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

October 4, 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: 876317**
T-Mobile Site ID: CT11269B
150 Mattatuck Heights, Waterbury, CT 06705
Latitude: 41° 32' 16.3" I Longitude: -72° 59' 6.1"

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 100 foot level of the existing 133 foot monopole at 150 Mattatuck Heights, Waterbury, CT. The tower is owned by Crown Castle. The property is owned by Waterbury Twin LLC & 150 MH LLC. T-Mobile now intends to remove and replace three (3) of their existing antennas with three (3) new antennas. Remove and replace three (3) existing RRUs with three (3) new RRUs and replace one (1) coax with one (1) hybrid fiber line.

Please be advised I have included an email from Margaret Rice from the City of Waterbury indicating they no longer have the original zoning approval on file as well as an email from myself indicating the same. Please use both emails to replace the zoning approval requirement.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § l 6-50j-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. § l 6-50j-73, a copy of this letter is being sent to The Honorable Neil M. O'Leary, Mayor, City of Waterbury, James A. Sequin, AICP, City Planner, City of Waterbury, the owner and 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:

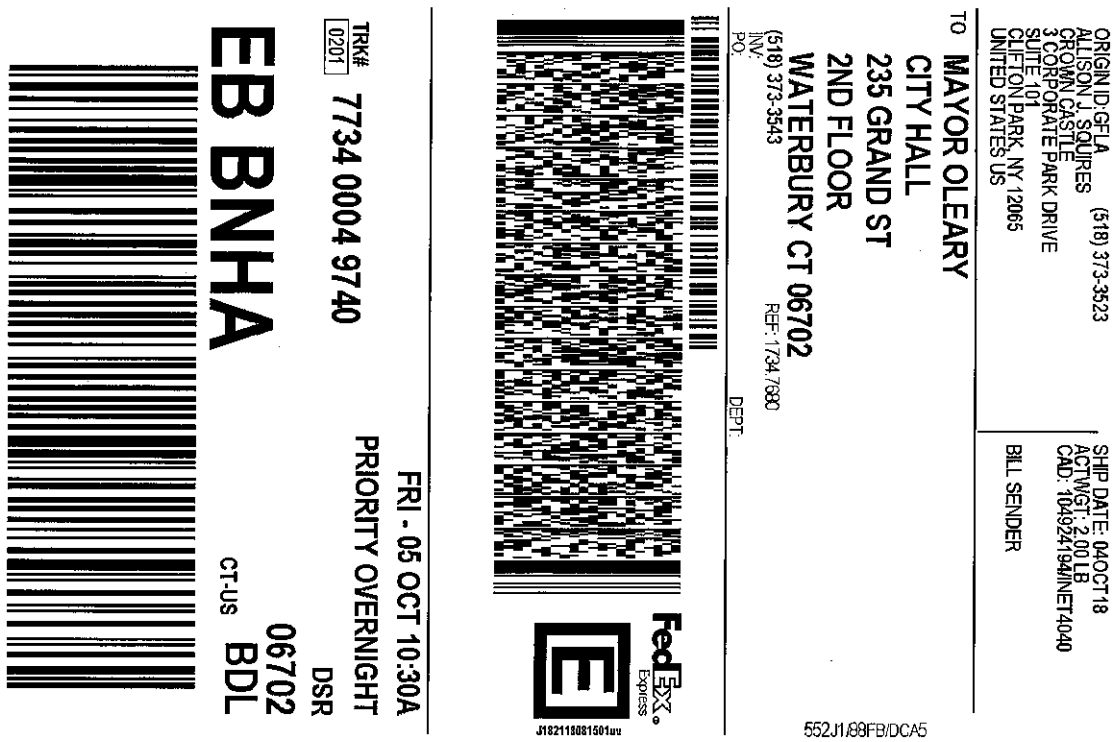
Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc:

The Honorable Neil M. O'Leary, Mayor
City Hall Building
235 Grand Street, 2nd floor
Waterbury, CT 06702

James A. Sequin, AICP
City Hall Building
235 Grand Street
Waterbury, CT 06702

Waterbury Twin LLC & 150 MH LLC
12 Iselin Terrace
Larchmont, New York 10538



After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

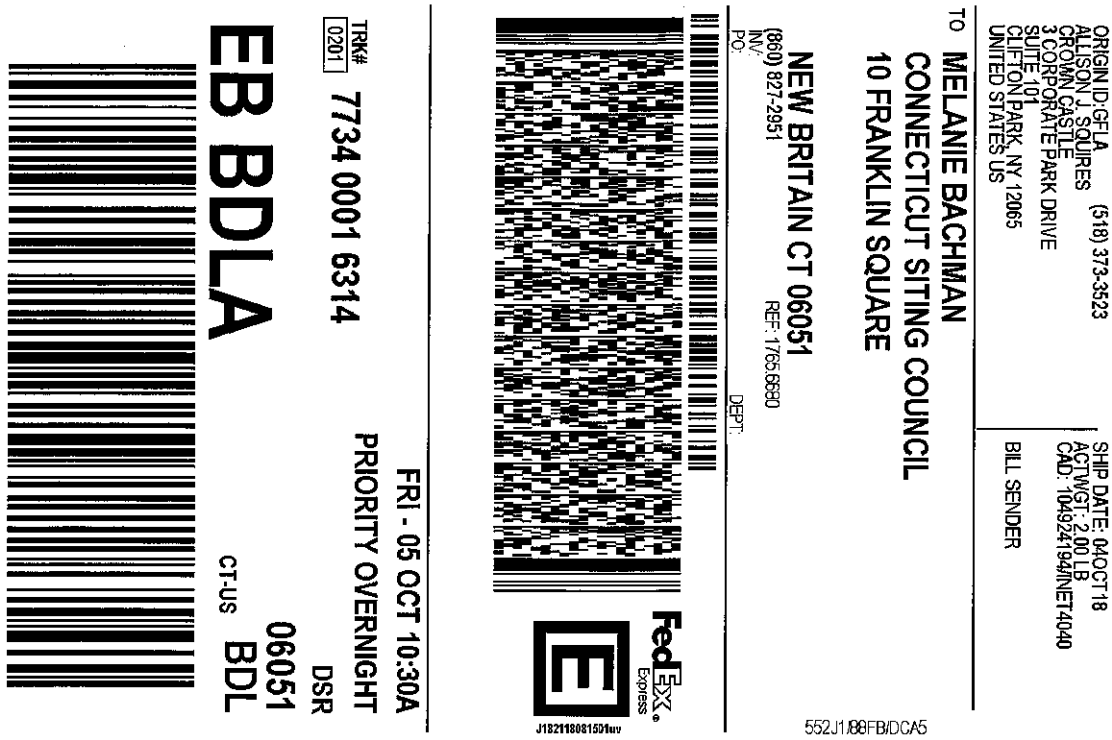
Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions 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.

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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.

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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.



After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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.

Myl, Kimberly

From: Myl, Kimberly
Sent: Tuesday, May 17, 2016 3:38 PM
To: 'siting.council@ct.gov'
Subject: 150 Mattatuck Heights - Existing Telecommunications Tower Original Zoning Approval

To Whom It May Concern:

Please be advised both the township (email below) and Crown Castle as the tower owner, do not have the original zoning resolution on file. Please use this email as notification to waive this requirement as we will include this and the email from the township within our submission.

Please let me know if you have any questions or need additional information. Thank you in advance.

KIMBERLY MYL
Real Estate Specialist
T: (201) 236-9069 | M: (201) 993-3697

CROWN CASTLE
1200 MacArthur Blvd, Suite 200
Mahwah, NJ 07430

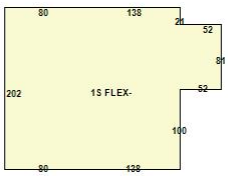
From: Margaret Rice [mailto:mrice@waterburyct.org]
Sent: Tuesday, May 17, 2016 1:03 PM
To: Myl, Kimberly
Subject: RE: 150 Mattatuck Heights - Existing Telecommunications Tower Original Zoning Approval

Hi Kimberly,

I checked our records and City Clerk's office and could not find anything. I then contacted the Town Clerk and I was told that there might be something on the Land Records and that you would need to contact the Town Clerk for them to do a Title Search. They're phone number is (203) 574-6806.

Cissie
Administrative Support Specialist III
203)574-6817 Ext,7296

Location: 150 MATTATUCK HEIGHTS **Owner:** WATERBURY TWIN LLC & 150 MH LLC



Property Information:

Map Block Lot:	0424-0141-0001	**Acres:**	7.02
Primary Use:	Industrial - Flex	**Zone:**	IP
Neighborhood:	85000-Industrial Park	**Vol/Page:**	4647
Mailing Address:	WATERBURY TWIN LLC & 150 MH LLC 12 ISELIN TERRACE LARCHMONT NY 10538		

Property Values:

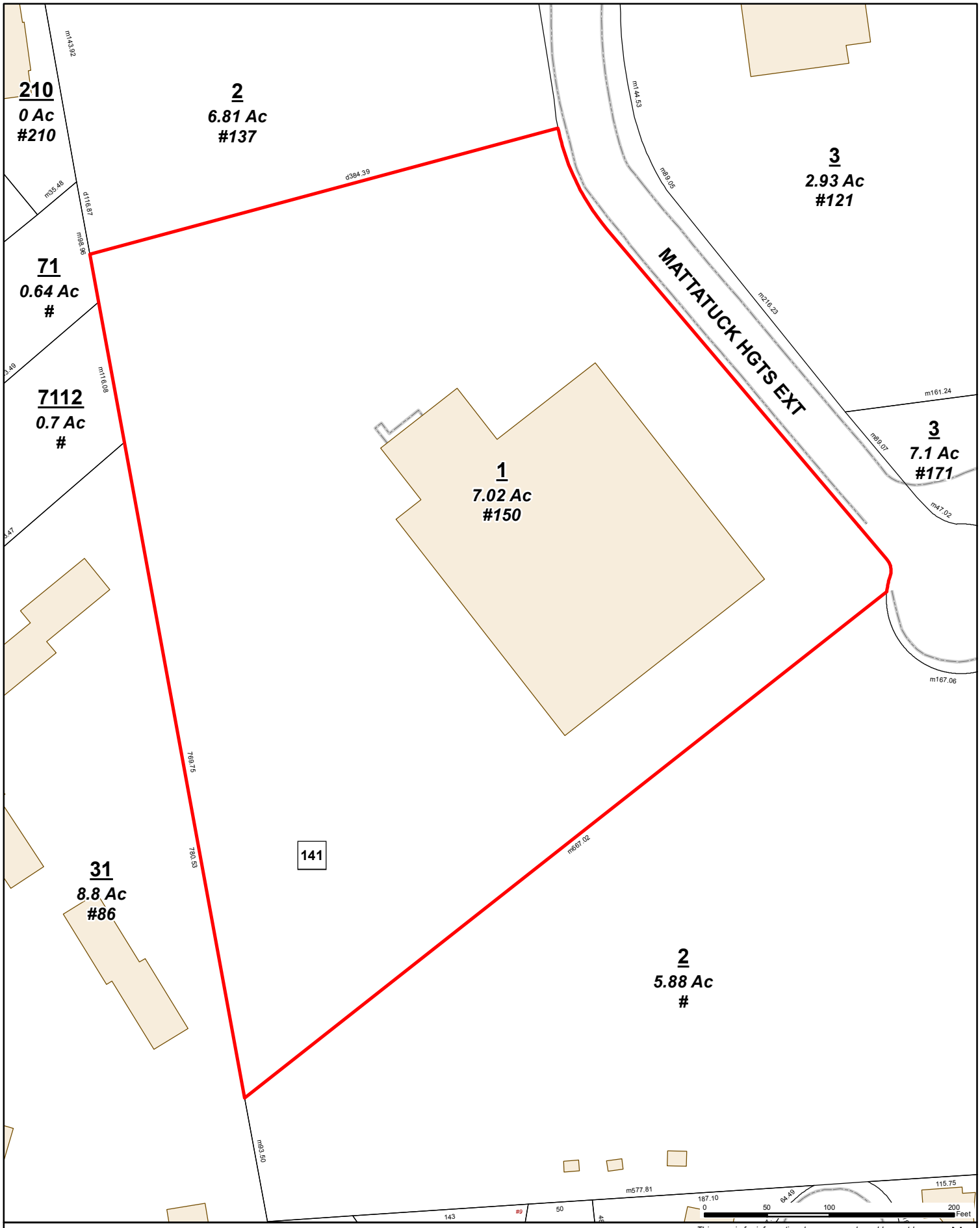
	Appraised Value	**Assessed Value (70%)**
Building	1619053	1133340
Land	287048	200930
OutBuilding	66320	46420
Total	1972421	1380690

Building Information:

Bldg Style:		**Living Area:**	48248sq.ft
Construction:	Average	**Year Built:**	1988
Exterior Wall:	Brick Solid	**Stories:**	1
Roof Cover:		**Heating:**	Space Heater
Condition:	Average	**Heat Fuel:**	
Rooms:	0	**Bedrooms:**	0
Full Baths:	0	**Half Baths:**	0

Outbuilding Information:

Type	**Area (sq.ft)**	**Year Built**	**Condition**
Tanks Tanks	1sq.ft	1996	Average
Concrete Paving	390sq.ft	1996	Average
Concrete Paving	40sq.ft	1988	Average
Concrete Paving	40sq.ft	1988	Average



City of Waterbury
Public Works Department

MBL: **0424-0141-0001**

ADDRESS: 150 MATTATUCK HEIGHTS

This map is for informational purposes only and has not been prepared for, or suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to verify the usability of the information. The City of Waterbury makes no warranties, express or implied, as to the use of the information obtained herein.

N

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

CBU # 876317

SITE ID

CT11269B

SITE NAME

WATERBURY/I-84/MATTATUCK

SITE ADDRESS

150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

CONFIGURATION

67D92DB_2XAIR+1OP

PROJECT SITE INFORMATION

SITE ID:	CT11269B	
SITE NAME:	WATERBURY/I-84/MATTATUCK	
SITE ADDRESS:	150 MATTATUCK HEIGHTS WATERBURY, CT 06705-3831	
PERMITTING JURISDICTION:	CITY OF WESTBURY	
COUNTY:	NEW HAVEN	
ZONING:	IP	
SITE COORDINATES:		
LATITUDE:	41.5378000000°	(NAD 83)
LONGITUDE:	-72.9850000000°	(NAD 83)
APPLICANT:	T-MOBILE NORTHEAST LLC 103 MONARCH DRIVE LIVERPOOL, NY 13088	

STRUCTURAL ANALYSIS INFORMATION

TOWER ANALYSIS

BASED ON THE STRUCTURAL ANALYSIS COMPLETED BY **JACOBS** DATED **08/20/2018**, THE EXISTING TOWER IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION.

ANTENNA MOUNTS

BASED ON THE MOUNT ANALYSIS COMPLETED BY **MASER** DATED **08/01/2018**, THE EXISTING ANTENNA MOUNTS ARE CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION WITH THE FOLLOWING MODIFICATIONS:

- **CONTRACTOR TO INSTALL SITE PRO 1 P/N: PRK-1245**

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

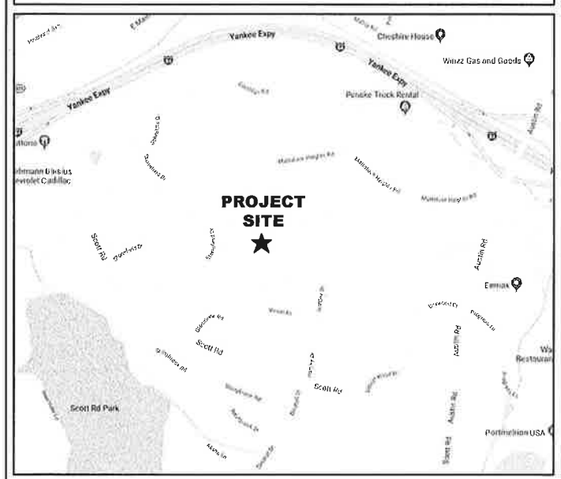
SCOPE OF WORK

SCOPE OF WORK:
L700 4X2 67D92DB HYBRID: REPLACE (3) ANTENNAS AND (3) RRU'S. REPLACE (1) COAX WITH (1) NEW HYBRID. FINAL CONFIG: (9) ANTENNAS, (11) COAX, (3) HYBRIDS, (3) TMA'S, AND (3) RRU'S.

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
No. 24705
REGISTERED PROFESSIONAL ENGINEER
SEP 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	Appd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title: CT11269B WATERBURY/I-84/ MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

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
M	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

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
No. 21705
LICENSED PROFESSIONAL ENGINEER
SEP 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: RCD
Designed: MRL
Checked: AJD

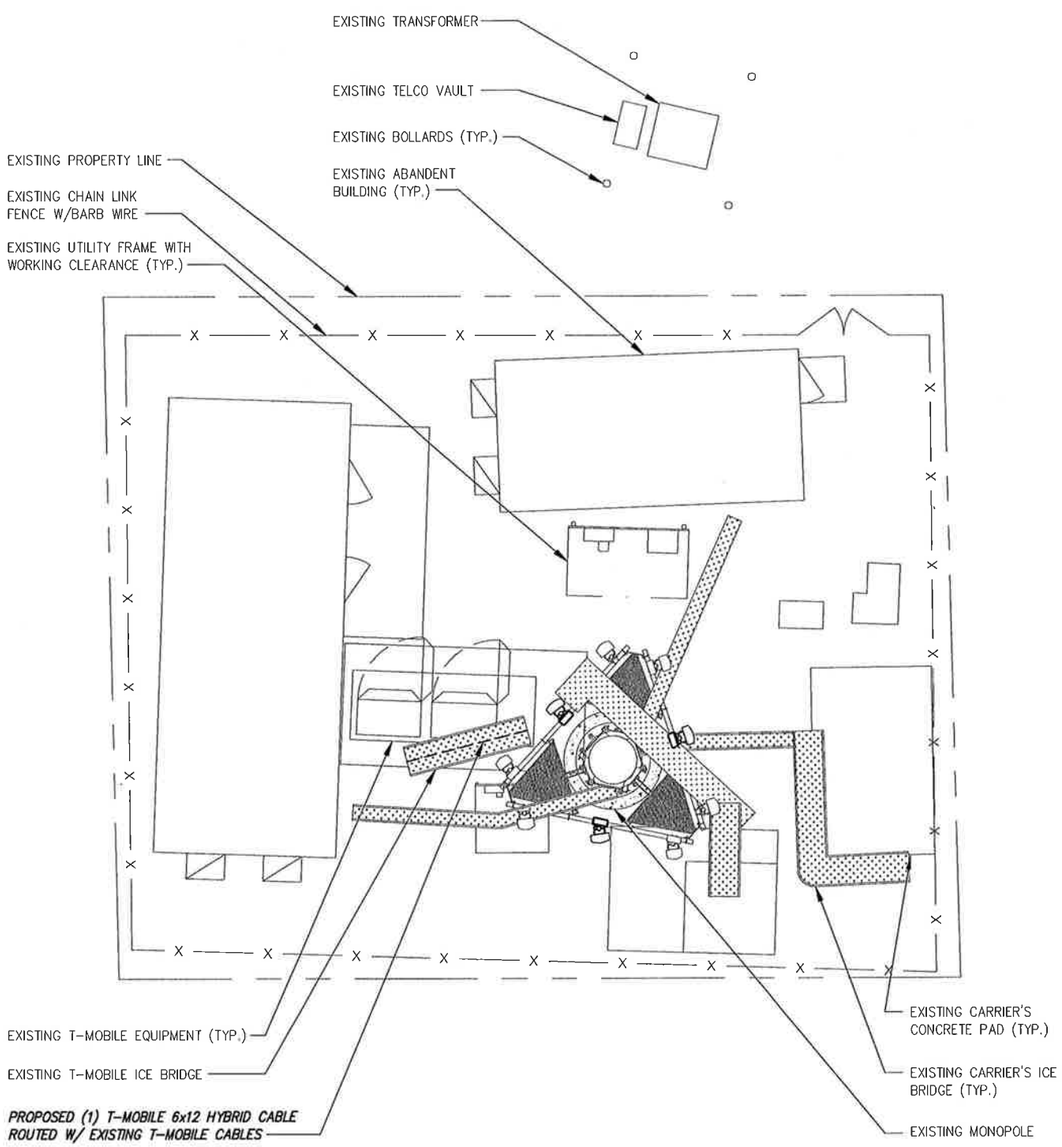
Project Number: 600-007

Project Title:
CT11269B
WATERBURY/I-84/ MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

Prepared For: CROWN CASTLE

Drawing Title: **NOTES**

Drawing Number: **N1**



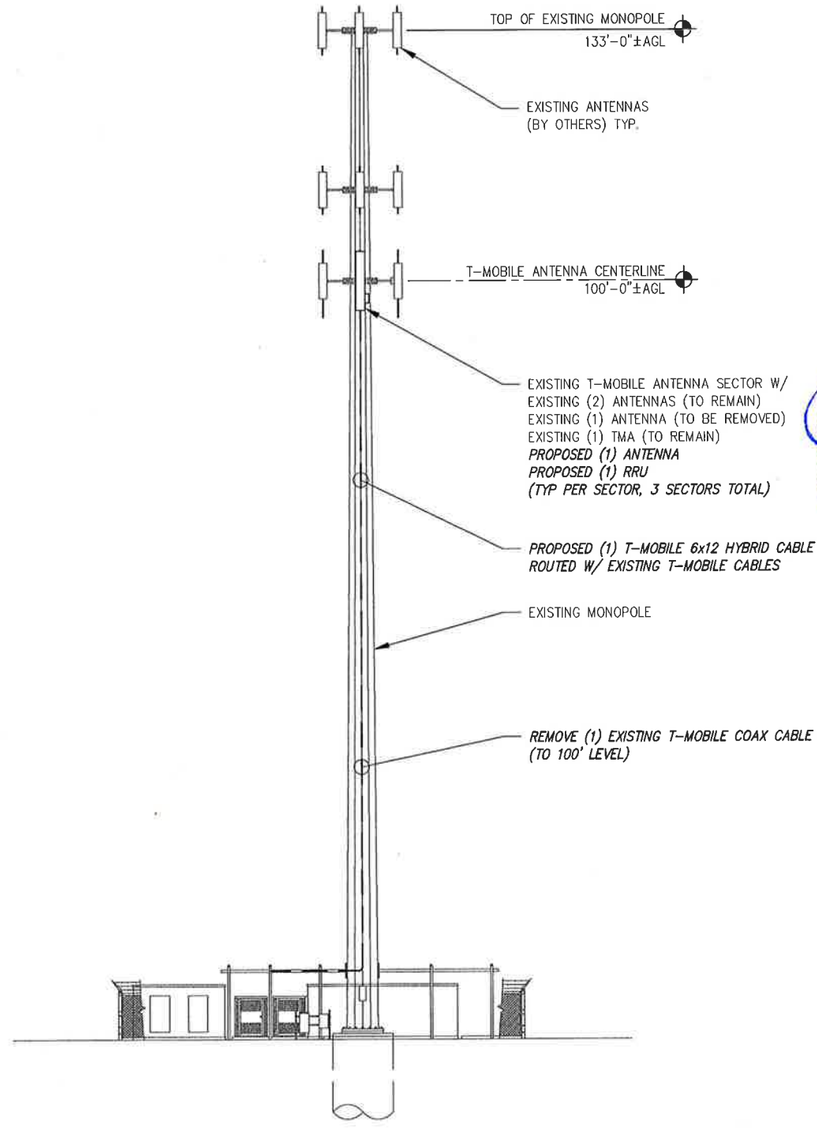
NORTH

1 C1 PLAN VIEW
SCALE: AS NOTED

GRAPHIC SCALE:

10' 5' 0 5' 10'

SCALE (11x17): 1" = 10'-0"
SCALE (22x34): 1" = 5'-0"



2 C1 ELEVATION
SCALE: NOT TO SCALE

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
No. 21705
LICENSED PROFESSIONAL ENGINEER
SEP. 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 800-007

Project Title:
CT11269B
WATERBURY/I-84/ MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

Prepared For: CROWN CASTLE

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	AIR21 B2A/B4P	ERICSSON	50°	0	2°/2°	100'-0"	TWIN STYLE 1B-AWS	130'±	(2) 1-5/8" COAX (1) 6X12 HYBRID TRUNK CABLE (SHARED)
	A-2	**APXVA_43_U_NA20**	**RFS**	**50°**	0	2°/2°	100'-0"	**4449 B71+B12**	**130'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	A-3	AIR32 B66A/B2A	ERICSSON	50°	0	2°/2°	100'-0"	-	130'±	(1) 6X12 HYBRID TRUNK CABLE (SHARED)
BETA	B-1	AIR21 B2A/B4P	ERICSSON	150°	0	2°/2°	100'-0"	TWIN STYLE 1B-AWS	130'±	(2) 1-5/8" COAX (1) 6X12 HYBRID TRUNK CABLE (SHARED)
	B-2	**APXVA_43_U_NA20**	**RFS**	**150°**	0	2°/2°	100'-0"	**4449 B71+B12**	**130'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	B-3	AIR32 B66A/B2A	ERICSSON	150°	0	2°/2°	100'-0"	-	130'±	(1) 6X12 HYBRID TRUNK CABLE (SHARED)
GAMMA	C-1	AIR21 B2A/B4P	ERICSSON	300°	0	2°/2°	100'-0"	TWIN STYLE 1B-AWS	130'±	(2) 1-5/8" COAX (1) 6X12 HYBRID TRUNK CABLE (SHARED)
	C-2	**APXVA_43_U_NA20**	**RFS**	**300°**	0	2°/2°	100'-0"	**4449 B71+B12**	**130'±**	**(1) 6X12 HYBRID TRUNK CABLE (SHARED)**
	C-3	AIR32 B66A/B2A	ERICSSON	300°	0	2°/2°	100'-0"	-	130'±	(1) 6X12 HYBRID TRUNK CABLE (SHARED)

1 / C2 RF SYSTEM CHART
SCALE: NOT TO SCALE

KEY
EXISTING **PROPOSED**

ANTENNA LOCATION KEY

VIEWED FROM BEHIND

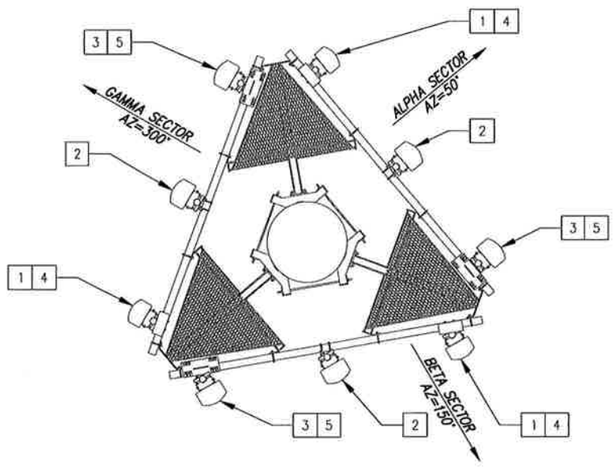
#1 #2 #3

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

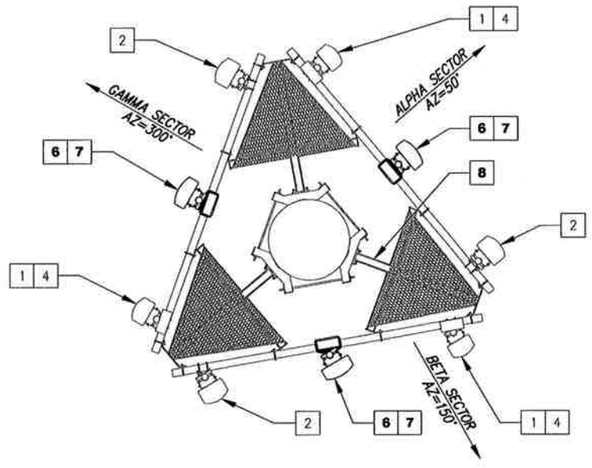
KEY	DESCRIPTION	TYPE	QTY	STATUS
1	AIR21_B2A_B4P	ANTENNA	3	REMAIN
2	AIR32_B66A_B2A	ANTENNA	3	REMAIN
3	LNX-6514DS-A1M	ANTENNA	3	REMOVED
4	TWIN STYLE 1B TMA	TMA	3	REMAIN
5	RRUS11 B12	RRU	3	REMOVED
6	**APXVA_43_U_NA20**	**ANTENNA**	**3**	**PROPOSED**
7	**4449 B71+B12**	**RRU**	**3**	**PROPOSED**
8	**PRK-1245**	**REINF. KIT**	**1**	**PROPOSED**

NOTE:
PLATFORM KIT NOT VISIBLE IN THIS VIEW. GC TO INSTALL PLATFORM REINFORCEMENT KIT PER PASSING MOUNT ANALYSIS.



NORTH

2 / C2 EXISTING ANTENNA ORIENTATION
SCALE: NOT TO SCALE



NORTH

3 / C2 PROPOSED ANTENNA ORIENTATION
SCALE: NOT TO SCALE

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 27 LICENSED PROFESSIONAL ENGINEER
SEP 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: RCD
Designed: MRL
Checked: A.D

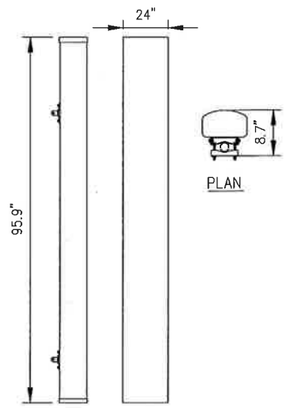
Project Number: 600-007

Project Title:
CT11269B
WATERBURY/I-84/ MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

Prepared For: CROWN CASTLE

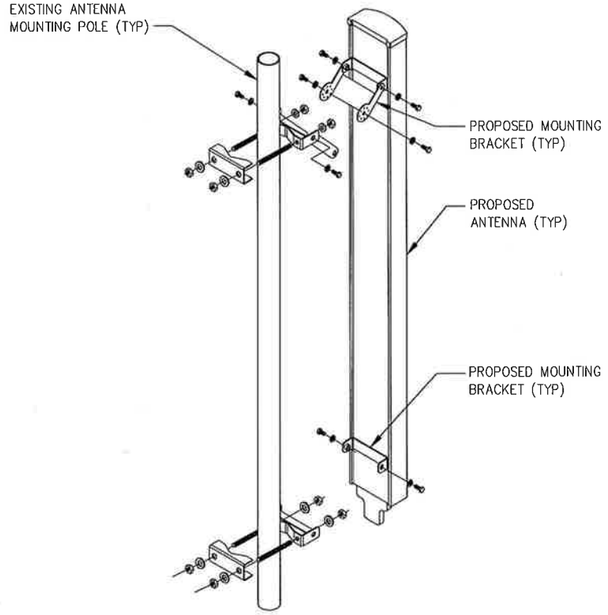
Drawing Title
RF CHART

Drawing Number
C2

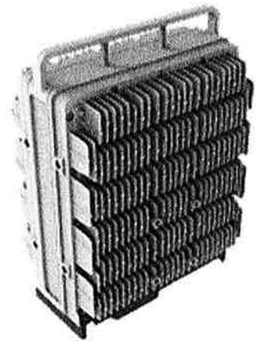


RFS MODEL NO.:	APXVAARR24_43-U-NA20
RADOME MATERIAL:	FIBERGLASS
RADOME COLOR:	LIGHT GREY
DIMENSIONS, HxWxD:	95.9"x24"x8.7"
WEIGHT, W/O MOUNTING KIT:	128 LBS

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

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
LICENSED PROFESSIONAL ENGINEER
SEP 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	Appl'd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: RCD
Designed: WRL
Checked: AJD

Project Number: 600-007

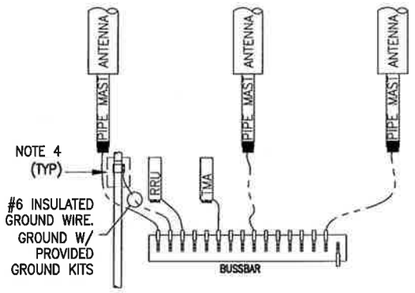
Project Title:
CT11269B
WATERBURY/I-84/ MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

Prepared For: CROWN CASTLE

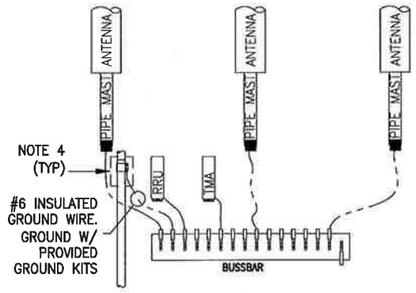
Drawing Title
EQUIPMENT DETAILS

Drawing Number
D1

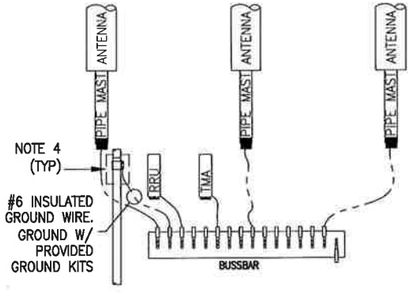
ALPHA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



BETA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)

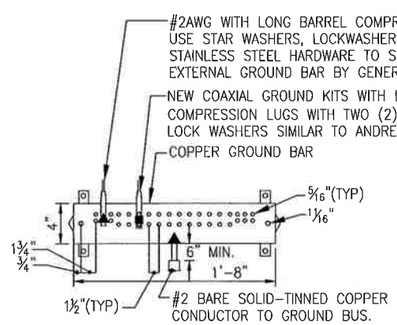


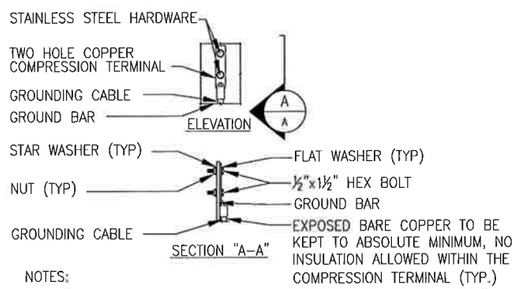
GAMMA SECTOR
(LAYOUT SHOWN GENERICALLY, SEE ANTENNA ORIENTATION)



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

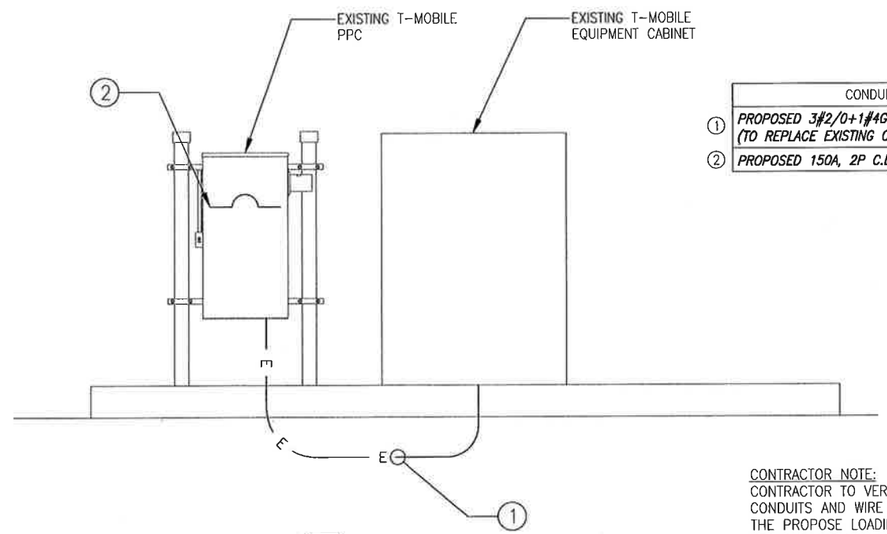




NOTES:
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

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

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
LICENSED PROFESSIONAL ENGINEER
SEP 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: BCD
Designed: MRL
Checked: AJD

Project Number: 600-007

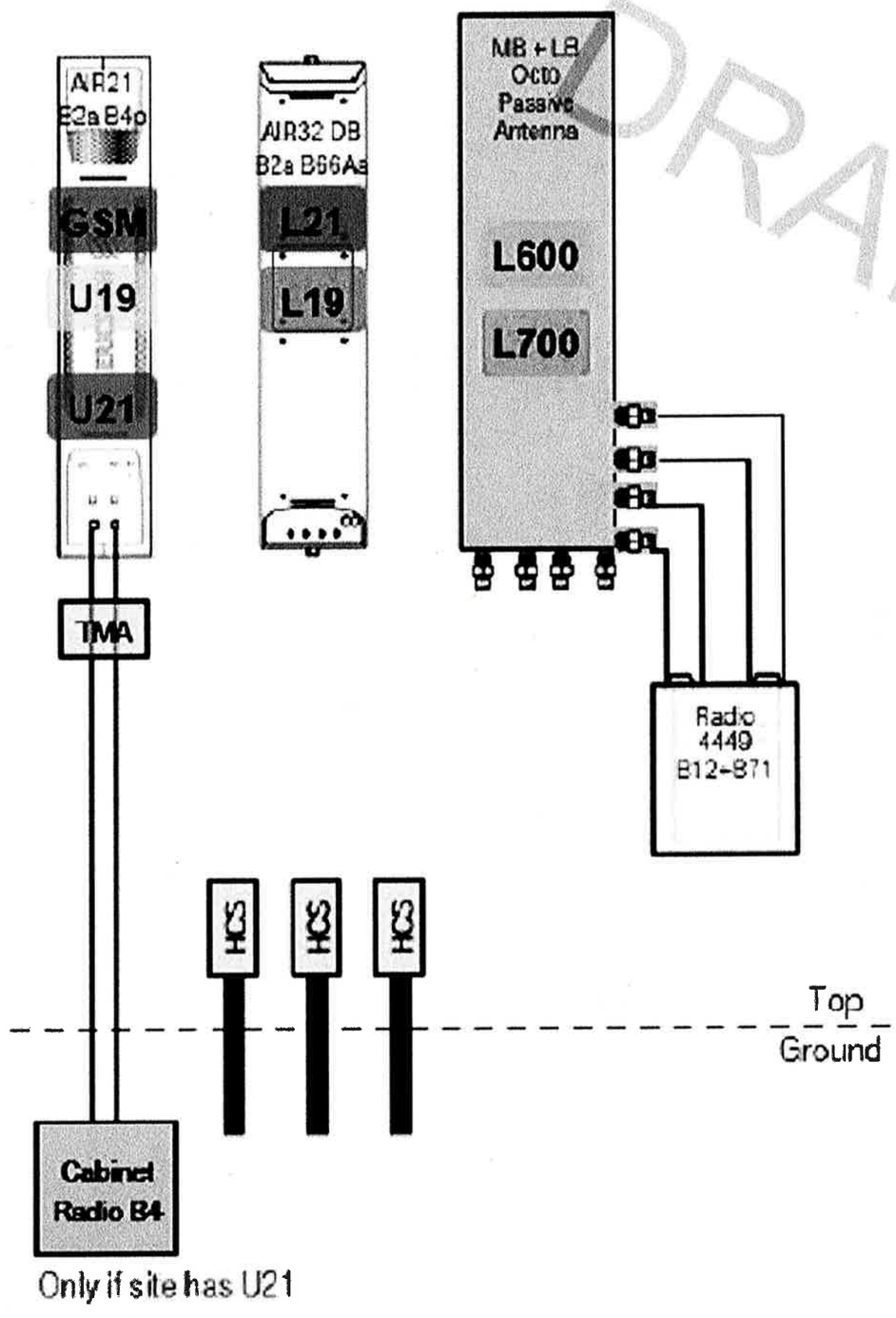
Project Title:
CT11269B
WATERBURY/I-84/ MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

Prepared For:
CROWN CASTLE

Drawing Title
GROUNDING & ELECTRICAL DETAILS

Drawing Number
E1

67D92DB_2xAIR+1OP.JPG



1 / E2 RF PLUMBING DIAGRAM
SCALE: AS NOTED

PRELIMINARY

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

INFINIGY
6885 DEERPATH ROAD SUITE 152
ELKRIDGE, MD 21075
TEL (443) 592-3143

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 20705
LICENSED PROFESSIONAL ENGINEER
SEP 24 2018

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No.	Submittal / Revision	App'd	Date
0	ISSUED FOR CONSTRUCTION	SL	09/24/18
A	ISSUED FOR REVIEW	SL	08/20/18

Drawn: RCD
Designed: MRL
Checked: AJD

Project Number: 600-007

Project Title:
CT11269B
WATERBURY/I-84/
MATTATUCK
150 MATTATUCK HEIGHTS
WATERBURY, CT 06705-3831

Prepared For:
CROWN CASTLE

Drawing Title
RF PLUMBING DIAGRAM

Drawing Number
E2

Date: **August 20, 2018**

Amanda Brown
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
770-701-2500

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11269B
Crown Castle Designation:	**Crown Castle BU Number:**	876317
	Crown Castle Site Name:	WATERBURY
	Crown Castle JDE Job Number:	515660
	Crown Castle Work Order Number:	1603364
	Crown Castle Application Number:	447836 Rev. 0
Engineering Firm Designation:	**Jacobs Engineering Group, Inc. Project Number:** 1603364	
Site Data:	**150 Mattatuck Heights, WATERBURY, New Haven County, CT**	
	Latitude *41° 32' 16.3"*, Longitude *-72° 59' 6.1"*	
	133 Foot - Monopole Tower	

Dear Amanda Brown,

Jacobs Engineering Group, Inc. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the *Crown Castle* Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 1236638, in accordance with application 447836, revision 0.

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: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

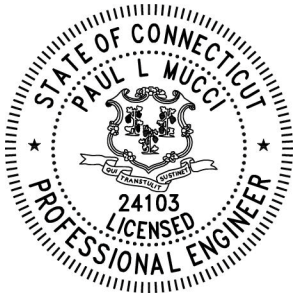
This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception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

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

Jacobs Engineering Group, Inc. appreciates the opportunity to provide 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.

Structural analysis prepared by:

Donitha Chiu
Structural Engineer



Engineer of Record:

Paul L. Mucci, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 133 ft Monopole tower designed by VALMONT in April of 1998. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified multiple times in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 97 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
100.0	100.0	3	ericsson	RADIO 4449 B12/B71	1	1-1/2	-
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe			
		1	site pro 1	PRK-1245 (Kicker Support)			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
133.0	135.0	1	andrew	VHLP2-18	3 3	1-1/4 7983A	1
		2	andrew	VHLP2-23			
	133.0	6	alcatel lucent	1900MHz RRH (65MHz)			
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			
		12	rfs celwave	ACU-A20-N			
		4	rfs celwave	IBC1900HB-2			
		2	rfs celwave	PD2DE-700/2700			
		1	tower mounts	Platform Mount [LP 602-1]			
	130.0	4	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
110.0	113.0	1	trimble	BULLET III	13 1	1-5/8 1/2	1
	110.0	3	antel	BXA-70063/6CF-2 w/ Mount Pipe			
		3	antel	BXA-80063/4CF w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 713-1]			
		3	alcatel lucent	RRH2X60-PCS	-	-	2
		3	alcatel lucent	RRH4X45-AWS4 B66			
		6	andrew	SBNHH-1D65B w/ Mount Pipe			
		6	commscope	CBC78-DF			
100.0	100.0	3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe	1 1 6 5	1-5/8 1-1/2 1-1/4 7/8	1
		3	ericsson	AIR 21 B2A/B4P w/ Mount Pipe			
		3	rfs celwave	ATMAA1412D-1A20			
		1	tower mounts	Platform Mount [LP 303-1]			
		3	commscope	LNX-6515DS-A1M w/ Mount Pipe	1	7/8	3
		3	ericsson	RRUS 11 B12			
90.0	90.0	3	rfs celwave	APXV18-206517S-C	6	1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
50.0	51.0	1	lucent	KS24019-L112A	1	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be Removed; Not Considered in this Analysis

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
130.0	130.0	12	decibel	DB980H	-	-
110.0	110.0	12	decibel	DB980H	-	-
90.0	90.0	2	generic	Omni	-	-
50.0	50.0	1	generic	GPS	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Velocitel	1529737	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Valmont	1630930	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Valmont	1530953	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Solutions	2381113	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company	3315244	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Solutions	2381112	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals	3770745	CCISITES
4-EXPOSURE CATEGORY/ TOPOGRAPHIC FACTOR	Crown Castle	6219669	CCISITES
4-MOUNT ANALYSIS REPORTS	Maser Consulting, Connecticut	7710555	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.2.1), 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) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Proposed mount modifications per mount structural analysis report prepared by Maser Consulting, Connecticut must be installed for this analysis to be valid.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14.48x13.48x0.1875	Pole	16.4%	Pass
128 - 123	Pole	TP15.479x14.48x0.1875	Pole	29.7%	Pass
123 - 118	Pole	TP16.479x15.479x0.1875	Pole	40.3%	Pass
118 - 113	Pole	TP17.478x16.479x0.1875	Pole	49.8%	Pass
113 - 108	Pole	TP18.478x17.478x0.1875	Pole	62.2%	Pass
108 - 104.75	Pole	TP19.127x18.478x0.1875	Pole	72.3%	Pass
104.75 - 104.5	Pole + Reinf.	TP19.177x19.127x0.425	Reinf. 11 Bolt-Shaft Bearing	45.7%	Pass
104.5 - 99.5	Pole + Reinf.	TP20.177x19.177x0.4063	Reinf. 11 Tension Rupture	51.1%	Pass
99.5 - 98.75	Pole + Reinf.	TP20.327x20.177x0.4063	Reinf. 11 Tension Rupture	52.9%	Pass
98.75 - 98.5	Pole + Reinf.	TP20.377x20.327x0.4063	Reinf. 11 Tension Rupture	53.4%	Pass
98.5 - 95	Pole + Reinf.	TP21.81x20.377x0.6625	Reinf. 6 Tension Rupture	56.5%	Pass
95 - 90	Pole + Reinf.	TP21.7x20.701x0.7125	Reinf. 6 Tension Rupture	61.5%	Pass
90 - 89.25	Pole + Reinf.	TP21.85x21.7x0.45	Reinf. 11 Tension Rupture	63.9%	Pass
89.25 - 89	Pole + Reinf.	TP21.9x21.85x0.85	Reinf. 5 Bolt Shear	60.6%	Pass
89 - 88.25	Pole + Reinf.	TP22.05x21.9x0.8375	Reinf. 5 Tension Rupture	46.2%	Pass
88.25 - 88	Pole + Reinf.	TP22.1x22.05x0.6125	Reinf. 5 Tension Rupture	61.6%	Pass
88 - 83	Pole + Reinf.	TP23.099x22.1x0.5875	Reinf. 5 Tension Rupture	69.0%	Pass
83 - 78	Pole + Reinf.	TP24.097x23.099x0.575	Reinf. 5 Tension Rupture	75.7%	Pass
78 - 77	Pole + Reinf.	TP24.297x24.097x0.575	Reinf. 5 Tension Rupture	77.0%	Pass
77 - 76.75	Pole + Reinf.	TP24.347x24.297x0.7625	Reinf. 5 Tension Rupture	59.1%	Pass
76.75 - 71.75	Pole + Reinf.	TP25.346x24.347x0.7375	Reinf. 5 Tension Rupture	63.9%	Pass
71.75 - 66.75	Pole + Reinf.	TP26.345x25.346x0.7125	Reinf. 5 Tension Rupture	68.3%	Pass
66.75 - 62.25	Pole + Reinf.	TP27.244x26.345x0.7	Reinf. 5 Tension Rupture	71.9%	Pass
62.25 - 62	Pole + Reinf.	TP27.294x27.244x0.7	Reinf. 5 Tension Rupture	72.1%	Pass
62 - 59.5	Pole + Reinf.	TP27.793x27.294x0.4	Reinf. 9 Tension Rupture	98.1%	Pass
59.5 - 59.25	Pole + Reinf.	TP27.843x27.793x0.75	Reinf. 4 Bolt-Shaft Bearing	66.9%	Pass
59.25 - 54.25	Pole + Reinf.	TP28.842x27.843x0.725	Reinf. 4 Tension Rupture	68.4%	Pass
54.25 - 50	Pole + Reinf.	TP30.64x28.842x0.7	Reinf. 4 Tension Rupture	71.0%	Pass
50 - 45	Pole + Reinf.	TP30.192x29.191x0.7625	Reinf. 4 Tension Rupture	69.3%	Pass
45 - 40.75	Pole + Reinf.	TP31.043x30.192x0.75	Reinf. 4 Tension Rupture	71.4%	Pass
40.75 - 40.5	Pole + Reinf.	TP31.093x31.043x0.7625	Reinf. 4 Tension Rupture	71.4%	Pass
40.5 - 35.75	Pole + Reinf.	TP32.044x31.093x0.75	Reinf. 4 Tension Rupture	73.6%	Pass
35.75 - 35.5	Pole + Reinf.	TP32.094x32.044x0.6875	Reinf. 4 Tension Rupture	76.8%	Pass
35.5 - 30.5	Pole + Reinf.	TP33.095x32.094x0.675	Reinf. 4 Tension Rupture	79.1%	Pass
30.5 - 29.75	Pole + Reinf.	TP33.245x33.095x0.4	Reinf. 7 Tension Rupture	104.6%	Pass[2]
29.75 - 29.5	Pole + Reinf.	TP33.295x33.245x0.675	Reinf. 1 Tension Rupture	77.6%	Pass
29.5 - 24.5	Pole + Reinf.	TP34.296x33.295x0.6625	Reinf. 1 Tension Rupture	79.7%	Pass
24.5 - 19.5	Pole + Reinf.	TP35.297x34.296x0.65	Reinf. 1 Tension Rupture	81.6%	Pass
19.5 - 14.5	Pole + Reinf.	TP36.297x35.297x0.6375	Reinf. 1 Tension Rupture	83.4%	Pass
14.5 - 12.5	Pole + Reinf.	TP36.698x36.297x0.6375	Reinf. 1 Tension Rupture	84.1%	Pass
12.5 - 12.25	Pole + Reinf.	TP36.748x36.698x0.5625	Reinf. 1 Tension Rupture	97.1%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
12.25 - 10.75	Pole + Reinf.	TP37.048x36.748x0.5625	Reinf. 1 Tension Rupture	97.6%	Pass
10.75 - 10.5	Pole + Reinf.	TP37.098x37.048x0.6375	Reinf. 1 Tension Rupture	89.9%	Pass
10.5 - 5.5	Pole + Reinf.	TP38.099x37.098x0.625	Reinf. 1 Tension Rupture	91.6%	Pass
5.5 - 0.5	Pole + Reinf.	TP39.1x38.099x0.6125	Reinf. 1 Tension Rupture	93.1%	Pass
0.5 - 0	Pole + Reinf.	TP39.2x39.1x0.6125	Reinf. 1 Tension Rupture	93.3%	Pass
				Summary	
			Pole	95.3%	Pass
			Reinforcement	104.6%	Pass[2]
			Overall	104.6%	Pass[2]

Table 6 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	75.4	Pass
1	Base Plate	0	73.6	Pass
1	Base Foundation Structural	0	14.9	Pass
1	Base Foundation Soil Interaction	0	73.0	Pass

Structure Rating (max from all components) =	104.6%[2]

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Capacities up to 105% are considered acceptable based on analysis methods used.

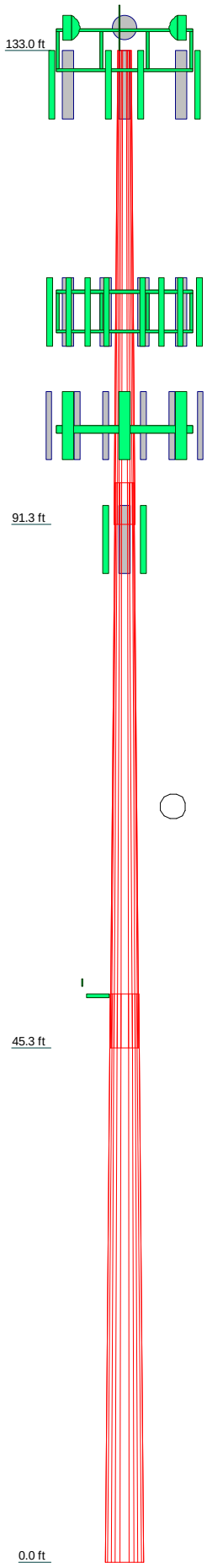
4.1) Recommendations

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	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	41.67	12	0.1875	3.67	13.4800	21.8100		1.5
2	49.75	12	0.2500	4.75	20.7014	30.6400	A572-65	3.5
3	50.00	12	0.3125		29.1911	39.2000		5.8
								10.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	133	BXA-70063/6CF-2 w/ Mount Pipe	110
(2) APXVSPP18-C-A20 w/ Mount Pipe	133	BXA-70063/6CF-2 w/ Mount Pipe	110
APXVSPP18-C-A20 w/ Mount Pipe	133	BXA-80063/4CF w/ Mount Pipe	110
APXVSPP18-C-A20 w/ Mount Pipe	133	BXA-80063/4CF w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	133	BXA-80063/4CF w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	133	BULLET III	110
APXVTM14-C-120 w/ Mount Pipe	133	DB-T1-6Z-8AB-0Z	110
(6) ACU-A20-N	133	10' x 2" Pipe Mount	110
(3) ACU-A20-N	133	10' x 2" Pipe Mount	110
(3) ACU-A20-N	133	10' x 2" Pipe Mount	110
(2) 800MHZ RRH	133	(2) 5' x 2" Mount Pipe	110
800MHZ RRH	133	(2) 5' x 2" Mount Pipe	110
(2) IBC1900HB-2	133	(2) 5' x 2" Mount Pipe	110
IBC1900HB-2	133	Platform Mount [LP 713-1]	110
IBC1900HB-2	133	(2) SBNHH-1D65B w/ Mount Pipe	110
(4) 1900MHz RRH (65MHz)	133	(2) SBNHH-1D65B w/ Mount Pipe	110
(2) 1900MHz RRH (65MHz)	133	(2) SBNHH-1D65B w/ Mount Pipe	110
(2) 800 EXTERNAL NOTCH FILTER	133	RADIO 4449 B12/B71	100
800 EXTERNAL NOTCH FILTER	133	RADIO 4449 B12/B71	100
TD-RRH8x20-25	133	RADIO 4449 B12/B71	100
TD-RRH8x20-25	133	AIR 21 B2A/B4P w/ Mount Pipe	100
TD-RRH8x20-25	133	AIR 21 B2A/B4P w/ Mount Pipe	100
PD2DE-700/2700	133	AIR 21 B2A/B4P w/ Mount Pipe	100
PD2DE-700/2700	133	AIR -32 B2A/B66AA w/ Mount Pipe	100
8' x 3" Pipe Mount	133	AIR -32 B2A/B66AA w/ Mount Pipe	100
8' x 3" Pipe Mount	133	AIR -32 B2A/B66AA w/ Mount Pipe	100
8' x 3" Pipe Mount	133	ATMAA1412D-1A20	100
(3) 6' x 2" Mount Pipe	133	ATMAA1412D-1A20	100
(3) 6' x 2" Mount Pipe	133	ATMAA1412D-1A20	100
(3) 6' x 2" Mount Pipe	133	Platform Mount [LP 303-1]	100
Platform Mount [LP 602-1]	133	Miscellaneous [NA 509-3]	100
VHLP2-23	133	APXVAARR24_43-U-NA20 w/ Mount Pipe	100
VHLP2-23	133		
VHLP2-18	133	APXVAARR24_43-U-NA20 w/ Mount Pipe	100
RRH4X45-AWS4 B66	110		
RRH4X45-AWS4 B66	110	APXVAARR24_43-U-NA20 w/ Mount Pipe	100
RRH4X45-AWS4 B66	110		
RRH2X60-PCS	110	Pipe Mount [PM 601-3]	90
RRH2X60-PCS	110	APXV18-206517S-C	90
RRH2X60-PCS	110	APXV18-206517S-C	90
(2) CBC78-DF	110	APXV18-206517S-C	90
(2) CBC78-DF	110	Side Arm Mount [SO 701-1]	50
(2) CBC78-DF	110	KS24019-L112A	50
BXA-70063/6CF-2 w/ Mount Pipe	110		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

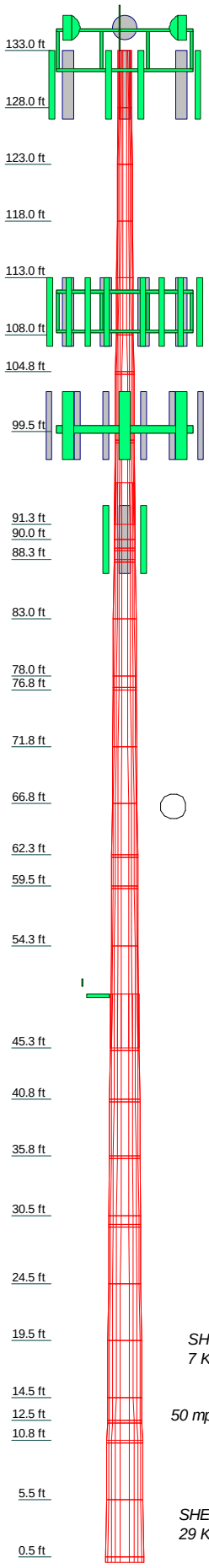
TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft

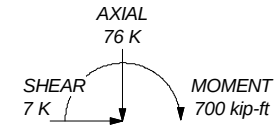
Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
Phone: 770-701-2500
FAX: 770-701-2501

Job:	***WATERBURY***		
Project:	***BU#876317 WO#1603364***		
Client: Crown Castle		Drawn by: Donitha F. Chiu	App'd:
Code: TIA-222-G		Date: 08/20/18	Scale: NTS
Path:			Dwg No. E-1

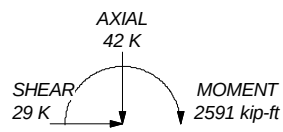
Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46
Length (ft)	5.00	5.00	5.00	5.00	5.00	3.25	0.25	5.00	0.75	0.75	7.17	5.00	0.25	0.25	0.25	0.25	5.00	5.00	0.25	0.25	5.00	5.00	4.50	0.25	0.25	0.25	5.00	9.00	0.25	4.25	0.25	4.75	0.25	5.00	0.75	0.25	5.00	5.00	0.25	0.25	0.25	0.25	0.25	5.00	5.00	0.50
Number of Sides	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Thickness (in)	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.6625	0.6625	0.6625	0.6625	0.6625	0.6625	0.5875	0.5750	0.5750	0.5750	0.7375	0.7125	0.7000	0.7000	0.7000	0.7000	0.7250	0.7000	0.6875	0.6875	0.6875	0.7500	0.6875	0.6750	0.6750	0.6750	0.6625	0.6500	0.6375	0.6375	0.6375	0.6375	0.6375	0.6250	0.6125	0.6125
Socket Length (ft)																																															
Top Dia (in)	13.4800	14.4795	15.4790	16.4786	17.4781	18.4776	19.1779	20.1786	20.8789	21.5793	20.3767	21.8100	22.0914	22.3728	22.6542	22.9356	22.0986	23.0975	23.3779	24.0975	24.3442	25.3460	26.3449	27.0439	27.3233	27.6028	27.8422	28.8421	29.1911	29.8920	30.1720	30.8720	31.1520	31.8520	32.1320	32.8320	33.2943	34.2956	35.2965	36.2974	36.5774	37.2774	37.5574	38.0993	38.0993	39.2000
Bot Dia (in)	14.4795	15.4790	16.4786	17.4781	18.4776	19.1779	20.1786	20.8789	21.5793	22.3728	21.8100	22.0914	22.3728	22.6542	22.9356	23.0986	23.0975	24.0975	24.3779	25.3460	25.3460	26.3449	27.0439	27.3233	27.6028	27.8422	28.8421	29.1911	29.8920	30.1720	30.8720	31.1520	31.8520	32.1320	32.8320	33.2943	34.2956	35.2965	36.2974	36.5774	37.2774	37.5574	38.0993	38.0993	39.2000	39.2000
Grade	A572-65																																														
Weight (K)	0.1	0.2	0.2	0.2	0.2	0.1	0.0	0.4	0.0	0.1	0.9	0.7	0.1	0.1	0.1	0.1	0.6	0.7	0.1	0.1	0.9	0.9	0.8	0.1	0.0	0.1	1.0	1.9	1.1	1.0	0.1	1.2	0.1	1.2	0.1	0.1	1.2	1.2	1.2	1.2	0.5	0.6	0.1	1.2	1.2	0.1



ALL REACTIONS ARE FACTORED



TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE



TORQUE 3 kip-ft
REACTIONS - 97 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	133	BXA-70063/6CF-2 w/ Mount Pipe	110
(2) APXVSPP18-C-A20 w/ Mount Pipe	133	BXA-70063/6CF-2 w/ Mount Pipe	110
APXVSPP18-C-A20 w/ Mount Pipe	133	BXA-80063/4CF w/ Mount Pipe	110
APXVSPP18-C-A20 w/ Mount Pipe	133	BXA-80063/4CF w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	133	BXA-80063/4CF w/ Mount Pipe	110
APXVTM14-C-120 w/ Mount Pipe	133	BULLET III	110
APXVTM14-C-120 w/ Mount Pipe	133	DB-T1-6Z-8AB-0Z	110
(6) ACU-A20-N	133	10' x 2" Pipe Mount	110
(3) ACU-A20-N	133	10' x 2" Pipe Mount	110
(3) ACU-A20-N	133	10' x 2" Pipe Mount	110
(2) 800MHZ RRH	133	(2) 5' x 2" Mount Pipe	110
800MHZ RRH	133	(2) 5' x 2" Mount Pipe	110
(2) IBC1900HB-2	133	(2) 5' x 2" Mount Pipe	110
IBC1900HB-2	133	Platform Mount [LP 713-1]	110
IBC1900HB-2	133	(2) SBNHH-1D65B w/ Mount Pipe	110
(4) 1900MHz RRH (65MHz)	133	(2) SBNHH-1D65B w/ Mount Pipe	110
(2) 1900MHz RRH (65MHz)	133	(2) SBNHH-1D65B w/ Mount Pipe	110
(2) 800 EXTERNAL NOTCH FILTER	133	RADIO 4449 B12/B71	100
800 EXTERNAL NOTCH FILTER	133	RADIO 4449 B12/B71	100
TD-RRH8x20-25	133	RADIO 4449 B12/B71	100
TD-RRH8x20-25	133	AIR 21 B2A/B4P w/ Mount Pipe	100
TD-RRH8x20-25	133	AIR 21 B2A/B4P w/ Mount Pipe	100
PD2DE-700/2700	133	AIR 21 B2A/B4P w/ Mount Pipe	100
PD2DE-700/2700	133	AIR -32 B2A/B66AA w/ Mount Pipe	100
8' x 3" Pipe Mount	133	AIR -32 B2A/B66AA w/ Mount Pipe	100
8' x 3" Pipe Mount	133	AIR -32 B2A/B66AA w/ Mount Pipe	100
8' x 3" Pipe Mount	133	ATMAA1412D-1A20	100
(3) 6' x 2" Mount Pipe	133	ATMAA1412D-1A20	100
(3) 6' x 2" Mount Pipe	133	ATMAA1412D-1A20	100
(3) 6' x 2" Mount Pipe	133	Platform Mount [LP 303-1]	100
Platform Mount [LP 602-1]	133	Miscellaneous [NA 509-3]	100
VHLP2-23	133	APXVAARR24_43-U-NA20 w/ Mount Pipe	100
VHLP2-23	133	APXVAARR24_43-U-NA20 w/ Mount Pipe	100
VHLP2-18	133	APXVAARR24_43-U-NA20 w/ Mount Pipe	100
RRH4X45-AWS4 B66	110	Pipe Mount [PM 601-3]	90
RRH4X45-AWS4 B66	110	APXV18-206517S-C	90
RRH4X45-AWS4 B66	110	APXV18-206517S-C	90
RRH2X60-PCS	110	APXV18-206517S-C	90
RRH2X60-PCS	110	Side Arm Mount [SO 701-1]	50
RRH2X60-PCS	110	KS24019-L112A	50
(2) CBC78-DF	110		
(2) CBC78-DF	110		
(2) CBC78-DF	110		
BXA-70063/6CF-2 w/ Mount Pipe	110		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft

Jacobs Engineering Group, Inc.
5449 Bells Ferry Road
Acworth, GA 30102
Phone: 770-701-2500
FAX: 770-701-2501

Job: **WATERBURY**		
Project: **BU#876317 WO#1603364**		
Client: Crown Castle	Drawn by: Donitha F. Chiu	App'd:
Code: TIA-222-G	Date: 08/20/18	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

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

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 97 mph.
3) Structure Class II.
4) Exposure Category B.
5) Topographic Category 1.
6) Crest Height 0.00 ft.
7) Nominal ice thickness of 0.7500 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Temperature drop of 50 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.
16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	133.00-128.00	5.00	0.00	12	13.4800	14.4795	0.1875	0.7500	A572-65 (65 ksi)
L2	128.00-123.00	5.00	0.00	12	14.4795	15.4790	0.1875	0.7500	A572-65 (65 ksi)
L3	123.00-118.00	5.00	0.00	12	15.4790	16.4786	0.1875	0.7500	A572-65 (65 ksi)
L4	118.00-113.00	5.00	0.00	12	16.4786	17.4781	0.1875	0.7500	A572-65 (65 ksi)

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
L5	113.00-108.00	5.00	0.00	12	17.4781	18.4776	0.1875	0.7500	A572-65 (65 ksi)
L6	108.00-104.75	3.25	0.00	12	18.4776	19.1273	0.1875	0.7500	A572-65 (65 ksi)
L7	104.75-104.50	0.25	0.00	12	19.1273	19.1773	0.4250	1.7000	A572-65 (65 ksi)
L8	104.50-99.50	5.00	0.00	12	19.1773	20.1768	0.4063	1.6250	A572-65 (65 ksi)
L9	99.50-98.75	0.75	0.00	12	20.1768	20.3267	0.4063	1.6250	A572-65 (65 ksi)
L10	98.75-98.50	0.25	0.00	12	20.3267	20.3767	0.4063	1.6250	A572-65 (65 ksi)
L11	98.50-91.33	7.17	3.67	12	20.3767	21.8100	0.6625	2.6500	A572-65 (65 ksi)
L12	91.33-90.00	5.00	0.00	12	20.7014	21.7002	0.7125	2.8500	A572-65 (65 ksi)
L13	90.00-89.25	0.75	0.00	12	21.7002	21.8500	0.4500	1.8000	A572-65 (65 ksi)
L14	89.25-89.00	0.25	0.00	12	21.8500	21.9000	0.8500	3.4000	A572-65 (65 ksi)
L15	89.00-88.25	0.75	0.00	12	21.9000	22.0498	0.8375	3.3500	A572-65 (65 ksi)
L16	88.25-88.00	0.25	0.00	12	22.0498	22.0998	0.6125	2.4500	A572-65 (65 ksi)
L17	88.00-83.00	5.00	0.00	12	22.0998	23.0986	0.5875	2.3500	A572-65 (65 ksi)
L18	83.00-78.00	5.00	0.00	12	23.0986	24.0975	0.5750	2.3000	A572-65 (65 ksi)
L19	78.00-77.00	1.00	0.00	12	24.0975	24.2972	0.5750	2.3000	A572-65 (65 ksi)
L20	77.00-76.75	0.25	0.00	12	24.2972	24.3472	0.7625	3.0500	A572-65 (65 ksi)
L21	76.75-71.75	5.00	0.00	12	24.3472	25.3460	0.7375	2.9500	A572-65 (65 ksi)
L22	71.75-66.75	5.00	0.00	12	25.3460	26.3449	0.7125	2.8500	A572-65 (65 ksi)
L23	66.75-62.25	4.50	0.00	12	26.3449	27.2439	0.7000	2.8000	A572-65 (65 ksi)
L24	62.25-62.00	0.25	0.00	12	27.2439	27.2938	0.7000	2.8000	A572-65 (65 ksi)
L25	62.00-59.50	2.50	0.00	12	27.2938	27.7933	0.4000	1.6000	A572-65 (65 ksi)
L26	59.50-59.25	0.25	0.00	12	27.7933	27.8432	0.7500	3.0000	A572-65 (65 ksi)
L27	59.25-54.25	5.00	0.00	12	27.8432	28.8421	0.7250	2.9000	A572-65 (65 ksi)
L28	54.25-45.25	9.00	4.75	12	28.8421	30.6400	0.7000	2.8000	A572-65 (65 ksi)
L29	45.25-45.00	5.00	0.00	12	29.1911	30.1920	0.7625	3.0500	A572-65 (65 ksi)
L30	45.00-40.75	4.25	0.00	12	30.1920	31.0427	0.7500	3.0000	A572-65 (65 ksi)
L31	40.75-40.50	0.25	0.00	12	31.0427	31.0928	0.7625	3.0500	A572-65 (65 ksi)
L32	40.50-35.75	4.75	0.00	12	31.0928	32.0436	0.7500	3.0000	A572-65 (65 ksi)
L33	35.75-35.50	0.25	0.00	12	32.0436	32.0937	0.6875	2.7500	A572-65 (65 ksi)
L34	35.50-30.50	5.00	0.00	12	32.0937	33.0946	0.6750	2.7000	A572-65 (65 ksi)
L35	30.50-29.75	0.75	0.00	12	33.0946	33.2447	0.4000	1.6000	A572-65 (65 ksi)
L36	29.75-29.50	0.25	0.00	12	33.2447	33.2947	0.6750	2.7000	A572-65 (65 ksi)
L37	29.50-24.50	5.00	0.00	12	33.2947	34.2956	0.6625	2.6500	A572-65 (65 ksi)
L38	24.50-19.50	5.00	0.00	12	34.2956	35.2965	0.6500	2.6000	A572-65 (65 ksi)
L39	19.50-14.50	5.00	0.00	12	35.2965	36.2974	0.6375	2.5500	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L40	14.50-12.50	2.00	0.00	12	36.2974	36.6978	0.6375	2.5500	(65 ksi) A572-65 (65 ksi)
L41	12.50-12.25	0.25	0.00	12	36.6978	36.7478	0.5625	2.2500	A572-65 (65 ksi)
L42	12.25-10.75	1.50	0.00	12	36.7478	37.0481	0.5625	2.2500	A572-65 (65 ksi)
L43	10.75-10.50	0.25	0.00	12	37.0481	37.0981	0.6375	2.5500	A572-65 (65 ksi)
L44	10.50-5.50	5.00	0.00	12	37.0981	38.0990	0.6250	2.5000	A572-65 (65 ksi)
L45	5.50-0.50	5.00	0.00	12	38.0990	39.0999	0.6125	2.4500	A572-65 (65 ksi)
L46	0.50-0.00	0.50		12	39.0999	39.2000	0.6125	2.4500	A572-65 (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	13.8894	8.0253	180.9936	4.7587	6.9826	25.9205	366.7420	3.9498	3.1101	16.587
	14.9242	8.6288	224.9697	5.1165	7.5004	29.9944	455.8495	4.2468	3.3780	18.016
L2	14.9242	8.6288	224.9697	5.1165	7.5004	29.9944	455.8495	4.2468	3.3780	18.016
	15.9589	9.2323	275.5477	5.4744	8.0181	34.3655	558.3343	4.5438	3.6459	19.445
L3	15.9589	9.2323	275.5477	5.4744	8.0181	34.3655	558.3343	4.5438	3.6459	19.445
	16.9937	9.8357	333.1894	5.8322	8.5359	39.0339	675.1320	4.8408	3.9138	20.873
L4	16.9937	9.8357	333.1894	5.8322	8.5359	39.0339	675.1320	4.8408	3.9138	20.873
	18.0285	10.4392	398.3564	6.1900	9.0536	43.9996	807.1780	5.1379	4.1816	22.302
L5	18.0285	10.4392	398.3564	6.1900	9.0536	43.9996	807.1780	5.1379	4.1816	22.302
	19.0633	11.0426	471.5105	6.5479	9.5714	49.2625	955.4080	5.4349	4.4495	23.731
L6	19.0633	11.0426	471.5105	6.5479	9.5714	49.2625	955.4080	5.4349	4.4495	23.731
	19.7359	11.4349	523.5624	6.7804	9.9079	52.8427	1060.8793	5.6279	4.6236	24.659
L7	19.6521	25.5941	1142.6546	6.6954	9.9079	115.3272	2315.3280	12.5966	3.9871	9.381
	19.7038	25.6625	1151.8393	6.7133	9.9338	115.9513	2333.9386	12.6303	4.0005	9.413
L8	19.7105	24.5548	1104.3288	6.7200	9.9338	111.1686	2237.6695	12.0851	4.0508	9.971
	20.7452	25.8623	1290.2991	7.0779	10.4516	123.4550	2614.4958	12.7287	4.3186	10.63
L9	20.7452	25.8623	1290.2991	7.0779	10.4516	123.4550	2614.4958	12.7287	4.3186	10.63
	20.9005	26.0585	1319.8769	7.1315	10.5292	125.3535	2674.4284	12.8252	4.3588	10.729
L10	20.9005	26.0585	1319.8769	7.1315	10.5292	125.3535	2674.4284	12.8252	4.3588	10.729
	20.9522	26.1238	1329.8356	7.1494	10.5551	125.9896	2694.6075	12.8574	4.3722	10.762
L11	20.8618	42.0553	2086.2406	7.0577	10.5551	197.6519	4227.2890	20.6983	3.6855	5.563
	22.3457	45.1129	2575.1635	7.5708	11.2976	227.9394	5217.9794	22.2032	4.0696	6.143
L12	21.9393	45.8594	2338.7847	7.1560	10.7233	218.1031	4739.0119	22.5706	3.6385	5.107
	22.2144	48.1511	2707.2098	7.5136	11.2407	240.8398	5485.5411	23.6985	3.9062	5.482
L13	22.3070	30.7916	1774.7782	7.6076	11.2407	157.8884	3596.1817	15.1547	4.6097	10.244
	22.4621	31.0087	1812.5838	7.6612	11.3183	160.1460	3672.7862	15.2615	4.6498	10.333
L14	22.3210	57.4771	3235.3488	7.5180	11.3183	285.8506	6555.6939	28.2885	3.5778	4.209
	22.3727	57.6138	3258.4870	7.5359	11.3442	287.2384	6602.5781	28.3558	3.5912	4.225
L15	22.3771	56.8003	3216.2910	7.5404	11.3442	283.5188	6517.0776	27.9554	3.6247	4.328
	22.5322	57.2043	3285.4182	7.5940	11.4218	287.6445	6657.1480	28.1542	3.6648	4.376
L16	22.6116	42.2797	2480.0412	7.6746	11.4218	217.1322	5025.2359	20.8088	4.2678	6.968
	22.6633	42.3782	2497.4151	7.6924	11.4477	218.1592	5060.4400	20.8573	4.2812	6.99
L17	22.6721	40.6958	2403.8508	7.7014	11.4477	209.9860	4870.8534	20.0292	4.3482	7.401
	23.7062	42.5854	2754.4865	8.0590	11.9651	230.2104	5581.3365	20.9592	4.6159	7.857
L18	23.7106	41.7025	2700.3739	8.0635	11.9651	225.6879	5471.6895	20.5247	4.6494	8.086
	24.7447	43.5519	3075.8036	8.4210	12.4825	246.4094	6232.4120	21.4349	4.9171	8.552
L19	24.7447	43.5519	3075.8036	8.4210	12.4825	246.4094	6232.4120	21.4349	4.9171	8.552
	24.9515	43.9217	3154.8377	8.4926	12.5860	250.6630	6392.5566	21.6169	4.9707	8.645
L20	24.8854	57.7837	4085.1703	8.4254	12.5860	324.5812	8277.6625	28.4394	4.4682	5.86
	24.9371	57.9063	4111.2329	8.4433	12.6118	325.9819	8330.4724	28.4997	4.4815	5.877
L21	24.9459	56.0671	3989.0969	8.4523	12.6118	316.2977	8082.9919	27.5945	4.5485	6.168
	25.9800	58.4391	4517.1214	8.8099	13.1293	344.0502	9152.9126	28.7620	4.8162	6.53
L22	25.9888	56.5155	4377.3124	8.8188	13.1293	333.4015	8869.6217	27.8152	4.8832	6.854
	27.0229	58.8071	4931.6791	9.1764	13.6467	361.3836	9992.9189	28.9431	5.1509	7.229
L23	27.0273	57.8036	4852.2503	9.1809	13.6467	355.5632	9831.9746	28.4492	5.1844	7.406

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
	27.9580	59.8299	5380.6288	9.5027	14.1123	381.2715	10902.6126	29.4465	5.4254	7.751
L24	27.9580	59.8299	5380.6288	9.5027	14.1123	381.2715	10902.6126	29.4465	5.4254	7.751
	28.0097	59.9425	5411.0573	9.5206	14.1382	382.7260	10964.2691	29.5019	5.4387	7.77
L25	28.1155	34.6392	3197.8596	9.6280	14.1382	226.1858	6479.7305	17.0484	6.2427	15.607
	28.6326	35.2825	3379.3455	9.8068	14.3969	234.7272	6847.4701	17.3650	6.3766	15.941
L26	28.5091	65.3095	6096.4895	9.6815	14.3969	423.4584	12353.1406	32.1433	5.4386	7.251
	28.5608	65.4301	6130.3286	9.6994	14.4228	425.0450	12421.7077	32.2027	5.4520	7.269
L27	28.5696	63.3074	5942.4039	9.7083	14.4228	412.0153	12040.9213	31.1580	5.5190	7.612
	29.6037	65.6393	6623.5264	10.0659	14.9402	443.3363	13421.0603	32.3056	5.7867	7.982
L28	29.6126	63.4322	6412.2026	10.0749	14.9402	429.1917	12992.8610	31.2194	5.8537	8.362
	31.4739	67.4848	7721.3858	10.7185	15.8715	486.4931	15645.6209	33.2139	6.3355	9.051
L29	30.9362	69.7993	7200.2463	10.1774	15.1210	476.1759	14589.6512	34.3531	5.7797	7.58
	30.9881	72.2567	7987.8382	10.5358	15.6394	510.7495	16185.5258	35.5626	6.0479	7.932
L30	30.9925	71.1024	7866.9058	10.5402	15.6394	503.0170	15940.4839	34.9944	6.0814	8.109
	31.8732	73.1570	8568.7694	10.8448	16.0801	532.8792	17362.6499	36.0056	6.3095	8.413
L31	31.8688	74.3455	8700.8024	10.8403	16.0801	541.0901	17630.1847	36.5906	6.2760	8.231
	31.9206	74.4684	8744.0140	10.8582	16.1061	542.9021	17717.7429	36.6511	6.2894	8.248
L32	31.9250	73.2778	8611.3076	10.8627	16.1061	534.6626	17448.8439	36.0651	6.3229	8.43
	32.9094	75.5741	9446.4952	11.2031	16.5986	569.1140	19141.1603	37.1953	6.5777	8.77
L33	32.9315	69.4146	8711.2742	11.2255	16.5986	524.8199	17651.4033	34.1638	6.7452	9.811
	32.9833	69.5254	8753.0509	11.2434	16.6245	526.5145	17736.0543	34.2183	6.7586	9.831
L34	32.9877	68.2885	8604.1700	11.2479	16.6245	517.5590	17434.3812	33.6095	6.7921	10.062
	34.0239	70.4639	9452.9418	11.6062	17.1430	551.4176	19154.2229	34.6802	7.0603	10.46
L35	34.1209	42.1106	5745.5068	11.7047	17.1430	335.1521	11641.9545	20.7256	7.7973	19.493
	34.2763	42.3040	5825.0212	11.7584	17.2208	338.2559	11803.0723	20.8207	7.8376	19.594
L36	34.1793	70.7902	9584.8798	11.6600	17.2208	556.5889	19421.5650	34.8408	7.1006	10.519
	34.2311	70.8990	9629.1298	11.6779	17.2467	558.3180	19511.2275	34.8943	7.1140	10.539
L37	34.2355	69.6127	9461.6815	11.6823	17.2467	548.6090	19171.9319	34.2613	7.1475	10.789
	35.2717	71.7479	10359.2807	12.0407	17.7651	583.1242	20990.7112	35.3121	7.4157	11.194
L38	35.2762	70.4203	10175.1592	12.0451	17.7651	572.7600	20617.6311	34.6587	7.4492	11.46
	36.3124	72.5152	11110.5140	12.4035	18.2836	607.6765	22512.9135	35.6898	7.7175	11.873
L39	36.3168	71.1463	10908.6488	12.4079	18.2836	596.6358	22103.8799	35.0160	7.7510	12.158
	37.3530	73.2009	11881.2706	12.7662	18.8021	631.9132	24074.6753	36.0273	8.0192	12.579
L40	37.3530	73.2009	11881.2706	12.7662	18.8021	631.9132	24074.6753	36.0273	8.0192	12.579
	37.7674	74.0227	12285.9564	12.9096	19.0094	646.3080	24894.6785	36.4317	8.1265	12.747
L41	37.7939	65.4500	10908.3307	12.9364	19.0094	573.8374	22103.2355	32.2125	8.3275	14.804

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
	37.8457	65.5407	10953.7155	12.9543	19.0354	575.4402	22195.1973	32.2571	8.3409	14.828
L42	37.8457	65.5407	10953.7155	12.9543	19.0354	575.4402	22195.1973	32.2571	8.3409	14.828
	38.1566	66.0845	11228.6674	13.0618	19.1909	585.1035	22752.3245	32.5248	8.4214	14.971
L43	38.1301	74.7418	12647.5064	13.0350	19.1909	659.0364	25627.2770	36.7857	8.2204	12.895
	38.1819	74.8446	12699.7287	13.0529	19.2168	660.8649	25733.0935	36.8362	8.2338	12.916
L44	38.1863	73.4022	12463.5245	13.0574	19.2168	648.5734	25254.4797	36.1263	8.2673	13.228
	39.2225	75.4165	13518.0067	13.4157	19.7353	684.9661	27391.1465	37.1177	8.5355	13.657
L45	39.2269	73.9328	13260.9078	13.4202	19.7353	671.9388	26870.1944	36.3875	8.5690	13.99
	40.2631	75.9068	14351.7218	13.7785	20.2538	708.5956	29080.4794	37.3590	8.8373	14.428
L46	40.2631	75.9068	14351.7218	13.7785	20.2538	708.5956	29080.4794	37.3590	8.8373	14.428
	40.3668	76.1042	14463.9810	13.8143	20.3056	712.3149	29307.9469	37.4562	8.8641	14.472

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 133.00-128.00				1	1	1			
L2 128.00-123.00				1	1	1			
L3 123.00-118.00				1	1	1			
L4 118.00-113.00				1	1	1			
L5 113.00-108.00				1	1	1			
L6 108.00-104.75				1	1	1			
L7 104.75-104.50				1	1	0.915043			
L8 104.50-99.50				1	1	0.931306			
L9 99.50-98.75				1	1	0.92777			
L10 98.75-98.50				1	1	0.926603			
L11 98.50-91.33				1	1	0.878162			
L12 91.33-90.00				1	1	0.890902			
L13 90.00-89.25				1	1	0.948291			
L14 89.25-89.00				1	1	0.869583			
L15 89.00-88.25				1	1	0.877917			
L16 88.25-88.00				1	1	0.902435			
L17 88.00-83.00				1	1	0.916927			
L18 83.00-78.00				1	1	0.915042			
L19 78.00-77.00				1	1	0.910998			
L20 77.00-76.75				1	1	0.899211			

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
L21 76.75-71.75				1	1	0.904772			
L22 71.75-66.75				1	1	0.912783			
L23 66.75-62.25				1	1	0.909275			
L24 62.25-62.00				1	1	0.908238			
L25 62.00-59.50				1	1	0.969022			
L26 59.50-59.25				1	1	0.903393			
L27 59.25-54.25				1	1	0.912764			
L28 54.25-45.25				1	1	0.927321			
L29 45.25-45.00				1	1	0.926734			
L30 45.00-40.75				1	1	0.927032			
L31 40.75-40.50				1	1	0.965174			
L32 40.50-35.75				1	1	0.963713			
L33 35.75-35.50				1	1	0.990665			
L34 35.50-30.50				1	1	0.991763			
L35 30.50-29.75				1	1	1.0674			
L36 29.75-29.50				1	1	1.00176			
L37 29.50-24.50				1	1	1.00395			
L38 24.50-19.50				1	1	1.00721			
L39 19.50-14.50				1	1	1.01154			
L40 14.50-12.50				1	1	1.00575			
L41 12.50-12.25				1	1	0.95332			
L42 12.25-10.75				1	1	0.950047			
L43 10.75-10.50				1	1	0.954509			
L44 10.50-5.50				1	1	0.960625			
L45 5.50-0.50				1	1	0.967688			
L46 0.50-0.00				1	1	0.966502			

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
Top										
Safety Line 5/8	A	No	Surface Ar (CaAa)	133.00 - 0.00	1	1	0.500 0.500	0.8800		0.40
Level 133										
7983A(ELLIPTICAL)	A	No	Surface Ar (CaAa)	133.00 - 0.00	3	3	0.300 0.300	0.5730		0.08

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*
MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	C	No	Surface Ar (CaAa)	100.00 - 0.00	1	1	0.200 0.200	1.6250		1.07
Level 90										
LCF158-50JL(1-5/8)	A	No	Surface Ar (CaAa)	90.00 - 0.00	2	2	-0.100 -0.050	1.9800		0.52
***										
***										
RNF 2381113										
6.875" x 1.25" Flat Plate (G)	B	No	Surface Af (CaAa)	12.00 - 0.00	1	1	0.500 0.500	6.8750	27.5000	0.00
6.875" x 1.25" Flat Plate (G)	C	No	Surface Af (CaAa)	12.00 - 0.00	1	1	0.000 0.000	6.8750	27.5000	0.00
*										
6.875" x 1.25" Flat Plate (G)	B	No	Surface Af (CaAa)	29.75 - 0.00	1	1	-0.250 -0.250	6.8750	27.5000	0.00
6.875" x 1.25" Flat Plate (G)	A	No	Surface Af (CaAa)	29.75 - 0.00	1	1	-0.250 -0.250	6.8750	27.5000	0.00
6.875" x 1.25" Flat Plate (G)	C	No	Surface Af (CaAa)	29.75 - 7.25	1	1	-0.250 -0.250	6.8750	27.5000	0.00
*										
6.625" x 1.25" Flat Plate (G)	A	No	Surface Af (CaAa)	59.50 - 29.75	1	1	-0.250 -0.250	6.6250	26.5000	0.00
6.625" x 1.25" Flat Plate (G)	B	No	Surface Af (CaAa)	59.50 - 29.75	1	1	-0.250 -0.250	6.6250	26.5000	0.00
6.625" x 1.25" Flat Plate (G)	C	No	Surface Af (CaAa)	59.50 - 29.75	1	1	-0.250 -0.250	6.6250	26.5000	0.00
*										
5.5" x 1.25'' Flat Plate (G)	A	No	Surface Af (CaAa)	89.25 - 59.50	1	1	-0.250 -0.250	5.5000	13.5000	0.00
5.5" x 1.25'' Flat Plate (G)	B	No	Surface Af (CaAa)	89.25 - 59.50	1	1	-0.250 -0.250	5.5000	13.5000	0.00
5.5" x 1.25'' Flat Plate (G)	C	No	Surface Af (CaAa)	89.25 - 59.50	1	1	-0.250 -0.250	5.5000	13.5000	0.00
*										
3.625" x 1.25" Flat Plate (G)	A	No	Surface Af (CaAa)	100.00 - 89.25	1	1	-0.250 -0.250	3.6250	14.5000	0.00
3.625" x 1.25" Flat Plate (G)	B	No	Surface Af (CaAa)	100.00 - 89.25	1	1	-0.250 -0.250	3.6250	14.5000	0.00
3.625" x 1.25" Flat Plate (G)	C	No	Surface Af (CaAa)	100.00 - 89.25	1	1	-0.250 -0.250	3.6250	14.5000	0.00
RNF 3315244										
4" x 1'' Flat Plate (G)	C	No	Surface Af (CaAa)	35.75 - 10.75	1	1	0.000 0.000	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	B	No	Surface Af (CaAa)	40.75 - 10.75	1	1	-0.250 -0.250	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	A	No	Surface Af (CaAa)	35.75 - 10.75	1	1	0.000 0.000	4.0000	10.0000	0.00
*										
4" x 1'' Flat Plate (G)	A	No	Surface Af (CaAa)	62.25 - 32.25	1	1	0.250 0.250	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	B	No	Surface Af (CaAa)	62.25 - 32.25	1	1	0.250 0.250	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	C	No	Surface Af (CaAa)	62.25 - 32.25	1	1	0.250 0.250	4.0000	10.0000	0.00
*										
4" x 1'' Flat Plate (G)	A	No	Surface Af (CaAa)	78.75 - 58.75	1	1	0.000 0.000	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	B	No	Surface Af (CaAa)	78.75 - 58.75	1	1	0.000 0.000	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	C	No	Surface Af (CaAa)	78.75 - 58.75	1	1	0.000 0.000	4.0000	10.0000	0.00
*										
4" x 1'' Flat Plate (G)	A	No	Surface Af (CaAa)	106.50 - 86.50	1	1	0.000 0.000	4.0000	10.0000	0.00
4" x 1'' Flat Plate (G)	B	No	Surface Af (CaAa)	106.50 - 86.50	1	1	0.000 0.000	4.0000	10.0000	0.00

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
4" x 1'' Flat Plate (G)	C	No	Surface Af (CaAa)	106.50 - 86.50	1	1	0.000 0.000	4.0000	10.0000	0.00
*** *** * *										

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
HB114-1-0813U4-M5J(1 1/4")	A	No	No	Inside Pole	133.00 - 0.00	3	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.20 1.20 1.20
Level 110									
LDF4-50A(1/2")	B	No	No	Inside Pole	110.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15
LDF7-50A(1-5/8)	B	No	No	Inside Pole	110.00 - 0.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.82 0.82 0.82
HB158-1-08U8-S8J18(1-5/8)	B	No	No	Inside Pole	110.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	1.30 1.30 1.30
Level 100									
MLC HYBRID 6X12 6AWGX6(1-1/2)	C	No	No	Inside Pole	100.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.59 0.59 0.59
LDF5-50A(7/8)	C	No	No	Inside Pole	100.00 - 0.00	5	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.33 0.33 0.33
LDF6-50A(1-1/4)	C	No	No	Inside Pole	100.00 - 0.00	6	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.60 0.60 0.60
MLC HYBRID 6X12 6AWGX6(1-1/2)	C	No	No	Inside Pole	100.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.59 0.59 0.59
LCF158-50JL(1-5/8)	A	No	No	Inside Pole	90.00 - 0.00	4	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.52 0.52 0.52
Level 50									
LDF4-50A(1/2")	B	No	No	Inside Pole	50.00 - 0.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.15 0.15 0.15
*** *** *** *** * *									

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	133.00-128.00	A	0.000	0.000	1.300	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.00
L2	128.00-123.00	A	0.000	0.000	1.300	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L3	123.00-118.00	A	0.000	0.000	1.300	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L4	118.00-113.00	A	0.000	0.000	1.300	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L5	113.00-108.00	A	0.000	0.000	1.300	0.000	0.02
		B	0.000	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
L6	108.00-104.75	A	0.000	0.000	2.011	0.000	0.01
		B	0.000	0.000	1.167	0.000	0.04
		C	0.000	0.000	1.167	0.000	0.00
L7	104.75-104.50	A	0.000	0.000	0.232	0.000	0.00
		B	0.000	0.000	0.167	0.000	0.00
		C	0.000	0.000	0.167	0.000	0.00
L8	104.50-99.50	A	0.000	0.000	4.935	0.000	0.02
		B	0.000	0.000	3.635	0.000	0.06
		C	0.000	0.000	3.717	0.000	0.00
L9	99.50-98.75	A	0.000	0.000	1.148	0.000	0.00
		B	0.000	0.000	0.953	0.000	0.01
		C	0.000	0.000	1.075	0.000	0.01
L10	98.75-98.50	A	0.000	0.000	0.383	0.000	0.00
		B	0.000	0.000	0.318	0.000	0.00
		C	0.000	0.000	0.358	0.000	0.00
L11	98.50-91.33	A	0.000	0.000	10.975	0.000	0.03
		B	0.000	0.000	9.112	0.000	0.08
		C	0.000	0.000	10.277	0.000	0.05
L12	91.33-90.00	A	0.000	0.000	2.036	0.000	0.01
		B	0.000	0.000	1.690	0.000	0.02
		C	0.000	0.000	1.906	0.000	0.01
L13	90.00-89.25	A	0.000	0.000	1.445	0.000	0.01
		B	0.000	0.000	0.953	0.000	0.01
		C	0.000	0.000	1.075	0.000	0.01
L14	89.25-89.00	A	0.000	0.000	0.560	0.000	0.00
		B	0.000	0.000	0.396	0.000	0.00
		C	0.000	0.000	0.436	0.000	0.00
L15	89.00-88.25	A	0.000	0.000	1.679	0.000	0.01
		B	0.000	0.000	1.188	0.000	0.01
		C	0.000	0.000	1.309	0.000	0.01
L16	88.25-88.00	A	0.000	0.000	0.560	0.000	0.00
		B	0.000	0.000	0.396	0.000	0.00
		C	0.000	0.000	0.436	0.000	0.00
L17	88.00-83.00	A	0.000	0.000	8.863	0.000	0.04
		B	0.000	0.000	5.583	0.000	0.06
		C	0.000	0.000	6.396	0.000	0.04
L18	83.00-78.00	A	0.000	0.000	8.363	0.000	0.04
		B	0.000	0.000	5.083	0.000	0.06
		C	0.000	0.000	5.896	0.000	0.04
L19	78.00-77.00	A	0.000	0.000	2.239	0.000	0.01
		B	0.000	0.000	1.583	0.000	0.01
		C	0.000	0.000	1.746	0.000	0.01
L20	77.00-76.75	A	0.000	0.000	0.560	0.000	0.00
		B	0.000	0.000	0.396	0.000	0.00
		C	0.000	0.000	0.436	0.000	0.00
L21	76.75-71.75	A	0.000	0.000	11.196	0.000	0.04
		B	0.000	0.000	7.917	0.000	0.06
		C	0.000	0.000	8.729	0.000	0.04
L22	71.75-66.75	A	0.000	0.000	11.196	0.000	0.04
		B	0.000	0.000	7.917	0.000	0.06
		C	0.000	0.000	8.729	0.000	0.04
L23	66.75-62.25	A	0.000	0.000	10.077	0.000	0.03
		B	0.000	0.000	7.125	0.000	0.05
		C	0.000	0.000	7.856	0.000	0.03
L24	62.25-62.00	A	0.000	0.000	0.726	0.000	0.00
		B	0.000	0.000	0.563	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.603	0.000	0.00
L25	62.00-59.50	A	0.000	0.000	7.265	0.000	0.02
		B	0.000	0.000	5.625	0.000	0.03
		C	0.000	0.000	6.031	0.000	0.02
L26	59.50-59.25	A	0.000	0.000	0.773	0.000	0.00
		B	0.000	0.000	0.609	0.000	0.00
		C	0.000	0.000	0.650	0.000	0.00
L27	59.25-54.25	A	0.000	0.000	12.467	0.000	0.04
		B	0.000	0.000	9.188	0.000	0.06
		C	0.000	0.000	10.000	0.000	0.04
L28	54.25-45.25	A	0.000	0.000	21.841	0.000	0.07
		B	0.000	0.000	15.938	0.000	0.10
		C	0.000	0.000	17.400	0.000	0.07
L29	45.25-45.00	A	0.000	0.000	0.607	0.000	0.00
		B	0.000	0.000	0.443	0.000	0.00
		C	0.000	0.000	0.483	0.000	0.00
L30	45.00-40.75	A	0.000	0.000	10.314	0.000	0.03
		B	0.000	0.000	7.526	0.000	0.05
		C	0.000	0.000	8.217	0.000	0.03
L31	40.75-40.50	A	0.000	0.000	0.607	0.000	0.00
		B	0.000	0.000	0.609	0.000	0.00
		C	0.000	0.000	0.483	0.000	0.00
L32	40.50-35.75	A	0.000	0.000	11.527	0.000	0.04
		B	0.000	0.000	11.578	0.000	0.05
		C	0.000	0.000	9.183	0.000	0.04
L33	35.75-35.50	A	0.000	0.000	0.773	0.000	0.00
		B	0.000	0.000	0.609	0.000	0.00
		C	0.000	0.000	0.650	0.000	0.00
L34	35.50-30.50	A	0.000	0.000	14.300	0.000	0.04
		B	0.000	0.000	11.021	0.000	0.06
		C	0.000	0.000	11.833	0.000	0.04
L35	30.50-29.75	A	0.000	0.000	1.820	0.000	0.01
		B	0.000	0.000	1.328	0.000	0.01
		C	0.000	0.000	1.450	0.000	0.01
L36	29.75-29.50	A	0.000	0.000	0.617	0.000	0.00
		B	0.000	0.000	0.453	0.000	0.00
		C	0.000	0.000	0.494	0.000	0.00
L37	29.50-24.50	A	0.000	0.000	12.342	0.000	0.04
		B	0.000	0.000	9.063	0.000	0.06
		C	0.000	0.000	9.875	0.000	0.04
L38	24.50-19.50	A	0.000	0.000	12.342	0.000	0.04
		B	0.000	0.000	9.063	0.000	0.06
		C	0.000	0.000	9.875	0.000	0.04
L39	19.50-14.50	A	0.000	0.000	12.342	0.000	0.04
		B	0.000	0.000	9.063	0.000	0.06
		C	0.000	0.000	9.875	0.000	0.04
L40	14.50-12.50	A	0.000	0.000	4.937	0.000	0.01
		B	0.000	0.000	3.625	0.000	0.02
		C	0.000	0.000	3.950	0.000	0.01
L41	12.50-12.25	A	0.000	0.000	0.617	0.000	0.00
		B	0.000	0.000	0.453	0.000	0.00
		C	0.000	0.000	0.494	0.000	0.00
L42	12.25-10.75	A	0.000	0.000	3.703	0.000	0.01
		B	0.000	0.000	3.908	0.000	0.02
		C	0.000	0.000	4.152	0.000	0.01
L43	10.75-10.50	A	0.000	0.000	0.450	0.000	0.00
		B	0.000	0.000	0.524	0.000	0.00
		C	0.000	0.000	0.565	0.000	0.00
L44	10.50-5.50	A	0.000	0.000	9.009	0.000	0.04
		B	0.000	0.000	10.485	0.000	0.06
		C	0.000	0.000	9.293	0.000	0.04
L45	5.50-0.50	A	0.000	0.000	9.009	0.000	0.04
		B	0.000	0.000	10.485	0.000	0.06
		C	0.000	0.000	5.569	0.000	0.04
L46	0.50-0.00	A	0.000	0.000	0.901	0.000	0.00
		B	0.000	0.000	1.049	0.000	0.01
		C	0.000	0.000	0.557	0.000	0.00

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	133.00-128.00	A	1.721	0.000	0.000	5.387	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	128.00-123.00	A	1.714	0.000	0.000	5.372	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L3	123.00-118.00	A	1.707	0.000	0.000	5.356	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L4	118.00-113.00	A	1.700	0.000	0.000	5.340	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L5	113.00-108.00	A	1.693	0.000	0.000	5.323	0.000	0.08
		B		0.000	0.000	0.000	0.000	0.02
		C		0.000	0.000	0.000	0.000	0.00
L6	108.00-104.75	A	1.686	0.000	0.000	5.207	0.000	0.07
		B		0.000	0.000	1.757	0.000	0.06
		C		0.000	0.000	1.757	0.000	0.02
L7	104.75-104.50	A	1.683	0.000	0.000	0.516	0.000	0.01
		B		0.000	0.000	0.251	0.000	0.01
		C		0.000	0.000	0.251	0.000	0.00
L8	104.50-99.50	A	1.679	0.000	0.000	10.710	0.000	0.14
		B		0.000	0.000	5.417	0.000	0.12
		C		0.000	0.000	5.666	0.000	0.07
L9	99.50-98.75	A	1.674	0.000	0.000	2.150	0.000	0.03
		B		0.000	0.000	1.358	0.000	0.03
		C		0.000	0.000	1.731	0.000	0.03
L10	98.75-98.50	A	1.674	0.000	0.000	0.716	0.000	0.01
		B		0.000	0.000	0.452	0.000	0.01
		C		0.000	0.000	0.577	0.000	0.01
L11	98.50-91.33	A	1.667	0.000	0.000	20.513	0.000	0.28
		B		0.000	0.000	12.963	0.000	0.25
		C		0.000	0.000	16.519	0.000	0.27
L12	91.33-90.00	A	1.660	0.000	0.000	3.806	0.000	0.05
		B		0.000	0.000	2.405	0.000	0.05
		C		0.000	0.000	3.065	0.000	0.05
L13	90.00-89.25	A	1.658	0.000	0.000	2.822	0.000	0.04
		B		0.000	0.000	1.354	0.000	0.03
		C		0.000	0.000	1.724	0.000	0.03
L14	89.25-89.00	A	1.657	0.000	0.000	1.051	0.000	0.01
		B		0.000	0.000	0.562	0.000	0.01
		C		0.000	0.000	0.685	0.000	0.01
L15	89.00-88.25	A	1.656	0.000	0.000	3.152	0.000	0.04
		B		0.000	0.000	1.684	0.000	0.03
		C		0.000	0.000	2.054	0.000	0.03
L16	88.25-88.00	A	1.655	0.000	0.000	1.050	0.000	0.01
		B		0.000	0.000	0.561	0.000	0.01
		C		0.000	0.000	0.685	0.000	0.01
L17	88.00-83.00	A	1.650	0.000	0.000	17.492	0.000	0.22
		B		0.000	0.000	7.728	0.000	0.14
		C		0.000	0.000	10.190	0.000	0.15
L18	83.00-78.00	A	1.640	0.000	0.000	16.698	0.000	0.21
		B		0.000	0.000	6.969	0.000	0.13
		C		0.000	0.000	9.422	0.000	0.14
L19	78.00-77.00	A	1.634	0.000	0.000	4.178	0.000	0.05
		B		0.000	0.000	2.237	0.000	0.03
		C		0.000	0.000	2.726	0.000	0.04
L20	77.00-76.75	A	1.632	0.000	0.000	1.044	0.000	0.01
		B		0.000	0.000	0.559	0.000	0.01
		C		0.000	0.000	0.681	0.000	0.01
L21	76.75-71.75	A	1.627	0.000	0.000	20.853	0.000	0.25
		B		0.000	0.000	11.170	0.000	0.17
		C		0.000	0.000	13.609	0.000	0.18
L22	71.75-66.75	A	1.615	0.000	0.000	20.791	0.000	0.25
		B		0.000	0.000	11.147	0.000	0.17

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
		C		0.000	0.000	13.575	0.000	0.18
L23	66.75-62.25	A	1.604	0.000	0.000	18.655	0.000	0.23
		B		0.000	0.000	10.012	0.000	0.15
		C		0.000	0.000	12.187	0.000	0.16
L24	62.25-62.00	A	1.598	0.000	0.000	1.281	0.000	0.01
		B		0.000	0.000	0.802	0.000	0.01
		C		0.000	0.000	0.923	0.000	0.01
L25	62.00-59.50	A	1.594	0.000	0.000	12.801	0.000	0.15
		B		0.000	0.000	8.017	0.000	0.11
		C		0.000	0.000	9.220	0.000	0.11
L26	59.50-59.25	A	1.591	0.000	0.000	1.326	0.000	0.02
		B		0.000	0.000	0.848	0.000	0.01
		C		0.000	0.000	0.968	0.000	0.01
L27	59.25-54.25	A	1.584	0.000	0.000	22.045	0.000	0.29
		B		0.000	0.000	12.513	0.000	0.21
		C		0.000	0.000	14.909	0.000	0.22
L28	54.25-45.25	A	1.563	0.000	0.000	38.589	0.000	0.51
		B		0.000	0.000	21.563	0.000	0.37
		C		0.000	0.000	25.839	0.000	0.39
L29	45.25-45.00	A	1.548	0.000	0.000	1.072	0.000	0.01
		B		0.000	0.000	0.599	0.000	0.01
		C		0.000	0.000	0.718	0.000	0.01
L30	45.00-40.75	A	1.540	0.000	0.000	18.115	0.000	0.24
		B		0.000	0.000	10.144	0.000	0.17
		C		0.000	0.000	12.143	0.000	0.18
L31	40.75-40.50	A	1.532	0.000	0.000	1.063	0.000	0.01
		B		0.000	0.000	0.839	0.000	0.01
		C		0.000	0.000	0.713	0.000	0.01
L32	40.50-35.75	A	1.522	0.000	0.000	20.153	0.000	0.26
		B		0.000	0.000	15.915	0.000	0.23
		C		0.000	0.000	13.520	0.000	0.20
L33	35.75-35.50	A	1.512	0.000	0.000	1.300	0.000	0.02
		B		0.000	0.000	0.836	0.000	0.01
		C		0.000	0.000	0.952	0.000	0.01
L34	35.50-30.50	A	1.500	0.000	0.000	24.235	0.000	0.30
		B		0.000	0.000	14.996	0.000	0.23
		C		0.000	0.000	17.308	0.000	0.24
L35	30.50-29.75	A	1.486	0.000	0.000	3.153	0.000	0.04
		B		0.000	0.000	1.774	0.000	0.03
		C		0.000	0.000	2.119	0.000	0.03
L36	29.75-29.50	A	1.484	0.000	0.000	1.061	0.000	0.01
		B		0.000	0.000	0.602	0.000	0.01
		C		0.000	0.000	0.703	0.000	0.01
L37	29.50-24.50	A	1.470	0.000	0.000	21.138	0.000	0.27
		B		0.000	0.000	12.003	0.000	0.20
		C		0.000	0.000	14.027	0.000	0.20
L38	24.50-19.50	A	1.440	0.000	0.000	20.974	0.000	0.26
		B		0.000	0.000	11.943	0.000	0.19
		C		0.000	0.000	13.950	0.000	0.20
L39	19.50-14.50	A	1.404	0.000	0.000	20.772	0.000	0.25
		B		0.000	0.000	11.870	0.000	0.19
		C		0.000	0.000	13.854	0.000	0.19
L40	14.50-12.50	A	1.372	0.000	0.000	8.239	0.000	0.10
		B		0.000	0.000	4.722	0.000	0.07
		C		0.000	0.000	5.508	0.000	0.08
L41	12.50-12.25	A	1.360	0.000	0.000	1.027	0.000	0.01
		B		0.000	0.000	0.589	0.000	0.01
		C		0.000	0.000	0.687	0.000	0.01
L42	12.25-10.75	A	1.350	0.000	0.000	6.143	0.000	0.07
		B		0.000	0.000	4.921	0.000	0.08
		C		0.000	0.000	5.507	0.000	0.08
L43	10.75-10.50	A	1.339	0.000	0.000	0.787	0.000	0.01
		B		0.000	0.000	0.632	0.000	0.01
		C		0.000	0.000	0.729	0.000	0.01
L44	10.50-5.50	A	1.302	0.000	0.000	15.576	0.000	0.20
		B		0.000	0.000	12.573	0.000	0.22
		C		0.000	0.000	12.101	0.000	0.20
L45	5.50-0.50	A	1.180	0.000	0.000	15.027	0.000	0.18
		B		0.000	0.000	12.380	0.000	0.20

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
		C		0.000	0.000	7.463	0.000	0.13
L46	0.50-0.00	A	0.920	0.000	0.000	1.386	0.000	0.01
		B		0.000	0.000	1.197	0.000	0.02
		C		0.000	0.000	0.705	0.000	0.01

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	133.00-128.00	-0.3483	-1.2301	-0.5676	-2.2293
L2	128.00-123.00	-0.3515	-1.2407	-0.5879	-2.3075
L3	123.00-118.00	-0.3544	-1.2502	-0.6070	-2.3806
L4	118.00-113.00	-0.3569	-1.2587	-0.6248	-2.4488
L5	113.00-108.00	-0.3592	-1.2664	-0.6415	-2.5125
L6	108.00-104.75	-0.2293	-0.8083	-0.4598	-1.8001
L7	104.75-104.50	-0.1768	-0.6232	-0.3714	-1.4535
L8	104.50-99.50	-0.1882	-0.5631	-0.3932	-1.3500
L9	99.50-98.75	-0.2297	-0.1490	-0.4949	-0.5584
L10	98.75-98.50	-0.2304	-0.1495	-0.4966	-0.5605
L11	98.50-91.33	-0.2358	-0.1535	-0.5097	-0.5761
L12	91.33-90.00	-0.2396	-0.1563	-0.5181	-0.5862
L13	90.00-89.25	-0.8655	-0.3931	-1.3202	-0.8430
L14	89.25-89.00	-0.7993	-0.3631	-1.1901	-0.7600
L15	89.00-88.25	-0.8020	-0.3643	-1.1940	-0.7626
L16	88.25-88.00	-0.8042	-0.3654	-1.1973	-0.7648
L17	88.00-83.00	-1.0056	-0.4573	-1.4523	-0.9282
L18	83.00-78.00	-1.0882	-0.4956	-1.5601	-0.9980
L19	78.00-77.00	-0.8585	-0.3913	-1.2796	-0.8190
L20	77.00-76.75	-0.8620	-0.3930	-1.2850	-0.8225
L21	76.75-71.75	-0.8741	-0.3988	-1.3046	-0.8354
L22	71.75-66.75	-0.8968	-0.4096	-1.3415	-0.8595
L23	66.75-62.25	-0.9180	-0.4197	-1.3757	-0.8818
L24	62.25-62.00	-0.7299	-0.3339	-1.1392	-0.7303
L25	62.00-59.50	-0.7351	-0.3364	-1.1468	-0.7352
L26	59.50-59.25	-0.6804	-0.3114	-1.1173	-0.7164
L27	59.25-54.25	-0.8232	-0.3770	-1.3438	-0.8617
L28	54.25-45.25	-0.8666	-0.3974	-1.4176	-0.9090
L29	45.25-45.00	-0.8743	-0.4011	-1.4326	-0.9189
L30	45.00-40.75	-0.8822	-0.4049	-1.4437	-0.9249
L31	40.75-40.50	-0.7445	-1.5675	-1.2797	-2.0225
L32	40.50-35.75	-0.7521	-1.5838	-1.2932	-2.0454
L33	35.75-35.50	-1.5063	-0.9307	-1.9725	-1.3619
L34	35.50-30.50	-1.6217	-1.0022	-2.1215	-1.4645
L35	30.50-29.75	-1.8620	-1.1509	-2.4303	-1.6773
L36	29.75-29.50	-1.8432	-1.1393	-2.4882	-1.7221
L37	29.50-24.50	-1.8608	-1.1504	-2.5119	-1.7378
L38	24.50-19.50	-1.8940	-1.1713	-2.5549	-1.7660
L39	19.50-14.50	-1.9264	-1.1917	-2.5939	-1.7908
L40	14.50-12.50	-1.9488	-1.2058	-2.6180	-1.8054
L41	12.50-12.25	-1.9554	-1.2100	-2.6245	-1.8090
L42	12.25-10.75	-1.0310	2.2773	-1.7655	1.2111
L43	10.75-10.50	-0.0529	4.2210	-0.9255	2.8942
L44	10.50-5.50	-0.8677	3.8171	-1.6599	2.5153
L45	5.50-0.50	-2.5871	2.9600	-3.1880	1.7467
L46	0.50-0.00	-2.6081	2.9811	-3.1268	1.9305

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	2	Safety Line 5/8	128.00 - 133.00	1.0000	1.0000
L1	4	7983A(ELLIPTICAL)	128.00 - 133.00	1.0000	1.0000
L2	2	Safety Line 5/8	123.00 - 128.00	1.0000	1.0000
L2	4	7983A(ELLIPTICAL)	123.00 - 128.00	1.0000	1.0000
L3	2	Safety Line 5/8	118.00 - 123.00	1.0000	1.0000
L3	4	7983A(ELLIPTICAL)	118.00 - 123.00	1.0000	1.0000
L4	2	Safety Line 5/8	113.00 - 118.00	1.0000	1.0000
L4	4	7983A(ELLIPTICAL)	113.00 - 118.00	1.0000	1.0000
L5	2	Safety Line 5/8	108.00 - 113.00	1.0000	1.0000
L5	4	7983A(ELLIPTICAL)	108.00 - 113.00	1.0000	1.0000
L6	2	Safety Line 5/8	104.75 - 108.00	1.0000	1.0000
L6	4	7983A(ELLIPTICAL)	104.75 - 108.00	1.0000	1.0000
L6	56	4" x 1" Flat Plate (G)	104.75 - 106.50	1.0000	1.0000
L6	57	4" x 1" Flat Plate (G)	104.75 - 106.50	1.0000	1.0000
L6	58	4" x 1" Flat Plate (G)	104.75 - 106.50	1.0000	1.0000
L7	2	Safety Line 5/8	104.50 - 104.75	1.0000	1.0000
L7	4	7983A(ELLIPTICAL)	104.50 - 104.75	1.0000	1.0000
L7	56	4" x 1" Flat Plate (G)	104.50 - 104.75	1.0000	1.0000
L7	57	4" x 1" Flat Plate (G)	104.50 - 104.75	1.0000	1.0000
L7	58	4" x 1" Flat Plate (G)	104.50 - 104.75	1.0000	1.0000
L8	2	Safety Line 5/8	99.50 - 104.50	1.0000	1.0000
L8	4	7983A(ELLIPTICAL)	99.50 - 104.50	1.0000	1.0000
L8	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	99.50 - 100.00	1.0000	1.0000
L8	40	3.625" x 1.25" Flat Plate (G)	99.50 - 100.00	1.0000	1.0000
L8	41	3.625" x 1.25" Flat Plate (G)	99.50 - 100.00	1.0000	1.0000
L8	42	3.625" x 1.25" Flat Plate (G)	99.50 - 100.00	1.0000	1.0000
L8	56	4" x 1" Flat Plate (G)	99.50 - 104.50	1.0000	1.0000
L8	57	4" x 1" Flat Plate (G)	99.50 - 104.50	1.0000	1.0000
L8	58	4" x 1" Flat Plate (G)	99.50 - 104.50	1.0000	1.0000
L9	2	Safety Line 5/8	98.75 - 99.50	1.0000	1.0000
L9	4	7983A(ELLIPTICAL)	98.75 - 99.50	1.0000	1.0000
L9	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	98.75 - 99.50	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L9	40	3.625" x 1.25" Flat Plate (G)	98.75 - 99.50	1.0000	1.0000
L9	41	3.625" x 1.25" Flat Plate (G)	98.75 - 99.50	1.0000	1.0000
L9	42	3.625" x 1.25" Flat Plate (G)	98.75 - 99.50	1.0000	1.0000
L9	56	4" x 1" Flat Plate (G)	98.75 - 99.50	1.0000	1.0000
L9	57	4" x 1" Flat Plate (G)	98.75 - 99.50	1.0000	1.0000
L9	58	4" x 1" Flat Plate (G)	98.75 - 99.50	1.0000	1.0000
L10	2	Safety Line 5/8	98.50 - 98.75	1.0000	1.0000
L10	4	7983A(ELLIPTICAL)	98.50 - 98.75	1.0000	1.0000
L10	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	98.50 - 98.75	1.0000	1.0000
L10	40	3.625" x 1.25" Flat Plate (G)	98.50 - 98.75	1.0000	1.0000
L10	41	3.625" x 1.25" Flat Plate (G)	98.50 - 98.75	1.0000	1.0000
L10	42	3.625" x 1.25" Flat Plate (G)	98.50 - 98.75	1.0000	1.0000
L10	56	4" x 1" Flat Plate (G)	98.50 - 98.75	1.0000	1.0000
L10	57	4" x 1" Flat Plate (G)	98.50 - 98.75	1.0000	1.0000
L10	58	4" x 1" Flat Plate (G)	98.50 - 98.75	1.0000	1.0000
L11	2	Safety Line 5/8	91.33 - 98.50	1.0000	1.0000
L11	4	7983A(ELLIPTICAL)	91.33 - 98.50	1.0000	1.0000
L11	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	91.33 - 98.50	1.0000	1.0000
L11	40	3.625" x 1.25" Flat Plate (G)	91.33 - 98.50	1.0000	1.0000
L11	41	3.625" x 1.25" Flat Plate (G)	91.33 - 98.50	1.0000	1.0000
L11	42	3.625" x 1.25" Flat Plate (G)	91.33 - 98.50	1.0000	1.0000
L11	56	4" x 1" Flat Plate (G)	91.33 - 98.50	1.0000	1.0000
L11	57	4" x 1" Flat Plate (G)	91.33 - 98.50	1.0000	1.0000
L11	58	4" x 1" Flat Plate (G)	91.33 - 98.50	1.0000	1.0000
L13	2	Safety Line 5/8	89.25 - 90.00	1.0000	1.0000
L13	4	7983A(ELLIPTICAL)	89.25 - 90.00	1.0000	1.0000
L13	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	89.25 - 90.00	1.0000	1.0000
L13	18	LCF158-50JL(1-5/8)	89.25 - 90.00	1.0000	1.0000
L13	40	3.625" x 1.25" Flat Plate (G)	89.25 - 90.00	1.0000	1.0000
L13	41	3.625" x 1.25" Flat Plate (G)	89.25 - 90.00	1.0000	1.0000
L13	42	3.625" x 1.25" Flat Plate (G)	89.25 - 90.00	1.0000	1.0000
L13	56	4" x 1" Flat Plate (G)	89.25 - 90.00	1.0000	1.0000
L13	57	4" x 1" Flat Plate (G)	89.25 - 90.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L13	58	4" x 1" Flat Plate (G)	89.25 - 90.00	1.0000	1.0000
L14	2	Safety Line 5/8	89.00 - 89.25	1.0000	1.0000
L14	4	7983A(ELLIPTICAL)	89.00 - 89.25	1.0000	1.0000
L14	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	89.00 - 89.25	1.0000	1.0000
L14	18	LCF158-50JL(1-5/8)	89.00 - 89.25	1.0000	1.0000
L14	36	5.5" x 1.25" Flat Plate (G)	89.00 - 89.25	1.0000	1.0000
L14	37	5.5" x 1.25" Flat Plate (G)	89.00 - 89.25	1.0000	1.0000
L14	38	5.5" x 1.25" Flat Plate (G)	89.00 - 89.25	1.0000	1.0000
L14	56	4" x 1" Flat Plate (G)	89.00 - 89.25	1.0000	1.0000
L14	57	4" x 1" Flat Plate (G)	89.00 - 89.25	1.0000	1.0000
L14	58	4" x 1" Flat Plate (G)	89.00 - 89.25	1.0000	1.0000
L15	2	Safety Line 5/8	88.25 - 89.00	1.0000	1.0000
L15	4	7983A(ELLIPTICAL)	88.25 - 89.00	1.0000	1.0000
L15	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	88.25 - 89.00	1.0000	1.0000
L15	18	LCF158-50JL(1-5/8)	88.25 - 89.00	1.0000	1.0000
L15	36	5.5" x 1.25" Flat Plate (G)	88.25 - 89.00	1.0000	1.0000
L15	37	5.5" x 1.25" Flat Plate (G)	88.25 - 89.00	1.0000	1.0000
L15	38	5.5" x 1.25" Flat Plate (G)	88.25 - 89.00	1.0000	1.0000
L15	56	4" x 1" Flat Plate (G)	88.25 - 89.00	1.0000	1.0000
L15	57	4" x 1" Flat Plate (G)	88.25 - 89.00	1.0000	1.0000
L15	58	4" x 1" Flat Plate (G)	88.25 - 89.00	1.0000	1.0000
L16	2	Safety Line 5/8	88.00 - 88.25	1.0000	1.0000
L16	4	7983A(ELLIPTICAL)	88.00 - 88.25	1.0000	1.0000
L16	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	88.00 - 88.25	1.0000	1.0000
L16	18	LCF158-50JL(1-5/8)	88.00 - 88.25	1.0000	1.0000
L16	36	5.5" x 1.25" Flat Plate (G)	88.00 - 88.25	1.0000	1.0000
L16	37	5.5" x 1.25" Flat Plate (G)	88.00 - 88.25	1.0000	1.0000
L16	38	5.5" x 1.25" Flat Plate (G)	88.00 - 88.25	1.0000	1.0000
L16	56	4" x 1" Flat Plate (G)	88.00 - 88.25	1.0000	1.0000
L16	57	4" x 1" Flat Plate (G)	88.00 - 88.25	1.0000	1.0000
L16	58	4" x 1" Flat Plate (G)	88.00 - 88.25	1.0000	1.0000
L17	2	Safety Line 5/8	83.00 - 88.00	1.0000	1.0000
L17	4	7983A(ELLIPTICAL)	83.00 - 88.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L17	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	83.00 - 88.00	1.0000	1.0000
L17	18	LCF158-50JL(1-5/8)	83.00 - 88.00	1.0000	1.0000
L17	36	5.5" x 1.25" Flat Plate (G)	83.00 - 88.00	1.0000	1.0000
L17	37	5.5" x 1.25" Flat Plate (G)	83.00 - 88.00	1.0000	1.0000
L17	38	5.5" x 1.25" Flat Plate (G)	83.00 - 88.00	1.0000	1.0000
L17	56	4" x 1" Flat Plate (G)	86.50 - 88.00	1.0000	1.0000
L17	57	4" x 1" Flat Plate (G)	86.50 - 88.00	1.0000	1.0000
L17	58	4" x 1" Flat Plate (G)	86.50 - 88.00	1.0000	1.0000
L18	2	Safety Line 5/8	78.00 - 83.00	1.0000	1.0000
L18	4	7983A(ELLIPTICAL)	78.00 - 83.00	1.0000	1.0000
L18	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	78.00 - 83.00	1.0000	1.0000
L18	18	LCF158-50JL(1-5/8)	78.00 - 83.00	1.0000	1.0000
L18	36	5.5" x 1.25" Flat Plate (G)	78.00 - 83.00	1.0000	1.0000
L18	37	5.5" x 1.25" Flat Plate (G)	78.00 - 83.00	1.0000	1.0000
L18	38	5.5" x 1.25" Flat Plate (G)	78.00 - 83.00	1.0000	1.0000
L18	52	4" x 1" Flat Plate (G)	78.00 - 78.75	1.0000	1.0000
L18	53	4" x 1" Flat Plate (G)	78.00 - 78.75	1.0000	1.0000
L18	54	4" x 1" Flat Plate (G)	78.00 - 78.75	1.0000	1.0000
L19	2	Safety Line 5/8	77.00 - 78.00	1.0000	1.0000
L19	4	7983A(ELLIPTICAL)	77.00 - 78.00	1.0000	1.0000
L19	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	77.00 - 78.00	1.0000	1.0000
L19	18	LCF158-50JL(1-5/8)	77.00 - 78.00	1.0000	1.0000
L19	36	5.5" x 1.25" Flat Plate (G)	77.00 - 78.00	1.0000	1.0000
L19	37	5.5" x 1.25" Flat Plate (G)	77.00 - 78.00	1.0000	1.0000
L19	38	5.5" x 1.25" Flat Plate (G)	77.00 - 78.00	1.0000	1.0000
L19	52	4" x 1" Flat Plate (G)	77.00 - 78.00	1.0000	1.0000
L19	53	4" x 1" Flat Plate (G)	77.00 - 78.00	1.0000	1.0000
L19	54	4" x 1" Flat Plate (G)	77.00 - 78.00	1.0000	1.0000
L20	2	Safety Line 5/8	76.75 - 77.00	1.0000	1.0000
L20	4	7983A(ELLIPTICAL)	76.75 - 77.00	1.0000	1.0000
L20	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	76.75 - 77.00	1.0000	1.0000
L20	18	LCF158-50JL(1-5/8)	76.75 - 77.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L20	36	5.5" x 1.25" Flat Plate (G)	76.75 - 77.00	1.0000	1.0000
L20	37	5.5" x 1.25" Flat Plate (G)	76.75 - 77.00	1.0000	1.0000
L20	38	5.5" x 1.25" Flat Plate (G)	76.75 - 77.00	1.0000	1.0000
L20	52	4" x 1" Flat Plate (G)	76.75 - 77.00	1.0000	1.0000
L20	53	4" x 1" Flat Plate (G)	76.75 - 77.00	1.0000	1.0000
L20	54	4" x 1" Flat Plate (G)	76.75 - 77.00	1.0000	1.0000
L21	2	Safety Line 5/8	71.75 - 76.75	1.0000	1.0000
L21	4	7983A(ELLIPTICAL)	71.75 - 76.75	1.0000	1.0000
L21	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	71.75 - 76.75	1.0000	1.0000
L21	18	LCF158-50JL(1-5/8)	71.75 - 76.75	1.0000	1.0000
L21	36	5.5" x 1.25" Flat Plate (G)	71.75 - 76.75	1.0000	1.0000
L21	37	5.5" x 1.25" Flat Plate (G)	71.75 - 76.75	1.0000	1.0000
L21	38	5.5" x 1.25" Flat Plate (G)	71.75 - 76.75	1.0000	1.0000
L21	52	4" x 1" Flat Plate (G)	71.75 - 76.75	1.0000	1.0000
L21	53	4" x 1" Flat Plate (G)	71.75 - 76.75	1.0000	1.0000
L21	54	4" x 1" Flat Plate (G)	71.75 - 76.75	1.0000	1.0000
L22	2	Safety Line 5/8	66.75 - 71.75	1.0000	1.0000
L22	4	7983A(ELLIPTICAL)	66.75 - 71.75	1.0000	1.0000
L22	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	66.75 - 71.75	1.0000	1.0000
L22	18	LCF158-50JL(1-5/8)	66.75 - 71.75	1.0000	1.0000
L22	36	5.5" x 1.25" Flat Plate (G)	66.75 - 71.75	1.0000	1.0000
L22	37	5.5" x 1.25" Flat Plate (G)	66.75 - 71.75	1.0000	1.0000
L22	38	5.5" x 1.25" Flat Plate (G)	66.75 - 71.75	1.0000	1.0000
L22	52	4" x 1" Flat Plate (G)	66.75 - 71.75	1.0000	1.0000
L22	53	4" x 1" Flat Plate (G)	66.75 - 71.75	1.0000	1.0000
L22	54	4" x 1" Flat Plate (G)	66.75 - 71.75	1.0000	1.0000
L23	2	Safety Line 5/8	62.25 - 66.75	1.0000	1.0000
L23	4	7983A(ELLIPTICAL)	62.25 - 66.75	1.0000	1.0000
L23	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	62.25 - 66.75	1.0000	1.0000
L23	18	LCF158-50JL(1-5/8)	62.25 - 66.75	1.0000	1.0000
L23	36	5.5" x 1.25" Flat Plate (G)	62.25 - 66.75	1.0000	1.0000
L23	37	5.5" x 1.25" Flat Plate (G)	62.25 - 66.75	1.0000	1.0000
L23	38	5.5" x 1.25" Flat Plate (G)	62.25 - 66.75	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L23	52	4" x 1" Flat Plate (G)	62.25 - 66.75	1.0000	1.0000
L23	53	4" x 1" Flat Plate (G)	62.25 - 66.75	1.0000	1.0000
L23	54	4" x 1" Flat Plate (G)	62.25 - 66.75	1.0000	1.0000
L24	2	Safety Line 5/8	62.00 - 62.25	1.0000	1.0000
L24	4	7983A(ELLIPTICAL)	62.00 - 62.25	1.0000	1.0000
L24	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	62.00 - 62.25	1.0000	1.0000
L24	18	LCF158-50JL(1-5/8)	62.00 - 62.25	1.0000	1.0000
L24	36	5.5" x 1.25" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	37	5.5" x 1.25" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	38	5.5" x 1.25" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	48	4" x 1" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	49	4" x 1" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	50	4" x 1" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	52	4" x 1" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	53	4" x 1" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L24	54	4" x 1" Flat Plate (G)	62.00 - 62.25	1.0000	1.0000
L25	2	Safety Line 5/8	59.50 - 62.00	1.0000	1.0000
L25	4	7983A(ELLIPTICAL)	59.50 - 62.00	1.0000	1.0000
L25	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	59.50 - 62.00	1.0000	1.0000
L25	18	LCF158-50JL(1-5/8)	59.50 - 62.00	1.0000	1.0000
L25	36	5.5" x 1.25" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	37	5.5" x 1.25" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	38	5.5" x 1.25" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	48	4" x 1" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	49	4" x 1" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	50	4" x 1" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	52	4" x 1" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	53	4" x 1" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L25	54	4" x 1" Flat Plate (G)	59.50 - 62.00	1.0000	1.0000
L26	2	Safety Line 5/8	59.25 - 59.50	1.0000	1.0000
L26	4	7983A(ELLIPTICAL)	59.25 - 59.50	1.0000	1.0000
L26	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	59.25 - 59.50	1.0000	1.0000
L26	18	LCF158-50JL(1-5/8)	59.25 - 59.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L26	32	6.625" x 1.25" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	33	6.625" x 1.25" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	34	6.625" x 1.25" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	48	4" x 1" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	49	4" x 1" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	50	4" x 1" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	52	4" x 1" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	53	4" x 1" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L26	54	4" x 1" Flat Plate (G)	59.25 - 59.50	1.0000	1.0000
L27	2	Safety Line 5/8	54.25 - 59.25	1.0000	1.0000
L27	4	7983A(ELLIPTICAL)	54.25 - 59.25	1.0000	1.0000
L27	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	54.25 - 59.25	1.0000	1.0000
L27	18	LCF158-50JL(1-5/8)	54.25 - 59.25	1.0000	1.0000
L27	32	6.625" x 1.25" Flat Plate (G)	54.25 - 59.25	1.0000	1.0000
L27	33	6.625" x 1.25" Flat Plate (G)	54.25 - 59.25	1.0000	1.0000
L27	34	6.625" x 1.25" Flat Plate (G)	54.25 - 59.25	1.0000	1.0000
L27	48	4" x 1" Flat Plate (G)	54.25 - 59.25	1.0000	1.0000
L27	49	4" x 1" Flat Plate (G)	54.25 - 59.25	1.0000	1.0000
L27	50	4" x 1" Flat Plate (G)	54.25 - 59.25	1.0000	1.0000
L27	52	4" x 1" Flat Plate (G)	58.75 - 59.25	1.0000	1.0000
L27	53	4" x 1" Flat Plate (G)	58.75 - 59.25	1.0000	1.0000
L27	54	4" x 1" Flat Plate (G)	58.75 - 59.25	1.0000	1.0000
L28	2	Safety Line 5/8	45.25 - 54.25	1.0000	1.0000
L28	4	7983A(ELLIPTICAL)	45.25 - 54.25	1.0000	1.0000
L28	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	45.25 - 54.25	1.0000	1.0000
L28	18	LCF158-50JL(1-5/8)	45.25 - 54.25	1.0000	1.0000
L28	32	6.625" x 1.25" Flat Plate (G)	45.25 - 54.25	1.0000	1.0000
L28	33	6.625" x 1.25" Flat Plate (G)	45.25 - 54.25	1.0000	1.0000
L28	34	6.625" x 1.25" Flat Plate (G)	45.25 - 54.25	1.0000	1.0000
L28	48	4" x 1" Flat Plate (G)	45.25 - 54.25	1.0000	1.0000
L28	49	4" x 1" Flat Plate (G)	45.25 - 54.25	1.0000	1.0000
L28	50	4" x 1" Flat Plate (G)	45.25 - 54.25	1.0000	1.0000
L30	2	Safety Line 5/8	40.75 - 45.00	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L30	4	7983A(ELLIPTICAL)	40.75 - 45.00	1.0000	1.0000
L30	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	40.75 - 45.00	1.0000	1.0000
L30	18	LCF158-50JL(1-5/8)	40.75 - 45.00	1.0000	1.0000
L30	32	6.625" x 1.25" Flat Plate (G)	40.75 - 45.00	1.0000	1.0000
L30	33	6.625" x 1.25" Flat Plate (G)	40.75 - 45.00	1.0000	1.0000
L30	34	6.625" x 1.25" Flat Plate (G)	40.75 - 45.00	1.0000	1.0000
L30	48	4" x 1" Flat Plate (G)	40.75 - 45.00	1.0000	1.0000
L30	49	4" x 1" Flat Plate (G)	40.75 - 45.00	1.0000	1.0000
L30	50	4" x 1" Flat Plate (G)	40.75 - 45.00	1.0000	1.0000
L31	2	Safety Line 5/8	40.50 - 40.75	1.0000	1.0000
L31	4	7983A(ELLIPTICAL)	40.50 - 40.75	1.0000	1.0000
L31	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	40.50 - 40.75	1.0000	1.0000
L31	18	LCF158-50JL(1-5/8)	40.50 - 40.75	1.0000	1.0000
L31	32	6.625" x 1.25" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L31	33	6.625" x 1.25" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L31	34	6.625" x 1.25" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L31	45	4" x 1" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L31	48	4" x 1" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L31	49	4" x 1" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L31	50	4" x 1" Flat Plate (G)	40.50 - 40.75	1.0000	1.0000
L32	2	Safety Line 5/8	35.75 - 40.50	1.0000	1.0000
L32	4	7983A(ELLIPTICAL)	35.75 - 40.50	1.0000	1.0000
L32	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	35.75 - 40.50	1.0000	1.0000
L32	18	LCF158-50JL(1-5/8)	35.75 - 40.50	1.0000	1.0000
L32	32	6.625" x 1.25" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L32	33	6.625" x 1.25" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L32	34	6.625" x 1.25" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L32	45	4" x 1" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L32	48	4" x 1" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L32	49	4" x 1" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L32	50	4" x 1" Flat Plate (G)	35.75 - 40.50	1.0000	1.0000
L33	2	Safety Line 5/8	35.50 - 35.75	1.0000	1.0000
L33	4	7983A(ELLIPTICAL)	35.50 - 35.75	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L33	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	35.50 - 35.75	1.0000	1.0000
L33	18	LCF158-50JL(1-5/8)	35.50 - 35.75	1.0000	1.0000
L33	32	6.625" x 1.25" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	33	6.625" x 1.25" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	34	6.625" x 1.25" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	44	4" x 1" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	45	4" x 1" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	46	4" x 1" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	48	4" x 1" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	49	4" x 1" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L33	50	4" x 1" Flat Plate (G)	35.50 - 35.75	1.0000	1.0000
L34	2	Safety Line 5/8	30.50 - 35.50	1.0000	1.0000
L34	4	7983A(ELLIPTICAL)	30.50 - 35.50	1.0000	1.0000
L34	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	30.50 - 35.50	1.0000	1.0000
L34	18	LCF158-50JL(1-5/8)	30.50 - 35.50	1.0000	1.0000
L34	32	6.625" x 1.25" Flat Plate (G)	30.50 - 35.50	1.0000	1.0000
L34	33	6.625" x 1.25" Flat Plate (G)	30.50 - 35.50	1.0000	1.0000
L34	34	6.625" x 1.25" Flat Plate (G)	30.50 - 35.50	1.0000	1.0000
L34	44	4" x 1" Flat Plate (G)	30.50 - 35.50	1.0000	1.0000
L34	45	4" x 1" Flat Plate (G)	30.50 - 35.50	1.0000	1.0000
L34	46	4" x 1" Flat Plate (G)	30.50 - 35.50	1.0000	1.0000
L34	48	4" x 1" Flat Plate (G)	32.25 - 35.50	1.0000	1.0000
L34	49	4" x 1" Flat Plate (G)	32.25 - 35.50	1.0000	1.0000
L34	50	4" x 1" Flat Plate (G)	32.25 - 35.50	1.0000	1.0000
L35	2	Safety Line 5/8	29.75 - 30.50	1.0000	1.0000
L35	4	7983A(ELLIPTICAL)	29.75 - 30.50	1.0000	1.0000
L35	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	29.75 - 30.50	1.0000	1.0000
L35	18	LCF158-50JL(1-5/8)	29.75 - 30.50	1.0000	1.0000
L35	32	6.625" x 1.25" Flat Plate (G)	29.75 - 30.50	1.0000	1.0000
L35	33	6.625" x 1.25" Flat Plate (G)	29.75 - 30.50	1.0000	1.0000
L35	34	6.625" x 1.25" Flat Plate (G)	29.75 - 30.50	1.0000	1.0000
L35	44	4" x 1" Flat Plate (G)	29.75 - 30.50	1.0000	1.0000
L35	45	4" x 1" Flat Plate (G)	29.75 - 30.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L35	46	4" x 1" Flat Plate (G)	29.75 - 30.50	1.0000	1.0000
L36	2	Safety Line 5/8	29.50 - 29.75	1.0000	1.0000
L36	4	7983A(ELLIPTICAL)	29.50 - 29.75	1.0000	1.0000
L36	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	29.50 - 29.75	1.0000	1.0000
L36	18	LCF158-50JL(1-5/8)	29.50 - 29.75	1.0000	1.0000
L36	28	6.875" x 1.25" Flat Plate (G)	29.50 - 29.75	1.0000	1.0000
L36	29	6.875" x 1.25" Flat Plate (G)	29.50 - 29.75	1.0000	1.0000
L36	30	6.875" x 1.25" Flat Plate (G)	29.50 - 29.75	1.0000	1.0000
L36	44	4" x 1" Flat Plate (G)	29.50 - 29.75	1.0000	1.0000
L36	45	4" x 1" Flat Plate (G)	29.50 - 29.75	1.0000	1.0000
L36	46	4" x 1" Flat Plate (G)	29.50 - 29.75	1.0000	1.0000
L37	2	Safety Line 5/8	24.50 - 29.50	1.0000	1.0000
L37	4	7983A(ELLIPTICAL)	24.50 - 29.50	1.0000	1.0000
L37	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	24.50 - 29.50	1.0000	1.0000
L37	18	LCF158-50JL(1-5/8)	24.50 - 29.50	1.0000	1.0000
L37	28	6.875" x 1.25" Flat Plate (G)	24.50 - 29.50	1.0000	1.0000
L37	29	6.875" x 1.25" Flat Plate (G)	24.50 - 29.50	1.0000	1.0000
L37	30	6.875" x 1.25" Flat Plate (G)	24.50 - 29.50	1.0000	1.0000
L37	44	4" x 1" Flat Plate (G)	24.50 - 29.50	1.0000	1.0000
L37	45	4" x 1" Flat Plate (G)	24.50 - 29.50	1.0000	1.0000
L37	46	4" x 1" Flat Plate (G)	24.50 - 29.50	1.0000	1.0000
L38	2	Safety Line 5/8	19.50 - 24.50	1.0000	1.0000
L38	4	7983A(ELLIPTICAL)	19.50 - 24.50	1.0000	1.0000
L38	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	19.50 - 24.50	1.0000	1.0000
L38	18	LCF158-50JL(1-5/8)	19.50 - 24.50	1.0000	1.0000
L38	28	6.875" x 1.25" Flat Plate (G)	19.50 - 24.50	1.0000	1.0000
L38	29	6.875" x 1.25" Flat Plate (G)	19.50 - 24.50	1.0000	1.0000
L38	30	6.875" x 1.25" Flat Plate (G)	19.50 - 24.50	1.0000	1.0000
L38	44	4" x 1" Flat Plate (G)	19.50 - 24.50	1.0000	1.0000
L38	45	4" x 1" Flat Plate (G)	19.50 - 24.50	1.0000	1.0000
L38	46	4" x 1" Flat Plate (G)	19.50 - 24.50	1.0000	1.0000
L39	2	Safety Line 5/8	14.50 - 19.50	1.0000	1.0000
L39	4	7983A(ELLIPTICAL)	14.50 - 19.50	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L39	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	14.50 - 19.50	1.0000	1.0000
L39	18	LCF158-50JL(1-5/8)	14.50 - 19.50	1.0000	1.0000
L39	28	6.875" x 1.25" Flat Plate (G)	14.50 - 19.50	1.0000	1.0000
L39	29	6.875" x 1.25" Flat Plate (G)	14.50 - 19.50	1.0000	1.0000
L39	30	6.875" x 1.25" Flat Plate (G)	14.50 - 19.50	1.0000	1.0000
L39	44	4" x 1" Flat Plate (G)	14.50 - 19.50	1.0000	1.0000
L39	45	4" x 1" Flat Plate (G)	14.50 - 19.50	1.0000	1.0000
L39	46	4" x 1" Flat Plate (G)	14.50 - 19.50	1.0000	1.0000
L40	2	Safety Line 5/8	12.50 - 14.50	1.0000	1.0000
L40	4	7983A(ELLIPTICAL)	12.50 - 14.50	1.0000	1.0000
L40	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	12.50 - 14.50	1.0000	1.0000
L40	18	LCF158-50JL(1-5/8)	12.50 - 14.50	1.0000	1.0000
L40	28	6.875" x 1.25" Flat Plate (G)	12.50 - 14.50	1.0000	1.0000
L40	29	6.875" x 1.25" Flat Plate (G)	12.50 - 14.50	1.0000	1.0000
L40	30	6.875" x 1.25" Flat Plate (G)	12.50 - 14.50	1.0000	1.0000
L40	44	4" x 1" Flat Plate (G)	12.50 - 14.50	1.0000	1.0000
L40	45	4" x 1" Flat Plate (G)	12.50 - 14.50	1.0000	1.0000
L40	46	4" x 1" Flat Plate (G)	12.50 - 14.50	1.0000	1.0000
L41	2	Safety Line 5/8	12.25 - 12.50	1.0000	1.0000
L41	4	7983A(ELLIPTICAL)	12.25 - 12.50	1.0000	1.0000
L41	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	12.25 - 12.50	1.0000	1.0000
L41	18	LCF158-50JL(1-5/8)	12.25 - 12.50	1.0000	1.0000
L41	28	6.875" x 1.25" Flat Plate (G)	12.25 - 12.50	1.0000	1.0000
L41	29	6.875" x 1.25" Flat Plate (G)	12.25 - 12.50	1.0000	1.0000
L41	30	6.875" x 1.25" Flat Plate (G)	12.25 - 12.50	1.0000	1.0000
L41	44	4" x 1" Flat Plate (G)	12.25 - 12.50	1.0000	1.0000
L41	45	4" x 1" Flat Plate (G)	12.25 - 12.50	1.0000	1.0000
L41	46	4" x 1" Flat Plate (G)	12.25 - 12.50	1.0000	1.0000
L42	2	Safety Line 5/8	10.75 - 12.25	1.0000	1.0000
L42	4	7983A(ELLIPTICAL)	10.75 - 12.25	1.0000	1.0000
L42	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	10.75 - 12.25	1.0000	1.0000
L42	18	LCF158-50JL(1-5/8)	10.75 - 12.25	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L42	25	6.875" x 1.25" Flat Plate (G)	10.75 - 12.00	1.0000	1.0000
L42	26	6.875" x 1.25" Flat Plate (G)	10.75 - 12.00	1.0000	1.0000
L42	28	6.875" x 1.25" Flat Plate (G)	10.75 - 12.25	1.0000	1.0000
L42	29	6.875" x 1.25" Flat Plate (G)	10.75 - 12.25	1.0000	1.0000
L42	30	6.875" x 1.25" Flat Plate (G)	10.75 - 12.25	1.0000	1.0000
L42	44	4" x 1" Flat Plate (G)	10.75 - 12.25	1.0000	1.0000
L42	45	4" x 1" Flat Plate (G)	10.75 - 12.25	1.0000	1.0000
L42	46	4" x 1" Flat Plate (G)	10.75 - 12.25	1.0000	1.0000
L43	2	Safety Line 5/8	10.50 - 10.75	1.0000	1.0000
L43	4	7983A(ELLIPTICAL)	10.50 - 10.75	1.0000	1.0000
L43	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	10.50 - 10.75	1.0000	1.0000
L43	18	LCF158-50JL(1-5/8)	10.50 - 10.75	1.0000	1.0000
L43	25	6.875" x 1.25" Flat Plate (G)	10.50 - 10.75	1.0000	1.0000
L43	26	6.875" x 1.25" Flat Plate (G)	10.50 - 10.75	1.0000	1.0000
L43	28	6.875" x 1.25" Flat Plate (G)	10.50 - 10.75	1.0000	1.0000
L43	29	6.875" x 1.25" Flat Plate (G)	10.50 - 10.75	1.0000	1.0000
L43	30	6.875" x 1.25" Flat Plate (G)	10.50 - 10.75	1.0000	1.0000
L44	2	Safety Line 5/8	5.50 - 10.50	1.0000	1.0000
L44	4	7983A(ELLIPTICAL)	5.50 - 10.50	1.0000	1.0000
L44	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	5.50 - 10.50	1.0000	1.0000
L44	18	LCF158-50JL(1-5/8)	5.50 - 10.50	1.0000	1.0000
L44	25	6.875" x 1.25" Flat Plate (G)	5.50 - 10.50	1.0000	1.0000
L44	26	6.875" x 1.25" Flat Plate (G)	5.50 - 10.50	1.0000	1.0000
L44	28	6.875" x 1.25" Flat Plate (G)	5.50 - 10.50	1.0000	1.0000
L44	29	6.875" x 1.25" Flat Plate (G)	5.50 - 10.50	1.0000	1.0000
L44	30	6.875" x 1.25" Flat Plate (G)	7.25 - 10.50	1.0000	1.0000
L45	2	Safety Line 5/8	0.50 - 5.50	1.0000	1.0000
L45	4	7983A(ELLIPTICAL)	0.50 - 5.50	1.0000	1.0000
L45	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	0.50 - 5.50	1.0000	1.0000
L45	18	LCF158-50JL(1-5/8)	0.50 - 5.50	1.0000	1.0000
L45	25	6.875" x 1.25" Flat Plate (G)	0.50 - 5.50	1.0000	1.0000
L45	26	6.875" x 1.25" Flat Plate (G)	0.50 - 5.50	1.0000	1.0000
L45	28	6.875" x 1.25" Flat Plate (G)	0.50 - 5.50	1.0000	1.0000
L45	29	6.875" x 1.25" Flat Plate (G)	0.50 - 5.50	1.0000	1.0000
L46	2	Safety Line 5/8	0.00 - 0.50	1.0000	1.0000
L46	4	7983A(ELLIPTICAL)	0.00 - 0.50	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L46	16	MLE Hybrid 9Power/18Fiber RL 2(1 5/8")	0.00 - 0.50	1.0000	1.0000
L46	18	LCF158-50JL(1-5/8)	0.00 - 0.50	1.0000	1.0000
L46	25	6.875" x 1.25" Flat Plate (G)	0.00 - 0.50	1.0000	1.0000
L46	26	6.875" x 1.25" Flat Plate (G)	0.00 - 0.50	1.0000	1.0000
L46	28	6.875" x 1.25" Flat Plate (G)	0.00 - 0.50	1.0000	1.0000
L46	29	6.875" x 1.25" Flat Plate (G)	0.00 - 0.50	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
Lightning Rod 5/8x4'	C	From Leg	0.00 0.00 2.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.03 0.03 0.04
*** L133 ***									
(2) APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 -3.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 -3.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 -3.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 -3.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 -3.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 -3.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
(6) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.07 0.10 0.15	0.12 0.16 0.21	0.00 0.00 0.00

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) 800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
(2) IBC1900HB-2	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	1.13 1.27 1.42	0.71 0.84 0.97	0.04 0.05 0.06
IBC1900HB-2	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	1.13 1.27 1.42	0.71 0.84 0.97	0.04 0.05 0.06
IBC1900HB-2	C	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	1.13 1.27 1.42	0.71 0.84 0.97	0.04 0.05 0.06
(4) 1900MHz RRH (65MHz)	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	0.06 0.08 0.11
(2) 1900MHz RRH (65MHz)	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	2.31 2.52 2.73	2.38 2.58 2.79	0.06 0.08 0.11
(2) 800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.66 0.76 0.87	0.32 0.40 0.48	0.01 0.02 0.02
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
PD2DE-700/2700	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.11 0.18 0.25	0.11 0.18 0.25	0.00 0.00 0.00
PD2DE-700/2700	C	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	0.11 0.18 0.25	0.11 0.18 0.25	0.00 0.00 0.00
8' x 3" Pipe Mount	A	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	2.40 3.19 3.67	2.40 3.19 3.67	0.04 0.05 0.08
8' x 3" Pipe Mount	B	From Leg	4.00 0.00 0.00	0.0000	133.00	No Ice 1/2" Ice 1" Ice	2.40 3.19 3.67	2.40 3.19 3.67	0.04 0.05 0.08
8' x 3" Pipe Mount	C	From Leg	4.00	0.0000	133.00	No Ice	2.40	2.40	0.04

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*
			0.00			1/2"	3.19	3.19	0.05
			0.00			Ice	3.67	3.67	0.08
						1" Ice			
(3) 6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	133.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(3) 6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	133.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
(3) 6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	133.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice			
Platform Mount [LP 602-1]	C	None		0.0000	133.00	No Ice	32.03	32.03	1.34
						1/2"	38.71	38.71	1.80
						Ice	45.39	45.39	2.26
						1" Ice			
*** L110 ***									
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	110.00	No Ice	8.62	7.30	0.07
			0.00			1/2"	9.28	8.58	0.14
			0.00			Ice	9.91	9.72	0.22
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.0000	110.00	No Ice	8.62	7.30	0.07
			0.00			1/2"	9.28	8.58	0.14
			0.00			Ice	9.91	9.72	0.22
						1" Ice			
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.0000	110.00	No Ice	8.62	7.30	0.07
			0.00			1/2"	9.28	8.58	0.14
			0.00			Ice	9.91	9.72	0.22
						1" Ice			
RRH4X45-AWS4 B66	A	From Leg	4.00	0.0000	110.00	No Ice	2.66	1.59	0.06
			0.00			1/2"	2.88	1.77	0.08
			0.00			Ice	3.10	1.96	0.11
						1" Ice			
RRH4X45-AWS4 B66	B	From Leg	4.00	0.0000	110.00	No Ice	2.66	1.59	0.06
			0.00			1/2"	2.88	1.77	0.08
			0.00			Ice	3.10	1.96	0.11
						1" Ice			
RRH4X45-AWS4 B66	C	From Leg	4.00	0.0000	110.00	No Ice	2.66	1.59	0.06
			0.00			1/2"	2.88	1.77	0.08
			0.00			Ice	3.10	1.96	0.11
						1" Ice			
RRH2X60-PCS	A	From Leg	4.00	0.0000	110.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			0.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2X60-PCS	B	From Leg	4.00	0.0000	110.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			0.00			Ice	2.59	2.09	0.10
						1" Ice			
RRH2X60-PCS	C	From Leg	4.00	0.0000	110.00	No Ice	2.20	1.72	0.06
			0.00			1/2"	2.39	1.90	0.08
			0.00			Ice	2.59	2.09	0.10
						1" Ice			
(2) CBC78-DF	A	From Leg	4.00	0.0000	110.00	No Ice	0.39	0.17	0.01
			0.00			1/2"	0.47	0.23	0.01
			0.00			Ice	0.56	0.30	0.01
						1" Ice			
(2) CBC78-DF	B	From Leg	4.00	0.0000	110.00	No Ice	0.39	0.17	0.01
			0.00			1/2"	0.47	0.23	0.01
			0.00			Ice	0.56	0.30	0.01
						1" Ice			
(2) CBC78-DF	C	From Leg	4.00	0.0000	110.00	No Ice	0.39	0.17	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00				1/2" Ice	0.47	0.23	0.01
			0.00				1" Ice	0.56	0.30	0.01
BXA-70063/6CF-2 w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	110.00	No Ice	7.81	5.40	0.04
			0.00				1/2" Ice	8.36	6.55	0.10
			0.00				1" Ice	8.87	7.41	0.17
BXA-70063/6CF-2 w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	110.00	No Ice	7.81	5.40	0.04
			0.00				1/2" Ice	8.36	6.55	0.10
			0.00				1" Ice	8.87	7.41	0.17
BXA-70063/6CF-2 w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	110.00	No Ice	7.81	5.40	0.04
			0.00				1/2" Ice	8.36	6.55	0.10
			0.00				1" Ice	8.87	7.41	0.17
BXA-80063/4CF w/ Mount Pipe	A	From Leg	4.00	0.00	0.0000	110.00	No Ice	4.95	3.42	0.03
			0.00				1/2" Ice	5.32	4.02	0.07
			0.00				1" Ice	5.71	4.64	0.12
BXA-80063/4CF w/ Mount Pipe	B	From Leg	4.00	0.00	0.0000	110.00	No Ice	4.95	3.42	0.03
			0.00				1/2" Ice	5.32	4.02	0.07
			0.00				1" Ice	5.71	4.64	0.12
BXA-80063/4CF w/ Mount Pipe	C	From Leg	4.00	0.00	0.0000	110.00	No Ice	4.95	3.42	0.03
			0.00				1/2" Ice	5.32	4.02	0.07
			0.00				1" Ice	5.71	4.64	0.12
BULLET III	C	From Leg	4.00	0.00	0.0000	110.00	No Ice	0.07	0.07	0.00
			0.00				1/2" Ice	0.10	0.10	0.00
			3.00				1" Ice	0.14	0.14	0.00
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.00	0.0000	110.00	No Ice	4.80	2.00	0.04
			0.00				1/2" Ice	5.07	2.19	0.08
			0.00				1" Ice	5.35	2.39	0.12
10' x 2" Pipe Mount	A	From Leg	4.00	0.00	0.0000	110.00	No Ice	2.00	2.00	0.02
			0.00				1/2" Ice	3.02	3.02	0.04
			0.00				1" Ice	4.07	4.07	0.06
10' x 2" Pipe Mount	B	From Leg	4.00	0.00	0.0000	110.00	No Ice	2.00	2.00	0.02
			0.00				1/2" Ice	3.02	3.02	0.04
			0.00				1" Ice	4.07	4.07	0.06
10' x 2" Pipe Mount	C	From Leg	4.00	0.00	0.0000	110.00	No Ice	2.00	2.00	0.02
			0.00				1/2" Ice	3.02	3.02	0.04
			0.00				1" Ice	4.07	4.07	0.06
(2) 5' x 2" Mount Pipe	A	From Leg	4.00	0.00	0.0000	110.00	No Ice	1.19	1.19	0.02
			0.00				1/2" Ice	1.50	1.50	0.03
			0.00				1" Ice	1.81	1.81	0.04
(2) 5' x 2" Mount Pipe	B	From Leg	4.00	0.00	0.0000	110.00	No Ice	1.19	1.19	0.02
			0.00				1/2" Ice	1.50	1.50	0.03
			0.00				1" Ice	1.81	1.81	0.04
(2) 5' x 2" Mount Pipe	C	From Leg	4.00	0.00	0.0000	110.00	No Ice	1.19	1.19	0.02
			0.00				1/2" Ice	1.50	1.50	0.03
			0.00				1" Ice	1.81	1.81	0.04
Platform Mount [LP 713-1]	C	None			0.0000	110.00	No Ice	31.27	31.27	1.51
							1/2" Ice	39.68	39.68	1.93
							1" Ice	48.09	48.09	2.35
*** L100 ***										

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
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	20.48 21.23 21.99	11.02 12.55 14.10	0.16 0.30 0.44
RADIO 4449 B12/B71	A	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
RADIO 4449 B12/B71	B	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
RADIO 4449 B12/B71	C	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.65 1.81 1.98	1.30 1.44 1.60	0.08 0.09 0.11
AIR 21 B2A/B4P w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	6.16 6.60 7.03	5.55 6.30 7.00	0.10 0.16 0.22
AIR 21 B2A/B4P w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	6.16 6.60 7.03	5.55 6.30 7.00	0.10 0.16 0.22
AIR 21 B2A/B4P w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	6.16 6.60 7.03	5.55 6.30 7.00	0.10 0.16 0.22
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	6.75 7.20 7.65	6.07 6.87 7.58	0.15 0.21 0.28
ATMAA1412D-1A20	A	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
ATMAA1412D-1A20	B	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
ATMAA1412D-1A20	C	From Face	4.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.26	0.41 0.50 0.59	0.01 0.02 0.03
Platform Mount [LP 303-1]	C	None		0.0000	100.00	No Ice 1/2" Ice 1" Ice	14.66 18.87 23.08	14.66 18.87 23.08	1.25 1.48 1.71
Miscellaneous [NA 509-3]	C	None		0.0000	100.00	No Ice	11.84	11.84	0.28

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
						1/2" Ice	16.96	16.96	0.30
						1" Ice	22.08	22.08	0.32
*** L90 ***									
APXV18-206517S-C	A	From Leg	1.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09
APXV18-206517S-C	B	From Leg	1.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09
APXV18-206517S-C	C	From Leg	1.00 0.00 0.00	0.0000	90.00	No Ice 1/2" Ice 1" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09
Pipe Mount [PM 601-3]	C	None		0.0000	90.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
Level 50									
KS24019-L112A	C	From Leg	3.00 0.00 1.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	C	From Leg	1.50 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
********* ***** *** * *									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
* 133' *											
VHLP2-23	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 2.00	0.0000		133.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07
VHLP2-23	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 2.00	-30.0000		133.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07
VHLP2-18	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 2.00	-60.0000		133.00	2.17	No Ice 1/2" Ice 1" Ice	3.72 4.01 4.30	0.03 0.05 0.07
*** *											

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum 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	133 - 128	Pole	Max Tension	26	0.00	0.00	-0.00
			Max. Compression	26	-10.22	-2.09	6.01
			Max. Mx	8	-3.34	-26.83	1.77
			Max. My	2	-3.30	-0.83	29.20
			Max. Vy	20	-6.20	25.43	1.87
			Max. Vx	2	-6.36	-0.83	29.20
			Max. Torque	20			-3.16
L2	128 - 123	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-10.67	-2.09	6.18
			Max. Mx	8	-3.53	-58.31	1.78

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	2	-3.49	-0.89	61.68
			Max. Vy	20	-6.48	57.12	1.98
			Max. Vx	2	-6.64	-0.89	61.68
			Max. Torque	20			-3.16
L3	123 - 118	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.14	-2.09	6.32
			Max. Mx	8	-3.76	-91.23	1.78
			Max. My	2	-3.72	-0.94	95.60
			Max. Vy	20	-6.77	90.23	2.08
			Max. Vx	2	-6.93	-0.94	95.60
			Max. Torque	20			-3.16
L4	118 - 113	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-11.63	-2.07	6.45
			Max. Mx	8	-4.00	-125.62	1.77
			Max. My	2	-3.97	-0.99	130.98
			Max. Vy	20	-7.07	124.82	2.17
			Max. Vx	2	-7.23	-0.99	130.98
			Max. Torque	20			-3.16
L5	113 - 108	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.05	-2.02	7.47
			Max. Mx	8	-7.10	-171.86	1.95
			Max. My	2	-7.05	-1.03	178.63
			Max. Vy	20	-12.55	171.28	2.45
			Max. Vx	2	-12.80	-1.03	178.63
			Max. Torque	20			-3.48
L6	108 - 104.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.49	-2.00	7.56
			Max. Mx	8	-7.36	-212.79	1.94
			Max. My	2	-7.32	-1.07	220.51
			Max. Vy	20	-12.74	212.34	2.51
			Max. Vx	2	-12.99	-1.07	220.51
			Max. Torque	20			-3.48
L7	104.75 - 104.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.54	-2.00	7.57
			Max. Mx	8	-7.41	-215.96	1.94
			Max. My	2	-7.36	-1.07	223.76
			Max. Vy	20	-12.75	215.52	2.51
			Max. Vx	2	-13.00	-1.07	223.76
			Max. Torque	20			-3.48
L8	104.5 - 99.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.28	-1.97	7.68
			Max. Mx	8	-11.27	-282.50	1.92
			Max. My	2	-11.23	-1.12	291.73
			Max. Vy	20	-17.36	282.27	2.60
			Max. Vx	2	-17.60	-1.12	291.73
			Max. Torque	20			-3.48
L9	99.5 - 98.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.47	-1.97	7.70
			Max. Mx	8	-11.37	-295.52	1.92
			Max. My	2	-11.33	-1.12	304.95
			Max. Vy	20	-17.44	295.32	2.61
			Max. Vx	2	-17.66	-1.12	304.95
			Max. Torque	20			-3.48
L10	98.75 - 98.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.54	-1.97	7.70
			Max. Mx	8	-11.41	-299.87	1.92
			Max. My	2	-11.37	-1.13	309.36
			Max. Vy	20	-17.46	299.68	2.62
			Max. Vx	2	-17.68	-1.13	309.36
			Max. Torque	20			-3.48
L11	98.5 - 91.33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.65	-1.94	7.77
			Max. Mx	8	-12.05	-361.55	1.91
			Max. My	2	-12.02	-1.16	371.77
			Max. Vy	20	-17.87	361.51	2.68
			Max. Vx	2	-18.00	-1.16	371.77
			Max. Torque	20			-3.48
L12	91.33 - 90	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-34.10	-1.91	7.87
			Max. Mx	20	-13.61	452.56	2.77
			Max. My	2	-13.60	-1.21	463.09
			Max. Vy	20	-18.54	452.56	2.77
			Max. Vx	2	-18.53	-1.21	463.09
			Max. Torque	20			-3.48
L13	90 - 89.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.13	-1.90	7.89
			Max. Mx	20	-14.03	466.93	2.78
			Max. My	2	-14.02	-1.22	477.44
			Max. Vy	20	-19.20	466.93	2.78
			Max. Vx	2	-19.18	-1.22	477.44
			Max. Torque	20			-3.48
L14	89.25 - 89	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.23	-1.89	7.90
			Max. Mx	20	-14.10	471.73	2.78
			Max. My	2	-14.09	-1.22	482.24
			Max. Vy	20	-19.21	471.73	2.78
			Max. Vx	2	-19.20	-1.22	482.24
			Max. Torque	20			-3.48
L15	89 - 88.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.51	-1.88	7.91
			Max. Mx	20	-14.28	486.16	2.80
			Max. My	2	-14.27	-1.22	496.65
			Max. Vy	20	-19.28	486.16	2.80
			Max. Vx	2	-19.26	-1.22	496.65
			Max. Torque	20			-3.48
L16	88.25 - 88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.60	-1.88	7.92
			Max. Mx	20	-14.33	490.98	2.80
			Max. My	2	-14.32	-1.23	501.47
			Max. Vy	20	-19.29	490.98	2.80
			Max. Vx	2	-19.28	-1.23	501.47
			Max. Torque	20			-3.48
L17	88 - 83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.16	-1.79	8.04
			Max. Mx	20	-15.33	588.34	2.89
			Max. My	2	-15.32	-1.27	598.75
			Max. Vy	20	-19.66	588.34	2.89
			Max. Vx	2	-19.65	-1.27	598.75
			Max. Torque	20			-3.48
L18	83 - 78	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.72	-1.70	8.15
			Max. Mx	20	-16.36	687.51	2.97
			Max. My	2	-16.35	-1.31	697.84
			Max. Vy	20	-20.02	687.51	2.97
			Max. Vx	2	-20.01	-1.31	697.84
			Max. Torque	20			-3.48
L19	78 - 77	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.07	-1.68	8.17
			Max. Mx	20	-16.57	707.56	2.98
			Max. My	2	-16.56	-1.32	717.87
			Max. Vy	20	-20.09	707.56	2.98
			Max. Vx	2	-20.08	-1.32	717.87
			Max. Torque	20			-3.47
L20	77 - 76.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.16	-1.67	8.18
			Max. Mx	20	-16.64	712.59	2.99
			Max. My	2	-16.64	-1.32	722.89
			Max. Vy	20	-20.11	712.59	2.99
			Max. Vx	2	-20.09	-1.32	722.89
			Max. Torque	20			-3.47
L21	76.75 - 71.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.12	-1.57	8.28
			Max. Mx	20	-17.91	814.09	3.06
			Max. My	2	-17.91	-1.36	824.31
			Max. Vy	20	-20.50	814.09	3.06
			Max. Vx	2	-20.49	-1.36	824.31

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	20			-3.47
L22	71.75 - 66.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-43.11	-1.46	8.37
			Max. Mx	20	-19.21	917.55	3.14
			Max. My	2	-19.21	-1.39	927.68
			Max. Vy	20	-20.89	917.55	3.14
			Max. Vx	2	-20.88	-1.39	927.68
			Max. Torque	20			-3.47
L23	66.75 - 62.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-44.91	-1.37	8.46
			Max. Mx	20	-20.40	1012.29	3.20
			Max. My	2	-20.40	-1.43	1022.34
			Max. Vy	20	-21.24	1012.29	3.20
			Max. Vx	2	-21.22	-1.43	1022.34
			Max. Torque	20			-3.47
L24	62.25 - 62	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.02	-1.36	8.46
			Max. Mx	20	-20.48	1017.60	3.21
			Max. My	2	-20.47	-1.43	1027.65
			Max. Vy	20	-21.25	1017.60	3.21
			Max. Vx	2	-21.23	-1.43	1027.65
			Max. Torque	20			-3.47
L25	62 - 59.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.89	-1.30	8.50
			Max. Mx	20	-20.96	1070.90	3.24
			Max. My	2	-20.95	-1.44	1080.92
			Max. Vy	20	-21.41	1070.90	3.24
			Max. Vx	2	-21.41	-1.44	1080.92
			Max. Torque	20			-3.47
L26	59.5 - 59.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.01	-1.30	8.51
			Max. Mx	20	-21.05	1076.25	3.24
			Max. My	2	-21.04	-1.45	1086.27
			Max. Vy	20	-21.42	1076.25	3.24
			Max. Vx	2	-21.42	-1.45	1086.27
			Max. Torque	20			-3.47
L27	59.25 - 54.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.26	-1.18	8.59
			Max. Mx	20	-22.46	1184.98	3.31
			Max. My	2	-22.45	-1.48	1194.97
			Max. Vy	20	-22.08	1184.98	3.31
			Max. Vx	2	-22.08	-1.48	1194.97
			Max. Torque	20			-3.47
L28	54.25 - 45.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.17	-1.08	8.65
			Max. Mx	20	-23.69	1279.88	3.36
			Max. My	2	-23.68	-1.51	1289.86
			Max. Vy	20	-22.60	1279.88	3.36
			Max. Vx	2	-22.60	-1.51	1289.86
			Max. Torque	20			-3.48
L29	45.25 - 45	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-54.17	-0.62	8.53
			Max. Mx	20	-26.50	1395.11	3.37
			Max. My	2	-26.49	-1.29	1404.86
			Max. Vy	20	-23.37	1395.11	3.37
			Max. Vx	2	-23.39	-1.29	1404.86
			Max. Torque	20			-3.40
L30	45 - 40.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.21	-0.51	8.59
			Max. Mx	20	-27.85	1495.51	3.48
			Max. My	2	-27.84	-1.26	1505.34
			Max. Vy	20	-23.89	1495.51	3.48
			Max. Vx	2	-23.91	-1.26	1505.34
			Max. Torque	20			-3.41
L31	40.75 - 40.5	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-56.33	-0.51	8.59
			Max. Mx	20	-27.94	1501.48	3.48
			Max. My	2	-27.94	-1.26	1511.32
			Max. Vy	20	-23.91	1501.48	3.48
			Max. Vx	2	-23.94	-1.26	1511.32
			Max. Torque	20			-3.41
L32	40.5 - 35.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.74	-0.43	8.71
			Max. Mx	20	-29.55	1616.35	3.59
			Max. My	2	-29.54	-1.24	1626.31
			Max. Vy	20	-24.47	1616.35	3.59
			Max. Vx	2	-24.50	-1.24	1626.31
			Max. Torque	20			-3.44
L33	35.75 - 35.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.87	-0.42	8.72
			Max. Mx	20	-29.64	1622.47	3.60
			Max. My	2	-29.64	-1.24	1632.44
			Max. Vy	20	-24.49	1622.47	3.60
			Max. Vx	2	-24.52	-1.24	1632.44
			Max. Torque	20			-3.44
L34	35.5 - 30.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.38	-0.28	8.81
			Max. Mx	20	-31.29	1746.33	3.72
			Max. My	2	-31.28	-1.21	1756.38
			Max. Vy	20	-25.07	1746.33	3.72
			Max. Vx	2	-25.08	-1.21	1756.38
			Max. Torque	20			-3.46
L35	30.5 - 29.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.67	-0.26	8.82
			Max. Mx	20	-31.47	1765.14	3.73
			Max. My	2	-31.47	-1.21	1775.20
			Max. Vy	20	-25.14	1765.14	3.73
			Max. Vx	2	-25.14	-1.21	1775.20
			Max. Torque	20			-3.46
L36	29.75 - 29.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-61.80	-0.25	8.82
			Max. Mx	20	-31.57	1771.43	3.74
			Max. My	2	-31.57	-1.20	1781.49
			Max. Vy	20	-25.15	1771.43	3.74
			Max. Vx	2	-25.15	-1.20	1781.49
			Max. Torque	20			-3.46
L37	29.5 - 24.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.26	-0.11	8.89
			Max. Mx	20	-33.27	1898.52	3.85
			Max. My	2	-33.26	-1.18	1908.53
			Max. Vy	20	-25.70	1898.52	3.85
			Max. Vx	2	-25.69	-1.18	1908.53
			Max. Torque	20			-3.49
L38	24.5 - 19.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-66.74	0.04	8.94
			Max. Mx	20	-35.00	2028.32	3.96
			Max. My	2	-35.00	-1.15	2038.18
			Max. Vy	20	-26.25	2028.32	3.96
			Max. Vx	2	-26.21	-1.15	2038.18
			Max. Torque	20			-3.51
L39	19.5 - 14.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.22	0.18	8.99
			Max. Mx	20	-36.76	2160.84	4.07
			Max. My	2	-36.76	-1.12	2170.44
			Max. Vy	20	-26.79	2160.84	4.07
			Max. Vx	2	-26.73	-1.12	2170.44
			Max. Torque	20			-3.53
L40	14.5 - 12.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.21	0.24	9.01
			Max. Mx	20	-37.47	2214.61	4.11
			Max. My	2	-37.47	-1.10	2224.07
			Max. Vy	20	-27.01	2214.61	4.11
			Max. Vx	2	-26.94	-1.10	2224.07
			Max. Torque	20			-3.54

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L41	12.5 - 12.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.32	0.24	9.02
			Max. Mx	20	-37.56	2221.36	4.12
			Max. My	2	-37.56	-1.10	2230.81
			Max. Vy	20	-27.02	2221.36	4.12
			Max. Vx	2	-26.95	-1.10	2230.81
			Max. Torque	20			-3.55
L42	12.25 - 10.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.04	0.23	8.98
			Max. Mx	20	-38.01	2262.03	4.15
			Max. My	2	-38.01	-1.09	2271.35
			Max. Vy	20	-27.23	2262.03	4.15
			Max. Vx	2	-27.14	-1.09	2271.35
			Max. Torque	20			-3.55
L43	10.75 - 10.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-71.16	0.23	8.97
			Max. Mx	20	-38.11	2268.83	4.15
			Max. My	2	-38.11	-1.09	2278.13
			Max. Vy	20	-27.24	2268.83	4.15
			Max. Vx	2	-27.15	-1.09	2278.13
			Max. Torque	20			-3.52
L44	10.5 - 5.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.58	0.18	8.86
			Max. Mx	20	-39.84	2406.59	4.26
			Max. My	2	-39.84	-1.06	2415.30
			Max. Vy	20	-27.88	2406.59	4.26
			Max. Vx	2	-27.74	-1.06	2415.30
			Max. Torque	20			-3.52
L45	5.5 - 0.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.89	0.17	8.85
			Max. Mx	20	-41.60	2547.38	4.36
			Max. My	2	-41.60	-1.03	2555.39
			Max. Vy	20	-28.47	2547.38	4.36
			Max. Vx	2	-28.33	-1.03	2555.39
			Max. Torque	20			-3.39
L46	0.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-76.11	0.17	8.85
			Max. Mx	20	-41.78	2561.62	4.37
			Max. My	2	-41.78	-1.02	2569.56
			Max. Vy	20	-28.52	2561.62	4.37
			Max. Vx	2	-28.38	-1.02	2569.56
			Max. Torque	20			-3.30

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	76.11	-0.00	0.00
	Max. H_x	20	41.79	28.51	0.02
	Max. H_z	2	41.79	0.00	28.37
	Max. M_x	2	2569.56	0.00	28.37
	Max. M_z	8	2556.90	-28.47	-0.02
	Max. Torsion	8	3.24	-28.47	-0.02
	Min. Vert	25	31.34	13.68	23.86
	Min. H_x	8	41.79	-28.47	-0.02
	Min. H_z	14	41.79	-0.04	-28.37
	Min. M_x	14	-2564.67	-0.04	-28.37
	Min. M_z	20	-2561.62	28.51	0.02
	Min. Torsion	20	-3.29	28.51	0.02

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	34.82	0.00	-0.00	-1.96	-0.37	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	41.79	-0.00	-28.37	-2569.56	-1.02	0.29
0.9 Dead+1.6 Wind 0 deg - No Ice	31.34	-0.00	-28.37	-2538.55	-0.88	0.26
1.2 Dead+1.6 Wind 30 deg - No Ice	41.79	14.30	-25.06	-2253.30	-1278.27	-1.54
0.9 Dead+1.6 Wind 30 deg - No Ice	31.34	14.30	-25.06	-2226.10	-1263.11	-1.52
1.2 Dead+1.6 Wind 60 deg - No Ice	41.79	23.91	-14.02	-1288.94	-2177.82	-3.06
0.9 Dead+1.6 Wind 60 deg - No Ice	31.34	23.91	-14.02	-1273.03	-2151.98	-3.00
1.2 Dead+1.6 Wind 90 deg - No Ice	41.79	28.47	0.02	-0.46	-2556.90	-3.24
0.9 Dead+1.6 Wind 90 deg - No Ice	31.34	28.47	0.02	0.17	-2526.67	-3.16
1.2 Dead+1.6 Wind 120 deg - No Ice	41.79	24.73	14.52	1309.19	-2217.36	-2.67
0.9 Dead+1.6 Wind 120 deg - No Ice	31.34	24.73	14.52	1294.35	-2191.17	-2.59
1.2 Dead+1.6 Wind 150 deg - No Ice	41.79	13.64	23.88	2224.58	-1266.73	-2.04
0.9 Dead+1.6 Wind 150 deg - No Ice	31.34	13.64	23.88	2198.80	-1251.61	-1.98
1.2 Dead+1.6 Wind 180 deg - No Ice	41.79	0.04	28.37	2564.67	-4.93	-0.36
0.9 Dead+1.6 Wind 180 deg - No Ice	31.34	0.04	28.37	2534.99	-4.74	-0.34
1.2 Dead+1.6 Wind 210 deg - No Ice	41.79	-14.33	25.05	2246.80	1282.72	1.35
0.9 Dead+1.6 Wind 210 deg - No Ice	31.34	-14.33	25.05	2220.95	1267.75	1.34
1.2 Dead+1.6 Wind 240 deg - No Ice	41.79	-23.95	14.03	1285.43	2182.70	2.61
0.9 Dead+1.6 Wind 240 deg - No Ice	31.34	-23.95	14.03	1270.81	2157.04	2.56
1.2 Dead+1.6 Wind 270 deg - No Ice	41.79	-28.51	-0.02	-4.37	2561.62	3.29
0.9 Dead+1.6 Wind 270 deg - No Ice	31.34	-28.51	-0.02	-3.69	2531.56	3.21
1.2 Dead+1.6 Wind 300 deg - No Ice	41.79	-24.77	-14.53	-1315.38	2222.27	2.65
0.9 Dead+1.6 Wind 300 deg - No Ice	31.34	-24.77	-14.53	-1299.21	2196.26	2.57
1.2 Dead+1.6 Wind 330 deg - No Ice	41.79	-13.68	-23.86	-2227.83	1271.22	1.74
0.9 Dead+1.6 Wind 330 deg - No Ice	31.34	-13.68	-23.86	-2200.75	1256.28	1.68
1.2 Dead+1.0 Ice+1.0 Temp	76.11	0.00	-0.00	-8.85	0.17	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	76.11	-0.00	-6.82	-695.76	0.14	0.07
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	76.11	3.44	-6.01	-607.98	-341.67	-0.48
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	76.11	5.87	-3.43	-355.83	-590.87	-0.89
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	76.11	7.05	0.01	-8.38	-698.29	-1.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	76.11	5.96	3.49	340.28	-593.77	-0.83
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	76.11	3.27	5.70	574.94	-333.52	-0.58
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	76.11	0.01	6.82	677.91	-0.95	-0.08
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	76.11	-3.44	6.00	589.76	343.24	0.45

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	76.11	-5.88	3.43	338.29	592.54	0.80
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	76.11	-7.06	-0.01	-9.46	699.92	1.02
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	76.11	-5.97	-3.49	-358.44	595.44	0.82
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	76.11	-3.28	-5.70	-592.42	335.10	0.52
Dead+Wind 0 deg - Service	34.82	-0.00	-6.07	-547.85	-0.50	0.06
Dead+Wind 30 deg - Service	34.82	3.06	-5.36	-480.62	-272.08	-0.33
Dead+Wind 60 deg - Service	34.82	5.12	-3.00	-275.55	-463.32	-0.65
Dead+Wind 90 deg - Service	34.82	6.09	0.00	-1.60	-543.94	-0.70
Dead+Wind 120 deg - Service	34.82	5.29	3.11	276.86	-471.76	-0.58
Dead+Wind 150 deg - Service	34.82	2.92	5.11	471.49	-269.62	-0.44
Dead+Wind 180 deg - Service	34.82	0.01	6.07	543.81	-1.33	-0.08
Dead+Wind 210 deg - Service	34.82	-3.07	5.36	476.24	272.47	0.29
Dead+Wind 240 deg - Service	34.82	-5.13	3.00	271.79	463.80	0.57
Dead+Wind 270 deg - Service	34.82	-6.10	-0.00	-2.44	544.38	0.71
Dead+Wind 300 deg - Service	34.82	-5.30	-3.11	-281.19	472.24	0.56
Dead+Wind 330 deg - Service	34.82	-2.93	-5.11	-475.19	270.01	0.37

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX	PY	PZ	PX	PY	PZ	
	K	K	K	K	K	K	
1	0.00	-34.82	0.00	-0.00	34.82	0.00	0.000%
2	-0.00	-41.79	-28.37	0.00	41.79	28.37	0.000%
3	-0.00	-31.34	-28.37	0.00	31.34	28.37	0.000%
4	14.30	-41.79	-25.06	-14.30	41.79	25.06	0.000%
5	14.30	-31.34	-25.06	-14.30	31.34	25.06	0.000%
6	23.91	-41.79	-14.02	-23.91	41.79	14.02	0.000%
7	23.91	-31.34	-14.02	-23.91	31.34	14.02	0.000%
8	28.47	-41.79	0.02	-28.47	41.79	-0.02	0.000%
9	28.47	-31.34	0.02	-28.47	31.34	-0.02	0.000%
10	24.73	-41.79	14.52	-24.73	41.79	-14.52	0.000%
11	24.73	-31.34	14.52	-24.73	31.34	-14.52	0.000%
12	13.64	-41.79	23.88	-13.64	41.79	-23.88	0.000%
13	13.64	-31.34	23.88	-13.64	31.34	-23.88	0.000%
14	0.04	-41.79	28.37	-0.04	41.79	-28.37	0.000%
15	0.04	-31.34	28.37	-0.04	31.34	-28.37	0.000%
16	-14.33	-41.79	25.05	14.33	41.79	-25.05	0.000%
17	-14.33	-31.34	25.05	14.33	31.34	-25.05	0.000%
18	-23.95	-41.79	14.03	23.95	41.79	-14.03	0.000%
19	-23.95	-31.34	14.03	23.95	31.34	-14.03	0.000%
20	-28.51	-41.79	-0.02	28.51	41.79	0.02	0.000%
21	-28.51	-31.34	-0.02	28.51	31.34	0.02	0.000%
22	-24.77	-41.79	-14.53	24.77	41.79	14.53	0.000%
23	-24.77	-31.34	-14.53	24.77	31.34	14.53	0.000%
24	-13.68	-41.79	-23.86	13.68	41.79	23.86	0.000%
25	-13.68	-31.34	-23.86	13.68	31.34	23.86	0.000%
26	0.00	-76.11	0.00	-0.00	76.11	0.00	0.000%
27	-0.00	-76.11	-6.82	0.00	76.11	6.82	0.000%
28	3.44	-76.11	-6.01	-3.44	76.11	6.01	0.000%
29	5.87	-76.11	-3.43	-5.87	76.11	3.43	0.000%
30	7.05	-76.11	0.01	-7.05	76.11	-0.01	0.000%
31	5.96	-76.11	3.49	-5.96	76.11	-3.49	0.000%
32	3.27	-76.11	5.70	-3.27	76.11	-5.70	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	0.01	-76.11	6.82	-0.01	76.11	-6.82	0.000%
34	-3.44	-76.11	6.00	3.44	76.11	-6.00	0.000%
35	-5.88	-76.11	3.43	5.88	76.11	-3.43	0.000%
36	-7.06	-76.11	-0.01	7.06	76.11	0.01	0.000%
37	-5.97	-76.11	-3.49	5.97	76.11	3.49	0.000%
38	-3.28	-76.11	-5.70	3.28	76.11	5.70	0.000%
39	-0.00	-34.82	-6.07	0.00	34.82	6.07	0.000%
40	3.06	-34.82	-5.36	-3.06	34.82	5.36	0.000%
41	5.12	-34.82	-3.00	-5.12	34.82	3.00	0.000%
42	6.09	-34.82	0.00	-6.09	34.82	-0.00	0.000%
43	5.29	-34.82	3.11	-5.29	34.82	-3.11	0.000%
44	2.92	-34.82	5.11	-2.92	34.82	-5.11	0.000%
45	0.01	-34.82	6.07	-0.01	34.82	-6.07	0.000%
46	-3.07	-34.82	5.36	3.07	34.82	-5.36	0.000%
47	-5.13	-34.82	3.00	5.13	34.82	-3.00	0.000%
48	-6.10	-34.82	-0.00	6.10	34.82	0.00	0.000%
49	-5.30	-34.82	-3.11	5.30	34.82	3.11	0.000%
50	-2.93	-34.82	-5.11	2.93	34.82	5.11	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000767
2	Yes	5	0.00000001	0.00061121
3	Yes	5	0.00000001	0.00026443
4	Yes	7	0.00000001	0.00005969
5	Yes	6	0.00000001	0.00035522
6	Yes	7	0.00000001	0.00006519
7	Yes	6	0.00000001	0.00039068
8	Yes	6	0.00000001	0.00015067
9	Yes	6	0.00000001	0.00004907
10	Yes	7	0.00000001	0.00005772
11	Yes	6	0.00000001	0.00034415
12	Yes	7	0.00000001	0.00006455
13	Yes	6	0.00000001	0.00038630
14	Yes	5	0.00000001	0.00074882
15	Yes	5	0.00000001	0.00032826
16	Yes	7	0.00000001	0.00006275
17	Yes	6	0.00000001	0.00037477
18	Yes	7	0.00000001	0.00005716
19	Yes	6	0.00000001	0.00034188
20	Yes	6	0.00000001	0.00015716
21	Yes	6	0.00000001	0.00005117
22	Yes	7	0.00000001	0.00006632
23	Yes	6	0.00000001	0.00039598
24	Yes	7	0.00000001	0.00005888
25	Yes	6	0.00000001	0.00035135
26	Yes	5	0.00000001	0.00042602
27	Yes	7	0.00000001	0.00021021
28	Yes	7	0.00000001	0.00027351
29	Yes	7	0.00000001	0.00028095
30	Yes	7	0.00000001	0.00020929
31	Yes	7	0.00000001	0.00025450
32	Yes	7	0.00000001	0.00025500
33	Yes	7	0.00000001	0.00019535
34	Yes	7	0.00000001	0.00025558
35	Yes	7	0.00000001	0.00025163
36	Yes	7	0.00000001	0.00020703
37	Yes	7	0.00000001	0.00027945
38	Yes	7	0.00000001	0.00026507
39	Yes	4	0.00000001	0.00090165
40	Yes	5	0.00000001	0.00027122
41	Yes	5	0.00000001	0.00035055
42	Yes	5	0.00000001	0.00014403
43	Yes	5	0.00000001	0.00025183
44	Yes	5	0.00000001	0.00032901
45	Yes	4	0.00000001	0.00093248
46	Yes	5	0.00000001	0.00030126
47	Yes	5	0.00000001	0.00024299
48	Yes	5	0.00000001	0.00014617
49	Yes	5	0.00000001	0.00035864
50	Yes	5	0.00000001	0.00026024

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	21.554	40	1.6483	0.0281
L2	128 - 123	19.841	40	1.6188	0.0224
L3	123 - 118	18.176	40	1.5565	0.0177
L4	118 - 113	16.589	40	1.4723	0.0138
L5	113 - 108	15.098	40	1.3737	0.0106
L6	108 - 104.75	13.716	40	1.2642	0.0078
L7	104.75 - 104.5	12.883	40	1.1829	0.0061
L8	104.5 - 99.5	12.821	40	1.1799	0.0060
L9	99.5 - 98.75	11.619	40	1.1136	0.0049
L10	98.75 - 98.5	11.445	40	1.1031	0.0048

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L11	98.5 - 91.33	11.388	40	1.0996	0.0047
L12	95 - 90	10.594	40	1.0663	0.0043
L13	90 - 89.25	9.491	40	1.0339	0.0040
L14	89.25 - 89	9.330	40	1.0220	0.0039
L15	89 - 88.25	9.276	40	1.0198	0.0039
L16	88.25 - 88	9.117	40	1.0129	0.0038
L17	88 - 83	9.064	40	1.0099	0.0038
L18	83 - 78	8.040	40	0.9446	0.0033
L19	78 - 77	7.087	40	0.8760	0.0028
L20	77 - 76.75	6.905	40	0.8623	0.0027
L21	76.75 - 71.75	6.860	40	0.8596	0.0027
L22	71.75 - 66.75	5.989	40	0.8040	0.0024
L23	66.75 - 62.25	5.177	40	0.7465	0.0021
L24	62.25 - 62	4.498	40	0.6941	0.0019
L25	62 - 59.5	4.462	40	0.6912	0.0019
L26	59.5 - 59.25	4.113	40	0.6423	0.0017
L27	59.25 - 54.25	4.079	40	0.6396	0.0016
L28	54.25 - 45.25	3.438	40	0.5842	0.0014
L29	50 - 45	2.940	40	0.5362	0.0013
L30	45 - 40.75	2.393	40	0.5075	0.0012
L31	40.75 - 40.5	1.961	40	0.4616	0.0010
L32	40.5 - 35.75	1.937	40	0.4589	0.0010
L33	35.75 - 35.5	1.506	40	0.4086	0.0009
L34	35.5 - 30.5	1.484	40	0.4057	0.0009
L35	30.5 - 29.75	1.090	40	0.3485	0.0007
L36	29.75 - 29.5	1.036	40	0.3346	0.0007
L37	29.5 - 24.5	1.019	40	0.3318	0.0007
L38	24.5 - 19.5	0.701	40	0.2750	0.0006
L39	19.5 - 14.5	0.443	40	0.2184	0.0004
L40	14.5 - 12.5	0.243	40	0.1621	0.0003
L41	12.5 - 12.25	0.180	40	0.1399	0.0003
L42	12.25 - 10.75	0.173	40	0.1367	0.0002
L43	10.75 - 10.5	0.133	40	0.1184	0.0002
L44	10.5 - 5.5	0.127	40	0.1157	0.0002
L45	5.5 - 0.5	0.035	40	0.0605	0.0001
L46	0.5 - 0	0.000	40	0.0000	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
135.00	VHLP2-23	40	21.554	1.6483	0.0281	6107
133.00	Lightning Rod 5/8x4'	40	21.554	1.6483	0.0281	6107
110.00	(2) SBNHH-1D65B w/ Mount Pipe	40	14.255	1.3134	0.0090	2550
100.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	40	11.736	1.1205	0.0050	4550
90.00	APXV18-206517S-C	40	9.491	1.0339	0.0040	5688
50.00	KS24019-L112A	40	2.940	0.5362	0.0013	6882

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	133 - 128	100.212	4	7.5325	0.1308
L2	128 - 123	92.393	4	7.4405	0.1041
L3	123 - 118	84.759	4	7.1855	0.0823
L4	118 - 113	77.449	4	6.8210	0.0643
L5	113 - 108	70.556	4	6.3834	0.0494

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L6	108 - 104.75	64.145	4	5.8909	0.0362
L7	104.75 - 104.5	60.269	4	5.5222	0.0283
L8	104.5 - 99.5	59.981	4	5.5086	0.0281
L9	99.5 - 98.75	54.383	4	5.2053	0.0230
L10	98.75 - 98.5	53.571	4	5.1574	0.0223
L11	98.5 - 91.33	53.302	4	5.1410	0.0221
L12	95 - 90	49.597	4	4.9878	0.0201
L13	90 - 89.25	44.449	4	4.8380	0.0186
L14	89.25 - 89	43.695	4	4.7828	0.0181
L15	89 - 88.25	43.446	4	4.7724	0.0180
L16	88.25 - 88	42.700	4	4.7406	0.0177
L17	88 - 83	42.453	4	4.7265	0.0176
L18	83 - 78	37.669	4	4.4232	0.0152
L19	78 - 77	33.211	4	4.1037	0.0131
L20	77 - 76.75	32.360	4	4.0398	0.0127
L21	76.75 - 71.75	32.149	4	4.0273	0.0126
L22	71.75 - 66.75	28.072	4	3.7680	0.0111
L23	66.75 - 62.25	24.271	4	3.4994	0.0098
L24	62.25 - 62	21.092	4	3.2546	0.0087
L25	62 - 59.5	20.922	4	3.2411	0.0087
L26	59.5 - 59.25	19.286	4	3.0122	0.0077
L27	59.25 - 54.25	19.129	4	2.9996	0.0077
L28	54.25 - 45.25	16.126	4	2.7402	0.0067
L29	50 - 45	13.788	4	2.5154	0.0059
L30	45 - 40.75	11.222	4	2.3807	0.0054
L31	40.75 - 40.5	9.200	4	2.1654	0.0048
L32	40.5 - 35.75	9.087	4	2.1531	0.0048
L33	35.75 - 35.5	7.064	4	1.9170	0.0041
L34	35.5 - 30.5	6.964	4	1.9037	0.0041
L35	30.5 - 29.75	5.112	4	1.6351	0.0034
L36	29.75 - 29.5	4.860	4	1.5701	0.0032
L37	29.5 - 24.5	4.778	4	1.5569	0.0032
L38	24.5 - 19.5	3.288	4	1.2904	0.0026
L39	19.5 - 14.5	2.076	4	1.0249	0.0020
L40	14.5 - 12.5	1.142	4	0.7603	0.0014
L41	12.5 - 12.25	0.846	4	0.6561	0.0012
L42	12.25 - 10.75	0.812	4	0.6416	0.0012
L43	10.75 - 10.5	0.624	4	0.5554	0.0010
L44	10.5 - 5.5	0.595	4	0.5426	0.0010
L45	5.5 - 0.5	0.163	4	0.2836	0.0005
L46	0.5 - 0	0.001	4	0.0254	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
135.00	VHLP2-23	4	100.212	7.5325	0.1308	1652
133.00	Lightning Rod 5/8x4'	4	100.212	7.5325	0.1308	1652
110.00	(2) SBNHH-1D65B w/ Mount Pipe	4	66.647	6.1131	0.0417	577
100.00	APXVAARR24_43-U-NA20 w/ Mount Pipe	4	54.928	5.2372	0.0235	1007
90.00	APXV18-206517S-C	4	44.449	4.8380	0.0186	1243
50.00	KS24019-L112A	4	13.788	2.5154	0.0059	1476

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	133 - 132	TP14.4795x13.48x0.1875	5.00	0.00	0.0	8.1460	-9.82	600.45	0.016
	132 - 131					8.2667	-9.90	609.34	0.016
	131 - 130					8.3874	-3.23	618.24	0.005
	130 - 129					8.5081	-3.26	627.13	0.005
	129 - 128					8.6288	-3.30	636.03	0.005
L2	128 - 127	TP15.479x14.4795x0.1875	5.00	0.00	0.0	8.7495	-3.33	644.93	0.005
	127 - 126					8.8702	-3.37	653.82	0.005
	126 - 125					8.9909	-3.41	662.72	0.005
	125 - 124					9.1116	-3.45	671.61	0.005
	124 - 123					9.2323	-3.49	680.51	0.005
L3	123 - 122	TP16.4786x15.479x0.1875	5.00	0.00	0.0	9.3530	-3.54	689.41	0.005
	122 - 121					9.4736	-3.58	698.30	0.005
	121 - 120					9.5943	-3.63	707.20	0.005
	120 - 119					9.7150	-3.67	716.10	0.005
	119 - 118					9.8357	-3.72	724.99	0.005
L4	118 - 117	TP17.4781x16.4786x0.1875	5.00	0.00	0.0	9.9564	-3.77	731.54	0.005
	117 - 116					10.0771	-3.82	737.58	0.005
	116 - 115					10.1978	-3.87	743.55	0.005
	115 - 114					10.3185	-3.92	749.46	0.005
	114 - 113					10.4392	-3.97	755.30	0.005
L5	113 - 112	TP18.4776x17.4781x0.1875	5.00	0.00	0.0	10.5599	-4.03	761.07	0.005
	112 - 111					10.6806	-4.09	766.77	0.005
	111 - 110					10.8013	-4.15	772.40	0.005
	110 - 109					10.9220	-6.98	777.97	0.009
	109 - 108					11.0426	-7.05	783.47	0.009
L6	108 - 106.917	TP19.1273x18.4776x0.1875	3.25	0.00	0.0	11.1734	-7.14	789.35	0.009
	106.917 - 105.833					11.3041	-7.23	795.16	0.009
	105.833 - 104.75					11.4349	-7.32	800.88	0.009
L7	104.75 - 104.5 (7)	TP19.1773x19.1273x0.425	0.25	0.00	0.0	25.6625	-7.36	1891.58	0.004
L8	104.5 - 103.5	TP20.1768x19.1773x0.4063	5.00	0.00	0.0	24.8163	-7.48	1829.21	0.004
	103.5 - 102.5					25.0778	-7.60	1848.49	0.004
	102.5 - 101.5					25.3393	-7.72	1867.76	0.004
	101.5 - 100.5					25.6008	-7.85	1887.04	0.004
	100.5 - 99.5					25.8623	-11.23	1906.31	0.006
L9	99.5 - 98.75 (9)	TP20.3267x20.1768x0.4063	0.75	0.00	0.0	26.0585	-11.33	1920.77	0.006
L10	98.75 - 98.5 (10)	TP20.3767x20.3267x0.4063	0.25	0.00	0.0	26.1238	-11.37	1925.59	0.006
L11	98.5 - 97.3333	TP21.81x20.3767x0.6625	7.17	0.00	0.0	42.5528	-11.58	3136.57	0.004
	97.3333 - 96.1667					43.0503	-11.80	3173.24	0.004
	96.1667 - 95					43.5479	-12.02	3209.91	0.004
	95 - 91.33					45.1129	-6.50	3325.27	0.002

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L12	95 - 91.33	TP21.7002x20.7014x0.7125	5.00	0.00	0.0	47.5415	-6.82	3504.28	0.002
	91.33 - 90					48.1511	-13.60	3549.21	0.004
L13	90 - 89.25 (13)	TP21.85x21.7002x0.45	0.75	0.00	0.0	31.0087	-14.02	2285.65	0.006
L14	89.25 - 89 (14)	TP21.9x21.85x0.85	0.25	0.00	0.0	57.6138	-14.09	4246.71	0.003
L15	89 - 88.25 (15)	TP22.0498x21.9x0.8375	0.75	0.00	0.0	57.2043	-14.27	4216.53	0.003
L16	88.25 - 88 (16)	TP22.0998x22.0498x0.6125	0.25	0.00	0.0	42.3782	-14.32	3123.70	0.005
L17	88 - 87	TP23.0986x22.0998x0.5875	5.00	0.00	0.0	41.0737	-14.51	3027.54	0.005
	87 - 86					41.4516	-14.71	3055.40	0.005
	86 - 85					41.8296	-14.91	3083.26	0.005
	85 - 84					42.2075	-15.12	3111.11	0.005
	84 - 83					42.5854	-15.31	3138.97	0.005
L18	83 - 82	TP24.0975x23.0986x0.575	5.00	0.00	0.0	42.0723	-15.51	3101.15	0.005
	82 - 81					42.4422	-15.71	3128.42	0.005
	81 - 80					42.8121	-15.92	3155.68	0.005
	80 - 79					43.1820	-16.13	3182.94	0.005
	79 - 78					43.5519	-16.34	3210.21	0.005
L19	78 - 77 (19)	TP24.2972x24.0975x0.575	1.00	0.00	0.0	43.9217	-16.55	3237.47	0.005
L20	77 - 76.75 (20)	TP24.3472x24.2972x0.7625	0.25	0.00	0.0	57.9063	-16.62	4268.27	0.004
L21	76.75 - 75.75	TP25.346x24.3472x0.7375	5.00	0.00	0.0	56.5415	-16.87	4167.68	0.004
	75.75 - 74.75					57.0159	-17.12	4202.64	0.004
	74.75 - 73.75					57.4903	-17.38	4237.61	0.004
	73.75 - 72.75					57.9647	-17.63	4272.58	0.004
	72.75 - 71.75					58.4391	-17.89	4307.55	0.004
L22	71.75 - 70.75	TP26.3449x25.346x0.7125	5.00	0.00	0.0	56.9738	-18.15	4199.54	0.004
	70.75 - 69.75					57.4322	-18.41	4233.33	0.004
	69.75 - 68.75					57.8905	-18.67	4267.11	0.004
	68.75 - 67.75					58.3488	-18.92	4300.89	0.004
	67.75 - 66.75					58.8071	-19.19	4334.68	0.004
L23	66.75 - 65.625	TP27.2439x26.3449x0.7	4.50	0.00	0.0	58.3102	-19.48	4298.04	0.005
	65.625 - 64.5					58.8168	-19.78	4335.38	0.005
	64.5 - 63.375					59.3233	-20.08	4372.72	0.005
	63.375 - 62.25					59.8299	-20.38	4410.06	0.005
L24	62.25 - 62 (24)	TP27.2938x27.2439x0.7	0.25	0.00	0.0	59.9425	-20.45	4418.36	0.005
L25	62 - 60.75	TP27.7933x27.2938x0.4	2.50	0.00	0.0	34.9609	-20.68	2576.97	0.008

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
	60.75 - 59.5					35.2825	-20.93	2600.67	0.008
L26	59.5 - 59.25 (26)	TP27.8432x27.7933x0.75	0.25	0.00	0.0	65.4301	-21.02	4822.85	0.004
L27	59.25 - 58.25	TP28.8421x27.8432x0.725	5.00	0.00	0.0	63.7738	-21.30	4700.77	0.005
	58.25 - 57.25					64.2402	-21.58	4735.14	0.005
	57.25 - 56.25					64.7065	-21.86	4769.52	0.005
	56.25 - 55.25					65.1729	-22.15	4803.89	0.005
	55.25 - 54.25					65.6393	-22.44	4838.27	0.005
L28	54.25 - 53.1875	TP30.64x28.8421x0.7	9.00	0.00	0.0	63.9106	-22.74	4710.85	0.005
	53.1875 - 52.125					64.3890	-23.05	4746.12	0.005
	52.125 - 51.0625					64.8675	-23.36	4781.38	0.005
	51.0625 - 50					65.3459	-23.67	4816.65	0.005
	50 - 45.25					67.4848	-12.78	4974.30	0.003
L29	50 - 45.25	TP30.192x29.1911x0.7625	5.00	0.00	0.0	72.1339	-13.59	5316.99	0.003
	45.25 - 45					72.2567	-26.48	5326.04	0.005
L30	45 - 43.9375	TP31.0427x30.192x0.75	4.25	0.00	0.0	71.6160	-26.80	5278.82	0.005
	43.9375 - 42.875					72.1297	-27.14	5316.68	0.005
	42.875 - 41.8125					72.6433	-27.48	5354.54	0.005
	41.8125 - 40.75					73.1570	-27.83	5392.40	0.005
L31	40.75 - 40.5 (31)	TP31.0928x31.0427x0.7625	0.25	0.00	0.0	74.4684	-27.92	5489.07	0.005
L32	40.5 - 39.3125	TP32.0436x31.0928x0.75	4.75	0.00	0.0	73.8519	-28.31	5443.62	0.005
	39.3125 - 38.125					74.4260	-28.72	5485.94	0.005
	38.125 - 36.9375					75.0000	-29.12	5528.25	0.005
	36.9375 - 35.75					75.5741	-29.53	5570.57	0.005
L33	35.75 - 35.5 (33)	TP32.0937x32.0436x0.6875	0.25	0.00	0.0	69.5254	-29.62	5124.72	0.006
L34	35.5 - 34.5	TP33.0946x32.0937x0.675	5.00	0.00	0.0	68.7236	-29.94	5065.61	0.006
	34.5 - 33.5					69.1587	-30.27	5097.68	0.006
	33.5 - 32.5					69.5937	-30.60	5129.75	0.006
	32.5 - 31.5					70.0288	-30.94	5161.83	0.006
	31.5 - 30.5					70.4639	-31.27	5193.90	0.006
L35	30.5 - 29.75 (35)	TP33.2447x33.0946x0.4	0.75	0.00	0.0	42.3040	-31.46	3118.23	0.010
L36	29.75 - 29.5 (36)	TP33.2947x33.2447x0.675	0.25	0.00	0.0	70.8990	-31.55	5225.97	0.006
L37	29.5 - 28.5	TP34.2956x33.2947x0.6625	5.00	0.00	0.0	70.0398	-31.88	5162.63	0.006
	28.5 - 27.5					70.4668	-32.22	5194.11	0.006
	27.5 - 26.5					70.8938	-32.56	5225.58	0.006

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	26.5 - 25.5					71.3208	-32.91	5257.06	0.006
	25.5 - 24.5					71.7479	-33.25	5288.54	0.006
L38	24.5 - 23.5	TP35.2965x34.2956x0.65	5.00	0.00	0.0	70.8393	-33.60	5221.56	0.006
	23.5 - 22.5					71.2583	-33.94	5252.45	0.006
	22.5 - 21.5					71.6772	-34.29	5283.33	0.006
	21.5 - 20.5					72.0962	-34.64	5314.21	0.007
	20.5 - 19.5					72.5152	-34.99	5345.09	0.007
L39	19.5 - 18.5	TP36.2974x35.2965x0.6375	5.00	0.00	0.0	71.5572	-35.34	5274.48	0.007
	18.5 - 17.5					71.9681	-35.69	5304.77	0.007
	17.5 - 16.5					72.3791	-36.04	5335.06	0.007
	16.5 - 15.5					72.7900	-36.39	5365.35	0.007
	15.5 - 14.5					73.2009	-36.75	5395.64	0.007
L40	14.5 - 13.5	TP36.6978x36.2974x0.6375	2.00	0.00	0.0	73.6118	-37.11	5425.93	0.007
	13.5 - 12.5					74.0227	-37.46	5456.22	0.007
L41	12.5 - 12.25 (41)	TP36.7478x36.6978x0.5625	0.25	0.00	0.0	65.5407	-37.55	4831.00	0.008
L42	12.25 - 10.75 (42)	TP37.0481x36.7478x0.5625	1.50	0.00	0.0	66.0845	-38.00	4871.09	0.008
L43	10.75 - 10.5 (43)	TP37.0981x37.0481x0.6375	0.25	0.00	0.0	74.8446	-38.11	5516.79	0.007
L44	10.5 - 9.5	TP38.099x37.0981x0.625	5.00	0.00	0.0	73.8050	-38.44	5440.17	0.007
	9.5 - 8.5					74.2079	-38.79	5469.86	0.007
	8.5 - 7.5					74.6107	-39.13	5499.56	0.007
	7.5 - 6.5					75.0136	-39.48	5529.25	0.007
	6.5 - 5.5					75.4165	-39.83	5558.95	0.007
L45	5.5 - 4.5	TP39.0999x38.099x0.6125	5.00	0.00	0.0	74.3276	-40.18	5478.69	0.007
	4.5 - 3.5					74.7224	-40.53	5507.79	0.007
	3.5 - 2.5					75.1172	-40.89	5536.89	0.007
	2.5 - 1.5					75.5120	-41.24	5565.99	0.007
	1.5 - 0.5					75.9068	-41.60	5595.09	0.007
L46	0.5 - 0 (46)	TP39.2x39.0999x0.6125	0.50	0.00	0.0	76.1042	-41.78	5609.64	0.007

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	133 - 132	TP14.4795x13.48x0.1875	7.10	164.07	0.043	0.00	164.07	0.000
	132 - 131		8.92	169.01	0.053	0.00	169.01	0.000
	131 - 130		16.62	174.01	0.096	0.00	174.01	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
	130 - 129		22.89	179.09	0.128	0.00	179.09	0.000
	129 - 128		29.21	184.24	0.159	0.00	184.24	0.000
L2	128 - 127	TP15.479x14.4795x0.1875	35.60	189.46	0.188	0.00	189.46	0.000
	127 - 126		42.03	194.76	0.216	0.00	194.76	0.000
	126 - 125		48.53	200.13	0.242	0.00	200.13	0.000
	125 - 124		55.08	205.57	0.268	0.00	205.57	0.000
	124 - 123		61.69	211.09	0.292	0.00	211.09	0.000
L3	123 - 122	TP16.4786x15.479x0.1875	68.36	216.68	0.315	0.00	216.68	0.000
	122 - 121		75.08	222.34	0.338	0.00	222.34	0.000
	121 - 120		81.86	228.08	0.359	0.00	228.08	0.000
	120 - 119		88.70	233.88	0.379	0.00	233.88	0.000
	119 - 118		95.60	239.77	0.399	0.00	239.77	0.000
L4	118 - 117	TP17.4781x16.4786x0.1875	102.56	244.93	0.419	0.00	244.93	0.000
	117 - 116		109.58	249.98	0.438	0.00	249.98	0.000
	116 - 115		116.65	255.06	0.457	0.00	255.06	0.000
	115 - 114		123.79	260.16	0.476	0.00	260.16	0.000
	114 - 113		130.98	265.29	0.494	0.00	265.29	0.000
L5	113 - 112	TP18.4776x17.4781x0.1875	138.24	270.44	0.511	0.00	270.44	0.000
	112 - 111		145.55	275.61	0.528	0.00	275.61	0.000
	111 - 110		152.93	280.81	0.545	0.00	280.81	0.000
	110 - 109		165.87	286.02	0.580	0.00	286.02	0.000
	109 - 108		178.64	291.26	0.613	0.00	291.26	0.000
L6	108 - 106.917	TP19.1273x18.4776x0.1875	192.53	296.96	0.648	0.00	296.96	0.000
	106.917 - 105.833		206.49	302.68	0.682	0.00	302.68	0.000
	105.833 - 104.75		220.51	308.42	0.715	0.00	308.42	0.000
L7	104.75 - 104.5 (7)	TP19.1773x19.1273x0.425	223.76	712.23	0.314	0.00	712.23	0.000
L8	104.5 - 103.5	TP20.1768x19.1773x0.4063	236.79	697.63	0.339	0.00	697.63	0.000
	103.5 - 102.5		249.89	712.57	0.351	0.00	712.57	0.000
	102.5 - 101.5		263.06	727.66	0.362	0.00	727.66	0.000
	101.5 - 100.5		276.30	742.91	0.372	0.00	742.91	0.000
	100.5 - 99.5		291.73	758.32	0.385	0.00	758.32	0.000
L9	99.5 - 98.75 (9)	TP20.3267x20.1768x0.4063	304.95	769.98	0.396	0.00	769.98	0.000
L10	98.75 - 98.5 (10)	TP20.3767x20.3267x0.4063	309.37	773.89	0.400	0.00	773.89	0.000
L11	98.5 - 97.3333	TP21.81x20.3767x0.6625	330.05	1243.44	0.265	0.00	1243.44	0.000
	97.3333 - 96.1667		350.85	1273.17	0.276	0.00	1273.17	0.000
	96.1667 - 95		371.78	1303.23	0.285	0.00	1303.23	0.000
	95 - 91.33		218.14	1400.12	0.156	0.00	1400.12	0.000
L12	95 - 91.33	TP21.7002x20.7014x0.7125	220.40	1441.53	0.153	0.00	1441.53	0.000
	91.33 - 90		463.09	1479.36	0.313	0.00	1479.36	0.000
L13	90 - 89.25 (13)	TP21.85x21.7002x0.45	477.44	983.70	0.485	0.00	983.70	0.000
L14	89.25 - 89 (14)	TP21.9x21.85x0.85	482.24	1764.36	0.273	0.00	1764.36	0.000
L15	89 - 88.25 (15)	TP22.0498x21.9x0.8375	496.66	1766.86	0.281	0.00	1766.86	0.000
L16	88.25 - 88 (16)	TP22.0998x22.0498x0.6125	501.47	1340.04	0.374	0.00	1340.04	0.000
L17	88 - 87	TP23.0986x22.0998x0.5875	520.78	1314.22	0.396	0.00	1314.22	0.000
	87 - 86		540.16	1338.84	0.403	0.00	1338.84	0.000
	86 - 85		559.62	1363.69	0.410	0.00	1363.69	0.000
	85 - 84		579.15	1388.77	0.417	0.00	1388.77	0.000
	84 - 83		598.87	1414.07	0.424	0.00	1414.07	0.000
L18	83 - 82	TP24.0975x23.0986x0.575	618.69	1411.30	0.438	0.00	1411.30	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
	82 - 81		638.59	1436.53	0.445	0.00	1436.53	0.000
	81 - 80		658.55	1461.98	0.450	0.00	1461.98	0.000
	80 - 79		678.59	1487.67	0.456	0.00	1487.67	0.000
	79 - 78		698.70	1513.57	0.462	0.00	1513.57	0.000
L19	78 - 77 (19)	TP24.2972x24.0975x0.575	718.88	1539.70	0.467	0.00	1539.70	0.000
L20	77 - 76.75 (20)	TP24.3472x24.2972x0.7625	723.93	2002.34	0.362	0.00	2002.34	0.000
L21	76.75 - 75.75	TP25.346x24.3472x0.7375	744.21	1976.38	0.377	0.00	1976.38	0.000
	75.75 - 74.75		764.56	2010.18	0.380	0.00	2010.18	0.000
	74.75 - 73.75		784.99	2044.28	0.384	0.00	2044.28	0.000
	73.75 - 72.75		805.50	2078.66	0.388	0.00	2078.66	0.000
	72.75 - 71.75		826.09	2113.32	0.391	0.00	2113.32	0.000
L22	71.75 - 70.75	TP26.3449x25.346x0.7125	846.76	2081.74	0.407	0.00	2081.74	0.000
	70.75 - 69.75		867.50	2115.84	0.410	0.00	2115.84	0.000
	69.75 - 68.75		888.32	2150.22	0.413	0.00	2150.22	0.000
	68.75 - 67.75		909.25	2184.87	0.416	0.00	2184.87	0.000
	67.75 - 66.75		930.26	2219.80	0.419	0.00	2219.80	0.000
L23	66.75 - 65.625	TP27.2439x26.3449x0.7	953.99	2223.01	0.429	0.00	2223.01	0.000
	65.625 - 64.5		977.82	2262.32	0.432	0.00	2262.32	0.000
	64.5 - 63.375		1001.74	2301.97	0.435	0.00	2301.97	0.000
	63.375 - 62.25		1025.77	2341.96	0.438	0.00	2341.96	0.000
L24	62.25 - 62 (24)	TP27.2938x27.2439x0.7	1031.13	2350.89	0.439	0.00	2350.89	0.000
L25	62 - 60.75	TP27.7933x27.2938x0.4	1057.94	1415.46	0.747	0.00	1415.46	0.000
	60.75 - 59.5		1084.85	1441.81	0.752	0.00	1441.81	0.000
L26	59.5 - 59.25 (26)	TP27.8432x27.7933x0.75	1090.24	2610.84	0.418	0.00	2610.84	0.000
L27	59.25 - 58.25	TP28.8421x27.8432x0.725	1111.91	2568.72	0.433	0.00	2568.72	0.000
	58.25 - 57.25		1133.70	2606.92	0.435	0.00	2606.92	0.000
	57.25 - 56.25		1155.63	2645.39	0.437	0.00	2645.39	0.000
	56.25 - 55.25		1177.68	2684.15	0.439	0.00	2684.15	0.000
	55.25 - 54.25		1199.88	2723.19	0.441	0.00	2723.19	0.000
L28	54.25 - 53.1875	TP30.64x28.8421x0.7	1223.59	2676.72	0.457	0.00	2676.72	0.000
	53.1875 - 52.125		1247.46	2717.43	0.459	0.00	2717.43	0.000
	52.125 - 51.0625		1271.46	2758.44	0.461	0.00	2758.44	0.000
	51.0625 - 50		1295.61	2799.78	0.463	0.00	2799.78	0.000
	50 - 45.25		693.15	2988.28	0.232	0.00	2988.28	0.000
L29	50 - 45.25	TP30.192x29.1911x0.7625	712.44	3126.48	0.228	0.00	3126.48	0.000
	45.25 - 45		1411.49	3137.28	0.450	0.00	3137.28	0.000
L30	45 - 43.9375	TP31.0427x30.192x0.75	1436.62	3135.14	0.458	0.00	3135.14	0.000
	43.9375 - 42.875		1461.89	3180.83	0.460	0.00	3180.83	0.000
	42.875 - 41.8125		1487.30	3226.86	0.461	0.00	3226.86	0.000
	41.8125 - 40.75		1512.84	3273.21	0.462	0.00	3273.21	0.000
L31	40.75 - 40.5 (31)	TP31.0928x31.0427x0.7625	1518.88	3334.78	0.455	0.00	3334.78	0.000
L32	40.5 - 39.3125	TP32.0436x31.0928x0.75	1547.63	3336.45	0.464	0.00	3336.45	0.000
	39.3125 - 38.125		1576.54	3389.15	0.465	0.00	3389.15	0.000
	38.125 - 36.9375		1605.63	3442.26	0.466	0.00	3442.26	0.000
	36.9375 - 35.75		1634.88	3495.78	0.468	0.00	3495.78	0.000
L33	35.75 - 35.5 (33)	TP32.0937x32.0436x0.6875	1641.07	3234.12	0.507	0.00	3234.12	0.000

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 $\frac{M_{uy}}{\phi M_{ny}}$
L34	35.5 - 34.5	TP33.0946x32.0937x0.675	1665.86	3220.18	0.517	0.00	3220.18	0.000
	34.5 - 33.5		1690.78	3261.51	0.518	0.00	3261.51	0.000
	33.5 - 32.5		1715.80	3303.10	0.519	0.00	3303.10	0.000
	32.5 - 31.5		1740.94	3344.96	0.520	0.00	3344.96	0.000
	31.5 - 30.5		1766.20	3387.08	0.521	0.00	3387.08	0.000
L35	30.5 - 29.75 (35)	TP33.2447x33.0946x0.4	1785.21	2077.73	0.859	0.00	2077.73	0.000
L36	29.75 - 29.5 (36)	TP33.2947x33.2447x0.675	1791.56	3429.47	0.522	0.00	3429.47	0.000
L37	29.5 - 28.5	TP34.2956x33.2947x0.6625	1817.03	3411.72	0.533	0.00	3411.72	0.000
	28.5 - 27.5		1842.60	3453.86	0.533	0.00	3453.86	0.000
	27.5 - 26.5		1868.29	3496.26	0.534	0.00	3496.26	0.000
	26.5 - 25.5		1894.09	3538.93	0.535	0.00	3538.93	0.000
	25.5 - 24.5		1920.00	3581.84	0.536	0.00	3581.84	0.000
L38	24.5 - 23.5	TP35.2965x34.2956x0.65	1946.03	3560.57	0.547	0.00	3560.57	0.000
	23.5 - 22.5		1972.15	3603.21	0.547	0.00	3603.21	0.000
	22.5 - 21.5		1998.40	3646.10	0.548	0.00	3646.10	0.000
	21.5 - 20.5		2024.75	3689.25	0.549	0.00	3689.25	0.000
	20.5 - 19.5		2051.22	3732.65	0.550	0.00	3732.65	0.000
L39	19.5 - 18.5	TP36.2974x35.2965x0.6375	2077.79	3707.68	0.560	0.00	3707.68	0.000
	18.5 - 17.5		2104.48	3750.77	0.561	0.00	3750.77	0.000
	17.5 - 16.5		2131.28	3794.10	0.562	0.00	3794.10	0.000
	16.5 - 15.5		2158.19	3837.69	0.562	0.00	3837.69	0.000
	15.5 - 14.5		2185.21	3881.53	0.563	0.00	3881.53	0.000
L40	14.5 - 13.5	TP36.6978x36.2974x0.6375	2212.34	3925.61	0.564	0.00	3925.61	0.000
	13.5 - 12.5		2239.58	3969.95	0.564	0.00	3969.95	0.000
L41	12.5 - 12.25 (41)	TP36.7478x36.6978x0.5625	2246.42	3534.64	0.636	0.00	3534.64	0.000
L42	12.25 - 10.75 (42)	TP37.0481x36.7478x0.5625	2287.55	3594.00	0.636	0.00	3594.00	0.000
L43	10.75 - 10.5 (43)	TP37.0981x37.0481x0.6375	2294.43	4059.37	0.565	0.00	4059.37	0.000
L44	10.5 - 9.5	TP38.099x37.0981x0.625	2322.04	4028.08	0.576	0.00	4028.08	0.000
	9.5 - 8.5		2349.78	4072.55	0.577	0.00	4072.55	0.000
	8.5 - 7.5		2377.66	4117.26	0.577	0.00	4117.26	0.000
	7.5 - 6.5		2405.65	4162.21	0.578	0.00	4162.21	0.000
	6.5 - 5.5		2433.78	4207.41	0.578	0.00	4207.41	0.000
L45	5.5 - 4.5	TP39.0999x38.099x0.6125	2462.03	4171.94	0.590	0.00	4171.94	0.000
	4.5 - 3.5		2490.39	4216.73	0.591	0.00	4216.73	0.000
	3.5 - 2.5		2518.88	4261.77	0.591	0.00	4261.77	0.000
	2.5 - 1.5		2547.48	4307.03	0.591	0.00	4307.03	0.000
	1.5 - 0.5		2576.22	4352.55	0.592	0.00	4352.55	0.000
L46	0.5 - 0 (46)	TP39.2x39.0999x0.6125	2590.63	4375.39	0.592	0.00	4375.39	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	133 - 132	TP14.4795x13.48x0.1875	1.83	300.22	0.006	0.26	334.26	0.001
	132 - 131		1.84	304.67	0.006	0.26	344.28	0.001
	131 - 130		6.20	309.12	0.020	0.96	354.45	0.003
	130 - 129		6.30	313.57	0.020	0.82	364.77	0.002
	129 - 128		6.36	318.01	0.020	0.82	375.24	0.002
L2	128 - 127	TP15.479x14.4795x0.1875	6.41	322.46	0.020	0.82	385.85	0.002
	127 - 126		6.47	326.91	0.020	0.82	396.62	0.002
	126 - 125		6.53	331.36	0.020	0.82	407.53	0.002
	125 - 124		6.58	335.81	0.020	0.82	418.59	0.002
	124 - 123		6.64	340.26	0.020	0.82	429.80	0.002

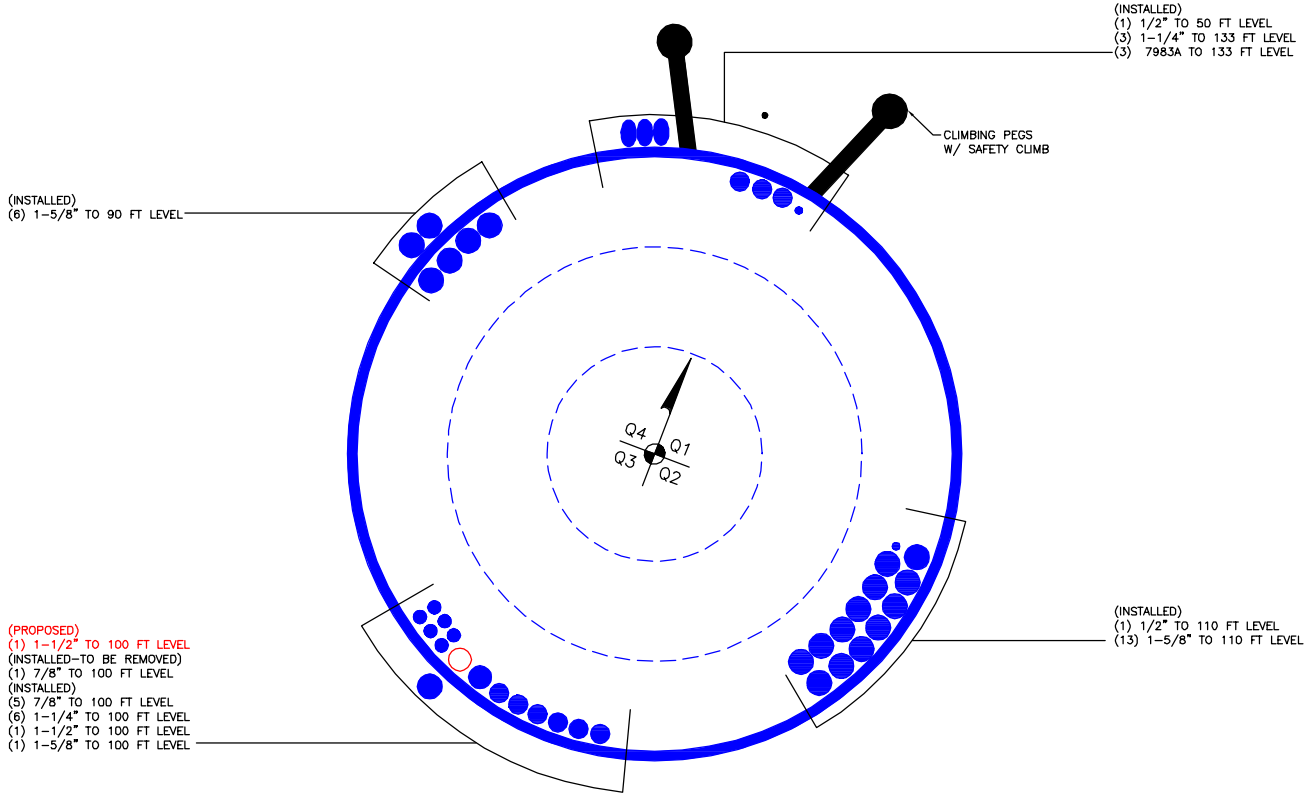
Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L3	123 - 122	TP16.4786x15.479x0.1875	6.70	344.70	0.019	0.82	441.16	0.002
	122 - 121		6.76	349.15	0.019	0.82	452.66	0.002
	121 - 120		6.81	353.60	0.019	0.82	464.31	0.002
	120 - 119		6.87	358.05	0.019	0.82	476.11	0.002
	119 - 118		6.93	362.50	0.019	0.82	488.06	0.002
L4	118 - 117	TP17.4781x16.4786x0.1875	6.99	365.77	0.019	0.82	498.56	0.002
	117 - 116		7.05	368.79	0.019	0.82	508.81	0.002
	116 - 115		7.11	371.78	0.019	0.82	519.12	0.002
	115 - 114		7.17	374.73	0.019	0.82	529.48	0.002
	114 - 113		7.23	377.65	0.019	0.82	539.89	0.002
L5	113 - 112	TP18.4776x17.4781x0.1875	7.29	380.53	0.019	0.82	550.35	0.001
	112 - 111		7.35	383.38	0.019	0.82	560.86	0.001
	111 - 110		7.41	386.20	0.019	0.82	571.41	0.001
	110 - 109		12.74	388.99	0.033	0.81	582.00	0.001
	109 - 108		12.80	391.74	0.033	0.81	592.64	0.001
L6	108 - 106.917	TP19.1273x18.4776x0.1875	12.86	394.68	0.033	0.81	604.21	0.001
	106.917 - 105.833		12.92	397.58	0.033	0.81	615.82	0.001
	105.833 - 104.75		12.99	400.44	0.032	0.81	627.47	0.001
L7	104.75 - 104.5 (7)	TP19.1773x19.1273x0.425	13.00	945.79	0.014	0.81	1455.17	0.001
L8	104.5 - 103.5	TP20.1768x19.1773x0.4063	13.07	914.61	0.014	0.81	1424.76	0.001
	103.5 - 102.5		13.14	924.24	0.014	0.81	1455.15	0.001
	102.5 - 101.5		13.21	933.88	0.014	0.81	1485.87	0.001
	101.5 - 100.5		13.28	943.52	0.014	0.81	1516.91	0.001
	100.5 - 99.5		17.60	953.16	0.018	0.81	1548.27	0.001
L9	99.5 - 98.75 (9)	TP20.3267x20.1768x0.4063	17.66	960.38	0.018	0.81	1571.99	0.001
L10	98.75 - 98.5 (10)	TP20.3767x20.3267x0.4063	17.68	962.79	0.018	0.81	1579.94	0.001
L11	98.5 - 97.3333	TP21.81x20.3767x0.6625	17.79	1568.28	0.011	0.81	2549.24	0.000
	97.3333 - 96.1667		17.89	1586.62	0.011	0.81	2609.84	0.000
	96.1667 - 95		18.00	1604.96	0.011	0.81	2671.17	0.000
	95 - 91.33		9.24	1662.64	0.006	0.40	2868.69	0.000
L12	95 - 91.33	TP21.7002x20.7014x0.7125	9.17	1752.14	0.005	0.41	2956.47	0.000
	91.33 - 90		18.53	1774.61	0.010	0.81	3033.62	0.000
L13	90 - 89.25 (13)	TP21.85x21.7002x0.45	19.18	1142.82	0.017	0.81	2008.72	0.000
L14	89.25 - 89 (14)	TP21.9x21.85x0.85	19.20	2123.36	0.009	0.81	3625.53	0.000
L15	89 - 88.25 (15)	TP22.0498x21.9x0.8375	19.26	2108.26	0.009	0.81	3629.61	0.000
L16	88.25 - 88 (16)	TP22.0998x22.0498x0.6125	19.28	1561.85	0.012	0.81	2743.09	0.000
L17	88 - 87	TP23.0986x22.0998x0.5875	19.35	1513.77	0.013	0.81	2688.98	0.000
	87 - 86		19.43	1527.70	0.013	0.81	2739.13	0.000
	86 - 85		19.50	1541.63	0.013	0.81	2789.74	0.000
	85 - 84		19.57	1555.56	0.013	0.81	2840.82	0.000
	84 - 83		19.79	1569.48	0.013	2.00	2892.36	0.001
L18	83 - 82	TP24.0975x23.0986x0.575	19.87	1550.58	0.013	2.00	2885.94	0.001
	82 - 81		19.94	1564.21	0.013	2.00	2937.32	0.001
	81 - 80		20.01	1577.84	0.013	2.00	2989.17	0.001
	80 - 79		20.08	1591.47	0.013	2.00	3041.46	0.001
	79 - 78		20.15	1605.10	0.013	2.00	3094.21	0.001
L19	78 - 77 (19)	TP24.2972x24.0975x0.575	20.23	1618.74	0.012	2.00	3147.41	0.001
L20	77 - 76.75 (20)	TP24.3472x24.2972x0.7625	20.24	2134.14	0.009	2.00	4103.93	0.000

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 $\frac{T_u}{\phi T_n}$
L21	76.75 - 75.75	TP25.346x24.3472x0.7375	20.32	2083.84	0.010	2.00	4048.93	0.000
	75.75 - 74.75		20.40	2101.32	0.010	2.00	4117.84	0.000
	74.75 - 73.75		20.48	2118.81	0.010	2.00	4187.34	0.000
	73.75 - 72.75		20.56	2136.29	0.010	2.00	4257.42	0.000
	72.75 - 71.75		20.64	2153.77	0.010	2.00	4328.08	0.000
L22	71.75 - 70.75	TP26.3449x25.346x0.7125	20.71	2099.77	0.010	2.00	4261.62	0.000
	70.75 - 69.75		20.79	2116.66	0.010	2.00	4331.10	0.000
	69.75 - 68.75		20.87	2133.55	0.010	2.00	4401.15	0.000
	68.75 - 67.75		20.98	2150.45	0.010	1.13	4471.76	0.000
	67.75 - 66.75		21.06	2167.34	0.010	1.13	4542.93	0.000
L23	66.75 - 65.625	TP27.2439x26.3449x0.7	21.15	2149.02	0.010	1.13	4548.40	0.000
	65.625 - 64.5		21.24	2167.69	0.010	1.13	4628.47	0.000
	64.5 - 63.375		21.32	2186.36	0.010	1.13	4709.24	0.000
	63.375 - 62.25		21.41	2205.03	0.010	1.13	4790.71	0.000
L24	62.25 - 62 (24)	TP27.2938x27.2439x0.7	21.42	2209.18	0.010	1.13	4808.91	0.000
L25	62 - 60.75	TP27.7933x27.2938x0.4	21.51	1288.48	0.017	1.13	2884.38	0.000
	60.75 - 59.5		21.59	1300.34	0.017	1.13	2937.95	0.000
L26	59.5 - 59.25 (26)	TP27.8432x27.7933x0.75	21.60	2411.43	0.009	1.13	5343.01	0.000
L27	59.25 - 58.25	TP28.8421x27.8432x0.725	21.74	2350.38	0.009	1.13	5254.85	0.000
	58.25 - 57.25		21.87	2367.57	0.009	1.14	5332.65	0.000
	57.25 - 56.25		22.00	2384.76	0.009	1.14	5411.02	0.000
	56.25 - 55.25		22.14	2401.95	0.009	1.15	5489.98	0.000
	55.25 - 54.25		22.27	2419.14	0.009	1.15	5569.49	0.000
L28	54.25 - 53.1875	TP30.64x28.8421x0.7	22.40	2355.43	0.010	1.15	5472.47	0.000
	53.1875 - 52.125		22.54	2373.06	0.009	1.16	5555.37	0.000
	52.125 - 51.0625		22.67	2390.69	0.009	1.16	5638.89	0.000
	51.0625 - 50		22.81	2408.32	0.009	1.17	5723.03	0.000
	50 - 45.25		11.80	2487.15	0.005	0.64	6106.85	0.000
L29	50 - 45.25	TP30.192x29.1911x0.7625	11.79	2658.49	0.004	0.64	6394.65	0.000
	45.25 - 45		23.59	2663.02	0.009	1.28	6416.64	0.000
L30	45 - 43.9375	TP31.0427x30.192x0.75	23.73	2639.41	0.009	1.28	6410.97	0.000
	43.9375 - 42.875		23.86	2658.34	0.009	1.29	6504.02	0.000
	42.875 - 41.8125		23.99	2677.27	0.009	1.29	6597.75	0.000
	41.8125 - 40.75		24.12	2696.20	0.009	1.30	6692.14	0.000
L31	40.75 - 40.5 (31)	TP31.0928x31.0427x0.7625	24.14	2744.53	0.009	1.30	6818.87	0.000
L32	40.5 - 39.3125	TP32.0436x31.0928x0.75	24.30	2721.81	0.009	1.31	6820.92	0.000
	39.3125 - 38.125		24.44	2742.97	0.009	1.31	6928.22	0.000
	38.125 - 36.9375		24.58	2764.13	0.009	1.32	7036.37	0.000
	36.9375 - 35.75		24.72	2785.28	0.009	1.33	7145.34	0.000
L33	35.75 - 35.5 (33)	TP32.0937x32.0436x0.6875	24.74	2562.36	0.010	1.33	6605.99	0.000
L34	35.5 - 34.5	TP33.0946x32.0937x0.675	24.87	2532.81	0.010	1.34	6576.34	0.000
	34.5 - 33.5		24.98	2548.84	0.010	1.35	6660.46	0.000
	33.5 - 32.5		25.10	2564.88	0.010	1.36	6745.11	0.000
	32.5 - 31.5		25.22	2580.91	0.010	1.36	6830.29	0.000
	31.5 - 30.5		25.33	2596.95	0.010	1.37	6916.01	0.000
L35	30.5 - 29.75 (35)	TP33.2447x33.0946x0.4	25.40	1559.11	0.016	1.38	4230.34	0.000

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 $\frac{T_u}{\phi T_n}$
L36	29.75 - 29.5 (36)	TP33.2947x33.2447x0.675	25.42	2612.98	0.010	1.38	7002.27	0.000
L37	29.5 - 28.5	TP34.2956x33.2947x0.6625	25.54	2581.32	0.010	1.39	6964.83	0.000
	28.5 - 27.5		25.65	2597.05	0.010	1.40	7050.58	0.000
	27.5 - 26.5		25.76	2612.79	0.010	1.41	7136.86	0.000
	26.5 - 25.5		25.87	2628.53	0.010	1.42	7223.65	0.000
	25.5 - 24.5		25.98	2644.27	0.010	1.43	7310.97	0.000
L38	24.5 - 23.5	TP35.2965x34.2956x0.65	26.09	2610.78	0.010	1.44	7266.37	0.000
	23.5 - 22.5		26.21	2626.22	0.010	1.45	7353.12	0.000
	22.5 - 21.5		26.32	2641.66	0.010	1.46	7440.37	0.000
	21.5 - 20.5		26.43	2657.11	0.010	1.47	7528.16	0.000
	20.5 - 19.5		26.54	2672.55	0.010	1.48	7616.45	0.000
L39	19.5 - 18.5	TP36.2974x35.2965x0.6375	26.65	2637.24	0.010	1.49	7564.30	0.000
	18.5 - 17.5		26.76	2652.39	0.010	1.50	7651.94	0.000
	17.5 - 16.5		26.87	2667.53	0.010	1.51	7740.09	0.000
	16.5 - 15.5		26.98	2682.67	0.010	1.53	7828.75	0.000
	15.5 - 14.5		27.10	2697.82	0.010	1.54	7917.91	0.000
L40	14.5 - 13.5	TP36.6978x36.2974x0.6375	27.21	2712.96	0.010	1.55	8007.57	0.000
	13.5 - 12.5		27.32	2728.11	0.010	1.56	8097.74	0.000
L41	12.5 - 12.25 (41)	TP36.7478x36.6978x0.5625	27.33	2415.50	0.011	1.56	7204.72	0.000
L42	12.25 - 10.75 (42)	TP37.0481x36.7478x0.5625	27.55	2435.54	0.011	1.56	7325.41	0.000
L43	10.75 - 10.5 (43)	TP37.0981x37.0481x0.6375	27.56	2758.40	0.010	1.56	8279.60	0.000
L44	10.5 - 9.5	TP38.099x37.0981x0.625	27.70	2720.08	0.010	1.55	8214.60	0.000
	9.5 - 8.5		27.82	2734.93	0.010	1.55	8305.02	0.000
	8.5 - 7.5		27.95	2749.78	0.010	1.54	8395.92	0.000
	7.5 - 6.5		28.08	2764.63	0.010	1.53	8487.33	0.000
	6.5 - 5.5		28.21	2779.47	0.010	1.52	8579.25	0.000
L45	5.5 - 4.5	TP39.0999x38.099x0.6125	28.33	2739.34	0.010	1.52	8505.75	0.000
	4.5 - 3.5		28.45	2753.89	0.010	1.52	8596.83	0.000
	3.5 - 2.5		28.57	2768.44	0.010	1.53	8688.42	0.000
	2.5 - 1.5		28.69	2782.99	0.010	1.53	8780.42	0.000
	1.5 - 0.5		28.81	2797.55	0.010	1.54	8873.00	0.000
L46	0.5 - 0 (46)	TP39.2x39.0999x0.6125	28.86	2804.82	0.010	1.54	8919.42	0.000

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 876317 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

21/9/2015	UPDATED PER WORK ORDER 1120561	AGC
2/12/2015	UPDATED PER WORK ORDER 1160372 1161339	NJH
14/03/16	UPDATED PER WORK ORDER 1206275	AMM
04/05/16	UPDATED PER WORK ORDER 1231179	ARR
05/08/16	UPDATED PER WORK ORDER 1257682	ADE
08/12/16	UPDATED PER WORK ORDER 1325869	ALM
26/01/17	UPDATED PER WORK ORDER 1354533	SF
10/08/17	UPDATED PER WORK ORDER 1437493	BMJ
16/07/18	UPDATED PER WORK ORDER 1603362	SL

DRAWN BY: **GSV**
CHECKED BY: **KAH**
DRAWING DATE: **30/11/07**

SITE NUMBER:
SITE NAME:

SITE NAME

WATERBURY

BUSINESS UNIT NUMBER

876317

SITE ADDRESS

150 MATTATUCK HEIGHTS
WATERBURY, CT 06705
NEW HAVEN COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING

SCALE: 1" = 1'-0" | 1

PLOT DATE: 9/26/2018 FILENAME: 876317_BASELEVEL.DWG
Xref R:\TEMPLATES\TYPICAL BLOCKS FOR TEMPLATES\TITLE BLOCK STD-VER 5.1.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- G

Site BU: 876317

Work Order: 1603364

Copyright © 2018 Crown Castle

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	133	41.67	3.67	12	13.48	21.81	0.1875	Auto	A572-65
2	95	49.75	4.75	12	20.70	30.64	0.25	Auto	A572-65
3	50	50	0	12	29.19	39.2	0.3125	Auto	A572-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12
1	0	29.75	plate	Reinf. Bar #1	2		x								x		
2	0	10.75	plate	Reinf. Bar #1A	2					x		x					
3	10.75	29.75	plate	Reinf. Bar #1B	1						x						
4	29.75	59.5	plate	Reinf. Bar #2	3		x				x				x		
5	59.5	89.25	plate	Reinf. Bar #3	3		x				x				x		
6	89.25	98.75	plate	Reinf. Bar #4	3		x				x				x		
7	12.5	35.75	plate	SR1	2							x				x	
8	12.5	40.75	plate	SR2	1		x										
9	35.75	62.25	plate	SR3	3				x				x				x
10	62.25	77	plate	SR4	3			x				x				x	
11	88.25	104.75	plate	SR5	3			x				x				x	
12																	

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Length (in)	Top Termination Length (in)	L_u (in)	Net Area (in^2)	Bolt Hole Size (in)	Reinforcement Material
1	6.875	1.25	8.59375	0.625	n/a	36.000	15.000	6.991	1.2200	A572-65
2	6.875	1.25	8.59375	0.625	n/a	42.000	15.000	6.991	1.2200	A572-65
3	6.875	1.25	8.59375	0.625	42.000	36.000	15.000	6.991	1.2200	A572-65
4	6.625	1.25	8.28125	0.625	3.000	30.000	18.000	6.678	1.2200	A572-65
5	5.5	1.25	6.875	0.625	3.000	18.000	18.000	5.272	1.2200	A572-65
6	3.625	1.25	4.53125	0.625	3.000	15.000	24.000	2.928	1.2200	A572-65
7	4	1	4	0.5	21.000	21.000	20.000	2.750	1.1875	A514-GR100
8	4	1	4	0.5	21.000	21.000	20.000	2.750	1.1875	A514-GR100
9	4	1	4	0.5	21.000	21.000	20.000	2.750	1.1875	A514-GR100
10	4	1	4	0.5	21.000	21.000	20.000	2.750	1.1875	A514-GR100
11	4	1	4	0.5	21.000	21.000	20.000	2.750	1.1875	A514-GR100

TNX Geometry Input

Increment (ft): 5

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	133 - 128	5		12	13.480	14.480	0.1875	A572-65	1.000
2	128 - 123	5		12	14.480	15.479	0.1875	A572-65	1.000
3	123 - 118	5		12	15.479	16.479	0.1875	A572-65	1.000
4	118 - 113	5		12	16.479	17.478	0.1875	A572-65	1.000
5	113 - 108	5		12	17.478	18.478	0.1875	A572-65	1.000
6	108 - 104.75	3.25		12	18.478	19.127	0.1875	A572-65	1.000
7	104.75 - 104.5	0.25		12	19.127	19.177	0.425	A572-65	0.915
8	104.5 - 99.5	5		12	19.177	20.177	0.40625	A572-65	0.931
9	99.5 - 98.75	0.75		12	20.177	20.327	0.40625	A572-65	0.928
10	98.75 - 98.5	0.25		12	20.327	20.377	0.40625	A572-65	0.927
11	98.5 - 95	7.17	3.67	12	20.377	21.810	0.6625	A572-65	0.878
12	95 - 90	5		12	20.701	21.700	0.7125	A572-65	0.891
13	90 - 89.25	0.75		12	21.700	21.850	0.45	A572-65	0.948
14	89.25 - 89	0.25		12	21.850	21.900	0.85	A572-65	0.870
15	89 - 88.25	0.75		12	21.900	22.050	0.8375	A572-65	0.878
16	88.25 - 88	0.25		12	22.050	22.100	0.6125	A572-65	0.902
17	88 - 83	5		12	22.100	23.099	0.5875	A572-65	0.917
18	83 - 78	5		12	23.099	24.097	0.575	A572-65	0.915
19	78 - 77	1		12	24.097	24.297	0.575	A572-65	0.911
20	77 - 76.75	0.25		12	24.297	24.347	0.7625	A572-65	0.899
21	76.75 - 71.75	5		12	24.347	25.346	0.7375	A572-65	0.905
22	71.75 - 66.75	5		12	25.346	26.345	0.7125	A572-65	0.913
23	66.75 - 62.25	4.5		12	26.345	27.244	0.7	A572-65	0.909
24	62.25 - 62	0.25		12	27.244	27.294	0.7	A572-65	0.908
25	62 - 59.5	2.5		12	27.294	27.793	0.4	A572-65	0.969
26	59.5 - 59.25	0.25		12	27.793	27.843	0.75	A572-65	0.903
27	59.25 - 54.25	5		12	27.843	28.842	0.725	A572-65	0.913
28	54.25 - 50	9	4.75	12	28.842	30.640	0.7	A572-65	0.927
29	50 - 45	5		12	29.191	30.192	0.7625	A572-65	0.927
30	45 - 40.75	4.25		12	30.192	31.043	0.75	A572-65	0.927
31	40.75 - 40.5	0.25		12	31.043	31.093	0.7625	A572-65	0.965
32	40.5 - 35.75	4.75		12	31.093	32.044	0.75	A572-65	0.964
33	35.75 - 35.5	0.25		12	32.044	32.094	0.6875	A572-65	0.991
34	35.5 - 30.5	5		12	32.094	33.095	0.675	A572-65	0.992
35	30.5 - 29.75	0.75		12	33.095	33.245	0.4	A572-65	1.067
36	29.75 - 29.5	0.25		12	33.245	33.295	0.675	A572-65	1.002
37	29.5 - 24.5	5		12	33.295	34.296	0.6625	A572-65	1.004
38	24.5 - 19.5	5		12	34.296	35.297	0.65	A572-65	1.007
39	19.5 - 14.5	5		12	35.297	36.297	0.6375	A572-65	1.012
40	14.5 - 12.5	2		12	36.297	36.698	0.6375	A572-65	1.006
41	12.5 - 12.25	0.25		12	36.698	36.748	0.5625	A572-65	0.953
42	12.25 - 10.75	1.5		12	36.748	37.048	0.5625	A572-65	0.950
43	10.75 - 10.5	0.25		12	37.048	37.098	0.6375	A572-65	0.955
44	10.5 - 5.5	5		12	37.098	38.099	0.625	A572-65	0.961
45	5.5 - 0.5	5		12	38.099	39.100	0.6125	A572-65	0.968
46	0.5 - 0	0.5		12	39.100	39.200	0.6125	A572-65	0.967

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	133 - 128	3.30	29.21	6.36
2	128 - 123	3.49	61.69	6.64
3	123 - 118	3.72	95.60	6.93
4	118 - 113	3.97	130.98	7.23
5	113 - 108	7.05	178.64	12.80
6	108 - 104.75	7.32	220.51	12.99
7	104.75 - 104.5	7.36	223.76	13.00
8	104.5 - 99.5	11.23	291.73	17.60
9	99.5 - 98.75	11.33	304.95	17.66
10	98.75 - 98.5	11.37	309.37	17.68
11	98.5 - 95	12.02	371.78	18.00
12	95 - 90	13.60	463.09	18.53
13	90 - 89.25	14.02	477.44	19.18
14	89.25 - 89	14.09	482.24	19.20
15	89 - 88.25	14.27	496.66	19.26
16	88.25 - 88	14.32	501.47	19.28
17	88 - 83	15.31	598.87	19.79
18	83 - 78	16.34	698.70	20.15
19	78 - 77	16.55	718.88	20.23
20	77 - 76.75	16.62	723.93	20.24
21	76.75 - 71.75	17.89	826.09	20.64
22	71.75 - 66.75	19.19	930.26	21.06
23	66.75 - 62.25	20.38	1025.77	21.41
24	62.25 - 62	20.45	1031.12	21.42
25	62 - 59.5	20.93	1084.85	21.59
26	59.5 - 59.25	21.02	1090.24	21.60
27	59.25 - 54.25	22.44	1199.88	22.27
28	54.25 - 50	23.67	1295.61	22.81
29	50 - 45	26.48	1411.49	23.59
30	45 - 40.75	27.83	1512.84	24.12
31	40.75 - 40.5	27.92	1518.88	24.14
32	40.5 - 35.75	29.53	1634.89	24.72
33	35.75 - 35.5	29.62	1641.07	24.74
34	35.5 - 30.5	31.27	1766.20	25.33
35	30.5 - 29.75	31.46	1785.21	25.40
36	29.75 - 29.5	31.55	1791.56	25.42
37	29.5 - 24.5	33.25	1920.00	25.98
38	24.5 - 19.5	34.99	2051.22	26.54
39	19.5 - 14.5	36.75	2185.21	27.10
40	14.5 - 12.5	37.46	2239.59	27.32
41	12.5 - 12.25	37.55	2246.41	27.33
42	12.25 - 10.75	38.00	2287.55	27.55
43	10.75 - 10.5	38.11	2294.43	27.56
44	10.5 - 5.5	39.83	2433.78	28.21
45	5.5 - 0.5	41.60	2576.21	28.81
46	0.5 - 0	41.78	2590.62	28.86

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
133 - 128	Pole	TP14.48x13.48x0.1875	Pole	16.4%	Pass
128 - 123	Pole	TP15.479x14.48x0.1875	Pole	29.7%	Pass
123 - 118	Pole	TP16.479x15.479x0.1875	Pole	40.3%	Pass
118 - 113	Pole	TP17.478x16.479x0.1875	Pole	49.8%	Pass
113 - 108	Pole	TP18.478x17.478x0.1875	Pole	62.2%	Pass
108 - 104.75	Pole	TP19.127x18.478x0.1875	Pole	72.3%	Pass
104.75 - 104.5	Pole + Reinf.	TP19.177x19.127x0.425	Reinf. 11 Bolt-Shaft Bearing	45.7%	Pass
104.5 - 99.5	Pole + Reinf.	TP20.177x19.177x0.4063	Reinf. 11 Tension Rupture	51.1%	Pass
99.5 - 98.75	Pole + Reinf.	TP20.327x20.177x0.4063	Reinf. 11 Tension Rupture	52.9%	Pass
98.75 - 98.5	Pole + Reinf.	TP20.377x20.327x0.4063	Reinf. 11 Tension Rupture	53.4%	Pass
98.5 - 95	Pole + Reinf.	TP21.81x20.377x0.6625	Reinf. 6 Tension Rupture	56.5%	Pass
95 - 90	Pole + Reinf.	TP21.7x20.701x0.7125	Reinf. 6 Tension Rupture	61.5%	Pass
90 - 89.25	Pole + Reinf.	TP21.85x21.7x0.45	Reinf. 11 Tension Rupture	63.9%	Pass
89.25 - 89	Pole + Reinf.	TP21.9x21.85x0.85	Reinf. 5 Bolt Shear	60.6%	Pass
89 - 88.25	Pole + Reinf.	TP22.05x21.9x0.8375	Reinf. 5 Tension Rupture	46.2%	Pass
88.25 - 88	Pole + Reinf.	TP22.1x22.05x0.6125	Reinf. 5 Tension Rupture	61.6%	Pass
88 - 83	Pole + Reinf.	TP23.099x22.1x0.5875	Reinf. 5 Tension Rupture	69.0%	Pass
83 - 78	Pole + Reinf.	TP24.097x23.099x0.575	Reinf. 5 Tension Rupture	75.7%	Pass
78 - 77	Pole + Reinf.	TP24.297x24.097x0.575	Reinf. 5 Tension Rupture	77.0%	Pass
77 - 76.75	Pole + Reinf.	TP24.347x24.297x0.7625	Reinf. 5 Tension Rupture	59.1%	Pass
76.75 - 71.75	Pole + Reinf.	TP25.346x24.347x0.7375	Reinf. 5 Tension Rupture	63.9%	Pass
71.75 - 66.75	Pole + Reinf.	TP26.345x25.346x0.7125	Reinf. 5 Tension Rupture	68.3%	Pass
66.75 - 62.25	Pole + Reinf.	TP27.244x26.345x0.7	Reinf. 5 Tension Rupture	71.9%	Pass
62.25 - 62	Pole + Reinf.	TP27.294x27.244x0.7	Reinf. 5 Tension Rupture	72.1%	Pass
62 - 59.5	Pole + Reinf.	TP27.793x27.294x0.4	Reinf. 9 Tension Rupture	98.1%	Pass
59.5 - 59.25	Pole + Reinf.	TP27.843x27.793x0.75	Reinf. 4 Bolt-Shaft Bearing	66.9%	Pass
59.25 - 54.25	Pole + Reinf.	TP28.842x27.843x0.725	Reinf. 4 Tension Rupture	68.4%	Pass
54.25 - 50	Pole + Reinf.	TP30.64x28.842x0.7	Reinf. 4 Tension Rupture	71.0%	Pass
50 - 45	Pole + Reinf.	TP30.192x29.191x0.7625	Reinf. 4 Tension Rupture	69.3%	Pass
45 - 40.75	Pole + Reinf.	TP31.043x30.192x0.75	Reinf. 4 Tension Rupture	71.4%	Pass
40.75 - 40.5	Pole + Reinf.	TP31.093x31.043x0.7625	Reinf. 4 Tension Rupture	71.4%	Pass
40.5 - 35.75	Pole + Reinf.	TP32.044x31.093x0.75	Reinf. 4 Tension Rupture	73.6%	Pass
35.75 - 35.5	Pole + Reinf.	TP32.094x32.044x0.6875	Reinf. 4 Tension Rupture	76.8%	Pass
35.5 - 30.5	Pole + Reinf.	TP33.095x32.094x0.675	Reinf. 4 Tension Rupture	79.1%	Pass
30.5 - 29.75	Pole + Reinf.	TP33.245x33.095x0.4	Reinf. 7 Tension Rupture	104.6%	Pass
29.75 - 29.5	Pole + Reinf.	TP33.295x33.245x0.675	Reinf. 1 Tension Rupture	77.6%	Pass
29.5 - 24.5	Pole + Reinf.	TP34.296x33.295x0.6625	Reinf. 1 Tension Rupture	79.7%	Pass
24.5 - 19.5	Pole + Reinf.	TP35.297x34.296x0.65	Reinf. 1 Tension Rupture	81.6%	Pass
19.5 - 14.5	Pole + Reinf.	TP36.297x35.297x0.6375	Reinf. 1 Tension Rupture	83.4%	Pass
14.5 - 12.5	Pole + Reinf.	TP36.698x36.297x0.6375	Reinf. 1 Tension Rupture	84.1%	Pass
12.5 - 12.25	Pole + Reinf.	TP36.748x36.698x0.5625	Reinf. 1 Tension Rupture	97.1%	Pass
12.25 - 10.75	Pole + Reinf.	TP37.048x36.748x0.5625	Reinf. 1 Tension Rupture	97.6%	Pass
10.75 - 10.5	Pole + Reinf.	TP37.098x37.048x0.6375	Reinf. 1 Tension Rupture	89.9%	Pass
10.5 - 5.5	Pole + Reinf.	TP38.099x37.098x0.625	Reinf. 1 Tension Rupture	91.6%	Pass
5.5 - 0.5	Pole + Reinf.	TP39.1x38.099x0.6125	Reinf. 1 Tension Rupture	93.1%	Pass
0.5 - 0	Pole + Reinf.	TP39.2x39.1x0.6125	Reinf. 1 Tension Rupture	93.3%	Pass
				Summary	
			Pole	95.3%	Pass
			Reinforcement	104.6%	Pass
			Overall	104.6%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity											
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11
133 - 128	225	n/a	225	8.62	n/a	8.62	16.4%											
128 - 123	276	n/a	276	9.22	n/a	9.22	29.7%											
123 - 118	334	n/a	334	9.82	n/a	9.82	40.3%											
118 - 113	399	n/a	399	10.42	n/a	10.42	49.8%											
113 - 108	472	n/a	472	11.03	n/a	11.03	62.2%											
108 - 104.75	524	n/a	524	11.42	n/a	11.42	72.3%											
104.75 - 104.5	528	619	1148	11.45	12.00	23.45	32.6%											45.7%
104.5 - 99.5	616	681	1298	12.05	12.00	24.05	40.5%											51.1%
99.5 - 98.75	630	691	1321	12.14	12.00	24.14	42.0%											52.9%
98.75 - 98.5	635	694	1329	12.17	12.00	24.17	42.5%											53.4%
98.5 - 95	703	1595	2298	12.59	25.59	38.19	31.0%						56.5%					38.4%
95 - 90	1015	1685	2700	17.24	25.59	42.84	30.8%						61.5%					41.7%
90 - 89.25	1037	792	1829	17.36	12.00	29.36	47.2%											63.9%
89.25 - 89	1044	2204	3248	17.40	32.63	50.03	26.9%					60.6%						36.4%
89 - 88.25	1066	2232	3298	17.52	32.63	50.15	27.5%					46.2%						37.2%
88.25 - 88	1073	1433	2506	17.56	20.63	38.19	36.7%					61.6%						
88 - 83	1227	1556	2783	18.37	20.63	38.99	41.8%					69.0%						
83 - 78	1395	1684	3079	19.17	20.63	39.79	46.6%					75.7%						
78 - 77	1431	1710	3141	19.33	20.63	39.96	47.5%					77.0%						
77 - 76.75	1440	2689	4128	19.37	32.63	52.00	36.5%					59.1%					47.6%	
76.75 - 71.75	1626	2901	4527	20.17	32.63	52.80	40.1%					63.9%					51.4%	
71.75 - 66.75	1828	3121	4949	20.98	32.63	53.60	43.6%					68.3%					55.0%	
66.75 - 62.25	2024	3326	5349	21.70	32.63	54.32	46.6%					71.9%					57.9%	
62.25 - 62	2035	3337	5372	21.74	32.63	54.36	46.8%					72.1%				58.1%		
62 - 59.5	2150	1252	3402	22.14	12.00	34.14	79.6%									98.1%		
59.5 - 59.25	2162	3932	6094	22.18	36.84	59.02	44.9%				66.9%					55.2%		
59.25 - 54.25	2405	4203	6608	22.98	36.84	59.83	47.9%				68.4%					58.0%		
54.25 - 50	2626	4441	7067	23.67	36.84	60.51	50.4%				71.0%					60.2%		
50 - 45	3431	4585	8016	30.02	36.84	66.87	45.3%				69.3%					58.8%		
45 - 40.75	3732	4834	8566	30.88	36.84	67.72	47.2%				71.4%					60.5%		
40.75 - 40.5	3757	5090	8847	30.93	40.84	71.77	47.3%				71.4%				51.5%	57.8%		
40.5 - 35.75	4116	5391	9507	31.88	40.84	72.73	49.3%				73.6%				53.2%	59.6%		
35.75 - 35.5	4132	4593	8726	31.93	36.84	68.78	53.7%				76.8%			63.1%	60.9%			
35.5 - 30.5	4535	4870	9406	32.94	36.84	69.78	55.9%				79.1%			65.0%	62.7%			
30.5 - 29.75	4610	1281	5891	33.09	12.00	45.09	95.3%							104.6%	99.3%			
29.75 - 29.5	4619	5072	9691	33.14	37.78	70.92	55.5%	77.6%		75.2%				64.4%	62.2%			
29.5 - 24.5	5052	5367	10419	34.15	37.78	71.93	57.7%	79.7%		77.2%				66.1%	63.9%			
24.5 - 19.5	5511	5671	11182	35.15	37.78	72.93	59.8%	81.6%		79.1%				67.7%	65.5%			
19.5 - 14.5	5998	5983	11981	36.16	37.78	73.94	61.9%	83.4%		80.9%				69.3%	67.0%			
14.5 - 12.5	6200	6110	12310	36.56	37.78	74.34	62.8%	84.1%		81.5%				69.9%	67.6%			
12.5 - 12.25	6221	4705	10926	36.61	25.78	62.39	69.8%	97.1%		97.1%								
12.25 - 10.75	6376	4779	11155	36.91	25.78	62.69	70.4%	97.6%		97.6%								
10.75 - 10.5	6437	6287	12724	36.96	34.38	71.34	66.4%	89.9%	80.0%									
10.5 - 5.5	6975	6617	13592	37.97	34.38	72.34	68.6%	91.6%	81.6%									
5.5 - 0.5	7543	6955	14498	38.97	34.38	73.35	70.7%	93.1%	83.1%									
0.5 - 0	7602	6989	14591	39.07	34.38	73.45	70.9%	93.3%	83.2%									

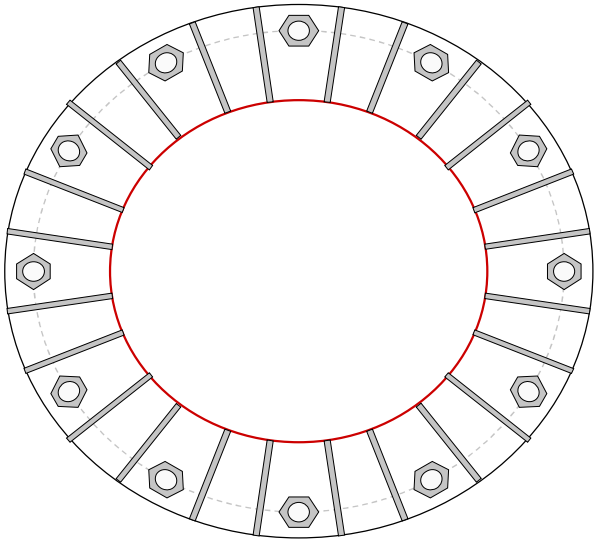
Note: Section capacity checked in 5 degree increments.

Monopole Base Plate Connection

Site Info	
BU #	876317
Site Name	WATERBURY
Order #	447386 Rev. 0

Analysis Considerations	
TIA-222 Revision	G
l_{ar} (in)	0
Eta Factor, η	0.5

Applied Loads	
Moment (kip-ft)	2590.62
Axial Force (kips)	41.78
Shear Force (kips)	28.86



Connection Properties

Anchor Rod Data

(12) 2-1/4" ø bolts (A615-75; Fy=75 ksi, Fu=100 ksi) on 55.16" BC

Base Plate Data

61.16" OD x 2.5" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

(24) 21.5"H x 11"W x 0.625"T, Notch: 0.75"
plate: Fy= 50 ksi ; weld: Fy= 80 ksi
horiz. weld: 0.25" groove, 45° dbl bevel, 0.5" fillet
vert. weld: 0.3125" fillet

Pole Data

39.2" x 0.3125" 12-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary		*(units of kips, kip-ft)*
Pu = 191.22	ϕPn = 260	Stress Rating
Vu = 2.4	ϕVn = n/a	75.4%
Mu = n/a	ϕMn = n/a	Pass

Base Plate Summary		
Max Stress (ksi):	16.65	
Allowable Stress (ksi):	54	
Stress Ratio:	30.8%	Pass

Stiffener Summary		
Horizontal Weld:	73.6%	Pass
Vertical Weld:	34.2%	Pass
Plate Flexure+Shear:	18.4%	Pass
Plate Tension+Shear:	35.2%	Pass
Plate Compression:	50.9%	Pass
Pole Summary		
Punching Shear:	15.4%	Pass

Pier and Pad Foundation

BU # :	876317
Site Name:	WATERBURY
App. Number:	447386 Rev. 0

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?:	☑

Superstructure Analysis Reactions		
Compression, P_{comp}:	41	kips
Base Shear, Vu_comp:	29	kips
Moment, M_u:	2579	ft-kips
Tower Height, **H**:	133	ft
BP Dist. Above Fdn, bp_{dist}:	0	in
Bolt Circle / Bearing Plate Width, **BC**:	55.16	in

Foundation Analysis Checks				
	Capacity	**Demand**	**Rating**	**Check**
Lateral (Sliding) (kips)	283.43	29.00	**10.2%**	**Pass**
Bearing Pressure (ksf)	22.50	3.81	**16.9%**	**Pass**
*Overturning (kip*ft)*	3811.91	2774.75	**72.8%**	**Pass**
*Pad Flexure (kip*ft)*	9014.86	1328.95	**14.7%**	**Pass**
Pad Shear - 1-way (kips)	1732.56	86.35	**5.0%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.000	**0.0%**	**Pass**

Soil Rating:	**72.8%**
Structural Rating:	**14.7%**

Pad Properties		
Depth, **D**:	6.75	ft
Pad Width, **W**:	20	ft
Pad Thickness, **T**:	6.75	ft
Pad Rebar Size, **Sp**:	10	
Pad Rebar Quantity, **mp**:	21	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	130	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	37	degrees
SPT Blow Count, N_{blows}:		
Base Friction, **μ**:	0.5	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	11.5	ft

<--Toggle between Gross and Net

Date: **August 1, 2018**

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

Maser Consulting, Connecticut
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
(732) 383-1950

Subject:	**Mount Structural Analysis Report**	
Carrier Designation:	**T-Mobile Tower Equipment**	
	T-Mobile Site Number:	CT11269B
	T-Mobile Site Name:	CT11269B
Crown Castle Designation:	**Crown Castle BU Number:**	876317
	Crown Castle Site Name:	Waterbury
	Crown Castle JDE Job Number:	515660
	Crown Castle PO Number:	1217309
	Crown Castle Application Number:	447836
Engineering Firm Designation:	**Maser Consulting, Connecticut Project Number:** 18922085A	
Site Data:	**150 Mattatuck Heights, Waterbury, New Haven County, CT, 06705** **Latitude 41°32'16.30" Longitude -72°59'6.10"**	
Structure Information:	**Tower Height & Type:**	**133 ft Monopole**
	Mount Elevation:	**100 ft**
	Mount Type:	**12.5 ft Platform**

Dear Charles McGuirt,

Maser Consulting, Connecticut 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 abovementioned 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:

Platform (Typical of 1) **Sufficient**

This analysis has been performed in accordance with the 2016 Connecticut State Building Code Incorporating the 2012 International Building Code based upon an ultimate 3-second gust wind speed of 115 mph converted to a nominal 3-second gust wind speed of 89 mph per section 1609.3.1 as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with Topographic Category 1 and Risk Category II were used in this analysis.

We at Maser Consulting, Connecticut 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: Pedro Sabillon
Respectfully Submitted by:

Petros E. Tsoukalas, P.E.
Principal Associate/Geographic Discipline Leader
Connecticut License: 32577
856-797-0412
Ptsoukalas@Maserconsulting.com

Pedro Sabillon
Engineer

TABLE OF CONTENTS

1) INTRODUCTION

The existing antenna mounting system can be categorized as as Low-Profile Platform, Andrew Commscope P/N MC-PK12S, installed at 100 ft above ground level. The proposed equipment is to be supported on this antenna mounting system at a centerline of 100 ft above ground level. This report is based upon this information, as well as information from manufacturer specifications.

2) ANALYSIS CRITERIA

The structural analysis was performed in accordance with the requirements of ANSI/TIA-222-G-2-2009 Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 89 mph with no ice, 40 mph with 0.75 inch escalated ice thickness, Exposure B 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 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
100	100	3	RFS	APXVAARR24_43-U-NA20	-	1
		3	Ericsson	RADIO 4449 B12/B71		
98	98	-	SitePro 1	PRK-1245	Reinfocement Kit	2

Note:
1) To be mounted on existing sector mounts
2) Reinforcement kit to be installed to support existing boom arms

Table 2 - Existing and Reserved Antenna

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Existing Mount Type	Note
100	100	3	Ericsson	AIR 21 B2A/B4P	MC-PK12S	-
		3	Ericsson	AIR 32 B2A/B66AA		
		3	RFS	ATMA1412D-1A20		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Platform Specification	Crown Castle	MC-PK12S	Andrew Commscope
Construction Drawings dated 05/10/16	Dewberry Engineers Inc	Job Number 50078111	Crown Castle

3.1) Analysis Method

RISA-3D, a comprehensive structural analysis program was used for this analysis. The program performs design checks of structures under user specified loads. The user specified loads have been calculated separately based on the requirements of the above referenced codes. The program performs an analysis based on the steel code to determine the adequacy of the members and produces the reactions at the connection points of the mounts to the existing structure.

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

5) Platform information per mount mapping report is accurate to represent the current mount conditions. No modifications have been installed after this mount mapping report..

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

4) ANALYSIS RESULTS

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

Notes	Component	Mount Centerline (ft)	% Capacity	Pass / Fail
1	Standoff Arms	100	57.4	Pass
1	Inner Bracings	100	88.9	Pass
1	Face Horizontals	100	18.0	Pass
1	Corner Plate	100	68.6	Pass
1	Antenna Pipes	100	37.8	Pass
1	Kickers	98	47.5	Pass
2	Mount to Monopole Ring Mount Kit	100	14.8	Pass

Structure Rating (max from all components) =	88.9%

Notes:

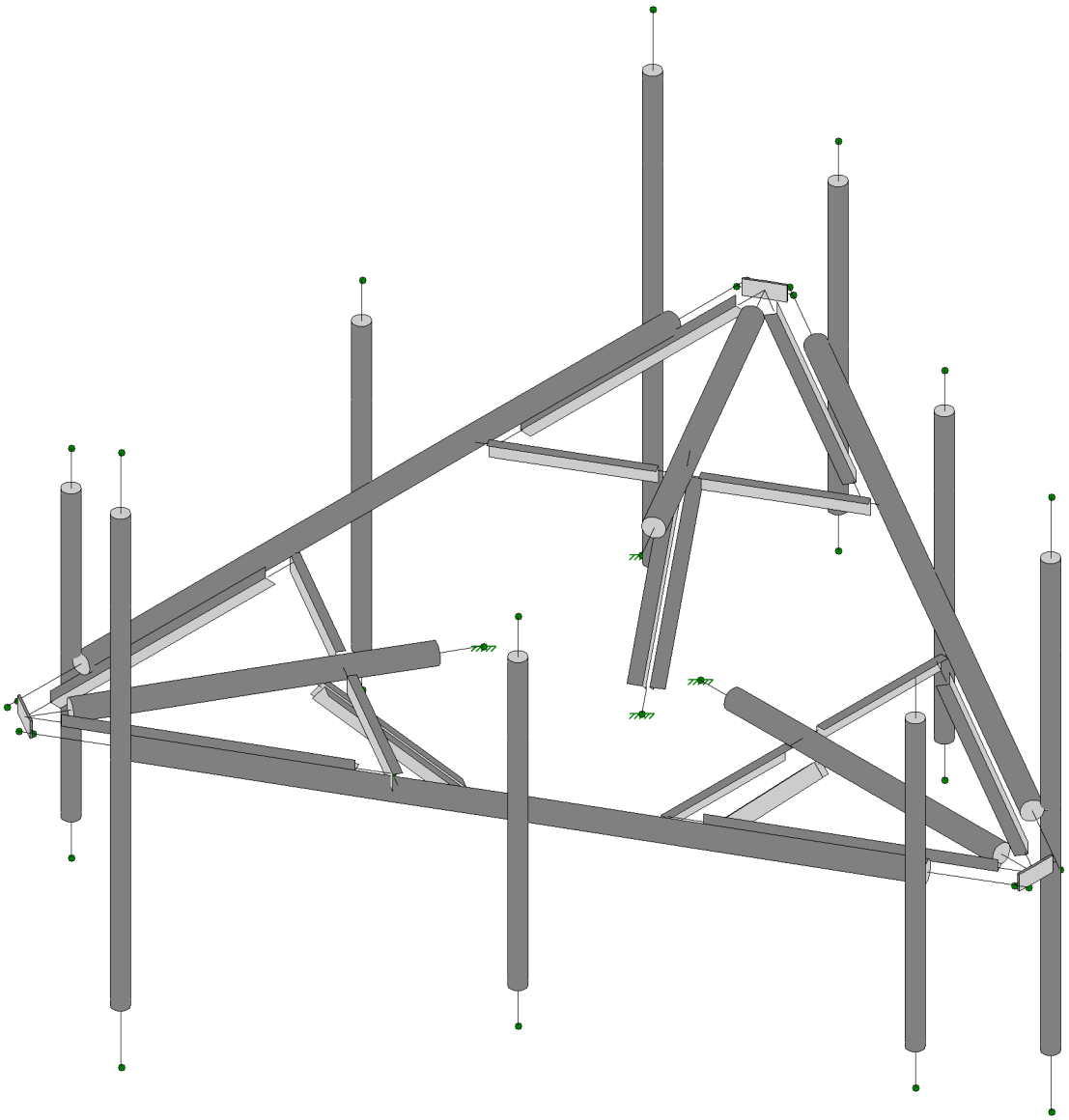
1) See additional documentation in "Appendix C - Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D – Additional Calculations” for calculation supporting the % capacity consumed.

4.1) Recommendations

The existing platform **DOES NOT** have sufficient capacity to support the proposed loading with its as-built conditions. Maser Consulting P.A. recommends installing **(1) SitePro 1 reinforcement kick for platforms P/N: PRK-1245** to support the stand-off arms. With the proposed recommendations, the existing platform has sufficient capacity to support the proposed loading, therefore, the proposed installation **CAN** be installed as intended.

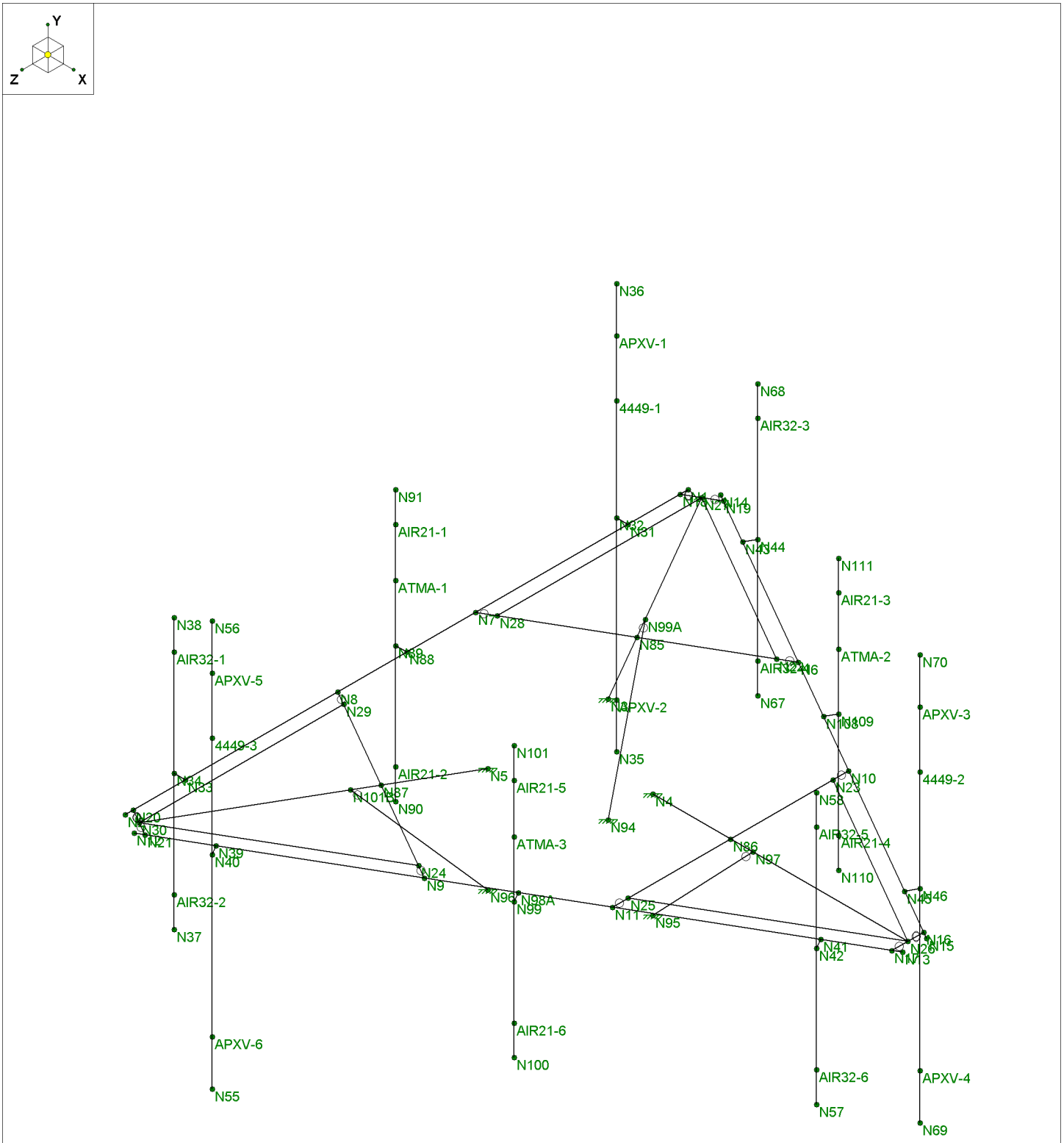
APPENDIX A

WIRE FRAME AND RENDERED MODELS



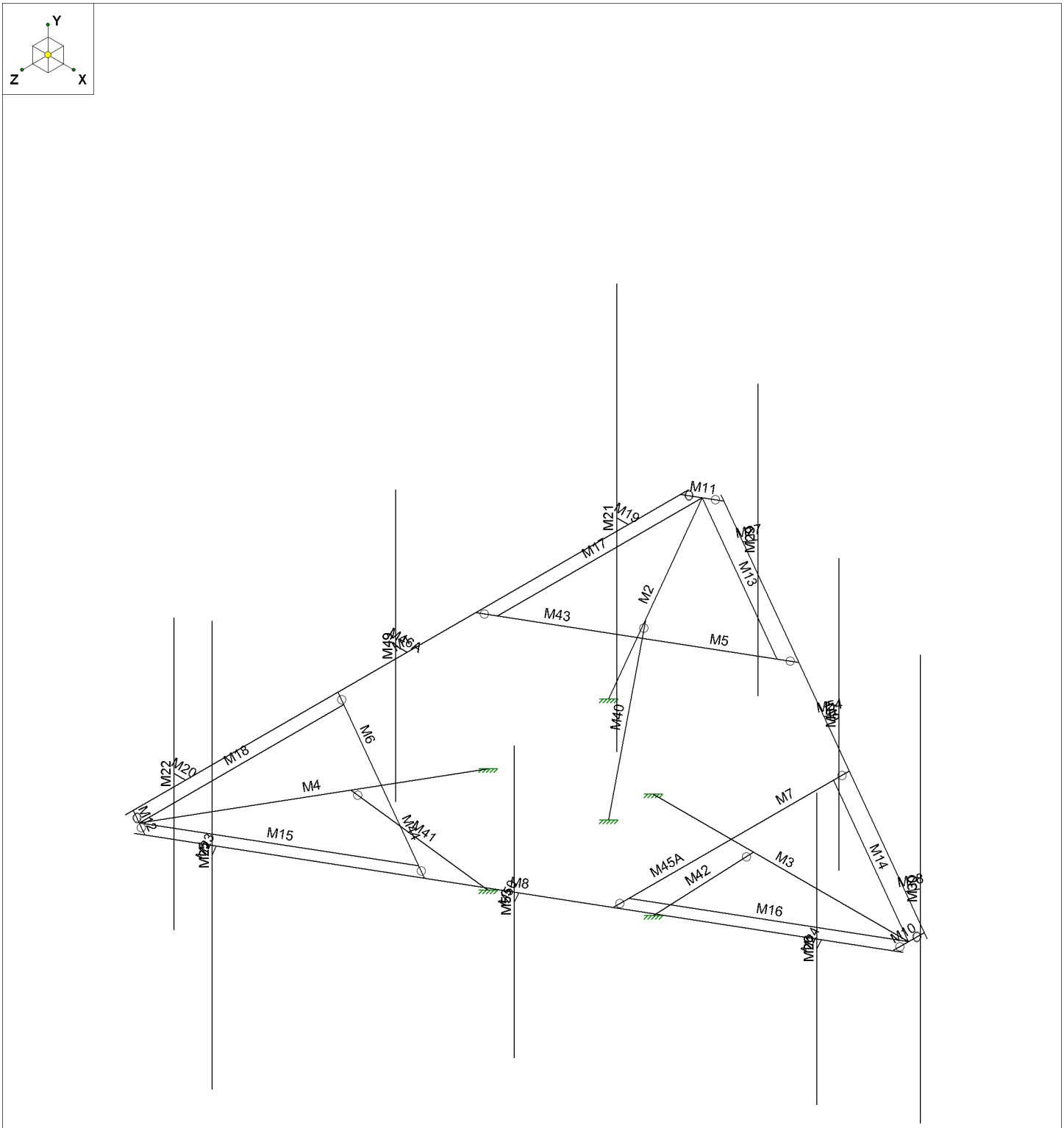
Envelope Only Solution

Maser Consulting P.A.		SK - 1
PSC	876317 - Waterbury	July 25, 2018 at 10:24 AM
18922085A	Rendered View	Platform Mount.r3d



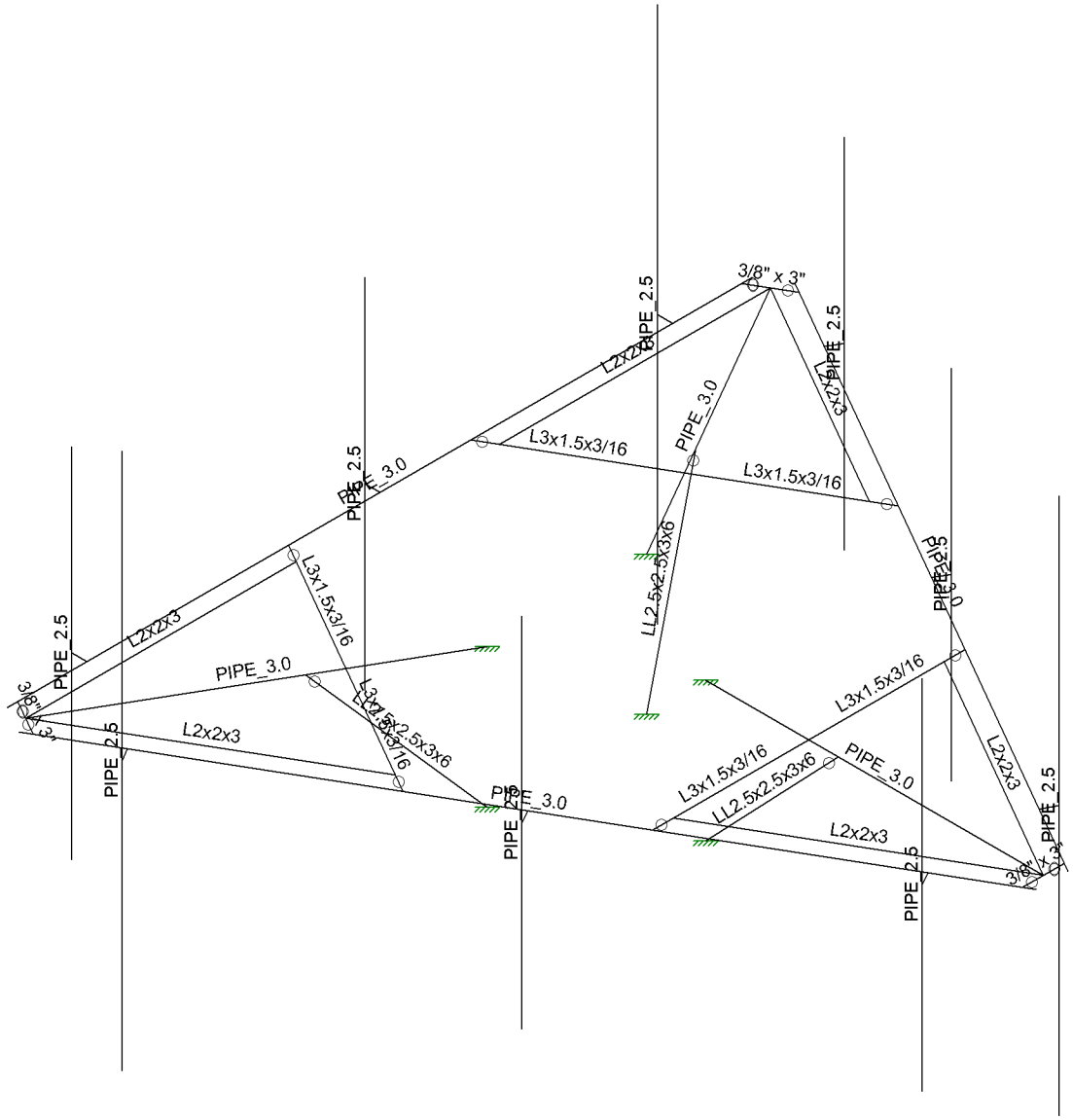
Envelope Only Solution

Maser Consulting P.A.		SK - 2
PSC	876317 - Waterbury	July 25, 2018 at 10:24 AM
18922085A	Joints	Platform Mount.r3d



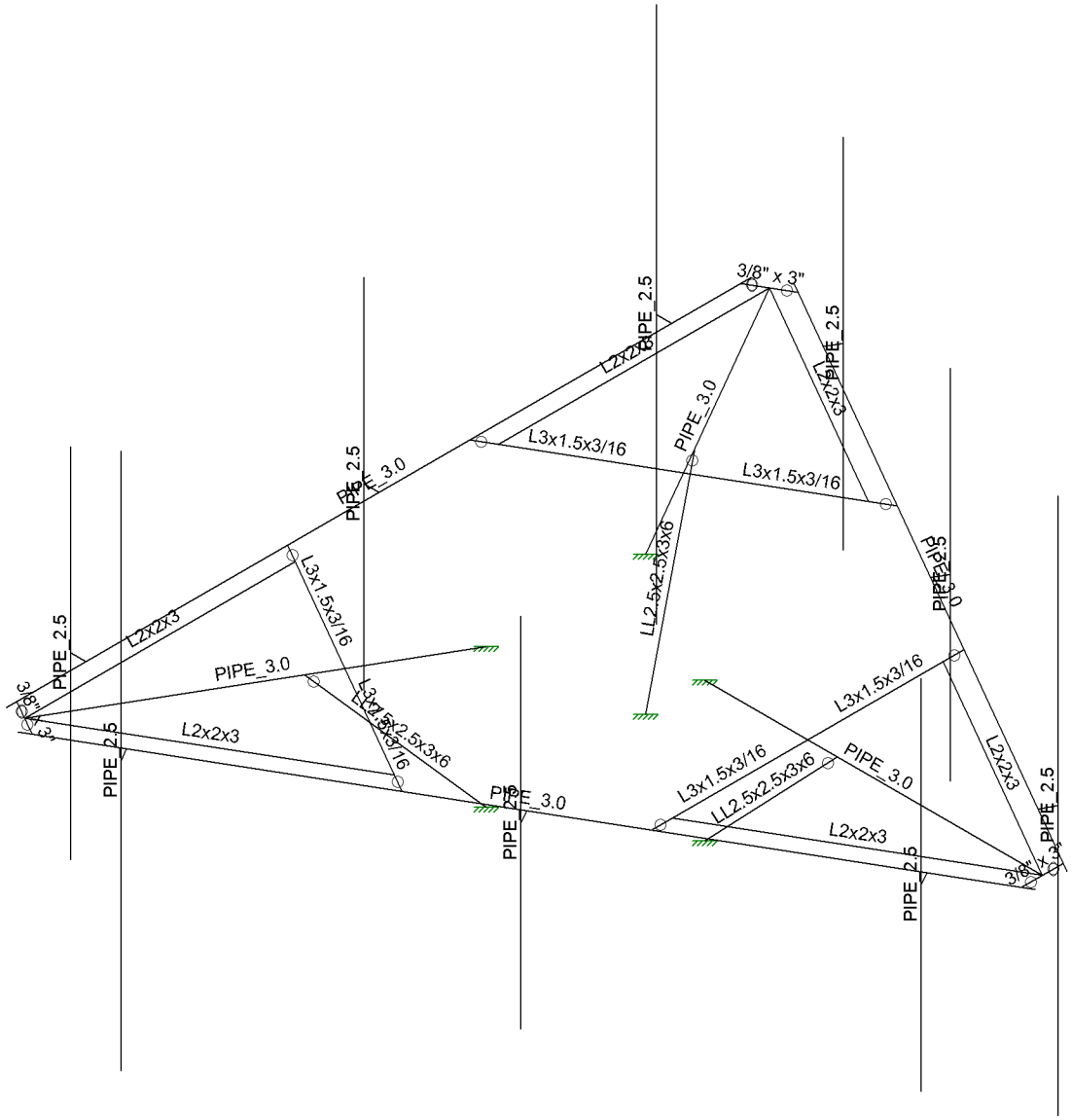
Envelope Only Solution

Maser Consulting P.A.		SK - 3
PSC	876317 - Waterbury	July 25, 2018 at 10:24 AM
18922085A	Members	Platform Mount.r3d



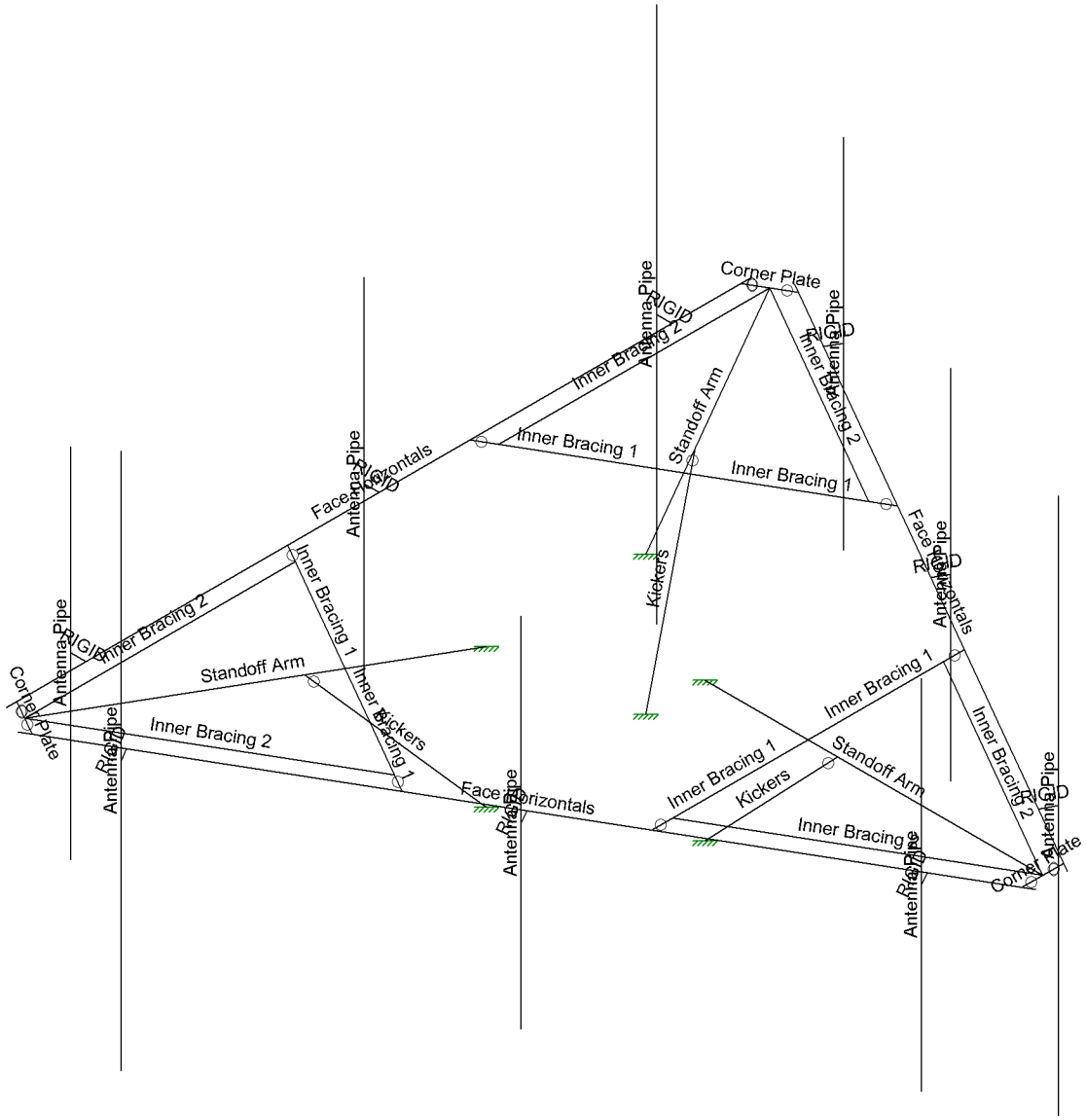
Envelope Only Solution

Maser Consulting P.A.		SK - 4
PSC	876317 - Waterbury	July 25, 2018 at 10:24 AM
18922085A	Shape	Platform Mount.r3d



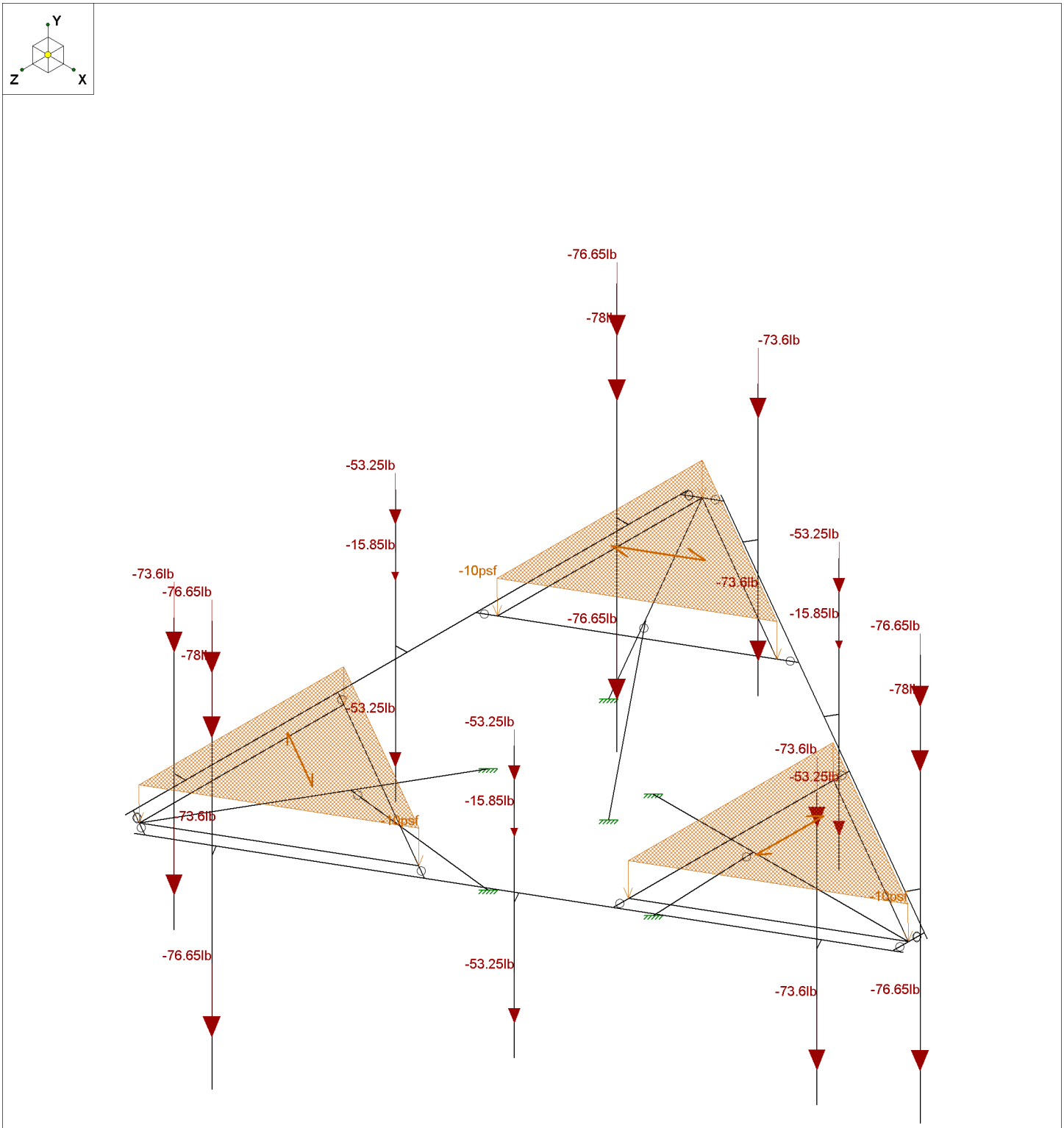
Envelope Only Solution

Maser Consulting P.A.		SK - 5
PSC	876317 - Waterbury	July 25, 2018 at 10:24 AM
18922085A	Shape	Platform Mount.r3d



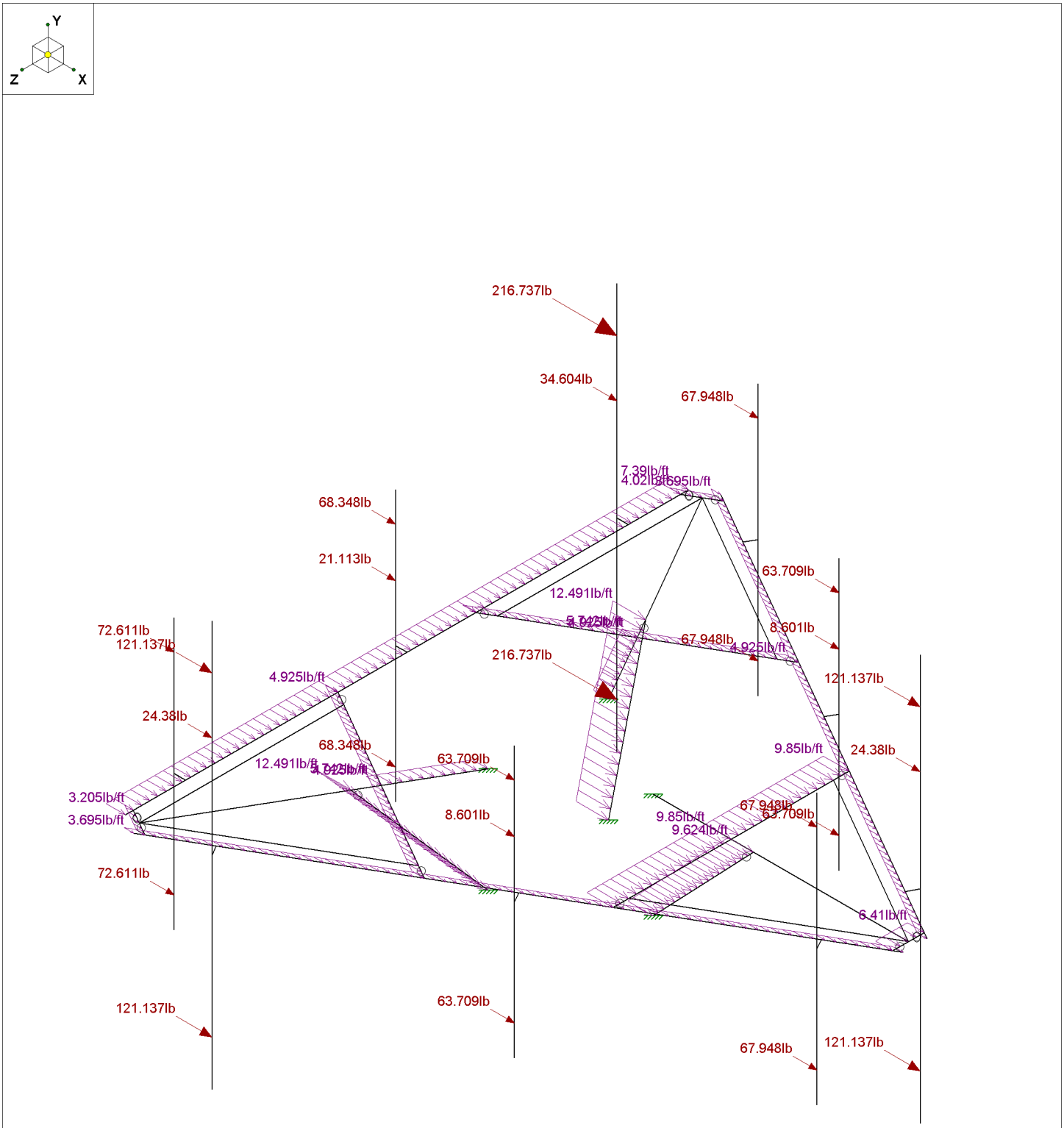
Envelope Only Solution

Maser Consulting P.A.		SK - 6
PSC	876317 - Waterbury	July 25, 2018 at 10:25 AM
18922085A	Section Set	Platform Mount.r3d



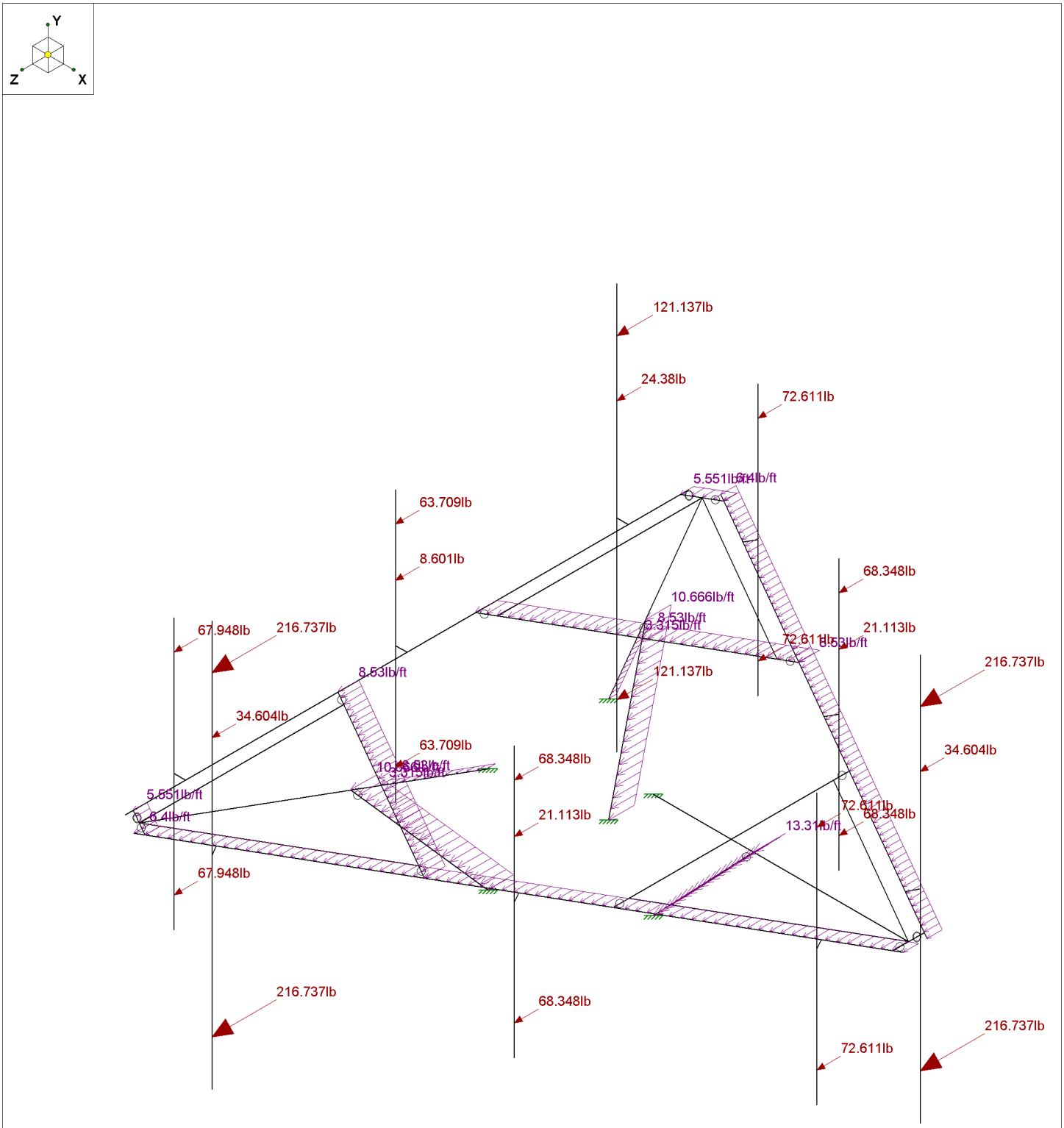
Loads: BLC 1, Dead
Envelope Only Solution

Maser Consulting P.A.		SK - 7
PSC	876317 - Waterbury	July 25, 2018 at 10:25 AM
18922085A	Dead Load	Platform Mount.r3d



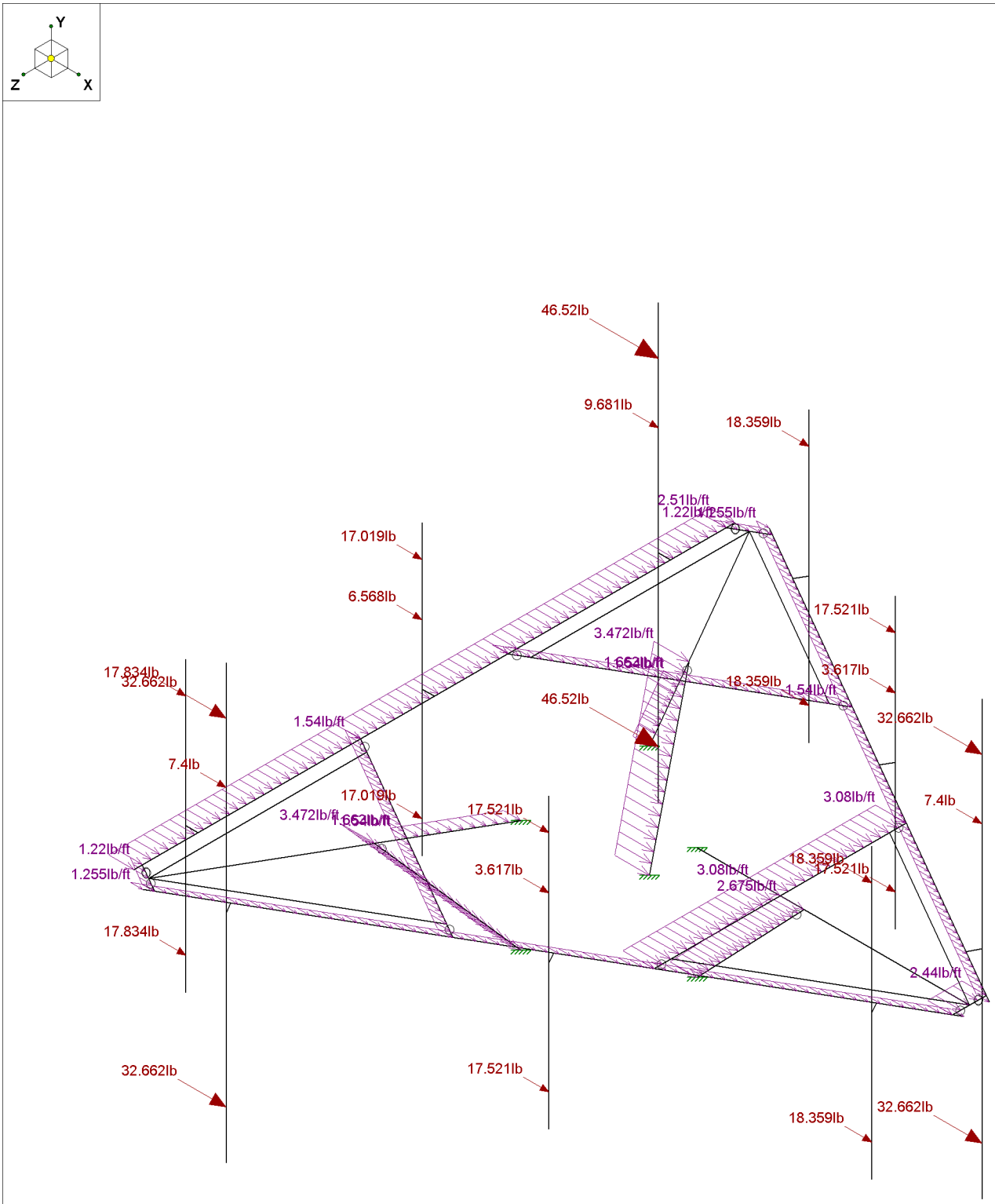
Loads: BLC 2, Wx
Envelope Only Solution

Maser Consulting P.A.		SK - 8
PSC	876317 - Waterbury	July 25, 2018 at 10:25 AM
18922085A	Wind X	Platform Mount.r3d



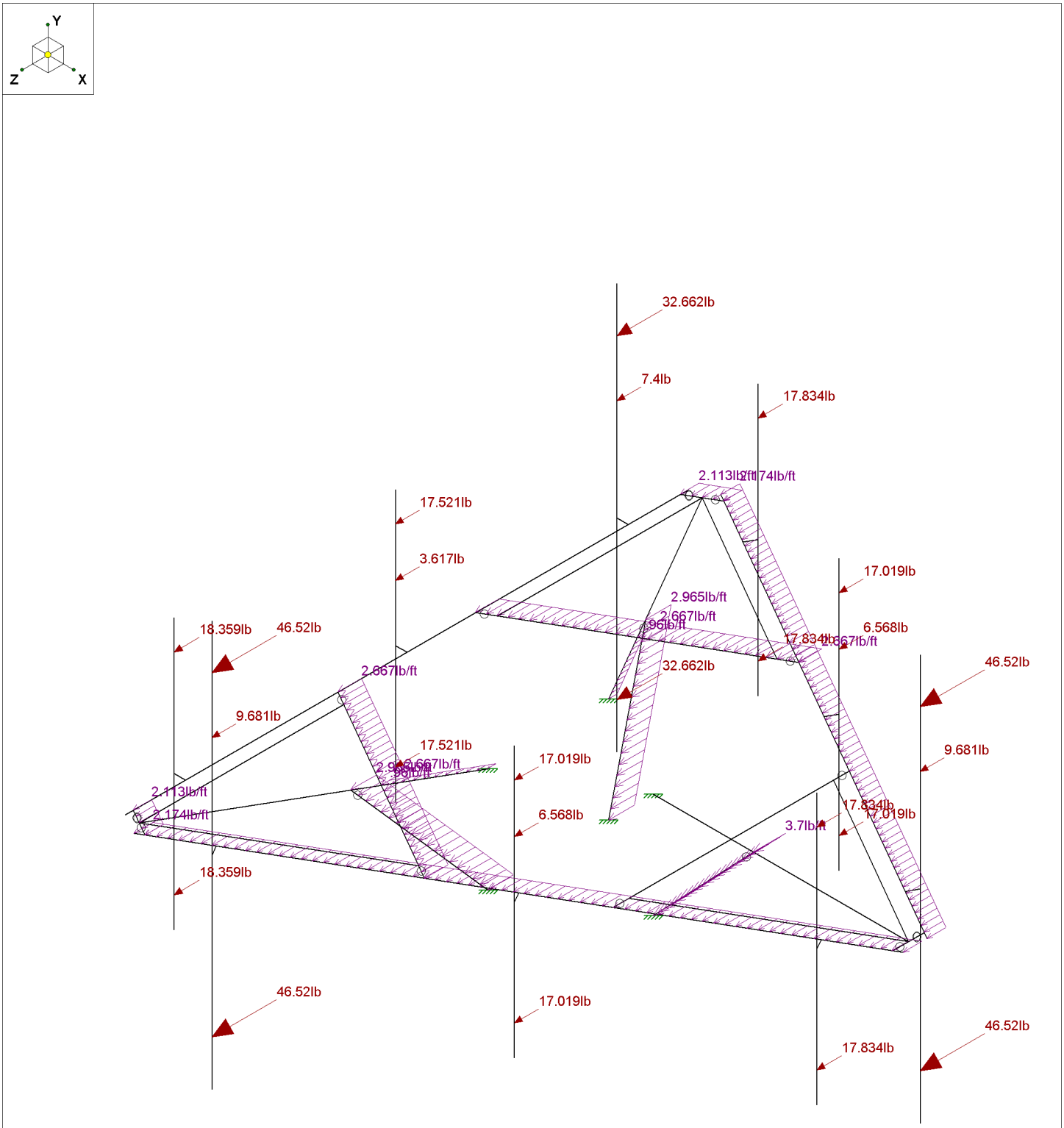
Loads: BLC 3, Wz
Envelope Only Solution

Maser Consulting P.A.		SK - 9
PSC	876317 - Waterbury	July 25, 2018 at 10:25 AM
18922085A	Wind Z	Platform Mount.r3d



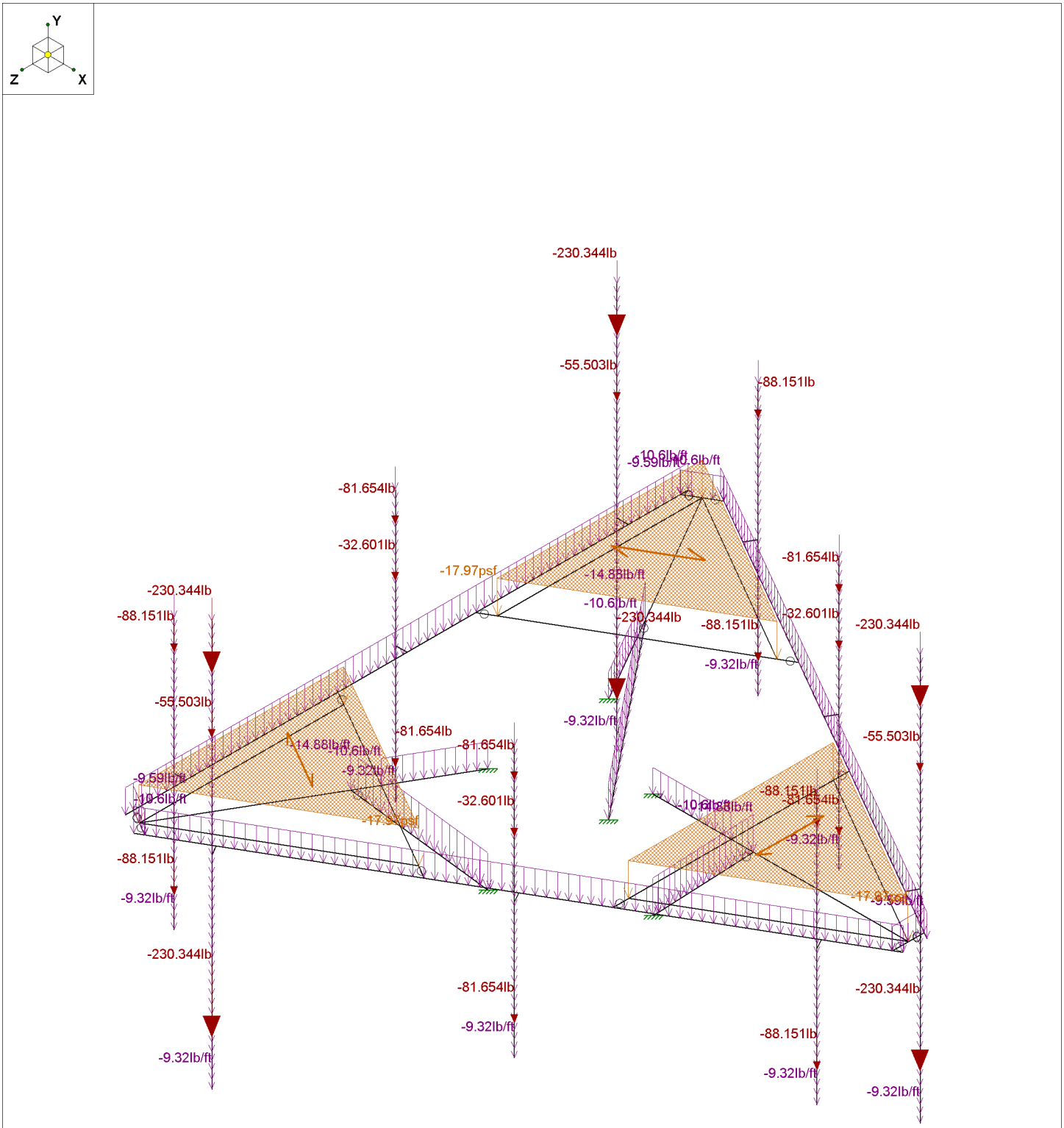
Loads: BLC 4, Wx Ice
Envelope Only Solution

Maser Consulting P.A.		SK - 10
PSC	876317 - Waterbury	July 25, 2018 at 10:25 AM
18922085A	Wind X Ice	Platform Mount.r3d



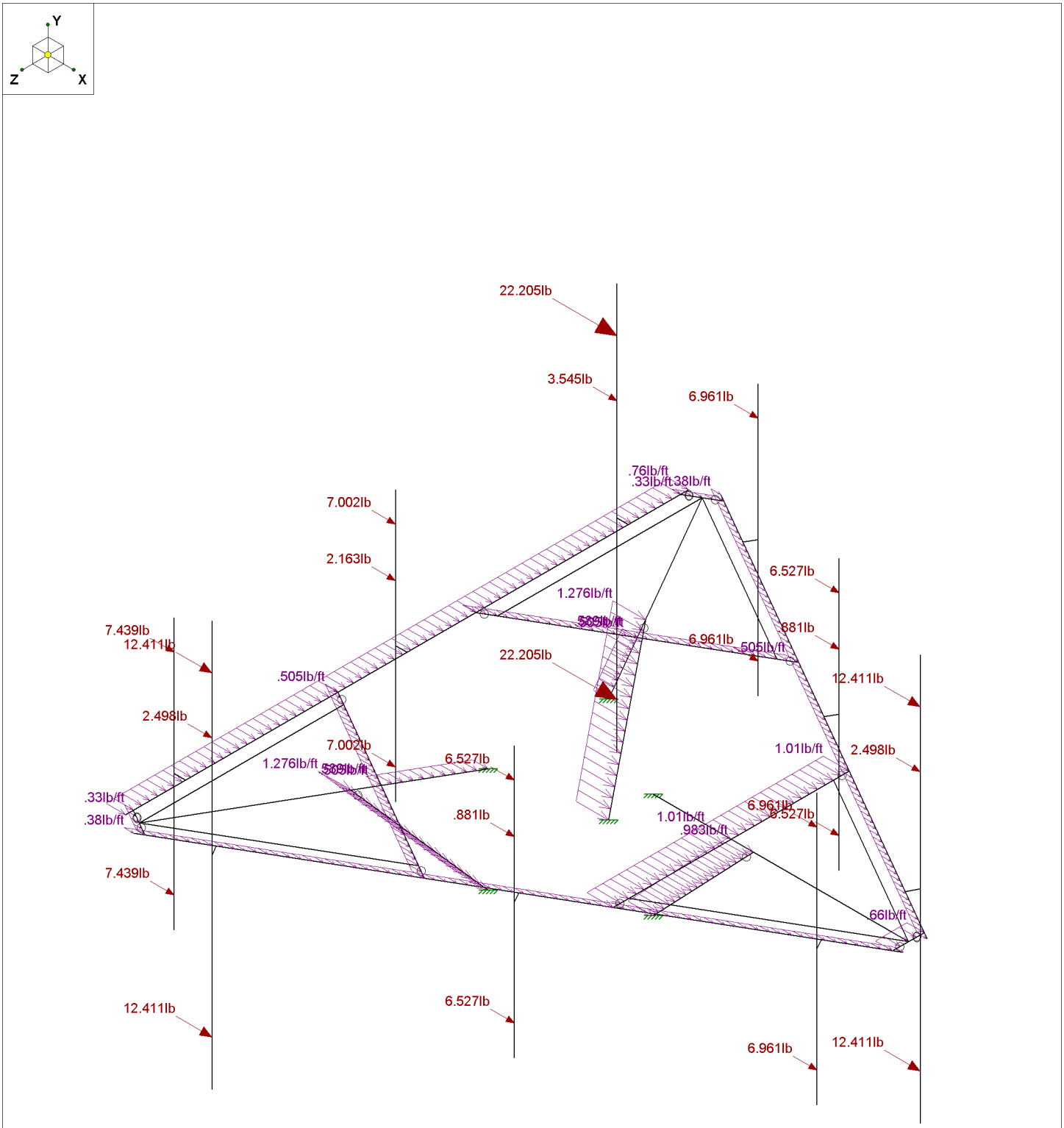
Loads: BLC 5, Wz Ice
Envelope Only Solution

Maser Consulting P.A.		SK - 11
PSC	876317 - Waterbury	July 25, 2018 at 10:25 AM
18922085A	Wind Z Ice	Platform Mount.r3d



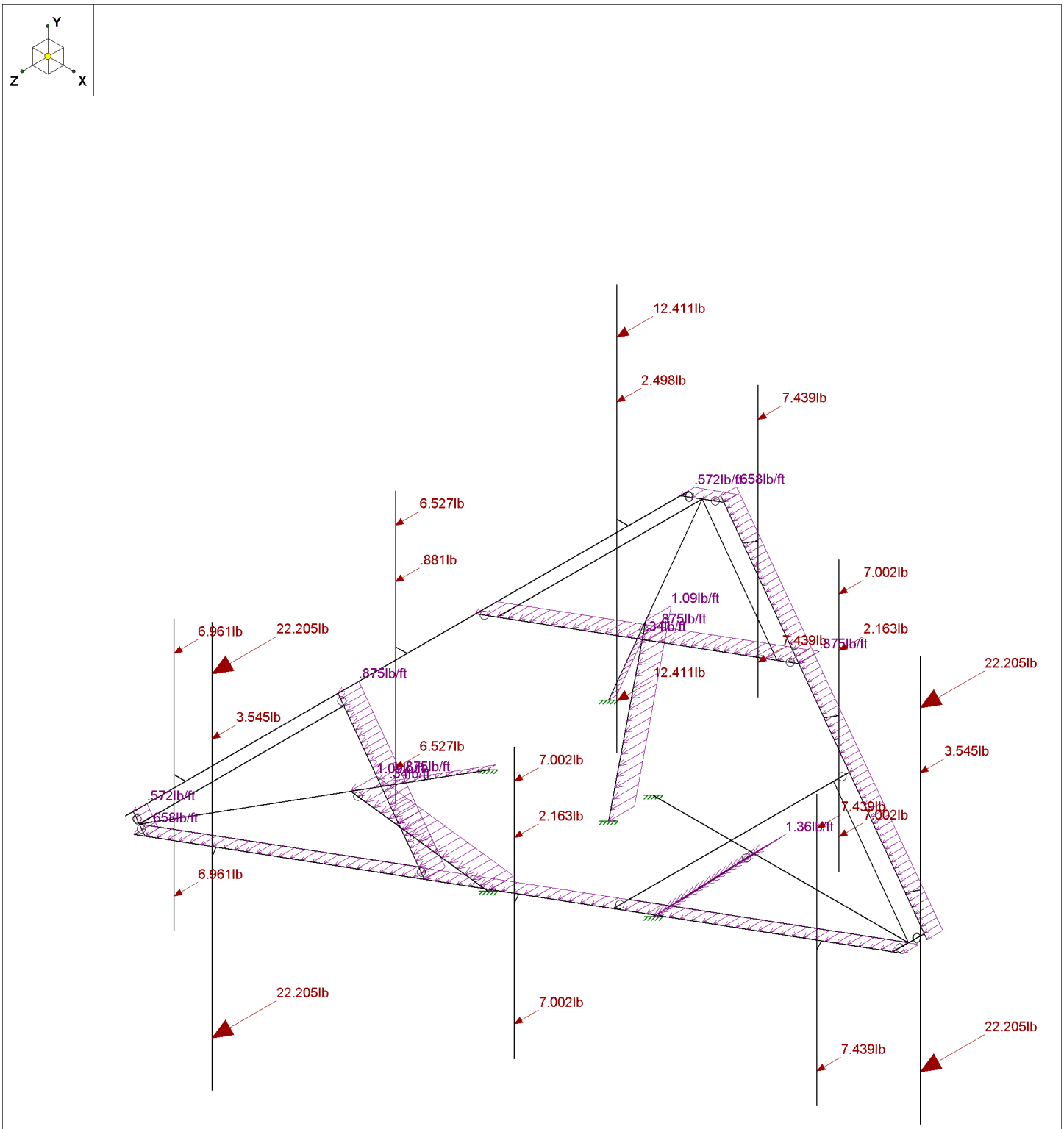
Loads: BLC 6, Ice Weight
Envelope Only Solution

Maser Consulting P.A.		SK - 12
PSC	876317 - Waterbury	July 25, 2018 at 10:26 AM
18922085A	Ice Dead Load	Platform Mount.r3d



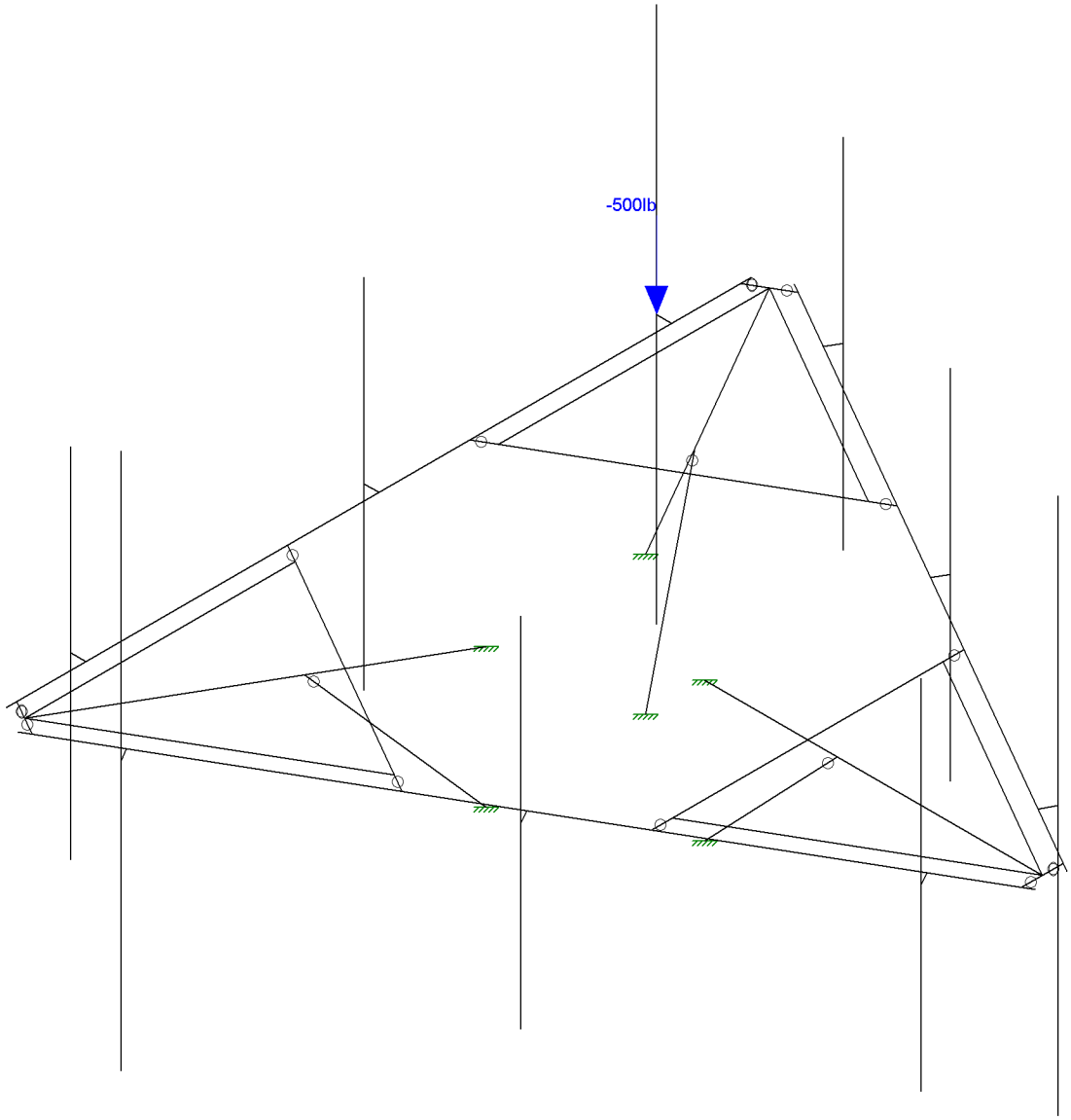
Loads: BLC 7, Wx Service
Envelope Only Solution

Maser Consulting P.A.		SK - 13
PSC	876317 - Waterbury	July 25, 2018 at 10:26 AM
18922085A	Wind X Service	Platform Mount.r3d



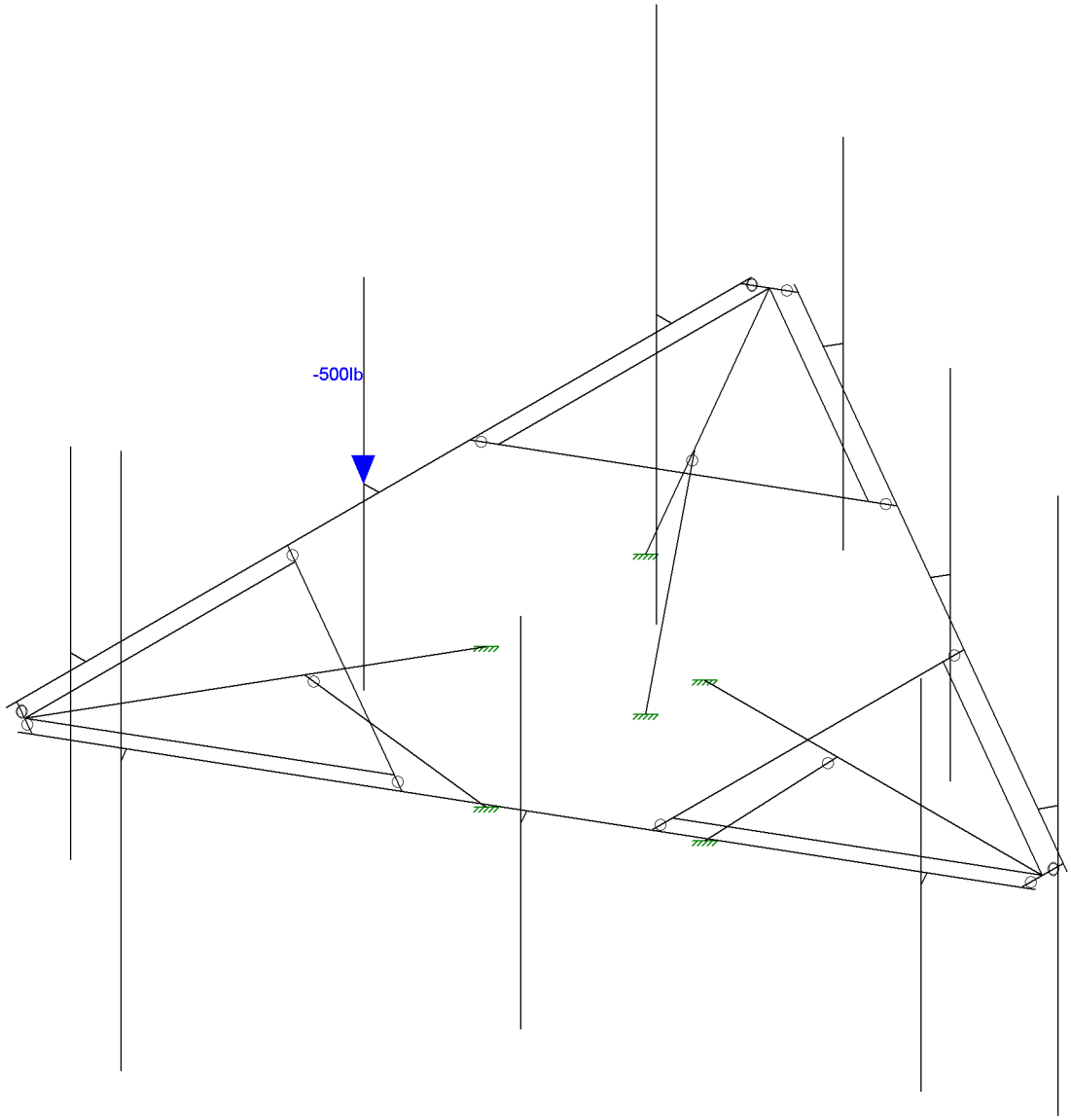
Loads: BLC 8, Wz Service
Envelope Only Solution

Maser Consulting P.A.		SK - 14
PSC	876317 - Waterbury	July 25, 2018 at 10:26 AM
18922085A	Wind Z Service	Platform Mount.r3d



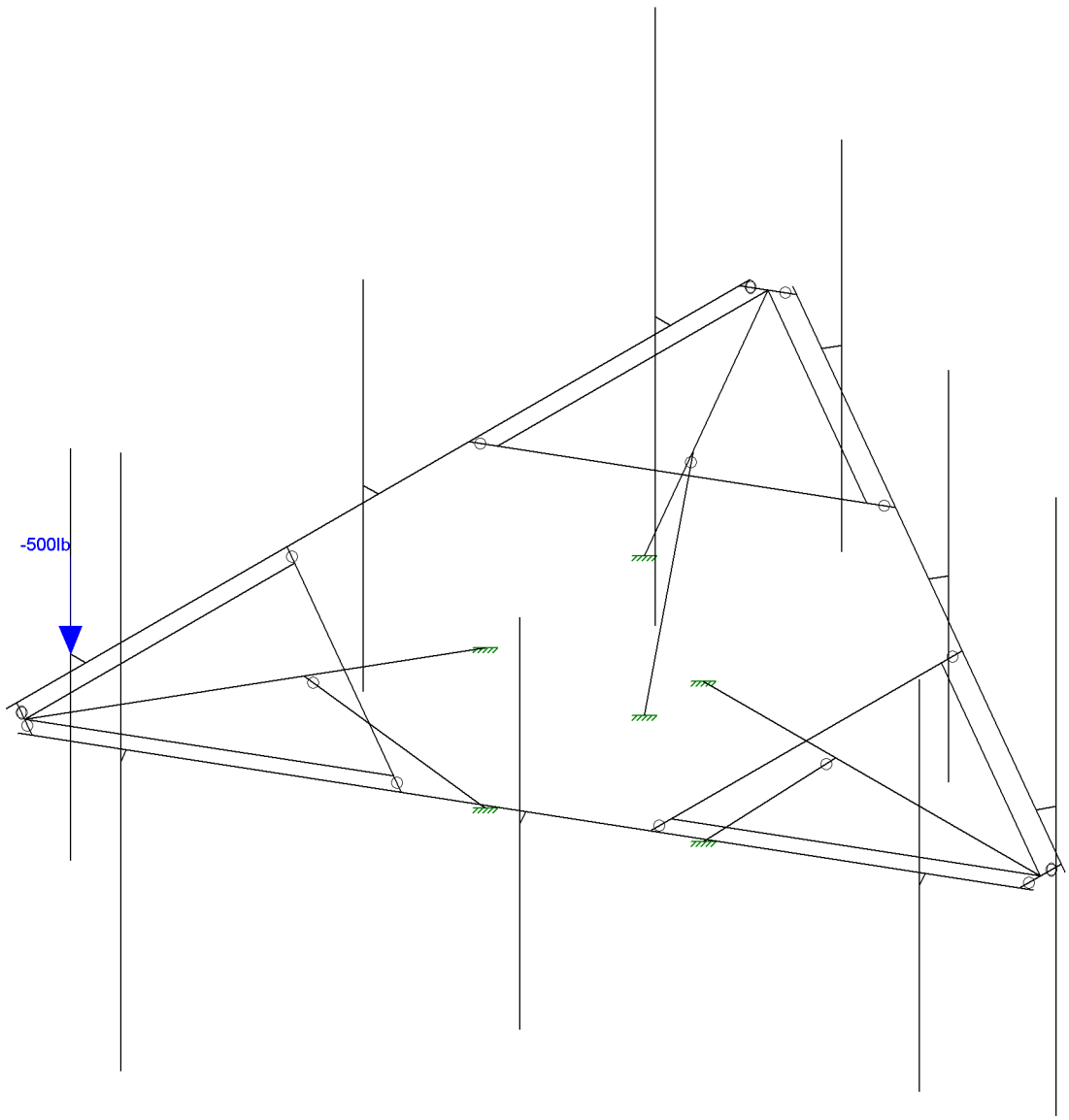
Loads: BLC 9, Maintenance Load LM1
Envelope Only Solution

Maser Consulting P.A.		SK - 15
PSC	876317 - Waterbury	July 25, 2018 at 10:26 AM
18922085A	Maintenance 1	Platform Mount.r3d



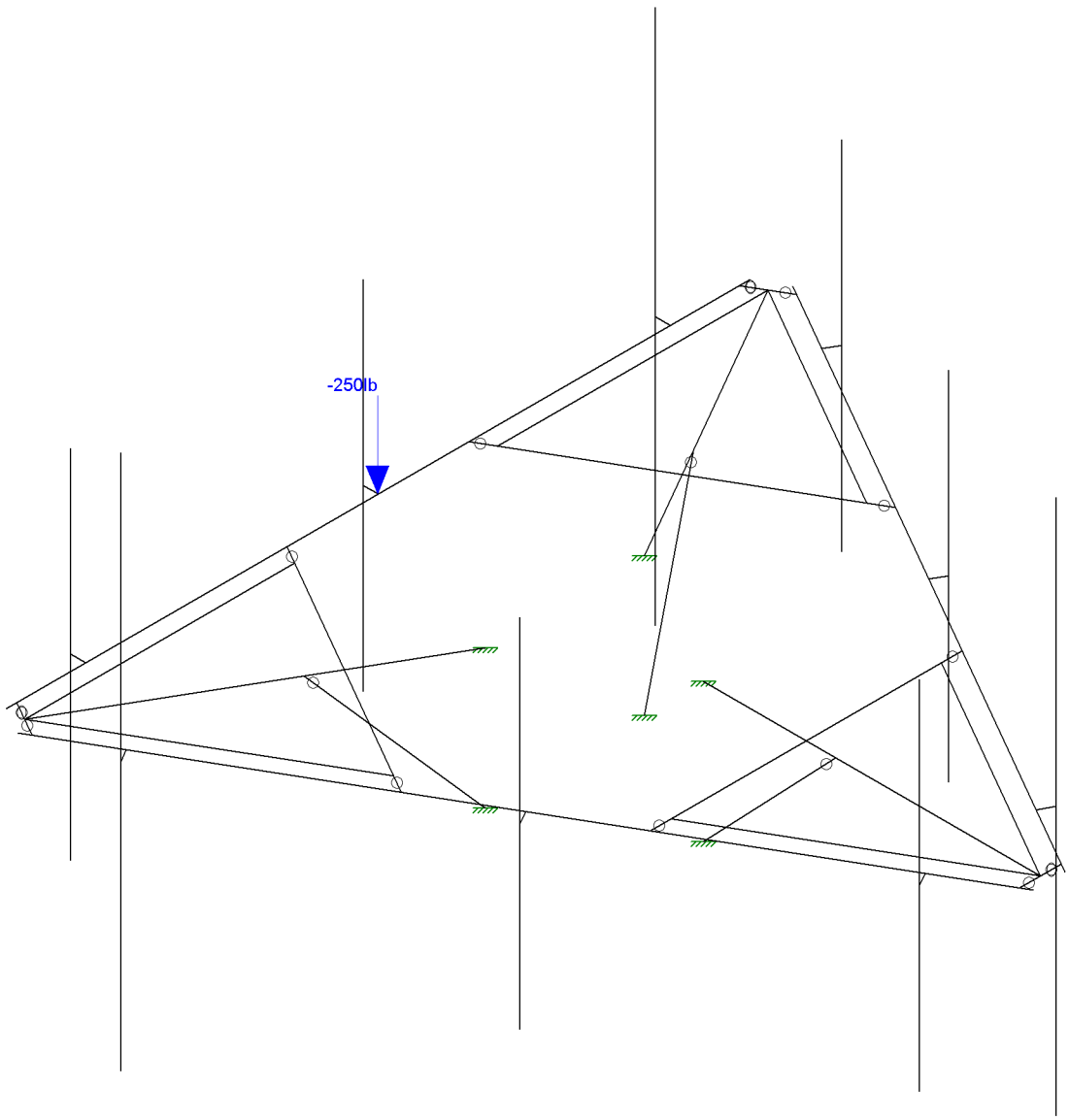
Loads: BLC 10, Maintenance Load LM2
Envelope Only Solution

Maser Consulting P.A.		SK - 16
PSC	876317 - Waterbury	July 25, 2018 at 10:26 AM
18922085A	Maintenance 2	Platform Mount.r3d



Loads: BLC 11, Maintenance Load LM3
Envelope Only Solution

Maser Consulting P.A.		SK - 17
PSC	876317 - Waterbury	July 25, 2018 at 10:27 AM
18922085A	Maintenance 3	Platform Mount.r3d



Loads: BLC 12, Maintenance Load LV1
Envelope Only Solution

Maser Consulting P.A.		SK - 18
PSC	876317 - Waterbury	July 25, 2018 at 10:27 AM
18922085A	Maintenance 4	Platform Mount.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Client:	TMobile	Computed By:	PS
Site Name:	876317 - Waterbury	Date:	7/25/2018
Project No.	18922085A	Verified By:	SMS
Title:	Antenna Platform Analysis	Page:	1

Version 4.0

LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector
3	ERICSSON	Air 32 DB B2A B66Aa	Existing	Alpha, Beta, & Gamma
3	ERICSSON	AIR 21 B2A B4P	Existing	Alpha, Beta, & Gamma
3	**RFS**	**APXVAARR24_43-U-NA20**	**Proposed**	**Alpha, Beta, & Gamma**
3	**ERICSSON**	**RRU 4449 B71 + B12**	**Proposed**	**Alpha, Beta, & Gamma**
3	RFS	ATMAA1412D-1A20	Existing	Alpha, Beta, & Gamma

Client:	TMobile	Computed By:	PS
Site Name:	876317 - Waterbury	Date:	7/25/2018
Project No.	18922085A	Verified By:	SMS
Title:	Antenna Platform Analysis	Page:	3

I. DESIGN INPUTS

Antenna Centerline	z	100	ft	
Ultimate Wind Speed	V_U	121	mph	
Nominal Wind Speed (3 sec. Gust):	V	94	mph	Ref. 1, Eqn. 16-33
Nominal Wind Speed with Ice (3 sec. gust):	V_i	40.0	mph	(Figure a5-2a, p. 233)
Maintenance Wind Speed:	V_m	30.0	mph	
Service Wind Speed:	V_s	60.0	mph	(Figure a5-2a, p. 233)
Design Ice Thickness:	t_i	0.75	in	(Figure A1-2a, p. 233)
Exposure Category:		B		Ref. 3, Section 2.6.5.1
Structure Class:		II		Ref. 3, Table 2-1
Gust Effect Factor:	G_h	1.00		Ref. 3, Section 2.6.7
Wind Directionality Factor:	K_d	0.95		Ref. 3, Table 2-2
Topographic Category:		1		Ref. 3, Section 2.6.6.2

Wind Load Coefficients

Importance Factors:

Non-Iced:	I	1	Ref. 3, Table 2-3
Iced:	I_{ice}	1	(Table 2-3, P. 39)

Exposure Category Coefficients:

3-s Gust-Speed Power Law Exponent:	α	7.0		Ref. 3, Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z_g	1200	ft	Ref. 3, Table 2-4	
Min. Value for k_z:	Kz_{min}	0.70		Ref. 3, Table 2-4	
Terrain Constant:	K_e	0.90		Ref. 3, Table 2-4	
Velocity Pressure Exposure Coefficient:	K_z	0.988		Ref. 3, Section 2.6.5.2	$=2.01\cdot(z/z_g)^{2/\alpha}$

Topographic Category Coefficients:

Topographic Constant:	K_t	N/A		Ref. 3, Table 2-5	
Height Attenuation Factor:	f	N/A		Ref. 3, Table 2-5	
Height Reduction Factor:	K_h	N/A		Ref. 3, Section 2.6.6.4	$=e^{(f\cdot z/H)}$
Topographic Factor:	K_{zt}	1.00		Ref.3, Section 2.6.6.4	$=[1+(K_e\cdot K_t/K_h)]^2$

Ice Accumulation:

Ice Velocity Pressure Exposure Coefficient:	K_{iz}	1.12			$=(z/33)^{0.10}$
Factored Ice Thickness:	t_{iz}	1.68	in	(Section 2.6.8, p. 16)	$=2.0\cdot t_i\cdot I\cdot K_{iz}\cdot K_{zt}$
Ice Density:	ρ_i	56.00	pcf		

Design Wind Pressures:

Velocity Pressure:	q_z	21.11	psf	Ref. 3, Section 2.6.9.6	$=0.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V^2\cdot I$
Velocity Pressure (With Ice):	q_{zi}	3.85	psf	(Section 2.6.9.6, P. 25)	$=.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V_i^2\cdot I$
Velocity Pressure (Maintenance):	q_{zm}	2.16	psf	(Section 2.6.9.6, P. 25)	$=.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V_m^2\cdot I$
Velocity Pressure (Service):	q_{zs}	8.65	psf	(Section 2.6.9.6, P. 25)	$=.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V_i^2\cdot I$

II. CALCULATIONS

- ***Wind Load on Appurtenances***

Dimensions and Force Coefficients

Antenna/ Appurtenance	Non-Iced Condition								Iced Condition							
	Mounting Pipe			Equipment					Mounting Pipe			Equipment				
	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$
Air 32 DB B2A B66Aa	72.0	2.875	1.200	56.60	12.90	8.70	1.28	1.38	75.4	6.2	0.913	59.95	16.25	12.05	1.25	1.31
AIR 21 B2A B4P	72.0	2.875	1.200	56.00	12.10	7.90	1.29	1.40	75.4	6.2	0.913	59.35	15.45	11.25	1.26	1.32
APXVAARR24_43-U-NA20	108.0	2.875	1.200	95.90	24.00	8.70	1.27	1.53	111.4	6.2	1.042	99.25	27.35	12.05	1.25	1.44
RRU 4449 B71 + B12	0.0	0.000	0.000	14.90	13.20	9.30	1.20	1.20	0.0	0.0	0.000	18.25	16.55	12.65	1.20	1.20
ATMAA1412D-1A20	0.0	0.000	0.000	12.00	10.00	4.00	1.20	1.22	0.0	0.0	0.000	15.35	13.35	7.35	1.20	1.20
	0.0	0.000	0.000						0.0	0.0	0.000					

Antenna/ Appurtenance	# of Brackets	Non-Iced Condition			Iced Condition			Maintenance Condition	
		Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)		Gravity (lbs.)	Wind Force (lbs.)	
		F_N	F_T		F_N	F_T		F_N	F_T
Air 32 DB B2A B66Aa	2	72.6	67.9	**73.6**	17.8	18.4	**88.2**	7.4	7.0
AIR 21 B2A B4P	2	68.3	63.7	**53.3**	17.0	17.5	**81.7**	7.0	6.5
APXVAARR24_43-U-NA20	2	216.7	121.1	**76.7**	46.5	32.7	**230.3**	22.2	12.4
RRU 4449 B71 + B12	1	34.6	24.4	**78.0**	9.7	7.4	**55.5**	3.5	2.5
ATMAA1412D-1A20	1	21.1	8.6	**15.9**	6.6	3.6	**32.6**	2.2	0.9

**** ALL CALCULATED LOADS ARE PER MOUNTING BRACKET. TO GET THE TOTAL EQUIPMENT LOAD, MULTIPLY THE INDIVIDUAL LOADS BY THE NUMBER OF BRACKETS***

- ***Wind Load on Framing Members***

Member Category	Member Shape	Length (in)	Member Surface	Non-Iced Condition			Iced Condition						Maintenance Condition
				Exposed Wind Height (in)	Force Coefficient C_a	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient C_a	Wind Load (plf)	Ice Weight (plf)	Wind Load (plf)
Pipe	Pipe 3.0	150	Round	3.50	1.20	7.39	6.85	6.85	153.35	1.14	2.51	10.60	0.76
Pipe	Pipe 2.5	108	Round	2.88	1.20	6.07	6.23	6.23	111.35	1.04	2.08	9.32	0.62
Double Angle	2L1.5x1.5	63	Square	3.00	1.87	9.85	6.35	4.85	66.35	1.51	3.08	10.30	1.01
Pipe	Pipe 3.0	68	Round	3.50	1.08	6.63	6.85	6.85	71.35	0.88	1.92	10.60	0.68
Solid Flat Bar	3x0.25	8.5	Square	3.00	1.21	6.41	6.35	3.60	11.85	1.20	2.44	9.59	0.66
Double Angle	2L2.5x2.5	52	Square	5.00	1.51	13.31	8.35	5.85	55.35	1.38	3.70	14.88	1.36
											Grating	17.97	psf

Client:	TMobile	Computed By:	PS
Site Name:	876317 - Waterbury	Date:	7/25/2018
Project No.	18922085A	Verified By:	SMS
Title:	Antenna Platform Analysis	Page:	5

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Importance Factor:

$$I := \begin{cases} 1.0 & \text{if } Class = \text{"II"} \\ 1.15 & \text{if } Class = \text{"III"} \end{cases}$$

Table 2-3, Pg. 39

Force Coefficient:
(Square)

$$C_{f\_square}(h, w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \le 2.5 \\ \left[1.2 + \frac{0.2}{4.5} \cdot \left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[1.4 + \frac{0.6}{18} \cdot \left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 2.0 & \text{otherwise} \end{cases}$$

Table 2-8, P. 42

Force Coefficient:
(Round)

$$C_{f\_round}(h, w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \le 2.5 \\ \left[0.7 + \frac{0.1}{4.5} \cdot \left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[0.8 + \frac{0.4}{18} \cdot \left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 1.2 & \text{otherwise} \end{cases}$$

Table 2-8, P. 42

Terrain Exposure Constants:

Table 2-4, P. 40

$$\alpha := \begin{cases} 7.0 & \text{if } Exp = \text{"B"} \\ 9.5 & \text{if } Exp = \text{"C"} \\ 11.5 & \text{if } Exp = \text{"D"} \end{cases} \quad Z_g := \begin{cases} 1200\text{ft} & \text{if } Exp = \text{"B"} \\ 900\text{ft} & \text{if } Exp = \text{"C"} \\ 700\text{ft} & \text{if } Exp = \text{"D"} \end{cases} \quad K_{zmin} := \begin{cases} 0.70 & \text{if } Exp = \text{"B"} \\ 0.85 & \text{if } Exp = \text{"C"} \\ 1.03 & \text{if } Exp = \text{"D"} \end{cases}$$

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Velocity Pressure Coefficient:

$$Kz(z) := \left| \begin{array}{l} K_z \leftarrow \max\left[2.01 \cdot \left(\frac{z}{Z_g} \right)^{\frac{2}{\alpha}}, K_{zmin} \right] \\ K_z \leftarrow \min\left(K_z, 2.01 \right) \end{array} \right.$$

$K_z := Kz(z)$ — Section 2.6.5, P. 13

$$Kzt(z) := K_{zt} \leftarrow \left| \begin{array}{ll} 1.0 \text{ if } Topo = "1" & \text{Section 2.6.6.4, p. 14} \\ \text{otherwise} & \\ \quad K_e \leftarrow \left| \begin{array}{ll} 0.90 \text{ if } Exp = "B" & \text{Table 2-4 p. 40} \\ 1.00 \text{ if } Exp = "C" & \\ 1.10 \text{ if } Exp = "D" & \end{array} \right. & \\ \quad K_t \leftarrow \left| \begin{array}{ll} 0.43 \text{ if } Topo = "2" & \text{Table 2-5 p. 40} \\ 0.53 \text{ if } Topo = "3" & \\ 0.72 \text{ if } Topo = "4" & \end{array} \right. & \\ \quad f \leftarrow \left| \begin{array}{ll} 1.25 \text{ if } Topo = "2" & \text{Table 2-5 p. 40} \\ 2.00 \text{ if } Topo = "3" & \\ 1.50 \text{ if } Topo = "4" & \end{array} \right. & \\ \quad K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} & \text{Section 2.6.6.4, P. 14} \\ \quad \left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 & \text{Section 2.6.6.4, P. 14} \end{array} \right.$$

$K_{zt} := Kzt(z)$

Velocity Pressure: — Section 2.6.9.6, P. 25

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

LOAD EQUATIONS

WIND LOAD

Area (Normal): $AN_{area} = H_{ant} \cdot Want$

Area (Side): $AT_{area} = H_{ant} \cdot Dant$

Force Coefficient (Normal): $C_{fn} = C_{fsquare}(H_{ant}, Want)$

Force Coefficient (Side): $C_{fs} = C_{fsquare}(H_{ant}, Dant)$

Pipe Area (Normal): $AN_p = \max[(L_p - H_{ant}) * Dp, 0]$

Pipe Area (Side): $AT_p = L_p \cdot Dp$

Force Coefficient (Normal): $C_{fp} = C_{fround}(Lp, Dp)$

Normal Effective Projected Area: $E_{pan} = (C_{fn} \cdot ANarea) + (Cfp \cdot ANp)$

Side Effective Projected Area: $E_{pat} = (C_{fs} \cdot ATarea) + (Cfp \cdot ATp)$

Effective Projected Area: $EPA = max(E_{pan}, Epat)$

Wind Force: $F_{ant} = q_z \cdot Gh \cdot EPA$

ICE DEAD LOAD

Largest Out-to-Out Dimension: $D_{ant} = \sqrt{{D_{ant}}^2 + {W_{ant}}^2}$

Cross Sectional Area of Ice: $A_{ice\_ant} = \pi \cdot tiz \cdot (Dant + tiz)$

Total Ice Dead Load: $DL_{ice\_ant} = \boldsymbol{\rho_i} \cdot (Aice_{\_ant} \cdot Hant)$

ICE WIND LOAD

Dimensions: $H_{i_{ant}} = H_{ant} + 2tiz$

$W_{i_{ant}} = W_{ant} + 2tiz$

$D_{i_{ant}} = D_{ant} + 2tiz$

Area (Normal): $AIN_{area} = H_{i\_ant} \cdot W_{i\_ant}$

Area (Side): $AIT_{area} = H_{i\_ant} \cdot D_{i\_ant}$

Force Coefficient (Normal): $Ci_{fn} = C_{fsquare}(H_{i\_ant}, W_{i\_ant})$

Force Coefficient (Side): $Ci_{fs} = C_{fsquare}(H_{i\_ant}, D_{i\_ant})$

Pipe Area (Normal): $AN_p = \max[(L_{ip} - H_{i\_ant}) * D_{ip}, 0]$

Pipe Area (Side): $AT_p = L_{ip} \cdot Dip$

Force Coefficient (Normal): $C_{fp} = C_{fround}(L_{ip}, D_{ip})$

Normal Effective Projected Area: $E_{pain} = (Ci_{fn} \cdot ANarea) + (Cfp \cdot ANp)$

Side Effective Projected Area: $E_{pait} = (Ci_{fs} \cdot ATarea) + (Cfp \cdot ATp)$

Effective Projected Area: $EPA_i = max(E_{pain}, Epait)$

Wind Force: $F_{i\_ant} = q_z \cdot Gh \cdot EPAi$

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M2	N27	N3			Standoff Arm	Beam	Wide Flange	A53 Gr. B	Typical
2	M3	N26	N4			Standoff Arm	Beam	Wide Flange	A53 Gr. B	Typical
3	M4	N30	N5			Standoff Arm	Beam	Wide Flange	A53 Gr. B	Typical
4	M19	N31	N32			RIGID	None	None	RIGID	Typical
5	M20	N33	N34			RIGID	None	None	RIGID	Typical
6	M23	N39	N40			RIGID	None	None	RIGID	Typical
7	M24	N41	N42			RIGID	None	None	RIGID	Typical
8	M27	N43	N44			RIGID	None	None	RIGID	Typical
9	M28	N45	N46			RIGID	None	None	RIGID	Typical
10	M13	N27	N22			Inner Bracing 2	Beam	Single Angle	A36 Gr.36	Typical
11	M14	N23	N26			Inner Bracing 2	Beam	Single Angle	A36 Gr.36	Typical
12	M15	N30	N24		270	Inner Bracing 2	Beam	Single Angle	A36 Gr.36	Typical
13	M16	N25	N26		270	Inner Bracing 2	Beam	Single Angle	A36 Gr.36	Typical
14	M17	N27	N28		270	Inner Bracing 2	Beam	Single Angle	A36 Gr.36	Typical
15	M18	N29	N30		270	Inner Bracing 2	Beam	Single Angle	A36 Gr.36	Typical
16	M5	N6	N85		180	Inner Bracing 1	Beam	Single Angle	A36 Gr.36	Typical
17	M6	N8	N87		180	Inner Bracing 1	Beam	Single Angle	A36 Gr.36	Typical
18	M7	N10	N86		180	Inner Bracing 1	Beam	Single Angle	A36 Gr.36	Typical
19	M1	N1	N2			Face Horizontals	Beam	Pipe	A53 Gr. B	Typical
20	M8	N12	N13			Face Horizontals	Beam	Pipe	A53 Gr. B	Typical
21	M9	N14	N15			Face Horizontals	Beam	Pipe	A53 Gr. B	Typical
22	M10	N16	N17			Corner Plate	Beam	BAR	A36 Gr.36	Typical
23	M11	N18	N19			Corner Plate	Beam	BAR	A36 Gr.36	Typical
24	M12	N20	N21			Corner Plate	Beam	BAR	A36 Gr.36	Typical
25	M21	N35	N36			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
26	M22	N37	N38			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
27	M25	N55	N56			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
28	M26	N57	N58			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
29	M29	N67	N68			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
30	M30	N69	N70			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
31	M43	N85	N7		180	Inner Bracing 1	Beam	Single Angle	A36 Gr.36	Typical
32	M44	N87	N9		180	Inner Bracing 1	Beam	Single Angle	A36 Gr.36	Typical
33	M45A	N86	N11		180	Inner Bracing 1	Beam	Single Angle	A36 Gr.36	Typical
34	M46A	N88	N89			RIGID	None	None	RIGID	Typical
35	M49	N90	N91			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
36	M50	N98A	N99			RIGID	None	None	RIGID	Typical
37	M53	N100	N101			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
38	M54	N108	N109			RIGID	None	None	RIGID	Typical
39	M57	N110	N111			Antenna Pipe	Column	Pipe	A53 Gr. B	Typical
40	M40	N99A	N94			Kickers	Beam	Double Angle (...	A36 Gr.36	Typical
41	M41	N101B	N96			Kickers	Beam	Double Angle (...	A36 Gr.36	Typical
42	M42	N97	N95			Kickers	Beam	Double Angle (...	A36 Gr.36	Typical

Joint Loads and Enforced Displacements (BLC 1 : Dead)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	Y	-53.25
2	AIR21-2	L	Y	-53.25
3	AIR21-3	L	Y	-53.25
4	AIR21-4	L	Y	-53.25

Joint Loads and Enforced Displacements (BLC 1 : Dead) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
5	AIR21-5	L	Y	-53.25
6	AIR21-6	L	Y	-53.25
7	APXV-1	L	Y	-76.65
8	APXV-2	L	Y	-76.65
9	APXV-3	L	Y	-76.65
10	APXV-4	L	Y	-76.65
11	APXV-5	L	Y	-76.65
12	APXV-6	L	Y	-76.65
13	AIR32-1	L	Y	-73.6
14	AIR32-2	L	Y	-73.6
15	AIR32-3	L	Y	-73.6
16	AIR32-4	L	Y	-73.6
17	AIR32-5	L	Y	-73.6
18	AIR32-6	L	Y	-73.6
19	4449-1	L	Y	-78
20	4449-2	L	Y	-78
21	4449-3	L	Y	-78
22	ATMA-1	L	Y	-15.85
23	ATMA-2	L	Y	-15.85
24	ATMA-3	L	Y	-15.85

Joint Loads and Enforced Displacements (BLC 2 : Wx)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	X	68.348
2	AIR21-2	L	X	68.348
3	AIR21-3	L	X	63.709
4	AIR21-4	L	X	63.709
5	AIR21-5	L	X	63.709
6	AIR21-6	L	X	63.709
7	APXV-1	L	X	216.737
8	APXV-2	L	X	216.737
9	APXV-3	L	X	121.137
10	APXV-4	L	X	121.137
11	APXV-5	L	X	121.137
12	APXV-6	L	X	121.137
13	AIR32-1	L	X	72.611
14	AIR32-2	L	X	72.611
15	AIR32-3	L	X	67.948
16	AIR32-4	L	X	67.948
17	AIR32-5	L	X	67.948
18	AIR32-6	L	X	67.948
19	4449-1	L	X	34.604
20	4449-2	L	X	24.38
21	4449-3	L	X	24.38
22	ATMA-1	L	X	21.113
23	ATMA-2	L	X	8.601
24	ATMA-3	L	X	8.601

Joint Loads and Enforced Displacements (BLC 3 : Wz)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	Z	63.709

Joint Loads and Enforced Displacements (BLC 3 : Wz) (Continued)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
2	AIR21-2	L	Z	63.709
3	AIR21-3	L	Z	68.348
4	AIR21-4	L	Z	68.348
5	AIR21-5	L	Z	68.348
6	AIR21-6	L	Z	68.348
7	APXV-1	L	Z	121.137
8	APXV-2	L	Z	121.137
9	APXV-3	L	Z	216.737
10	APXV-4	L	Z	216.737
11	APXV-5	L	Z	216.737
12	APXV-6	L	Z	216.737
13	AIR32-1	L	Z	67.948
14	AIR32-2	L	Z	67.948
15	AIR32-3	L	Z	72.611
16	AIR32-4	L	Z	72.611
17	AIR32-5	L	Z	72.611
18	AIR32-6	L	Z	72.611
19	4449-1	L	Z	24.38
20	4449-2	L	Z	34.604
21	4449-3	L	Z	34.604
22	ATMA-1	L	Z	8.601
23	ATMA-2	L	Z	21.113
24	ATMA-3	L	Z	21.113

Joint Loads and Enforced Displacements (BLC 4 : Wx Ice)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	X	17.019
2	AIR21-2	L	X	17.019
3	AIR21-3	L	X	17.521
4	AIR21-4	L	X	17.521
5	AIR21-5	L	X	17.521
6	AIR21-6	L	X	17.521
7	APXV-1	L	X	46.52
8	APXV-2	L	X	46.52
9	APXV-3	L	X	32.662
10	APXV-4	L	X	32.662
11	APXV-5	L	X	32.662
12	APXV-6	L	X	32.662
13	AIR32-1	L	X	17.834
14	AIR32-2	L	X	17.834
15	AIR32-3	L	X	18.359
16	AIR32-4	L	X	18.359
17	AIR32-5	L	X	18.359
18	AIR32-6	L	X	18.359
19	4449-1	L	X	9.681
20	4449-2	L	X	7.4
21	4449-3	L	X	7.4
22	ATMA-1	L	X	6.568
23	ATMA-2	L	X	3.617
24	ATMA-3	L	X	3.617

Joint Loads and Enforced Displacements (BLC 5 : Wz Ice)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	Z	17.521
2	AIR21-2	L	Z	17.521
3	AIR21-3	L	Z	17.019
4	AIR21-4	L	Z	17.019
5	AIR21-5	L	Z	17.019
6	AIR21-6	L	Z	17.019
7	APXV-1	L	Z	32.662
8	APXV-2	L	Z	32.662
9	APXV-3	L	Z	46.52
10	APXV-4	L	Z	46.52
11	APXV-5	L	Z	46.52
12	APXV-6	L	Z	46.52
13	AIR32-1	L	Z	18.359
14	AIR32-2	L	Z	18.359
15	AIR32-3	L	Z	17.834
16	AIR32-4	L	Z	17.834
17	AIR32-5	L	Z	17.834
18	AIR32-6	L	Z	17.834
19	4449-1	L	Z	7.4
20	4449-2	L	Z	9.681
21	4449-3	L	Z	9.681
22	ATMA-1	L	Z	3.617
23	ATMA-2	L	Z	6.568
24	ATMA-3	L	Z	6.568

Joint Loads and Enforced Displacements (BLC 6 : Ice Weight)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	Y	-81.654
2	AIR21-2	L	Y	-81.654
3	AIR21-3	L	Y	-81.654
4	AIR21-4	L	Y	-81.654
5	AIR21-5	L	Y	-81.654
6	AIR21-6	L	Y	-81.654
7	APXV-1	L	Y	-230.344
8	APXV-2	L	Y	-230.344
9	APXV-3	L	Y	-230.344
10	APXV-4	L	Y	-230.344
11	APXV-5	L	Y	-230.344
12	APXV-6	L	Y	-230.344
13	AIR32-1	L	Y	-88.151
14	AIR32-2	L	Y	-88.151
15	AIR32-3	L	Y	-88.151
16	AIR32-4	L	Y	-88.151
17	AIR32-5	L	Y	-88.151
18	AIR32-6	L	Y	-88.151
19	4449-1	L	Y	-55.503
20	4449-2	L	Y	-55.503
21	4449-3	L	Y	-55.503
22	ATMA-1	L	Y	-32.601
23	ATMA-2	L	Y	-32.601
24	ATMA-3	L	Y	-32.601

Joint Loads and Enforced Displacements (BLC 7 : Wx Service)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	X	7.002
2	AIR21-2	L	X	7.002
3	AIR21-3	L	X	6.527
4	AIR21-4	L	X	6.527
5	AIR21-5	L	X	6.527
6	AIR21-6	L	X	6.527
7	APXV-1	L	X	22.205
8	APXV-2	L	X	22.205
9	APXV-3	L	X	12.411
10	APXV-4	L	X	12.411
11	APXV-5	L	X	12.411
12	APXV-6	L	X	12.411
13	AIR32-1	L	X	7.439
14	AIR32-2	L	X	7.439
15	AIR32-3	L	X	6.961
16	AIR32-4	L	X	6.961
17	AIR32-5	L	X	6.961
18	AIR32-6	L	X	6.961
19	4449-1	L	X	3.545
20	4449-2	L	X	2.498
21	4449-3	L	X	2.498
22	ATMA-1	L	X	2.163
23	ATMA-2	L	X	.881
24	ATMA-3	L	X	.881

Joint Loads and Enforced Displacements (BLC 8 : Wz Service)

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^...
1	AIR21-1	L	Z	6.527
2	AIR21-2	L	Z	6.527
3	AIR21-3	L	Z	7.002
4	AIR21-4	L	Z	7.002
5	AIR21-5	L	Z	7.002
6	AIR21-6	L	Z	7.002
7	APXV-1	L	Z	12.411
8	APXV-2	L	Z	12.411
9	APXV-3	L	Z	22.205
10	APXV-4	L	Z	22.205
11	APXV-5	L	Z	22.205
12	APXV-6	L	Z	22.205
13	AIR32-1	L	Z	6.961
14	AIR32-2	L	Z	6.961
15	AIR32-3	L	Z	7.439
16	AIR32-4	L	Z	7.439
17	AIR32-5	L	Z	7.439
18	AIR32-6	L	Z	7.439
19	4449-1	L	Z	2.498
20	4449-2	L	Z	3.545
21	4449-3	L	Z	3.545
22	ATMA-1	L	Z	.881
23	ATMA-2	L	Z	2.163
24	ATMA-3	L	Z	2.163

Member Distributed Loads (BLC 2 : Wx)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M1	PX	7.39	7.39	0	0
2	M9	PX	7.39	7.39	0	0
3	M8	PX	7.39	7.39	0	0
4	M7	PX	9.85	9.85	0	0
5	M6	PX	9.85	9.85	0	0
6	M5	PX	9.85	9.85	0	0
7	M2	PX	6.63	6.63	47.25	0
8	M4	PX	6.63	6.63	47.25	0
9	M10	PX	6.41	6.41	0	0
10	M12	PX	6.41	6.41	0	0
11	M11	PX	8.04	8.04	0	0
12	M43	PX	9.85	9.85	0	31.5
13	M44	PX	9.85	9.85	0	31.5
14	M45A	PX	9.85	9.85	0	31.5
15	M40	PX	13.31	13.31	0	0
16	M41	PX	13.31	13.31	0	0
17	M42	PX	13.31	13.31	0	0

Member Distributed Loads (BLC 3 : Wz)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M9	PZ	7.39	7.39	0	0
2	M8	PZ	7.39	7.39	0	0
3	M6	PZ	9.85	9.85	0	0
4	M5	PZ	9.85	9.85	0	0
5	M11	PZ	6.41	6.41	0	0
6	M12	PZ	6.41	6.41	0	0
7	M2	PZ	6.63	6.63	47.25	0
8	M4	PZ	6.63	6.63	47.25	0
9	M43	PZ	9.85	9.85	0	31.5
10	M44	PZ	9.85	9.85	0	31.5
11	M40	PZ	13.31	13.31	0	0
12	M41	PZ	13.31	13.31	0	0
13	M42	PZ	13.31	13.31	0	0

Member Distributed Loads (BLC 4 : Wx Ice)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M10	PX	2.44	2.44	0	0
2	M12	PX	2.44	2.44	0	0
3	M11	PX	2.44	2.44	0	0
4	M1	PX	2.51	2.51	0	0
5	M9	PX	2.51	2.51	0	0
6	M8	PX	2.51	2.51	0	0
7	M2	PX	1.92	1.92	47.25	0
8	M4	PX	1.92	1.92	47.25	0
9	M7	PX	3.08	3.08	0	0
10	M6	PX	3.08	3.08	0	0
11	M5	PX	3.08	3.08	0	0
12	M43	PX	3.08	3.08	0	31.5
13	M44	PX	3.08	3.08	0	31.5
14	M45A	PX	3.08	3.08	0	31.5

Member Distributed Loads (BLC 4 : Wx Ice) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
15	M40	PX	3.7	3.7	0	0
16	M41	PX	3.7	3.7	0	0
17	M42	PX	3.7	3.7	0	0

Member Distributed Loads (BLC 5 : Wz Ice)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M11	PZ	2.44	2.44	0	0
2	M12	PZ	2.44	2.44	0	0
3	M9	PZ	2.51	2.51	0	0
4	M8	PZ	2.51	2.51	0	0
5	M2	PZ	1.92	1.92	47.25	0
6	M4	PZ	1.92	1.92	47.25	0
7	M6	PZ	3.08	3.08	0	0
8	M5	PZ	3.08	3.08	0	0
9	M43	PZ	3.08	3.08	0	31.5
10	M44	PZ	3.08	3.08	0	31.5
11	M40	PZ	3.7	3.7	0	0
12	M41	PZ	3.7	3.7	0	0
13	M42	PZ	3.7	3.7	0	0

Member Distributed Loads (BLC 6 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M1	Y	-10.6	-10.6	0	0
2	M8	Y	-10.6	-10.6	0	0
3	M9	Y	-10.6	-10.6	0	0
4	M3	Y	-10.6	-10.6	47.25	0
5	M2	Y	-10.6	-10.6	47.25	0
6	M4	Y	-10.6	-10.6	47.25	0
7	M11	Y	-9.59	-9.59	0	0
8	M12	Y	-9.59	-9.59	0	0
9	M10	Y	-9.59	-9.59	0	0
10	M30	Y	-9.32	-9.32	0	0
11	M26	Y	-9.32	-9.32	0	0
12	M25	Y	-9.32	-9.32	0	0
13	M22	Y	-9.32	-9.32	0	0
14	M29	Y	-9.32	-9.32	0	0
15	M21	Y	-9.32	-9.32	0	0
16	M49	Y	-9.32	-9.32	0	0
17	M53	Y	-9.32	-9.32	0	0
18	M57	Y	-9.32	-9.32	0	0
19	M40	Y	-14.88	-14.88	0	0
20	M41	Y	-14.88	-14.88	0	0
21	M42	Y	-14.88	-14.88	0	0

Member Distributed Loads (BLC 7 : Wx Service)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M1	PX	.76	.76	0	0
2	M9	PX	.76	.76	0	0
3	M8	PX	.76	.76	0	0
4	M2	PX	.68	.68	47.25	0

Member Distributed Loads (BLC 7 : Wx Service) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
5	M4	PX	.68	.68	47.25	0
6	M10	PX	.66	.66	0	0
7	M12	PX	.66	.66	0	0
8	M11	PX	.66	.66	0	0
9	M7	PX	1.01	1.01	0	0
10	M6	PX	1.01	1.01	0	0
11	M5	PX	1.01	1.01	0	0
12	M43	PX	1.01	1.01	0	31.5
13	M44	PX	1.01	1.01	0	31.5
14	M45A	PX	1.01	1.01	0	31.5
15	M40	PX	1.36	1.36	0	0
16	M41	PX	1.36	1.36	0	0
17	M42	PX	1.36	1.36	0	0

Member Distributed Loads (BLC 8 : Wz Service)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M9	PZ	.76	.76	0	0
2	M8	PZ	.76	.76	0	0
3	M11	PZ	.66	.66	0	0
4	M12	PZ	.66	.66	0	0
5	M6	PZ	1.01	1.01	0	0
6	M5	PZ	1.01	1.01	0	0
7	M43	PZ	1.01	1.01	0	31.5
8	M44	PZ	1.01	1.01	0	31.5
9	M2	PZ	.68	.68	47.25	0
10	M4	PZ	.68	.68	47.25	0
11	M40	PZ	1.36	1.36	0	0
12	M41	PZ	1.36	1.36	0	0
13	M42	PZ	1.36	1.36	0	0

Member Distributed Loads (BLC 15 : BLC 1 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M3	Y	-1.317	-5.148	0	10.88
2	M3	Y	-5.148	-12.375	10.88	21.76
3	M3	Y	-12.375	-18.531	21.76	32.64
4	M3	Y	-18.531	-13.851	32.64	43.52
5	M3	Y	-13.851	-2.802	43.52	54.4
6	M14	Y	-10.076	-7.778	0	10.912
7	M14	Y	-7.778	-5.301	10.912	21.824
8	M14	Y	-5.301	-3.881	21.824	32.736
9	M14	Y	-3.881	-2.62	32.736	43.648
10	M14	Y	-2.62	-.285	43.648	54.56
11	M16	Y	-9.366	-6.806	0	10.912
12	M16	Y	-6.806	-4.689	10.912	21.824
13	M16	Y	-4.689	-3.33	21.824	32.736
14	M16	Y	-3.33	-2.065	32.736	43.648
15	M16	Y	-2.065	-.579	43.648	54.56
16	M4	Y	-3.643	-6.03	0	10.88
17	M4	Y	-6.03	-10.265	10.88	21.76
18	M4	Y	-10.265	-14.942	21.76	32.64
19	M4	Y	-14.942	-14.37	32.64	43.52

Member Distributed Loads (BLC 15 : BLC 1 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
20	M4	Y	-14.37	-9.954	43.52	54.4
21	M15	Y	.036	-3.065	5.456	15.277
22	M15	Y	-3.065	-5.284	15.277	25.097
23	M15	Y	-5.284	-6.212	25.097	34.918
24	M15	Y	-6.212	-8.381	34.918	44.739
25	M15	Y	-8.381	-9.102	44.739	54.56
26	M18	Y	-6.99	-7.121	0	10.912
27	M18	Y	-7.121	-5.477	10.912	21.824
28	M18	Y	-5.477	-3.245	21.824	32.736
29	M18	Y	-3.245	-1.936	32.736	43.648
30	M18	Y	-1.936	-.365	43.648	54.56
31	M2	Y	-2.273	-4.579	0	10.88
32	M2	Y	-4.579	-10.69	10.88	21.76
33	M2	Y	-10.69	-15.705	21.76	32.64
34	M2	Y	-15.705	-12.938	32.64	43.52
35	M2	Y	-12.938	-7.292	43.52	54.4
36	M13	Y	-.179	-2.749	0	10.912
37	M13	Y	-2.749	-4.14	10.912	21.824
38	M13	Y	-4.14	-6.294	21.824	32.736
39	M13	Y	-6.294	-7.839	32.736	43.648
40	M13	Y	-7.839	-6.76	43.648	54.56
41	M17	Y	-3.005	-4.86	10.912	19.641
42	M17	Y	-4.86	-4.088	19.641	28.371
43	M17	Y	-4.088	-6.435	28.371	37.101
44	M17	Y	-6.435	-10.135	37.101	45.83
45	M17	Y	-10.135	-9.442	45.83	54.56

Member Distributed Loads (BLC 16 : BLC 6 Transient Area Loads)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
1	M3	Y	-2.404	-10.225	0	10.88
2	M3	Y	-10.225	-18.512	10.88	21.76
3	M3	Y	-18.512	-26.921	21.76	32.64
4	M3	Y	-26.921	-25.818	32.64	43.52
5	M3	Y	-25.818	-15.549	43.52	54.4
6	M14	Y	-18.075	-15.195	0	8.73
7	M14	Y	-15.195	-12.746	8.73	17.459
8	M14	Y	-12.746	-9.445	17.459	26.189
9	M14	Y	-9.445	-6.679	26.189	34.918
10	M14	Y	-6.679	-5.733	34.918	43.648
11	M16	Y	-12.785	-13.189	0	10.912
12	M16	Y	-13.189	-10.292	10.912	21.824
13	M16	Y	-10.292	-7.148	21.824	32.736
14	M16	Y	-7.148	-4.786	32.736	43.648
15	M16	Y	-4.786	-.243	43.648	54.56
16	M4	Y	-6.571	-11.102	0	10.88
17	M4	Y	-11.102	-18.963	10.88	21.76
18	M4	Y	-18.963	-26.688	21.76	32.64
19	M4	Y	-26.688	-23.601	32.64	43.52
20	M4	Y	-23.601	-13.166	43.52	54.4
21	M15	Y	-.733	-3.595	0	10.912
22	M15	Y	-3.595	-6.107	10.912	21.824

Member Distributed Loads (BLC 16 : BLC 6 Transient Area Loads) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,F]	End Magnitude[lb/ft,F]	Start Location[in,%]	End Location[in,%]
23	M15	Y	-6.107	-11.05	21.824	32.736
24	M15	Y	-11.05	-13.975	32.736	43.648
25	M15	Y	-13.975	-12.099	43.648	54.56
26	M18	Y	-17.049	-18.21	0	8.73
27	M18	Y	-18.21	-11.53	8.73	17.459
28	M18	Y	-11.53	-7.319	17.459	26.189
29	M18	Y	-7.319	-8.809	26.189	34.918
30	M18	Y	-8.809	-5.69	34.918	43.648
31	M2	Y	-2.407	-10.219	0	10.88
32	M2	Y	-10.219	-18.448	10.88	21.76
33	M2	Y	-18.448	-26.907	21.76	32.64
34	M2	Y	-26.907	-25.899	32.64	43.52
35	M2	Y	-25.899	-15.612	43.52	54.4
36	M13	Y	-5.743	-6.649	10.912	19.641
37	M13	Y	-6.649	-9.408	19.641	28.371
38	M13	Y	-9.408	-12.713	28.371	37.101
39	M13	Y	-12.713	-15.172	37.101	45.83
40	M13	Y	-15.172	-18.091	45.83	54.56
41	M17	Y	-.241	-4.797	0	10.912
42	M17	Y	-4.797	-7.186	10.912	21.824
43	M17	Y	-7.186	-10.3	21.824	32.736
44	M17	Y	-10.3	-13.176	32.736	43.648
45	M17	Y	-13.176	-12.815	43.648	54.56

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Dead	DL		-1.05		24			3	
2	Wx	None				24		17		
3	Wz	WL				24		13		
4	Wx Ice	WL				24		17		
5	Wz Ice	WL				24		13		
6	Ice Weight	OL1				24		21	3	
7	Wx Service	WL				24		17		
8	Wz Service	WL				24		13		
9	Maintenance Load LM1	OL2					1			
10	Maintenance Load LM2	OL2					1			
11	Maintenance Load LM3	OL2					1			
12	Maintenance Load LV1	OL2					1			
15	BLC 1 Transient Area Loads	None						45		
16	BLC 6 Transient Area Loads	None						45		

Joint Coordinates and Temperatures

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
1	N1	1.16082	0	3.390194	0	
2	N2	1.16082	0	153.390194	0	
3	N3	38.81562	0	62.279921	0	
4	N4	66.719431	0	78.390194	0	
5	N5	38.81562	0	94.500466	0	
6	N6	55.72042	0	28.559894	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
7	N7	1.16082	0	60.059894	0	
8	N8	1.16082	0	96.720494	0	
9	N9	55.72042	0	128.220494	0	
10	N10	87.469431	0	46.890194	0	
11	N11	87.469431	0	109.890194	0	
12	N12	6.64302	0	156.555344	0	
13	N13	136.546831	0	81.555344	0	
14	N14	6.64302	0	0.225044	0	
15	N15	136.546831	0	75.225044	0	
16	N16	134.719431	0	74.169994	0	
17	N17	134.719431	0	82.610394	0	
18	N18	1.16082	0	5.500294	0	
19	N19	8.47042	0	1.280094	0	
20	N20	1.16082	0	151.280094	0	
21	N21	8.47042	0	155.500294	0	
22	N22	52.06562	0	30.669994	0	
23	N23	87.469431	0	51.110394	0	
24	N24	52.06562	0	126.110394	0	
25	N25	87.469431	0	105.669994	0	
26	N26	134.719431	0	78.390194	0	
27	N27	4.81562	0	3.390194	0	
28	N28	4.81562	0	57.949794	0	
29	N29	4.81562	0	98.830593	0	
30	N30	4.81562	0	153.390194	0	
31	N31	1.16082	0	19.390194	0	
32	N32	-1.83918	0	19.390194	0	
33	N33	1.16082	0	137.390194	0	
34	N34	-1.83918	0	137.390194	0	
35	N35	-1.83918	-54	19.390194	0	
36	N36	-1.83918	54	19.390194	0	
37	N37	-1.83918	-36	137.390194	0	
38	N38	-1.83918	36	137.390194	0	
39	N39	20.499427	0	148.555344	0	
40	N40	21.999427	0	151.15342	0	
41	N41	122.690424	0	89.555344	0	
42	N42	124.190424	0	92.15342	0	
43	N43	20.499427	0	8.225044	0	
44	N44	21.999427	0	5.626968	0	
45	N45	122.690424	0	67.225044	0	
46	N46	124.190424	0	64.626968	0	
47	APXV-1	-1.83918	42	19.390194	0	
48	APXV-2	-1.83918	-42	19.390194	0	
49	AIR32-1	-1.83918	28	137.390194	0	
50	AIR32-2	-1.83918	-28	137.390194	0	
51	N55	21.999427	-54	151.15342	0	
52	N56	21.999427	54	151.15342	0	
53	N57	124.190424	-36	92.15342	0	
54	N58	124.190424	36	92.15342	0	
55	APXV-5	21.999427	42	151.15342	0	
56	APXV-6	21.999427	-42	151.15342	0	
57	AIR32-5	124.190424	28	92.15342	0	
58	AIR32-6	124.190424	-28	92.15342	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [in]	Y [in]	Z [in]	Temp [F]	Detach From Diap...
59	N67	21.999427	-36	5.626968	0	
60	N68	21.999427	36	5.626968	0	
61	N69	124.190424	-54	64.626968	0	
62	N70	124.190424	54	64.626968	0	
63	AIR32-3	21.999427	28	5.626968	0	
64	AIR32-4	21.999427	-28	5.626968	0	
65	APXV-3	124.190424	42	64.626968	0	
66	APXV-4	124.190424	-42	64.626968	0	
67	4449-1	-1.83918	27	19.390194	0	
68	4449-3	21.999427	27	151.15342	0	
69	4449-2	124.190424	27	64.626968	0	
70	N85	28.44062	0	44.309894	0	
71	N86	87.469431	0	78.390194	0	
72	N87	28.44062	0	112.470494	0	
73	N88	1.16082	0	78.390194	0	
74	N89	-1.83918	0	78.390194	0	
75	N90	-1.83918	-36	78.390194	0	
76	N91	-1.83918	36	78.390194	0	
77	AIR21-1	-1.83918	28	78.390194	0	
78	AIR21-2	-1.83918	-28	78.390194	0	
79	ATMA-1	-1.83918	15	78.390194	0	
80	N98A	71.594925	0	119.055344	0	
81	N99	73.094925	0	121.65342	0	
82	N100	73.094925	-36	121.65342	0	
83	N101	73.094925	36	121.65342	0	
84	AIR21-5	73.094925	28	121.65342	0	
85	AIR21-6	73.094925	-28	121.65342	0	
86	ATMA-3	73.094925	15	121.65342	0	
87	N108	71.594925	0	37.725044	0	
88	N109	73.094925	0	35.126968	0	
89	N110	73.094925	-36	35.126968	0	
90	N111	73.094925	36	35.126968	0	
91	AIR21-3	73.094925	28	35.126968	0	
92	AIR21-4	73.094925	-28	35.126968	0	
93	ATMA-2	73.094925	15	35.126968	0	
94	N94	38.81562	-28	62.279921	0	
95	N95	66.719431	-28	78.390194	0	
96	N96	38.81562	-28	94.500466	0	
97	N97	93.469431	0	78.390194	0	
98	N99A	25.44062	0	39.113742	0	
99	N101B	25.44062	0	117.666646	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]	Footing
1	N5	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
2	N3	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
3	N4	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
4	N94	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
5	N95	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	
6	N96	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction	

Member Point Loads (BLC 9 : Maintenance Load LM1)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M21	Y	-500	%50

Member Point Loads (BLC 10 : Maintenance Load LM2)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M49	Y	-500	%50

Member Point Loads (BLC 11 : Maintenance Load LM3)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M22	Y	-500	%50

Member Point Loads (BLC 12 : Maintenance Load LV1)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	M1	Y	-250	%50

Load Combinations

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
1	1.4D	Yes	Y		1	1.4														
2	1.2D+1.6W1	Yes	Y		1	1.2	2	1.6	3											
3	1.2D+1.6W2	Yes	Y		1	1.2	2	1.386	3	.8										
4	1.2D+1.6W3	Yes	Y		1	1.2	2	.8	3	1.386										
5	1.2D+1.6W4	Yes	Y		1	1.2	2		3	1.6										
6	1.2D+1.6W5	Yes	Y		1	1.2	2	-.8	3	1.386										
7	1.2D+1.6W6	Yes	Y		1	1.2	2	-1.3...	3	.8										
8	1.2D+1.6W7	Yes	Y		1	1.2	2	-1.6	3											
9	1.2D+1.6W8	Yes	Y		1	1.2	2	-1.3...	3	-.8										
10	1.2D+1.6W9	Yes	Y		1	1.2	2	-.8	3	-1.3...										
11	1.2D+1.6W10	Yes	Y		1	1.2	2		3	-1.6										
12	1.2D+1.6W11	Yes	Y		1	1.2	2	.8	3	-1.3...										
13	1.2D+1.6W12	Yes	Y		1	1.2	2	1.386	3	-.8										
14																				
15	1.2D+1.0 Ice	Yes	Y		1	1.2	6	1												
16	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	1	5									
17	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	.866	5	.5								
18	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	.5	5	.866								
19	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4		5	1								
20	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	-.5	5	.866								
21	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	-.866	5	.5								
22	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	-1	5									
23	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	-.866	5	-.5								
24	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	-.5	5	-.866								
25	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4		5	-1								
26	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	.5	5	-.866								
27	1.2D+1.0ICE+1.0...	Yes	Y		1	1.2	6	1	4	.866	5	-.5								
28																				
29	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	1	8									
30	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	.866	8	.5								
31	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	.5	8	.866								
32	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7		8	1								

Load Combinations (Continued)

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact..	BLC	Fact...
33	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	-.5	8	.866								
34	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	-.866	8	.5								
35	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	-1	8									
36	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	-.866	8	-.5								
37	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	-.5	8	-.866								
38	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7		8	-1								
39	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	.5	8	-.866								
40	1.2D+1.5LM1+1.0...	Yes	Y		1	1.2	9	1.5	7	.866	8	-.5								
41																				
42	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	1	8									
43	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	.866	8	.5								
44	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	.5	8	.866								
45	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7		8	1								
46	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	-.5	8	.866								
47	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	-.866	8	.5								
48	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	-1	8									
49	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	-.866	8	-.5								
50	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	-.5	8	-.866								
51	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7		8	-1								
52	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	.5	8	-.866								
53	1.2D+1.5LM2+1.0...	Yes	Y		1	1.2	10	1.5	7	.866	8	-.5								
54																				
55	1.2D+1.5LV1	Yes	Y		1	1.2	13	1.5												
56	1.2D+1.5LV2	Yes	Y		1	1.2	14	1.5												
57			Y																	

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	N4	max	-92.423	8	-470.579	8	882.401	11	114.413	24	1228.373	5	-300.626	9
2		min	-4283.578	16	-1219.467	16	-879.625	5	-31.68	30	-1233.34	11	-759.308	17
3	N95	max	3953.748	16	3762.54	16	184.881	11	356.354	11	339.533	5	-109.582	13
4		min	1565.857	48	1477.281	48	-184.129	5	-354.55	5	-341.128	11	-272.161	21
5	N3	max	2204.945	23	-479.87	53	3682.513	24	-233.31	13	1098.366	2	299.447	27
6		min	-460.809	3	-1213.497	21	164.179	4	-770.093	33	-1086.435	8	-381.25	47
7	N5	max	2164.149	21	-478.972	42	94.224	11	618.195	23	676.906	9	474.978	17
8		min	-10.422	13	-1220.107	22	-3721.712	19	206.455	3	-682.309	3	-334.751	49
9	N94	max	-706.966	8	3761.787	24	-1367.771	2	50.604	2	296.69	2	328.7	2
10		min	-1997.448	27	1546.137	4	-3429.806	22	-253.544	21	-289.738	8	-207.686	8
11	N96	max	-747.11	9	3764.669	20	3430.899	22	250.181	23	173.984	9	218.466	3
12		min	-1994.621	17	1541.435	12	1392.662	2	3.121	3	-179.329	3	-98.629	9
13	Totals:	max	3644.074	8	7619.497	20	3938.27	11						
14		min	-3644.074	2	3267.809	12	-3938.27	5						

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

	Member	Shape	Code Check	Loc[in]	LC	She..	Lo.....			phi*Pnc ..	phi*Pnt...	phi*Mn ..	phi*M.....	Eqn
1	M7	L3x1.5x3/16	.889	31.5	21	.176	3....	z	7	17874.6..	26198....	368.585	1538.....	H2-1
2	M43	L3x1.5x3/16	.876	0	23	.215	27..	z	3	17874.6..	26198....	368.585	1538.....	H2-1
3	M6	L3x1.5x3/16	.868	31.5	20	.145	3....	z	...	17874.6..	26198....	368.585	1536.....	H2-1
4	M44	L3x1.5x3/16	.867	0	19	.241	27..	z	...	17874.6..	26198....	368.585	1537.....	H2-1

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

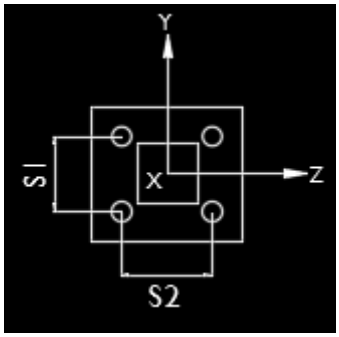
	Member	Shape	Code Check	Loc[in]	LC	She..	Lo.....		.....	phi*Pnc ..	phi*Pnt...	phi*Mn ..	phi*M.....	Eqn
5	M5	L3x1.5x3/16	.865	31.5	24	.178	3....	z	5	17874.6..	26198....	368.585	1535.....	H2-1
6	M45A	L3x1.5x3/16	.861	0	23	.146	27..	z	9	17874.6..	26198....	368.585	1535.....	H2-1
7	M12	3/8" x 3"	.686	4.22	11	.362	4.22	y	...	26347.8..	36450	283.5	2278.8	H1-...
8	M10	3/8" x 3"	.657	4.22	13	.339	4.22	y	...	26347.8..	36450	283.5	2278.8	H1-...
9	M11	3/8" x 3"	.634	4.22	9	.340	4.22	y	...	26347.8..	36450	283.5	2278.8	H1-...
10	M3	PIPE_3.0	.574	41.083	16	.147	41...		...	54907.0..	65205	5748.75	5748.....	H1-...
11	M4	PIPE_3.0	.572	41.083	24	.151	41...		...	54907.0..	65205	5748.75	5748.....	H1-...
12	M2	PIPE_3.0	.570	41.083	18	.151	41...		...	54907.0..	65205	5748.75	5748.....	H1-...
13	M41	LL2.5x2.5x3x6	.475	0	21	.018	0	y	...	43090.2..	58320	4643.061	1593.....	H1-...
14	M42	LL2.5x2.5x3x6	.475	0	16	.018	0	y	...	43090.2..	58320	4643.061	1593.....	H1-...
15	M40	LL2.5x2.5x3x6	.473	0	24	.018	0	y	...	43090.2..	58320	4643.061	1593.....	H1-...
16	M13	L2x2x3	.387	0	20	.022	0	y	...	15102.8..	23392.8	557.717	1182.....	H2-1
17	M18	L2x2x3	.385	54.56	16	.022	54..	z	...	8291.515	23392.8	557.717	1182.....	H2-1
18	M25	PIPE_2.5	.378	54	5	.027	54		5	26137.1..	50715	3596.25	3596.....	H1-...
19	M21	PIPE_2.5	.378	54	8	.027	54		8	26137.1..	50715	3596.25	3596.....	H1-...
20	M30	PIPE_2.5	.378	54	11	.027	54		...	26137.1..	50715	3596.25	3596.....	H1-...
21	M16	L2x2x3	.368	54.56	16	.021	54..	z	...	15102.8..	23392.8	557.717	1206.....	H2-1
22	M17	L2x2x3	.358	0	17	.019	0	z	...	15102.8..	23392.8	557.717	1183.....	H2-1
23	M15	L2x2x3	.354	0	25	.019	0	z	...	15102.8..	23392.8	557.717	1181.....	H2-1
24	M14	L2x2x3	.341	54.56	16	.018	54..	y	...	15102.8..	23392.8	557.717	1216.....	H2-1
25	M1	PIPE_3.0	.180	93.75	19	.150	3....		...	28250.5..	65205	5748.75	5748.....	H1-...
26	M8	PIPE_3.0	.179	93.75	25	.146	3....		...	28250.5..	65205	5748.75	5748.....	H1-...
27	M9	PIPE_3.0	.177	56.25	24	.150	14...		...	28250.5..	65205	5748.75	5748.....	H1-...
28	M49	PIPE_2.5	.084	36	8	.009	36		8	37773.8..	50715	3596.25	3596.....	H1-...
29	M53	PIPE_2.5	.084	36	5	.009	36		5	37773.8..	50715	3596.25	3596.....	H1-...
30	M57	PIPE_2.5	.084	36	11	.009	36		...	37773.8..	50715	3596.25	3596.....	H1-...
31	M29	PIPE_2.5	.077	36	11	.008	36		...	37773.8..	50715	3596.25	3596.....	H1-...
32	M22	PIPE_2.5	.077	36	8	.008	36		8	37773.8..	50715	3596.25	3596.....	H1-...
33	M26	PIPE_2.5	.077	36	5	.008	36		5	37773.8..	50715	3596.25	3596.....	H1-...

APPENDIX D

ADDITIONAL CALCUATIONS

Mount to Monopole Ring Mount Kit Connection Check:

Applied Tension:	$Rx := 4284 \cdot lbf$	From Risa 3D LRFD Loading
Applied Shear:	$Ry := 1219 lbf$	From Risa 3D LRFD Loading
Applied Shear:	$Rz := 882 \cdot lbf$	From Risa 3D LRFD Loading
Applied Torque:	$Mx := 114 \cdot lbf \cdot ft$	From Risa 3D LRFD Loading
Applied Moment:	$My := 1228 lbf \cdot ft$	From Risa 3D LRFD Loading
Applied Moment:	$Mz := 759 \cdot lbf \cdot ft$	From Risa 3D LRFD Loading
Number of Bolts:	$n := 4$	Per Specifications
Bolts Vertical Spacing:	$S_1 := 6in$	Per Specifications
Bolts Horizontal Spacing:	$S_2 := 6in$	Per Specifications
Applied Tension at Bolt:	$P_{a.t} := \frac{Rx}{n} + \frac{2My}{n \cdot S_2} + \frac{2Mz}{n \cdot S_1} = 3058\,lbf$	
Applied Shear at Bolt:	$P_{a.v} := \frac{\sqrt{Ry^2 + Rz^2}}{n} + \frac{2Mx}{n\sqrt{S_1^{\,2} + S_2^{\,2}}} = 456.8\,lbf$	
Bolt Type Used:	**A325N**	
Nominal Tensile Stress, Fnt:	$F_{n.t} := 90ksi$	AISC, Table J3-2, P. 16.1-104
Nominal Shear Stress, Fnv:	$F_{n.v} := 54ksi$	AISC, Table J3-2, P. 16.1-104
Nominal Bolt Diameter:	$d_b := \frac{5}{8}in$	Per Specifications
Gross Area of the Bolt:	$A_{b.g} := 0.307in^2$	AISC, Table 7-18, P. 7-83
Net Area of the Bolt:	$A_{b.n} := 0.226in^2$	AISC, Table 7-18, P. 7-83
Strength Reduction Factor, ϕ:	$\phi := 0.75$	



Combined Tension And Shear Check

Nominal Tensile Reduced Fntr

$$F_{n.t.r} := 1.3 \cdot F_{n.t} - \frac{F_{n.t}}{\phi \cdot F_{n.v}} \cdot \frac{P_{a.v}}{A_{b.g}} = 113.7 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

Nominal Shear Reduced Fntv

$$F_{n.v.r} := 1.3 \cdot F_{n.v} - \frac{F_{n.v}}{\phi \cdot F_{n.t}} \cdot \frac{P_{a.t}}{A_{b.g}} = 62.2 \cdot ksi$$

AISC Eq. J3-3a, P. 16.1-109

Bolt Nominal Tensive Strength

$$R_{n.t} := F_{n.t} \cdot A_{b.g} = 27.6 \cdot kip$$

Tension Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.t} \geq P_{a.t} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

$$Check = \text{"OK"}$$

Tension Ratio

$$Ratio_t := \frac{P_{a.t}}{\phi \cdot R_{n.t}} \qquad Ratio_t = 14.8 \cdot \%$$

Bolt Nominal Shear Strength

$$R_{n.v} := F_{n.v} \cdot A_{b.g} = 16.6 \cdot kip$$

Shear Check

$$Check := \begin{cases} \text{"OK"} & \text{if } \phi \cdot R_{n.v} \geq P_{a.v} \\ \text{"NOT GOOD"} & \text{otherwise} \end{cases}$$

$$Check = \text{"OK"}$$

Shear Ratio

$$Ratio_v := \frac{P_{a.v}}{\phi \cdot R_{n.v}} \qquad Ratio_v = 3.7 \cdot \%$$

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: CT11269B

Waterbury/I-84/Mattatuck
150 Mattatuck Heights
Waterbury, CT 06705

September 28, 2018

EBI Project Number: 6218006462

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**16.07 %**

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

EBI Consulting
environmental | engineering | due diligence

September 28, 2018

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

Emissions Analysis for Site: **CT11269B – Waterbury/I-84/Mattatuck**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **150 Mattatuck Heights, Waterbury, 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 **150 Mattatuck Heights, Waterbury, 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 (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 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.

4) 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.

5) 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.

6) 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.

7) 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.

8) 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.

9) 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.

10) 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.

11) The antenna mounting height centerline of the proposed antennas is **100 feet** above ground level (AGL).

12) 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.

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

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):	100 feet	Height (AGL):	100 feet	Height (AGL):	100 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%	**3.17**	Antenna B1 MPE%	**3.17**	Antenna C1 MPE%	**3.17**
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):	100 feet	Height (AGL):	100 feet	Height (AGL):	100 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	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A2 MPE%	**1.50**	Antenna B2 MPE%	**1.50**	Antenna C2 MPE%	**1.50**
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):	100 feet	Height (AGL):	100 feet	Height (AGL):	100 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%	**2.36**	Antenna B3 MPE%	**2.36**	Antenna C3 MPE%	**2.36**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**7.03 %**
Verizon Wireless	**7.41** %
Clearwire	**0.12** %
Sprint	**1.07** %
Nextel	**0.44** %
Site Total MPE %:	**16.07 %**

T-Mobile Sector A Total:	7.03 %
T-Mobile Sector B Total:	7.03 %
T-Mobile Sector C Total:	7.03 %
Site Total:	16.07 %

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	100	12.66	PCS - 1900 MHz	1000.00	1.27%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	100	18.99	AWS - 2100 MHz	1000.00	1.90%
T-Mobile PCS - 1900 MHz GSM	1	583.57	100	2.37	PCS - 1900 MHz	1000.00	0.24%
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	100	6.33	PCS - 1900 MHz	1000.00	0.63%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	100	6.33	AWS - 2100 MHz	1000.00	0.63%
T-Mobile 600 MHz LTE	2	788.97	100	6.42	600 MHz	400.00	1.61%
T-Mobile 700 MHz LTE	2	432.54	100	3.52	700 MHz	467.00	0.75%
						Total:	**7.03%**

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:	7.03 %
Sector B:	7.03 %
Sector C:	7.03 %
T-Mobile Maximum MPE % (Per Sector):	7.03 %
Site Total:	16.07 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **16.07%** 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.