDP (Dual)	Empty Antenna Mount (Empty mount)	RFS - APX16DWV-16DWV-S-E-A20 (Quad)		EMS - RR90-17-XXDP (Dual)
Azimuth			300		
M. Tilt			0		
Height			110		
Ports	**P1**		**P2**	**P3**	**P4**
Active Tech.			L1900 G1900	U2100 L2100	
Dark Tech.					
Restricted Tech.					
Decomm. Tech.			U1900		
E. Tilt			5	5	
Cables			1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**	
TMAs					
Diplexers / Combiners					
Radio					
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template: 67D94B Outdoor	**A&L Template:** 67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1	2				3		4
Antenna Model	Empty Antenna Mount (Empty mount)	RFS - APXVAALL18_43-U-NA20 (Octo)				RFS - APX16DWV-16DWV-S-E-A20 (Quad)		Empty Antenna Mount (Empty mount)
Azimuth		300				300		
M. Tilt		0				0		
Height		105				105		
Ports		P1	P2	P3	P4	P5	P6	
Active Tech.		L700 L600 N600	L700 L600 N600			L1900 G1900	U2100 L2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt		6	6		6	6	6	
Cables		1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**			1-5/8" Coax - 132 ft. **(x2)**	1-5/8" Coax - 132 ft. **(x2)**	
TMAs								
Diplexers / Combiners								
Radio		Radio 4449 B71+B85 (At Cabinet)	SHARED Radio 4449 B71+B85 (At Cabinet)					
Sector Equipment					Andrew Smart Bias T (Ericsson) (At Antenna)		Andrew Smart Bias T (Ericsson) (At Antenna)	

Unconnected Equipment:

Scope of Work:

*** Empty Position 2. Quad in Position 3 ***
Remove unused EMS antennae in Positions 1 and 4.

Add (1) LB/MB Octo in Position 2.
Move lines for PCS (L1900 and GSM) to two Mid-Band Ports of LB/MB Octo.
Add (1) Radio 4449 B71+B12 at ground level.
Use Bias-T for RETs as appropriate and daisy chain if needed.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
67D94B Outdoor	67D94B_1DP+1OP

CT11001B_L600_6

Print Name: Standard (1)
PORs: L600_CMP5

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

RADIO FREQUENCY SYSTEMS

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-894/617-894/1695-2690/1695-2690MHz, 65deg, 15.0/14.6/18.4/18.3dBi, 1.8m (6ft), RET, 2-12°/2-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600, 700, 800, AWS, PCS & BRS applications.

- 24 Inch Width For Easier Zoning
- Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality
- Superior elevation pattern performance across the entire electrical down tilt range
- Includes three AISG RET motors - Includes 0.5m AISG jumper for optional daisy chain of two high band RET motors for one single AISG point of high band tilt control.
- Low band arrays driven by a single RET motor

Technical Features

LOW BAND LEFT ARRAY (617-894 MHZ) [R1]

Frequency Band	MHz	617-698	698-746	746-806	806-894
Gain Typical	dBi	14.3	15.0	14.8	15.0
Gain Over All Tilts	dBi	13.8+/-.5	14.5+/-.5	14.3+/-.5	14.6+/.4
Horizontal Beamwidth @3dB	Deg	65+/-2	64+/-2	66+/-2	62+/-5
Vertical Beamwidth @3dB	Deg	14+/-1	13+/-.9	12+/-.7	11+/-.9
Electrical Downtilt Range	Deg	2 to 12			
Upper Side Lobe Suppression Peak to +20	dB	15	15	15	14
Front-to-Back, at +/-30°, Copolar	dB	22	22	24	27
Cross Polar Discrimination (XPD) @ Boresight	dB	18	18	16	15
Cross Polar Discrimination (XPD) @ +/-60	dB	4	3	7	5
3rd Order PIM 2 x 43dBm	dBc	-153			
VSWR	-	1.5:1			
Cross Polar Isolation	dB	25			
Maximum Effective Power per Port	Watt	400			

RADIO FREQUENCY SYSTEMS

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-894/617-894/1695-2690/1695-2690MHz, 65deg, 15.0/14.6/18.4/18.3dBi, 1.8m (6ft), RET, 2-12°/2-12°/2-12°/2-12°

HIGH BAND RIGHT ARRAY (1695-2690 MHZ) [Y2]

Frequency Band	MHz	1695-1880	1850-1990	1920-2200	2200-2490	2490-2690
Gain Typical	dBi	17.5	17.8	18.3	18.1	17.9
Gain Over All Tilts	dBi	17+/-.5	17.3+/-.5	17.6+/-.7	17.4+/-.7	17.1+/-.8
Horizontal Beamwidth @3dB	Deg	66+/-6	64+/-5	64+/-7	62+/-4	61+/-7
Vertical Beamwidth @3dB	Deg	5.5+/-.3	5.1+/-.2	4.9+/-.3	4.4+/-.3	4+/-.3
Electrical Downtilt Range	Deg	2 to 12				
Upper Side Lobe Suppression Peak to +20	dB	14	16	15	14	13
Front-to-Back, at +/-30°, Copolar	dB	25	23	23	23	20
Cross Polar Discrimination (XPD) @ Boresight	dB	22	17	16	17	17
Cross Polar Discrimination (XPD) @ +/-60	dB	8	8	9	4	1
3rd Order PIM 2 x 43dBm	dBc	-153				
VSWR	-	1.5:1				
Cross Polar Isolation	dB	25				
Maximum Effective Power per Port	Watt	300				

ELECTRICAL SPECIFICATIONS

Impedance	Ohm	50.0
Polarization	Deg	±45°

MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	1829 x 609 x 215 (72 x 24 x 8.5)
Weight (Antenna Only)	kg (lb)	42 (92.6)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	63 (138.9)
Connector type		8 x 4.3-10 female at bottom
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		Direct Ground
Survival/Rated Wind Velocity	km/h	240 (150)
Wind Load @Rated Wind Front	N	1072.0
Wind Load @Rated Wind Side	N	326.0
Wind Load @Rated Wind Rear	N	1160.0

Product Specifications

ATSBT-TOP-FM-4G

Teletilt® Top Smart Bias Tee

- Injects AISG power and control signals onto a coaxial cable line
- Reduces cable and site lease costs by eliminating the need for AISG home run cables
- AISG 1.1 and 2.0 compliant
- Operates at 10-30 Vdc
- Weatherproof AISG connectors
- Intuitive schematics simplify and ensure proper installation
- Enhanced lightning protection plus grounding stud for additional surge protection
- 7-16 DIN female connector (BTS)
- 7-16 DIN male connector (ANT)

General Specifications

Smart Bias Tee Type	10–30 V Top
Brand	Teletilt®
Operating Frequency Band	694 – 2690 MHz

Electrical Specifications

EU Certification	CE
Protocol	AISG 1.1 | AISG 2.0
Antenna Interface Signal	dc Blocked | RF
BTS Interface Signal	AISG data | dc | RF
Interface Protocol Signal	Data | dc
Voltage Range	10–30 Vdc
VSWR | Return Loss	1.17:1 | 22 dB, typical
Power Consumption, maximum	0.6 W
RF Power, maximum	250 W @ 1850 MHz 500 W @ 850 MHz
Impedance	50 ohm
Insertion Loss, typical	0.1 dB
3rd Order IMD	-158.0 dBc (relative to carrier)
3rd Order IMD Test Method	Two +43 dBm carriers
Electromagnetic Compatibility (EMC)	CFR 47 Part 15, Subpart B, Class B | EN 55022, Class B | ICES-003 Issue 4 CAN/CSA-CEI/IEC CISPR 22:02

Mechanical Specifications

Antenna Interface	7-16 DIN Male
BTS Interface	7-16 DIN Female
AISG Input Connector	8-pin DIN Female
Color	Silver
Grounding Lug Thread Size	M8
Material Type	Aluminum
Lightning Surge Capability	5 times @ -3 kA 5 times @ 3 kA

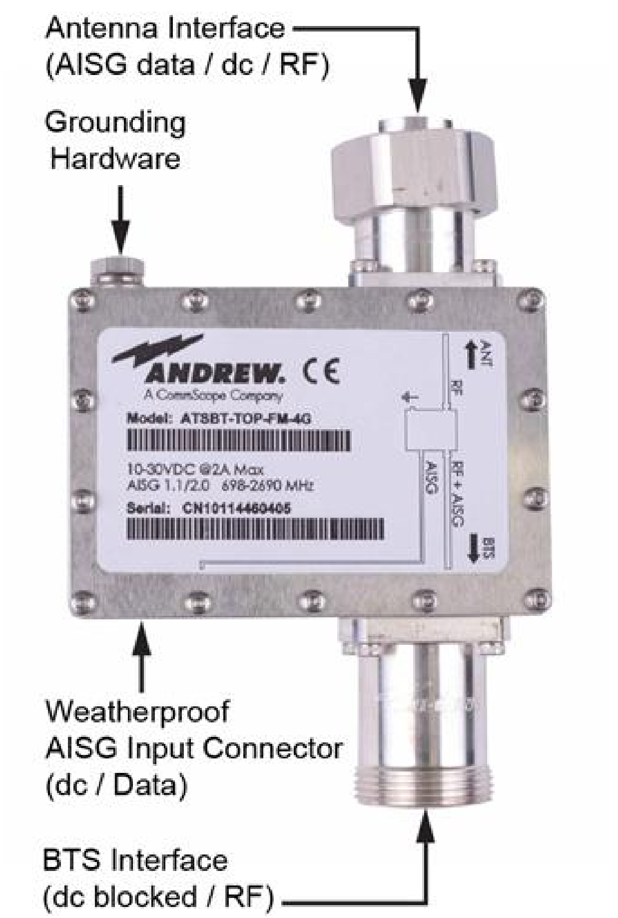
Product Specifications

Lightning Surge Capability Test Method	IEC 61000-4-5, Level X
Lightning Surge Capability Waveform	1.2/50 voltage and 8/20 current combination waveform

Environmental Specifications

Ingress Protection Test Method	IEC 60529:2001, IP66
Operating Temperature	-40 °C to +70 °C (-40 °F to +158 °F)

Interface Port Drawing



Dimensions

Width	94.0 mm | 3.7 in
Depth	50.0 mm | 2.0 in
Height	143.00 mm | 5.63 in
Net Weight	0.8 kg | 1.8 lb

Regulatory Compliance/Certifications

Agency	Classification
RoHS 2011/65/EU	Compliant by Exemption

Exhibit E

Mount Analysis

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

Site Ref: CT11001B

Eversource Structure No. 1256
95' Electric Transmission Lattice Tower

160 Sound Beach Road
Greenwich, CT

Centek Project No. 21051.03

Date: July 8, 2021

Max Stress Ratio = 12.4%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

July 8, 2021

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main Street, Building 4
Sturbridge, MA 01566

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CT11001B
160 Sound Beach Road
Greenwich, CT 06870

Centek Project No. 21051.03

Dear Mr. Freincle,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the proposed mount, consisting two (2) monopole double support arm kits (SitePro P/N RDS-284) spaced 4' apart vertically to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- <u>T-Mobile:</u>
  Three (3) RFS APXVAALL18_43 panel antennas, three (3) RFS APX16DWV-16DWV-S-E-A20 panel antennas and six (6) Andrew ATSBT-TOP-FF-4G Bias-Tees mounted on the proposed mount with a RAD center elevation of 105-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 93 mph for Greenwich as required in Appendix N of the 2018 Connecticut State Building Code.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration.

If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

Prepared by:

Fernando J. Palacios
Engineer

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

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

Wind Speeds

Basic Wind Speed	$V := 93$	mph	(User Input - 2018 CSBC Appendix N)
Basic Wind Speed with Ice	$V_i := 50$	mph	(User Input per Annex B of TIA-222-G)

Input

Structure Type =	Structure_Type := Pole		(User Input)
Structure Category =	SC := III		(User Input)
Exposure Category =	Exp := C		(User Input)
Structure Height =	$h := 95$	ft	(User Input)
Height to Center of Antennas =	$z := 105$	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)
Topographic Factor =	$K_{zt} := 1.0$		(User Input)
	$K_a := 1.0$		(User Input)
Gust Response Factor =	$G_H = 1.1$		(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)

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

Importance Factors =

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

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

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

$$K_{iz} := \left(\frac{z}{33}\right)^{0.1} = 1.123$$

Velocity Pressure Coefficient Antennas =

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 2.105$$

$$Kz := 2.01 \cdot \left(\left(\frac{z}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.279$$

Velocity Pressure w/o Ice Antennas = $qz := 0.00256 \cdot K_d \cdot Kz \cdot V^2 \cdot I_{Wind} = 31$ psf

Velocity Pressure with Ice Antennas = $qz_{ice} := 0.00256 \cdot K_d \cdot Kz \cdot V_i^2 \cdot I_{Wind} = 9$ psf

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model = RFS - APXVAARR18_43-U-NA20

Antenna Shape = Flat (User Input)

Antenna Height = $L_{ant} := 72.0$ in (User Input)

Antenna Width = $W_{ant} := 24.0$ in (User Input)

Antenna Thickness = $T_{ant} := 8.5$ in (User Input)

Antenna Weight = $WT_{ant} := 131.3$ lbs (User Input)

Number of Antennas = $N_{ant} := 1$ (User Input)

Antenna Aspect Ratio = $Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 3.0$

Antenna Force Coefficient = $Ca_{ant} = 1.22$

Wind Load (without ice)

Surface Area for One Antenna = $SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 12$ sf

Total Antenna Wind Force Front = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 499$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 4.3$ sf

Total Antenna Wind Force Side = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 177$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 14.9$ sf

Total Antenna Wind Force w/ Ice Front = $Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 179$ lbs

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

Total Antenna Wind Force w/ Ice Side = $Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 81$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 131$ lbs

Gravity Loads (ice only)

Volume of Each Antenna = $V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 1 \cdot 10^4$ cu in

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

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 410$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 410$ lbs

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS-APX16DWV-16DWV-S-E-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13.0$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 41.8$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

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

Total Antenna Wind Force Front = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 220$ lbs

Surface Area for One Antenna = $SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$ sf

Total Antenna Wind Force Side = $F_{ant} := qz \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 53$ lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice = $SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 7.2$ sf

Total Antenna Wind Force w/ Ice Front = $Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 90$ lbs

Surface Area for One Antenna w/ Ice = $SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3.1$ sf

Total Antenna Wind Force w/ Ice Side = $Fi_{ant} := qz_{ice} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 39$ lbs

Gravity Load (without ice)

Weight of All Antennas = $WT_{ant} \cdot N_{ant} = 42$ lbs

Gravity Loads (ice only)

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

Volume of Ice on Each Antenna = $V_{ice} := (L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5325$ cu in

Weight of Ice on Each Antenna = $W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 173$ lbs

Weight of Ice on All Antennas = $W_{ICEant} \cdot N_{ant} = 173$ lbs

Development of Wind & Ice Load on Equipment

Equipment Data:

Equipment Model =	Andrew ATSBT-TOP-FF-4G		
Equipment Shape =	Flat		(User Input)
Equipment Height =	$L_{EQ} := 5.6$	in	(User Input)
Equipment Width =	$W_{EQ} := 3.7$	in	(User Input)
Equipment Thickness =	$T_{EQ} := 2.0$	in	(User Input)
Equipment Weight =	$WT_{EQ} := 1.7$	lbs	(User Input)
Number of Equipment 's=	$N_{EQ} := 1$		
Equipment Aspect Ratio =	$Ar_{EQ} := \frac{L_{EQ}}{W_{EQ}} = 1.5$		
Equipment Force Coefficient =	$Ca_{EQ} = 1.2$		

Wind Load (without ice)

Surface Area for One Equipment =	$SA_{EQF} := \frac{L_{EQ} \cdot W_{EQ}}{144} = 0.1$	sf
Total Equipment Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{EQ} \cdot K_a \cdot SA_{EQF} = 6$	lbs
Surface Area for One Equipment =	$SA_{EQS} := \frac{L_{EQ} \cdot T_{EQ}}{144} = 7.8 \cdot 10^{-2}$	sf
Total Equipment Wind Force =	$F_{RRUS} := qz \cdot G_H \cdot Ca_{EQ} \cdot K_a \cdot SA_{EQS} = 3$	lbs

Wind Load (with ice)

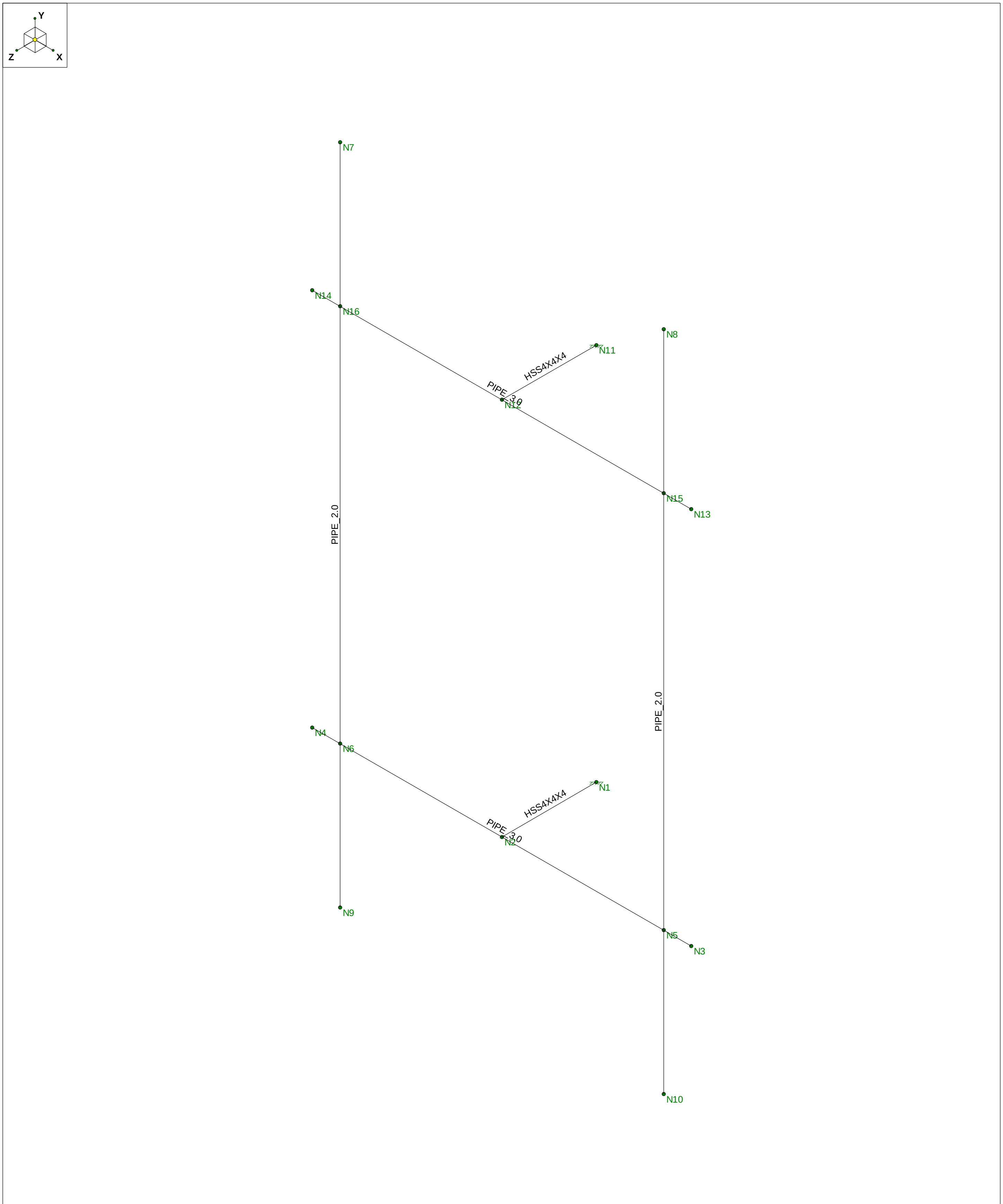
Surface Area for One Equipment w/ Ice =	$SA_{ICEEQF} := \frac{(L_{EQ} + 2 \cdot t_{iz}) \cdot (W_{EQ} + 2 \cdot t_{iz})}{144} = 0.5$	sf
Total Equipment Wind Force w/ Ice =	$Fi_{EQF} := qz_{ice} \cdot G_H \cdot Ca_{EQ} \cdot K_a \cdot SA_{ICEEQF} = 6$	lbs
Surface Area for One Equipment w/ Ice =	$SA_{ICEEQS} := \frac{(L_{EQ} + 2 \cdot t_{iz}) \cdot (T_{EQ} + 2 \cdot t_{iz})}{144} = 0.4$	sf
Total Equipment Wind Force w/ Ice =	$Fi_{EQS} := qz_{ice} \cdot G_H \cdot Ca_{EQ} \cdot K_a \cdot SA_{ICEEQS} = 5$	lbs

Gravity Load (without ice)

Weight of All Equipment 's=	$WT_{EQ} \cdot N_{EQ} = 2$	lbs

Gravity Loads (ice only)

Volume of Each Equipment =	$V_{EQ} := L_{EQ} \cdot W_{EQ} \cdot T_{EQ} = 41$	cu in
Volume of Ice on Each Equipment =	$V_{ice} := (L_{EQ} + 2 \cdot t_{iz}) \cdot (W_{EQ} + 2 \cdot t_{iz}) \cdot (T_{EQ} + 2 \cdot t_{iz}) - V_{EQ} = 440$	cu in
Weight of Ice on Each Equipment =	$W_{ICEEQS} := \frac{V_{ice}}{1728} \cdot Id = 14$	lbs
Weight of Ice on All Equipment 's=	$W_{ICEEQS} \cdot N_{EQ} = 14$	lbs



Envelope Only Solution

Centek Engineering Inc.		
FJP	CT11001B - AMA	July 8, 2021 at 3:47 PM
21051.03	Member Framing	CT11001B_AMA.R3D

(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?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: 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	Exact Integration
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	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	.145
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#6
Footing Top Bar Cover (in)	1.5
Footing Bottom Bar	#6
Footing Bottom Bar Cover (in)	3
Pedestal Bar	#6
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#4

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Horz_Pipe 3.0 STD	PIPE_3.0	Beam	None	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	Outrigger	HSS4X4X4	Beam	None	A500 Gr.B ...	Typical	3.37	7.8	7.8	12.8
3	Antenna Mast	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	Outrigger	1			Lbyy						Lateral
2	M2	Outrigger	1			Lbyy						Lateral
3	M3	Horz_Pipe 3.0 STD	4			Lbyy						Lateral
4	M4	Horz_Pipe 3.0 STD	4			Lbyy						Lateral
5	PS.2	Antenna Mast	7									Lateral
6	PS.1	Antenna Mast	7									Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design R...
1	M1	N11	N12			Outrigger	Beam	None	A500 Gr.B Rect	Typical
2	M2	N1	N2			Outrigger	Beam	None	A500 Gr.B Rect	Typical
3	M3	N14	N13			Horz_Pipe 3.0 STD	Beam	None	A53 Gr.B	Typical
4	M4	N4	N3			Horz_Pipe 3.0 STD	Beam	None	A53 Gr.B	Typical
5	PS.2	N10	N8			Antenna Mast	Column	Pipe	A53 Gr.B	Typical
6	PS.1	N9	N7			Antenna Mast	Column	Pipe	A53 Gr.B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N9	0.291667	-3.5	1	0	
2	N10	3.708333	-3.5	1	0	
3	N4	0	-2	1	0	
4	N6	0.291667	-2	1	0	
5	N1	2	-2	0	0	
6	N2	2	-2	1	0	
7	N5	3.708333	-2	1	0	
8	N3	4	-2	1	0	
9	N14	0	2	1	0	
10	N16	0.291667	2	1	0	
11	N11	2	2	0	0	
12	N12	2	2	1	0	
13	N15	3.708333	2	1	0	
14	N13	4	2	1	0	
15	N8	3.708333	3.5	1	0	
16	N7	0.291667	3.5	1	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	N11	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	Y	-.066	1.083
2	PS.1	Y	-.066	5.917
3	PS.2	Y	-.021	.5
4	PS.2	Y	-.021	6.5
5	PS.2	Y	-.002	3.5
6	PS.1	Y	-.002	%50

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	Y	-.205	1.083
2	PS.1	Y	-.205	5.917
3	PS.2	Y	-.087	.5
4	PS.2	Y	-.087	6.5
5	PS.2	Y	-.014	3.5
6	PS.1	Y	-.014	%50

Member Point Loads (BLC 4 : (x) TIA Wind with Ice (9 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	X	.041	1.083
2	PS.1	X	.041	5.917
3	PS.2	X	.02	.5
4	PS.2	X	.02	6.5
5	PS.2	X	.005	3.5
6	PS.1	X	.005	%50

Member Point Loads (BLC 5 : (x) TIA Wind (31 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	X	.089	1.083
2	PS.1	X	.089	5.917
3	PS.2	X	.027	.5
4	PS.2	X	.027	6.5
5	PS.2	X	.003	3.5
6	PS.1	X	.003	%50

Member Point Loads (BLC 6 : (z) TIA Wind with Ice (9 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	Z	.09	1.083
2	PS.1	Z	.09	5.917
3	PS.2	Z	.045	.5
4	PS.2	Z	.045	6.5
5	PS.2	Z	.006	3.5
6	PS.1	Z	.006	%50

Member Point Loads (BLC 7 : (z) TIA Wind (31 psf))

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	PS.1	Z	.25	1.083
2	PS.1	Z	.25	5.917
3	PS.2	Z	.11	.5
4	PS.2	Z	.11	6.5
5	PS.2	Z	.006	3.5
6	PS.1	Z	.006	%50

Member Distributed Loads (BLC 4 : (x) TIA Wind with Ice (9 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	PS.1	X	.002	.002	0	0
2	PS.2	X	.002	.002	0	0
3	M1	X	.003	.003	0	0
4	M2	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : (x) TIA Wind (31 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	PS.1	X	.007	.007	0	0
2	PS.2	X	.007	.007	0	0
3	M1	X	.009	.009	0	0
4	M2	X	.009	.009	0	0

Member Distributed Loads (BLC 6 : (z) TIA Wind with Ice (9 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M3	Z	.003	.003	1.292	3.167
2	M4	Z	.003	.003	1.292	3.167

Member Distributed Loads (BLC 7 : (z) TIA Wind (31 psf))

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/f...	Start Location[ft,%]	End Location[ft,%]
1	M3	Z	.009	.009	1.292	3.167
2	M4	Z	.009	.009	1.292	3.167

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Dead Load	None					6			
3	Ice Load	None					6			
4	(x) TIA Wind with Ice (9 psf)	None					6	4		
5	(x) TIA Wind (31 psf)	None					6	4		
6	(z) TIA Wind with Ice (9 psf)	None					6	2		
7	(z) TIA Wind (31 psf)	None					6	2		

Load Combinations

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6																
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1														

Load Combinations (Continued)

	Description	Solve	P...	S...	B...	Fa...	BLC	Fact...	BLC	Fa...	BLC	Fa...	BLC	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
4	1.2D + 1.6W (Z-dire...	Yes	Y		1	1.2	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-dire...	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	6	1														

Envelope Joint Reactions

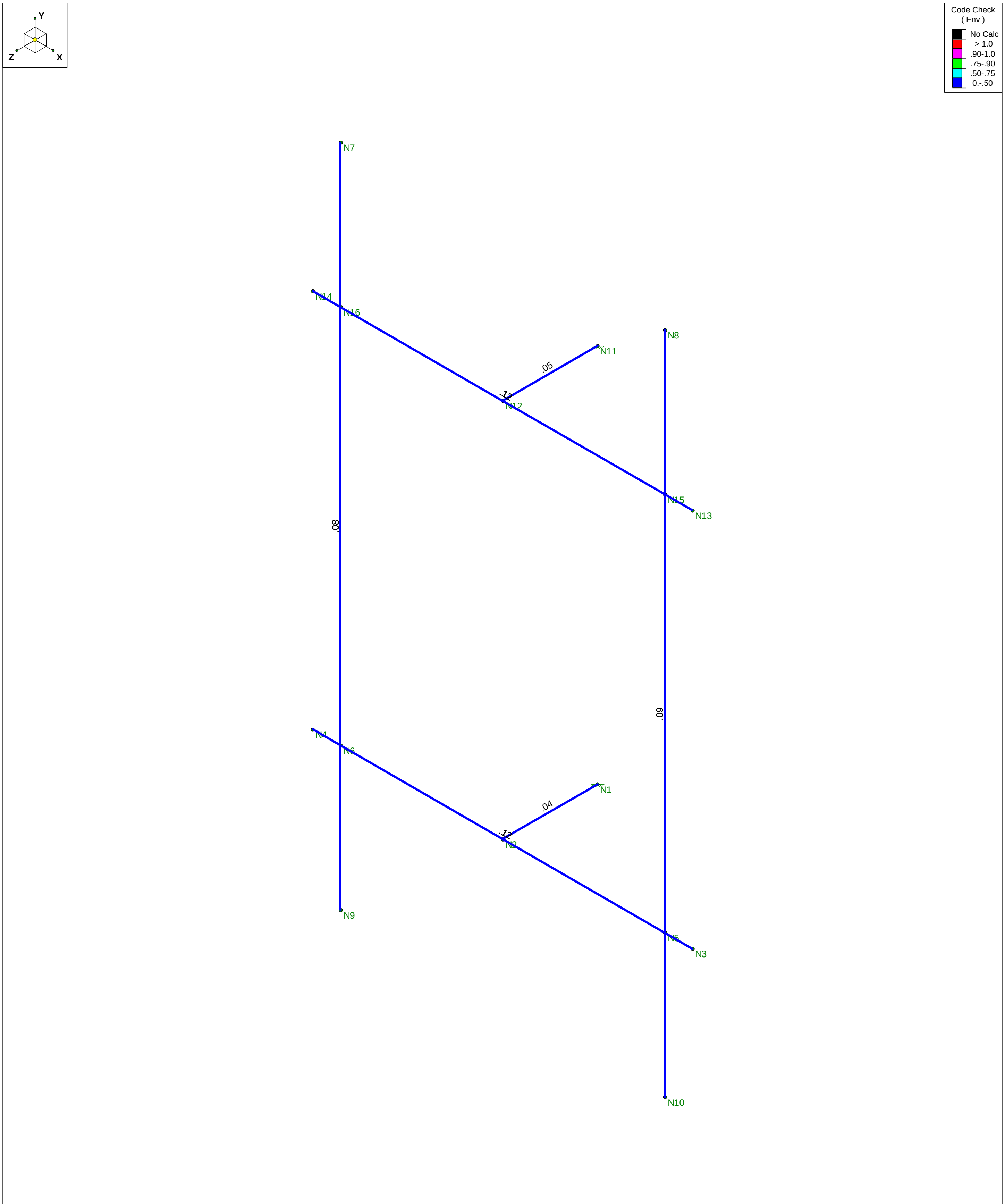
	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	-.011	5	.502	6	.015	3	.086	5	-.118	6	-.034	2
2		min	-.302	1	.128	2	-.609	5	-.456	3	-.39	4	-.203	6
3	N11	max	.045	6	.489	3	-.004	2	-.135	2	-.033	6	-.048	5
4		min	-.277	2	.087	5	-.618	4	-.502	6	-.366	5	-.208	3
5	Totals:	max	0	6	.981	6	0	3						
6		min	-.575	1	.277	2	-1.225	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotation [rad]	LC
1	N9	max	.016	3	-.004	5	.042	5	1.069e-04	3	1.585e-03	5	8.388e-04	3
2		min	.006	5	-.016	3	-.001	3	-9.963e-04	5	2.472e-05	3	2.576e-04	5
3	N10	max	.005	2	0	5	.027	5	1.155e-04	3	1.215e-04	1	2.795e-04	2
4		min	-.003	6	-.003	6	-.003	3	-1.552e-03	5	-2.751e-04	5	-1.73e-04	6
5	N4	max	.002	4	-.005	5	.03	5	1.071e-04	3	1.585e-03	5	7.928e-04	3
6		min	0	3	-.019	3	0	3	-6.53e-04	5	2.472e-05	3	2.536e-04	2
7	N6	max	.002	4	-.004	5	.025	5	1.071e-04	3	1.585e-03	5	7.927e-04	3
8		min	0	3	-.016	3	0	3	-6.53e-04	5	2.472e-05	3	2.535e-04	2
9	N1	max	0	6	0	6	0	6	0	6	0	6	0	6
10		min	0	1	0	1	0	1	0	1	0	1	0	1
11	N2	max	.002	4	0	5	0	5	1.686e-04	3	3.045e-04	4	2.05e-04	6
12		min	0	3	-.002	3	0	3	-1.427e-04	5	4.838e-05	3	3.393e-05	2
13	N5	max	.002	4	0	5	.002	5	1.155e-04	3	1.215e-04	1	-2.566e-07	2
14		min	0	3	-.003	6	-.002	1	-6.813e-04	5	-2.751e-04	5	-1.731e-04	6
15	N3	max	.002	4	0	2	.003	5	1.155e-04	3	1.215e-04	1	-3.137e-07	2
16		min	0	3	-.004	6	-.003	1	-6.813e-04	5	-2.751e-04	5	-1.731e-04	6
17	N14	max	.002	5	-.004	2	.03	4	7.214e-04	4	1.591e-03	4	7.612e-04	6
18		min	0	3	-.018	6	0	3	3.254e-05	2	4.076e-05	3	1.2e-04	5
19	N16	max	.002	5	-.004	2	.025	4	7.214e-04	4	1.591e-03	4	7.611e-04	6
20		min	0	3	-.016	6	0	3	3.254e-05	2	4.076e-05	3	1.2e-04	5
21	N11	max	0	6	0	6	0	6	0	6	0	6	0	6
22		min	0	1	0	1	0	1	0	1	0	1	0	1
23	N12	max	.002	5	0	2	0	4	2.495e-04	4	2.959e-04	5	2.098e-04	3
24		min	0	3	-.002	6	0	2	4.974e-05	2	1.709e-05	3	4.827e-05	5
25	N15	max	.002	5	0	2	.002	4	7.542e-04	4	1.024e-04	2	2.593e-05	5
26		min	0	3	-.003	3	-.002	2	3.452e-05	2	-2.943e-04	4	-1.773e-04	3
27	N13	max	.002	5	0	5	.003	4	7.542e-04	4	1.024e-04	2	2.587e-05	5
28		min	0	3	-.004	3	-.002	2	3.452e-05	2	-2.943e-04	4	-1.774e-04	3
29	N8	max	.007	1	0	2	.029	4	1.626e-03	4	1.024e-04	2	2.593e-05	5
30		min	.001	5	-.003	3	-.002	2	3.453e-05	2	-2.943e-04	4	-3.798e-04	1
31	N7	max	.002	2	-.004	2	.043	4	1.066e-03	4	1.591e-03	4	7.624e-04	6
32		min	-.014	6	-.016	6	.003	3	3.256e-05	2	4.076e-05	3	-6.399e-05	2

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	Dir	...	phi*...	phi*...	phi*...	phi*...	Cb	Eqn
1	M1	HSS4X4X4	.048	0	4	.028	0	y	3	138....	139....	16.181	16.181	1.1...	H1-...
2	M2	HSS4X4X4	.042	1	4	.028	0	y	6	138....	139....	16.181	16.181	1.4...	H1-...
3	M3	PIPE_3.0	.123	2	4	.047	2		4	59.853	65.205	5.749	5.749	1.6...	H1-...
4	M4	PIPE_3.0	.124	2	4	.050	2		4	59.853	65.205	5.749	5.749	1.5...	H1-...
5	PS.2	PIPE_2.0	.091	5....	4	.018	5....		4	17.855	32.13	1.872	1.872	1.6...	H1-...
6	PS.1	PIPE_2.0	.083	5....	4	.042	5....		4	17.855	32.13	1.872	1.872	1.62	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering Inc.		SK - 1
FJP	CT11001B - AMA	July 8, 2021 at 3:46 PM
21051.03	Unity Check	CT11001B_AMA.R3D

Existing Connection to Host Structure

Bolts Grade	A325	(User Input)
Number of Bolts =	$n_b := 4$	(User Input)
Bolt Diameter =	$d\phi := \frac{5}{8}\ in$	(User Input)
Nominal Tensile Strength=	$F_{nt} := 90\ ksi$	(User Input)
Nominal Shear Strength=	$F_{nv} := 54\ ksi$	(User Input)
Safety Factor=	$\phi := 0.75$	(User Input)
Horizontal Spacing Between Bolts=	$S := 6.0\ in$	(User Input)

Reactions at Connection:

Shear X =	$Shear_x := .275 \cdot kip$	(User Input)
Vertical=	$Vertical := .482\ kip$	(User Input)
Shear Z =	$Shear_z := .613 \cdot kip$	(User Input)
Moment X=	$M_X := .496 \cdot kip \cdot ft$	(User Input)
Moment Y=	$M_Y := .358 \cdot kip \cdot ft$	(User Input)
Moment Z=	$M_Z := .199\ kip \cdot ft$	(User Input)

Anchor Check:

Bolt Area= $a_b := \pi \cdot \left(\frac{d\phi}{2}\right)^2 = 0.307\ in^2$

Allowable Shear Strength= $R_{nv} := F_{nv} \cdot a_b \cdot \phi = 12.425\ kip$

Shear Stress per Bolt= $V_{act} := \frac{\sqrt{Shear_x^2 + Vertical^2}}{n_b} + \frac{M_Z}{S \cdot \frac{n_b}{2}} = 0.338\ kip$

Condition1 := if $(V_{act} \le R_{nv}$, "OK", "Overstressed") = "OK" $\frac{V_{act}}{R_{nv}} = 2.7\%$

Condition1 = "OK"

$f_v := \frac{V_{act}}{a_b} = 1.101\ ksi$

Tensile Stress Adjusted for Shear= $F'_{nt} :=$ if $\left(1.3\ F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v\right) \le F_{nt}$ then $1.3\ F_{nt} - \frac{F_{nt}}{\phi \cdot F_{nv}} \cdot f_v$, else F_{nt} $= 90\ ksi$

Allowable Tensile Strength= $R_{nt} := F'_{nt} \cdot a_b \cdot \phi = 20.709\ kip$

Tension Force Each Bolt= $T_{act} := \frac{Shear_z}{n_b} + \frac{M_Y}{S \cdot \frac{n_b}{2}} + \frac{M_X}{S \cdot \frac{n_b}{2}} = 1.007\ kip$

Tension Stress Each Bolt= $f_t := \frac{T_{act}}{a_b} = 3.283\ ksi$

Condition2 := if $(f_t \le F'_{nt} \cdot \phi$, "OK", "Overstressed") = "OK" $\frac{T_{act}}{R_{nt}} = 4.9\%$

Condition2 = "OK"

Exhibit F

Power Density/RF Emissions Report

INFINIGY

Non-Ionizing Radiation Report

Compiled For: Northeast Site Solutions on behalf of T-Mobile

Site Name: CT11001B

Site ID: CT11001B

160 Sound Beach Road, Greenwich, CT 06870

Latitude: 41.033026; Longitude: -73.567291

Structure Type: Utility Lattice Tower

Report Date: July 9, 2021

Report Written By: Tim Harris

Status: T-Mobile will be compliant with FCC rules on RF Exposure.

Table of Contents

1. Executive Summary:

Northeast Site Solutions on behalf of T-Mobile has contracted Infinigy Solutions, LLC to determine whether the site CT11001B located at 160 Sound Beach Road in Greenwich, CT Will Be Compliant with all Federal Communications Commission (FCC) rules and regulations for radio frequency (RF) exposure as indicated in **47CFR§1.1310**.

The report incorporates a theoretical RF field analysis in accordance with the FCC Rules and Regulations for all individuals classified as "Occupational or Controlled" and "General Public or Uncontrolled" (see Appendix A and B).

This document and the conclusions herein are based on information provided by Northeast Site Solutions on behalf of T-Mobile.

As a result of the analysis, **T-Mobile Will Be Compliant with FCC rules.**

T-Mobile, All Bands Cumulative Exposure %		
Uncontrolled / General Population	Exposure values at the site (mW/cm^2)	0.0205
	% Exposure	2.82 %
Controlled / Occupational	Exposure values at the site (mW/cm^2)	0.0205
	% Exposure	0.57 %

2. Site Summary:

Site Information	
Site Name: CT11001B	
Site Address: 160 Sound Beach Road, Greenwich, CT 06870	
Site Type: Utility Lattice Tower	
Compliance Status	Will Be Compliant
Mitigation Required	No
Signage Required	Yes
Barriers Required	No
Access Locked	No
Area Controlled or Uncontrolled	Uncontrolled

3. Site Compliance

This report also incorporates overview of the site information:

- Antenna Inventory Table
- Calculation Tables showing exposure for each carrier transmit frequency
- Total exposure for all carriers existing and proposed at ground level considering the centerline of all antennas and horizontal distance from the tower.
- Maximum Effective Radiated Power Assumed as Worst Case for Calculations used in this study
- Calculations based on flat ground around base of the structure

4. Site Compliance Recommendations

Infinigy recommends the following upon the installation of antennas at the site:

Base of tower

Install an RF caution sign. Note: The recommendation for alerting signage is moot if there is an RF caution, or greater already installed.

5. Antenna Inventory Table

Ant ID	Sector	Azimuth	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
1	Alpha		Empty						
2a	Alpha	60	T-Mobile	RFS	APXVAARR18_N43-U-NA20	700 MHz LTE	105	60	2256
2b	Alpha	60	T-Mobile	RFS	APXVAARR18_N43-U-NA20	600 MHz LTE	105	60	1128
2c	Alpha	60	T-Mobile	RFS	APXVAARR18_N43-U-NA20	600 MHz 5G	105	60	1128
3a	Alpha	60	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	1900 MHz LTE	105	60	3052
3b	Alpha	60	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	1900 MHz GSM	105	60	3052
3c	Alpha	60	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	2100 MHz UMTS	105	60	2154
3d	Alpha	60	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	2100 MHz LTE	105	60	2154
4	Alpha		Empty						
5	Beta		Empty						
6a	Beta	180	T-Mobile	RFS	APXVAARR18_N43-U-NA20	700 MHz LTE	105	180	2256
6b	Beta	180	T-Mobile	RFS	APXVAARR18_N43-U-NA20	600 MHz LTE	105	180	1128
6c	Beta	180	T-Mobile	RFS	APXVAARR18_N43-U-NA20	600 MHz 5G	105	180	1128
7a	Beta	180	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	1900 MHz LTE	105	180	3052
7b	Beta	180	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	1900 MHz GSM	105	180	3052
7c	Beta	180	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	2100 MHz UMTS	105	180	2154
7d	Beta	180	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	2100 MHz LTE	105	180	2154
8	Beta		Empty						
9	Gamma		Empty						
10a	Gamma	300	T-Mobile	RFS	APXVAARR18_N43-U-NA20	700 MHz LTE	105	300	2256
10b	Gamma	300	T-Mobile	RFS	APXVAARR18_N43-U-NA20	600 MHz LTE	105	300	1128
10c	Gamma	300	T-Mobile	RFS	APXVAARR18_N43-U-NA20	600 MHz 5G	105	300	1128
11a	Gamma	300	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	1900 MHz LTE	105	300	3052
11b	Gamma	300	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	1900 MHz GSM	105	300	3052

Ant ID	Sector	Azimuth	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
11c	Gamma	300	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	2100 MHz UMTS	105	300	2154
11d	Gamma	300	T-Mobile	RFS	APX16DW-16DWV-S-E-A20	2100 MHz LTE	105	300	2154
12	Gamma		Empty						

6. RF Guidelines

To ensure safety of company workers, the following points need to be taken into consideration and implemented at wireless sites in accordance with the Carriers policies:

a) Worksite: Any employee at the site should avoid working directly in front of the antenna or in areas predicted to exceed general population exposure limits by 100%. Workers should insist that the transmitters be switched off during the work period.

b) RF Safety Training and Awareness: All employees working in areas exceeding the general population limits should have a basic awareness of RF safety measures. Videos, classroom lectures and online courses are all appropriate training methods on these topics.

c) Site Access: Restricting access to transmitting antenna locations is one of the most important elements of RF safety. This can be done with:
   - Locked doors/gates/ladder access
   - Alarmed doors
   - Restrictive barriers

d) Three-foot Buffer: There is an inverse relationship between the strength of the field and the distance from the antenna. The RF field diminishes with distance from the antenna. Workers should maintain a three-foot distance from the antennas.

e) Antennas: Workers should always assume that the antenna is transmitting and should never stop right in front of the antenna. If someone must pass by an antenna, he/she should move quickly, thus reducing RF exposure.

7. T-Mobile Exposure Analysis By Band and Technology

T-Mobile 600 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	0.4
	Exposure values at the site (mW/cm^2)	0.0015
	% Exposure	0.39%
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	2.0
	Exposure values at the site (mW/cm^2)	0.0015
	% Exposure	0.08%

T-Mobile 600 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	0.4
	Exposure values at the site (mW/cm^2)	0.0015
	% Exposure	0.39%
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	2.0
	Exposure values at the site (mW/cm^2)	0.0015
	% Exposure	0.08%

T-Mobile 700 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	0.5
	Exposure values at the site (mW/cm^2)	0.0031
	% Exposure	0.62%
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	2.3
	Exposure values at the site (mW/cm^2)	0.0031
	% Exposure	0.13%

T-Mobile 1900 MHz GSM		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0042**
	% Exposure	**0.42%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0042**
	% Exposure	**0.08%**

T-Mobile 1900 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0042**
	% Exposure	**0.42%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0042**
	% Exposure	**0.08%**

T-Mobile 2100 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0030**
	% Exposure	**0.30%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0030**
	% Exposure	**0.06%**

T-Mobile 2100 MHz UMTS		
Uncontrolled / General Population	FCC's exposure limits (mW/cm^2)	**1.0**
	Exposure values at the site (mW/cm^2)	**0.0030**
	% Exposure	**0.30%**
Controlled / Occupational	FCC's Exposure limits(mW/cm^2)	**5.0**
	Exposure values at the site (mW/cm^2)	**0.0030**
	% Exposure	**0.06%**

8. Appendix A: FCC Guidelines

FCC Policies

The Federal Communications Commission (FCC) in 1996 implemented regulations and policies for analysis of RF propagation to evaluate RF emissions. All the analysis and results of this report are compared with FCC's (Federal Communications Commission) rules to determine whether a site is compliant for Occupational/Controlled or General Public/Uncontrolled exposure. All the analysis of RF propagation is done in terms of a percentage. The limits primarily indicate the power density and are generally expressed in terms of milliwatts per centimeter square, mW/cm^2.

FCC guidelines incorporate two separate tiers of exposure limits that are dependent on the scenario/ situation in which that exposure takes place or the status of the individuals who are subjected to that exposure. The decision as to which tier is applied to a scenario is based on the following definitions:

Occupational / Controlled

These limits apply in situations when someone is exposed to RF energy through his/her occupation, is fully aware of the harmful effects of the RF exposure and has an ability to exercise control over this exposure. Occupational / controlled exposure limits also apply when 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. limits for Occupational/Controlled exposure can be found on Table 1(A).

General Population / Uncontrolled

These limits apply to situations in which the general public may be exposed or in which persons who are exposed because of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure to RF. Therefore, members of the general public would always be considered under this category, for example, in the case of a telecommunications tower that exposes people in a nearby residential area. Exposure limits for General Population/Uncontrolled can be found on Table 1(B).

Table 1. LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

(A) Limits for Occupational/Controlled Exposure

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

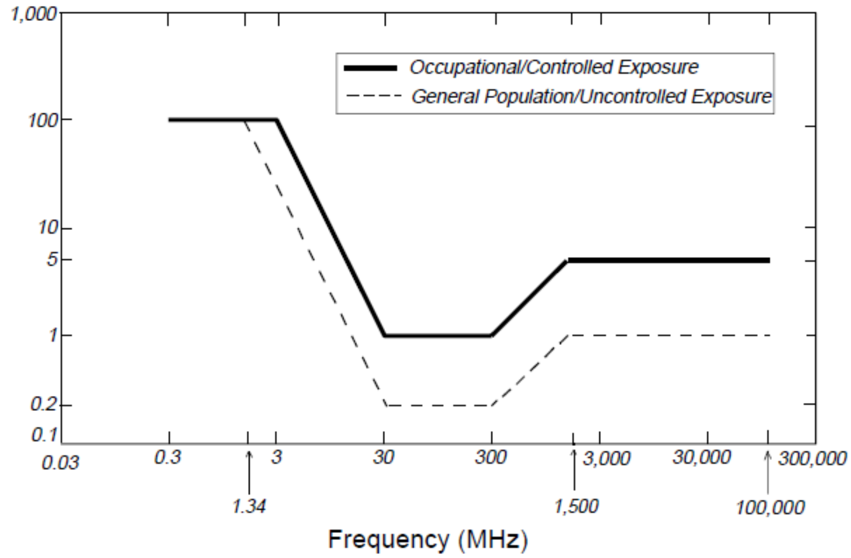
(B) Limits for General Population/Uncontrolled Exposure

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

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

Figure 1. **FCC Limits for Maximum Permissible Exposure (MPE)**

Plane-wave Equivalent Power Density



OSHA Statement:

The objective of the OSHA Act is to ensure the safety and health of the working men and women by enforcing certain standards. The act also assists and encourages the states in their efforts to ensure safe and healthy working conditions through means of research, information, education and training in the field of occupational safety and health and for other purposes.

According to OSHA Act section 5, important duties to be considered are:

(a) Each employer
    1) Shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious harm to his employees
    2) Shall comply with occupational safety and health standards promulgated under this act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

9. Preparer Certification

I, Tim Harris, preparer of this report, certify that I am fully trained and aware of the rules and regulations of both the Federal Communications Commission and the Occupational Safety and Heath Administration regarding Human Exposure to Radio Frequency Radiation. In addition, I have been trained in RF safety practices, rules, and regulations.

I certify that the information contained in this report is true and correct to the best of my knowledge.

Timothy A. Harris 7/9/2021

Signature Date

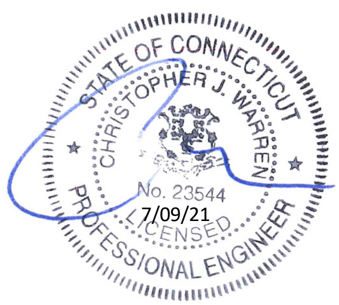


Exhibit G

Letter of Authorization

56 Prospect Street,
Hartford, CT 06103

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

August 11, 2021

Mr. Sheldon Freincle
Northeast Site Solutions
420 Main St,
Sturbridge, MA 01566

RE: T-Mobile Antenna Site CT11001B, Sound Beach Ave, Greenwich CT, Eversource Structure 1256

Dear Mr. Freincle:

Based on our reviews of the site drawings, the structural analysis and foundation review provided by Centek Engineering, along with a third party review performed by Paul J. Ford and Company, we accept the proposed modification.

Please work with Christopher Gelinas of Eversource Real Estate to process the site lease amendment. Please do not hesitate to contact us with questions or concerns. Christopher can be contacted at 860-665-2008, and I can be contacted at (203) 623-0409.

Sincerely,

Richard Badon

Richard Badon
Transmission Line Engineering

Ref: 2021-0708 - CT11001B Structural Analysis Rev0 (21051.03)
CT11001B-L600-MA 7-8-21
2021-0810_21051.03 CT11001B - Rev2 CDs (S&S)

Exhibit H

Recipient Mailings

Click-N-Ship®

P

usps.com
9405 5036 9930 0479 6354 36 0082 5000 0020 6830
$8.25
US POSTAGE
Legal Flat Rt Env

U.S. POSTAGE PAID
Click-N-Ship®

08/20/2021 Mailed from 01566

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Expected Delivery Date: 08/23/21
Ref#: 001B-L600
0006

C027

SHIP TO: FRED CAMILLO
FIRST SELECTMAN-GREENWICH
101 FIELD POINT RD
GREENWICH CT 06830-6463

USPS TRACKING #

9405 5036 9930 0479 6354 36

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.
2. Place your label so it does not wrap around the edge of the package.
3. Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.
4. To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.
5. Mail your package on the "Ship Date" you selected when creating this label.

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0479 6354 36

Trans. #:	541295795
Print Date:	08/19/2021
Ship Date:	08/20/2021
Expected Delivery Date:	08/23/2021

Priority Mail® Postage:	$8.25
Total:	$8.25

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: 001B-L600

To: FRED CAMILLO
FIRST SELECTMAN-GREENWICH
101 FIELD POINT RD
GREENWICH CT 06830-6463

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

Click-N-Ship®

P

usps.com
$8.25
US POSTAGE
Legal Flat Rt Env

9405 5036 9930 0479 6354 43 0082 5000 0020 6830

U.S. POSTAGE PAID
Click-N-Ship®

08/20/2021 Mailed from 01566

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Expected Delivery Date: 08/23/21
Ref#: 001B-L600
0006

C027

SHIP TO: KATIE DELUCA
PLANNING & ZONING-ZEO-TOWN PLANNER
101 FIELD POINT RD
GREENWICH CT 06830-6463

USPS TRACKING #

9405 5036 9930 0479 6354 43

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0479 6354 43

Trans. #:	541295795	Priority Mail® Postage:	**$8.25**
Print Date:	08/19/2021	Total:	**$8.25**
Ship Date:	08/20/2021		
Expected Delivery Date:	08/23/2021		

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: 001B-L600

To: KATIE DELUCA
PLANNING & ZONING-ZEO-TOWN PLANNER
101 FIELD POINT RD
GREENWICH CT 06830-6463

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

P

usps.com
9405 5036 9930 0479 6354 67 0082 5000 0010 6037
$8.25
US POSTAGE
Legal Flat Rt Env

U.S. POSTAGE PAID
Click-N-Ship®

08/20/2021 Mailed from 01566

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 08/23/21
Ref#: 001B-L600

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

0006

C015

SHIP
TO: CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

USPS TRACKING #

9405 5036 9930 0479 6354 67

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0479 6354 67

Trans. #:	541295795
Print Date:	08/19/2021
Ship Date:	08/20/2021
Expected Delivery Date:	08/23/2021

Priority Mail® Postage:	**$8.25**
Total:	**$8.25**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: 001B-L600

To: CHRIS GELINAS
EVERSOURCE
107 SELDEN ST
BERLIN CT 06037-1616

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE® *Thank you for shipping with the United States Postal Service!*
Check the status of your shipment on the USPS Tracking® page at usps.com

CT11001B-460D

UNITED STATES POSTAL SERVICE.

FISKDALE
458 MAIN ST
FISKDALE, MA 01518-9998
(800)275-8777

08/24/2021 12:17 PM

Product	Qty	Unit Price	Price
Prepaid Mail Greenwich, CT 06830 Weight: 2 lb 2.50 oz Acceptance Date: Tue 08/24/2021 Tracking #: 9405 5036 9930 0479 6354 36	1		$0.00
Prepaid Mail Berlin, CT 06037 Weight: 2 lb 2.60 oz Acceptance Date: Tue 08/24/2021 Tracking #: 9405 5036 9930 0479 6354 67	1		$0.00
Prepaid Mail Greenwich, CT 06830 Weight: 2 lb 2.40 oz Acceptance Date: Tue 08/24/2021 Tracking #: 9405 5036 9930 0479 6354 43	1		$0.00

Grand Total: $0.00

****
USPS is experiencing unpreced