Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

October 16, 2018

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

RE: **Notice of Exempt Modification for T-Mobile / Crown Site BU: 803175**
T-Mobile Site ID: CT11783B
Located at: 167 Coccomo Cir (167/178 Lester Street), New Britain, CT 06051
Latitude: 41° 41' 11.8" / Longitude: -72° 45' 27.8

Dear Ms. Bachman:

T-Mobile currently maintains six (9) antennas at the 161 foot level of the existing 188 foot monopole located at 167 Coccomo Cir (167/178 Lester Street), New Britain, CT. The tower is owned by Crown Castle. The property is owned by Crown Castle. T-Mobile now proposes to swap out (3) panel antennas and (3) RRUs for new models. As well as swapping our (1) line of coax for (1) hybrid fiber line.

This facility was approved by the City of New Britain Planning and Zoning Commission on May 2002. This approval did not include any conditions (please see attached letter from City Zoning Enforcement Officer).

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j- 73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Erin E. Stewart, Mayor, William P. Carroll, Director of Economic Development, as well as the property owner and the tower owner.

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

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

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

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

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

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

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: William Stone.

Sincerely,

William Stone
Real Estate Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
518-373-3543
William.stone@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

Honorable Erin E. Stewart, Mayor
City of New Britain
27 West Main Street
New Britain, CT 06051

William P. Carroll, Director of Economic Development
City of New Britain
27 West Main Street
New Britain, CT 06051

Crown Castle (Both Property Owner and Tower Owner)
3 Corporate Park Dr, Suite 101
Clifton Park, NY 12065

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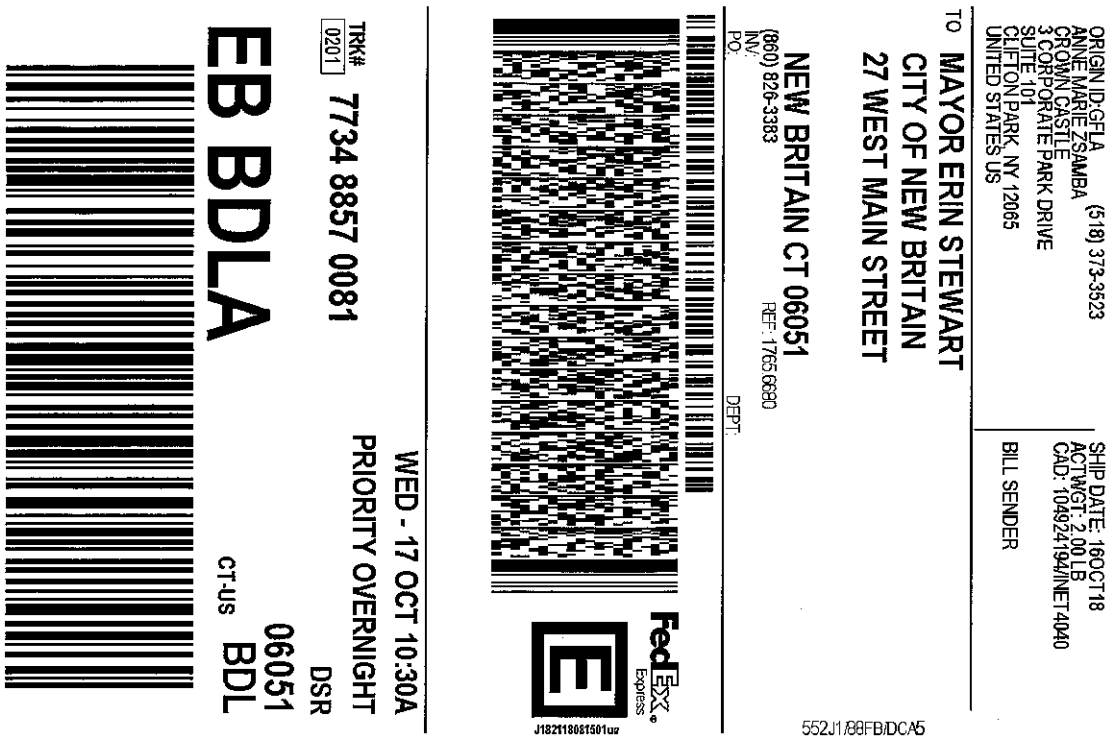
Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.



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167 COCCOMO CIR

Location	167 COCCOMO CIR	**Mblu**	A5D/ 22/ / /
Acct#	15950167	**Owner**	CROWN ATLANTIC COMPANY LLC
Assessment	$58,380	**Appraisal**	$83,400
PID	10590	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$47,400	$36,000	$83,400
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$33,180	$25,200	$58,380

Owner of Record

Owner	CROWN ATLANTIC COMPANY LLC	**Sale Price**	$90,000
Co-Owner		**Certificate**	
Address	4017 WASHINGTON RD PMB 353 MCMURRAY, PA 15317	**Book & Page**	1359/ 428
		Sale Date	02/13/2001

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
CROWN ATLANTIC COMPANY LLC	$90,000		1359/ 428	02/13/2001
BALAVENDER JOHN S +	$44,000		1284/ 180	08/26/1998
	$0		1281/ 173	07/15/1998
	$0		770/ 808	10/29/1981
CLARA MARY DOUCETTE	$0		725/ 121	03/02/1977

Building Information

Building 1 : Section 1

Year Built:	1918
Living Area:	624
Replacement Cost:	$105,398

Building Percent Good: 45

Replacement Cost Less Depreciation: $47,400

Building Attributes	
Field	**Description**
Style	Conventional
Model	Residential
Grade	C
Stories	1 1/4 Stories
Occupancy	1
Exterior Wall 1	Aluminum Sidin
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt Shingl
Interior Wall 1	Plaster
Interior Wall 2	
Interior Flr 1	Carpet
Interior Flr 2	
Central Heat Sys	Yes
AC Type	None
Total Bedrooms	2 Bedrooms
Total Full Baths	1
Total Half Baths	0
Total Xtra Fixtrs	0
Total Rooms	4
Bath Style	Average
Kitchen Style	Average
Whirlpool Tub	
Fireplaces	
Rec Room Finish	
Rec Room Qual	
Bsmt Garages	
Bldg Nbhd	104A

Building Photo

(http://images.vgsi.com/photos/NewBritainCTPhotos//\00\02\86/

Building Layout

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	624	624
EAU	Attic, Expansion, Unfinished	624	0
FEP	Enclosed Porch	66	0
FOP	Open Porch	50	0
URB	Unfin Raised Basement	624	0
		1,988	624

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	1010
Description	Single Family
Zone	I2
Neighborhood	104
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.32
Depth	
Assessed Value	$25,200
Appraised Value	$36,000

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

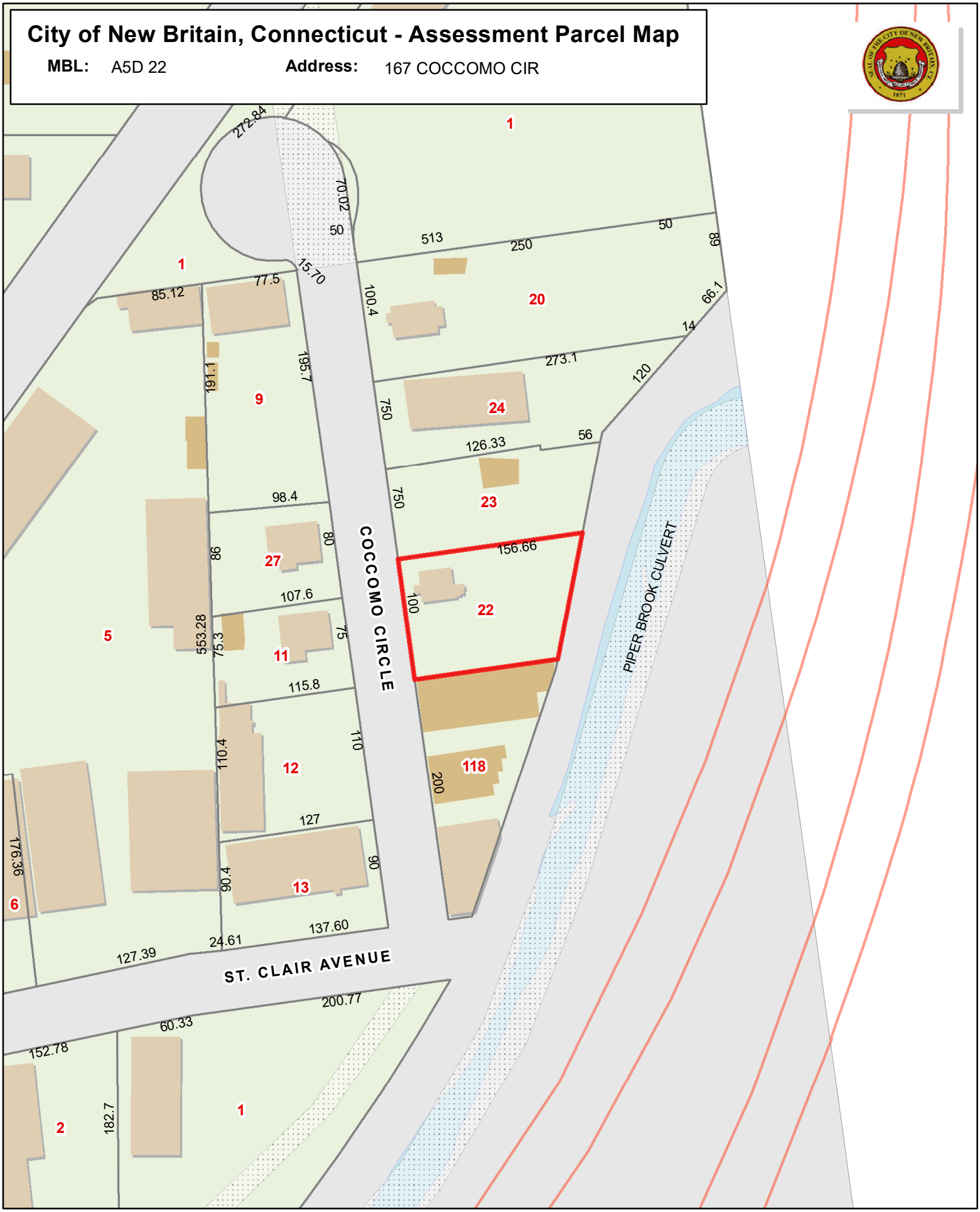
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$39,900	$32,800	$72,700
2015	$39,900	$32,800	$72,700
2014	$39,900	$32,800	$72,700

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$27,930	$22,960	$50,890
2015	$27,930	$22,960	$50,890
2014	$27,930	$22,960	$50,890

City of New Britain, Connecticut - Assessment Parcel Map

MBL: A5D 22 **Address:** 167 COCCOMO CIR



Approximate Scale:

1 inch = 100 feet

Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user.
The City of New Britain and its mapping contractors
assume no legal responsibility for the information contained herein.

Map Produced Feb 2017

City of New Britain

DEPARTMENT OF
LICENSES, PERMITS AND INSPECTIONS

"New Britain: A City for All People"

Tel (860) 826-3384 27 West Main Street, Suite 404 New Britain, CT 06051 Fax (860) 612-4212

December 8, 2015

AMANDA GOODALL
Real Estate Specialist
c/o CROWN CASTLE
12 Gill Street, Suite 5800
Woburn, MA 01801

Subject: 167 Lester Street
I-2 District (general industry) Zone

Dear Sir or Madam:

This is to advise you that the zoning and use of the above caption Premises are governed by the law and regulations of the City of New Britain and the Premises are located in an I-2 District (general industry) under the City of New Britain Zoning Ordinances Section 200.

The property is being used as a Telecommunication tower, 200-10-110 Industry--which is not specifically prohibited. Therefore is a permitted use.

A file check in this department revealed no violations or special conditions on file. Certificate of Occupancy(completion) was issued May 30, 2002.

I hope this letter will suffice in satisfying your needs. If you have any questions, please call at (860) 612 5014.

Sincerely,

David D. Zajac
Building Inspector
Zoning Enforcement Officer

Cc:
file

SHEET INDEX

NO.	DESCRIPTION
T1	TITLE PAGE
N1	NOTES
C1	PLAN & ELEVATION
C2	RF CHART AND ORIENTATION
D1	EQUIPMENT DETAILS
E1	GROUNDING & ELECTRICAL DETAILS
E2	RF PLUMBING DIAGRAM

TOWER OWNER NOTIFICATION

ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1-800-788-7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

T-Mobile

CROWN CASTLE

CBU

803175

SITE ID

CT11783B

SITE NAME

CT NEW BRITAIN 3 CAC

SITE ADDRESS

167 COCCOMO CIR
NEW BRITAIN, CT 06051

CONFIGURATION

67D92DB

PROJECT SITE INFORMATION

SITE ID:	CT11783B
SITE NAME:	CT NEW BRITAIN 3 CAC
SITE ADDRESS:	167 COCCOMO CIR NEW BRITAIN, CT 06051
PERMITTING JURISDICTION:	TOWN OF NEW BRITAIN
COUNTY:	HARTFORD
ZONING:	I2
SITE COORDINATES:	
LATITUDE:	41° 41' 11.80" (41.686611°) (NAD 83)
LONGITUDE:	-72° 45' 27.80" (-72.757722°) (NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING **TOWER** FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO STRUCTURAL ANALYSIS FROM TOWER OWNER PRIOR TO ANY CONSTRUCTION.

ANTENNA MOUNTS

INFINIGY ENGINEERING HAS NOT EVALUATED THE EXISTING **MOUNTS** FOR THIS SITE, AND ASSUMES NO RESPONSIBILITY FOR ITS STRUCTURAL INTEGRITY. REFER TO PASSING MOUNT ANALYSIS PRIOR TO ANY CONSTRUCTION.

PROJECT TEAM INFORMATION

CLIENT REPRESENTATIVE:	CROWN CASTLE 3 CORPORATE PARK DRIVE SUITE 101 CLIFTON PARK, NY 12065
CLIENT REP. CONTACT:	WILL STONE (518) 373-3543
ENGINEER:	INFINIGY 6865 DEERPATH ROAD SUITE 152 ELKRIDGE, MD 21075
ENGINEER CONTACT:	MATTHEW LIVERETTE (518) 690-0790

SCOPE OF WORK

SCOPE OF WORK:
TMO L700 4X2 67D92DB OUTDOOR (CONNECTICUT MARKET) REPLACING (3) EXISTING ANTENNAS WITH NEW MODELS. REMOVING (1) COAX LINE AND REPLACING WITH (1) HYBRID FIBER CABLE.REPLACING (3) RRUS WITH NEW MODELS.

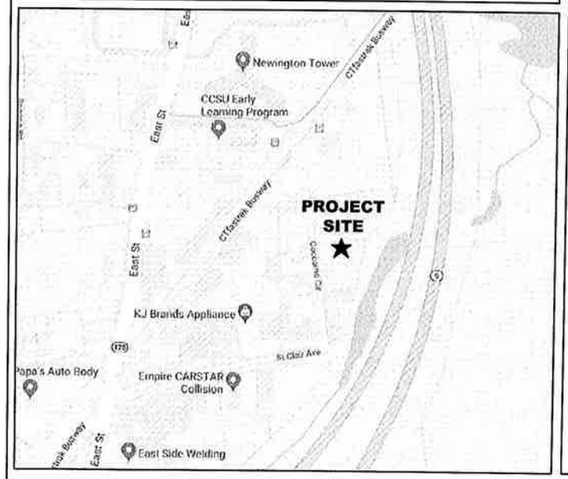
CURRENT INSTALL: (9) ANTENNAS, (11) COAX, (2) HYBRID FIBER CABLES, (3) TMA'S, AND (3) RRUS. NO CHANGES MADE TO LEASED GROUND SPACE.

FINAL CONFIGURATION: (9) ANTENNAS, (10) COAX, (3) HYBRID FIBER CABLES, (3) TMA'S, AND (3) RRUS.

811 Know what's below. Call before you dig.

TO OBTAIN LOCATION OF PARTICIPANTS UNDERGROUND FACILITIES BEFORE YOU DIG IN CONNECTICUT, CONTACT CALL BEFORE YOU DIG
TOLL FREE: 1-800-922-4455 OR www.cbyd.com
CONNECTICUT STATUTE REQUIRES MIN OF 2 WORKING DAYS NOTICE BEFORE YOU EXCAVATE

LOCATION MAP



GENERAL NOTES

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- FACILITY HAS NO PLUMBING OR REFRIGERANTS.
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS.
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. EQUIPMENT, ANTENNAS/RRH AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR.
- THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON STORMWATER DRAINAGE.
- NO SANITARY SEWER, POTABLE WATER, OR TRASH DISPOSAL SERVICE IS REQUIRED
- NO COMMERCIAL SIGNAGE IS PROPOSED

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED WITH ANY LOCAL AMENDMENTS BY THE LOCAL GOVERNING AUTHORITIES:

- INTERNATIONAL BUILDING CODE
- NATIONAL ELECTRICAL CODE
- NATIONAL FIRE PROTECTION ASSOCIATION 101
- NATIONAL FIRE PROTECTION ASSOCIATION 1
- LOCAL BUILDING CODES
- CITY/COUNTY ORDINANCES
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS (AISC)
- UNDERWRITERS LABORATORIES APPROVED ELECTRICAL PRODUCTS.
- ANSI EIA/TIA 222 REV. G
- TIA 607
- INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
- IEEE C2 (LATEST EDITION)
- TELCORDIA GR-1275
- ANSI T1.311

T-Mobile
T-MOBILE NORTHEAST LLC
103 MONARCH DRIVE
LIVERPOOL, NY 13088

INFINIGY
6865 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
10/8/2018
LICENSED PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT IN ANY WAY. IF ANY ITEM BEARING THE SEAL OF A LICENSED PROFESSIONAL ENGINEER IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM THE SEAL, THE WORDS "ALTERED BY" FOLLOWED BY THE ALTERING ENGINEER'S SIGNATURE, AND THE DATE OF THE ALTERATION. THIS ALTERATION SHALL BE DESCRIBED IN A WRITTEN STATEMENT. IT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	RMS	10/08/18
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: MJD

Project Number: 600-007

Project Title:
CT11783B
CT NEW BRITAIN 3 CAC
167 COCCOMO CIR
NEW BRITAIN, CT 06051

Prepared For: CROWN CASTLE

Drawing Title
TITLE PAGE

Drawing Number
T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
- A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
- B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
- C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
- D. AND NFPA 101 (LIFE SAFETY CODE).
- E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
- F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: T-MOBILE CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E", THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D: CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E: THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 ON-SITE SUPERVISION: THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.5 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES, AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.

1.6 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE T-MOBILE WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE, POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

2.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

2.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD-PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY T-MOBILE TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

2.5 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

3.1 RECEIPT OF MATERIAL AND EQUIPMENT: CONTRACTOR IS RESPONSIBLE FOR T-MOBILE PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
- A. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
- B. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
- C. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
- D. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO T-MOBILE OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
- E. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
- F. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

4.2 EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
B. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

4.4 CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

5.1 TESTS AND INSPECTIONS:
- A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
- B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.
- C. WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
- D. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
- E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
- F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
- G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ROOTS, SOD, RUBBING, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
KWH	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR	GROUND ROD
OR	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
	DC POWER AND FIBER OPTIC TRUNK CABLES
E	DC POWER CABLES
# / #	REPRESENTS DETAIL NUMBER / REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

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JOHN S. STEVENS
No. 21705
PROFESSIONAL ENGINEER
08/2018

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	RMS	10/08/18
A	ISSUED FOR REVIEW	SL	09/14/18

Drawn: RCD
Designed: MRL
Checked: AJD

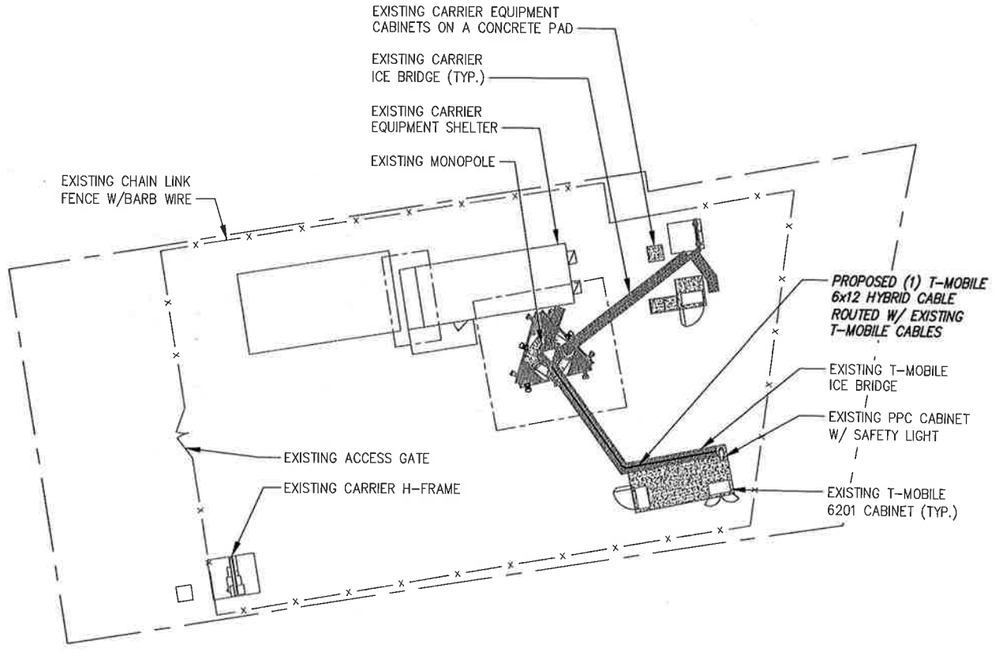
Project Number: 600-007

Project Title:
CT11783B
CT NEW BRITAIN 3
CAC
167 COCCOMO CIR
NEW BRITAIN, CT 06051

Prepared For: CROWN CASTLE

Drawing Title: NOTES

Drawing Number: N1



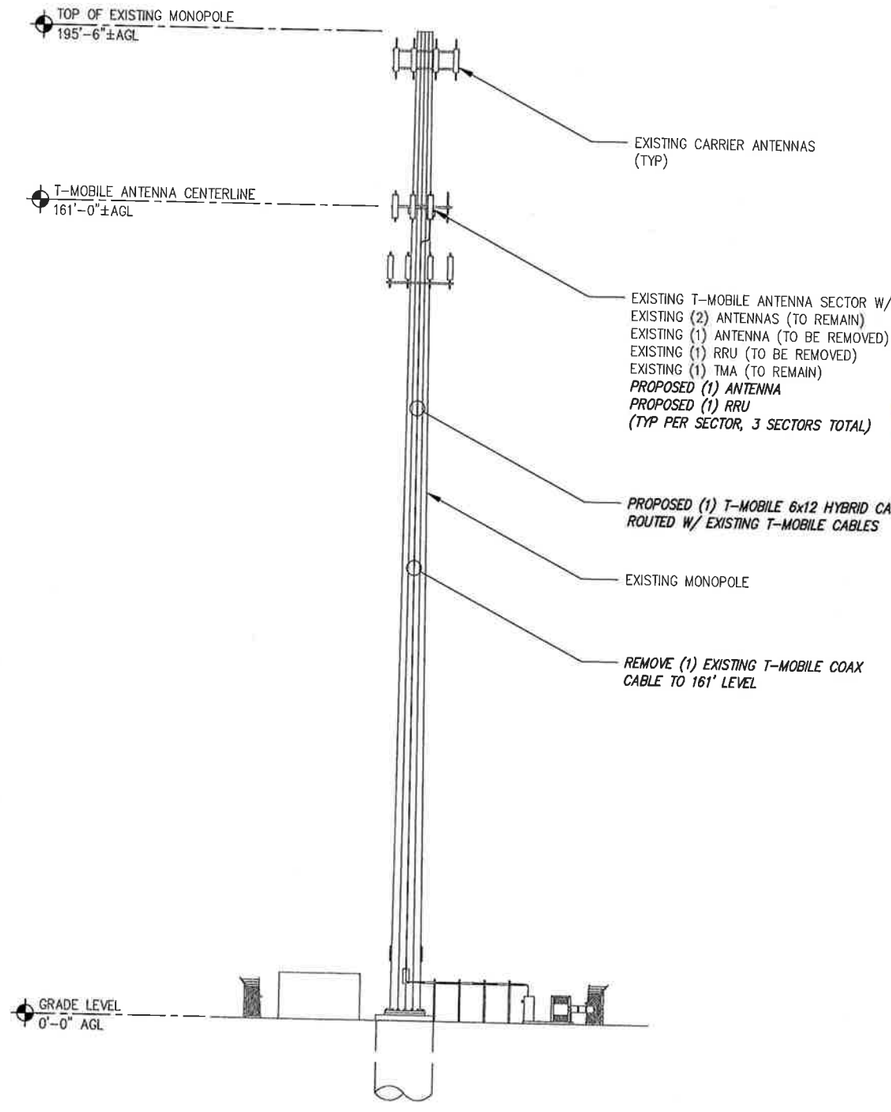
NORTH

1 / C1 PLAN VIEW
SCALE: AS NOTED

GRAPHIC SCALE:

30' 15' 0 15' 30'

SCALE (11x17): 1" = 30'-0"
SCALE (22x34): 1" = 15'-0"



2 / C1 ELEVATION
SCALE: NOT TO SCALE

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No	Submittal / Revision	Appd	Date
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Drawing Title
PLAN AND ELEVATION

Drawing Number
C1

SECTOR	ANTENNA POSITION	ANTENNA MODEL #	VENDOR	AZIMUTH	M-TILT	E-TILT	ANTENNA CENTERLINE	TMA/RRU MODEL #	CABLE LENGTH	CABLE TYPE AND QUANTITY
ALPHA	A-1	AIR 32 B2A/B66A	ERICSSON	45	TBD	2°/2°	163'-0"	-	EXISTING	(1) EXISTING HCS (SHARED)
	A-2	**APXVAARR24_43-U-NA20**	**RFS**	**45°**	TBD	2°/2°	163'-0"	**RRU 4449 B71+B1**	**230'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	A-3	AIR 21 B2A/B4P	ERICSSON	45°	TBD	2°/2°	163'-0"	TWIN STYLE 1B-AWS	EXISTING	(1) EXISTING 6x12 HCS (SHARED) (4) EXISTING COAX
BETA	B-1	AIR 32 B2A/B66A	ERICSSON	170°	TBD	2°/2°	163'-0"	-	EXISTING	(1) EXISTING HCS (SHARED)
	B-2	AIR 21 B2A/B4P	ERICSSON	170°	TBD	2°/2°	163'-0"	TWIN STYLE 1B-AWS	EXISTING	(1) EXISTING 6x12 HCS (SHARED) (4) EXISTING COAX
	B-3	**APXVAARR24_43-U-NA20**	**RFS**	**170°**	TBD	2°/2°	163'-0"	**RRU 4449 B71+B1**	**230'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
GAMMA	C-1	AIR 32 B2A/B66A	ERICSSON	300°	TBD	2°/2°	163'-0"	-	EXISTING	(1) EXISTING HCS (SHARED)
	C-2	**APXVAARR24_43-U-NA20**	**RFS**	**300°**	TBD	2°/2°	163'-0"	**RRU 4449 B71+B1**	**230'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	C-3	AIR 21 B2A/B4P	ERICSSON	300°	TBD	2°/2°	163'-0"	TWIN STYLE 1B-AWS	EXISTING	(1) EXISTING 6x12 HCS (SHARED) (2) EXISTING COAX

1 / C2 RF SYSTEM CHART
SCALE: NOT TO SCALE

KEY

EXISTING
PROPOSED

ANTENNA LOCATION KEY

VIEWED FROM BEHIND

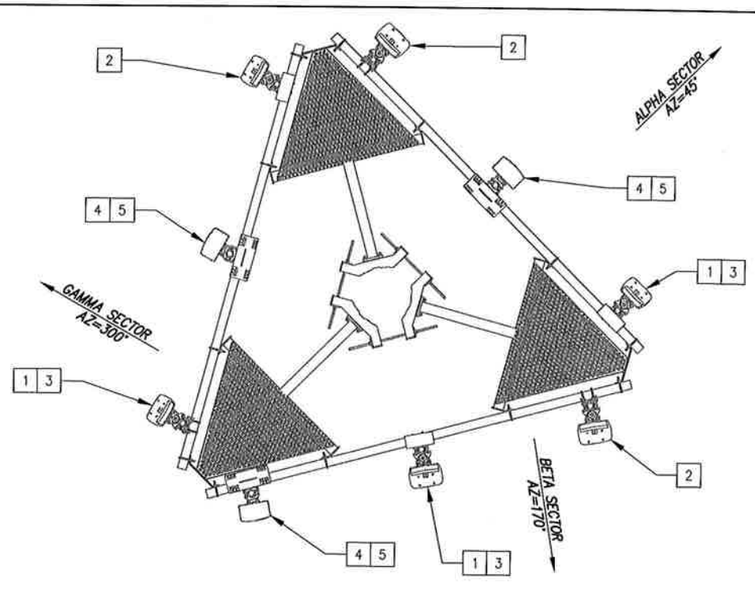
#1 #2 #3

GENERAL NOTES:

1. CONTRACTOR TO VERIFY PROPOSED ANTENNA INFORMATION IS THE MOST CURRENT AT TIME OF CONSTRUCTION.
2. CONTRACTOR TO CONFIRM CABLE LENGTHS FOR ANY PROPOSED CABLES/JUMPERS PRIOR TO CONSTRUCTION.

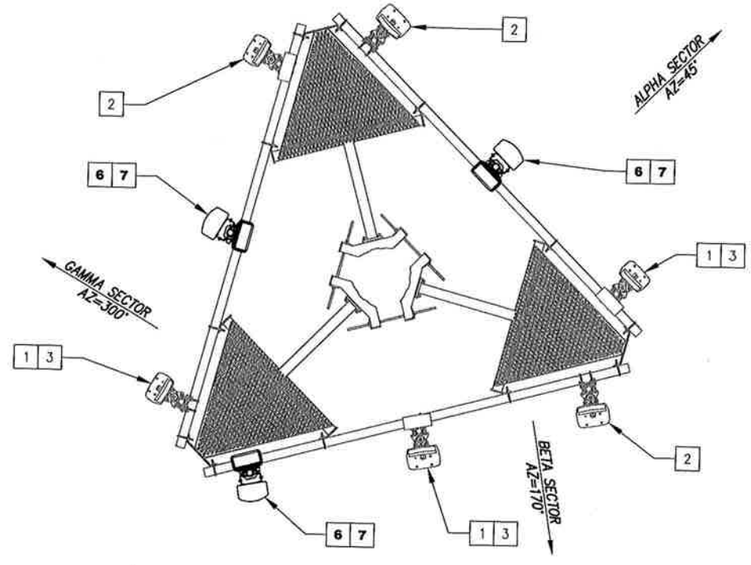
ORIENTATION PLAN KEY

KEY	DESCRIPTION	TYPE	QTY	STATUS
1	AIR 21 B2A/B4P	ANTENNA	3	REMAIN
2	AIR 32 B2A/B66A	ANTENNA	3	REMAIN
3	TWIN STYLE 1B-AWS	TMA	3	REMAIN
4	LNX-6515DS-A1M	ANTENNA	3	REMOVED
5	RRU 11B12	RRU	3	REMOVED
6	**APXVAARR24_43-U-NA20**	**ANTENNA**	**3**	**PROPOSED**
7	**RRU 4449 B71+B12**	**RRU**	**3**	**PROPOSED**



NORTH

2 / C2 EXISTING ANTENNA ORIENTATION
SCALE: NOT TO SCALE



NORTH

3 / C2 PROPOSED ANTENNA ORIENTATION
SCALE: NOT TO SCALE

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STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24795
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OCT 08 2018

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	RMS	10/08/18
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Drawn: RCD
Designed: MRL
Checked: AJD

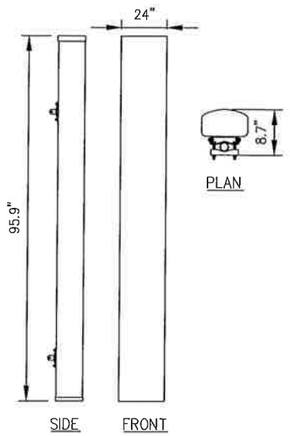
Project Number: 600-007

Project Title:
CT11783B
CT NEW BRITAIN 3
CAC
167 COCCOMO CIR
NEW BRITAIN, CT 06051

Prepared For: CROWN CASTLE

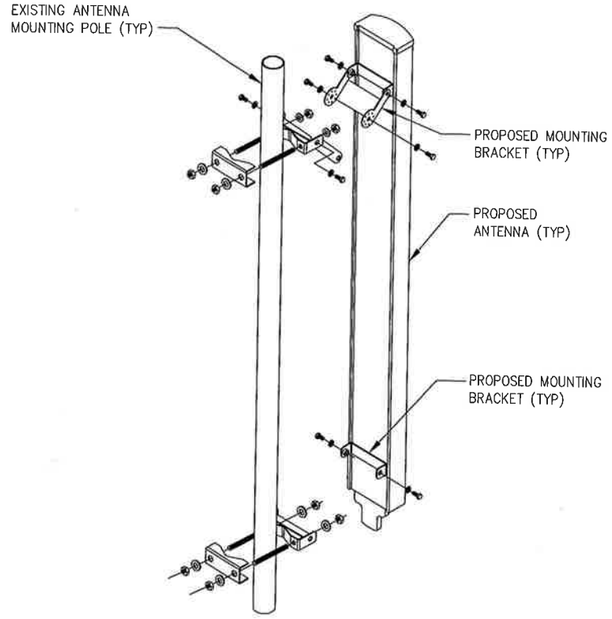
Drawing Title
RF CHART

Drawing Number
C2

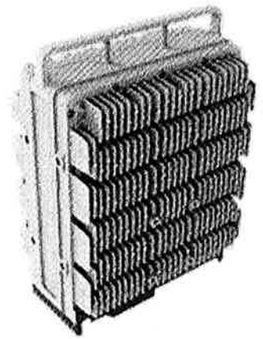


RFS MODEL NO.:	APXVAARR24_43-U-NA20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	95.9"x24"x8.7"
WEIGHT, W/O MOUNTING KIT:	128 LBS

1 / D1 APX ANTENNA DETAIL
SCALE: NOT TO SCALE



2 / D1 ANTENNA/RRU MOUNTING DETAIL
SCALE: NOT TO SCALE



ERICSSON 4449 B71+B12 SPECIFICATIONS

- HxWxD, (INCHES) : 17.91"x13.19"x10.63"
- WEIGHT (LBS) : 74.96
- COLOR : GRAY

3 / D1 4449 B71+B12 RRU DETAIL
SCALE: NOT TO SCALE

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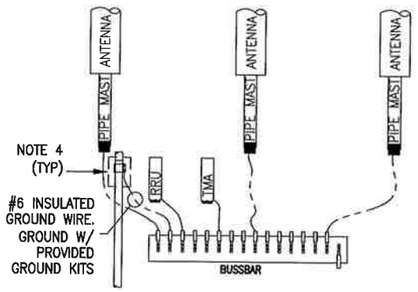
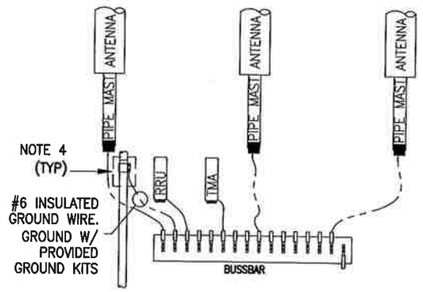
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

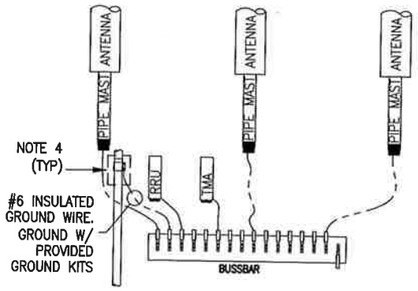
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

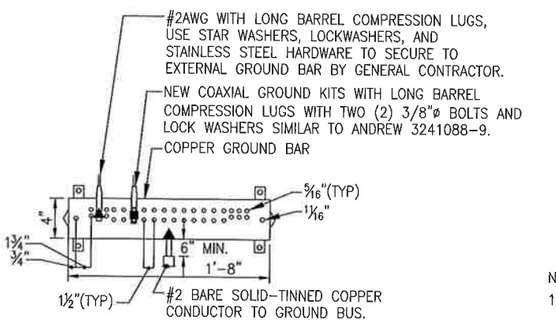


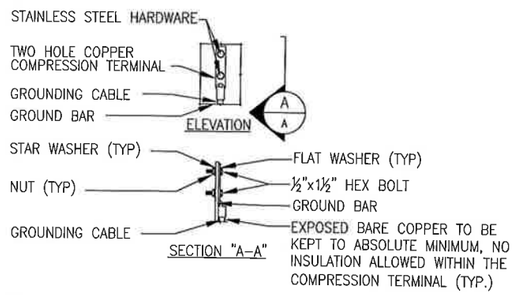
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



NOTES:
1. PROVIDE #2AWG GROUNDING CONDUCTOR, U.O.N.
2. PROVIDE BONDING AND GROUNDING CONDUCTORS WITH GREEN TYPE THWN INSULATION, U.O.N.
3. PROVIDE SOLID TINNED BARE COPPER WIRE (BCW) GROUNDING CONDUCTOR.
4. PROVIDE STANDARD COAX OR HYBRID CABLE GROUNDING KIT OR FIELD FABRICATE TO SUIT CONDITIONS. TOTAL LENGTH OF GROUNDING CONDUCTOR SHALL NOT EXCEED 10'-0".
5. PROVIDE GROUNDING ELECTRODES QUANTITY, TYPE AND SIZE AS INDICATED ON SITE GROUNDING PLAN.
6. LEAVE GROUND WIRE COILED UP ABOVE GRADE. CAP END OF CONDUIT.
7. ADD COAX OR HYBRID CABLE GROUND KIT CONNECTION TO BUSSBAR WHEN LENGTH OF CABLE TRAY (FROM TOWER OR MONOPOLE TO EQUIPMENT) IS GREATER THAN 20'-0".
8. ADD #2/0 GREEN INSULATED CONDUCTOR BETWEEN CABLE TRAY AND GRIPSTRUT/COVER.
9. BUSSBARS ARE TO BE TINNED COPPER BARS (¼"X2"X12") MOUNTED ON INSULATORS, U.O.N.
10. GROUND ALL PROPOSED ANTENNAS, DIPLEXERS, TMAS, AND RRUS PER MANU. SPECS.

1 / E1 GROUNDING DIAGRAM
SCALE: NOT TO SCALE

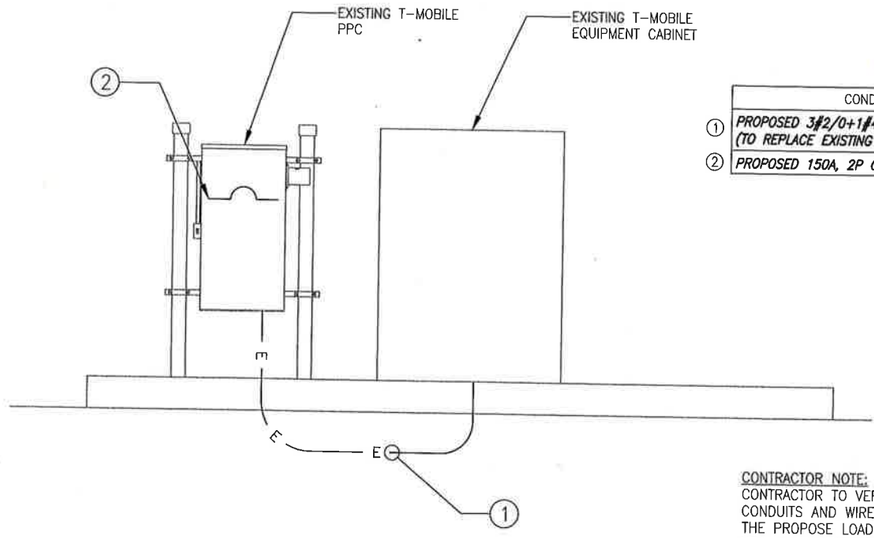




NOTE:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

NOTES:
1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
3. ALL HOLES ARE COUNTERSUNK 1/16".

2 / E1 GROUND BAR CONNECTION DETAIL
SCALE: NOT TO SCALE



CONDUIT SCHEDULE
① PROPOSED 3#2/0+1#4G IN 2" CONDUIT (TO REPLACE EXISTING CONDUCTOR AND CONDUIT)
② PROPOSED 150A, 2P C.B.

CONTRACTOR NOTE:
CONTRACTOR TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSE LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

3 / E1 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

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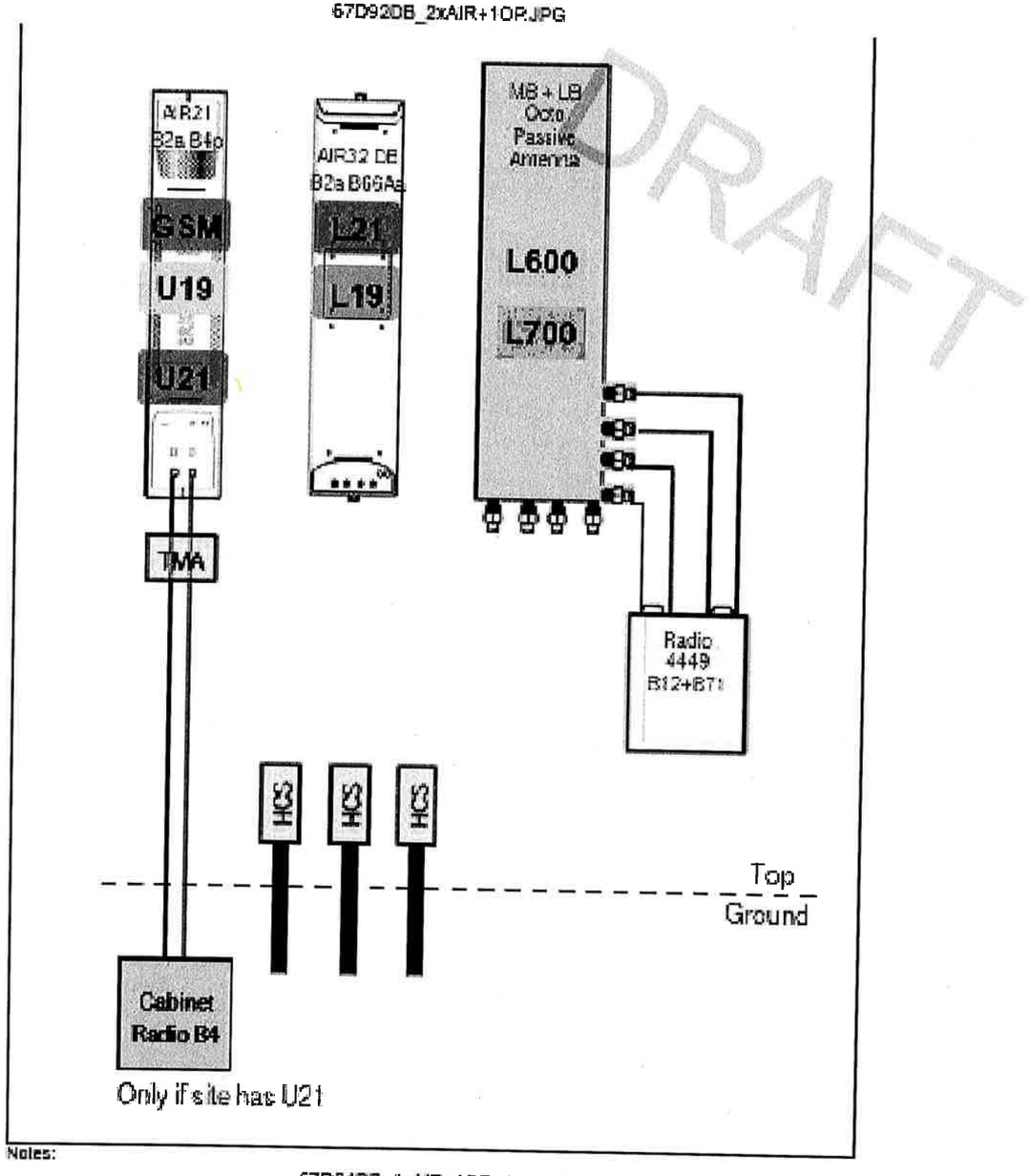
Prepared For:
CROWN CASTLE

Drawing Title
GROUNDING & ELECTRICAL DETAILS

Drawing Number
E1

67D92DB_2xAIR+1OP.JPG



Notes:

67D94DB_1xAIR+1OP+1OP.JPG

1 / E2 RF PLUMBING DIAGRAM
SCALE: AS NOTED

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Prepared For: CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

Date: **August 22, 2018**

Rebecca Klein
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Tower Engineering Professionals
326 Tryon Road
Raleigh, NC 27603
(919) 661-6351

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11783B
	Carrier Site Name:	Crown Comm. Monopole
Crown Castle Designation:	**Crown Castle BU Number:**	803175
	Crown Castle Site Name:	CT New Britain 3 CAC 803175
	Crown Castle JDE Job Number:	512588
	Crown Castle Work Order Number:	1616203
	Crown Castle Order Number:	446050 Rev. 0
Engineering Firm Designation:	**TEP Project Number:**	25666.176751
Site Data:	**167 Coccomo, New Britain, Hartford County, CT 06051** **Latitude *41° 41' 11.80"*, Longitude *-72° 45' 27.80"*** **188 Foot - Monopole Tower**	

Dear Rebecca Klein,

Tower Engineering Professionals, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

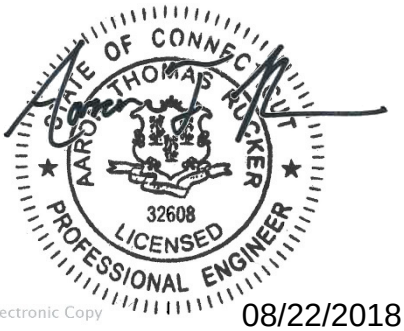
LC7: Proposed Equipment Configuration **Sufficient Capacity**

The analysis has been performed in accordance with the TIA-222-H Standard. This analysis utilizes an ultimate 3-second gust wind speed of 125 mph from the 2012 International Building Code. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

Structural analysis prepared by: Travis L. Infante, E.I. / KEH

Respectfully submitted by:

Aaron T. Rucker, P.E.



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08/22/2018

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1) INTRODUCTION

This tower is a 188-ft monopole tower designed by Paul J. Ford and Company. All information provided to TEP was assumed to be accurate and complete.

2) ANALYSIS CRITERIA

Building Code:	2012 IBC
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.7 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
161.0	163.0	2	RFS Celwave	ATMAA1412D-1A20	1 12	1-1/2 1-5/8
	161.0	3	Ericsson	AIR -32 B2A/B66AA w/ Mount Pipe		
		3	Ericsson	AIR 21 B2A B4P w/ Mount Pipe		
		3	Ericsson	Radio 4449 B12/B71		
		3	RFS Celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
		1	Tower Mounts	Platform Mount [LP 601-1]		
	160.0	1	RFS Celwave	ATMAA1412D-1A20		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
190.0	190.0	1	Tower Mounts	Miscellaneous [NA 507-3]	6 6 2	3/4 1-5/8 3/8
		1	Tower Mounts	Platform Mount [LP 1201-1]		
		1	Tower Mounts	Miscellaneous [NA 509-3]		
	189.0	1	CCI Antennas	OPA-65R-LCUU-H4 w/ Mount Pipe		
		2	CCI Antennas	OPA-65R-LCUU-H6 w/ Mount Pipe		
		3	Ericsson	RRUS 12		
		3	Ericsson	RRUS 32 B2		
		3	Ericsson	RRUS 32 B30		
		3	Ericsson	RRUS 32 B66		
		6	Kathrein	860 10025		
		1	Quintel Technology	QS46512-2 w/ Mount Pipe		
		2	Quintel Technology	QS66512-2 w/ Mount Pipe		
		1	Raycap	DC6-48-60-0-8F		
		2	Raycap	DC6-48-60-18-8F		
		3	Ericsson	RRUS-11		
		6	Powerwave Technologies	LGP21401		
146.0	149.0	3	Amphenol	BXA-80063-6BF-EDIN-4 w/ Mount Pipe	1 13	1-1/2 1-5/8
		3	Andrew	LNX-6512DS-A1M w/ Mount Pipe		
		6	Andrew	SBNHH-1D65B w/ Mount Pipe		
		1	GPS	GPS_A		
		3	Samsung Telecommunications	RFV01U-D1A		
		3	Samsung Telecommunications	RFV01U-D2A		
		2	Raycap	RHSDC-3315-PF-48		
	146.0	1	Tower Mounts	Platform Mount [LP 601-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Clough, Harbour & Associates LLP	679661	CCISites
Tower Foundation Drawings	Paul J. Ford and Company	679660	CCISites
Foundation Mapping Report	Tower Engineering Professionals	679660	CCISites
Tower Manufacturer Drawings	Paul J. Ford and Company	679659	CCISites

3.1) Analysis Method

tnxTower (version 8.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) The tower and foundation were built and maintained in accordance with the manufacturer's specification.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2, and the referenced drawings.
3) All tower components are in sufficient condition to carry their full design capacity.
4) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
5) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

This analysis may be affected if any assumptions are not valid or have been made in error. Tower Engineering Professionals should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	ϕP_{allow} (K)	% Capacity	Pass / Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-13.47	1801.17	65.7	Pass
L2	137 - 90.25	Pole	TP42.03x31.3184x0.3125	2	-23.63	2867.54	90.0	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.3023x0.375	3	-37.37	4158.27	89.0	Pass
L4	44.5 - 0	Pole	TP59.61x48.8988x0.5	4	-60.35	6892.95	70.1	Pass
							Summary	
						Pole (L2)	90.0	Pass
						RATING =	**90.0**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	82.3	Pass
1	Base Plate	-	75.3	Pass
1	Base Foundation Soil Interaction	-	92.3	Pass
1	Base Foundation Structural	-	80.5	Pass

Structure Rating (max from all components) =	**92.3%**

Notes:
1) See additional documentation in "Appendix C - Additional Calculations" for calculations supporting the % capacity listed.

4.1) Recommendations

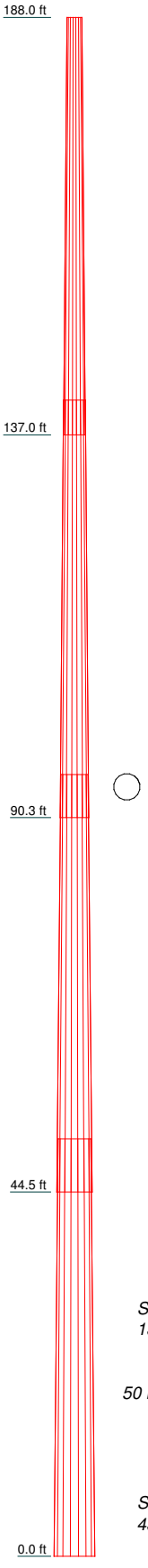
1) If the load differs from that described in Tables 1 and 2 of this report, the referenced drawings, or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
2) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

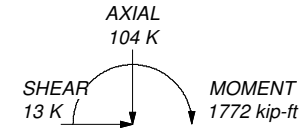
TNXTOWER OUTPUT

Section	1	2	3	4
Length (ft)	51.00	51.00	51.00	51.00
Number of Sides	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.5000
Socket Length (ft)	4.25	5.25	6.50	
Top Dia (in)	22.0000	31.3184	40.3023	48.8988
Bot Dia (in)	32.7110	42.0300	51.0140	59.6100
Grade	A607-65			
Weight (K)	3.7	6.3	9.4	14.8

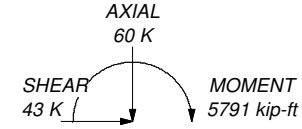
34.1



ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 1.7000 in ICE



TORQUE 1 kip-ft
REACTIONS - 125 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
800 10121 w/ Mount Pipe	190	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161
800 10121 w/ Mount Pipe	190	AIR -32 B2A/B66AA w/ Mount Pipe	161
800 10121 w/ Mount Pipe	190	AIR -32 B2A/B66AA w/ Mount Pipe	161
OPA-65R-LCUU-H6 w/ Mount Pipe	190	AIR -32 B2A/B66AA w/ Mount Pipe	161
OPA-65R-LCUU-H4 w/ Mount Pipe	190	RADIO 4449 B12/B71	161
OPA-65R-LCUU-H6 w/ Mount Pipe	190	RADIO 4449 B12/B71	161
QS66512-2 w/ Mount Pipe	190	RADIO 4449 B12/B71	161
QS46512-2 w/ Mount Pipe	190	ATMAA1412D-1A20	161
QS66512-2 w/ Mount Pipe	190	ATMAA1412D-1A20	161
(2) LGP21401	190	ATMAA1412D-1A20	161
(2) LGP21401	190	2.4" Dia x 8-ft Mount Pipe	161
(2) LGP21401	190	2.4" Dia x 8-ft Mount Pipe	161
(2) 860 10025	190	2.4" Dia x 8-ft Mount Pipe	161
(2) 860 10025	190	Platform Mount [LP 601-1]	161
(2) 860 10025	190	BXA-80063-6BF-EDIN-4 w/ Mount Pipe	146
RRUS 32 B30	190	BXA-80063-6BF-EDIN-4 w/ Mount Pipe	146
RRUS 32 B30	190	BXA-80063-6BF-EDIN-4 w/ Mount Pipe	146
RRUS 32 B30	190	(2) SBNHH-1D65B w/ Mount Pipe	146
RRUS 12	190	(2) SBNHH-1D65B w/ Mount Pipe	146
RRUS 12	190	(2) SBNHH-1D65B w/ Mount Pipe	146
RRUS 12	190	LNX-6512DS-A1M w/ Mount Pipe	146
RRUS-11	190	LNX-6512DS-A1M w/ Mount Pipe	146
RRUS-11	190	LNX-6512DS-A1M w/ Mount Pipe	146
RRUS-11	190	GPS_A	146
RRUS 32 B2	190	RHSDC-3315-PF-48	146
RRUS 32 B2	190	RHSDC-3315-PF-48	146
RRUS 32 B2	190	(2) RFV01U-D2A	146
RRUS 32 B66	190	RFV01U-D2A	146
RRUS 32 B66	190	RFV01U-D1A	146
RRUS 32 B66	190	(2) RFV01U-D1A	146
DC6-48-60-18-8F	190	Platform Mount [LP 601-1]	146
DC6-48-60-18-8F	190	Side Arm Mount [SO 701-3]	133
DC6-48-60-0-8F	190	1" Dia x 3.5-ft	100
2.4" Dia x 6-ft Pipe	190	1" Dia x 3.5-ft	100
2.4" Dia x 6-ft Pipe	190	1" Dia x 3.5-ft	100
2.4" Dia x 6-ft Pipe	190	1" Dia x 3.5-ft	70
Platform Mount [LP 1201-1]	190	1" Dia x 3.5-ft	70
Miscellaneous [NA 507-3]	190	1" Dia x 3.5-ft	70
Miscellaneous [NA 509-3]	190	1" Dia x 3.5-ft	40
Lighting Rod 3/4" x 8'	188	1" Dia x 3.5-ft	40
APXVAARR24_43-U-NA20 w/ Mount Pipe	161	1" Dia x 3.5-ft	40
APXVAARR24_43-U-NA20 w/ Mount Pipe	161	1" Dia x 3.5-ft	10
APXVAARR24_43-U-NA20 w/ Mount Pipe	161	1" Dia x 3.5-ft	10
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161	1" Dia x 3.5-ft	10
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	161		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.70 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TIA-222-H Annex S
9. TOWER RATING: 90%

Tower Engineering Professionals

Tower Engineering Professionals, Inc.
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Raleigh, NC 27603-5263
Phone: (919) 661-6351
FAX: (919) 661-6350

Job:	***CT New Britain 3 CAC 803175 (BU 803175)***		
Project:	***TEP No. 25666.176751***		
Client: Crown Castle	Drawn by: TLI	App'd:	
Code: TIA-222-H	Date: 08/22/18	Scale: NTS	
Path: C:\Users\tlinfante\Desktop\25666.176751 CT NEW BRITAIN 3 CAC\tnxTower\803175_LC7.eri		Dwg No. E-1	

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Tower base elevation above sea level: 88.00 ft.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.7000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
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-H Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H 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	188.00-137.00	51.00	4.25	18	22.0000	32.7110	0.2500	1.0000	A607-65 (65 ksi)
L2	137.00-90.25	51.00	5.25	18	31.3184	42.0300	0.3125	1.2500	A607-65 (65 ksi)
L3	90.25-44.50	51.00	6.50	18	40.3023	51.0140	0.3750	1.5000	A607-65 (65 ksi)
L4	44.50-0.00	51.00		18	48.8988	59.6100	0.5000	2.0000	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	22.3008	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	33.1771	25.7578	3429.0204	11.5237	16.6172	206.3538	6862.5527	12.8813	5.3171	21.269
L2	32.6597	30.7540	3735.3228	11.0071	15.9098	234.7819	7475.5606	15.3799	4.9620	15.879
	42.6302	41.3785	9098.0688	14.8097	21.3512	426.1143	18208.1091	20.6932	6.8473	21.911
L3	41.9859	47.5235	9571.6471	14.1742	20.4736	467.5120	19155.8887	23.7663	6.4332	17.155
	51.7431	60.2731	19526.7966	17.9768	25.9151	753.4907	39079.2871	30.1423	8.3185	22.183
L4	50.9622	76.8089	22730.9630	17.1816	24.8406	915.0736	45491.8360	38.4117	7.7262	15.452
	60.4524	93.8076	41409.2395	20.9841	30.2819	1367.4593	82872.9664	46.9127	9.6114	19.223

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 188.00-137.00				1	1	1			
L2 137.00-90.25				1	1	1			
L3 90.25-44.50				1	1	1			
L4 44.50-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
Step Pegs (5/8" SR) 7-in. w/30" step	C	No	Surface Ar (CaAa)	188.00 - 0.00	1	1	0.000 0.000	0.3500		0.49
Safety Line 3/8	C	No	Surface Ar (CaAa)	188.00 - 0.00	1	1	0.000 0.000	0.3750		0.22

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
*188									
LDF7-50A(1-5/8")	B	No	No	Inside Pole	188.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-002-75000 (3/8")	B	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4")	B	No	No	Inside Pole	188.00 - 0.00	4	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
2" Flex Conduit	B	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.36
							1/2" Ice	0.00	0.36
							1" Ice	0.00	0.36
							2" Ice	0.00	0.36
2" Flex Conduit	B	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.36
							1/2" Ice	0.00	0.36
							1" Ice	0.00	0.36
							2" Ice	0.00	0.36
FB-L98B-034-XXX XXX(3/8")	B	No	No	Inside Pole	188.00 - 0.00	1	No Ice	0.00	0.05
							1/2" Ice	0.00	0.05
							1" Ice	0.00	0.05
							2" Ice	0.00	0.05
WR-VG86ST-BRD(3/4")	B	No	No	Inside Pole	188.00 - 0.00	2	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
*									
33-597(1-1/2)	C	No	No	Inside Pole	161.00 - 0.00	1	No Ice	0.00	1.61
							1/2" Ice	0.00	1.61
							1" Ice	0.00	1.61
							2" Ice	0.00	1.61
LCF158-50J(1-5/8")	C	No	No	Inside Pole	161.00 - 0.00	11	No Ice	0.00	0.92
							1/2" Ice	0.00	0.92
							1" Ice	0.00	0.92
							2" Ice	0.00	0.92
MLE Hybrid 9Power/18Fiber RL 2(1-5/8")	C	No	No	Inside Pole	161.00 - 0.00	1	No Ice	0.00	1.07
							1/2" Ice	0.00	1.07
							1" Ice	0.00	1.07
							2" Ice	0.00	1.07
*145									
HB158-1-08U8-S8J 18(1-5/8")	C	No	No	Inside Pole	146.00 - 0.00	1	No Ice	0.00	1.30
							1/2" Ice	0.00	1.30
							1" Ice	0.00	1.30
							2" Ice	0.00	1.30
HB114-13U6-S12F1 8(1 1/2")	C	No	No	Inside Pole	146.00 - 0.00	1	No Ice	0.00	1.44
							1/2" Ice	0.00	1.44
							1" Ice	0.00	1.44
							2" Ice	0.00	1.44
LCF158-50J(1-5/8")	C	No	No	Inside Pole	146.00 - 0.00	12	No Ice	0.00	0.92
							1/2" Ice	0.00	0.92
							1" Ice	0.00	0.92
							2" Ice	0.00	0.92
***									
3/8-in Detuner Wire	A	No	No	CaAa (Out Of Face)	133.00 - 0.00	1	No Ice	0.02	0.10
							1/2" Ice	0.12	0.52
							1" Ice	0.22	1.55
							2" Ice	0.42	5.44

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
3/8-in Detuner Wire	B	No	No	CaAa (Out Of Face)	133.00 - 0.00	1	No Ice	0.02	0.10
							1/2" Ice	0.12	0.52
							1" Ice	0.22	1.55
							2" Ice	0.42	5.44
3/8-in Detuner Wire	C	No	No	CaAa (Out Of Face)	133.00 - 0.00	1	No Ice	0.02	0.10
							1/2" Ice	0.12	0.52
							1" Ice	0.22	1.55
							2" Ice	0.42	5.44

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 K
L1	188.00-137.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.47
		C	0.000	0.000	3.697	0.000	0.47
L2	137.00-90.25	A	0.000	0.000	0.000	0.802	0.00
		B	0.000	0.000	0.000	0.802	0.44
		C	0.000	0.000	3.389	0.802	1.28
L3	90.25-44.50	A	0.000	0.000	0.000	0.858	0.00
		B	0.000	0.000	0.000	0.858	0.43
		C	0.000	0.000	3.317	0.858	1.25
L4	44.50-0.00	A	0.000	0.000	0.000	0.834	0.00
		B	0.000	0.000	0.000	0.834	0.42
		C	0.000	0.000	3.226	0.834	1.22

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 K
L1	188.00-137.00	A	1.992	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.47
		C		0.000	0.000	44.335	0.000	1.05
L2	137.00-90.25	A	1.922	0.000	0.000	0.000	17.833	0.23
		B		0.000	0.000	0.000	17.833	0.66
		C		0.000	0.000	40.640	17.833	2.04
L3	90.25-44.50	A	1.825	0.000	0.000	0.000	18.448	0.24
		B		0.000	0.000	0.000	18.448	0.66
		C		0.000	0.000	38.497	18.448	1.97
L4	44.50-0.00	A	1.636	0.000	0.000	0.000	17.075	0.21
		B		0.000	0.000	0.000	17.075	0.62
		C		0.000	0.000	35.707	17.075	1.86

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	188.00-137.00	0.0000	0.5709	0.0000	2.9809
L2	137.00-90.25	0.0000	0.5629	0.0000	2.6377
L3	90.25-44.50	0.0000	0.5666	0.0000	2.7512
L4	44.50-0.00	0.0000	0.5699	0.0000	2.8122

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	20	Step Pegs (5/8" SR) 7-in. w/30" step	137.00 - 188.00	1.0000	1.0000
L1	21	Safety Line 3/8	137.00 - 188.00	1.0000	1.0000
L2	20	Step Pegs (5/8" SR) 7-in. w/30" step	90.25 - 137.00	1.0000	1.0000
L2	21	Safety Line 3/8	90.25 - 137.00	1.0000	1.0000
L3	20	Step Pegs (5/8" SR) 7-in. w/30" step	44.50 - 90.25	1.0000	1.0000
L3	21	Safety Line 3/8	44.50 - 90.25	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lighting Rod 3/4" x 8'	C	From Leg	0.00 0.00 4.00	0.0000	188.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.60 1.41 2.25 3.67	0.60 1.41 2.25 3.67	0.03 0.04 0.05 0.09
188									
800 10121 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.39 5.81 6.23 7.10	4.60 5.35 6.05 7.48	0.07 0.11 0.17 0.30
800 10121 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.39 5.81 6.23 7.10	4.60 5.35 6.05 7.48	0.07 0.11 0.17 0.30
800 10121 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice	5.39 5.81 6.23	4.60 5.35 6.05	0.07 0.11 0.17

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 K
						2" Ice	7.10	7.48	0.30
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.90 10.47 11.01 12.11	7.18 8.36 9.26 11.09	0.10 0.18 0.26 0.46
OPA-65R-LCUU-H4 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.18 6.57 6.98 7.82	4.55 5.16 5.78 7.07	0.08 0.13 0.19 0.33
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	9.90 10.47 11.01 12.11	7.18 8.36 9.26 11.09	0.10 0.18 0.26 0.46
QS66512-2 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.14 0.21 0.30 0.49
QS46512-2 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.79 6.21 6.62 7.48	5.88 6.58 7.25 8.65	0.12 0.18 0.24 0.39
QS66512-2 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.37 8.93 9.46 10.53	8.46 9.66 10.55 12.35	0.14 0.21 0.30 0.49
(2) LGP21401	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) 860 10025	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.19 0.25 0.40	0.12 0.17 0.23 0.37	0.00 0.00 0.01 0.01
(2) 860 10025	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.19 0.25 0.40	0.12 0.17 0.23 0.37	0.00 0.00 0.01 0.01
(2) 860 10025	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.14 0.19 0.25 0.40	0.12 0.17 0.23 0.37	0.00 0.00 0.01 0.01
RRUS 32 B30	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B30	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16

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 K
RRUS 32 B30	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 12	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.15 3.36 3.59 4.07	1.29 1.44 1.60 1.95	0.06 0.08 0.11 0.17
RRUS 12	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.15 3.36 3.59 4.07	1.29 1.44 1.60 1.95	0.06 0.08 0.11 0.17
RRUS 12	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.15 3.36 3.59 4.07	1.29 1.44 1.60 1.95	0.06 0.08 0.11 0.17
RRUS-11	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.79 3.00 3.21 3.67	1.19 1.34 1.50 1.84	0.05 0.07 0.09 0.15
RRUS-11	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.79 3.00 3.21 3.67	1.19 1.34 1.50 1.84	0.05 0.07 0.09 0.15
RRUS-11	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.79 3.00 3.21 3.67	1.19 1.34 1.50 1.84	0.05 0.07 0.09 0.15
RRUS 32 B2	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B2	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.73 2.95 3.18 3.66	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B66	A	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B66	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
RRUS 32 B66	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.19 3.68	1.67 1.86 2.05 2.46	0.05 0.07 0.10 0.16
DC6-48-60-18-8F	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.21 1.89 2.11 2.57	1.21 1.89 2.11 2.57	0.03 0.05 0.08 0.14
DC6-48-60-18-8F	B	From	4.00	0.0000	190.00	No Ice	1.21	1.21	0.03

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 K
		Centroid-Face	0.00 -1.00			1/2" Ice 1" Ice 2" Ice	1.89 2.11 2.57	1.89 2.11 2.57	0.05 0.08 0.14
DC6-48-60-0-8F	C	From Centroid-Face	4.00 0.00 -1.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.20 2.40 2.60 3.04	2.20 2.40 2.60 3.04	0.03 0.06 0.08 0.14
2.4" Dia x 6-ft Pipe	A	From Centroid-Face	4.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
2.4" Dia x 6-ft Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
2.4" Dia x 6-ft Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.43 1.93 2.30 3.06	1.43 1.93 2.30 3.06	0.02 0.03 0.05 0.09
Platform Mount [LP 1201-1]	C	None		0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	23.10 26.80 30.50 37.90	23.10 26.80 30.50 37.90	2.10 2.50 2.90 3.70
Miscellaneous [NA 507-3]	C	None		0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	18.50 26.40 34.30 50.10	18.50 26.40 34.30 50.10	0.51 0.70 0.90 1.29
Miscellaneous [NA 509-3]	C	None		0.0000	190.00	No Ice 1/2" Ice 1" Ice 2" Ice	11.84 16.96 22.08 32.32	11.84 16.96 22.08 32.32	0.28 0.30 0.32 0.36
*									
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	20.48 21.23 21.99 23.44	11.02 12.55 14.10 16.45	0.16 0.30 0.44 0.78
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.33 6.78 7.21 8.12	5.64 6.43 7.13 8.59	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.33 6.78 7.21 8.12	5.64 6.43 7.13 8.59	0.11 0.17 0.23 0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.33 6.78 7.21 8.12	5.64 6.43 7.13 8.59	0.11 0.17 0.23 0.38
AIR -32 B2A/B66AA w/	A	From	4.00	0.0000	161.00	No Ice	6.75	6.07	0.15

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 K
Mount Pipe		Centroid-Face	0.00 0.00			1/2" Ice 1" Ice 2" Ice	7.20 7.65 8.57	6.87 7.58 9.06	0.21 0.28 0.44
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.75 7.20 7.65 8.57	6.07 6.87 7.58 9.06	0.15 0.21 0.28 0.44
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	6.75 7.20 7.65 8.57	6.07 6.87 7.58 9.06	0.15 0.21 0.28 0.44
RADIO 4449 B12/B71	A	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
RADIO 4449 B12/B71	B	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
RADIO 4449 B12/B71	C	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
ATMAA1412D-1A20	B	From Centroid-Face	4.00 0.00 -1.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.13 1.26 1.55	0.41 0.50 0.59 0.81	0.01 0.02 0.03 0.06
ATMAA1412D-1A20	C	From Centroid-Face	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.00 1.13 1.26 1.55	0.41 0.50 0.59 0.81	0.01 0.02 0.03 0.06
ATMAA1412D-1A20	C	From Centroid-Face	4.00 0.00 2.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
2.4" Dia x 8-ft Mount Pipe	A	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
2.4" Dia x 8-ft Mount Pipe	B	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
2.4" Dia x 8-ft Mount Pipe	C	From Centroid-Face	4.00 0.00 0.00	0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
Platform Mount [LP 601-1]	C	None		0.0000	161.00	No Ice 1/2" Ice 1" Ice 2" Ice	28.47 33.59 38.71 48.95	28.47 33.59 38.71 48.95	1.12 1.51 1.91 2.69
*									
BXA-80063-6BF-EDIN-4 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.50 8.03 8.53 9.56	5.63 6.72 7.56 9.29	0.04 0.10 0.17 0.33
BXA-80063-6BF-EDIN-4 w/	B	From	4.00	0.0000	146.00	No Ice	7.50	5.63	0.04

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 K
Mount Pipe		Centroid-Leg	0.00 3.00			1/2" Ice 1" Ice 2" Ice	8.03 8.53 9.56	6.72 7.56 9.29	0.10 0.17 0.33
BXA-80063-6BF-EDIN-4 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.50 8.03 8.53 9.56	5.63 6.72 7.56 9.29	0.04 0.10 0.17 0.33
(2) SBNHH-1D65B w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.65 9.32 9.90 11.10	7.64 8.93 9.88 11.82	0.09 0.16 0.25 0.44
(2) SBNHH-1D65B w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.65 9.32 9.90 11.10	7.64 8.93 9.88 11.82	0.09 0.16 0.25 0.44
(2) SBNHH-1D65B w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.65 9.32 9.90 11.10	7.64 8.93 9.88 11.82	0.09 0.16 0.25 0.44
LNX-6512DS-A1M w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.33 5.72 6.12 6.94	4.53 5.15 5.77 7.07	0.05 0.10 0.15 0.28
LNX-6512DS-A1M w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.33 5.72 6.12 6.94	4.53 5.15 5.77 7.07	0.05 0.10 0.15 0.28
LNX-6512DS-A1M w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.33 5.72 6.12 6.94	4.53 5.15 5.77 7.07	0.05 0.10 0.15 0.28
GPS_A	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.26 0.32 0.39 0.56	0.26 0.32 0.39 0.56	0.00 0.00 0.01 0.02
RHSDC-3315-PF-48	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.60 3.84 4.34	2.19 2.39 2.61 3.05	0.03 0.06 0.09 0.17
RHSDC-3315-PF-48	C	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.36 3.60 3.84 4.34	2.19 2.39 2.61 3.05	0.03 0.06 0.09 0.17
(2) RFV01U-D2A	A	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.01 1.14 1.28 1.59	0.07 0.09 0.11 0.15
RFV01U-D2A	B	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.01 1.14 1.28 1.59	0.07 0.09 0.11 0.15
RFV01U-D1A	B	From Centroid-Leg	4.00 0.00 3.00	0.0000	146.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.88 2.05 2.22 2.60	1.25 1.39 1.54 1.86	0.08 0.10 0.12 0.18
(2) RFV01U-D1A	C	From Centroid-Le	4.00 0.00	0.0000	146.00	No Ice 1/2" Ice	1.88 2.05	1.25 1.39	0.08 0.10

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 K
		g	3.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
Platform Mount [LP 601-1]	C	None		0.0000	146.00	No Ice	28.47	28.47	1.12
						1/2" Ice	33.59	33.59	1.51
						1" Ice	38.71	38.71	1.91
						2" Ice	48.95	48.95	2.69
Detuner									
Side Arm Mount [SO 701-3]	C	None		0.0000	133.00	No Ice	2.83	2.83	0.20
						1/2" Ice	3.92	3.92	0.24
						1" Ice	5.01	5.01	0.28
						2" Ice	7.19	7.19	0.36
*****									
1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
*****									
1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	70.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
*****									
1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	B	From Leg	1.50 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	C	From Leg	1.50 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
*****									
1" Dia x 3.5-ft	A	From Leg	1.50 0.00 0.00	0.0000	10.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.37 0.68 0.90 1.37	0.00 0.01 0.01 0.03
1" Dia x 3.5-ft	B	From Leg	1.50 0.00	0.0000	10.00	No Ice 1/2" Ice	0.00 0.00	0.37 0.68	0.00 0.01

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 K
1" Dia x 3.5-ft	C	From Leg	0.00 1.50 0.00 0.00	0.0000	10.00	1" Ice 2" Ice No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00 0.00 0.00	0.90 1.37 0.37 0.68 0.90 1.37	0.01 0.03 0.00 0.01 0.01 0.03

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
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

Comb. No.	Description
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 Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	188 - 137	Pole	Max Tension	26	0.00	-0.00	0.00
			Max. Compression	26	-40.35	0.41	-1.22
			Max. Mx	20	-13.49	752.60	0.84
			Max. My	14	-13.47	-0.97	-754.97
			Max. Vy	20	-27.14	752.60	0.84
			Max. Vx	14	27.23	-0.97	-754.97
			Max. Torque	12			-1.12
L2	137 - 90.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.52	0.44	-2.21
			Max. Mx	20	-23.65	2123.63	0.67
			Max. My	14	-23.63	-0.86	-2130.21
			Max. Vy	20	-32.70	2123.63	0.67
			Max. Vx	14	32.79	-0.86	-2130.21
			Max. Torque	12			-1.12
L3	90.25 - 44.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-74.55	0.44	-3.20
			Max. Mx	20	-37.38	3698.52	0.50
			Max. My	14	-37.37	-0.77	-3709.18
			Max. Vy	20	-37.96	3698.52	0.50
			Max. Vx	14	38.05	-0.77	-3709.18
			Max. Torque	12			-1.11
L4	44.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-104.06	0.44	-4.43
			Max. Mx	20	-60.35	5776.23	0.30
			Max. My	14	-60.35	-0.67	-5791.45
			Max. Vy	20	-43.14	5776.23	0.30
			Max. Vx	14	43.22	-0.67	-5791.45
			Max. Torque	12			-1.10

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	104.06	0.01	-12.86
	Max. H_x	21	45.29	43.09	-0.00
	Max. H_z	3	45.29	-0.00	43.17
	Max. M_x	2	5790.58	-0.00	43.17
	Max. M_z	8	5776.08	-43.09	0.00

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. Torsion	24	1.09	21.54	37.39
	Min. Vert	23	45.29	37.31	21.58
	Min. H_x	9	45.29	-43.09	0.00
	Min. H_z	15	45.29	0.00	-43.17
	Min. M_x	14	-5791.45	0.00	-43.17
	Min. M_z	20	-5776.23	43.09	-0.00
	Min. Torsion	12	-1.10	-21.54	-37.39

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	50.32	0.00	0.00	0.34	0.06	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	60.38	0.00	-43.17	-5790.58	0.78	-0.86
0.9 Dead+1.0 Wind 0 deg - No Ice	45.29	0.00	-43.17	-5711.31	0.74	-0.86
1.2 Dead+1.0 Wind 30 deg - No Ice	60.38	21.55	-37.39	-5014.41	-2887.35	-0.40
0.9 Dead+1.0 Wind 30 deg - No Ice	45.29	21.55	-37.39	-4945.79	-2847.81	-0.40
1.2 Dead+1.0 Wind 60 deg - No Ice	60.38	37.32	-21.59	-2894.51	-5001.85	0.17
0.9 Dead+1.0 Wind 60 deg - No Ice	45.29	37.32	-21.59	-2854.95	-4933.33	0.17
1.2 Dead+1.0 Wind 90 deg - No Ice	60.38	43.09	-0.00	1.14	-5776.08	0.70
0.9 Dead+1.0 Wind 90 deg - No Ice	45.29	43.09	-0.00	1.00	-5696.92	0.69
1.2 Dead+1.0 Wind 120 deg - No Ice	60.38	37.31	21.58	2896.59	-5002.55	1.04
0.9 Dead+1.0 Wind 120 deg - No Ice	45.29	37.31	21.58	2856.76	-4934.01	1.04
1.2 Dead+1.0 Wind 150 deg - No Ice	60.38	21.54	37.39	5015.96	-2888.60	1.10
0.9 Dead+1.0 Wind 150 deg - No Ice	45.29	21.54	37.39	4947.10	-2849.01	1.10
1.2 Dead+1.0 Wind 180 deg - No Ice	60.38	-0.00	43.17	5791.45	-0.67	0.86
0.9 Dead+1.0 Wind 180 deg - No Ice	45.29	-0.00	43.17	5711.94	-0.65	0.86
1.2 Dead+1.0 Wind 210 deg - No Ice	60.38	-21.55	37.39	5015.29	2887.48	0.39
0.9 Dead+1.0 Wind 210 deg - No Ice	45.29	-21.55	37.39	4946.44	2847.91	0.39
1.2 Dead+1.0 Wind 240 deg - No Ice	60.38	-37.32	21.59	2895.37	5002.00	-0.18
0.9 Dead+1.0 Wind 240 deg - No Ice	45.29	-37.32	21.59	2855.59	4933.44	-0.18
1.2 Dead+1.0 Wind 270 deg - No Ice	60.38	-43.09	0.00	-0.30	5776.23	-0.70
0.9 Dead+1.0 Wind 270 deg - No Ice	45.29	-43.09	0.00	-0.39	5697.03	-0.69
1.2 Dead+1.0 Wind 300 deg - No Ice	60.38	-37.31	-21.58	-2895.76	5002.68	-1.03
0.9 Dead+1.0 Wind 300 deg -	45.29	-37.31	-21.58	-2856.15	4934.10	-1.02

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
No Ice 1.2 Dead+1.0 Wind 330 deg - No Ice	60.38	-21.54	-37.39	-5015.12	2888.70	-1.09
0.9 Dead+1.0 Wind 330 deg - No Ice	45.29	-21.54	-37.39	-4946.48	2849.09	-1.09
1.2 Dead+1.0 Ice+1.0 Temp	104.06	-0.00	0.00	4.43	0.44	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	104.06	0.01	-12.86	-1762.21	-0.79	-0.17
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	104.06	6.43	-11.14	-1526.11	-883.43	-0.07
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	104.06	11.13	-6.44	-879.82	-1529.23	0.05
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	104.06	12.85	-0.01	3.50	-1765.14	0.16
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	104.06	11.13	6.42	887.15	-1527.96	0.23
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	104.06	6.42	11.13	1534.37	-881.24	0.23
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	104.06	-0.01	12.86	1771.73	1.74	0.17
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	104.06	-6.43	11.14	1535.64	884.39	0.07
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	104.06	-11.13	6.44	889.35	1530.19	-0.06
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	104.06	-12.85	0.01	6.03	1766.11	-0.16
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	104.06	-11.13	-6.42	-877.63	1528.92	-0.23
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	104.06	-6.42	-11.13	-1524.85	882.19	-0.23
Dead+Wind 0 deg - Service	50.32	0.00	-8.90	-1186.37	0.21	-0.18
Dead+Wind 30 deg - Service	50.32	4.44	-7.71	-1027.31	-591.65	-0.08
Dead+Wind 60 deg - Service	50.32	7.69	-4.45	-592.88	-1024.95	0.04
Dead+Wind 90 deg - Service	50.32	8.88	-0.00	0.51	-1183.60	0.15
Dead+Wind 120 deg - Service	50.32	7.69	4.45	593.86	-1025.10	0.22
Dead+Wind 150 deg - Service	50.32	4.44	7.71	1028.18	-591.90	0.23
Dead+Wind 180 deg - Service	50.32	-0.00	8.90	1187.09	-0.09	0.18
Dead+Wind 210 deg - Service	50.32	-4.44	7.71	1028.03	591.77	0.08
Dead+Wind 240 deg - Service	50.32	-7.69	4.45	593.60	1025.08	-0.04
Dead+Wind 270 deg - Service	50.32	-8.88	0.00	0.21	1183.72	-0.15
Dead+Wind 300 deg - Service	50.32	-7.69	-4.45	-593.13	1025.22	-0.22
Dead+Wind 330 deg - Service	50.32	-4.44	-7.71	-1027.46	592.02	-0.23

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-50.32	0.00	0.00	50.32	0.00	0.000%
2	0.00	-60.38	-43.17	-0.00	60.38	43.17	0.000%
3	0.00	-45.29	-43.17	-0.00	45.29	43.17	0.000%
4	21.55	-60.38	-37.39	-21.55	60.38	37.39	0.000%
5	21.55	-45.29	-37.39	-21.55	45.29	37.39	0.000%
6	37.32	-60.38	-21.59	-37.32	60.38	21.59	0.000%
7	37.32	-45.29	-21.59	-37.32	45.29	21.59	0.000%
8	43.09	-60.38	-0.00	-43.09	60.38	0.00	0.000%
9	43.09	-45.29	-0.00	-43.09	45.29	0.00	0.000%
10	37.31	-60.38	21.58	-37.31	60.38	-21.58	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
11	37.31	-45.29	21.58	-37.31	45.29	-21.58	0.000%
12	21.54	-60.38	37.39	-21.54	60.38	-37.39	0.000%
13	21.54	-45.29	37.39	-21.54	45.29	-37.39	0.000%
14	-0.00	-60.38	43.17	0.00	60.38	-43.17	0.000%
15	-0.00	-45.29	43.17	0.00	45.29	-43.17	0.000%
16	-21.55	-60.38	37.39	21.55	60.38	-37.39	0.000%
17	-21.55	-45.29	37.39	21.55	45.29	-37.39	0.000%
18	-37.32	-60.38	21.59	37.32	60.38	-21.59	0.000%
19	-37.32	-45.29	21.59	37.32	45.29	-21.59	0.000%
20	-43.09	-60.38	0.00	43.09	60.38	-0.00	0.000%
21	-43.09	-45.29	0.00	43.09	45.29	-0.00	0.000%
22	-37.31	-60.38	-21.58	37.31	60.38	21.58	0.000%
23	-37.31	-45.29	-21.58	37.31	45.29	21.58	0.000%
24	-21.54	-60.38	-37.39	21.54	60.38	37.39	0.000%
25	-21.54	-45.29	-37.39	21.54	45.29	37.39	0.000%
26	0.00	-104.06	0.00	0.00	104.06	-0.00	0.000%
27	0.01	-104.06	-12.86	-0.01	104.06	12.86	0.000%
28	6.43	-104.06	-11.14	-6.43	104.06	11.14	0.000%
29	11.13	-104.06	-6.44	-11.13	104.06	6.44	0.000%
30	12.85	-104.06	-0.01	-12.85	104.06	0.01	0.000%
31	11.13	-104.06	6.42	-11.13	104.06	-6.42	0.000%
32	6.42	-104.06	11.13	-6.42	104.06	-11.13	0.000%
33	-0.01	-104.06	12.86	0.01	104.06	-12.86	0.000%
34	-6.43	-104.06	11.14	6.43	104.06	-11.14	0.000%
35	-11.13	-104.06	6.44	11.13	104.06	-6.44	0.000%
36	-12.85	-104.06	0.01	12.85	104.06	-0.01	0.000%
37	-11.13	-104.06	-6.42	11.13	104.06	6.42	0.000%
38	-6.42	-104.06	-11.13	6.42	104.06	11.13	0.000%
39	0.00	-50.32	-8.90	-0.00	50.32	8.90	0.000%
40	4.44	-50.32	-7.71	-4.44	50.32	7.71	0.000%
41	7.69	-50.32	-4.45	-7.69	50.32	4.45	0.000%
42	8.88	-50.32	-0.00	-8.88	50.32	0.00	0.000%
43	7.69	-50.32	4.45	-7.69	50.32	-4.45	0.000%
44	4.44	-50.32	7.71	-4.44	50.32	-7.71	0.000%
45	-0.00	-50.32	8.90	0.00	50.32	-8.90	0.000%
46	-4.44	-50.32	7.71	4.44	50.32	-7.71	0.000%
47	-7.69	-50.32	4.45	7.69	50.32	-4.45	0.000%
48	-8.88	-50.32	0.00	8.88	50.32	-0.00	0.000%
49	-7.69	-50.32	-4.45	7.69	50.32	4.45	0.000%
50	-4.44	-50.32	-7.71	4.44	50.32	7.71	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00005642
3	Yes	4	0.00000001	0.00076523
4	Yes	6	0.00000001	0.00025200
5	Yes	6	0.00000001	0.00006840
6	Yes	6	0.00000001	0.00025224
7	Yes	6	0.00000001	0.00006850
8	Yes	5	0.00000001	0.00005363
9	Yes	4	0.00000001	0.00074068
10	Yes	6	0.00000001	0.00025564
11	Yes	6	0.00000001	0.00006960

12	Yes	6	0.00000001	0.00025022
13	Yes	6	0.00000001	0.00006771
14	Yes	5	0.00000001	0.00005015
15	Yes	4	0.00000001	0.00072310
16	Yes	6	0.00000001	0.00025385
17	Yes	6	0.00000001	0.00006903
18	Yes	6	0.00000001	0.00025348
19	Yes	6	0.00000001	0.00006891
20	Yes	5	0.00000001	0.00004740
21	Yes	4	0.00000001	0.00070019
22	Yes	6	0.00000001	0.00025019
23	Yes	6	0.00000001	0.00006772
24	Yes	6	0.00000001	0.00025574
25	Yes	6	0.00000001	0.00006964
26	Yes	4	0.00000001	0.00002843
27	Yes	6	0.00000001	0.00020205
28	Yes	6	0.00000001	0.00038847
29	Yes	6	0.00000001	0.00038789
30	Yes	6	0.00000001	0.00020257
31	Yes	6	0.00000001	0.00039372
32	Yes	6	0.00000001	0.00038951
33	Yes	6	0.00000001	0.00020347
34	Yes	6	0.00000001	0.00039380
35	Yes	6	0.00000001	0.00039425
36	Yes	6	0.00000001	0.00020281
37	Yes	6	0.00000001	0.00038582
38	Yes	6	0.00000001	0.00039013
39	Yes	4	0.00000001	0.00012394
40	Yes	5	0.00000001	0.00006217
41	Yes	5	0.00000001	0.00006229
42	Yes	4	0.00000001	0.00012230
43	Yes	5	0.00000001	0.00006486
44	Yes	5	0.00000001	0.00006126
45	Yes	4	0.00000001	0.00012364
46	Yes	5	0.00000001	0.00006352
47	Yes	5	0.00000001	0.00006323
48	Yes	4	0.00000001	0.00012187
49	Yes	4	0.00000001	0.00099850
50	Yes	5	0.00000001	0.00006490

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	38.757	45	1.9493	0.0030
L2	141.25 - 90.25	21.089	45	1.5664	0.0011
L3	95.5 - 44.5	8.826	45	0.9510	0.0004
L4	51 - 0	2.325	45	0.4232	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	800 10121 w/ Mount Pipe	45	38.757	1.9493	0.0031	38792

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.00	Lighting Rod 3/4" x 8'	45	38.757	1.9493	0.0031	38792
161.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	45	28.147	1.7548	0.0017	7182
146.00	BXA-80063-6BF-EDIN-4 w/ Mount Pipe	45	22.702	1.6173	0.0012	4616
133.00	Side Arm Mount [SO 701-3]	45	18.442	1.4685	0.0009	4199
100.00	1" Dia x 3.5-ft	45	9.775	1.0134	0.0004	4419
70.00	1" Dia x 3.5-ft	45	4.469	0.6276	0.0002	4616
40.00	1" Dia x 3.5-ft	45	1.493	0.3196	0.0001	6052
10.00	1" Dia x 3.5-ft	45	0.249	0.0753	0.0000	24209

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	188 - 137	188.759	14	9.5122	0.0143
L2	141.25 - 90.25	102.845	14	7.6482	0.0051
L3	95.5 - 44.5	43.076	14	4.6447	0.0019
L4	51 - 0	11.350	14	2.0661	0.0006

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	800 10121 w/ Mount Pipe	14	188.759	9.5122	0.0148	8342
188.00	Lighting Rod 3/4" x 8'	14	188.759	9.5122	0.0148	8342
161.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	14	137.180	8.5660	0.0084	1539
146.00	BXA-80063-6BF-EDIN-4 w/ Mount Pipe	14	110.691	7.8963	0.0057	984
133.00	Side Arm Mount [SO 701-3]	14	89.955	7.1708	0.0041	888
100.00	1" Dia x 3.5-ft	14	47.707	4.9495	0.0021	918
70.00	1" Dia x 3.5-ft	14	21.814	3.0651	0.0011	951
40.00	1" Dia x 3.5-ft	14	7.287	1.5604	0.0004	1241
10.00	1" Dia x 3.5-ft	14	1.217	0.3676	0.0001	4959

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	188 - 137 (1)	TP32.711x22x0.25	51.00	0.00	0.0	25.0495	-13.47	1715.40	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L2	137 - 90.25 (2)	TP42.03x31.3184x0.3125	51.00	0.00	0.0	40.2848	-23.63	2730.99	0.009
L3	90.25 - 44.5 (3)	TP51.014x40.3023x0.375	51.00	0.00	0.0	58.6481	-37.37	3960.26	0.009
L4	44.5 - 0 (4)	TP59.61x48.8988x0.5	51.00	0.00	0.0	93.8076	-60.35	6564.71	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	188 - 137 (1)	TP32.711x22x0.25	755.17	1113.48	0.678	0.00	1113.48	0.000
L2	137 - 90.25 (2)	TP42.03x31.3184x0.3125	2130.21	2281.22	0.934	0.00	2281.22	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.3023x0.375	3709.18	4013.65	0.924	0.00	4013.65	0.000
L4	44.5 - 0 (4)	TP59.61x48.8988x0.5	5791.45	7974.63	0.726	0.00	7974.63	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	188 - 137 (1)	TP32.711x22x0.25	27.21	439.62	0.062	1.12	1196.20	0.001
L2	137 - 90.25 (2)	TP42.03x31.3184x0.3125	32.79	698.57	0.047	0.86	2476.13	0.000
L3	90.25 - 44.5 (3)	TP51.014x40.3023x0.375	38.05	1019.71	0.037	0.86	4374.13	0.000
L4	44.5 - 0 (4)	TP59.61x48.8988x0.5	43.22	1632.62	0.026	0.86	8378.75	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	188 - 137 (1)	0.008	0.678	0.000	0.062	0.001	0.690	1.050	4.8.2
L2	137 - 90.25 (2)	0.009	0.934	0.000	0.047	0.000	0.945	1.050	4.8.2
L3	90.25 - 44.5 (3)	0.009	0.924	0.000	0.037	0.000	0.935	1.050	4.8.2
L4	44.5 - 0 (4)	0.009	0.726	0.000	0.026	0.000	0.736	1.050	4.8.2

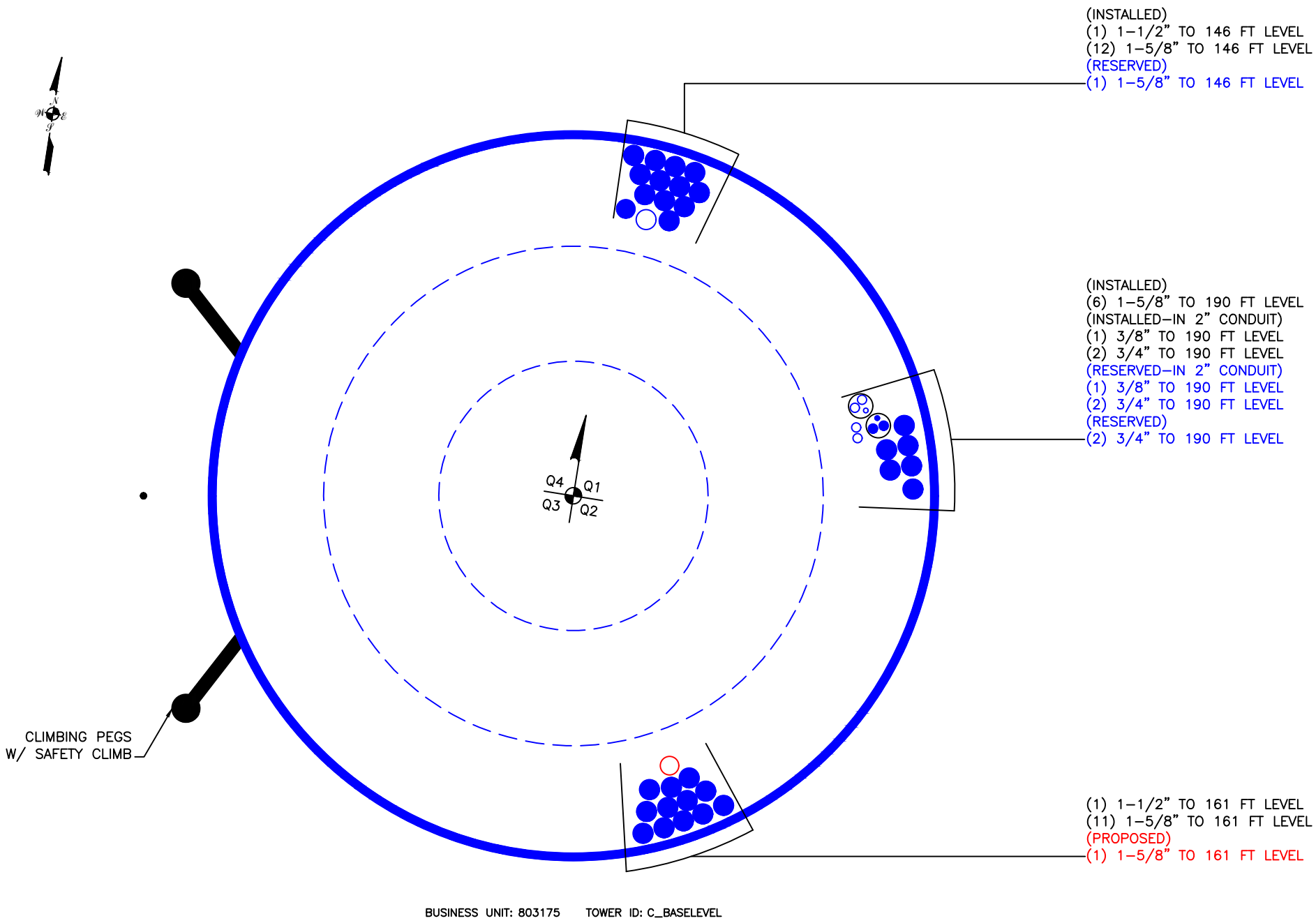
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	188 - 137	Pole	TP32.711x22x0.25	1	-13.47	1801.17	65.7	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L2	137 - 90.25	Pole	TP42.03x31.3184x0.3125	2	-23.63	2867.54	90.0	Pass
L3	90.25 - 44.5	Pole	TP51.014x40.3023x0.375	3	-37.37	4158.27	89.0	Pass
L4	44.5 - 0	Pole	TP59.61x48.8988x0.5	4	-60.35	6892.95	70.1	Pass
							Summary	
						Pole (L2)	90.0	Pass
						RATING =	**90.0**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 803175 TOWER ID: C_BASELEVEL

APPENDIX C

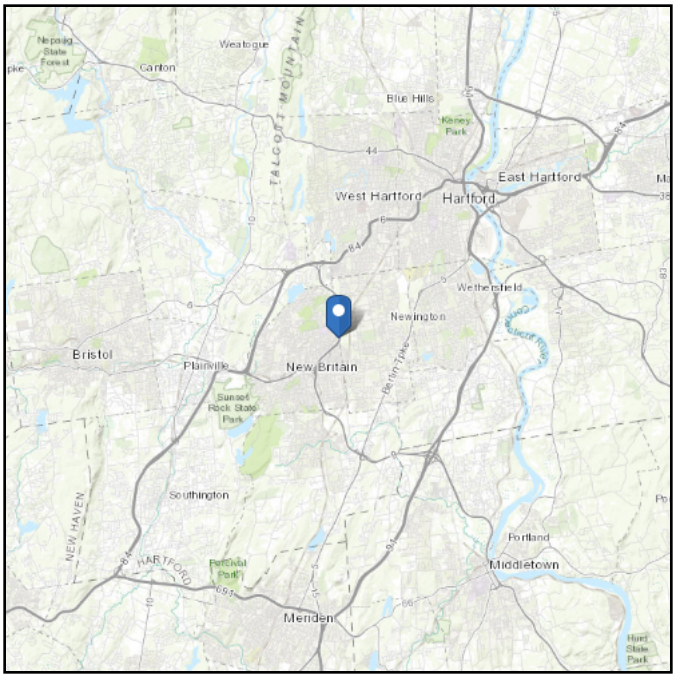
ADDITIONAL CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 88.33 ft (NAVD 88)
Latitude: 41.686611
Longitude: -72.757722



Wind

Results:

Wind Speed:	122 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	93 Vmph
100-year MRI	100 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Sat Aug 18 2018

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

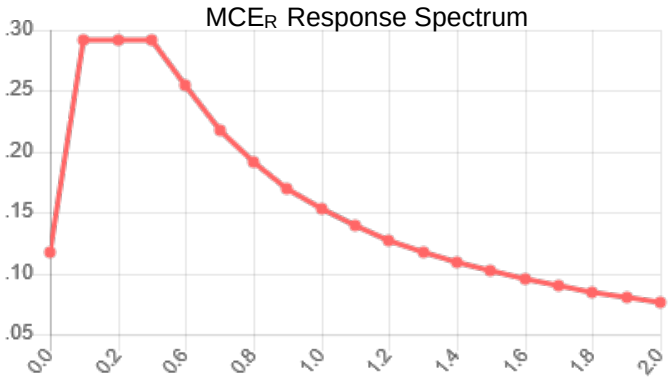
Seismic

Site Soil Class: D - Stiff Soil

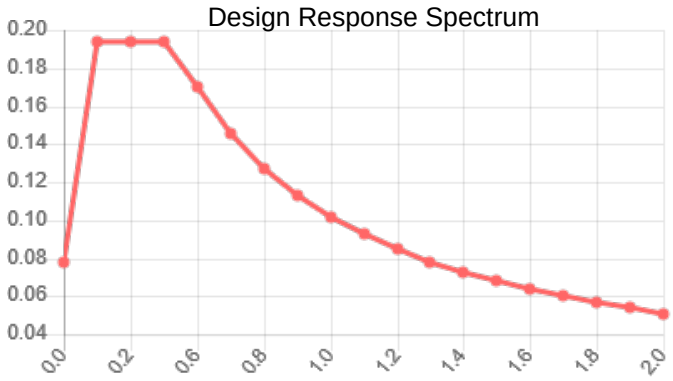
Results:

S_S :	0.182	S_{DS} :	0.194
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.092
S_{MS} :	0.292	PGA_M :	0.148
S_{M1} :	0.153	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B



Sa(g) vs T(s)



Sa(g) vs T(s)

Data Accessed: Sat Aug 18 2018

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Sat Aug 18 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

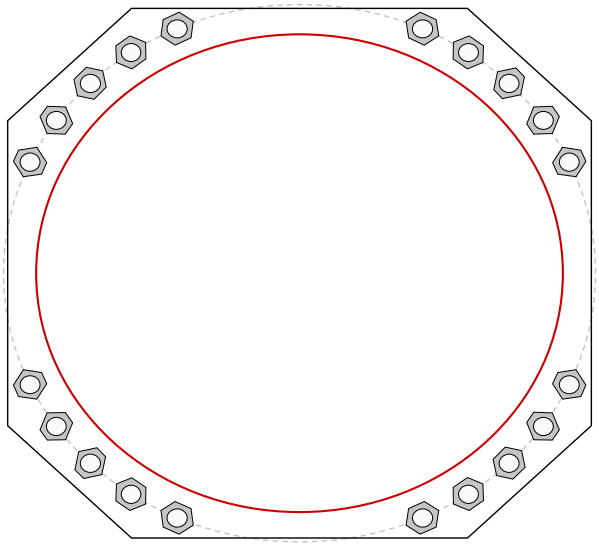
Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Monopole Base Plate Connection

Site Info	
BU #	803175
Site Name	New Britain 3 CAC 803
Order #	446050 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0

Applied Loads	
Moment (kip-ft)	5791.00
Axial Force (kips)	60.00
Shear Force (kips)	43.00



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75; Fy=75 ksi, Fu=100 ksi) on 67" BC

Base Plate Data

66" OD x 3" Plate (A572-50; Fy=50 ksi, Fu=65 ksi)

Stiffener Data

N/A

Pole Data

59.61" x 0.5" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-ft)*

Pu = 210.34	ϕPn = 243.75	**Stress Rating**
Vu = 2.15	ϕVn = 73.13	**82.3%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	35.59	
Allowable Stress (ksi):	45	
Stress Ratio:	**75.3%**	**Pass**

Pier and Pad Foundation

BU # :	803175
Site Name:	CT New Britain 3 C
App. Number:	446050 Rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	60	kips
Base Shear, Vu_comp:	43	kips
Moment, M_u:	5791	ft-kips
Tower Height, **H**:	188	ft
BP Dist. Above Fdn, bp_{dist}:	3.5	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	8	ft
Ext. Above Grade, **E**:	1.08	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	36	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	12	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	4	in

Pad Properties

Depth, **D**:	5.91667	ft
Pad Width, **W**:	26	ft
Pad Thickness, **T**:	3	ft
Pad Rebar Size, **Sp**:	11	
Pad Rebar Quantity, **mp**:	33	
Pad Clear Cover, cc_{pad}:	4	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	3000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	110	pcf
Ultimate Net Bearing, Qnet:	12.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:		
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	17.9	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	221.64	43.00	**18.5%**	**Pass**
Bearing Pressure (ksf)	9.49	5.14	**54.2%**	**Pass**
*Overturning (kip*ft)*	6613.28	6104.40	**92.3%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	9854.47	5962.86	**57.6%**	**Pass**
Pier Compression (kip)	30551.04	106.04	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	6473.47	3253.77	**47.9%**	**Pass**
Pad Shear - 1-way (kips)	766.05	412.61	**51.3%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	**0.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	4232.07	3577.71	**80.5%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Soil Rating*:	**92.3%**
Structural Rating*:	**80.5%**

Version 3.0.1

Date: **August 30, 2018**

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300,
Charlotte, NC 28277
(704) 405-6607

Tectonic
1279 Route 300
Newburgh, NY 12550
(845) -567-6656

Subject:	**Mount Structural Analysis Report**	
Carrier Designation:	**T-Mobile Tower Equipment**	
	Carrier Site Number:	CT11783B
	Carrier Site Name:	Crown Comm. Monopole
Crown Castle Designation:	**Crown Castle BU Number:**	803175
	Crown Castle Site Name:	CT NEW BRITAIN 3 CAC 803175
	Crown Castle JDE Job Number:	512588
	Crown Castle PO Number:	1219379
	Crown Castle Application Number:	446050 Rev 0
Engineering Firm Designation:	**Tectonic Project Number:**	9500.803175
Site Data:	**167 Coccomo, New Britain, Hartford County, CT 06051** **Latitude 41° 41' 11.80" Longitude -72° 45' 27.80"**	
Structure Information:	**Tower Height & Type:**	**188 ft MP**
	Mount Elevation:	**161 ft**
	Mount Type:	**13.5 ft Low Profile Platform**

Dear Charles,

Tectonic Engineering & Surveying Consultants P.C. (Tectonic) is pleased to submit this **"Mount Structural Analysis Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore, is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

Based upon our analysis, we have determined the adequacy of the antenna mounting system that will support the existing and proposed loading to be:

Low Profile Platform **Sufficient**

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category C with a maximum topographic factor, Kzt, of 1.0 and Risk Category II were used in this analysis.

We at Tectonic appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Swati Gandhi/ KZ

Respectfully Submitted by:

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

8/30/18.

Antonio A. Gualtieri, P.E.
Sr. Vice President

TABLE OF CONTENTS

1) INTRODUCTION

The existing antenna mounting system can be categorized as a Low Profile Platform, installed at 161 ft elevation above ground level. The design and mount manufacturer information for the mount is not available. The member sizes for the analysis have therefore, been based on mounting mapping report by Engineered tower Solutions, PLLC dated 8/23/18.

2) ANALYSIS CRITERIA

The structural analysis was performed in accordance with the requirements of ANSI/TIA-222-G-2005 "Structural Standard for Antenna Supporting Structures and Antennas" using a nominal 3-second gust wind speed of 97 mph with no ice, 50 mph with 1 inch ice thickness, Exposure C and Topographic Category 1. In addition, the mount has been analyzed for various live loading conditions consisting of a 250-pound man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500-pound man live load applied individually at mount pipe locations using a nominal 3-second gust wind speed of 30 mph.

Table 1 - Proposed Equipment Loading Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Proposed Mount Type	Note
161	161	3	RFS/Celwave	APXVAARR24_43-U-NA20	-	1
		3	Ericsson	RADIO 4449 B12/B71		
	163	1	RFS/Celwave	ATMAA1412D-1A20		

Note:
1) To be mounted on existing mounts.

Table 2 - Existing Antenna Information

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type	Note
161	163	3	Andrew	LNX-6515DS-A1M	-	2
		3	Ericsson	RRUS 11 B12		
		1	RFS/Celwave	ATMAA1412D-1A20	Low Profile Platform	1
	161	3	Ericsson	AIR 21 B2A B4P		
		3	Ericsson	AIR 32 B2A/B66AA		
	160	1	RFS/Celwave	ATMAA1412D-1A20		
		1	RFS/Celwave	ATMAA1412D-1A20	-	2

Notes:
1) Existing Equipment.
2) Existing Equipment to be removed, not considered in this analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-TOWER STRUCTURAL ANALYSIS REPORTS	Crown Castle	7076494	CCISITES
MOUNT MAPPING REPORT	Engineered Tower Solutions, PLLC	-	EMAIL
SITE PHOTOS	-	-	CCISITES

3.1) Analysis Method

RISA-3D (16.0.0), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Proprietary excel sheets were used to calculate appurtenance and member loading for various load cases. Selected output from the analysis is included in Appendix B

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Tectonic should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 4 - Mount Component Stresses vs. Capacity (Low Profile Platform)

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	161	49	Pass
	Grating Support		92	Pass
	Standoff Boom		63	Pass
	Mount Pipe		81	Pass
1,2	Mount to Tower Connection		55	Pass

Structure Rating (max from all components) =	92%

Notes:

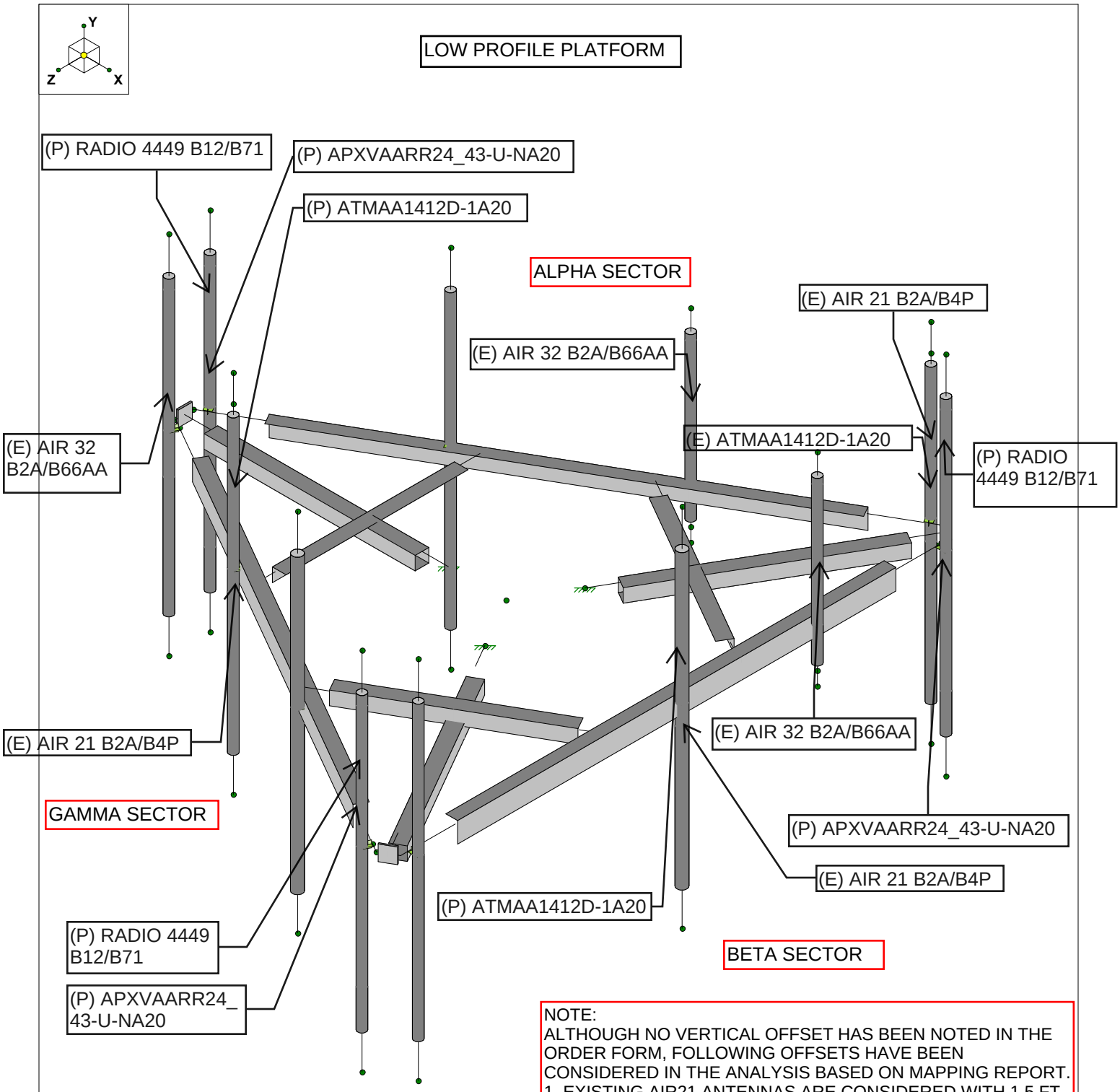
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The existing low profile platform has sufficient capacity to support the proposed loading configuration. No modification is required at this time.

APPENDIX A

WIRE FRAME AND RENDERED MODELS

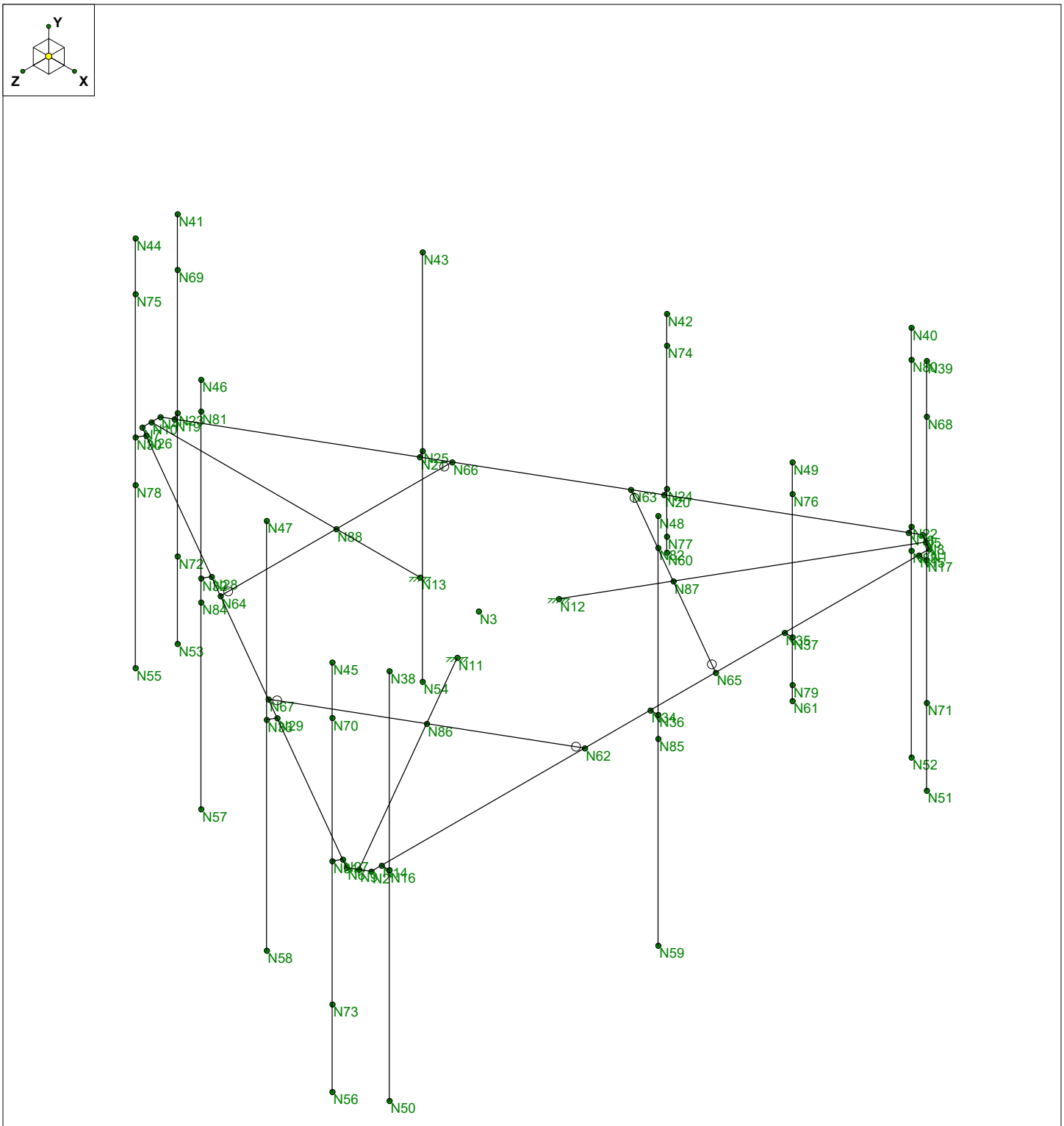


NOTE:
ALTHOUGH NO VERTICAL OFFSET HAS BEEN NOTED IN THE ORDER FORM, FOLLOWING OFFSETS HAVE BEEN CONSIDERED IN THE ANALYSIS BASED ON MAPPING REPORT.
1. EXISTING AIR21 ANTENNAS ARE CONSIDERED WITH 1.5 FT VERTICAL OFFSET.
2. EXISTING AIR32 ANTENNAS ARE CONSIDERED WITH 1 FT VERTICAL OFFSET.
3. PROPOSED APXVAARR24 ANTENNA IS CONSIDERED CENTERED ALONG THE EXISTING PLATFORM (ZERO OFFSET).
4. THE PROPOSED RADIO 4449 B12/B71 RRH'S ARE CONSIDERED WITH 1 FT OFFSET.
5. THE PROPOSED ATMAA1412D-1A20 AMPLIFIERS ARE CONSIDERED WITH 3 FT OFFSET.

(E) EXISTING
(P) PROPOSED

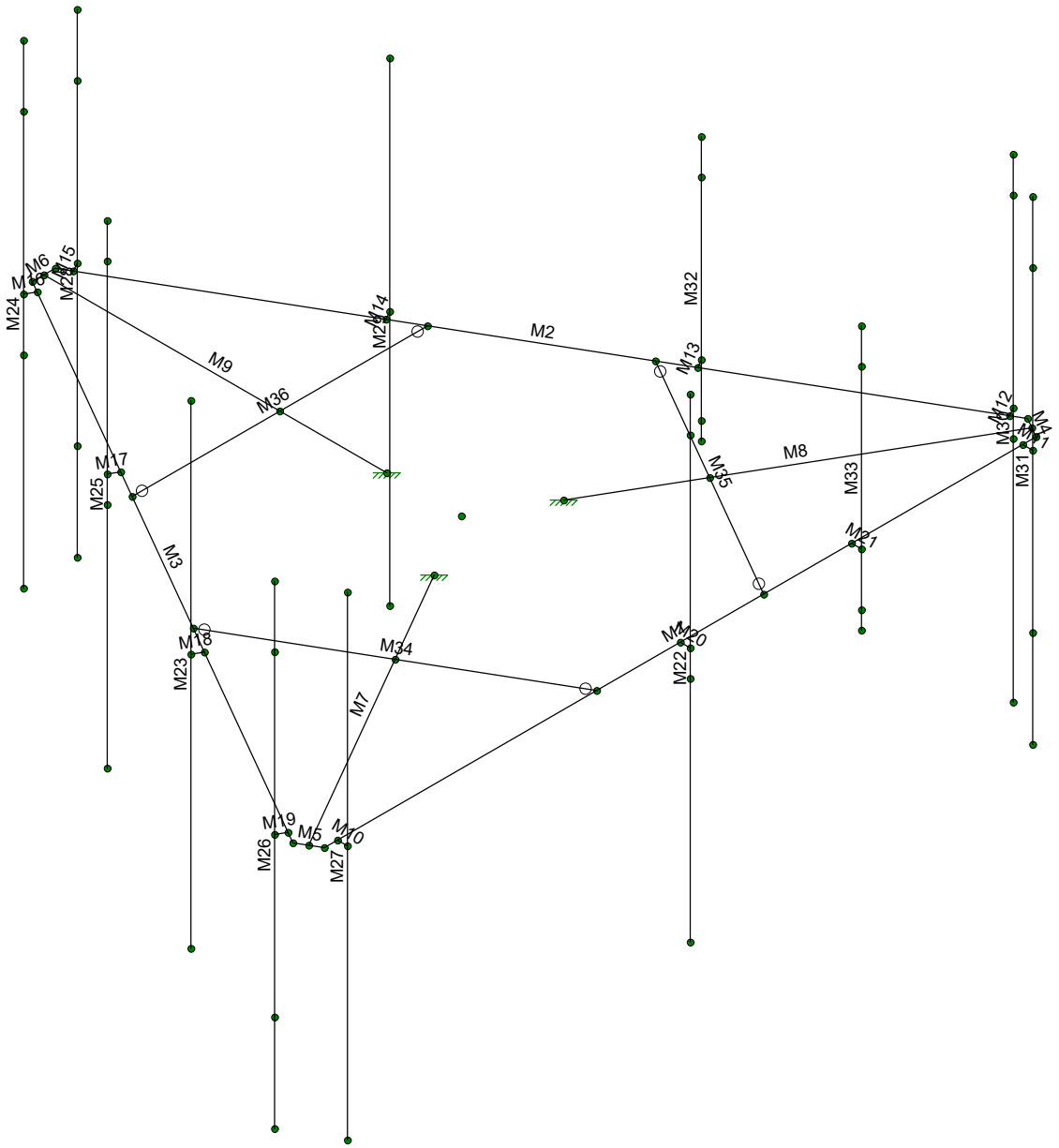
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 1
SG		Aug 30, 2018 at 11:09 AM
9500.803175		9500.803175 Mount Analysis.r3d



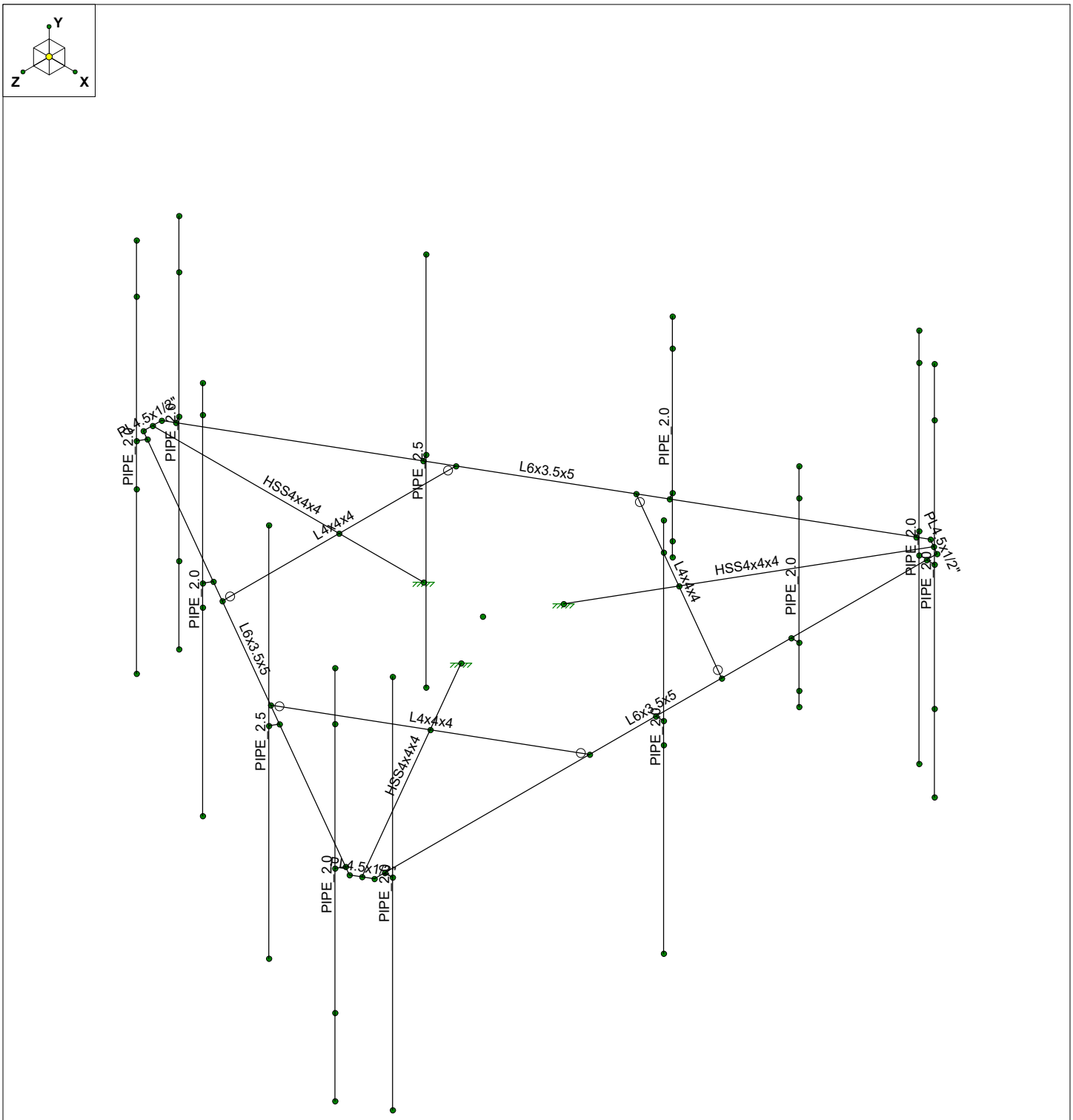
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 2
SG		Aug 30, 2018 at 6:29 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



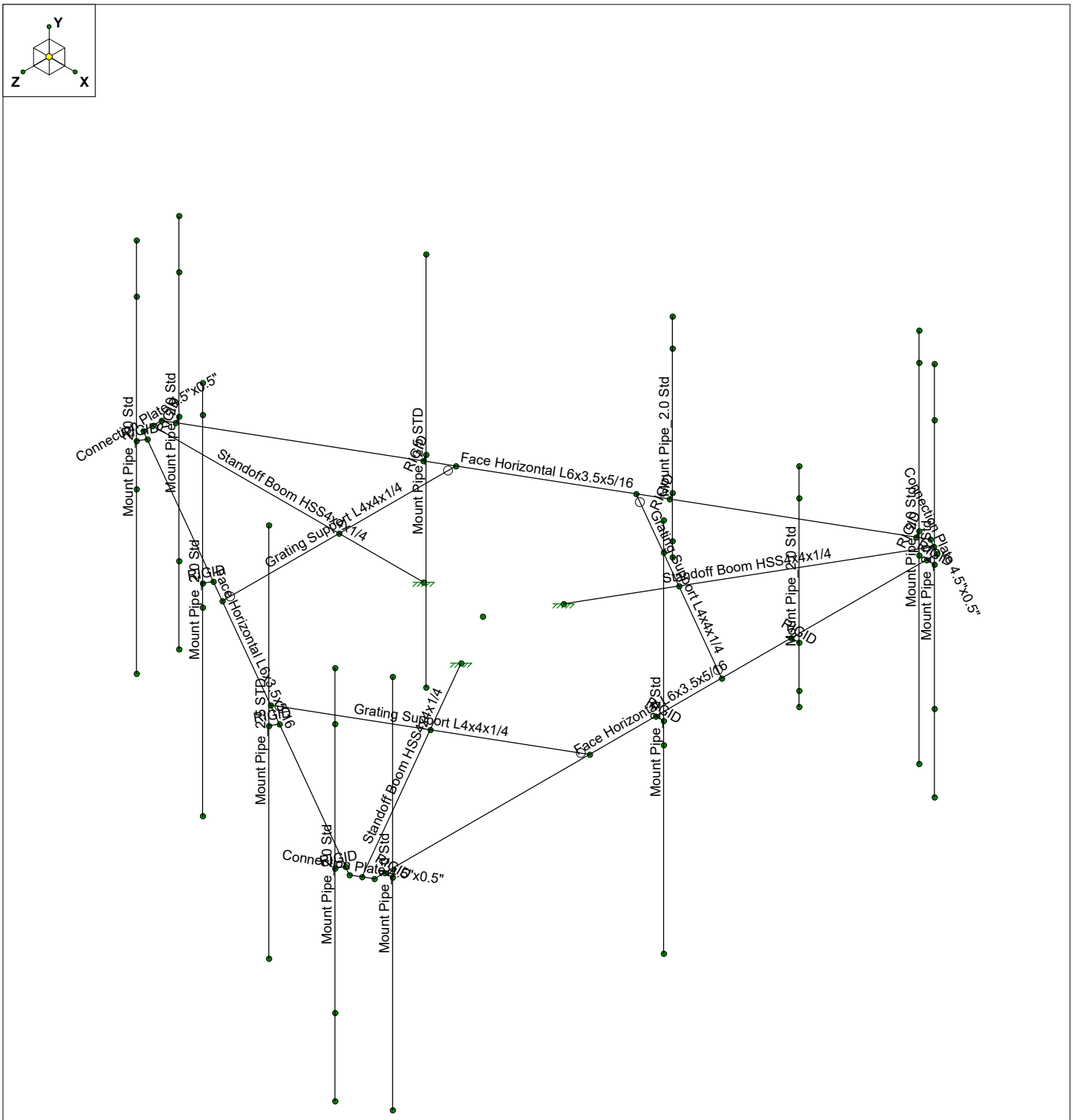
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 3
SG		Aug 30, 2018 at 6:29 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



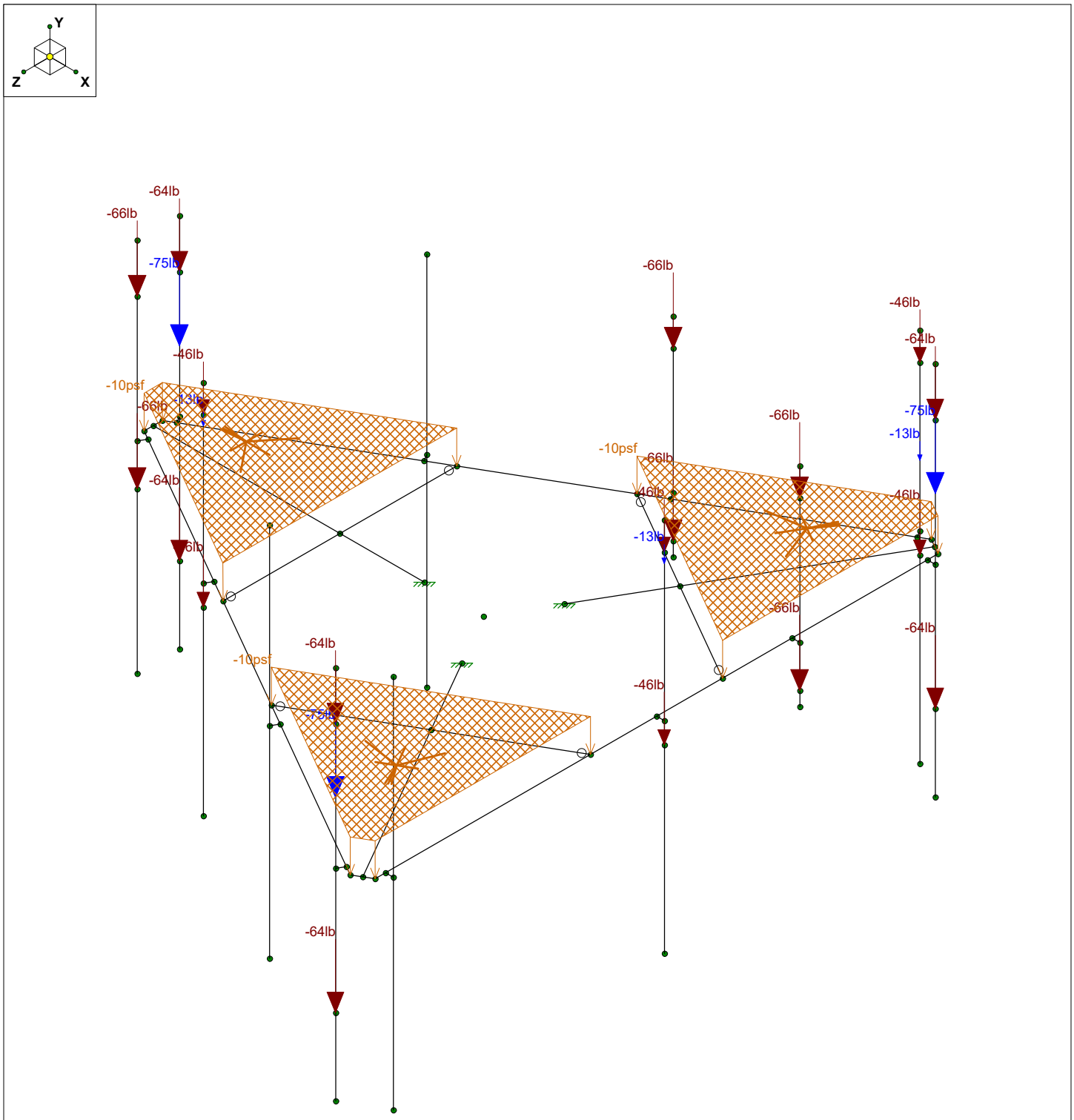
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 4
SG		Aug 30, 2018 at 6:29 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



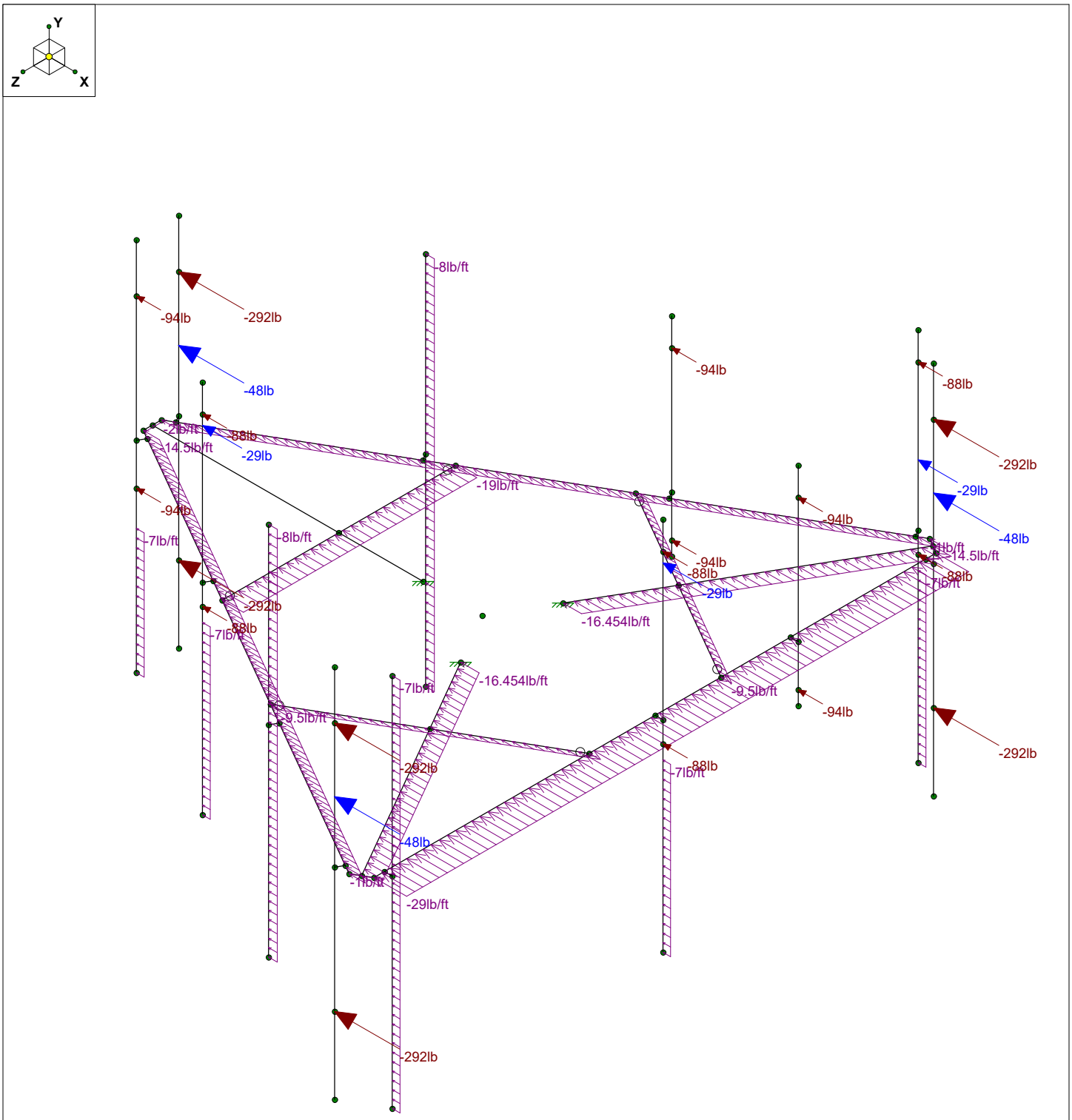
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 5
SG		Aug 30, 2018 at 6:29 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



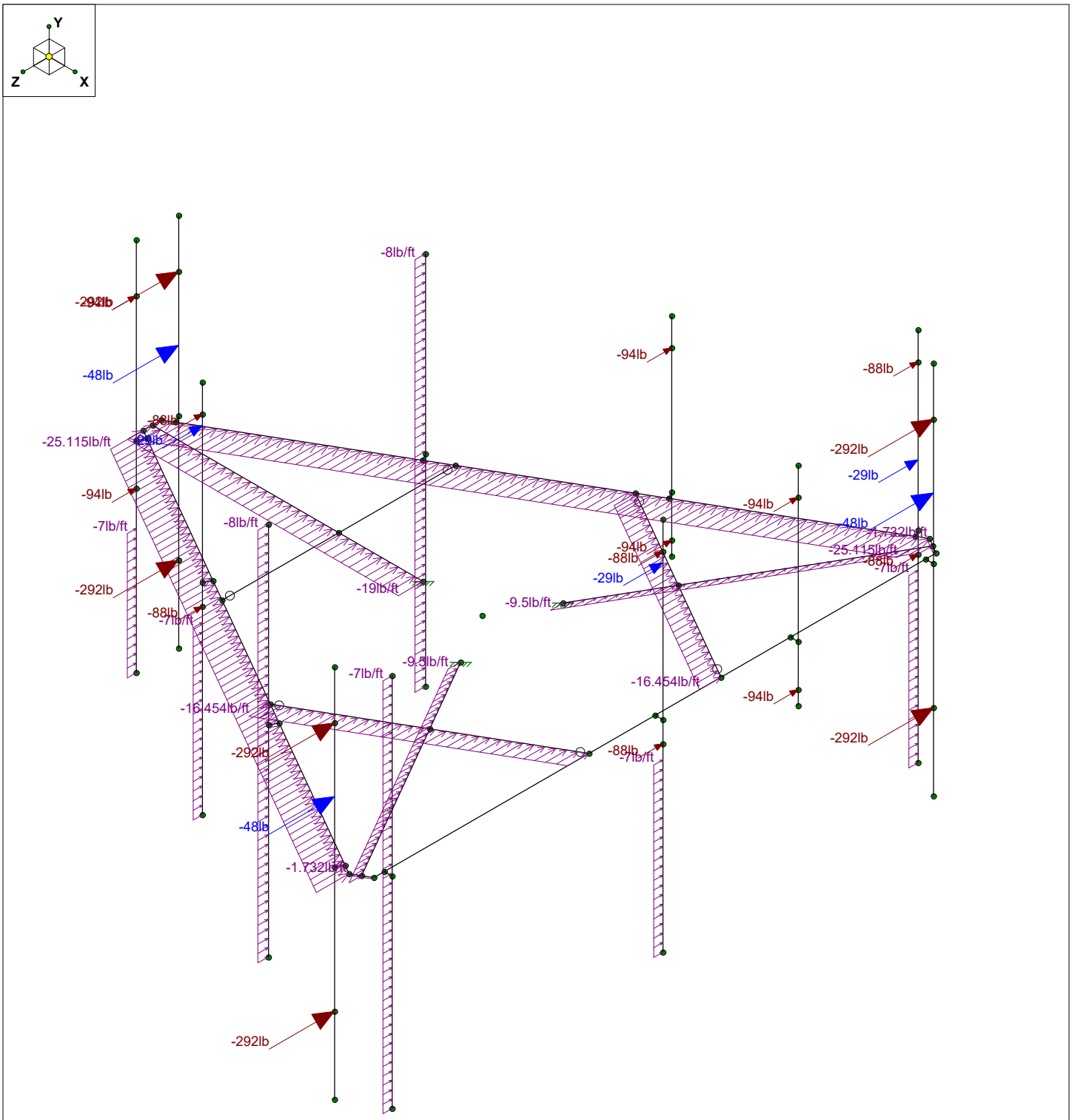
Loads: BLC 1, DEAD LOAD
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 6
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



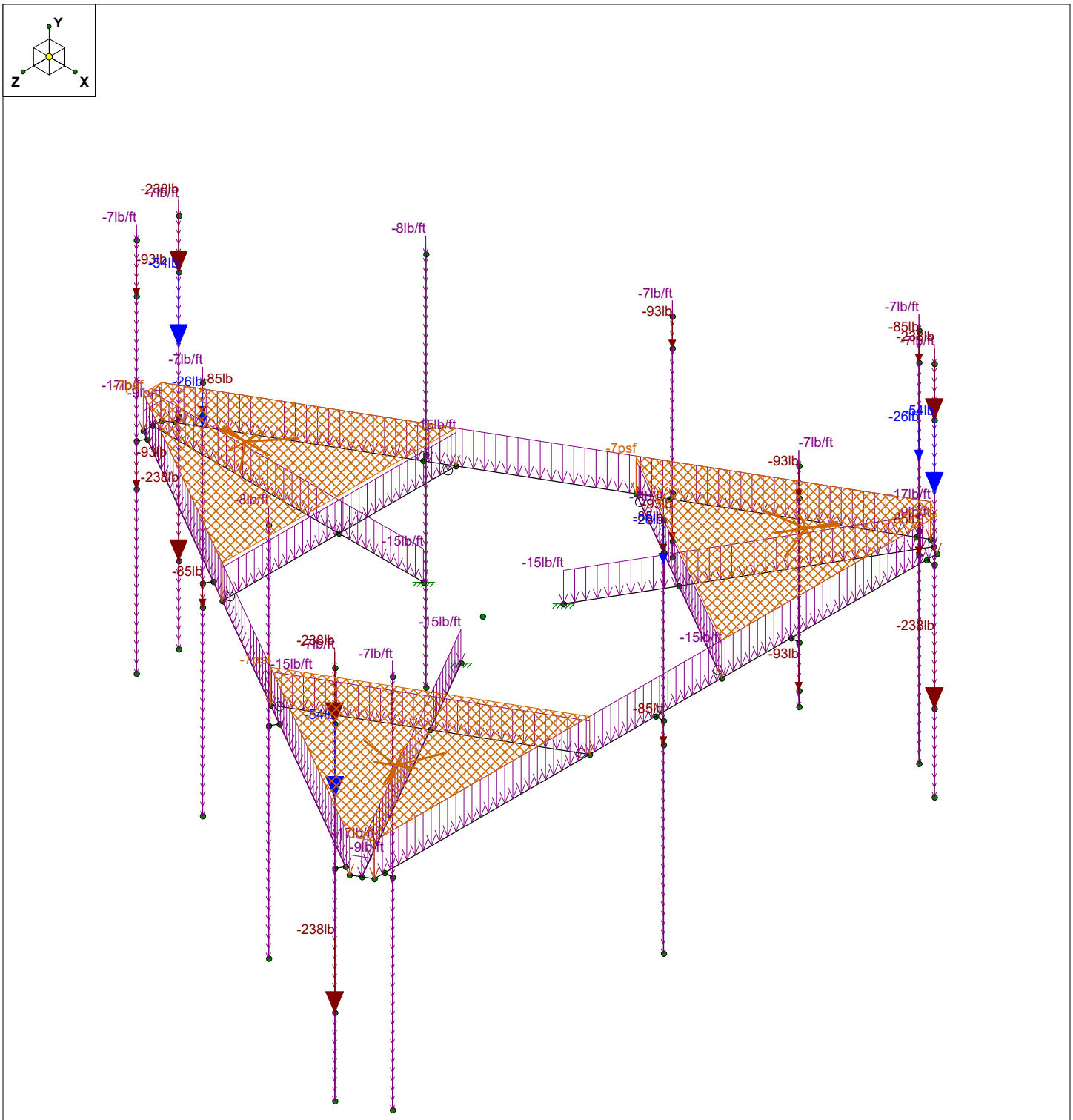
Loads: BLC 2, WIND X
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 7
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



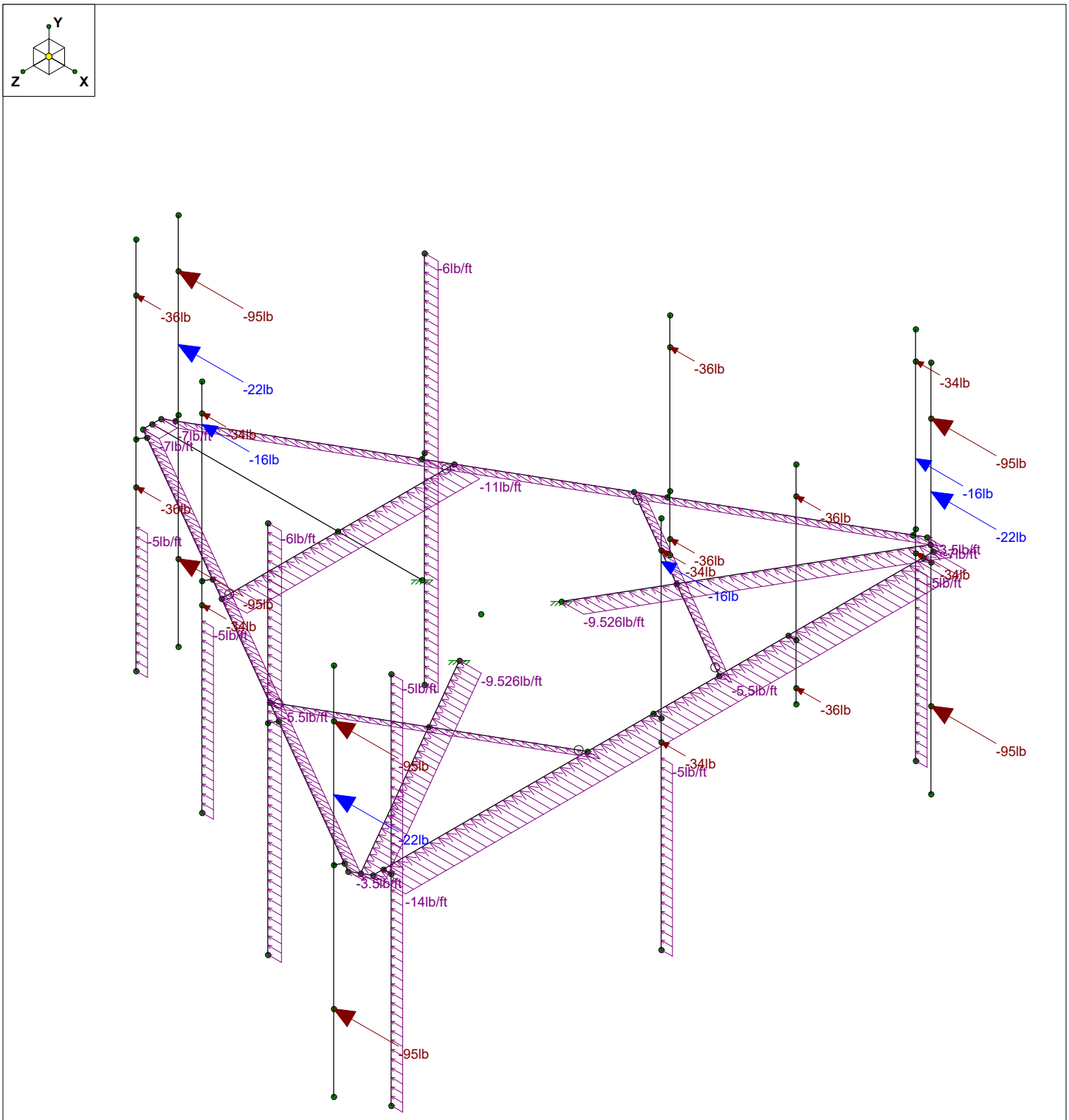
Loads: BLC 3, WIND Z
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 8
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



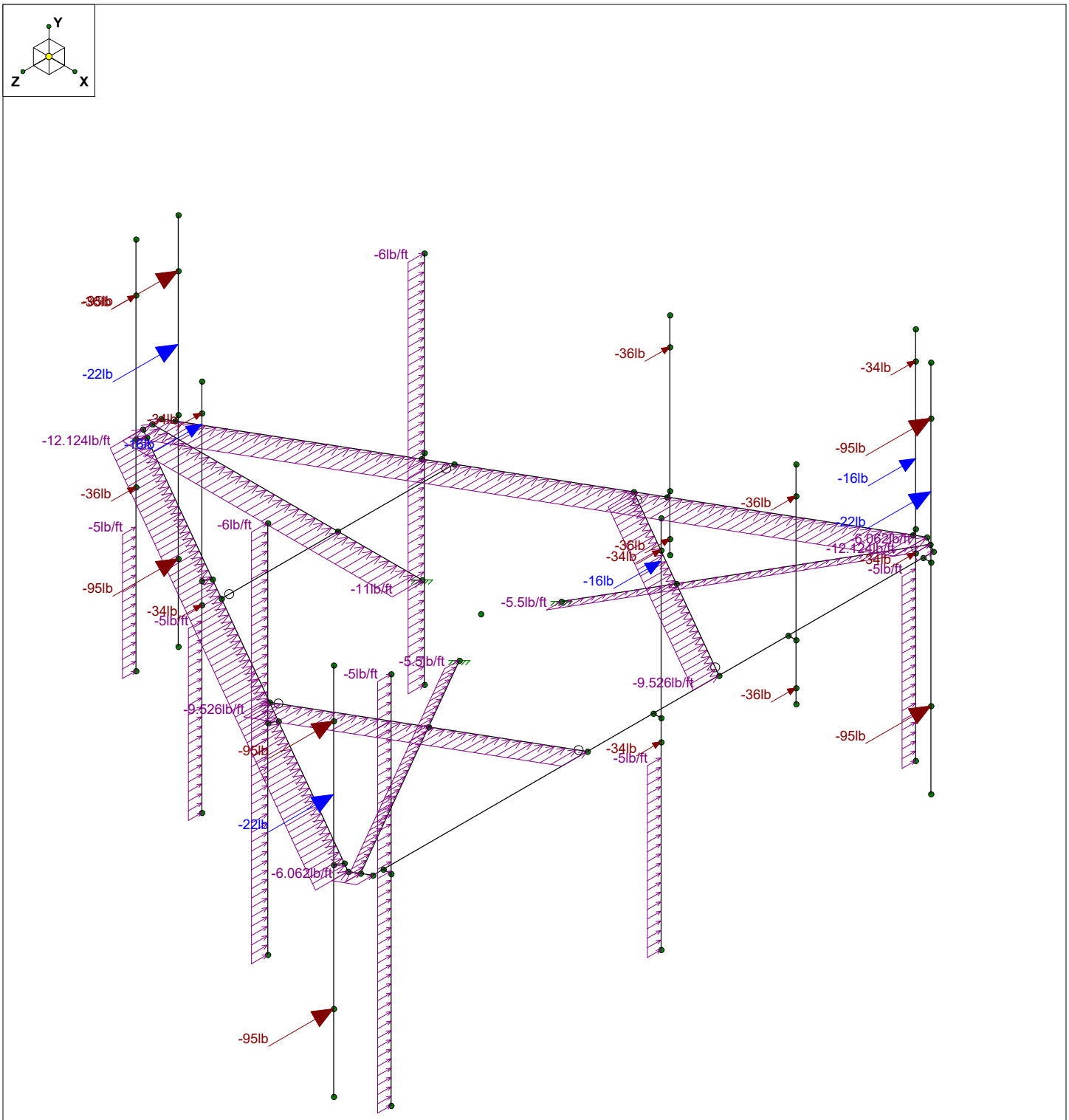
Loads: BLC 4, ICE LOAD
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 9
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



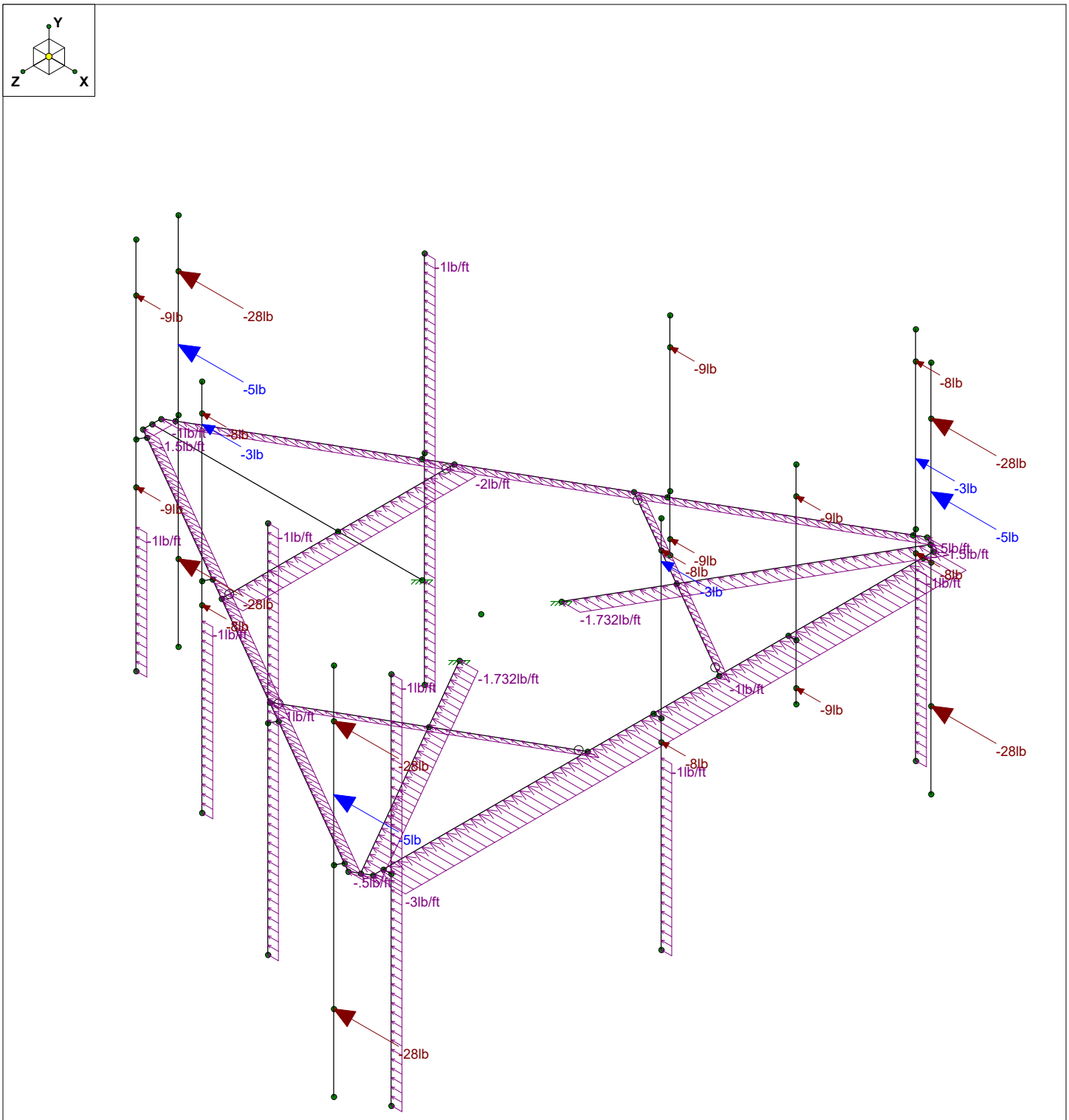
Loads: BLC 5, WIND + ICE IN X
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 10
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



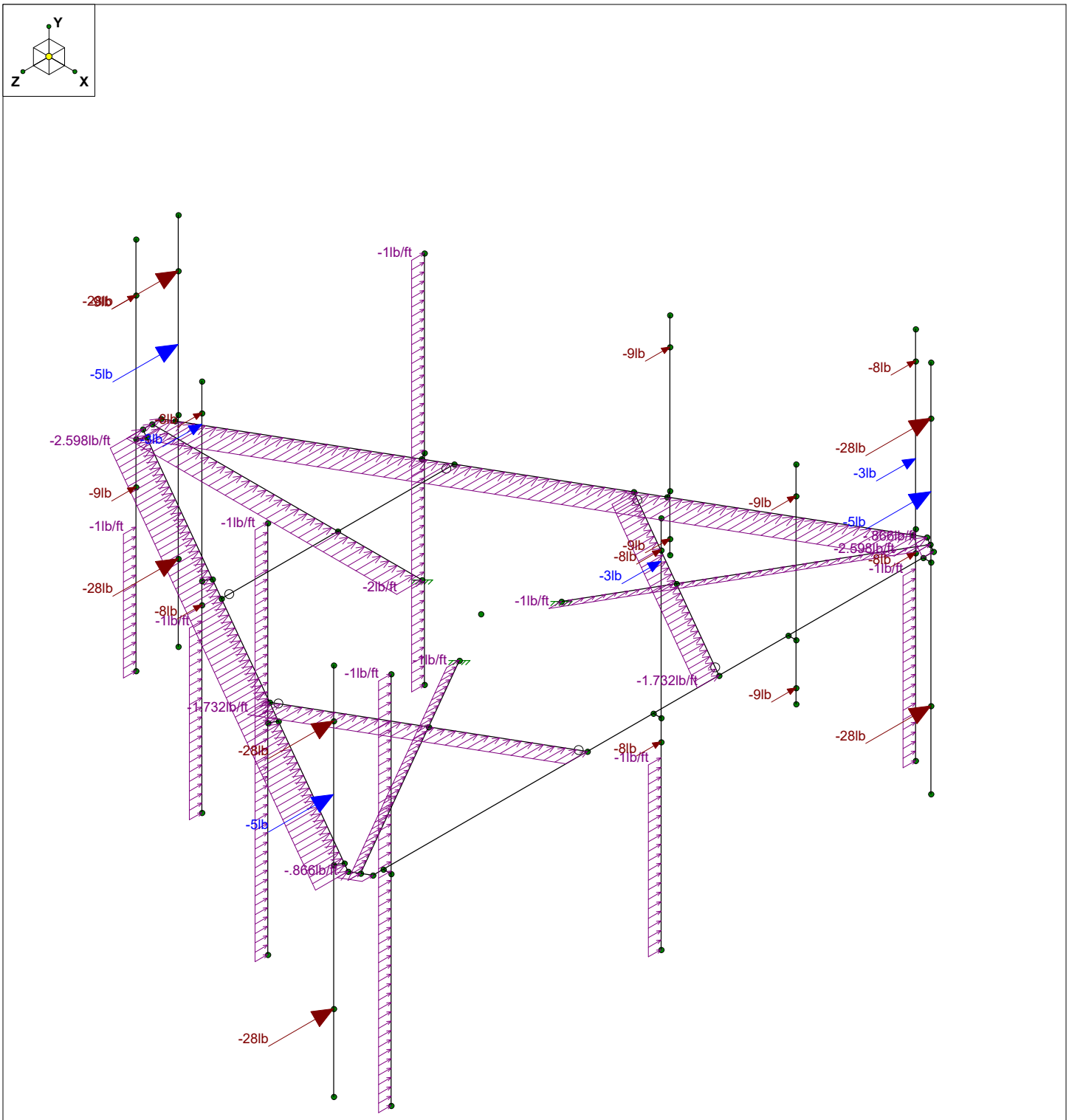
Loads: BLC 6, WIND + ICE IN Z
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 11
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



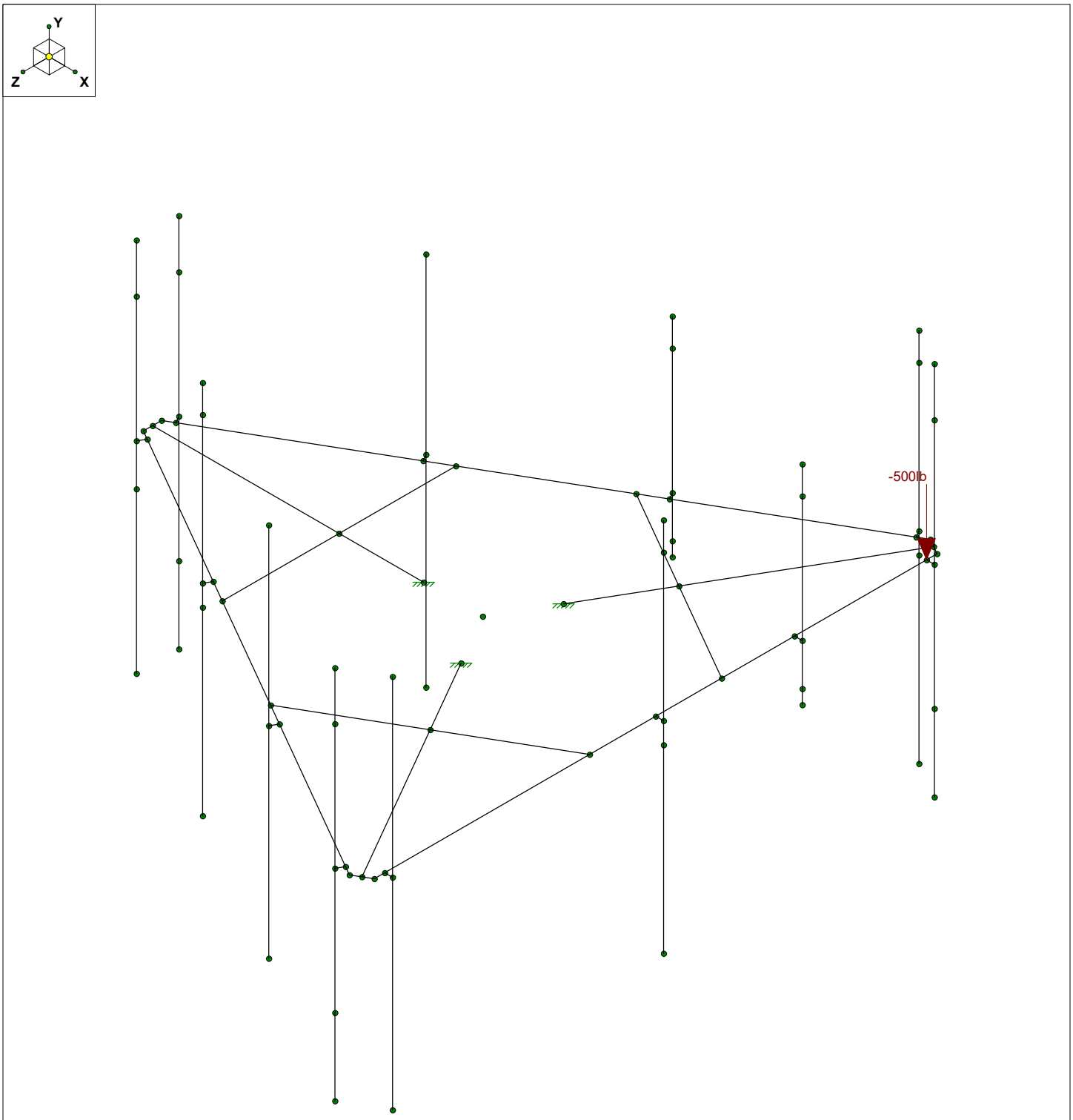
Loads: BLC 7, WIND X Main
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 12
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



Loads: BLC 8, WIND Z Main Envelope Only Solution

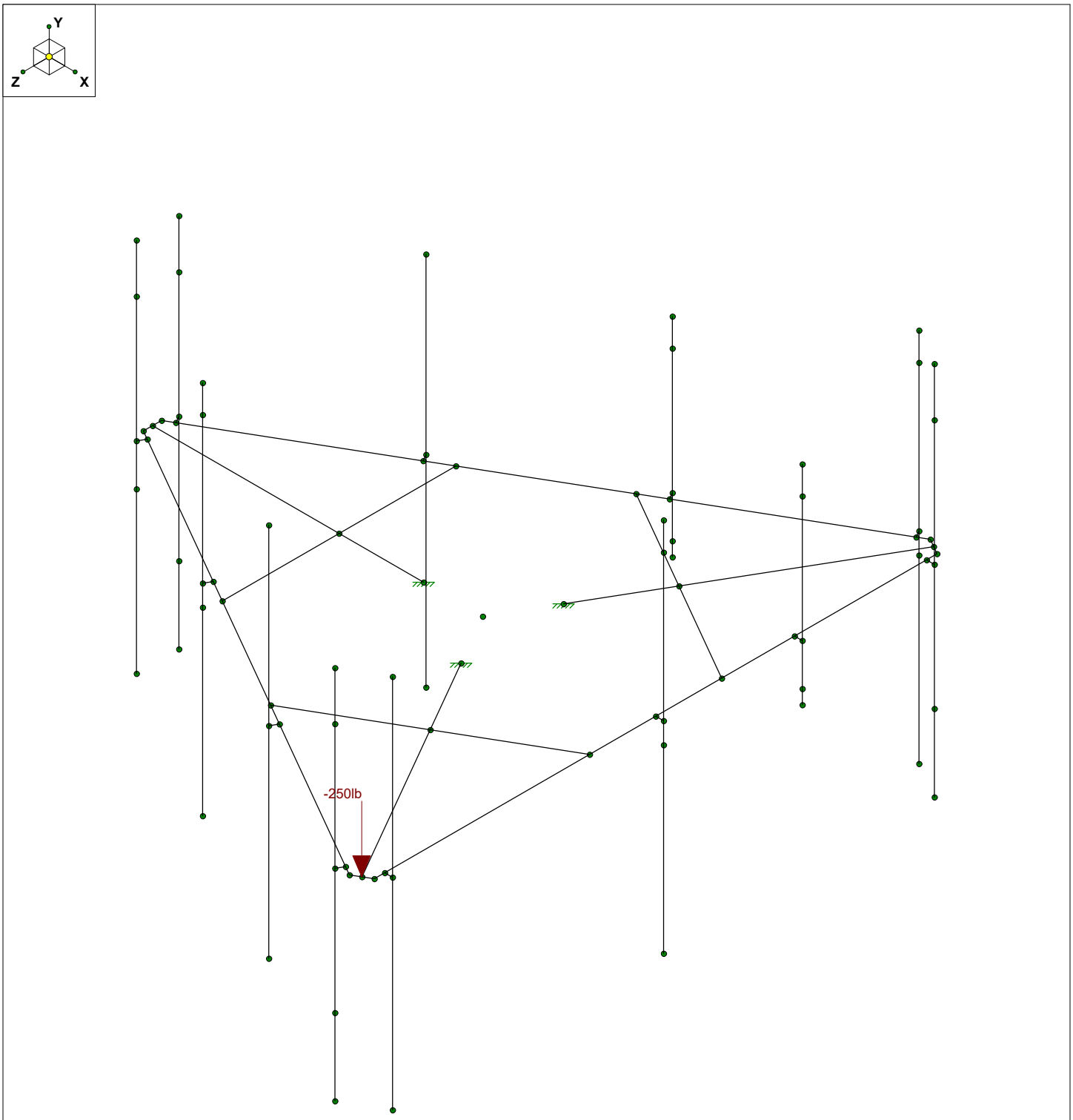
Tectonic	Low Profile Platform	SK - 13
SG		Aug 30, 2018 at 6:30 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...



500 LB MAN LIVE LOAD APPLIED INDIVIDUALLY AT MOUNT PIPE LOCATION. (4 LOCATIONS TOTAL)

Loads: BLC 9, LM1

Tectonic	Low Profile Platform	SK - 14
SG		Aug 30, 2018 at 11:14 AM
9500.803175		9500.803175 Mount Analysis.r3d



250 LB MAN LIVE LOAD
(3 LOCATIONS TOTAL)

Loads: BLC 13, LV1

Tectonic	Low Profile Platform	SK - 15
SG		Aug 30, 2018 at 11:14 AM
9500.803175		9500.803175 Mount Analysis.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Tectonic	Job No.	9500.803175		
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.	Sheet No.	1	of	3
	Calculated By	SG	Date :	08/30/18
	Checked By	KZ	Date :	08/30/18

WIND AND ICE LOADS PER TIA-222-G

W.O.	9500.803175
Project Name	CT NEW BRITAIN 3 CAC 803175
Location	167 Coccomo, New Britain, CT 06051
County	Hartford

Tower Type	MP	Monopole
Structure Class	2	Substantial hazard
Exposure Category	C	Open terrain
Topo Category	1	Flat or rolling terrain
Height of crest	0	ft

Basic Wind Speed (3-sec gust):		
Without ice	97	mph*
With ice	50	mph
Maintenance	30	mph
Ice thickness	1.00	in

Importance Factor	
Wind only	1.00
Wind with ice	1.00
Ice thickness	1.00
Supporting Data:	
K_e	1.00
K_t	N/A
f	N/A
z_g	900
α	9.5
$K_{z,min}$	0.85
K_d	0.95
G_h	1.00

Height	z (ft)	161
	Kh	N/A
	Kzt	1.00
	Kz	1.40
	Kiz	1.17
Wind Pressure, qz (psf)	No Ice	32.01
	With Ice	8.51
	Service	3.06
(tiz)	Ice Thk	2.34
Appurtenances (qzGh)	No Ice	32.01
	With Ice	8.51
	Service	3.06

*Basic Wind speed converted from ultimate gust wind speed of 125 mph.

Tectonic

Job No.	9500.803175		
Sheet No.	2	of	3
Calculated By	SG	Date :	08/30/18
Checked By	KZ	Date :	08/30/18

Appurtenance Information

Effective Projected Area for Appurtenance $(EPA)_A=Max((EPA)_N,(EPA)_T)$

$(EPA)_T=\sum(C_aA_A)_T$ | | $(EPA)_N=\sum(C_aA_A)_N$

Reduction Factor = 0.9

Wind Only Load Combinations

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(Aa)_T$ (ft^2)	Wind ward Side Face (CaAa)T (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Antenna Weight (lb)	Total Weight (lb)
AIR 32 B2A/B66AA	E	3	161	4.72	12.90	8.70	Flat	1.38	1.28	3.42	12.72	5.07	17.58	188	136	132.2	396.6
AIR 21 B2A B4P	E	3	161	4.67	12.10	7.87	Flat	1.40	1.29	3.06	11.60	4.71	16.45	176	124	91.5	274.5
APXVAARR24_43-U-NA20	**P**	**3**	161	7.99	24.00	8.70	Flat	1.53	1.27	5.79	24.00	15.98	54.66	583	256	128.0	384.0
ATMAA1412D-1A20	E	2	161	1.00	10.00	4.00	Flat	1.22	1.20	0.33	0.73	0.83	1.80	29	12	13.0	26.0
ATMAA1412D-1A20	**P**	**1**	161	1.00	10.00	4.00	Flat	1.22	1.20	0.33	0.37	0.83	0.90	29	12	13.0	13.0
RADIO 4449 B12/B71	**P**	**3**	161	1.25	13.20	10.40	Flat	1.20	1.20	1.08	3.51	1.38	4.46	48	37	75.0	225.0
										$\sum(CaAA)_T$	52.93	$\sum(CaAA)_N$	95.83				1319

Note: Appurtenances listed above are to be installed along Low Profile Platform

Wind with Ice Load Combinations **Ice Thk=** 2.34 in

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	Transverse Antenna Wind Load Each (lb)	Ice Area for Weight (ft^2)	Ice Weight Alone (lbs)
AIR 32 B2A/B66AA	E	3.00	161.00	5.11	17.59	13.39	Cylindrical	1.29	1.24	5.70	19.88	7.49	25.14	71	56	17.0	185.7
AIR 21 B2A B4P	E	3.00	161.00	5.06	16.79	12.56	Cylindrical	1.30	1.25	5.29	18.63	7.07	23.87	68	53	15.5	169.9
APXVAARR24_43-U-NA20	P	3.00	161.00	8.38	28.69	13.39	Cylindrical	1.42	1.24	9.35	35.78	20.04	67.34	191	101	43.6	476.3
ATMAA1412D-1A20	E	2.00	161.00	1.39	14.69	8.69	Cylindrical	1.20	1.20	1.01	2.17	1.70	3.68	16	9	2.3	25.5
ATMAA1412D-1A20	P	1.00	161.00	1.39	14.69	8.69	Cylindrical	1.20	1.20	1.01	1.09	1.70	1.84	16	9	2.3	25.5
RADIO 4449 B12/B71	P	3.00	161.00	1.64	17.89	15.09	Cylindrical	1.20	1.20	2.06	6.68	2.45	7.92	22	19	4.9	53.8
										$\sum(CaAA)_T$	84.23	$\sum(CaAA)_N$	129.79				937

Maintenance Wind Load Combinations

Antenna Configuration	(E) or (P)	Qty	z (ft)	Length or Diameter (ft)	Width (in)	Depth (in)	Flat or Cylindrical?	Antenna $(Ca)_T$	Antenna $(Ca)_N$	Side Face $(A_a)_T$ (ft^2)	Windward Side Face (CaAa)T (ft^2)	Face Normal $(A_a)_N$ (ft^2)	Windward Face Normal $(C_aA_a)_N$ (ft^2)	Normal Antenna Wind Load Each (lb)	TransverseAntenna Wind Load Each (lb)
AIR 32 B2A/B66AA	E	3	161	4.72	12.9	8.7	Flat	1.38	1.28	3.42	12.72	5.07	17.58	18	13
AIR 21 B2A B4P	E	3	161	4.67	12.1	7.87	Flat	1.40	1.29	3.06	11.60	4.71	16.45	17	12
APXVAARR24_43-U-NA20	P	3	161	7.99	24	8.7	Flat	1.53	1.27	5.79	24.00	15.98	54.66	56	24
ATMAA1412D-1A20	E	2	161	1.00	10	4	Flat	1.22	1.20	0.33	0.73	0.83	1.80	3	1
ATMAA1412D-1A20	P	1	161	1.00	10	4	Flat	1.22	1.20	0.33	0.37	0.83	0.90	3	1
RADIO 4449 B12/B71	P	3	161	1.25	13.2	10.4	Flat	1.20	1.20	1.08	3.51	1.38	4.46	5	4
										$\sum(CaAA)_T$	52.93	$\sum(CaAA)_N$	95.83		

Tectonic

Job No.	9500.803175		
Sheet No.	3	of	3
Calculated By	SG	Date :	08/30/18
Checked By	KZ	Date :	08/30/18

Low Profile Platform

Mount Center Line=	161 ft

Member sizes and dimensions are based on mapping report by Engineered Tower Solutions, PLLC dated 8/23/2018.

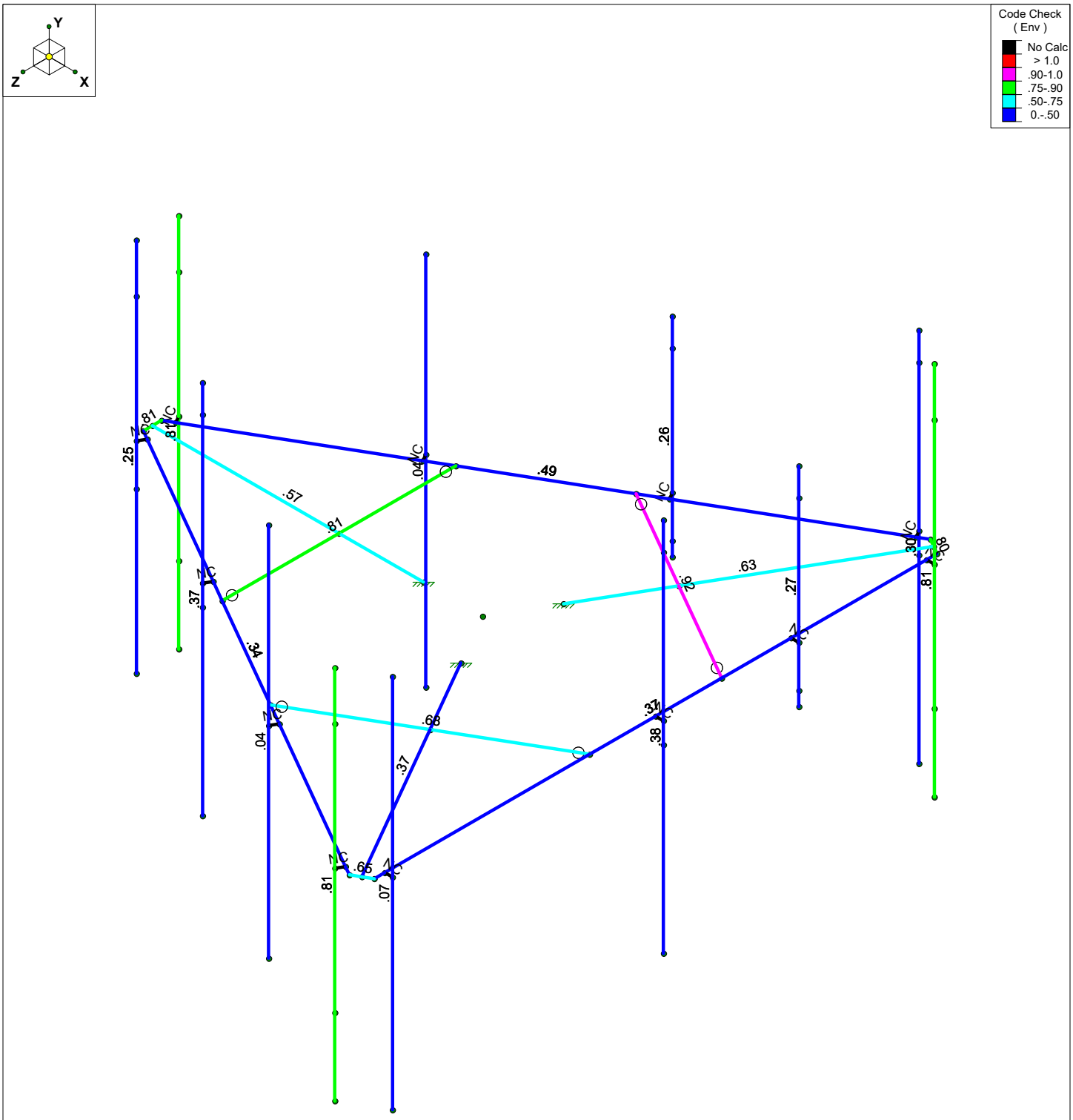
Reduction Factor = 0.9

Mount Part	Quantity	Length (ft)	Projected Width (in)	Depth (in)	Flat or Cylindrical ?	Drag Factor	Projected Area (ft^2)	Wind Force (lbs/ft)	Ice Weight Area (ft^2)	Ice Weight (lbs/ft)	Projected Area with Ice (ft^2)	Wind Force Ice (lbs/ft)	ServiceWind Force (lbs/ft)
Face Horizontal L6x3.5x5/16	3	13.50	6.00	3.50	Flat	2	40.50	28.8	64.13	17.3	72.14	13.6	2.8
Grating Tube L4x4x1/4	6	5.13	4.00	4.00	Flat	2	20.52	19.2	41.04	14.6	44.56	11.1	1.8
Mount Pipe 2.0" STD	2	5.00	2.40	2.40	Cylindrical	1.2	2.40	6.9	6.28	6.9	7.09	5.4	0.7
Mount Pipe 2.0" STD	8	9.00	2.40	2.40	Cylindrical	1.2	17.28	6.9	45.22	6.9	51.03	5.4	0.7
Mount Pipe 2.5" STD	2	9.00	2.90	2.90	Cylindrical	1.2	5.22	8.4	13.66	8.3	13.66	5.8	0.8
Standoff Boom HSS4x4x1/4	3	6.50	4.00	4.00	Flat	2	13.00	19.2	26.00	14.6	28.23	11.1	1.8
Connection Plate 4.5x1/2	6	1.00	0.50	4.50	Flat	2	0.50	2.4	5.00	9.1	5.19	6.6	0.2

Note: The members listed above are for Low Profile Platform mount

APPENDIX C

SOFTWARE ANALYSIS OUTPUT



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Tectonic	Low Profile Platform	SK - 16
SG		Aug 30, 2018 at 6:32 PM
9500.803175		9500.803175 Mount Analysis - KZ.r...

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Face Horizontal L6x3.5x5/16	L6x3.5x5	Beam	Pipe	A36 Gr.36	Typical	2.89	2.84	10.9	.099
2	Grating Support L4x4x1/4	L4x4x4	Beam	Tube	A36 Gr.36	Typical	1.93	3	3	.044
3	Standoff Boom HSS4x4x1/4	HSS4x4x4	Beam	Tube	A500 Gr.B Rect	Typical	3.37	7.8	7.8	12.8
4	Mount Pipe_2.0 Std	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
5	Connection Plate 4.5"x0.5"	PL4.5x1/2"	Beam	Pipe	A36 Gr.36	Typical	2	.042	2.667	.154
6	Mount Pipe_2.5 STD	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Grav...	Joint	Point	Distrib...	Area(...	Surfac...
1	DEAD LOAD	DL		-1.05		18	6		3	
2	WIND X	WLX				18	6	19		
3	WIND Z	WLZ				18	6	19		
4	ICE LOAD	SL				18	6	24	3	
5	WIND + ICE IN X	WL+X				18	6	19		
6	WIND + ICE IN Z	WL+Z				18	6	19		
7	WIND X Main	WL+X				18	6	19		
8	WIND Z Main	WL+Z				18	6	19		
9	LM1	OL1				1				
10	LM2	OL2				1				
11	LM3	OL3				1				
12	LM4	OL4				1				
13	LV1	OL5				1				
14	LV2	OL6					1			
15	LV3	OL7					1			
16	BLC 1 Transient Area Loads	None						60		
17	BLC 4 Transient Area Loads	None						60		

Load Combinations

	Description	So...	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4D	Yes	Y		1	1.4																		
2	1.2D+1.6WLX	Yes	Y		1	1.2	2	1.6																
3	1.2D+1.6WLZ	Yes	Y		1	1.2	3	1.6																
4	1.2D+1.6(WLX+WLZ) - 0 Deg	Yes	Y		1	1.2	2	1.6																
5	1.2D+1.6(WLX+WLZ) - 30 Deg	Yes	Y		1	1.2	2	1.3...	3	.8														
6	1.2D+1.6(WLX+WLZ) - 60 Deg	Yes	Y		1	1.2	2	.8	3	1.3...														
7	1.2D+1.6(WLX+WLZ) - 90 Deg	Yes	Y		1	1.2	2		3	1.6														
8	1.2D+1.6(WLX+WLZ) - 120 Deg	Yes	Y		1	1.2	2	-.8	3	1.3...														
9	1.2D+1.6(WLX+WLZ) - 150 Deg	Yes	Y		1	1.2	2	-1....	3	.8														
10	1.2D+1.6(WLX+WLZ) - 180 Deg	Yes	Y		1	1.2	2	-1.6	3															
11	1.2D+1.6(WLX+WLZ) - 210 Deg	Yes	Y		1	1.2	2	-1....	3	-.8														
12	1.2D+1.6(WLX+WLZ) - 240 Deg	Yes	Y		1	1.2	2	-.8	3	-1....														

Load Combinations (Continued)

	Description	So..	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
13	1.2D+1.6(WLX+WLZ) - 270 Deg	Yes	Y		1	1.2	2		3	-1.6																
14	1.2D+1.6(WLX+WLZ) - 300 Deg	Yes	Y		1	1.2	2	.8	3	-1....																
15	1.2D+1.6(WLX+WLZ) - 330 Deg	Yes	Y		1	1.2	2	1.3...	3	-.8																
16	**Wind Load with Ice**																									
17	1.2D+1.0Di+1.0WLXi	Yes	Y		1	1.2	4	1	5	1																
18	1.2D+1.0Di+1.0WLZi	Yes	Y		1	1.2	4	1			6	1														
19	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	1	6															
20	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.87	6	.5														
21	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.5	6	.87														
22	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5		6	1														
23	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.5	6	.87														
24	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.87	6	.5														
25	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-1	6															
26	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.87	6	-.5														
27	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	-.5	6	-.87														
28	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5		6	-1														
29	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.5	6	-.87														
30	1.2D+1.0Di+1.0(WLXi+WLZi) -...	Yes	Y		1	1.2	4	1	5	.87	6	-.5														
31	**Maintenance Load (With Ser...		Y																							
32	1.2D+1.5Lm1+1.0WLX (service)	Yes	Y		1	1.2	9	1.5	7	1	8															
33	1.2D+1.5Lm1+1.0WLZ (service)	Yes	Y		1	1.2	9	1.5	7		8	1														
34	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	1	8															
35	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	.87	8	.5														
36	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	.5	8	.87														
37	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7		8	1														
38	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	-.5	8	.87														
39	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	-.87	8	.5														
40	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	-1	8															
41	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	-.87	8	-.5														
42	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	-.5	8	-.87														
43	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7		8	-1														
44	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	.5	8	-.87														
45	1.2D+1.5Lm1+1.0(WLX+WLZ,...	Yes	Y		1	1.2	9	1.5	7	.87	8	-.5														
46	**Maintenance Load (With Ser...		Y																							
47	1.2D+1.5Lm2+1.0WLX (service)	Yes	Y		1	1.2	10	1.5	7	1	8															
48	1.2D+1.5Lm2+1.0WLZ (service)	Yes	Y		1	1.2	10	1.5	7		8	1														
49	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	1	8															
50	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	.87	8	.5														
51	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	.5	8	.87														
52	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7		8	1														
53	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	-.5	8	.87														
54	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	-.87	8	.5														
55	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	-1	8															
56	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	-.87	8	-.5														
57	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	-.5	8	-.87														
58	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7		8	-1														
59	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	.5	8	-.87														
60	1.2D+1.5Lm2+1.0(WLX+WLZ,...	Yes	Y		1	1.2	10	1.5	7	.87	8	-.5														
61	**Maintenance Load (With Ser...		Y																							
62	1.2D+1.5Lm3+1.0WLX (service)	Yes	Y		1	1.2	11	1.5	7	1	8															
63	1.2D+1.5Lm3+1.0WLZ (service)	Yes	Y		1	1.2	11	1.5	7		8	1														
64	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	1	8															
65	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	.87	8	.5														
66	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	.5	8	.87														
67	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7		8	1														
68	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	-.5	8	.87														
69	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	-.87	8	.5														

Load Combinations (Continued)

	Description	So..	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
70	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	-1	8													
71	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	-.87	8	-.5												
72	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	-.5	8	-.87												
73	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7		8	-1												
74	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	.5	8	-.87												
75	1.2D+1.5Lm3+1.0(WLX+WLZ,...	Yes	Y		1	1.2	11	1.5	7	.87	8	-.5												
76	**Maintenance Load (With Ser...		Y																					
77	1.2D+1.5Lm4+1.0WLX (service)	Yes	Y		1	1.2	12	1.5	7	1	8													
78	1.2D+1.5Lm3+1.0WLZ (service)	Yes	Y		1	1.2	12	1.5	7		8	1												
79	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	1	8													
80	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	.87	8	.5												
81	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	.5	8	.87												
82	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7		8	1												
83	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	-.5	8	.87												
84	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	-.87	8	.5												
85	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	-1	8													
86	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	-.87	8	-.5												
87	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	-.5	8	-.87												
88	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7		8	-1												
89	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	.5	8	-.87												
90	1.2D+1.5Lm4+1.0(WLX+WLZ,...	Yes	Y		1	1.2	12	1.5	7	.87	8	-.5												
91	**Maintenance Load** Locatio...																							
92	1.2D+1.5Lv1	Yes	Y		1	1.2	13	1.5																
93	**Maintenance Load** Locatio...																							
94	1.2D+1.5Lv2	Yes	Y		1	1.2	14	1.5																
95	**Maintenance Load** Locatio...																							
96	1.2D+1.5Lv3	Yes	Y		1	1.2	15	1.5																

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N12	max	3405.341	15	3363.924	23	2426.056	3	8779.247	18	1877.965	10	5331.272	25
2		min	-1636.931	9	1028.125	14	-5332.152	13	2746.845	13	-2000.888	2	1318.485	2
3	N13	max	2770.161	2	2996.681	17	1280.733	3	430.176	3	2071.981	3	-3032.608	10
4		min	-6127.571	10	901.969	10	-1181.784	13	-324.775	13	-1923.743	13	-9003.62	30
5	N11	max	2535.84	20	2366.904	27	4372.198	21	-1874.589	33	605.344	15	3608.497	26
6		min	-526.909	11	567.498	6	-781.547	12	-6132.232	27	-619.432	9	1076.5	5
7	Totals:	max	7357.838	2	8491.887	20	7196.925	3						
8		min	-7357.839	10	3508.864	10	-7196.928	13						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M35	L4x4x4	.924	2.802	24	.446	2.802	y	10	40005....	62532	3137.597	6235.407	1...	H2-1
2	M31	PIPE_2.0	.814	4.125	10	.057	2.813		10	12143....	32130	1871.625	1871.625	1...	H1-1b
3	M36	L4x4x4	.814	2.802	17	.308	2.802	y	14	40005....	62532	3137.597	6236.72	1...	H2-1
4	M28	PIPE_2.0	.810	4.125	6	.057	2.813		6	12143....	32130	1871.625	1871.625	1...	H1-1b
5	M26	PIPE_2.0	.810	4.125	14	.057	2.813		14	12143....	32130	1871.625	1871.625	1...	H1-1b
6	M6	PL4.5x1/2"	.807	.219	11	.340	.219	y	3	60464....	64800	675	5120.64	1...	H1-1b
7	M4	PL4.5x1/2"	.801	.219	27	.496	.219	y	5	60464....	64800	675	5120.64	1...	H1-1b
8	M34	L4x4x4	.679	2.802	28	.366	2.802	y	10	40005....	62532	3137.597	6256.091	1...	H2-1
9	M5	PL4.5x1/2"	.647	.219	18	.239	.438	y	14	60464....	64800	675	5120.64	1...	H1-1b
10	M8	HSS4x4x4	.632	0	20	.111	0	y	26	116902...	139518	16180.5	16180.5	2...	H1-1b
11	M9	HSS4x4x4	.571	0	21	.098	0	y	18	116902...	139518	16180.5	16180.5	2...	H1-1b
12	M2	L6x3.5x5	.487	5.203	25	.971	0	z	6	69504....	93636	2866.332	9790.793	1...	H2-1
13	M22	PIPE_2.0	.382	4.125	10	.022	.938		10	12143....	32130	1871.625	1871.625	2...	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
14	M1	L6x3.5x5	.371	8.297	17	1.064	13.5	z	10	75295....	93636	2866.332	10230....	1...	H2-1
15	M25	PIPE_2.0	.369	4.125	14	.021	.938		14	12143....	32130	1871.625	1871.625	2...	H1-1b
16	M7	HSS4x4x4	.368	0	26	.077	0	y	70	116902...	139518	16180.5	16180.5	2...	H1-1b
17	M3	L6x3.5x5	.340	5.203	18	.839	0	z	14	69504....	93636	2866.332	9945.028	1...	H2-1
18	M30	PIPE_2.0	.304	4.125	6	.020	2.719		6	12143....	32130	1871.625	1871.625	2...	H1-1b
19	M33	PIPE_2.0	.273	3.646	10	.018	.677		10	23808.54	32130	1871.625	1871.625	1...	H1-1b
20	M32	PIPE_2.0	.261	3.646	6	.017	.677		6	23808.54	32130	1871.625	1871.625	1...	H1-1b
21	M24	PIPE_2.0	.246	4.125	14	.019	4.219		14	12143....	32130	1871.625	1871.625	2...	H1-1b
22	M27	PIPE_2.0	.069	4.219	10	.006	4.219		10	12143....	32130	1871.625	1871.625	1...	H1-1b
23	M23	PIPE_2.5	.043	4.219	14	.004	4.219		14	26137....	50715	3596.25	3596.25	1...	H1-1b
24	M29	PIPE_2.5	.042	4.219	6	.004	4.219		6	26137....	50715	3596.25	3596.25	1...	H1-1b

MAXIMUM MEMBER STRESS IS AT 92% OF THEIR CAPACITY, THEREFORE, IT IS ADEQUATE TO SUPPORT THE PROPOSED UPGRADE.

APPENDIX D

ADDITIONAL CALCUATIONS

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Job No.	9500.803175		
Sheet No.	1	of	1
Calculated By	SG	Date :	08/30/18
Checked By	KZ	Date :	08/30/18

Existing Connection Check- Low Profile Platform

N12 Envelope

Connection Details		
Bolts		
Qty:	4	
Diam:	0.625	in.
VS:	6	in.
HS:	6	in.
Grade	A325N	
Tult	20.7	k
Vult	12.4	k

Loads per RISA model		
Fx	3.405	k
Fy	3.363	k
Fz	5.332	k
Mx	8.779	k-ft
My	2.001	k-ft
Mz	5.331	k-ft

T max	**8.2**	k		
V max	**7.8**	k		
Interaction	**0.55**	<	1.0	Pass

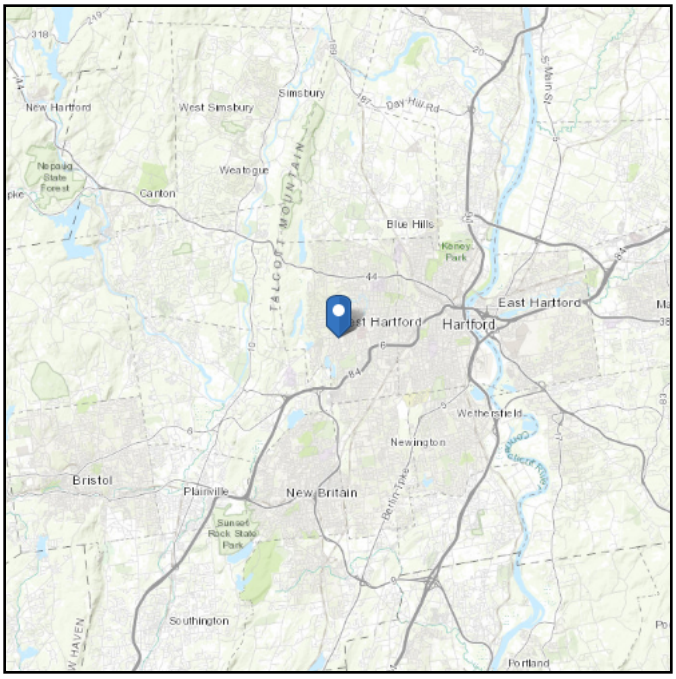
Therefore existing connection is adequate under proposed loads

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 150.82 ft (NAVD 88)
Latitude: 41.75344
Longitude: -72.757722



Wind

Results:

Wind Speed:	122 Vmph	USE 125 MPH PER THE 2016 CONNECTICUT STATE BUILDING CODE.
10-year MRI	76 Vmph	
25-year MRI	86 Vmph	
50-year MRI	92 Vmph	
100-year MRI	99 Vmph	

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

Date Accessed: Fri Jul 27 2018

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

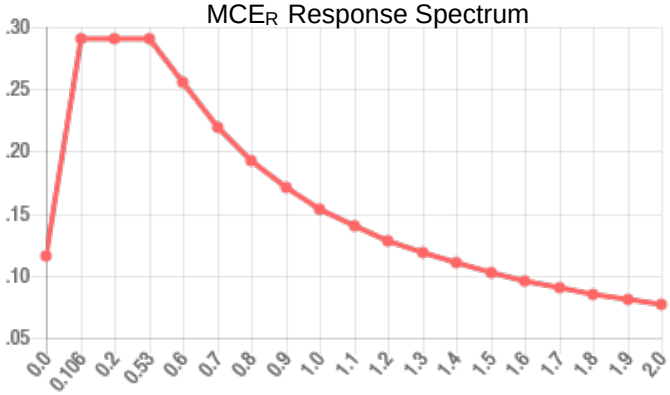
Seismic

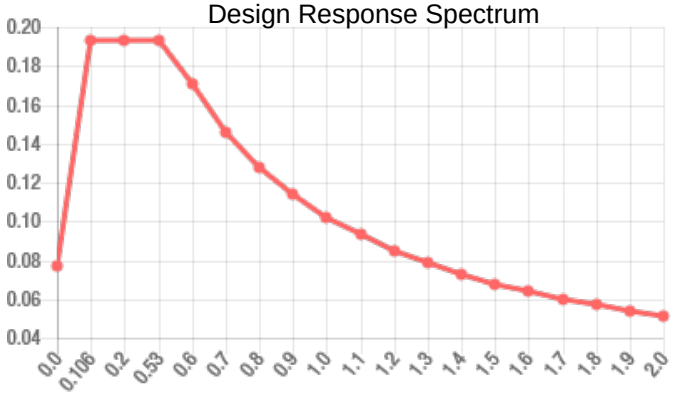
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.181	S_{DS} :	0.193
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.600	T_L :	6.000
F_v :	2.400	PGA :	0.091
S_{MS} :	0.290	PGA_M :	0.146
S_{M1} :	0.154	F_{PGA} :	1.600
		I_e :	1

Seismic Design Category B





Data Accessed: Fri Jul 27 2018

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph

Data Source: Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

Date Accessed: Fri Jul 27 2018

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CT11783B

Crown Comm. Monopole
167 Coccomo Circle
New Britain, CT 06051

October 3, 2018

EBI Project Number: 6218006476

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**8.49 %**

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

EBI Consulting
environmental | engineering | due diligence

October 3, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11783B – Crown Comm. Monopole**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **167 Coccomo Circle, New Britain, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **167 Coccomo Circle, New Britain, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

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

9) The antennas used in this modeling are the **Ericsson AIR32 B2A/B66AA** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **161 feet** above ground level (AGL).

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

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

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T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA	Make / Model:	Ericsson AIR32 B2A/B66AA
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	161 feet	Height (AGL):	161 feet	Height (AGL):	161 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.16**	Antenna B1 MPE%	**1.16**	Antenna C1 MPE%	**1.16**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	161 feet	Height (AGL):	161 feet	Height (AGL):	161 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	55	Total TX Power(W):	55	Total TX Power(W):	55
ERP (W):	2,139.75	ERP (W):	2,139.75	ERP (W):	2,139.75
Antenna A2 MPE%	**0.32**	Antenna B2 MPE%	**0.32**	Antenna C2 MPE%	**0.32**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd
Height (AGL):	161 feet	Height (AGL):	161 feet	Height (AGL):	161 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**0.87**	Antenna B3 MPE%	**0.87**	Antenna C3 MPE%	**0.87**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.35 %**
AT&T	**1.88** %
Verizon Wireless	**4.26** %
Site Total MPE %:	**8.49 %**

T-Mobile Sector A Total:	2.35 %
T-Mobile Sector B Total:	2.35 %
T-Mobile Sector C Total:	2.35 %
Site Total:	8.49 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	161	4.64	PCS - 1900 MHz	1000.00	0.46%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	161	6.99	AWS - 2100 MHz	1000.00	0.70%
T-Mobile PCS - 1900 MHz GSM	1	583.57	161	0.87	PCS - 1900 MHz	1000.00	0.09%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	161	2.33	AWS - 2100 MHz	1000.00	0.23%
T-Mobile 600 MHz LTE	2	788.97	161	2.36	600 MHz	400.00	0.59%
T-Mobile 700 MHz LTE	2	432.54	161	1.29	700 MHz	467.00	0.28%
						Total:	**2.35%**

Summary

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

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	2.35 %
Sector B:	2.35 %
Sector C:	2.35 %
T-Mobile Maximum MPE % (Per Sector):	2.35 %
Site Total:	8.49 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.49%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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