Robinson+Cole

KENNETH C. BALDWIN

280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

Also admitted in Massachusetts
and New York

September 22, 2021

Via Electronic Mail

Melanie A. Bachman, Esq.
Executive Director/Staff Attorney
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

Re: **Notice of Exempt Modification – Facility Modification**
16 Bell Road Extension, Cornwall, Connecticut

Dear Attorney Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains an existing wireless telecommunications facility at the above-referenced property address (the "Property"). The facility consists of antennas and remote radio heads attached to a tower and related equipment on the ground, near the base of the tower. The tower was approved by the Siting Council ("Council") in October 2010 (Docket No. 402). Cellco's use of the tower was approved in July 2020 (TS-VER-031-200619). A copy of the Council's Docket No. 402 Decision and Order and TS-VER-031-200619 approval are included in Attachment 1.

Cellco now intends to modify its facility by installing three (3) Samsung MT6407-77A antennas on its existing mounting platform. A set of project plans showing Cellco's proposed facility modifications and new antennas specifications are included in Attachment 2.

Please accept this letter as notification pursuant to R.C.S.A. § 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 Cornwall's Chief Elected Official and Land Use Officer.

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

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

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, 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 installation of Cellco's new antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A General Power Density table for Cellco's modified facility is included in Attachment 3. The modified facility will be capable of providing Cellco's 5G wireless service.

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

6. According to the attached Structural Analysis ("SA") and Mount Analysis ("MA"), the existing tower, tower foundation and antenna platform can support Cellco's proposed modifications. Copies of the SA and MA are included in Attachment 4.

A copy of the parcel map and Property owner information is included in Attachment 5. A Certificate of Mailing verifying that this filing was sent to municipal officials and the property owner is included in Attachment 6.

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

Sincerely,

Kenneth C. Baldwin

Enclosures
Copy to:

Gordon Ridgway, First Selectman for the Town of Cornwall
Karen Nelson, Cornwall Zoning Enforcement Officer & Clerk
Legull LLC, Property Owner
Karla Hanna

ATTACHMENT 1

DOCKET NO. 402 - Cellco Partnership d/b/a Verizon Wireless application for a Certificate of Environmental Compatibility and Public need for the construction, maintenance and operation of a telecommunications facility located at 16 Bell Road Extension, Cornwall, Connecticut.	}	Connecticut
	}	Siting
	}	Council
		October 21, 2010

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, maintenance, and operation of a telecommunications facility, including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate, either alone or cumulatively with other effects, when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application, and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to Cellco Partnership d/b/a Verizon Wireless, hereinafter referred to as the Certificate Holder, for a telecommunications facility at 16 Bell Road Extension, Cornwall, Connecticut.

Unless otherwise approved by the Council, the facility shall be constructed, operated, and maintained substantially as specified in the Council's record in this matter, and subject to the following conditions:

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of the Certificate Holder and other entities, both public and private, but such tower shall not exceed a height of 110 feet above ground level. The height at the top of the Certificate Holder's antennas shall not exceed 112 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on the Town of Cornwall for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) a final site plan(s) of site development to include specifications for the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line, and landscaping; and
    b) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, and the Connecticut Department of Transportation Drainage Manual;
    c) delineation of the south property line through a certified A-2 survey; and,
    d) provisions for an independent environmental inspector to be on-site bi-weekly to ensure environmental controls are in place during road construction activities. A final report of the inspector's findings shall be issued to the Council once road construction is complete.

3. Construction of the access road shall not occur from March 1 through May 15.

4. Prior to the commencement of operation, the Certificate Holder shall provide the Council worst-case modeling of the electromagnetic radio frequency power density of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

5. Upon the establishment of any new State or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

6. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

7. The Certificate Holder shall provide reasonable space on the tower for no compensation for any Town of Cornwall public safety services (police, fire and medical services), provided such use can be accommodated and is compatible with the structural integrity of the tower.

8. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed with at least one fully operational wireless telecommunications carrier providing wireless service within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.

9. Any request for extension of the time period referred to in Condition 8 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the Town of Cornwall. Any proposed modifications to this Decision and Order shall likewise be so served.

10. If the facility ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

11. Any nonfunctioning antenna, and associated antenna mounting equipment, on this facility shall be removed within 60 days of the date the antenna ceased to function.

12. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction, and the commencement of site operation.

13. The Certificate Holder shall maintain the facility and associated equipment in a reasonable physical and operational condition, including but not limited to, the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line and landscaping, that is consistent with this Decision and Order and a Development and Management Plan to be approved by the Council.

14. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.

15. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

Pursuant to General Statutes **§** 16-50p, the Council hereby directs that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in the Waterbury Republican-American and The Register Citizen.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of Connecticut State Agencies.

The parties and intervenors to this proceeding are:

Applicant
Cellco Partnership d/b/a
Verizon Wireless

Its Representative
Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

Intervenor
Town of Cornwall

Its Representative
The Honorable Gordon M. Ridgway
First Selectman
Town of Cornwall
P.O. Box 97
Cornwall, CT 06753

Intervenor
Frederic I. Thaler
Kathleen Mooney
66 Popple Swamp Road
Cornwall Bridge, CT 06754

Intervenor
Nicholas and Caroline Daifotis
239 Brushy Ridge Road
New Canaan, CT 06840

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

July 17, 2020

Kenneth C. Baldwin, Esq.
Robinson & Cole LLP
280 Trumbull Street
Hartford, CT 06103-3597

RE: **TS-VER-031-200619** – Cellco Partnership d/b/a Verizon Wireless request for an order to approve tower sharing at an existing telecommunications facility located at 16 Bell Road Extension, Cornwall, Connecticut.

Dear Attorney Baldwin:

At a public meeting held on July 16, 2020, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures with the following conditions:

1. Approval of any minor changes be delegated to Council staff;

2. Any deviation from the proposed installation as specified in the original tower share request and supporting materials with the Council shall render this decision invalid;

3. Any material changes to the proposed installation as specified in the original tower share request and supporting materials filed with the Council shall require an explicit request for modification to the Council pursuant to Connecticut General Statutes § 16-50aa, including all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65;

4. Not less than 45 days after completion of the proposed installation, the Council shall be notified in writing that the installation has been completed;

5. Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by Verizon shall be removed within 60 days of the date the antenna ceased to function;

6. The validity of this action shall expire one year from the date of this letter; and

7. The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration.

This decision is under the exclusive jurisdiction of the Council and applies only to this request for tower sharing dated June 19, 2020. This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower. Any deviation from the approved tower sharing request is enforceable under the provisions of Connecticut General Statutes § 16-50u.

The proposed shared use is to be implemented as specified in your letter dated June 19, 2020, including the placement of all necessary equipment and shelters within the tower compound.

Please be advised that the validity of this action shall expire one year from the date of this letter.

Thank you for your attention and cooperation.

Sincerely,

s/ Melanie A. Bachman

Melanie Bachman
Executive Director

MAB/IN/emr

c: The Honorable Gordon M. Ridgway, First Selectman, Town of Cornwall
Karen Nelson, Administrator, Zoning Enforcement Officer and Clerk, Town of Cornwall

ATTACHMENT 2

verizon

WIRELESS COMMUNICATIONS FACILITY

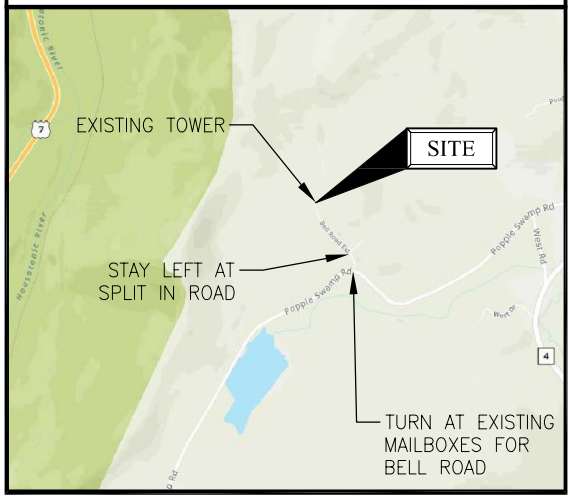
SITE NAME:
CORNWALL CT

BLUE SKY TOWERS CT-5001
16 BELL ROAD EXT.
CORNWALL, CT 06754

ANTENNA MODIFICATION

PROJECT SUMMARY	
SITE NAME:	CORNWALL CT
SITE ADDRESS:	16 BELL ROAD EXT. CORNWALL, CT 06754
PROPERTY OWNER:	LEGULL LLC 24 BRATTLE DR. YARMOUTH PORT, MA 02675
TOWER OWNER/MGMT:	BLUE SKY TOWERS CT-5001
PARCEL ID:	C07-1-1
COORDINATES:	41° 50' 44.815" N 73° 21' 51.476" W
VERIZON CONSTRUCTION:	WALTER CHARCZYNSKI (860) 306-1806
VERIZON REAL ESTATE:	ALEX TYURIN (860) 550-3195

AERIAL MAP



SHEET INDEX	
DE-1	TITLE SHEET
DE-2	COMPOUND PLAN & ELEVATION
DE-3	ANTENNA PLANS & ELEVATION
DE-4	RF PLUMBING DIAGRAM & B.O.M.
DE-5	GENERAL CONSTRUCTION NOTES

verizon
WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
201-456-4624
onair@optonline.net

LICENSURE

STATE OF CONNECTICUT
DAVID A. WEINPAHL
NO. 22144
LICENSED PROFESSIONAL ENGINEER

DAVID WEINPAHL, P.E.
CT LIC NO. 22144

SUBMITTALS

NO	DATE	DESCRIPTION
1	05.28.21	REVIEW

DRAWN BY:	MF
CHECKED BY:	DW

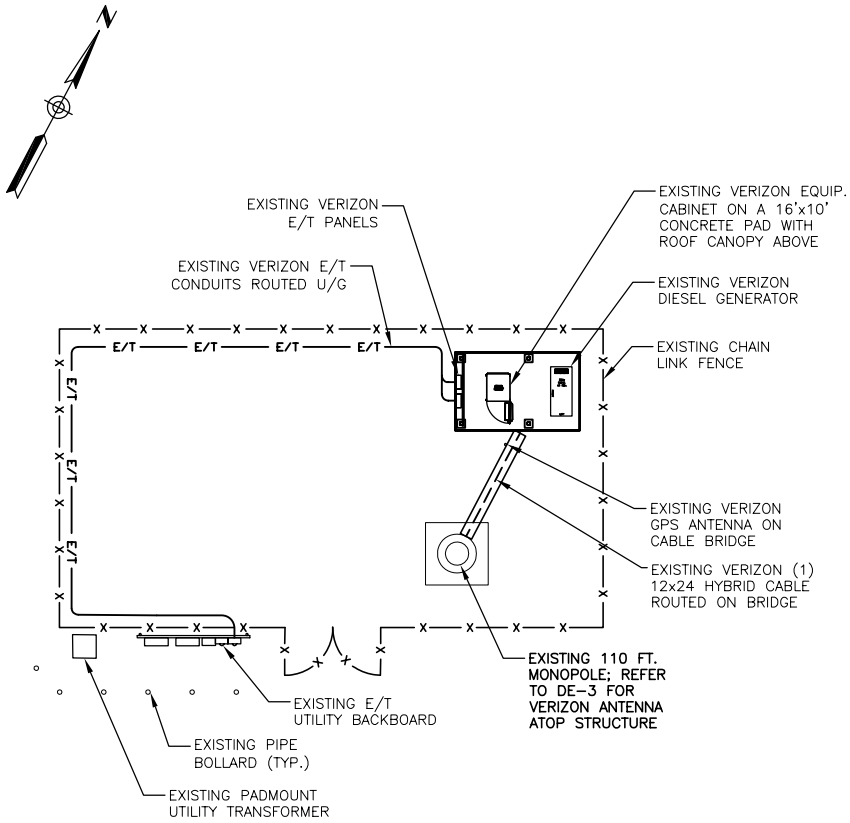
PROJECT NAME:
ANTMO
MT6407
DESIGN EXHIBITS

SITE NAME:
CORNWALL CT

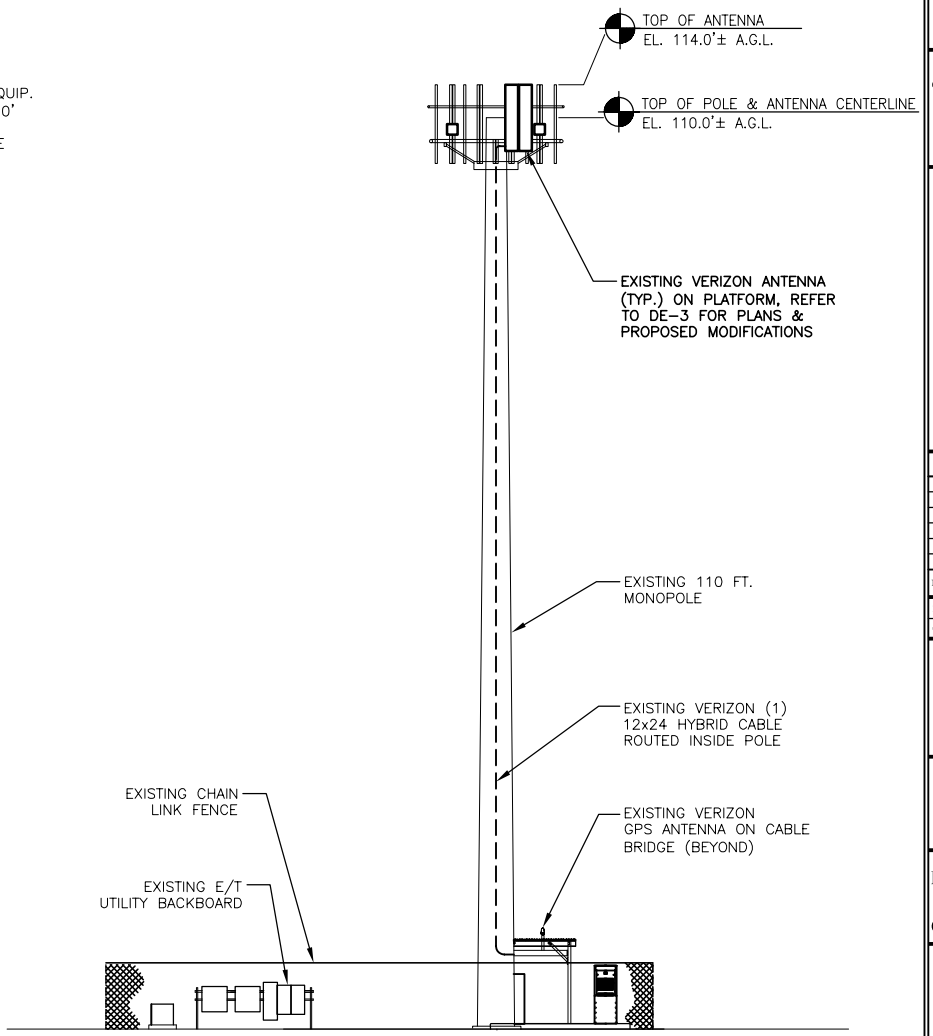
SITE ADDRESS:
BLUE SKY TOWERS CT-5001
16 BELL RD. EXT.
CORNWALL, CT 06754

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
DE-1



1 / DE-2 COMPOUND PLAN
Scale: 1/16" = 1'-0"



2 / DE-2 ELEVATION
Scale: NTS

NOTES:
1. COMPOUND PLAN IS TAKEN FROM THE ORIGINAL VERIZON CD's PREPARED BY THIS OFFICE IN 2020 AND A LIMITED DESIGN VISIT ON 05-06-21 FOR A PROPOSED VERIZON ANTENNA MODIFICATION.
2. PLANS ARE DIAGRAMMATIC ONLY AND NOT TO BE SCALED.
3. REFER TO STRUCTURAL TOWER AND MOUNT ANALYSIS REPORTS, BY OTHERS UNDER SEPARATE COVER, FOR ANY REQUIRED TOWER & MOUNT REINFORCEMENTS, WHICH MUST BE PERFORMED PRIOR TO ANY OTHER VERIZON ANTENNA MODIFICATIONS.

verizon
WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
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SUBMITTALS

NO	DATE	DESCRIPTION
1	05.28.21	REVIEW

DRAWN BY:	MF
CHECKED BY:	DW

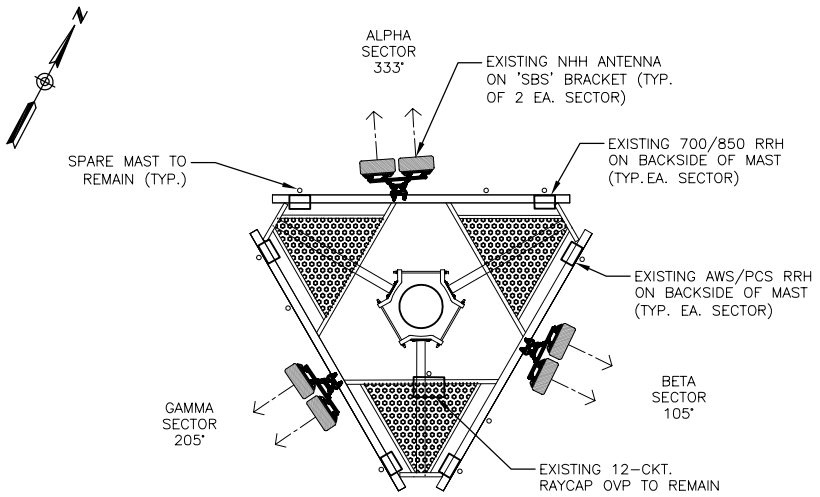
PROJECT NAME:
ANTMO
MT6407
DESIGN EXHIBITS

SITE NAME:
CORNWALL CT

SITE ADDRESS:
BLUE SKY TOWERS CT-5001
16 BELL RD. EXT.
CORNWALL, CT 06754

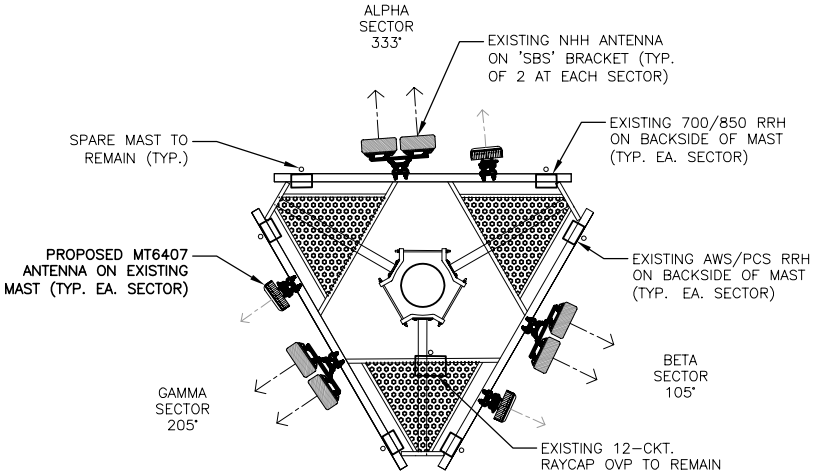
SHEET TITLE:
COMPOUND PLAN & ELEVATION

SHEET NUMBER:
DE-2



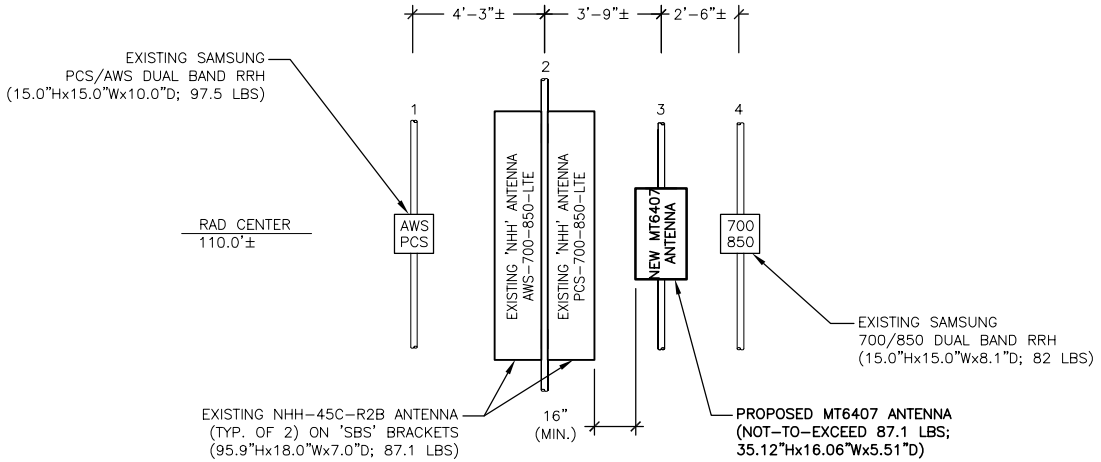
1 DE-3 ANTENNA PLAN @ 110 FT. - EXISTING

Scale: 1/8" = 1'-0"



2 DE-3 ANTENNA PLAN @ 110 FT. - PROPOSED

Scale: 1/8" = 1'-0"



(VIEWED FROM BEHIND SECTOR)

3 DE-3 ANTENNA ELEVATION (TYP.) - PROPOSED

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

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WIRELESS COMMUNICATIONS FACILITY

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WALLINGFORD, CT 06492

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CT LIC NO. 22144

SUBMITTALS

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1	05.28.21	REVIEW

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CHECKED BY:	DW

PROJECT NAME:
ANTMO
MT6407
DESIGN EXHIBITS

SITE NAME:
CORNWALL CT

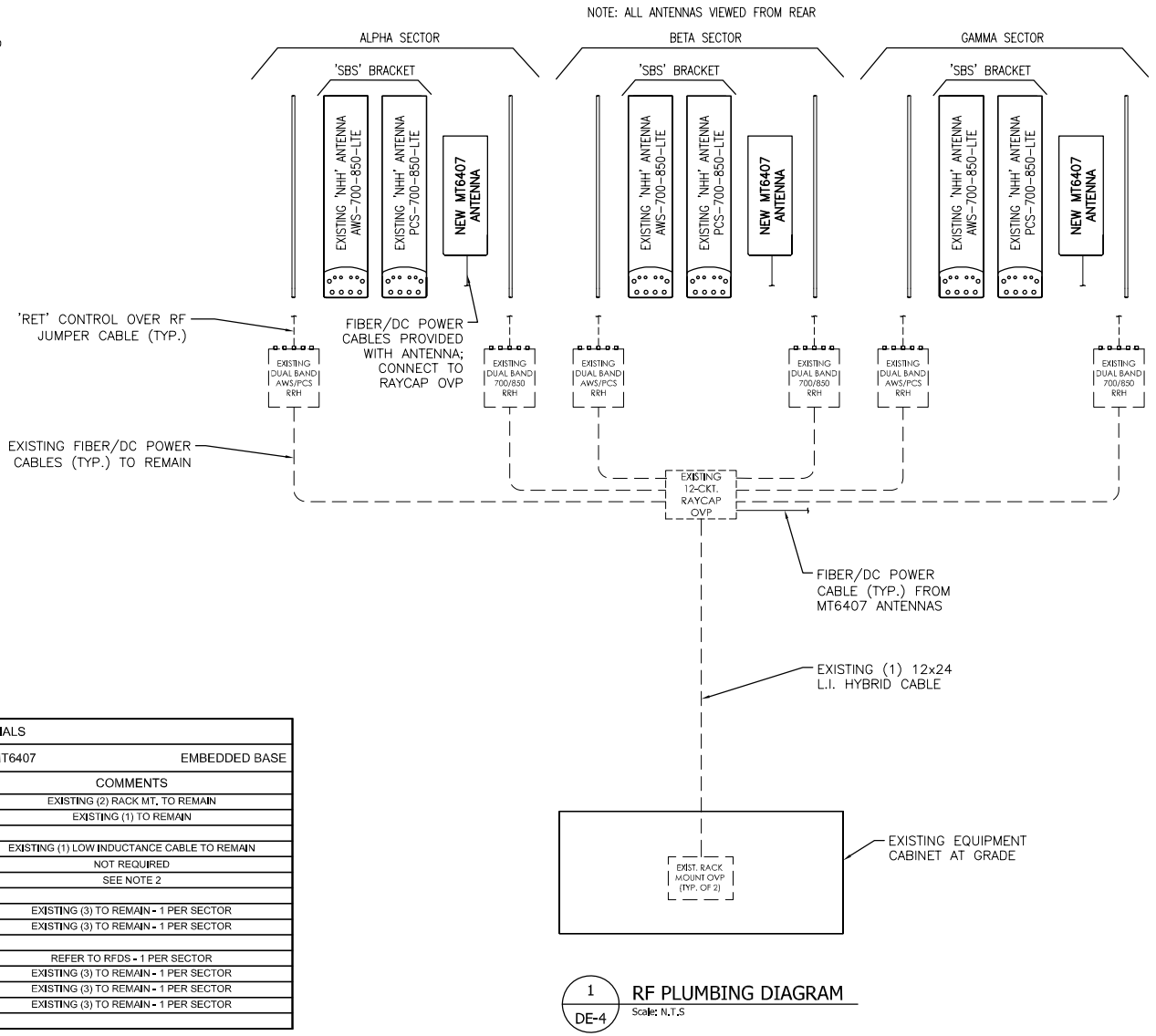
SITE ADDRESS:
BLUE SKY TOWERS CT-5001
16 BELL RD. EXT.
CORNWALL, CT 06754

SHEET TITLE:
ANTENNA PLANS & ELEVATION

SHEET NUMBER:
DE-3

GENERAL NOTES:

1. CONTRACTOR SHALL REFER TO THE LATEST VERIZON WIRELESS RFDS WHICH MAY INCLUDE ANTENNA SECTOR AZIMUTHS/ANTENNA CHANGES, ETC. THAT ARE REQUIRED AS PART OF THE PROJECT.
2. CONTRACTOR SHALL SECURE ALL CONTROL CABLES IN ACCORDANCE WITH INDUSTRY STANDARDS AND MANUFACTURERS INSTRUCTIONS. EXTERIOR CABLES MAY BE TAPED OR TIE-WRAPPED TO EXISTING SUPPORTS EVERY 4 FT. MAX. FOR HORIZONTAL RUNS. CONTRACTOR MAY USE HOISTING GRIPS AT TOP OF VERTICAL CABLE RUNS WHEN REQUIRED.
3. ALL CABLES SHALL BE ROUTED AND SECURED ON STRUCTURAL MEMBERS ONLY - DO NOT "LOOP" THE CABLES IN MID-AIR BETWEEN ANTENNAS
4. REFER TO RFDS FOR DETAILED PLUMBING DIAGRAM SHOWING ALL JUMPER AND OTHER CABLING CONNECTIONS AT ANTENNAS, RRH's, DIPLEXERS OR OTHER DEVICES.



1 DE-4 RF PLUMBING DIAGRAM
Scale: N.T.S

BILL OF MATERIALS			
SITE NAME: CORNWALL CT	ANTMO MT6407		EMBEDDED BASE
DESCRIPTION	QTY	LENGTH	COMMENTS
6-CKT. LOWER OVP	-	-	EXISTING (2) RACK MT. TO REMAIN
12-CKT. UPPER OVP	-	-	EXISTING (1) TO REMAIN
12x24 HYBRID CABLE	-	-	EXISTING (1) LOW INDUCTANCE CABLE TO REMAIN
'RET' CONTROL CABLE	-	-	NOT REQUIRED
1/2" JUMPER CABLE	-	-	SEE NOTE 2
		-	
AWS/PCS DUAL BAND RRH	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
700/850 DUAL BAND RRH	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
MT6407 INTEGRATED ANTENNA	3	-	REFER TO RFDS - 1 PER SECTOR
NHH AWS-700-850-LTE ANTENNA	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
NHH PCS-700-850-LTE ANTENNA	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR
SBS MOUNTING BRACKET	-	-	EXISTING (3) TO REMAIN - 1 PER SECTOR

NOTES:
1. ITEMS SHOWN ARE FOR MAJOR DESIGN ELEMENTS ONLY. REFER TO VERIZON WIRELESS RFDS FOR ALL MANUFACTURER PART NUMBERS AND ACCESSORY ITEMS REQUIRED FOR A COMPLETE INSTALLATION.
2. CONTRACTOR SHALL DETERMINE AND PROVIDE ALL REQUIRED PRE-FAB JUMPER QUANTITIES AND LENGTHS, KEEPING ALL LENGTHS TO A MINIMUM.

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SITE NAME:
CORNWALL CT

SITE ADDRESS:
BLUE SKY TOWERS CT-5001
16 BELL RD. EXT.
CORNWALL, CT 06754

SHEET TITLE:
RF PLUMBING DIAGRAM & B.O.M.

SHEET NUMBER:
DE-4

GENERAL CONSTRUCTION NOTES:

1. CONTRACTOR SHALL NOT COMMENCE ANY WORK UNTIL HE OBTAINS, AT HIS OWN EXPENSE, ALL INSURANCE REQUIRED BY *CELLCO PARTNERSHIP d/b/a VERIZON, THE PRO*PERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.

2. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS AND ALL LOCAL LAWS AND REGULATIONS, CURRENT EDITIONS.

3. CONTRACTOR SHALL VISIT THE JOB SITE AND FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND MAKE PROVISIONS AS TO THE COST THEREOF. CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. 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 AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

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

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

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

8. CONTRACTOR SHALL OBTAIN AT HIS OWN EXPENSE ALL PERMITS AND ALL INSPECTIONS REQUIRED FROM FEDERAL AND STATE GOVERNMENTS, COUNTIES, MUNICIPALITIES AND OTHER REGULATORY AGENCIES WHICH MAY BE REQUIRED FOR THE PROJECT.

10. DETAILS ARE INTENDED TO SHOW END RESULT OF DESIGN. MINOR MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

11. ALL MATERIAL PROVIDED BY *CELLCO PARTNERSHIP d/b/a VERIZON IS TO BE* REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTOR PRIOR TO INSTALLATION. ANY DEFICIENCIES TO PROVIDED MATERIALS SHALL BE BROUGHT TO THE CONSTRUCTION MANAGERS ATTENTION IMMEDIATELY.

12. THE MATERIALS INSTALLED IN THE WORK SHALL MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. NO SUBSTITUTIONS ARE ALLOWED.

13. CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION, FOR SEQUENCES AND PROCEDURES TO BE USED, AND TO ENSURE THE SAFETY OF THE EXISTING BUILDING AND ITS COMPONENT DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.

14. CONTRACTOR SHALL COORDINATE ALL CIVIL, STRUCTURAL AND ELECTRICAL DRAWINGS FOR THE LOCATION OF ALL OPENINGS, RECESSES, BUILT-IN WORK, ETC.

15. CONTRACTOR SHALL RECEIVE CLARIFICATION IN WRITING AND SHALL RECEIVE IN WRITING AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.

16. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS "EXISTING" WHICH ARE NOT FOUND TO BE IN THE FIELD.

17. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST-ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.

18. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE WORK AREA, ADJACENT AREAS, AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFORM TO ALL O.S.H.A REQUIREMENTS.

19. CONTRACTOR SHALL COORDINATE HIS WORK AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.

20. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.

21. CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY INDICATED OR WHERE LOCAL CODES OR REGULATIONS MAY TAKE PRECEDENCE.

22. CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING SURFACES, EQUIPMENT, IMPROVEMENTS, PIPING, ANTENNA AND ANTENNA CABLES AND REPAIR ANY DAMAGE THAT OCCURS DURING CONSTRUCTION.

23. CONTRACTOR SHALL REPAIR ALL EXISTING SURFACES DAMAGED DURING CONSTRUCTION SUCH THAT THEY MATCH AND BLEND WITH ADJACENT SURFACES.

24. CONTRACTOR SHALL KEEP CONTRACT AREA CLEAN, HAZARD FREE AND DISPOSE OF ALL DEBRIS AND RUBBISH. EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY OF THE OWNER SHALL BE REMOVED. LEAVE PREMISES IN CLEAN CONDITIONS AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.

25. BEFORE FINAL ACCEPTANCE OF THE WORK, CONTRACTOR SHALL REMOVE ALL EQUIPMENT, TEMPORARY WORKS, UNUSED AND USELESS MATERIALS, RUBBISH AND TEMPORARY STRUCTURES.

verizon

WIRELESS COMMUNICATIONS FACILITY

20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 Foundry Pond Road
Cold Spring, NY 10516
201-456-4624
onair@optonline.net

LICENSURE

STATE OF CONNECTICUT
DAVID A. WEINPAHL
NO. 22144
LICENSED
LICENSED PROFESSIONAL ENGINEER

DAVID WEINPAHL, P.E.
CT LIC NO. 22144

SUBMITTALS

NO	DATE	DESCRIPTION
1	05.28.21	REVIEW

DRAWN BY:	MF
CHECKED BY:	DW

PROJECT NAME:
ANTMO
MT6407
DESIGN EXHIBITS

SITE NAME:
CORNWALL CT

SITE ADDRESS:
BLUE SKY TOWERS CT-5001
16 BELL RD. EXT.
CORNWALL, CT 06754

SHEET TITLE:
GENERAL CONSTRUCTION NOTES

SHEET NUMBER:
DE-5

SAMSUNG

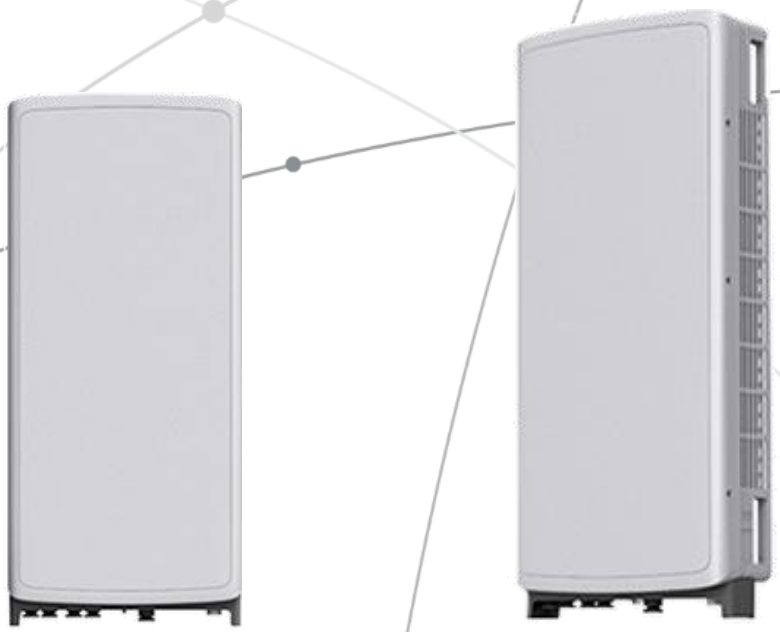
SAMSUNG

C-Band 64T64R Massive MIMO Radio

for High Capacity and Wide Coverage

Samsung C-Band 64T64R Massive MIMO Radio enables mobile operators to increase coverage range, boost data speeds and ultimately offer enriched 5G experiences to users in the U.S..

Model Code : MT6407-77A

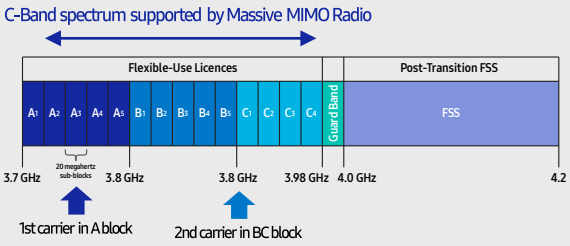


Points of Differentiation

Wide Bandwidth

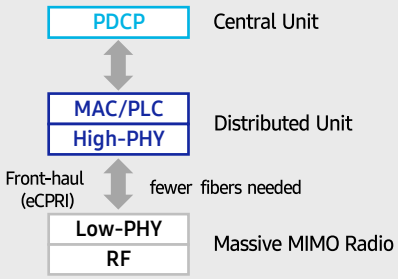
With capability to support up to 2 CC carrier configuration, Samsung C-Band massive MIMO Radio supports 200 MHz bandwidth in the C-Band spectrum.

Samsung C-Band massive MIMO Radio covers the entire C-Band 280 MHz spectrum, so it can meet the operator's needs in current A block and future B/C blocks



Future Proof Product

Samsung C-Band 64T64R Massive MIMO radio supports not only CPRI but also eCPRI as front-haul interface.
It enables operators can cut down on OPEX/CAPEX by reducing front-haul bandwidth through low layer split and using ethernet based higher efficient line.



Enhanced Performance

C-Band massive MIMO Radio creates sharp beams and extends networks' coverage on the critical mid-band spectrum using a large number of antenna elements and high output power to boost data speeds.

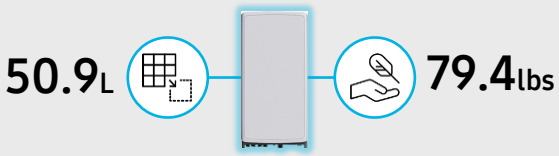
This helps operators reduce their CAPEX as they now need less products to cover the same area than before.

Furthermore, as C-Band massive MIMO Radio supports MU-MIMO(Multi-user MIMO) , it enables to increase user throughput by minimizing interference.

Well Matched Design

Samsung C-Band Massive MIMO radio utilizes 64 antennas, supports up to 280MHz bandwidth, and delivers a 200W output power. despite the above advanced performance, the Radio has a compact size of 50.9L and 79.4lbs. This makes it easy to install the Radio.

It is designed to look solid and compact, with a low profile appearance so that, when installed, harmonizes well with the surrounding environment..



Technical Specifications

Item	Specification
Tech	NR
Band	n77
Frequency Band	3700 - 3980 MHz
EIRP	78.5dBm (53.0 dBm+25.5 dBi)
IBW/OBW	280 MHz / 200 MHz
Installation	Pole/Wall
Size/ Weight	16.06 x 35.06 x 5.51 inch (50.86L)/ 79.4 lbs

SAMSUNG

About Samsung Electronics Co., Ltd.

Samsung inspires the world and shapes the future with transformative ideas and technologies. The company is redefining the worlds of TVs, smartphones, wearable devices, tablets, digital appliances, network systems, and memory, system LSI, foundry and LED solutions.

129 Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, Korea

ATTACHMENT 3

Site Name: ***CORNWALL CT***
Cumulative Power Density

Operator	Operating Frequency	Number of Trans.	ERP Per Trans.	Total ERP	Distance to Target	Calculated Power Density	Maximum Permissible Exposure*	Fraction of MPE
	(MHz)		(watts)	(watts)	(feet)	(mW/cm^2)	(mW/cm^2)	(%)
VZW 700	751	4	929	3716	110	0.0110	0.5007	2.21%
VZW CDMA	877.26	2	473	946	110	0.0028	0.5848	0.48%
VZW Cellular	874	4	896	3584	110	0.0107	0.5827	1.83%
VZW PCS	1975	4	1459	5836	110	0.0173	1.0000	1.73%
VZW AWS	2120	4	2910	11640	110	0.0346	1.0000	3.46%
VZW CBAND	3730.08	4	6531	26125	110	0.0776	1.0000	7.76%
Total Percentage of Maximum Permissible Exposure								17.47%

*Guidelines adopted by the FCC on August 1, 1996, 47 CFR Part 1 based on NCRP Report 86, 1986 and generally on ANSI/IEEE C95.1-1992
**Calculation includes a -10 dB Off Beam Antenna Pattern Adjustment pursuant to Attachments B and C of the Siting Council's November 10, 2015 Memorandum for Exempt Modification filings

MHz = Megahertz
mW/cm^2 = milliwatts per square centimeter
ERP = Effective Radiated Power

Absolute worst case maximum values used.

ATTACHMENT 4

Structural Components
Bringing It All Together.

Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221

Voice:866-386-7622

August 17, 2021

BST Management, LLC
325 Park Street
Suite 106
North Reading, MA 01864

Re: Rigorous Structural Analysis Report
Structure: 110ft Valmont Monopole
Site Address: 16 Bell Road Extension, Cornwall Connecticut 06754 (Litchfield County)
Latitude: 41.8458°N, Longitude: 73.3643°W
Site Name: BST Management, LLC – Cornwall Sharon
Verizon Wireless – Cornwall_CT
Site Number: BST Management, LLC – CT-5001
Verizon Wireless – 591561
SC Number: 210376
Status: **Structure Passes (21% Capacity)**
Foundation Passes

Per your request, Structural Components, LLC has completed a structural analysis for the above referenced project to verify the tower's compliance to the following design criteria:

Standard:	TIA-222-G *Structural Standard for Antenna Supporting Structures and Antennas*
Building Code:	2015 International Building Code 2018 Connecticut State Building Code
Design Basic Wind Speed without Ice:	115 mph 3-second gust V_{ULT}
Design Basic Wind Speed with Ice:	40 mph 3-second gust
Ice Thickness:	3/4" radial
Serviceability Basic Wind Speed:	60 mph 3-second gust
Exposure Category:	C
Topographic Category:	1
Risk Category:	II
Seismic Site Class:	B, S_s=0.180, S_1=0.065
Seismic Design Category:	A

Please refer to the following structural analysis report, which gives complete details of the tower loading, results, information provided, and necessary assumptions.

We trust you find this report satisfactory. Please do not hesitate to contact us if you should have any questions or concerns.

Best Regards,
Structural Components LLC

Michael L. Lassiter
2021.08.20
14:37:18 -04'00'

STATE OF CONNECTICUT
MICHAEL LASSITER
No. 25064
LICENSED
PROFESSIONAL ENGINEER

Wesley Culver
Engineering Manager

/TR

Michael L. Lassiter, SE, PE
4904 Professional Ct
Raleigh, NC 27609
CT PE License PEN.0025064

1 LOADING CONFIGURATION

The following antennas, mounts, transmission lines, and other appurtenances were considered for the structural analysis.

Elevation (ft)		Equipment	Feedlines	Notes
Mount	Equip			
110.0	110.0	(6) CommScope NHH-45C-R2B Panels (3) Samsung MT6407-77A Panels (3) Samsung RFV01U-D1A RRUs (3) Samsung RFV01U-D2A RRUs (1) 12 OVP (1) Site Pro 1 RMQP-4096-HK Platform Mount	(1) 12x24 Hybrid	Verizon Final

1) Elevations reference centerline of panel, yagi, mounts, and dish antennas, and base of whip antennas, in relation to the base of the tower.
2) Refer to the feed line diagram and analysis output in Appendix A for the location and orientation of feedlines and equipment.

2 RESULTS

The analysis was performed using tnxTower v8.1.1.0, a structural analysis program developed by Tower Numerics, Inc. specifically for the communication tower industry.

2.1 TOWER MEMBER STRESS LEVELS

The tower has the following stress ratios in its structural members.

Elev. (ft)	Member	Stress Ratio
0 – 110.0	Monopole Shaft	0.18
0.0	Base Plate	0.10
0.0	Anchor Rods	0.21

Stress ratio (SR) criteria:
SR $\leq$ 1.00 is completely within code limits.
SR $\leq$ 1.05 is considered within acceptable tolerance of code limits.
SR > 1.05 is outside acceptable tolerance of code limits and requires structural modifications.

2.2 FOUNDATION REACTIONS

The reactions listed below are for the design wind speed listed. Reactions are factored loads.

Reaction Type	Current Wind Reactions	Current Iced Reactions	Current Seismic Reactions	Foundation Status
Moment (ft-kips)	1,141.2	229.8	137.4	Passes*
Shear (kips)	15.9	3.4	1.8	
Axial (kips)	35.5	51.8	32.0	

* See Appendix A for foundation calculations.

2.3 TOWER DEFLECTION

The tower deflections have been reviewed and are believed to be acceptable for the proposed equipment. The carrier(s) should review the deflections for the service wind condition included in Appendix A for compatibility with their equipment.

3 PROVIDED INFORMATION AND ASSUMPTIONS

The following information was directly used to generate this report, and can be found in Appendix B.

Document	Author	Date	Reference
Collocation Application	Verizon Wireless	07/27/2021	CT-5001
Permit Drawings	Valmont	04/16/2015	278467
Design Calculations	Valmont	04/16/2015	278467
Foundation Drawings	Valmont	04/16/2015	278467
Mount Analysis Report	KM Consulting Engineers, Inc.	06/17/2021	210602.00
Geotechnical and Geophysical Testing Report	DET	11/26/2010	2010.17

The following assumptions were made in order to complete the analysis. These assumptions must be checked. If they do not accurately represent the existing or proposed tower, foundation, soil, and loading conditions, we must be notified so that we can make the appropriate changes to our analysis, conclusions, and recommendations.

1. Tower and structures were built per manufacturers specifications.
2. The tower and foundation are in good condition with no corrosion, damage or fatiguing issues which could reduce the carrying capacity of the tower.
3. All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
4. All prior structural modifications, if any, are assumed to be as per date supplied/ available, to be properly installed and to be fully effective.
5. The feedline and appurtenance configuration is as stated in the report. All antennas, coax, cables and waveguide cables are assumed to be properly installed and supported as per manufacturer requirement.
6. The support mounts and/or platforms are not analyzed and are considered adequate to support the loading.
7. All mounting systems connect at tower bracing points. Local stresses are not considered unless noted otherwise in analysis.
8. Some assumptions are made regarding antenna and mount sizes and their projected areas based on a best interpretation of the data supplied and a best knowledge of antenna type and industry practice.
9. The soil parameters are as per data supplied, or as assumed, and stated in the calculations.

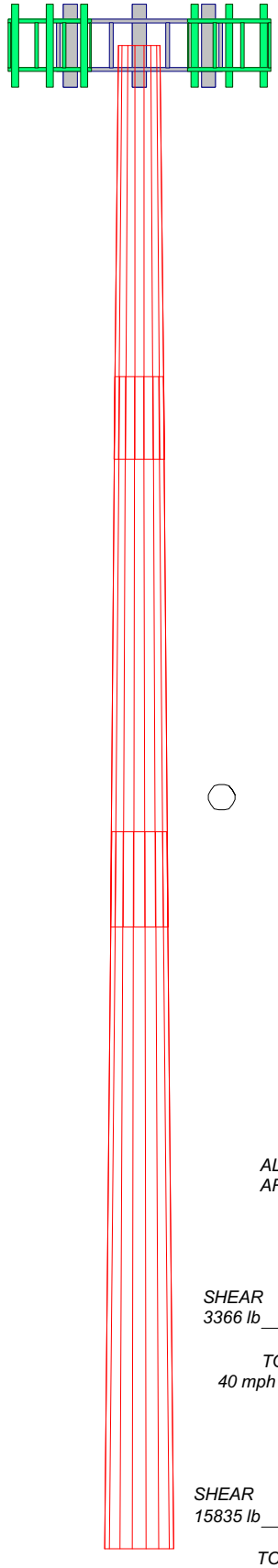
4 CONCLUSIONS

To the best of our knowledge and belief the tower and foundations satisfy the requirements of the applicable codes and standards having jurisdiction over the work for the loadings and conditions as outlined in this report. **Structural modifications are not required at this time.**

APPENDIX A

Tower Profile and Calculations

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (lb)
1	30.00	18	0.3750	6.00	36.0910	43.1750		4770.1
2	39.92	18	0.3750	6.92	41.0082	50.4340	A607-65	7331.1
3	52.00	18	0.4375		48.0507	60.3300		13207.5
								25308.7



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 115 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 17.5%

ALL REACTIONS ARE FACTORED

AXIAL 51747 lb

SHEAR 3366 lb *MOMENT 229766 lb-ft*

TORQUE 149 lb-ft
40 mph WIND - 0.7500 in ICE

AXIAL 35467 lb

SHEAR 15835 lb *MOMENT 1141111 lb-ft*

TORQUE 1120 lb-ft
REACTIONS - 115 mph WIND

Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: *210376*			
Project: *Cornwall Sharon (CT-5001)*			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 08/17/21	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

ASCE 7-10 Wind Data is used.
Basic wind speed of 115 mph.
Risk Category II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals		Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification		Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component	√	Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	110.00-80.00	30.00	6.00	18	36.0910	43.1750	0.3750	1.5000	A607-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	80.00-46.08	39.92	6.92	18	41.0082	50.4340	0.3750	1.5000	(65 ksi) A607-65 (65 ksi)
L3	46.08-1.00	52.00		18	48.0507	60.3300	0.4375	1.7500	(65 ksi) A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	36.5899	42.5110	6851.1596	12.6792	18.3342	373.6814	13711.3341	21.2595	5.6920	15.179
	43.7832	50.9427	11789.8138	15.1940	21.9329	537.5401	23595.1410	25.4762	6.9388	18.503
L2	43.0216	48.3637	10088.3169	14.4248	20.8322	484.2664	20189.9083	24.1864	6.5574	17.487
	51.1542	59.5827	18863.4945	17.7709	25.6205	736.2665	37751.8100	29.7970	8.2164	21.91
L3	50.3830	66.1169	18936.7691	16.9027	24.4098	775.7861	37898.4556	33.0648	7.6869	17.57
	61.1932	83.1682	37691.1818	21.2618	30.6476	1229.8233	75431.9586	41.5920	9.8481	22.51

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 110.00-80.00				1	1	1			
L2 80.00-46.08				1	1	1			
L3 46.08-1.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
12x24 (1.95) (Verizon)	C	No	No	Inside Pole	110.00 - 4.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	110.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	84.00
L2	80.00-46.08	A	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	94.97
L3	46.08-1.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	117.83

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	110.00-80.00	A	1.667	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	84.00
L2	80.00-46.08	A	1.600	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	94.97
L3	46.08-1.00	A	1.452	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	117.83

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	110.00-80.00	0.0000	0.0000	0.0000	0.0000
L2	80.00-46.08	0.0000	0.0000	0.0000	0.0000
L3	46.08-1.00	0.0000	0.0000	0.0000	0.0000

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(2) NHH-45C-R2B	A	From Face	3.00	33.0000	110.00	No Ice	15.89	7.57	87.10
(Verizon)			0.00			1/2" Ice	16.51	8.16	172.83
			0.00			1" Ice	17.13	8.75	266.59
(2) NHH-45C-R2B	B	From Face	3.00	45.0000	110.00	No Ice	15.89	7.57	87.10
(Verizon)			0.00			1/2" Ice	16.51	8.16	172.83
			0.00			1" Ice	17.13	8.75	266.59
(2) NHH-45C-R2B	C	From Face	3.00	25.0000	110.00	No Ice	15.89	7.57	87.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(Verizon)			0.00			1/2" Ice	16.51	8.16	172.83
			0.00			1" Ice	17.13	8.75	266.59
MT6407-77A	A	From Face	3.00	33.0000	110.00	No Ice	4.70	1.84	87.10
(Verizon)			0.00			1/2" Ice	4.99	2.07	116.39
			0.00			1" Ice	5.28	2.30	149.54
MT6407-77A	B	From Face	3.00	45.0000	110.00	No Ice	4.70	1.84	87.10
(Verizon)			0.00			1/2" Ice	4.99	2.07	116.39
			0.00			1" Ice	5.28	2.30	149.54
MT6407-77A	C	From Face	3.00	25.0000	110.00	No Ice	4.70	1.84	87.10
(Verizon)			0.00			1/2" Ice	4.99	2.07	116.39
			0.00			1" Ice	5.28	2.30	149.54
B2/B66a RFV01U-D1A	A	From Face	2.00	33.0000	110.00	No Ice	1.88	1.25	85.00
(Verizon)			0.00			1/2" Ice	2.05	1.39	103.34
			0.00			1" Ice	2.22	1.54	124.47
B2/B66a RFV01U-D1A	B	From Face	2.00	45.0000	110.00	No Ice	1.88	1.25	85.00
(Verizon)			0.00			1/2" Ice	2.05	1.39	103.34
			0.00			1" Ice	2.22	1.54	124.47
B2/B66a RFV01U-D1A	C	From Face	2.00	25.0000	110.00	No Ice	1.88	1.25	85.00
(Verizon)			0.00			1/2" Ice	2.05	1.39	103.34
			0.00			1" Ice	2.22	1.54	124.47
B5/B13 RFV01U-D2A	A	From Face	2.00	33.0000	110.00	No Ice	1.88	1.00	70.00
(Verizon)			0.00			1/2" Ice	2.05	1.13	86.33
			0.00			1" Ice	2.22	1.27	105.32
B5/B13 RFV01U-D2A	B	From Face	2.00	45.0000	110.00	No Ice	1.88	1.00	70.00
(Verizon)			0.00			1/2" Ice	2.05	1.13	86.33
			0.00			1" Ice	2.22	1.27	105.32
B5/B13 RFV01U-D2A	C	From Face	2.00	25.0000	110.00	No Ice	1.88	1.00	70.00
(Verizon)			0.00			1/2" Ice	2.05	1.13	86.33
			0.00			1" Ice	2.22	1.27	105.32
OVP-12	A	From Leg	1.00	33.0000	110.00	No Ice	3.10	1.73	32.00
(Verizon)			0.00			1/2" Ice	3.34	1.90	68.49
			0.00			1" Ice	3.58	2.07	108.97
Low Profile Platform w/ Rails	C	None		0.0000	110.00	No Ice	30.00	30.00	2669.03
(Verizon)						1/2" Ice	35.00	35.00	3202.84
						1" Ice	40.00	40.00	3736.64

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	25308.73					
Bracing Weight	0.00					
Total Member Self-Weight	25308.73			-80.12	0.00	
Total Weight	29555.46			-80.12	0.00	
Wind 0 deg - No Ice		-179.92	-15756.22	-1122209.03	19611.52	203.46
Wind 30 deg - No Ice		7569.69	-13555.32	-962066.50	-527446.51	-383.51
Wind 60 deg - No Ice		13291.00	-7722.29	-544160.50	-933175.68	-867.72
Wind 90 deg - No Ice		15451.01	179.92	19531.40	-1088861.18	-1119.43
Wind 120 deg - No Ice		13470.93	8033.92	577968.41	-952787.21	-1071.18

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 150 deg - No Ice		7881.32	13735.24	981517.78	-561414.67	-735.92
Wind 180 deg - No Ice		179.92	15756.22	1122048.79	-19611.52	-203.46
Wind 210 deg - No Ice		-7569.69	13555.32	961906.26	527446.51	383.51
Wind 240 deg - No Ice		-13291.00	7722.29	544000.26	933175.68	867.72
Wind 270 deg - No Ice		-15451.01	-179.92	-19691.64	1088861.18	1119.43
Wind 300 deg - No Ice		-13470.93	-8033.92	-578128.65	952787.21	1071.18
Wind 330 deg - No Ice		-7881.32	-13735.24	-981678.02	561414.67	735.92
Member Ice	10326.25					
Total Weight Ice	44567.30			-435.20	0.00	
Wind 0 deg - Ice		-21.91	-3356.74	-225542.89	2388.43	24.01
Wind 30 deg - Ice		1640.15	-2896.07	-194189.96	-108387.31	-53.02
Wind 60 deg - Ice		2862.73	-1659.39	-110920.60	-190120.75	-115.84
Wind 90 deg - Ice		3318.25	21.91	1953.23	-220911.49	-147.63
Wind 120 deg - Ice		2884.64	1697.35	114187.09	-192509.18	-139.86
Wind 150 deg - Ice		1678.10	2917.98	195707.99	-112524.19	-94.61
Wind 180 deg - Ice		21.91	3356.74	224672.49	-2388.43	-24.01
Wind 210 deg - Ice		-1640.15	2896.07	193319.56	108387.31	53.02
Wind 240 deg - Ice		-2862.73	1659.39	110050.20	190120.75	115.84
Wind 270 deg - Ice		-3318.25	-21.91	-2823.63	220911.49	147.63
Wind 300 deg - Ice		-2884.64	-1697.35	-115057.49	192509.18	139.86
Wind 330 deg - Ice		-1678.10	-2917.98	-196578.39	112524.19	94.61
Total Weight	29555.46			-80.12	0.00	
Wind 0 deg - Service		-43.82	-3837.55	-273383.43	4776.54	49.55
Wind 30 deg - Service		1843.66	-3301.51	-234379.46	-128463.74	-93.41
Wind 60 deg - Service		3237.13	-1880.82	-132595.17	-227282.27	-211.34
Wind 90 deg - Service		3763.21	43.82	4696.42	-265200.69	-272.65
Wind 120 deg - Service		3280.95	1956.73	140708.14	-232058.81	-260.89
Wind 150 deg - Service		1919.56	3345.33	238995.76	-136736.95	-179.24
Wind 180 deg - Service		43.82	3837.55	273223.19	-4776.54	-49.55
Wind 210 deg - Service		-1843.66	3301.51	234219.22	128463.74	93.41
Wind 240 deg - Service		-3237.13	1880.82	132434.93	227282.27	211.34
Wind 270 deg - Service		-3763.21	-43.82	-4856.66	265200.69	272.65
Wind 300 deg - Service		-3280.95	-1956.73	-140868.38	232058.81	260.89
Wind 330 deg - Service		-1919.56	-3345.33	-239156.00	136736.95	179.24

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice

Comb. No.	Description
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	26	51747.16	0.00	0.00
	Max. H_x	21	26599.91	15450.57	179.91
	Max. H_z	3	26599.91	179.91	15755.76
	Max. M_x	2	1132356.48	179.91	15755.60
	Max. M_z	8	1098643.85	-15450.41	-179.91
	Max. Torsion	8	1120.24	-15450.41	-179.91
	Min. Vert	25	26599.91	7881.09	13734.84
	Min. H_x	9	26599.91	-15450.57	-179.91
	Min. H_z	15	26599.91	-179.91	-15755.76
	Min. M_x	14	-1132161.11	-179.91	-15755.60
	Min. M_z	20	-1098643.86	15450.41	179.91
	Min. Torsion	20	-1120.27	15450.41	179.91

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
Dead Only	29555.46	0.00	-0.00	-80.12	0.00	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	35466.55	-179.91	-15755.60	-1132356.48	19817.19	203.44
0.9 Dead+1.0 Wind 0 deg - No Ice	26599.91	-179.91	-15755.76	-1129773.37	19765.22	203.43
1.2 Dead+1.0 Wind 30 deg - No Ice	35466.55	7569.40	-13554.79	-970755.08	-532159.63	-383.95
0.9 Dead+1.0 Wind 30 deg - No Ice	26599.91	7569.47	-13554.93	-968540.70	-530969.47	-383.83
1.2 Dead+1.0 Wind 60 deg - No Ice	35466.55	13290.49	-7721.99	-549065.88	-941545.33	-868.45
0.9 Dead+1.0 Wind 60 deg - No Ice	26599.91	13290.63	-7722.07	-547806.98	-939431.95	-868.24
1.2 Dead+1.0 Wind 90 deg - No Ice	35466.55	15450.41	179.91	19719.66	-1098643.85	-1120.24
0.9 Dead+1.0 Wind 90 deg - No Ice	26599.91	15450.57	179.91	19692.36	-1096173.57	-1120.00
1.2 Dead+1.0 Wind 120 deg - No Ice	35466.55	13470.40	8033.60	583194.25	-961360.96	-1071.87
0.9 Dead+1.0 Wind 120 deg - No Ice	26599.91	13470.54	8033.69	581894.72	-959195.69	-1071.65
1.2 Dead+1.0 Wind 150 deg - No Ice	35466.55	7881.01	13734.70	990375.47	-566483.02	-736.31
0.9 Dead+1.0 Wind 150 deg - No Ice	26599.91	7881.09	13734.84	988158.54	-565202.92	-736.18
1.2 Dead+1.0 Wind 180 deg - No Ice	35466.55	179.91	15755.60	1132161.11	-19817.13	-203.47
0.9 Dead+1.0 Wind 180 deg - No Ice	26599.91	179.91	15755.76	1129627.42	-19765.19	-203.46
1.2 Dead+1.0 Wind 210 deg - No Ice	35466.55	-7569.40	13554.79	970559.75	532159.54	383.91
0.9 Dead+1.0 Wind 210 deg - No Ice	26599.91	-7569.47	13554.93	968394.78	530969.41	383.79
1.2 Dead+1.0 Wind 240 deg - No Ice	35466.55	-13290.49	7721.99	548870.70	941545.21	868.44
0.9 Dead+1.0 Wind 240 deg - No Ice	26599.91	-13290.63	7722.07	547661.16	939431.88	868.23
1.2 Dead+1.0 Wind 270 deg - No Ice	35466.55	-15450.41	-179.91	-19914.74	1098643.86	1120.27
0.9 Dead+1.0 Wind 270 deg - No Ice	26599.91	-15450.57	-179.91	-19838.12	1096173.58	1120.02
1.2 Dead+1.0 Wind 300 deg - No Ice	35466.56	-13470.84	-8033.87	-583413.48	961400.62	1071.91
0.9 Dead+1.0 Wind 300 deg - No Ice	26599.91	-13470.54	-8033.69	-582040.51	959195.79	1071.69
1.2 Dead+1.0 Wind 330 deg - No Ice	35466.55	-7881.01	-13734.70	-990570.74	566483.20	736.32
0.9 Dead+1.0 Wind 330 deg - No Ice	26599.91	-7881.09	-13734.84	-988304.43	565203.04	736.19
1.2 Dead+1.0 Ice+1.0 Temp	51747.16	0.00	-0.00	-451.25	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	51747.16	-21.91	-3356.72	-228789.48	2429.57	24.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	51747.16	1640.14	-2896.05	-196984.81	-109924.74	-53.46
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	51747.16	2862.71	-1659.38	-112522.37	-192824.81	-116.62
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	51747.16	3318.22	21.91	1966.18	-224057.62	-148.53
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	51747.16	2884.62	1697.34	115803.72	-195254.37	-140.64
1.2 Dead+1.0 Wind 150	51747.16	1678.09	2917.96	198487.58	-114132.87	-95.07

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	51747.16	21.91	3356.72	227862.69	-2429.57	-24.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	51747.16	-1640.14	2896.05	196058.01	109924.73	53.46
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	51747.16	-2862.71	1659.38	111595.58	192824.80	116.62
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	51747.16	-3318.22	-21.91	-2892.96	224057.62	148.53
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	51747.16	-2884.62	-1697.34	-116730.51	195254.37	140.64
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	51747.16	-1678.09	-2917.96	-199414.37	114132.88	95.07
Dead+Wind 0 deg - Service	29555.46	-43.81	-3836.91	-275392.86	4817.30	49.56
Dead+Wind 30 deg - Service	29555.46	1843.36	-3300.96	-236099.46	-129398.06	-93.50
Dead+Wind 60 deg - Service	29555.46	3236.60	-1880.52	-133565.13	-228941.33	-211.51
Dead+Wind 90 deg - Service	29555.46	3762.60	43.81	4736.12	-267139.95	-272.84
Dead+Wind 120 deg - Service	29555.46	3280.41	1956.39	141746.58	-233758.63	-261.07
Dead+Wind 150 deg - Service	29555.46	1919.24	3344.77	240754.39	-137741.88	-179.34
Dead+Wind 180 deg - Service	29555.46	43.81	3836.91	275230.52	-4817.31	-49.56
Dead+Wind 210 deg - Service	29555.46	-1843.36	3300.96	235937.11	129398.07	93.50
Dead+Wind 240 deg - Service	29555.46	-3236.60	1880.52	133402.78	228941.34	211.51
Dead+Wind 270 deg - Service	29555.46	-3762.60	-43.81	-4898.49	267139.95	272.84
Dead+Wind 300 deg - Service	29555.46	-3280.41	-1956.39	-141908.94	233758.62	261.07
Dead+Wind 330 deg - Service	29555.46	-1919.24	-3344.77	-240916.74	137741.86	179.34

Solution Summary

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
1	0.00	-29555.46	0.00	0.00	29555.46	0.00	0.000%
2	-179.92	-35466.56	-15756.22	179.91	35466.55	15755.60	0.002%
3	-179.92	-26599.92	-15756.22	179.91	26599.91	15755.76	0.001%
4	7569.69	-35466.56	-13555.32	-7569.40	35466.55	13554.79	0.002%
5	7569.69	-26599.92	-13555.32	-7569.47	26599.91	13554.93	0.001%
6	13291.00	-35466.56	-7722.29	-13290.49	35466.55	7721.99	0.002%
7	13291.00	-26599.92	-7722.29	-13290.63	26599.91	7722.07	0.001%
8	15451.01	-35466.56	179.92	-15450.41	35466.55	-179.91	0.002%
9	15451.01	-26599.92	179.92	-15450.57	26599.91	-179.91	0.001%
10	13470.93	-35466.56	8033.92	-13470.40	35466.55	-8033.60	0.002%
11	13470.93	-26599.92	8033.92	-13470.54	26599.91	-8033.69	0.001%
12	7881.32	-35466.56	13735.24	-7881.01	35466.55	-13734.70	0.002%
13	7881.32	-26599.92	13735.24	-7881.09	26599.91	-13734.84	0.001%
14	179.92	-35466.56	15756.22	-179.91	35466.55	-15755.60	0.002%
15	179.92	-26599.92	15756.22	-179.91	26599.91	-15755.76	0.001%
16	-7569.69	-35466.56	13555.32	7569.40	35466.55	-13554.79	0.002%
17	-7569.69	-26599.92	13555.32	7569.47	26599.91	-13554.93	0.001%
18	-13291.00	-35466.56	7722.29	13290.49	35466.55	-7721.99	0.002%
19	-13291.00	-26599.92	7722.29	13290.63	26599.91	-7722.07	0.001%
20	-15451.01	-35466.56	-179.92	15450.41	35466.55	179.91	0.002%
21	-15451.01	-26599.92	-179.92	15450.57	26599.91	179.91	0.001%
22	-13470.93	-35466.56	-8033.92	13470.84	35466.56	8033.87	0.000%
23	-13470.93	-26599.92	-8033.92	13470.54	26599.91	8033.69	0.001%
24	-7881.32	-35466.56	-13735.24	7881.01	35466.55	13734.70	0.002%
25	-7881.32	-26599.92	-13735.24	7881.09	26599.91	13734.84	0.001%
26	0.00	-51747.16	0.00	0.00	51747.16	0.00	0.000%
27	-21.91	-51747.16	-3356.74	21.91	51747.16	3356.72	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
28	1640.15	-51747.16	-2896.07	-1640.14	51747.16	2896.05	0.000%
29	2862.73	-51747.16	-1659.39	-2862.71	51747.16	1659.38	0.000%
30	3318.25	-51747.16	21.91	-3318.22	51747.16	-21.91	0.000%
31	2884.64	-51747.16	1697.35	-2884.62	51747.16	-1697.34	0.000%
32	1678.10	-51747.16	2917.98	-1678.09	51747.16	-2917.96	0.000%
33	21.91	-51747.16	3356.74	-21.91	51747.16	-3356.72	0.000%
34	-1640.15	-51747.16	2896.07	1640.14	51747.16	-2896.05	0.000%
35	-2862.73	-51747.16	1659.39	2862.71	51747.16	-1659.38	0.000%
36	-3318.25	-51747.16	-21.91	3318.22	51747.16	21.91	0.000%
37	-2884.64	-51747.16	-1697.35	2884.62	51747.16	1697.34	0.000%
38	-1678.10	-51747.16	-2917.98	1678.09	51747.16	2917.96	0.000%
39	-43.82	-29555.46	-3837.55	43.81	29555.46	3836.91	0.002%
40	1843.66	-29555.46	-3301.51	-1843.36	29555.46	3300.96	0.002%
41	3237.13	-29555.46	-1880.82	-3236.60	29555.46	1880.52	0.002%
42	3763.21	-29555.46	43.82	-3762.60	29555.46	-43.81	0.002%
43	3280.95	-29555.46	1956.73	-3280.41	29555.46	-1956.39	0.002%
44	1919.56	-29555.46	3345.33	-1919.24	29555.46	-3344.77	0.002%
45	43.82	-29555.46	3837.55	-43.81	29555.46	-3836.91	0.002%
46	-1843.66	-29555.46	3301.51	1843.36	29555.46	-3300.96	0.002%
47	-3237.13	-29555.46	1880.82	3236.60	29555.46	-1880.52	0.002%
48	-3763.21	-29555.46	-43.82	3762.60	29555.46	43.81	0.002%
49	-3280.95	-29555.46	-1956.73	3280.41	29555.46	1956.39	0.002%
50	-1919.56	-29555.46	-3345.33	1919.24	29555.46	3344.77	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	8	0.00000001	0.00007882
3	Yes	8	0.00000001	0.00007526
4	Yes	8	0.00000001	0.00008544
5	Yes	8	0.00000001	0.00007779
6	Yes	8	0.00000001	0.00013521
7	Yes	8	0.00000001	0.00012378
8	Yes	8	0.00000001	0.00010704
9	Yes	8	0.00000001	0.00010053
10	Yes	8	0.00000001	0.00009695
11	Yes	8	0.00000001	0.00008785
12	Yes	8	0.00000001	0.00014264
13	Yes	8	0.00000001	0.00012970
14	Yes	8	0.00000001	0.00008064
15	Yes	8	0.00000001	0.00007685
16	Yes	8	0.00000001	0.00011420
17	Yes	8	0.00000001	0.00010428
18	Yes	8	0.00000001	0.00008387
19	Yes	8	0.00000001	0.00007648
20	Yes	8	0.00000001	0.00011367
21	Yes	8	0.00000001	0.00010648
22	Yes	9	0.00000001	0.00004518
23	Yes	8	0.00000001	0.00014235
24	Yes	8	0.00000001	0.00009134
25	Yes	8	0.00000001	0.00008249
26	Yes	6	0.00000001	0.00000001
27	Yes	9	0.00000001	0.00006178
28	Yes	9	0.00000001	0.00006092

29	Yes	9	0.00000001	0.00006011
30	Yes	9	0.00000001	0.00006011
31	Yes	9	0.00000001	0.00006127
32	Yes	9	0.00000001	0.00006188
33	Yes	9	0.00000001	0.00006127
34	Yes	9	0.00000001	0.00006046
35	Yes	9	0.00000001	0.00005984
36	Yes	9	0.00000001	0.00006012
37	Yes	9	0.00000001	0.00006155
38	Yes	9	0.00000001	0.00006233
39	Yes	7	0.00000001	0.00008758
40	Yes	7	0.00000001	0.00008388
41	Yes	7	0.00000001	0.00008294
42	Yes	7	0.00000001	0.00008526
43	Yes	7	0.00000001	0.00008566
44	Yes	7	0.00000001	0.00008717
45	Yes	7	0.00000001	0.00008749
46	Yes	7	0.00000001	0.00008397
47	Yes	7	0.00000001	0.00008254
48	Yes	7	0.00000001	0.00008530
49	Yes	7	0.00000001	0.00008616
50	Yes	7	0.00000001	0.00008689

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 80	2.121	50	0.1508	0.0007
L2	86 - 46.083	1.385	50	0.1383	0.0004
L3	52.9996 - 1	0.558	50	0.0937	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
110.00	(2) NHH-45C-R2B	50	2.121	0.1508	0.0007	362578

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 80	8.720	24	0.6199	0.0028
L2	86 - 46.083	5.694	24	0.5687	0.0017
L3	52.9996 - 1	2.295	24	0.3855	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
110.00	(2) NHH-45C-R2B	24	8.720	0.6199	0.0028	88336

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
L1	110 - 108.737	TP43.175x36.091x0.375	30.00	109.00	102.3	42.8660	-9755.58	925216.00	0.011
	108.737 - 107.474					43.2210	-10089.10	948395.00	0.011
	107.474 - 106.211					43.5760	-5361.04	971958.00	0.006
	106.211 - 104.947					43.9310	-5589.81	995909.00	0.006
	104.947 - 103.684					44.2861	-5820.44	1020250.00	0.006
	103.684 - 102.421					44.6411	-6052.92	1044980.00	0.006
	102.421 - 101.158					44.9961	-6287.25	1070110.00	0.006
	101.158 - 99.8947					45.3511	-6523.45	1095640.00	0.006
	99.8947 - 98.6316					45.7062	-6761.50	1121580.00	0.006
	98.6316 - 97.3684					46.0612	-7001.42	1147910.00	0.006
	97.3684 - 96.1053					46.4162	-7243.19	1174660.00	0.006
	96.1053 - 94.8421					46.7712	-7486.83	1201820.00	0.006
	94.8421 - 93.5789					47.1262	-7732.33	1229400.00	0.006
	93.5789 - 92.3158					47.4813	-7979.69	1257390.00	0.006
	92.3158 - 91.0526					47.8363	-8228.93	1285810.00	0.006
	91.0526 - 89.7895					48.1913	-8480.02	1314650.00	0.006
	89.7895 - 88.5263					48.5463	-8732.99	1343920.00	0.006
	88.5263 - 87.2632					48.9013	-8987.82	1373620.00	0.007
	87.2632 - 86					49.2564	-9244.53	1403480.00	0.007
	86 - 80					50.9427	-5902.32	1540360.00	0.004
L2	86 - 80	TP50.434x41.0082x0.375	39.92	109.00	87.6	50.0500	-5790.32	1467870.00	0.004
	80 - 78.5					50.4716	-12005.60	1502100.00	0.008
	78.5 - 77					50.8932	-12320.70	1536340.00	0.008
	77 - 75.4999					51.3148	-12638.50	1570570.00	0.008
	75.4999 -					51.7364	-12958.90	1604780.00	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
	73.9999								
	73.9999 - 72.4999					52.1580	-13282.00	1638970.00	0.008
	72.4999 - 70.9999					52.5796	-13607.80	1673110.00	0.008
	70.9999 - 69.4998					53.0012	-13936.20	1707210.00	0.008
	69.4998 - 67.9998					53.4228	-14267.30	1741260.00	0.008
	67.9998 - 66.4998					53.8444	-14601.00	1775240.00	0.008
	66.4998 - 64.9998					54.2660	-14937.40	1809150.00	0.008
	64.9998 - 63.4998					54.6876	-15276.50	1842980.00	0.008
	63.4998 - 61.9997					55.1092	-15618.20	1876720.00	0.008
	61.9997 - 60.4997					55.5308	-15962.60	1910370.00	0.008
	60.4997 - 58.9997					55.9524	-16309.70	1943920.00	0.008
	58.9997 - 57.4997					56.3740	-16659.40	1977350.00	0.008
	57.4997 - 55.9996					56.7956	-17011.80	2010680.00	0.008
	55.9996 - 54.4996					57.2172	-17366.90	2043880.00	0.008
	54.4996 - 52.9996					57.6387	-17724.60	2076950.00	0.009
	52.9996 - 46.083					59.5827	-9924.23	2227660.00	0.004
L3	52.9996 - 46.083	TP60.33x48.0507x0.4375	52.00	109.00	74.8	68.3850	-11376.80	2557530.00	0.004
	46.083 - 43.7102					69.1630	-21977.50	2621640.00	0.008
	43.7102 - 41.3374					69.9411	-22661.00	2685430.00	0.008
	41.3374 - 38.9646					70.7192	-23352.10	2748880.00	0.008
	38.9646 - 36.5918					71.4972	-24051.00	2811960.00	0.009
	36.5918 - 34.2191					72.2753	-24757.70	2874670.00	0.009
	34.2191 - 31.8463					73.0534	-25472.10	2936970.00	0.009
	31.8463 - 29.4735					73.8314	-26194.30	2998860.00	0.009
	29.4735 - 27.1007					74.6095	-26924.10	3060320.00	0.009
	27.1007 - 24.7279					75.3876	-27661.80	3121340.00	0.009
	24.7279 - 22.3551					76.1656	-28407.20	3181890.00	0.009
	22.3551 - 19.9823					76.9437	-29160.30	3241980.00	0.009
	19.9823 - 17.6095					77.7218	-29921.10	3301590.00	0.009
	17.6095 - 15.2367					78.4998	-30689.70	3360700.00	0.009
	15.2367 -					79.2779	-31466.10	3419320.00	0.009

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	P_n lb	Ratio $\frac{P_u}{P_n}$
	12.8639								
	12.8639 - 10.4912					80.0560	-32250.10	3477430.00	0.009
	10.4912 - 8.11837					80.8340	-33041.90	3535020.00	0.009
	8.11837 - 5.74558					81.6121	-33841.50	3592080.00	0.009
	5.74558 - 3.37279					82.3902	-34648.70	3648620.00	0.009
	3.37279 - 1					83.1682	-35463.70	3704610.00	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} lb-ft	M_{nx} lb-ft	Ratio $\frac{M_{ux}}{M_{nx}}$	M_{uy} lb-ft	M_{ny} lb-ft	Ratio $\frac{M_{uy}}{M_{ny}}$
L1	110 - 108.737	TP43.175x36.091x0.375	1468.67	2352558.33	0.001	0.00	2352558.33	0.000
	108.737 - 107.474		2520.88	2391891.67	0.001	0.00	2391891.67	0.000
	107.474 - 106.211		19771.00	2431550.00	0.008	0.00	2431550.00	0.000
	106.211 - 104.947		26624.50	2471533.33	0.011	0.00	2471533.33	0.000
	104.947 - 103.684		33625.50	2511850.00	0.013	0.00	2511850.00	0.000
	103.684 - 102.421		40775.17	2552483.33	0.016	0.00	2552483.33	0.000
	102.421 - 101.158		48074.67	2588575.00	0.019	0.00	2588575.00	0.000
	101.158 - 99.8947		55525.08	2624533.33	0.021	0.00	2624533.33	0.000
	99.8947 - 98.6316		63127.50	2660650.00	0.024	0.00	2660650.00	0.000
	98.6316 - 97.3684		70883.00	2696925.00	0.026	0.00	2696925.00	0.000
	97.3684 - 96.1053		78792.83	2733350.00	0.029	0.00	2733350.00	0.000
	96.1053 - 94.8421		86858.33	2769933.33	0.031	0.00	2769933.33	0.000
	94.8421 - 93.5789		95080.00	2806666.67	0.034	0.00	2806666.67	0.000
	93.5789 - 92.3158		103459.17	2843550.00	0.036	0.00	2843550.00	0.000
	92.3158 - 91.0526		111996.67	2880583.33	0.039	0.00	2880583.33	0.000
	91.0526 - 89.7895		120695.00	2917758.33	0.041	0.00	2917758.33	0.000
	89.7895 - 88.5263		129553.33	2955083.33	0.044	0.00	2955083.33	0.000
	88.5263 - 87.2632		138573.33	2992541.67	0.046	0.00	2992541.67	0.000
	87.2632 - 86		147757.50	3030150.00	0.049	0.00	3030150.00	0.000
	86 - 80		99600.83	3210616.67	0.031	0.00	3210616.67	0.000
L2	86 - 80	TP50.434x41.0082x0.375	94080.00	3114708.33	0.030	0.00	3114708.33	0.000
	80 - 78.5		205757.50	3159900.00	0.065	0.00	3159900.00	0.000
	78.5 - 77		218059.17	3205275.00	0.068	0.00	3205275.00	0.000

Section No.	Elevation	Size	M_{ux}	M_{nx}	Ratio $\frac{M_{ux}}{M_{nx}}$	M_{uy}	M_{ny}	Ratio $\frac{M_{uy}}{M_{ny}}$
	ft		lb-ft	lb-ft		lb-ft	lb-ft	
	77 - 75.4999		230587.50	3250833.33	0.071	0.00	3250833.33	0.000
	75.4999 - 73.9999		243341.67	3296575.00	0.074	0.00	3296575.00	0.000
	73.9999 - 72.4999		256324.17	3342483.33	0.077	0.00	3342483.33	0.000
	72.4999 - 70.9999		269534.17	3388566.67	0.080	0.00	3388566.67	0.000
	70.9999 - 69.4998		282972.50	3434825.00	0.082	0.00	3434825.00	0.000
	69.4998 - 67.9998		296641.67	3481241.67	0.085	0.00	3481241.67	0.000
	67.9998 - 66.4998		310540.00	3527825.00	0.088	0.00	3527825.00	0.000
	66.4998 - 64.9998		324670.00	3574566.67	0.091	0.00	3574566.67	0.000
	64.9998 - 63.4998		339030.83	3621458.33	0.094	0.00	3621458.33	0.000
	63.4998 - 61.9997		353624.17	3668508.33	0.096	0.00	3668508.33	0.000
	61.9997 - 60.4997		368450.83	3715708.33	0.099	0.00	3715708.33	0.000
	60.4997 - 58.9997		383510.83	3763050.00	0.102	0.00	3763050.00	0.000
	58.9997 - 57.4997		398805.00	3810541.67	0.105	0.00	3810541.67	0.000
	57.4997 - 55.9996		414334.17	3858166.67	0.107	0.00	3858166.67	0.000
	55.9996 - 54.4996		430099.17	3905925.00	0.110	0.00	3905925.00	0.000
	54.4996 - 52.9996		446100.83	3953825.00	0.113	0.00	3953825.00	0.000
	52.9996 - 46.083		248118.33	4176300.00	0.059	0.00	4176300.00	0.000
L3	52.9996 - 46.083	TP60.33x48.0507x0.4375	274911.67	4978683.33	0.055	0.00	4978683.33	0.000
	46.083 - 43.7102		550603.33	5076241.67	0.108	0.00	5076241.67	0.000
	43.7102 - 41.3374		578745.83	5174333.33	0.112	0.00	5174333.33	0.000
	41.3374 - 38.9646		607454.17	5272941.67	0.115	0.00	5272941.67	0.000
	38.9646 - 36.5918		636725.00	5372050.00	0.119	0.00	5372050.00	0.000
	36.5918 - 34.2191		666555.83	5471666.67	0.122	0.00	5471666.67	0.000
	34.2191 - 31.8463		696943.33	5571750.00	0.125	0.00	5571750.00	0.000
	31.8463 - 29.4735		727884.17	5672316.67	0.128	0.00	5672316.67	0.000
	29.4735 - 27.1007		759374.17	5773324.67	0.132	0.00	5773324.67	0.000
	27.1007 - 24.7279		791410.83	5874783.33	0.135	0.00	5874783.33	0.000
	24.7279 - 22.3551		823991.67	5976666.67	0.138	0.00	5976666.67	0.000
	22.3551 - 19.9823		857108.33	6078974.67	0.141	0.00	6078974.67	0.000
	19.9823 - 17.6095		890766.67	6181683.33	0.144	0.00	6181683.33	0.000
	17.6095 -		924958.33	6284774.67	0.147	0.00	6284774.67	0.000

Section No.	Elevation ft	Size	M_{ux} lb-ft	M_{nx} lb-ft	Ratio $\frac{M_{ux}}{M_{nx}}$	M_{uy} lb-ft	M_{ny} lb-ft	Ratio $\frac{M_{uy}}{M_{ny}}$
	15.2367							
	15.2367 - 12.8639		959683.33	6388250.00	0.150	0.00	6388250.00	0.000
	12.8639 - 10.4912		994925.00	6492091.33	0.153	0.00	6492091.33	0.000
	10.4912 - 8.11837		1030700.00	6596283.33	0.156	0.00	6596283.33	0.000
	8.11837 - 5.74558		1066983.33	6700816.67	0.159	0.00	6700816.67	0.000
	5.74558 - 3.37279		1103791.67	6805674.67	0.162	0.00	6805674.67	0.000
	3.37279 - 1		1141108.33	6910841.33	0.165	0.00	6910841.33	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u lb	V_n lb	Ratio $\frac{V_u}{V_n}$	Actual T_u lb-ft	T_n lb-ft	Ratio $\frac{T_u}{T_n}$
L1	110 - 108.737	TP43.175x36.091x0.375	819.65	1592360.00	0.001	24.02	4718266.67	0.000
	108.737 - 107.474		847.46	1605550.00	0.001	24.02	4797083.33	0.000
	107.474 - 106.211		5368.74	1618740.00	0.003	736.39	4876558.33	0.000
	106.211 - 104.947		5485.13	1631930.00	0.003	736.39	4956691.67	0.000
	104.947 - 103.684		5602.42	1645120.00	0.003	736.39	5037475.00	0.000
	103.684 - 102.421		5720.60	1658300.00	0.003	736.39	5118908.33	0.000
	102.421 - 101.158		5839.67	1668360.00	0.004	736.39	5191233.33	0.000
	101.158 - 99.8947		5959.62	1678160.00	0.004	736.39	5263283.33	0.000
	99.8947 - 98.6316		6080.47	1687910.00	0.004	736.39	5335641.67	0.000
	98.6316 - 97.3684		6202.19	1697610.00	0.004	736.39	5408325.00	0.000
	97.3684 - 96.1053		6324.80	1707250.00	0.004	736.39	5481316.67	0.000
	96.1053 - 94.8421		6448.28	1716850.00	0.004	736.39	5554616.67	0.000
	94.8421 - 93.5789		6572.63	1726390.00	0.004	736.39	5628224.67	0.000
	93.5789 - 92.3158		6697.85	1735870.00	0.004	736.39	5702124.67	0.000
	92.3158 - 91.0526		6823.95	1745310.00	0.004	736.39	5776324.67	0.000
	91.0526 - 89.7895		6950.91	1754690.00	0.004	736.38	5850816.67	0.000
	89.7895 - 88.5263		7078.73	1764020.00	0.004	736.38	5925591.33	0.000
	88.5263 - 87.2632		7207.41	1773300.00	0.004	736.38	6000650.00	0.000
	87.2632 - 86		7336.95	1782520.00	0.004	736.38	6076000.00	0.000
	86 - 80		4247.84	1825620.00	0.002	378.10	6437574.67	0.000
L2	86 - 80	TP50.434x41.0082x0.375	3729.71	1802950.00	0.002	358.28	6245424.67	0.000

Section No.	Elevation ft	Size	Actual V_u lb	V_n lb	Ratio $\frac{V_u}{V_n}$	Actual T_u lb-ft	T_n lb-ft	Ratio $\frac{T_u}{T_n}$
	80 - 78.5		8127.76	1813700.00	0.004	736.38	6335966.67	0.000
	78.5 - 77		8278.22	1824370.00	0.005	736.38	6426883.33	0.000
	77 - 75.4999		8429.16	1834970.00	0.005	736.38	6518158.00	0.000
	75.4999 - 73.9999		8580.58	1845490.00	0.005	736.38	6609800.00	0.000
	73.9999 - 72.4999		8732.48	1855940.00	0.005	736.37	6701783.33	0.000
	72.4999 - 70.9999		8884.84	1866320.00	0.005	736.37	6794116.67	0.000
	70.9999 - 69.4998		9037.67	1876620.00	0.005	736.37	6886783.33	0.000
	69.4998 - 67.9998		9190.96	1886850.00	0.005	736.37	6979783.33	0.000
	67.9998 - 66.4998		9344.71	1897000.00	0.005	736.37	7073108.00	0.000
	66.4998 - 64.9998		9498.92	1907080.00	0.005	736.37	7166758.00	0.000
	64.9998 - 63.4998		9653.57	1917080.00	0.005	736.36	7260708.00	0.000
	63.4998 - 61.9997		9808.68	1927010.00	0.005	736.36	7354966.67	0.000
	61.9997 - 60.4997		9964.24	1936870.00	0.005	736.36	7449533.33	0.000
	60.4997 - 58.9997		10120.20	1946650.00	0.005	736.36	7544383.33	0.000
	58.9997 - 57.4997		10276.70	1956360.00	0.005	736.36	7639516.67	0.000
	57.4997 - 55.9996		10433.50	1965990.00	0.005	736.36	7734933.33	0.000
	55.9996 - 54.4996		10590.80	1975550.00	0.005	736.35	7830616.67	0.000
	54.4996 - 52.9996		10748.60	1985040.00	0.005	736.35	7926574.67	0.000
	52.9996 - 46.083		5647.98	2027810.00	0.003	348.99	8372250.00	0.000
L3	52.9996 - 46.083	TP60.33x48.0507x0.4375	5857.08	2460690.00	0.002	387.35	9982916.67	0.000
	46.083 - 43.7102		11744.30	2480440.00	0.005	736.35	10178333.33	0.000
	43.7102 - 41.3374		11983.60	2500000.00	0.005	736.34	10374916.67	0.000
	41.3374 - 38.9646		12221.60	2519380.00	0.005	736.34	10572416.67	0.000
	38.9646 - 36.5918		12458.30	2538560.00	0.005	736.34	10771000.00	0.000
	36.5918 - 34.2191		12693.60	2557570.00	0.005	736.34	10970583.33	0.000
	34.2191 - 31.8463		12927.60	2576390.00	0.005	736.33	11171166.67	0.000
	31.8463 - 29.4735		13160.20	2595020.00	0.005	736.33	11372582.67	0.000
	29.4735 - 27.1007		13391.50	2613460.00	0.005	736.33	11575000.00	0.000
	27.1007 - 24.7279		13621.30	2631730.00	0.005	736.33	11778249.33	0.000
	24.7279 - 22.3551		13849.80	2649800.00	0.005	736.33	11982333.33	0.000
	22.3551 - 19.9823		14076.80	2667690.00	0.005	736.32	12187333.33	0.000
	19.9823 -		14302.50	2685390.00	0.005	736.32	12393082.67	0.000

Section No.	Elevation ft	Size	Actual V_u lb	V_n lb	Ratio $\frac{V_u}{V_n}$	Actual T_u lb-ft	T_n lb-ft	Ratio $\frac{T_u}{T_n}$
	17.6095							
	17.6095 - 15.2367		14526.70	2702910.00	0.005	736.32	12599666.67	0.000
	15.2367 - 12.8639		14749.40	2720240.00	0.005	736.32	12806916.00	0.000
	12.8639 - 10.4912		14970.80	2737390.00	0.005	736.32	13014916.00	0.000
	10.4912 - 8.11837		15190.70	2754350.00	0.006	736.32	13223666.67	0.000
	8.11837 - 5.74558		15409.10	2771130.00	0.006	736.32	13433082.67	0.000
	5.74558 - 3.37279		15626.00	2787720.00	0.006	736.32	13643166.67	0.000
	3.37279 - 1		15841.50	2804120.00	0.006	736.32	13853833.33	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{P_n}$	Ratio $\frac{M_{ux}}{M_{nx}}$	Ratio $\frac{M_{uy}}{M_{ny}}$	Ratio $\frac{V_u}{V_n}$	Ratio $\frac{T_u}{T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 108.737	0.011	0.001	0.000	0.001	0.000	0.011 ✔	1.000	4.8.2 ✔
	108.737 - 107.474	0.011	0.001	0.000	0.001	0.000	0.012 ✔	1.000	4.8.2 ✔
	107.474 - 106.211	0.006	0.008	0.000	0.003	0.000	0.014 ✔	1.000	4.8.2 ✔
	106.211 - 104.947	0.006	0.011	0.000	0.003	0.000	0.016 ✔	1.000	4.8.2 ✔
	104.947 - 103.684	0.006	0.013	0.000	0.003	0.000	0.019 ✔	1.000	4.8.2 ✔
	103.684 - 102.421	0.006	0.016	0.000	0.003	0.000	0.022 ✔	1.000	4.8.2 ✔
	102.421 - 101.158	0.006	0.019	0.000	0.004	0.000	0.024 ✔	1.000	4.8.2 ✔
	101.158 - 99.8947	0.006	0.021	0.000	0.004	0.000	0.027 ✔	1.000	4.8.2 ✔
	99.8947 - 98.6316	0.006	0.024	0.000	0.004	0.000	0.030 ✔	1.000	4.8.2 ✔
	98.6316 - 97.3684	0.006	0.026	0.000	0.004	0.000	0.032 ✔	1.000	4.8.2 ✔
	97.3684 - 96.1053	0.006	0.029	0.000	0.004	0.000	0.035 ✔	1.000	4.8.2 ✔
	96.1053 - 94.8421	0.006	0.031	0.000	0.004	0.000	0.038 ✔	1.000	4.8.2 ✔
	94.8421 - 93.5789	0.006	0.034	0.000	0.004	0.000	0.040 ✔	1.000	4.8.2 ✔
	93.5789 - 92.3158	0.006	0.036	0.000	0.004	0.000	0.043 ✔	1.000	4.8.2 ✔
	92.3158 - 91.0526	0.006	0.039	0.000	0.004	0.000	0.045 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio P_u / P_n	Ratio M_{ux} / M_{nx}	Ratio M_{uy} / M_{ny}	Ratio V_u / V_n	Ratio T_u / T_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	91.0526 - 89.7895	0.006	0.041	0.000	0.004	0.000	0.048 ✔	1.000	4.8.2 ✔
	89.7895 - 88.5263	0.006	0.044	0.000	0.004	0.000	0.050 ✔	1.000	4.8.2 ✔
	88.5263 - 87.2632	0.007	0.046	0.000	0.004	0.000	0.053 ✔	1.000	4.8.2 ✔
	87.2632 - 86	0.007	0.049	0.000	0.004	0.000	0.055 ✔	1.000	4.8.2 ✔
	86 - 80	0.004	0.031	0.000	0.002	0.000	0.035 ✔	1.000	4.8.2 ✔
L2	86 - 80	0.004	0.030	0.000	0.002	0.000	0.034 ✔	1.000	4.8.2 ✔
	80 - 78.5	0.008	0.065	0.000	0.004	0.000	0.073 ✔	1.000	4.8.2 ✔
	78.5 - 77	0.008	0.068	0.000	0.005	0.000	0.076 ✔	1.000	4.8.2 ✔
	77 - 75.4999	0.008	0.071	0.000	0.005	0.000	0.079 ✔	1.000	4.8.2 ✔
	75.4999 - 73.9999	0.008	0.074	0.000	0.005	0.000	0.082 ✔	1.000	4.8.2 ✔
	73.9999 - 72.4999	0.008	0.077	0.000	0.005	0.000	0.085 ✔	1.000	4.8.2 ✔
	72.4999 - 70.9999	0.008	0.080	0.000	0.005	0.000	0.088 ✔	1.000	4.8.2 ✔
	70.9999 - 69.4998	0.008	0.082	0.000	0.005	0.000	0.091 ✔	1.000	4.8.2 ✔
	69.4998 - 67.9998	0.008	0.085	0.000	0.005	0.000	0.093 ✔	1.000	4.8.2 ✔
	67.9998 - 66.4998	0.008	0.088	0.000	0.005	0.000	0.096 ✔	1.000	4.8.2 ✔
	66.4998 - 64.9998	0.008	0.091	0.000	0.005	0.000	0.099 ✔	1.000	4.8.2 ✔
	64.9998 - 63.4998	0.008	0.094	0.000	0.005	0.000	0.102 ✔	1.000	4.8.2 ✔
	63.4998 - 61.9997	0.008	0.096	0.000	0.005	0.000	0.105 ✔	1.000	4.8.2 ✔
	61.9997 - 60.4997	0.008	0.099	0.000	0.005	0.000	0.108 ✔	1.000	4.8.2 ✔
	60.4997 - 58.9997	0.008	0.102	0.000	0.005	0.000	0.110 ✔	1.000	4.8.2 ✔
	58.9997 - 57.4997	0.008	0.105	0.000	0.005	0.000	0.113 ✔	1.000	4.8.2 ✔
	57.4997 - 55.9996	0.008	0.107	0.000	0.005	0.000	0.116 ✔	1.000	4.8.2 ✔
	55.9996 - 54.4996	0.008	0.110	0.000	0.005	0.000	0.119 ✔	1.000	4.8.2 ✔
	54.4996 - 52.9996	0.009	0.113	0.000	0.005	0.000	0.121 ✔	1.000	4.8.2 ✔
	52.9996 - 46.083	0.004	0.059	0.000	0.003	0.000	0.064 ✔	1.000	4.8.2 ✔
L3	52.9996 - 46.083	0.004	0.055	0.000	0.002	0.000	0.060 ✔	1.000	4.8.2 ✔

Section No.	Elevation ft	Ratio P_u / P_n	Ratio M_{ux} / M_{nx}	Ratio M_{uy} / M_{ny}	Ratio V_u / V_n	Ratio T_u / T_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	46.083 - 43.7102	0.008	0.108	0.000	0.005	0.000	0.117 ✔	1.000	4.8.2 ✔
	43.7102 - 41.3374	0.008	0.112	0.000	0.005	0.000	0.120 ✔	1.000	4.8.2 ✔
	41.3374 - 38.9646	0.008	0.115	0.000	0.005	0.000	0.124 ✔	1.000	4.8.2 ✔
	38.9646 - 36.5918	0.009	0.119	0.000	0.005	0.000	0.127 ✔	1.000	4.8.2 ✔
	36.5918 - 34.2191	0.009	0.122	0.000	0.005	0.000	0.130 ✔	1.000	4.8.2 ✔
	34.2191 - 31.8463	0.009	0.125	0.000	0.005	0.000	0.134 ✔	1.000	4.8.2 ✔
	31.8463 - 29.4735	0.009	0.128	0.000	0.005	0.000	0.137 ✔	1.000	4.8.2 ✔
	29.4735 - 27.1007	0.009	0.132	0.000	0.005	0.000	0.140 ✔	1.000	4.8.2 ✔
	27.1007 - 24.7279	0.009	0.135	0.000	0.005	0.000	0.144 ✔	1.000	4.8.2 ✔
	24.7279 - 22.3551	0.009	0.138	0.000	0.005	0.000	0.147 ✔	1.000	4.8.2 ✔
	22.3551 - 19.9823	0.009	0.141	0.000	0.005	0.000	0.150 ✔	1.000	4.8.2 ✔
	19.9823 - 17.6095	0.009	0.144	0.000	0.005	0.000	0.153 ✔	1.000	4.8.2 ✔
	17.6095 - 15.2367	0.009	0.147	0.000	0.005	0.000	0.156 ✔	1.000	4.8.2 ✔
	15.2367 - 12.8639	0.009	0.150	0.000	0.005	0.000	0.159 ✔	1.000	4.8.2 ✔
	12.8639 - 10.4912	0.009	0.153	0.000	0.005	0.000	0.163 ✔	1.000	4.8.2 ✔
	10.4912 - 8.11837	0.009	0.156	0.000	0.006	0.000	0.166 ✔	1.000	4.8.2 ✔
	8.11837 - 5.74558	0.009	0.159	0.000	0.006	0.000	0.169 ✔	1.000	4.8.2 ✔
	5.74558 - 3.37279	0.009	0.162	0.000	0.006	0.000	0.172 ✔	1.000	4.8.2 ✔
	3.37279 - 1	0.010	0.165	0.000	0.006	0.000	0.175 ✔	1.000	4.8.2 ✔

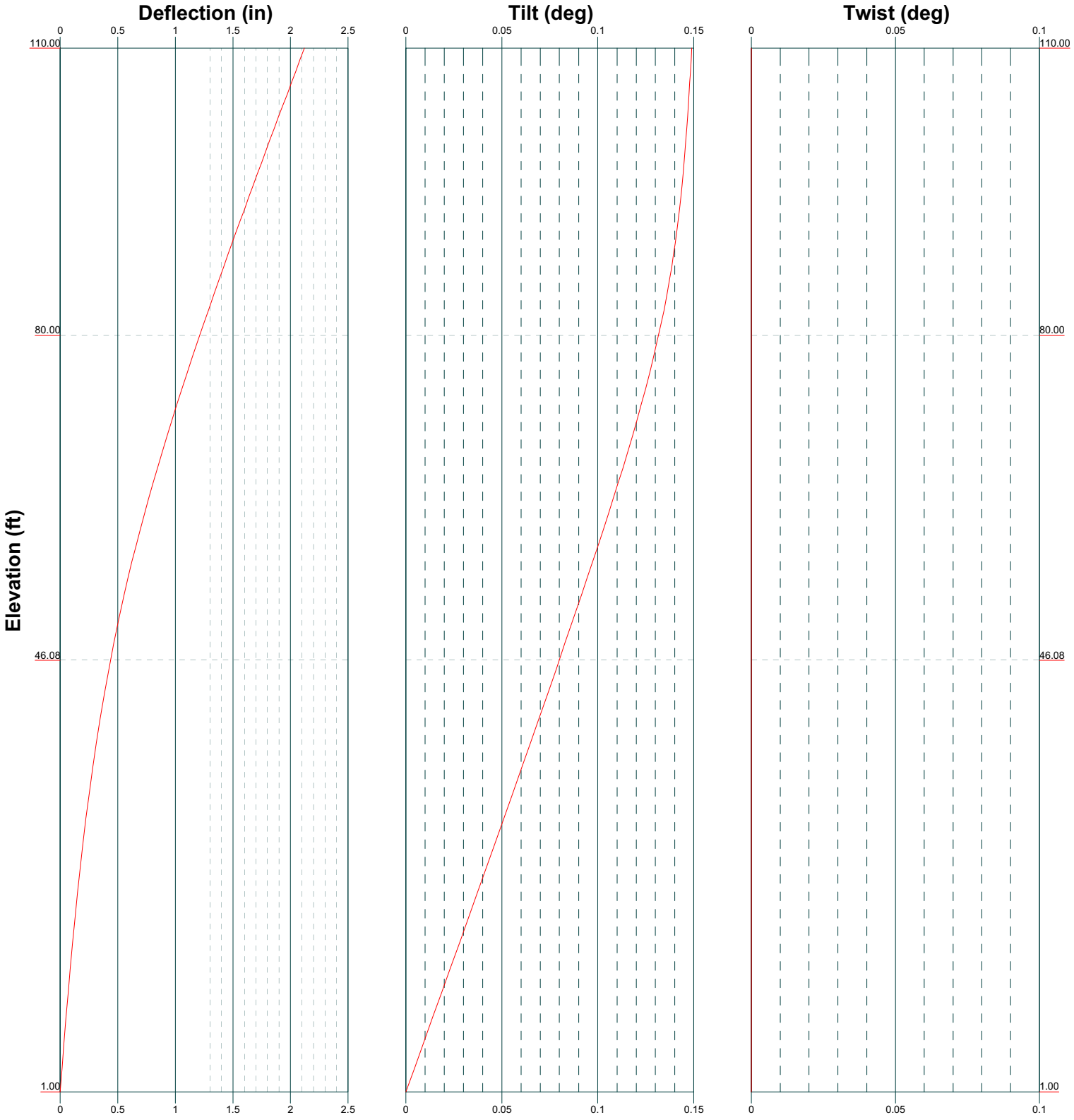
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	110 - 80	Pole	TP43.175x36.091x0.375	1	-9244.53	1403480.00	5.5	Pass
L2	80 - 46.083	Pole	TP50.434x41.0082x0.375	2	-17724.60	2076950.00	12.1	Pass
L3	46.083 - 1	Pole	TP60.33x48.0507x0.4375	3	-35463.70	3704610.00	17.5	Pass
							Summary	
						Pole (L3)	17.5	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
						RATING =	**17.5**	**Pass**

TIA-222-G - Service - 60 mph

Maximum Values



Structural Components, LLC
1870 West 64th Lane, Unit A
Denver, CO 80221
Phone: (866) 386-7622
FAX:

Job: ***210376***			
Project: ***Cornwall Sharon (CT-5001)***			
Client: BST Management, LLC	Drawn by: treed	App'd:	
Code: TIA-222-G	Date: 08/17/21	Scale: NTS	
Path:		Dwg No. E-5	

Seismic Analysis for Monopole Towers v. 4.0

Site: Cornwall Sharon (CT-5001)

Client: BST Management, LLC

By: Structural Components, LLC

8/17/2021

References:

TIA-222-G, IBC 2015, ASCE 7-10

Structure Class:	II-Significant Hazard if Fails and/or Outage is Disruptive		(Per TIA Table 2-1)
Importance Factor:	1.00		(Per TIA Table 2-3)
Occupancy Category:	II	(no special occupancy)	(IBC 2012)
Site Class:	D		(Per Geo. or Per TIA Table 2-11)
Tower Type:	Monopole Tower		
Tower Height:	109.0	ft	

Per Figure 1613.5(3) and 1613.5(4),

Ss:	0.180	g
S1:	0.065	g
Fa:	1.60	
Fv:	2.40	
S_{DS}:	0.19	g
S_{D1}:	0.10	g
Design Category:	B	

Method:	2	
R:	1.5	(Per Section 2.7.7.1)
SA:	0.09	

Fundamental Frequency Calculation

Pole Mat'l:	Steel	
E:	29000	ksi
L:	109.0	ft (structure height)
Iavg:	17944	in^4
Wt:	27	kip (total weight of structure and appurtenances)
Wu:	4	kip (weight of discrete apurtenances within top 36ft)
WL:	23	kip
f1:	0.86	Hz

Seismic Analysis Results

Section	Top Elev (ft)	Bot Elev (ft)	Mn (kip-ft)	Factored Flexure (kip-ft)	Saz	Ratio	Check
1	109.0	79.0	2,812	24	0.33	0.01	Pass
2	79.0	45.1	3,757	68	0.04	0.02	Pass
3	45.1	0.0	6,160	137	0.04	0.03	Pass

Seismic Reactions

Moment	Lateral	Axial
137.4	1.8	32.0

Base/Splice Plate & Anchor/Splice Bolt

Template "Plate&Connection.xmcd"
Version 2.00

Structural Components
Bringing It All Together.

1870 West 64th Lane, UnitA
Denver, CO 80221
866-386-7622

PROJECT DATA

Job 210376.0

Client "BST Management, LLC"

Site "Cornwall Sharon (CT-5001)"

Model "110ft Monopole"

DESIGN CODES AND STANDARDS

Code "ANSI/TIA-222-G, "Structural Standard for Antenna Supporting Structures and Antennas" 2005."
"ANSI/AISC 360-05, "Specifications for Structural Steel Buildings" 2005."

FACTORED FOUNDATION DESIGN REACTIONS

Overdesign Factor: α 1.00

Percentage for Passing: PP 100 %

	Load Comb. #1	Load Comb. #2	Load Comb. #3
Load Combination:	$Comb_1$ "1.2D + 1.0W"	$Comb_2$ "0.9D + 1.0W"	$Comb_3$ "1.2D + 1.0Di + 1.0W"
Moment Reaction:	M_1 1141.2 kip ft	M_2 1138.6 kip ft	M_3 229.8 kip ft
Axial Reactions:	P_1 35.5 kip	P_2 26.6 kip	P_3 51.8 kip
	P'_1 26.6 kip	P'_2 35.5 kip	P'_3 51.8 kip
Shear Reaction:	V_1 15.9 kip	V_2 15.9 kip	V_3 3.4 kip

TOWER BASE DETAILS

Plate Geometry:	$geom_{PL}$ "Round"	Pole Diameter @ Plate:	ϕ_{pole} 60.3 in
Plate Thickness:	t_{PL} 3.3 in	Plate OD or Width:	ϕ_{PL} 74.9 in
Plate Yield Strength:	fy_{PL} 50 ksi	Face Width of Clipped Plate:	W_{PL} 0.0 in
Plate Ultimate Strength:	fu_{PL} 65 ksi	Inner Plate Diameter:	ID_{PL} 0.0 in
Gussets?	gus "No"	Qty. Bolts Between Gussets:	BB_{gus} 0.00
Gusset Height:	h_{gus} 0.0 in	Gusset Thickness:	t_{gus} 0.0 in

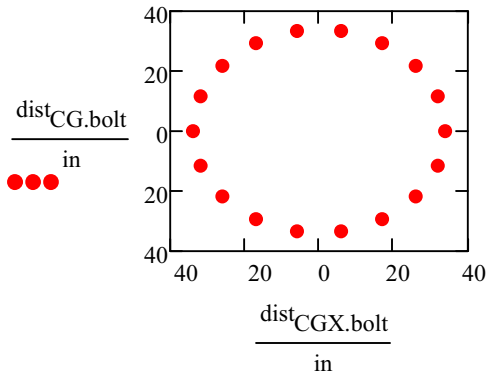
BOLT DETAILS

Bolt Diameter:	ϕ_{bolt} 2.250 in	Bolt Circle Diameter:	ϕ_{BC} 67.8 in
Threads per Inch:	tpi_{bolt} 4.5	Quantity of Bolts:	qty_{bolt} 18
Bolt Yield:	$f_{y.bolt}$ 75 ksi	Bolt Ult. Tens. Strength:	$f_{u.bolt}$ 100 ksi

Distance From Top of Concrete to Bottom Face of Leveling Nut (for baseplates): $l_{ar.bolt}$ 3.0 in

Bolt Layout: lay_{bolt} "Case A - Bolts are evenly distributed w/ a bolt positioned on the vertical axis of the pl

Nominal Bolt Area:	$A_{bolt.nom}$ 3.98 in^2	Tensile Root Diameter:	ϕ'_{bolt} 2.033 in
Area of All Bolts:	$A_{bolt.nom.T}$ 71.57 in^2	Tensile Root Area of Bolt:	$A_{bolt.tra}$ 3.25 in^2
		Area of All Bolts:	$A_{bolt.tra.T}$ 58.46 in^2
		Moment of Inertia of Bolt:	$I_{bolt.each}$ 0.84 in^4
		Plastic Section Modulus:	$Z_{bolt.tra}$ 1.40 in^3
		Moment of Inertia All Bolts:	$I_{bolt.T}$ 33565.9 in^4



BOLT CAPACITIES

	Per AISC	Per TIA
Nominal axial strength of bolt:	$Rnt_{bolt.AISC}$ 298.2 kip	$Rnt_{bolt.TIA}$ 324.8 kip
Nominal shear strength of bolt:	$Rnv_{bolt.AISC}$ 159.0 kip	$Rnv_{bolt.TIA}$ 178.9 kip
Nominal bending strength of bolt:	$Rnm_{bolt.AISC}$ 8.8 ft kip	$Rnm_{bolt.TIA}$ 8.8 ft kip

FACTORED LOADS

	Bolts
Compression:	Pu_{bolt} 46.9 kip
Tension:	Tu_{bolt} 46.9 kip
Shear:	Vu_{bolt} 0.9 kip
Moment:	Mu_{bolt} 0.1 ft kip

STRESS RATIOS

Bolts

$Bolt_{SR'}$ 0.21

$Check'_{Bolt.SR}$ "OK"

Base Plate

$Check_{PL'}$ "OK"

$Ratio'_{PL}$ 0.1

INDIVIDUAL PIER/PAD & MAT FOUNDATION

Template "PierPadMat.xmcd"
Version 4.03

Structural Components
Bringing It All Together.
1870 West 64th Lane, Unit A
Denver, CO 80221
866-386-7622

PROJECT DATA

Job 210376
Client "BST Management, LLC"
Site "Cornwall Sharon (CT-5001)"
Model "110ft Monopole"

DESIGN CODES AND STANDARD

Code "TIA-222-G, "Structural Standard for Antenna Supporting Structures and Antennas" 2005."
"ACI 318-08, "Building Code Requirements for Structural Concrete and Commentary," 2008."

FACTORED FOUNDATION DESIGN LOADS

Overdesign Factor: α 1.00 Percentage for Passing: PP 100 %

Calculation Mode: calc "Analysis (no seismic provision check)" reinf' "Reinforcing Details Available"

	Load Comb. #1	Load Comb. #2	Load Comb. #3
Load Combination:	$Comb_1$ "1.2D + 1.0W"	$Comb_2$ "0.9D + 1.0W"	$Comb_3$ "1.2D + 1.0Di + 1.0W"
Moment Load:	M_{u_1} 1141 kip ft	M_{u_2} 1139 kip ft	M_{u_3} 230 kip ft
Axial Load:	$Pmax_{u_1}$ 36 kip	$Pmax_{u_2}$ 27 kip	$Pmax_{u_3}$ 52 kip
	$Pmin_{u_1}$ 36 kip	$Pmin_{u_2}$ 27 kip	$Pmin_{u_3}$ 52 kip
Shear Load:	S_{u_1} 16 kip	S_{u_2} 16 kip	S_{u_3} 3 kip

DIMENSIONS

Pier (or mat) Extension: E 0.5 ft (above-grade portion)

Depth: D 7.5 ft (from grade to bottom of pad)

Pad Width: W 25.0 ft (short side)

Pad Length: L 25.0 ft (long side)

Pad Thickness: T 2.5 ft

Pier: Pier "Round" D_p 8.0 ft

Base Plate Geometry: BPG "Round" BP 74.9 in

Offset Distance of Leg: ecc1 0.0 ft (center of leg to center of pier, enter as positive number)

Offset Distance of Pier: ecc2 0.0 ft (center of pier to center of pad, enter as a positive number if it adds to ecc1 or negative if it subtracts from ecc1)

Concrete Volume: V_{pad} 57.9 yd^3 V_{pier} 10.2 yd^3 V_{conc} 68.1 yd^3

MATERIAL SPECIFICATIONS

Concrete:	Compressive Strength:	f'_c 3000 psi
	Clear Cover:	cc 3 in
	Lightweight Aggregate Factor:	λ 1.00
	Unit Weight:	γ_{conc} 150 pcf
Rebar:	Yield Strength:	F_y 60 ksi

SITE & GEOTECHNICAL DATA

Soil Parameters:	Geo "DET, 11/26/2010, Job # 2010.17"
Soil Unit Weight:	γ_{soil} 125 pcf
Soil Cone Override:	soilcone "N" ϕ_{cone} 0.0 deg
Constant Lateral Pressure:	costpres "N" CP_p 0 psf (for pier)
Equivalent Fluid Pressure:	EFpres "N" EFP 0 pcf
Angle of Internal Friction:	ϕ_1 30 deg (above water table) ϕ_2 "N/A" deg (below water table)
Depth of Water Table:	D_w 999 ft
Ultimate Bearing Pressure:	B'_c 53333 psf Bearing 2
Cohesion:	c 0 psf
Adhesion:	c_A 0 psf
Passive Pressure Coefficient (Rankine):	K_{p1} 3.00 (above water table) K_{p2} "N/A" (below water table)
Active Pressure Coefficient:	K_{a1} 0.33 (above water table) K_{a2} "N/A" (below water table)
Ultimate Friction Coefficient:	μ 0.45 (base) μ_s 0.45 (sides)
Ultimate Sliding Friction:	f_s 0 psf (base) $f_{s.s}$ 0 psf (sides)
Depth Neglected:	D_n 0.0
Seismic Design Category:	SDCT "Seismic Design Category A"
	$Note_{SDC}$ "N/A"

LATERAL CAPACITY

Design Resist.	Lateral Load	Check	Ratio
$\min(\phi S_n)$ 341 kip	$\max(S_u)$ 16 kip	$Check'_{lateral}$ "OK"	$Ratio'_{lateral}$ 0.05

OVERTURNING

Design Resist.	O.T. Moment	Check	Ratio
DR_{ot} 7536 kip ft	OTM 933 ft kip	$Check'_{over}$ "OK"	$Ratio'_{over}$ 0.12

UPLIFT

Design Resist.	Uplift Load	Check	Ratio
DR_u 779 kip	max(Uu) 0 kip	$Check'_{up}$ "OK"	$Ratio'_{up}$ 0.00

SOIL BEARING

Design Bearing Cap	Maximum Bearing Load	Check	Ratio
ϕB_c 40000 psf	P_{pos} 1763 psf	$Check'_{comp}$ "OK"	$Ratio'_{comp}$ 0.04

PAD REINFORCEMENT/STRENGTH

Number of Reinforcing Layers: Mats "Top & Bottom Mats"

Pad has Hoops or Ties? Tie_P "No"

	Short Bars	Long Bars	
Bar Quantity (top layer):	n_{pt} 33	$n_{pt.L}$ 33	(per direction)
Bar Quantity (bottom layer):	n_{pb} 35	$n_{pb.L}$ 35	(per direction)
Bar Size (top layer):	s_{pt} 6	$s_{pt.L}$ 6	
Bar Size (bottom layer):	s_{pb} 9	$s_{pb.L}$ 9	
Bar Spacing (Center to Center):	$sp_{p.ctr.t}$ 9.2 in	$sp_{p.ctr.Lt}$ 9.2 in	
	$sp_{p.ctr.b}$ 8.6 in	$sp_{p.ctr.Lb}$ 8.6 in	

Total Weight Pad Reinforcement: Wt_p 8232 lbf

Minumum Spacing Check:	$Check_{spp.cl}$ "OK"	$Check_{spp.cl2}$ "OK"
Minumum Reinforcing Check:	$Check_{minpA}$ "OK"	$Check_{minpA}$ "OK"

REINFORCING FLEXURAL STRENGTH

Case	Design Strength	Calculated Max Moment	Check	Ratio
A	ϕM_{nA} 3749 ft kip	Mu_A 309 ft kip	$Check_{flexA}$ "OK"	$Ratio_{flexA}$ 0.08
A	ϕM_{nAL} 3749 ft kip	Mu_{LA} 309 ft kip		
B	ϕM_{nB} 1660 ft kip	Mu_B 1084 ft kip	$Check_{flexB}$ "OK"	$Ratio_{flexB}$ 0.65
B	ϕM_{nBL} 1660 ft kip	Mu_{LB} 1084 ft kip		

(Case A = Bottom Mat at Toe, Case B = Top Mat at Heel)

REINFORCING DEVELOPMENT LENGTH

Required Length	Length Available	Check
l_{dp} 19.3 in	l_{ap} 99.0 in	$Check_{dev.p}$ "OK"
l_{dpL} 19.3 in	l_{apL} 99.0 in	

ONE-WAY PAD SHEAR

Case	Design Strength	Calculated Max Shear	Check	Ratio
A	ϕV_{n1} 624 kip	$\max(V1_{uA}\ V2_{uA})$ 70 kip	$Check'_{shear.1}$ "OK"	$Ratio'_{shear.1}$ 0.12
B		$\max(V1_{uB}\ V2_{uB})$ 219 kip	$Check'_{shrrnf}$ "OK"	

(Case A = Bottom Mat at Toe, Case B = Top Mat at Heel)

TWO-WAY PAD SHEAR

Design Strength	Calculated Max Shear	Check	Ratio
ϕV_{n2} 1585 kip	$\max(V_{u2})$ 264 kip	$Check'_{shear.2}$ "OK"	$Ratio'_{shear.2}$ 0.17

PIER REINFORCEMENT

Gross Area: A_{pier} 50.3 ft^2

LONGITUDINAL PIER REINFORCING

Bar Quantity: n_c 44

Bar Size: s_c 11

Hook Length: $hook_{ca}$ 22.9 in (actual/0 for none)

Bend Dia: $bend_c$ 11.0 in

Hook Length: $hook_c$ 16.5 in (required)

Bar Weight: Wt_{tc} 2051 lbf (per pier)

Check of Hook Length: $Check_{hookc}$ "OK"

TIES

Tie Size: s_t 5

Tie Weight: Wt_{tt} 238 lbf (per pier)

Check of Tie Size: $Check_{st}$ "OK"

Maximum Crosstie Spacing (hx): h_x 0.0 in

(0 for none)

$Note_{SDCt1}$ "N/A"

	Qty. Spaces		Spacing		
Tie Levels: (0 if none)	qsp_{t1}	1	sp_{t1}	2.5 in	(top)
	qsp_{t2}	7	sp_{t2}	8.0 in	(mid.)
	qsp_{t3}	0	sp_{t3}	0.0 in	(bot.)

Tie Quantity: n_t 9

Maximum Required Tie Spacing (top, mid., bot.): $sp_{t.max}$ 22.0 in

$Check_{tie}$ "OK"

$Note_{SDCt3}$ "N/A"

$Check_{sp.cl}$ "OK"

TIE SPLICE

Required Lap Splice Length: Lap 30 in

$Note_{SDCt2}$ "N/A"

MINIMUM LONGITUDINAL REINFORCEMENT

Pier Area of Steel: A_{tc} 65.3 in^2

Minimum Steel Area Required: $A_{min.c}$ 36.2 in^2

Maximum Steel Area Allowed: $A_{max.c}$ 579.1 in^2

Check of Steel Area: $Check_{min.c}$ "OK"

BASE PLATE BEARING ON CONCRETE

Design Strength	Factored Compression	Check	Ratio
ϕB_n 9213 kip	$\max(Pmax_u)$ 52 kip	$Check'_{bear}$ "OK"	$Ratio'_{bear}$ 0.01

COMPRESSIVE STRENGTH OF PIER CONCRETE

Design Strength	Factored Compression	Check	Ratio
ϕP_n 9598 kip	$\max(P_u)$ 102 kip	$Check'_{comp2}$ "OK"	$Ratio'_{comp2}$ 0.01

SHEAR STRENGTH OF PIER CONCRETE

Design Strength	Factored Shear	Check	Ratio
ϕV_{npM} 873 kip	$\max(S_u)$ 16 kip	$Check'_{shear.p}$ "OK" $Check'_{shrrnfp}$ "OK"	$Ratio'_{shear.p}$ 0.02

PIER MOMENT CAPACITY

Design Strength	Factored Moment	Check	Ratio
ϕMn_{cm} 63574 ft kip	$\max(Mu_c)$ 1229 ft kip	$Check'_{pier}$ "OK"	$Ratio'_{pier}$ 0.02

DEVELOPMENT LENGTH IN TENSION

Case	Required Length	Length Available	Check	Ratio
w/o Hook	l_{dc} 12.0 in	l_{ac} 27.0 in $hook_{ca}$ 23 in	$Check_{dev.ch}$ "Hook not Required"	$Ratio_{dev}$ 0.44
w/ Hook	l_{dch} 11.0 in			

Controlling Foundation %: CFP 65 %

APPENDIX B

Data Provided for Analysis

Blue Sky Tower Collocation Application

Installation Type: Anchor ☐ Collocation ☐ Add to Existing ☑

Contact: James Burgess
Email: jamesb@blueskytower.com
Office: 617-549-2800
Fax:

Site Number:
Site Name:
Submittal Date
Revision Date(s)

PLEASE SUBMIT THIS APPLICATION VIA E-MAIL. Include Drawings, Specification Sheets, RFDS, Antenna Data Sheets

Applicant Information

Applicant Name:	Verizon Wireless	Primary Contact/Agent Name:	Greg Richard
Applicant Site Name:	Cornwall_CT	Contact/Agent Company Name:	Centerline Communications LLC
Applicant Site Number:	591561	Contact/Agent Number:	781-710-3811
Proposed ON AIR Date:	8/31/2021	Contact Email:	grichard@clinellc.com

Applicant Contact Information

Leasing Contact Name:	Greg Richard	Email:	grichard@clinellc.com	Number:	781-710-3811
RF Contact Name:		Email:		Number:	
Construction Contact Name:	Steve Sawyer	Email:	stephen.sawyer@verizonwireless.com	Number:	508-776-2056
Emergency Contact Name:		Email:		Number:	
Account Payable Contact Name:		Email:		Number:	

Tower Information

Latitude:	41.845806	N	Structure Type:	monopole	
Longitude:	-73.364389	W	Structure Height:	110'	
AMSL:	999.8	FT	Site Address:	16 Bell Road Extension, Cornwall CT 06754	

EQUIPMENT SPECIFICATIONS

Summary of Work to be Completed: Verizon Wireless to Add (3)MT-6407 antennas and retain (6) antennas (6) RRHs (1) 12x24 Hybrid cable. (1) 12 OVP Box.

EXISTING CONDITIONS - List all installed equipment prior to proposed modification. If this is a new installation, proceed to FINAL CONFIGURATION.

	SECTOR 1	SECTOR 2	SECTOR 3	SECTOR 4 (if necessary)
Current RAD Center (Ft AGL)	110			
Tower Mount Height (if different than RAD ctr)				
Mount Type (Label "Existing" if no change)	existing			
Mount Model #				
Antenna Manufacturer	Commscope			
Antenna Model# (Attach Specs)	NHH-45C-R2B			
Antenna Dimensions (WxHxD in inches)	17.992" x 95.945" x 7.008"			
Antenna Weight (Lbs.)	87.082 Lbs			
Antenna Quantity	6			
Dish Manufacturer				
Dish Model# (attach Specs)				
Dish Diameter (Ft)				
Dish Weight (Lbs.)				
Dish Mount Height				
Azimuths	105, 205, 333			
Total # of Coax Lines per Sector				
Diameter Of Coax Cables (In)				
Total # of Hybrid Cables per Sector	1			
Diameter Of Hybrid Cables (In)	1.95"			
Total # of other Cables per Sector				
Diameter Of Other Cables (In)				
Quantity of RRUs per Sector	3	3		
Manufacturer	Samsung	Samsung		
Model	B2/B66A RRH-BR049 (RFV01U-D1A)	B5/B13 RRH-BR04C (RFV01U-D2A)		
Dimensions				
Weight (Lbs.)				
Quantity of TMAs per Sector				
Manufacturer				
Model				
Dimensions				
Weight (Lbs.)				
Quantity of Surge Arrestors per Sector	1			
Manufacturer				
Model	12 OVP			
Antenna Model & Quantity to be Removed per Sector (If Applicable)	none			
RRU Model & Quantity to be Removed per Sector (If Applicable)	none			
Line/Cable Type, Size & Quantity to be Removed (If Applicable)	none			
List Any Other Equipment to be Removed (If Applicable)	none			

FINAL CONFIGURATION - List all installed equipment after proposed modification or initial installation.

	SECTOR 1	SECTOR 2	SECTOR 3	SECTOR 4 (if necessary)
Current/Proposed RAD Center (Ft AGL)	110	110		
Tower Mount Height (if different than RAD ctr)				
Mount Type (Label "Existing" if no change)	exisisting see mount SA	exisisting see mount SA	exisisting see mount SA	
Mount Model #				
Antenna Manufacturer	Commscope/Samsung	Commscope/Samsung	Commscope/Samsung	
Antenna Model# (Attach Specs)	NHH-45C-R2B /MT6407-77A	NHH-45C-R2B /MT6407-77A	NHH-45C-R2B /MT6407-77A	
Antenna Dimensions (WxHxD in inches)	992" x 95.945" x 7.008"/16 x 35.1	35.1 5.5	35.1 5.5	
Antenna Weight (Lbs.)	87.082 Lbs/87.1	87.082 Lbs/87.1	87.082 Lbs/87.1	
Antenna Quantity	2/1	2/1	2/1	
Dish Manufacturer				
Dish Model# (attach Specs)				
Dish Diameter (Ft)				
Dish Weight (Lbs.)				
Dish Mount Height				
Azimuths	105	205	333	

Total # of Coax Lines per Sector				
Diameter Of Coax Cables (In)				
Total # of Hybrid Cables per Sector	(1) 12 x 24			
Diameter Of Hybrid Cables (In)	1.95			
Total # of other Cables per Sector				
Diameter Of Other Cables (In)				

Quantity of RRUs per Sector	1/1	1/1	1/1	
Manufacturer	Samsung	Samsung	Samsung	
Model	D1A)/B5/B13 RRH-BR04C (RFV01U-D2A)	D1A)/B5/B13 RRH-BR04C (RFV01U-	D1A)/B5/B13 RRH-BR04C (RFV01U-	
Quantity of TMAs per Sector				
Manufacturer				
Model				
Quantity of Surge Arrestors per Sector	1			
Manufacturer				
Model	12 OVP			

Transmit Frequency (MHz)	776-787,869-880, 890-891.5, 1970-1	3700.0-3980.0		
Receive Frequency (MHz)	746-757,824-835, 845-846.5, 1890-1	3700.0-3980.0		
Antenna Gain (Db)				
Type of Technology	LTE	5g		
TX Power Output				
ERP (Watts)				
Electric Service Required (Amps/Volts)				

GROUND SPACE REQUIREMENTS

Existing Lease Area: DIMS: L(ft) 16 W(ft) 10 OR _____ Square footage

New/Add 'l Lease Area being requested: DIMS: L(ft) _____ W(ft) _____ OR _____ Square footage

Shelter: DIMS: L(ft) _____ W(ft) _____ H(ft) _____

Concrete Pad for Shelter/Cabinets: DIMS: L(ft) _____ W(ft) _____

POWER REQUIREMENTS

Power Provided by: _____ Electrical Service Provider: _____ Electrical Service Telephone Number: _____

Average Monthly Power Consumption: _____ KWH units

Is a multi-tenant meter rack present: Yes How many, if any, empty meter banks are present: _____

Telco/Interconnect Requirements: POTS ☐ T1 ☐ MICROWAVE ☐ FIBER OPTICS ☑

Fiber Provider: _____

BACK-UP POWER INFORMATION

Generator Required: Yes Generation Location: Inside Lease Area

Generator Ground Space Requirement: DIMS: L(ft) _____ W(ft) _____ H(ft) _____ **Fuel Type:** _____

BST Generator: _____ Generator Owner: _____ Shared Generator Peak Usage: _____ KW

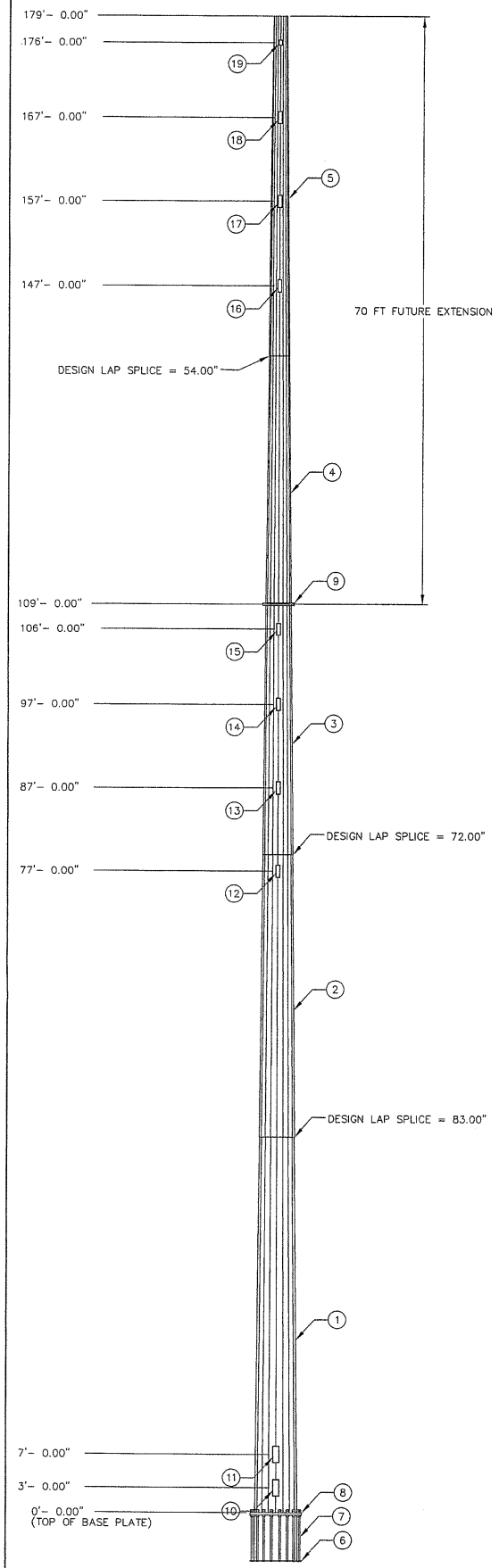
Generator Capacity: _____ KW Generator Make: _____ Generator Model: _____

Fuel Tank Location: _____ Fuel Tank Size: DIMS: L(f _____ W(ft) _____ Fuel Tank S _____ Gallons

Pad for Fuel Tank (if required) DIMS: L(ft) _____ W(ft) _____

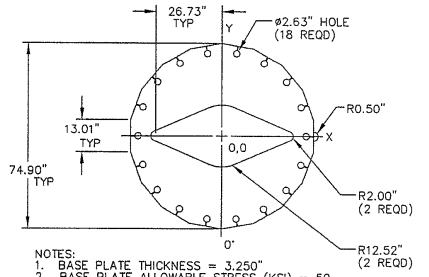
Comments: existing

Comments: List any pertinent information that was not included above.



ITEM ID	NO. REQD	FEATURES	UNIT WEIGHT(LBS)	WEIGHT (LBS)
1	1	SECTION A VALMONT S-22 0.438" THK (A572 GR65)	13,207	13,207
2	1	SECTION B VALMONT S-22 0.375" THK (A572 GR65)	7,331	7,331
3	1	SECTION C VALMONT S-22 0.375" THK (A572 GR65)	4,770	4,770
4	1	SECTION D VALMONT S-22 0.313" THK (A572 GR65)	3,645	3,645
5	1	SECTION E VALMONT S-22 0.219" THK (A572 GR65)	2,350	2,350
6	1	BOTTOM CAGE PLATE	135	135
7	18	2.25" ANCHOR BOLT, LENGTH=6.00' A615 GR75	104	1,865
8	1	BASE PLATE VALMONT S-56 3.250" THK (A572 GR50)	3,108	3,108
9	2	FLANGE PLATE	573	1,145
	1	TOP CAGE PLATE (REMOVE BEFORE SETTING POLE)	177	177
	24	BOLT 1.50" DIA		
	1	SAFETY CLIMBING CABLE (LENGTH = 169.00')	121	121
	3	GROUNDING LUG	2	6
		GALVANIZING	605	605
	134	STEP AND CLIP (VALMONT STANDARD)	1	67
10	2	HAND HOLE STD (9" x 24")	48	96
11	2	HAND HOLE STD (9" x 24")	48	96
12	3	HAND HOLE STD (6" x 18")	18	54
13	3	HAND HOLE STD (6" x 18")	18	54
14	3	HAND HOLE STD (6" x 18")	18	54
15	3	HAND HOLE STD (6" x 18")	18	54
16	3	HAND HOLE STD (6" x 18")	18	54
17	3	HAND HOLE STD (6" x 18")	18	54
18	3	HAND HOLE STD (6" x 18")	18	54
19	3	HAND HOLE UR (6" x 18")		
	1	POLE CAP	22	22

HOLE COORDS (INCHES)	
X-COORD	Y-COORD
33.88	0.00
31.84	11.59
25.95	21.78
16.94	29.34
5.88	33.37



NOTES:
1. BASE PLATE THICKNESS = 3.250"
2. BASE PLATE ALLOWABLE STRESS (KSI) = 50
3. ANGLES ARE MEASURED CLOCKWISE FROM 0 DEGREES
4. MAXIMUM BOLT CIRCLE DIAMETER = 67.76"
5. MAXIMUM CAGE TEMPLATE DIAMETER = 73.76"

BASE PLATE / ANCHORAGE CHARACTERISTICS

NOTES:

1. FACTORED REACTIONS FOR FOUNDATION DESIGN.
   MOMENT = 73,435 IN-KIPS
   SHEAR = 45,128 #
   VERTICAL = 49,599 #
2. GALVANIZED PER ASTM A-123.
3. DESIGN CRITERIA: ANSI/TIA 222-G ADDENDUM 2
4. THIS STRUCTURE HAS BEEN DESIGNED FOR THE FOLLOWING LOADING:
   EXPOSURE CATEGORY = C
   STRUCTURE CLASSIFICATION = 2
   TOPOGRAPHY CATEGORY = 1
   WIND LOAD CASES ARE BASED ON 3 SECOND GUST AND 50 YEAR WIND RETURN PERIOD
   A. CASE 1: WIND = 100 MPH WIND SPEED
   B. CASE 2: WIND = 50 MPH ICE AND WIND SPEED
      DESIGN ICE THICKNESS = 1.00 INCH
   C. CASE 3: WIND = 60 MPH WIND SPEED
   D. EQUIPMENT

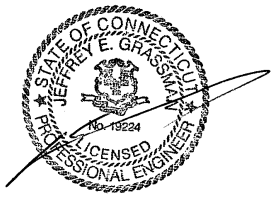
DESCRIPTION	MTG HT. (FT)	CENTROID HT. (FT)	WITHOUT ICE EPA (FT**2)	WITHOUT ICE WT (LBS)	WITH ICE EPA (FT**2)	WITH ICE WT (LBS)
1-5/8" X 10' LIGHTNING ROD	179.00	179.00	0.50	23	4.07	114
15-LNX-6515DS-VTM	179.00	179.00	126.30	1185	168.45	8280
3-T-ARM SP1 3' S/O 12' C/A	179.00	179.00	22.14	618	39.33	1602
12-LNX-6515DS-VTM	169.00	169.00	101.04	948	134.64	6576
3-T-ARM SP1 3' S/O 12' C/A	169.00	169.00	11.07	618	19.62	1596
9-LNX-6515DS-VTM	159.00	159.00	75.78	711	100.80	4905
3-T-ARM SP1 3' S/O 12' C/A	159.00	159.00	11.07	618	19.59	1587
9-LNX-6515DS-VTM	149.00	149.00	75.78	711	100.62	4869
3-T-ARM SP1 3' S/O 12' C/A	149.00	149.00	11.07	618	19.56	1578

5. FEEDLINES ARE PLACED INTERIOR TO POLE SHAFT (UNLESS NOTED OTHERWISE).
6. TOTAL POLE HEIGHT IS 110 FT AGL.
7. POLE IS EXTENDABLE TO 180 FT AGL.
8. ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX. 1 FT AGL).

APR 16 2015

EXPIRES ON

JAN 31 2016



SECTION INFORMATION					
ITEM ID	LENGTH	BASE OD	TOP OD	THK	MATL
1	52'- 0.00"	60.33"	48.05"	0.438"	A572 65 KSI
2	39'-11.00"	50.43"	41.01"	0.375"	A572 65 KSI
3	30'- 0.00"	43.17"	36.09"	0.375"	A572 65 KSI
4	34'- 0.00"	36.09"	28.06"	0.313"	A572 65 KSI
5	40'- 6.00"	29.56"	20.00"	0.219"	A572 65 KSI

ORDER	PROJECT	FILE ID	SCALE	DATE	ENGR
278467	278467	278467	NONE	04/10/15	JDN4

DESCRIPTION
BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001

valmont

valmont

STRUCTURES

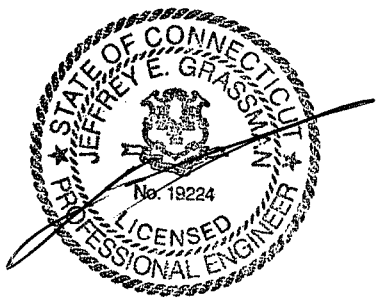
VALMONT MICROFLECT
3575 25th St. SE
Salem, OR 97302
PHONE: 1-800-547-2151
ENGINEER: Jonathon Neumann
Reviewed by: JDN

COMMUNICATION POLE DESIGN CALCULATIONS

APR 16 2015

EXPIRES ON

JAN 31 2016



BLUE SKY TOWER
VALMONT ORDER# 278467
SITE NAME: SHARON, CT, CT-5001
POLE HEIGHT: 179FT (110 FT AGL EXT. 180 FT AGL)

valmont STRUCTURES

4/10/15

ENGINEERING DATA

for

BLUE SKY TOWER
SHARON, CT, CT-5001
VALMONT QUOTATION 278467

1) STRUCTURE DESIGN CONFORMS TO EIA/TIA-222-G INCLUDING:
   100.0 MPH WIND (3 SECOND GUST, 50 YR. RETURN PERIOD)
   50.0 MPH ICE WIND (50 YR. RETURN PERIOD)
   DESIGN ICE THICKNESS = 1.00 INCHES
   EXPOSURE CATEGORY C
   STRUCTURE CLASSIFICATION II
   TOPOGRAPHIC CATEGORY 1
   60.0 MPH BASIC WIND SPEED WITH NO ICE FOR TWIST AND SWAY
2) FEEDLINES ARE ASSUMED TO BE PLACED INTERIOR TO THE POLE.
3) ALL MICROWAVE ASSUMED TO BE 6 GHz UNLESS OTHERWISE NOTED.
4) TOTAL POLE HEIGHT IS 110 FT AGL.
5) POLE IS EXTENDABLE TO 180 FT AGL.
6) ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE (APPROX. 1 FT AGL).
7) LOADING AS FOLLOWS:
   179.0' POLE
   1 - 5/8" x 10' lightning rod @ 179.0
   15 - LNX-6515DS-VTM (w/PM) @ 179.0
   3 - T-arm SP1 3' S/O 12' C/A @ 179.0
   12 - LNX-6515DS-VTM (w/PM) @ 169.0
   3 - T-arm SP1 3' S/O 12' C/A @ 169.0
   9 - LNX-6515DS-VTM (w/PM) @ 159.0
   3 - T-arm SP1 3' S/O 12' C/A @ 159.0
   9 - LNX-6515DS-VTM (w/PM) @ 149.0
   3 - T-arm SP1 3' S/O 12' C/A @ 149.0

STRUCTURE ANCHORAGE INFORMATION

POLE HEIGHT(FT):	179	NUMBER OF A.B.'s:	18
BOLT CIRCLE(IN):	67.76	DIA. OF A.B.'s(IN):	2.25
BASE VERTICAL(K):	49.60	LENGTH OF A.B.'s(IN):	72.00
BASE SHEAR(K):	45.13	PROJECTION LENGTH(IN):	12.25
BASE MOMENT(FT-K):	6120	TEMPLATE OD(IN):	71.26

valmont STRUCTURES

BY_____ DATE _____
CHKD. BY _____ DATE _____

SHEET NO. _____

4/10/15

ENGINEERING DATA

for

BLUE SKY TOWER
SHARON, CT, CT-5001
VALMONT QUOTATION 278467

EIA/TIA-222-G

BASIC WIND:	100.0 MPH	DESIGN ICE THICKNESS:	1. IN.
WIND & ICE:	50.0 MPH	EXPOSURE CATEGORY:	C
TWIST & SWAY:	60.0 MPH	STRUCTURE CLASS.:	II
S_S:	N/A	TOPOGRAPHIC CATEGORY:	1
S_1:	N/A		

QTY	DESCRIPTION	HEIGHT	DATA W.O. ICE EPA	DATA W.O. ICE WT	DATA W/ ICE EPA	DATA W/ ICE WT
1	5/8" x 10' lightning rod	@ 179.0 '	0.50	23	4.07	114
15	LNX-6515DS-VTM (w/PM)	@ 179.0 '	126.30	1185	168.45	8280
3	T-arm SP1 3' S/O 12' C/A	@ 179.0 '	22.14	618	39.33	1602
12	LNX-6515DS-VTM (w/PM)	@ 169.0 '	101.04	948	134.64	6576
3	T-arm SP1 3' S/O 12' C/A	@ 169.0 '	11.07	618	19.62	1596
9	LNX-6515DS-VTM (w/PM)	@ 159.0 '	75.78	711	100.80	4905
3	T-arm SP1 3' S/O 12' C/A	@ 159.0 '	11.07	618	19.59	1587
9	LNX-6515DS-VTM (w/PM)	@ 149.0 '	75.78	711	100.62	4869
3	T-arm SP1 3' S/O 12' C/A	@ 149.0 '	11.07	618	19.56	1578

1
1

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

*** SUMMARY ***

Design Code: TIA-222-G Addendum 2

---------- DESIGN SUMMARY ----------

Height Above Base Plate (ft) 179.00 Ground Line Diameter (in) 60.330 Pole Shaft Weight (lbs) 31303

Top Diameter (in) 19.998

Pole Taper (in/ft) 0.23614 Shape: 18 Sides

Connections Between Sections	/First/	/Second/	/Third/	/Fourth/
Height Above Ground (ft)	52.00	85.00	109.00	143.00
Type	Slip Joint	Slip Joint	Flange Joint	Slip Joint
Overlap Length (in)	83	72	0	54
Maximum Axial Force (lbs)	70320	57252	50128	41964

Section Characteristics	/First/	/Second/	/Third/	/Fourth/	/Fifth/
Base Diameter (in)	60.330	50.434	43.175	36.091	29.562
Top Diameter (in)	48.051	41.008	36.091	28.062	19.998
Thickness (in)	0.43750	0.37500	0.37500	0.31250	0.21875
Length (ft)	52.000	39.917	30.000	34.000	40.500
Weight (lbs)	13207	7331	4770	3645	2350
Yield Strength (ksi)	65.00	65.00	65.00	65.00	65.00

---------- ANALYSIS SUMMARY ----------

	Pt. of Fixity	Governing Level Sec.1	Governing Level Sec.2	Governing Level Sec.3	Governing Level Sec.4	Governing Level Sec.5	Pole Top
Governing Load Case	WIND	WIND	WIND	WIND	WIND	WIND	WIND
Height (ft)	0.00	0.00	52.00	85.00	109.00	143.00	179.00
Resultant Moment (in-kips)	73435	73435	46697	31482	21362	8307	0
Shear Force (lbs)	45204	45204	40242	36552	33816	30213	9385
Axial Force (lbs)	46417	46417	26928	17000	11423	5225	323
Effective Yield Strength (ksi)	74.88	74.88	76.49	80.38	79.52	76.45	82.55
Combined Interaction Value	0.90	0.90	0.99	0.87	0.96	0.90	0.00
Total Deflection (in)	0.00	0.00	14.18	40.63	70.04	128.33	209.89

Note: Diameters are outside, measured across the flats
Forces and moments are reported in the local element coordinate system

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

SUMMARY OF SECTION DIMENSIONS AS DETAILED

Height Above Base Plate (ft) 179.00 Ground Line Diameter (in) 60.330 Pole Shaft Weight (lbs) 31303

Top Diameter (in) 19.998

Pole Taper (in/ft) 0.23614 Shape: 18 Sides

Connections Between Sections	/First/	/Second/	/Third/	/Fourth/
Height Above Ground (ft)	52.00	85.00	109.00	143.00
Type	Slip Joint	Slip Joint	Flange Joint	Slip Joint
Flange Thickness (in)			2.000	
Weld Root Gap (in)			0.250	

Theoretical Design Section Dimension	/First/	/Second/	/Third/	/Fourth/	/Fifth/
Base Diameter (in)	60.330	50.434	43.175	36.091	29.562
Top Diameter (in)	48.051	41.008	36.091	28.062	19.998
Thickness (in)	0.43750	0.37500	0.37500	0.31250	0.21875
Length (ft)	52.000	39.917	30.000	34.000	40.500

As Detailed Section Characteristic	/First/	/Second/	/Third/	/Fourth/	/Fifth/
Base Diameter (in)	60.330	50.434	43.175	36.046	29.562
Top Diameter (in)	48.051	41.008	36.135	28.062	19.998
Thickness (in)	0.43750	0.37500	0.37500	0.31250	0.21875
Length (ft)	52.000	39.917	29.813	33.813	40.500

Note: Diameter are outside, measured across the flats

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

*** POLE SHAFT POINT OF FIXITY REACTIONS ***

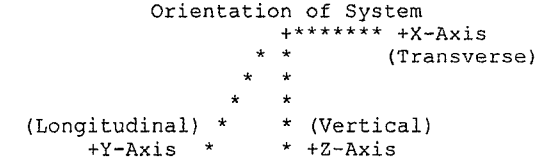
Loading Case Identifier	Moments About X-Axis (in-kips)	Moments About Y-Axis (in-kips)	Moments Resultant (X & Y) (in-kips)	Moments Torsional (in-kips)	Vertical Force (lbs)	Shear In X-Direction (lbs)	Shear In Y-Direction (lbs)	Shear Resultant (X & Y) (lbs)	Notes
WIND	56255	-47203	73435	0	46491	29008	34570	45128	
ICE + WIND	15515	-13018	20253	0	95269	7635	9099	11878	
T+S	11337	-9513	14800	0	37421	5867	6992	9127	

Note: Positive vertical force is downward.
Reactions are considered in the global coordinate system.

*** INPUT LOADS ***

Design Code TIA-222-G Addendum 2
Loading Case WIND

Basic Wind Velocity is 100.00 mph Ice Thickness 0.00
Wind Orientation is 50.0 Degrees Clockwise From +X Axis
Structure Weight Overload Factor is 1.200
Exposure C, Gust Factor 1.10
Structure Category 2, Topographic Category 1, Crest Height 0.00 ft
Orientations are Measured Clockwise From +X Axis
Positive Y Axis is 90 Degrees Clockwise From +X Axis
Foundation Rotation of 0.00 Degrees
Elevation of structure base above surrounding terrain = 1.00 ft



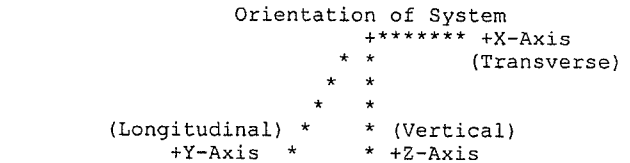
Load Number	Mounting Height (ft)	Load Height (ft)	Load Eccentricity (ft)	Orientation in XY Plane (Degrees)	Force-X (lbs)	Force-Y (lbs)	Force-Z (lbs)	EPA (ft^2)	
1	179.00	179.00	0.00	50.00	20	23	28	0.50	1-5/8" x 10'
2	179.00	179.00	0.00	50.00	4977	5932	1422	126.30	15-LNX-6515DS-
3	179.00	179.00	0.00	50.00	873	1040	742	22.14	3-T-arm SP1 3
4	169.00	169.00	0.00	50.00	3934	4689	1138	101.04	12-LNX-6515DS-
5	169.00	169.00	0.00	50.00	431	514	742	11.07	3-T-arm SP1 3
6	159.00	159.00	0.00	50.00	2913	3472	853	75.78	9-LNX-6515DS-
7	159.00	159.00	0.00	50.00	426	507	742	11.07	3-T-arm SP1 3
8	149.00	149.00	0.00	50.00	2874	3425	853	75.78	9-LNX-6515DS-
9	149.00	149.00	0.00	50.00	420	500	742	11.07	3-T-arm SP1 3

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

*** INPUT LOADS ***

Design Code TIA-222-G Addendum 2
Loading Case ICE + WIND

Basic Wind Velocity is 50.00 mph Ice Thickness 1.00
Wind Orientation is 50.0 Degrees Clockwise From +X Axis
Structure Weight Overload Factor is 1.200
Exposure C, Gust Factor 1.10
Structure Category 2, Topographic Category 1, Crest Height 0.00 ft
Orientations are Measured Clockwise From +X Axis
Positive Y Axis is 90 Degrees Clockwise From +X Axis
Foundation Rotation of 0.00 Degrees
Elevation of structure base above surrounding terrain = 1.00 ft

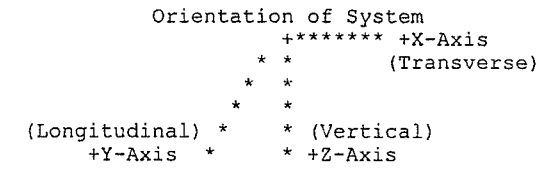


Load Number	Mounting Height (ft)	Load Height (ft)	Load Eccentricity (ft)	Orientation in XY Plane (Degrees)	Force-X (lbs)	Force-Y (lbs)	Force-Z (lbs)	EPA (ft^2)	
1	179.00	179.00	0.00	50.00	25	30	137	4.07	1-5/8" x 10'
2	179.00	179.00	0.00	50.00	1037	1236	9936	168.45	15-LNX-6515DS-
3	179.00	179.00	0.00	50.00	242	289	1922	39.33	3-T-arm SP1 3
4	169.00	169.00	0.00	50.00	819	976	7891	134.64	12-LNX-6515DS-
5	169.00	169.00	0.00	50.00	119	142	1915	19.62	3-T-arm SP1 3
6	159.00	159.00	0.00	50.00	605	722	5886	100.80	9-LNX-6515DS-
7	159.00	159.00	0.00	50.00	118	140	1904	19.59	3-T-arm SP1 3
8	149.00	149.00	0.00	50.00	596	711	5843	100.62	9-LNX-6515DS-
9	149.00	149.00	0.00	50.00	116	138	1894	19.56	3-T-arm SP1 3

*** INPUT LOADS ***

Design Code TIA-222-G Addendum 2
Loading Case T+S

Basic Wind Velocity is 60.00 mph Ice Thickness 0.00
Wind Orientation is 50.0 Degrees Clockwise From +X Axis
Structure Weight Overload Factor is 1.000
Exposure C, Gust Factor 1.10
Structure Category 2, Topographic Category 1, Crest Height 0.00 ft
Orientations are Measured Clockwise From +X Axis
Positive Y Axis is 90 Degrees Clockwise From +X Axis
Foundation Rotation of 0.00 Degrees
Elevation of structure base above surrounding terrain = 1.00 ft



Load Number	Mounting Height (ft)	Load Height (ft)	Load Eccentricity (ft)	Orientation in XY Plane (Degrees)	Force-X (lbs)	Force-Y (lbs)	Force-Z (lbs)	EPA (ft^2)	
1	179.00	179.00	0.00	50.00	4	5	23	0.50	1-5/8" x 10'
2	179.00	179.00	0.00	50.00	1002	1194	1185	126.30	15-LNX-6515DS-
3	179.00	179.00	0.00	50.00	176	209	618	22.14	3-T-arm SP1 3
4	169.00	169.00	0.00	50.00	792	944	948	101.04	12-LNX-6515DS-
5	169.00	169.00	0.00	50.00	87	103	618	11.07	3-T-arm SP1 3
6	159.00	159.00	0.00	50.00	586	699	711	75.78	9-LNX-6515DS-
7	159.00	159.00	0.00	50.00	86	102	618	11.07	3-T-arm SP1 3
8	149.00	149.00	0.00	50.00	579	690	711	75.78	9-LNX-6515DS-
9	149.00	149.00	0.00	50.00	85	101	618	11.07	3-T-arm SP1 3

*** Properties ***

Connection Locations	Distance From Base (ft)	Diameter Across Flats (in)	Wall Thickness (in)	D/t Across Flats	w/t Across Flats	Moments of Inertia (in^4)	Area (in^2)
Top of Sect 5	179.00	19.998	0.2188	91.42	14.36	679	13.73
	174.00	21.179	0.2188	96.82	15.31	807	14.55
EPA 4	169.00	22.360	0.2188	102.22	16.26	952	15.37
	164.00	23.541	0.2188	107.61	17.21	1112	16.19
EPA 6	159.00	24.721	0.2188	113.01	18.16	1290	17.01
	154.00	25.902	0.2188	118.41	19.12	1486	17.83
EPA 8	149.00	27.083	0.2188	123.81	20.07	1700	18.65
	144.00	28.263	0.2188	129.20	21.02	1934	19.47
	143.00	28.500	0.2188	130.28	21.21	1983	19.63
Top of Sect 4	143.00	28.062	0.3125	89.80	14.07	2677	27.52
	139.00	29.007	0.3125	92.82	14.60	2960	28.46
Base of Sect 5	138.50	29.125	0.3125	93.20	14.67	2996	28.58
	134.00	30.187	0.3125	96.60	15.27	3340	29.63
	129.00	31.368	0.3125	100.38	15.94	3752	30.80
	124.00	32.549	0.3125	104.16	16.60	4196	31.97
	119.00	33.729	0.3125	107.93	17.27	4675	33.14
	114.00	34.910	0.3125	111.71	17.93	5188	34.32
	109.00	36.091	0.3125	115.49	18.60	5737	35.49
Top of Sect 3	109.00	36.091	0.3750	96.24	15.21	6849	42.51
	104.00	37.271	0.3750	99.39	15.76	7551	43.91
	99.00	38.452	0.3750	102.54	16.32	8299	45.32
	94.00	39.633	0.3750	105.69	16.87	9095	46.72
	89.00	40.814	0.3750	108.84	17.43	9940	48.13
	85.00	41.758	0.3750	111.35	17.87	10653	49.25
Top of Sect 2	85.00	41.008	0.3750	109.35	17.52	10085	48.36
	84.00	41.244	0.3750	109.98	17.63	10262	48.64
Base of Sect 3	79.00	42.425	0.3750	113.13	18.19	11177	50.05
	74.00	43.606	0.3750	116.28	18.74	12145	51.45
	69.00	44.786	0.3750	119.43	19.30	13167	52.86
	64.00	45.967	0.3750	122.58	19.85	14246	54.26
	59.00	47.148	0.3750	125.73	20.41	15381	55.67
	54.00	48.328	0.3750	128.88	20.96	16576	57.07
	52.00	48.801	0.3750	130.14	21.18	17071	57.64
Top of Sect 1	52.00	48.051	0.4375	109.83	17.60	18930	66.11
	49.00	48.759	0.4375	111.45	17.89	19788	67.10
Base of Sect 2	45.08	49.684	0.4375	113.56	18.26	20946	68.38

*** Properties ***

Connection Locations	Distance From Base (ft)	Diameter Across Flats (in)	Wall Thickness (in)	D/t Across Flats	w/t Across Flats	Moments of Inertia (in^4)	Area (in^2)
	44.00	49.940	0.4375	114.15	18.36	21274	68.74
	39.00	51.121	0.4375	116.85	18.84	22833	70.38
	34.00	52.301	0.4375	119.55	19.32	24466	72.02
	29.00	53.482	0.4375	122.24	19.79	26175	73.66
	24.00	54.663	0.4375	124.94	20.27	27962	75.30
	19.00	55.843	0.4375	127.64	20.74	29829	76.94
	14.00	57.024	0.4375	130.34	21.22	31776	78.57
	9.00	58.205	0.4375	133.04	21.70	33807	80.21
	4.00	59.385	0.4375	135.74	22.17	35923	81.85
Pt of Fixity	0.00	60.330	0.4375	137.90	22.55	37678	83.17

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case WIND

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
179.00	0	0	0	0	6033	7189	9385	323
174.00	440	-369	574	0	6276	7479	9763	620
169.00	898	-754	1172	0	6533	7786	10164	919
169.00	898	-754	1172	0	11049	13168	17189	1461
164.00	1698	-1425	2216	0	11315	13484	17603	1848
159.00	2517	-2112	3286	0	11598	13822	18043	2181
159.00	2517	-2112	3286	0	15062	17950	23432	2876
154.00	3605	-3025	4705	0	15343	18286	23870	3381
149.00	4713	-3954	6152	0	15651	18652	24348	3747
149.00	4713	-3954	6152	0	19053	22707	29641	4616
144.00	6086	-5107	7945	0	19356	23067	30112	5146
143.00	6364	-5340	8307	0	19420	23144	30213	5225
143.00	6364	-5340	8307	0	19409	23130	30194	5331
139.00	7483	-6279	9768	0	19709	23488	30661	6196
138.50	7624	-6397	9952	0	19734	23518	30700	6402
134.00	8904	-7471	11623	0	20020	23859	31145	7143
129.00	10349	-8683	13509	0	20344	24245	31650	7988
124.00	11817	-9915	15425	0	20672	24637	32161	8867
119.00	13308	-11167	17373	0	21005	25033	32678	9777
114.00	14824	-12439	19352	0	21341	25433	33200	10716
109.00	16364	-13731	21362	0	21736	25904	33816	11423
109.00	16364	-13731	21362	0	21684	25842	33734	11662
104.00	17930	-15045	23405	0	22045	26273	34297	12758
99.00	19521	-16380	25483	0	22409	26706	34863	13885
94.00	21139	-17737	27594	0	22775	27142	35431	15043
89.00	22782	-19117	29740	0	23148	27586	36011	16208
85.00	24116	-20236	31482	0	23495	28001	36552	17000
85.00	24116	-20236	31482	0	23461	27960	36499	17113
84.00	24453	-20518	31921	0	23516	28026	36585	17652
79.00	26152	-21944	34139	0	23928	28517	37226	19913
74.00	27878	-23393	36393	0	24279	28934	37771	21181
69.00	29630	-24863	38679	0	24628	29351	38314	22476
64.00	31407	-26353	40999	0	24976	29765	38855	23799
59.00	33208	-27865	43350	0	25321	30176	39392	25150
54.00	35035	-29398	45734	0	25692	30618	39969	26460
52.00	35772	-30016	46697	0	25867	30827	40242	26928
52.00	35772	-30016	46697	0	25821	30772	40170	27035
49.00	36886	-30951	48151	0	26043	31037	40516	28701
45.08	38355	-32184	50069	0	26365	31421	41017	30829
44.00	38764	-32527	50603	0	26400	31462	41071	31254

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case WIND

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
39.00	40667	-34124	53088	0	26730	31855	41584	32873
34.00	42594	-35741	55602	0	27052	32240	42086	34524
29.00	44543	-37376	58147	0	27365	32613	42573	36207
24.00	46515	-39031	60721	0	27667	32972	43042	37921
19.00	48507	-40702	63322	0	27954	33314	43488	39666
14.00	50520	-42391	65949	0	28222	33634	43906	41442
9.00	52551	-44096	68601	0	28481	33942	44308	43249
4.00	54601	-45816	71277	0	28752	34265	44730	45070
0.00	56255	-47203	73435	0	29057	34628	45204	46417

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Deflections and Stresses for Pole

Loading Case WIND

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
179.00	134.9	160.8	209.9	14.7	11.55	0.00	0.00	0.05	0.00	0.01	82.55
174.00	127.2	151.6	197.9	13.5	11.50	0.00	0.10	0.05	0.00	0.11	82.55
169.00	119.5	142.5	186.0	12.3	11.38	0.00	0.19	0.05	0.00	0.19	82.28
169.00	119.5	142.5	186.0	12.3	11.38	0.00	0.19	0.08	0.00	0.20	82.28
164.00	112.0	133.5	174.2	11.1	11.19	0.00	0.33	0.07	0.00	0.33	81.16
159.00	104.6	124.7	162.7	10.0	10.92	0.00	0.44	0.07	0.00	0.45	80.04
159.00	104.6	124.7	162.7	10.0	10.92	0.00	0.44	0.09	0.00	0.46	80.04
154.00	97.4	116.1	151.5	9.0	10.58	0.00	0.59	0.09	0.00	0.60	78.92
149.00	90.4	107.8	140.7	8.0	10.17	0.00	0.71	0.09	0.00	0.72	77.80
149.00	90.4	107.8	140.7	8.0	10.17	0.00	0.71	0.11	0.00	0.73	77.80
144.00	83.8	99.8	130.3	7.1	9.71	0.00	0.85	0.11	0.00	0.87	76.68
143.00	82.5	98.3	128.3	6.9	9.61	0.00	0.88	0.11	0.00	0.90	76.45
143.00	82.5	98.3	128.3	6.9	9.61	0.00	0.60	0.08	0.00	0.60	82.55
139.00	77.4	92.3	120.4	6.2	9.31	0.00	0.65	0.07	0.00	0.66	82.55
138.50	76.8	91.5	119.5	6.2	9.27	0.00	0.66	0.07	0.00	0.67	82.55
134.00	71.3	85.0	110.9	5.5	8.91	0.00	0.72	0.07	0.00	0.73	82.55
129.00	65.5	78.0	101.9	4.8	8.49	0.00	0.77	0.07	0.00	0.78	82.55
124.00	59.9	71.4	93.2	4.2	8.06	0.00	0.82	0.07	0.00	0.83	81.87
119.00	54.7	65.1	85.0	3.6	7.62	0.00	0.87	0.07	0.00	0.88	81.09
114.00	49.7	59.2	77.3	3.1	7.18	0.00	0.91	0.07	0.00	0.92	80.31
109.00	45.0	53.7	70.0	2.7	6.73	0.00	0.95	0.07	0.00	0.96	79.52
109.00	45.0	53.7	70.0	2.7	6.73	0.00	0.77	0.05	0.00	0.78	82.55
104.00	40.6	48.4	63.2	2.3	6.37	0.00	0.79	0.05	0.00	0.80	82.55
99.00	36.5	43.5	56.7	1.9	6.00	0.00	0.81	0.05	0.00	0.82	82.21
94.00	32.6	38.8	50.6	1.6	5.64	0.00	0.83	0.05	0.00	0.84	81.56
89.00	28.9	34.4	44.9	1.3	5.28	0.00	0.85	0.05	0.00	0.86	80.90
85.00	26.1	31.1	40.6	1.1	5.00	0.01	0.87	0.05	0.00	0.87	80.38
85.00	26.1	31.1	40.6	1.1	5.00	0.01	0.89	0.05	0.00	0.90	80.80
84.00	25.4	30.3	39.6	1.1	4.93	0.01	0.90	0.05	0.00	0.91	80.66
79.00	22.3	26.5	34.6	0.9	4.56	0.01	0.91	0.05	0.00	0.92	80.01
74.00	19.3	23.0	30.0	0.7	4.20	0.01	0.93	0.05	0.00	0.94	79.36
69.00	16.6	19.8	25.8	0.6	3.85	0.01	0.94	0.05	0.00	0.95	78.71
64.00	14.1	16.8	22.0	0.4	3.51	0.01	0.96	0.05	0.00	0.97	78.05
59.00	11.9	14.2	18.5	0.3	3.17	0.01	0.97	0.05	0.00	0.98	77.40
54.00	9.9	11.7	15.3	0.3	2.84	0.01	0.98	0.05	0.00	0.99	76.75
52.00	9.1	10.9	14.2	0.2	2.71	0.01	0.98	0.05	0.00	0.99	76.49
52.00	9.1	10.9	14.2	0.2	2.71	0.01	0.83	0.04	0.00	0.84	80.70
49.00	8.1	9.6	12.5	0.2	2.53	0.01	0.83	0.04	0.00	0.84	80.36
45.08	6.8	8.1	10.5	0.1	2.31	0.01	0.84	0.04	0.00	0.85	79.92

Deflections and Stresses for Pole

Loading Case WIND

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
44.00	6.4	7.7	10.0	0.1	2.25	0.01	0.84	0.04	0.00	0.85	79.80
39.00	5.0	6.0	7.8	0.1	1.97	0.01	0.85	0.04	0.00	0.85	79.24
34.00	3.8	4.5	5.9	0.1	1.70	0.01	0.85	0.04	0.00	0.86	78.68
29.00	2.7	3.3	4.3	0.0	1.43	0.01	0.86	0.04	0.00	0.87	78.12
24.00	1.9	2.2	2.9	0.0	1.17	0.01	0.86	0.04	0.00	0.87	77.56
19.00	1.2	1.4	1.8	0.0	0.92	0.01	0.87	0.04	0.00	0.88	77.00
14.00	0.6	0.7	1.0	0.0	0.67	0.01	0.87	0.04	0.00	0.88	76.44
9.00	0.3	0.3	0.4	0.0	0.42	0.01	0.88	0.04	0.00	0.89	75.88
4.00	0.1	0.1	0.1	0.0	0.19	0.01	0.88	0.04	0.00	0.89	75.32
0.00	0.0	0.0	0.0	0.0	0.00	0.01	0.89	0.04	0.00	0.90	74.88

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case ICE + WIND

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
179.00	0	0	0	0	1745	2080	2715	11859
174.00	128	-108	168	0	1841	2194	2864	12445
169.00	264	-221	344	0	1944	2317	3025	13063
169.00	264	-221	344	0	3229	3848	5023	22775
164.00	498	-418	651	0	3318	3954	5162	23432
159.00	740	-621	965	0	3429	4087	5335	24116
159.00	740	-621	965	0	4394	5237	6837	31843
154.00	1058	-888	1381	0	4509	5373	7014	32560
149.00	1382	-1159	1804	0	4586	5466	7135	33322
149.00	1382	-1159	1804	0	5495	6549	8549	41010
144.00	1779	-1493	2322	0	5616	6692	8736	41792
143.00	1859	-1560	2427	0	5602	6676	8715	41964
143.00	1859	-1560	2427	0	5574	6643	8672	41973
139.00	2181	-1830	2847	0	5693	6785	8857	43307
138.50	2222	-1864	2900	0	5684	6773	8842	43485
134.00	2589	-2173	3380	0	5714	6810	8890	44421
129.00	3003	-2519	3920	0	5782	6891	8995	45488
124.00	3421	-2870	4466	0	5849	6971	9100	46595
119.00	3844	-3225	5018	0	5916	7051	9204	47741
114.00	4272	-3584	5576	0	5983	7130	9308	48926
109.00	4705	-3948	6141	0	6121	7295	9523	50128
109.00	4705	-3948	6141	0	6056	7217	9421	50147
104.00	5143	-4315	6713	0	6137	7314	9548	51550
99.00	5587	-4688	7293	0	6219	7411	9675	52996
94.00	6036	-5065	7880	0	6301	7509	9802	54484
89.00	6492	-5448	8475	0	6389	7614	9939	56012
85.00	6861	-5757	8956	0	6506	7753	10121	57252
85.00	6861	-5757	8956	0	6473	7715	10071	57261
84.00	6954	-5835	9078	0	6467	7707	10061	57895
79.00	7422	-6228	9689	0	6566	7825	10215	61076
74.00	7897	-6626	10309	0	6640	7913	10330	62703
69.00	8377	-7029	10935	0	6713	8000	10443	64370
64.00	8862	-7436	11569	0	6785	8086	10556	66076
59.00	9352	-7848	12209	0	6857	8172	10668	67823
54.00	9848	-8263	12855	0	6949	8281	10811	69603
52.00	10047	-8431	13116	0	7006	8349	10899	70320
52.00	10047	-8431	13116	0	6972	8309	10846	70329
49.00	10349	-8683	13509	0	7020	8366	10921	72560
45.08	10745	-9016	14027	0	7107	8470	11057	75509
44.00	10855	-9109	14171	0	7097	8458	11041	75958

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case ICE + WIND

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
39.00	11368	-9539	14840	0	7167	8541	11150	78026
34.00	11885	-9973	15515	0	7235	8622	11255	80133
29.00	12407	-10411	16196	0	7300	8699	11356	82279
24.00	12934	-10853	16884	0	7361	8772	11451	84462
19.00	13465	-11298	17577	0	7417	8840	11540	86678
14.00	13999	-11747	18275	0	7468	8900	11619	88925
9.00	14537	-12198	18977	0	7516	8957	11693	91194
4.00	15079	-12653	19684	0	7570	9022	11777	93473
0.00	15515	-13018	20253	0	7663	9132	11921	95264

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Deflections and Stresses for Pole

Loading Case ICE + WIND

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
179.00	38.3	45.6	59.6	1.3	3.30	0.01	0.00	0.01	0.00	0.01	82.55
174.00	36.1	43.0	56.1	1.2	3.28	0.01	0.03	0.01	0.00	0.04	82.55
169.00	33.9	40.4	52.7	1.1	3.25	0.01	0.06	0.01	0.00	0.07	82.28
169.00	33.9	40.4	52.7	1.1	3.25	0.02	0.06	0.02	0.00	0.08	82.28
164.00	31.7	37.8	49.3	1.0	3.19	0.02	0.10	0.02	0.00	0.12	81.16
159.00	29.6	35.2	46.0	0.9	3.11	0.02	0.13	0.02	0.00	0.15	80.04
159.00	29.6	35.2	46.0	0.9	3.11	0.03	0.13	0.03	0.00	0.16	80.04
154.00	27.5	32.8	42.8	0.8	3.01	0.03	0.17	0.03	0.00	0.20	78.92
149.00	25.5	30.4	39.7	0.7	2.89	0.03	0.21	0.03	0.00	0.24	77.80
149.00	25.5	30.4	39.7	0.7	2.89	0.03	0.21	0.03	0.00	0.24	77.80
144.00	23.6	28.1	36.7	0.6	2.76	0.03	0.25	0.03	0.00	0.28	76.68
143.00	23.2	27.7	36.2	0.6	2.73	0.03	0.26	0.03	0.00	0.29	76.45
143.00	23.2	27.7	36.2	0.6	2.73	0.02	0.17	0.02	0.00	0.20	82.55
139.00	21.8	26.0	33.9	0.6	2.64	0.02	0.19	0.02	0.00	0.21	82.55
138.50	21.6	25.8	33.6	0.6	2.63	0.02	0.19	0.02	0.00	0.21	82.55
134.00	20.1	23.9	31.2	0.5	2.53	0.02	0.21	0.02	0.00	0.23	82.55
129.00	18.4	21.9	28.6	0.4	2.40	0.02	0.22	0.02	0.00	0.25	82.55
124.00	16.8	20.1	26.2	0.4	2.28	0.02	0.24	0.02	0.00	0.26	81.87
119.00	15.3	18.3	23.9	0.3	2.15	0.02	0.25	0.02	0.00	0.27	81.09
114.00	13.9	16.6	21.7	0.3	2.02	0.02	0.26	0.02	0.00	0.28	80.31
109.00	12.6	15.0	19.6	0.3	1.90	0.02	0.27	0.02	0.00	0.30	79.52
109.00	12.6	15.0	19.6	0.3	1.90	0.02	0.22	0.02	0.00	0.24	82.55
104.00	11.4	13.5	17.7	0.2	1.79	0.02	0.23	0.01	0.00	0.24	82.55
99.00	10.2	12.1	15.9	0.2	1.69	0.02	0.23	0.01	0.00	0.25	82.21
94.00	9.1	10.8	14.1	0.2	1.58	0.02	0.24	0.01	0.00	0.25	81.56
89.00	8.1	9.6	12.5	0.1	1.48	0.02	0.24	0.01	0.00	0.26	80.90
85.00	7.3	8.7	11.3	0.1	1.40	0.02	0.25	0.01	0.00	0.26	80.38
85.00	7.3	8.7	11.3	0.1	1.40	0.02	0.25	0.01	0.00	0.27	80.80
84.00	7.1	8.5	11.0	0.1	1.38	0.02	0.26	0.01	0.00	0.27	80.66
79.00	6.2	7.4	9.6	0.1	1.28	0.02	0.26	0.01	0.00	0.28	80.01
74.00	5.4	6.4	8.4	0.1	1.18	0.02	0.26	0.01	0.00	0.28	79.36
69.00	4.6	5.5	7.2	0.1	1.08	0.02	0.27	0.01	0.00	0.28	78.71
64.00	3.9	4.7	6.1	0.1	0.98	0.02	0.27	0.01	0.00	0.29	78.05
59.00	3.3	3.9	5.1	0.1	0.88	0.02	0.27	0.01	0.00	0.29	77.40
54.00	2.7	3.3	4.3	0.0	0.79	0.02	0.28	0.01	0.00	0.29	76.75
52.00	2.5	3.0	3.9	0.0	0.75	0.02	0.28	0.01	0.00	0.30	76.49
52.00	2.5	3.0	3.9	0.0	0.75	0.02	0.23	0.01	0.00	0.25	80.70
49.00	2.2	2.7	3.5	0.0	0.70	0.02	0.23	0.01	0.00	0.25	80.36
45.08	1.9	2.2	2.9	0.0	0.64	0.02	0.23	0.01	0.00	0.25	79.92

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Deflections and Stresses for Pole

Loading Case ICE + WIND

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
44.00	1.8	2.1	2.8	0.0	0.62	0.02	0.24	0.01	0.00	0.25	79.80
39.00	1.4	1.7	2.2	0.0	0.55	0.02	0.24	0.01	0.00	0.25	79.24
34.00	1.0	1.3	1.6	0.0	0.47	0.02	0.24	0.01	0.00	0.25	78.68
29.00	0.8	0.9	1.2	0.0	0.40	0.02	0.24	0.01	0.00	0.26	78.12
24.00	0.5	0.6	0.8	0.0	0.32	0.02	0.24	0.01	0.00	0.26	77.56
19.00	0.3	0.4	0.5	0.0	0.25	0.02	0.24	0.01	0.00	0.26	77.00
14.00	0.2	0.2	0.3	0.0	0.18	0.02	0.24	0.01	0.00	0.26	76.44
9.00	0.1	0.1	0.1	0.0	0.12	0.02	0.24	0.01	0.00	0.26	75.88
4.00	0.0	0.0	0.0	0.0	0.05	0.02	0.24	0.01	0.00	0.26	75.32
0.00	0.0	0.0	0.0	0.0	0.00	0.02	0.24	0.01	0.00	0.26	74.88

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case T+S

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
179.00	0	0	0	0	1228	1464	1911	1750
174.00	90	-75	117	0	1277	1522	1986	1991
169.00	183	-153	239	0	1328	1583	2066	2245
169.00	183	-153	239	0	2245	2676	3493	3757
164.00	345	-290	451	0	2297	2738	3574	4028
159.00	511	-429	668	0	2354	2805	3662	4310
159.00	511	-429	668	0	3055	3641	4753	5603
154.00	732	-614	956	0	3109	3705	4837	5905
149.00	957	-803	1249	0	3170	3778	4932	6215
149.00	957	-803	1249	0	3857	4596	6000	7515
144.00	1235	-1036	1612	0	3915	4666	6091	7845
143.00	1291	-1083	1685	0	3928	4681	6111	7912
143.00	1291	-1083	1685	0	3925	4677	6106	7916
139.00	1517	-1273	1980	0	3982	4746	6195	8572
138.50	1545	-1297	2017	0	3986	4750	6201	8660
134.00	1804	-1514	2355	0	4040	4815	6286	9114
129.00	2095	-1758	2735	0	4103	4889	6382	9637
124.00	2391	-2007	3122	0	4166	4965	6481	10181
119.00	2692	-2259	3514	0	4230	5041	6581	10745
114.00	2997	-2515	3913	0	4296	5120	6683	11329
109.00	3307	-2775	4317	0	4374	5213	6805	11923
109.00	3307	-2775	4317	0	4363	5200	6788	11932
104.00	3622	-3039	4728	0	4434	5285	6898	12676
99.00	3942	-3308	5146	0	4506	5370	7010	13444
94.00	4267	-3581	5571	0	4578	5456	7123	14236
89.00	4598	-3858	6002	0	4653	5545	7238	15051
85.00	4866	-4083	6352	0	4721	5627	7345	15714
85.00	4866	-4083	6352	0	4715	5619	7335	15718
84.00	4933	-4140	6440	0	4726	5632	7353	16057
79.00	5275	-4426	6886	0	4807	5729	7479	17761
74.00	5622	-4717	7338	0	4878	5814	7589	18633
69.00	5974	-5012	7798	0	4950	5899	7700	19530
64.00	6331	-5312	8264	0	5021	5983	7811	20451
59.00	6693	-5616	8737	0	5092	6068	7921	21395
54.00	7060	-5924	9216	0	5167	6158	8039	22361
52.00	7208	-6048	9410	0	5202	6199	8093	22751
52.00	7208	-6048	9410	0	5194	6190	8081	22755
49.00	7432	-6236	9702	0	5240	6244	8151	24034
45.08	7728	-6484	10088	0	5304	6321	8252	25727
44.00	7810	-6553	10195	0	5313	6332	8265	25985

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Forces and Moments for Pole in the Local Element Coordinate System

Loading Case T+S

Dist. From Base (ft)	Mx (in-kips)	My (in-kips)	Resultant Mx & My (in-kips)	Torsion (in-kips)	Shear X-Dir. (lbs)	Shear Y-Dir. (lbs)	Resultant Shear (lbs)	Axial (lbs)
39.00	8193	-6875	10695	0	5382	6414	8373	27177
34.00	8581	-7200	11202	0	5449	6494	8478	28396
29.00	8974	-7530	11714	0	5515	6573	8580	29643
24.00	9371	-7863	12233	0	5579	6649	8680	30918
19.00	9773	-8200	12757	0	5641	6722	8775	32221
14.00	10179	-8541	13287	0	5699	6791	8865	33551
9.00	10589	-8885	13823	0	5755	6858	8953	34910
4.00	11003	-9233	14364	0	5813	6928	9044	36295
0.00	11337	-9513	14800	0	5875	7001	9139	37418

Deflections and Stresses for Pole

Loading Case T+S

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
179.00	27.3	32.6	42.5	0.6	2.33	0.00	0.00	0.01	0.00	0.01	82.55
174.00	25.8	30.7	40.1	0.6	2.32	0.00	0.02	0.01	0.00	0.02	82.55
169.00	24.2	28.8	37.6	0.5	2.30	0.00	0.04	0.01	0.00	0.04	82.28
169.00	24.2	28.8	37.6	0.5	2.30	0.00	0.04	0.02	0.00	0.04	82.28
164.00	22.7	27.0	35.3	0.5	2.26	0.00	0.07	0.02	0.00	0.07	81.16
159.00	21.2	25.2	32.9	0.4	2.21	0.00	0.09	0.01	0.00	0.09	80.04
159.00	21.2	25.2	32.9	0.4	2.21	0.00	0.09	0.02	0.00	0.10	80.04
154.00	19.7	23.5	30.6	0.4	2.14	0.00	0.12	0.02	0.00	0.12	78.92
149.00	18.3	21.8	28.4	0.3	2.05	0.01	0.14	0.02	0.00	0.15	77.80
149.00	18.3	21.8	28.4	0.3	2.05	0.01	0.14	0.02	0.00	0.15	77.80
144.00	16.9	20.2	26.3	0.3	1.96	0.01	0.17	0.02	0.00	0.18	76.68
143.00	16.7	19.9	25.9	0.3	1.94	0.01	0.18	0.02	0.00	0.19	76.45
143.00	16.7	19.9	25.9	0.3	1.94	0.00	0.12	0.02	0.00	0.13	82.55
139.00	15.6	18.6	24.3	0.3	1.88	0.00	0.13	0.01	0.00	0.14	82.55
138.50	15.5	18.5	24.1	0.3	1.87	0.00	0.13	0.01	0.00	0.14	82.55
134.00	14.4	17.2	22.4	0.2	1.80	0.00	0.15	0.01	0.00	0.15	82.55
129.00	13.2	15.8	20.6	0.2	1.71	0.00	0.16	0.01	0.00	0.16	82.55
124.00	12.1	14.4	18.8	0.2	1.63	0.00	0.17	0.01	0.00	0.17	81.87
119.00	11.0	13.1	17.2	0.2	1.54	0.00	0.18	0.01	0.00	0.18	81.09
114.00	10.0	11.9	15.6	0.1	1.45	0.00	0.18	0.01	0.00	0.19	80.31
109.00	9.1	10.8	14.1	0.1	1.36	0.00	0.19	0.01	0.00	0.20	79.52
109.00	9.1	10.8	14.1	0.1	1.36	0.00	0.16	0.01	0.00	0.16	82.55
104.00	8.2	9.8	12.7	0.1	1.28	0.00	0.16	0.01	0.00	0.16	82.55
99.00	7.4	8.8	11.4	0.1	1.21	0.00	0.16	0.01	0.00	0.17	82.21
94.00	6.6	7.8	10.2	0.1	1.14	0.00	0.17	0.01	0.00	0.17	81.56
89.00	5.8	6.9	9.1	0.1	1.06	0.00	0.17	0.01	0.00	0.18	80.90
85.00	5.3	6.3	8.2	0.1	1.01	0.00	0.17	0.01	0.00	0.18	80.38
85.00	5.3	6.3	8.2	0.1	1.01	0.00	0.18	0.01	0.00	0.19	80.80
84.00	5.1	6.1	8.0	0.1	0.99	0.00	0.18	0.01	0.00	0.19	80.66
79.00	4.5	5.3	7.0	0.0	0.92	0.01	0.18	0.01	0.00	0.19	80.01
74.00	3.9	4.6	6.1	0.0	0.85	0.01	0.19	0.01	0.00	0.19	79.36
69.00	3.3	4.0	5.2	0.0	0.78	0.01	0.19	0.01	0.00	0.20	78.71
64.00	2.8	3.4	4.4	0.0	0.71	0.01	0.19	0.01	0.00	0.20	78.05
59.00	2.4	2.9	3.7	0.0	0.64	0.01	0.20	0.01	0.00	0.20	77.40
54.00	2.0	2.4	3.1	0.0	0.57	0.01	0.20	0.01	0.00	0.20	76.75
52.00	1.8	2.2	2.9	0.0	0.55	0.01	0.20	0.01	0.00	0.20	76.49
52.00	1.8	2.2	2.9	0.0	0.55	0.01	0.17	0.01	0.00	0.17	80.70
49.00	1.6	1.9	2.5	0.0	0.51	0.01	0.17	0.01	0.00	0.17	80.36
45.08	1.4	1.6	2.1	0.0	0.47	0.01	0.17	0.01	0.00	0.17	79.92

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

Deflections and Stresses for Pole

Loading Case T+S

*** Deflections and Stresses ***

Distance From Base (ft)	Defl. X-Dir (in)	Defl. Y-Dir (in)	Defl. Resultant X & Y (in)	Defl. Z-Dir (in)	Rotation (deg.)	Axial Interaction Term	Flexural Interaction Term	Shear Interaction Term	Torsion Interaction Term	Combined Stress Interaction	Effective Yield Strength (ksi)
44.00	1.3	1.5	2.0	0.0	0.45	0.01	0.17	0.01	0.00	0.17	79.80
39.00	1.0	1.2	1.6	0.0	0.40	0.01	0.17	0.01	0.00	0.18	79.24
34.00	0.8	0.9	1.2	0.0	0.34	0.01	0.17	0.01	0.00	0.18	78.68
29.00	0.6	0.7	0.9	0.0	0.29	0.01	0.17	0.01	0.00	0.18	78.12
24.00	0.4	0.4	0.6	0.0	0.24	0.01	0.17	0.01	0.00	0.18	77.56
19.00	0.2	0.3	0.4	0.0	0.18	0.01	0.17	0.01	0.00	0.18	77.00
14.00	0.1	0.1	0.2	0.0	0.13	0.01	0.18	0.01	0.00	0.18	76.44
9.00	0.1	0.1	0.1	0.0	0.09	0.01	0.18	0.01	0.00	0.18	75.88
4.00	0.0	0.0	0.0	0.0	0.04	0.01	0.18	0.01	0.00	0.18	75.32
0.00	0.0	0.0	0.0	0.0	0.00	0.01	0.18	0.01	0.00	0.19	74.88

MINIMUM DEFLECTION RATIO // DEFLECTION LIMIT / DEFLECTION // IS

F L A N G E A N A L Y S I S Version IMPAX-16.3.5

FLANGE FOR THE C - D JOINT : SIZED FOR SHAFT MOMENT CAPACITY

Input Data

Applied Reactions			
Resultant Moment	=	25,283	in-kips
Torsion	=	0	in-kips
Resultant Shear	=	0	lbs
Axial	=	0	lbs
Bolts			
Number of Bolts	=	24	
Bolt Diameter	=	1.50	in
Bolt Material	=	A325	
Bolt Circle	=	41.15	in
Flange			
Outside Diameter	=	44.90	in
Thickness	=	2.000	in
Yield Strength	=	50	ksi
Tensile Strength	=	65	ksi
Valmont Material Spec.	=	S-56	
Tube			
No. of sides	=	18	
Design Diameter	=	36.091	in
Detailed "C" Sect. Dia	=	36.135	in
Detailed "D" Sect. Dia	=	36.046	in
Thickness	=	0.3750	in
Thickness for M. Cap.	=	0.3125	in
Yield	=	65	ksi

Results

Bolts			
Maximum Bolt Axial Force	=	102,407	lbs
Maximum Bolt Shear	=	1,409	lbs
Tensile Strength	=	105	ksi
Combined Stress Ratio	=	0.85	
Flange			
Weight	=	572	lbs
Controlling Stress	=	Bending	
Maximum Stress Ratio	=	0.55	
Bending Stress Ratio	=	0.55	
Shear Stress Ratio	=	0.49	
Bearing Stress Ratio	=	0.01	

*** BOLT COORDINATES ***

BOLT NO.	X-COORD	Y-COORD		BOLT NO.	X-COORD	Y-COORD
1	20.57	0.00	*	2	19.87	5.32
3	17.82	10.29	*	4	14.55	14.55
5	10.29	17.82	*	6	5.32	19.87
7	0.00	20.57	*			

BY VALMONT INDUSTRIES FOR: BLUE SKY TOWER 110' EXT. 180.0' POLE, SITE: SHARON, CT, CT-5001 DATE 04/10/2015
Fuse 1.13.0.0

*** ANCHOR BOLT CHARACTERISTICS GOVERNED BY LOADING CASE WIND ***

NUMBER OF BOLTS	DIAMETER (IN.)	LENGTH (IN.)	WEIGHT (LB.)	SHIPPED AS	PROJECTION LENGTH (IN.)	GALVANIZED LENGTH (IN.)	THREAD SIZE
18	2.250	72	2219	BOLTS, TEMPLATES	12.25	72.00	4.5-UNC-2A

STEEL SPECIF.	MAXIMUM BOLT FORCE (LB.)	MAXIMUM BOLT SHEAR FORCE (LB.)	FACTORED NOMINAL TENS. STRENGTH (LB.)	STRESS AREA (SQ. IN.)	INTERACTION VALUE	CONFIGURATION OF BOTTOM END
A615	243420	2507	260004	3.250	0.96	THREADED WITH HEAVY HEX HEAD NUT

NOTE: BOLT INTERACTION VALUE WAS CALCULATED BY DIVIDING SHEAR FORCE BY FACTOR RELATED TO DETAIL TYPE d] IN EIA-G SPECS.

*** BOLT COORDINATES AND FORCES ***

BOLT NO.	X-COORD	Y-COORD	MAX TENSION-LB	MAX FORCE-LB	*	BOLT NO.	X-COORD	Y-COORD	MAX TENSION-LB	MAX FORCE-LB
1	33.880	0.00	39238	44403	*	2	31.837	11.588	117838	123003
3	25.954	21.778	181910	187075	*	4	16.940	29.341	223730	228895
5	5.883	33.366	238254	243419	*					

MAX. BOLT CIRCLE = 67.76 IN. TEMPLATE DIAMETER = 73.76 IN.

*** BASE PLATE CHARACTERISTICS GOVERNED BY LOADING CASE WIND ***

DRAWING NUMBER	OVERALL LENGTH (IN.)	OVERALL WIDTH (IN.)	THICKNESS (IN.)	ACTUAL WEIGHT (LB.)	RAW MATERIAL WEIGHT (LB.)	SIDE LENGTH (IN.)
SD18-99	73.76	74.90	3.2500	3108	5087	13.01

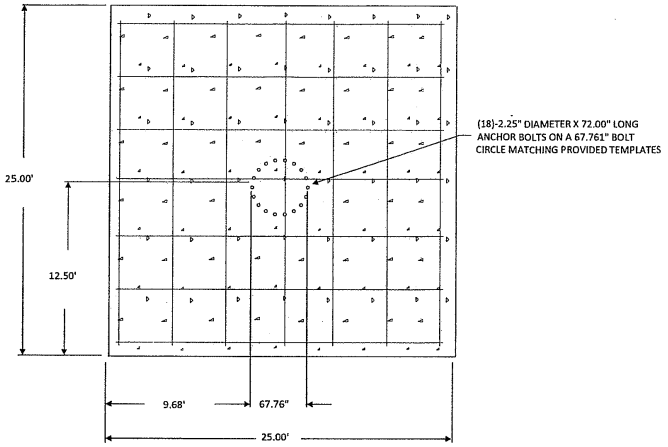
TOP WIDTH (IN.)	POLE DIAM. (MAJOR DIAM.) (IN.)	CRITICAL FAILURE MODE	TOTAL LENGTH OF FAIL MODE LINE (IN.)	EFFECTIVE LENGTH (IN.)	TOTAL MOMENT ALONG FAIL LINE (IN.-LB.)
13.01	60.33	2	85.44	75.09	4695925

STEEL SPECIF.		BENDING STRESS (PSI)	EFFECTIVE YIELD STRESS (PSI)	MAX. VERTICAL SHEAR STRESS (PSI)
VALMONT	OTHER			
S56	A572	35525	50000	12050

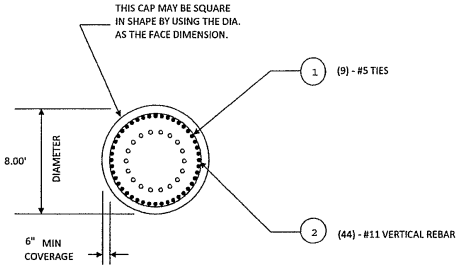
** LOADS AT POLE BASE IN THE GLOBAL COORDINATE SYSTEM ********** LOADING CASES **********

LOADING CASE IDENTIFICATION	WIND	ICE	T+S
MOMENT ABT. X-AXIS (IN-KIP)	56255	15515	11337
MOMENT ABT. Y-AXIS (IN-KIP)	- 47203	- 13018	- 9513
SHEAR FORCE (LB.)	45128	11878	9127
VERTICAL FORCE (LB.)	46491	95269	37421

]MAX CRITERION-	LOAD CASE
]MOMENT ABT. X	WIND
]MOMENT ABT. Y	WIND
]RES. MOMENT	WIND
]SHEAR FORCE	WIND
]BOLT FORCE	WIND
]BOLT TENSION	WIND



SECTION A-A
No Scale



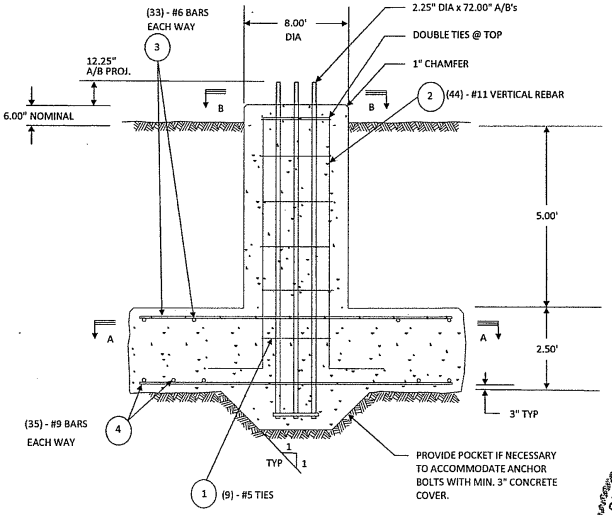
SECTION B-B
No Scale

GENERAL NOTES: SLAB FOUNDATION

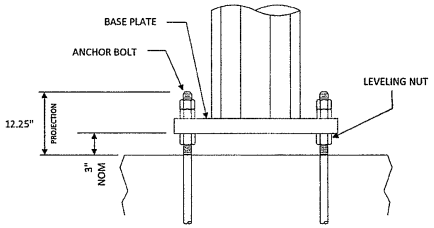
1. Prior to excavation, check the area for underground facilities.
2. All reinforcing shall be deformed bars conforming to ASTM A615 Grade 60 (60,000 psi min. yield) and shall be provided by the foundation contractor.
3. All concrete shall have a minimum compressive strength of 3000 psi @ 28 days. The requirement for the concrete shall be as given in the ACI "Building Code Requirements for Reinforced Concrete", ACI 318, the latest edition.
4. Trowel top of foundation smooth.
5. Concrete shall be placed against undisturbed soil to the depth indicated on the foundation drawing. The portion above grade shall be formed. If an area is excavated beyond the limits shown, this volume shall be filled with concrete or formed. After the forms are removed, the excess excavation shall be replaced and compacted.
6. Ground water was not encountered below grade during boring.
7. Foundation design based on vert. bearing pressure of 20000 psf.
8. Concrete is assumed to weigh 150 pcf.
9. Estimated concrete volume = **70.91 cubic yards total.**
10. Design Based on the following loads from installation drawing for order No: 278467.

Factored Moment = 6120 FT-KIPS **Overturning Safety Factor = 1.06**
Factored Download = 37.2 KIPS **Max. Toe Bearing Pressure = 4.60 ksf**
Factored Shear = 45.1 KIPS

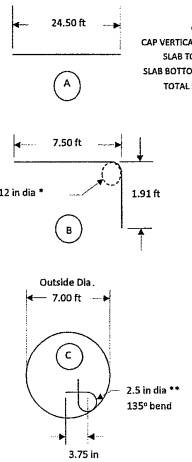
11. Backfill should be compacted to a density of 100 pct.
12. Anchor bolts to be ASTM A615, Gr. 75 ksi.
13. Reference: DET Job No. 2010.17, Dated: November 26th, 2010
14. Ref Soils Report for installation recommendations.



ELEVATION
No Scale



ANCHOR BOLT INSTALLATION
N.T.S.
EXTREME CARE SHOULD BE TAKEN TO ASSURE THAT ALL LEVELING NUTS ARE LEVEL WITH RESPECT TO EACH OTHER PRIOR TO ERECTION OF THE STRUCTURE



REINFORCEMENT STEEL SCHEDULE						
Sym	Type	Rebar Size	Rebar Spacing	Weight (lbs)	Qty
CAP TIES	1	C	#5	EQUAL	206	9
CAP VERTICAL REBAR	2	B	#11	-----	2200	44
SLAB TOP STEEL	3	A	#6	9.19 in	2429	66
SLAB BOTTOM STEEL	4	A	#9	8.65 in	5831	70
TOTAL STEEL WEIGHT FOR COMPLETE FOUNDATION INSTALLATION =					10666	

Grade 60 Rebar

Size	Ask #	Wt/ft	6db (in)	d* (in)	d** (in)
#3	11-97203	0.38	2.25	2.25	1.50
#4	11-97204	0.67	3.00	3.00	2.00
#5	11-97205	1.04	3.75	3.75	2.50
#6	11-97206	1.50	4.50	4.50	4.50
#7	11-97207	2.04	5.25	5.25	4.25
#8	11-97208	2.67	6.00	6.00	6.00
#9	11-97209	3.40	6.77	9.50	-
#10	11-97210	4.30	7.62	10.75	-
#11	11-97211	5.31	8.46	12.00	-

* Refers to ACI standard hook detail chart
** Refers to ACI stirrup hook detail chart

Rebar Lap Splice

Rebar Size	Rebar Grade	Specified Concrete Strength	Overlap (inches) Vert & Ties	Bottom Horiz	Top Horiz
#3	60	3000 psi	13	15	21
#4	60	3000 psi	18	20	29
#5	60	3000 psi	22	26	36
#6	60	3000 psi	26	33	46
#7	60	3000 psi	38	45	62
#8	60	3000 psi	43	59	82
#9	60	3000 psi	49	74	104
#10	60	3000 psi	58	95	132
#11	60	3000 psi	71	116	163

Splicing is an alternative to specified material listed in rebar schedule.
Lap Splice may be used on ties when Seismic Hook not required.

APR 16 2015
STATE OF CONNECTICUT
JEFFREY E. GRASSMAN
No. 19224
REGISTERED PROFESSIONAL ENGINEER
EXPIRES ON
JAN 31 2016

Rev	Description	Date	By/Ck

UNLESS OTHERWISE NOTED DIMENSIONS ARE IN INCHES TOLERANCES ARE:
X" = X.X/X" = ± 1/8"
X.XX" = ± 1/16"
X" = ± 1/16"

valmont MICROFLECT
3575 25TH STREET SE SALEM, OR 97302
MAIN (503) 363-9267
FAX (503) 316-2040

By:	JDN
Check:	MF
Date:	04/10/15
S.O. 278467	SIZE - B

SLAB FOUNDATION LAYOUT
Customer BLUE SKY TOWER
Site SHARON
Dwg No. B-141475
Sheet 1 of 1

304

MOUNT ANALYSIS REPORT

For

SITE NAME: CORNWALL CT
16 BELL ROAD EXT.
CORNWALL, CT 06754
41°50'44.8"N, 73°21'51.5"W

PREPARED FOR:

verizon

WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 FOUNDRY POND ROAD
COLD SPRING, NY 10516
ONAIR@OPTONLINE.NET
201-456-4624

Prepared By:

KM CONSULTING ENGINEERS, INC.

262 Upper Ferry Road, Ewing, NJ 08628
Ph: (609) 538-0400 www.kmengr.com

KM Project No. 210602.00

Date: June 17, 2021

Michael L. Bohlinger, PE
Connecticut Professional Engineer
License No. 20405

On Air Engineering, LLC
Cornwall CT

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Structure Blue Sky Towers CT-5001

Location: 16 Bell Road Ext.
Cornwall, CT 06754
41°50’44.8”N, 73°21’51.5”W

Manufacturer:

Equipment

Existing inventory plus the proposed installation are detailed below.

Proposed Verizon Installation:

Final loading per sector listed (Alpha/Beta/Gamma):

Proposed Equipment:

(1) Samsung MT6407-77A integrated panel antenna

Existing Equipment to Remain:

(2) NHH-45C-R2B panel antennas (installed on dual antenna mount)
(1) B2/B66A RRH-BR049 (RFV01U-D1A)
(1) B5/B13 RRH-BR04C (RFV01U-D2A)
(1) BSAMNT-SBS-2-3 dual antenna mount
(1) Raycap DB-C1-12C-24AB-0Z OVP (1 total overall)

Existing Equipment to be Removed:

(None)

1.0 EXECUTIVE SUMMARY

Site Design Parameters

Structure Class: II
Exposure Category: B
Basic Wind Speed for Antennas: 89 mph
Antenna Centerline Height: 110’ AGL
Basic Wind Speed with Ice: 40 mph
Design Ice Thickness: 0.75”

The basic wind speed for the antennas is taken from Appendix N in the 2018 Connecticut State Building Code for the nominal design wind speed for the municipality of Cornwall, CT, and used as the basic wind speed with no ice per the ANSI/TIA-222-G design standard. The basic wind speed concurrent with the design ice thickness is in accordance with the ANSI/TIA-222-G design standard.

Synopsis

The proposed and existing Verizon equipment listed will be installed on the existing monopole frame mount. The monopole frame mount is from the manufacturer Site Pro 1, model no. RMQP-4096-HK, based on information provided by the client. A RISA-3D model of the mount structure was obtained from the manufacturer and subsequently analyzed for the proposed Verizon loading. From the analysis the existing mount structure has sufficient capacity with a rating of 28.2% and therefore meets the current ANSI/TIA-222-G standards and is acceptable for the proposed Verizon loading.

2.0 ANALYSIS PROCEDURE

Our scope of work is to determine if the existing structure and existing Verizon mounts are capable of withstanding the additional stresses/forces imposed by the installation of the proposed equipment.

Existing antenna mount details and existing and proposed equipment inventory were based on a previous mount analysis by Paul J. Ford & Company dated 5/28/20 and design exhibit drawings by On Air Engineering, LLC dated 5/28/21. The structural model of the mount structure was obtained from mount manufacturer, Site Pro 1 (model no. RMQP-4096-HK taken from the previous mount analysis). Recent photographs of the installation were provided by the client for review.

The following report will provide analytical calculations and commentary regarding the capacity of the existing mount structure and subsequent recommendations. The existing antenna mount structure was analyzed using RISA-3D, a comprehensive structural analysis program. The loads inputted into the program are calculated separately based on the requirements of the codes referenced below. The structural review is based on the site-specific condition noted and considering the requirements of the codes listed below. For clarity, this review shall include worst case loadings.

Codes and Standards

2018 Connecticut State Building Code

ASCE - American Society of Civil Engineers - ASCE/SEI 7-10 *Minimum Design Loads for Buildings and Other Structures*, 2010

TIA - Telecommunications Industry Association - ANSI/TIA-222-G-4 *Structural Standard for Antenna Supporting Structures and Antennas*, 2014

AISC - American Institute of Steel Construction - *Manual of Steel Construction, 14th Edition* (AISC 360-10), 2011

3.0 ANALYSIS RESULTS

The site was analyzed for the existing and proposed Verizon inventory and site design parameters detailed in Section 1.0 and checked using the appropriate design codes and standards given in Section 2.0.

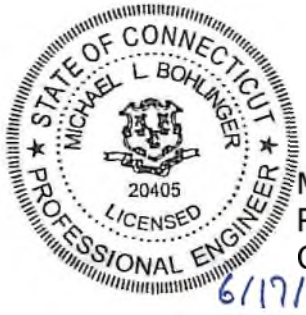
Further to our calculations, the existing mount is acceptable for the proposed Verizon loading. The existing mount structure has sufficient capacity for the proposed loading with a rating of 28.2% and therefore meets the current ANSI/TIA-222-G standards.

Please do not hesitate to contact our office with any questions or concerns regarding this report.

Sincerely,
KM CONSULTING ENGINEERS, INC

Domenic Aversa, PE
Project Manager

Reviewed and Approved by:



Michael L. Bohlinger, PE
Principal
CT License #20405

4.0 APPENDIX

KM Consulting Engineers, Inc.
262 Upper Ferry Road
Ewing, NJ 08628

Tel.: (609) 538-0400
www.kmengr.com

Cornwall CT
16 Bell Road Ext.
Cornwall, CT 06754

Index

Design Criteria: 2018 Connecticut State Building Code
ANSI/TIA-222-G
AISC Steel Construction Manual

Assumptions: Proposed and existing loading was obtained from design exhibit drawings by On Air Engineering, LLC dated 5/28/21. All members are assumed to be in good working condition.

KM Consulting Engineers, Inc.
262 Upper Ferry Road
Ewing, NJ 08628

Tel.: (609) 538-0400
www.kmengr.com

Purpose:

Purposed of this analysis is to evaluate the structural capacity of the existing mounting frame on the monopole structure at 16 Bell Road Ext., Cornwall, CT for the proposed carrier loading for Verizon Wireless.

Site Details:

Wind Speed:	$V := 89\ \text{mph}$	(wind speed as per 2018 CSBC)
	$V_{ice} := 40\ \text{mph}$	
Antenna Centerline Height:	$z_a := 110\ \text{ft}$	
Exposure B:	$z_g := 1200\ \text{ft}$	$\alpha := 7.0$
Structure Class II:	$I_{wind} := 1.00$	$I_{ice} := 1.00$
Design Ice Thickness:	$t_i := 0.75\ \text{in}$	

Wind Pressure Calculations:

$$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$$

$$F_A = q_z\ G_h\ \left(EPA_A\right)$$

$$K_z := 2.01\ \left(\frac{z_a}{z_g}\right)^{\frac{2}{\alpha}} = 1.02$$

$$G_h := 1.10$$

$$K_d := 0.95$$

$$K_{zt} := 1.0$$

$$q_z := 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I_{wind}\ \frac{\text{psf}}{\text{mph}^2} = 19.6\ \text{psf}$$

$$q_{z\_i} := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V_{ice}{}^2 \cdot I_{ice} \cdot \frac{\text{psf}}{\text{mph}^2} = 3.95\ \text{psf}$$

Antenna & Mount Details:		Weight:
Samsung MT6407-77A antenna:	$h_{A1} := 35.1\ \text{in}$ $w_{A1} := 16.1\ \text{in}$ $d_{A1} := 5.5\ \text{in}$	$W_{A1} := 87.1\ \text{lbf} + 15\ \text{lbf} = 102.1\ \text{lbf}$
CommScope NHH-45C-R2B:	$h_{A2} := 95.9\ \text{in}$ $w_{A2} := 18.0\ \text{in}$ $d_{A2} := 7.0\ \text{in}$	$W_{A2} := 87.1\ \text{lbf} + 23.6\ \text{lbf} = 110.7\ \text{lbf}$
Samsung B2/B66A RRH-BR049 (RFV01U-D1A):	$h_{A3} := 15\ \text{in}$ $w_{A3} := 15\ \text{in}$ $d_{A3} := 10\ \text{in}$	$W_{A3} := 97.5\ \text{lbf}$
Samsung B5/B13 RRH-BR04C (RFV01U-D2A):	$h_{A4} := 15\ \text{in}$ $w_{A4} := 15\ \text{in}$ $d_{A4} := 8.1\ \text{in}$	$W_{A4} := 82\ \text{lbf}$
Raycap DB-C1-12C-24AB-0Z:	$h_{A5} := 27\ \text{in}$ $w_{A5} := 16.5\ \text{in}$ $d_{A5} := 12.6\ \text{in}$	$W_{A5} := 32\ \text{lbf} + 7.5\ \text{lbf} = 39.5\ \text{lbf}$
CommScope BSAMNT-SBS-2-3 antenna mount:		$W_{A7} := 110\ \text{lbf}$
3" nom. sched. 40 pipe mounts:	$l_{m1} := 12.5\ \text{ft}$ $d_{m1} := 3.50\ \text{in}$	
2" nom. sched. 40 pipe mounts:	$l_{m2} := 12.5\ \text{ft}$ $d_{m2} := 2.38\ \text{in}$	
2.5" nom. sched. 40 pipe mounts:	$h_{m3} := 8\ \text{ft}$ $d_{m3} := 2.88\ \text{in}$	
HSS4x4x1/4 members:	$h_{m4} := 4\ \text{in}$ $w_{m4} := 4\ \text{in}$	
2L2.5x2.5x1/2 members:	$h_{m5} := 2.5\ \text{in}$ $w_{m5} := 5.25\ \text{in}$	
L2x2x3/16 members:	$h_{m6} := 2\ \text{in}$ $w_{m6} := 2\ \text{in}$	
L2.5x2.5x1/4 members:	$h_{m7} := 2.5\ \text{in}$ $w_{m7} := 2.5\ \text{in}$	

Mounting Frame Wind Force Calculations:

$F_A = q_z\ G_h\ (EPA_A)$

$EPA_A = K_a\ \sum C_a\ A_A$ $\quad K_a := 1.0$

$EPA_{MN} = C_{as}\ (A_f + R_{rf}\ A_r)$

$C_{as} = 1.58 + 1.05\ (0.6 - \varepsilon)^{1.8}$ $\quad \varepsilon \le 0.6$

$A_f := 0\ \text{ft}^2$ $\quad A_r := l_{m1} \cdot d_{m1} + l_{m2} \cdot d_{m2} = 6.13\ \text{ft}^2$

$\varepsilon := \dfrac{A_r}{l_{m1} \cdot 3.5\ \text{ft}} = 0.140$

$C_{as} := 1.58 + 1.05\ (0.6 - \varepsilon)^{1.8} = 1.84$

$R_{rf} := 0.6 + 0.4\ \varepsilon^2 = 0.61$

$0.75\ C_{as}\ R_{rf} = 0.84$

3" nom. pipe mounts:

$C_{a\_1mN} := 0.75\ C_{as}\ R_{rf} = 0.84$ $\quad f_{m1\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_1mN}\ d_{m1} = 5.3\ \text{plf}$

2" nom. pipe mounts:

$C_{a\_2mN} := 0.75\ C_{as}\ R_{rf} = 0.84$ $\quad f_{m2\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_2mN}\ d_{m2} = 3.6\ \text{plf}$

HSS4x4x1/4 members:

$C_{a\_4mT} := 1.0$ $\quad f_{m4\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_4mT}\ h_{m4} = 7.2\ \text{plf}$

2L2.5x2.5x1/2 members:

$C_{a\_5mN} := 1.0$ $\quad C_{a\_5mT} := 1.0$

$f_{m5\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_5mN}\ w_{m5} = 9.4\ \text{plf}$ $\quad f_{m5\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_5mT}\ h_{m5} = 4.5\ \text{plf}$

L2x2x3/16 members:

$C_{a\_6mN} := 1.0$ $\quad C_{a\_6mT} := 1.0$

$f_{m6\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_6mN}\ h_{m6} = 3.6\ \text{plf}$ $\quad f_{m6\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_6mT}\ h_{m6} = 3.6\ \text{plf}$

L2.5x2.5x1/4 members:

$C_{a\_7mN} := 1.0$ $C_{a\_7mT} := 1.0$

$f_{m7\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_7mN}\ h_{m7} = 4.5$ plf $f_{m7\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_7mT}\ h_{m7} = 4.5$ plf

Antenna Wind Force Calculations:

$F_A = q_z\ G_h\ (EPA_A)$

$EPA_A = K_a\ \sum C_a\ A_A$ $K_a := 0.8$

Samsung MT6407-77A antenna:

$A_{A1\_N} := h_{A1} \cdot w_{A1} = 3.92$ ft^2 $A_{A1\_T} := h_{A1} \cdot d_{A1} = 1.34$ ft^2

$AR := \frac{h_{A1}}{w_{A1}} = 2.18$ $AR := \frac{h_{A1}}{d_{A1}} = 6.38$

$C_{a\_1N} := 1.2$ $C_{a\_1T} := 1.4$

$EPA_{A1\_N} := K_a\ (C_{a\_1N}\ A_{A1\_N}) = 3.77$ ft^2 $EPA_{A1\_T} := K_a\ (C_{a\_1T}\ A_{A1\_T}) = 1.50$ ft^2

$F_{A1\_N} := q_z \cdot G_h \cdot EPA_{A1\_N} = 81.1$ lbf $F_{A1\_T} := q_z \cdot G_h \cdot EPA_{A1\_T} = 32.3$ lbf

CommScope NHH-45C-R2B:

$A_{A2\_N} := h_{A2} \cdot w_{A2} = 11.99$ ft^2 $A_{A2\_T} := h_{A2} \cdot d_{A2} = 4.66$ ft^2

$AR := \frac{h_{A2}}{w_{A2}} = 5.33$ $AR := \frac{h_{A2}}{d_{A2}} = 13.70$

$C_{a\_2N} := 1.4$ $C_{a\_2T} := 1.5$

$EPA_{A2\_N} := K_a\ (C_{a\_2N}\ A_{A2\_N}) = 13.43$ ft^2 $EPA_{A2\_T} := K_a\ (C_{a\_2T}\ A_{A2\_T}) = 5.59$ ft^2

$F_{A2\_N} := q_z \cdot G_h \cdot EPA_{A2\_N} = 288.9$ lbf $F_{A2\_T} := q_z \cdot G_h \cdot EPA_{A2\_T} = 120.4$ lbf

Samsung B2/B66A RRH-BR049 (RFV01U-D1A):

$A_{A3\_N} := h_{A3} \cdot w_{A3} = 1.56\ \text{ft}^2$

$AR := \frac{h_{A3}}{w_{A3}} = 1.00$

$C_{a\_3N} := 1.2$

$EPA_{A3\_N} := K_a \left(C_{a\_3N}\ A_{A3\_N}\right) = 1.50\ \text{ft}^2$

$F_{A3\_N} := q_z \cdot G_h \cdot EPA_{A3\_N} = 32.3\ \text{lbf}$

$A_{A3\_T} := h_{A3} \cdot d_{A3} = 1.04\ \text{ft}^2$

$AR := \frac{h_{A3}}{d_{A3}} = 1.50$

$C_{a\_3T} := 1.2$

$EPA_{A3\_T} := K_a \left(C_{a\_3T}\ A_{A3\_T}\right) = 1.00\ \text{ft}^2$

$F_{A3\_T} := q_z \cdot G_h \cdot EPA_{A3\_T} = 21.5\ \text{lbf}$

Samsung B2/B66A RRH-BR049 (RFV01U-D1A):

$A_{A4\_N} := h_{A4} \cdot w_{A4} = 1.56\ \text{ft}^2$

$AR := \frac{h_{A4}}{w_{A4}} = 1.00$

$C_{a\_4N} := 1.2$

$EPA_{A4\_N} := K_a \left(C_{a\_4N}\ A_{A4\_N}\right) = 1.50\ \text{ft}^2$

$F_{A4\_N} := q_z \cdot G_h \cdot EPA_{A4\_N} = 32.3\ \text{lbf}$

$A_{A4\_T} := h_{A4} \cdot d_{A4} = 0.84\ \text{ft}^2$

$AR := \frac{h_{A4}}{d_{A4}} = 1.85$

$C_{a\_4T} := 1.2$

$EPA_{A4\_T} := K_a \left(C_{a\_4T}\ A_{A4\_T}\right) = 0.81\ \text{ft}^2$

$F_{A4\_T} := q_z \cdot G_h \cdot EPA_{A4\_T} = 17.4\ \text{lbf}$

Raycap DB-C1-12C-24AB-0Z:

$A_{A5\_N} := h_{A5} \cdot w_{A5} = 3.09\ \text{ft}^2$

$AR := \frac{h_{A5}}{w_{A5}} = 1.64$

$C_{a\_5N} := 1.2$

$EPA_{A5\_N} := K_a \left(C_{a\_5N}\ A_{A5\_N}\right) = 2.97\ \text{ft}^2$

$F_{A5\_N} := q_z \cdot G_h \cdot EPA_{A5\_N} = 63.9\ \text{lbf}$

$A_{A5\_T} := h_{A5} \cdot d_{A5} = 2.36\ \text{ft}^2$

$AR := \frac{h_{A5}}{d_{A5}} = 2.14$

$C_{a\_5T} := 1.2$

$EPA_{A5\_T} := K_a \left(C_{a\_5T}\ A_{A5\_T}\right) = 2.27\ \text{ft}^2$

$F_{A5\_T} := q_z \cdot G_h \cdot EPA_{A5\_T} = 48.8\ \text{lbf}$

2.5" nom. pipe mounts:

$AR := \frac{h_{m3}}{d_{m3}} = 33.33$

$C_{a\_3mT} := 1.2$

$f_{m3\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_3mT}\ d_{m3} = 5.0\ \text{plf}$

Mounting Frame Wind Force Calculations (with ice):

$t_{iz} = 2.0\ t_i \cdot I_{ice}\ K_{iz}\ K_{zt}^{0.35}$ $\quad t_i = 0.75\ \text{in}$

$K_{iz} := \left(\frac{z_a}{33\ \text{ft}}\right)^{0.10} = 1.13$

$t_{iz} := 2.0\ t_i \cdot I_{ice}\ K_{iz}\ K_{zt}^{0.35} = 1.69\ \text{in}$

$A_r := \left(l_{m1} + 2\ t_{iz}\right) \cdot \left(d_{m1} + 2\ t_{iz}\right) + \left(l_{m2} + 2\ t_{iz}\right) \cdot \left(d_{m2} + 2\ t_{iz}\right) = 13.47\ \text{ft}^2$

$\varepsilon := \frac{A_r}{\left(l_{m1} + 2\ t_{iz}\right) \cdot \left(3.5\ \text{ft} + 2\ t_{iz}\right)} = 0.279$

$C_{as} := 1.58 + 1.05\ \left(0.6 - \varepsilon\right)^{1.8} = 1.72$

$R_{rf} := 0.6 + 0.4\ \varepsilon^2 = 0.63$

$0.75\ C_{as}\ R_{rf} = 0.81$ $\quad K_a := 1.0$

3" nom. pipe mounts:

$C_{a\_1mN} := 0.75\ C_{as}\ R_{rf} = 0.81$ $\quad f_{m1\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_1mN}\ \left(d_{m1} + 2\ t_{iz}\right) = 2.0\ \text{plf}$

2" nom. pipe mounts:

$C_{a\_2mN} := 0.75\ C_{as}\ R_{rf} = 0.81$ $\quad f_{m2\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_2mN}\ \left(d_{m2} + 2\ t_{iz}\right) = 1.7\ \text{plf}$

HSS4x4x1/4 members:

$C_{a\_4mT} := 1.0$ $\quad f_{m4\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_4mT}\ \left(h_{m4} + 2\ t_{iz}\right) = 2.7\ \text{plf}$

2L2.5x2.5x1/2 members:

$C_{a\_5mN} := 1.0$ $\quad f_{m5\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_5mN}\ \left(w_{m5} + 2\ t_{iz}\right) = 3.1\ \text{plf}$

$C_{a\_5mT} := 1.0$ $\quad f_{m5\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_5mT}\ \left(h_{m5} + 2\ t_{iz}\right) = 2.1\ \text{plf}$

L2x2x3/16 members:

$C_{a\_6mN} := 1.0$ $\quad f_{m6\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_6mN}\ \left(h_{m6} + 2\ t_{iz}\right) = 2.0\ \text{plf}$

$C_{a\_6mT} := 1.0$ $\quad f_{m6\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_6mT}\ \left(h_{m6} + 2\ t_{iz}\right) = 2.0\ \text{plf}$

L2.5x2.5x1/4 members:

$C_{a\_7mN} := 1.0$ $\quad f_{m7\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_7mN} \left(h_{m7} + 2\ t_{iz}\right) = 2.1$ plf

$C_{a\_7mT} := 1.0$ $\quad f_{m7\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_7mT} \left(h_{m7} + 2\ t_{iz}\right) = 2.1$ plf

Antenna Wind Force Calculations (with ice):

$K_a := 0.8$

Samsung MT6407-77A antenna:

$A_{A1\_N} := \left(h_{A1} + 2\ t_{iz}\right) \cdot \left(w_{A1} + 2\ t_{iz}\right) = 5.21$ ft^2 $\quad A_{A1\_T} := \left(h_{A1} + 2\ t_{iz}\right) \cdot \left(d_{A1} + 2\ t_{iz}\right) = 2.37$ ft^2

$AR := \dfrac{h_{A1} + 2\ t_{iz}}{w_{A1} + 2\ t_{iz}} = 1.98$ $\quad AR := \dfrac{h_{A1} + 2\ t_{iz}}{d_{A1} + 2\ t_{iz}} = 4.33$

$C_{a\_1N} := 0.70$ $\quad C_{a\_1T} := 0.74$

$EPA_{A1\_N} := K_a \left(C_{a\_1N}\ A_{A1\_N}\right) = 2.92$ ft^2 $\quad EPA_{A1\_T} := K_a \left(C_{a\_1T}\ A_{A1\_T}\right) = 1.41$ ft^2

$F_{A1\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A1\_N} = 12.7$ lbf $\quad F_{A1\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A1\_T} = 6.1$ lbf

CommScope NHH-45C-R2B:

$A_{A2\_N} := \left(h_{A2} + 2\ t_{iz}\right) \cdot \left(w_{A2} + 2\ t_{iz}\right) = 14.74$ ft^2 $\quad A_{A2\_T} := \left(h_{A2} + 2\ t_{iz}\right) \cdot \left(d_{A2} + 2\ t_{iz}\right) = 7.16$ ft^2

$AR := \dfrac{h_{A2} + 2\ t_{iz}}{w_{A2} + 2\ t_{iz}} = 4.64$ $\quad AR := \dfrac{h_{A2} + 2\ t_{iz}}{d_{A2} + 2\ t_{iz}} = 9.56$

$C_{a\_2N} := 0.75$ $\quad C_{a\_2T} := 0.86$

$EPA_{A2\_N} := K_a \left(C_{a\_2N}\ A_{A2\_N}\right) = 8.85$ ft^2 $\quad EPA_{A2\_T} := K_a \left(C_{a\_2T}\ A_{A2\_T}\right) = 4.93$ ft^2

$F_{A2\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A2\_N} = 38.5$ lbf $\quad F_{A2\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A2\_T} = 21.4$ lbf

Samsung B2/B66A RRH-BR049
(RFV01U-D1A):

$A_{A3\_N} := (h_{A3} + 2\ t_{iz}) \cdot (w_{A3} + 2\ t_{iz}) = 2.35\ \text{ft}^2$

$AR := \frac{h_{A3} + 2\ t_{iz}}{w_{A3} + 2\ t_{iz}} = 1.00$

$C_{a\_3N} := 0.70$

$EPA_{A3\_N} := K_a\ (C_{a\_3N}\ A_{A3\_N}) = 1.31\ \text{ft}^2$

$F_{A3\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A3\_N} = 5.7\ \text{lbf}$

$A_{A3\_T} := (h_{A3} + 2\ t_{iz}) \cdot (d_{A3} + 2\ t_{iz}) = 1.71\ \text{ft}^2$

$AR := \frac{h_{A3} + 2\ t_{iz}}{d_{A3} + 2\ t_{iz}} = 1.37$

$C_{a\_3T} := 0.70$

$EPA_{A3\_T} := K_a\ (C_{a\_3T}\ A_{A3\_T}) = 0.96\ \text{ft}^2$

$F_{A3\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A3\_T} = 4.2\ \text{lbf}$

Samsung B2/B66A RRH-BR049
(RFV01U-D1A):

$A_{A4\_N} := (h_{A4} + 2\ t_{iz}) \cdot (w_{A4} + 2\ t_{iz}) = 2.35\ \text{ft}^2$

$AR := \frac{h_{A4} + 2\ t_{iz}}{w_{A4} + 2\ t_{iz}} = 1.00$

$C_{a\_4N} := 0.70$

$EPA_{A4\_N} := K_a\ (C_{a\_4N}\ A_{A4\_N}) = 1.31\ \text{ft}^2$

$F_{A4\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A4\_N} = 5.7\ \text{lbf}$

$A_{A4\_T} := (h_{A4} + 2\ t_{iz}) \cdot (d_{A4} + 2\ t_{iz}) = 1.47\ \text{ft}^2$

$AR := \frac{h_{A4} + 2\ t_{iz}}{d_{A4} + 2\ t_{iz}} = 1.60$

$C_{a\_4T} := 0.70$

$EPA_{A4\_T} := K_a\ (C_{a\_4T}\ A_{A4\_T}) = 0.82\ \text{ft}^2$

$F_{A4\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A4\_T} = 3.6\ \text{lbf}$

Raycap DB-C1-12C-24AB-0Z:

$A_{A5\_N} := (h_{A5} + 2\ t_{iz}) \cdot (w_{A5} + 2\ t_{iz}) = 4.20\ \text{ft}^2$

$AR := \frac{h_{A5} + 2\ t_{iz}}{w_{A5} + 2\ t_{iz}} = 1.53$

$C_{a\_5N} := 0.70$

$EPA_{A5\_N} := K_a\ (C_{a\_5N}\ A_{A5\_N}) = 2.35\ \text{ft}^2$

$F_{A5\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A5\_N} = 10.2\ \text{lbf}$

$A_{A5\_T} := (h_{A5} + 2\ t_{iz}) \cdot (d_{A5} + 2\ t_{iz}) = 3.37\ \text{ft}^2$

$AR := \frac{h_{A5} + 2\ t_{iz}}{d_{A5} + 2\ t_{iz}} = 1.90$

$C_{a\_5T} := 0.70$

$EPA_{A5\_T} := K_a\ (C_{a\_5T}\ A_{A5\_T}) = 1.89\ \text{ft}^2$

$F_{A5\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A5\_T} = 8.2\ \text{lbf}$

2.5" nom. pipe mounts:

$A_{m3\_T} := (h_{m3} + 2\ t_{iz}) \cdot (d_{m3} + 2\ t_{iz}) = 4.32\ \text{ft}^2$

$AR := \frac{h_{m3} + 2\ t_{iz}}{d_{m3} + 2\ t_{iz}} = 15.87$

$EPA_{m3\_T} := K_a\ (C_{a\_3T}\ A_{m3\_T}) = 3.46\ \text{ft}^2$

$C_{a\_3T} := 1.0$

$f_{m3\_Ti} := \frac{q_{z\_i} \cdot G_h \cdot EPA_{m3\_T}}{h_{m3}} = 1.9\ \text{plf}$

Ice Weight Calculations:

$A_{iz} = \pi \cdot t_{iz} \left(D_c + t_{iz}\right)$ $\gamma_{ice} := 56$ pcf

Samsung MT6407-77A antenna:

$D_c := \sqrt{w_{A1}{}^2 + d_{A1}{}^2} = 17.0$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.69$ ft^2

$W_{A1\_i} := \gamma_{ice} \left(h_{A1} + 2\ t_{iz}\right) A_{iz} = 124.0$ lbf

CommScope NHH-45C-R2B:

$D_c := \sqrt{w_{A2}{}^2 + d_{A2}{}^2} = 19.3$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.78$ ft^2

$W_{A2\_i} := \gamma_{ice} \left(h_{A2} + 2\ t_{iz}\right) A_{iz} = 359.2$ lbf

Samsung B2/B66A RRH-BR049 (RFV01U-D1A):

$D_c := \sqrt{w_{A3}{}^2 + d_{A3}{}^2} = 18.0$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.73$ ft^2

$W_{A3\_i} := \gamma_{ice} \left(h_{A3} + 2\ t_{iz}\right) A_{iz} = 62.4$ lbf

Samsung B5/B13 RRH-BR04C (RFV01U-D2A):

$D_c := \sqrt{w_{A4}{}^2 + d_{A4}{}^2} = 17.0$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.69$ ft^2

$W_{A4\_i} := \gamma_{ice} \left(h_{A4} + 2\ t_{iz}\right) A_{iz} = 59.3$ lbf

Raycap DB-C1-12C-24AB-0Z:

$D_c := \sqrt{w_{A5}{}^2 + d_{A5}{}^2} = 20.8$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.83$ ft^2

$W_{A5\_i} := \gamma_{ice} \left(h_{A5} + 2\ t_{iz}\right) A_{iz} = 117.5$ lbf

3" nom. pipe mounts:

$D_c := d_{m1} = 3.50\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.19\ \text{ft}^2$

$\omega_{m1\_i} := \gamma_{ice}\ A_{iz} = 10.7\ \text{plf}$

2" nom. pipe mounts:

$D_c := d_{m2} = 2.38\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.15\ \text{ft}^2$

$\omega_{m2\_i} := \gamma_{ice}\ A_{iz} = 8.4\ \text{plf}$

2.5" nom. pipe mounts:

$D_c := d_{m3} = 2.88\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.17\ \text{ft}^2$

$\omega_{m3\_i} := \gamma_{ice}\ A_{iz} = 9.5\ \text{plf}$

HSS4x4x1/4 members:

$D_c := \sqrt{h_{m4}^{\ 2} + w_{m4}^{\ 2}} = 5.66\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.27\ \text{ft}^2$

$\omega_{m4\_i} := \gamma_{ice}\ A_{iz} = 15.2\ \text{plf}$

2L2.5x2.5x1/2 members:

$D_c := w_{m5} = 5.25\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.26\ \text{ft}^2$

$\omega_{m5\_i} := \gamma_{ice}\ A_{iz} = 14.3\ \text{plf}$

L2x2x3/16 members:

$D_c := \sqrt{h_{m6}^{\ 2} + w_{m6}^{\ 2}} = 2.83\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.17\ \text{ft}^2$

$\omega_{m6\_i} := \gamma_{ice}\ A_{iz} = 9.3\ \text{plf}$

L2.5x2.5x1/4 members:

$D_c := \sqrt{h_{m7}^{\ 2} + w_{m7}^{\ 2}} = 3.54\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.19\ \text{ft}^2$

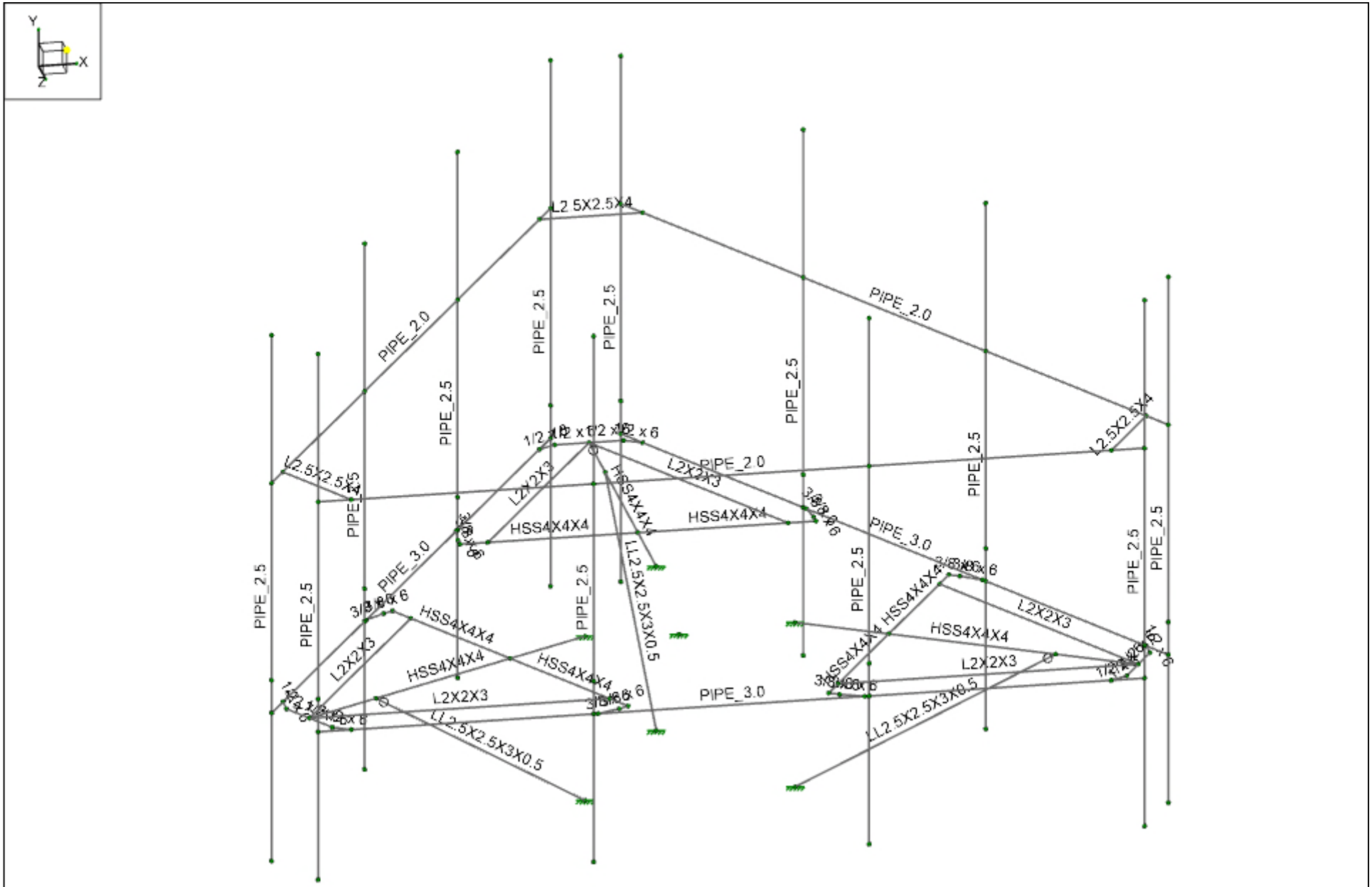
$\omega_{m7\_i} := \gamma_{ice}\ A_{iz} = 10.8\ \text{plf}$

Summary (without ice):

	Front Wind Force:	Side Wind Force:	Weight:
Samsung MT6407-77A antenna:	$F_{A1\_N} = 81.1$ lbf	$F_{A1\_T} = 32.3$ lbf	$W_{A1} = 102.1$ lbf
CommScope NHH-45C-R2B:	$F_{A2\_N} = 288.9$ lbf	$F_{A2\_T} = 120.4$ lbf	$W_{A2} = 110.7$ lbf
B2/B66A RRH-BR049 (RFV01U-D1A):	$F_{A3\_N} = 32.3$ lbf	$F_{A3\_T} = 21.5$ lbf	$W_{A3} = 97.5$ lbf
B2/B66A RRH-BR049 (RFV01U-D1A):	$F_{A4\_N} = 32.3$ lbf	$F_{A4\_T} = 17.4$ lbf	$W_{A4} = 82.0$ lbf
Raycap DB-C1-12C-24AB-0Z:	$F_{A5\_N} = 63.9$ lbf	$F_{A5\_T} = 48.8$ lbf	$W_{A5} = 39.5$ lbf
BSAMNT-SBS-2-3:			$W_{A6} = ?$
3" nom. pipe mounts:	$f_{m1\_N} = 5.3$ plf		
2.5" nom. pipe mounts:	$f_{m2\_N} = 3.6$ plf		
2" nom. pipe mounts:		$f_{m3\_T} = 5.0$ plf	
HSS4x4x1/4 members:		$f_{m4\_T} = 7.2$ plf	
2L2.5x2.5x1/2 members:	$f_{m5\_N} = 9.4$ plf	$f_{m5\_T} = 4.5$ plf	
L2x2x3/16 members:	$f_{m6\_N} = 3.6$ plf	$f_{m6\_T} = 3.6$ plf	
L2.5x2.5x1/4 members:	$f_{m7\_N} = 4.5$ plf	$f_{m7\_T} = 4.5$ plf	

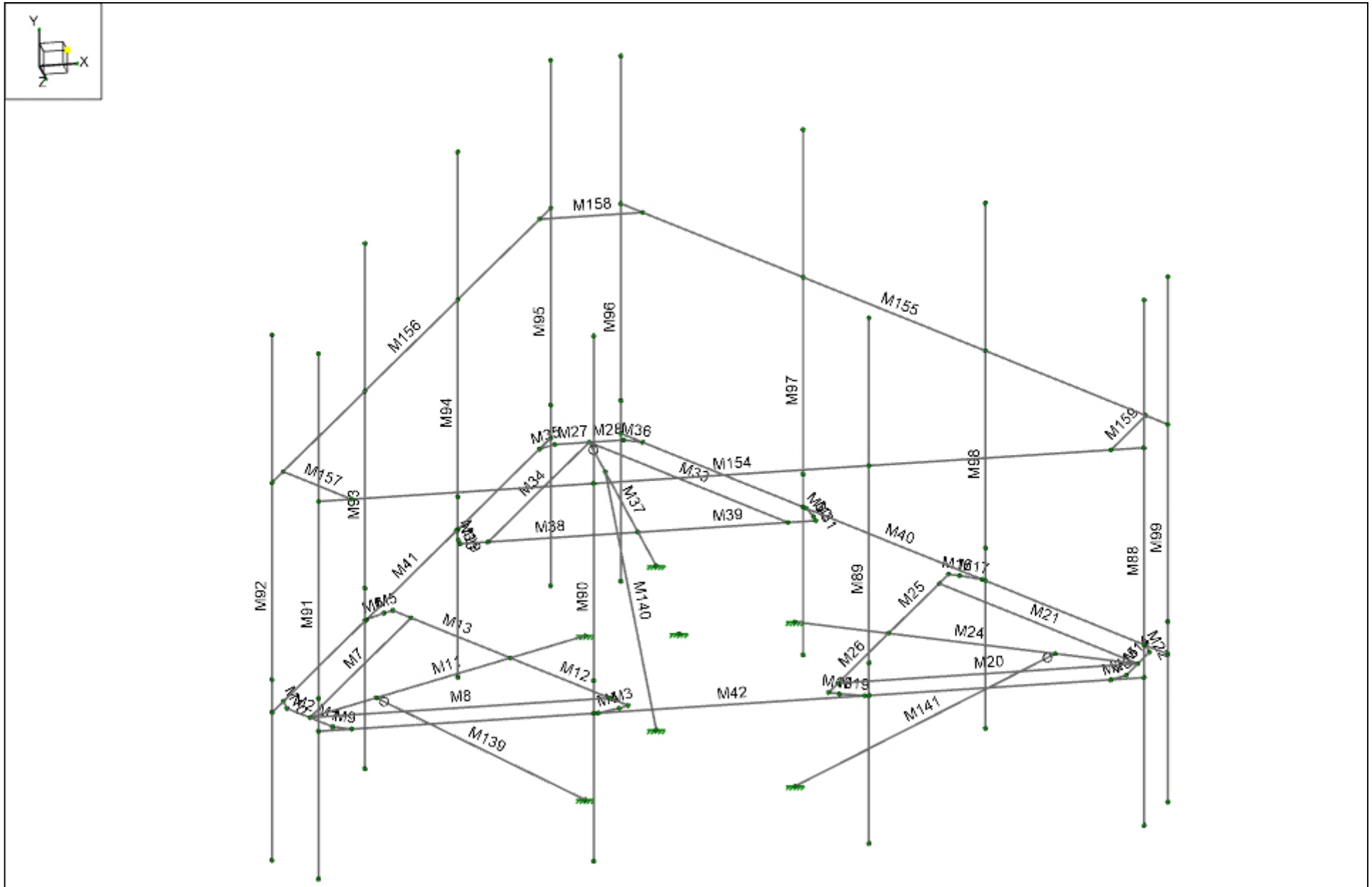
Summary (with ice):

	Front Wind Force:	Side Wind Force:	Ice Weight:
Samsung MT6407-77A antenna:	$F_{A1\_Ni} = 12.7$ lbf	$F_{A1\_Ti} = 6.1$ lbf	$W_{A1\_i} = 124.0$ lbf
CommScope NHH-45C-R2B:	$F_{A2\_Ni} = 38.5$ lbf	$F_{A2\_Ti} = 21.4$ lbf	$W_{A2\_i} = 359.2$ lbf
B2/B66A RRH-BR049 (RFV01U-D1A):	$F_{A3\_Ni} = 5.7$ lbf	$F_{A3\_Ti} = 4.2$ lbf	$W_{A3\_i} = 62.4$ lbf
B5/B13 RRH-BR04C (RFV01U-D2A):	$F_{A4\_Ni} = 5.7$ lbf	$F_{A4\_Ti} = 3.6$ lbf	$W_{A4\_i} = 59.3$ lbf
Raycap DB-C1-12C-24AB-0Z:	$F_{A5\_Ni} = 10.2$ lbf	$F_{A5\_Ti} = 8.2$ lbf	$W_{A5\_i} = 117.5$ lbf
3" nom. pipe mounts:	$f_{m1\_Ni} = 2.0$ plf		$\omega_{m1\_i} = 10.7$ plf
2.5" nom. pipe mounts:	$f_{m2\_Ni} = 1.7$ plf		$\omega_{m2\_i} = 8.4$ plf
2" nom. pipe mounts:		$f_{m3\_Ti} = 1.9$ plf	$\omega_{m3\_i} = 9.5$ plf
HSS4x4x1/4 members:		$f_{m4\_Ti} = 2.7$ plf	$\omega_{m4\_i} = 15.2$ plf
2L2.5x2.5x1/2 members:	$f_{m5\_Ni} = 3.1$ plf	$f_{m5\_Ti} = 2.1$ plf	$\omega_{m5\_i} = 14.3$ plf
L2x2x3/16 members:	$f_{m6\_Ni} = 2.0$ plf	$f_{m6\_Ti} = 2.0$ plf	$\omega_{m6\_i} = 9.3$ plf
L2.5x2.5x1/4 members:	$f_{m7\_Ni} = 2.1$ plf	$f_{m7\_Ti} = 2.1$ plf	$\omega_{m7\_i} = 10.8$ plf



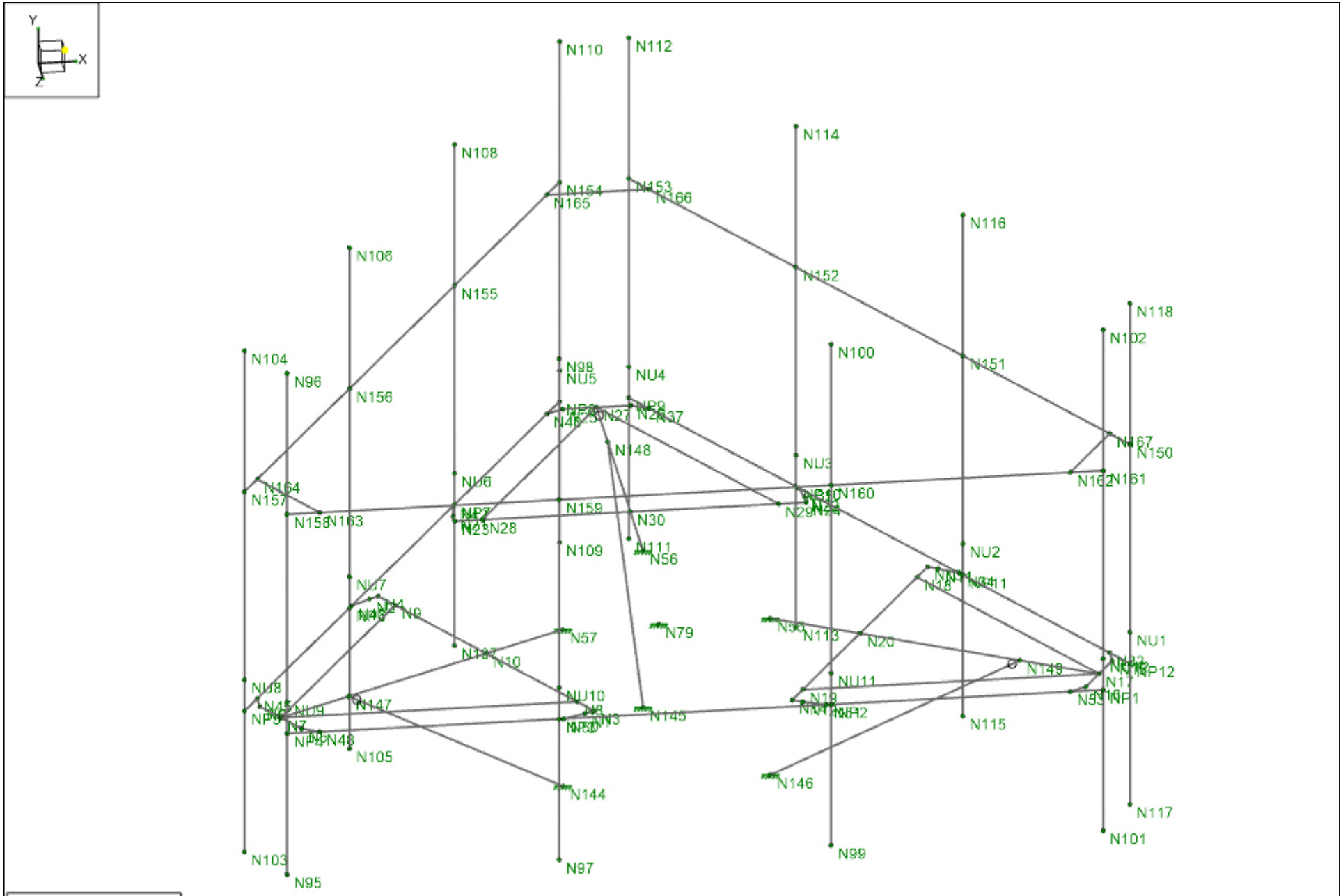
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-1
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

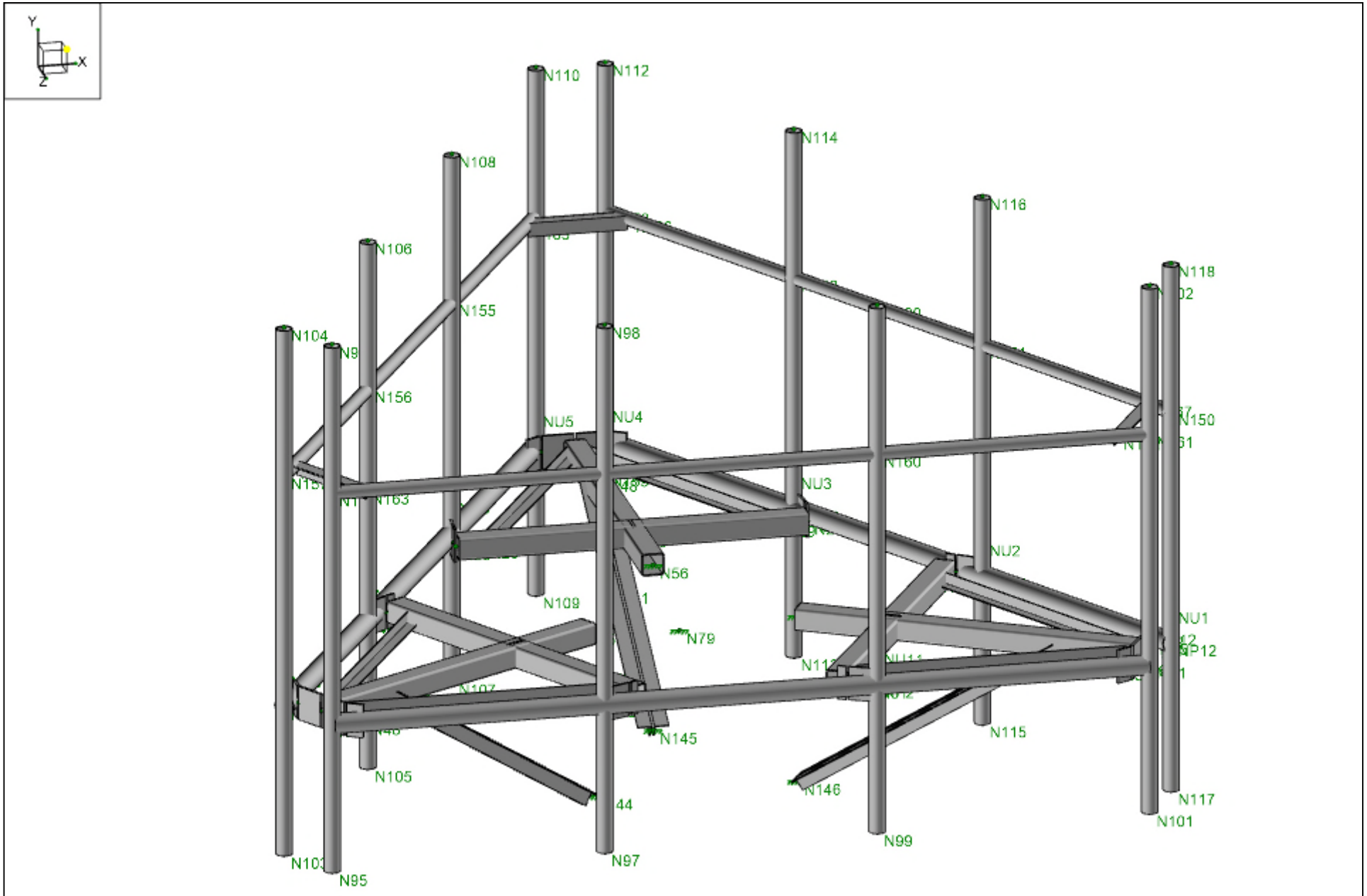


Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-2
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure member labels	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

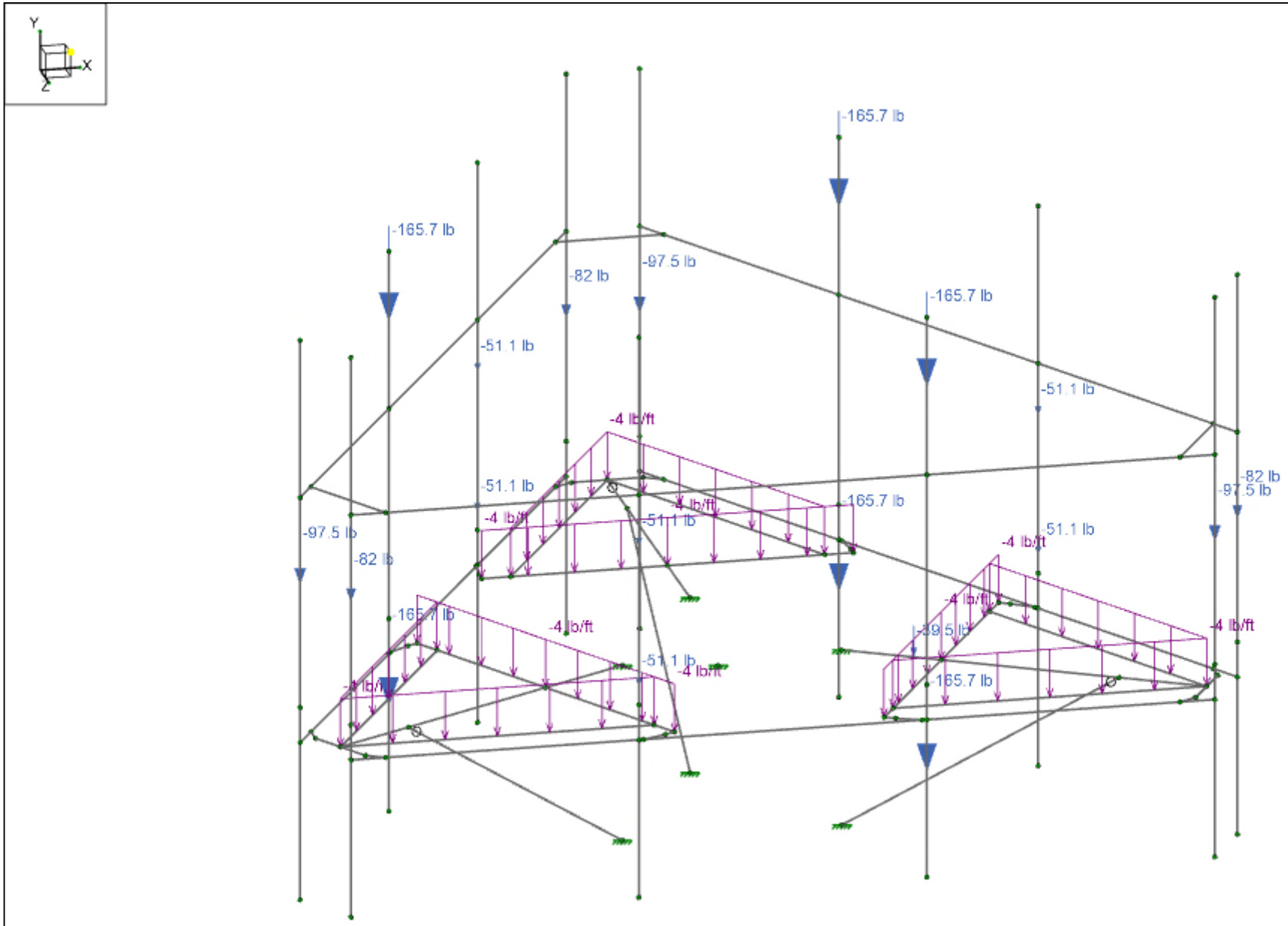


KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-3
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure node labels	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



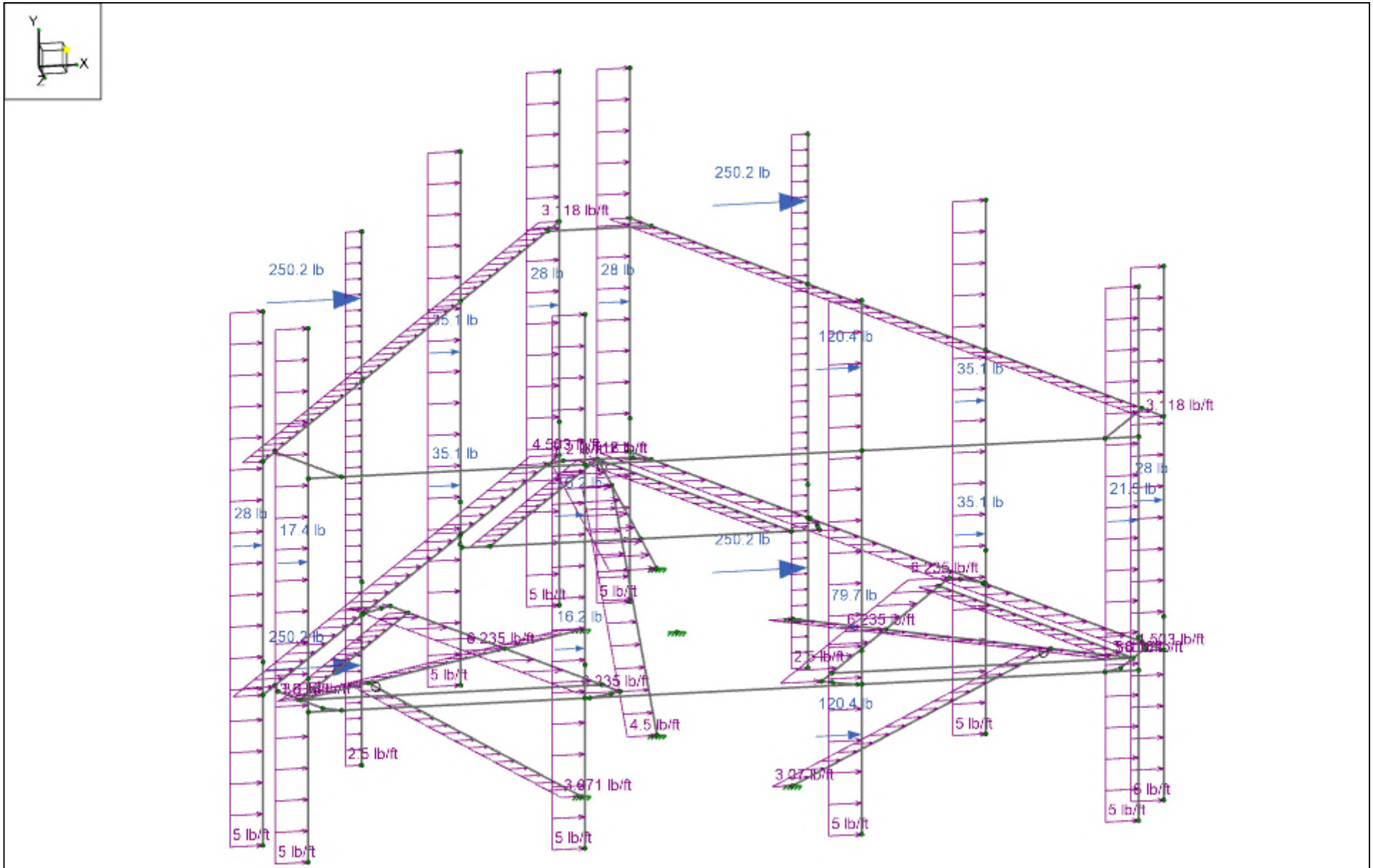
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-4
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure rendering	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

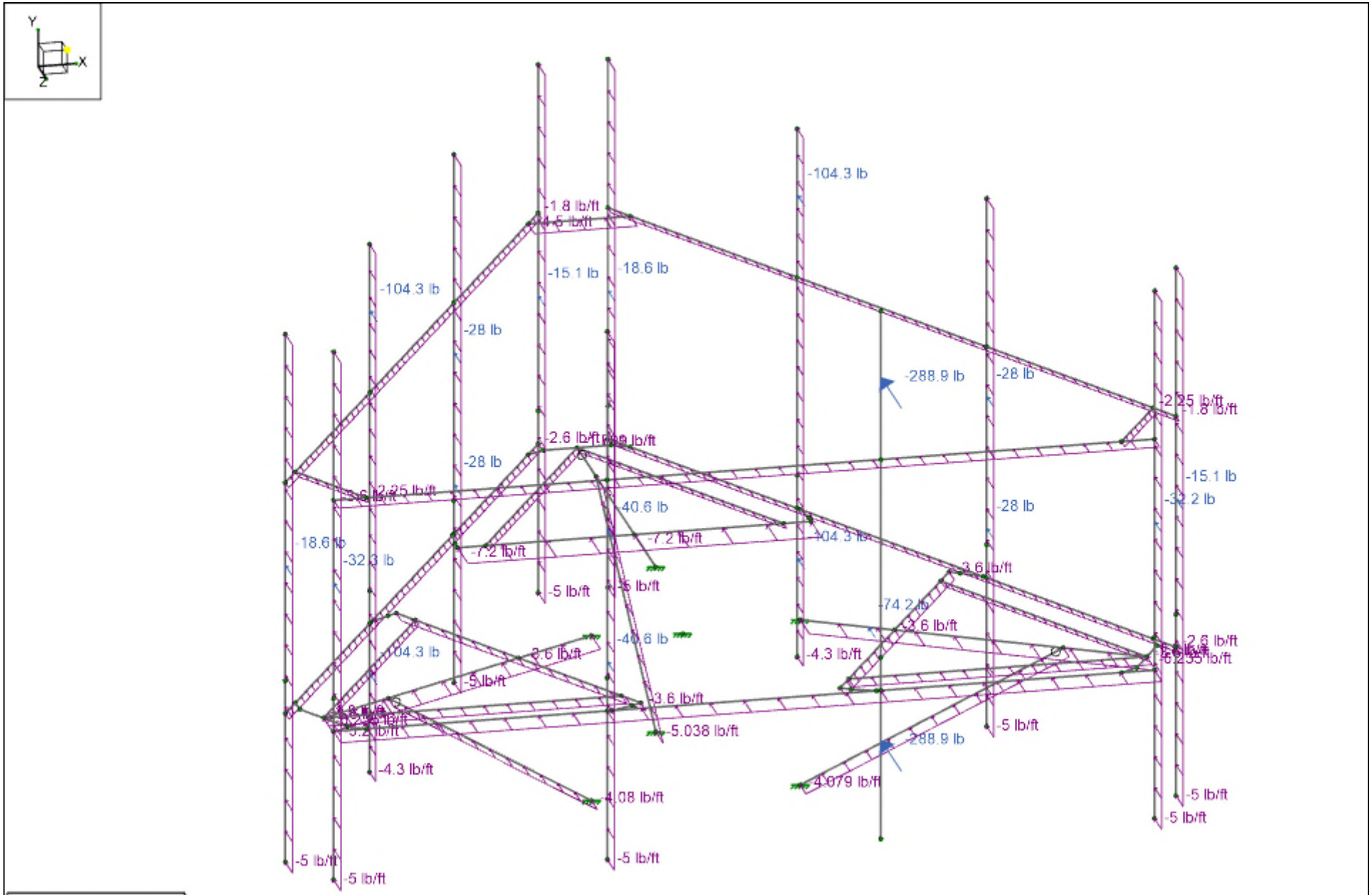


Loads: BLC 1, Dead
Envelope Only Solution

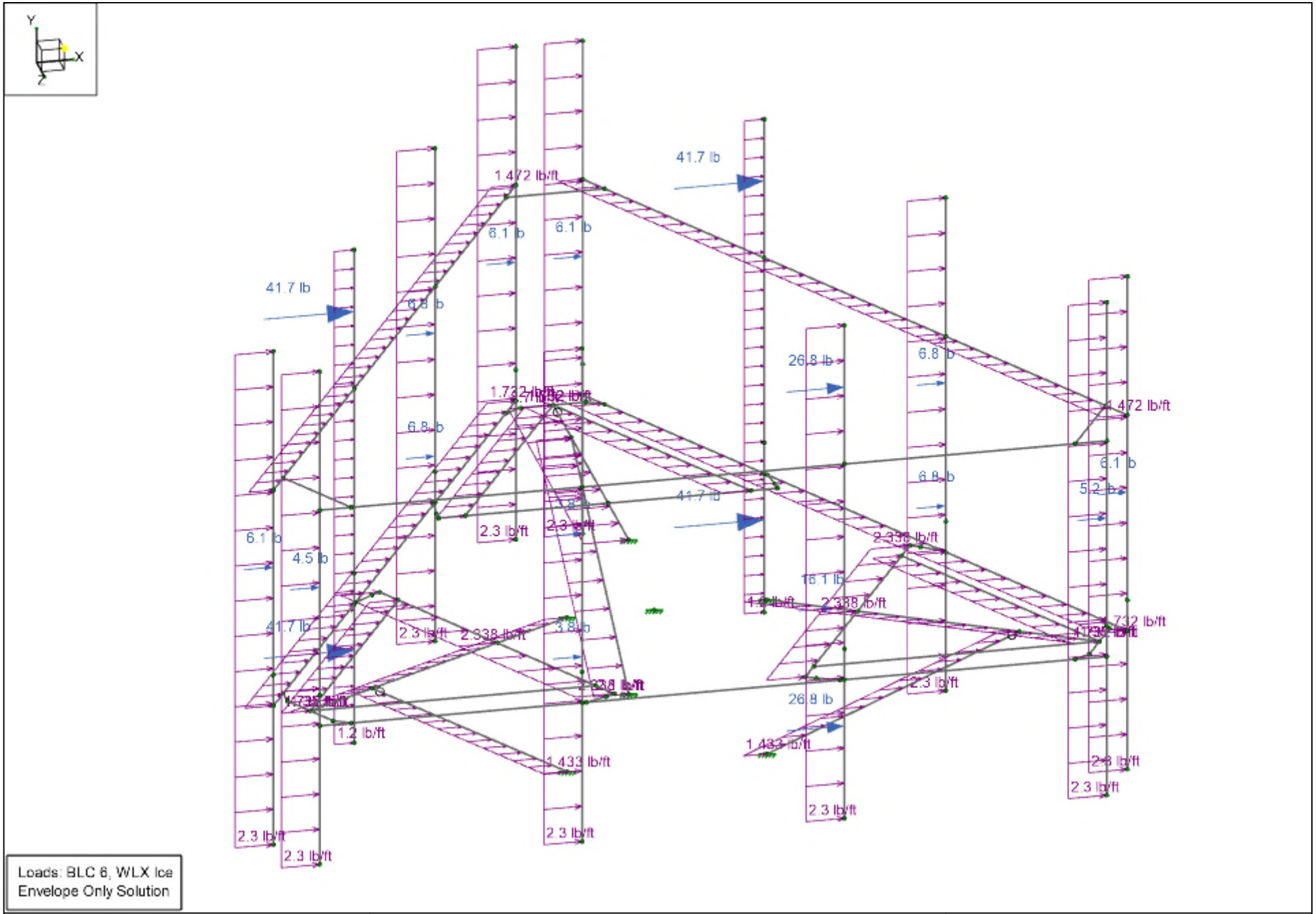
KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-5
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure dead loads	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



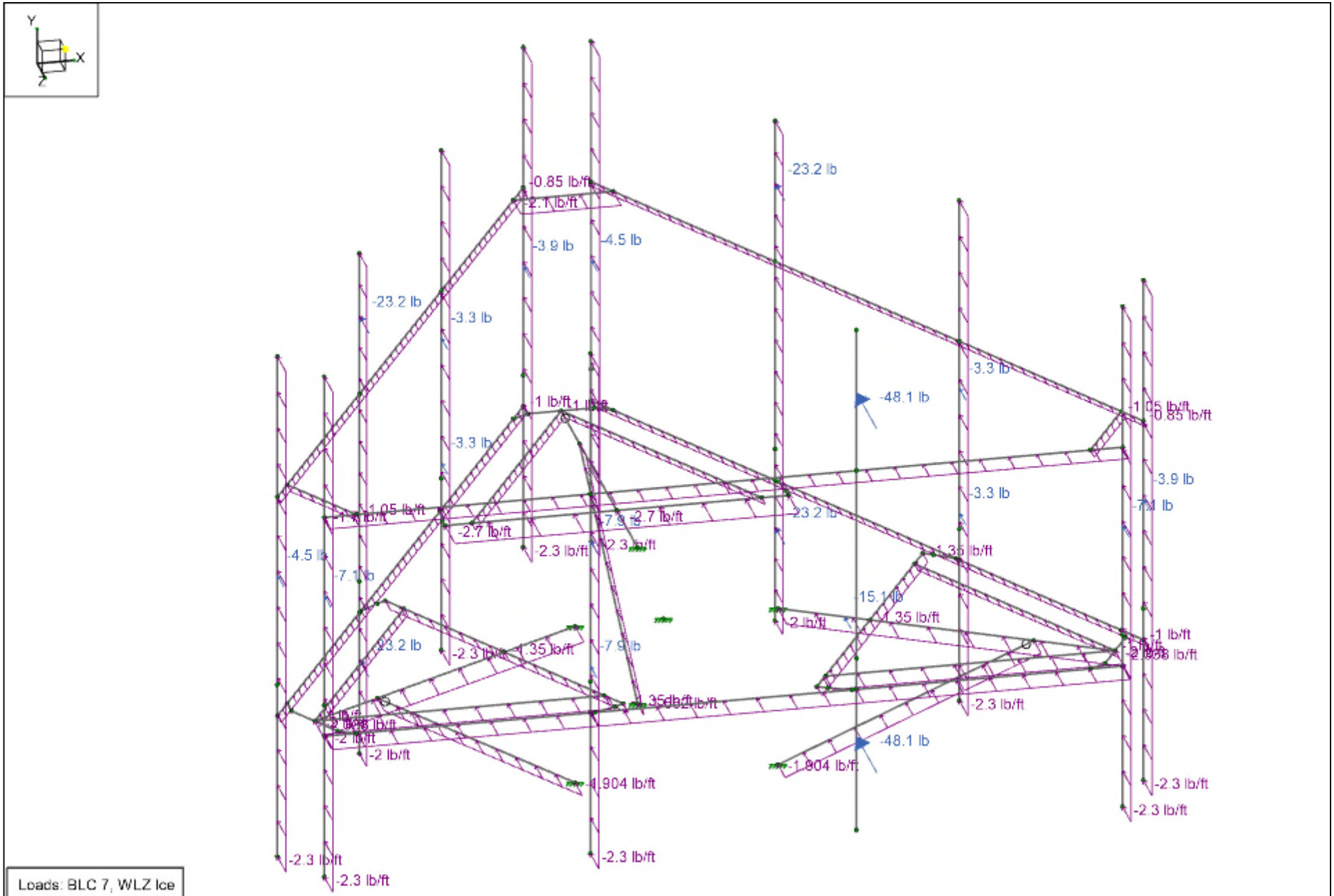
KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-6
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure wind loads - X	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



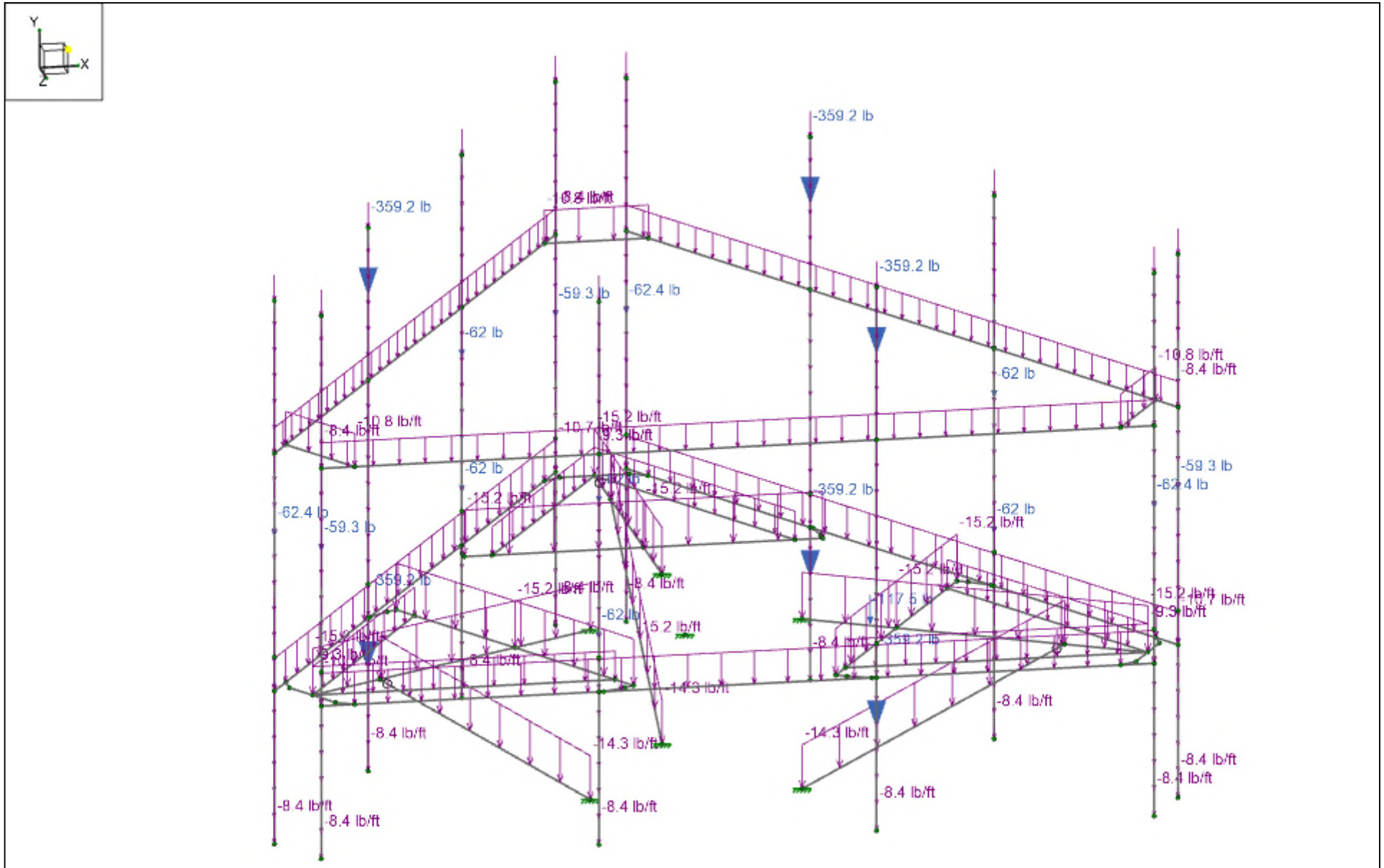
KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-7
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure wind loads - Z	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-8
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure ice wind loads - X	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

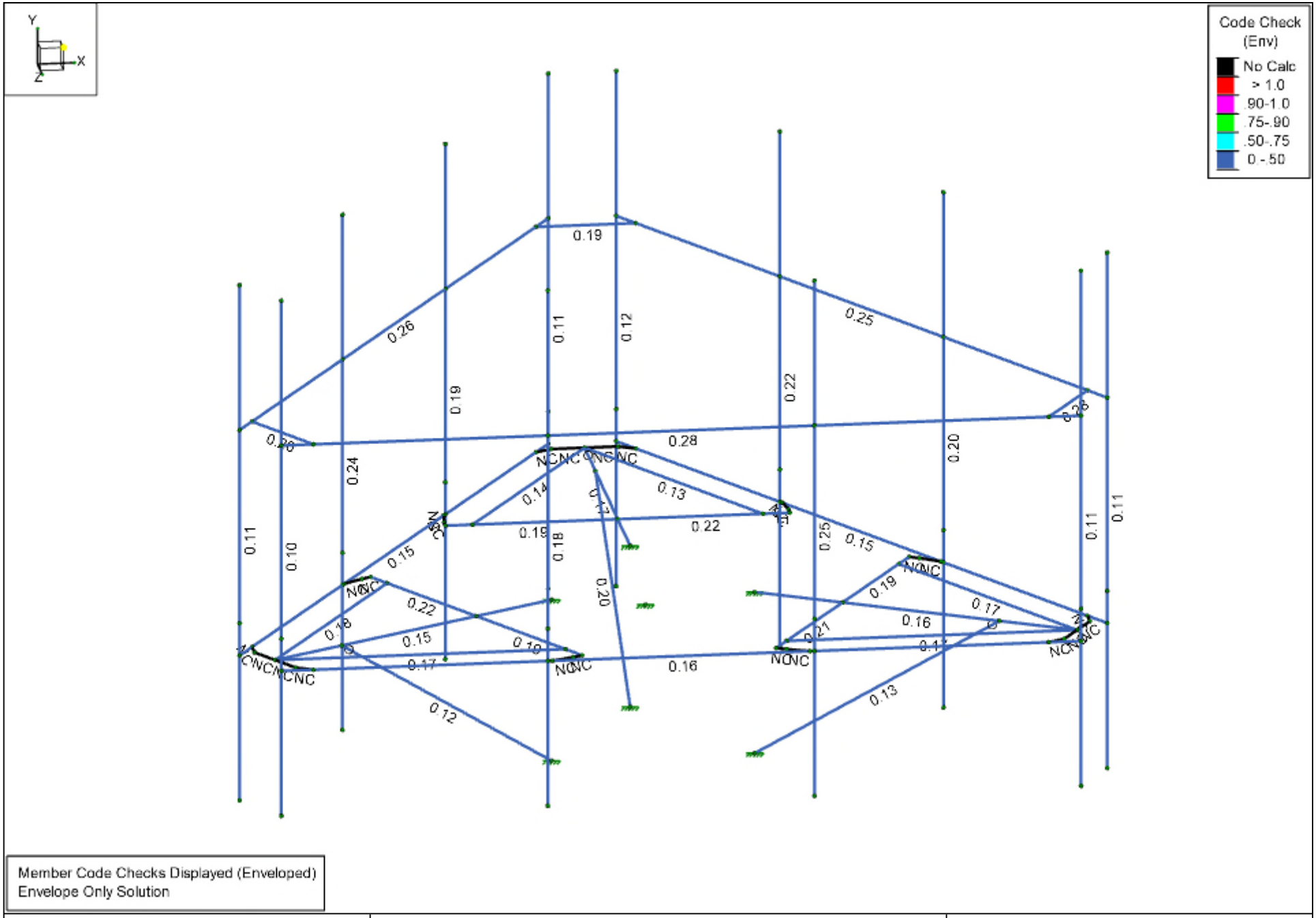


KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-9
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure ice wind loads - Z	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

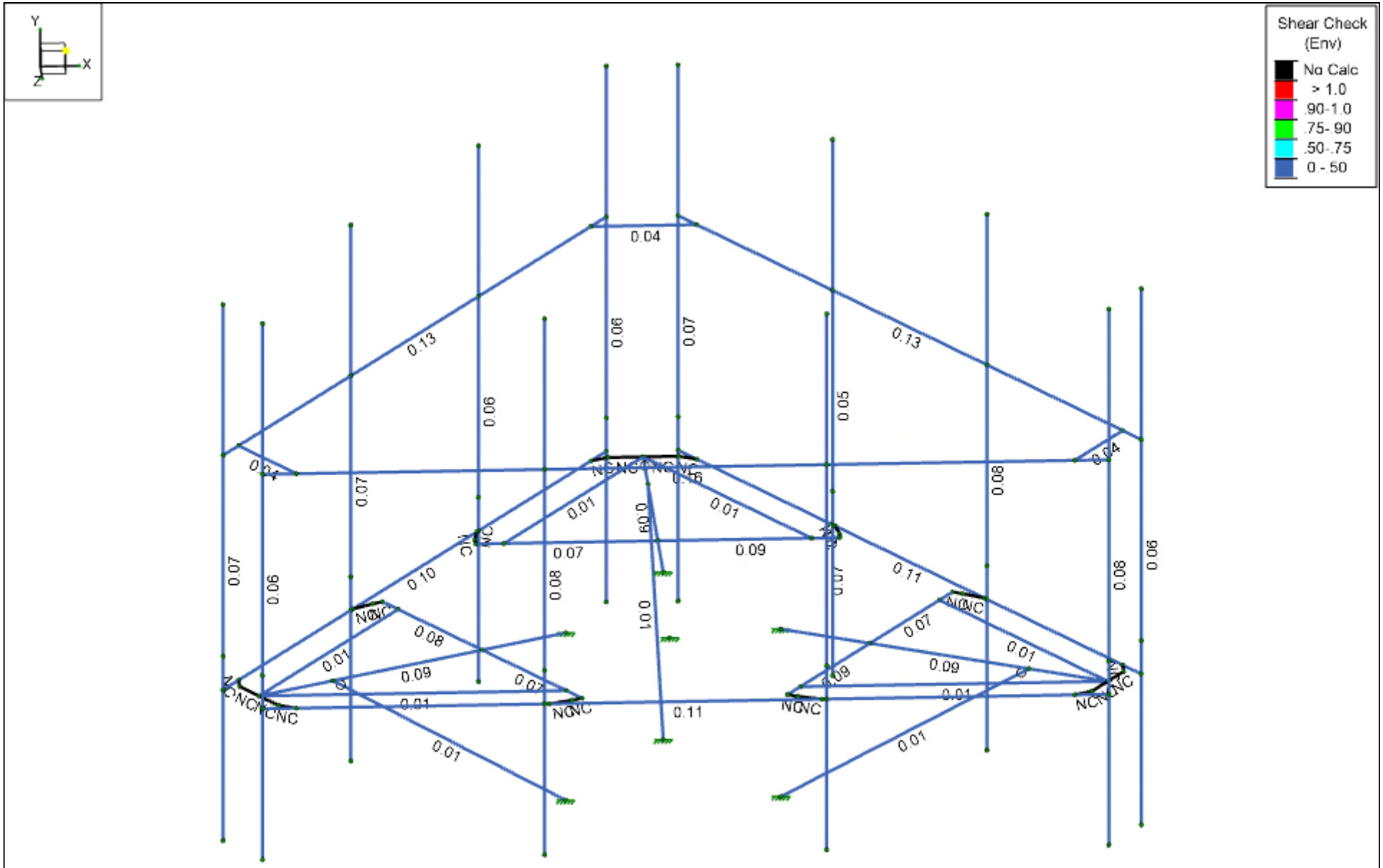


Loads: BLC 15, Ice
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-10
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure ice weight loading	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-11
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure code checks	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-12
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure shear load checks	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [lb/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	490	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	490	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	490	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	490	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	490	46	1.2	58	1.1
6	A53 Gr.B	29000	11154	0.3	0.65	490	35	1.5	58	1.2
7	Q235	29000	11154	0.3	0.65	490	34	1.5	58	1.2
8	J429-Gr5	29000	11154	0.3	0.65	490	92	1.5	120	1.2

Node Coordinates

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
1	NP12	56.989389	0	38.030411	
2	NP11	32.989389	0	-3.538808	
3	NP10	8.989389	0	-45.108027	
4	NP9	-15.010611	0	-86.677247	
5	NP8	-27.244585	0	-86.680673	
6	NP7	-51.244585	0	-45.111454	
7	NP6	-75.244585	0	-3.542235	
8	NP5	-99.244585	0	38.026985	
9	NP4	-93.124362	0	48.627066	
10	NP3	-45.124362	0	48.627065	
11	NP2	2.875638	0	48.627065	
12	NP1	50.875638	0	48.627066	
13	N79	-21.14	-4.75	0	
14	N57	-39.447777	0	10.57	
15	N56	-21.124362	0	-21.127507	
16	N55	-2.834959	0	10.550669	
17	N53	45.076281	0	48.627066	
18	N51	2.076281	0	48.627066	
19	N50	-44.333455	0	48.627066	
20	N48	-87.333455	0	48.627066	
21	N45	-96.349	0	33.011685	
22	N43	-74.849	0	-4.227408	
23	N42	-51.644131	0	-44.419418	
24	N40	-30.144131	0	-81.65851	
25	N37	-12.113043	0	-81.65851	
26	N35	9.386957	0	-44.419418	
27	N34	32.591825	0	-4.227408	
28	N32	54.091825	0	33.011685	
29	N30	-21.14	0	-38.08032	
30	N29	5.026113	0	-38.080316	
31	N28	-47.283288	0	-38.080316	
32	N27	-21.14	0	-83.381588	
33	N26	-15.128587	0	-83.381587	
34	N25	-27.128587	0	-83.381587	
35	N24	9.871413	0	-38.080316	
36	N23	-52.128587	0	-38.080316	
37	N22	9.871413	0	-40.080316	
38	N21	-52.128587	0	-40.080316	
39	N20	11.846211	0	19.026847	
40	N19	-1.23312	0	41.680913	
41	N18	24.92158	0	-3.620357	
42	N17	51.078262	0	41.677482	
43	N16	48.076281	0	46.877066	
44	N15	54.076281	0	36.484761	
45	N14	-3.65577	0	45.877066	
46	N13	27.34423	0	-7.816509	
47	N12	-1.923719	0	46.877066	
48	N11	29.076281	0	-6.816509	
49	N10	-54.101405	0	19.030276	
50	N9	-67.178755	0	-3.620357	
51	N8	-41.024054	0	41.680913	
52	N7	-93.333456	0	41.680911	
53	N6	-96.333455	0	36.484761	

Node Coordinates (Continued)

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
54	N5	-90.333455	0	46.877066	
55	N4	-69.601404	0	-7.816509	
56	N3	-38.601404	0	45.877066	
57	N2	-71.333455	0	-6.816509	
58	N1	-40.333455	0	46.877066	
59	NU1	56.989389	6	38.030411	
60	NU2	32.989389	6	-3.538808	
61	NU3	8.989389	6	-45.108027	
62	NU4	-15.010611	6	-86.677247	
63	NU5	-27.244585	6	-86.680673	
64	NU6	-51.244585	6	-45.111454	
65	NU7	-75.244585	6	-3.542235	
66	NU8	-99.244585	6	38.026985	
67	NU9	-93.124362	6	48.627066	
68	NU10	-45.124362	6	48.627065	
69	NU11	2.875638	6	48.627065	
70	NU12	50.875638	6	48.627066	
71	N144	-39.447777	-30	10.57	
72	N145	-21.124362	-30	-21.127507	
73	N146	-2.834959	-30	10.550669	
74	N147	-80.343075	0	34.180911	
75	N148	-21.136232	0	-68.381589	
76	N149	38.087881	0	34.177482	
77	N150	56.989389	42	38.030411	
78	N151	32.989389	42	-3.538808	
79	N152	8.989389	42	-45.108027	
80	N153	-15.010611	42	-86.677247	
81	N154	-27.244585	42	-86.680673	
82	N155	-51.244585	42	-45.111454	
83	N156	-75.244585	42	-3.542235	
84	N157	-99.244585	42	38.026985	
85	N158	-93.124362	42	48.627066	
86	N159	-45.124362	42	48.627065	
87	N160	2.875638	42	48.627065	
88	N161	50.875638	42	48.627066	
89	N162	45.076281	42	48.627066	
90	N163	-87.333455	42	48.627066	
91	N164	-96.349	42	33.011685	
92	N165	-30.144131	42	-81.65851	
93	N166	-12.113043	42	-81.65851	
94	N167	54.091825	42	33.011685	
95	N95	-93.124362	-27	48.627066	
96	N96	-93.124362	69	48.627066	
97	N97	-45.124362	-27	48.627065	
98	N98	-45.124362	69	48.627065	
99	N99	2.875638	-27	48.627065	
100	N100	2.875638	69	48.627065	
101	N101	50.875638	-27	48.627066	
102	N102	50.875638	69	48.627066	
103	N103	-99.244585	-27	38.026985	
104	N104	-99.244585	69	38.026985	
105	N105	-75.244585	-27	-3.542235	
106	N106	-75.244585	69	-3.542235	
107	N107	-51.244585	-27	-45.111454	
108	N108	-51.244585	69	-45.111454	
109	N109	-27.244585	-27	-86.680673	
110	N110	-27.244585	69	-86.680673	
111	N111	-15.010611	-27	-86.677247	
112	N112	-15.010611	69	-86.677247	
113	N113	8.989389	-27	-45.108027	
114	N114	8.989389	69	-45.108027	
115	N115	32.989389	-27	-3.538808	
116	N116	32.989389	69	-3.538808	
117	N117	56.989389	-27	38.030411	
118	N118	56.989389	69	38.030411	

Node Coordinates (Continued)

Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N7	N5	90	1/2 x 6	Beam	RECT	Q235	Typical
2	M2	N7	N6	90	1/2 x 6	Beam	RECT	Q235	Typical
3	M3	N3	N1	90	3/8 x 6	Beam	RECT	Q235	Typical
4	M4	N1	N50	90	3/8 x 6	Beam	RECT	Q235	Typical
5	M5	N4	N2	90	3/8 x 6	Beam	RECT	Q235	Typical
6	M6	N2	N43	90	3/8 x 6	Beam	RECT	Q235	Typical
7	M7	N7	N9		L2X2X3	Beam	Single Angle	Q235	Typical
8	M8	N7	N8	270	L2X2X3	Beam	Single Angle	Q235	Typical
9	M9	N5	N48	90	1/2 x 6	Beam	RECT	Q235	Typical
10	M10	N6	N45	90	1/2 x 6	Beam	RECT	Q235	Typical
11	M11	N7	N57		HSS4X4X4	Beam	Tube	Q235	Typical
12	M12	N3	N10		HSS4X4X4	Beam	Tube	Q235	Typical
13	M13	N10	N4		HSS4X4X4	Beam	Tube	Q235	Typical
14	M14	N17	N15	90	1/2 x 6	Beam	RECT	Q235	Typical
15	M15	N17	N16	90	1/2 x 6	Beam	RECT	Q235	Typical
16	M16	N13	N11	90	3/8 x 6	Beam	RECT	Q235	Typical
17	M17	N11	N34	90	3/8 x 6	Beam	RECT	Q235	Typical
18	M18	N14	N12	90	3/8 x 6	Beam	RECT	Q235	Typical
19	M19	N12	N51	90	3/8 x 6	Beam	RECT	Q235	Typical
20	M20	N17	N19		L2X2X3	Beam	Single Angle	Q235	Typical
21	M21	N17	N18	270	L2X2X3	Beam	Single Angle	Q235	Typical
22	M22	N15	N32	90	1/2 x 6	Beam	RECT	Q235	Typical
23	M23	N16	N53	90	1/2 x 6	Beam	RECT	Q235	Typical
24	M24	N17	N55		HSS4X4X4	Beam	Tube	Q235	Typical
25	M25	N13	N20		HSS4X4X4	Beam	Tube	Q235	Typical
26	M26	N20	N14		HSS4X4X4	Beam	Tube	Q235	Typical
27	M27	N27	N25	90	1/2 x 6	Beam	RECT	Q235	Typical
28	M28	N27	N26	90	1/2 x 6	Beam	RECT	Q235	Typical
29	M29	N23	N21	90	3/8 x 6	Beam	RECT	Q235	Typical
30	M30	N21	N42	90	3/8 x 6	Beam	RECT	Q235	Typical
31	M31	N24	N22	90	3/8 x 6	Beam	RECT	Q235	Typical
32	M32	N22	N35	90	3/8 x 6	Beam	RECT	Q235	Typical
33	M33	N27	N29		L2X2X3	Beam	Single Angle	Q235	Typical
34	M34	N27	N28	270	L2X2X3	Beam	Single Angle	Q235	Typical
35	M35	N25	N40	90	1/2 x 6	Beam	RECT	Q235	Typical
36	M36	N26	N37	90	1/2 x 6	Beam	RECT	Q235	Typical
37	M37	N27	N56		HSS4X4X4	Beam	Tube	Q235	Typical
38	M38	N23	N30		HSS4X4X4	Beam	Tube	Q235	Typical
39	M39	N30	N24		HSS4X4X4	Beam	Tube	Q235	Typical
40	M40	NP12	NP9		PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical
41	M41	NP8	NP5		PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical
42	M42	NP4	NP1		PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical
43	M88	N101	N102		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
44	M89	N99	N100		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
45	M90	N97	N98		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
46	M91	N95	N96		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
47	M92	N103	N104		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
48	M93	N105	N106		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
49	M94	N107	N108		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
50	M95	N109	N110		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
51	M96	N111	N112		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
52	M97	N113	N114		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
53	M98	N115	N116		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
54	M99	N117	N118		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
55	M139	N144	N147		LL2.5X2.5X3X0.5	Beam	Double Angle (3/8 Gap)	Q235	Typical
56	M140	N145	N148		LL2.5X2.5X3X0.5	Beam	Double Angle (3/8 Gap)	Q235	Typical
57	M141	N146	N149		LL2.5X2.5X3X0.5	Beam	Double Angle (3/8 Gap)	Q235	Typical
58	M154	N158	N161		PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
59	M155	N150	N153		PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
60	M156	N154	N157		PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
61	M157	N163	N164	180	L2.5X2.5X4	Beam	Single Angle	Q235	Typical
62	M158	N165	N166	180	L2.5X2.5X4	Beam	Single Angle	Q235	Typical
63	M159	N167	N162	180	L2.5X2.5X4	Beam	Single Angle	Q235	Typical

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M21	Y	-4	-4	0	%100
2	M20	Y	-4	-4	0	%100
3	M26	Y	-4	-4	0	%100
4	M25	Y	-4	-4	0	%100
5	M39	Y	-4	-4	0	%100
6	M38	Y	-4	-4	0	%100
7	M34	Y	-4	-4	0	%100
8	M33	Y	-4	-4	0	%100
9	M7	Y	-4	-4	0	%100
10	M13	Y	-4	-4	0	%100
11	M12	Y	-4	-4	0	%100
12	M8	Y	-4	-4	0	%100

Member Distributed Loads (BLC 4 : WLX)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M41	PX	5.2	5.2	0	%100
2	M40	PX	5.2	5.2	0	%100
3	M156	PX	3.6	3.6	0	%100
4	M155	PX	3.6	3.6	0	%100
5	M11	PX	7.2	7.2	0	%100
6	M24	PX	7.2	7.2	0	%100
7	M37	PX	7.2	7.2	0	%100
8	M12	PX	7.2	7.2	0	%100
9	M13	PX	7.2	7.2	0	%100
10	M26	PX	7.2	7.2	0	%100
11	M25	PX	7.2	7.2	0	%100
12	M7	PX	3.6	3.6	0	%100
13	M34	PX	3.6	3.6	0	%100
14	M21	PX	3.6	3.6	0	%100
15	M33	PX	3.6	3.6	0	%100
16	M139	PX	4.5	4.5	0	%100
17	M140	PX	4.5	4.5	0	%100
18	M141	PX	4.5	4.5	0	%100
19	M91	X	5	5	0	%100
20	M90	X	5	5	0	%100
21	M89	X	5	5	0	%100
22	M88	X	5	5	0	%100
23	M95	X	5	5	0	%100
24	M94	X	5	5	0	%100
25	M93	X	2.5	2.5	0	%100
26	M92	X	5	5	0	%100
27	M96	X	5	5	0	%100
28	M97	X	2.5	2.5	0	%100
29	M98	X	5	5	0	%100
30	M99	X	5	5	0	%100

Member Distributed Loads (BLC 5 : WLZ)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
1	M42	Z	-5.2	-5.2	0	%100	
2	M41	PZ	-5.2	-5.2	0	%100	
3	M40	PZ	-5.2	-5.2	0	%100	
4	M154	Z	-3.6	-3.6	0	%100	
5	M156	PZ	-3.6	-3.6	0	%100	
6	M155	PZ	-3.6	-3.6	0	%100	
7	M11	PZ	-7.2	-7.2	0	%100	
8	M24	PZ	-7.2	-7.2	0	%100	
9	M12	PZ	-7.2	-7.2	0	%100	
10	M13	PZ	-7.2	-7.2	0	%100	
11	M26	PZ	-7.2	-7.2	0	%100	
12	M25	PZ	-7.2	-7.2	0	%100	
13	M38	Z	-7.2	-7.2	0	%100	
14	M39	Z	-7.2	-7.2	0	%100	
15	M8	Z	-3.6	-3.6	0	%100	
16	M7	PZ	-3.6	-3.6	0	%100	

Member Distributed Loads (BLC 5 : WLZ) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
17	M20	Z	-3.6	-3.6	0	%100	
18	M21	PZ	-3.6	-3.6	0	%100	
19	M34	PZ	-3.6	-3.6	0	%100	
20	M33	PZ	-3.6	-3.6	0	%100	
21	M157	PZ	-4.5	-4.5	0	%100	
22	M159	PZ	-4.5	-4.5	0	%100	
23	M158	Z	-4.5	-4.5	0	%100	
24	M139	PZ	-4.5	-4.5	0	%100	
25	M140	PZ	-9.4	-9.4	0	%100	
26	M141	PZ	-4.5	-4.5	0	%100	
27	M91	Z	-5	-5	0	%100	
28	M90	Z	-5	-5	0	%100	
29	M89	Z	-5	-5	0	%100	Inactive
30	M88	Z	-5	-5	0	%100	
31	M92	Z	-5	-5	0	%100	
32	M93	Z	-4.3	-4.3	0	%100	
33	M94	Z	-5	-5	0	%100	
34	M95	Z	-5	-5	0	%100	
35	M99	Z	-5	-5	0	%100	
36	M98	Z	-5	-5	0	%100	
37	M97	Z	-4.3	-4.3	0	%100	
38	M96	Z	-5	-5	0	%100	

Member Distributed Loads (BLC 6 : WLX Ice)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M41	PX	2	2	0	%100
2	M40	PX	2	2	0	%100
3	M156	PX	1.7	1.7	0	%100
4	M155	PX	1.7	1.7	0	%100
5	M11	PX	2.7	2.7	0	%100
6	M24	PX	2.7	2.7	0	%100
7	M37	PX	2.7	2.7	0	%100
8	M12	PX	2.7	2.7	0	%100
9	M13	PX	2.7	2.7	0	%100
10	M26	PX	2.7	2.7	0	%100
11	M25	PX	2.7	2.7	0	%100
12	M7	PX	2	2	0	%100
13	M34	PX	2	2	0	%100
14	M21	PX	2	2	0	%100
15	M33	PX	2	2	0	%100
16	M139	PX	2.1	2.1	0	%100
17	M140	PX	2.1	2.1	0	%100
18	M141	PX	2.1	2.1	0	%100
19	M91	X	2.3	2.3	0	%100
20	M90	X	2.3	2.3	0	%100
21	M89	X	2.3	2.3	0	%100
22	M88	X	2.3	2.3	0	%100
23	M95	X	2.3	2.3	0	%100
24	M94	X	2.3	2.3	0	%100
25	M93	X	1.2	1.2	0	%100
26	M92	X	2.3	2.3	0	%100
27	M96	X	2.3	2.3	0	%100
28	M97	X	1.2	1.2	0	%100
29	M98	X	2.3	2.3	0	%100
30	M99	X	2.3	2.3	0	%100

Member Distributed Loads (BLC 7 : WLZ Ice)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
1	M42	Z	-2	-2	0	%100	
2	M41	PZ	-2	-2	0	%100	
3	M40	PZ	-2	-2	0	%100	
4	M154	Z	-1.7	-1.7	0	%100	
5	M156	PZ	-1.7	-1.7	0	%100	
6	M155	PZ	-1.7	-1.7	0	%100	

Member Distributed Loads (BLC 7 : WLZ Ice) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
7	M11	PZ	-2.7	-2.7	0	%100	
8	M24	PZ	-2.7	-2.7	0	%100	
9	M12	PZ	-2.7	-2.7	0	%100	
10	M13	PZ	-2.7	-2.7	0	%100	
11	M26	PZ	-2.7	-2.7	0	%100	
12	M25	PZ	-2.7	-2.7	0	%100	
13	M38	Z	-2.7	-2.7	0	%100	
14	M39	Z	-2.7	-2.7	0	%100	
15	M8	Z	-2	-2	0	%100	
16	M7	PZ	-2	-2	0	%100	
17	M20	Z	-2	-2	0	%100	
18	M21	PZ	-2	-2	0	%100	
19	M34	PZ	-2	-2	0	%100	
20	M33	PZ	-2	-2	0	%100	
21	M157	PZ	-2.1	-2.1	0	%100	
22	M159	PZ	-2.1	-2.1	0	%100	
23	M158	Z	-2.1	-2.1	0	%100	
24	M139	PZ	-2.1	-2.1	0	%100	
25	M140	PZ	-3.1	-3.1	0	%100	
26	M141	PZ	-2.1	-2.1	0	%100	
27	M91	Z	-2.3	-2.3	0	%100	
28	M90	Z	-2.3	-2.3	0	%100	
29	M89	Z	-2.3	-2.3	0	%100	Inactive
30	M88	Z	-2.3	-2.3	0	%100	
31	M92	Z	-2.3	-2.3	0	%100	
32	M93	Z	-2	-2	0	%100	
33	M94	Z	-2.3	-2.3	0	%100	
34	M95	Z	-2.3	-2.3	0	%100	
35	M99	Z	-2.3	-2.3	0	%100	
36	M98	Z	-2.3	-2.3	0	%100	
37	M97	Z	-2	-2	0	%100	
38	M96	Z	-2.3	-2.3	0	%100	

Member Distributed Loads (BLC 11 : Extreme Ice Vertical (Mount))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M40	Y	-22	-22	0	%100
2	M42	Y	-22	-22	0	%100
3	M41	Y	-22	-22	0	%100
4	M14	Y	-50	-50	0	%100
5	M15	Y	-50	-50	0	%100
6	M19	Y	-50	-50	0	%100
7	M4	Y	-50	-50	0	%100
8	M1	Y	-50	-50	0	%100
9	M2	Y	-50	-50	0	%100
10	M6	Y	-50	-50	0	%100
11	M30	Y	-50	-50	0	%100
12	M27	Y	-50	-50	0	%100
13	M28	Y	-50	-50	0	%100
14	M32	Y	-50	-50	0	%100
15	M17	Y	-50	-50	0	%100
16	M21	Y	-23	-23	0	%100
17	M20	Y	-23	-23	0	%100
18	M8	Y	-23	-23	0	%100
19	M7	Y	-23	-23	0	%100
20	M34	Y	-23	-23	0	%100
21	M33	Y	-23	-23	0	%100
22	M24	Y	-32	-32	0	%100
23	M11	Y	-32	-32	0	%100
24	M37	Y	-32	-32	0	%100
25	M26	Y	-35	-35	0	%100
26	M12	Y	-35	-35	0	%100
27	M13	Y	-35	-35	0	%100
28	M38	Y	-35	-35	0	%100
29	M39	Y	-35	-35	0	%100

Member Distributed Loads (BLC 11 : Extreme Ice Vertical (Mount)) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
30	M25	Y	-35	-35	0	%100
31	M154	Y	-18	-18	0	%100
32	M156	Y	-18	-18	0	%100
33	M155	Y	-18	-18	0	%100
34	M157	Y	-30	-30	0	%100
35	M158	Y	-30	-30	0	%100
36	M159	Y	-30	-30	0	%100
37	M7	Y	-4	-4	0	%100
38	M8	Y	-4	-4	0	%100
39	M11	Y	-4	-4	0	%100
40	M12	Y	-4	-4	0	%100
41	M13	Y	-4	-4	0	%100
42	M20	Y	-4	-4	0	%100
43	M21	Y	-4	-4	0	%100
44	M24	Y	-4	-4	0	%100
45	M25	Y	-4	-4	0	%100
46	M26	Y	-4	-4	0	%100
47	M33	Y	-4	-4	0	%100
48	M34	Y	-4	-4	0	%100
49	M37	Y	-4	-4	0	%100
50	M38	Y	-4	-4	0	%100
51	M39	Y	-4	-4	0	%100

Member Distributed Loads (BLC 12 : Extreme Ice Normal (Mount))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M40	PZ	8.04	8.04	0	%100
2	M42	PZ	8.04	8.04	0	%100
3	M41	PZ	8.04	8.04	0	%100
4	M15	PZ	15.41	15.41	0	%100
5	M19	PZ	15.41	15.41	0	%100
6	M4	PZ	15.41	15.41	0	%100
7	M1	PZ	15.41	15.41	0	%100
8	M2	PZ	15.41	15.41	0	%100
9	M6	PZ	15.41	15.41	0	%100
10	M30	PZ	15.41	15.41	0	%100
11	M27	PZ	15.41	15.41	0	%100
12	M28	PZ	15.41	15.41	0	%100
13	M32	PZ	15.41	15.41	0	%100
14	M17	PZ	15.41	15.41	0	%100
15	M14	PZ	15.41	15.41	0	%100
16	M20	PZ	6.7	6.7	0	%100
17	M8	PZ	6.7	6.7	0	%100
18	M7	PZ	6.7	6.7	0	%100
19	M34	PZ	6.7	6.7	0	%100
20	M33	PZ	6.7	6.7	0	%100
21	M21	PZ	6.7	6.7	0	%100
22	M24	PZ	8.71	8.71	0	%100
23	M11	PZ	8.71	8.71	0	%100
24	M37	PZ	8.71	8.71	0	%100
25	M26	PZ	8.71	8.71	0	%100
26	M12	PZ	8.71	8.71	0	%100
27	M13	PZ	8.71	8.71	0	%100
28	M38	PZ	8.71	8.71	0	%100
29	M39	PZ	8.71	8.71	0	%100
30	M25	PZ	8.71	8.71	0	%100
31	M157	PZ	7.37	7.37	0	%100
32	M156	PZ	7.37	7.37	0	%100
33	M158	PZ	7.37	7.37	0	%100
34	M155	PZ	7.37	7.37	0	%100
35	M159	PZ	7.37	7.37	0	%100
36	M154	PZ	7.37	7.37	0	%100

Member Distributed Loads (BLC 15 : Ice)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M42	Y	-10.7	-10.7	0	%100
2	M41	Y	-10.7	-10.7	0	%100
3	M40	Y	-10.7	-10.7	0	%100
4	M154	Y	-8.4	-8.4	0	%100
5	M156	Y	-8.4	-8.4	0	%100
6	M155	Y	-8.4	-8.4	0	%100
7	M91	Y	-8.4	-8.4	0	%100
8	M90	Y	-8.4	-8.4	0	%100
9	M89	Y	-8.4	-8.4	0	%100
10	M88	Y	-8.4	-8.4	0	%100
11	M92	Y	-8.4	-8.4	0	%100
12	M93	Y	-8.4	-8.4	0	%100
13	M94	Y	-8.4	-8.4	0	%100
14	M95	Y	-8.4	-8.4	0	%100
15	M96	Y	-8.4	-8.4	0	%100
16	M97	Y	-8.4	-8.4	0	%100
17	M98	Y	-8.4	-8.4	0	%100
18	M99	Y	-8.4	-8.4	0	%100
19	M11	Y	-15.2	-15.2	0	%100
20	M37	Y	-15.2	-15.2	0	%100
21	M24	Y	-15.2	-15.2	0	%100
22	M12	Y	-15.2	-15.2	0	%100
23	M13	Y	-15.2	-15.2	0	%100
24	M38	Y	-15.2	-15.2	0	%100
25	M39	Y	-15.2	-15.2	0	%100
26	M26	Y	-15.2	-15.2	0	%100
27	M25	Y	-15.2	-15.2	0	%100
28	M8	Y	-9.3	-9.3	0	%100
29	M7	Y	-9.3	-9.3	0	%100
30	M34	Y	-9.3	-9.3	0	%100
31	M33	Y	-9.3	-9.3	0	%100
32	M20	Y	-9.3	-9.3	0	%100
33	M21	Y	-9.3	-9.3	0	%100
34	M139	Y	-14.3	-14.3	0	%100
35	M140	Y	-14.3	-14.3	0	%100
36	M141	Y	-14.3	-14.3	0	%100
37	M157	Y	-10.8	-10.8	0	%100
38	M158	Y	-10.8	-10.8	0	%100
39	M159	Y	-10.8	-10.8	0	%100

Member Distributed Loads (BLC 20 : Maint. Normal (Mount))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M40	PZ	2.68	2.68	0	%100
2	M42	PZ	2.68	2.68	0	%100
3	M41	PZ	2.68	2.68	0	%100
4	M15	PZ	4.02	4.02	0	%100
5	M19	PZ	4.02	4.02	0	%100
6	M4	PZ	4.02	4.02	0	%100
7	M1	PZ	4.02	4.02	0	%100
8	M2	PZ	4.02	4.02	0	%100
9	M6	PZ	4.02	4.02	0	%100
10	M30	PZ	4.02	4.02	0	%100
11	M27	PZ	4.02	4.02	0	%100
12	M28	PZ	4.02	4.02	0	%100
13	M32	PZ	4.02	4.02	0	%100
14	M17	PZ	4.02	4.02	0	%100
15	M14	PZ	4.02	4.02	0	%100
16	M21	PZ	2.01	2.01	0	%100
17	M20	PZ	2.01	2.01	0	%100
18	M8	PZ	2.01	2.01	0	%100
19	M7	PZ	2.01	2.01	0	%100
20	M34	PZ	2.01	2.01	0	%100
21	M33	PZ	2.01	2.01	0	%100
22	M24	PZ	4.02	4.02	0	%100

Member Distributed Loads (BLC 20 : Maint. Normal (Mount)) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
23	M11	PZ	4.02	4.02	0	%100
24	M37	PZ	4.02	4.02	0	%100
25	M26	PZ	3.35	3.35	0	%100
26	M12	PZ	3.35	3.35	0	%100
27	M13	PZ	3.35	3.35	0	%100
28	M38	PZ	3.35	3.35	0	%100
29	M39	PZ	3.35	3.35	0	%100
30	M25	PZ	3.35	3.35	0	%100
31	M157	PZ	2.01	2.01	0	%100
32	M156	PZ	2.01	2.01	0	%100
33	M158	PZ	2.01	2.01	0	%100
34	M155	PZ	2.01	2.01	0	%100
35	M159	PZ	2.01	2.01	0	%100
36	M154	PZ	2.01	2.01	0	%100

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Y	-51.1	36
2	M90	Y	-51.1	60
3	M94	Y	-51.1	36
4	M94	Y	-51.1	60
5	M98	Y	-51.1	36
6	M98	Y	-51.1	60
7	M89	Y	-110.7	18
8	M89	Y	-110.7	84
9	M93	Y	-110.7	18
10	M93	Y	-110.7	84
11	M97	Y	-110.7	18
12	M97	Y	-110.7	84
13	M89	Y	-55	18
14	M89	Y	-55	84
15	M93	Y	-55	18
16	M93	Y	-55	84
17	M97	Y	-55	18
18	M97	Y	-55	84
19	M91	Y	-82	54
20	M95	Y	-82	54
21	M99	Y	-82	54
22	M88	Y	-97.5	54
23	M92	Y	-97.5	54
24	M96	Y	-97.5	54
25	M24	Y	-39.5	50

Member Point Loads (BLC 4 : WLX)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	X	16.2	36
2	M90	X	16.2	60
3	M94	X	35.1	36
4	M94	X	35.1	60
5	M98	X	35.1	36
6	M98	X	35.1	60
7	M89	X	120.4	18
8	M89	X	120.4	84
9	M93	X	250.2	18
10	M93	X	250.2	84
11	M97	X	250.2	18
12	M97	X	250.2	84
13	M91	X	17.4	54
14	M95	X	28	54
15	M99	X	28	54
16	M88	X	21.5	54
17	M92	X	28	54
18	M96	X	28	54
19	M24	X	79.7	50

Member Point Loads (BLC 5 : WLZ)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Z	-40.6	36
2	M90	Z	-40.6	60
3	M94	Z	-28	36
4	M94	Z	-28	60
5	M98	Z	-28	36
6	M98	Z	-28	60
7	M89	Z	-288.9	18
8	M89	Z	-288.9	84
9	M93	Z	-104.3	18
10	M93	Z	-104.3	84
11	M97	Z	-104.3	18
12	M97	Z	-104.3	84
13	M91	Z	-32.3	54
14	M95	Z	-15.1	54
15	M99	Z	-15.1	54
16	M88	Z	-32.2	54
17	M92	Z	-18.6	54
18	M96	Z	-18.6	54
19	M24	Z	-74.2	50

Member Point Loads (BLC 6 : WLX Ice)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	X	3.8	36
2	M90	X	3.8	60
3	M94	X	6.8	36
4	M94	X	6.8	60
5	M98	X	6.8	36
6	M98	X	6.8	60
7	M89	X	26.8	18
8	M89	X	26.8	84
9	M93	X	41.7	18
10	M93	X	41.7	84
11	M97	X	41.7	18
12	M97	X	41.7	84
13	M91	X	4.5	54
14	M95	X	6.1	54
15	M99	X	6.1	54
16	M88	X	5.2	54
17	M92	X	6.1	54
18	M96	X	6.1	54
19	M24	X	16.1	50

Member Point Loads (BLC 7 : WLZ Ice)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Z	-7.9	36
2	M90	Z	-7.9	60
3	M94	Z	-3.3	36
4	M94	Z	-3.3	60
5	M98	Z	-3.3	36
6	M98	Z	-3.3	60
7	M89	Z	-48.1	18
8	M89	Z	-48.1	84
9	M93	Z	-23.2	18
10	M93	Z	-23.2	84
11	M97	Z	-23.2	18
12	M97	Z	-23.2	84
13	M91	Z	-7.1	54
14	M95	Z	-3.9	54
15	M99	Z	-3.9	54
16	M88	Z	-7.1	54
17	M92	Z	-4.5	54
18	M96	Z	-4.5	54
19	M24	Z	-15.1	50

Member Point Loads (BLC 15 : Ice)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Y	-62	36
2	M90	Y	-62	60
3	M94	Y	-62	36
4	M94	Y	-62	60
5	M98	Y	-62	36
6	M98	Y	-62	60
7	M89	Y	-359.2	18
8	M89	Y	-359.2	84
9	M93	Y	-359.2	18
10	M93	Y	-359.2	84
11	M97	Y	-359.2	18
12	M97	Y	-359.2	84
13	M91	Y	-59.3	54
14	M95	Y	-59.3	54
15	M99	Y	-59.3	54
16	M88	Y	-62.4	54
17	M92	Y	-62.4	54
18	M96	Y	-62.4	54
19	M24	Y	-117.5	50

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	Dead	DL	-1		25	12
3	Extreme Wind Vertical (Mount)	None				
4	WLX	WLX			19	30
5	WLZ	WLZ			19	38
6	WLX Ice	None			19	30
7	WLZ Ice	None		12	19	38
8	Extreme Wind Normal (Epuipment)	None		12		
9	Extreme Wind Tangential (Equipme	None				
11	Extreme Ice Vertical (Mount)	None				51
12	Extreme Ice Normal (Mount)	None				36
13	Extreme Ice Tangential (Mount)	None				
15	Ice	None		12	19	39
16	Extreme Ice Normal (Equipment)	None		12		
17	Extreme Ice Tangential (Equipmen	None				
19	Maint. Vertical (Mount)	None				
20	Maint. Normal (Mount)	None				36
21	Maint. Tangential (Mount)	None				
23	Maint. Vertical (Equipment)	None		12		
24	Maint. Normal (Equipment)	None		12		
25	Maint. Tangential (Equipment)	None				
27	Lm	None		1		

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	TIA-222-G (1) 0	Yes	Y	DL	1.2	WLX		WLZ	1.6								
2	TIA-222-G (1) 30	Yes	Y	DL	1.2	WLX	0.8	WLZ	1.386								
3	TIA-222-G (1) 45	Yes	Y	DL	1.2	WLX	1.131	WLZ	1.131								
4	TIA-222-G (1) 60	Yes	Y	DL	1.2	WLX	1.386	WLZ	0.8								
5	TIA-222-G (1) 90	Yes	Y	DL	1.2	WLX	1.6	WLZ									
6	TIA-222-G (1) 120	Yes	Y	DL	1.2	WLX	1.386	WLZ	-0.8								
7	TIA-222-G (1) 135	Yes	Y	DL	1.2	WLX	1.131	WLZ	-1.131								
8	TIA-222-G (1) 150	Yes	Y	DL	1.2	WLX	0.8	WLZ	-1.386								
9	TIA-222-G (1) 180	Yes	Y	DL	1.2	WLX		WLZ	-1.6								
10	TIA-222-G (1) 210	Yes	Y	DL	1.2	WLX	-0.8	WLZ	-1.386								
11	TIA-222-G (1) 225	Yes	Y	DL	1.2	WLX	-1.131	WLZ	-1.131								
12	TIA-222-G (1) 240	Yes	Y	DL	1.2	WLX	-1.386	WLZ	-0.8								
13	TIA-222-G (1) 270	Yes	Y	DL	1.2	WLX	-1.6	WLZ									
14	TIA-222-G (1) 300	Yes	Y	DL	1.2	WLX	-1.386	WLZ	0.8								
15	TIA-222-G (1) 315	Yes	Y	DL	1.2	WLX	-1.131	WLZ	1.131								
16	TIA-222-G (1) 330	Yes	Y	DL	1.2	WLX	-0.8	WLZ	1.386								
17	TIA-222-G (2) 0	Yes	Y	DL	0.9	WLX		WLZ	1.6								
18	TIA-222-G (2) 30	Yes	Y	DL	0.9	WLX	0.8	WLZ	1.386								

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
19	TIA-222-G (2) 45	Yes	Y	DL	0.9	WLX	1.131	WLZ	1.131								
20	TIA-222-G (2) 60	Yes	Y	DL	0.9	WLX	1.386	WLZ	0.8								
21	TIA-222-G (2) 90	Yes	Y	DL	0.9	WLX	1.6	WLZ									
22	TIA-222-G (2) 120	Yes	Y	DL	0.9	WLX	1.386	WLZ	-0.8								
23	TIA-222-G (2) 135	Yes	Y	DL	0.9	WLX	1.131	WLZ	-1.131								
24	TIA-222-G (2) 150	Yes	Y	DL	0.9	WLX	0.8	WLZ	-1.386								
25	TIA-222-G (2) 180	Yes	Y	DL	0.9	WLX		WLZ	-1.6								
26	TIA-222-G (2) 210	Yes	Y	DL	0.9	WLX	-0.8	WLZ	-1.386								
27	TIA-222-G (2) 225	Yes	Y	DL	0.9	WLX	-1.131	WLZ	-1.131								
28	TIA-222-G (2) 240	Yes	Y	DL	0.9	WLX	-1.386	WLZ	-0.8								
29	TIA-222-G (2) 270	Yes	Y	DL	0.9	WLX	-1.6	WLZ									
30	TIA-222-G (2) 300	Yes	Y	DL	0.9	WLX	-1.386	WLZ	0.8								
31	TIA-222-G (2) 315	Yes	Y	DL	0.9	WLX	-1.131	WLZ	1.131								
32	TIA-222-G (2) 330	Yes	Y	DL	0.9	WLX	-0.8	WLZ	1.386								
33	TIA-222-G (3) 0	Yes	Y	DL	1.2	WLX		WLZ	1	15	1						
34	TIA-222-G (3) 30	Yes	Y	DL	1.2	WLX	0.5	WLZ	0.866	15	1						
35	TIA-222-G (3) 45	Yes	Y	DL	1.2	WLX	0.707	WLZ	0.707	15	1						
36	TIA-222-G (3) 60	Yes	Y	DL	1.2	WLX	0.866	WLZ	0.5	15	1						
37	TIA-222-G (3) 90	Yes	Y	DL	1.2	WLX	1	WLZ		15	1						
38	TIA-222-G (3) 120	Yes	Y	DL	1.2	WLX	0.866	WLZ	-0.5	15	1						
39	TIA-222-G (3) 135	Yes	Y	DL	1.2	WLX	0.707	WLZ	-0.707	15	1						
40	TIA-222-G (3) 150	Yes	Y	DL	1.2	WLX	0.5	WLZ	-0.866	15	1						
41	TIA-222-G (3) 180	Yes	Y	DL	1.2	WLX		WLZ	-1	15	1						
42	TIA-222-G (3) 210	Yes	Y	DL	1.2	WLX	-0.5	WLZ	-0.866	15	1						
43	TIA-222-G (3) 225	Yes	Y	DL	1.2	WLX	-0.707	WLZ	-0.707	15	1						
44	TIA-222-G (3) 240	Yes	Y	DL	1.2	WLX	-0.866	WLZ	-0.5	15	1						
45	TIA-222-G (3) 270	Yes	Y	DL	1.2	WLX	-1	WLZ		15	1						
46	TIA-222-G (3) 300	Yes	Y	DL	1.2	WLX	-0.866	WLZ	0.5	15	1						
47	TIA-222-G (3) 315	Yes	Y	DL	1.2	WLX	-0.707	WLZ	0.707	15	1						
48	TIA-222-G (3) 330	Yes	Y	DL	1.2	WLX	-0.5	WLZ	0.866	15	1						
49	**********																
50	Catagory A Extreme Wind																
51	Extreme Wind 0		Y	8	1	9		7	0.5	4	1	5		1	1.2		
52	Extreme Wind 30		Y	8	0.779	9	0.45	7	0.5	4	0.866	5	0.5	1	1.2		
53	Extreme Wind 45		Y	8	0.566	9	0.57	7	0.5	4	0.707	5	0.707	1	1.2		
54	Extreme Wind 60		Y	8	0.35	9	0.61	7	0.5	4	0.5	5	0.866	1	1.2		
55	Extreme Wind 90		Y	8		9	0.6	7	0.5	4		5	1	1	1.2		
56	Extreme Wind 120		Y	8	-0.35	9	0.61	7	0.5	4	-0.5	5	0.866	1	1.2		
57	Extreme Wind 135		Y	8	-0.566	9	0.57	7	0.5	4	-0.707	5	0.707	1	1.2		
58	Extreme Wind 150		Y	8	-0.779	9	0.45	7	0.5	4	-0.866	5	0.5	1	1.2		
59	Extreme Wind 180		Y	8	-1	9		7	0.5	4	-1	5		1	1.2		
60	Extreme Wind 210		Y	8	-0.779	9	-0.45	7	0.5	4	-0.866	5	-0.5	1	1.2		
61	Extreme Wind 225		Y	8	-0.566	9	-0.57	7	0.5	4	-0.707	5	-0.707	1	1.2		
62	Extreme Wind 240		Y	8	-0.35	9	-0.61	7	0.5	4	-0.5	5	-0.866	1	1.2		
63	Extreme Wind 270		Y	8		9	-0.6	7	0.5	4		5	-1	1	1.2		
64	Extreme Wind 300		Y	8	0.35	9	-0.61	7	0.5	4	0.5	5	-0.866	1	1.2		
65	Extreme Wind 315		Y	8	0.566	9	-0.57	7	0.5	4	0.707	5	-0.707	1	1.2		
66	Extreme Wind 330		Y	8	0.779	9	-0.45	7	0.5	4	0.866	5	-0.5	1	1.2		
67	Catagory A Extreme Ice																
68	Extreme Ice 0		Y	16	1	17		15	1	12	1	13		1	1.2	11	1
69	Extreme Ice 30		Y	16	0.779	17	0.45	15	1	12	0.866	13	0.5	1	1.2	11	1
70	Extreme Ice 45		Y	16	0.566	17	0.57	15	1	12	0.707	13	0.707	1	1.2	11	1
71	Extreme Ice 60		Y	16	0.35	17	0.61	15	1	12	0.5	13	0.866	1	1.2	11	1
72	Extreme Ice 90		Y	16		17	0.6	15	1	12		13	1	1	1.2	11	1
73	Extreme Ice 120		Y	16	-0.35	17	0.61	15	1	12	-0.5	13	0.866	1	1.2	11	1
74	Extreme Ice 135		Y	16	-0.566	17	0.57	15	1	12	-0.707	13	0.707	1	1.2	11	1
75	Extreme Ice 150		Y	16	-0.779	17	0.45	15	1	12	-0.866	13	0.5	1	1.2	11	1
76	Extreme Ice 180		Y	16	-1	17		15	1	12	-1	13		1	1.2	11	1
77	Extreme Ice 210		Y	16	-0.779	17	-0.45	15	1	12	-0.866	13	-0.5	1	1.2	11	1
78	Extreme Ice 225		Y	16	-0.566	17	-0.57	15	1	12	-0.707	13	-0.707	1	1.2	11	1
79	Extreme Ice 240		Y	16	-0.35	17	-0.61	15	1	12	-0.5	13	-0.866	1	1.2	11	1
80	Extreme Ice 270		Y	16		17	-0.6	15	1	12		13	-1	1	1.2	11	1
81	Extreme Ice 300		Y	16	0.35	17	-0.61	15	1	12	0.5	13	-0.866	1	1.2	11	1
82	Extreme Ice 315		Y	16	0.566	17	-0.57	15	1	12	0.707	13	-0.707	1	1.2	11	1
83	Extreme Ice 330		Y	16	0.779	17	-0.45	15	1	12	0.866	13	-0.5	1	1.2	11	1

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
84	Catagory A Maintenance																
85	Maintenance 0		Y	24	1	25		23	0.5	20	1	21		27	1.5	1	1.2
86	Maintenance 30		Y	24	0.779	25	0.45	23	0.5	20	0.866	21	0.5	27	1.5	1	1.2
87	Maintenance 45		Y	24	0.566	25	0.57	23	0.5	20	0.707	21	0.707	27	1.5	1	1.2
88	Maintenance 60		Y	24	0.35	25	0.61	23	0.5	20	0.5	21	0.866	27	1.5	1	1.2
89	Maintenance 90		Y	24		25	0.6	23	0.5	20		21	1	27	1.5	1	1.2
90	Maintenance 120		Y	24	-0.35	25	0.61	23	0.5	20	-0.5	21	0.866	27	1.5	1	1.2
91	Maintenance 135		Y	24	-0.566	25	0.57	23	0.5	20	-0.707	21	0.707	27	1.5	1	1.2
92	Maintenance 150		Y	24	-0.779	25	0.45	23	0.5	20	-0.866	21	0.5	27	1.5	1	1.2
93	Maintenance 180		Y	24	-1	25		23	0.5	20	-1	21		27	1.5	1	1.2
94	Maintenance 210		Y	24	-0.779	25	-0.45	23	0.5	20	-0.866	21	-0.5	27	1.5	1	1.2
95	Maintenance 225		Y	24	-0.566	25	-0.57	23	0.5	20	-0.707	21	-0.707	27	1.5	1	1.2
96	Maintenance 240		Y	24	-0.35	25	-0.61	23	0.5	20	-0.5	21	-0.866	27	1.5	1	1.2
97	Maintenance 270		Y	24		25	-0.6	23	0.5	20		21	-1	27	1.5	1	1.2
98	Maintenance 300		Y	24	0.35	25	-0.61	23	0.5	20	0.5	21	-0.866	27	1.5	1	1.2
99	Maintenance 315		Y	24	0.566	25	-0.57	23	0.5	20	0.707	21	-0.707	27	1.5	1	1.2
100	Maintenance 330		Y	24	0.779	25	-0.45	23	0.5	20	0.866	21	-0.5	27	1.5	1	1.2
101	Extreme Ice + DM		Y	1	1	11	1										
102	DM		Y	1	1												

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N79	max	0	48	0	48	0	48	0	48	0	48	0	48
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N56	max	1123.538	29	1166.532	41	4446.784	33	1.062	48	1.251	5	0.498	37
4		min	-1138.739	5	196.563	17	-1383.81	25	0.284	24	-1.232	29	-0.29	29
5	N55	max	1545.29	30	1308.628	46	1490.157	32	0.092	18	0.815	9	0.923	34
6		min	-4086.907	38	158.921	22	-2732.126	40	-0.991	42	-0.813	17	0.066	26
7	N57	max	4126.457	44	1168.017	36	964.341	19	0.23	32	0.391	1	-0.135	23
8		min	-1654.7	20	133.614	28	-2389.711	43	-0.448	40	-0.388	25	-1.116	47
9	N144	max	18.01	20	2604.531	44	1982.016	44	0.031	20	0.059	5	-0.012	31
10		min	-3451.707	44	-2.095	20	8.427	20	-0.062	44	-0.058	29	-0.067	40
11	N145	max	50.868	37	2508.373	33	-107.878	25	0.016	42	0.011	24	0.007	24
12		min	-29.351	29	71.964	25	-3915.318	33	-0.002	18	-0.045	33	-0.029	48
13	N146	max	3481.695	38	2624.164	38	1997.074	38	0.037	30	0.068	6	0.065	47
14		min	-23.864	30	-5.426	30	8.061	30	-0.067	38	-0.068	30	0.014	23
15	Totals:	max	4017.63	29	9724.572	33	3697.956	1						
16		min	-4017.63	21	3192.491	25	-3697.956	25						

Envelope Maximum Member Section Forces

	Member		Axial[lb]	Loc[in]	LC	y Shear[lb]	Loc[in]	LC	z Shear[lb]	Loc[in]	LC	Torque[k-ft]	Loc[in]	LC	y-y Moment[k-ft]	Loc[in]	LC	z-z Moment[k-ft]	Loc[in]	LC
1	M7	max	881.432	0	29	60.799	0	44	17.213	52.309	21	0	52.309	40	0.01	29.969	47	0.094	0	42
2		min	-1052.862	0	5	-29.001	52.309	36	-23.96	52.309	13	0	0	32	-0.038	0	43	-0.055	52.309	29
3	M8	max	695.182	52.309	27	18.098	52.309	18	57.491	0	43	0	52.309	22	0.01	28.334	8	0.05	52.309	25
4		min	-847.638	0	3	-23.851	52.309	10	-33.147	52.309	35	0	0	46	-0.038	0	44	-0.092	0	45
5	M11	max	1917.462	44.722	20	982.926	15.555	44	678.744	62.222	24	0.366	14.907	24	0.699	45.37	30	1.581	14.907	44
6		min	-4740.956	62.222	44	-1519.312	14.907	44	-678.785	62.222	32	-0.516	45.37	48	-0.702	45.37	6	-0.758	44.722	43
7	M12	max	476.284	31	2	-152.731	0	20	670.487	4.844	2	0.522	4.844	17	0.257	4.844	3	2.084	31	44
8		min	-440.212	31	26	-852.032	31	44	-576.024	4.844	26	-0.547	0	9	-0.263	31	8	-0.022	0	16
9	M13	max	606.388	0	5	959.839	0	43	814.87	26.156	29	0.588	31	14	0.388	0	21	2.342	0	43
10		min	-572.628	0	29	181.942	31	19	-922.431	26.156	5	-0.46	26.156	22	-0.424	0	13	-0.04	31	37
11	M20	max	926.611	52.311	24	60.261	0	39	17.113	52.311	32	0	52.311	34	0.011	29.97	42	0.093	0	36
12		min	-1097.766	0	16	-28.329	52.311	47	-23.878	52.311	8	0	0	26	-0.038	0	38	-0.055	52.311	25
13	M21	max	661.801	0	22	18.029	52.307	29	58.413	0	38	0	52.307	17	0.009	28.333	2	0.052	52.307	21
14		min	-812.627	0	14	-23.828	52.307	5	-33.831	52.307	46	0	0	41	-0.038	0	39	-0.096	0	40
15	M24	max	1974.457	62.254	30	998.2	15.563	38	990.663	62.254	17	0.396	14.915	18	0.813	62.254	17	1.586	14.915	38
16		min	-4837.823	62.254	38	-1523.618	14.915	38	-989.962	62.254	25	-0.509	45.393	42	-0.815	62.254	9	-0.792	44.745	38
17	M25	max	348.938	30.996	12	-150.93	0	31	688.258	4.843	13	0.516	4.843	28	0.3	30.996	28	2.069	30.996	38
18		min	-314.291	30.996	20	-846.846	30.996	39	-594.148	4.843	21	-0.541	0	4	-0.34	30.996	4	-0.019	0	11
19	M26	max	811.221	0	1	954.101	0	37	824.77	26.16	24	0.623	31.004	9	0.32	0	17	2.319	0	38
20		min	-777.7	0	25	178.558	31.004	29	-932.005	26.16	16	-0.498	26.16	17	-0.356	0	9	-0.041	31.004	33
21	M33	max	658.15	0	18	29.405	0	33	16.175	0	5	0	52.315	46	0.015	25.068	37	0.061	52.315	43
22		min	-832.848	0	10	-49.973	52.315	41	-10.961	0	29	0	0	22	-0.026	52.315	46	-0.048	0	5
23	M34	max	544.881	0	17	17.419	0	13	26.16	0	34	0	52.304	28	0.015	23.428	45	0.05	0	13

Envelope Maximum Member Section Forces (Continued)

	Member		Axial[lb]	Loc[in]	LC	y Shear[lb]	Loc[in]	LC	z Shear[lb]	Loc[in]	LC	Torque[k-ft]	Loc[in]	LC	y-y Moment[k-ft]	Loc[in]	LC	z-z Moment[k-ft]	Loc[in]	LC
24		min	-690.023	0	9	-11.433	0	21	-54.202	52.304	42	0	0	36	-0.031	52.304	36	-0.073	52.304	39
25	M37	max	1546.456	14.915	9	996.76	15.564	33	1123.219	62.254	29	0.487	14.915	29	1.232	62.254	29	1.729	14.915	33
26		min	-4446.783	45.394	33	-1409.375	14.915	33	-1138.14	62.254	5	-0.522	0	5	-1.251	62.254	5	-0.794	44.745	33
27	M38	max	459.856	30.989	6	-158.524	0	25	561.076	4.842	8	0.514	4.842	22	0.228	4.842	9	2.137	30.989	33
28		min	-419.551	5.165	30	-886.804	30.989	33	-464.009	4.842	32	-0.535	0	14	-0.213	30.989	14	-0.024	0	5
29	M39	max	694.701	26.166	12	1002.038	0	48	612.755	26.166	19	0.604	31.011	4	0.264	0	27	2.413	0	33
30		min	-649.178	0	20	179.033	31.011	24	-722.346	26.166	11	-0.484	26.166	28	-0.306	0	3	-0.039	31.011	44
31	M40	max	430.263	96	24	1058.751	96	39	570.64	96	12	0.364	96	13	0.197	144	28	0.664	49.5	41
32		min	-483.829	49.5	13	-531.007	48	48	-555.508	96	20	-0.362	48	10	-0.2	144	4	-0.877	96	42
33	M41	max	507.991	96	20	1047.928	96	34	546.145	96	6	0.299	96	7	0.208	144	22	0.683	49.5	36
34		min	-554.455	96	12	-539.793	48	43	-531.815	96	30	-0.394	48	5	-0.212	144	14	-0.865	96	37
35	M42	max	424.244	96	30	1043.31	96	45	684.355	96	1	0.341	96	2	0.238	48	12	0.67	49.5	46
36		min	-467.5	96	6	-526.19	48	37	-669.685	96	25	-0.359	48	16	-0.238	48	4	-0.885	96	47
37	M88	max	475.116	27	41	196.186	27	5	94.678	69	8	0.23	33	17	0.108	69	8	0.365	27	5
38		min	-221.104	69	17	-160.254	27	29	-77.554	69	32	-0.233	33	9	-0.094	69	32	-0.294	27	29
39	M89	max	596.479	27	37	245.401	27	21	480.763	27	9	0.124	33	32	0.819	27	25	0.534	27	21
40		min	-591.732	27	33	-270.387	27	13	-480.702	27	1	-0.132	33	8	-0.869	27	1	-0.596	27	13
41	M90	max	474.41	27	45	312.045	27	21	247.966	27	1	0.205	69	9	0.519	27	25	0.555	27	21
42		min	-32.444	26	34	-343.644	27	13	-233.09	27	25	-0.19	27	17	-0.576	27	1	-0.609	27	13
43	M91	max	414.133	27	40	171.794	27	5	84.712	69	10	0.176	69	8	0.085	69	28	0.353	27	5
44		min	-146.354	69	32	-166.872	27	29	-79.539	69	18	-0.17	27	32	-0.088	69	4	-0.326	27	29
45	M92	max	473.142	27	46	55.005	69	31	160.131	27	18	0.208	69	22	0.372	27	10	0.106	27	1
46		min	-217.364	69	22	-57.792	69	7	-200.004	27	10	-0.212	27	14	-0.287	27	18	-0.1	27	25
47	M93	max	598.236	27	42	410.356	69	5	225.247	27	2	0.125	69	21	0.465	27	25	0.829	27	5
48		min	-591.732	27	33	-410.374	69	13	-211.998	28	26	-0.133	33	13	-0.489	27	1	-0.757	27	29
49	M94	max	469.629	27	35	309.585	27	4	299.5	27	1	0.144	33	14	0.517	27	25	0.62	27	5
50		min	-32.444	26	42	-281.418	27	28	-282.784	27	25	-0.129	27	22	-0.526	27	1	-0.545	27	29
51	M95	max	445.789	27	46	133.783	27	4	137.398	27	19	0.173	33	13	0.326	27	11	0.238	27	3
52		min	-198.771	69	22	-123.497	27	28	-140.487	27	11	-0.168	27	21	-0.302	27	19	-0.209	27	27
53	M96	max	475.696	27	36	109.017	27	23	164.316	27	16	0.197	33	28	0.27	27	23	0.201	27	23
54		min	-210.392	69	28	-147.818	27	15	-137.53	27	24	-0.2	33	4	-0.319	27	15	-0.302	27	47
55	M97	max	591.732	69	48	410.381	69	5	219.402	27	17	0.097	69	26	0.627	27	10	0.714	27	21
56		min	-591.732	27	33	-410.358	69	13	-249.445	27	9	-0.105	27	2	-0.541	27	18	-0.729	27	13
57	M98	max	476.309	27	39	278.245	27	5	315.006	27	32	0.186	69	5	0.61	27	8	0.575	27	21
58		min	-32.444	26	45	-274.879	27	29	-349.978	27	8	-0.171	27	29	-0.535	27	32	-0.598	27	13
59	M99	max	439.163	27	35	45.737	27	23	182.811	27	16	0.172	33	2	0.348	27	24	0.102	27	25
60		min	-185.51	69	27	-52.739	27	15	-181.307	27	24	-0.166	33	26	-0.36	27	16	-0.135	27	1
61	M139	max	4756.265	0	44	65.066	0	44	22.587	55.946	30	0	55.946	23	0.07	0	5	0.085	0	44
62		min	-45.475	55.946	20	-28.588	55.946	43	-22.72	55.946	6	0	0	15	-0.069	0	29	-0.021	38.463	41
63	M140	max	4649.869	0	33	21.477	0	42	78.296	55.973	5	0	55.973	29	0.281	55.973	5	0.148	55.973	33
64		min	84.085	55.973	25	-77.81	55.973	33	-62.524	55.973	29	0	0	5	-0.23	55.973	29	-0.008	55.973	25
65	M141	max	4795.05	0	38	65.153	0	38	24.228	0	32	0	55.972	18	0.081	0	6	0.086	0	38
66		min	-51.707	55.972	30	-28.528	55.972	39	-24.324	0	8	0	0	10	-0.081	0	30	-0.02	38.481	41
67	M154	max	194.46	48	22	233.373	139.5	17	226.316	138	9	0.221	138	9	0.484	96	17	0.305	48	13
68		min	-222.904	6	14	-258.836	144	9	-212.762	138	17	-0.219	96	1	-0.507	96	9	-0.337	96	13
69	M155	max	243.785	48	4	231.499	0	3	163.593	138	4	0.184	138	4	0.357	96	28	0.317	48	7
70		min	-269.29	48	9	-252.68	144	4	-149.007	138	28	-0.181	96	28	-0.381	96	4	-0.353	96	8
71	M156	max	196.633	138	15	244.169	0	14	191.884	138	13	0.187	138	14	0.388	96	21	0.3	48	2
72		min	-181.146	48	5	-255.697	144	14	-178.221	138	21	-0.184	96	22	-0.412	96	13	-0.35	96	3
73	M157	max	228.24	18.031	20	218.3	18.031	31	266.08	18.031	23	0.003	18.031	32	0.144	0	12	0.315	0	14
74		min	-258.255	18.031	12	-236.208	0	7	-275.443	18.031	15	-0.003	0	8	-0.119	0	20	-0.305	0	22
75	M158	max	133.505	18.031	26	278.925	18.031	21	228.664	9.579	29	0.003	18.031	21	0.087	0	1	0.327	0	5
76		min	-169.412	0	2	-294.768	0	13	-235.587	1.503	5	-0.003	0	13	-0.081	18.031	11	-0.316	0	29
77	M159	max	254.45	0	32	246.174	18.031	26	271.291	0	18	0.003	18.031	26	0.135	0	8	0.382	0	9
78		min	-284.789	0	8	-264.327	0	2	-278.736	0	10	-0.003	0	2	-0.122	18.031	15	-0.374	0	17

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M7	L2X2X3	0.177	0	44	0.011	0	y	42	15110.904	22093.2	0.527	1.098	1.5	H2-1
2	M8	L2X2X3	0.171	0	44	0.011	0	z	45	15110.903	22093.2	0.527	1.098	1.5	H2-1
3	M11	HSS4X4X4	0.153	15.555	44	0.088	62.222	y	48	99561.427	103122	11.96	11.96	1.914	H1-1b
4	M12	HSS4X4X4	0.188	31	41	0.071	4.844	z	1	102226.485	103122	11.96	11.96	1.689	H1-1b
5	M13	HSS4X4X4	0.22	0	45	0.083	0	y	46	102226.485	103122	11.96	11.96	1.697	H1-1b
6	M20	L2X2X3	0.174	0	39	0.011	0	y	37	15110.469	22093.2	0.527	1.098	1.5	H2-1

Envelope AISC 14TH (360-10): LRFD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
7	M21	L2X2X3	0.173	0	38	0.011	0	z	40	15111.338	22093.2	0.527	1.098	1.5	H2-1
8	M24	HSS4X4X4	0.157	62.254	40	0.092	62.254	y	42	99557.85	103122	11.96	11.96	1.901	H1-1b
9	M25	HSS4X4X4	0.193	30.996	37	0.071	4.843	z	12	102226.713	103122	11.96	11.96	1.69	H1-1b
10	M26	HSS4X4X4	0.212	0	40	0.088	26.16	z	9	102226.257	103122	11.96	11.96	1.698	H1-1b
11	M33	L2X2X3	0.132	52.315	43	0.012	52.315	y	45	15109.651	22093.2	0.527	1.098	1.5	H2-1
12	M34	L2X2X3	0.145	52.304	39	0.012	52.304	z	37	15112.156	22093.2	0.527	1.098	1.5	H2-1
13	M37	HSS4X4X4	0.169	62.254	37	0.087	62.254	y	37	99557.798	103122	11.96	11.96	1.934	H1-1b
14	M38	HSS4X4X4	0.19	30.989	48	0.067	30.989	y	46	102227.141	103122	11.96	11.96	1.709	H1-1b
15	M39	HSS4X4X4	0.22	0	34	0.088	0	y	36	102225.828	103122	11.96	11.96	1.715	H1-1b
16	M40	PIPE_3.0	0.153	96	42	0.113	96		45	30165.191	65205	5.749	5.749	2.701	H1-1b
17	M41	PIPE_3.0	0.154	96	37	0.105	96		38	30165.191	65205	5.749	5.749	2.527	H1-1b
18	M42	PIPE_3.0	0.157	96	47	0.112	96		33	30165.191	65205	5.749	5.749	2.724	H1-1b
19	M88	PIPE_2.5	0.109	27	37	0.08	69		9	30038.461	50715	3.596	3.596	3	H1-1b
20	M89	PIPE_2.5	0.25	27	1	0.07	27		9	30038.461	50715	3.596	3.596	3	H1-1b
21	M90	PIPE_2.5	0.177	27	12	0.083	27		10	30038.461	50715	3.596	3.596	3	H1-1b
22	M91	PIPE_2.5	0.102	27	5	0.062	27		8	30038.461	50715	3.596	3.596	3	H1-1b
23	M92	PIPE_2.5	0.111	27	42	0.073	69		14	30038.461	50715	3.596	3.596	3	H1-1b
24	M93	PIPE_2.5	0.235	27	5	0.069	69		13	30038.461	50715	3.596	3.596	1.797	H1-1b
25	M94	PIPE_2.5	0.188	27	4	0.06	27		14	30038.461	50715	3.596	3.596	3	H1-1b
26	M95	PIPE_2.5	0.112	27	11	0.064	27		13	30038.461	50715	3.596	3.596	3	H1-1b
27	M96	PIPE_2.5	0.124	27	47	0.072	27		13	30038.461	50715	3.596	3.596	3	H1-1b
28	M97	PIPE_2.5	0.216	27	13	0.055	69		4	30038.461	50715	3.596	3.596	1.705	H1-1b
29	M98	PIPE_2.5	0.195	27	6	0.079	27		5	30038.461	50715	3.596	3.596	3	H1-1b
30	M99	PIPE_2.5	0.11	27	16	0.061	27		2	30038.461	50715	3.596	3.596	2.848	H1-1b
31	M139	LL2.5X2.5X3X0.5	0.124	0	44	0.006	0	y	46	40564.524	55223.453	4.01	1.544	1.722	H1-1b
32	M140	LL2.5X2.5X3X0.5	0.197	55.973	35	0.007	55.973	z	5	40563.366	55223.453	4.01	1.544	2.081	H1-1b
33	M141	LL2.5X2.5X3X0.5	0.127	0	38	0.006	0	y	42	40563.382	55223.453	4.01	1.544	1.712	H1-1b
34	M154	PIPE_2.0	0.282	96	9	0.157	138		9	6830.97	32130	1.872	1.872	2.651	H1-1b
35	M155	PIPE_2.0	0.25	96	5	0.127	138		4	6830.97	32130	1.872	1.872	2.863	H1-1b
36	M156	PIPE_2.0	0.258	96	13	0.133	138		13	6830.97	32130	1.872	1.872	2.387	H1-1b
37	M157	L2.5X2.5X4	0.259	0	13	0.037	18.031	z	15	33966.483	36414	1.052	2.396	1.5	H2-1
38	M158	L2.5X2.5X4	0.188	0	4	0.042	0	y	13	33966.483	36414	1.052	2.396	1.5	H2-1
39	M159	L2.5X2.5X4	0.281	0	9	0.039	0	z	10	33966.483	36414	1.052	2.396	1.5	H2-1

DESIGN EARTH TECHNOLOGY

P.O. Box 187, Guilford, CT 06437
Phone/Fax: (203) 458-9806 ▪ Email: docdirt@aol.com

GENERAL CIVIL ENGINEERING ▪ GEOTECHNICAL ENGINEERING ▪ HYDROGEOLOGY ▪ HYDROLOGY AND HYDRAULICS ▪ TESTING—SOILS & MATERIALS ▪ CONSTRUCTION ENGINEERING

GEOTECHNICAL AND GEOPHYSICAL TESTING REPORT

PROPOSED VERIZON WIRELESS COMMUNICATIONS TOWER
BELL ROAD EXTENSION
CORNWALL, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, Inc.

STATE OF CONNECTICUT
LAWRENCE J. MARCH
No. 15255
LICENSED
PROFESSIONAL ENGINEER

L.J.M. P.E.

NOVEMBER 2010

DESIGN **EARTH TECHNOLOGY**

P.O. Box 187, Guilford, CT 06437
Phone/Fax: (203) 458-9806 ▪ Email: docdirt@aol.com

November 26, 2010

Mr. Carlo F. Centore, P.E.
Centek Engineering, Inc.
63-2 North Branford Road
Branford, CT 06405

Re: Proposed Verizon Communications Tower
16 Bell Road Extension
Cornwall, Connecticut
DET Job No. 2010.17

Dear Mr. Centore:

Lawrence J. Marcik, Jr., P.E. dba **Design Earth Technology (DET)** has completed a geotechnical engineering study for the above referenced project. Included in this report is a summary of subsurface conditions, delineation of engineering characteristics of the foundation materials, and the implications of the conditions and characteristics with respect to the design and construction of the proposed communication facilities. This report was prepared under our agreement dated November 10, 2010 and your subsequent authorization.

The purpose of this study is to develop geotechnical engineering recommendations for the proposed foundation design and compound development. No subsurface investigations were performed within the very long access drive as this work was not part of the scope of geotechnical services. These additional services could be performed by **DET** if you desire and authorize. The subsurface investigation and sampling program was conducted by **DET** for the sole purpose of obtaining subsurface information as part of a geotechnical study. No services were performed to evaluate subsurface environmental conditions, however, the client requested that as a courtesy, **DET** log any noticeable non-typical visual and/or odorous conditions from the soil and rock core samples.

SITE DESCRIPTION

The project site is located off of Bell Road Extension in Cornwall, Connecticut. The project location is shown on the attached "Site Location Plan, Figure No. 1". The cell site is located within a large residential lot (41+/- acres) that is wooded and undeveloped except for log cabin at the end of the current driveway. The northwest property line boarder the Housatonic State Forest which is owned and operated by the State of Connecticut. The cell site will be accessed from Bell Road by Bell Road Extension (existing gravel drive) and than by a proposed "very long" access drive that is steep in most areas. Surface relief at the proposed cell site ranges from elevation 800 at Bell Road to 1000 at the compound (Elevations are in feet and refer to the NGVD 29). The cell site is located near the top of a mountain ridge called "Mine Mountain"

PROJECT DESCRIPTION

The proposed project consists of the construction of a 110' monopole communications tower and the installation of new Verizon Wireless equipment.

SUBSURFACE EXPLORATION

Associated Borings Company, Inc. performed the subsurface exploration work on November 11, 2010. Locations of the subsurface exploration are shown on Figure No. 2 and logs have been included in Appendix A. The subsurface exploration program consisted of a total of one rock core boring and nine (9) bedrock verification probes (power drill soundings). All subsurface penetrations were conducted in the area of the proposed Verizon Wireless facilities and observed by personnel from **DET**. The proposed location of tower center, retaining walls and compound corners were staked out by the project surveyor.

The rock core boring was advanced to a depth of 19.5 feet below existing grade while the bedrock verification probes were advanced to refusal at possible bedrock which ranged between 0.5 and 3.0 feet below existing grades.

The rock cores were drilled using a standard NQ-2 size core bit resulting in the diameter core sample being ± 2". The coring was conducted using a standard double barrel core boring technique using water flushing. Rock probes (power drill soundings) were drilled using solid-stem auger techniques. Standard Penetration Tests (SPT) of the soils was not performed in Boring No. B1 due to the shallow depth to rock (≤3.5').

Logs of the probes and rock core boring are included in Appendix A. See attached photo of the Boring No. B1 coring process.

DET did not notice any non-typical visual and/or ordorous conditions from any of the auger probes and rock cores.

RESISTIVITY TESTING

In place soil resistivity testing was conducted by **DET** personnel on November 11, 2010 within the vicinity of the proposed tower facilities. Three (3) test sections were established in an approximate northeast-southwest direction and one (1) test section was established in an approximate northwest-southeast direction. Approximate test section locations are illustrated in Figure 2. Each section was tested up to an electrode "A" spacing of 40 feet. Test results yielded resistivity values within acceptable ranges for the given soil/rock types and moisture conditions typically found in the New England geology. It should be noted, however, that resistivity measurements are strongly influenced by local variations in surface conductivity caused by soil/rock weathering, soil/rock moisture content, soil temperature and rugged topography. Attempts were made (where possible) during field operations to minimize some of these effects on the test results. Results of the resistivity tests are summarized in Table No. 1 with detailed calculations shown in Appendix B.

LABORATORY TESTING

The laboratory testing program consisted of two (2) Gradation Analyses and five (5) Unconfined Compressive Strength of Intact Rock Core Samples. All tests were conducted in accordance with applicable ASTM standards. Laboratory test data is attached in Appendix C.

SUBSURFACE CONDITIONS

Based upon our review of the testing program, the site is covered with a very shallow layer of natural soil consisting of a leaf/organic litter layer underlain by a topsoil layer underlain by a silty subsoil layer underlain by silty glacial till. This soil generally consists of boulders, cobbles, gravel, sand, silt, clay in varying proportions underlain by bedrock. The topsoil, subsoil, and till layers varies from 0.5 to 3.0 feet deep in the areas tested. Very large boulders are also present in the area as observed by an "Erratic Boulder" located near the cell site (see attached photo of the large Erratic Boulder).

The bedrock surface at the site varies from "at-surface" to 3.0 feet below grade where tested. According to the "Bedrock Geological Map of Connecticut", by John Rodgers, the bedrock at the site is classified as either rusty mica schist and gneiss (dark-gray, rusty weathering schist and gneiss) or layered gneiss (gray, medium-grained, well-layered gneiss). A geologist was not retained to log the core samples obtained, so no determination of specific rock type was made. To assess the engineering properties of the bedrock, rock cores were conducted in Boring No. B1. The rock cores were reviewed by this writer to determine "Rock Quality Designation" (RQD). The RQD values were conducted to measure the rock core quality of fracture frequency. The results of RQD varied between 65 for fair quality of fractured rock to 83 for good quality fractured rock. The average of all RQD tests is 75. For specific results of RQD, see Appendix C. The bedrock quality classification varies from fair to good.

Uni-axial compressive strength of rock core samples were conducted on five (5) rock core samples with strengths ranging from 7,500 psi to 16,500 psi. The rock Strength Classification ranges from medium to high strength with average being of high strength. For specific compressive strength results, see Appendix C. An important item to note is that the drilling contractor had difficulties in coring the bedrock due to the quartzite located within the bedrock. The contractor polished (wore-out) two diamond bits during his coring process and drilling times were very long.

Groundwater was not observed in Boring No. B1 and in any of the probes. It should be noted, however, that groundwater levels vary depending upon season, precipitation and other conditions that may be different from those at the time of drilling.

GEOTECHNICAL DESIGN CONSIDERATIONS

Tower Foundation

It is recommended that the proposed monopole be supported on a spread footing (mat foundation) bearing on suitable, competent (sound) rock. For these foundations, an allowable bearing pressure of 10 tons per square foot is recommended for the design. These allowable loading pressures can be increased by $^1/_3$ for seismic or wind loading. Settlement of the tower should be negligible if founded directly on (sound) bedrock.

All proposed foundations **must** bear on competent (sound) level rock. The bottom of the excavation is to be carried down below fractured rock to obtain competent (sound) rock bearing that is level. If the Contractor over-excavates and/or over-blasts and competent (sound) rock is not obtained at the proposed bottom of foundation elevation, the Contractor shall excavate down to competent (sound) rock and remove all of the loose material and fill excavation to the proposed bottom of footing with 3,000 psi concrete (lean concrete). Minor irregularities in the rock may be filled with lean concrete to provide a level working surface.

Competent (Sound) Rock is defined as where no fragmentation is produced under rock that will not break down with the use of a single-tooth ripper on a D-8 Caterpillar Power Bulldozer or equal force.

All foundations that bear on sound bedrock shall have the following preparations (See Figure 3 for additional details):

⇒ Bedrock bearing surface shall be cleaned of any soil, loose rock fragments and any unsuitable bearing material. The bearing surface is to be air blown clean and/or swept clean.

⇒ Bedrock bearing surface shall be level. Level is defined as no steeper than 12H :1V.

As a result of the required seismic and wind loading, monopoles typically have portions of their foundation that undergo uplift and lateral loading. To address these issues, to resist this uplift and lateral loading, and to reduce the foundation size, **DET** recommends rock anchors. A pre-stress rock anchor system is to be used for design. A pre-stress rock anchor system is superior to the non-prestress system in that the prestressing of rock anchors minimizes foundation movement when stress is applied. Foundations are not allowed to move under constantly changing loading conditions. This will result in reducing the potential for long term fatigue of the rock anchor system.

The rock anchor system we recommend is the DYWIDAG System International or approval equal. DYWIDAG rock anchors are post-tensioned tendons installed in drilled holes for which at least the entire bond length is located in suitable rock. The anchor force is transmitted to the rock by bond between the grout body and the rock. The following information is for general consideration, but **DET** recommends that the design of these anchors should be a joint effort between **DET** (geotechnical engineer) and the structural engineer.

⇒ All rock anchors are to be designed in accordance with the publication entitled, *Recommendations For Prestressed Rock and Soil Anchors,* by Post-Tensioning Institute lasted edition.

⇒ The anchor bolt system shall be corrosion protection "Class 1" (double corrosion protection) unless others conduct an environmental study to determine the aggressivity of the host soil/rock system.

⇒ The load carrying capacity of each anchor is to be verified by load testing after installation and prior to being placed in service.

⇒ The anchor system is to be designed using permanent anchor design criteria.

⇒ The working bond stress along the interface between rock and grout to be used for design shall be 100 psi.

⇒ The rock anchor pull-out cone has an angle of 30° with the center of the anchor and total cone angle of 60°. The resulting rock anchor pull-out cone must be evaluated for global stability when single and/or multiple anchors are used. Use rock unit weight of 165 pcf to estimate the weight of bedrock engaged within a theoretical pull-out cone.

⇒ The point where the cone starts is taken at the midway distance of the bonded length.

Given the empirical nature of the design of these rock anchors, it is advisable that **DET** be retained to assist in the design of the rock anchor system.

Equipment Shelter

A spread footing is considered appropriate for the subsurface conditions at the proposed equipment shelter with the following foundation preparation requirements.

1. Remove all topsoil, subsoil, and till material down to bedrock. Remove bedrock and loose bedrock as required, to provide a level surface to construct the spread footing.
2. If bedrock is over-excavated, use compacted ½" size crushed stone to level area. Note: Crushed stone leveling course **can not** be used in the tower foundation construction.

With this foundation preparation requirements, use allowable bearing pressure of 2 tons per square foot for foundation design of the spread footing. Settlement of the spread footing will be negligible. The bottom of footing needs to be at least 42" below outside grades for frost protection.

EARTHQUAKE DESIGN (SEISMIC)

Seismic design requirements for the State of Connecticut are based on the Connecticut State Building Code, which incorporates the Seismic design Category approach from the International Building Code. The seismic design Category determination is based on a few category factors. One such category is the "Site Classification (soil type)". From our test boring, we consider that the site subsurface conditions match the General Description of "Rock". The site classification is therefore "B".

For transfer of ground shear into the natural soil/rock, the friction factor between the concrete and bedrock of 0.60 and concrete and soil 0.45.

The proposed foundation is to bear on sound bedrock. This sound bedrock will not liquefy during a seismic event and needs not be addressed in the foundation design.

The writer is not aware of any known "active" bedrock fault in the area of the proposed structure.

Passive earth pressure is not typically used in resisting sliding of structures due to the potential of this earthen material being removed in the future. If this material can be guaranteed to remain in place for the life of the structure, the following design parameters can be used for design:

⇒ Dry unit weight of gravel backfill soil should be 125 pound per cubic foot (pcf).
Ultimate passive earth pressure coefficient (K_p = 3.0)

⇒ A factor of safety of 3 is to be used in the design to obtain "allowable" passive pressure from ultimate passive pressure.

Compound Retaining Walls (lateral earth pressures)

Retaining walls should be designed to accommodate the lateral forces resulting from earth pressures and proposed surcharge loading. Backfill material behind retaining walls should consist of compacted Gravel Backfill (see Gravel Backfill requirements in this report). It is recommended that earth pressures for a pre-engineered retaining wall with level backfill be based in a lateral earth pressure corresponding to an equivalent fluid weight of backfill equal to 40 PCF. Walls with sloping backfill (up to 3:1) should be designed utilizing 45 PCF equivalent fluid weight. For walls with sloping backfill from 3:1 to 2:1 should be designed utilizing 55 PCF equivalent fluid weight. Surcharge loading applied to the upper side of the wall should be designed for an intensity equal to 0.4 times the surcharge loading. This load is to be distributed uniformly over the height of wall. The wall should be proportioned to provide a factor of safety against sliding of 1.5 and overturning equal to at least 2.0. Passive earth pressure resistance should be neglected. A coefficient of friction between concrete footing and bearing soil of 0.45 should be used.

The above earth pressure values do not include hydrostatic water pressures. These pressures can be as much as or greater than the earth pressures if the drainage system behind the retaining walls are not properly designed and implemented. The retaining wall is required to be backfilled with free-draining fill (Gravel Backfill) and have a drainage system installed (i.e., crushed stone blanket drain, geo-composite drain).

Excessive compaction of backfill behind the retaining walls tends to increase horizontal pressures beyond that of active pressures. Lightweight compaction equipment should be used to compact the backfill material within 10 feet of the wall. Backfill placement requirements shall be as indicated in the Geotechnical Construction Consideration section of this report.

For footing design considerations, we recommend the following:

⇒ Bottom of foundation (footing) shall be a minimum of 42" below grade on low side of wall.
⇒ The foundation (footing) shall be on a level surface. Bedrock removal will be required to obtain a level surface for the proposed footings.
⇒ Contractor to brace or slope back excavation to those specified in OSHA Health and Safety Standards for Excavation, 29 CFR Part 1926.
⇒ Remove all topsoil, subsoil, and till material down to bedrock. Remove bedrock and loose bedrock as required, to provide a level surface to construct the spread footing.
⇒ If bedrock is over-excavated, use compacted ½" size crushed stone to level area.
⇒ Provided that the foundations are prepared as recommended above, a maximum net allowable soil bearing of 2 tons per square foot (tsf) may by used to size the spread footings foundation. The net pressure is the pressure in excess of the minimum surrounding overburden pressure.

GEOTECHNICAL CONSTRUCTION CONSIDERATIONS

General

This section provides comments related to foundation construction and other geotechnical aspects of the project. It will aid personnel responsible for preparation of Contract Plans and Specifications and those involved with the actual construction and construction monitoring. The contractor must evaluate potential construction problems on the basis of his own knowledge and experience in the area and on the basis of similar projects in other localities, taking into consideration his own proposed construction methods and procedures.

Erosion Control

Erosion sedimentation control of the disturbed areas will be a construction issue requiring careful attention. The existing soils at the site are susceptible to erosion and are on very steep slopes. All construction methods in grading the site and implementing the erosion control measures shall be in accordance with recommendations as found in the DEP Bulletin No. 34 "2002 Connecticut Guidelines for Soil Erosion and Sediment Control", current edition.

Excavation

Materials to be excavated are expected to be mostly topsoil, subsoil, till, boulders, and bedrock, hence excavation is expected to be very difficult when excavating boulders and bedrock. Bedrock is at or just below the surface (0.5'-3.0' below ground surface based upon probes) so most excavations will be within the bedrock. This will be a major site issue for the contractor. It is anticipated that blasting will be required for rock excavation. Controlled blasting procedures are recommended. Blasting specifications should limit blast vibrations, air blast overpressure, and provide criteria for perimeter control. As an alternative to blasting, methods such as, hydraulic impact and hydraulic splitting have a track record of reducing vibration and air blast. Pre and post construction surveys of the surrounding structure should be performed to minimize damage claims.

In the compound development, if filling is required to construct the development, the embankment material shall be clean compacted granular fill. Embankment fill slopes should generally be no steeper than an inclination of 2(H):1(V).

Dewatering/Groundwater

Normal groundwater levels are expected to be at or below the proposed excavation at the soil/bedrock interface. Therefore, dewatering is expected to be limited to pumping of surface runoff, precipitation that enters the excavation, and localized groundwater. It is anticipated that dewatering will be performed by localized sump techniques.

Materials

Gravel Backfill is material used to backfill the foundation and is to be obtained from off-site borrow sources. This material shall consist of inert material that is hard, durable stone and coarse stone, free from loam and clay, surface coatings and deleterious materials. These materials shall conform to the following gradation requirements:

Sieve Size	Percent Finer by Weight
1-1 1/2"	100
¾"	45 – 80
¼"	25 – 60
No. 10	15 – 45
No. 40	5 – 25
No. 100	0 – 10
No. 200	0 – 5

Placement and Compaction of Foundation Backfill

A. All backfill materials shall be placed in horizontal layers not exceeding 6". Each layer shall be spread evenly and thoroughly blade mixed during spreading to ensure uniformity of material in each layer. Each layer shall be evenly compacted with an approved hand operated compactor, making a minimum of at least five (5) passes.

B. In no case shall fill be placed over frozen material or snow. No fill material shall be placed, spread, or compacted during unfavorable weather conditions where soil moisture precludes achievement of the specified compaction. When the work is interrupted by heavy rains or snow, fill operations shall not be resumed until the moisture content and the density of the previously placed fill are as specified.

C. Gravel fill shall be compacted in individual layers (not exceeding 6") to 95% maximum dry density using ASTM D1557.

LIMITATIONS

Explorations

The analysis and recommendations submitted in this report are based in part upon the data obtained from a limited number of widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction excavation. If variations then appear evident, it will be necessary to re-evaluate the recommendations of this report at that time.

The soil profiles described and shown in this report are generalized and are intended to convey trends in subsurface conditions. The boundaries between strata and bedrock are approximate and generalized. They have been developed by data that is limited in number and widely spaced.

Water level readings have been observed in the drill hole at times and under conditions stated on the boring log and in this report. This data has been reviewed, analyzed, and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, time of the year and other factors not evident at the time measurements were taken.

Designer Review

In the event that any changes in the design or location of the monopole or proposed site development, the conclusions and recommendations contained in this report shall not be considered valid unless these changes are reviewed by this office and conclusions of this report modified.

Construction

It is recommended that Design Earth Technology retained to provide geotechnical field monitoring services based on familiarity with the subsurface conditions, design concepts and specifications, technical expertise, and experience in monitoring of site development construction.

Use of This Report

This report has been prepared for specific application and use of the proposed Verizon Wireless Tower to be located off of Bell Road Extension, Cornwall, Connecticut and is in accordance with generally accepted soil and foundation engineering practices. No other warranty expressed or implied is made.

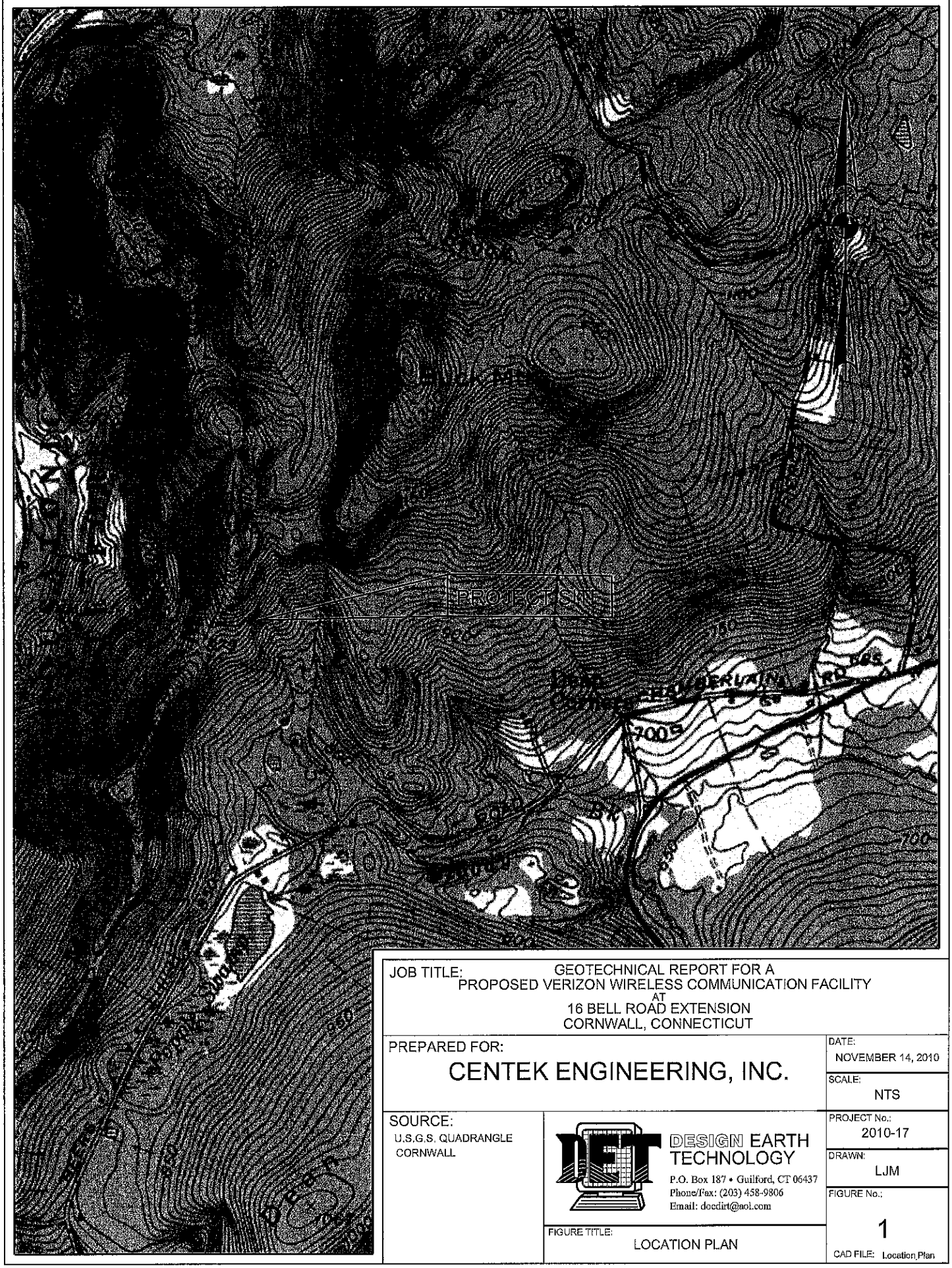
If you have any questions regarding the above information, please call.

Sincerely,

DESIGN EARTH TECHNOLOGY

Lawrence J. Marcik, Jr., P.E.

FIGURES



JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATION FACILITY AT 16 BELL ROAD EXTENSION CORNWALL, CONNECTICUT

PREPARED FOR:

CENTEK ENGINEERING, INC.

DATE: NOVEMBER 14, 2010

SCALE: NTS

SOURCE:
U.S.G.S. QUADRANGLE
CORNWALL

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: docdirt@aol.com

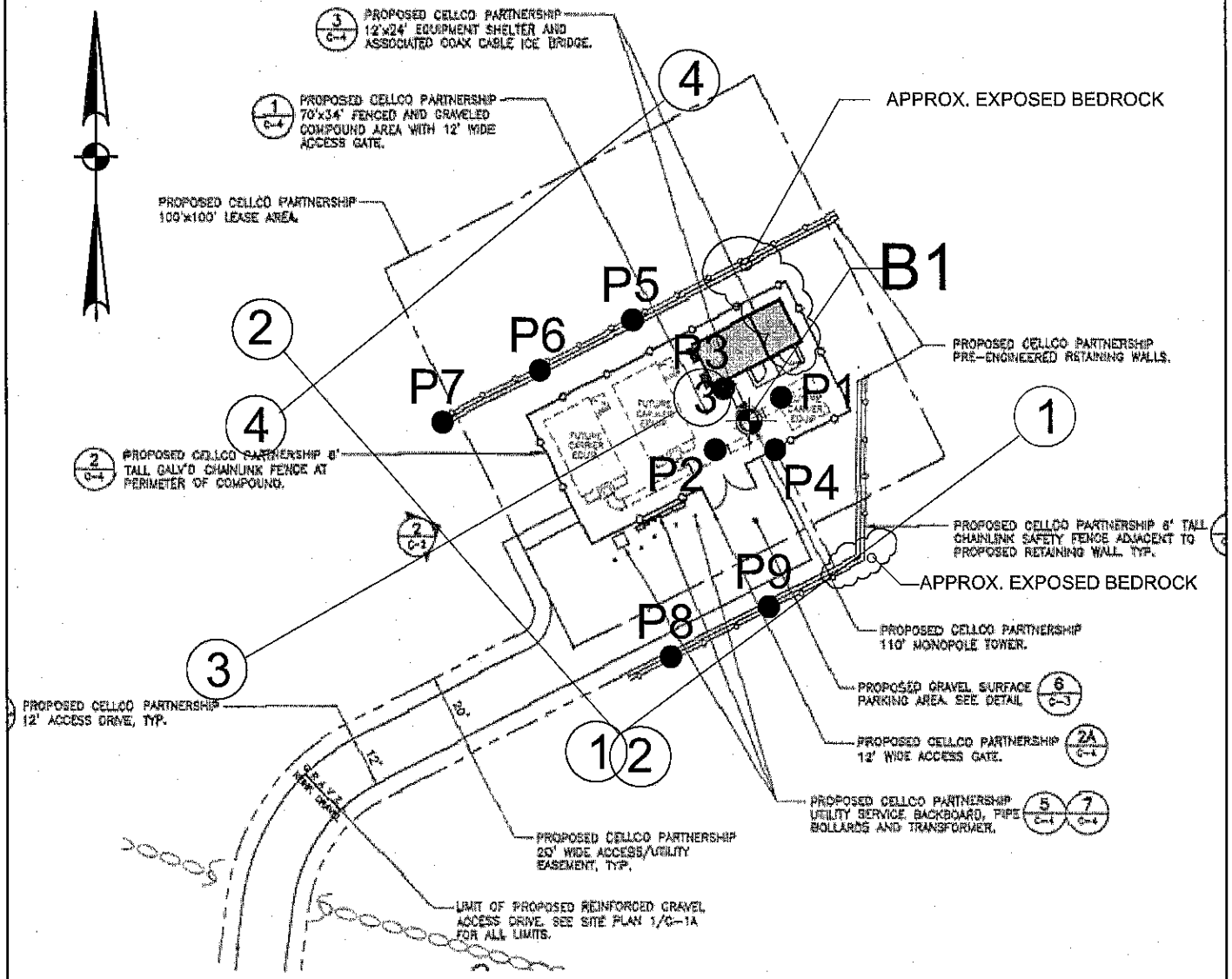
PROJECT No.: 2010-17

DRAWN: LJM

FIGURE No.: 1

FIGURE TITLE: LOCATION PLAN

CAD FILE: Location Plan



LEGEND

P6 — TYPICAL PROBE

B1 — TYPICAL BORING

1 — SECTION NUMBER

JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATION FACILITY AT 16 BELL ROAD EXTENSION CORNWALL, CONNECTICUT

PREPARED FOR: CENTEK ENGINEERING, INC

DATE: NOVEMBER 14, 2010

SCALE: 1" = 40' +/-

PROJECT No.: 2010-17

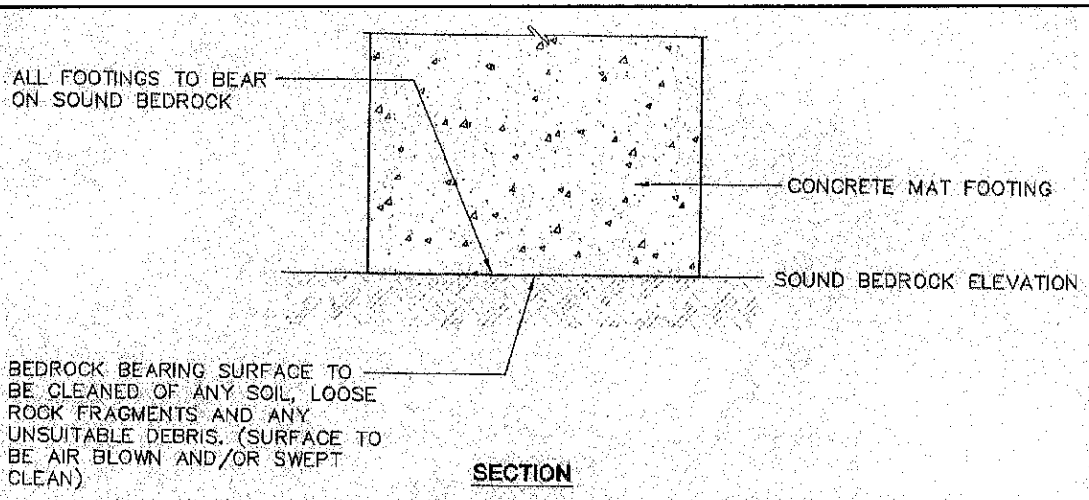
DRAWN: LJM

FIGURE No.: 2

CAD FILE: Figures

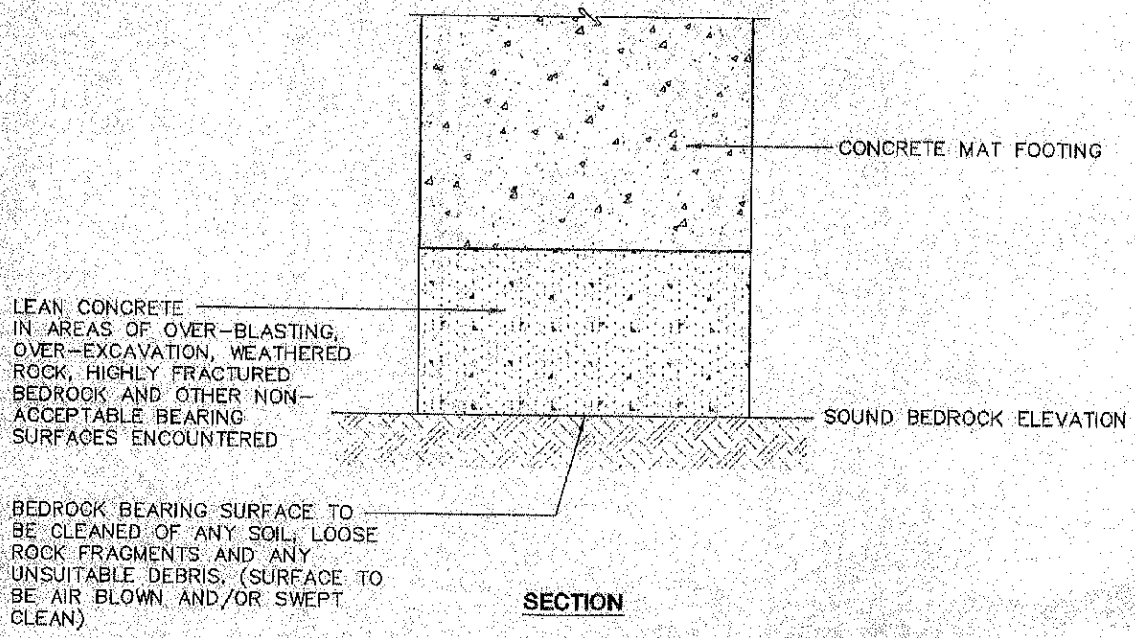
DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: doedirt@aol.com

FIGURE TITLE: SKETCH OF LOCATIONS OF SUBSURFACE EXPLORATIONS



FOUNDATION BEARING SURFACE PREPARATION AT DESIGNED ELEVATIONS

NOT TO SCALE



FOUNDATION BEARING SURFACE PREPARATION WHERE SOUND BEDROCK IS LOWER THAN DESIGNED ELEVATION

NOT TO SCALE

JOB TITLE: GEOTECHNICAL REPORT FOR A PROPOSED VERIZON WIRELESS COMMUNICATION FACILITY AT 16 BELL ROAD EXTENSION CORNWALL, CONNECTICUT

PREPARED FOR: CENTEK ENGINEERING, INC

DATE: NOVEMBER 14, 2010

SCALE: NTS

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: doedirt@aol.com

PROJECT No.: 2010-17

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FIGURE No.: 3

FIGURE TITLE: FOUNDATION DETAILS

CAD FILE: Figures

TABLES

TABLE 1

PROPOSED VERIZON WIRELESS TOWER
BELL ROAD EXTENSION
CORNWALL, CT

IN-SITU SOIL RESISTIVITY RESULTS[1]

ELECTRODE SPACING (ft)	Section No. 1	2	3	4
5	415,555	208,735	77,749	503,645
10	341,444	80,238	4,347	436,620
20	486,793	6,633	4,083	181,542
30	349,296	5,710	5,094	99,733
40	36,615	8,319	16,775	109,461

NOTES:
1. Resistivity values indicated are in OHM-CM
2. [1]Test completed using Wenner Four Probe Method with a Det 2/2 Auto Earth Tester as manufactured by Avo, Inc.
3. The tests were performed on irregular ground surface. This condition may affect test results.

APPENDICES

APPENDIX A

Jaime Lloret	**TEST BORING REPORT**		SHEET 1 OF 1
DRILLER	**ASSOCIATED BORINGS CO., INC.**		
Larry Marcik, Jr.	**119 MARGARET CIRCLE, NAUGATUCK, CT 06770**		CME-45B
INSPECTOR	**Tel (203) 729-5435 Fax (203) 729-5116**		DRILLING EQUIPMENT
	PROJECT NAME: 16 Bell Road Extension		Design Earth Technology
SOILS ENGINEER	PROJECT NUMBER: Cell Tower		CLIENT
Surface Elevation:	LOCATION: Cornwall, Connecticut		

Date Started: 11/11/2010		Auger	Casing	Sampler	Core Bar	Hole No. **B-1**
Date Finished: 11/11/2010	Type	HSA		SS	NQ-2	Line & Station
Groundwater Observations	Size I. D.	3 1/4 in		2 in		Offset
AT 3.5 ' AFTER 0 HRS	Hammer			140 lb	Bit	N Coordinate
AT ' AFTER HRS	Fall			30 in		E. Coordinate

DEPTH	Casing blows per foot	SAMPLE DEPTH IN FEET FROM - TO	SAMPLE NO.	PEN. INCH	REC. INCH	SAMPLE TYPE	BLOWS PER 6 INCHES ON SAMPLER 0 - 6	6 - 12	12-18	18-24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											8"	Topsoil
												Br. M-F Sand, Little Silt
		3.5 - 8.5	1	60	54	C					3.5	
												Cored Run # 1
5												From 3.5 feet to 8.5 feet
												Recovery - 54"
												RQD = 39/60 = 65%
		8.5 - 13.5	2	60	60	C					8.5	
												Cored Run # 2
10												From 8.5 feet to 13.5 feet
												Recovery - 60"
												RQD = 47/60= 78%
		13.5 - 18.5	3	60	48	C					13.5	
												Cored Run #3
15												From 13.5 feet to 18.5 feet
												Recovery - 48"
												RQD = 44/60 = 73%
		18.5 - 19.5	4	12	10	C					18.5	
												Cored Run # 4
20												From - 18.5 feet to 19.5
												Recovery - 10"
											19.5	RQD = 10/12 = 83%
												End of Boring - 19.5
25												
												BORING TERMINATED DUE TO
												BEDROCK BEING TO HARD TO CORE
												BECAUSE OF QUARTZITE TWO DIAMONDS
												WERE POLISHED.
30												
35												
40												

From Ground Surface to Feet Used Inch Casing Then Inch Casing For Feet

Footage in Earth 3.5 Footage in Rock 16.0 No. of Samples 0 Hole No. **B-1**

SAMPLE TYPE CODING: D = DRIVEN C = CORE A = AUGER UP = UNDISTURBED PISTON

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

Jaime Lloret DRILLER Larry Marcik, Jr. INSPECTOR DATE; 11/11/2010	**TEST BORING REPORT** **ASSOCIATED BORINGS CO., INC.** **119 MARGARET CIRCLE, NAUGATUCK, CT 06770** **Tel (203) 729-5435 Fax (203) 729-5116** PROJECT NAME: 16 Bell Street Extension PROJECT NUMBER: Cell Tower LOCATION: Cornwall, Connecticut	SHEET 1 OF 1 CME-45B DRILLING EQUIPMENT Design Earth Technology CLIENT

POWER DRILL SOUNDING REPORT

Station	Offset	Elev	Probe #	From	To	Remarks: Soil Encountered, Groundwater Depth, Refusal Etc.
			P-1	0.0	8"	Topsoil
				8"	2.0	Soil
						Refusal - 2.0 G.W.O. - None
			P-2	0.0	8"	Topsoil
				8"	3.0	Soil
						Refusal - 3.0 G.W.O. - None
			P-3	0.0	8"	Topsoil
				8"	2.5	Soil
						Refusal - 2.5 G.W.O. - None
			P-4	0.0	8"	Topsoil
				8"	0.5	Soil
						Refusal - 0.5 G.W.O. - None
			P-5	0.0	8"	Topsoil
				8"	3.0	Soil
						Refusal - 3.0 G.W.O. - None
			P-6	0.0	8"	Topsoil
				8"	2.0	Soil
						Refusal - 2.0 G.W.O. - None
			P-7	0.0	8"	Topsoil
				8"	3.0	Soil
						Refusal - 3.0 G.W.O. - None
			P-8	0.0	8"	Topsoil
				8"	2.0	Soil
						Refusal - 2.0 G.W.O. - None
			P-9	0.0	8"	Topsoil
				8"	3.0	Soil
						Refusal - 3.0 G.W.O. - None

PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

APPENDIX B

RESISTIVITY DATA

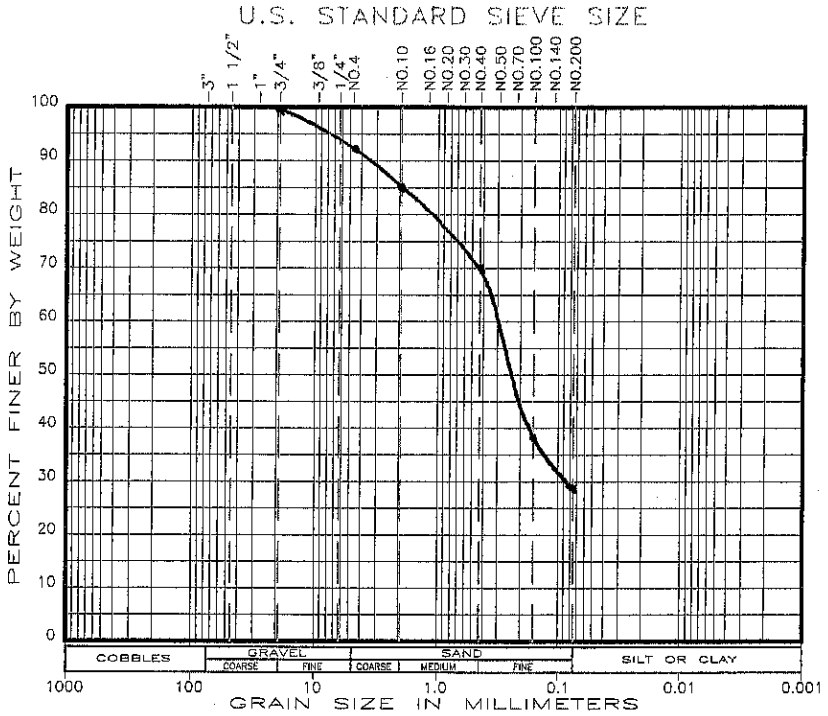
SITE: Cornwall, Connecticut
DATE: November 11, 2010
SIGNATURE:

A=(FT)	5	10	20	30	40
FORMULA □ = (OHM-CM)	**957.5*R**	**1915*R**	**3830*R**	**5745*R**	**7660*R**
AREA 1 MEASURED R (OHM)	434.0	178.3	127.1	60.8	4.78
AREA 1 CALCULATED (OHM-CM)	415,555	341,444	486,793	349,296	36,615
AREA 2 MEASURED R (OHM)	218.0	41.9	1.732	0.994	1.086
AREA 2 CALCULATED (OHM-CM)	208,735	80,238	6,633	5,710	8,319
AREA 3 MEASURED R (OHM)	81.2	2.27	1.066	1.026	2.190
AREA 3 CALCULATED (OHM-CM)	77,749	4,347	4,083	5,094	16,775
AREA 4 MEASURED R (OHM)	526.0	228.0	47.4	17.36	14.29
AREA 4 CALCULATED (OHM-CM)	503,645	436,620	181,542	99,733	109,461

Notes: 1. Ground surface was very irregular (very steep slopes)

APPENDIX C

REPORT OF GRADATION ANALYSIS



PROBE NO. 1	SAMPLE NO. 1
ORIGIN OF MATERIAL: Auger Grab Sample	
VISUAL CLASSIFICATION: Medium to Fine Sand, Trace Coarse Sand, Trace Fine Gravel, Some Silt/Clay	
PROPOSED USE: Existing On-Site Soil	
ASTM METHOD USED: D422	
DEVIATION FROM ASTM METHOD:	
DESCRIPTION OF SAMPLING PROCEDURE USED: Random on Auger flights	
DESCRIPTION OF ANY MEASUREMENT UNCERTAINTY: NONE	
REMARKS: 1. Depth of sample about 1 to 2 feet	

SIEVE SIZE	% PASSING
¾"	100
No. 4	92
No. 10	85
No. 40	70
No. 100	38
No. 200	29

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: doedirt@aol.com

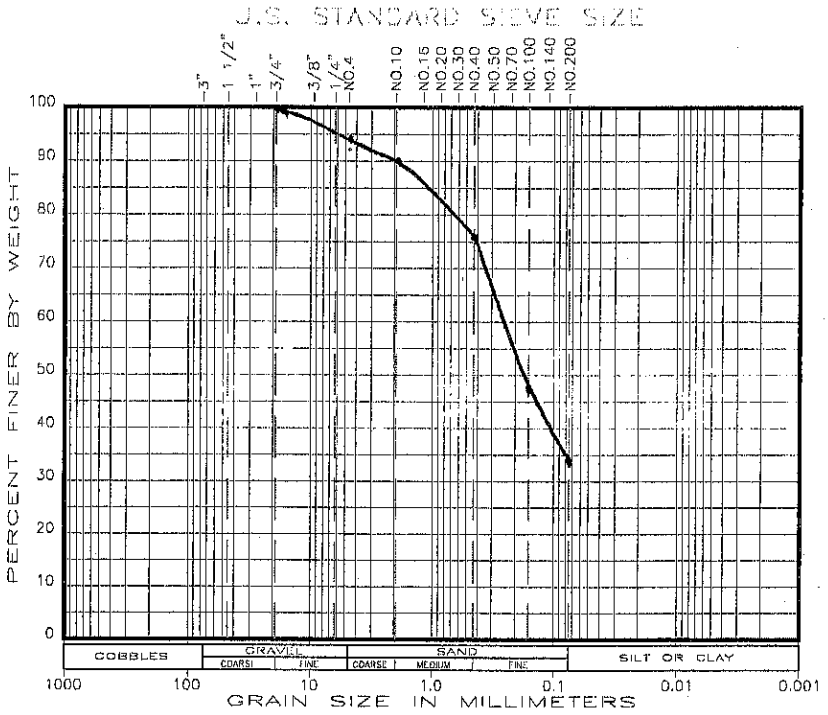
RESPECTFULLY SUBMITTED,

STATE OF CONNECTICUT · LAWRENCE J. MARCIK, JR. · No. 15265 · LICENSED PROFESSIONAL ENGINEER

Lawrence J. Marcik, Jr., P.E.
DESIGN EARTH TECHNOLOGY

Date: November 14, 2010	Project No.: 2010-17
Test By: LJM, Jr.	Checked By: LJM, Jr.
Project: Proposed Verizon Wireless Communications	
Tower at 16 Bell Road Extension	
Cornwall, Connecticut	
Prepared For: Centek Engineering, Inc.	
GA-1	

REPORT OF GRADATION ANALYSIS

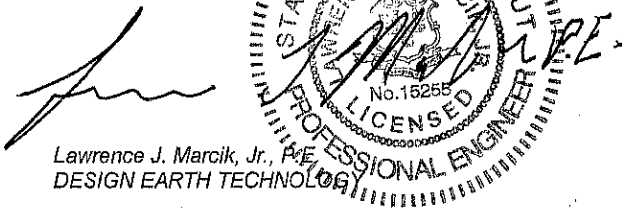


PROBE NO. 2	SAMPLE NO. 1
ORIGIN OF MATERIAL: Auger Grab Sample	
VISUAL CLASSIFICATION: Medium to Fine Sand, Trace Coarse Sand, Trace Fine Gravel, Some Silt/Clay	
PROPOSED USE: Existing On-Site Soil	
ASTM METHOD USED: D422	
DEVIATION FROM ASTM METHOD:	
DESCRIPTION OF SAMPLING PROCEDURE USED: Random on Auger flights	
DESCRIPTION OF ANY MEASUREMENT UNCERTAINTY: NONE	
REMARKS: 1. Depth of sample about 2 to 3 feet	

SIEVE SIZE	% PASSING
¾"	100
No. 4	94
No. 10	90
No. 40	76
No. 100	47
No. 200	34

DESIGN EARTH TECHNOLOGY
P.O. Box 187 • Guilford, CT 06437
Phone/Fax: (203) 458-9806
Email: dedirt@aol.com

RESPECTFULLY SUBMITTED,



Lawrence J. Marcik, Jr., P.E.
DESIGN EARTH TECHNOLOGY

Date: November 14, 2010	Project No.: 2010-17
Test By: LJM, Jr.	Checked By: LJM, Jr.
Project: Proposed Verizon Wireless Communications Tower at 16 Bell Road Extension Cornwall, Connecticut	
Prepared For: Centek Engineering, Inc.	
	GA-2

ROCK QUANTITY DESIGNATION

SUMMARY REPORT

PROJECT: Proposed Verizon Wireless Tower, Cornwall, Ct.
DET PROJECT NO.: 2010.17
MEASUREMENTS CONDUCTED BY: Lawrence J. Marcik, Jr., P.E.

BORING IDENTIFICATIONS AND CORE RUN DEPTH (ft)	CORE RUN LENGTH (in)	CORE RECOVERY LENGTH And % (in/%)	RQD (%)
B-1 Run #1 3.5' – 8.5'	60"	54/90	65
B-1 Run #2 8.5' – 13.5'	60"	60/100	78
B-1 Run #3 13.5' – 18.5'	60"	48/80	73
B-1 Run #4 18.5' – 19.5'	12"	10/83	83

UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMENS

SUMMARY REPORT

PROJECT: Proposed Verizon Wireless, Lane Street
Cornwall, Connecticut

DET PROJECT NO.: 2010.17
DATE OF TEST: November 16, 2010
ROCK TYPE: Metamorphic Rock
TEST CONDUCTED BY: Lawrence J. Marcik, Jr., P.E.

CORE IDENTIFICATION	LOCATION OF SAMPLE	CORE DIAMETER (in.)	LENGTH OF CORE (in.)	COMPRESSIVE STRENGTH (psi)	TYPE OF FRACTURE
A	B-1, Run #1 Depth ±4'	1.87	4.5	16,500	Columnar
B	B-1, Run #1 Depth ±8'	1.87	3.75	14,500	Columnar
C	B-1, Run #2 Depth ±9'	1.87	3.75	12,000	Columnar
D	B-1, Run #3 Depth ±14'	1.87	4.25	13,000	Columnar
E	B-1, Run #4 Depth ±19.5'	1.87	4.25	7,500	Shear

PHOTOGRAPHS

PHOTOGRAPHS

BEDROCK CORING AT PROPOSED TOWER FOUNDATION

ERRATIC BOULDER NEAR THE PROPOSED CELL SITE

MOUNT ANALYSIS REPORT

For

SITE NAME: CORNWALL CT
16 BELL ROAD EXT.
CORNWALL, CT 06754
41°50'44.8"N, 73°21'51.5"W

PREPARED FOR:

verizon

WIRELESS COMMUNICATIONS FACILITY
20 ALEXANDER DRIVE
WALLINGFORD, CT 06492

On Air Engineering, LLC
88 FOUNDRY POND ROAD
COLD SPRING, NY 10516
ONAIR@OPTONLINE.NET
201-456-4624

Prepared By:

KM CONSULTING ENGINEERS, INC.

262 Upper Ferry Road, Ewing, NJ 08628
Ph: (609) 538-0400 www.kmengr.com

KM Project No. 210602.00

Date: June 17, 2021

Michael L. Bohlinger, PE
Connecticut Professional Engineer
License No. 20405

On Air Engineering, LLC
Cornwall CT

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

Structure Blue Sky Towers CT-5001

Location: 16 Bell Road Ext.
Cornwall, CT 06754
41°50’44.8”N, 73°21’51.5”W

Manufacturer:

Equipment

Existing inventory plus the proposed installation are detailed below.

Proposed Verizon Installation:

Final loading per sector listed (Alpha/Beta/Gamma):

Proposed Equipment:

(1) Samsung MT6407-77A integrated panel antenna

Existing Equipment to Remain:

(2) NHH-45C-R2B panel antennas (installed on dual antenna mount)
(1) B2/B66A RRH-BR049 (RFV01U-D1A)
(1) B5/B13 RRH-BR04C (RFV01U-D2A)
(1) BSAMNT-SBS-2-3 dual antenna mount
(1) Raycap DB-C1-12C-24AB-0Z OVP (1 total overall)

Existing Equipment to be Removed:

(None)

1.0 EXECUTIVE SUMMARY

Site Design Parameters

Structure Class: II
Exposure Category: B
Basic Wind Speed for Antennas: 89 mph
Antenna Centerline Height: 110’ AGL
Basic Wind Speed with Ice: 40 mph
Design Ice Thickness: 0.75”

The basic wind speed for the antennas is taken from Appendix N in the 2018 Connecticut State Building Code for the nominal design wind speed for the municipality of Cornwall, CT, and used as the basic wind speed with no ice per the ANSI/TIA-222-G design standard. The basic wind speed concurrent with the design ice thickness is in accordance with the ANSI/TIA-222-G design standard.

Synopsis

The proposed and existing Verizon equipment listed will be installed on the existing monopole frame mount. The monopole frame mount is from the manufacturer Site Pro 1, model no. RMQP-4096-HK, based on information provided by the client. A RISA-3D model of the mount structure was obtained from the manufacturer and subsequently analyzed for the proposed Verizon loading. From the analysis the existing mount structure has sufficient capacity with a rating of 28.2% and therefore meets the current ANSI/TIA-222-G standards and is acceptable for the proposed Verizon loading.

2.0 ANALYSIS PROCEDURE

Our scope of work is to determine if the existing structure and existing Verizon mounts are capable of withstanding the additional stresses/forces imposed by the installation of the proposed equipment.

Existing antenna mount details and existing and proposed equipment inventory were based on a previous mount analysis by Paul J. Ford & Company dated 5/28/20 and design exhibit drawings by On Air Engineering, LLC dated 5/28/21. The structural model of the mount structure was obtained from mount manufacturer, Site Pro 1 (model no. RMQP-4096-HK taken from the previous mount analysis). Recent photographs of the installation were provided by the client for review.

The following report will provide analytical calculations and commentary regarding the capacity of the existing mount structure and subsequent recommendations. The existing antenna mount structure was analyzed using RISA-3D, a comprehensive structural analysis program. The loads inputted into the program are calculated separately based on the requirements of the codes referenced below. The structural review is based on the site-specific condition noted and considering the requirements of the codes listed below. For clarity, this review shall include worst case loadings.

Codes and Standards

2018 Connecticut State Building Code

ASCE - American Society of Civil Engineers - ASCE/SEI 7-10 *Minimum Design Loads for Buildings and Other Structures*, 2010

TIA - Telecommunications Industry Association - ANSI/TIA-222-G-4 *Structural Standard for Antenna Supporting Structures and Antennas*, 2014

AISC - American Institute of Steel Construction - *Manual of Steel Construction, 14th Edition* (AISC 360-10), 2011

3.0 ANALYSIS RESULTS

The site was analyzed for the existing and proposed Verizon inventory and site design parameters detailed in Section 1.0 and checked using the appropriate design codes and standards given in Section 2.0.

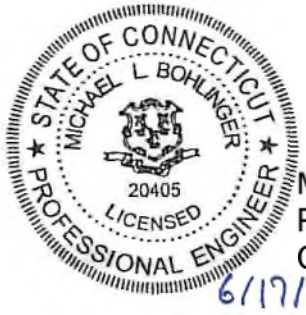
Further to our calculations, the existing mount is acceptable for the proposed Verizon loading. The existing mount structure has sufficient capacity for the proposed loading with a rating of 28.2% and therefore meets the current ANSI/TIA-222-G standards.

Please do not hesitate to contact our office with any questions or concerns regarding this report.

Sincerely,
KM CONSULTING ENGINEERS, INC

Domenic Aversa, PE
Project Manager

Reviewed and Approved by:



Michael L. Bohlinger, PE
Principal
CT License #20405

4.0 APPENDIX

KM Consulting Engineers, Inc.
262 Upper Ferry Road
Ewing, NJ 08628

Tel.: (609) 538-0400
www.kmengr.com

Cornwall CT
16 Bell Road Ext.
Cornwall, CT 06754

Index

Design Criteria: 2018 Connecticut State Building Code
ANSI/TIA-222-G
AISC Steel Construction Manual

Assumptions: Proposed and existing loading was obtained from design exhibit drawings by On Air Engineering, LLC dated 5/28/21. All members are assumed to be in good working condition.

KM Consulting Engineers, Inc.
262 Upper Ferry Road
Ewing, NJ 08628

Tel.: (609) 538-0400
www.kmengr.com

Purpose:

Purposed of this analysis is to evaluate the structural capacity of the existing mounting frame on the monopole structure at 16 Bell Road Ext., Cornwall, CT for the proposed carrier loading for Verizon Wireless.

Site Details:

Wind Speed:	$V := 89\ \text{mph}$	(wind speed as per 2018 CSBC)
	$V_{ice} := 40\ \text{mph}$	
Antenna Centerline Height:	$z_a := 110\ \text{ft}$	
Exposure B:	$z_g := 1200\ \text{ft}$	$\alpha := 7.0$
Structure Class II:	$I_{wind} := 1.00$	$I_{ice} := 1.00$
Design Ice Thickness:	$t_i := 0.75\ \text{in}$	

Wind Pressure Calculations:

$$q_z = 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I$$

$$F_A = q_z\ G_h\ \left(EPA_A\right)$$

$$K_z := 2.01\ \left(\frac{z_a}{z_g}\right)^{\frac{2}{\alpha}} = 1.02$$

$$G_h := 1.10$$

$$K_d := 0.95$$

$$K_{zt} := 1.0$$

$$q_z := 0.00256\ K_z\ K_{zt}\ K_d\ V^2\ I_{wind}\ \frac{\text{psf}}{\text{mph}^2} = 19.6\ \text{psf}$$

$$q_{z\_i} := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V_{ice}{}^2 \cdot I_{ice} \cdot \frac{\text{psf}}{\text{mph}^2} = 3.95\ \text{psf}$$

Antenna & Mount Details:		Weight:
Samsung MT6407-77A antenna:	$h_{A1} := 35.1\ \text{in}$ $w_{A1} := 16.1\ \text{in}$ $d_{A1} := 5.5\ \text{in}$	$W_{A1} := 87.1\ \text{lbf} + 15\ \text{lbf} = 102.1\ \text{lbf}$
CommScope NHH-45C-R2B:	$h_{A2} := 95.9\ \text{in}$ $w_{A2} := 18.0\ \text{in}$ $d_{A2} := 7.0\ \text{in}$	$W_{A2} := 87.1\ \text{lbf} + 23.6\ \text{lbf} = 110.7\ \text{lbf}$
Samsung B2/B66A RRH-BR049 (RFV01U-D1A):	$h_{A3} := 15\ \text{in}$ $w_{A3} := 15\ \text{in}$ $d_{A3} := 10\ \text{in}$	$W_{A3} := 97.5\ \text{lbf}$
Samsung B5/B13 RRH-BR04C (RFV01U-D2A):	$h_{A4} := 15\ \text{in}$ $w_{A4} := 15\ \text{in}$ $d_{A4} := 8.1\ \text{in}$	$W_{A4} := 82\ \text{lbf}$
Raycap DB-C1-12C-24AB-0Z:	$h_{A5} := 27\ \text{in}$ $w_{A5} := 16.5\ \text{in}$ $d_{A5} := 12.6\ \text{in}$	$W_{A5} := 32\ \text{lbf} + 7.5\ \text{lbf} = 39.5\ \text{lbf}$
CommScope BSAMNT-SBS-2-3 antenna mount:		$W_{A7} := 110\ \text{lbf}$
3" nom. sched. 40 pipe mounts:	$l_{m1} := 12.5\ \text{ft}$ $d_{m1} := 3.50\ \text{in}$	
2" nom. sched. 40 pipe mounts:	$l_{m2} := 12.5\ \text{ft}$ $d_{m2} := 2.38\ \text{in}$	
2.5" nom. sched. 40 pipe mounts:	$h_{m3} := 8\ \text{ft}$ $d_{m3} := 2.88\ \text{in}$	
HSS4x4x1/4 members:	$h_{m4} := 4\ \text{in}$ $w_{m4} := 4\ \text{in}$	
2L2.5x2.5x1/2 members:	$h_{m5} := 2.5\ \text{in}$ $w_{m5} := 5.25\ \text{in}$	
L2x2x3/16 members:	$h_{m6} := 2\ \text{in}$ $w_{m6} := 2\ \text{in}$	
L2.5x2.5x1/4 members:	$h_{m7} := 2.5\ \text{in}$ $w_{m7} := 2.5\ \text{in}$	

Mounting Frame Wind Force Calculations:

$F_A = q_z\ G_h\ (EPA_A)$

$EPA_A = K_a\ \sum C_a\ A_A$ $\quad K_a := 1.0$

$EPA_{MN} = C_{as}\ (A_f + R_{rf}\ A_r)$

$C_{as} = 1.58 + 1.05\ (0.6 - \varepsilon)^{1.8}$ $\quad \varepsilon \le 0.6$

$A_f := 0\ \text{ft}^2$ $\quad A_r := l_{m1} \cdot d_{m1} + l_{m2} \cdot d_{m2} = 6.13\ \text{ft}^2$

$\varepsilon := \dfrac{A_r}{l_{m1} \cdot 3.5\ \text{ft}} = 0.140$

$C_{as} := 1.58 + 1.05\ (0.6 - \varepsilon)^{1.8} = 1.84$

$R_{rf} := 0.6 + 0.4\ \varepsilon^2 = 0.61$

$0.75\ C_{as}\ R_{rf} = 0.84$

3" nom. pipe mounts:

$C_{a\_1mN} := 0.75\ C_{as}\ R_{rf} = 0.84$ $\quad f_{m1\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_1mN}\ d_{m1} = 5.3\ \text{plf}$

2" nom. pipe mounts:

$C_{a\_2mN} := 0.75\ C_{as}\ R_{rf} = 0.84$ $\quad f_{m2\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_2mN}\ d_{m2} = 3.6\ \text{plf}$

HSS4x4x1/4 members:

$C_{a\_4mT} := 1.0$ $\quad f_{m4\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_4mT}\ h_{m4} = 7.2\ \text{plf}$

2L2.5x2.5x1/2 members:

$C_{a\_5mN} := 1.0$ $\quad C_{a\_5mT} := 1.0$

$f_{m5\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_5mN}\ w_{m5} = 9.4\ \text{plf}$ $\quad f_{m5\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_5mT}\ h_{m5} = 4.5\ \text{plf}$

L2x2x3/16 members:

$C_{a\_6mN} := 1.0$ $\quad C_{a\_6mT} := 1.0$

$f_{m6\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_6mN}\ h_{m6} = 3.6\ \text{plf}$ $\quad f_{m6\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_6mT}\ h_{m6} = 3.6\ \text{plf}$

L2.5x2.5x1/4 members:

$C_{a\_7mN} := 1.0$ $C_{a\_7mT} := 1.0$

$f_{m7\_N} := q_z \cdot G_h \cdot K_a \cdot C_{a\_7mN}\ h_{m7} = 4.5$ plf $f_{m7\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_7mT}\ h_{m7} = 4.5$ plf

Antenna Wind Force Calculations:

$F_A = q_z\ G_h\ (EPA_A)$

$EPA_A = K_a\ \sum C_a\ A_A$ $K_a := 0.8$

Samsung MT6407-77A antenna:

$A_{A1\_N} := h_{A1} \cdot w_{A1} = 3.92$ ft^2 $A_{A1\_T} := h_{A1} \cdot d_{A1} = 1.34$ ft^2

$AR := \frac{h_{A1}}{w_{A1}} = 2.18$ $AR := \frac{h_{A1}}{d_{A1}} = 6.38$

$C_{a\_1N} := 1.2$ $C_{a\_1T} := 1.4$

$EPA_{A1\_N} := K_a\ (C_{a\_1N}\ A_{A1\_N}) = 3.77$ ft^2 $EPA_{A1\_T} := K_a\ (C_{a\_1T}\ A_{A1\_T}) = 1.50$ ft^2

$F_{A1\_N} := q_z \cdot G_h \cdot EPA_{A1\_N} = 81.1$ lbf $F_{A1\_T} := q_z \cdot G_h \cdot EPA_{A1\_T} = 32.3$ lbf

CommScope NHH-45C-R2B:

$A_{A2\_N} := h_{A2} \cdot w_{A2} = 11.99$ ft^2 $A_{A2\_T} := h_{A2} \cdot d_{A2} = 4.66$ ft^2

$AR := \frac{h_{A2}}{w_{A2}} = 5.33$ $AR := \frac{h_{A2}}{d_{A2}} = 13.70$

$C_{a\_2N} := 1.4$ $C_{a\_2T} := 1.5$

$EPA_{A2\_N} := K_a\ (C_{a\_2N}\ A_{A2\_N}) = 13.43$ ft^2 $EPA_{A2\_T} := K_a\ (C_{a\_2T}\ A_{A2\_T}) = 5.59$ ft^2

$F_{A2\_N} := q_z \cdot G_h \cdot EPA_{A2\_N} = 288.9$ lbf $F_{A2\_T} := q_z \cdot G_h \cdot EPA_{A2\_T} = 120.4$ lbf

Samsung B2/B66A RRH-BR049 (RFV01U-D1A):

$A_{A3\_N} := h_{A3} \cdot w_{A3} = 1.56\ \text{ft}^2$

$AR := \frac{h_{A3}}{w_{A3}} = 1.00$

$C_{a\_3N} := 1.2$

$EPA_{A3\_N} := K_a \left(C_{a\_3N}\ A_{A3\_N}\right) = 1.50\ \text{ft}^2$

$F_{A3\_N} := q_z \cdot G_h \cdot EPA_{A3\_N} = 32.3\ \text{lbf}$

$A_{A3\_T} := h_{A3} \cdot d_{A3} = 1.04\ \text{ft}^2$

$AR := \frac{h_{A3}}{d_{A3}} = 1.50$

$C_{a\_3T} := 1.2$

$EPA_{A3\_T} := K_a \left(C_{a\_3T}\ A_{A3\_T}\right) = 1.00\ \text{ft}^2$

$F_{A3\_T} := q_z \cdot G_h \cdot EPA_{A3\_T} = 21.5\ \text{lbf}$

Samsung B2/B66A RRH-BR049 (RFV01U-D1A):

$A_{A4\_N} := h_{A4} \cdot w_{A4} = 1.56\ \text{ft}^2$

$AR := \frac{h_{A4}}{w_{A4}} = 1.00$

$C_{a\_4N} := 1.2$

$EPA_{A4\_N} := K_a \left(C_{a\_4N}\ A_{A4\_N}\right) = 1.50\ \text{ft}^2$

$F_{A4\_N} := q_z \cdot G_h \cdot EPA_{A4\_N} = 32.3\ \text{lbf}$

$A_{A4\_T} := h_{A4} \cdot d_{A4} = 0.84\ \text{ft}^2$

$AR := \frac{h_{A4}}{d_{A4}} = 1.85$

$C_{a\_4T} := 1.2$

$EPA_{A4\_T} := K_a \left(C_{a\_4T}\ A_{A4\_T}\right) = 0.81\ \text{ft}^2$

$F_{A4\_T} := q_z \cdot G_h \cdot EPA_{A4\_T} = 17.4\ \text{lbf}$

Raycap DB-C1-12C-24AB-0Z:

$A_{A5\_N} := h_{A5} \cdot w_{A5} = 3.09\ \text{ft}^2$

$AR := \frac{h_{A5}}{w_{A5}} = 1.64$

$C_{a\_5N} := 1.2$

$EPA_{A5\_N} := K_a \left(C_{a\_5N}\ A_{A5\_N}\right) = 2.97\ \text{ft}^2$

$F_{A5\_N} := q_z \cdot G_h \cdot EPA_{A5\_N} = 63.9\ \text{lbf}$

$A_{A5\_T} := h_{A5} \cdot d_{A5} = 2.36\ \text{ft}^2$

$AR := \frac{h_{A5}}{d_{A5}} = 2.14$

$C_{a\_5T} := 1.2$

$EPA_{A5\_T} := K_a \left(C_{a\_5T}\ A_{A5\_T}\right) = 2.27\ \text{ft}^2$

$F_{A5\_T} := q_z \cdot G_h \cdot EPA_{A5\_T} = 48.8\ \text{lbf}$

2.5" nom. pipe mounts:

$AR := \frac{h_{m3}}{d_{m3}} = 33.33$

$C_{a\_3mT} := 1.2$

$f_{m3\_T} := q_z \cdot G_h \cdot K_a \cdot C_{a\_3mT}\ d_{m3} = 5.0\ \text{plf}$

Mounting Frame Wind Force Calculations (with ice):

$t_{iz} = 2.0\ t_i \cdot I_{ice}\ K_{iz}\ K_{zt}^{0.35}$ $\quad t_i = 0.75\ \text{in}$

$K_{iz} := \left(\frac{z_a}{33\ \text{ft}}\right)^{0.10} = 1.13$

$t_{iz} := 2.0\ t_i \cdot I_{ice}\ K_{iz}\ K_{zt}^{0.35} = 1.69\ \text{in}$

$A_r := \left(l_{m1} + 2\ t_{iz}\right) \cdot \left(d_{m1} + 2\ t_{iz}\right) + \left(l_{m2} + 2\ t_{iz}\right) \cdot \left(d_{m2} + 2\ t_{iz}\right) = 13.47\ \text{ft}^2$

$\varepsilon := \frac{A_r}{\left(l_{m1} + 2\ t_{iz}\right) \cdot \left(3.5\ \text{ft} + 2\ t_{iz}\right)} = 0.279$

$C_{as} := 1.58 + 1.05\ \left(0.6 - \varepsilon\right)^{1.8} = 1.72$

$R_{rf} := 0.6 + 0.4\ \varepsilon^2 = 0.63$

$0.75\ C_{as}\ R_{rf} = 0.81$ $\quad K_a := 1.0$

3" nom. pipe mounts:

$C_{a\_1mN} := 0.75\ C_{as}\ R_{rf} = 0.81$ $\quad f_{m1\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_1mN}\ \left(d_{m1} + 2\ t_{iz}\right) = 2.0\ \text{plf}$

2" nom. pipe mounts:

$C_{a\_2mN} := 0.75\ C_{as}\ R_{rf} = 0.81$ $\quad f_{m2\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_2mN}\ \left(d_{m2} + 2\ t_{iz}\right) = 1.7\ \text{plf}$

HSS4x4x1/4 members:

$C_{a\_4mT} := 1.0$ $\quad f_{m4\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_4mT}\ \left(h_{m4} + 2\ t_{iz}\right) = 2.7\ \text{plf}$

2L2.5x2.5x1/2 members:

$C_{a\_5mN} := 1.0$ $\quad f_{m5\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_5mN}\ \left(w_{m5} + 2\ t_{iz}\right) = 3.1\ \text{plf}$

$C_{a\_5mT} := 1.0$ $\quad f_{m5\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_5mT}\ \left(h_{m5} + 2\ t_{iz}\right) = 2.1\ \text{plf}$

L2x2x3/16 members:

$C_{a\_6mN} := 1.0$ $\quad f_{m6\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_6mN}\ \left(h_{m6} + 2\ t_{iz}\right) = 2.0\ \text{plf}$

$C_{a\_6mT} := 1.0$ $\quad f_{m6\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_6mT}\ \left(h_{m6} + 2\ t_{iz}\right) = 2.0\ \text{plf}$

L2.5x2.5x1/4 members:

$C_{a\_7mN} := 1.0$ $\quad f_{m7\_Ni} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_7mN} \left(h_{m7} + 2\ t_{iz}\right) = 2.1$ plf

$C_{a\_7mT} := 1.0$ $\quad f_{m7\_Ti} := q_{z\_i} \cdot G_h \cdot K_a \cdot C_{a\_7mT} \left(h_{m7} + 2\ t_{iz}\right) = 2.1$ plf

Antenna Wind Force Calculations (with ice):

$K_a := 0.8$

Samsung MT6407-77A antenna:

$A_{A1\_N} := \left(h_{A1} + 2\ t_{iz}\right) \cdot \left(w_{A1} + 2\ t_{iz}\right) = 5.21$ ft^2 $\quad A_{A1\_T} := \left(h_{A1} + 2\ t_{iz}\right) \cdot \left(d_{A1} + 2\ t_{iz}\right) = 2.37$ ft^2

$AR := \dfrac{h_{A1} + 2\ t_{iz}}{w_{A1} + 2\ t_{iz}} = 1.98$ $\quad AR := \dfrac{h_{A1} + 2\ t_{iz}}{d_{A1} + 2\ t_{iz}} = 4.33$

$C_{a\_1N} := 0.70$ $\quad C_{a\_1T} := 0.74$

$EPA_{A1\_N} := K_a \left(C_{a\_1N}\ A_{A1\_N}\right) = 2.92$ ft^2 $\quad EPA_{A1\_T} := K_a \left(C_{a\_1T}\ A_{A1\_T}\right) = 1.41$ ft^2

$F_{A1\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A1\_N} = 12.7$ lbf $\quad F_{A1\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A1\_T} = 6.1$ lbf

CommScope NHH-45C-R2B:

$A_{A2\_N} := \left(h_{A2} + 2\ t_{iz}\right) \cdot \left(w_{A2} + 2\ t_{iz}\right) = 14.74$ ft^2 $\quad A_{A2\_T} := \left(h_{A2} + 2\ t_{iz}\right) \cdot \left(d_{A2} + 2\ t_{iz}\right) = 7.16$ ft^2

$AR := \dfrac{h_{A2} + 2\ t_{iz}}{w_{A2} + 2\ t_{iz}} = 4.64$ $\quad AR := \dfrac{h_{A2} + 2\ t_{iz}}{d_{A2} + 2\ t_{iz}} = 9.56$

$C_{a\_2N} := 0.75$ $\quad C_{a\_2T} := 0.86$

$EPA_{A2\_N} := K_a \left(C_{a\_2N}\ A_{A2\_N}\right) = 8.85$ ft^2 $\quad EPA_{A2\_T} := K_a \left(C_{a\_2T}\ A_{A2\_T}\right) = 4.93$ ft^2

$F_{A2\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A2\_N} = 38.5$ lbf $\quad F_{A2\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A2\_T} = 21.4$ lbf

Samsung B2/B66A RRH-BR049
(RFV01U-D1A):

$A_{A3\_N} := (h_{A3} + 2\ t_{iz}) \cdot (w_{A3} + 2\ t_{iz}) = 2.35\ \text{ft}^2$

$AR := \frac{h_{A3} + 2\ t_{iz}}{w_{A3} + 2\ t_{iz}} = 1.00$

$C_{a\_3N} := 0.70$

$EPA_{A3\_N} := K_a\ (C_{a\_3N}\ A_{A3\_N}) = 1.31\ \text{ft}^2$

$F_{A3\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A3\_N} = 5.7\ \text{lbf}$

$A_{A3\_T} := (h_{A3} + 2\ t_{iz}) \cdot (d_{A3} + 2\ t_{iz}) = 1.71\ \text{ft}^2$

$AR := \frac{h_{A3} + 2\ t_{iz}}{d_{A3} + 2\ t_{iz}} = 1.37$

$C_{a\_3T} := 0.70$

$EPA_{A3\_T} := K_a\ (C_{a\_3T}\ A_{A3\_T}) = 0.96\ \text{ft}^2$

$F_{A3\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A3\_T} = 4.2\ \text{lbf}$

Samsung B2/B66A RRH-BR049
(RFV01U-D1A):

$A_{A4\_N} := (h_{A4} + 2\ t_{iz}) \cdot (w_{A4} + 2\ t_{iz}) = 2.35\ \text{ft}^2$

$AR := \frac{h_{A4} + 2\ t_{iz}}{w_{A4} + 2\ t_{iz}} = 1.00$

$C_{a\_4N} := 0.70$

$EPA_{A4\_N} := K_a\ (C_{a\_4N}\ A_{A4\_N}) = 1.31\ \text{ft}^2$

$F_{A4\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A4\_N} = 5.7\ \text{lbf}$

$A_{A4\_T} := (h_{A4} + 2\ t_{iz}) \cdot (d_{A4} + 2\ t_{iz}) = 1.47\ \text{ft}^2$

$AR := \frac{h_{A4} + 2\ t_{iz}}{d_{A4} + 2\ t_{iz}} = 1.60$

$C_{a\_4T} := 0.70$

$EPA_{A4\_T} := K_a\ (C_{a\_4T}\ A_{A4\_T}) = 0.82\ \text{ft}^2$

$F_{A4\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A4\_T} = 3.6\ \text{lbf}$

Raycap DB-C1-12C-24AB-0Z:

$A_{A5\_N} := (h_{A5} + 2\ t_{iz}) \cdot (w_{A5} + 2\ t_{iz}) = 4.20\ \text{ft}^2$

$AR := \frac{h_{A5} + 2\ t_{iz}}{w_{A5} + 2\ t_{iz}} = 1.53$

$C_{a\_5N} := 0.70$

$EPA_{A5\_N} := K_a\ (C_{a\_5N}\ A_{A5\_N}) = 2.35\ \text{ft}^2$

$F_{A5\_Ni} := q_{z\_i} \cdot G_h \cdot EPA_{A5\_N} = 10.2\ \text{lbf}$

$A_{A5\_T} := (h_{A5} + 2\ t_{iz}) \cdot (d_{A5} + 2\ t_{iz}) = 3.37\ \text{ft}^2$

$AR := \frac{h_{A5} + 2\ t_{iz}}{d_{A5} + 2\ t_{iz}} = 1.90$

$C_{a\_5T} := 0.70$

$EPA_{A5\_T} := K_a\ (C_{a\_5T}\ A_{A5\_T}) = 1.89\ \text{ft}^2$

$F_{A5\_Ti} := q_{z\_i} \cdot G_h \cdot EPA_{A5\_T} = 8.2\ \text{lbf}$

2.5" nom. pipe mounts:

$A_{m3\_T} := (h_{m3} + 2\ t_{iz}) \cdot (d_{m3} + 2\ t_{iz}) = 4.32\ \text{ft}^2$

$AR := \frac{h_{m3} + 2\ t_{iz}}{d_{m3} + 2\ t_{iz}} = 15.87$

$EPA_{m3\_T} := K_a\ (C_{a\_3T}\ A_{m3\_T}) = 3.46\ \text{ft}^2$

$C_{a\_3T} := 1.0$

$f_{m3\_Ti} := \frac{q_{z\_i} \cdot G_h \cdot EPA_{m3\_T}}{h_{m3}} = 1.9\ \text{plf}$

Ice Weight Calculations:

$A_{iz} = \pi \cdot t_{iz} \left(D_c + t_{iz}\right)$ $\gamma_{ice} := 56$ pcf

Samsung MT6407-77A antenna:

$D_c := \sqrt{w_{A1}{}^2 + d_{A1}{}^2} = 17.0$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.69$ ft^2

$W_{A1\_i} := \gamma_{ice} \left(h_{A1} + 2\ t_{iz}\right) A_{iz} = 124.0$ lbf

CommScope NHH-45C-R2B:

$D_c := \sqrt{w_{A2}{}^2 + d_{A2}{}^2} = 19.3$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.78$ ft^2

$W_{A2\_i} := \gamma_{ice} \left(h_{A2} + 2\ t_{iz}\right) A_{iz} = 359.2$ lbf

Samsung B2/B66A RRH-BR049 (RFV01U-D1A):

$D_c := \sqrt{w_{A3}{}^2 + d_{A3}{}^2} = 18.0$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.73$ ft^2

$W_{A3\_i} := \gamma_{ice} \left(h_{A3} + 2\ t_{iz}\right) A_{iz} = 62.4$ lbf

Samsung B5/B13 RRH-BR04C (RFV01U-D2A):

$D_c := \sqrt{w_{A4}{}^2 + d_{A4}{}^2} = 17.0$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.69$ ft^2

$W_{A4\_i} := \gamma_{ice} \left(h_{A4} + 2\ t_{iz}\right) A_{iz} = 59.3$ lbf

Raycap DB-C1-12C-24AB-0Z:

$D_c := \sqrt{w_{A5}{}^2 + d_{A5}{}^2} = 20.8$ in $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.83$ ft^2

$W_{A5\_i} := \gamma_{ice} \left(h_{A5} + 2\ t_{iz}\right) A_{iz} = 117.5$ lbf

3" nom. pipe mounts:

$D_c := d_{m1} = 3.50\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.19\ \text{ft}^2$

$\omega_{m1\_i} := \gamma_{ice}\ A_{iz} = 10.7\ \text{plf}$

2" nom. pipe mounts:

$D_c := d_{m2} = 2.38\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.15\ \text{ft}^2$

$\omega_{m2\_i} := \gamma_{ice}\ A_{iz} = 8.4\ \text{plf}$

2.5" nom. pipe mounts:

$D_c := d_{m3} = 2.88\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.17\ \text{ft}^2$

$\omega_{m3\_i} := \gamma_{ice}\ A_{iz} = 9.5\ \text{plf}$

HSS4x4x1/4 members:

$D_c := \sqrt{h_{m4}{}^2 + w_{m4}{}^2} = 5.66\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.27\ \text{ft}^2$

$\omega_{m4\_i} := \gamma_{ice}\ A_{iz} = 15.2\ \text{plf}$

2L2.5x2.5x1/2 members:

$D_c := w_{m5} = 5.25\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.26\ \text{ft}^2$

$\omega_{m5\_i} := \gamma_{ice}\ A_{iz} = 14.3\ \text{plf}$

L2x2x3/16 members:

$D_c := \sqrt{h_{m6}{}^2 + w_{m6}{}^2} = 2.83\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.17\ \text{ft}^2$

$\omega_{m6\_i} := \gamma_{ice}\ A_{iz} = 9.3\ \text{plf}$

L2.5x2.5x1/4 members:

$D_c := \sqrt{h_{m7}{}^2 + w_{m7}{}^2} = 3.54\ \text{in}$ $A_{iz} := \pi \cdot t_{iz} \left(D_c + t_{iz}\right) = 0.19\ \text{ft}^2$

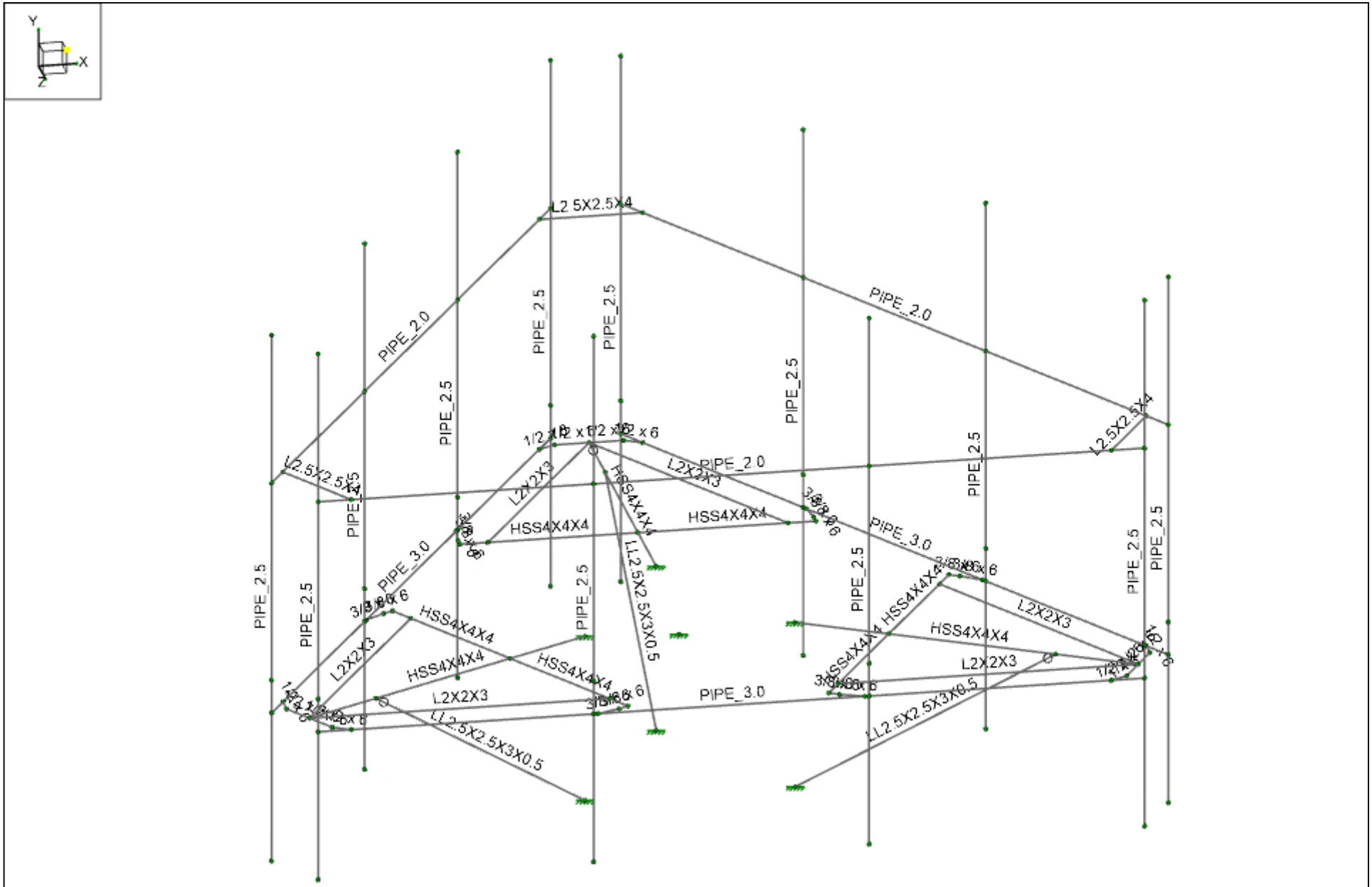
$\omega_{m7\_i} := \gamma_{ice}\ A_{iz} = 10.8\ \text{plf}$

Summary (without ice):

	Front Wind Force:	Side Wind Force:	Weight:
Samsung MT6407-77A antenna:	$F_{A1\_N} = 81.1$ lbf	$F_{A1\_T} = 32.3$ lbf	$W_{A1} = 102.1$ lbf
CommScope NHH-45C-R2B:	$F_{A2\_N} = 288.9$ lbf	$F_{A2\_T} = 120.4$ lbf	$W_{A2} = 110.7$ lbf
B2/B66A RRH-BR049 (RFV01U-D1A):	$F_{A3\_N} = 32.3$ lbf	$F_{A3\_T} = 21.5$ lbf	$W_{A3} = 97.5$ lbf
B2/B66A RRH-BR049 (RFV01U-D1A):	$F_{A4\_N} = 32.3$ lbf	$F_{A4\_T} = 17.4$ lbf	$W_{A4} = 82.0$ lbf
Raycap DB-C1-12C-24AB-0Z:	$F_{A5\_N} = 63.9$ lbf	$F_{A5\_T} = 48.8$ lbf	$W_{A5} = 39.5$ lbf
BSAMNT-SBS-2-3:			$W_{A6} = ?$
3" nom. pipe mounts:	$f_{m1\_N} = 5.3$ plf		
2.5" nom. pipe mounts:	$f_{m2\_N} = 3.6$ plf		
2" nom. pipe mounts:		$f_{m3\_T} = 5.0$ plf	
HSS4x4x1/4 members:		$f_{m4\_T} = 7.2$ plf	
2L2.5x2.5x1/2 members:	$f_{m5\_N} = 9.4$ plf	$f_{m5\_T} = 4.5$ plf	
L2x2x3/16 members:	$f_{m6\_N} = 3.6$ plf	$f_{m6\_T} = 3.6$ plf	
L2.5x2.5x1/4 members:	$f_{m7\_N} = 4.5$ plf	$f_{m7\_T} = 4.5$ plf	

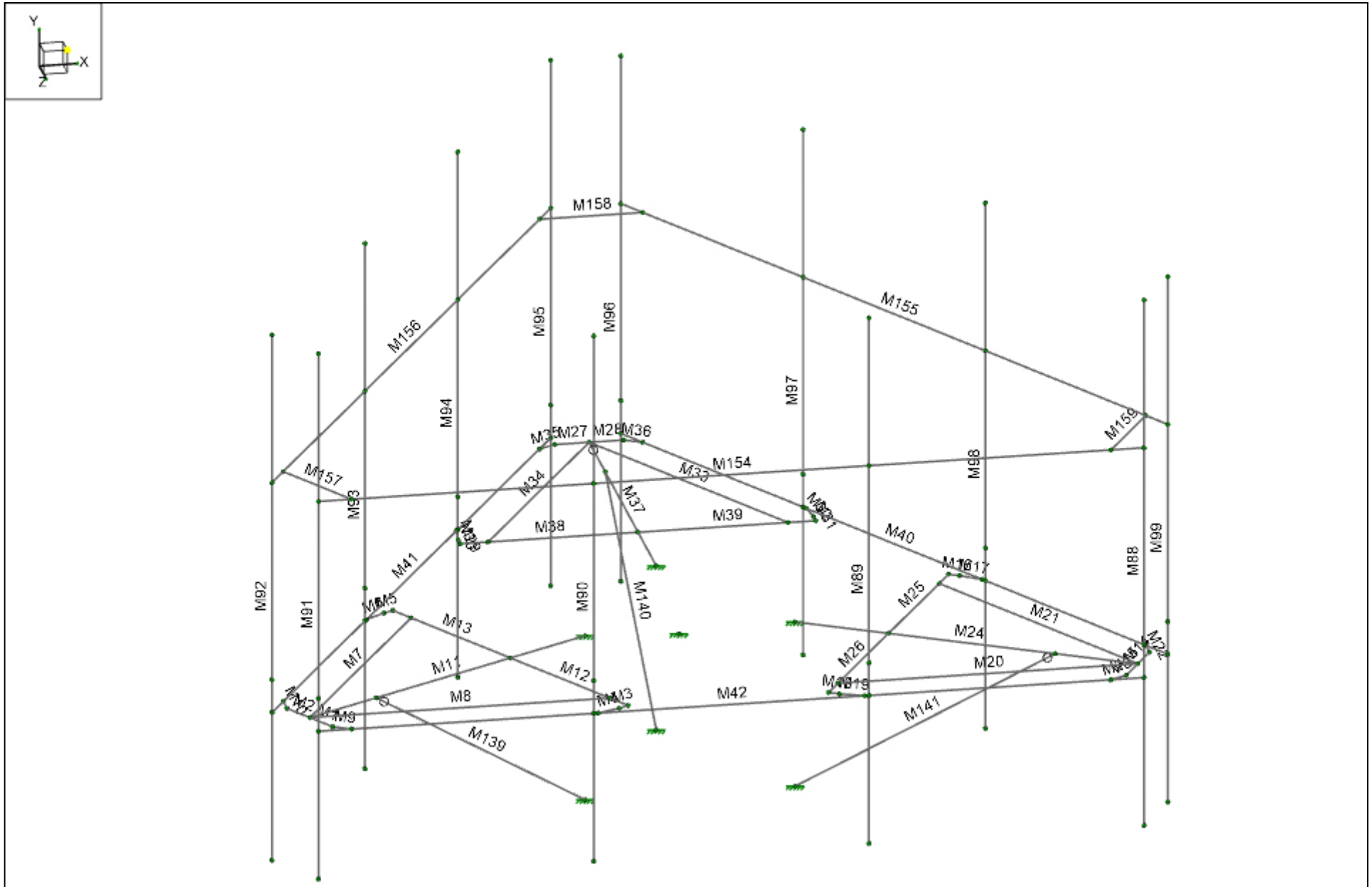
Summary (with ice):

	Front Wind Force:	Side Wind Force:	Ice Weight:
Samsung MT6407-77A antenna:	$F_{A1\_Ni} = 12.7$ lbf	$F_{A1\_Ti} = 6.1$ lbf	$W_{A1\_i} = 124.0$ lbf
CommScope NHH-45C-R2B:	$F_{A2\_Ni} = 38.5$ lbf	$F_{A2\_Ti} = 21.4$ lbf	$W_{A2\_i} = 359.2$ lbf
B2/B66A RRH-BR049 (RFV01U-D1A):	$F_{A3\_Ni} = 5.7$ lbf	$F_{A3\_Ti} = 4.2$ lbf	$W_{A3\_i} = 62.4$ lbf
B5/B13 RRH-BR04C (RFV01U-D2A):	$F_{A4\_Ni} = 5.7$ lbf	$F_{A4\_Ti} = 3.6$ lbf	$W_{A4\_i} = 59.3$ lbf
Raycap DB-C1-12C-24AB-0Z:	$F_{A5\_Ni} = 10.2$ lbf	$F_{A5\_Ti} = 8.2$ lbf	$W_{A5\_i} = 117.5$ lbf
3" nom. pipe mounts:	$f_{m1\_Ni} = 2.0$ plf		$\omega_{m1\_i} = 10.7$ plf
2.5" nom. pipe mounts:	$f_{m2\_Ni} = 1.7$ plf		$\omega_{m2\_i} = 8.4$ plf
2" nom. pipe mounts:		$f_{m3\_Ti} = 1.9$ plf	$\omega_{m3\_i} = 9.5$ plf
HSS4x4x1/4 members:		$f_{m4\_Ti} = 2.7$ plf	$\omega_{m4\_i} = 15.2$ plf
2L2.5x2.5x1/2 members:	$f_{m5\_Ni} = 3.1$ plf	$f_{m5\_Ti} = 2.1$ plf	$\omega_{m5\_i} = 14.3$ plf
L2x2x3/16 members:	$f_{m6\_Ni} = 2.0$ plf	$f_{m6\_Ti} = 2.0$ plf	$\omega_{m6\_i} = 9.3$ plf
L2.5x2.5x1/4 members:	$f_{m7\_Ni} = 2.1$ plf	$f_{m7\_Ti} = 2.1$ plf	$\omega_{m7\_i} = 10.8$ plf



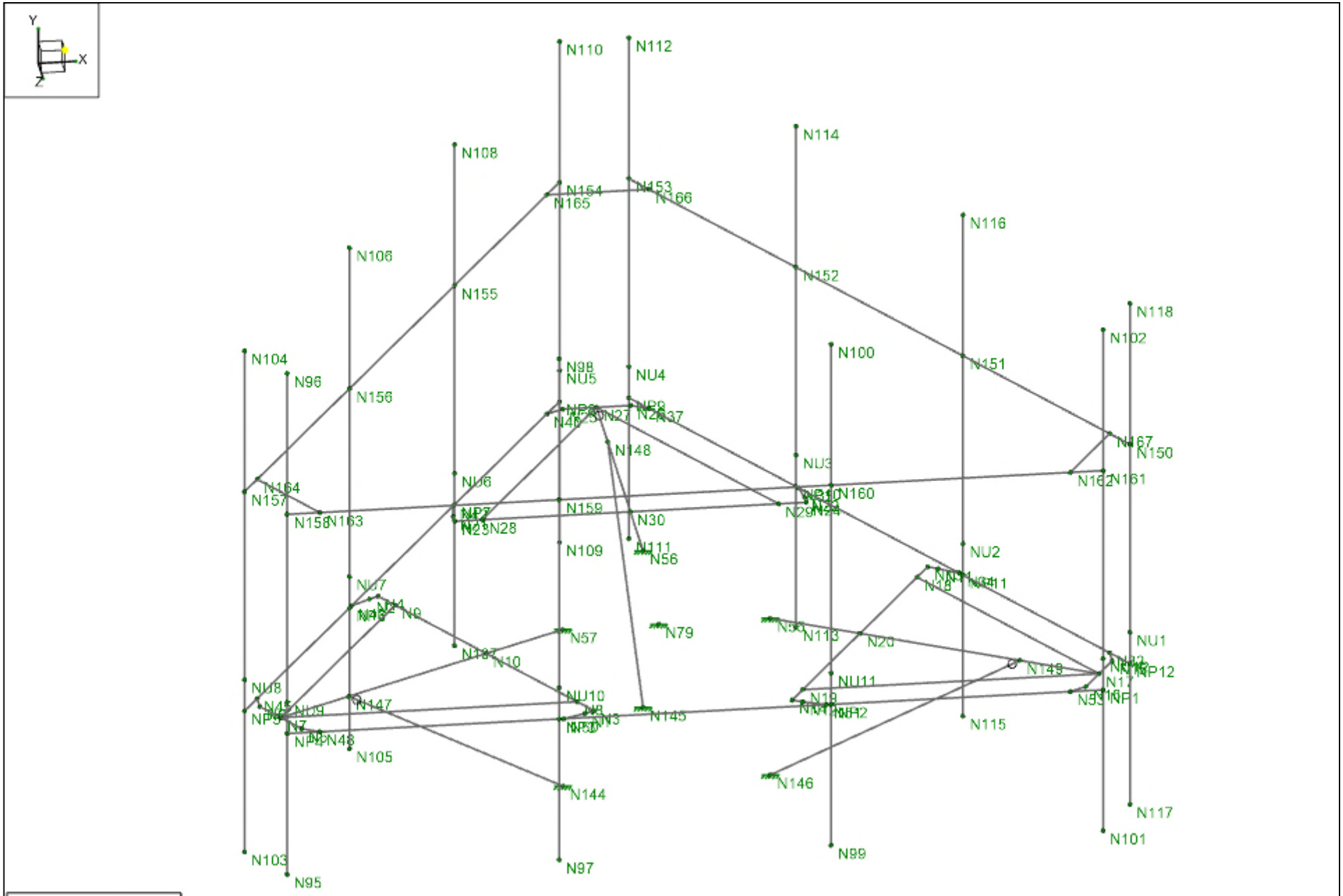
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-1
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



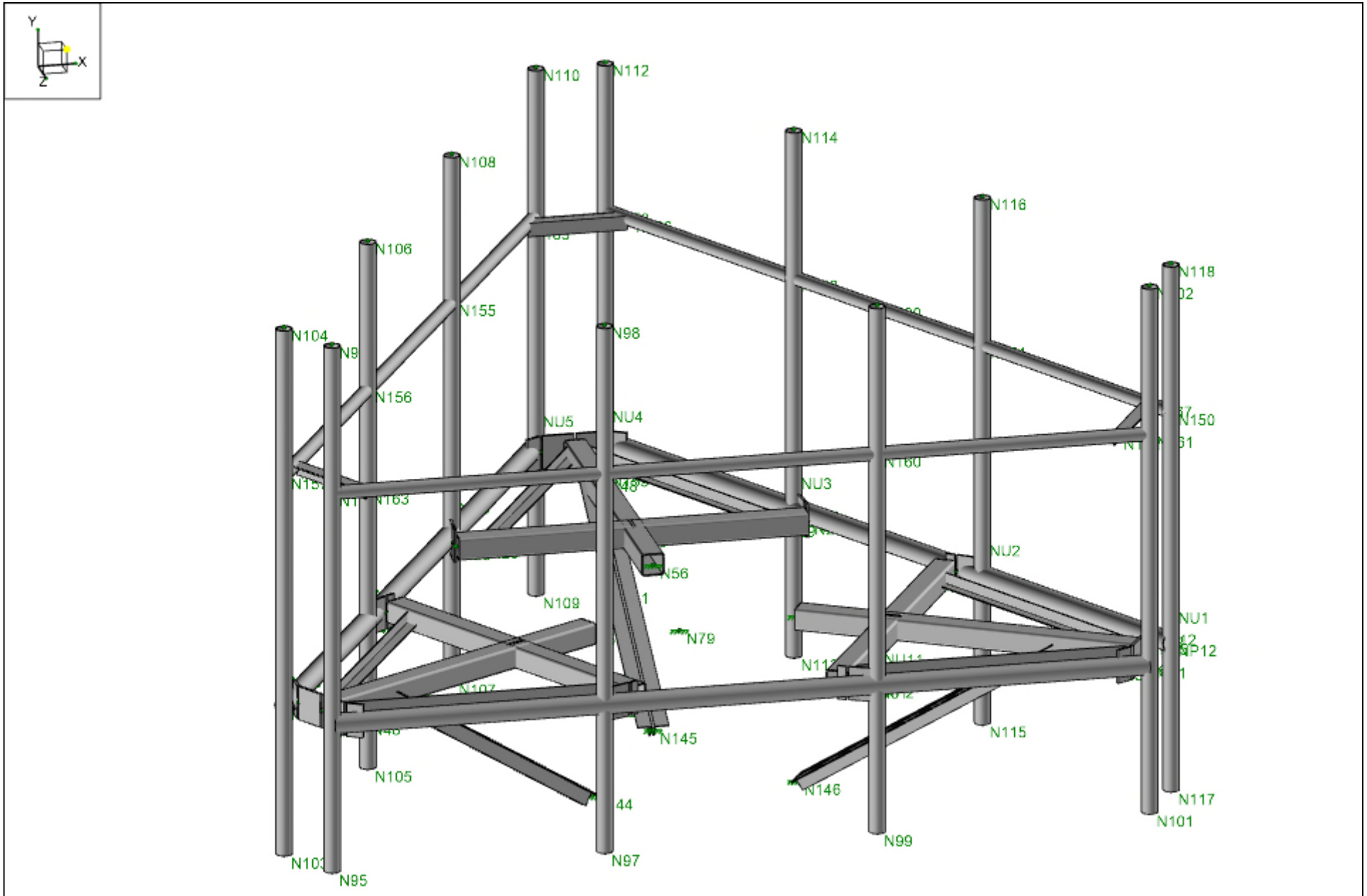
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-2
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure member labels	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



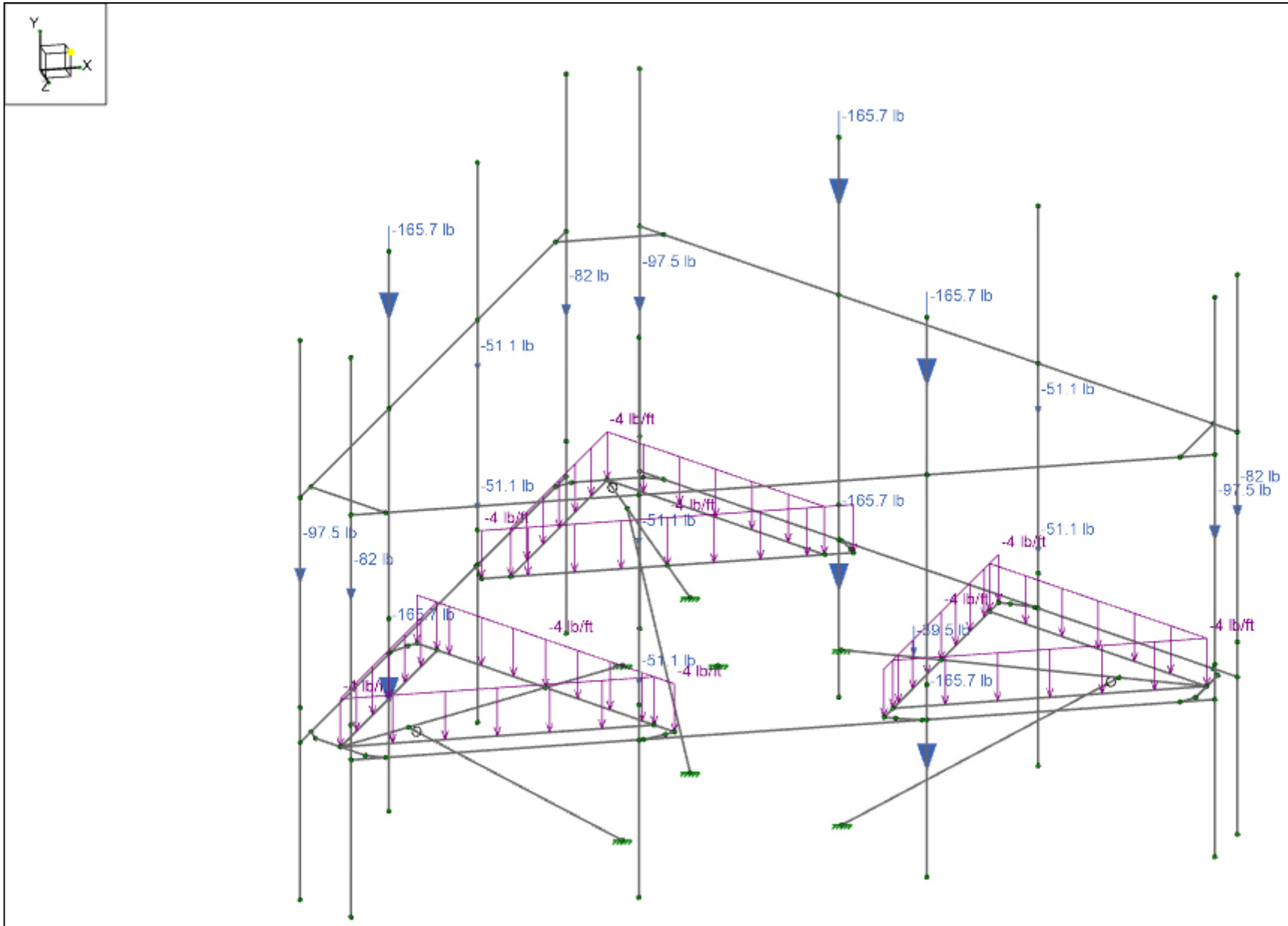
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-3
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure node labels	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



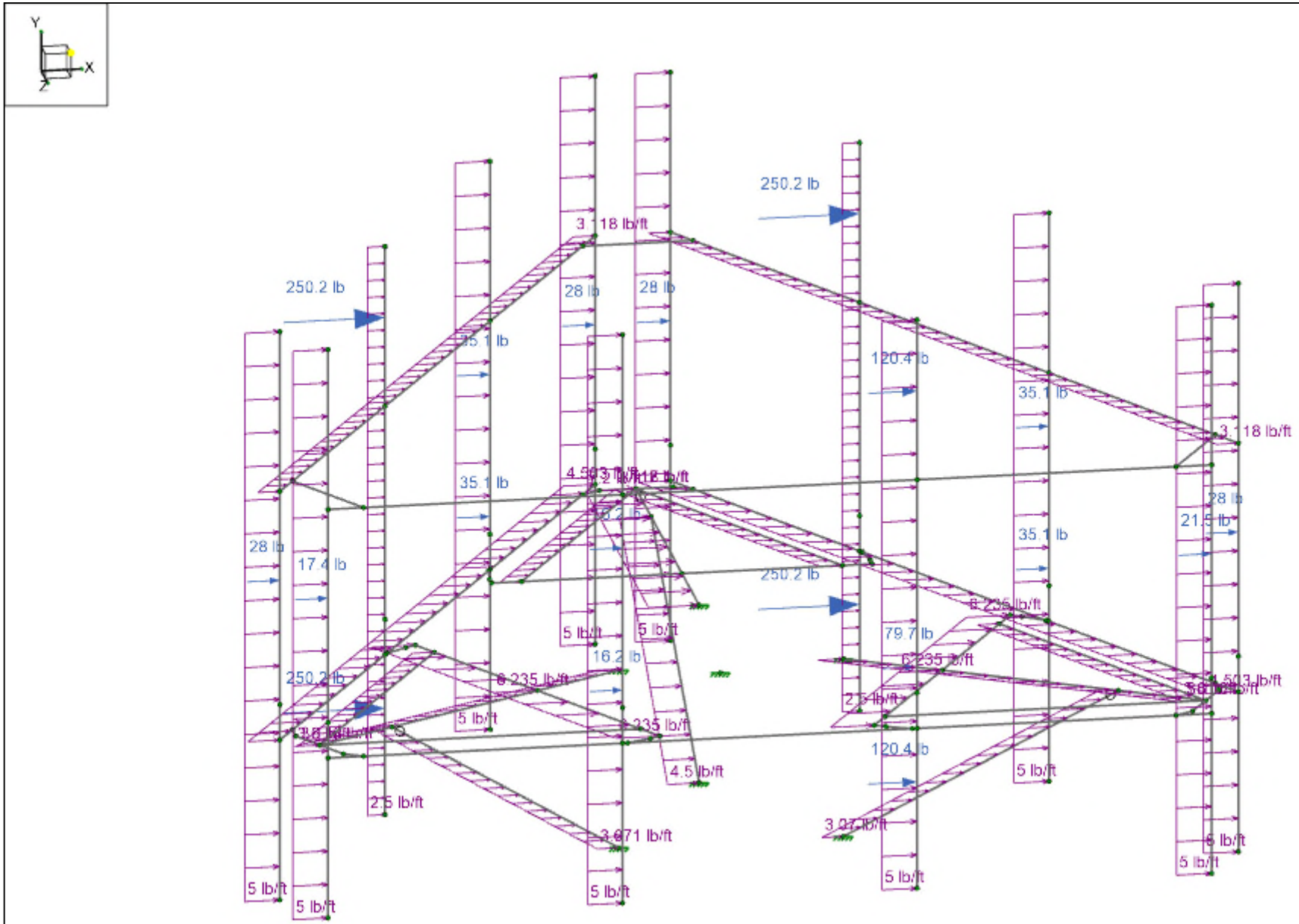
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-4
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure rendering	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



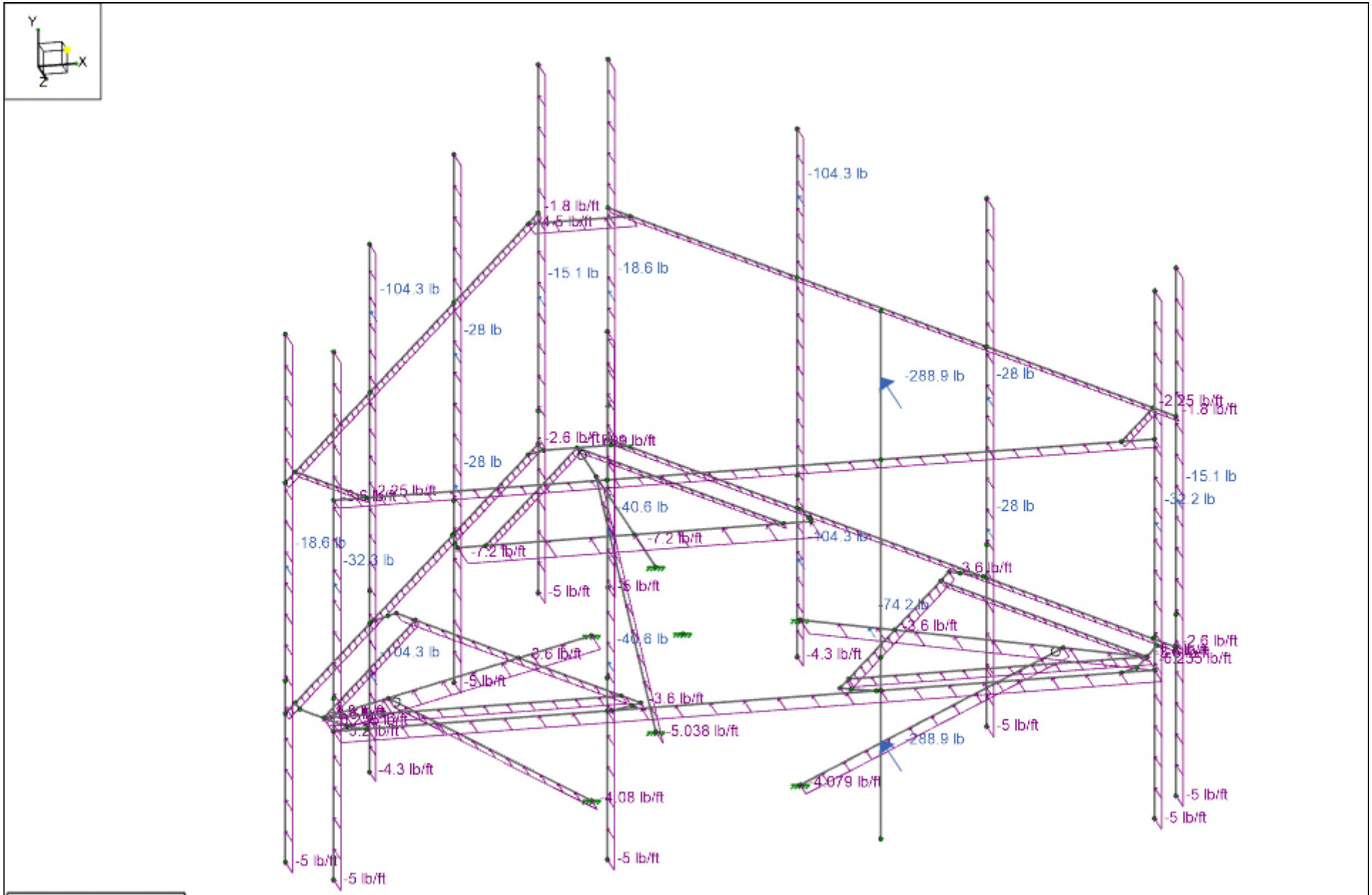
Loads: BLC 1, Dead
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-5
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure dead loads	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

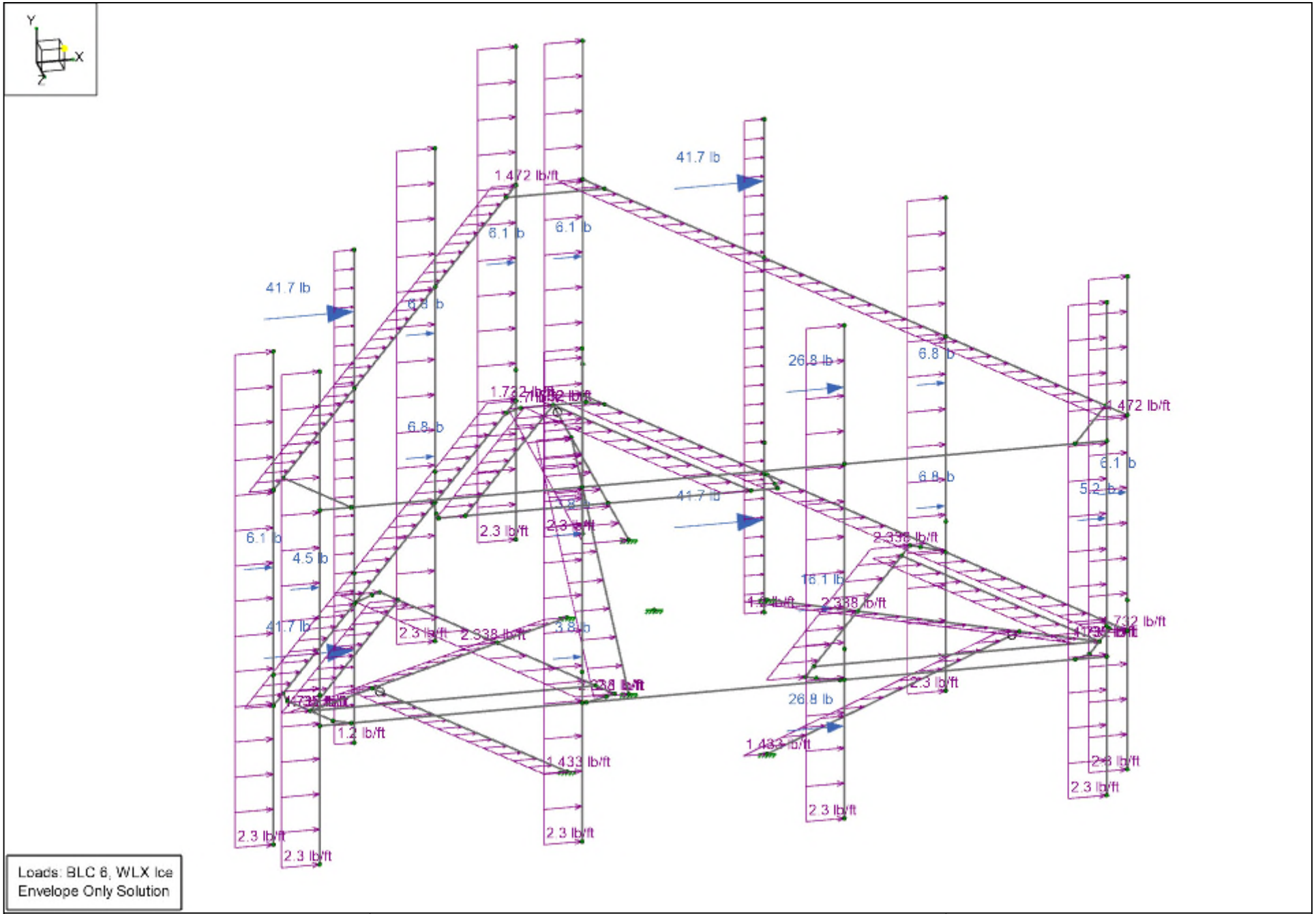


Loads: BLC 4, WLX
Envelope Only Solution

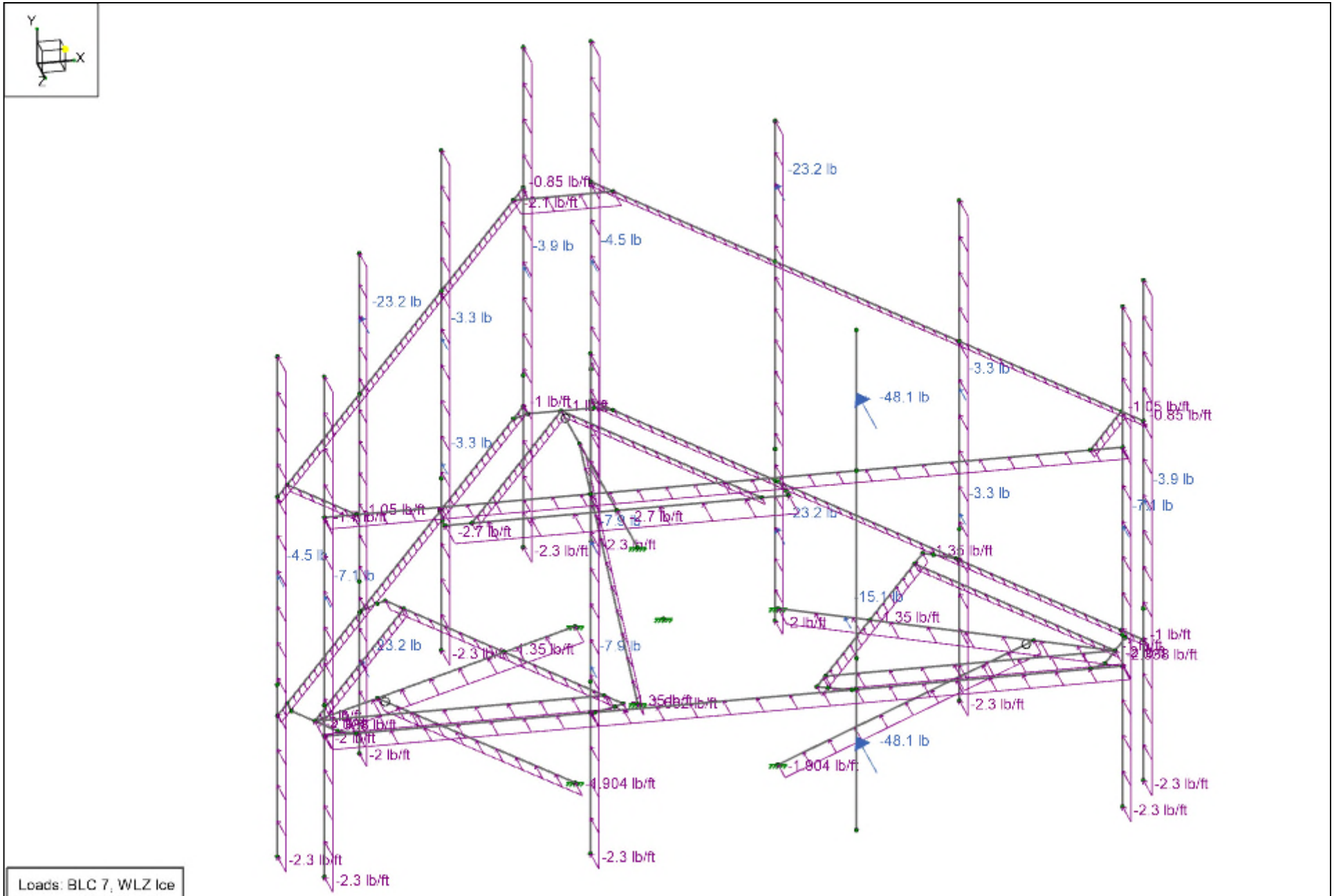
KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-6
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure wind loads - X	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



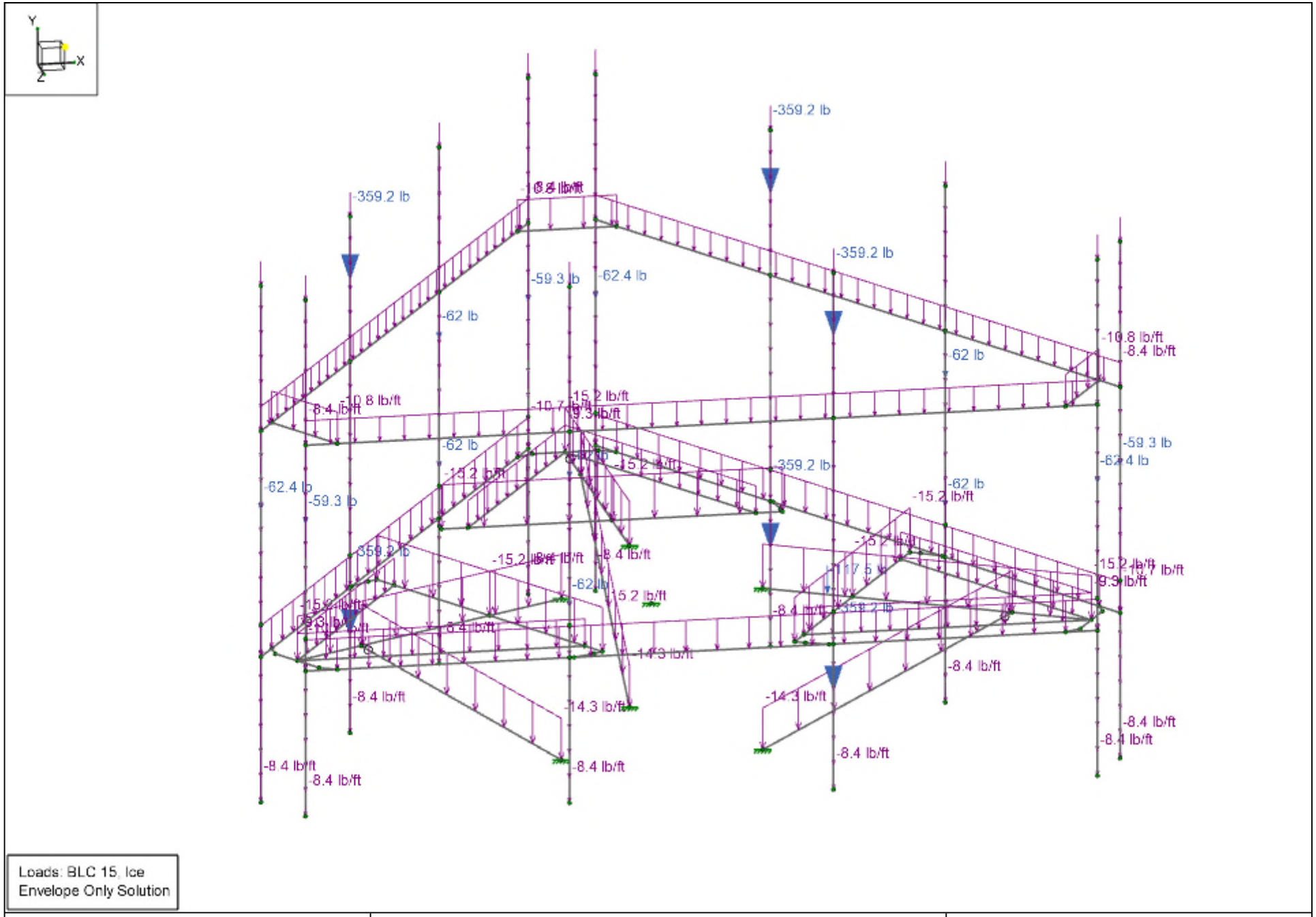
KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-7
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure wind loads - Z	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-8
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure ice wind loads - X	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

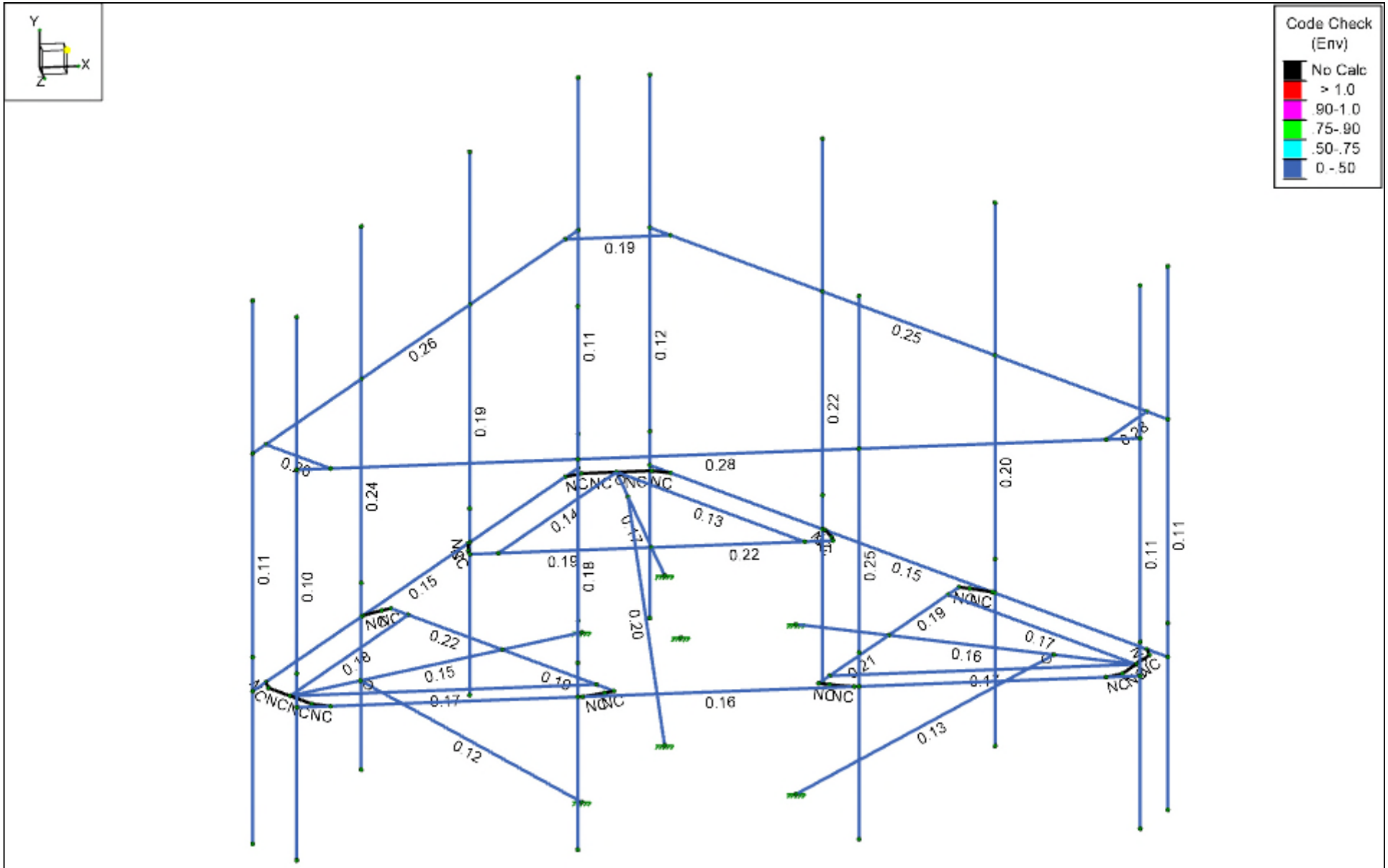


KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-9
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure ice wind loads - Z	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

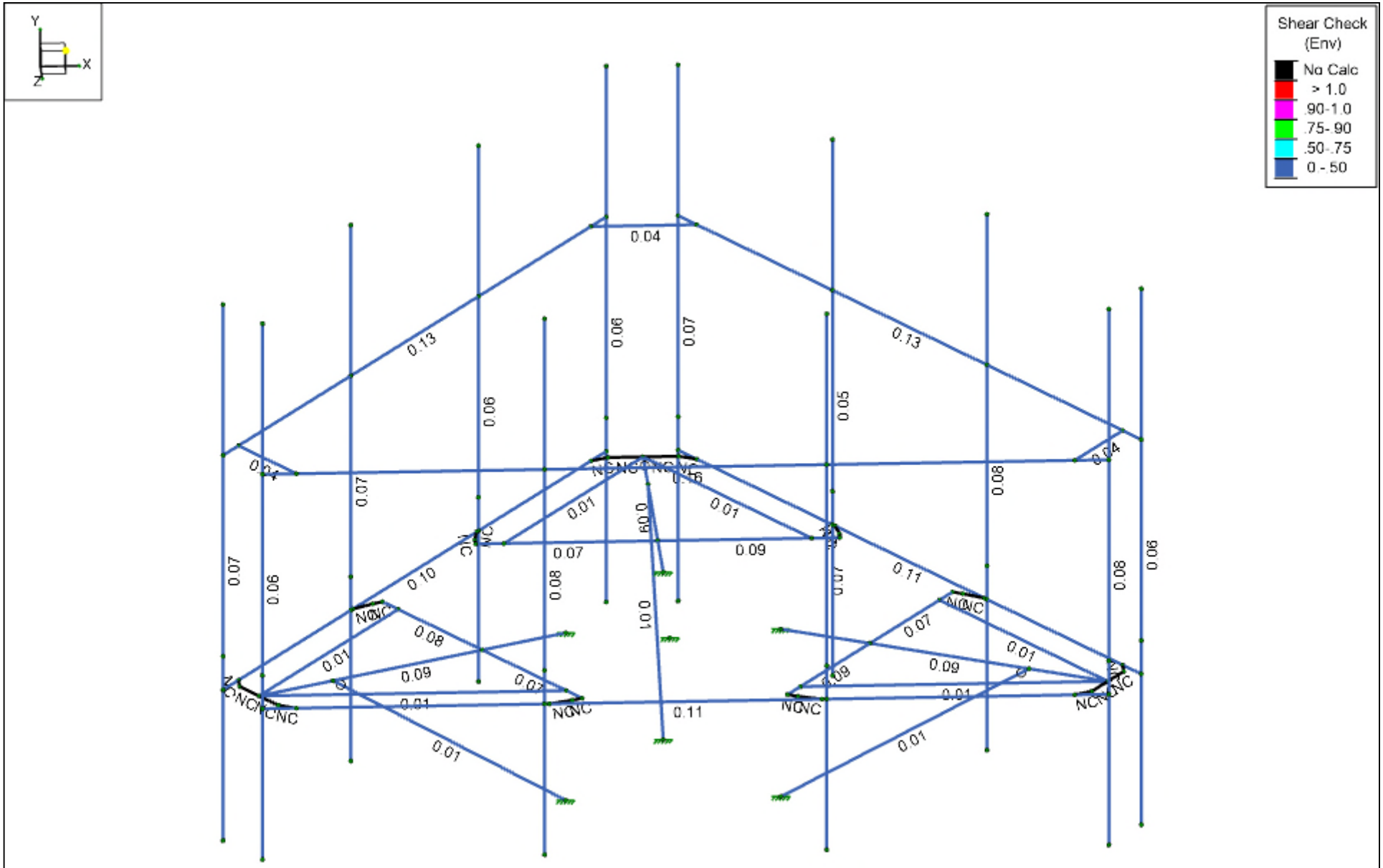


Loads: BLC 15, Ice
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-10
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure ice weight loading	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-11
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure code checks	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

KM Consulting Engineers, Inc.	Cornwall CT Mount Analysis	SK-12
JET (Site Pro 1)		Jun 16, 2021
210602.00	Monopole mount structure shear load checks	RMQP-4096-HK (0 - 180) Cornwall CT MA.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [lb/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	490	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	0.3	0.65	490	50	1.1	58	1.2
3	A992	29000	11154	0.3	0.65	490	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	0.3	0.65	490	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	0.3	0.65	490	46	1.2	58	1.1
6	A53 Gr.B	29000	11154	0.3	0.65	490	35	1.5	58	1.2
7	Q235	29000	11154	0.3	0.65	490	34	1.5	58	1.2
8	J429-Gr5	29000	11154	0.3	0.65	490	92	1.5	120	1.2

Node Coordinates

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
1	NP12	56.989389	0	38.030411	
2	NP11	32.989389	0	-3.538808	
3	NP10	8.989389	0	-45.108027	
4	NP9	-15.010611	0	-86.677247	
5	NP8	-27.244585	0	-86.680673	
6	NP7	-51.244585	0	-45.111454	
7	NP6	-75.244585	0	-3.542235	
8	NP5	-99.244585	0	38.026985	
9	NP4	-93.124362	0	48.627066	
10	NP3	-45.124362	0	48.627065	
11	NP2	2.875638	0	48.627065	
12	NP1	50.875638	0	48.627066	
13	N79	-21.14	-4.75	0	
14	N57	-39.447777	0	10.57	
15	N56	-21.124362	0	-21.127507	
16	N55	-2.834959	0	10.550669	
17	N53	45.076281	0	48.627066	
18	N51	2.076281	0	48.627066	
19	N50	-44.333455	0	48.627066	
20	N48	-87.333455	0	48.627066	
21	N45	-96.349	0	33.011685	
22	N43	-74.849	0	-4.227408	
23	N42	-51.644131	0	-44.419418	
24	N40	-30.144131	0	-81.65851	
25	N37	-12.113043	0	-81.65851	
26	N35	9.386957	0	-44.419418	
27	N34	32.591825	0	-4.227408	
28	N32	54.091825	0	33.011685	
29	N30	-21.14	0	-38.08032	
30	N29	5.026113	0	-38.080316	
31	N28	-47.283288	0	-38.080316	
32	N27	-21.14	0	-83.381588	
33	N26	-15.128587	0	-83.381587	
34	N25	-27.128587	0	-83.381587	
35	N24	9.871413	0	-38.080316	
36	N23	-52.128587	0	-38.080316	
37	N22	9.871413	0	-40.080316	
38	N21	-52.128587	0	-40.080316	
39	N20	11.846211	0	19.026847	
40	N19	-1.23312	0	41.680913	
41	N18	24.92158	0	-3.620357	
42	N17	51.078262	0	41.677482	
43	N16	48.076281	0	46.877066	
44	N15	54.076281	0	36.484761	
45	N14	-3.65577	0	45.877066	
46	N13	27.34423	0	-7.816509	
47	N12	-1.923719	0	46.877066	
48	N11	29.076281	0	-6.816509	
49	N10	-54.101405	0	19.030276	
50	N9	-67.178755	0	-3.620357	
51	N8	-41.024054	0	41.680913	
52	N7	-93.333456	0	41.680911	
53	N6	-96.333455	0	36.484761	

Node Coordinates (Continued)

	Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm
54	N5	-90.333455	0	46.877066	
55	N4	-69.601404	0	-7.816509	
56	N3	-38.601404	0	45.877066	
57	N2	-71.333455	0	-6.816509	
58	N1	-40.333455	0	46.877066	
59	NU1	56.989389	6	38.030411	
60	NU2	32.989389	6	-3.538808	
61	NU3	8.989389	6	-45.108027	
62	NU4	-15.010611	6	-86.677247	
63	NU5	-27.244585	6	-86.680673	
64	NU6	-51.244585	6	-45.111454	
65	NU7	-75.244585	6	-3.542235	
66	NU8	-99.244585	6	38.026985	
67	NU9	-93.124362	6	48.627066	
68	NU10	-45.124362	6	48.627065	
69	NU11	2.875638	6	48.627065	
70	NU12	50.875638	6	48.627066	
71	N144	-39.447777	-30	10.57	
72	N145	-21.124362	-30	-21.127507	
73	N146	-2.834959	-30	10.550669	
74	N147	-80.343075	0	34.180911	
75	N148	-21.136232	0	-68.381589	
76	N149	38.087881	0	34.177482	
77	N150	56.989389	42	38.030411	
78	N151	32.989389	42	-3.538808	
79	N152	8.989389	42	-45.108027	
80	N153	-15.010611	42	-86.677247	
81	N154	-27.244585	42	-86.680673	
82	N155	-51.244585	42	-45.111454	
83	N156	-75.244585	42	-3.542235	
84	N157	-99.244585	42	38.026985	
85	N158	-93.124362	42	48.627066	
86	N159	-45.124362	42	48.627065	
87	N160	2.875638	42	48.627065	
88	N161	50.875638	42	48.627066	
89	N162	45.076281	42	48.627066	
90	N163	-87.333455	42	48.627066	
91	N164	-96.349	42	33.011685	
92	N165	-30.144131	42	-81.65851	
93	N166	-12.113043	42	-81.65851	
94	N167	54.091825	42	33.011685	
95	N95	-93.124362	-27	48.627066	
96	N96	-93.124362	69	48.627066	
97	N97	-45.124362	-27	48.627065	
98	N98	-45.124362	69	48.627065	
99	N99	2.875638	-27	48.627065	
100	N100	2.875638	69	48.627065	
101	N101	50.875638	-27	48.627066	
102	N102	50.875638	69	48.627066	
103	N103	-99.244585	-27	38.026985	
104	N104	-99.244585	69	38.026985	
105	N105	-75.244585	-27	-3.542235	
106	N106	-75.244585	69	-3.542235	
107	N107	-51.244585	-27	-45.111454	
108	N108	-51.244585	69	-45.111454	
109	N109	-27.244585	-27	-86.680673	
110	N110	-27.244585	69	-86.680673	
111	N111	-15.010611	-27	-86.677247	
112	N112	-15.010611	69	-86.677247	
113	N113	8.989389	-27	-45.108027	
114	N114	8.989389	69	-45.108027	
115	N115	32.989389	-27	-3.538808	
116	N116	32.989389	69	-3.538808	
117	N117	56.989389	-27	38.030411	
118	N118	56.989389	69	38.030411	

Node Coordinates (Continued)

Label	X [in]	Y [in]	Z [in]	Detach From Diaphragm

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N7	N5	90	1/2 x 6	Beam	RECT	Q235	Typical
2	M2	N7	N6	90	1/2 x 6	Beam	RECT	Q235	Typical
3	M3	N3	N1	90	3/8 x 6	Beam	RECT	Q235	Typical
4	M4	N1	N50	90	3/8 x 6	Beam	RECT	Q235	Typical
5	M5	N4	N2	90	3/8 x 6	Beam	RECT	Q235	Typical
6	M6	N2	N43	90	3/8 x 6	Beam	RECT	Q235	Typical
7	M7	N7	N9		L2X2X3	Beam	Single Angle	Q235	Typical
8	M8	N7	N8	270	L2X2X3	Beam	Single Angle	Q235	Typical
9	M9	N5	N48	90	1/2 x 6	Beam	RECT	Q235	Typical
10	M10	N6	N45	90	1/2 x 6	Beam	RECT	Q235	Typical
11	M11	N7	N57		HSS4X4X4	Beam	Tube	Q235	Typical
12	M12	N3	N10		HSS4X4X4	Beam	Tube	Q235	Typical
13	M13	N10	N4		HSS4X4X4	Beam	Tube	Q235	Typical
14	M14	N17	N15	90	1/2 x 6	Beam	RECT	Q235	Typical
15	M15	N17	N16	90	1/2 x 6	Beam	RECT	Q235	Typical
16	M16	N13	N11	90	3/8 x 6	Beam	RECT	Q235	Typical
17	M17	N11	N34	90	3/8 x 6	Beam	RECT	Q235	Typical
18	M18	N14	N12	90	3/8 x 6	Beam	RECT	Q235	Typical
19	M19	N12	N51	90	3/8 x 6	Beam	RECT	Q235	Typical
20	M20	N17	N19		L2X2X3	Beam	Single Angle	Q235	Typical
21	M21	N17	N18	270	L2X2X3	Beam	Single Angle	Q235	Typical
22	M22	N15	N32	90	1/2 x 6	Beam	RECT	Q235	Typical
23	M23	N16	N53	90	1/2 x 6	Beam	RECT	Q235	Typical
24	M24	N17	N55		HSS4X4X4	Beam	Tube	Q235	Typical
25	M25	N13	N20		HSS4X4X4	Beam	Tube	Q235	Typical
26	M26	N20	N14		HSS4X4X4	Beam	Tube	Q235	Typical
27	M27	N27	N25	90	1/2 x 6	Beam	RECT	Q235	Typical
28	M28	N27	N26	90	1/2 x 6	Beam	RECT	Q235	Typical
29	M29	N23	N21	90	3/8 x 6	Beam	RECT	Q235	Typical
30	M30	N21	N42	90	3/8 x 6	Beam	RECT	Q235	Typical
31	M31	N24	N22	90	3/8 x 6	Beam	RECT	Q235	Typical
32	M32	N22	N35	90	3/8 x 6	Beam	RECT	Q235	Typical
33	M33	N27	N29		L2X2X3	Beam	Single Angle	Q235	Typical
34	M34	N27	N28	270	L2X2X3	Beam	Single Angle	Q235	Typical
35	M35	N25	N40	90	1/2 x 6	Beam	RECT	Q235	Typical
36	M36	N26	N37	90	1/2 x 6	Beam	RECT	Q235	Typical
37	M37	N27	N56		HSS4X4X4	Beam	Tube	Q235	Typical
38	M38	N23	N30		HSS4X4X4	Beam	Tube	Q235	Typical
39	M39	N30	N24		HSS4X4X4	Beam	Tube	Q235	Typical
40	M40	NP12	NP9		PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical
41	M41	NP8	NP5		PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical
42	M42	NP4	NP1		PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical
43	M88	N101	N102		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
44	M89	N99	N100		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
45	M90	N97	N98		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
46	M91	N95	N96		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
47	M92	N103	N104		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
48	M93	N105	N106		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
49	M94	N107	N108		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
50	M95	N109	N110		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
51	M96	N111	N112		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
52	M97	N113	N114		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
53	M98	N115	N116		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
54	M99	N117	N118		PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical
55	M139	N144	N147		LL2.5X2.5X3X0.5	Beam	Double Angle (3/8 Gap)	Q235	Typical
56	M140	N145	N148		LL2.5X2.5X3X0.5	Beam	Double Angle (3/8 Gap)	Q235	Typical
57	M141	N146	N149		LL2.5X2.5X3X0.5	Beam	Double Angle (3/8 Gap)	Q235	Typical
58	M154	N158	N161		PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
59	M155	N150	N153		PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
60	M156	N154	N157		PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical
61	M157	N163	N164	180	L2.5X2.5X4	Beam	Single Angle	Q235	Typical
62	M158	N165	N166	180	L2.5X2.5X4	Beam	Single Angle	Q235	Typical
63	M159	N167	N162	180	L2.5X2.5X4	Beam	Single Angle	Q235	Typical

Member Distributed Loads (BLC 1 : Dead)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M21	Y	-4	-4	0	%100
2	M20	Y	-4	-4	0	%100
3	M26	Y	-4	-4	0	%100
4	M25	Y	-4	-4	0	%100
5	M39	Y	-4	-4	0	%100
6	M38	Y	-4	-4	0	%100
7	M34	Y	-4	-4	0	%100
8	M33	Y	-4	-4	0	%100
9	M7	Y	-4	-4	0	%100
10	M13	Y	-4	-4	0	%100
11	M12	Y	-4	-4	0	%100
12	M8	Y	-4	-4	0	%100

Member Distributed Loads (BLC 4 : WLX)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M41	PX	5.2	5.2	0	%100
2	M40	PX	5.2	5.2	0	%100
3	M156	PX	3.6	3.6	0	%100
4	M155	PX	3.6	3.6	0	%100
5	M11	PX	7.2	7.2	0	%100
6	M24	PX	7.2	7.2	0	%100
7	M37	PX	7.2	7.2	0	%100
8	M12	PX	7.2	7.2	0	%100
9	M13	PX	7.2	7.2	0	%100
10	M26	PX	7.2	7.2	0	%100
11	M25	PX	7.2	7.2	0	%100
12	M7	PX	3.6	3.6	0	%100
13	M34	PX	3.6	3.6	0	%100
14	M21	PX	3.6	3.6	0	%100
15	M33	PX	3.6	3.6	0	%100
16	M139	PX	4.5	4.5	0	%100
17	M140	PX	4.5	4.5	0	%100
18	M141	PX	4.5	4.5	0	%100
19	M91	X	5	5	0	%100
20	M90	X	5	5	0	%100
21	M89	X	5	5	0	%100
22	M88	X	5	5	0	%100
23	M95	X	5	5	0	%100
24	M94	X	5	5	0	%100
25	M93	X	2.5	2.5	0	%100
26	M92	X	5	5	0	%100
27	M96	X	5	5	0	%100
28	M97	X	2.5	2.5	0	%100
29	M98	X	5	5	0	%100
30	M99	X	5	5	0	%100

Member Distributed Loads (BLC 5 : WLZ)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
1	M42	Z	-5.2	-5.2	0	%100	
2	M41	PZ	-5.2	-5.2	0	%100	
3	M40	PZ	-5.2	-5.2	0	%100	
4	M154	Z	-3.6	-3.6	0	%100	
5	M156	PZ	-3.6	-3.6	0	%100	
6	M155	PZ	-3.6	-3.6	0	%100	
7	M11	PZ	-7.2	-7.2	0	%100	
8	M24	PZ	-7.2	-7.2	0	%100	
9	M12	PZ	-7.2	-7.2	0	%100	
10	M13	PZ	-7.2	-7.2	0	%100	
11	M26	PZ	-7.2	-7.2	0	%100	
12	M25	PZ	-7.2	-7.2	0	%100	
13	M38	Z	-7.2	-7.2	0	%100	
14	M39	Z	-7.2	-7.2	0	%100	
15	M8	Z	-3.6	-3.6	0	%100	
16	M7	PZ	-3.6	-3.6	0	%100	

Member Distributed Loads (BLC 5 : WLZ) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
17	M20	Z	-3.6	-3.6	0	%100	
18	M21	PZ	-3.6	-3.6	0	%100	
19	M34	PZ	-3.6	-3.6	0	%100	
20	M33	PZ	-3.6	-3.6	0	%100	
21	M157	PZ	-4.5	-4.5	0	%100	
22	M159	PZ	-4.5	-4.5	0	%100	
23	M158	Z	-4.5	-4.5	0	%100	
24	M139	PZ	-4.5	-4.5	0	%100	
25	M140	PZ	-9.4	-9.4	0	%100	
26	M141	PZ	-4.5	-4.5	0	%100	
27	M91	Z	-5	-5	0	%100	
28	M90	Z	-5	-5	0	%100	
29	M89	Z	-5	-5	0	%100	Inactive
30	M88	Z	-5	-5	0	%100	
31	M92	Z	-5	-5	0	%100	
32	M93	Z	-4.3	-4.3	0	%100	
33	M94	Z	-5	-5	0	%100	
34	M95	Z	-5	-5	0	%100	
35	M99	Z	-5	-5	0	%100	
36	M98	Z	-5	-5	0	%100	
37	M97	Z	-4.3	-4.3	0	%100	
38	M96	Z	-5	-5	0	%100	

Member Distributed Loads (BLC 6 : WLX Ice)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M41	PX	2	2	0	%100
2	M40	PX	2	2	0	%100
3	M156	PX	1.7	1.7	0	%100
4	M155	PX	1.7	1.7	0	%100
5	M11	PX	2.7	2.7	0	%100
6	M24	PX	2.7	2.7	0	%100
7	M37	PX	2.7	2.7	0	%100
8	M12	PX	2.7	2.7	0	%100
9	M13	PX	2.7	2.7	0	%100
10	M26	PX	2.7	2.7	0	%100
11	M25	PX	2.7	2.7	0	%100
12	M7	PX	2	2	0	%100
13	M34	PX	2	2	0	%100
14	M21	PX	2	2	0	%100
15	M33	PX	2	2	0	%100
16	M139	PX	2.1	2.1	0	%100
17	M140	PX	2.1	2.1	0	%100
18	M141	PX	2.1	2.1	0	%100
19	M91	X	2.3	2.3	0	%100
20	M90	X	2.3	2.3	0	%100
21	M89	X	2.3	2.3	0	%100
22	M88	X	2.3	2.3	0	%100
23	M95	X	2.3	2.3	0	%100
24	M94	X	2.3	2.3	0	%100
25	M93	X	1.2	1.2	0	%100
26	M92	X	2.3	2.3	0	%100
27	M96	X	2.3	2.3	0	%100
28	M97	X	1.2	1.2	0	%100
29	M98	X	2.3	2.3	0	%100
30	M99	X	2.3	2.3	0	%100

Member Distributed Loads (BLC 7 : WLZ Ice)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
1	M42	Z	-2	-2	0	%100	
2	M41	PZ	-2	-2	0	%100	
3	M40	PZ	-2	-2	0	%100	
4	M154	Z	-1.7	-1.7	0	%100	
5	M156	PZ	-1.7	-1.7	0	%100	
6	M155	PZ	-1.7	-1.7	0	%100	

Member Distributed Loads (BLC 7 : WLZ Ice) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]	Inactive
7	M11	PZ	-2.7	-2.7	0	%100	
8	M24	PZ	-2.7	-2.7	0	%100	
9	M12	PZ	-2.7	-2.7	0	%100	
10	M13	PZ	-2.7	-2.7	0	%100	
11	M26	PZ	-2.7	-2.7	0	%100	
12	M25	PZ	-2.7	-2.7	0	%100	
13	M38	Z	-2.7	-2.7	0	%100	
14	M39	Z	-2.7	-2.7	0	%100	
15	M8	Z	-2	-2	0	%100	
16	M7	PZ	-2	-2	0	%100	
17	M20	Z	-2	-2	0	%100	
18	M21	PZ	-2	-2	0	%100	
19	M34	PZ	-2	-2	0	%100	
20	M33	PZ	-2	-2	0	%100	
21	M157	PZ	-2.1	-2.1	0	%100	
22	M159	PZ	-2.1	-2.1	0	%100	
23	M158	Z	-2.1	-2.1	0	%100	
24	M139	PZ	-2.1	-2.1	0	%100	
25	M140	PZ	-3.1	-3.1	0	%100	
26	M141	PZ	-2.1	-2.1	0	%100	
27	M91	Z	-2.3	-2.3	0	%100	
28	M90	Z	-2.3	-2.3	0	%100	
29	M89	Z	-2.3	-2.3	0	%100	Inactive
30	M88	Z	-2.3	-2.3	0	%100	
31	M92	Z	-2.3	-2.3	0	%100	
32	M93	Z	-2	-2	0	%100	
33	M94	Z	-2.3	-2.3	0	%100	
34	M95	Z	-2.3	-2.3	0	%100	
35	M99	Z	-2.3	-2.3	0	%100	
36	M98	Z	-2.3	-2.3	0	%100	
37	M97	Z	-2	-2	0	%100	
38	M96	Z	-2.3	-2.3	0	%100	

Member Distributed Loads (BLC 11 : Extreme Ice Vertical (Mount))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M40	Y	-22	-22	0	%100
2	M42	Y	-22	-22	0	%100
3	M41	Y	-22	-22	0	%100
4	M14	Y	-50	-50	0	%100
5	M15	Y	-50	-50	0	%100
6	M19	Y	-50	-50	0	%100
7	M4	Y	-50	-50	0	%100
8	M1	Y	-50	-50	0	%100
9	M2	Y	-50	-50	0	%100
10	M6	Y	-50	-50	0	%100
11	M30	Y	-50	-50	0	%100
12	M27	Y	-50	-50	0	%100
13	M28	Y	-50	-50	0	%100
14	M32	Y	-50	-50	0	%100
15	M17	Y	-50	-50	0	%100
16	M21	Y	-23	-23	0	%100
17	M20	Y	-23	-23	0	%100
18	M8	Y	-23	-23	0	%100
19	M7	Y	-23	-23	0	%100
20	M34	Y	-23	-23	0	%100
21	M33	Y	-23	-23	0	%100
22	M24	Y	-32	-32	0	%100
23	M11	Y	-32	-32	0	%100
24	M37	Y	-32	-32	0	%100
25	M26	Y	-35	-35	0	%100
26	M12	Y	-35	-35	0	%100
27	M13	Y	-35	-35	0	%100
28	M38	Y	-35	-35	0	%100
29	M39	Y	-35	-35	0	%100

Member Distributed Loads (BLC 11 : Extreme Ice Vertical (Mount)) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
30	M25	Y	-35	-35	0	%100
31	M154	Y	-18	-18	0	%100
32	M156	Y	-18	-18	0	%100
33	M155	Y	-18	-18	0	%100
34	M157	Y	-30	-30	0	%100
35	M158	Y	-30	-30	0	%100
36	M159	Y	-30	-30	0	%100
37	M7	Y	-4	-4	0	%100
38	M8	Y	-4	-4	0	%100
39	M11	Y	-4	-4	0	%100
40	M12	Y	-4	-4	0	%100
41	M13	Y	-4	-4	0	%100
42	M20	Y	-4	-4	0	%100
43	M21	Y	-4	-4	0	%100
44	M24	Y	-4	-4	0	%100
45	M25	Y	-4	-4	0	%100
46	M26	Y	-4	-4	0	%100
47	M33	Y	-4	-4	0	%100
48	M34	Y	-4	-4	0	%100
49	M37	Y	-4	-4	0	%100
50	M38	Y	-4	-4	0	%100
51	M39	Y	-4	-4	0	%100

Member Distributed Loads (BLC 12 : Extreme Ice Normal (Mount))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M40	PZ	8.04	8.04	0	%100
2	M42	PZ	8.04	8.04	0	%100
3	M41	PZ	8.04	8.04	0	%100
4	M15	PZ	15.41	15.41	0	%100
5	M19	PZ	15.41	15.41	0	%100
6	M4	PZ	15.41	15.41	0	%100
7	M1	PZ	15.41	15.41	0	%100
8	M2	PZ	15.41	15.41	0	%100
9	M6	PZ	15.41	15.41	0	%100
10	M30	PZ	15.41	15.41	0	%100
11	M27	PZ	15.41	15.41	0	%100
12	M28	PZ	15.41	15.41	0	%100
13	M32	PZ	15.41	15.41	0	%100
14	M17	PZ	15.41	15.41	0	%100
15	M14	PZ	15.41	15.41	0	%100
16	M20	PZ	6.7	6.7	0	%100
17	M8	PZ	6.7	6.7	0	%100
18	M7	PZ	6.7	6.7	0	%100
19	M34	PZ	6.7	6.7	0	%100
20	M33	PZ	6.7	6.7	0	%100
21	M21	PZ	6.7	6.7	0	%100
22	M24	PZ	8.71	8.71	0	%100
23	M11	PZ	8.71	8.71	0	%100
24	M37	PZ	8.71	8.71	0	%100
25	M26	PZ	8.71	8.71	0	%100
26	M12	PZ	8.71	8.71	0	%100
27	M13	PZ	8.71	8.71	0	%100
28	M38	PZ	8.71	8.71	0	%100
29	M39	PZ	8.71	8.71	0	%100
30	M25	PZ	8.71	8.71	0	%100
31	M157	PZ	7.37	7.37	0	%100
32	M156	PZ	7.37	7.37	0	%100
33	M158	PZ	7.37	7.37	0	%100
34	M155	PZ	7.37	7.37	0	%100
35	M159	PZ	7.37	7.37	0	%100
36	M154	PZ	7.37	7.37	0	%100

Member Distributed Loads (BLC 15 : Ice)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M42	Y	-10.7	-10.7	0	%100
2	M41	Y	-10.7	-10.7	0	%100
3	M40	Y	-10.7	-10.7	0	%100
4	M154	Y	-8.4	-8.4	0	%100
5	M156	Y	-8.4	-8.4	0	%100
6	M155	Y	-8.4	-8.4	0	%100
7	M91	Y	-8.4	-8.4	0	%100
8	M90	Y	-8.4	-8.4	0	%100
9	M89	Y	-8.4	-8.4	0	%100
10	M88	Y	-8.4	-8.4	0	%100
11	M92	Y	-8.4	-8.4	0	%100
12	M93	Y	-8.4	-8.4	0	%100
13	M94	Y	-8.4	-8.4	0	%100
14	M95	Y	-8.4	-8.4	0	%100
15	M96	Y	-8.4	-8.4	0	%100
16	M97	Y	-8.4	-8.4	0	%100
17	M98	Y	-8.4	-8.4	0	%100
18	M99	Y	-8.4	-8.4	0	%100
19	M11	Y	-15.2	-15.2	0	%100
20	M37	Y	-15.2	-15.2	0	%100
21	M24	Y	-15.2	-15.2	0	%100
22	M12	Y	-15.2	-15.2	0	%100
23	M13	Y	-15.2	-15.2	0	%100
24	M38	Y	-15.2	-15.2	0	%100
25	M39	Y	-15.2	-15.2	0	%100
26	M26	Y	-15.2	-15.2	0	%100
27	M25	Y	-15.2	-15.2	0	%100
28	M8	Y	-9.3	-9.3	0	%100
29	M7	Y	-9.3	-9.3	0	%100
30	M34	Y	-9.3	-9.3	0	%100
31	M33	Y	-9.3	-9.3	0	%100
32	M20	Y	-9.3	-9.3	0	%100
33	M21	Y	-9.3	-9.3	0	%100
34	M139	Y	-14.3	-14.3	0	%100
35	M140	Y	-14.3	-14.3	0	%100
36	M141	Y	-14.3	-14.3	0	%100
37	M157	Y	-10.8	-10.8	0	%100
38	M158	Y	-10.8	-10.8	0	%100
39	M159	Y	-10.8	-10.8	0	%100

Member Distributed Loads (BLC 20 : Maint. Normal (Mount))

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
1	M40	PZ	2.68	2.68	0	%100
2	M42	PZ	2.68	2.68	0	%100
3	M41	PZ	2.68	2.68	0	%100
4	M15	PZ	4.02	4.02	0	%100
5	M19	PZ	4.02	4.02	0	%100
6	M4	PZ	4.02	4.02	0	%100
7	M1	PZ	4.02	4.02	0	%100
8	M2	PZ	4.02	4.02	0	%100
9	M6	PZ	4.02	4.02	0	%100
10	M30	PZ	4.02	4.02	0	%100
11	M27	PZ	4.02	4.02	0	%100
12	M28	PZ	4.02	4.02	0	%100
13	M32	PZ	4.02	4.02	0	%100
14	M17	PZ	4.02	4.02	0	%100
15	M14	PZ	4.02	4.02	0	%100
16	M21	PZ	2.01	2.01	0	%100
17	M20	PZ	2.01	2.01	0	%100
18	M8	PZ	2.01	2.01	0	%100
19	M7	PZ	2.01	2.01	0	%100
20	M34	PZ	2.01	2.01	0	%100
21	M33	PZ	2.01	2.01	0	%100
22	M24	PZ	4.02	4.02	0	%100

Member Distributed Loads (BLC 20 : Maint. Normal (Mount)) (Continued)

	Member Label	Direction	Start Magnitude [lb/ft, F, psf, k-ft/in]	End Magnitude [lb/ft, F, psf, k-ft/in]	Start Location [(in, %)]	End Location [(in, %)]
23	M11	PZ	4.02	4.02	0	%100
24	M37	PZ	4.02	4.02	0	%100
25	M26	PZ	3.35	3.35	0	%100
26	M12	PZ	3.35	3.35	0	%100
27	M13	PZ	3.35	3.35	0	%100
28	M38	PZ	3.35	3.35	0	%100
29	M39	PZ	3.35	3.35	0	%100
30	M25	PZ	3.35	3.35	0	%100
31	M157	PZ	2.01	2.01	0	%100
32	M156	PZ	2.01	2.01	0	%100
33	M158	PZ	2.01	2.01	0	%100
34	M155	PZ	2.01	2.01	0	%100
35	M159	PZ	2.01	2.01	0	%100
36	M154	PZ	2.01	2.01	0	%100

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Y	-51.1	36
2	M90	Y	-51.1	60
3	M94	Y	-51.1	36
4	M94	Y	-51.1	60
5	M98	Y	-51.1	36
6	M98	Y	-51.1	60
7	M89	Y	-110.7	18
8	M89	Y	-110.7	84
9	M93	Y	-110.7	18
10	M93	Y	-110.7	84
11	M97	Y	-110.7	18
12	M97	Y	-110.7	84
13	M89	Y	-55	18
14	M89	Y	-55	84
15	M93	Y	-55	18
16	M93	Y	-55	84
17	M97	Y	-55	18
18	M97	Y	-55	84
19	M91	Y	-82	54
20	M95	Y	-82	54
21	M99	Y	-82	54
22	M88	Y	-97.5	54
23	M92	Y	-97.5	54
24	M96	Y	-97.5	54
25	M24	Y	-39.5	50

Member Point Loads (BLC 4 : WLX)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	X	16.2	36
2	M90	X	16.2	60
3	M94	X	35.1	36
4	M94	X	35.1	60
5	M98	X	35.1	36
6	M98	X	35.1	60
7	M89	X	120.4	18
8	M89	X	120.4	84
9	M93	X	250.2	18
10	M93	X	250.2	84
11	M97	X	250.2	18
12	M97	X	250.2	84
13	M91	X	17.4	54
14	M95	X	28	54
15	M99	X	28	54
16	M88	X	21.5	54
17	M92	X	28	54
18	M96	X	28	54
19	M24	X	79.7	50

Member Point Loads (BLC 5 : WLZ)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Z	-40.6	36
2	M90	Z	-40.6	60
3	M94	Z	-28	36
4	M94	Z	-28	60
5	M98	Z	-28	36
6	M98	Z	-28	60
7	M89	Z	-288.9	18
8	M89	Z	-288.9	84
9	M93	Z	-104.3	18
10	M93	Z	-104.3	84
11	M97	Z	-104.3	18
12	M97	Z	-104.3	84
13	M91	Z	-32.3	54
14	M95	Z	-15.1	54
15	M99	Z	-15.1	54
16	M88	Z	-32.2	54
17	M92	Z	-18.6	54
18	M96	Z	-18.6	54
19	M24	Z	-74.2	50

Member Point Loads (BLC 6 : WLX Ice)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	X	3.8	36
2	M90	X	3.8	60
3	M94	X	6.8	36
4	M94	X	6.8	60
5	M98	X	6.8	36
6	M98	X	6.8	60
7	M89	X	26.8	18
8	M89	X	26.8	84
9	M93	X	41.7	18
10	M93	X	41.7	84
11	M97	X	41.7	18
12	M97	X	41.7	84
13	M91	X	4.5	54
14	M95	X	6.1	54
15	M99	X	6.1	54
16	M88	X	5.2	54
17	M92	X	6.1	54
18	M96	X	6.1	54
19	M24	X	16.1	50

Member Point Loads (BLC 7 : WLZ Ice)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Z	-7.9	36
2	M90	Z	-7.9	60
3	M94	Z	-3.3	36
4	M94	Z	-3.3	60
5	M98	Z	-3.3	36
6	M98	Z	-3.3	60
7	M89	Z	-48.1	18
8	M89	Z	-48.1	84
9	M93	Z	-23.2	18
10	M93	Z	-23.2	84
11	M97	Z	-23.2	18
12	M97	Z	-23.2	84
13	M91	Z	-7.1	54
14	M95	Z	-3.9	54
15	M99	Z	-3.9	54
16	M88	Z	-7.1	54
17	M92	Z	-4.5	54
18	M96	Z	-4.5	54
19	M24	Z	-15.1	50

Member Point Loads (BLC 15 : Ice)

	Member Label	Direction	Magnitude [lb, k-ft]	Location [(in, %)]
1	M90	Y	-62	36
2	M90	Y	-62	60
3	M94	Y	-62	36
4	M94	Y	-62	60
5	M98	Y	-62	36
6	M98	Y	-62	60
7	M89	Y	-359.2	18
8	M89	Y	-359.2	84
9	M93	Y	-359.2	18
10	M93	Y	-359.2	84
11	M97	Y	-359.2	18
12	M97	Y	-359.2	84
13	M91	Y	-59.3	54
14	M95	Y	-59.3	54
15	M99	Y	-59.3	54
16	M88	Y	-62.4	54
17	M92	Y	-62.4	54
18	M96	Y	-62.4	54
19	M24	Y	-117.5	50

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	Dead	DL	-1		25	12
3	Extreme Wind Vertical (Mount)	None				
4	WLX	WLX			19	30
5	WLZ	WLZ			19	38
6	WLX Ice	None			19	30
7	WLZ Ice	None		12	19	38
8	Extreme Wind Normal (Epuipment)	None		12		
9	Extreme Wind Tangential (Equipme	None				
11	Extreme Ice Vertical (Mount)	None				51
12	Extreme Ice Normal (Mount)	None				36
13	Extreme Ice Tangential (Mount)	None				
15	Ice	None		12	19	39
16	Extreme Ice Normal (Equipment)	None		12		
17	Extreme Ice Tangential (Equipmen	None				
19	Maint. Vertical (Mount)	None				
20	Maint. Normal (Mount)	None				36
21	Maint. Tangential (Mount)	None				
23	Maint. Vertical (Equipment)	None		12		
24	Maint. Normal (Equipment)	None		12		
25	Maint. Tangential (Equipment)	None				
27	Lm	None		1		

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	TIA-222-G (1) 0	Yes	Y	DL	1.2	WLX		WLZ	1.6								
2	TIA-222-G (1) 30	Yes	Y	DL	1.2	WLX	0.8	WLZ	1.386								
3	TIA-222-G (1) 45	Yes	Y	DL	1.2	WLX	1.131	WLZ	1.131								
4	TIA-222-G (1) 60	Yes	Y	DL	1.2	WLX	1.386	WLZ	0.8								
5	TIA-222-G (1) 90	Yes	Y	DL	1.2	WLX	1.6	WLZ									
6	TIA-222-G (1) 120	Yes	Y	DL	1.2	WLX	1.386	WLZ	-0.8								
7	TIA-222-G (1) 135	Yes	Y	DL	1.2	WLX	1.131	WLZ	-1.131								
8	TIA-222-G (1) 150	Yes	Y	DL	1.2	WLX	0.8	WLZ	-1.386								
9	TIA-222-G (1) 180	Yes	Y	DL	1.2	WLX		WLZ	-1.6								
10	TIA-222-G (1) 210	Yes	Y	DL	1.2	WLX	-0.8	WLZ	-1.386								
11	TIA-222-G (1) 225	Yes	Y	DL	1.2	WLX	-1.131	WLZ	-1.131								
12	TIA-222-G (1) 240	Yes	Y	DL	1.2	WLX	-1.386	WLZ	-0.8								
13	TIA-222-G (1) 270	Yes	Y	DL	1.2	WLX	-1.6	WLZ									
14	TIA-222-G (1) 300	Yes	Y	DL	1.2	WLX	-1.386	WLZ	0.8								
15	TIA-222-G (1) 315	Yes	Y	DL	1.2	WLX	-1.131	WLZ	1.131								
16	TIA-222-G (1) 330	Yes	Y	DL	1.2	WLX	-0.8	WLZ	1.386								
17	TIA-222-G (2) 0	Yes	Y	DL	0.9	WLX		WLZ	1.6								
18	TIA-222-G (2) 30	Yes	Y	DL	0.9	WLX	0.8	WLZ	1.386								

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
19	TIA-222-G (2) 45	Yes	Y	DL	0.9	WLX	1.131	WLZ	1.131								
20	TIA-222-G (2) 60	Yes	Y	DL	0.9	WLX	1.386	WLZ	0.8								
21	TIA-222-G (2) 90	Yes	Y	DL	0.9	WLX	1.6	WLZ									
22	TIA-222-G (2) 120	Yes	Y	DL	0.9	WLX	1.386	WLZ	-0.8								
23	TIA-222-G (2) 135	Yes	Y	DL	0.9	WLX	1.131	WLZ	-1.131								
24	TIA-222-G (2) 150	Yes	Y	DL	0.9	WLX	0.8	WLZ	-1.386								
25	TIA-222-G (2) 180	Yes	Y	DL	0.9	WLX		WLZ	-1.6								
26	TIA-222-G (2) 210	Yes	Y	DL	0.9	WLX	-0.8	WLZ	-1.386								
27	TIA-222-G (2) 225	Yes	Y	DL	0.9	WLX	-1.131	WLZ	-1.131								
28	TIA-222-G (2) 240	Yes	Y	DL	0.9	WLX	-1.386	WLZ	-0.8								
29	TIA-222-G (2) 270	Yes	Y	DL	0.9	WLX	-1.6	WLZ									
30	TIA-222-G (2) 300	Yes	Y	DL	0.9	WLX	-1.386	WLZ	0.8								
31	TIA-222-G (2) 315	Yes	Y	DL	0.9	WLX	-1.131	WLZ	1.131								
32	TIA-222-G (2) 330	Yes	Y	DL	0.9	WLX	-0.8	WLZ	1.386								
33	TIA-222-G (3) 0	Yes	Y	DL	1.2	WLX		WLZ	1	15	1						
34	TIA-222-G (3) 30	Yes	Y	DL	1.2	WLX	0.5	WLZ	0.866	15	1						
35	TIA-222-G (3) 45	Yes	Y	DL	1.2	WLX	0.707	WLZ	0.707	15	1						
36	TIA-222-G (3) 60	Yes	Y	DL	1.2	WLX	0.866	WLZ	0.5	15	1						
37	TIA-222-G (3) 90	Yes	Y	DL	1.2	WLX	1	WLZ		15	1						
38	TIA-222-G (3) 120	Yes	Y	DL	1.2	WLX	0.866	WLZ	-0.5	15	1						
39	TIA-222-G (3) 135	Yes	Y	DL	1.2	WLX	0.707	WLZ	-0.707	15	1						
40	TIA-222-G (3) 150	Yes	Y	DL	1.2	WLX	0.5	WLZ	-0.866	15	1						
41	TIA-222-G (3) 180	Yes	Y	DL	1.2	WLX		WLZ	-1	15	1						
42	TIA-222-G (3) 210	Yes	Y	DL	1.2	WLX	-0.5	WLZ	-0.866	15	1						
43	TIA-222-G (3) 225	Yes	Y	DL	1.2	WLX	-0.707	WLZ	-0.707	15	1						
44	TIA-222-G (3) 240	Yes	Y	DL	1.2	WLX	-0.866	WLZ	-0.5	15	1						
45	TIA-222-G (3) 270	Yes	Y	DL	1.2	WLX	-1	WLZ		15	1						
46	TIA-222-G (3) 300	Yes	Y	DL	1.2	WLX	-0.866	WLZ	0.5	15	1						
47	TIA-222-G (3) 315	Yes	Y	DL	1.2	WLX	-0.707	WLZ	0.707	15	1						
48	TIA-222-G (3) 330	Yes	Y	DL	1.2	WLX	-0.5	WLZ	0.866	15	1						
49	**********																
50	Catagory A Extreme Wind																
51	Extreme Wind 0		Y	8	1	9		7	0.5	4	1	5		1	1.2		
52	Extreme Wind 30		Y	8	0.779	9	0.45	7	0.5	4	0.866	5	0.5	1	1.2		
53	Extreme Wind 45		Y	8	0.566	9	0.57	7	0.5	4	0.707	5	0.707	1	1.2		
54	Extreme Wind 60		Y	8	0.35	9	0.61	7	0.5	4	0.5	5	0.866	1	1.2		
55	Extreme Wind 90		Y	8		9	0.6	7	0.5	4		5	1	1	1.2		
56	Extreme Wind 120		Y	8	-0.35	9	0.61	7	0.5	4	-0.5	5	0.866	1	1.2		
57	Extreme Wind 135		Y	8	-0.566	9	0.57	7	0.5	4	-0.707	5	0.707	1	1.2		
58	Extreme Wind 150		Y	8	-0.779	9	0.45	7	0.5	4	-0.866	5	0.5	1	1.2		
59	Extreme Wind 180		Y	8	-1	9		7	0.5	4	-1	5		1	1.2		
60	Extreme Wind 210		Y	8	-0.779	9	-0.45	7	0.5	4	-0.866	5	-0.5	1	1.2		
61	Extreme Wind 225		Y	8	-0.566	9	-0.57	7	0.5	4	-0.707	5	-0.707	1	1.2		
62	Extreme Wind 240		Y	8	-0.35	9	-0.61	7	0.5	4	-0.5	5	-0.866	1	1.2		
63	Extreme Wind 270		Y	8		9	-0.6	7	0.5	4		5	-1	1	1.2		
64	Extreme Wind 300		Y	8	0.35	9	-0.61	7	0.5	4	0.5	5	-0.866	1	1.2		
65	Extreme Wind 315		Y	8	0.566	9	-0.57	7	0.5	4	0.707	5	-0.707	1	1.2		
66	Extreme Wind 330		Y	8	0.779	9	-0.45	7	0.5	4	0.866	5	-0.5	1	1.2		
67	Catagory A Extreme Ice																
68	Extreme Ice 0		Y	16	1	17		15	1	12	1	13		1	1.2	11	1
69	Extreme Ice 30		Y	16	0.779	17	0.45	15	1	12	0.866	13	0.5	1	1.2	11	1
70	Extreme Ice 45		Y	16	0.566	17	0.57	15	1	12	0.707	13	0.707	1	1.2	11	1
71	Extreme Ice 60		Y	16	0.35	17	0.61	15	1	12	0.5	13	0.866	1	1.2	11	1
72	Extreme Ice 90		Y	16		17	0.6	15	1	12		13	1	1	1.2	11	1
73	Extreme Ice 120		Y	16	-0.35	17	0.61	15	1	12	-0.5	13	0.866	1	1.2	11	1
74	Extreme Ice 135		Y	16	-0.566	17	0.57	15	1	12	-0.707	13	0.707	1	1.2	11	1
75	Extreme Ice 150		Y	16	-0.779	17	0.45	15	1	12	-0.866	13	0.5	1	1.2	11	1
76	Extreme Ice 180		Y	16	-1	17		15	1	12	-1	13		1	1.2	11	1
77	Extreme Ice 210		Y	16	-0.779	17	-0.45	15	1	12	-0.866	13	-0.5	1	1.2	11	1
78	Extreme Ice 225		Y	16	-0.566	17	-0.57	15	1	12	-0.707	13	-0.707	1	1.2	11	1
79	Extreme Ice 240		Y	16	-0.35	17	-0.61	15	1	12	-0.5	13	-0.866	1	1.2	11	1
80	Extreme Ice 270		Y	16		17	-0.6	15	1	12		13	-1	1	1.2	11	1
81	Extreme Ice 300		Y	16	0.35	17	-0.61	15	1	12	0.5	13	-0.866	1	1.2	11	1
82	Extreme Ice 315		Y	16	0.566	17	-0.57	15	1	12	0.707	13	-0.707	1	1.2	11	1
83	Extreme Ice 330		Y	16	0.779	17	-0.45	15	1	12	0.866	13	-0.5	1	1.2	11	1

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
84	Catagory A Maintenance																
85	Maintenance 0		Y	24	1	25		23	0.5	20	1	21		27	1.5	1	1.2
86	Maintenance 30		Y	24	0.779	25	0.45	23	0.5	20	0.866	21	0.5	27	1.5	1	1.2
87	Maintenance 45		Y	24	0.566	25	0.57	23	0.5	20	0.707	21	0.707	27	1.5	1	1.2
88	Maintenance 60		Y	24	0.35	25	0.61	23	0.5	20	0.5	21	0.866	27	1.5	1	1.2
89	Maintenance 90		Y	24		25	0.6	23	0.5	20		21	1	27	1.5	1	1.2
90	Maintenance 120		Y	24	-0.35	25	0.61	23	0.5	20	-0.5	21	0.866	27	1.5	1	1.2
91	Maintenance 135		Y	24	-0.566	25	0.57	23	0.5	20	-0.707	21	0.707	27	1.5	1	1.2
92	Maintenance 150		Y	24	-0.779	25	0.45	23	0.5	20	-0.866	21	0.5	27	1.5	1	1.2
93	Maintenance 180		Y	24	-1	25		23	0.5	20	-1	21		27	1.5	1	1.2
94	Maintenance 210		Y	24	-0.779	25	-0.45	23	0.5	20	-0.866	21	-0.5	27	1.5	1	1.2
95	Maintenance 225		Y	24	-0.566	25	-0.57	23	0.5	20	-0.707	21	-0.707	27	1.5	1	1.2
96	Maintenance 240		Y	24	-0.35	25	-0.61	23	0.5	20	-0.5	21	-0.866	27	1.5	1	1.2
97	Maintenance 270		Y	24		25	-0.6	23	0.5	20		21	-1	27	1.5	1	1.2
98	Maintenance 300		Y	24	0.35	25	-0.61	23	0.5	20	0.5	21	-0.866	27	1.5	1	1.2
99	Maintenance 315		Y	24	0.566	25	-0.57	23	0.5	20	0.707	21	-0.707	27	1.5	1	1.2
100	Maintenance 330		Y	24	0.779	25	-0.45	23	0.5	20	0.866	21	-0.5	27	1.5	1	1.2
101	Extreme Ice + DM		Y	1	1	11	1										
102	DM		Y	1	1												

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N79	max	0	48	0	48	0	48	0	48	0	48	0	48
2		min	0	1	0	1	0	1	0	1	0	1	0	1
3	N56	max	1123.538	29	1166.532	41	4446.784	33	1.062	48	1.251	5	0.498	37
4		min	-1138.739	5	196.563	17	-1383.81	25	0.284	24	-1.232	29	-0.29	29
5	N55	max	1545.29	30	1308.628	46	1490.157	32	0.092	18	0.815	9	0.923	34
6		min	-4086.907	38	158.921	22	-2732.126	40	-0.991	42	-0.813	17	0.066	26
7	N57	max	4126.457	44	1168.017	36	964.341	19	0.23	32	0.391	1	-0.135	23
8		min	-1654.7	20	133.614	28	-2389.711	43	-0.448	40	-0.388	25	-1.116	47
9	N144	max	18.01	20	2604.531	44	1982.016	44	0.031	20	0.059	5	-0.012	31
10		min	-3451.707	44	-2.095	20	8.427	20	-0.062	44	-0.058	29	-0.067	40
11	N145	max	50.868	37	2508.373	33	-107.878	25	0.016	42	0.011	24	0.007	24
12		min	-29.351	29	71.964	25	-3915.318	33	-0.002	18	-0.045	33	-0.029	48
13	N146	max	3481.695	38	2624.164	38	1997.074	38	0.037	30	0.068	6	0.065	47
14		min	-23.864	30	-5.426	30	8.061	30	-0.067	38	-0.068	30	0.014	23
15	Totals:	max	4017.63	29	9724.572	33	3697.956	1						
16		min	-4017.63	21	3192.491	25	-3697.956	25						

Envelope Maximum Member Section Forces

	Member		Axial[lb]	Loc[in]	LC	y Shear[lb]	Loc[in]	LC	z Shear[lb]	Loc[in]	LC	Torque[k-ft]	Loc[in]	LC	y-y Moment[k-ft]	Loc[in]	LC	z-z Moment[k-ft]	Loc[in]	LC
1	M7	max	881.432	0	29	60.799	0	44	17.213	52.309	21	0	52.309	40	0.01	29.969	47	0.094	0	42
2		min	-1052.862	0	5	-29.001	52.309	36	-23.96	52.309	13	0	0	32	-0.038	0	43	-0.055	52.309	29
3	M8	max	695.182	52.309	27	18.098	52.309	18	57.491	0	43	0	52.309	22	0.01	28.334	8	0.05	52.309	25
4		min	-847.638	0	3	-23.851	52.309	10	-33.147	52.309	35	0	0	46	-0.038	0	44	-0.092	0	45
5	M11	max	1917.462	44.722	20	982.926	15.555	44	678.744	62.222	24	0.366	14.907	24	0.699	45.37	30	1.581	14.907	44
6		min	-4740.956	62.222	44	-1519.312	14.907	44	-678.785	62.222	32	-0.516	45.37	48	-0.702	45.37	6	-0.758	44.722	43
7	M12	max	476.284	31	2	-152.731	0	20	670.487	4.844	2	0.522	4.844	17	0.257	4.844	3	2.084	31	44
8		min	-440.212	31	26	-852.032	31	44	-576.024	4.844	26	-0.547	0	9	-0.263	31	8	-0.022	0	16
9	M13	max	606.388	0	5	959.839	0	43	814.87	26.156	29	0.588	31	14	0.388	0	21	2.342	0	43
10		min	-572.628	0	29	181.942	31	19	-922.431	26.156	5	-0.46	26.156	22	-0.424	0	13	-0.04	31	37
11	M20	max	926.611	52.311	24	60.261	0	39	17.113	52.311	32	0	52.311	34	0.011	29.97	42	0.093	0	36
12		min	-1097.766	0	16	-28.329	52.311	47	-23.878	52.311	8	0	0	26	-0.038	0	38	-0.055	52.311	25
13	M21	max	661.801	0	22	18.029	52.307	29	58.413	0	38	0	52.307	17	0.009	28.333	2	0.052	52.307	21
14		min	-812.627	0	14	-23.828	52.307	5	-33.831	52.307	46	0	0	41	-0.038	0	39	-0.096	0	40
15	M24	max	1974.457	62.254	30	998.2	15.563	38	990.663	62.254	17	0.396	14.915	18	0.813	62.254	17	1.586	14.915	38
16		min	-4837.823	62.254	38	-1523.618	14.915	38	-989.962	62.254	25	-0.509	45.393	42	-0.815	62.254	9	-0.792	44.745	38
17	M25	max	348.938	30.996	12	-150.93	0	31	688.258	4.843	13	0.516	4.843	28	0.3	30.996	28	2.069	30.996	38
18		min	-314.291	30.996	20	-846.846	30.996	39	-594.148	4.843	21	-0.541	0	4	-0.34	30.996	4	-0.019	0	11
19	M26	max	811.221	0	1	954.101	0	37	824.77	26.16	24	0.623	31.004	9	0.32	0	17	2.319	0	38
20		min	-777.7	0	25	178.558	31.004	29	-932.005	26.16	16	-0.498	26.16	17	-0.356	0	9	-0.041	31.004	33
21	M33	max	658.15	0	18	29.405	0	33	16.175	0	5	0	52.315	46	0.015	25.068	37	0.061	52.315	43
22		min	-832.848	0	10	-49.973	52.315	41	-10.961	0	29	0	0	22	-0.026	52.315	46	-0.048	0	5
23	M34	max	544.881	0	17	17.419	0	13	26.16	0	34	0	52.304	28	0.015	23.428	45	0.05	0	13

Envelope Maximum Member Section Forces (Continued)

	Member		Axial[lb]	Loc[in]	LC	y Shear[lb]	Loc[in]	LC	z Shear[lb]	Loc[in]	LC	Torque[k-ft]	Loc[in]	LC	y-y Moment[k-ft]	Loc[in]	LC	z-z Moment[k-ft]	Loc[in]	LC
24		min	-690.023	0	9	-11.433	0	21	-54.202	52.304	42	0	0	36	-0.031	52.304	36	-0.073	52.304	39
25	M37	max	1546.456	14.915	9	996.76	15.564	33	1123.219	62.254	29	0.487	14.915	29	1.232	62.254	29	1.729	14.915	33
26		min	-4446.783	45.394	33	-1409.375	14.915	33	-1138.14	62.254	5	-0.522	0	5	-1.251	62.254	5	-0.794	44.745	33
27	M38	max	459.856	30.989	6	-158.524	0	25	561.076	4.842	8	0.514	4.842	22	0.228	4.842	9	2.137	30.989	33
28		min	-419.551	5.165	30	-886.804	30.989	33	-464.009	4.842	32	-0.535	0	14	-0.213	30.989	14	-0.024	0	5
29	M39	max	694.701	26.166	12	1002.038	0	48	612.755	26.166	19	0.604	31.011	4	0.264	0	27	2.413	0	33
30		min	-649.178	0	20	179.033	31.011	24	-722.346	26.166	11	-0.484	26.166	28	-0.306	0	3	-0.039	31.011	44
31	M40	max	430.263	96	24	1058.751	96	39	570.64	96	12	0.364	96	13	0.197	144	28	0.664	49.5	41
32		min	-483.829	49.5	13	-531.007	48	48	-555.508	96	20	-0.362	48	10	-0.2	144	4	-0.877	96	42
33	M41	max	507.991	96	20	1047.928	96	34	546.145	96	6	0.299	96	7	0.208	144	22	0.683	49.5	36
34		min	-554.455	96	12	-539.793	48	43	-531.815	96	30	-0.394	48	5	-0.212	144	14	-0.865	96	37
35	M42	max	424.244	96	30	1043.31	96	45	684.355	96	1	0.341	96	2	0.238	48	12	0.67	49.5	46
36		min	-467.5	96	6	-526.19	48	37	-669.685	96	25	-0.359	48	16	-0.238	48	4	-0.885	96	47
37	M88	max	475.116	27	41	196.186	27	5	94.678	69	8	0.23	33	17	0.108	69	8	0.365	27	5
38		min	-221.104	69	17	-160.254	27	29	-77.554	69	32	-0.233	33	9	-0.094	69	32	-0.294	27	29
39	M89	max	596.479	27	37	245.401	27	21	480.763	27	9	0.124	33	32	0.819	27	25	0.534	27	21
40		min	-591.732	27	33	-270.387	27	13	-480.702	27	1	-0.132	33	8	-0.869	27	1	-0.596	27	13
41	M90	max	474.41	27	45	312.045	27	21	247.966	27	1	0.205	69	9	0.519	27	25	0.555	27	21
42		min	-32.444	26	34	-343.644	27	13	-233.09	27	25	-0.19	27	17	-0.576	27	1	-0.609	27	13
43	M91	max	414.133	27	40	171.794	27	5	84.712	69	10	0.176	69	8	0.085	69	28	0.353	27	5
44		min	-146.354	69	32	-166.872	27	29	-79.539	69	18	-0.17	27	32	-0.088	69	4	-0.326	27	29
45	M92	max	473.142	27	46	55.005	69	31	160.131	27	18	0.208	69	22	0.372	27	10	0.106	27	1
46		min	-217.364	69	22	-57.792	69	7	-200.004	27	10	-0.212	27	14	-0.287	27	18	-0.1	27	25
47	M93	max	598.236	27	42	410.356	69	5	225.247	27	2	0.125	69	21	0.465	27	25	0.829	27	5
48		min	-591.732	27	33	-410.374	69	13	-211.998	28	26	-0.133	33	13	-0.489	27	1	-0.757	27	29
49	M94	max	469.629	27	35	309.585	27	4	299.5	27	1	0.144	33	14	0.517	27	25	0.62	27	5
50		min	-32.444	26	42	-281.418	27	28	-282.784	27	25	-0.129	27	22	-0.526	27	1	-0.545	27	29
51	M95	max	445.789	27	46	133.783	27	4	137.398	27	19	0.173	33	13	0.326	27	11	0.238	27	3
52		min	-198.771	69	22	-123.497	27	28	-140.487	27	11	-0.168	27	21	-0.302	27	19	-0.209	27	27
53	M96	max	475.696	27	36	109.017	27	23	164.316	27	16	0.197	33	28	0.27	27	23	0.201	27	23
54		min	-210.392	69	28	-147.818	27	15	-137.53	27	24	-0.2	33	4	-0.319	27	15	-0.302	27	47
55	M97	max	591.732	69	48	410.381	69	5	219.402	27	17	0.097	69	26	0.627	27	10	0.714	27	21
56		min	-591.732	27	33	-410.358	69	13	-249.445	27	9	-0.105	27	2	-0.541	27	18	-0.729	27	13
57	M98	max	476.309	27	39	278.245	27	5	315.006	27	32	0.186	69	5	0.61	27	8	0.575	27	21
58		min	-32.444	26	45	-274.879	27	29	-349.978	27	8	-0.171	27	29	-0.535	27	32	-0.598	27	13
59	M99	max	439.163	27	35	45.737	27	23	182.811	27	16	0.172	33	2	0.348	27	24	0.102	27	25
60		min	-185.51	69	27	-52.739	27	15	-181.307	27	24	-0.166	33	26	-0.36	27	16	-0.135	27	1
61	M139	max	4756.265	0	44	65.066	0	44	22.587	55.946	30	0	55.946	23	0.07	0	5	0.085	0	44
62		min	-45.475	55.946	20	-28.588	55.946	43	-22.72	55.946	6	0	0	15	-0.069	0	29	-0.021	38.463	41
63	M140	max	4649.869	0	33	21.477	0	42	78.296	55.973	5	0	55.973	29	0.281	55.973	5	0.148	55.973	33
64		min	84.085	55.973	25	-77.81	55.973	33	-62.524	55.973	29	0	0	5	-0.23	55.973	29	-0.008	55.973	25
65	M141	max	4795.05	0	38	65.153	0	38	24.228	0	32	0	55.972	18	0.081	0	6	0.086	0	38
66		min	-51.707	55.972	30	-28.528	55.972	39	-24.324	0	8	0	0	10	-0.081	0	30	-0.02	38.481	41
67	M154	max	194.46	48	22	233.373	139.5	17	226.316	138	9	0.221	138	9	0.484	96	17	0.305	48	13
68		min	-222.904	6	14	-258.836	144	9	-212.762	138	17	-0.219	96	1	-0.507	96	9	-0.337	96	13
69	M155	max	243.785	48	4	231.499	0	3	163.593	138	4	0.184	138	4	0.357	96	28	0.317	48	7
70		min	-269.29	48	9	-252.68	144	4	-149.007	138	28	-0.181	96	28	-0.381	96	4	-0.353	96	8
71	M156	max	196.633	138	15	244.169	0	14	191.884	138	13	0.187	138	14	0.388	96	21	0.3	48	2
72		min	-181.146	48	5	-255.697	144	14	-178.221	138	21	-0.184	96	22	-0.412	96	13	-0.35	96	3
73	M157	max	228.24	18.031	20	218.3	18.031	31	266.08	18.031	23	0.003	18.031	32	0.144	0	12	0.315	0	14
74		min	-258.255	18.031	12	-236.208	0	7	-275.443	18.031	15	-0.003	0	8	-0.119	0	20	-0.305	0	22
75	M158	max	133.505	18.031	26	278.925	18.031	21	228.664	9.579	29	0.003	18.031	21	0.087	0	1	0.327	0	5
76		min	-169.412	0	2	-294.768	0	13	-235.587	1.503	5	-0.003	0	13	-0.081	18.031	11	-0.316	0	29
77	M159	max	254.45	0	32	246.174	18.031	26	271.291	0	18	0.003	18.031	26	0.135	0	8	0.382	0	9
78		min	-284.789	0	8	-264.327	0	2	-278.736	0	10	-0.003	0	2	-0.122	18.031	15	-0.374	0	17

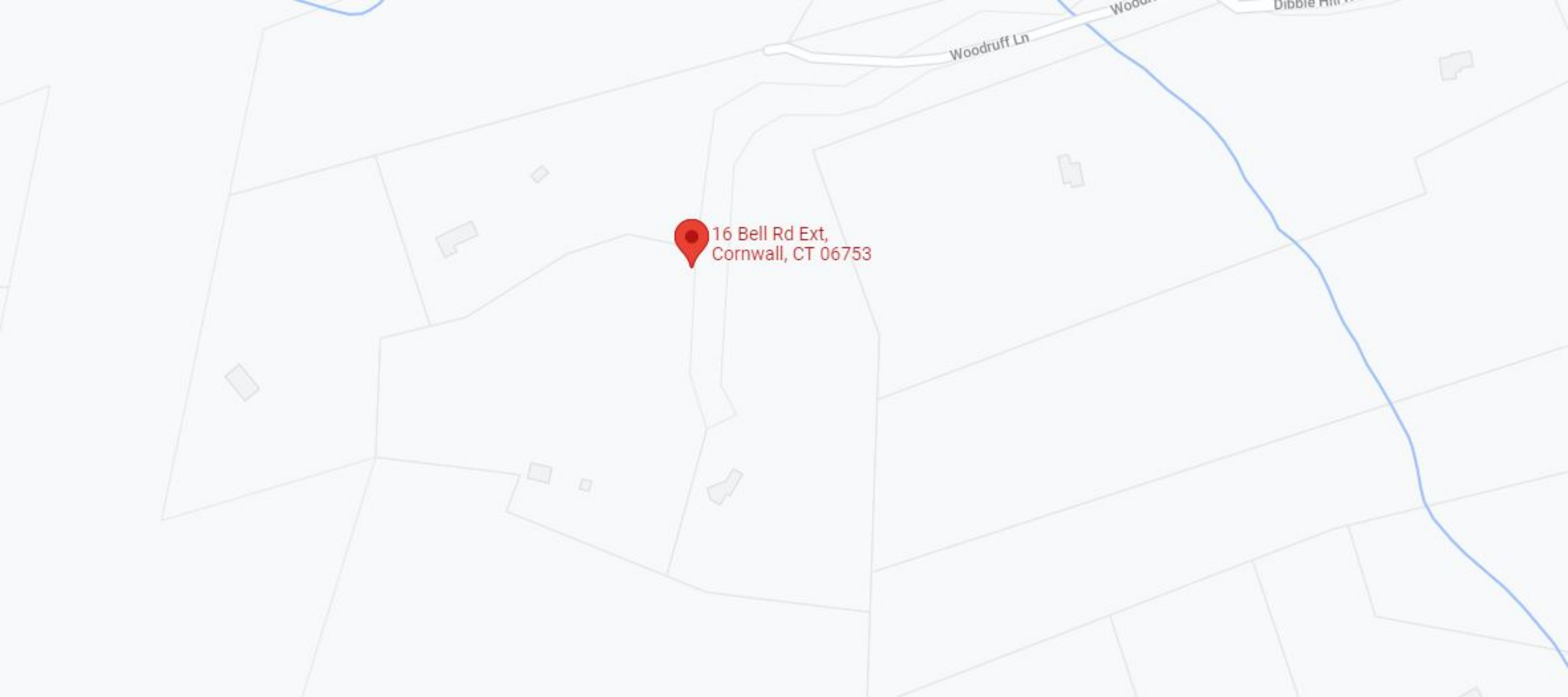
Envelope AISC 14TH (360-10): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M7	L2X2X3	0.177	0	44	0.011	0	y	42	15110.904	22093.2	0.527	1.098	1.5	H2-1
2	M8	L2X2X3	0.171	0	44	0.011	0	z	45	15110.903	22093.2	0.527	1.098	1.5	H2-1
3	M11	HSS4X4X4	0.153	15.555	44	0.088	62.222	y	48	99561.427	103122	11.96	11.96	1.914	H1-1b
4	M12	HSS4X4X4	0.188	31	41	0.071	4.844	z	1	102226.485	103122	11.96	11.96	1.689	H1-1b
5	M13	HSS4X4X4	0.22	0	45	0.083	0	y	46	102226.485	103122	11.96	11.96	1.697	H1-1b
6	M20	L2X2X3	0.174	0	39	0.011	0	y	37	15110.469	22093.2	0.527	1.098	1.5	H2-1

Envelope AISC 14TH (360-10): LRFD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
7	M21	L2X2X3	0.173	0	38	0.011	0	z	40	15111.338	22093.2	0.527	1.098	1.5	H2-1
8	M24	HSS4X4X4	0.157	62.254	40	0.092	62.254	y	42	99557.85	103122	11.96	11.96	1.901	H1-1b
9	M25	HSS4X4X4	0.193	30.996	37	0.071	4.843	z	12	102226.713	103122	11.96	11.96	1.69	H1-1b
10	M26	HSS4X4X4	0.212	0	40	0.088	26.16	z	9	102226.257	103122	11.96	11.96	1.698	H1-1b
11	M33	L2X2X3	0.132	52.315	43	0.012	52.315	y	45	15109.651	22093.2	0.527	1.098	1.5	H2-1
12	M34	L2X2X3	0.145	52.304	39	0.012	52.304	z	37	15112.156	22093.2	0.527	1.098	1.5	H2-1
13	M37	HSS4X4X4	0.169	62.254	37	0.087	62.254	y	37	99557.798	103122	11.96	11.96	1.934	H1-1b
14	M38	HSS4X4X4	0.19	30.989	48	0.067	30.989	y	46	102227.141	103122	11.96	11.96	1.709	H1-1b
15	M39	HSS4X4X4	0.22	0	34	0.088	0	y	36	102225.828	103122	11.96	11.96	1.715	H1-1b
16	M40	PIPE_3.0	0.153	96	42	0.113	96		45	30165.191	65205	5.749	5.749	2.701	H1-1b
17	M41	PIPE_3.0	0.154	96	37	0.105	96		38	30165.191	65205	5.749	5.749	2.527	H1-1b
18	M42	PIPE_3.0	0.157	96	47	0.112	96		33	30165.191	65205	5.749	5.749	2.724	H1-1b
19	M88	PIPE_2.5	0.109	27	37	0.08	69		9	30038.461	50715	3.596	3.596	3	H1-1b
20	M89	PIPE_2.5	0.25	27	1	0.07	27		9	30038.461	50715	3.596	3.596	3	H1-1b
21	M90	PIPE_2.5	0.177	27	12	0.083	27		10	30038.461	50715	3.596	3.596	3	H1-1b
22	M91	PIPE_2.5	0.102	27	5	0.062	27		8	30038.461	50715	3.596	3.596	3	H1-1b
23	M92	PIPE_2.5	0.111	27	42	0.073	69		14	30038.461	50715	3.596	3.596	3	H1-1b
24	M93	PIPE_2.5	0.235	27	5	0.069	69		13	30038.461	50715	3.596	3.596	1.797	H1-1b
25	M94	PIPE_2.5	0.188	27	4	0.06	27		14	30038.461	50715	3.596	3.596	3	H1-1b
26	M95	PIPE_2.5	0.112	27	11	0.064	27		13	30038.461	50715	3.596	3.596	3	H1-1b
27	M96	PIPE_2.5	0.124	27	47	0.072	27		13	30038.461	50715	3.596	3.596	3	H1-1b
28	M97	PIPE_2.5	0.216	27	13	0.055	69		4	30038.461	50715	3.596	3.596	1.705	H1-1b
29	M98	PIPE_2.5	0.195	27	6	0.079	27		5	30038.461	50715	3.596	3.596	3	H1-1b
30	M99	PIPE_2.5	0.11	27	16	0.061	27		2	30038.461	50715	3.596	3.596	2.848	H1-1b
31	M139	LL2.5X2.5X3X0.5	0.124	0	44	0.006	0	y	46	40564.524	55223.453	4.01	1.544	1.722	H1-1b
32	M140	LL2.5X2.5X3X0.5	0.197	55.973	35	0.007	55.973	z	5	40563.366	55223.453	4.01	1.544	2.081	H1-1b
33	M141	LL2.5X2.5X3X0.5	0.127	0	38	0.006	0	y	42	40563.382	55223.453	4.01	1.544	1.712	H1-1b
34	M154	PIPE_2.0	0.282	96	9	0.157	138		9	6830.97	32130	1.872	1.872	2.651	H1-1b
35	M155	PIPE_2.0	0.25	96	5	0.127	138		4	6830.97	32130	1.872	1.872	2.863	H1-1b
36	M156	PIPE_2.0	0.258	96	13	0.133	138		13	6830.97	32130	1.872	1.872	2.387	H1-1b
37	M157	L2.5X2.5X4	0.259	0	13	0.037	18.031	z	15	33966.483	36414	1.052	2.396	1.5	H2-1
38	M158	L2.5X2.5X4	0.188	0	4	0.042	0	y	13	33966.483	36414	1.052	2.396	1.5	H2-1
39	M159	L2.5X2.5X4	0.281	0	9	0.039	0	z	10	33966.483	36414	1.052	2.396	1.5	H2-1

ATTACHMENT 5


Woodruff Ln
16 Bell Rd Ext,
Cornwall, CT 06753

Cornwall, CT

016 BELL RD EXT

Location
016 BELL RD EXT
Mblu
C07/ 01/ 01/ /
Acct#
98100451
Owner
LEGULL LLC
PBN
Assessment
$272,300
Appraisal
$517,900
PID
450
Building Count
1

Current Value

Appraisal

Valuation Year	Improvements	Land	Total
2019	$115,500	$402,400	$517,900

Assessment

Valuation Year	Improvements	Land	Total
2019	$80,900	$191,400	$272,300

Owner of Record

Owner LEGULL LLC
Co-Owner
Address 24 BRATTLE DR
YARMOUTH PORT, MA 02675-2068
Sale Price $0
Certificate
Book & Page 123/ 250
Sale Date 11/25/2019

Ownership History

Ownership History

Owner	Sale Price	Certificate	Book & Page	Sale Date
LEGULL LLC	$0		123/ 250	11/25/2019
GULLIVER RALPH JR EST OF	$0		059/ 459	09/15/1983

Building Information
Building 1 : Section 1

Year Built: 1984
Living Area: 1,680
Replacement Cost: $164,274
Building Percent Good: 68
Replacement Cost Less Depreciation: $111,700

Building Attributes

Field	Description
Style	LOG HOUSE
Model	Residential
Grade:	C

Stories:	1 Story
Occupancy	1
Exterior Wall 1	Logs
Exterior Wall 2	
Roof Structure:	Gable/Hip
Roof Cover	Metal/Tin
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	wood
Interior Flr 2	
Heat Fuel	Oil
Heat Type:	Hot Water
AC Type:	None
Total Bedrooms:	3 Bedrooms
Total Bthrms:	2
Total Half Baths:	0
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	Average
Kitchen Style:	Average

Building Photo


EAF
BAS
UBM
28
40
Enp

Building Sub-Areas (sq ft) Legend

Code	Description	Gross Area	Living Area
BAS	First Floor	1,120	1,120
EAF	Attic, Expansion, Finished	1,120	560
FOP	Porch, Open, Finished	189	0
UBM	Basement, Unfinished	1,120	0
		3,549	1,680

Extra Features

Extra Features Legend

Code	Description	Size	Value	Bldg #
GEN	GENERATORS	1 UNITS	$0	1

Land

Land Use

Use Code 1-1
Description BUILDING LOT
Zone R-5
Neighborhood
Alt Land Appr No
Category

Land Line Valuation

Size (Acres) 41
Frontage
Depth
Assessed Value $191,400
Appraised Value $402,400

Outbuildings

Outbuildings Legend

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD1	SHED AVER			171 S.F.	$1,700	1

SHD1	SHED AVER			208 S.F.	$2,100	1

Valuation History

Appraisal

Valuation Year	Improvements	Land	Total
2020	$115,500	$402,400	$517,900
2019	$115,500	$402,400	$517,900
2018	$115,500	$402,400	$517,900

Assessment

Valuation Year	Improvements	Land	Total
2020	$80,900	$191,400	$272,300
2019	$80,900	$191,400	$272,300
2018	$80,900	$191,400	$272,300

closecloseclose

ATTACHMENT 6

UNITED STATES POSTAL SERVICE®

CORNWALL

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here ***Postmark with Date of Receipt.***
Kenneth C. Baldwin, Esq. Robinson & Cole LLP 280 Trumbull Street Hartford, CT 06103	3	3	neopost 09/22/2021 US POSTAGE $002.99 ZIP 06103 041L12203937
	Postmaster, per *(name of receiving employee)*		

OLD STATE HOUSE STATION 06103 SEP 21 2021 USPS

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	Gordon Ridgway, First Selectman Town of Cornwall 26 Pine Street Cornwall, CT 06753				
2.	Karen Nelson, Zoning Enforcement Officer & Clerk Town of Cornwall 26 Pine Street Cornwall, CT 06753				
3.	Legull LLC 24 Brattle Drive Yarmouth, MA 02675-2068				
4.					
5.					
6.					