



Filed by:

G. Scott Shepherd, Sr. Property Specialist - SBA Communications  
134 Flanders Rd., Suite 125, Westborough, MA 01581  
508.251.0720 x 3807 - GShepherd@sbsite.com

August 19, 2019

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

**RE: Notice of Exempt Modification**  
**215 Coatney Hill Road, Woodstock, CT 06281**  
**Latitude: 41.962264**  
**Longitude: -72.018655**  
**T-Mobile Site #: CTNL181A\_L600**

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 177-foot level of the existing 190-foot Monopole Tower at 215 Coatney Hill Rd., Woodstock, CT. The 190-foot tower is owned by SBA Towers V, LLC. The property is owned by the Town of Woodstock. T-Mobile now intends to replace six (6) existing antennas with six (6) new 600/700/1900 MHz antennas. The new antennas would be installed at the 177-foot level of the tower.

Planned Modifications:

TOWER

Remove:

- (3) 1-5/8" lines

Remove and Replace:

- (3) EMS RR90-17-02DPL2 – Panel (Remove) / (3) APXV18-206516S-C-A20 – Panel 1900 MHz (Replace)
- (3) Andrew LNX-6515DS-VTM – Panel (Remove) / (3) APXVAARR24\_43-U-NA20 – Panel 600/700 MHz (Replace)

Install New:

- (3) Ericsson 4449 B71+B12
- (3) 1-5/8" fiber

Existing Equipment to Remain:

- (3) Ericsson KRY 112 489/2
- (3) Kathrein 782 11056
- (1) Platform with handrails
- (12) 1-5/8" lines

Entitlements:

- (3) 1-5/8" lines
- (3) EMS RR90-17-02DPL2 – Panel



SBA

GROUND

Install New:

- Equipment inside existing 6201 cabinet

This facility was approved by the Town of Woodstock's Planning and Zoning Commission under Special Permit on January 19, 2001 for application SP438-00-11. A bond was issued to the Town. There were no post construction stipulations set. Please see attached.

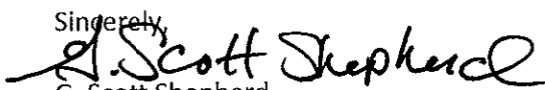
Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Town of Woodstock's First Selectman, Michael Alberts, and Zoning Enforcement Officer, Michael D'Amato. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,



G. Scott Shepherd

Sr. Property Specialist

SBA COMMUNICATIONS CORPORATION

134 Flanders Rd., Suite 125

Westborough, MA 01581

508.251.0720 x3804 + T

508.366.2610 + F

508.868.6000 + C

[GShepherd@sbsite.com](mailto:GShepherd@sbsite.com)

Attachments

cc: Michael Alberts, First Selectman / with attachments  
*Town of Woodstock, 415 Route 169, Woodstock, CT 06281-3039*  
Michael D'Amato, Zoning Enforcement Officer / with attachments  
*Town of Woodstock, 415 Route 169, Woodstock, CT 06281-3039*



Exhibit List

Exhibit 1	Check Copy	x
Exhibit 2	Notification Receipts	x
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	Planning and Zoning Commission January 19, 2001
Exhibit 6	Construction Drawings	B+T GRP dated 8/16/19
Exhibit 7	Structural Analysis	TES dated 7/3/19
Exhibit 8	Mount Analysis	TES dated 7/26/19
Exhibit 9	EME Report	Transcom 5/30/19

# EXHIBIT 1

# EXHIBIT 2

ORIGIN ID:BBFA (508) 251-0720  
KRI PELLETER  
SBA NETWORK SERVICES INC  
134 FLANDERS RD.  
SUITE 125  
WESTBOROUGH, MA 01581  
UNITED STATES US

SHIP DATE: 19AUG19  
ACTWTG1: 1.00 LB  
CAD: 105843304/NET/4160  
BILL SENDER

TO MELANIE A. BACHMAN ACTING EXEC. DIR  
CONNECTICUT SITING COUNCIL  
TEN FRANKLIN SQUARE

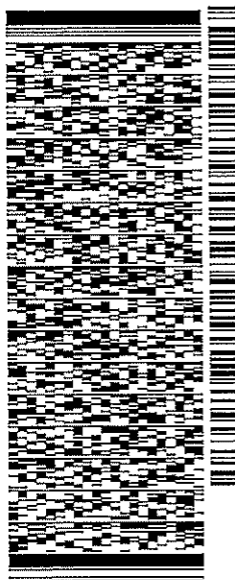
NEW BRITAIN CT 06051

(508) 251-0720 X 302

REF: 10-56-92009-6389

INV/

DEPT:

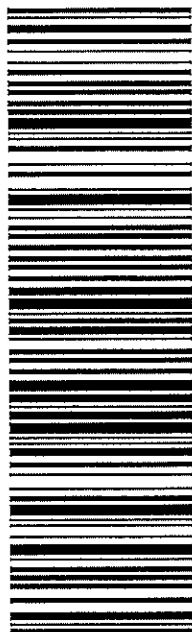


TRK# 7760 1568 9784  
0201

TUE - 20 AUG 10:30A  
PRIORITY OVERNIGHT

EB BDLA

06051  
BDL  
CT-US



567J3/E9E7/05A2

**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.

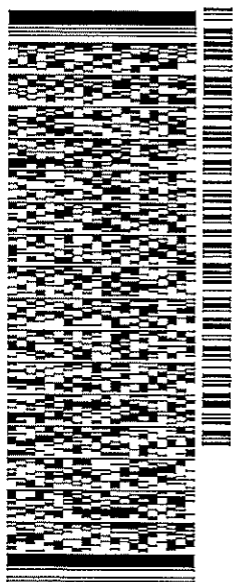
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on [fedex.com](http://fedex.com). FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or 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.

ORIGIN ID:BBFA (508) 251-0720  
KRI PELLETIER  
SBA COMMUNICATIONS CORPORATION  
134 FLANDERS RD  
SUITE 125  
WESTBOROUGH, MA 01581  
UNITED STATES US

SHIP DATE: 19AUG19  
ACTWGT: 1.00 LB  
CAD: 105943304/INLET4160  
BILL SENDER

TO MICHAEL ALBERTS  
FIRST SELECTMAN  
TOWN OF WOODSTOCK  
415 ROUTE 169  
WOODSTOCK CT 06281  
INV: (508) 251-0720 X 3807 REF: 105652003-5039  
P.O. DEPT:

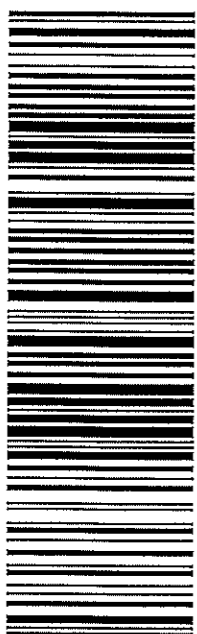
567.33E9E705A2



J18Z0191062401ev

TRK# 7760 1572 6738  
TUE - 20 AUG 4:30P  
PRIORITY OVERNIGHT

01 ORHA  
06281  
CT-US BOS



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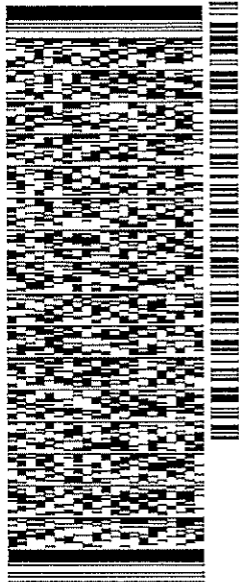
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on [fedex.com](http://fedex.com). FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or 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 Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

ORIGIN ID:BBFA (508) 251-0720  
KRI PELLETIER  
SBA COMMUNICATIONS CORPORATION  
132 FLANDERS RD  
SUITE 125  
WESTBOROUGH, MA 01581  
UNITED STATES US

SHIP DATE: 19AUG19  
ACTWGT: 1.00 LB  
CAD: 105843304/NET14160  
BILL SENDER

TO MICHAEL D'AMATO  
ZONING ENFORCEMENT OFFICER  
TOWN OF WOODSTOCK  
415 ROUTE 169  
WOODSTOCK CT 06281  
(508) 251-0720 X 3807 REF: 10-56-92009-5039  
INV: DEPT:  
PO:

567J3IE9E705A2

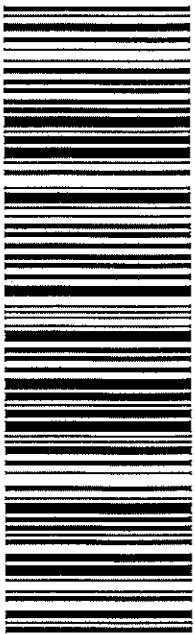


TRK# 7760 1574 9143  
0201

TUE - 20 AUG 4:30P  
PRIORITY OVERNIGHT

01 ORHA

06281  
CT-US BOS



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# EXHIBIT 3

# 215 COATNEY HILL RD

**Location** 215 COATNEY HILL RD

**Mblu** 7276/ 32/ 19A/ /

**Acct#** W0438400

**Owner** WOODSTOCK TOWN OF

**Assessment** \$825,500

**Appraisal** \$1,179,000

**PID** 4525

**Building Count** 2

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2016	\$919,500	\$259,500	\$1,179,000

Assessment			
Valuation Year	Improvements	Land	Total
2016	\$643,800	\$181,700	\$825,500

## Owner of Record

<b>Owner</b>	WOODSTOCK TOWN OF	<b>Sale Price</b>	\$0
<b>Co-Owner</b>	TOWN GARAGE	<b>Certificate</b>	1
<b>Address</b>	415 RT 169 WOODSTOCK , CT 06281-3039	<b>Book &amp; Page</b>	62/ 315
		<b>Sale Date</b>	09/14/1967

## Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
WOODSTOCK TOWN OF	\$0	1	62/ 315	09/14/1967

## Building Information

### Building 1 : Section 1

**Year Built:** 1970  
**Living Area:** 4,600  
**Replacement Cost:** \$208,028  
**Building Percent** 56  
**Good:**  
**Replacement Cost**  
**Less Depreciation:** \$116,500

Building Attributes	
Field	Description

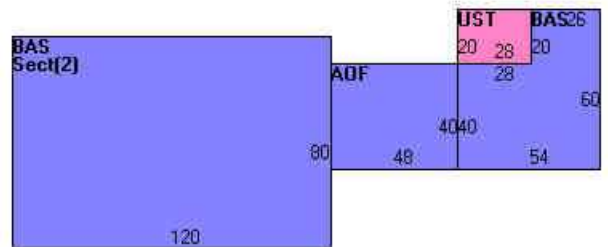
STYLE	Pre-Eng Garage
MODEL	Commercial
Grade	Average
Stories:	1.00
Occupancy	1
Exterior Wall 1	Pre-finish Metl
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Enam Mtl Shing
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-No Duc
AC Type	None
Bldg Use	Commercial
Sprinkler Type	
Sprinkler %	
Mezzanine Fin.	
Mezanine Unf.	1120
1st Floor Use:	200
Heat/AC	None
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Walls	Susp Ceil Only
Rooms/Prtns	Average
Wall Height	14
% Comn Wall	

## Building Photo



(<http://images.vgsi.com/photos/WoodstockCTPhotos//\00\00\46/>)

## Building Layout



(<http://images.vgsi.com/photos/WoodstockCTPhotos//Sketches/4>)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	2,680	2,680
AOF	Office Area	1,920	1,920
UST	Utility Storage	560	0
		5,160	4,600

## Building 1 : Section 2

**Year Built:** 2011  
**Living Area:** 9,600  
**Replacement Cost:** \$403,200  
**Building Percent Good:** 90  
**Replacement Cost Less Depreciation:** \$362,900

Building Attributes : Section 2 of 2	
Field	Description
STYLE	Pre-Eng Garage

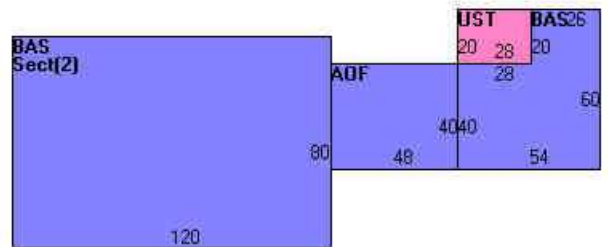
MODEL	Commercial
Grade	Average
Stories:	1.00
Occupancy	1
Exterior Wall 1	Pre-finish Metl
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Metal/Tin
Interior Wall 1	Minimum
Interior Wall 2	Drywall
Interior Floor 1	Concrete
Interior Floor 2	Carpet
Heating Fuel	Oil
Heating Type	Radiant
AC Type	None
Bldg Use	Commercial
Sprinkler Type	
Sprinkler %	
Mezzanine Fin.	
Mezanine Unf.	800
1st Floor Use:	200
Heat/AC	None
Frame Type	Steel
Baths/Plumbing	Average
Ceiling/Walls	Susp Ceil Only
Rooms/Prtns	Average
Wall Height	14
% Comn Wall	

## Building Photo



(<http://images.vgsi.com/photos/WoodstockCTPhotos//default.jpg>)

## Building Layout



(<http://images.vgsi.com/photos/WoodstockCTPhotos//Sketches/4>)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	9,600	9,600
		9,600	9,600

## Building 2 : Section 1

**Year Built:** 2011  
**Living Area:** 11,282  
**Replacement Cost:** \$315,827  
**Building Percent Good:** 70  
**Replacement Cost Less Depreciation:** \$221,100

Building Attributes : Bldg 2 of 2	
Field	Description
STYLE	Warehouse
MODEL	Commercial
Grade	Below Average

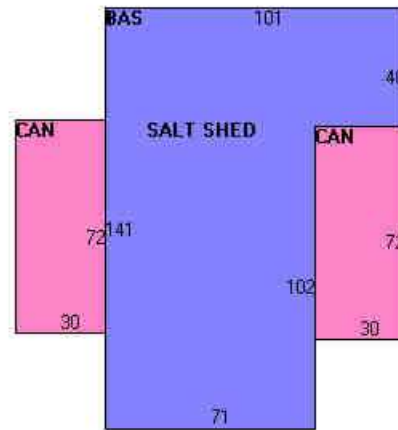
Stories:	1
Occupancy	1
Exterior Wall 1	Board & Batten
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Enam Mtl Shing
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Oil
Heating Type	None
AC Type	None
Bldg Use	Mun Bldg Com
Sprinkler Type	
Sprinkler %	
Mezzanine Fin.	
Mezanine Unf.	
1st Floor Use:	
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	Light
Ceiling/Walls	None
Rooms/Prtns	Light
Wall Height	18
% Comn Wall	

### Building Photo



(<http://images.vgsi.com/photos/WoodstockCTPhotos//default.jpg>)

### Building Layout



(<http://images.vgsi.com/photos/WoodstockCTPhotos//Sketches/4>)

Building Sub-Areas (sq ft)			<u>Legend</u>
Code	Description	Gross Area	Living Area
BAS	First Floor	11,282	11,282
CAN	Canopy	4,320	0
		15,602	11,282

### Extra Features

Extra Features				<u>Legend</u>
Code	Description	Size	Value	Bldg #
	LUMP SUM -	1800	\$0	1
XKIT	Addnl. Kitchen	1 UNITS	\$1,400	1

### Land

### Land Use

### Land Line Valuation

**Use Code** 922  
**Description** Mun Bldg Com  
**Zone**  
**Neighborhood**  
**Alt Land Appr** No  
**Category**

**Size (Acres)** 8.3  
**Frontage**  
**Depth**  
**Assessed Value** \$181,700  
**Appraised Value** \$259,500

### Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
SHD1	Shed	FR	Frame	360 S.F.	\$4,100	2
SHD1	Shed	FR	Frame	200 S.F.	\$2,300	2
FN3	Fence 6'			316 L.F.	\$5,200	2
PAV1	Paving Asph.			68566 S.F.	\$119,300	1
CNP	Canopy			576 S.F.	\$2,800	1
FN3	Fence 6'			320 L.F.	\$2,900	1
SHD2	Pre Cast Cell			360 S.F.	\$40,500	1
SHD2	Pre Cast Cell			360 S.F.	\$40,500	1

### Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2018	\$919,500	\$259,500	\$1,179,000
2017	\$919,500	\$259,500	\$1,179,000
2016	\$919,500	\$259,500	\$1,179,000

Assessment			
Valuation Year	Improvements	Land	Total
2018	\$643,800	\$181,700	\$825,500
2017	\$643,800	\$181,700	\$825,500
2016	\$643,800	\$181,700	\$825,500

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# EXHIBIT 4



215 Coatney Hill Rd



Map data ©2019 100 ft



# 215 Coatney Hill Rd

Woodstock, CT 06281



Directions



Save



Nearby



Send to your phone



Share



XX6J+GQ Woodstock, Connecticut

## At this location



6/13/2019

215 Coatney Hill Rd - Google Maps

## Woodstock Highway Department

3.0 ★★☆☆ (2)

Paving contractor · 215 Coatney Hill Rd



# EXHIBIT 5

NOTICE OF SPECIAL PERMIT

000077

Pursuant to Section 8-3c of the Connecticut General Statutes, notice is hereby given that on January 18, 2001 the Woodstock Planning and Zoning Commission:

1. Description of Premises:  
Woodstock, Assessor Map 7276  
Block 32 Lot 19A

2. Permit Granted:

Special Permit granted on condition maintenance agreement is executed as soon as lease is in effect.

(application No. SP438-00-11

3. Name and address  
Owner of record:


TOWN OF WOODSTOCK  
Town Hall  
415 Route 169  
Woodstock, CT 06281

4. Name and address  
of applicant:

MCF Communications, Inc.  
668 Main Street  
Suite 114  
Wilmington, CT 01887

Dated at Woodstock, Connecticut, this 19<sup>th</sup> day of January, 2001.

This information certified by:

  
Terry Beriman  
Zoning Enforcement Officer

RECEIVED  
TOWN CLERK, WOODSTOCK, CT

01 JAN 19 PM 1:40

*Gregory W. Wilberts*

Permit No

8508

Dept. of Building Inspections  
Town of Woodstock

# BUILDING PERMIT

ADDRESS

215 Coatney Hill

OWNER

Town of Woodstock

DATE

June 15, 2001

WORK AUTHORIZED

Construction of Tower Site

Attach this Permit in Clear View

**CALL 928-1388 FOR INSPECTIONS**



BUILDING OFFICIAL

**CERTIFICATE OF USE AND OCCUPANCY**  
**DEPARTMENT OF BUILDING INSPECTIONS**  
**WOODSTOCK, CONNECTICUT**

Certificate No. 1286

This is to certify that.....TOWN OF WOODSTOCK.....Map No. 7276  
Owner

Located at Street: .....215 COATNEY HILL ROAD.....Block 32

Building Permit No. ....8508.....Lot No 19A

conforms substantially to the requirements of the Connecticut State Building Code, Sanitation Code, all the Zoning Ordinance of the Town of Woodstock and is hereby approved for occupancy as indicated below:

Type of Construction ..... Use Group: .....

Conditions: .....  
.....  
.....

Occupancy Load \_\_\_\_\_

Live Loads \_\_\_\_\_

Fire Grading \_\_\_\_\_

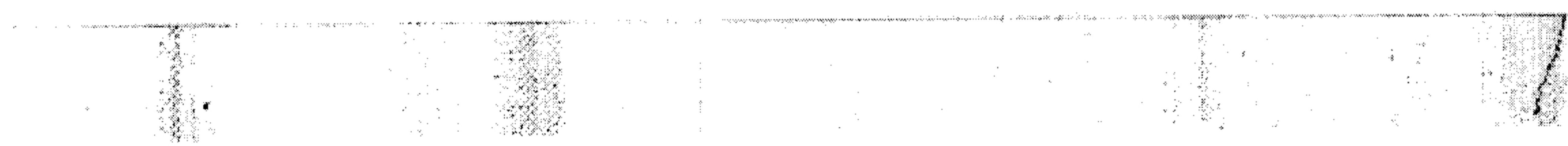
Type of Structure CELLULAR TOWER

Date 8-26-01

  
BUILDING OFFICIAL

Any change or extension of the use herein approved requires a new certificate

WHITE: APPLICANT    YELLOW: ASSESSOR    PINK: BUILDING OFFICE    GOLD: FILE



### CONTINUATION CERTIFICATE

BOND NUMBER	TYPE OF BOND	ORIGINAL EFFECTIVE DATE	DATE OF NOTICE
017-011-272	All Contractors License - Compliance	10/16/2003	19-Jul-05

In consideration of the renewal premium the Liberty Mutual Insurance Company (Surety)

Which executed the above described bond herein continues it subject to all the conditions and terms thereof to noon on 15-Oct-06 at location of risk.

Principal or Insured: MCF Communications, Inc.

Bond Amount: \$27,000.00

Premium Amount: \$540.00

Obligee: Town of Woodstock

This continuation is executed upon the express condition that the Surety's liability under said bond and this and all continuations

thereof shall not be cumulative and shall in no event exceed the sum of Twenty Seven Thousand Dollars and 00/100.

Signed and Sealed this 19 day of July, 2005.

Liberty Mutual Insurance Company  
(Name of Surety)

BY: \_\_\_\_\_  
Terry D. Reynolds  
Attorney-in-Fact

1729925

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

LIBERTY MUTUAL INSURANCE COMPANY  
BOSTON, MASSACHUSETTS  
POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS: That Liberty Mutual Insurance Company (the "Company"), a Massachusetts stock insurance company, pursuant to and by authority of the By-law and Authorization hereinafter set forth, does hereby name, constitute and appoint **MARY ANN MARBURY, BRADLEY T. SENN, MICHAEL A. WALTER, TERRY D. REYNOLDS, DEBORAH B. BROWN, DIANA L. PARKER, KENT M. PAGOOTA, ALL OF THE CITY OF COLUMBIA, STATE OF MARYLAND**.....

each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations in the penal sum not exceeding **TWENTY-FIVE MILLION AND 00/100** \*\*\*\*\* **DOLLARS (\$ 25,000,000.00 \*\*\*\*\*)** each, and the execution of such undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents, shall be as binding upon the Company as if they had been duly signed by the president and attested by the secretary of the Company in their own proper persons.

That this power is made and executed pursuant to and by authority of the following By-law and Authorization:

ARTICLE XIII - Execution of Contracts: Section 5. Surety Bonds and Undertakings.

Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

By the following instrument the chairman or the president has authorized the officer or other official named therein to appoint attorneys-in-fact:

Pursuant to Article XIII, Section 5 of the By-Laws, Garnet W. Elliott, Assistant Secretary of Liberty Mutual Insurance Company, is hereby authorized to appoint such attorneys-in-fact as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

That the By-law and the Authorization set forth above are true copies thereof and are now in full force and effect.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Company and the corporate seal of Liberty Mutual Insurance Company has been affixed thereto in Plymouth Meeting, Pennsylvania this 4th day of May, 2005

LIBERTY MUTUAL INSURANCE COMPANY

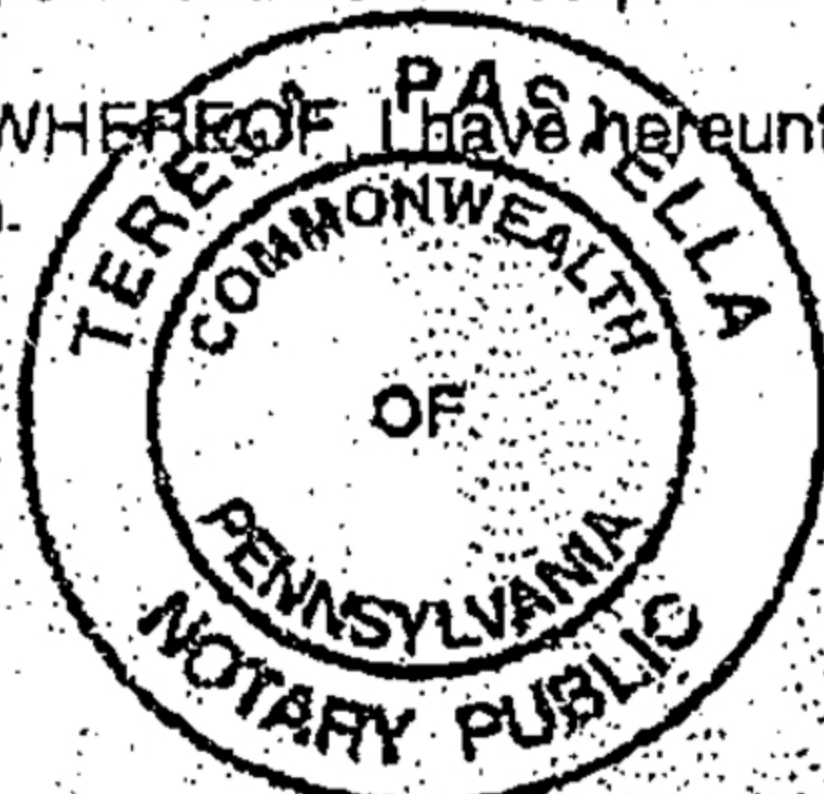
By Garnet W. Elliott  
Garnet W. Elliott, Assistant Secretary



COMMONWEALTH OF PENNSYLVANIA ss  
COUNTY OF MONTGOMERY

On this 4th day of May, 2005, before me, a Notary Public, personally came Garnet W. Elliott, to me known, and acknowledged that he is an Assistant Secretary of Liberty Mutual Insurance Company; that he knows the seal of said corporation; and that he executed the above Power of Attorney and affixed the corporate seal of Liberty Mutual Insurance Company thereto with the authority and at the direction of said corporation.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA  
Notarial Seal  
Teresa Pastella, Notary Public  
Plymouth Twp., Montgomery County  
My Commission Expires Mar. 28, 2009  
Member, Pennsylvania Association of Notaries

By Teresa Pastella  
Teresa Pastella, Notary Public

CERTIFICATE

I, the undersigned, Assistant Secretary of Liberty Mutual Insurance Company, do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy, is in full force and effect on the date of this certificate; and I do further certify that the officer or official who executed the said power of attorney is an Assistant Secretary specially authorized by the chairman or the president to appoint attorneys-in-fact as provided in Article XIII; Section 5 of the By-laws of Liberty Mutual Insurance Company.

This certificate and the above power of attorney may be signed by facsimile or mechanically reproduced signatures under and by authority of the following vote of the board of directors of Liberty Mutual Insurance Company at a meeting duly called and held on the 12th day of March, 1980.

VOTED that the facsimile or mechanically reproduced signature of any assistant secretary of the company, wherever appearing upon a certified copy of any power of attorney issued by the company in connection with surety bonds, shall be valid and binding upon the company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said company, this 19th day of July, 2005



By David M. Carny  
David M. Carny, Assistant Secretary

NOT valid for mortgage, note, loan, letter of credit, bank deposit, currency rate, interest rate or residual value guarantees.

To confirm the validity of this Power of Attorney call

# EXHIBIT 6

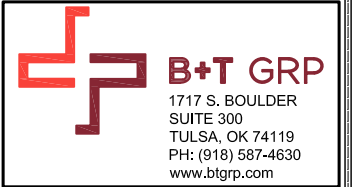


# SITE NAME: NL181/MCF WOODSTOCK

215 COATNEY HILL ROAD  
WOODSTOCK, CT 06281

SITE NUMBER: CTNL181A

SITE CONFIG: 67D04G



T-MOBILE NORTHEAST, LLC  
15 COMMERCE WAY, SUITE B  
NORTON, MA 02766



SBA COMMUNICATIONS CORP.  
134 FLANDERS ROAD, SUITE 125  
WESTBOROUGH, MA 01581

CTNL181A

NL181/MCF  
WOODSTOCK

215 COATNEY HILL ROAD  
WOODSTOCK, CT 06281

PROJECT NO: 136033.002.01

CHECKED BY: FWP

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION
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1	7/29/19	MTJ	FINALS
2	8/15/19	GEH	FINALS
3	8/16/19	GEH	FINALS

B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/20



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SHEET NUMBER: T-1 REVISION: 3

**T-1** **3**

## PROJECT NOTES

**GENERAL NOTES:**

THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC, ROUTINE MAINTENANCE AND THEREFORE, DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE NORTHEAST LLC REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

**SPECIAL STRUCTURAL NOTES:**

TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.

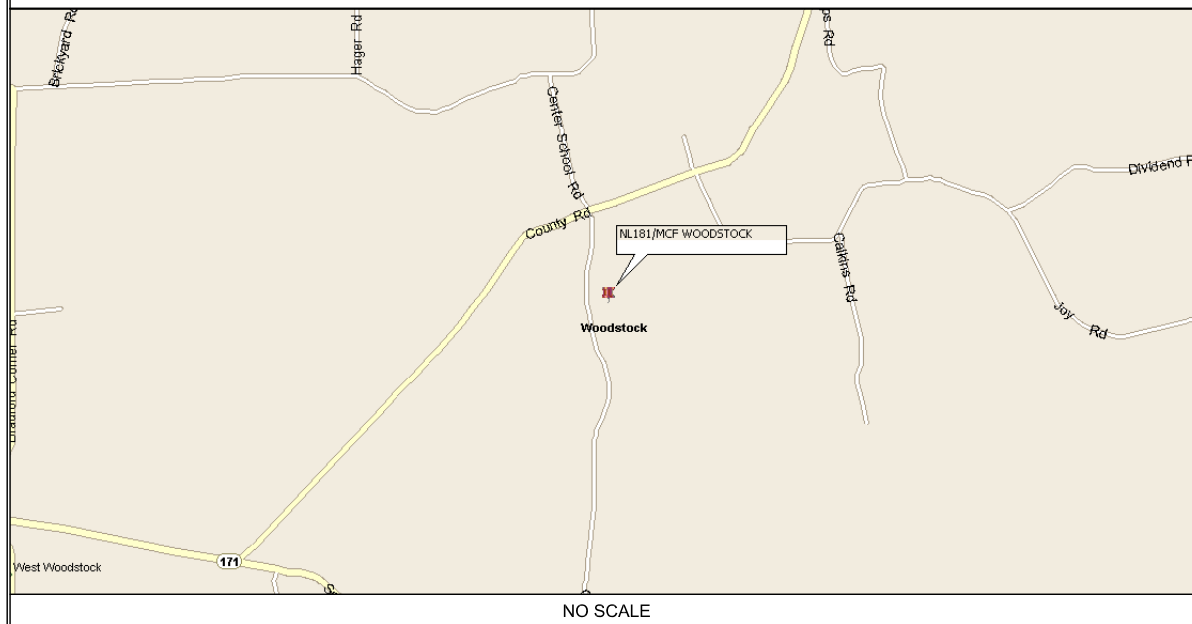
ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND HAS DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO ACCOMMODATE ANY ADDITIONAL EQUIPMENT LOAD. STRUCTURAL DESIGNS AND DETAILS AS SHOWN HEREIN FOR STRUCTURAL MODIFICATIONS OF THE EXISTING ANTENNA MOUNT ARE PRELIMINARY ONLY AND FINAL CONSTRUCTION DETAILS ARE SUBJECT TO CHANGE PENDING THE COMPLETION OF AN ANTENNA MOUNT STRUCTURAL ASSESSMENT.

B+T GROUP ASSUMES THAT THE TOWER IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTIONS ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.

## T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS	LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS NOT PERMITTED	DIPLEXERS:	UNRESTRICTED
SECTOR B:	ACCESS NOT PERMITTED	RADIO CABINETS:	UNRESTRICTED
SECTOR C:	ACCESS NOT PERMITTED	PPC DISCONNECT:	UNRESTRICTED
RRH:	ACCESS NOT PERMITTED	MAIN CIRCUIT D/C:	UNRESTRICTED
TMA:	ACCESS NOT PERMITTED	NIU/T DEMARC:	UNRESTRICTED
GPS/LMU:	CAUTION: OSHA APPROVED PORTABLE 8' STEP-LADDER REQUIRED	OTHER/SPECIAL:	NONE

## LOCATION MAP



## PROJECT INFORMATION

SCOPE OF WORK: UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION

ZONING JURISDICTION: (TOWN OF WOODSTOCK) BASED ON INFORMATION PROVIDED BY T-MOBILE, REGULATORY COMPLIANCE AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409 AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).

SITE ADDRESS: 215 COATNEY HILL ROAD WOODSTOCK, CT 06281

LATITUDE: 41.96205659° N  
LONGITUDE: 72.01803080° W

JURISDICTION: NATIONAL, STATE & LOCAL CODES & ORDINANCES

CURRENT USE: TELECOMMUNICATIONS FACILITY

PROPOSED USE: TELECOMMUNICATIONS FACILITY

TOWER OWNER: SBA TOWERS V, LLC

SBA SITE ID: CT08748-A

SBA SITE NAME: WOODSTOCK 4, CT

SBA REGIONAL SITE MANAGER: STEPHEN ROTH (860) 539-4920 sroth@sbasite.com

## APPROVALS

TITLE	SIGNATURE	DATE
PROJECT MANAGER:		
CONSTRUCTION:		
RF ENGINEERING:		
ZONING/SITE ACQ.:		
OPERATIONS:		
TOWER OWNER:		

ACCEPTANCE DOES NOT CONSTITUTE APPROVAL OF DESIGN, CALCULATIONS, ANALYSIS, TEST METHODS OF MATERIALS DEVELOPED OR SELECTED BY THE SUBCONTRACTOR AND DOES NOT RELIEVE SUBCONTRACTOR FROM FULL COMPLIANCE WITH CONTRACTUAL OBLIGATIONS.

## DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	3
GN-1	GENERAL NOTES	3
C-1	COMPOUND AND ELEVATION PLAN	3
C-2	EXISTING AND PROPOSED ANTENNA PLANS	3
C-3	DETAILS	3
RF-1	RFDS DIAGRAMS	3
E-1	GROUNDING DETAILS AND NOTES	3



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**GROUNDING NOTES:**

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI OR NFPA) LIGHTING PROTECTION CODE AND GENERAL COMPLIANCE WITH TELECORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATION OR ADVERSE FINDING TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GE'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 & 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BUS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDED FITTINGS OR BY BINDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20' OR MORE OF 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BAR TINNED COPPER GROUND WIRE, PER NEC 250.50.

**GENERAL NOTES:**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:  
 CONTRACTOR: SBA COMMUNICATIONS CORP.  
 SUBCONTRACTOR: GENERAL CONTRACTOR (CONSTRUCTION)  
 OWNER: T-MOBILE
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALL AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES AND GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY, SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS NOTED OTHERWISE, PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WETHER SHALL BE HOT DIPPED GALVANIZED. TOUCH-UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH UMS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW, USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, AL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION, EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT IF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:  
 SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.  
 BUILDING CODE: CT BUILDING CODE 2018  
 ELECTRICAL CODE: NEC 2017

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318;  
 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)


MANUAL OF STEEL CONSTRUCTION; ASD, FOURTEENTH EDITION

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G;  
 STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES;  
 REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHOD OF CONSTRUCTION OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS					
AGL	ABOVE GRADE LEVEL	GC	GENERAL CONTRACTOR	REF.	REFERENCE
AWG	AMERICAN WIRE GAUGE	MAX.	MAXIMUM	REQ.	REQUIRED
BCW	BARE COPPER WIRE	MGB	MASTER GROUND BAR	RF	RADIO FREQUENCY
BTS	BASE TRANSCEIVER STATION	MIN.	MINIMUM	T.B.D.	TO BE DETERMINED
(E)	EXISTING	(N)	PROPOSED	T.B.R.	TO BE REMOVED
EG	EQUIPMENT GROUND	N.T.S.	NOT TO SCALE	T.B.R.R.	TO BE REMOVED AND REPLACED
EGR	EQUIPMENT GROUND RING	RE:	REFERENCE	(TYP)	TYPICAL



**B+T GRP**  
 1717 S. BOULDER  
 SUITE 300  
 TULSA, OK 74119  
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CTNL181A

**NL181/MCF**

**WOODSTOCK**

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8/16/19

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CTNL181A

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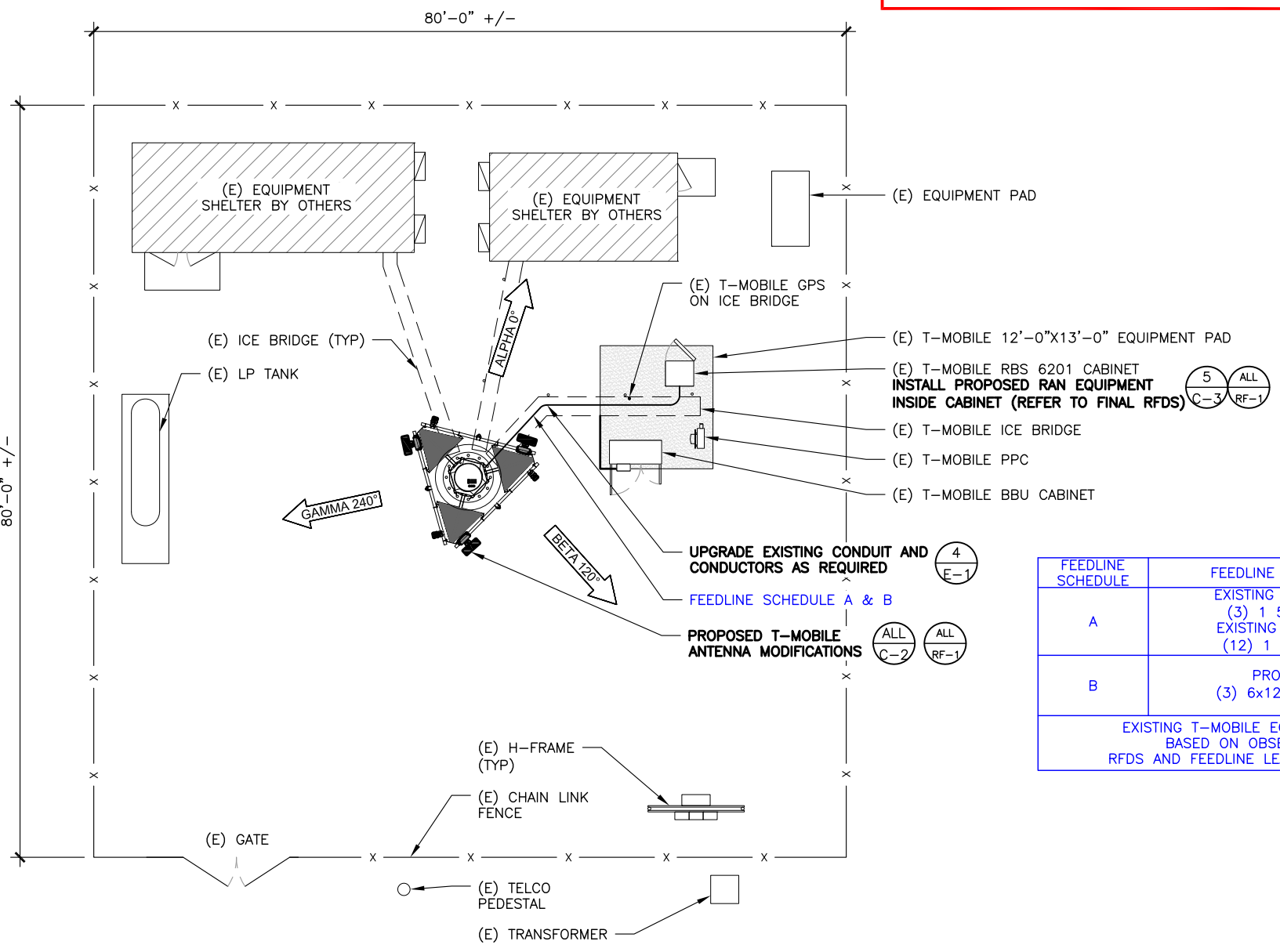
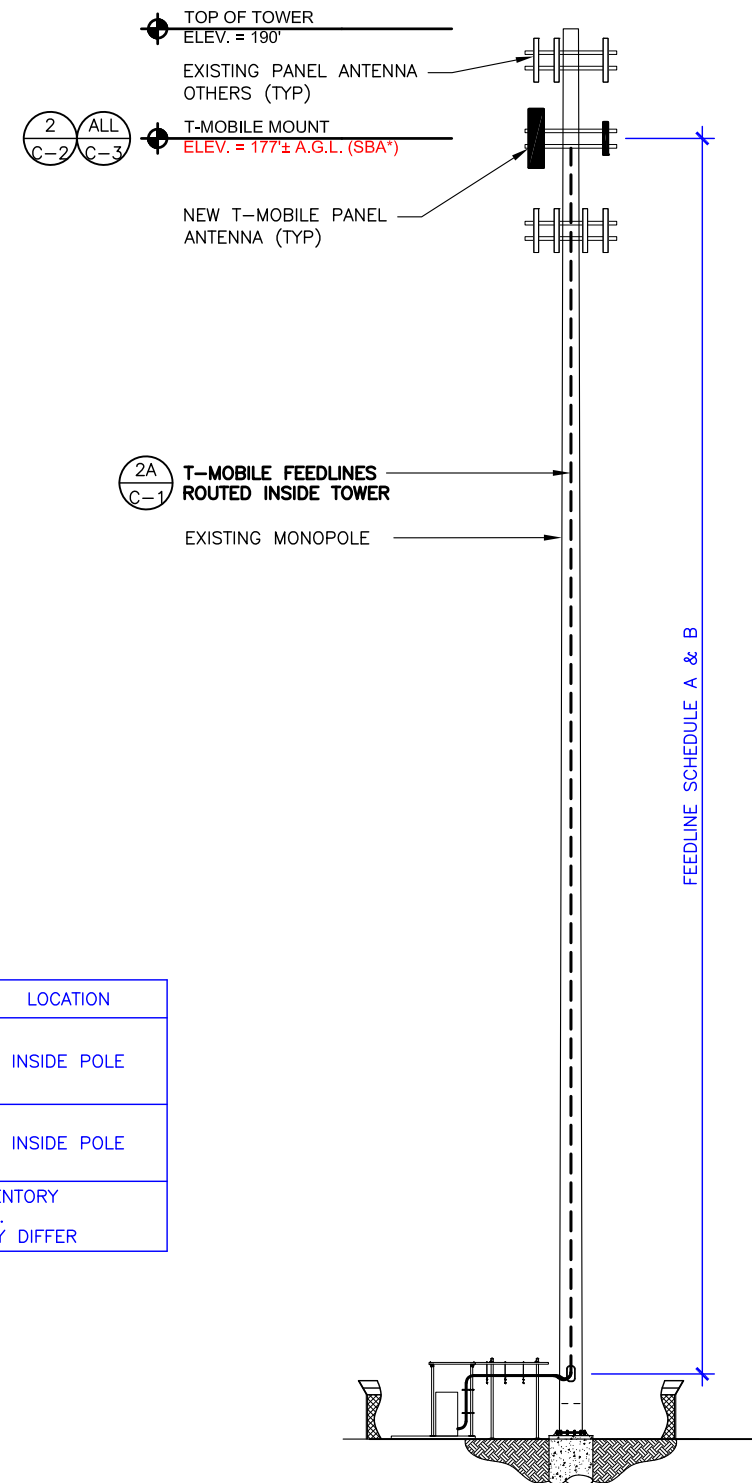
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SHEET NUMBER: REVISION:

**C-1** **3**

**SPECIAL PRE-CONSTRUCTION WORK NOTE:**  
 GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

**ANTENNA MOUNT STRUCTURAL DESIGN NOTE:**  
 ENGINEER-OF-RECORD HAS MADE A VISUAL ASSESSMENT ONLY OF EXISTING ANTENNA MOUNT ASSEMBLIES, WITHOUT THE BENEFIT OF A RIGOROUS ANTENNA MOUNT STRUCTURAL ANALYSIS, AND RECOMMENDS THAT EXISTING AND PROPOSED TOWER TOP EQUIPMENT BE INSTALLED AS DEPICTED HEREIN. STRUCTURAL DETAILS AS DEPICTED HEREIN FOR MODIFICATION OF EXISTING ANTENNA MOUNT ASSEMBLIES ARE PRELIMINARY ONLY AND THAT FINAL CONSTRUCTION DETAILS MAY BE SUBJECT TO CHANGE PENDING THE COMPLETION OF A SEPARATE SUPPLEMENTAL ANTENNA MOUNT STRUCTURAL ASSESSMENT, SUPPLEMENTAL STRUCTURAL MAPPING/CONDITIONS ASSESSMENT REPORT AND/OR SUPPLEMENTAL RIGOROUS ANTENNA MOUNT STRUCTURAL ANALYSIS.



FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMOVE: (3) 1 5/8" COAX EXISTING TO REMAIN: (12) 1 5/8" COAX	INSIDE POLE
B	PROPOSED: (3) 6x12 HCS FIBER	INSIDE POLE

EXISTING T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER

**1 OVERALL SITE PLAN**

SCALE: 0' 8' 16' 32' 48'  
 11x17 SCALE: 1/16"=1'-0"  
 22x34 SCALE: 1/8"=1'-0"



**2 ELEVATION DETAIL**

SCALE: N.T.S.

136033-CT08748-A-CTNL181A\_NL181\_MCF\_Woodstock\_CD.dwg - SheetC-1 - User: ghoyes - Aug 16, 2019 - 11:22am

CTNL181A

**NL181/MCF  
 WOODSTOCK**

215 COATNEY HILL ROAD  
 WOODSTOCK, CT 06281

PROJECT NO: 136033.002.01  
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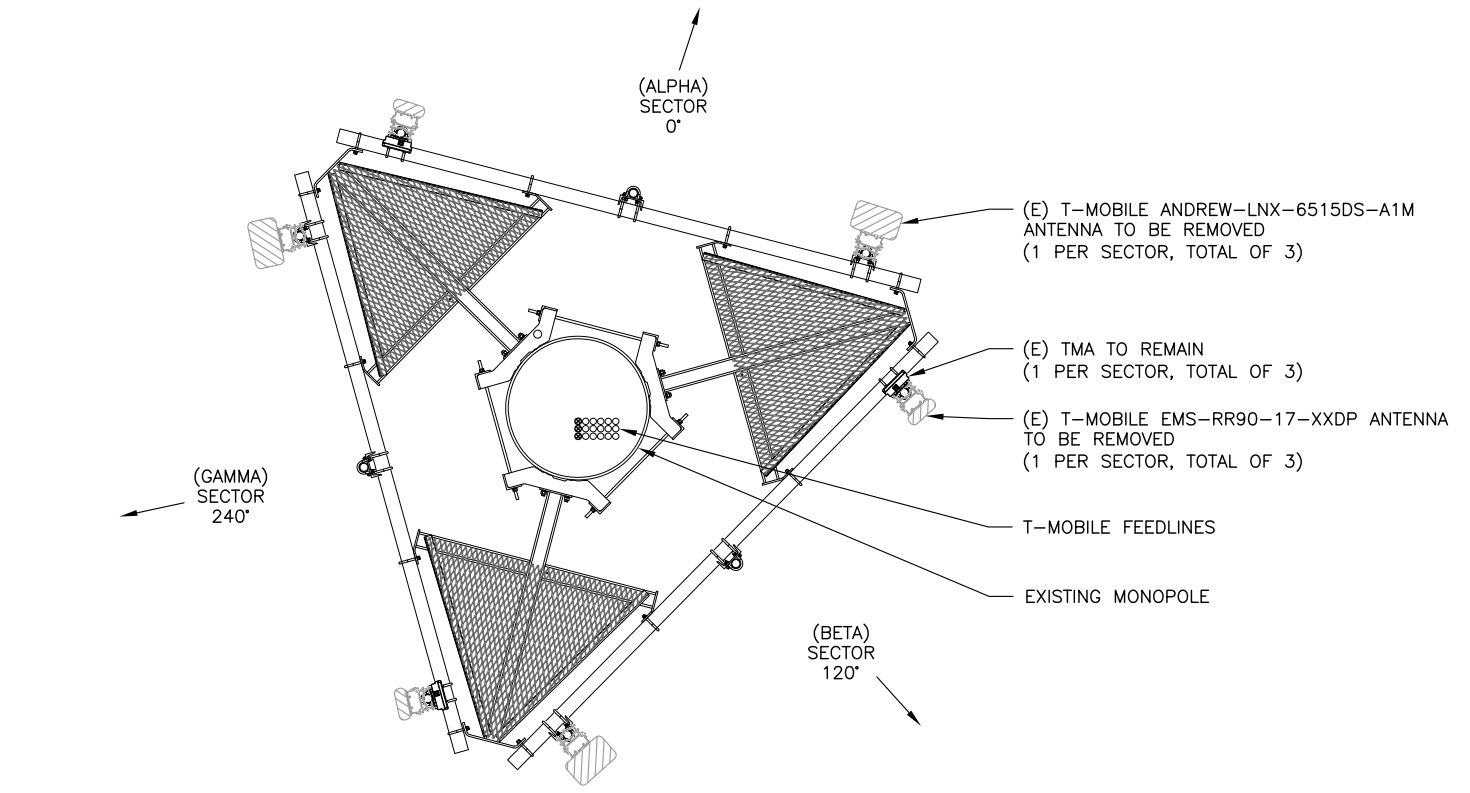


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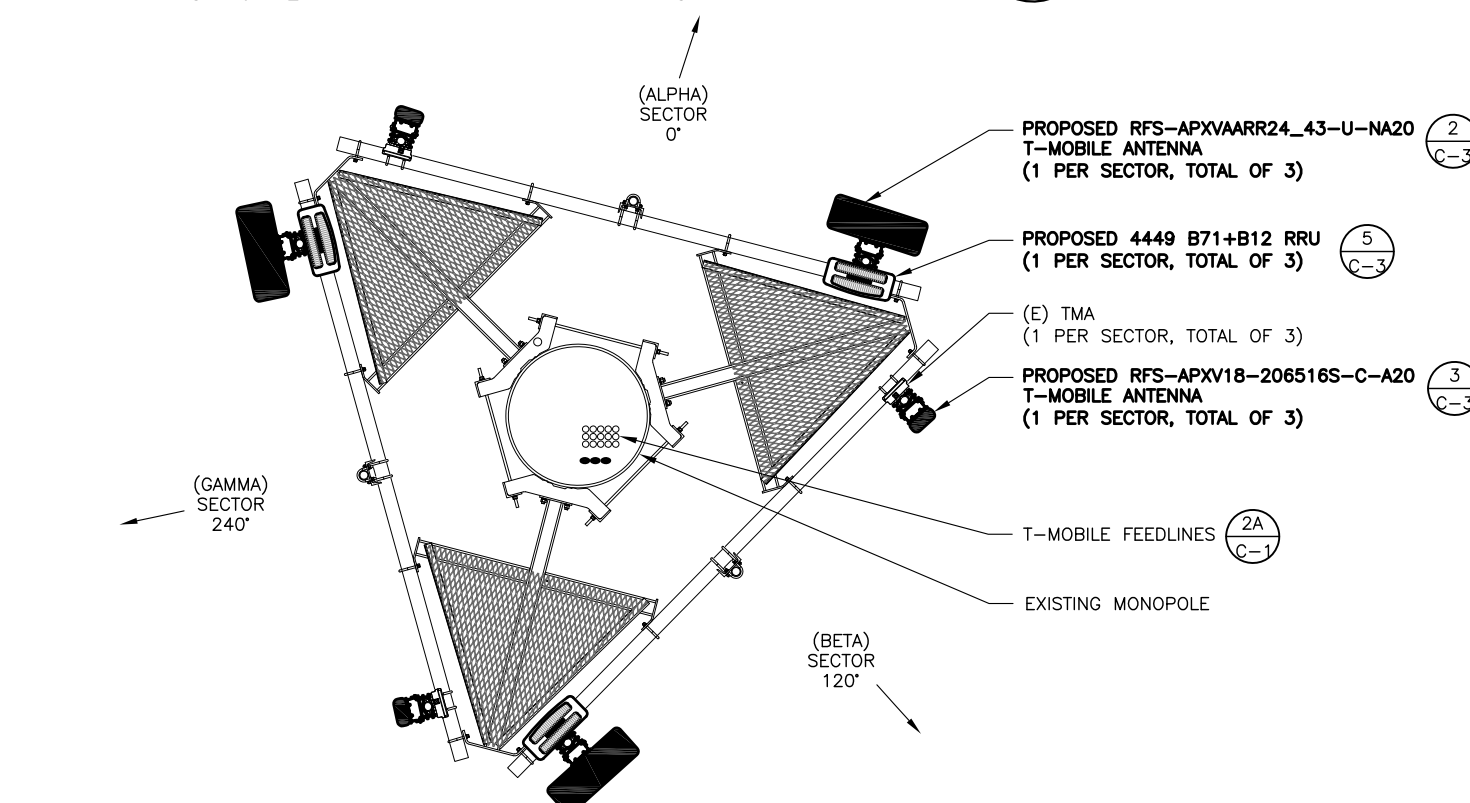
SHEET NUMBER: **C-2** REVISION: **3**

**NOTE:**  
 AT TIME OF CONSTRUCTION, CONTRACTOR TO VERIFY  
 AZIMUTHS OF EXISTING ANTENNAS. IF DIFFERENT  
 FROM RFDS, PLEASE NOTIFY THE RF ENGINEER AND  
 CONSTRUCTION MANAGER WITH ACTUAL AZIMUTH TO  
 ENSURE T-MOBILE'S DATABASE IS ACCURATE AND  
 UP-TO-DATE.

**SPECIAL PRE-CONSTRUCTION WORK NOTE:**  
 GENERAL CONTRACTOR SHALL FURNISH AND INSTALL  
 ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL  
 TOWER-MOUNTED EQUIPMENT PER  
 RECOMMENDATIONS FROM SBA-PROVIDED TOWER  
 STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING  
 OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL  
 FEEDLINE BUNDLING OR RELOCATION.



**1 EXISTING ANTENNA PLAN**  
 SCALE: 0' 1' 2' 4' 10'  
 11x17 SCALE: 1/4"=1'-0"  
 22x34 SCALE: 1/2"=1'-0"



**2 PROPOSED ANTENNA PLAN**  
 SCALE: 0' 1' 2' 4' 10'  
 11x17 SCALE: 1/4"=1'-0"  
 22x34 SCALE: 1/2"=1'-0"

136033-CT08748-A-CTNL181A\_NL181\_MCF\_Woodstock\_CD.dwg - Sheet: C-2 - User: ghoyes - Aug 16, 2019 - 11:22am

1A C-3 PROPOSED ANTENNA TO PIPE CLAMP (INCLUDED WITH ANTENNA)

EXISTING PLATFORM MOUNTING RAIL

3 C-3 PROPOSED RRU

WORKING POINT

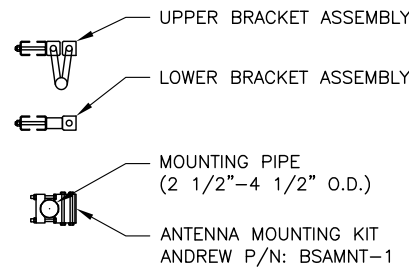
PROPOSED PIPE TO PIPE CROSS-OVER CLAMP KIT SITEPRO P/N: SP219 (OR APPROVED EQUAL)

EXISTING PLATFORM MOUNTING RAIL

EXISTING MOUNTING PIPE

PROPOSED ANTENNA

**ANTENNA INSTALLATION SPECIAL WORK NOTE:**  
ANTENNA INSTALLATION WORKING POINT IS THE STRUCTURAL FACE FRAME VERTICAL CENTERLINE OF THE EXISTING ANTENNA SUPPORT ASSEMBLY. UNLESS NOTED OTHERWISE VERTICALLY CENTER ALL PIPE MASTS AND ANTENNAS ON THIS WORKING POINT.

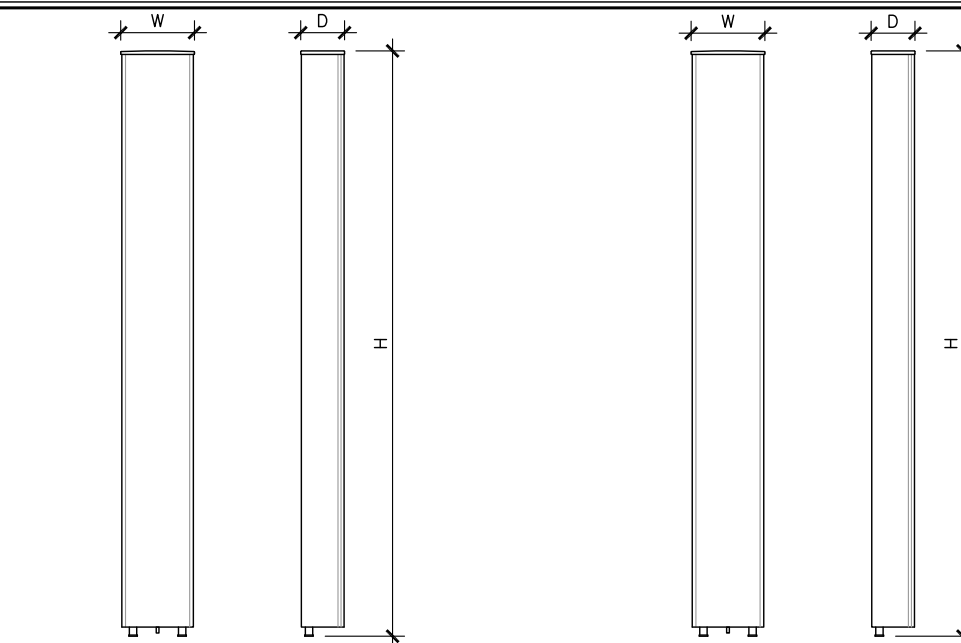


1 PROPOSED ANTENNA & RRU MOUNTING DETAIL  
SCALE: N.T.S.

1A ANTENNA MOUNTING BRACKET  
SCALE: N.T.S.

2 L7/L6 ANTENNA DETAIL  
SCALE: N.T.S.

3 L19/G19 ANTENNA DETAIL  
SCALE: N.T.S.



**L7/L6 ANTENNA SPECS**

MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128 LBS

**L19/G19 ANTENNA SPECS**

MANUFACTURER	RFS
MODEL #	APXV18-206516S-C-A20
WIDTH	6.9"
DEPTH	3.15"
HEIGHT	53.1"
WEIGHT	18.7 LBS

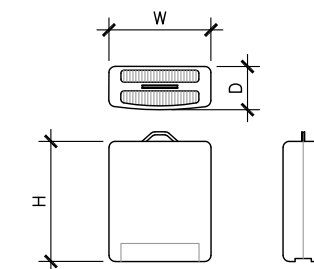
**ANTENNA MOUNT STRUCTURAL DESIGN NOTE:**  
ENGINEER-OF-RECORD HAS MADE A VISUAL ASSESSMENT ONLY OF EXISTING ANTENNA MOUNT ASSEMBLIES, WITHOUT THE BENEFIT OF A RIGOROUS ANTENNA MOUNT STRUCTURAL ANALYSIS, AND RECOMMENDS THAT EXISTING AND PROPOSED TOWER TOP EQUIPMENT BE INSTALLED AS DEPICTED HEREIN. STRUCTURAL DETAILS AS DEPICTED HEREIN FOR MODIFICATION OF EXISTING ANTENNA MOUNT ASSEMBLIES ARE PRELIMINARY ONLY AND THAT FINAL CONSTRUCTION DETAILS MAY BE SUBJECT TO CHANGE PENDING THE COMPLETION OF A SEPARATE SUPPLEMENTAL ANTENNA MOUNT STRUCTURAL ASSESSMENT, SUPPLEMENTAL STRUCTURAL MAPPING/CONDITIONS ASSESSMENT REPORT AND/OR SUPPLEMENTAL RIGOROUS ANTENNA MOUNT STRUCTURAL ANALYSIS.

**SPECIAL PRE-CONSTRUCTION WORK NOTE:**  
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

**FINAL ANTENNA SCHEDULE**

SECTOR	TECH	ANTENNA MODEL	AZIMUTH	RAD CENTER	M-TILT	E-TILT	RADIOS	CABLE TYPE	CABLE LENGTH
ALPHA	L19/G19	RFS - APXV18-206516S-C-A20	0°	177'	0	2	(1) PCD TMA	(2) 1 5/8" COAX	205'
	L7/L6	RFS - APXVAARR24_43-U-NA20	0°	177'	0	2/2	(1) 4449 B71+B12	(1) 6x12 HCS FIBER (2) 1 5/8" COAX	205'
BETA	L19/G19	RFS - APXV18-206516S-C-A20	120°	177'	0	2	(1) PCD TMA	(2) 1 5/8" COAX	205'
	L7/L6	RFS - APXVAARR24_43-U-NA20	120°	177'	0	2/2	(1) 4449 B71+B12	(1) 6x12 HCS FIBER (2) 1 5/8" COAX	205'
GAMMA	L19/G19	RFS - APXV18-206516S-C-A20	240°	177'	0	2	(1) PCD TMA	(2) 1 5/8" COAX	205'
	L7/L6	RFS - APXVAARR24_43-U-NA20	240°	177'	0	2/2	(1) 4449 B71+B12	(1) 6x12 HCS FIBER (2) 1 5/8" COAX	205'

4 FINAL ANTENNA SCHEDULE  
SCALE: N.T.S.



**RRU SPECIFICATIONS**

MANUFACTURER	ERICSSON
MODEL #	4449 B71+B12
WIDTH	13.18"
DEPTH	9.25"
HEIGHT	15"
WEIGHT	74 LBS

5 REMOTE RADIO UNIT (RRU)  
SCALE: N.T.S.

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T-MOBILE NORTHEAST, LLC  
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NORTON, MA 02766

**SBA**  
SBA COMMUNICATIONS CORP.  
134 FLANDERS ROAD, SUITE 125  
WESTBOROUGH, MA 01581

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WOODSTOCK**  
215 COATNEY HILL ROAD  
WOODSTOCK, CT 06281

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2	8/15/19	GEH	FINALS
3	8/16/19	GEH	FINALS

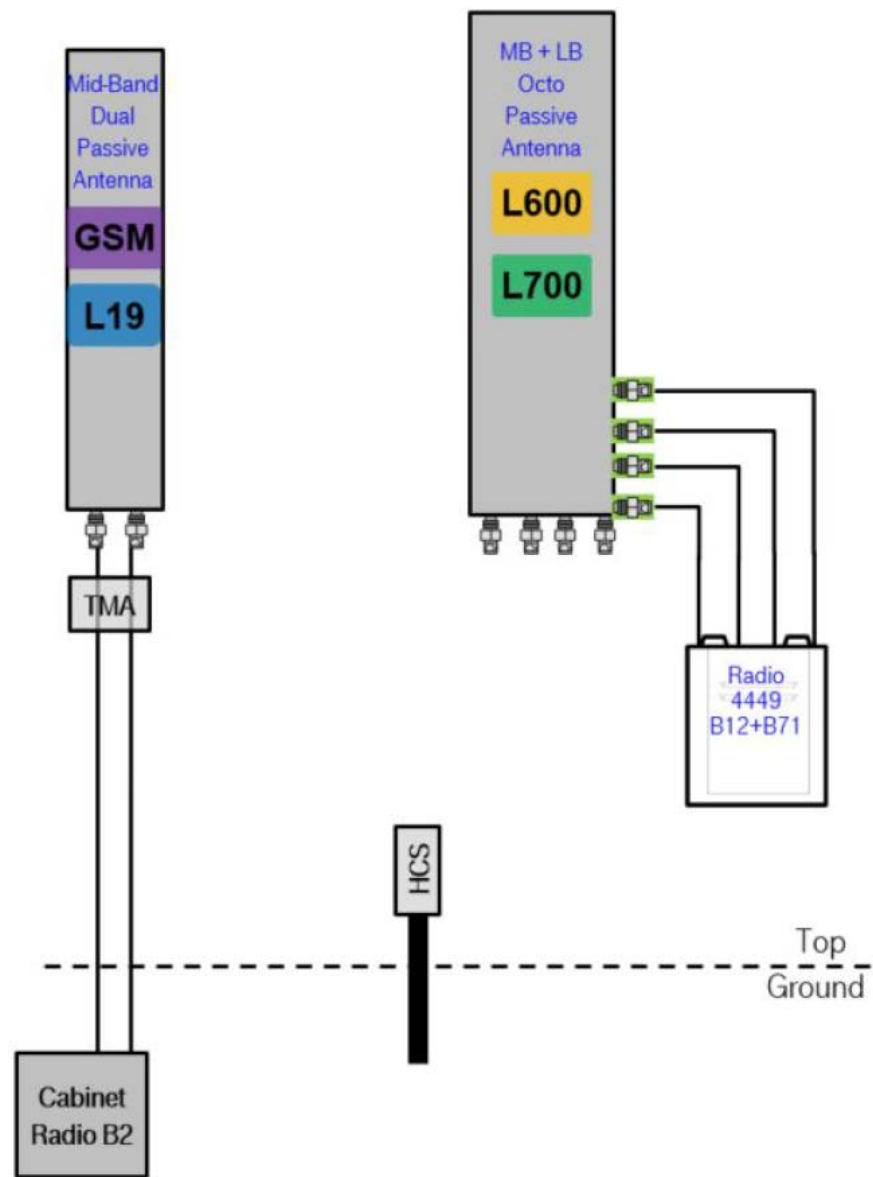
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8/16/19

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SHEET NUMBER: **C-3** REVISION: **3**

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**RF DESIGN GENERAL NOTE:**

- RF DESIGN BASED ON RFDS DATED 08/05/2019. GENERAL CONTRACTOR/TOWER CREW SHALL VERIFY THAT THE LATEST RFDS AND RAN WIRING DIAGRAM IS USED FOR EQUIPMENT INSTALLATION.
- PRIOR TO INSTALLATION OF TOWER TOP EQUIPMENT, GENERAL CONTRACTOR/TOWER CREW SHALL VERIFY AZIMUTHS OF EXISTING ANTENNAS. DISCREPANCIES AND ACTUAL AZIMUTHS SHALL BE REPORTED IMMEDIATELY TO RF ENGINEER AND T-MOBILE CONSTRUCTION MANAGER.

**RFDS FOOTNOTES:**

- INFORMATION IN BOLD RED TEXT IS PROVIDED BY A&E AND HIGHLIGHTS IMPORTANT DISCREPANCIES BETWEEN RFDS AND ACTUAL FIELD MEASUREMENTS OR SBA-PROVIDED RECORD INFORMATION.
- SBA-PROVIDED ANTENNA RAD AGL BASED ON COLOCATION APPLICATION AND STRUCTURAL ANALYSIS AND SHALL SUPERCEDE ANY CONFLICTING RFDS ANTENNA RAD AGL.
- HYBRID TRUNK FEEDLINE LENGTHS AS PROVIDED BY A&E BASED ON SCALED DIMENSIONS FROM RBS TO ANTENNA/RRU CONNECTIONS PLUS 20' FOR (2) 10' COILS EACH AT TOP AND BOTTOM TERMINATIONS. T-MOBILE CONSTRUCTION MANAGER SHALL CONFIRM ALL EQUIPMENT SCHEDULES, PART NUMBERS AND FEEDLINE/JUMPER LENGTHS BEFORE PREPARING A BILL OF MATERIALS.

5/8/2019 CTNL181A\_L600\_2.1\_draft\_2019-05-08 CTNL181A\_L600\_2.1\_draft

RAN Template: 67D04G A&E Template: 67D04G\_1DP+10P Power System Template: Custom

### Section 1 - Site Information

Site ID: CTNL181A Status: Draft Version: 2.1 Project Type: L600 Approved: Not Approved Approved By: Not Approved Last Modified: 4/26/2019 7:30:07 PM Last Modified By: GSM1900AMurli@

Site Name: NL181/MCF Woodstock Site Class: Monopole Site Type: Structure Non Building Plan Year: CONNECTICUT Vendor: Ericsson Landlord: MCF

Latitude: 41.9620565900 Longitude: -72.0180308000 Address: 215 Coatney Hill Road City, State: Woodstock, CT Region: NORTHEAST

RAN Template: 67D04G A&E Template: 67D04G\_1DP+10P

Sector Count: 3 Antenna Count: 6 Coax Line Count: 6 TMA Count: 3 RRU Count: 3

### Section 5 - RAN Equipment

Existing RAN Equipment: Template: 704G

Enclosure	1	
Enclosure Type	RBS 6201 ODE	
Baseband	DUG20 DUS41	
Radio	RUS01 B2 (x6) RUS01 B12 (x6)	

Proposed RAN Equipment: Template: 67D04G

Enclosure	1	
Enclosure Type	RBS 6201 ODE	
Baseband	DUG20 BB 6630 BB 6630 G1900 L1900 N600 (DARK) L700 L600	
Hybrid Cable System	Ericsson 6x12 HCS "Select Length & AWG" (x3)	
Radio	RUS01 B2 (x3) G1900 L1900 RUS01 B2 (x3)	

RAN Scope of Work:

\*\*\* RBS6201 ODE Cabinet \*\*\*

Replace (1) DUS41 with (1) BB6630 for LTE. Add (1) BB6630 for future 5G N600.

Remove all (6) RUS01 B12 from cabinet

Add (3) 6x12 HCS Existing: (12) Coaxial Lines. Remove (3) Coaxial Lines

Sector 1 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2		
Antenna Model	RFS - APXV18-206516S-C-A20 (Dual)		RFS - APXVAARR24_43-U-NA20 (Octo)		
Azimuth	0		0		
M. Tilt	0		0		
Height	177		177		
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2	2	2		
Cables	1-5/8" Coax - 205 ft. (x2)	Coax Jumper (x2)	Coax Jumper (x2)		
TMA's	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers/ Combiners					
Radio		Radio 4449 B71+B12 (At Antenna)	Radio 4449 B71+B12 (At Antenna)		
Sector Equipment					

Sector 2 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2		
Antenna Model	RFS - APXV18-206516S-C-A20 (Dual)		RFS - APXVAARR24_43-U-NA20 (Octo)		
Azimuth	120		120		
M. Tilt	0		0		
Height	177		177		
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2	2	2		
Cables	1-5/8" Coax - 205 ft. (x2)	Coax Jumper (x2)	Coax Jumper (x2)		
TMA's	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers/ Combiners					
Radio		Radio 4449 B71+B12 (At Antenna)	Radio 4449 B71+B12 (At Antenna)		
Sector Equipment					

Sector 3 (Proposed) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2		
Antenna Model	RFS - APXV18-206516S-C-A20 (Dual)		RFS - APXVAARR24_43-U-NA20 (Octo)		
Azimuth	240		240		
M. Tilt	0		0		
Height	177		177		
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	L700 L600	L700 L600		
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt	2	2	2		
Cables	1-5/8" Coax - 205 ft. (x2)	Coax Jumper (x2)	Coax Jumper (x2)		
TMA's	Generic Twin Style 1A - PCS (AtAntenna)				
Diplexers/ Combiners					
Radio		Radio 4449 B71+B12 (At Antenna)	Radio 4449 B71+B12 (At Antenna)		
Sector Equipment					

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**NL181/MCF  
WOODSTOCK**

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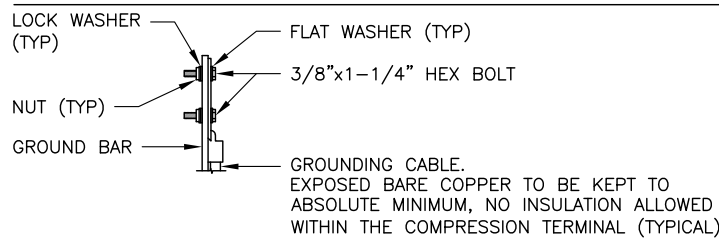
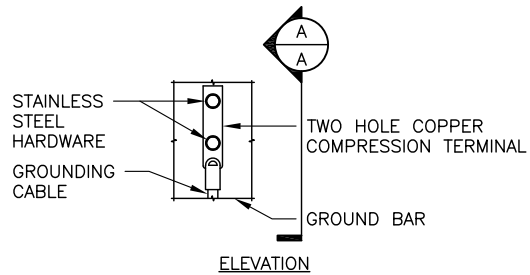
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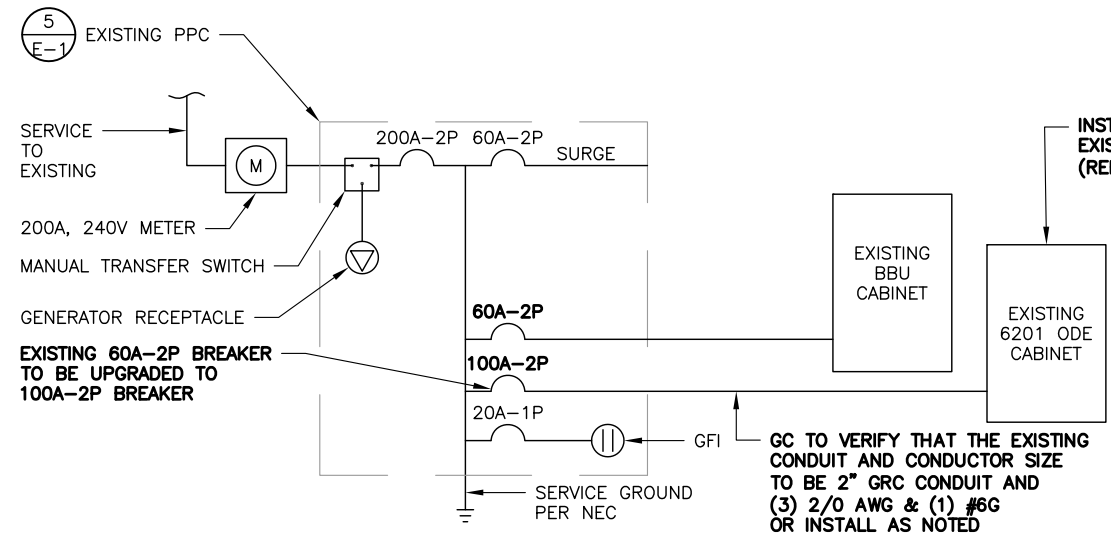
SHEET NUMBER: **RF-1** REVISION: **3**



SECTION "A-A"

- NOTE:
- "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
  - OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
  - CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

**1** TYPICAL GROUND BAR CONNECTION DETAIL  
SCALE: N.T.S.

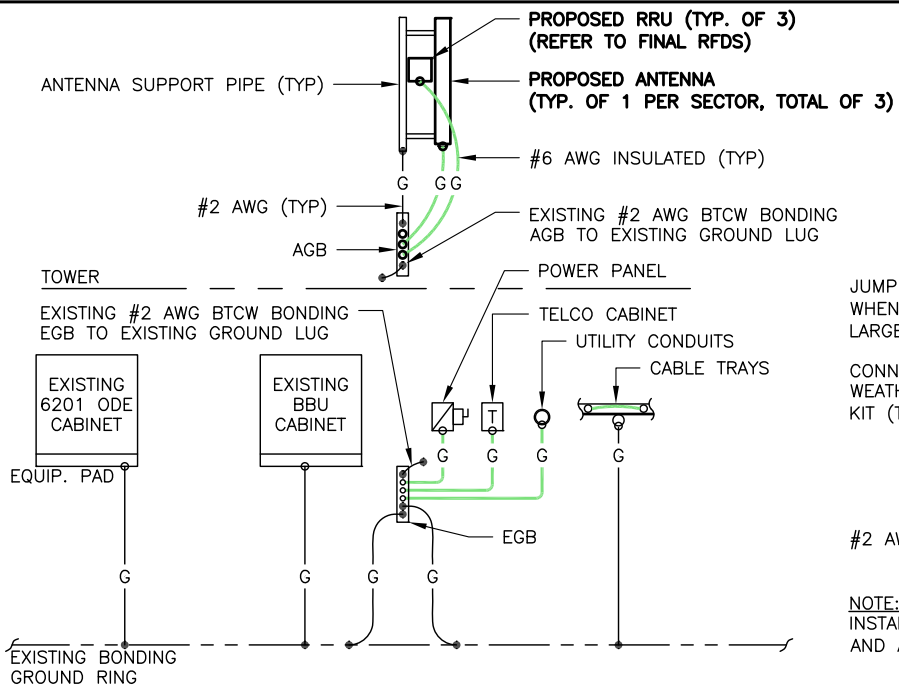


**4** ONE-LINE POWER DIAGRAM  
SCALE: N.T.S.

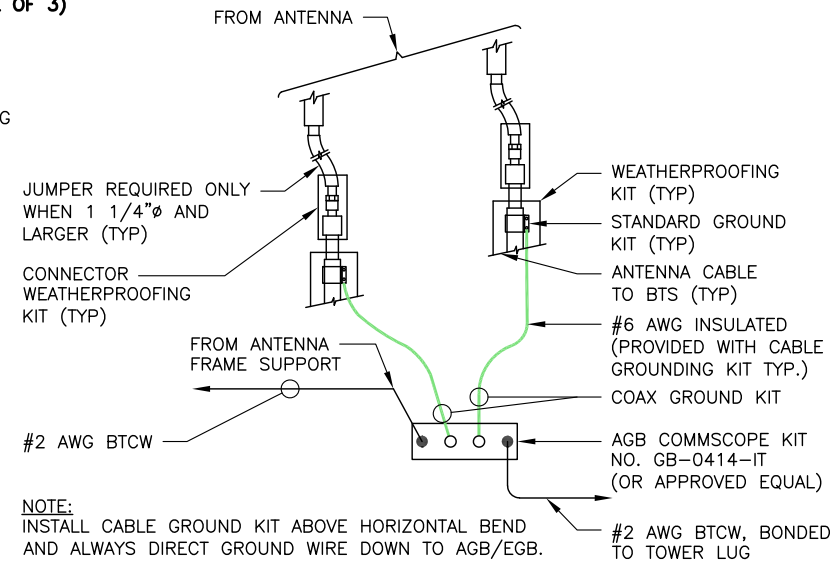
ELECTRICAL LEGEND	
A	AMPERE
BTW	BARE TINNED (SOLID) COPPER WIRE
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
KWH	KILOWATT - HOUR
PPC	POWER PROTECTION CABINET
V	VOLT
	5/8\"x8\" COPPER CLAD STAINLESS STEEL GROUND ROD
	EXOTHERMIC CONNECTION (CAD WELD)
	MECHANICAL CONNECTION
	ANTENNA GROUND BAR/EQUIPMENT GROUND BAR
	MASTER GROUND BAR
	GROUND COPPER WIRE, SIZED AS NOTED
	EXPOSED WIRING, SIZE AS NOTED
	INSULATED WIRING, SIZE AS NOTED
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

**ELECTRICAL & GROUNDING NOTES**

- ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
- ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
- THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
- GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
- ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
- RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
- ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
- RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
- RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT.
- PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
- ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
- GROUNDING SHALL COMPLY WITH NEC ART. 250.
- GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.

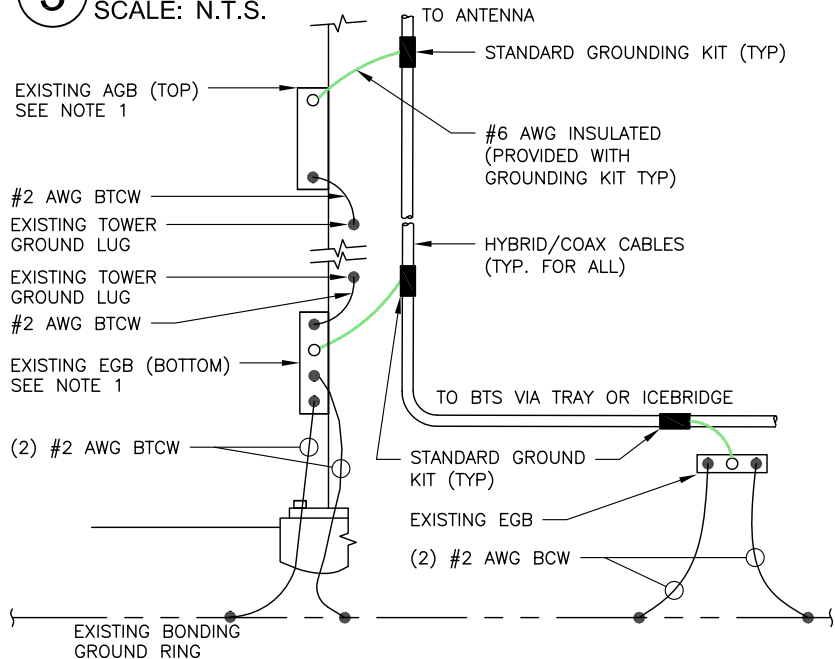


**2** TYPICAL GROUNDING RISER DIAGRAM  
SCALE: N.T.S.



- NOTE:
- INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

**3** TOWER TOP CABLE GROUNDING DETAIL  
SCALE: N.T.S.



- NOTE:
- NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION AND CONNECTION ANTENNA LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
  - A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

**5** TOWER BOTTOM CABLE GROUNDING DETAIL  
SCALE: N.T.S.

- USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
- ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
- ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12\" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6\" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
- CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
- CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
- APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
- BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
- BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
- TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
- BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
- VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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# EXHIBIT 7





**Tower Engineering Solutions**

Phone (972) 483-0607, Fax (972) 975-9615  
1320 Greenway Drive, Suite 600, Irving, Texas 75038

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**Structural Analysis Report**

Existing 190 ft. Nudd Corporation Monopole  
Customer Name: SBA Communications Corp  
Customer Site Number: CT08748-A  
Customer Site Name: Woodstock 4, CT  
Carrier Name: T-Mobile (App#: 116919 V1)  
Carrier Site ID / Name: CTNL181A / Woodstock  
Site Location: 215 Coatney Hill Road  
Woodstock, Connecticut  
Windham County  
Latitude: 41.962264  
Longitude: -72.018655



**Analysis Result:**

Max Structural Usage: 61.7% [Pass]

Max Foundation Usage: 35.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: N/A

Report Prepared By : Billy Davis

## Introduction

The purpose of this report is to summarize the analysis results on the 190 ft. Nudd Corporation Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

## Sources of Information

<b>Tower Drawings</b>	Fred A. Nudd Corporation, Project No. 01-8280, dated June 10,2001
<b>Foundation Drawing</b>	Fred A. Nudd Corporation, Project No. 01-8280, dated June 10,2001
<b>Geotechnical Report</b>	Fred A. Nudd Corporation, Project No. 01-8280, dated June 10,2001
<b>Modification Drawings</b>	N/A

## Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G. In accordance with this standard, the structure was analyzed using **TESPoles**, a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

<b>Wind Speed Used in the Analysis:</b>	Ultimate Design Wind Speed $V_{ult} = 130.0$ mph (3-Sec. Gust)/ Nominal Design Wind Speed $V_{asd} = 101.0$ mph (3-Sec. Gust)
<b>Wind Speed with Ice:</b>	50 mph (3-Sec. Gust) with 1" radial ice concurrent
<b>Operational Wind Speed:</b>	60 mph + 0" Radial ice
<b>Standard/Codes:</b>	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	C
<b>Structure Class:</b>	II
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft.
<b>Seismic Parameters:</b>	$S_S = 0.172$ , $S_1 = 0.063$

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

## Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	185.0	9	Powerwave 7770.00 - Panel	Low Profile Platform	(12) 1 5/8"	AT&T
2		6	Powerwave LGP21401			
3		6	Powerwave LGP21903			
4		6	ADC CG-1900W800-FULL-DIN			
-	177.0	6	EMS RR90-17-02DPL2 - Panel	Platform w/ Hand Rails	(18) 1 5/8"	T-Mobile
-		3	Andrew LNX-6515DS-VTM - Panel			
-		3	Ericsson KRY 112 489/2			
-		3	Kathrein 782 11056			
11	150.0	1	ANT450F6 - Whip	(1) Side arm (CommScope DB5004)	(1) 1 1/4"	Connecticut Light & Power
12		1	RFS PAD6-59A - Dish		(1) 1 5/8"	
13	135.0	1	ANT450F6 - Whip	(1) Side arm (CommScope DB5004)	(1) 1 5/8"	

## Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
5	177.0	3	EMS RR90-17-02DPL2 - Panel	Platform w/ Hand Rails	(15) 1 5/8" (3) 1 5/8" Fiber	T-Mobile
6		3	APXV18-206516S-C-A20 - Panel			
7		3	APXVAARR24_43-U-NA20 - Panel			
8		3	Ericsson KRY 112 489/2			
9		3	Ericsson 4449 B71+B12			
10		3	Kathrein 782 11056			

See the attached coax layout for the line placement considered in the analysis.

## **Analysis Results**

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	<b>61.6%</b>	<b>52.7%</b>	<b>52.7%</b>
Pass/Fail	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>

## **Foundations**

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	4397.0	35.8	84.8

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

## **Operational Condition (Rigidity):**

The maximum twist and sway of the microwave dishes under the operational wind speed as specified in the Analysis Criteria are listed in the table below:

Elevation (ft.)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
177.0	Various	T-Mobile	0.000	1.260
150.0	RFS PAD6-59A - Dish	Connecticut Light & Power	0.000	1.119

It is recommended that the carriers review the twist and sway values of the microwave dishes.

## **Conclusions**

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

## Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.
3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

# Usage Diagram - Max Ratio 61.68% at 91.0ft

**Structure:** CT08748-A-SBA  
**Site Name:** Woodstock 4, CT  
**Height:** 190.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-G  
**Exposure:** C  
**Gh:** 1.1

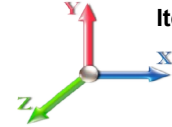
7/3/2019



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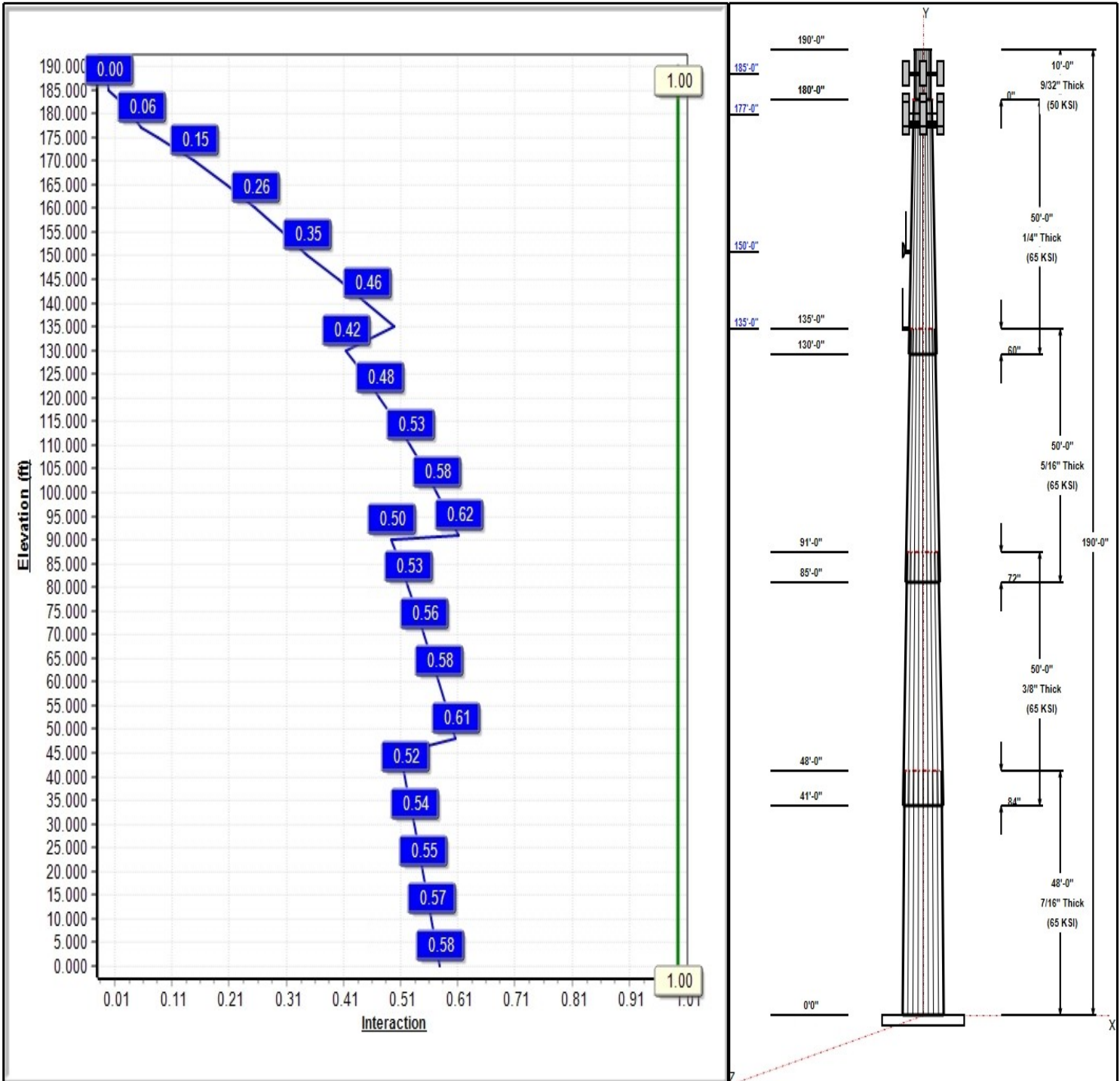
**Dead Load Factor:** 1.20  
**Wind Load Factor:** 1.60

**Load Case : 1.2D + 1.6W 101 mph Wind**



**Iterations:** 25

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**Structure: CT08748-A-SBA**

**Type:** Custom  
**Site Name:** Woodstock 4, CT  
**Height:** 190.00 (ft)  
**Base Elev:** 0.00 (ft)

**Base Shape:** 18 Sided  
**Taper:** 0.00000

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**Shaft Properties**

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	48.00	53.20	64.50	0.438		0.23542	65
2	50.00	43.83	55.60	0.375	Slip	0.23542	65
3	50.00	34.09	45.86	0.313	Slip	0.23542	65
4	50.00	24.00	35.77	0.250	Slip	0.23542	65
5	10.00	24.00	24.00	0.281	Butt	0.00000	50

**Discrete Appurtenances**

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
185.00	185.00	9	Powerwave 7770.00	AT&T
185.00	185.00	6	Powerwave LGP21401	AT&T
185.00	185.00	6	Powerwave LGP21903	AT&T
185.00	185.00	6	ADC	AT&T
185.00	185.00	1	Low Profile Platform	AT&T
177.00	177.00	3	EMS RR90-17-02DPL2	T-Mobile
177.00	177.00	3	Ericsson KRY 112 489/2	T-Mobile
177.00	177.00	1	Platform w/ Hand Rails	T-Mobile
177.00	177.00	3	APXV18-206516S-C-A20	T-Mobile
177.00	177.00	3	APXVAARR24_43-U-NA20	T-Mobile
177.00	177.00	3	4449 B71+B12	T-Mobile
177.00	177.00	3	782 11056	T-Mobile
150.00	153.92	1	ANT450F6	Connecticut Light &
150.00	150.00	1	CommScope DB5004	Connecticut Light &
150.00	150.00	1	RFS PAD6-59A	Connecticut Light &
135.00	135.00	1	CommScope DB5004	Connecticut Light &
135.00	138.92	1	ANT450F6	Connecticut Light &

**Linear Appurtenances**

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	185.00	Inside	1 5/8" Coax	AT&T
0.00	177.00	Inside	1 5/8" Coax	T-Mobile
0.00	177.00	Inside	1 5/8" Fiber	T-Mobile
0.00	150.00	Inside	1 1/4" Coax	Connecticut Light &
0.00	150.00	Inside	1 5/8" Coax	Connecticut Light &
0.00	135.00	Inside	1 5/8" Coax	Connecticut Light &

**Anchor Bolts**

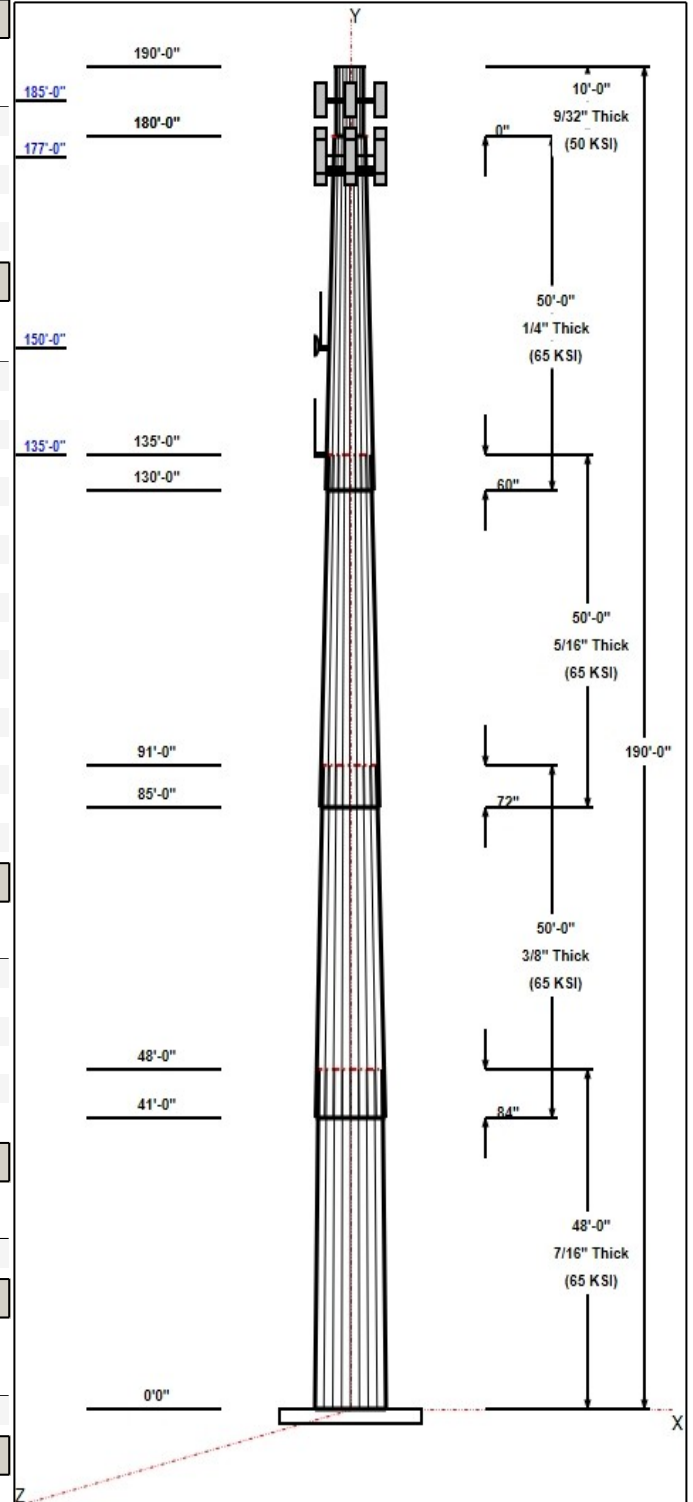
Qty	Specifications	Grade (ksi)	Arrangement
29	2.00" F1554 105	105.0	Radial

**Base Plate**

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.2500	76.1	50.0	Round

**Reactions**

Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 101 mph Wind	4397.0	35.8	52.4
0.9D + 1.6W 101 mph Wind	4357.9	35.8	39.3
1.2D + 1.0Di + 1.0Wi 50 mph Wind	1284.7	10.4	84.8
1.2D + 1.0E	226.9	1.7	52.5



Structure: CT08748-A-SBA

**Type:** Custom  
**Site Name:** Woodstock 4, CT  
**Height:** 190.00 (ft)  
**Base Elev:** 0.00 (ft)

**Base Shape:** 18 Sided  
**Taper:** 0.00000

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0.9D + 1.0E	224.7	1.7	39.4
1.0D + 1.0W 60 mph Wind	965.2	7.9	43.7

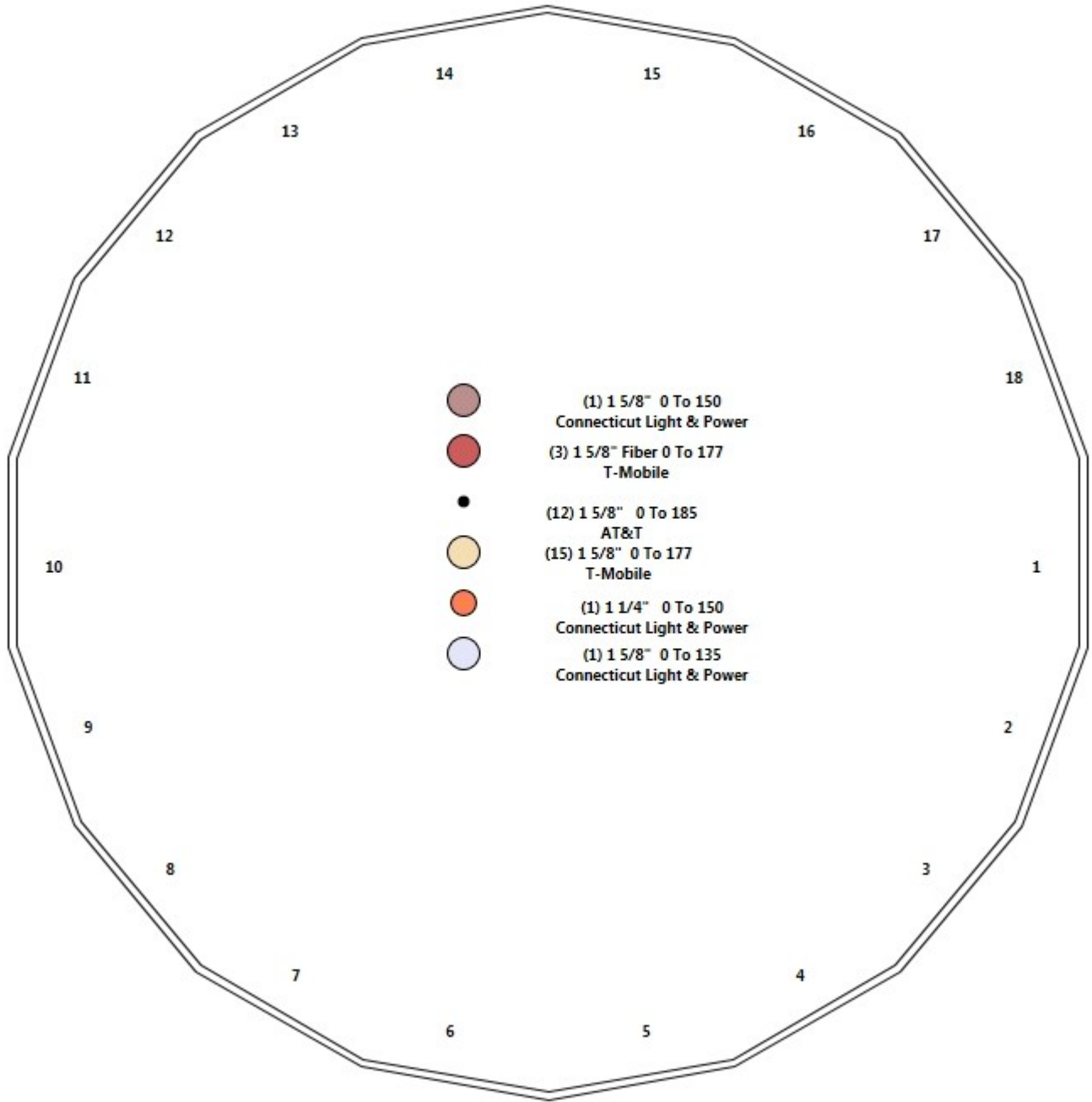


Structure: CT08748-A-SBA - Coax Line Placement

Type: Monopole  
Site Name: Woodstock 4, CT  
Height: 190.00 (ft)

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## Shaft Properties

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	48.000	0.4375	65		0.00	13,248
2	18	50.000	0.3750	65	Slip	84.00	9,991
3	18	50.000	0.3125	65	Slip	72.00	6,694
4	18	50.000	0.2500	65	Slip	60.00	4,001
5	18	10.000	0.2813	50	Flange	0.00	720
<b>Total Shaft Weight:</b>							<b>34,654</b>

Bottom

Top

Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	64.50	0.00	88.96	46124.76	24.59	147.43	53.20	48.00	73.26	25769.0	20.03	121.6	0.235417
2	55.60	41.00	65.73	25324.08	24.73	148.26	43.83	91.00	51.72	12336.9	19.20	116.8	0.235417
3	45.86	85.00	45.18	11844.57	24.47	146.77	34.09	135.00	33.51	4830.83	17.83	109.1	0.235417
4	35.77	130.0	28.18	4492.97	23.82	143.08	24.00	180.00	18.84	1343.00	15.52	96.00	0.235417
5	24.00	180.0	21.17	1504.92	13.64	85.33	24.00	190.00	21.17	1504.92	13.64	85.33	0.000000

## Load Summary

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
1	185.00	Powerwave 7770.00	9	53.28	5.50	0.84	252.74	6.985	0.87	0.00	0.00
2	185.00	Powerwave LGP21401	6	14.10	1.29	0.64	48.14	2.428	0.67	0.00	0.00
3	185.00	Powerwave LGP21903	6	5.50	0.27	0.74	16.98	0.811	0.77	0.00	0.00
4	185.00	ADC CG-1900W800-FULL-DIN	6	16.00	0.10	0.69	16.15	0.101	0.70	0.00	0.00
5	185.00	Low Profile Platform	1	1250.00	22.00	1.00	2735.17	46.048	1.00	0.00	0.00
6	177.00	EMS RR90-17-02DPL2	3	39.94	4.36	0.87	187.49	5.742	0.91	0.00	0.00
7	177.00	Ericsson KRY 112 489/2	3	15.40	0.65	0.82	39.29	1.480	0.84	0.00	0.00
8	177.00	Platform w/ Hand Rails	1	1588.50	32.00	1.00	4414.56	69.853	1.00	0.00	0.00
9	177.00	APXV18-206516S-C-A20	3	18.70	3.61	0.73	113.69	6.128	0.73	0.00	0.00
10	177.00	APXVAARR24_43-U-NA20	3	128.00	20.24	0.70	720.41	22.850	0.70	0.00	0.00
11	177.00	4449 B71+B12	3	70.00	1.65	0.67	171.22	2.408	0.67	0.00	0.00
12	177.00	782 11056	3	1.30	0.22	0.67	18.55	0.514	0.67	0.00	0.00
13	150.00	ANT450F6	1	21.00	1.86	1.00	86.38	5.636	1.00	0.00	3.92
14	150.00	CommScope DB5004	1	160.00	6.00	1.00	346.16	15.326	1.00	0.00	0.00
15	150.00	RFS PAD6-59A	1	278.00	47.05	1.00	1087.78	53.193	1.00	0.00	0.00
16	135.00	CommScope DB5004	1	160.00	6.00	1.00	344.21	15.229	1.00	0.00	0.00
17	135.00	ANT450F6	1	21.00	1.86	1.00	85.70	5.596	1.00	0.00	3.92
<b>Totals:</b>			<b>52</b>	<b>4,991.64</b>			<b>15,614.09</b>				

### Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	185.00	(12) 1 5/8" Coax	0.00	Inside
0.00	177.00	(15) 1 5/8" Coax	0.00	Inside
0.00	177.00	(3) 1 5/8" Fiber	0.00	Inside
0.00	150.00	(1) 1 1/4" Coax	0.00	Inside
0.00	150.00	(1) 1 5/8" Coax	0.00	Inside
0.00	135.00	(1) 1 5/8" Coax	0.00	Inside

## Shaft Section Properties

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Increment Length:** 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in <sup>3</sup> )	Weight (lb)
0.00		0.4375	64.500	88.956	46124.8	24.59	147.43	72.5	1408.	0.0
5.00		0.4375	63.323	87.321	43628.7	24.11	144.74	73.0	1357.	1499.6
10.00		0.4375	62.146	85.687	41224.4	23.64	142.05	73.6	1306.	1471.8
15.00		0.4375	60.969	84.052	38910.0	23.16	139.36	74.2	1257.	1444.0
20.00		0.4375	59.792	82.418	36683.9	22.69	136.67	74.7	1208.	1416.2
25.00		0.4375	58.615	80.783	34544.4	22.21	133.98	75.3	1160.	1388.3
30.00		0.4375	57.437	79.149	32489.8	21.74	131.29	75.8	1114.	1360.5
35.00		0.4375	56.260	77.514	30518.3	21.26	128.60	76.4	1068.	1332.7
40.00		0.4375	55.083	75.880	28628.2	20.79	125.90	76.9	1023.	1304.9
41.00	Bot - Section 2	0.4375	54.848	75.553	28259.8	20.69	125.37	77.1	1014.	257.6
45.00		0.4375	53.906	74.245	26817.8	20.32	123.21	77.5	979.9	1906.4
48.00	Top - Section 1	0.3750	53.950	63.765	23124.0	23.96	143.87	0.0	0.0	1408.1
50.00		0.3750	53.479	63.205	22519.6	23.74	142.61	73.5	829.4	432.1
55.00		0.3750	52.302	61.804	21055.1	23.18	139.47	74.1	792.9	1063.4
60.00		0.3750	51.125	60.403	19655.5	22.63	136.33	74.8	757.2	1039.6
65.00		0.3750	49.948	59.002	18319.3	22.08	133.19	75.4	722.4	1015.8
70.00		0.3750	48.771	57.601	17045.1	21.52	130.06	76.1	688.4	991.9
75.00		0.3750	47.594	56.200	15831.4	20.97	126.92	76.7	655.2	968.1
80.00		0.3750	46.417	54.799	14676.7	20.41	123.78	77.4	622.8	944.3
85.00	Bot - Section 3	0.3750	45.240	53.398	13579.6	19.86	120.64	78.0	591.2	920.4
90.00		0.3750	44.062	51.997	12538.5	19.31	117.50	78.7	560.5	1655.4
91.00	Top - Section 2	0.3125	44.452	43.779	10776.5	23.67	142.25	0.0	0.0	325.8
95.00		0.3125	43.510	42.845	10101.4	23.14	139.23	74.2	457.3	589.5
100.00		0.3125	42.333	41.678	9298.0	22.48	135.47	75.0	432.6	719.0
105.00		0.3125	41.156	40.510	8538.3	21.81	131.70	75.7	408.6	699.2
110.00		0.3125	39.979	39.343	7821.2	21.15	127.93	76.5	385.3	679.3
115.00		0.3125	38.802	38.175	7145.4	20.48	124.17	77.3	362.7	659.4
120.00		0.3125	37.625	37.008	6509.6	19.82	120.40	78.1	340.8	639.6
125.00		0.3125	36.448	35.841	5912.8	19.15	116.63	78.9	319.5	619.7
130.00	Bot - Section 4	0.3125	35.271	34.673	5353.6	18.49	112.87	79.7	299.0	599.9
135.00	Top - Section 3	0.2500	34.594	27.251	4060.9	22.99	138.37	0.0	0.0	1051.6
140.00		0.2500	33.417	26.317	3657.5	22.16	133.67	75.3	215.6	455.7
145.00		0.2500	32.240	25.383	3281.8	21.33	128.96	76.3	200.5	439.8
150.00		0.2500	31.062	24.449	2932.7	20.50	124.25	77.3	186.0	423.9
155.00		0.2500	29.885	23.515	2609.3	19.67	119.54	78.3	172.0	408.0
160.00		0.2500	28.708	22.581	2310.5	18.84	114.83	79.2	158.5	392.1
165.00		0.2500	27.531	21.647	2035.5	18.01	110.12	80.2	145.6	376.2
170.00		0.2500	26.354	20.713	1783.3	17.18	105.42	81.2	133.3	360.4
175.00		0.2500	25.177	19.779	1552.7	16.35	100.71	82.2	121.5	344.5
177.00		0.2500	24.706	19.405	1466.4	16.01	98.82	82.5	116.9	133.3
180.00	Top - Section 4	0.2500	24.000	18.845	1343.0	15.52	96.00	82.5	110.2	195.2
180.00	Bot - Section 5	0.2813	24.000	21.173	1504.9	13.79	85.33	63.5	123.5	
185.00		0.2813	24.000	21.173	1504.9	13.64	85.33	63.5	123.5	360.2
190.00		0.2813	24.000	21.173	1504.9	13.64	85.33	63.5	123.5	360.2

**34653.9**

# Wind Loading - Shaft

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	<b>7/3/2019</b>
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II

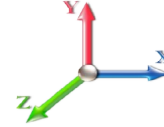


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**Load Case:** 1.2D + 1.6W 101 mph Wind

**Iterations** 25

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	21.088	23.20	508.23	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	21.088	23.20	498.95	0.650	0.000	5.00	27.041	17.58	652.3	0.0	1799.5
10.00		1.00	0.85	21.088	23.20	489.68	0.650	0.000	5.00	26.543	17.25	640.3	0.0	1766.1
15.00		1.00	0.85	21.088	23.20	480.40	0.650	0.000	5.00	26.045	16.93	628.3	0.0	1732.8
20.00		1.00	0.90	22.375	24.61	485.29	0.650	0.000	5.00	25.547	16.61	653.9	0.0	1699.4
25.00		1.00	0.95	23.451	25.80	487.05	0.650	0.000	5.00	25.049	16.28	672.0	0.0	1666.0
30.00		1.00	0.98	24.369	26.81	486.51	0.650	0.000	5.00	24.550	15.96	684.4	0.0	1632.6
35.00		1.00	1.01	25.172	27.69	484.34	0.650	0.000	5.00	24.052	15.63	692.6	0.0	1599.3
40.00		1.00	1.04	25.890	28.48	480.92	0.650	0.000	5.00	23.554	15.31	697.6	0.0	1565.9
41.00	Bot - Section 2	1.00	1.05	26.025	28.63	480.11	0.650	0.000	1.00	4.651	3.02	138.5	0.0	309.2
45.00		1.00	1.07	26.540	29.19	476.51	0.650	0.000	4.00	18.659	12.13	566.5	0.0	2287.7
48.00	Top - Section 1	1.00	1.08	26.903	29.59	473.48	0.650	0.000	3.00	13.785	8.96	424.3	0.0	1689.8
50.00		1.00	1.09	27.135	29.85	478.01	0.650	0.000	2.00	9.091	5.91	282.2	0.0	518.5
55.00		1.00	1.12	27.685	30.45	472.20	0.650	0.000	5.00	22.378	14.55	708.7	0.0	1276.1
60.00		1.00	1.14	28.197	31.02	465.82	0.650	0.000	5.00	21.880	14.22	705.8	0.0	1247.5
65.00		1.00	1.16	28.676	31.54	458.95	0.650	0.000	5.00	21.382	13.90	701.4	0.0	1218.9
70.00		1.00	1.17	29.127	32.04	451.64	0.650	0.000	5.00	20.884	13.57	695.9	0.0	1190.3
75.00		1.00	1.19	29.553	32.51	443.95	0.650	0.000	5.00	20.386	13.25	689.2	0.0	1161.7
80.00		1.00	1.21	29.958	32.95	435.93	0.650	0.000	5.00	19.888	12.93	681.6	0.0	1133.1
85.00	Bot - Section 3	1.00	1.22	30.342	33.38	427.59	0.650	0.000	5.00	19.390	12.60	673.0	0.0	1104.5
90.00		1.00	1.24	30.710	33.78	418.98	0.650	0.000	5.00	19.156	12.45	673.0	0.0	1986.4
91.00	Top - Section 2	1.00	1.24	30.781	33.86	417.23	0.650	0.000	1.00	3.771	2.45	132.8	0.0	391.0
95.00		1.00	1.25	31.061	34.17	416.09	0.650	0.000	4.00	14.887	9.68	529.0	0.0	707.4
100.00		1.00	1.27	31.399	34.54	407.03	0.650	0.000	5.00	18.160	11.80	652.3	0.0	862.8
105.00		1.00	1.28	31.723	34.89	397.75	0.650	0.000	5.00	17.662	11.48	641.0	0.0	839.0
110.00		1.00	1.29	32.035	35.24	388.27	0.650	0.000	5.00	17.164	11.16	629.0	0.0	815.2
115.00		1.00	1.30	32.336	35.57	378.60	0.650	0.000	5.00	16.666	10.83	616.5	0.0	791.3
120.00		1.00	1.32	32.627	35.89	368.77	0.650	0.000	5.00	16.168	10.51	603.5	0.0	767.5
125.00		1.00	1.33	32.909	36.20	358.77	0.650	0.000	5.00	15.670	10.19	589.9	0.0	743.7
130.00	Bot - Section 4	1.00	1.34	33.182	36.50	348.62	0.650	0.000	5.00	15.172	9.86	575.9	0.0	719.8
135.00	Top - Section 3	1.00	1.35	33.446	36.79	338.33	0.650	0.000	5.00	14.885	9.68	569.6	0.0	1261.9
140.00		1.00	1.36	33.703	37.07	332.88	0.650	0.000	5.00	14.387	9.35	554.7	0.0	546.8
145.00		1.00	1.37	33.953	37.35	322.34	0.650	0.000	5.00	13.889	9.03	539.5	0.0	527.8
150.00	Appurtenance(s)	1.00	1.38	34.196	37.62	311.68	0.650	0.000	5.00	13.391	8.70	523.9	0.0	508.7
155.00		1.00	1.39	34.433	37.88	300.91	0.650	0.000	5.00	12.893	8.38	507.9	0.0	489.6
160.00		1.00	1.40	34.664	38.13	290.02	0.650	0.000	5.00	12.395	8.06	491.5	0.0	470.6
165.00		1.00	1.41	34.890	38.38	279.04	0.650	0.000	5.00	11.897	7.73	474.9	0.0	451.5
170.00		1.00	1.42	35.110	38.62	267.95	0.650	0.000	5.00	11.399	7.41	457.9	0.0	432.4
175.00		1.00	1.42	35.324	38.86	256.76	0.650	0.000	5.00	10.901	7.09	440.5	0.0	413.4
177.00	Appurtenance(s)	1.00	1.43	35.409	38.95	252.26	0.650	0.000	2.00	4.221	2.74	171.0	0.0	160.0
180.00	Top - Section 4	1.00	1.43	35.535	39.09	245.48	0.650	0.000	3.00	6.182	4.02	251.3	0.0	234.3
185.00	Appurtenance(s)	1.00	1.44	35.740	39.31	246.19	0.650	0.000	5.00	10.154	6.60	415.2	0.0	432.3
190.00		1.00	1.45	35.941	39.54	246.88	0.650	0.000	5.00	10.154	6.60	417.5	0.0	432.3
<b>Totals:</b>									<b>190.00</b>			<b>23,047.0</b>		<b>41,584.7</b>

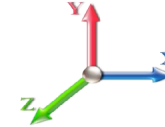
## Discrete Appurtenance Forces

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



**Load Case:** 1.2D + 1.6W 101 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



**Iterations** 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor	x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	185.00	Low Profile Platform	1	35.740	39.314	1.00	1.00	1.00	22.00	1500.00	0.000	0.000	1383.86	0.00	0.00
2	185.00	ADC	6	35.740	39.314	0.55	0.80	0.33	0.33	115.20	0.000	0.000	20.71	0.00	0.00
3	185.00	Powerwave LGP21903	6	35.740	39.314	0.59	0.80	0.96	0.96	39.60	0.000	0.000	60.16	0.00	0.00
4	185.00	Powerwave LGP21401	6	35.740	39.314	0.51	0.80	3.97	101.52	101.52	0.000	0.000	249.66	0.00	0.00
5	185.00	Powerwave 7770.00	9	35.740	39.314	0.68	0.80	33.46	575.42	575.42	0.000	0.000	2104.85	0.00	0.00
6	177.00	782 11056	3	35.409	38.950	0.50	0.75	0.33	0.33	4.68	0.000	0.000	20.67	0.00	0.00
7	177.00	4449 B71+B12	3	35.409	38.950	0.50	0.75	2.49	252.00	252.00	0.000	0.000	155.01	0.00	0.00
8	177.00	APXVAARR24 43-U-NA2	3	35.409	38.950	0.52	0.75	31.88	460.80	460.80	0.000	0.000	1986.63	0.00	0.00
9	177.00	APXV18-206516S-C-A20	3	35.409	38.950	0.55	0.75	5.93	67.32	67.32	0.000	0.000	369.52	0.00	0.00
10	177.00	Platform w/ Hand Rails	1	35.409	38.950	1.00	1.00	32.00	1906.20	1906.20	0.000	0.000	1994.24	0.00	0.00
11	177.00	Ericsson KRY 112 489/2	3	35.409	38.950	0.62	0.75	1.20	55.44	55.44	0.000	0.000	75.01	0.00	0.00
12	177.00	EMS RR90-17-02DPL2	3	35.409	38.950	0.65	0.75	8.52	143.78	143.78	0.000	0.000	530.66	0.00	0.00
13	150.00	RFS PAD6-59A	1	34.196	37.616	1.00	1.00	47.05	333.60	333.60	0.000	0.000	2831.73	0.00	0.00
14	150.00	CommScope DB5004	1	34.196	37.616	1.00	1.00	6.00	192.00	192.00	0.000	0.000	361.11	0.00	0.00
15	150.00	ANT450F6	1	34.383	37.821	1.00	1.00	1.86	25.20	25.20	0.000	3.917	112.55	0.00	440.84
16	135.00	ANT450F6	1	33.648	37.013	1.00	1.00	1.86	25.20	25.20	0.000	3.917	110.15	0.00	431.42
17	135.00	CommScope DB5004	1	33.446	36.791	1.00	1.00	6.00	192.00	192.00	0.000	0.000	353.19	0.00	0.00

**Totals:** **5,989.97** **12,719.73**

## Total Applied Force Summary

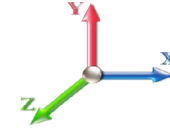
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.6W 101 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



**Iterations** 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		652.33	1940.85	0.00	0.00
10.00		640.32	1907.48	0.00	0.00
15.00		628.30	1874.11	0.00	0.00
20.00		653.91	1840.74	0.00	0.00
25.00		672.00	1807.37	0.00	0.00
30.00		684.41	1774.00	0.00	0.00
35.00		692.64	1740.63	0.00	0.00
40.00		697.64	1707.26	0.00	0.00
41.00		138.48	337.45	0.00	0.00
45.00		566.53	2400.82	0.00	0.00
48.00		424.27	1774.59	0.00	0.00
50.00		282.20	575.01	0.00	0.00
55.00		708.75	1417.49	0.00	0.00
60.00		705.78	1388.89	0.00	0.00
65.00		701.44	1360.29	0.00	0.00
70.00		695.88	1331.68	0.00	0.00
75.00		689.22	1303.08	0.00	0.00
80.00		681.58	1274.48	0.00	0.00
85.00		673.05	1245.87	0.00	0.00
90.00		672.99	2127.78	0.00	0.00
91.00		132.81	419.26	0.00	0.00
95.00		528.98	820.52	0.00	0.00
100.00		652.31	1004.20	0.00	0.00
105.00		640.97	980.37	0.00	0.00
110.00		629.02	956.53	0.00	0.00
115.00		616.52	932.69	0.00	0.00
120.00		603.48	908.86	0.00	0.00
125.00		589.93	885.02	0.00	0.00
130.00		575.92	861.19	0.00	0.00
135.00	(2) attachments	1032.90	1620.45	0.00	431.42
140.00		554.73	681.96	0.00	0.00
145.00		539.50	662.89	0.00	0.00
150.00	(3) attachments	3829.28	1194.62	0.00	440.84
155.00		507.89	614.55	0.00	0.00
160.00		491.55	595.48	0.00	0.00
165.00		474.87	576.41	0.00	0.00
170.00		457.86	557.34	0.00	0.00
175.00		440.53	538.27	0.00	0.00
177.00	(19) attachments	5302.73	3100.19	0.00	0.00
180.00		251.32	241.19	0.00	0.00
185.00	(28) attachments	4234.42	2775.54	0.00	0.00
190.00		417.51	432.28	0.00	0.00
<b>Totals:</b>		<b>35,766.71</b>	<b>52,489.70</b>	<b>0.00</b>	<b>872.26</b>

## Calculated Forces

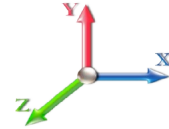
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.6W 101 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.60



**Iterations** 25

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-52.45	-35.83	0.00	-4397.0	0.00	4397.02	5803.10	2901.55	15291.3	7657.05	0.00	0.000	0.000	0.583
5.00	-50.42	-35.29	0.00	-4217.8	0.00	4217.88	5740.33	2870.16	14846.1	7434.11	0.07	-0.133	0.000	0.576
10.00	-48.44	-34.76	0.00	-4041.4	0.00	4041.42	5675.91	2837.95	14402.8	7212.14	0.28	-0.267	0.000	0.569
15.00	-46.48	-34.23	0.00	-3867.6	0.00	3867.63	5609.85	2804.93	13961.8	6991.28	0.64	-0.404	0.000	0.562
20.00	-44.57	-33.67	0.00	-3696.4	0.00	3696.47	5542.15	2771.07	13523.1	6771.63	1.13	-0.542	0.000	0.554
25.00	-42.69	-33.08	0.00	-3528.1	0.00	3528.12	5472.81	2736.40	13087.2	6553.32	1.78	-0.682	0.000	0.546
30.00	-40.84	-32.48	0.00	-3362.7	0.00	3362.70	5401.82	2700.91	12654.1	6336.48	2.57	-0.824	0.000	0.538
35.00	-39.03	-31.86	0.00	-3200.3	0.00	3200.30	5329.20	2664.60	12224.2	6121.21	3.51	-0.968	0.000	0.530
40.00	-37.29	-31.19	0.00	-3041.0	0.00	3041.02	5254.93	2627.47	11797.7	5907.64	4.60	-1.113	0.000	0.522
41.00	-36.91	-31.09	0.00	-3009.8	0.00	3009.83	5239.88	2619.94	11712.8	5865.14	4.84	-1.143	0.000	0.520
45.00	-34.47	-30.54	0.00	-2885.4	0.00	2885.48	5179.02	2589.51	11374.8	5695.90	5.85	-1.262	0.000	0.513
48.00	-32.67	-30.11	0.00	-2793.8	0.00	2793.88	4202.19	2101.09	9258.62	4636.19	6.67	-1.352	0.000	0.611
50.00	-32.04	-29.88	0.00	-2733.6	0.00	2733.65	4180.07	2090.03	9128.39	4570.98	7.25	-1.413	0.000	0.606
55.00	-30.55	-29.23	0.00	-2584.2	0.00	2584.24	4123.62	2061.81	8804.12	4408.60	8.82	-1.581	0.000	0.594
60.00	-29.10	-28.57	0.00	-2438.1	0.00	2438.11	4065.54	2032.77	8481.93	4247.27	10.57	-1.751	0.000	0.581
65.00	-27.68	-27.91	0.00	-2295.2	0.00	2295.28	4005.81	2002.90	8162.06	4087.10	12.49	-1.922	0.000	0.569
70.00	-26.29	-27.24	0.00	-2155.7	0.00	2155.75	3944.44	1972.22	7844.75	3928.21	14.60	-2.095	0.000	0.556
75.00	-24.93	-26.58	0.00	-2019.5	0.00	2019.53	3881.43	1940.71	7530.24	3770.72	16.89	-2.269	0.000	0.542
80.00	-23.61	-25.92	0.00	-1886.6	0.00	1886.63	3816.78	1908.39	7218.77	3614.75	19.36	-2.445	0.000	0.528
85.00	-22.32	-25.26	0.00	-1757.0	0.00	1757.03	3750.48	1875.24	6910.57	3460.42	22.01	-2.621	0.000	0.514
90.00	-20.18	-24.53	0.00	-1630.7	0.00	1630.72	3682.55	1841.27	6605.90	3307.86	24.85	-2.799	0.000	0.499
91.00	-19.73	-24.40	0.00	-1606.1	0.00	1606.19	2898.33	1449.17	5260.79	2634.30	25.44	-2.836	0.000	0.617
95.00	-18.86	-23.89	0.00	-1508.5	0.00	1508.58	2860.60	1430.30	5080.74	2544.15	27.88	-2.979	0.000	0.600
100.00	-17.81	-23.25	0.00	-1389.1	0.00	1389.12	2811.95	1405.98	4857.28	2432.25	31.11	-3.183	0.000	0.578
105.00	-16.79	-22.61	0.00	-1272.8	0.00	1272.87	2761.66	1380.83	4635.80	2321.34	34.55	-3.387	0.000	0.555
110.00	-15.80	-21.98	0.00	-1159.8	0.00	1159.80	2709.73	1354.87	4416.54	2211.55	38.21	-3.590	0.000	0.531
115.00	-14.83	-21.36	0.00	-1049.8	0.00	1049.88	2656.16	1328.08	4199.76	2103.00	42.07	-3.791	0.000	0.505
120.00	-13.89	-20.74	0.00	-943.08	0.00	943.08	2600.95	1300.48	3985.68	1995.80	46.15	-3.989	0.000	0.478
125.00	-12.98	-20.14	0.00	-839.36	0.00	839.36	2544.10	1272.05	3774.55	1890.08	50.43	-4.184	0.000	0.449
130.00	-12.11	-19.54	0.00	-738.68	0.00	738.68	2485.60	1242.80	3566.61	1785.96	54.91	-4.374	0.000	0.419
135.00	-10.51	-18.41	0.00	-640.56	0.00	640.56	1823.78	911.89	2575.19	1289.51	59.58	-4.557	0.000	0.503
140.00	-9.82	-17.84	0.00	-548.49	0.00	548.49	1784.40	892.20	2432.60	1218.11	64.45	-4.732	0.000	0.456
145.00	-9.15	-17.28	0.00	-459.30	0.00	459.30	1743.38	871.69	2291.70	1147.55	69.50	-4.928	0.000	0.406
150.00	-8.25	-13.38	0.00	-372.49	0.00	372.49	1700.71	850.36	2152.72	1077.96	74.76	-5.108	0.000	0.351
155.00	-7.65	-12.84	0.00	-305.58	0.00	305.58	1656.41	828.20	2015.90	1009.45	80.19	-5.273	0.000	0.308
160.00	-7.08	-12.31	0.00	-241.38	0.00	241.38	1610.46	805.23	1881.48	942.14	85.79	-5.422	0.000	0.261
165.00	-6.52	-11.80	0.00	-179.82	0.00	179.82	1562.88	781.44	1749.71	876.15	91.53	-5.551	0.000	0.210
170.00	-6.00	-11.30	0.00	-120.83	0.00	120.83	1513.65	756.82	1620.81	811.61	97.39	-5.657	0.000	0.153
175.00	-5.50	-10.81	0.00	-64.34	0.00	64.34	1462.77	731.39	1495.04	748.63	103.35	-5.730	0.000	0.090
177.00	-2.94	-5.22	0.00	-42.72	0.00	42.72	1441.72	720.86	1445.41	723.78	105.75	-5.750	0.000	0.061
180.00	-2.72	-4.95	0.00	-27.05	0.00	27.05	1400.09	700.04	1362.73	682.38	109.37	-5.770	0.000	0.042
180.00	-2.72	-4.95	0.00	-27.05	0.00	27.05	1210.02	605.01	1174.63	588.19	109.37	-5.770	0.000	0.048
185.00	-0.39	-0.46	0.00	-2.29	0.00	2.29	1210.02	605.01	1174.63	588.19	115.41	-5.786	0.000	0.004
190.00	0.00	-0.42	0.00	0.00	0.00	0.00	1210.02	605.01	1174.63	588.19	121.46	-5.787	0.000	0.000



## Wind Loading - Shaft

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	<b>7/3/2019</b>
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



<b>Load Case:</b> 0.9D + 1.6W 101 mph Wind		<b>Iterations</b> 25
<b>Dead Load Factor</b>	0.90	
<b>Wind Load Factor</b>	1.60	

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)	
0.00		1.00	0.85	21.088	23.20	508.23	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0	
5.00		1.00	0.85	21.088	23.20	498.95	0.650	0.000	5.00	27.041	17.58	652.3	0.0	1349.6	
10.00		1.00	0.85	21.088	23.20	489.68	0.650	0.000	5.00	26.543	17.25	640.3	0.0	1324.6	
15.00		1.00	0.85	21.088	23.20	480.40	0.650	0.000	5.00	26.045	16.93	628.3	0.0	1299.6	
20.00		1.00	0.90	22.375	24.61	485.29	0.650	0.000	5.00	25.547	16.61	653.9	0.0	1274.5	
25.00		1.00	0.95	23.451	25.80	487.05	0.650	0.000	5.00	25.049	16.28	672.0	0.0	1249.5	
30.00		1.00	0.98	24.369	26.81	486.51	0.650	0.000	5.00	24.550	15.96	684.4	0.0	1224.5	
35.00		1.00	1.01	25.172	27.69	484.34	0.650	0.000	5.00	24.052	15.63	692.6	0.0	1199.5	
40.00		1.00	1.04	25.890	28.48	480.92	0.650	0.000	5.00	23.554	15.31	697.6	0.0	1174.4	
41.00	Bot - Section 2	1.00	1.05	26.025	28.63	480.11	0.650	0.000	1.00	4.651	3.02	138.5	0.0	231.9	
45.00		1.00	1.07	26.540	29.19	476.51	0.650	0.000	4.00	18.659	12.13	566.5	0.0	1715.8	
48.00	Top - Section 1	1.00	1.08	26.903	29.59	473.48	0.650	0.000	3.00	13.785	8.96	424.3	0.0	1267.3	
50.00		1.00	1.09	27.135	29.85	478.01	0.650	0.000	2.00	9.091	5.91	282.2	0.0	388.8	
55.00		1.00	1.12	27.685	30.45	472.20	0.650	0.000	5.00	22.378	14.55	708.7	0.0	957.1	
60.00		1.00	1.14	28.197	31.02	465.82	0.650	0.000	5.00	21.880	14.22	705.8	0.0	935.6	
65.00		1.00	1.16	28.676	31.54	458.95	0.650	0.000	5.00	21.382	13.90	701.4	0.0	914.2	
70.00		1.00	1.17	29.127	32.04	451.64	0.650	0.000	5.00	20.884	13.57	695.9	0.0	892.7	
75.00		1.00	1.19	29.553	32.51	443.95	0.650	0.000	5.00	20.386	13.25	689.2	0.0	871.3	
80.00		1.00	1.21	29.958	32.95	435.93	0.650	0.000	5.00	19.888	12.93	681.6	0.0	849.8	
85.00	Bot - Section 3	1.00	1.22	30.342	33.38	427.59	0.650	0.000	5.00	19.390	12.60	673.0	0.0	828.4	
90.00		1.00	1.24	30.710	33.78	418.98	0.650	0.000	5.00	19.156	12.45	673.0	0.0	1489.8	
91.00	Top - Section 2	1.00	1.24	30.781	33.86	417.23	0.650	0.000	1.00	3.771	2.45	132.8	0.0	293.2	
95.00		1.00	1.25	31.061	34.17	416.09	0.650	0.000	4.00	14.887	9.68	529.0	0.0	530.6	
100.00		1.00	1.27	31.399	34.54	407.03	0.650	0.000	5.00	18.160	11.80	652.3	0.0	647.1	
105.00		1.00	1.28	31.723	34.89	397.75	0.650	0.000	5.00	17.662	11.48	641.0	0.0	629.3	
110.00		1.00	1.29	32.035	35.24	388.27	0.650	0.000	5.00	17.164	11.16	629.0	0.0	611.4	
115.00		1.00	1.30	32.336	35.57	378.60	0.650	0.000	5.00	16.666	10.83	616.5	0.0	593.5	
120.00		1.00	1.32	32.627	35.89	368.77	0.650	0.000	5.00	16.168	10.51	603.5	0.0	575.6	
125.00		1.00	1.33	32.909	36.20	358.77	0.650	0.000	5.00	15.670	10.19	589.9	0.0	557.7	
130.00	Bot - Section 4	1.00	1.34	33.182	36.50	348.62	0.650	0.000	5.00	15.172	9.86	575.9	0.0	539.9	
135.00	Top - Section 3	1.00	1.35	33.446	36.79	338.33	0.650	0.000	5.00	14.885	9.68	569.6	0.0	946.4	
140.00		1.00	1.36	33.703	37.07	332.88	0.650	0.000	5.00	14.387	9.35	554.7	0.0	410.1	
145.00		1.00	1.37	33.953	37.35	322.34	0.650	0.000	5.00	13.889	9.03	539.5	0.0	395.8	
150.00	Appurtenance(s)	1.00	1.38	34.196	37.62	311.68	0.650	0.000	5.00	13.391	8.70	523.9	0.0	381.5	
155.00		1.00	1.39	34.433	37.88	300.91	0.650	0.000	5.00	12.893	8.38	507.9	0.0	367.2	
160.00		1.00	1.40	34.664	38.13	290.02	0.650	0.000	5.00	12.395	8.06	491.5	0.0	352.9	
165.00		1.00	1.41	34.890	38.38	279.04	0.650	0.000	5.00	11.897	7.73	474.9	0.0	338.6	
170.00		1.00	1.42	35.110	38.62	267.95	0.650	0.000	5.00	11.399	7.41	457.9	0.0	324.3	
175.00		1.00	1.42	35.324	38.86	256.76	0.650	0.000	5.00	10.901	7.09	440.5	0.0	310.0	
177.00	Appurtenance(s)	1.00	1.43	35.409	38.95	252.26	0.650	0.000	2.00	4.221	2.74	171.0	0.0	120.0	
180.00	Top - Section 4	1.00	1.43	35.535	39.09	245.48	0.650	0.000	3.00	6.182	4.02	251.3	0.0	175.7	
185.00	Appurtenance(s)	1.00	1.44	35.740	39.31	246.19	0.650	0.000	5.00	10.154	6.60	415.2	0.0	324.2	
190.00		1.00	1.45	35.941	39.54	246.88	0.650	0.000	5.00	10.154	6.60	417.5	0.0	324.2	
<b>Totals:</b>									<b>190.00</b>			<b>23,047.0</b>			<b>31,188.5</b>

## Discrete Appurtenance Forces

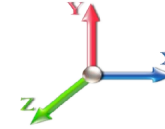
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 0.9D + 1.6W 101 mph Wind

**Dead Load Factor** 0.90  
**Wind Load Factor** 1.60



**Iterations** 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor	x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	185.00	Low Profile Platform	1	35.740	39.314	1.00	1.00	1.00	22.00	1125.00	0.000	0.000	1383.86	0.00	0.00
2	185.00	ADC	6	35.740	39.314	0.55	0.80	0.33	86.40	0.000	0.000	20.71	0.00	0.00	
3	185.00	Powerwave LGP21903	6	35.740	39.314	0.59	0.80	0.96	29.70	0.000	0.000	60.16	0.00	0.00	
4	185.00	Powerwave LGP21401	6	35.740	39.314	0.51	0.80	3.97	76.14	0.000	0.000	249.66	0.00	0.00	
5	185.00	Powerwave 7770.00	9	35.740	39.314	0.68	0.80	33.46	431.57	0.000	0.000	2104.85	0.00	0.00	
6	177.00	782 11056	3	35.409	38.950	0.50	0.75	0.33	3.51	0.000	0.000	20.67	0.00	0.00	
7	177.00	4449 B71+B12	3	35.409	38.950	0.50	0.75	2.49	189.00	0.000	0.000	155.01	0.00	0.00	
8	177.00	APXVAARR24 43-U-NA2	3	35.409	38.950	0.52	0.75	31.88	345.60	0.000	0.000	1986.63	0.00	0.00	
9	177.00	APXV18-206516S-C-A20	3	35.409	38.950	0.55	0.75	5.93	50.49	0.000	0.000	369.52	0.00	0.00	
10	177.00	Platform w/ Hand Rails	1	35.409	38.950	1.00	1.00	32.00	1429.65	0.000	0.000	1994.24	0.00	0.00	
11	177.00	Ericsson KRY 112 489/2	3	35.409	38.950	0.62	0.75	1.20	41.58	0.000	0.000	75.01	0.00	0.00	
12	177.00	EMS RR90-17-02DPL2	3	35.409	38.950	0.65	0.75	8.52	107.84	0.000	0.000	530.66	0.00	0.00	
13	150.00	RFS PAD6-59A	1	34.196	37.616	1.00	1.00	47.05	250.20	0.000	0.000	2831.73	0.00	0.00	
14	150.00	CommScope DB5004	1	34.196	37.616	1.00	1.00	6.00	144.00	0.000	0.000	361.11	0.00	0.00	
15	150.00	ANT450F6	1	34.383	37.821	1.00	1.00	1.86	18.90	0.000	3.917	112.55	0.00	440.84	
16	135.00	ANT450F6	1	33.648	37.013	1.00	1.00	1.86	18.90	0.000	3.917	110.15	0.00	431.42	
17	135.00	CommScope DB5004	1	33.446	36.791	1.00	1.00	6.00	144.00	0.000	0.000	353.19	0.00	0.00	

**Totals: 4,492.48 12,719.73**

## Total Applied Force Summary

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II

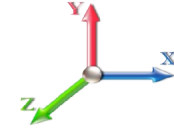


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**Load Case:** 0.9D + 1.6W 101 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.60



**Iterations** 25

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		652.33	1455.64	0.00	0.00
10.00		640.32	1430.61	0.00	0.00
15.00		628.30	1405.58	0.00	0.00
20.00		653.91	1380.56	0.00	0.00
25.00		672.00	1355.53	0.00	0.00
30.00		684.41	1330.50	0.00	0.00
35.00		692.64	1305.47	0.00	0.00
40.00		697.64	1280.44	0.00	0.00
41.00		138.48	253.09	0.00	0.00
45.00		566.53	1800.62	0.00	0.00
48.00		424.27	1330.94	0.00	0.00
50.00		282.20	431.25	0.00	0.00
55.00		708.75	1063.12	0.00	0.00
60.00		705.78	1041.67	0.00	0.00
65.00		701.44	1020.21	0.00	0.00
70.00		695.88	998.76	0.00	0.00
75.00		689.22	977.31	0.00	0.00
80.00		681.58	955.86	0.00	0.00
85.00		673.05	934.41	0.00	0.00
90.00		672.99	1595.84	0.00	0.00
91.00		132.81	314.45	0.00	0.00
95.00		528.98	615.39	0.00	0.00
100.00		652.31	753.15	0.00	0.00
105.00		640.97	735.27	0.00	0.00
110.00		629.02	717.40	0.00	0.00
115.00		616.52	699.52	0.00	0.00
120.00		603.48	681.64	0.00	0.00
125.00		589.93	663.77	0.00	0.00
130.00		575.92	645.89	0.00	0.00
135.00	(2) attachments	1032.90	1215.34	0.00	431.42
140.00		554.73	511.47	0.00	0.00
145.00		539.50	497.17	0.00	0.00
150.00	(3) attachments	3829.28	895.96	0.00	440.84
155.00		507.89	460.91	0.00	0.00
160.00		491.55	446.61	0.00	0.00
165.00		474.87	432.31	0.00	0.00
170.00		457.86	418.01	0.00	0.00
175.00		440.53	403.71	0.00	0.00
177.00	(19) attachments	5302.73	2325.15	0.00	0.00
180.00		251.32	180.90	0.00	0.00
185.00	(28) attachments	4234.42	2081.65	0.00	0.00
190.00		417.51	324.21	0.00	0.00
<b>Totals:</b>		<b>35,766.71</b>	<b>39,367.27</b>	<b>0.00</b>	<b>872.26</b>

## Calculated Forces

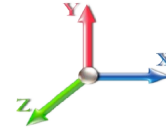
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	<b>7/3/2019</b>
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



**Load Case:** 0.9D + 1.6W 101 mph Wind

**Iterations** 25

**Dead Load Factor** 0.90  
**Wind Load Factor** 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-39.32	-35.81	0.00	-4357.8	0.00	4357.86	5803.10	2901.55	15291.3	7657.05	0.00	0.000	0.000	0.576
5.00	-37.79	-35.25	0.00	-4178.8	0.00	4178.80	5740.33	2870.16	14846.1	7434.11	0.07	-0.132	0.000	0.569
10.00	-36.28	-34.69	0.00	-4002.5	0.00	4002.57	5675.91	2837.95	14402.8	7212.14	0.28	-0.265	0.000	0.562
15.00	-34.80	-34.13	0.00	-3829.1	0.00	3829.15	5609.85	2804.93	13961.8	6991.28	0.63	-0.400	0.000	0.554
20.00	-33.34	-33.55	0.00	-3658.4	0.00	3658.49	5542.15	2771.07	13523.1	6771.63	1.12	-0.537	0.000	0.546
25.00	-31.91	-32.94	0.00	-3490.7	0.00	3490.75	5472.81	2736.40	13087.2	6553.32	1.76	-0.676	0.000	0.539
30.00	-30.51	-32.31	0.00	-3326.0	0.00	3326.06	5401.82	2700.91	12654.1	6336.48	2.54	-0.816	0.000	0.531
35.00	-29.14	-31.67	0.00	-3164.5	0.00	3164.50	5329.20	2664.60	12224.2	6121.21	3.48	-0.958	0.000	0.523
40.00	-27.82	-30.99	0.00	-3006.1	0.00	3006.14	5254.93	2627.47	11797.7	5907.64	4.56	-1.102	0.000	0.514
41.00	-27.53	-30.89	0.00	-2975.1	0.00	2975.15	5239.88	2619.94	11712.8	5865.14	4.79	-1.132	0.000	0.513
45.00	-25.69	-30.33	0.00	-2851.6	0.00	2851.61	5179.02	2589.51	11374.8	5695.90	5.79	-1.249	0.000	0.506
48.00	-24.33	-29.91	0.00	-2760.6	0.00	2760.63	4202.19	2101.09	9258.62	4636.19	6.60	-1.338	0.000	0.601
50.00	-23.85	-29.66	0.00	-2700.8	0.00	2700.82	4180.07	2090.03	9128.39	4570.98	7.18	-1.399	0.000	0.597
55.00	-22.72	-28.99	0.00	-2552.5	0.00	2552.51	4123.62	2061.81	8804.12	4408.60	8.73	-1.564	0.000	0.585
60.00	-21.61	-28.32	0.00	-2407.5	0.00	2407.56	4065.54	2032.77	8481.93	4247.27	10.46	-1.732	0.000	0.572
65.00	-20.53	-27.65	0.00	-2265.9	0.00	2265.97	4005.81	2002.90	8162.06	4087.10	12.36	-1.901	0.000	0.560
70.00	-19.48	-26.97	0.00	-2127.7	0.00	2127.74	3944.44	1972.22	7844.75	3928.21	14.45	-2.072	0.000	0.547
75.00	-18.45	-26.30	0.00	-1992.8	0.00	1992.86	3881.43	1940.71	7530.24	3770.72	16.71	-2.244	0.000	0.533
80.00	-17.45	-25.64	0.00	-1861.3	0.00	1861.34	3816.78	1908.39	7218.77	3614.75	19.15	-2.417	0.000	0.520
85.00	-16.47	-24.98	0.00	-1733.1	0.00	1733.15	3750.48	1875.24	6910.57	3460.42	21.78	-2.591	0.000	0.505
90.00	-14.86	-24.26	0.00	-1608.2	0.00	1608.28	3682.55	1841.27	6605.90	3307.86	24.58	-2.766	0.000	0.490
91.00	-14.51	-24.13	0.00	-1584.0	0.00	1584.02	2898.33	1449.17	5260.79	2634.30	25.17	-2.802	0.000	0.607
95.00	-13.85	-23.61	0.00	-1487.5	0.00	1487.50	2860.60	1430.30	5080.74	2544.15	27.57	-2.944	0.000	0.590
100.00	-13.06	-22.97	0.00	-1369.4	0.00	1369.44	2811.95	1405.98	4857.28	2432.25	30.76	-3.145	0.000	0.568
105.00	-12.28	-22.33	0.00	-1254.6	0.00	1254.61	2761.66	1380.83	4635.80	2321.34	34.17	-3.346	0.000	0.545
110.00	-11.53	-21.70	0.00	-1142.9	0.00	1142.96	2709.73	1354.87	4416.54	2211.55	37.78	-3.546	0.000	0.521
115.00	-10.80	-21.08	0.00	-1034.4	0.00	1034.47	2656.16	1328.08	4199.76	2103.00	41.59	-3.744	0.000	0.496
120.00	-10.09	-20.46	0.00	-929.10	0.00	929.10	2600.95	1300.48	3985.68	1995.80	45.62	-3.939	0.000	0.470
125.00	-9.40	-19.86	0.00	-826.79	0.00	826.79	2544.10	1272.05	3774.55	1890.08	49.84	-4.131	0.000	0.441
130.00	-8.74	-19.26	0.00	-727.50	0.00	727.50	2485.60	1242.80	3566.61	1785.96	54.27	-4.318	0.000	0.411
135.00	-7.55	-18.16	0.00	-630.75	0.00	630.75	1823.78	911.89	2575.19	1289.51	58.88	-4.498	0.000	0.494
140.00	-7.03	-17.59	0.00	-539.93	0.00	539.93	1784.40	892.20	2432.60	1218.11	63.68	-4.671	0.000	0.448
145.00	-6.52	-17.03	0.00	-451.97	0.00	451.97	1743.38	871.69	2291.70	1147.55	68.68	-4.864	0.000	0.398
150.00	-5.92	-13.16	0.00	-366.36	0.00	366.36	1700.71	850.36	2152.72	1077.96	73.86	-5.041	0.000	0.344
155.00	-5.47	-12.63	0.00	-300.56	0.00	300.56	1656.41	828.20	2015.90	1009.45	79.22	-5.203	0.000	0.301
160.00	-5.05	-12.11	0.00	-237.42	0.00	237.42	1610.46	805.23	1881.48	942.14	84.74	-5.349	0.000	0.255
165.00	-4.64	-11.61	0.00	-176.87	0.00	176.87	1562.88	781.44	1749.71	876.15	90.41	-5.477	0.000	0.205
170.00	-4.25	-11.12	0.00	-118.84	0.00	118.84	1513.65	756.82	1620.81	811.61	96.20	-5.580	0.000	0.149
175.00	-3.88	-10.64	0.00	-63.26	0.00	63.26	1462.77	731.39	1495.04	748.63	102.07	-5.653	0.000	0.087
177.00	-2.09	-5.14	0.00	-41.98	0.00	41.98	1441.72	720.86	1445.41	723.78	104.44	-5.672	0.000	0.060
180.00	-1.93	-4.87	0.00	-26.58	0.00	26.58	1400.09	700.04	1362.73	682.38	108.01	-5.692	0.000	0.040
180.00	-1.93	-4.87	0.00	-26.58	0.00	26.58	1210.02	605.01	1174.63	588.19	108.01	-5.692	0.000	0.047
185.00	-0.28	-0.45	0.00	-2.24	0.00	2.24	1210.02	605.01	1174.63	588.19	113.97	-5.707	0.000	0.004
190.00	0.00	-0.42	0.00	0.00	0.00	0.00	1210.02	605.01	1174.63	588.19	119.94	-5.708	0.000	0.000

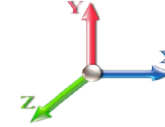
## Wind Loading - Shaft

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II
		Page: 16



**Load Case:** 1.2D + 1.0Di + 1.0Wi 50 mph Wind

**Dead Load Factor**     1.20  
**Wind Load Factor**     1.00



**Iterations**     24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.656	5.00	28.421	34.10	193.9	674.1	2473.6
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.775	5.00	28.022	33.63	191.2	710.7	2476.8
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.848	5.00	27.585	33.10	188.2	727.3	2460.0
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.902	5.00	27.132	32.56	196.4	735.1	2434.5
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.945	5.00	26.670	32.00	202.3	737.9	2403.9
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.981	5.00	26.201	31.44	206.5	737.3	2369.9
35.00		1.00	1.01	6.169	6.79	0.00	1.200	2.012	5.00	25.729	30.87	209.5	734.3	2333.5
40.00		1.00	1.04	6.345	6.98	0.00	1.200	2.039	5.00	25.253	30.30	211.5	729.4	2295.3
41.00	Bot - Section 2	1.00	1.05	6.378	7.02	0.00	1.200	2.044	1.00	4.992	5.99	42.0	145.7	454.8
45.00		1.00	1.07	6.504	7.15	0.00	1.200	2.063	4.00	20.035	24.04	172.0	586.3	2874.0
48.00	Top - Section 1	1.00	1.08	6.593	7.25	0.00	1.200	2.076	3.00	14.823	17.79	129.0	437.2	2126.9
50.00		1.00	1.09	6.650	7.32	0.00	1.200	2.085	2.00	9.785	11.74	85.9	290.2	808.7
55.00		1.00	1.12	6.785	7.46	0.00	1.200	2.105	5.00	24.132	28.96	216.1	717.2	1993.3
60.00		1.00	1.14	6.910	7.60	0.00	1.200	2.123	5.00	23.649	28.38	215.7	708.1	1955.6
65.00		1.00	1.16	7.028	7.73	0.00	1.200	2.140	5.00	23.165	27.80	214.9	698.2	1917.1
70.00		1.00	1.17	7.138	7.85	0.00	1.200	2.156	5.00	22.681	27.22	213.7	687.7	1878.0
75.00		1.00	1.19	7.243	7.97	0.00	1.200	2.171	5.00	22.195	26.63	212.2	676.6	1838.4
80.00		1.00	1.21	7.342	8.08	0.00	1.200	2.185	5.00	21.709	26.05	210.4	665.1	1798.2
85.00	Bot - Section 3	1.00	1.22	7.436	8.18	0.00	1.200	2.198	5.00	21.222	25.47	208.3	653.1	1757.6
90.00		1.00	1.24	7.526	8.28	0.00	1.200	2.211	5.00	20.999	25.20	208.6	649.4	2635.8
91.00	Top - Section 2	1.00	1.24	7.544	8.30	0.00	1.200	2.214	1.00	4.140	4.97	41.2	129.4	520.4
95.00		1.00	1.25	7.612	8.37	0.00	1.200	2.223	4.00	16.369	19.64	164.5	509.3	1216.8
100.00		1.00	1.27	7.695	8.46	0.00	1.200	2.234	5.00	20.022	24.03	203.4	623.6	1486.4
105.00		1.00	1.28	7.774	8.55	0.00	1.200	2.245	5.00	19.533	23.44	200.5	610.2	1449.2
110.00		1.00	1.29	7.851	8.64	0.00	1.200	2.256	5.00	19.044	22.85	197.4	596.6	1411.8
115.00		1.00	1.30	7.925	8.72	0.00	1.200	2.266	5.00	18.554	22.27	194.1	582.7	1374.0
120.00		1.00	1.32	7.996	8.80	0.00	1.200	2.276	5.00	18.064	21.68	190.7	568.5	1336.0
125.00		1.00	1.33	8.065	8.87	0.00	1.200	2.285	5.00	17.574	21.09	187.1	554.1	1297.8
130.00	Bot - Section 4	1.00	1.34	8.132	8.95	0.00	1.200	2.294	5.00	17.083	20.50	183.4	539.5	1259.3
135.00	Top - Section 3	1.00	1.35	8.197	9.02	0.00	1.200	2.303	5.00	16.804	20.17	181.8	531.9	1793.8
140.00		1.00	1.36	8.260	9.09	0.00	1.200	2.311	5.00	16.313	19.58	177.9	516.9	1063.7
145.00		1.00	1.37	8.321	9.15	0.00	1.200	2.319	5.00	15.822	18.99	173.8	501.7	1029.5
150.00	Appurtenance(s)	1.00	1.38	8.381	9.22	0.00	1.200	2.327	5.00	15.331	18.40	169.6	486.4	995.1
155.00		1.00	1.39	8.439	9.28	0.00	1.200	2.335	5.00	14.839	17.81	165.3	470.9	960.5
160.00		1.00	1.40	8.495	9.34	0.00	1.200	2.342	5.00	14.347	17.22	160.9	455.2	925.8
165.00		1.00	1.41	8.551	9.41	0.00	1.200	2.349	5.00	13.855	16.63	156.4	439.4	890.9
170.00		1.00	1.42	8.604	9.46	0.00	1.200	2.356	5.00	13.363	16.04	151.8	423.4	855.8
175.00		1.00	1.42	8.657	9.52	0.00	1.200	2.363	5.00	12.871	15.44	147.1	407.3	820.7
177.00	Appurtenance(s)	1.00	1.43	8.678	9.55	0.00	1.200	2.366	2.00	5.010	6.01	57.4	160.3	320.3
180.00	Top - Section 4	1.00	1.43	8.709	9.58	0.00	1.200	2.370	3.00	7.367	8.84	84.7	234.6	468.9
185.00	Appurtenance(s)	1.00	1.44	8.759	9.63	0.00	1.200	2.376	5.00	12.134	14.56	140.3	392.2	824.5
190.00		1.00	1.45	8.808	9.69	0.00	1.200	2.383	5.00	12.140	14.57	141.1	393.4	825.7
<b>Totals:</b>									<b>190.00</b>			<b>7,198.5</b>	<b>64,412.8</b>	

## Discrete Appurtenance Forces

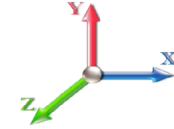
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.0Di + 1.0Wi 50 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.00



**Iterations** 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	185.00	Low Profile Platform	1	8.759	9.635	1.00	1.00	46.05	2753.84	0.000	0.000	443.67	0.00	0.00
2	185.00	ADC	6	8.759	9.635	0.56	0.80	0.34	79.27	0.000	0.000	3.28	0.00	0.00
3	185.00	Powerwave LGP21903	6	8.759	9.635	0.62	0.80	3.00	99.81	0.000	0.000	28.90	0.00	0.00
4	185.00	Powerwave LGP21401	6	8.759	9.635	0.53	0.80	7.75	270.55	0.000	0.000	74.67	0.00	0.00
5	185.00	Powerwave 7770.00	9	8.759	9.635	0.69	0.80	43.60	2370.52	0.000	0.000	420.10	0.00	0.00
6	177.00	782 11056	3	8.678	9.546	0.50	0.75	0.77	56.42	0.000	0.000	7.39	0.00	0.00
7	177.00	4449 B71+B12	3	8.678	9.546	0.50	0.75	3.63	555.65	0.000	0.000	34.64	0.00	0.00
8	177.00	APXVAARR24_43-U-NA2	3	8.678	9.546	0.52	0.75	35.99	2238.03	0.000	0.000	343.53	0.00	0.00
9	177.00	APXV18-206516S-C-A20	3	8.678	9.546	0.55	0.75	10.06	292.30	0.000	0.000	96.07	0.00	0.00
10	177.00	Platform w/ Hand Rails	1	8.678	9.546	1.00	1.00	69.85	4291.58	0.000	0.000	666.79	0.00	0.00
11	177.00	Ericsson KRY 112 489/2	3	8.678	9.546	0.63	0.75	2.80	115.52	0.000	0.000	26.76	0.00	0.00
12	177.00	EMS RR90-17-02DPL2	3	8.678	9.546	0.68	0.75	11.69	586.42	0.000	0.000	111.61	0.00	0.00
13	150.00	RFS PAD6-59A	1	8.381	9.219	1.00	1.00	53.19	969.38	0.000	0.000	490.37	0.00	0.00
14	150.00	CommScope DB5004	1	8.381	9.219	1.00	1.00	15.33	338.16	0.000	0.000	141.29	0.00	0.00
15	150.00	ANT450F6	1	8.426	9.269	1.00	1.00	5.64	76.58	0.000	3.917	52.24	0.00	204.60
16	135.00	ANT450F6	1	8.246	9.071	1.00	1.00	5.60	75.90	0.000	3.917	50.76	0.00	198.82
17	135.00	CommScope DB5004	1	8.197	9.016	1.00	1.00	15.23	336.21	0.000	0.000	137.31	0.00	0.00

**Totals: 15,506.12**

**3,129.38**

## Total Applied Force Summary

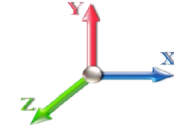
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.2D + 1.0Di + 1.0Wi 50 mph Wind

**Dead Load Factor** 1.20  
**Wind Load Factor** 1.00



**Iterations** 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		193.88	2614.94	0.00	0.00
10.00		191.16	2618.16	0.00	0.00
15.00		188.18	2601.40	0.00	0.00
20.00		196.38	2575.86	0.00	0.00
25.00		202.32	2545.24	0.00	0.00
30.00		206.55	2511.27	0.00	0.00
35.00		209.52	2474.90	0.00	0.00
40.00		211.51	2436.70	0.00	0.00
41.00		42.03	483.11	0.00	0.00
45.00		172.01	2987.12	0.00	0.00
48.00		129.01	2211.75	0.00	0.00
50.00		85.90	865.22	0.00	0.00
55.00		216.13	2134.71	0.00	0.00
60.00		215.72	2096.95	0.00	0.00
65.00		214.90	2058.48	0.00	0.00
70.00		213.71	2019.37	0.00	0.00
75.00		212.19	1979.72	0.00	0.00
80.00		210.38	1939.56	0.00	0.00
85.00		208.31	1898.97	0.00	0.00
90.00		208.61	2777.15	0.00	0.00
91.00		41.23	548.63	0.00	0.00
95.00		164.48	1329.84	0.00	0.00
100.00		203.37	1627.80	0.00	0.00
105.00		200.45	1590.60	0.00	0.00
110.00		197.36	1553.12	0.00	0.00
115.00		194.09	1515.36	0.00	0.00
120.00		190.66	1477.36	0.00	0.00
125.00		187.09	1439.13	0.00	0.00
130.00		183.38	1400.68	0.00	0.00
135.00	(2) attachments	369.89	2347.24	0.00	198.82
140.00		177.86	1198.85	0.00	0.00
145.00		173.79	1164.61	0.00	0.00
150.00	(3) attachments	853.50	2514.31	0.00	204.60
155.00		165.29	1085.41	0.00	0.00
160.00		160.88	1050.67	0.00	0.00
165.00		156.38	1015.78	0.00	0.00
170.00		151.77	980.75	0.00	0.00
175.00		147.08	945.58	0.00	0.00
177.00	(19) attachments	1344.19	8506.21	0.00	0.00
180.00		84.69	475.84	0.00	0.00
185.00	(28) attachments	1110.91	6410.02	0.00	0.00
190.00		141.15	825.65	0.00	0.00
<b>Totals:</b>		<b>10,327.85</b>	<b>84,834.03</b>	<b>0.00</b>	<b>403.42</b>

## Calculated Forces

**Structure:** CT08748-A-SBA      **Code:** EIA/TIA-222-G      7/3/2019  
**Site Name:** Woodstock 4, CT      **Exposure:** C  
**Height:** 190.00 (ft)      **Crest Height:** 0.00  
**Base Elev:** 0.000 (ft)      **Site Class:** D - Stiff Soil  
**Gh:** 1.1      **Topography:** 1      **Struct Class:** II      Page: 19



<b>Load Case:</b> 1.2D + 1.0Di + 1.0Wi 50 mph Wind	<b>Iterations</b> 24
<b>Dead Load Factor</b> 1.20	
<b>Wind Load Factor</b> 1.00	

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-84.83	-10.36	0.00	-1284.6	0.00	1284.66	5803.10	2901.55	15291.3	7657.05	0.00	0.000	0.000	0.182
5.00	-82.21	-10.22	0.00	-1232.8	0.00	1232.88	5740.33	2870.16	14846.1	7434.11	0.02	-0.039	0.000	0.180
10.00	-79.58	-10.08	0.00	-1181.7	0.00	1181.79	5675.91	2837.95	14402.8	7212.14	0.08	-0.078	0.000	0.178
15.00	-76.98	-9.94	0.00	-1131.4	0.00	1131.40	5609.85	2804.93	13961.8	6991.28	0.19	-0.118	0.000	0.176
20.00	-74.39	-9.79	0.00	-1081.7	0.00	1081.70	5542.15	2771.07	13523.1	6771.63	0.33	-0.159	0.000	0.173
25.00	-71.84	-9.63	0.00	-1032.7	0.00	1032.75	5472.81	2736.40	13087.2	6553.32	0.52	-0.200	0.000	0.171
30.00	-69.32	-9.47	0.00	-984.59	0.00	984.59	5401.82	2700.91	12654.1	6336.48	0.75	-0.241	0.000	0.168
35.00	-66.84	-9.30	0.00	-937.26	0.00	937.26	5329.20	2664.60	12224.2	6121.21	1.03	-0.283	0.000	0.166
40.00	-64.40	-9.10	0.00	-890.78	0.00	890.78	5254.93	2627.47	11797.7	5907.64	1.35	-0.326	0.000	0.163
41.00	-63.92	-9.08	0.00	-881.68	0.00	881.68	5239.88	2619.94	11712.8	5865.14	1.42	-0.335	0.000	0.163
45.00	-60.93	-8.92	0.00	-845.37	0.00	845.37	5179.02	2589.51	11374.8	5695.90	1.71	-0.369	0.000	0.160
48.00	-58.71	-8.80	0.00	-818.60	0.00	818.60	4202.19	2101.09	9258.62	4636.19	1.95	-0.396	0.000	0.191
50.00	-57.84	-8.74	0.00	-801.01	0.00	801.01	4180.07	2090.03	9128.39	4570.98	2.12	-0.414	0.000	0.189
55.00	-55.70	-8.56	0.00	-757.30	0.00	757.30	4123.62	2061.81	8804.12	4408.60	2.58	-0.463	0.000	0.185
60.00	-53.60	-8.37	0.00	-714.51	0.00	714.51	4065.54	2032.77	8481.93	4247.27	3.09	-0.513	0.000	0.181
65.00	-51.54	-8.18	0.00	-672.66	0.00	672.66	4005.81	2002.90	8162.06	4087.10	3.66	-0.563	0.000	0.177
70.00	-49.51	-7.99	0.00	-631.75	0.00	631.75	3944.44	1972.22	7844.75	3928.21	4.27	-0.613	0.000	0.173
75.00	-47.53	-7.80	0.00	-591.79	0.00	591.79	3881.43	1940.71	7530.24	3770.72	4.94	-0.665	0.000	0.169
80.00	-45.58	-7.61	0.00	-552.79	0.00	552.79	3816.78	1908.39	7218.77	3614.75	5.67	-0.716	0.000	0.165
85.00	-43.68	-7.41	0.00	-514.76	0.00	514.76	3750.48	1875.24	6910.57	3460.42	6.44	-0.768	0.000	0.160
90.00	-40.90	-7.19	0.00	-477.69	0.00	477.69	3682.55	1841.27	6605.90	3307.86	7.28	-0.820	0.000	0.156
91.00	-40.35	-7.16	0.00	-470.50	0.00	470.50	2898.33	1449.17	5260.79	2634.30	7.45	-0.830	0.000	0.193
95.00	-39.02	-7.01	0.00	-441.87	0.00	441.87	2860.60	1430.30	5080.74	2544.15	8.16	-0.873	0.000	0.187
100.00	-37.39	-6.82	0.00	-406.82	0.00	406.82	2811.95	1405.98	4857.28	2432.25	9.11	-0.932	0.000	0.181
105.00	-35.79	-6.63	0.00	-372.73	0.00	372.73	2761.66	1380.83	4635.80	2321.34	10.12	-0.992	0.000	0.174
110.00	-34.24	-6.44	0.00	-339.59	0.00	339.59	2709.73	1354.87	4416.54	2211.55	11.19	-1.051	0.000	0.166
115.00	-32.72	-6.25	0.00	-307.39	0.00	307.39	2656.16	1328.08	4199.76	2103.00	12.32	-1.110	0.000	0.159
120.00	-31.24	-6.06	0.00	-276.14	0.00	276.14	2600.95	1300.48	3985.68	1995.80	13.52	-1.168	0.000	0.150
125.00	-29.80	-5.87	0.00	-245.83	0.00	245.83	2544.10	1272.05	3774.55	1890.08	14.77	-1.225	0.000	0.142
130.00	-28.40	-5.69	0.00	-216.46	0.00	216.46	2485.60	1242.80	3566.61	1785.96	16.08	-1.281	0.000	0.133
135.00	-26.06	-5.29	0.00	-187.83	0.00	187.83	1823.78	911.89	2575.19	1289.51	17.45	-1.335	0.000	0.160
140.00	-24.86	-5.11	0.00	-161.39	0.00	161.39	1784.40	892.20	2432.60	1218.11	18.88	-1.386	0.000	0.146
145.00	-23.69	-4.93	0.00	-135.87	0.00	135.87	1743.38	871.69	2291.70	1147.55	20.36	-1.444	0.000	0.132
150.00	-21.20	-4.03	0.00	-111.04	0.00	111.04	1700.71	850.36	2152.72	1077.96	21.90	-1.497	0.000	0.115
155.00	-20.11	-3.85	0.00	-90.91	0.00	90.91	1656.41	828.20	2015.90	1009.45	23.50	-1.546	0.000	0.102
160.00	-19.06	-3.67	0.00	-71.66	0.00	71.66	1610.46	805.23	1881.48	942.14	25.14	-1.591	0.000	0.088
165.00	-18.05	-3.50	0.00	-53.29	0.00	53.29	1562.88	781.44	1749.71	876.15	26.83	-1.629	0.000	0.072
170.00	-17.07	-3.33	0.00	-35.80	0.00	35.80	1513.65	756.82	1620.81	811.61	28.55	-1.660	0.000	0.055
175.00	-16.13	-3.16	0.00	-19.16	0.00	19.16	1462.77	731.39	1495.04	748.63	30.31	-1.682	0.000	0.037
177.00	-7.67	-1.56	0.00	-12.85	0.00	12.85	1441.72	720.86	1445.41	723.78	31.01	-1.688	0.000	0.023
180.00	-7.20	-1.47	0.00	-8.16	0.00	8.16	1400.09	700.04	1362.73	682.38	32.07	-1.694	0.000	0.017
180.00	-7.20	-1.47	0.00	-8.16	0.00	8.16	1210.02	605.01	1174.63	588.19	32.07	-1.694	0.000	0.020
185.00	-0.82	-0.17	0.00	-0.83	0.00	0.83	1210.02	605.01	1174.63	588.19	33.85	-1.699	0.000	0.002
190.00	0.00	-0.14	0.00	0.00	0.00	0.00	1210.02	605.01	1174.63	588.19	35.63	-1.699	0.000	0.000



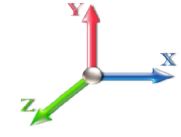
## Seismic Segment Forces (Factored)

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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<b>Load Case:</b> 1.2D + 1.0E				<b>Iterations</b> 22	
<b>Gust Response Factor</b>	1.10	<b>Sds</b>	0.18	<b>Ss</b>	0.17
<b>Dead Load Factor</b>	1.20	<b>Seismic Load Factor</b>	1.00	<b>Sd1</b>	0.10
<b>Wind Load Factor</b>	0.00	<b>Structure Frequency (f1)</b>	0.36	<b>SA</b>	0.04
				<b>Seismic Importance Factor</b>	1.00



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1499.5	0.00	0.03	0.01	21.36	
10.00		1471.7	0.01	0.05	0.03	32.21	
15.00		1443.9	0.01	0.06	0.03	37.90	
20.00		1416.1	0.02	0.06	0.04	40.78	
25.00		1388.3	0.03	0.07	0.04	42.10	
30.00		1360.5	0.05	0.07	0.04	42.61	
35.00		1332.7	0.06	0.07	0.04	42.72	
40.00		1304.9	0.08	0.07	0.04	42.69	
41.00	Bot - Section 2	257.65	0.09	0.07	0.04	8.46	
45.00		1906.4	0.11	0.07	0.04	63.57	
48.00	Top - Section 1	1408.1	0.12	0.07	0.03	47.48	
50.00		432.05	0.13	0.07	0.03	14.67	
55.00		1063.4	0.16	0.07	0.03	36.62	
60.00		1039.6	0.19	0.06	0.02	36.02	
65.00		1015.7	0.22	0.06	0.02	34.92	
70.00		991.94	0.26	0.05	0.02	33.06	
75.00		968.10	0.29	0.05	0.01	30.20	
80.00		944.26	0.34	0.04	0.01	26.12	
85.00	Bot - Section 3	920.43	0.38	0.02	0.01	20.67	
90.00		1655.3	0.42	0.01	0.01	25.65	
91.00	Top - Section 2	325.83	0.43	0.01	0.01	4.53	
95.00		589.53	0.47	-0.01	0.01	4.12	
100.00		719.04	0.52	-0.02	0.01	-1.76	
105.00		699.17	0.58	-0.04	0.01	-8.36	
110.00		679.31	0.63	-0.06	0.02	-13.91	
115.00		659.45	0.69	-0.08	0.03	-17.88	
120.00		639.58	0.75	-0.10	0.04	-19.98	
125.00		619.72	0.82	-0.11	0.06	-20.12	
130.00	Bot - Section 4	599.86	0.88	-0.12	0.08	-18.38	
135.00	Top - Section 3	1232.5	0.95	-0.12	0.11	-31.76	
140.00		455.70	1.03	-0.10	0.14	-8.12	
145.00		439.81	1.10	-0.07	0.19	-3.01	
150.00	Appurtenance(s)	882.92	1.18	-0.02	0.24	6.33	
155.00		408.02	1.26	0.07	0.30	9.88	
160.00		392.13	1.34	0.18	0.37	17.37	
165.00		376.24	1.43	0.33	0.46	25.39	
170.00		360.35	1.51	0.53	0.56	33.80	
175.00		344.46	1.60	0.79	0.67	42.46	
177.00	Appurtenance(s)	2541.8	1.64	0.91	0.73	345.62	
180.00	Top - Section 4	195.24	1.70	1.11	0.81	30.46	
185.00	Appurtenance(s)	2303.3	1.79	1.50	0.96	442.22	
190.00		360.23	1.89	1.98	1.14	83.33	
<b>Totals:</b>		<b>39,645.5</b>				<b>1,582.1</b>	<b>Total Wind: 35,766.7</b>

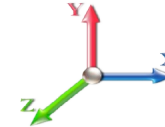
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

## Calculated Forces

**Structure:** CT08748-A-SBA **Code:** EIA/TIA-222-G **7/3/2019**  
**Site Name:** Woodstock 4, CT **Exposure:** C  
**Height:** 190.00 (ft) **Crest Height:** 0.00  
**Base Elev:** 0.000 (ft) **Site Class:** D - Stiff Soil  
**Gh:** 1.1 **Topography:** 1 **Struct Class:** II **Page: 21**



<b>Load Case:</b> 1.2D + 1.0E		<b>Iterations</b> 22	
<b>Gust Response Factor</b>	1.10	<b>Sds</b>	0.18
<b>Dead Load Factor</b>	1.20	<b>Seismic Load Factor</b>	1.00
<b>Wind Load Factor</b>	0.00	<b>Sd1</b>	0.10
<b>Structure Frequency (f1)</b>	0.36	<b>SA</b>	0.04
<b>Seismic Importance Factor</b>		1.00	



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-52.49	-1.73	0.00	-226.91	0.00	226.91	5803.10	2901.55	15291.3	7657.05	0.00	0.00	0.00	0.039
5.00	-50.55	-1.71	0.00	-218.27	0.00	218.27	5740.33	2870.16	14846.1	7434.11	0.00	-0.01	0.038	
10.00	-48.64	-1.69	0.00	-209.71	0.00	209.71	5675.91	2837.95	14402.8	7212.14	0.01	-0.01	0.038	
15.00	-46.77	-1.65	0.00	-201.29	0.00	201.29	5609.85	2804.93	13961.8	6991.28	0.03	-0.02	0.037	
20.00	-44.93	-1.62	0.00	-193.02	0.00	193.02	5542.15	2771.07	13523.1	6771.63	0.06	-0.03	0.037	
25.00	-43.12	-1.58	0.00	-184.94	0.00	184.94	5472.81	2736.40	13087.2	6553.32	0.09	-0.04	0.036	
30.00	-41.34	-1.54	0.00	-177.04	0.00	177.04	5401.82	2700.91	12654.1	6336.48	0.13	-0.04	0.036	
35.00	-39.60	-1.50	0.00	-169.34	0.00	169.34	5329.20	2664.60	12224.2	6121.21	0.18	-0.05	0.035	
40.00	-37.90	-1.46	0.00	-161.83	0.00	161.83	5254.93	2627.47	11797.7	5907.64	0.24	-0.06	0.035	
41.00	-37.56	-1.45	0.00	-160.37	0.00	160.37	5239.88	2619.94	11712.8	5865.14	0.25	-0.06	0.035	
45.00	-35.16	-1.39	0.00	-154.55	0.00	154.55	5179.02	2589.51	11374.8	5695.90	0.30	-0.07	0.034	
48.00	-33.38	-1.34	0.00	-150.37	0.00	150.37	4202.19	2101.09	9258.62	4636.19	0.35	-0.07	0.040	
50.00	-32.81	-1.33	0.00	-147.68	0.00	147.68	4180.07	2090.03	9128.39	4570.98	0.38	-0.07	0.040	
55.00	-31.39	-1.30	0.00	-141.02	0.00	141.02	4123.62	2061.81	8804.12	4408.60	0.46	-0.08	0.040	
60.00	-30.00	-1.27	0.00	-134.53	0.00	134.53	4065.54	2032.77	8481.93	4247.27	0.55	-0.09	0.039	
65.00	-28.64	-1.23	0.00	-128.20	0.00	128.20	4005.81	2002.90	8162.06	4087.10	0.66	-0.10	0.039	
70.00	-27.31	-1.20	0.00	-122.03	0.00	122.03	3944.44	1972.22	7844.75	3928.21	0.77	-0.11	0.038	
75.00	-26.01	-1.17	0.00	-116.01	0.00	116.01	3881.43	1940.71	7530.24	3770.72	0.89	-0.12	0.037	
80.00	-24.73	-1.15	0.00	-110.14	0.00	110.14	3816.78	1908.39	7218.77	3614.75	1.02	-0.13	0.037	
85.00	-23.48	-1.13	0.00	-104.39	0.00	104.39	3750.48	1875.24	6910.57	3460.42	1.17	-0.14	0.036	
90.00	-21.36	-1.10	0.00	-98.74	0.00	98.74	3682.55	1841.27	6605.90	3307.86	1.32	-0.15	0.036	
91.00	-20.94	-1.10	0.00	-97.64	0.00	97.64	2898.33	1449.17	5260.79	2634.30	1.35	-0.16	0.044	
95.00	-20.12	-1.10	0.00	-93.24	0.00	93.24	2860.60	1430.30	5080.74	2544.15	1.49	-0.16	0.044	
100.00	-19.11	-1.10	0.00	-87.77	0.00	87.77	2811.95	1405.98	4857.28	2432.25	1.67	-0.18	0.043	
105.00	-18.13	-1.10	0.00	-82.28	0.00	82.28	2761.66	1380.83	4635.80	2321.34	1.86	-0.19	0.042	
110.00	-17.17	-1.10	0.00	-76.79	0.00	76.79	2709.73	1354.87	4416.54	2211.55	2.07	-0.20	0.041	
115.00	-16.24	-1.10	0.00	-71.30	0.00	71.30	2656.16	1328.08	4199.76	2103.00	2.29	-0.22	0.040	
120.00	-15.33	-1.10	0.00	-65.80	0.00	65.80	2600.95	1300.48	3985.68	1995.80	2.52	-0.23	0.039	
125.00	-14.45	-1.10	0.00	-60.30	0.00	60.30	2544.10	1272.05	3774.55	1890.08	2.77	-0.24	0.038	
130.00	-13.59	-1.10	0.00	-54.81	0.00	54.81	2485.60	1242.80	3566.61	1785.96	3.03	-0.26	0.036	
135.00	-11.97	-1.09	0.00	-49.31	0.00	49.31	1823.78	911.89	2575.19	1289.51	3.31	-0.27	0.045	
140.00	-11.28	-1.09	0.00	-43.84	0.00	43.84	1784.40	892.20	2432.60	1218.11	3.60	-0.29	0.042	
145.00	-10.62	-1.09	0.00	-38.37	0.00	38.37	1743.38	871.69	2291.70	1147.55	3.91	-0.30	0.040	
150.00	-9.43	-1.08	0.00	-32.91	0.00	32.91	1700.71	850.36	2152.72	1077.96	4.23	-0.32	0.036	
155.00	-8.81	-1.07	0.00	-27.49	0.00	27.49	1656.41	828.20	2015.90	1009.45	4.57	-0.33	0.033	
160.00	-8.21	-1.05	0.00	-22.13	0.00	22.13	1610.46	805.23	1881.48	942.14	4.93	-0.35	0.029	
165.00	-7.64	-1.03	0.00	-16.86	0.00	16.86	1562.88	781.44	1749.71	876.15	5.29	-0.36	0.024	
170.00	-7.08	-0.99	0.00	-11.74	0.00	11.74	1513.65	756.82	1620.81	811.61	5.67	-0.37	0.019	
175.00	-6.54	-0.94	0.00	-6.79	0.00	6.79	1462.77	731.39	1495.04	748.63	6.06	-0.37	0.014	
177.00	-3.45	-0.58	0.00	-4.90	0.00	4.90	1441.72	720.86	1445.41	723.78	6.22	-0.38	0.009	
180.00	-3.20	-0.55	0.00	-3.16	0.00	3.16	1400.09	700.04	1362.73	682.38	6.46	-0.38	0.007	
180.00	-3.20	-0.55	0.00	-3.16	0.00	3.16	1210.02	605.01	1174.63	588.19	6.46	-0.38	0.008	
185.00	-0.43	-0.09	0.00	-0.43	0.00	0.43	1210.02	605.01	1174.63	588.19	6.86	-0.38	0.001	
190.00	0.00	-0.08	0.00	0.00	0.00	0.00	1210.02	605.01	1174.63	588.19	7.26	-0.38	0.000	

## Seismic Segment Forces (Factored)

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II

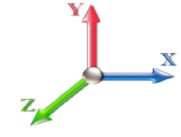


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**Load Case:** 0.9D + 1.0E

**Iterations** 22

<b>Gust Response Factor</b> 1.10	<b>Sds</b> 0.18	<b>Ss</b> 0.17
<b>Dead Load Factor</b> 0.90	<b>Seismic Load Factor</b> 1.00	<b>Sd1</b> 0.10
<b>Wind Load Factor</b> 0.00	<b>Structure Frequency (f1)</b> 0.36	<b>SA</b> 0.04
	<b>Seismic Importance Factor</b> 1.00	



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1499.5	0.00	0.03	0.01	21.36	
10.00		1471.7	0.01	0.05	0.03	32.21	
15.00		1443.9	0.01	0.06	0.03	37.90	
20.00		1416.1	0.02	0.06	0.04	40.78	
25.00		1388.3	0.03	0.07	0.04	42.10	
30.00		1360.5	0.05	0.07	0.04	42.61	
35.00		1332.7	0.06	0.07	0.04	42.72	
40.00		1304.9	0.08	0.07	0.04	42.69	
41.00	Bot - Section 2	257.65	0.09	0.07	0.04	8.46	
45.00		1906.4	0.11	0.07	0.04	63.57	
48.00	Top - Section 1	1408.1	0.12	0.07	0.03	47.48	
50.00		432.05	0.13	0.07	0.03	14.67	
55.00		1063.4	0.16	0.07	0.03	36.62	
60.00		1039.6	0.19	0.06	0.02	36.02	
65.00		1015.7	0.22	0.06	0.02	34.92	
70.00		991.94	0.26	0.05	0.02	33.06	
75.00		968.10	0.29	0.05	0.01	30.20	
80.00		944.26	0.34	0.04	0.01	26.12	
85.00	Bot - Section 3	920.43	0.38	0.02	0.01	20.67	
90.00		1655.3	0.42	0.01	0.01	25.65	
91.00	Top - Section 2	325.83	0.43	0.01	0.01	4.53	
95.00		589.53	0.47	-0.01	0.01	4.12	
100.00		719.04	0.52	-0.02	0.01	-1.76	
105.00		699.17	0.58	-0.04	0.01	-8.36	
110.00		679.31	0.63	-0.06	0.02	-13.91	
115.00		659.45	0.69	-0.08	0.03	-17.88	
120.00		639.58	0.75	-0.10	0.04	-19.98	
125.00		619.72	0.82	-0.11	0.06	-20.12	
130.00	Bot - Section 4	599.86	0.88	-0.12	0.08	-18.38	
135.00	Top - Section 3	1232.5	0.95	-0.12	0.11	-31.76	
140.00		455.70	1.03	-0.10	0.14	-8.12	
145.00		439.81	1.10	-0.07	0.19	-3.01	
150.00	Appurtenance(s)	882.92	1.18	-0.02	0.24	6.33	
155.00		408.02	1.26	0.07	0.30	9.88	
160.00		392.13	1.34	0.18	0.37	17.37	
165.00		376.24	1.43	0.33	0.46	25.39	
170.00		360.35	1.51	0.53	0.56	33.80	
175.00		344.46	1.60	0.79	0.67	42.46	
177.00	Appurtenance(s)	2541.8	1.64	0.91	0.73	345.62	
180.00	Top - Section 4	195.24	1.70	1.11	0.81	30.46	
185.00	Appurtenance(s)	2303.3	1.79	1.50	0.96	442.22	
190.00		360.23	1.89	1.98	1.14	83.33	
<b>Totals:</b>		<b>39,645.5</b>				<b>1,582.1</b>	<b>Total Wind: 35,766.7</b>

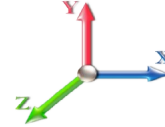
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

## Calculated Forces

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



<b>Load Case:</b> 0.9D + 1.0E			<b>Iterations</b> 22		
<b>Gust Response Factor</b> 1.10			<b>Sds</b> 0.18		
<b>Dead Load Factor</b> 0.90		<b>Seismic Load Factor</b> 1.00		<b>Ss</b> 0.17	
<b>Wind Load Factor</b> 0.00		<b>Structure Frequency (f1)</b> 0.36		<b>S1</b> 0.06	
			<b>SA</b> 0.04		<b>Seismic Importance Factor</b> 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-39.37	-1.73	0.00	-224.68	0.00	224.68	5803.10	2901.55	15291.3	7657.05	0.00	0.00	0.00	0.036
5.00	-37.91	-1.71	0.00	-216.05	0.00	216.05	5740.33	2870.16	14846.1	7434.11	0.00	-0.01	-0.01	0.036
10.00	-36.48	-1.68	0.00	-207.50	0.00	207.50	5675.91	2837.95	14402.8	7212.14	0.01	-0.01	-0.01	0.035
15.00	-35.07	-1.65	0.00	-199.10	0.00	199.10	5609.85	2804.93	13961.8	6991.28	0.03	-0.02	-0.02	0.035
20.00	-33.69	-1.61	0.00	-190.86	0.00	190.86	5542.15	2771.07	13523.1	6771.63	0.06	-0.03	-0.03	0.034
25.00	-32.34	-1.57	0.00	-182.81	0.00	182.81	5472.81	2736.40	13087.2	6553.32	0.09	-0.04	-0.04	0.034
30.00	-31.01	-1.53	0.00	-174.95	0.00	174.95	5401.82	2700.91	12654.1	6336.48	0.13	-0.04	-0.04	0.033
35.00	-29.70	-1.49	0.00	-167.29	0.00	167.29	5329.20	2664.60	12224.2	6121.21	0.18	-0.05	-0.05	0.033
40.00	-28.42	-1.45	0.00	-159.83	0.00	159.83	5254.93	2627.47	11797.7	5907.64	0.24	-0.06	-0.06	0.032
41.00	-28.17	-1.44	0.00	-158.37	0.00	158.37	5239.88	2619.94	11712.8	5865.14	0.25	-0.06	-0.06	0.032
45.00	-26.37	-1.38	0.00	-152.60	0.00	152.60	5179.02	2589.51	11374.8	5695.90	0.30	-0.07	-0.07	0.032
48.00	-25.04	-1.33	0.00	-148.46	0.00	148.46	4202.19	2101.09	9258.62	4636.19	0.34	-0.07	-0.07	0.038
50.00	-24.61	-1.32	0.00	-145.79	0.00	145.79	4180.07	2090.03	9128.39	4570.98	0.37	-0.07	-0.07	0.038
55.00	-23.54	-1.29	0.00	-139.18	0.00	139.18	4123.62	2061.81	8804.12	4408.60	0.46	-0.08	-0.08	0.037
60.00	-22.50	-1.25	0.00	-132.75	0.00	132.75	4065.54	2032.77	8481.93	4247.27	0.55	-0.09	-0.09	0.037
65.00	-21.48	-1.22	0.00	-126.49	0.00	126.49	4005.81	2002.90	8162.06	4087.10	0.65	-0.10	-0.10	0.036
70.00	-20.48	-1.19	0.00	-120.39	0.00	120.39	3944.44	1972.22	7844.75	3928.21	0.76	-0.11	-0.11	0.036
75.00	-19.50	-1.16	0.00	-114.45	0.00	114.45	3881.43	1940.71	7530.24	3770.72	0.88	-0.12	-0.12	0.035
80.00	-18.55	-1.13	0.00	-108.65	0.00	108.65	3816.78	1908.39	7218.77	3614.75	1.01	-0.13	-0.13	0.035
85.00	-17.61	-1.11	0.00	-102.97	0.00	102.97	3750.48	1875.24	6910.57	3460.42	1.15	-0.14	-0.14	0.034
90.00	-16.02	-1.09	0.00	-97.40	0.00	97.40	3682.55	1841.27	6605.90	3307.86	1.31	-0.15	-0.15	0.034
91.00	-15.70	-1.08	0.00	-96.31	0.00	96.31	2898.33	1449.17	5260.79	2634.30	1.34	-0.15	-0.15	0.042
95.00	-15.09	-1.08	0.00	-91.98	0.00	91.98	2860.60	1430.30	5080.74	2544.15	1.47	-0.16	-0.16	0.041
100.00	-14.33	-1.08	0.00	-86.58	0.00	86.58	2811.95	1405.98	4857.28	2432.25	1.65	-0.17	-0.17	0.041
105.00	-13.60	-1.08	0.00	-81.17	0.00	81.17	2761.66	1380.83	4635.80	2321.34	1.84	-0.19	-0.19	0.040
110.00	-12.88	-1.08	0.00	-75.76	0.00	75.76	2709.73	1354.87	4416.54	2211.55	2.04	-0.20	-0.20	0.039
115.00	-12.18	-1.08	0.00	-70.35	0.00	70.35	2656.16	1328.08	4199.76	2103.00	2.26	-0.21	-0.21	0.038
120.00	-11.50	-1.08	0.00	-64.94	0.00	64.94	2600.95	1300.48	3985.68	1995.80	2.49	-0.23	-0.23	0.037
125.00	-10.83	-1.08	0.00	-59.52	0.00	59.52	2544.10	1272.05	3774.55	1890.08	2.73	-0.24	-0.24	0.036
130.00	-10.19	-1.08	0.00	-54.11	0.00	54.11	2485.60	1242.80	3566.61	1785.96	2.99	-0.25	-0.25	0.034
135.00	-8.97	-1.08	0.00	-48.70	0.00	48.70	1823.78	911.89	2575.19	1289.51	3.27	-0.27	-0.27	0.043
140.00	-8.46	-1.08	0.00	-43.30	0.00	43.30	1784.40	892.20	2432.60	1218.11	3.56	-0.28	-0.28	0.040
145.00	-7.96	-1.08	0.00	-37.90	0.00	37.90	1743.38	871.69	2291.70	1147.55	3.86	-0.30	-0.30	0.038
150.00	-7.07	-1.07	0.00	-32.51	0.00	32.51	1700.71	850.36	2152.72	1077.96	4.18	-0.31	-0.31	0.034
155.00	-6.61	-1.06	0.00	-27.16	0.00	27.16	1656.41	828.20	2015.90	1009.45	4.52	-0.33	-0.33	0.031
160.00	-6.16	-1.04	0.00	-21.87	0.00	21.87	1610.46	805.23	1881.48	942.14	4.87	-0.34	-0.34	0.027
165.00	-5.73	-1.01	0.00	-16.67	0.00	16.67	1562.88	781.44	1749.71	876.15	5.23	-0.35	-0.35	0.023
170.00	-5.31	-0.98	0.00	-11.60	0.00	11.60	1513.65	756.82	1620.81	811.61	5.60	-0.36	-0.36	0.018
175.00	-4.91	-0.93	0.00	-6.72	0.00	6.72	1462.77	731.39	1495.04	748.63	5.99	-0.37	-0.37	0.012
177.00	-2.58	-0.57	0.00	-4.85	0.00	4.85	1441.72	720.86	1445.41	723.78	6.14	-0.37	-0.37	0.008
180.00	-2.40	-0.54	0.00	-3.13	0.00	3.13	1400.09	700.04	1362.73	682.38	6.38	-0.37	-0.37	0.006
180.00	-2.40	-0.54	0.00	-3.13	0.00	3.13	1210.02	605.01	1174.63	588.19	6.38	-0.37	-0.37	0.007
185.00	-0.32	-0.09	0.00	-0.43	0.00	0.43	1210.02	605.01	1174.63	588.19	6.77	-0.38	-0.38	0.001
190.00	0.00	-0.08	0.00	0.00	0.00	0.00	1210.02	605.01	1174.63	588.19	7.16	-0.38	-0.38	0.000

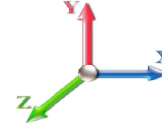
## Wind Loading - Shaft

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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<b>Load Case:</b> 1.0D + 1.0W 60 mph Wind	<b>Iterations</b> 24
<b>Dead Load Factor</b> 1.00	
<b>Wind Load Factor</b> 1.00	



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	301.92	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	296.41	0.650	0.000	5.00	27.041	17.58	143.9	0.0	1499.6
10.00		1.00	0.85	7.442	8.19	290.90	0.650	0.000	5.00	26.543	17.25	141.2	0.0	1471.8
15.00		1.00	0.85	7.442	8.19	285.39	0.650	0.000	5.00	26.045	16.93	138.6	0.0	1444.0
20.00		1.00	0.90	7.896	8.69	288.29	0.650	0.000	5.00	25.547	16.61	144.2	0.0	1416.2
25.00		1.00	0.95	8.276	9.10	289.33	0.650	0.000	5.00	25.049	16.28	148.2	0.0	1388.3
30.00		1.00	0.98	8.600	9.46	289.02	0.650	0.000	5.00	24.550	15.96	151.0	0.0	1360.5
35.00		1.00	1.01	8.883	9.77	287.73	0.650	0.000	5.00	24.052	15.63	152.8	0.0	1332.7
40.00		1.00	1.04	9.137	10.05	285.69	0.650	0.000	5.00	23.554	15.31	153.9	0.0	1304.9
41.00	Bot - Section 2	1.00	1.05	9.184	10.10	285.21	0.650	0.000	1.00	4.651	3.02	30.5	0.0	257.6
45.00		1.00	1.07	9.366	10.30	283.08	0.650	0.000	4.00	18.659	12.13	125.0	0.0	1906.4
48.00	Top - Section 1	1.00	1.08	9.494	10.44	281.27	0.650	0.000	3.00	13.785	8.96	93.6	0.0	1408.1
50.00		1.00	1.09	9.576	10.53	283.97	0.650	0.000	2.00	9.091	5.91	62.2	0.0	432.1
55.00		1.00	1.12	9.770	10.75	280.52	0.650	0.000	5.00	22.378	14.55	156.3	0.0	1063.4
60.00		1.00	1.14	9.951	10.95	276.73	0.650	0.000	5.00	21.880	14.22	155.7	0.0	1039.6
65.00		1.00	1.16	10.120	11.13	272.64	0.650	0.000	5.00	21.382	13.90	154.7	0.0	1015.8
70.00		1.00	1.17	10.279	11.31	268.30	0.650	0.000	5.00	20.884	13.57	153.5	0.0	991.9
75.00		1.00	1.19	10.430	11.47	263.74	0.650	0.000	5.00	20.386	13.25	152.0	0.0	968.1
80.00		1.00	1.21	10.572	11.63	258.97	0.650	0.000	5.00	19.888	12.93	150.3	0.0	944.3
85.00	Bot - Section 3	1.00	1.22	10.708	11.78	254.01	0.650	0.000	5.00	19.390	12.60	148.5	0.0	920.4
90.00		1.00	1.24	10.838	11.92	248.90	0.650	0.000	5.00	19.156	12.45	148.4	0.0	1655.4
91.00	Top - Section 2	1.00	1.24	10.863	11.95	247.86	0.650	0.000	1.00	3.771	2.45	29.3	0.0	325.8
95.00		1.00	1.25	10.962	12.06	247.18	0.650	0.000	4.00	14.887	9.68	116.7	0.0	589.5
100.00		1.00	1.27	11.081	12.19	241.80	0.650	0.000	5.00	18.160	11.80	143.9	0.0	719.0
105.00		1.00	1.28	11.195	12.31	236.29	0.650	0.000	5.00	17.662	11.48	141.4	0.0	699.2
110.00		1.00	1.29	11.305	12.44	230.65	0.650	0.000	5.00	17.164	11.16	138.7	0.0	679.3
115.00		1.00	1.30	11.412	12.55	224.91	0.650	0.000	5.00	16.666	10.83	136.0	0.0	659.4
120.00		1.00	1.32	11.514	12.67	219.07	0.650	0.000	5.00	16.168	10.51	133.1	0.0	639.6
125.00		1.00	1.33	11.614	12.78	213.13	0.650	0.000	5.00	15.670	10.19	130.1	0.0	619.7
130.00	Bot - Section 4	1.00	1.34	11.710	12.88	207.10	0.650	0.000	5.00	15.172	9.86	127.0	0.0	599.9
135.00	Top - Section 3	1.00	1.35	11.803	12.98	200.99	0.650	0.000	5.00	14.885	9.68	125.6	0.0	1051.6
140.00		1.00	1.36	11.894	13.08	197.75	0.650	0.000	5.00	14.387	9.35	122.4	0.0	455.7
145.00		1.00	1.37	11.982	13.18	191.49	0.650	0.000	5.00	13.889	9.03	119.0	0.0	439.8
150.00	Appurtenance(s)	1.00	1.38	12.068	13.27	185.16	0.650	0.000	5.00	13.391	8.70	115.6	0.0	423.9
155.00		1.00	1.39	12.152	13.37	178.76	0.650	0.000	5.00	12.893	8.38	112.0	0.0	408.0
160.00		1.00	1.40	12.233	13.46	172.29	0.650	0.000	5.00	12.395	8.06	108.4	0.0	392.1
165.00		1.00	1.41	12.313	13.54	165.76	0.650	0.000	5.00	11.897	7.73	104.7	0.0	376.2
170.00		1.00	1.42	12.390	13.63	159.18	0.650	0.000	5.00	11.399	7.41	101.0	0.0	360.4
175.00		1.00	1.42	12.466	13.71	152.53	0.650	0.000	5.00	10.901	7.09	97.2	0.0	344.5
177.00	Appurtenance(s)	1.00	1.43	12.496	13.75	149.86	0.650	0.000	2.00	4.221	2.74	37.7	0.0	133.3
180.00	Top - Section 4	1.00	1.43	12.540	13.79	145.83	0.650	0.000	3.00	6.182	4.02	55.4	0.0	195.2
185.00	Appurtenance(s)	1.00	1.44	12.613	13.87	146.25	0.650	0.000	5.00	10.154	6.60	91.6	0.0	360.2
190.00		1.00	1.45	12.684	13.95	146.66	0.650	0.000	5.00	10.154	6.60	92.1	0.0	360.2
<b>Totals:</b>									<b>190.00</b>			<b>5,083.4</b>		<b>34,653.9</b>

## Discrete Appurtenance Forces

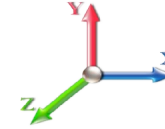
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations** 24

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor	x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	185.00	Low Profile Platform	1	12.613	13.874	1.00	1.00	1.00	22.00	1250.00	0.000	0.000	305.23	0.00	0.00
2	185.00	ADC	6	12.613	13.874	0.55	0.80	0.33	96.00	96.00	0.000	0.000	4.57	0.00	0.00
3	185.00	Powerwave LGP21903	6	12.613	13.874	0.59	0.80	0.96	33.00	33.00	0.000	0.000	13.27	0.00	0.00
4	185.00	Powerwave LGP21401	6	12.613	13.874	0.51	0.80	3.97	84.60	84.60	0.000	0.000	55.07	0.00	0.00
5	185.00	Powerwave 7770.00	9	12.613	13.874	0.68	0.80	33.46	479.52	479.52	0.000	0.000	464.26	0.00	0.00
6	177.00	782 11056	3	12.496	13.746	0.50	0.75	0.33	3.90	3.90	0.000	0.000	4.56	0.00	0.00
7	177.00	4449 B71+B12	3	12.496	13.746	0.50	0.75	2.49	210.00	210.00	0.000	0.000	34.19	0.00	0.00
8	177.00	APXVAARR24 43-U-NA2	3	12.496	13.746	0.52	0.75	31.88	384.00	384.00	0.000	0.000	438.19	0.00	0.00
9	177.00	APXV18-206516S-C-A20	3	12.496	13.746	0.55	0.75	5.93	56.10	56.10	0.000	0.000	81.50	0.00	0.00
10	177.00	Platform w/ Hand Rails	1	12.496	13.746	1.00	1.00	32.00	1588.50	1588.50	0.000	0.000	439.86	0.00	0.00
11	177.00	Ericsson KRY 112 489/2	3	12.496	13.746	0.62	0.75	1.20	46.20	46.20	0.000	0.000	16.54	0.00	0.00
12	177.00	EMS RR90-17-02DPL2	3	12.496	13.746	0.65	0.75	8.52	119.82	119.82	0.000	0.000	117.05	0.00	0.00
13	150.00	RFS PAD6-59A	1	12.068	13.275	1.00	1.00	47.05	278.00	278.00	0.000	0.000	624.59	0.00	0.00
14	150.00	CommScope DB5004	1	12.068	13.275	1.00	1.00	6.00	160.00	160.00	0.000	0.000	79.65	0.00	0.00
15	150.00	ANT450F6	1	12.134	13.347	1.00	1.00	1.86	21.00	21.00	0.000	3.917	24.83	0.00	97.23
16	135.00	ANT450F6	1	11.875	13.062	1.00	1.00	1.86	21.00	21.00	0.000	3.917	24.30	0.00	95.16
17	135.00	CommScope DB5004	1	11.803	12.984	1.00	1.00	6.00	160.00	160.00	0.000	0.000	77.90	0.00	0.00

**Totals:** **4,991.64** **2,805.55**

## Total Applied Force Summary

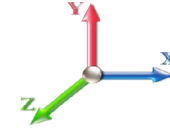
<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations** 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		143.88	1617.38	0.00	0.00
10.00		141.23	1589.57	0.00	0.00
15.00		138.58	1561.76	0.00	0.00
20.00		144.23	1533.95	0.00	0.00
25.00		148.22	1506.14	0.00	0.00
30.00		150.96	1478.33	0.00	0.00
35.00		152.77	1450.52	0.00	0.00
40.00		153.88	1422.72	0.00	0.00
41.00		30.54	281.21	0.00	0.00
45.00		124.96	2000.69	0.00	0.00
48.00		93.58	1478.82	0.00	0.00
50.00		62.24	479.17	0.00	0.00
55.00		156.33	1181.24	0.00	0.00
60.00		155.67	1157.41	0.00	0.00
65.00		154.71	1133.57	0.00	0.00
70.00		153.49	1109.74	0.00	0.00
75.00		152.02	1085.90	0.00	0.00
80.00		150.33	1062.06	0.00	0.00
85.00		148.45	1038.23	0.00	0.00
90.00		148.44	1773.15	0.00	0.00
91.00		29.29	349.39	0.00	0.00
95.00		116.68	683.77	0.00	0.00
100.00		143.88	836.84	0.00	0.00
105.00		141.38	816.97	0.00	0.00
110.00		138.74	797.11	0.00	0.00
115.00		135.98	777.25	0.00	0.00
120.00		133.11	757.38	0.00	0.00
125.00		130.12	737.52	0.00	0.00
130.00		127.03	717.66	0.00	0.00
135.00	(2) attachments	227.82	1350.38	0.00	95.16
140.00		122.35	568.30	0.00	0.00
145.00		119.00	552.41	0.00	0.00
150.00	(3) attachments	844.61	995.52	0.00	97.23
155.00		112.02	512.12	0.00	0.00
160.00		108.42	496.23	0.00	0.00
165.00		104.74	480.34	0.00	0.00
170.00		100.99	464.45	0.00	0.00
175.00		97.17	448.56	0.00	0.00
177.00	(19) attachments	1169.61	2583.50	0.00	0.00
180.00		55.43	201.00	0.00	0.00
185.00	(28) attachments	933.97	2312.95	0.00	0.00
190.00		92.09	360.23	0.00	0.00
<b>Totals:</b>		<b>7,888.94</b>	<b>43,741.42</b>	<b>0.00</b>	<b>192.39</b>

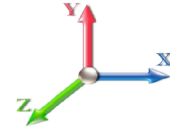
### Calculated Forces

Structure: CT08748-A-SBA	Code: EIA/TIA-222-G	7/3/2019
Site Name: Woodstock 4, CT	Exposure: C	
Height: 190.00 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: D - Stiff Soil	
Gh: 1.1	Struct Class: II	Page: 27
Topography: 1		



**Load Case: 1.0D + 1.0W 60 mph Wind**

**Dead Load Factor 1.00**  
**Wind Load Factor 1.00**



**Iterations 24**

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-43.74	-7.90	0.00	-965.18	0.00	965.18	5803.10	2901.55	15291.3	7657.05	0.00	0.000	0.000	0.134
5.00	-42.12	-7.78	0.00	-925.68	0.00	925.68	5740.33	2870.16	14846.1	7434.11	0.02	-0.029	0.000	0.132
10.00	-40.52	-7.66	0.00	-886.80	0.00	886.80	5675.91	2837.95	14402.8	7212.14	0.06	-0.059	0.000	0.130
15.00	-38.96	-7.54	0.00	-848.52	0.00	848.52	5609.85	2804.93	13961.8	6991.28	0.14	-0.089	0.000	0.128
20.00	-37.42	-7.41	0.00	-810.84	0.00	810.84	5542.15	2771.07	13523.1	6771.63	0.25	-0.119	0.000	0.127
25.00	-35.91	-7.28	0.00	-773.80	0.00	773.80	5472.81	2736.40	13087.2	6553.32	0.39	-0.150	0.000	0.125
30.00	-34.43	-7.14	0.00	-737.42	0.00	737.42	5401.82	2700.91	12654.1	6336.48	0.56	-0.181	0.000	0.123
35.00	-32.98	-7.00	0.00	-701.72	0.00	701.72	5329.20	2664.60	12224.2	6121.21	0.77	-0.212	0.000	0.121
40.00	-31.55	-6.85	0.00	-666.72	0.00	666.72	5254.93	2627.47	11797.7	5907.64	1.01	-0.244	0.000	0.119
41.00	-31.27	-6.83	0.00	-659.87	0.00	659.87	5239.88	2619.94	11712.8	5865.14	1.06	-0.251	0.000	0.118
45.00	-29.27	-6.71	0.00	-632.55	0.00	632.55	5179.02	2589.51	11374.8	5695.90	1.28	-0.277	0.000	0.117
48.00	-27.79	-6.61	0.00	-612.44	0.00	612.44	4202.19	2101.09	9258.62	4636.19	1.46	-0.297	0.000	0.139
50.00	-27.30	-6.56	0.00	-599.21	0.00	599.21	4180.07	2090.03	9128.39	4570.98	1.59	-0.310	0.000	0.138
55.00	-26.12	-6.41	0.00	-566.41	0.00	566.41	4123.62	2061.81	8804.12	4408.60	1.94	-0.347	0.000	0.135
60.00	-24.96	-6.27	0.00	-534.34	0.00	534.34	4065.54	2032.77	8481.93	4247.27	2.32	-0.384	0.000	0.132
65.00	-23.82	-6.12	0.00	-503.00	0.00	503.00	4005.81	2002.90	8162.06	4087.10	2.74	-0.422	0.000	0.129
70.00	-22.71	-5.97	0.00	-472.40	0.00	472.40	3944.44	1972.22	7844.75	3928.21	3.20	-0.459	0.000	0.126
75.00	-21.62	-5.83	0.00	-442.54	0.00	442.54	3881.43	1940.71	7530.24	3770.72	3.70	-0.498	0.000	0.123
80.00	-20.56	-5.68	0.00	-413.40	0.00	413.40	3816.78	1908.39	7218.77	3614.75	4.25	-0.536	0.000	0.120
85.00	-19.52	-5.54	0.00	-385.00	0.00	385.00	3750.48	1875.24	6910.57	3460.42	4.83	-0.575	0.000	0.116
90.00	-17.74	-5.38	0.00	-357.32	0.00	357.32	3682.55	1841.27	6605.90	3307.86	5.45	-0.614	0.000	0.113
91.00	-17.39	-5.35	0.00	-351.95	0.00	351.95	2898.33	1449.17	5260.79	2634.30	5.58	-0.622	0.000	0.140
95.00	-16.71	-5.24	0.00	-330.55	0.00	330.55	2860.60	1430.30	5080.74	2544.15	6.12	-0.653	0.000	0.136
100.00	-15.87	-5.09	0.00	-304.38	0.00	304.38	2811.95	1405.98	4857.28	2432.25	6.82	-0.698	0.000	0.131
105.00	-15.05	-4.95	0.00	-278.91	0.00	278.91	2761.66	1380.83	4635.80	2321.34	7.58	-0.742	0.000	0.126
110.00	-14.25	-4.82	0.00	-254.13	0.00	254.13	2709.73	1354.87	4416.54	2211.55	8.38	-0.787	0.000	0.120
115.00	-13.47	-4.68	0.00	-230.05	0.00	230.05	2656.16	1328.08	4199.76	2103.00	9.23	-0.831	0.000	0.114
120.00	-12.71	-4.54	0.00	-206.66	0.00	206.66	2600.95	1300.48	3985.68	1995.80	10.12	-0.874	0.000	0.108
125.00	-11.97	-4.41	0.00	-183.94	0.00	183.94	2544.10	1272.05	3774.55	1890.08	11.06	-0.917	0.000	0.102
130.00	-11.25	-4.28	0.00	-161.88	0.00	161.88	2485.60	1242.80	3566.61	1785.96	12.04	-0.959	0.000	0.095
135.00	-9.91	-4.04	0.00	-140.38	0.00	140.38	1823.78	911.89	2575.19	1289.51	13.07	-0.999	0.000	0.114
140.00	-9.34	-3.91	0.00	-120.19	0.00	120.19	1784.40	892.20	2432.60	1218.11	14.14	-1.037	0.000	0.104
145.00	-8.78	-3.79	0.00	-100.64	0.00	100.64	1743.38	871.69	2291.70	1147.55	15.25	-1.080	0.000	0.093
150.00	-7.80	-2.93	0.00	-81.60	0.00	81.60	1700.71	850.36	2152.72	1077.96	16.40	-1.120	0.000	0.080
155.00	-7.29	-2.81	0.00	-66.95	0.00	66.95	1656.41	828.20	2015.90	1009.45	17.59	-1.156	0.000	0.071
160.00	-6.80	-2.70	0.00	-52.89	0.00	52.89	1610.46	805.23	1881.48	942.14	18.82	-1.188	0.000	0.060
165.00	-6.32	-2.59	0.00	-39.41	0.00	39.41	1562.88	781.44	1749.71	876.15	20.08	-1.217	0.000	0.049
170.00	-5.85	-2.48	0.00	-26.48	0.00	26.48	1513.65	756.82	1620.81	811.61	21.37	-1.240	0.000	0.037
175.00	-5.41	-2.37	0.00	-14.10	0.00	14.10	1462.77	731.39	1495.04	748.63	22.68	-1.256	0.000	0.023
177.00	-2.85	-1.14	0.00	-9.36	0.00	9.36	1441.72	720.86	1445.41	723.78	23.20	-1.260	0.000	0.015
180.00	-2.65	-1.08	0.00	-5.92	0.00	5.92	1400.09	700.04	1362.73	682.38	24.00	-1.265	0.000	0.011
180.00	-2.65	-1.08	0.00	-5.92	0.00	5.92	1210.02	605.01	1174.63	588.19	24.00	-1.265	0.000	0.012
185.00	-0.36	-0.10	0.00	-0.50	0.00	0.50	1210.02	605.01	1174.63	588.19	25.32	-1.268	0.000	0.001
190.00	0.00	-0.09	0.00	0.00	0.00	0.00	1210.02	605.01	1174.63	588.19	26.65	-1.268	0.000	0.000



## Final Analysis Summary

<b>Structure:</b> CT08748-A-SBA	<b>Code:</b> EIA/TIA-222-G	7/3/2019
<b>Site Name:</b> Woodstock 4, CT	<b>Exposure:</b> C	
<b>Height:</b> 190.00 (ft)	<b>Crest Height:</b> 0.00	
<b>Base Elev:</b> 0.000 (ft)	<b>Site Class:</b> D - Stiff Soil	
<b>Gh:</b> 1.1	<b>Topography:</b> 1	<b>Struct Class:</b> II



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### Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 101 mph Wind	35.8	0.00	52.45	0.00	0.00	4397.02
0.9D + 1.6W 101 mph Wind	35.8	0.00	39.32	0.00	0.00	4357.86
1.2D + 1.0Di + 1.0Wi 50 mph Wind	10.4	0.00	84.83	0.00	0.00	1284.66
1.2D + 1.0E	1.7	0.00	52.49	0.00	0.00	226.91
0.9D + 1.0E	1.7	0.00	39.37	0.00	0.00	224.68
1.0D + 1.0W 60 mph Wind	7.9	0.00	43.74	0.00	0.00	965.18

### Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 101 mph Wind	-19.73	-24.40	0.00	-1606.1	0.00	-1606.1	2898.33	1449.1	5260.79	2634.30	91.00	0.617
0.9D + 1.6W 101 mph Wind	-14.51	-24.13	0.00	-1584.0	0.00	-1584.0	2898.33	1449.1	5260.79	2634.30	91.00	0.607
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-40.35	-7.16	0.00	-470.50	0.00	-470.50	2898.33	1449.1	5260.79	2634.30	91.00	0.193
1.2D + 1.0E	-11.97	-1.09	0.00	-49.31	0.00	-49.31	1823.78	911.89	2575.19	1289.51	135.00	0.045
0.9D + 1.0E	-8.97	-1.08	0.00	-48.70	0.00	-48.70	1823.78	911.89	2575.19	1289.51	135.00	0.043
1.0D + 1.0W 60 mph Wind	-17.39	-5.35	0.00	-351.95	0.00	-351.95	2898.33	1449.1	5260.79	2634.30	91.00	0.140



# Monopole Mat Foundation Design

Date

7/3/2019

<b>Customer Name:</b>	T-Mobile	<b>EIA/TIA Standard:</b>	EIA-222-G
<b>Site Name:</b>		<b>Structure Height (Ft.):</b>	190
<b>Site Number:</b>	CT08748-A-SBA	<b>Engineer Name:</b>	B. Davis
<b>Engr. Number:</b>	78009	<b>Engineer Login ID:</b>	

**Foundation Info Obtained from:**

Drawings/Calculations
Monopole
Analysis

**Structure Type:**

**Analysis or Design?**

**Base Reactions (Factored):**

Axial Load (Kips):	84.8	Shear Force (Kips):	35.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	4395.1
Allowable overstress %:	5.0%		

**Foundation Geometries:**

Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	8.0	Mods required -Yes/No ?:	No
Pier Height A. G. (ft.):	0.25	Thickness of Pad (ft.):	4.00		
Length of Pad (ft.):	33	Width of Pad (ft.):	33		
Final Length of pad (ft)	33.0	Final width of pad (ft):	33.0		
Control Value for Cell D18:	0	Control Value for Cell F18:	0		

**Material Properties and Rebar Info:**

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	11	Tie / Stirrup Size #:	6	
Qty. of Vertical Rebars:	62	Tie Spacing (in):	8.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	9	
Concrete Cover (in.):	4	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	40	Qty. of Rebar in Pad (W):	40	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	40	Qty. of Rebar in Pad (W):	40	

Apply 1.35 factor for e/w Per G. 1.35

**Soil Design Parameters:**

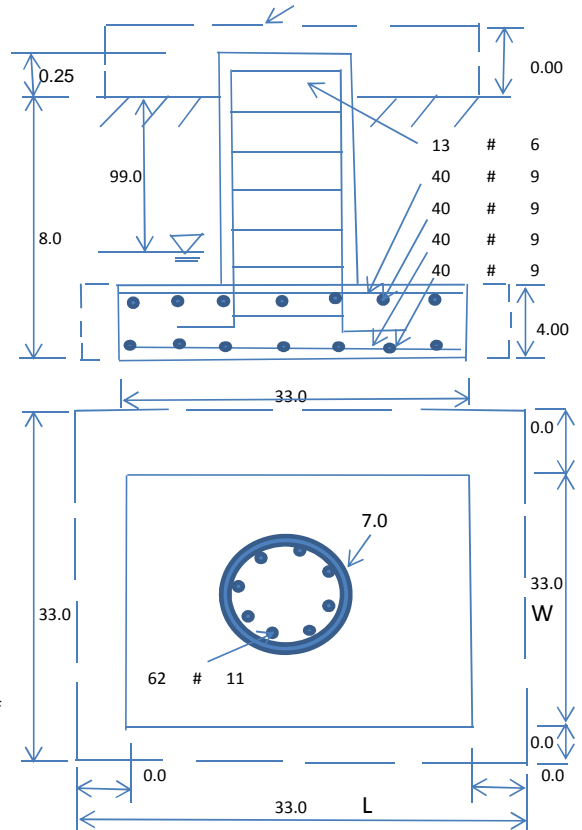
Soil Unit Weight (pcf):	100.0	Soil Buoyant Weight:	50.0	Pcf	
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad: 20
Ultimate Bearing Pressure (psf):	8000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad: 20
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad: 20
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00		

**Foundation Analysis and Design:**

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	4202.06	Total Dry Soil Weight (Kips):	420.21
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	420.21	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	4519.56	Total Dry Concrete Weight (Kips):	677.93
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	677.93	Total Vertical Load on Base (Kips):	1182.94

**Check Soil Capacities:**

Calculated Maxium Net Soil Pressure under the base (psf):	1722	<	Allowable Factored Soil Bearing (psf):	6000	0.29	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	17706.6	>	Design Factored Momont (kips-ft):	4690	0.26	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.78					OK!



**Check the capacities of Reinforcing Concrete:**

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00

Capacity Ratio

(1) Concrete Pier:

Vertical Steel Rebar Area (sq. in./each):	1.56	Tie / Stirrup Area (sq. in./each):	0.44		
Calculated Moment Capacity (Mn,Kips-Ft):	14906.9	> Design Factored Moment (Mu, Kips-Ft)	4547.3	0.31	OK!
Calculated Shear Capacity (Kips):	969.3	> Design Factored Shear (Kips):	35.8	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	5222.9	> Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9626.8	> Design Factored Axial Load (Pu Kips):	84.8	0.01	OK!
Moment & Axial Strength Combination:	0.31	OK!	Check Tie Spacing (Design/Required):	0.6667	OK!
Pier Reinforcement Ratio:	0.017	Reinforcement Ratio is satisfied per ACI			

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	1631.9	> One-Way Factored Shear (L-D. Kips):	338.5	0.21	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1631.9	> One-Way Factored Shear (W-D., Kips)	338.5	0.21	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1603.6	> One-Way Factored Shear (C-C, Kips):	299.2	0.19	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct. ):	0.0023	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0023	
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	7658.3	> Moment at Bottom ( L-Dir. K-Ft):	2704.3	0.35	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	7658.3	> Moment at Bottom ( W-Dir. K-Ft):	2704.3	0.35	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	10790.5	> Moment at Bottom ( C-C Dir. K-Ft):	3824.4	0.35	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct. ):	0.0023	OK!	Upper Steel Reinf. Ratio (W-Dir. ):	0.0023	
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	7658.3	> Moment at the top (L-Dir K-Ft):	886.4	0.12	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	7658.3	> Moment at the top (W-Dir K-Ft):	886.4	0.12	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	10790.5	> Moment at the top (C-C Dir. K-Ft):	826.8	0.08	OK!

(3).Check Punching Shear Capacity due to Moment in the Pier:

Moment transferred by punching shear:	1758.0	k-ft.	Max. factored shear stress $v_{u,cb}$ :	2.8	Psi
Max. factored shear stress $v_{u,AB}$ :	10.1	Psi	Factored shear Strength $\phi_v$ :	189.7	Psi
Max. factored shear stress $v_u$ :	10.1	Psi	Check Usage of Punching Shear Capacity:	0.05	OK!

# EXHIBIT 8



**Tower Engineering Solutions**

Phone (972) 483-0607, Fax (972) 975-9615  
1320 Greenway Drive, Suite 600, Irving, Texas 75038

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## Antenna Mount Analysis Report

Existing 190 ft. Monopole Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT08748-A-SBA

Customer Site Name: Woodstock 4, CT

Carrier Name: T-Mobile (Application #: 116919, v1)

Carrier Site ID / Name: CTNL181A / Woodstock

Site Location: 215 Coatney Hill Road

Woodstock, Connecticut

Windham County

Latitude: 41.962264

Longitude: -72.018655

**Analysis Result:**

Max Structural Usage: 87.6% [Pass]

Report Prepared By: Saurav Devkota





**Tower Engineering Solutions**

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**Woodstock, Connecticut**

**Windham County**

**Latitude: 41.962264**

**Longitude: -72.018655**

### **Analysis Result:**

**Max Structural Usage: 87.6% [Pass]**

**Report Prepared By: Saurav Devkota**

## **Introduction**

The purpose of this report is to summarize the analysis results on the (1) Platform w/ Hand Rails at 177.00' elevation to support the proposed antenna configuration. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

## **Sources of Information**

Mount Drawings	Sky Tower, LLC, Dated 5/1/2019
Antenna Loading	SBA, Application #: 116919, v1
Modification Drawings	N/A

## **Analysis Criteria**

Basic Wind Speed Used in the Analysis:  $V_{ULT} = 130.0$  mph (3-Sec. Gust) / Equivalent to  
 $V_{ASD} = 101.0$  mph (3-Sec. Gust)

Basic Wind Speed with Ice: 50 mph (3-Sec. Gust) with 1" radial ice concurrent

Operational Wind Speed: 60 mph +0" Radial ice

Standard/Codes: ANSI/TIA/EIA 222-G / 2015 IBC/ 2018 CSBC

Exposure Category: C

Structure Class: II

Topographic Category: 1

Crest Height (Ft): 0

The site is a Risk Category II structure per table 1604.5 of the IBC. This site does not support emergency communication equipment for first responders such as fire departments, police, hospitals, ambulance services or any of the facilities listed for Risk Categories III and IV. The scope of work detailed in this structural analysis does not include items that are a part of emergency service as the 911 or essential facility service of an emergency response system.

## **Mount Information**

(1) Platform w/ Hand Rails at 177.00' elevation.

## **Final Antenna Configuration**

- 3 EMS RR90-17-02DP
- 3 RFS APXV18-206516S-C-A20
- 3 RFS APXVAARR24\_43-U-NA20
- 3 Ericsson KRY 112 489/2
- 3 Ericsson Radio 4449 B71+B12
- 3 Kathrein 782 11056

Any proposed antennas not currently installed should be mounted such that the centers of the antennas do not exceed 0.5 ft vertically from the center of the Platform w/ Hand Rails.

In addition to the proposed equipment loading, a 500 lb serviceability load was also considered in this analysis in accordance with TIA requirements.

### **Analysis Results**

Our calculations have determined that under design wind load the existing mounts will be structurally adequate to support the proposed antenna configuration. The maximum structural usage is 87.6%, which occurs in the face horizontal. The proposed equipment must be installed as stipulated in the Final Antenna Configuration section of this report. The analysis results are void if the proposed equipment is not installed in accordance with this report.

### **Attachments**

1. Mount Photos
2. Antenna Placement Diagram
3. Mount Mapping Information
4. Analysis Calculations



## **Standard Conditions**

1. The loading configuration as analyzed in this report is as provided from the customer. Any deviation from this design shall be communicated to TES to verify deviation will not adversely impact the analysis.
2. The analysis is based on the presumption that the antenna mount members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.
3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion. The mount analysis is not a condition assessment of the mount.
4. The mount analysis was performed in accordance with the loading provided, and if applicable the modification required to support the additional loading.
5. If the mount is modified, installation must adhere to the configuration communicated in the modification drawings.
6. The modification drawings are not intended to convey means or methods. These are the responsibility of the installing contractor.
7. Rigging plan review is available if the contractor requires for a construction class IV or other if required. Review fee would apply.
8. The mount modification package was created based upon information provided for the mount loading. The underlying tower is assumed to provide support and sufficient rigidity to support the mount loads as a tower analysis was not part of the mount analysis.
9. TES is not responsible for modifications to climbing facilities unless communicated to TES in writing.





Structure: CT08748-A-SBA - Woodstock 4, CT

Sector: **A**

6/19/2019

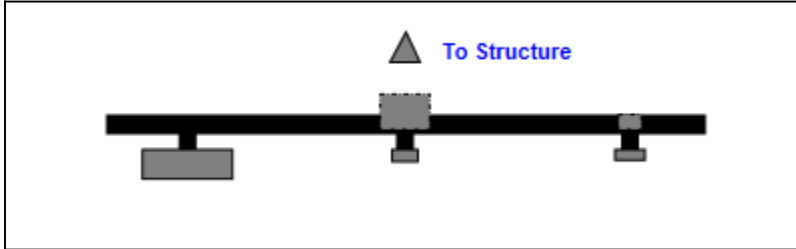
Structure Type: Monopole

Mount Elev: 177.00

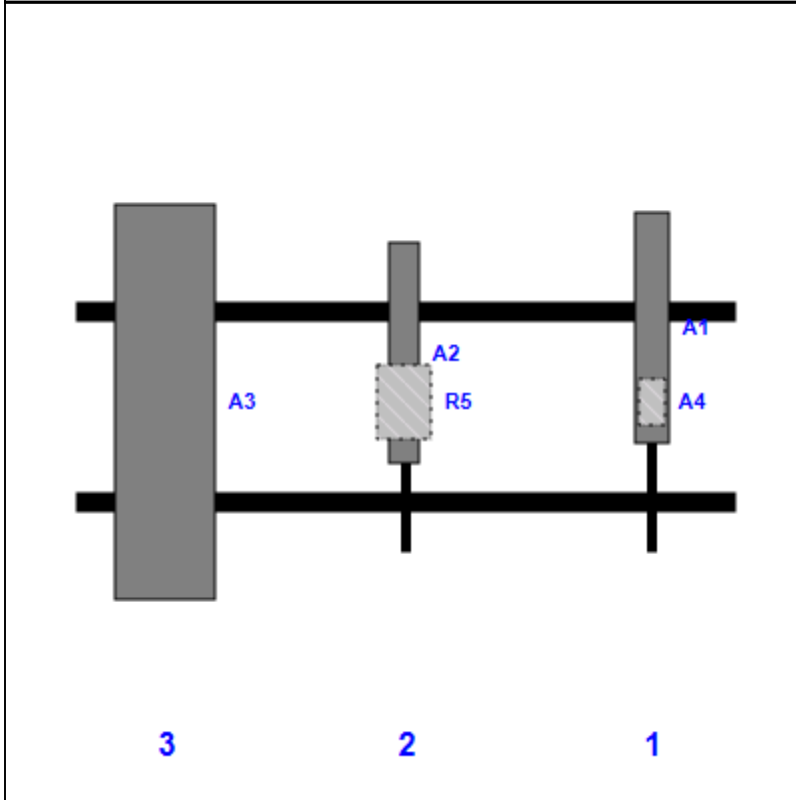
Page: 1



Plan View



Front View  
Looking Toward Structure



Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A1	RR90-17-02DP	56.00	8.00	140.00	1	a	Front	18.00	0.00
A4	KRY 112 89/4	11.00	6.10	140.00	1	a	Behind	36.00	0.00
A2	APXV18-206516S-C-A20	53.10	6.90	80.00	2	a	Front	24.00	0.00
R5	4449 B5/B12	17.90	13.20	80.00	2	a	Behind	36.00	0.00
A3	APXVAARR24_43-U-NA20	95.90	24.00	22.00	3	a	Front	36.00	0.00

Structure: CT08748-A-SBA - Woodstock 4, CT

Sector: **B**

6/19/2019

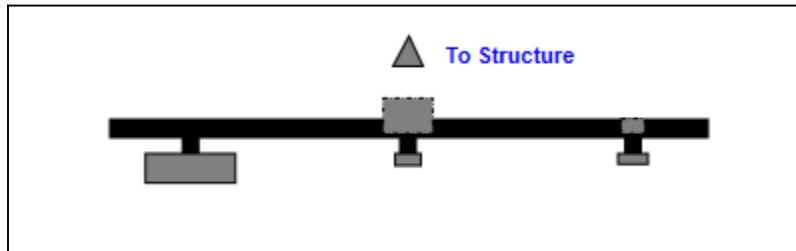
Structure Type: Monopole

Mount Elev: 177.00

Page: 2

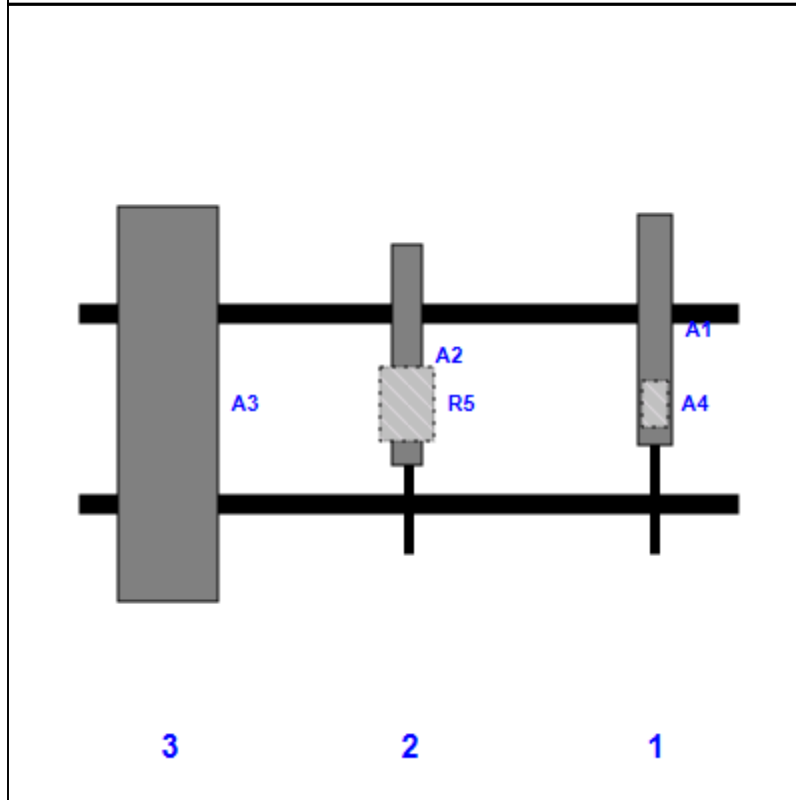


Plan View



Front View

Looking Toward Structure



Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A1	RR90-17-02DP	56.00	8.00	140.00	1	a	Front	18.00	0.00
A4	KRY 112 89/4	11.00	6.10	140.00	1	a	Behind	36.00	0.00
A2	APXV18-206516S-C-A20	53.10	6.90	80.00	2	a	Front	24.00	0.00
R5	4449 B5/B12	17.90	13.20	80.00	2	a	Behind	36.00	0.00
A3	APXVAARR24_43-U-NA20	95.90	24.00	22.00	3	a	Front	36.00	0.00

Structure: CT08748-A-SBA - Woodstock 4, CT

Sector: C

6/19/2019

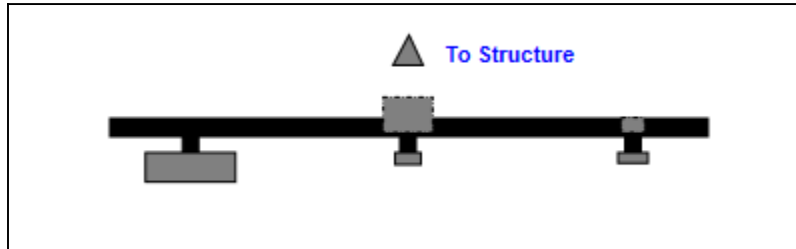
Structure Type: Monopole

Mount Elev: 177.00

Page: 3

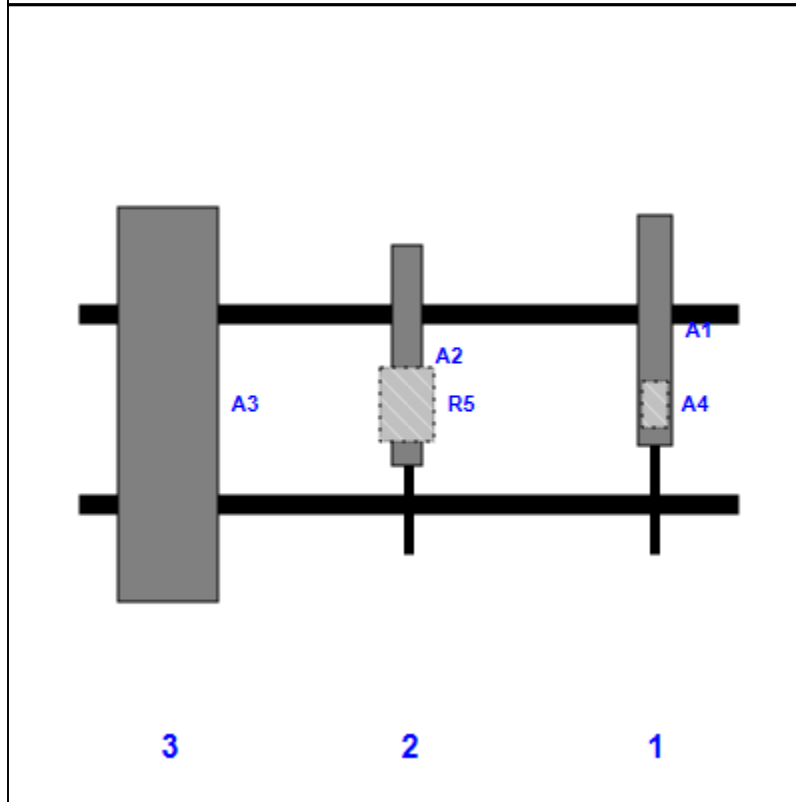


Plan View

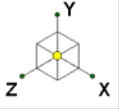


Front View

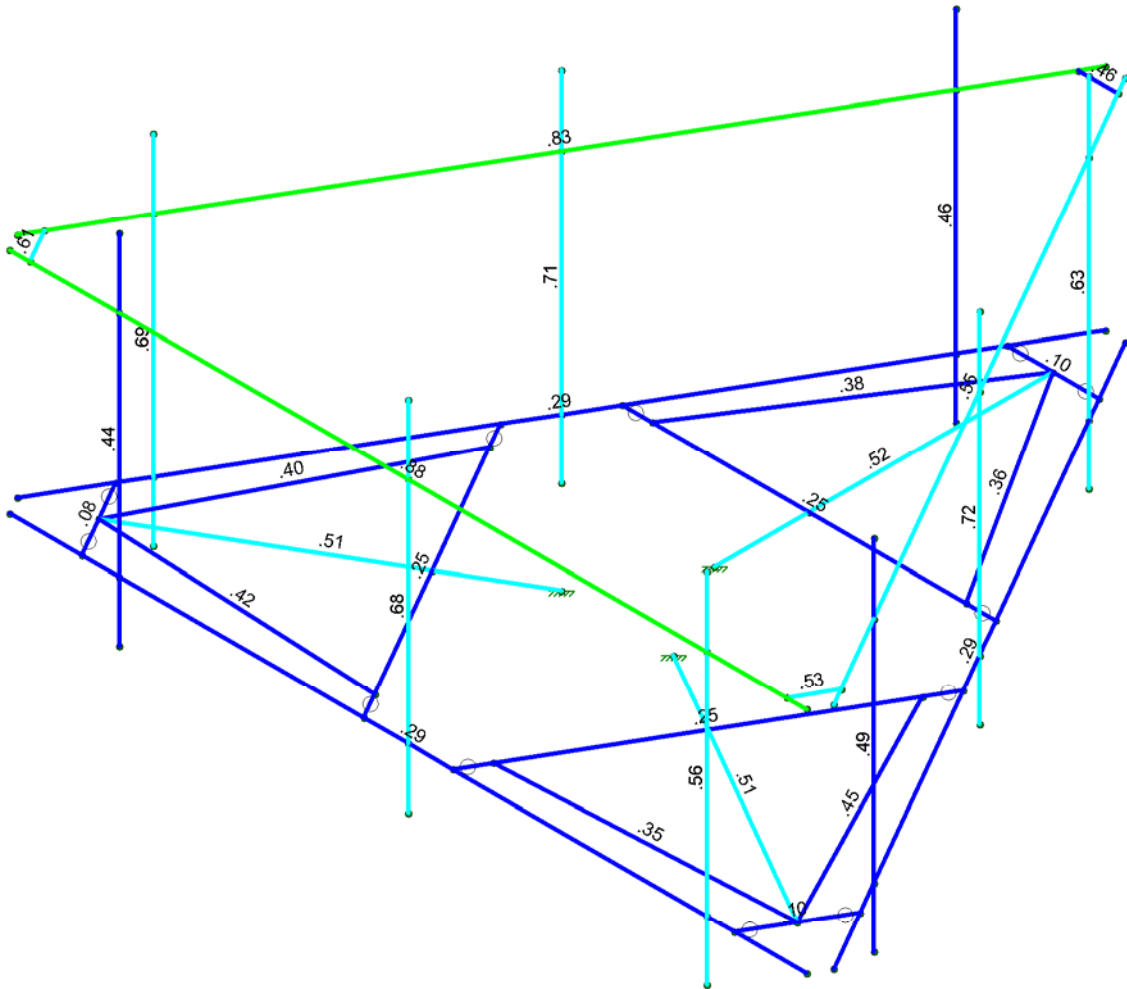
Looking Toward Structure



Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A1	RR90-17-02DP	56.00	8.00	140.00	1	a	Front	18.00	0.00
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R5	4449 B5/B12	17.90	13.20	80.00	2	a	Behind	36.00	0.00
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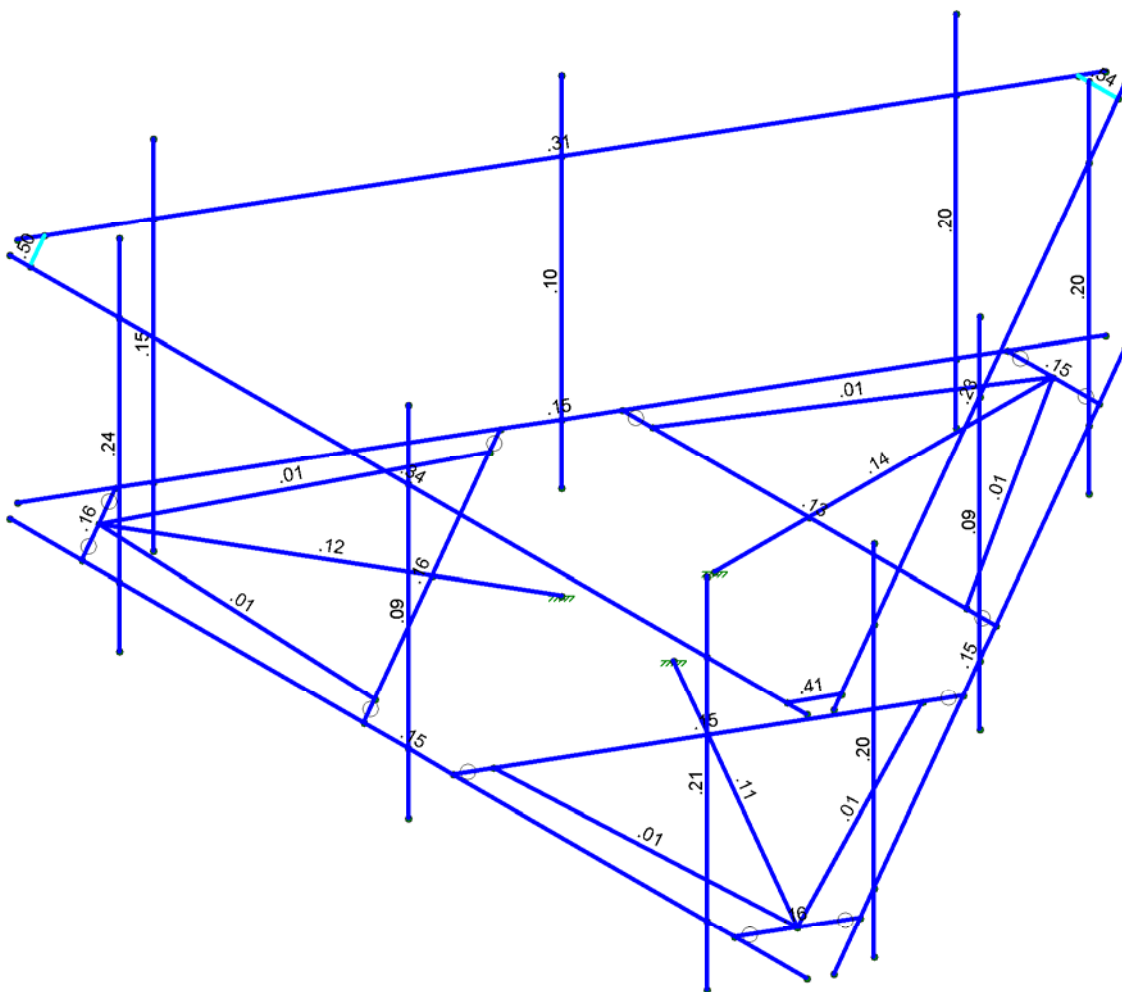
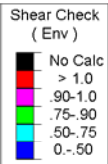
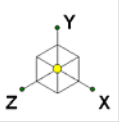


Code Check ( Env )	
Black	No Calc
Red	> 1.0
Magenta	.90-1.0
Green	.75-90
Cyan	.50-.75
Blue	0-.50



Member Code Checks Displayed (Enveloped)  
Results for LC 1, 1.2D+1.6W (Front)

Tower Engineering Solutio...	CT08748-A-SBA_MT_LO_Loads Only_G	SK - 1
TES Project No. 77902		June 19, 2019 at 3:47 PM
		CT08748-A-SBA_77902_G_RISA_L...



Member Shear Checks Displayed (Enveloped)  
Results for LC 1, 1.2D+1.6W (Front)

Tower Engineering Solutio...

CT08748-A-SBA\_MT\_LO\_Loads Only\_G

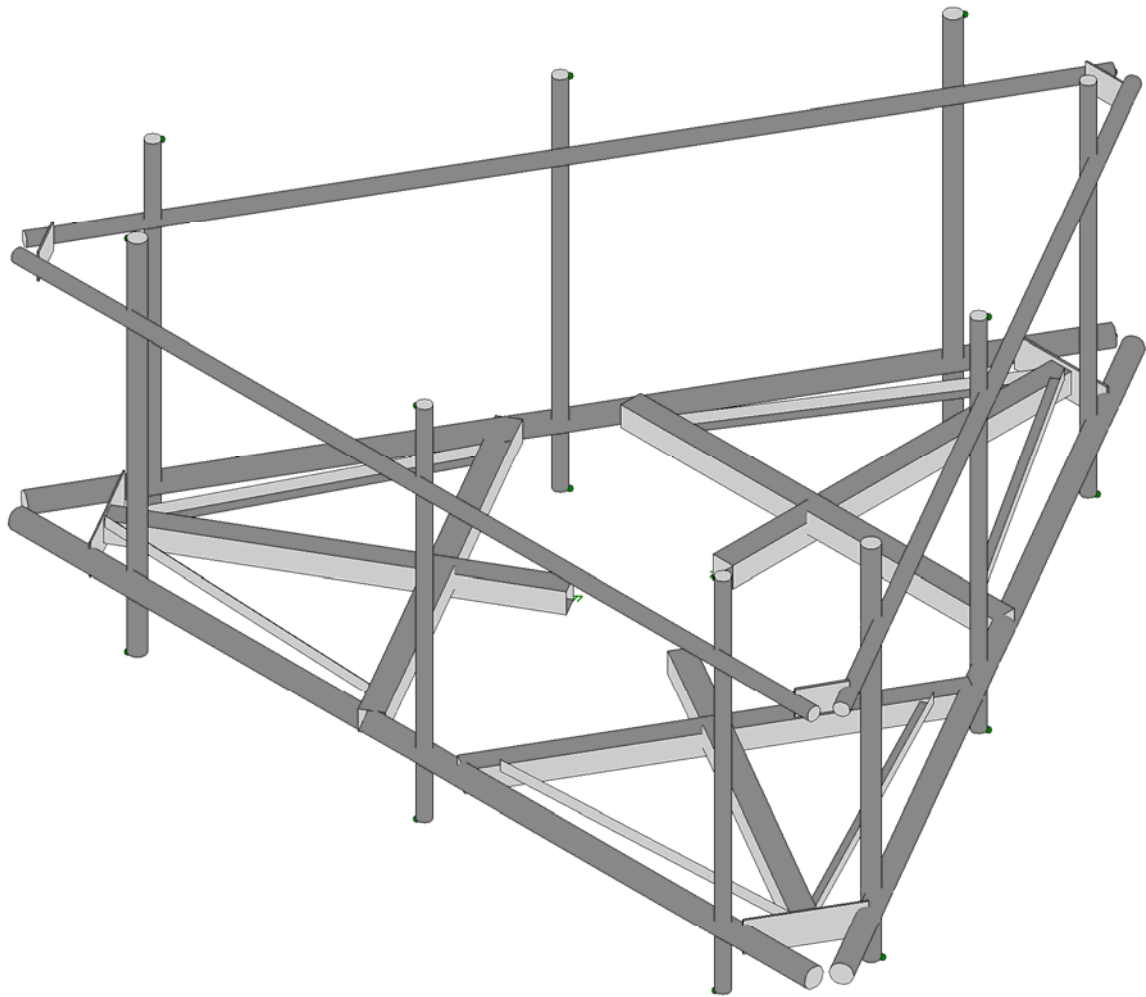
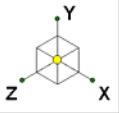
SK - 2

June 19, 2019 at 3:47 PM

TES Project No. 77902

CT08748-A-SBA\_77902\_G\_RISA\_L...





Tower Engineering Solutio...

CT08748-A-SBA\_MT\_LO\_Loads Only\_G

SK - 3

June 19, 2019 at 3:47 PM

TES Project No. 77902

CT08748-A-SBA\_77902\_G\_RISA\_L...



### Basic Load Cases

BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...)	Surface(P...
1	Antenna D	None				24		
2	Antenna Di	None				24		
3	Antenna W Front	None				24		
4	Antenna Wi Front	None				24		
5	Antenna W Side	None				24		
6	Antenna Wi Side	None				24		
7	Service Lm1	None				1		
8	Service Lm2	None				1		
9	Structure D	None	-1				3	
10	Structure Di	None					33	3
11	Structure W Front	None					33	
12	Structure Wi Front	None					33	
13	Structure W Side	None					33	
14	Structure Wi Side	None					33	
15	BLC 9 Transient Area..	None					96	
16	BLC 10 Transient Are..	None					96	

### Load Combinations

Description	So..P...	S...	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	BLCFac..	
1	1.2D+1.6W (Front)	Yes	Y	1	1.2	9	1.2	3	1.6	11	1.6				
2	1.2D+1.6W (Back)	Yes	Y	1	1.2	9	1.2	3	-1.6	11	-1.6				
3	1.2D+1.6W (Left)	Yes	Y	1	1.2	9	1.2	5	1.6	13	1.6				
4	1.2D+1.6W (Right)	Yes	Y	1	1.2	9	1.2	5	-1.6	13	-1.6				
5	1.2D+1.0Di+1.0Wi (Fr...	Yes	Y	1	1.2	9	1.2	2	1	10	1	4	1	12	1
6	1.2D+1.0Di+1.0Wi (B...	Yes	Y	1	1.2	9	1.2	2	1	10	1	4	-1	12	-1
7	1.2D+1.0Di+1.0Wi (L...	Yes	Y	1	1.2	9	1.2	2	1	10	1	6	1	14	1
8	1.2D+1.0Di+1.0Wi (Ri...	Yes	Y	1	1.2	9	1.2	2	1	10	1	6	-1	14	-1
9	1.2D+1.5L1+.16W (M...	Yes	Y	1	1.2	9	1.2	7	1.5	3	.16	11	.16		
10	1.2D+1.5L2+.16W (M...	Yes	Y	1	1.2	9	1.2	8	1.5	3	.16	11	.16		
11	1.4D	Yes	Y	1	1.4	9	1.4								

### Joint Coordinates and Temperatures

Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	-0.938194	0	0.541667	0
2	N2	0.938194	0	0.541667	0
3	N3	0	0	-1.083333	0
4	N4	-6.666667	0	4.041452	0
5	N5	6.666667	0	4.041452	0
6	N6	6.833333	0	3.752777	0
7	N7	0.166667	0	-7.794229	0
8	N8	-0.166667	0	-7.794229	0
9	N9	-6.833333	0	3.752777	0
10	N10	-5.845671	0	3.375	0
11	N11	5.845671	0	3.375	0
12	N12	0	0	-6.75	0
13	N13	-5.460895	0	4.041452	0
14	N14	-0.745868	0	4.041452	0
15	N15	0.745868	0	4.041452	0
16	N16	5.460895	0	4.041452	0
17	N17	6.230448	0	2.708548	0



**Joint Coordinates and Temperatures (Continued)**

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
18	N18	3.872934	0	-1.374785	0	
19	N19	3.127066	0	-2.666667	0	
20	N20	0.769552	0	-6.75	0	
21	N21	-0.769552	0	-6.75	0	
22	N22	-3.127066	0	-2.666667	0	
23	N23	-3.872934	0	-1.374785	0	
24	N24	-6.230448	0	2.708548	0	
25	N25	-6.666667	3.833333	4.041452	0	
26	N26	6.666667	3.833333	4.041452	0	
27	N27	6.833333	3.833333	3.752777	0	
28	N28	0.166667	3.833333	-7.794229	0	
29	N29	-0.166667	3.833333	-7.794229	0	
30	N30	-6.833333	3.833333	3.752777	0	
31	N31	-6.333333	3.833333	4.041452	0	
32	N32	6.333333	3.833333	4.041452	0	
33	N33	6.666667	3.833333	3.464102	0	
34	N34	0.333333	3.833333	-7.505553	0	
35	N35	-0.333333	3.833333	-7.505553	0	
36	N36	-6.666667	3.833333	3.464102	0	
37	NP1	5	5	4.041452	0	
38	NP2	5	-1	4.041452	0	
39	NP3	0	5	4.041452	0	
40	NP4	0	-1	4.041452	0	
41	NP5	-4.833333	5	4.041452	0	
42	NP6	-4.833333	-1	4.041452	0	
43	NP11	-6	5	2.309401	0	
44	NP12	-6	-1	2.309401	0	
45	NP13	-3.5	5	-2.020726	0	
46	NP14	-3.5	-1	-2.020726	0	
47	NP15	-1.083333	5	-6.206515	0	
48	NP16	-1.083333	-1	-6.206515	0	
49	NP21	1	5	-6.350853	0	
50	NP22	1	-1	-6.350853	0	
51	NP23	3.5	5	-2.020726	0	
52	NP24	3.5	-1	-2.020726	0	
53	NP25	5.916667	5	2.165064	0	
54	NP26	5.916667	-1	2.165064	0	
55	N55	5	0	4.041452	0	
56	N56	0	0	4.041452	0	
57	N57	-4.833333	0	4.041452	0	
58	N58	1.	0	-6.350853	0	
59	N59	3.5	0	-2.020726	0	
60	N60	5.916667	0	2.165064	0	
61	N61	-6	0	2.309401	0	
62	N62	-3.5	0	-2.020726	0	
63	N63	-1.083333	0	-6.206515	0	
64	N64	-2.309401	0	1.333333	0	
65	N65	2.309401	0	1.333333	0	
66	N66	0	0	-2.666667	0	
67	N67	5	3.833333	4.041452	0	
68	N68	0	3.833333	4.041452	0	
69	N69	-4.833333	3.833333	4.041452	0	
70	N70	1.	3.833333	-6.350853	0	
71	N71	3.5	3.833333	-2.020726	0	
72	N72	5.916667	3.833333	2.165064	0	
73	N73	-6	3.833333	2.309401	0	
74	N74	-3.5	3.833333	-2.020726	0	



**Joint Coordinates and Temperatures (Continued)**

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
75	N75	-1.083333	3.833333	-6.206515	0	
76	N76	2.627066	0	-2.666667	0	
77	N77	-2.627066	0	-2.666667	0	
78	N79	-3.622934	0	-0.941773	0	
79	N80	-0.995868	0	3.608439	0	
80	N82	0.995868	0	3.608439	0	
81	N83	3.622934	0	-0.941773	0	

**Hot Rolled Steel Section Sets**

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	xxxxx	HSS16x0.438	Beam	None	A572 Gr.50	Typical	19.9	606	606	1210

**Cold Formed Steel Section Sets**

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF	4CU5.25X0375	Beam	CU	A570 Gr.33	Typical	4.854	13.238	12.817	.228

**Aluminum Section Sets**

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	AL1A	AACS14X13.9	Beam	AA Channel	3003-H14	Typical	11.8	44.7	401	1.19

**Hot Rolled Steel Properties**

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

**Cold Formed Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^...	Yield[ksi]	Fu[ksi]
1	A570 Gr.33	29500	11346	.3	.65	.49	33	52
2	A607 C1 Gr.55	29500	11346	.3	.65	.49	55	70

**Aluminum Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm (...Density[...Table B.4	kt	Ftu[ksi]	Fty[ksi]	Fcy[ksi]	Fsu[ksi]	Ct	
1	3003-H14	10100	3787.5	.33	1.3 .173	Table B...	1	19	16	13	12	141
2	6061-T6	10100	3787.5	.33	1.3 .173	Table B...	1	38	35	35	24	141
3	6063-T5	10100	3787.5	.33	1.3 .173	Table B...	1	22	16	16	13	141
4	6063-T6	10100	3787.5	.33	1.3 .173	Table B...	1	30	25	25	19	141
5	5052-H34	10200	3787.5	.33	1.3 .173	Table B...	1	34	26	24	20	141
6	6061-T6 W	10100	3787.5	.33	1.3 .173	Table B...	1	24	15	15	15	141



**Member Primary Data**

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
1	M1	N4	N5			PIPE 3.0	Beam	Pipe	A53 Gr.B	DR1
2	M2	N6	N7			PIPE 3.0	Beam	Pipe	A53 Gr.B	DR1
3	M3	N8	N9			PIPE 3.0	Beam	Pipe	A53 Gr.B	DR1
4	M4	N1	N10			HSS4x4x4	Beam	None	A500 Gr...	DR1
5	M5	N2	N11			HSS4x4x4	Beam	None	A500 Gr...	DR1
6	M6	N3	N12			HSS4x4x4	Beam	None	A500 Gr...	DR1
7	M7	N23	N14			HSS4x4x4	Beam	Tube	A500 Gr...	DR1
8	M8	N15	N18			HSS4x4x4	Beam	Tube	A500 Gr...	DR1
9	M9	N19	N22			HSS4x4x4	Beam	Tube	A500 Gr...	DR1
10	M10	N24	N13			PL3/8x6	Beam	RECT	A36 Gr.36	DR1
11	M11	N16	N17			PL3/8x6	Beam	RECT	A36 Gr.36	DR1
12	M12	N20	N21			PL3/8x6	Beam	RECT	A36 Gr.36	DR1
13	M13	N25	N26			PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
14	M14	N27	N28			PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
15	M15	N29	N30			PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
16	M16	N36	N31			PL3/8x5	Beam	RECT	A36 Gr.36	DR1
17	M17	N32	N33			PL3/8x5	Beam	RECT	A36 Gr.36	DR1
18	M18	N34	N35			PL3/8x5	Beam	RECT	A36 Gr.36	DR1
19	MP1A	NP1	NP2			PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
20	MP2A	NP3	NP4			PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
21	MP3A	NP5	NP6			PIPE 2.5	Beam	Pipe	A53 Gr.B	DR1
22	MP1B	NP11	NP12		300	PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
23	MP2B	NP13	NP14		300	PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
24	MP3B	NP15	NP16		300	PIPE 2.5	Beam	Pipe	A53 Gr.B	DR1
25	MP1C	NP21	NP22		60	PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
26	MP2C	NP23	NP24		60	PIPE 2.0	Beam	Pipe	A53 Gr.B	DR1
27	MP3C	NP25	NP26		60	PIPE 2.5	Beam	Pipe	A53 Gr.B	DR1
28	M28	N77	N12			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
29	M29	N12	N76			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
30	M30	N80	N10			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
31	M31	N10	N79			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
32	M32	N83	N11			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical
33	M33	N11	N82			L2x2x3	Beam	Single Angle	A36 Gr.36	Typical

**Member Advanced Data**

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M1						Yes			None
2	M2						Yes			None
3	M3						Yes			None
4	M4						Yes			None
5	M5						Yes			None
6	M6						Yes			None
7	M7	BenPIN	BenPIN				Yes			None
8	M8	BenPIN	BenPIN				Yes			None
9	M9	BenPIN	BenPIN				Yes			None
10	M10	BenPIN	BenPIN				Yes			None
11	M11	BenPIN	BenPIN				Yes			None
12	M12	BenPIN	BenPIN				Yes			None
13	M13						Yes			None
14	M14						Yes			None
15	M15						Yes			None
16	M16						Yes			None
17	M17						Yes			None
18	M18						Yes			None



**Member Advanced Data (Continued)**

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
19	MP1A						Yes	-z		None
20	MP2A						Yes	-z		None
21	MP3A						Yes	-z		None
22	MP1B						Yes	+z		None
23	MP2B						Yes	+z		None
24	MP3B						Yes	+z		None
25	MP1C						Yes	+z		None
26	MP2C						Yes	+z		None
27	MP3C						Yes	+z		None
28	M28						Yes			None
29	M29						Yes			None
30	M30						Yes			None
31	M31						Yes			None
32	M32						Yes			None
33	M33						Yes			None

**Hot Rolled Steel Design Parameters**

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	PIPE 3.0	13.333			Lbyy						Gravity
2	M2	PIPE 3.0	13.333			Lbyy						Gravity
3	M3	PIPE 3.0	13.333			Lbyy						Gravity
4	M4	HSS4x4x4	5.667			Lbyy						Gravity
5	M5	HSS4x4x4	5.667			Lbyy						Gravity
6	M6	HSS4x4x4	5.667			Lbyy						Gravity
7	M7	HSS4x4x4	6.254			Lbyy						Gravity
8	M8	HSS4x4x4	6.254			Lbyy						Gravity
9	M9	HSS4x4x4	6.254			Lbyy						Gravity
10	M10	PL3/8x6	1.539			Lbyy						Gravity
11	M11	PL3/8x6	1.539			Lbyy						Gravity
12	M12	PL3/8x6	1.539			Lbyy						Gravity
13	M13	PIPE 2.0	13.333			Lbyy						Gravity
14	M14	PIPE 2.0	13.333			Lbyy						Gravity
15	M15	PIPE 2.0	13.333			Lbyy						Gravity
16	M16	PL3/8x5	.667			Lbyy						Gravity
17	M17	PL3/8x5	.667			Lbyy						Gravity
18	M18	PL3/8x5	.667			Lbyy						Gravity
19	MP1A	PIPE 2.0	6			Lbyy						Gravity
20	MP2A	PIPE 2.0	6			Lbyy						Gravity
21	MP3A	PIPE 2.5	6			Lbyy						Gravity
22	MP1B	PIPE 2.0	6			Lbyy						Gravity
23	MP2B	PIPE 2.0	6			Lbyy						Gravity
24	MP3B	PIPE 2.5	6			Lbyy						Gravity
25	MP1C	PIPE 2.0	6			Lbyy						Gravity
26	MP2C	PIPE 2.0	6			Lbyy						Gravity
27	MP3C	PIPE 2.5	6			Lbyy						Gravity
28	M28	L2x2x3	4.855			Lbyy						Lateral
29	M29	L2x2x3	4.855			Lbyy						Lateral
30	M30	L2x2x3	4.855			Lbyy						Lateral
31	M31	L2x2x3	4.855			Lbyy						Lateral
32	M32	L2x2x3	4.855			Lbyy						Lateral
33	M33	L2x2x3	4.855			Lbyy						Lateral



**Cold Formed Steel Design Parameters**

Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torque[ft]	Kyy	Kzz	Cm-...	Cm-...	Cb	R	a[ft]	y sw...	z sw...
No Data to Print ...																

**Aluminum Design Parameters**

Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torque[ft]	Kyy	Kzz	Cb	Function
No Data to Print ...											

**Joint Loads and Enforced Displacements**

Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...)]
No Data to Print ...			

**Member Point Loads (BLC 1 : Antenna D)**

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Y	-6.75	0
2	MP1A	Y	-6.75	3
3	MP1B	Y	-6.75	0
4	MP1B	Y	-6.75	3
5	MP1C	Y	-6.75	0
6	MP1C	Y	-6.75	3
7	MP2A	Y	-9.35	0
8	MP2A	Y	-9.35	4
9	MP2B	Y	-9.35	0
10	MP2B	Y	-9.35	4
11	MP2C	Y	-9.35	0
12	MP2C	Y	-9.35	4
13	MP3A	Y	-64	0
14	MP3A	Y	-64	6
15	MP3B	Y	-64	0
16	MP3B	Y	-64	6
17	MP3C	Y	-64	0
18	MP3C	Y	-64	6
19	MP1A	Y	-15.4	3
20	MP1B	Y	-15.4	3
21	MP1C	Y	-15.4	3
22	MP2A	Y	-71	3
23	MP2B	Y	-71	3
24	MP2C	Y	-71	3

**Member Point Loads (BLC 2 : Antenna Di)**

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Y	-74.036	0
2	MP1A	Y	-74.036	3
3	MP1B	Y	-74.036	0
4	MP1B	Y	-74.036	3
5	MP1C	Y	-74.036	0
6	MP1C	Y	-74.036	3
7	MP2A	Y	-67.454	0
8	MP2A	Y	-67.454	4
9	MP2B	Y	-67.454	0
10	MP2B	Y	-67.454	4
11	MP2C	Y	-67.454	0
12	MP2C	Y	-67.454	4



**Member Point Loads (BLC 2 : Antenna Di) (Continued)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft. %]
13	MP3A	Y	-296.206	0
14	MP3A	Y	-296.206	6
15	MP3B	Y	-296.206	0
16	MP3B	Y	-296.206	6
17	MP3C	Y	-296.206	0
18	MP3C	Y	-296.206	6
19	MP1A	Y	-39.184	3
20	MP1B	Y	-39.184	3
21	MP1C	Y	-39.184	3
22	MP2A	Y	-113.875	3
23	MP2B	Y	-113.875	3
24	MP2C	Y	-113.875	3

**Member Point Loads (BLC 3 : Antenna W Front)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft. %]
1	MP1A	Z	-84.911	0
2	MP1A	Z	-84.911	3
3	MP1B	Z	-50.386	0
4	MP1B	Z	-50.386	3
5	MP1C	Z	-50.386	0
6	MP1C	Z	-50.386	3
7	MP2A	Z	-70.305	0
8	MP2A	Z	-70.305	4
9	MP2B	Z	-47.217	0
10	MP2B	Z	-47.217	4
11	MP2C	Z	-47.217	0
12	MP2C	Z	-47.217	4
13	MP3A	Z	-394.173	0
14	MP3A	Z	-394.173	6
15	MP3B	Z	-218.157	0
16	MP3B	Z	-218.157	6
17	MP3C	Z	-218.157	0
18	MP3C	Z	-218.157	6
19	MP1A	Z	-18.988	3
20	MP1B	Z	-12.673	3
21	MP1C	Z	-12.673	3
22	MP2A	Z	-57.549	3
23	MP2B	Z	-45.108	3
24	MP2C	Z	-45.108	3

**Member Point Loads (BLC 4 : Antenna Wi Front)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft. %]
1	MP1A	Z	-27.406	0
2	MP1A	Z	-27.406	3
3	MP1B	Z	-18.601	0
4	MP1B	Z	-18.601	3
5	MP1C	Z	-18.601	0
6	MP1C	Z	-18.601	3
7	MP2A	Z	-23.571	0
8	MP2A	Z	-23.571	4
9	MP2B	Z	-17.636	0
10	MP2B	Z	-17.636	4
11	MP2C	Z	-17.636	0
12	MP2C	Z	-17.636	4
13	MP3A	Z	-109.059	0
14	MP3A	Z	-109.059	6





**Member Point Loads (BLC 4 : Antenna Wi Front) (Continued)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft.%,]
15	MP3B	Z	-64.43	0
16	MP3B	Z	-64.43	6
17	MP3C	Z	-64.43	0
18	MP3C	Z	-64.43	6
19	MP1A	Z	-7.598	3
20	MP1B	Z	-6.244	3
21	MP1C	Z	-6.244	3
22	MP2A	Z	-19.997	3
23	MP2B	Z	-16.484	3
24	MP2C	Z	-16.484	3

**Member Point Loads (BLC 5 : Antenna W Side)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft.%,]
1	MP1A	X	38.878	0
2	MP1A	X	38.878	3
3	MP1B	X	73.403	0
4	MP1B	X	73.403	3
5	MP1C	X	73.403	0
6	MP1C	X	73.403	3
7	MP2A	X	39.522	0
8	MP2A	X	39.522	4
9	MP2B	X	62.609	0
10	MP2B	X	62.609	4
11	MP2C	X	62.609	0
12	MP2C	X	62.609	4
13	MP3A	X	159.485	0
14	MP3A	X	159.485	6
15	MP3B	X	335.501	0
16	MP3B	X	335.501	6
17	MP3C	X	335.501	0
18	MP3C	X	335.501	6
19	MP1A	X	14.09	3
20	MP1B	X	22.511	3
21	MP1C	X	22.511	3
22	MP2A	X	54.614	3
23	MP2B	X	71.202	3
24	MP2C	X	71.202	3

**Member Point Loads (BLC 6 : Antenna Wi Side)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft.%,]
1	MP1A	X	15.666	0
2	MP1A	X	15.666	3
3	MP1B	X	24.471	0
4	MP1B	X	24.471	3
5	MP1C	X	24.471	0
6	MP1C	X	24.471	3
7	MP2A	X	15.658	0
8	MP2A	X	15.658	4
9	MP2B	X	21.592	0
10	MP2B	X	21.592	4
11	MP2C	X	21.592	0
12	MP2C	X	21.592	4
13	MP3A	X	49.554	0
14	MP3A	X	49.554	6
15	MP3B	X	94.183	0
16	MP3B	X	94.183	6



**Member Point Loads (BLC 6 : Antenna Wi Side) (Continued)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft.%,]
17	MP3C	X	94.183	0
18	MP3C	X	94.183	6
19	MP1A	X	7.723	3
20	MP1B	X	9.529	3
21	MP1C	X	9.529	3
22	MP2A	X	20.417	3
23	MP2B	X	25.101	3
24	MP2C	X	25.101	3

**Member Point Loads (BLC 7 : Service Lm1)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft.%,]
1	M1	Y	-500	0

**Member Point Loads (BLC 8 : Service Lm2)**

	Member Label	Direction	Magnitude[lb.k-ft]	Location[ft.%,]
1	M1	Y	-500	%100

**Member Distributed Loads (BLC 10 : Structure Di)**

	Member Label	Direction	Start Magnitude[lb/ft.F,ksf]	End Magnitud...	Start Location[ft.%,]	End Location[ft.%,]
1	M1	Y	-16.954	-16.954	0	%100
2	M2	Y	-16.954	-16.954	0	%100
3	M3	Y	-16.954	-16.954	0	%100
4	M4	Y	-23.427	-23.427	0	%100
5	M5	Y	-23.427	-23.427	0	%100
6	M6	Y	-23.427	-23.427	0	%100
7	M7	Y	-23.427	-23.427	0	%100
8	M8	Y	-23.427	-23.427	0	%100
9	M9	Y	-23.427	-23.427	0	%100
10	M10	Y	-20.437	-20.437	0	%100
11	M11	Y	-20.437	-20.437	0	%100
12	M12	Y	-20.437	-20.437	0	%100
13	M13	Y	-13.703	-13.703	0	%100
14	M14	Y	-13.703	-13.703	0	%100
15	M15	Y	-13.703	-13.703	0	%100
16	M16	Y	-20.437	-20.437	0	%100
17	M17	Y	-20.437	-20.437	0	%100
18	M18	Y	-20.437	-20.437	0	%100
19	MP1A	Y	-13.703	-13.703	0	%100
20	MP2A	Y	-13.703	-13.703	0	%100
21	MP3A	Y	-15.148	-15.148	0	%100
22	MP1B	Y	-13.703	-13.703	0	%100
23	MP2B	Y	-13.703	-13.703	0	%100
24	MP3B	Y	-15.148	-15.148	0	%100
25	MP1C	Y	-13.703	-13.703	0	%100
26	MP2C	Y	-13.703	-13.703	0	%100
27	MP3C	Y	-15.148	-15.148	0	%100
28	M28	Y	-11.713	-11.713	0	%100
29	M29	Y	-11.713	-11.713	0	%100
30	M30	Y	-11.713	-11.713	0	%100
31	M31	Y	-11.713	-11.713	0	%100
32	M32	Y	-11.713	-11.713	0	%100
33	M33	Y	-11.713	-11.713	0	%100



**Member Distributed Loads (BLC 11 : Structure W Front)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
1	M1	PZ	-13.632	-13.632	0	%100
2	M2	PZ	-13.632	-13.632	0	%100
3	M3	PZ	-13.632	-13.632	0	%100
4	M4	PZ	-25.967	-25.967	0	%100
5	M5	PZ	-25.967	-25.967	0	%100
6	M6	PZ	-25.967	-25.967	0	%100
7	M7	PZ	-25.967	-25.967	0	%100
8	M8	PZ	-25.967	-25.967	0	%100
9	M9	PZ	-25.967	-25.967	0	%100
10	M10	PZ	-38.95	-38.95	0	%100
11	M11	PZ	-38.95	-38.95	0	%100
12	M12	PZ	-38.95	-38.95	0	%100
13	M13	PZ	-9.251	-9.251	0	%100
14	M14	PZ	-9.251	-9.251	0	%100
15	M15	PZ	-9.251	-9.251	0	%100
16	M16	PZ	-38.95	-38.95	0	%100
17	M17	PZ	-38.95	-38.95	0	%100
18	M18	PZ	-38.95	-38.95	0	%100
19	MP1A	PZ	-9.251	-9.251	0	%100
20	MP2A	PZ	-9.251	-9.251	0	%100
21	MP3A	PZ	-11.198	-11.198	0	%100
22	MP1B	PZ	-9.251	-9.251	0	%100
23	MP2B	PZ	-9.251	-9.251	0	%100
24	MP3B	PZ	-11.198	-11.198	0	%100
25	MP1C	PZ	-9.251	-9.251	0	%100
26	MP2C	PZ	-9.251	-9.251	0	%100
27	MP3C	PZ	-11.198	-11.198	0	%100
28	M28	PZ	-12.983	-12.983	0	%100
29	M29	PZ	-12.983	-12.983	0	%100
30	M30	PZ	-12.983	-12.983	0	%100
31	M31	PZ	-12.983	-12.983	0	%100
32	M32	PZ	-12.983	-12.983	0	%100
33	M33	PZ	-12.983	-12.983	0	%100

**Member Distributed Loads (BLC 12 : Structure Wi Front)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
1	M1	PZ	-7.858	-7.858	0	%100
2	M2	PZ	-7.858	-7.858	0	%100
3	M3	PZ	-7.858	-7.858	0	%100
4	M4	PZ	-10.88	-10.88	0	%100
5	M5	PZ	-10.88	-10.88	0	%100
6	M6	PZ	-10.88	-10.88	0	%100
7	M7	PZ	-10.88	-10.88	0	%100
8	M8	PZ	-10.88	-10.88	0	%100
9	M9	PZ	-10.88	-10.88	0	%100
10	M10	PZ	-14.062	-14.062	0	%100
11	M11	PZ	-14.062	-14.062	0	%100
12	M12	PZ	-14.062	-14.062	0	%100
13	M13	PZ	-6.784	-6.784	0	%100
14	M14	PZ	-6.784	-6.784	0	%100
15	M15	PZ	-6.784	-6.784	0	%100
16	M16	PZ	-14.062	-14.062	0	%100
17	M17	PZ	-14.062	-14.062	0	%100
18	M18	PZ	-14.062	-14.062	0	%100
19	MP1A	PZ	-6.784	-6.784	0	%100
20	MP2A	PZ	-6.784	-6.784	0	%100



**Member Distributed Loads (BLC 12 : Structure Wi Front) (Continued)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
21	MP3A	PZ	-7.261	-7.261	0	%100
22	MP1B	PZ	-6.784	-6.784	0	%100
23	MP2B	PZ	-6.784	-6.784	0	%100
24	MP3B	PZ	-7.261	-7.261	0	%100
25	MP1C	PZ	-6.784	-6.784	0	%100
26	MP2C	PZ	-6.784	-6.784	0	%100
27	MP3C	PZ	-7.261	-7.261	0	%100
28	M28	PZ	-7.698	-7.698	0	%100
29	M29	PZ	-7.698	-7.698	0	%100
30	M30	PZ	-7.698	-7.698	0	%100
31	M31	PZ	-7.698	-7.698	0	%100
32	M32	PZ	-7.698	-7.698	0	%100
33	M33	PZ	-7.698	-7.698	0	%100

**Member Distributed Loads (BLC 13 : Structure W Side)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
1	M1	PX	13.632	13.632	0	%100
2	M2	PX	13.632	13.632	0	%100
3	M3	PX	13.632	13.632	0	%100
4	M4	PX	25.967	25.967	0	%100
5	M5	PX	25.967	25.967	0	%100
6	M6	PX	25.967	25.967	0	%100
7	M7	PX	25.967	25.967	0	%100
8	M8	PX	25.967	25.967	0	%100
9	M9	PX	25.967	25.967	0	%100
10	M10	PX	38.95	38.95	0	%100
11	M11	PX	38.95	38.95	0	%100
12	M12	PX	38.95	38.95	0	%100
13	M13	PX	9.251	9.251	0	%100
14	M14	PX	9.251	9.251	0	%100
15	M15	PX	9.251	9.251	0	%100
16	M16	PX	38.95	38.95	0	%100
17	M17	PX	38.95	38.95	0	%100
18	M18	PX	38.95	38.95	0	%100
19	MP1A	PX	9.251	9.251	0	%100
20	MP2A	PX	9.251	9.251	0	%100
21	MP3A	PX	11.198	11.198	0	%100
22	MP1B	PX	9.251	9.251	0	%100
23	MP2B	PX	9.251	9.251	0	%100
24	MP3B	PX	11.198	11.198	0	%100
25	MP1C	PX	9.251	9.251	0	%100
26	MP2C	PX	9.251	9.251	0	%100
27	MP3C	PX	11.198	11.198	0	%100
28	M28	PX	12.983	12.983	0	%100
29	M29	PX	12.983	12.983	0	%100
30	M30	PX	12.983	12.983	0	%100
31	M31	PX	12.983	12.983	0	%100
32	M32	PX	12.983	12.983	0	%100
33	M33	PX	12.983	12.983	0	%100

**Member Distributed Loads (BLC 14 : Structure Wi Side)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
1	M1	PX	7.858	7.858	0	%100
2	M2	PX	7.858	7.858	0	%100
3	M3	PX	7.858	7.858	0	%100
4	M4	PX	10.88	10.88	0	%100



**Member Distributed Loads (BLC 14 : Structure Wi Side) (Continued)**

Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
5	M5	PX	10.88	10.88	0 %100
6	M6	PX	10.88	10.88	0 %100
7	M7	PX	10.88	10.88	0 %100
8	M8	PX	10.88	10.88	0 %100
9	M9	PX	10.88	10.88	0 %100
10	M10	PX	14.062	14.062	0 %100
11	M11	PX	14.062	14.062	0 %100
12	M12	PX	14.062	14.062	0 %100
13	M13	PX	6.784	6.784	0 %100
14	M14	PX	6.784	6.784	0 %100
15	M15	PX	6.784	6.784	0 %100
16	M16	PX	14.062	14.062	0 %100
17	M17	PX	14.062	14.062	0 %100
18	M18	PX	14.062	14.062	0 %100
19	MP1A	PX	6.784	6.784	0 %100
20	MP2A	PX	6.784	6.784	0 %100
21	MP3A	PX	7.261	7.261	0 %100
22	MP1B	PX	6.784	6.784	0 %100
23	MP2B	PX	6.784	6.784	0 %100
24	MP3B	PX	7.261	7.261	0 %100
25	MP1C	PX	6.784	6.784	0 %100
26	MP2C	PX	6.784	6.784	0 %100
27	MP3C	PX	7.261	7.261	0 %100
28	M28	PX	7.698	7.698	0 %100
29	M29	PX	7.698	7.698	0 %100
30	M30	PX	7.698	7.698	0 %100
31	M31	PX	7.698	7.698	0 %100
32	M32	PX	7.698	7.698	0 %100
33	M33	PX	7.698	7.698	0 %100

**Member Distributed Loads (BLC 15 : BLC 9 Transient Area Loads)**

Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.028	-.911	0 1.333
2	M1	Y	-.911	-1.608	1.333 2.667
3	M1	Y	-1.608	-1.273	2.667 4
4	M1	Y	-1.273	-.717	4 5.333
5	M1	Y	-.717	-.028	5.333 6.667
6	M3	Y	-.028	-.717	6.667 8
7	M3	Y	-.717	-1.274	8 9.333
8	M3	Y	-1.274	-1.63	9.333 10.667
9	M3	Y	-1.63	-.932	10.667 12
10	M3	Y	-.932	-.028	12 13.333
11	M4	Y	-.42	-6.944	1.7 2.493
12	M4	Y	-6.944	-7.995	2.493 3.287
13	M4	Y	-7.995	-5.451	3.287 4.08
14	M4	Y	-5.451	-3.408	4.08 4.873
15	M4	Y	-3.408	-.42	4.873 5.667
16	M7	Y	-.19	-2.399	0 1.251
17	M7	Y	-2.399	-3.615	1.251 2.502
18	M7	Y	-3.615	-3.611	2.502 3.752
19	M7	Y	-3.611	-2.394	3.752 5.003
20	M7	Y	-2.394	-.19	5.003 6.254
21	M10	Y	-.824	-1.228	0 .77
22	M10	Y	-1.228	-1.633	.77 1.539
23	M30	Y	-.967	-4.359	0 .971
24	M30	Y	-4.359	-5.321	.971 1.942



**Member Distributed Loads (BLC 15 : BLC 9 Transient Area Loads) (Continued)**

Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
25	M30	Y	-5.321	-4.334	1.942 2.913
26	M30	Y	-4.334	-2.82	2.913 3.884
27	M30	Y	-2.82	-.298	3.884 4.855
28	M31	Y	-.532	-2.94	0 .971
29	M31	Y	-2.94	-4.373	.971 1.942
30	M31	Y	-4.373	-5.334	1.942 2.913
31	M31	Y	-5.334	-4.364	2.913 3.884
32	M31	Y	-4.364	-.963	3.884 4.855
33	M2	Y	-.028	-.717	6.667 8
34	M2	Y	-.717	-1.273	8 9.333
35	M2	Y	-1.273	-1.628	9.333 10.667
36	M2	Y	-1.628	-.931	10.667 12
37	M2	Y	-.931	-.028	12 13.333
38	M3	Y	-.028	-.929	0 1.333
39	M3	Y	-.929	-1.625	1.333 2.667
40	M3	Y	-1.625	-1.271	2.667 4
41	M3	Y	-1.271	-.716	4 5.333
42	M3	Y	-.716	-.028	5.333 6.667
43	M6	Y	-.421	-6.949	1.7 2.493
44	M6	Y	-6.949	-8.028	2.493 3.287
45	M6	Y	-8.028	-5.496	3.287 4.08
46	M6	Y	-5.496	-3.453	4.08 4.873
47	M6	Y	-3.453	-.421	4.873 5.667
48	M9	Y	-.191	-2.386	0 1.251
49	M9	Y	-2.386	-3.558	1.251 2.502
50	M9	Y	-3.558	-3.557	2.502 3.752
51	M9	Y	-3.557	-2.389	3.752 5.003
52	M9	Y	-2.389	-.191	5.003 6.254
53	M12	Y	-1.05	-1.05	0 .77
54	M12	Y	-1.05	-1.049	.77 1.539
55	M28	Y	-.963	-4.354	0 .971
56	M28	Y	-4.354	-5.322	.971 1.942
57	M28	Y	-5.322	-4.376	1.942 2.913
58	M28	Y	-4.376	-2.951	2.913 3.884
59	M28	Y	-2.951	-.54	3.884 4.855
60	M29	Y	-.541	-2.953	0 .971
61	M29	Y	-2.953	-4.383	.971 1.942
62	M29	Y	-4.383	-5.329	1.942 2.913
63	M29	Y	-5.329	-4.355	2.913 3.884
64	M29	Y	-4.355	-.961	3.884 4.855
65	M1	Y	-.028	-.717	6.667 8
66	M1	Y	-.717	-1.273	8 9.333
67	M1	Y	-1.273	-1.608	9.333 10.667
68	M1	Y	-1.608	-.911	10.667 12
69	M1	Y	-.911	-.028	12 13.333
70	M2	Y	-.028	-.929	0 1.333
71	M2	Y	-.929	-1.625	1.333 2.667
72	M2	Y	-1.625	-1.271	2.667 4
73	M2	Y	-1.271	-.716	4 5.333
74	M2	Y	-.716	-.028	5.333 6.667
75	M5	Y	-.421	-6.949	1.7 2.493
76	M5	Y	-6.949	-8.028	2.493 3.287
77	M5	Y	-8.028	-5.496	3.287 4.08
78	M5	Y	-5.496	-3.453	4.08 4.873
79	M5	Y	-3.453	-.421	4.873 5.667
80	M8	Y	-.191	-2.386	0 1.251
81	M8	Y	-2.386	-3.558	1.251 2.502



**Member Distributed Loads (BLC 15 : BLC 9 Transient Area Loads) (Continued)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
82	M8	Y	-3.558	-3.557	2.502	3.752
83	M8	Y	-3.557	-2.389	3.752	5.003
84	M8	Y	-2.389	-.191	5.003	6.254
85	M11	Y	-1.621	-1.24	0	.77
86	M11	Y	-1.24	-.859	.77	1.539
87	M32	Y	-.963	-4.354	0	.971
88	M32	Y	-4.354	-5.322	.971	1.942
89	M32	Y	-5.322	-4.376	1.942	2.913
90	M32	Y	-4.376	-2.951	2.913	3.884
91	M32	Y	-2.951	-.54	3.884	4.855
92	M33	Y	-.303	-2.836	0	.971
93	M33	Y	-2.836	-4.358	.971	1.942
94	M33	Y	-4.358	-5.335	1.942	2.913
95	M33	Y	-5.335	-4.361	2.913	3.884
96	M33	Y	-4.361	-.967	3.884	4.855

**Member Distributed Loads (BLC 16 : BLC 10 Transient Area Loads)**

	Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.085	-2.751	0	1.333
2	M1	Y	-2.751	-4.857	1.333	2.667
3	M1	Y	-4.857	-3.846	2.667	4
4	M1	Y	-3.846	-2.165	4	5.333
5	M1	Y	-2.165	-.085	5.333	6.667
6	M3	Y	-.085	-2.166	6.667	8
7	M3	Y	-2.166	-3.849	8	9.333
8	M3	Y	-3.849	-4.923	9.333	10.667
9	M3	Y	-4.923	-2.815	10.667	12
10	M3	Y	-2.815	-.085	12	13.333
11	M4	Y	-1.268	-20.976	1.7	2.493
12	M4	Y	-20.976	-24.15	2.493	3.287
13	M4	Y	-24.15	-16.464	3.287	4.08
14	M4	Y	-16.464	-10.295	4.08	4.873
15	M4	Y	-10.295	-1.268	4.873	5.667
16	M7	Y	-.575	-7.247	0	1.251
17	M7	Y	-7.247	-10.918	1.251	2.502
18	M7	Y	-10.918	-10.906	2.502	3.752
19	M7	Y	-10.906	-7.232	3.752	5.003
20	M7	Y	-7.232	-.575	5.003	6.254
21	M10	Y	-2.488	-3.71	0	.77
22	M10	Y	-3.71	-4.931	.77	1.539
23	M30	Y	-2.921	-13.167	0	.971
24	M30	Y	-13.167	-16.072	.971	1.942
25	M30	Y	-16.072	-13.09	1.942	2.913
26	M30	Y	-13.09	-8.517	2.913	3.884
27	M30	Y	-8.517	-.899	3.884	4.855
28	M31	Y	-1.607	-8.88	0	.971
29	M31	Y	-8.88	-13.209	.971	1.942
30	M31	Y	-13.209	-16.11	1.942	2.913
31	M31	Y	-16.11	-13.182	2.913	3.884
32	M31	Y	-13.182	-2.908	3.884	4.855
33	M2	Y	-.085	-2.165	6.667	8
34	M2	Y	-2.165	-3.846	8	9.333
35	M2	Y	-3.846	-4.919	9.333	10.667
36	M2	Y	-4.919	-2.812	10.667	12
37	M2	Y	-2.812	-.085	12	13.333
38	M3	Y	-.085	-2.807	0	1.333



**Member Distributed Loads (BLC 16 : BLC 10 Transient Area Loads) (Continued)**

Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]	
39	M3	Y	-2.807	-4.909	1.333	2.667
40	M3	Y	-4.909	-3.839	2.667	4
41	M3	Y	-3.839	-2.164	4	5.333
42	M3	Y	-2.164	-.085	5.333	6.667
43	M6	Y	-1.271	-20.991	1.7	2.493
44	M6	Y	-20.991	-24.249	2.493	3.287
45	M6	Y	-24.249	-16.602	3.287	4.08
46	M6	Y	-16.602	-10.43	4.08	4.873
47	M6	Y	-10.43	-1.271	4.873	5.667
48	M9	Y	-.578	-7.206	0	1.251
49	M9	Y	-7.206	-10.748	1.251	2.502
50	M9	Y	-10.748	-10.745	2.502	3.752
51	M9	Y	-10.745	-7.217	3.752	5.003
52	M9	Y	-7.217	-.578	5.003	6.254
53	M12	Y	-3.171	-3.17	0	.77
54	M12	Y	-3.17	-3.17	.77	1.539
55	M28	Y	-2.908	-13.151	0	.971
56	M28	Y	-13.151	-16.076	.971	1.942
57	M28	Y	-16.076	-13.219	1.942	2.913
58	M28	Y	-13.219	-8.915	2.913	3.884
59	M28	Y	-8.915	-1.632	3.884	4.855
60	M29	Y	-1.634	-8.92	0	.971
61	M29	Y	-8.92	-13.238	.971	1.942
62	M29	Y	-13.238	-16.097	1.942	2.913
63	M29	Y	-16.097	-13.154	2.913	3.884
64	M29	Y	-13.154	-2.901	3.884	4.855
65	M1	Y	-.085	-2.165	6.667	8
66	M1	Y	-2.165	-3.846	8	9.333
67	M1	Y	-3.846	-4.857	9.333	10.667
68	M1	Y	-4.857	-2.75	10.667	12
69	M1	Y	-2.75	-.085	12	13.333
70	M2	Y	-.085	-2.807	0	1.333
71	M2	Y	-2.807	-4.909	1.333	2.667
72	M2	Y	-4.909	-3.839	2.667	4
73	M2	Y	-3.839	-2.164	4	5.333
74	M2	Y	-2.164	-.085	5.333	6.667
75	M5	Y	-1.271	-20.991	1.7	2.493
76	M5	Y	-20.991	-24.249	2.493	3.287
77	M5	Y	-24.249	-16.602	3.287	4.08
78	M5	Y	-16.602	-10.43	4.08	4.873
79	M5	Y	-10.43	-1.271	4.873	5.667
80	M8	Y	-.578	-7.206	0	1.251
81	M8	Y	-7.206	-10.748	1.251	2.502
82	M8	Y	-10.748	-10.745	2.502	3.752
83	M8	Y	-10.745	-7.217	3.752	5.003
84	M8	Y	-7.217	-.578	5.003	6.254
85	M11	Y	-4.895	-3.745	0	.77
86	M11	Y	-3.745	-2.595	.77	1.539
87	M32	Y	-2.908	-13.151	0	.971
88	M32	Y	-13.151	-16.076	.971	1.942
89	M32	Y	-16.076	-13.219	1.942	2.913
90	M32	Y	-13.219	-8.915	2.913	3.884
91	M32	Y	-8.915	-1.632	3.884	4.855
92	M33	Y	-.915	-8.567	0	.971
93	M33	Y	-8.567	-13.163	.971	1.942
94	M33	Y	-13.163	-16.115	1.942	2.913
95	M33	Y	-16.115	-13.172	2.913	3.884





**Member Distributed Loads (BLC 16 : BLC 10 Transient Area Loads) (Continued)**

Member Label	Direction	Start Magnitude[lb/ft,F,ksf]	End Magnitud...	Start Location[ft,%]	End Location[ft,%]
96	M33	Y	-13.172	-2.92	3.884 4.855

**Member Area Loads (BLC 9 : Structure D)**

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]	
1	N13	N24	N23	N14	Y	Two Way	-.005
2	N20	N19	N22	N21	Y	Two Way	-.005
3	N16	N15	N18	N17	Y	Two Way	-.005

**Member Area Loads (BLC 10 : Structure Di)**

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]	
1	N13	N24	N23	N14	Y	Two Way	-.016
2	N20	N19	N22	N21	Y	Two Way	-.016
3	N16	N15	N18	N17	Y	Two Way	-.016

**Joint Boundary Conditions**

Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction
2	N2	Reaction	Reaction	Reaction	Reaction	Reaction
3	N3	Reaction	Reaction	Reaction	Reaction	Reaction

**Envelope Joint Reactions**

Joint	X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC		
1	N1	max	2350.267	4	3599.789	8	2598.221	1	1.322	1	2.009	1	3.364	3
2		min	-2373.137	3	-447.916	3	-2587.436	2	-4.064	6	-2.004	2	-7.116	8
3	N2	max	2814.754	4	3614.278	7	1651.46	1	1.606	1	1.001	2	7.143	7
4		min	-2794.449	3	-503.7	4	-1637.118	2	-3.974	6	-1.001	1	-3.098	4
5	N3	max	2242.278	4	3668.938	5	3273.635	1	8.366	5	2.556	3	1.062	3
6		min	-2239.712	3	-690.179	2	-3298.763	2	-4.169	2	-2.556	4	-1.109	4
7	Totals:	max	7407.299	4	9773.095	5	7523.316	1						
8		min	-7407.299	3	2631.493	2	-7523.316	2						

**Envelope Member Section Forces**

Member	Sec	Axial[lb]	LC	y Shear[lb]	LC	z Shea..	LC	Torqu...	LC	y-y Mo...	LC	z-z Mo...	LC	
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	
2			min	0	1	-750	9	0	1	0	1	0	1	
3		2	max	899.726	3	324.111	1	315.933	2	.121	2	.49	4	
4			min	-729.937	4	-627.662	6	-310.6...	1	-.261	5	-.41	2	-.577
5		3	max	1384.473	2	706.109	4	478.788	1	.618	1	.15	2	1.364
6			min	-1241.894	1	-796.876	3	-480.0...	2	-.659	2	-.149	1	.027
7		4	max	516.385	4	501.469	6	100.201	1	.243	1	.133	1	.472
8			min	-380.461	3	-307.522	1	-99.293	2	-.178	2	-.132	2	-.346
9		5	max	0	1	750	10	0	1	0	1	0	1	
10			min	0	1	0	1	0	1	0	1	0	1	
11	M2	1	max	0	1	.036	2	.011	3	0	1	0	1	
12			min	0	1	-.004	8	-.002	1	0	1	0	1	
13		2	max	997.016	1	336.526	2	193.746	3	.14	1	.455	4	.42
14			min	-828.521	2	-637.973	5	-189.0...	4	-.265	6	-.464	3	-.506
15		3	max	1280.032	3	614.554	2	510.041	3	.563	4	.13	3	1.378
16			min	-1136.227	4	-709.526	1	-511.9...	4	-.601	3	-.127	4	.27
17		4	max	625.642	3	621.248	3	138.617	4	.316	4	.069	2	.385



Company : Tower Engineering Solutions, LLC  
 Designer :  
 Job Number : TES Project No. 77902  
 Model Name : CT08748-A-SBA\_MT\_LO\_Loads Only\_G

June 19, 2019  
 3:47 PM  
 Checked By: \_\_\_\_\_

**Envelope Member Section Forces (Continued)**

Member	Sec	Axial[lb]	LC	y Shear[lb]	LC	z Shea...	LC Torqu...	LC y-y Mo...	LC z-z Mo...	LC			
18		min -482.545	4	-436.011	4	-137.6...	3	-.25	3	-.067	1	-.346	2
19		5 max 0	1	.007	7	0	9	0	1	0	1	0	1
20		min 0	1	-.04	1	-.004	3	0	1	0	1	0	1
21	M3	1 max 0	1	.042	1	.005	1	0	1	0	1	0	1
22		min 0	1	-.005	8	-.001	4	0	1	0	1	0	1
23		2 max 918.944	2	415.796	3	277.68	4	.189	4	.231	2	.457	1
24		min -739.96	1	-657.339	4	-272.3...	3	-.294	3	-.238	1	-.544	2
25		3 max 1514.321	4	668.197	1	694.636	3	.271	2	.144	4	1.372	6
26		min -1366.283	3	-770.072	2	-694.2...	4	-.537	3	-.141	3	.266	10
27		4 max 678.363	1	549.577	1	74.504	2	.259	2	.204	3	.359	2
28		min -544.481	2	-368.435	2	-73.773	1	-.192	1	-.202	4	-.319	1
29		5 max 0	1	.005	5	0	10	0	1	0	1	0	1
30		min 0	1	-.032	4	-.005	3	0	1	0	1	0	1
31	M4	1 max 2729.719	3	3597.551	8	1879.0...	2	.908	2	2.009	1	8.174	8
32		min -2704.168	4	-452.449	3	-1879....	1	-.863	1	-2.004	2	-3.502	3
33		2 max 2704.233	3	3543.397	8	1834.9...	2	.908	2	.627	2	3.903	4
34		min -2678.682	4	-473.415	3	-1835....	1	-.863	1	-.622	1	-2.847	3
35		3 max 2818.116	3	770.355	8	17.687	9	.586	9	.157	2	1.736	8
36		min -2808.042	4	-347.355	3	-10.532	2	-.007	10	-.155	1	-1.09	3
37		4 max 2792.63	3	675.216	8	56.243	1	.586	9	.111	2	.796	4
38		min -2782.556	4	-379.974	3	-54.675	2	-.007	10	-.107	1	-.574	3
39		5 max 2767.144	3	603.573	8	100.386	1	.586	9	.052	9	-.016	3
40		min -2757.07	4	-405.913	3	-98.818	2	-.007	10	-.005	10	-.188	8
41	M5	1 max 2986.634	4	3611.894	7	1039.6...	1	1.016	1	1.001	2	8.13	7
42		min -2961.493	3	-508.377	4	-1037....	2	-.972	2	-1.001	1	-3.335	4
43		2 max 2961.148	4	3557.739	7	995.531	1	1.016	1	.45	3	3.648	3
44		min -2936.007	3	-529.343	4	-993.0...	2	-.972	2	-.444	4	-2.6	4
45		3 max 3104.146	4	756.805	7	12.508	4	.238	5	.107	1	1.696	7
46		min -3093.661	3	-298.763	4	-14.84	10	-.493	10	-.105	2	-.945	4
47		4 max 3078.66	4	661.455	7	40.209	2	.238	5	.085	1	.749	10
48		min -3068.175	3	-331.443	4	-37.676	1	-.493	10	-.08	2	-.498	4
49		5 max 3053.174	4	589.617	7	84.352	2	.238	5	.02	7	-.009	4
50		min -3042.689	3	-357.437	4	-81.819	1	-.493	10	-.047	10	-.19	7
51	M6	1 max 3298.763	2	3666.106	5	2242.0...	4	1.109	4	2.556	3	8.366	5
52		min -3273.635	1	-696.624	2	-2239....	3	-1.062	3	-2.556	4	-4.169	2
53		2 max 3298.763	2	3611.951	5	2183.2...	4	1.109	4	.579	4	4.203	1
54		min -3273.635	1	-717.591	2	-2181....	3	-1.062	3	-.575	3	-3.167	2
55		3 max 3476.718	2	790.152	5	6.219	2	.242	8	.167	4	1.891	1
56		min -3467.24	1	-418.605	2	-4.188	1	-.025	3	-.165	3	-1.283	2
57		4 max 3476.718	2	694.914	1	61.431	3	.242	8	.124	4	.884	1
58		min -3467.24	1	-451.284	2	-59.37	4	-.025	3	-.119	3	-.666	2
59		5 max 3476.718	2	668.919	1	120.288	3	.242	8	.019	8	-.007	2
60		min -3467.24	1	-477.278	2	-118.2...	4	-.025	3	-.004	9	-.191	5
61	M7	1 max 945.188	4	255.791	3	1323.5...	4	1.165	4	0	1	0	1
62		min -943.471	3	-1166.97	8	-1327....	3	-1.38	3	0	1	0	1
63		2 max 492.553	2	190.642	3	131.693	1	1.136	4	.454	4	1.893	8
64		min -494.623	1	-1308.116	8	-144.6...	2	-1.299	3	-.449	3	-.391	3
65		3 max 1279.866	1	1330.071	6	115.453	1	1.561	1	.544	2	4.002	8
66		min -1281.112	2	-1389.93	8	-62.182	4	-1.489	2	-.55	1	-.666	3
67		4 max 1251.738	1	1248.279	6	141.437	4	1.561	1	.585	2	1.802	6
68		min -1252.984	2	-119.287	1	-135.2...	3	-1.489	2	-.588	1	-.315	1
69		5 max 486.969	4	1101.945	6	1523.7...	1	1.684	1	0	1	0	1
70		min -497.283	3	-203.258	1	-1485....	2	-1.559	2	0	1	0	1
71	M8	1 max 460.965	3	136.517	4	1048.0...	2	1.513	2	0	1	0	1
72		min -448.947	4	-1134.298	7	-1055.2	1	-1.719	1	0	1	0	1
73		2 max 472.929	1	101.595	4	149.115	4	1.452	2	.394	2	1.839	6
74		min -471.967	2	-1285.806	7	-162.0...	3	-1.607	1	-.39	1	-.179	4



**Envelope Member Section Forces (Continued)**

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shea...	LC Torqu...	LC y-y Mo...	LC z-z Mo...	LC
75		3	max 566.731	4	1203.288	5	70.089	3 1.452	2 .461	3 3.911	7
76			min -570.081	3	-1367.315	7	-89.061	1 -1.607	1 -.465	4 -.776	4
77		4	max 538.603	4	1271.448	7	118.809	3 1.258	4 .608	3 1.831	7
78			min -541.952	3	-223.714	4	-116.4...	4 -1.176	3 -.609	4 -.449	4
79		5	max 739.031	3	1123.279	7	1701.9...	4 1.347	4 0	1 0	1
80			min -767.552	4	-292.318	4	-1667....	3 -1.212	3 0	1 0	1
81	M9	1	max 793.645	1	257	2	1302.2...	1 1.364	3 0	1 0	1
82			min -786.518	2	-1169.265	5	-1299....	2 -1.58	4 0	1 0	1
83		2	max 859.289	4	209.999	2	151.393	2 1.3	3 .439	1 1.893	5
84			min -859.041	3	-1314.859	5	-162.6...	1 -1.464	4 -.431	2 -.381	2
85		3	max 1265.705	3	1272.667	8	86.434	2 1.384	3 .421	4 4.012	5
86			min -1265.618	4	-1396.368	5	-97.672	1 -1.464	4 -.426	3 -.687	2
87		4	max 1265.705	3	1262.657	5	161.013	1 1.384	3 .516	1 1.806	5
88			min -1265.618	4	-187.043	2	-156.36	2 -1.304	4 -.514	2 -.349	2
89		5	max 929.966	1	1109.5	5	1486.71	2 1.508	3 0	1 0	1
90			min -946.743	2	-236.531	2	-1462....	1 -1.375	4 0	1 0	1
91	M10	1	max 149.994	3	256.449	3	22.706	4 .038	4 0	1 0	1
92			min -111.423	4	-233.052	4	-22.833	3 -.048	3 0	1 0	1
93		2	max 160.377	3	252.487	3	40.69	4 .038	4 .012	4 .09	4
94			min -121.806	4	-237.014	4	-40.817	3 -.048	3 -.012	3 -.098	3
95		3	max 673.902	1	693.992	9	14.849	7 .067	1 .031	4 .531	9
96			min -599.686	2	-26.377	10	-58.802	3 -.052	2 -.031	3 -.194	3
97		4	max 663.519	1	689.843	9	38.69	1 .067	1 .013	2 .265	9
98			min -589.303	2	-167.802	3	-37.208	2 -.052	2 -.014	1 -.065	3
99		5	max 653.135	1	685.601	9	32.695	1 .067	1 0	1 0	1
100			min -578.92	2	-172.044	3	-31.213	2 -.052	2 0	1 0	1
101	M11	1	max 160.447	1	239.693	4	20.019	2 .056	2 0	1 0	1
102			min -113.332	2	-619.194	10	-20.209	1 -.066	1 0	1 0	1
103		2	max 170.83	1	235.453	4	31.07	3 .056	2 .009	2 .239	10
104			min -123.715	2	-623.433	10	-30.712	4 -.066	1 -.009	1 -.091	4
105		3	max 511.63	4	391.185	7	18.647	8 .056	2 .039	3 .48	10
106			min -447.98	3	-627.585	10	-68.099	3 -.066	1 -.04	4 -.181	4
107		4	max 501.246	4	377.927	7	51.526	4 .05	4 .016	3 .143	7
108			min -437.596	3	-134.363	4	-50.114	3 -.035	3 -.016	4 -.052	4
109		5	max 490.863	4	364.979	7	33.542	4 .05	4 0	1 0	1
110			min -427.213	3	-138.339	4	-32.13	3 -.035	3 0	1 0	1
111	M12	1	max 114.176	4	302.61	2	20.436	1 .055	3 0	1 0	1
112			min -68.213	3	-280.418	1	-20.336	2 -.065	4 0	1 0	1
113		2	max 114.176	4	298.59	2	44.415	1 .055	3 .012	1 .109	1
114			min -68.213	3	-284.438	1	-44.315	2 -.065	4 -.012	2 -.116	2
115		3	max 511.455	3	410.258	5	20.236	6 .065	3 .038	1 .306	5
116			min -442.52	4	-25.622	9	-73.162	1 -.065	4 -.039	2 -.23	2
117		4	max 511.455	3	397.155	5	50.279	2 .065	3 .014	1 .15	5
118			min -442.52	4	-192.619	2	-49.182	1 -.05	4 -.015	2 -.075	2
119		5	max 511.455	3	384.052	5	26.299	2 .065	3 0	1 0	1
120			min -442.52	4	-196.639	2	-25.203	1 -.05	4 0	1 0	1
121	M13	1	max 0	1	0	1	0	1 0	1 0	1 0	1
122			min 0	1	0	1	0	1 0	1 0	1 0	1
123		2	max -36.537	3	209.642	4	42.888	2 .102	1 .373	1 .28	4
124			min -334.577	8	-294.391	3	-42.973	1 -.112	2 -.406	2 -.369	3
125		3	max 246.633	4	263.082	8	92.224	2 .218	2 .183	1 .636	7
126			min -413.657	3	-308.274	3	-92.309	1 -.21	1 -.215	2 .057	1
127		4	max 246.633	4	236.31	4	41.759	3 .218	2 .235	1 .178	3
128			min -413.657	3	-163.988	3	-37.643	4 -.21	1 -.265	2 -.233	4
129		5	max 0	1	0	1	0	1 0	1 0	1 0	1
130			min 0	1	0	1	0	1 0	1 0	1 0	1
131	M14	1	max 0	1	.012	3	.017	3 0	1 0	1 0	1



**Envelope Member Section Forces (Continued)**

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shea...	LC Torqu...	LC y-y Mo...	LC z-z Mo...	LC			
132		min	0	1	0	10	-.007	1	0	1	0	1		
133		max	39.631	1	194.858	2	35.82	1	.115	4	.274	4	.233	3
134		min	-344.75	6	-279.258	1	-39.299	2	-.124	3	-.301	3	-.321	4
135		max	-33.125	9	259.193	6	48.154	1	.142	3	.15	4	.638	5
136		min	-382.701	5	-297.474	5	-55.555	4	-.135	4	-.183	3	.142	11
137		max	91.309	3	217.034	2	27.275	1	.142	3	.213	4	.203	1
138		min	-372.909	5	-144.432	1	-23.218	2	-.135	4	-.243	3	-.257	2
139		max	0	1	.003	3	.012	3	0	1	0	1	0	1
140		min	0	1	-.012	1	-.003	1	0	1	0	1	0	1
141	M15	max	0	1	.012	1	.007	1	0	1	0	1	0	1
142		min	0	1	-.002	4	-.015	4	0	1	0	1	0	1
143		max	19.982	4	208.267	1	40.939	4	.077	2	.289	3	.305	1
144		min	-339.495	7	-293.264	2	-42.396	3	-.084	1	-.32	4	-.394	2
145		max	281.05	1	260.816	5	77.942	4	.19	4	.169	3	.626	6
146		min	-447.49	2	-307.147	2	-51.816	1	-.183	3	-.203	4	.134	10
147		max	259.687	1	225.175	1	41.937	2	.19	4	.166	3	.173	4
148		min	-426.127	2	-153.45	2	-39.481	1	-.183	3	-.191	4	-.226	3
149		max	0	1	0	9	.007	1	0	1	0	1	0	1
150		min	0	1	-.011	4	-.012	4	0	1	0	1	0	1
151	M16	max	321.853	1	559.44	1	601.201	1	.174	1	.288	2	.203	4
152		min	-374.817	2	-540.787	2	-616.4...	2	-.171	2	-.265	1	-.203	3
153		max	317.356	1	558.164	1	598.604	1	.174	1	.186	2	.151	4
154		min	-370.319	2	-542.063	2	-613.8...	2	-.171	2	-.165	1	-.155	3
155		max	312.858	1	556.888	1	596.007	1	.174	1	.083	2	.211	2
156		min	-365.822	2	-543.339	2	-611.2...	2	-.171	2	-.065	1	-.216	1
157		max	308.361	1	555.612	1	593.411	1	.174	1	.106	4	.302	2
158		min	-361.324	2	-544.615	2	-608.6...	2	-.171	2	-.092	3	-.308	1
159		max	303.863	1	554.336	1	590.814	1	.174	1	.142	4	.393	2
160		min	-356.827	2	-545.891	2	-606.0...	2	-.171	2	-.129	3	-.401	1
161	M17	max	310.151	4	556.445	2	460.28	4	.141	2	.241	3	.227	2
162		min	-356.024	3	-529.524	1	-476.5...	3	-.135	1	-.22	4	-.224	1
163		max	305.654	4	555.169	2	452.49	4	.141	2	.162	3	.148	3
164		min	-351.527	3	-530.8	1	-468.7...	3	-.135	1	-.144	4	-.152	4
165		max	301.156	4	553.893	2	444.7	4	.141	2	.085	3	.184	3
166		min	-347.029	3	-532.076	1	-460.9...	3	-.135	1	-.069	4	-.192	4
167		max	296.658	4	552.617	2	436.91	4	.141	2	.125	2	.221	3
168		min	-342.532	3	-533.352	1	-453.1...	3	-.135	1	-.109	1	-.231	4
169		max	292.161	4	551.341	2	429.12	4	.141	2	.191	2	.258	3
170		min	-338.034	3	-534.628	1	-445.3...	3	-.135	1	-.176	1	-.271	4
171	M18	max	187.568	2	690.813	3	539.634	3	.186	3	.207	4	.14	1
172		min	-231.589	1	-669.154	4	-552.2...	4	-.182	4	-.183	3	-.142	2
173		max	187.568	2	689.537	3	539.634	3	.186	3	.115	4	.128	1
174		min	-231.589	1	-670.43	4	-552.2...	4	-.182	4	-.093	3	-.133	2
175		max	187.568	2	688.261	3	539.634	3	.186	3	.063	1	.115	1
176		min	-231.589	1	-671.706	4	-552.2...	4	-.182	4	-.049	2	-.124	2
177		max	187.568	2	686.985	3	539.634	3	.186	3	.086	3	.214	4
178		min	-231.589	1	-672.982	4	-552.2...	4	-.182	4	-.069	4	-.221	3
179		max	187.568	2	685.709	3	539.634	3	.186	3	.176	3	.327	4
180		min	-231.589	1	-674.258	4	-552.2...	4	-.182	4	-.161	4	-.335	3
181	MP1A	max	82.136	8	62.295	4	136.053	1	.006	3	.008	8	0	1
182		min	8.1	3	-62.3	3	-136.0...	2	-.006	4	0	10	0	1
183		max	555.728	2	388.723	4	87.427	2	.252	1	.04	1	.586	2
184		min	-546.893	1	-265.403	3	-65.711	1	-.281	2	-.036	2	-.43	3
185		max	586.244	2	488.303	4	108.273	1	.252	1	.09	6	.079	2
186		min	-516.377	1	-364.984	3	-86.557	2	-.281	2	-.041	1	-.14	10
187		max	594.803	2	517.874	4	144.93	1	.252	1	.177	5	.559	3
188		min	-507.818	1	-394.554	3	-123.2...	2	-.281	2	-.09	2	-.775	4



Company : Tower Engineering Solutions, LLC  
 Designer :  
 Job Number : TES Project No. 77902  
 Model Name : CT08748-A-SBA\_MT\_LO\_Loads Only\_G

June 19, 2019  
 3:47 PM  
 Checked By: \_\_\_\_\_

**Envelope Member Section Forces (Continued)**

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shea...	LC Torqu...	LC y-y Mo...	LC z-z Mo...	LC				
189	5	max	0	7	.046	7	.065	6	0	4	0	1	0	1	
190		min	0	4	-.011	4	-.034	1	0	7	0	2	0	1	
191	MP2A	1	max	78.674	5	63.336	4	112.889	1	.006	3	.008	5	0	1
192			min	11.22	9	-63.333	3	-112.8...	2	-.006	4	.001	9	0	1
193		2	max	568.418	7	461.419	4	271.078	1	.037	1	.113	6	.737	4
194			min	73.569	4	-465.162	3	-270.1...	2	-.035	2	-.068	1	-.743	3
195		3	max	776.983	7	563.405	4	377.35	1	.037	1	.355	1	.028	4
196			min	157.608	4	-567.148	3	-376.39	2	-.035	2	-.312	2	-.029	3
197		4	max	899.77	7	656.44	4	520.046	1	.037	1	1.006	1	.882	3
198			min	182.484	4	-660.183	3	-519.0...	2	-.035	2	-.961	2	-.876	4
199		5	max	0	2	.01	3	.072	6	0	8	0	1	0	1
200			min	0	1	-.015	8	-.032	1	0	3	0	2	0	1
201	MP3A	1	max	373.006	6	256.079	4	632.687	1	.031	3	.045	7	0	1
202			min	76.8	3	-256.061	3	-632.7...	2	-.031	4	.009	3	0	1
203		2	max	602.364	2	459.126	4	98.124	1	.624	2	.388	1	.604	1
204			min	-502.071	1	-606.312	3	-62.065	2	-.547	1	-.385	2	-.754	2
205		3	max	612.225	2	486.001	4	124.999	1	.624	2	.556	1	.281	9
206			min	-492.209	1	-633.187	3	-88.941	2	-.547	1	-.498	2	-.175	4
207		4	max	622.086	2	512.877	4	151.875	1	.624	2	.763	1	1.227	3
208			min	-482.348	1	-660.063	3	-115.8...	2	-.547	1	-.652	2	-.924	4
209		5	max	-76.8	3	255.656	3	632.002	2	.031	4	-.009	4	0	1
210			min	-373.006	8	-255.774	4	-631.9...	1	-.031	3	-.045	7	0	2
211	MP1B	1	max	82.136	8	69.883	2	101.863	4	.007	2	0	1	0	1
212			min	8.1	9	-69.877	1	-101.86	3	-.007	1	-.008	7	0	1
213		2	max	421.858	4	407.542	2	67.158	3	.195	3	.034	4	.698	2
214			min	-413.298	3	-531.792	1	-89.491	4	-.221	4	-.037	3	-.855	1
215		3	max	452.374	4	506.548	2	66.265	1	.195	3	.048	3	.078	6
216			min	-382.782	3	-630.798	1	-88.709	2	-.221	4	-.093	8	-.043	1
217		4	max	460.933	4	533.373	2	81.864	4	.195	3	.13	1	.929	1
218			min	-374.223	3	-657.623	1	-104.1...	3	-.221	4	-.202	2	-.713	2
219		5	max	0	4	.008	3	.027	3	0	3	0	4	0	3
220			min	0	3	-.043	8	-.057	8	0	8	0	3	0	4
221	MP2B	1	max	78.674	6	65.517	2	87.086	4	.006	2	-.001	1	0	1
222			min	11.22	9	-65.52	1	-87.077	3	-.006	1	-.008	6	0	1
223		2	max	569.102	6	476.185	2	202.743	4	.059	3	.058	3	.74	2
224			min	63.229	1	-471.634	1	-205.2...	3	-.057	4	-.108	8	-.733	1
225		3	max	777.667	6	552.48	2	312.051	4	.059	3	.22	4	.024	4
226			min	147.268	1	-547.929	1	-314.5...	3	-.057	4	-.265	3	-.024	3
227		4	max	900.453	6	642.568	2	426.611	4	.059	3	.759	4	.866	1
228			min	172.144	1	-638.018	1	-429.15	3	-.057	4	-.807	3	-.873	2
229		5	max	0	8	.013	5	.026	3	0	5	0	4	0	3
230			min	0	3	-.008	2	-.066	8	0	2	0	3	0	4
231	MP3B	1	max	373.006	8	303.213	2	466.6	4	.036	2	-.009	2	0	1
232			min	76.8	2	-303.229	1	-466.5...	3	-.036	1	-.045	8	0	1
233		2	max	571.432	4	692.281	4	88.116	4	.473	4	.212	4	.963	4
234			min	-469.645	3	-540.759	3	-125.0...	3	-.399	3	-.215	3	-.816	3
235		3	max	581.293	4	705.718	4	111.391	4	.473	4	.362	4	.24	1
236			min	-459.784	3	-554.196	3	-148.34	3	-.399	3	-.42	3	-.322	2
237		4	max	591.154	4	719.156	4	134.666	4	.473	4	.546	4	.846	3
238			min	-449.923	3	-567.634	3	-171.6...	3	-.399	3	-.66	3	-1.154	4
239		5	max	-76.799	1	302.86	1	466.001	3	.036	1	.045	6	0	2
240			min	-373.005	6	-302.745	2	-466.0...	4	-.036	2	.009	1	0	1
241	MP1C	1	max	82.136	8	69.922	1	101.9	3	.007	1	0	1	0	1
242			min	8.1	10	-69.917	2	-101.8...	4	-.007	2	-.008	8	0	1
243		2	max	572.077	3	388.973	4	15.476	2	.197	4	.021	9	.712	4
244			min	-563.267	4	-516.23	3	-53.836	5	-.224	3	-.023	10	-.874	3
245		3	max	602.593	3	470.132	4	105.544	3	.197	4	.022	2	.12	4



**Envelope Member Section Forces (Continued)**

Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shea...	LC Torqu...	LC	y-v Mo...	LC	z-z Mo...	LC	
246		min	-532.751	4	-597.389	3	-127.3...	4	-.224	3	-.086	5	-.091	3
247		4 max	611.152	3	487.905	4	136.328	3	.197	4	.153	3	.823	3
248		min	-524.192	4	-615.162	3	-158.1...	4	-.224	3	-.222	4	-.604	4
249		5 max	0	1	.011	2	.031	4	0	2	0	3	0	2
250		min	0	2	-.047	5	-.061	7	0	5	0	8	0	1
251	MP2C	1 max	78.674	8	65.514	1	87.099	3	.006	1	-.001	1	0	1
252		min	11.22	1	-65.517	2	-87.09	4	-.006	2	-.008	8	0	1
253		2 max	569.325	5	419.504	1	214.14	3	.038	2	.051	4	.665	1
254		min	65.077	3	-416.607	2	-217.5...	4	-.035	1	-.106	7	-.66	2
255		3 max	777.89	5	495.799	1	323.449	3	.038	2	.245	3	.021	1
256		min	149.116	3	-492.902	2	-326.8...	4	-.035	1	-.291	4	-.021	2
257		4 max	900.677	5	585.888	1	438.008	3	.038	2	.801	3	.774	2
258		min	173.992	3	-582.99	2	-441.4...	4	-.035	1	-.851	4	-.778	1
259		5 max	0	7	.014	6	.027	4	0	6	0	1	0	3
260		min	0	1	-.009	1	-.066	7	0	1	0	2	0	4
261	MP3C	1 max	373.006	7	303.006	1	466.46	3	.036	1	-.009	3	0	1
262		min	76.8	3	-303.027	2	-466.4...	4	-.036	2	-.045	7	0	1
263		2 max	449.861	3	713.905	1	58.8	1	.519	3	.349	3	.889	1
264		min	-350.684	4	-566.163	2	-97.293	2	-.449	4	-.351	4	-.748	2
265		3 max	459.722	3	737.18	1	72.238	1	.519	3	.365	3	.243	3
266		min	-340.822	4	-589.438	2	-110.7...	2	-.449	4	-.422	4	-.323	4
267		4 max	469.584	3	760.455	1	85.675	1	.519	3	.415	3	1.02	2
268		min	-330.961	4	-612.713	2	-124.1...	2	-.449	4	-.528	4	-1.323	1
269		5 max	-76.799	3	302.764	2	465.868	4	.036	2	.045	8	0	1
270		min	-373.005	8	-302.644	1	-465.9...	3	-.036	1	.009	3	0	2
271	M28	1 max	2021.782	1	99.463	7	58.086	4	0	3	0	2	.186	3
272		min	-2050.019	2	-14.066	4	-61.921	3	0	4	-.07	5	-.128	4
273		2 max	2033.255	1	66.186	7	40.252	4	0	3	.018	4	.094	3
274		min	-2061.493	2	-22.046	4	-44.087	3	0	4	-.021	3	-.071	4
275		3 max	2044.729	1	38.556	3	22.418	4	0	3	.021	4	.026	3
276		min	-2072.967	2	-32.922	4	-26.253	3	0	4	-.014	3	-.02	4
277		4 max	2056.203	1	28.932	3	4.584	4	0	3	.006	2	.036	1
278		min	-2084.44	2	-42.546	4	-8.571	6	0	4	-.006	1	-.03	2
279		5 max	2067.677	1	22.407	3	9.415	3	0	3	.022	3	.06	4
280		min	-2095.914	2	-64.483	8	-14.886	8	0	4	-.054	8	-.039	3
281	M29	1 max	1879.099	1	71.033	7	14.217	3	0	3	.02	4	.087	7
282		min	-1865.111	2	-18.513	4	-12.436	4	0	4	-.063	7	-.027	4
283		2 max	1867.625	1	42.867	7	5.398	4	0	3	.004	2	.046	5
284		min	-1853.637	2	-25.04	4	-3.617	3	0	4	-.008	5	-.022	2
285		3 max	1856.151	1	32.546	3	23.232	4	0	3	.02	3	.033	5
286		min	-1842.163	2	-34.672	4	-21.451	3	0	4	-.014	4	-.013	3
287		4 max	1844.677	1	21.662	3	41.066	4	0	3	.017	3	.088	4
288		min	-1830.69	2	-58.245	8	-39.285	3	0	4	-.021	4	-.062	3
289		5 max	1833.204	1	13.682	3	58.9	4	0	3	0	2	.174	4
290		min	-1819.216	2	-91.521	8	-57.119	3	0	4	-.069	5	-.118	3
291	M30	1 max	1876	2	100.015	5	76.938	2	0	9	.002	3	.199	1
292		min	-1921.912	1	-17.504	2	-80.676	1	0	2	-.07	8	-.141	2
293		2 max	1874.789	2	66.713	5	51.781	2	0	9	.014	2	.092	1
294		min	-1920.702	1	-25.491	2	-55.518	1	0	2	-.017	1	-.068	2
295		3 max	1873.578	2	41.708	1	26.623	2	0	9	.021	2	.028	4
296		min	-1919.491	1	-36.361	2	-30.361	1	0	2	-.014	1	-.022	3
297		4 max	1872.367	2	32.169	1	1.466	2	0	9	.005	3	.039	2
298		min	-1918.28	1	-45.9	2	-14.215	9	0	2	-.005	4	-.033	1
299		5 max	1871.156	2	25.898	1	19.954	1	0	9	.033	1	.072	2
300		min	-1917.069	1	-64.083	6	-23.692	2	0	2	-.057	6	-.051	1
301	M31	1 max	1841.619	4	69.087	8	20.838	4	0	8	.024	3	.088	8
302		min	-1838.59	3	-11.427	3	-19.098	3	0	3	-.064	8	-.034	3



**Envelope Member Section Forces (Continued)**

Member	Sec	Axial[lb]	LC	y Shear[lb]	LC	z Shea...	LC Torqu...	LC y-y Mo...	LC z-z Mo...	LC		
303	2	max 1831.357	4	40.98	8	8.971	2	0	8 .004	3 .056	9	
304		min -1828.327	3	-17.938	3	-7.033	1	0	3 -.013	9 -.029	3	
305	3	max 1821.094	4	25.547	4	20.765	3	0	8 .014	1 .042	9	
306		min -1818.065	3	-27.556	3	-19.025	4	0	3 -.009	2 -.02	1	
307	4	max 1810.831	4	14.657	4	40.696	3	0	8 .014	1 .073	2	
308		min -1807.802	3	-56.351	7	-38.956	4	0	3 -.019	2 -.046	1	
309	5	max 1800.568	4	6.668	4	60.628	3	0	8 .001	1 .149	7	
310		min -1797.539	3	-89.66	7	-58.888	4	0	3 -.07	8 -.079	4	
311	M32	1	max 2219.776	3	97.269	8	60.823	3	0	4 .002	1 .156	8
312		min -2262.9	4	-7.642	3	-64.618	4	0	3 -.071	7 -.091	3	
313	2	max 2230.038	3	63.992	8	40.891	3	0	4 .015	1 .072	2	
314		min -2273.162	4	-15.622	3	-44.687	4	0	3 -.019	2 -.048	1	
315	3	max 2240.301	3	32.022	4	20.96	3	0	4 .018	7 .04	10	
316		min -2283.425	4	-26.498	3	-24.755	4	0	3 -.008	2 -.025	1	
317	4	max 2250.564	3	22.399	4	5.779	1	0	4 .005	4 .051	10	
318		min -2293.688	4	-36.122	3	-10.285	6	0	3 -.012	10 -.037	4	
319	5	max 2260.827	3	15.874	4	15.108	4	0	4 .026	4 .07	3	
320		min -2303.951	4	-62.309	7	-18.903	3	0	3 -.055	7 -.049	4	
321	M33	1	max 1330.666	2	70.734	6	26.214	2	0	2 .032	1 .088	6
322		min -1330.342	1	-20.907	1	-24.536	1	0	10 -.066	6 -.036	1	
323	2	max 1331.877	2	44.487	2	13.242	10	0	2 .003	10 .048	6	
324		min -1331.553	1	-27.196	1	-1.21	4	0	10 -.007	7 -.026	1	
325	3	max 1333.088	2	34.917	2	25.779	1	0	2 .02	2 .035	7	
326		min -1332.764	1	-36.766	1	-24.101	2	0	10 -.015	1 -.018	4	
327	4	max 1334.299	2	24.028	2	50.936	1	0	2 .014	2 .082	1	
328		min -1333.975	1	-58.818	5	-49.258	2	0	10 -.018	1 -.056	2	
329	5	max 1335.51	2	16.04	2	76.094	1	0	2 .002	4 .181	1	
330		min -1335.186	1	-92.125	5	-74.416	2	0	10 -.069	6 -.126	2	

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

Member	Shape	Code Check	Loc[ft]	LC	Shear Ch...	Loc[ft]	Dir	phi*P...	phi*P...	phi*M...	phi*M.....	Eqn	
1	M13	PIPE 2.0	.876	1.806	2	.340	.417	1	5533...	32130	1.872	1.872	H3-6
2	M15	PIPE 2.0	.830	1.806	4	.309	.417	3	5533...	32130	1.872	1.872	H3-6
3	MP2C	PIPE 2.0	.722	5	4	.087	5	2	2086...	32130	1.872	1.872	H1-1b
4	MP2B	PIPE 2.0	.708	5	2	.096	5	3	2086...	32130	1.872	1.872	H1-1b
5	MP1B	PIPE 2.0	.689	5	1	.147	1.188	4	2086...	32130	1.872	1.872	H1-1b
6	MP2A	PIPE 2.0	.683	5	1	.087	5	4	2086...	32130	1.872	1.872	H1-1b
7	MP1C	PIPE 2.0	.631	5	3	.200	5	3	2086...	32130	1.872	1.872	H1-1b
8	M16	PL3/8x5	.615	0	2	.504	0	y	1 3770...	60750	.475	6.328	H1-1b
9	MP1A	PIPE 2.0	.555	5	4	.206	5	2	2086...	32130	1.872	1.872	H1-1b
10	M14	PIPE 2.0	.546	11.667	3	.225	.417	4	5533...	32130	1.872	1.872	H1-1b
11	M17	PL3/8x5	.528	0	3	.412	0	y	2 3770...	60750	.475	6.328	H1-1b
12	M6	HSS4x4x4	.521	0	5	.140	0	z	4 1219...	139518	16.181	16.181	H1-1b
13	M4	HSS4x4x4	.509	0	8	.116	0	z	2 1219...	139518	16.181	16.181	H1-1b
14	M5	HSS4x4x4	.507	0	7	.113	0	y	2 1219...	139518	16.181	16.181	H1-1b
15	MP3C	PIPE 2.5	.486	5	1	.200	5	3	3777...	50715	3.596	3.596	H1-1b
16	MP3B	PIPE 2.5	.462	5	4	.197	5	4	3777...	50715	3.596	3.596	H1-1b
17	M18	PL3/8x5	.456	0	4	.543	0	y	3 3770...	60750	.475	6.328	H1-1b
18	M32	L2x2x3	.453	4.855	3	.014	0	y	8 7270...	2339...	.558	1.211	H2-1
19	MP3A	PIPE 2.5	.435	5	3	.239	5	2	3777...	50715	3.596	3.596	H1-1b
20	M30	L2x2x3	.415	0	2	.015	0	z	1 7270...	2339...	.558	1.228	H2-1
21	M31	L2x2x3	.402	0	4	.014	4.855	y	7 7270...	2339...	.558	1.191	H2-1
22	M28	L2x2x3	.376	4.855	1	.014	0	y	7 7270...	2339...	.558	1.179	H2-1
23	M29	L2x2x3	.357	0	1	.014	4.855	y	8 7270...	2339...	.558	1.162	H2-1
24	M33	L2x2x3	.346	0	2	.014	4.855	y	5 7270...	2339...	.558	1.231	H2-1



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

Member	Shape	Code Check	Loc[ft]	LC Shear Ch...	Loc[ft]	Dir	...	phi*P...	phi*P...	phi*M...	phi*M.....	Eqn	
25	M3	PIPE 3.0	.293	7.361	7	.146	6.667	3	2515...	65205	5.749	5.749 ... H1-1b	
26	M1	PIPE 3.0	.288	7.361	5	.155	5.972	2	2515...	65205	5.749	5.749 ... H1-1b	
27	M2	PIPE 3.0	.288	7.361	6	.148	6.667	4	2515...	65205	5.749	5.749 ... H1-1b	
28	M9	HSS4x4x4	.253	3.127	5	.130	5.798	z	3	1184...	139518	16.181	16.181 ... H1-1b
29	M7	HSS4x4x4	.252	3.127	8	.163	5.798	z	1	1184...	139518	16.181	16.181 ... H1-1b
30	M8	HSS4x4x4	.249	3.127	7	.153	.456	z	1	1184...	139518	16.181	16.181 ... H1-1b
31	M11	PL3/8x6	.104	.77	4	.156	0	y	1	1746...	72900	.57	9.113 ... H1-1b
32	M12	PL3/8x6	.098	.77	2	.153	.77	y	3	1746...	72900	.57	9.113 ... H1-1b
33	M10	PL3/8x6	.082	.77	4	.156	.77	y	1	1746...	72900	.57	9.113 ... H1-1b

**Envelope AISI S100-10: LRFD Cold Formed Steel Code Checks**

Memb...	Shape	Code Check	Loc[...]	She...Loc.....	phi*P...phi*T...phi*...	phi*...	Cb	Cm...Cm...	Eqn
No Data to Print ...									

**Envelope AA ADM1-10: ASD - Building Aluminum Code Checks**

Member	Shape	Code C...	Loc[ft]	LC Shear ...	Loc[ft]	Dir	LC Pnc/O...	Pnt/Om...Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
No Data to Print ...													



# EXHIBIT 9

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

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## Radio Frequency Emissions Analysis Report

**T-MOBILE** Existing Facility

**Site ID: CTNL181A**

NL181/MCF Woodstock  
215 Coatney Hill Road  
Woodstock, CT 06281

**May 30, 2019**

**Transcom Engineering Project Number: 737001-0070**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>3.88 %</b>

# Transcom Engineering, Inc.

Wireless Network Design and Deployment

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May 30, 2019

T-MOBILE

Attn: Jason Overbey, RF Manager  
35 Griffin Road South  
Bloomfield, CT 6009

## Emissions Analysis for Site: **CTNL181A – NL181/MCF Woodstock**

Transcom Engineering, Inc (“Transcom”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **215 Coatney Hill Road, Woodstock, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 & 700 MHz bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$  respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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.

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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.

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## CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **215 Coatney Hill Road, Woodstock, 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
GSM	1900 MHz (PCS)	1	15
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

*Table 1: Channel Data Table*

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The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	RFS APXV18-206516S-C-A20	177
A	2	RFS APXVAARR24_43-U-NA20	177
B	1	RFS APXV18-206516S-C-A20	177
B	2	RFS APXVAARR24_43-U-NA20	177
C	1	RFS APXV18-206516S-C-A20	177
C	2	RFS APXVAARR24_43-U-NA20	177

*Table 2: Antenna Data*

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

Cable losses were factored in the calculations for this site. Since all **1900 MHz (PCS)** radios are ground mounted the following cable loss values were used. For each ground mounted **1900 MHz (PCS)** radio there was **2.11 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **205 feet** of **1-5/8"** coax.

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## RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	RFS APXV18-206516S-C-A20	1900 MHz (PCS)	16.3	5	175	4,592.38	0.57
Antenna A2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.72
Sector A Composite MPE%							<b>1.29</b>
Antenna B1	RFS APXV18-206516S-C-A20	1900 MHz (PCS)	16.3	5	175	4,592.38	0.57
Antenna B2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.72
Sector B Composite MPE%							<b>1.29</b>
Antenna C1	RFS APXV18-206516S-C-A20	1900 MHz (PCS)	16.3	5	175	4,592.38	0.57
Antenna C2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.72
Sector C Composite MPE%							<b>1.29</b>

*Table 3: T-MOBILE Emissions Levels*

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The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
T-MOBILE – Max Per Sector Value	<b>1.29 %</b>
AT&T	1.08 %
Verizon Wireless	1.51 %
<b>Site Total MPE %:</b>	<b>3.88 %</b>

*Table 4: All Carrier MPE Contributions*

T-MOBILE Sector A Total:	1.29 %
T-MOBILE Sector B Total:	1.29 %
T-MOBILE Sector C Total:	1.29 %
Site Total:	3.88 %

*Table 5: Site MPE Summary*



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FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	1,049.69	177	5.16	1900 MHz (PCS)	1000	0.52%
T-Mobile 1900 MHz (PCS) GSM	1	393.63	177	0.48	1900 MHz (PCS)	1000	0.05%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	177	1.94	600 MHz	400	0.49%
T-Mobile 700 MHz LTE	2	432.54	177	1.06	700 MHz	467	0.23%
						<b>Total:</b>	<b>1.29%</b>

*Table 6: T-MOBILE Maximum Sector MPE Power Values*

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## 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:	1.29 %
Sector B:	1.29 %
Sector C:	1.29 %
T-MOBILE Maximum Total (per sector):	1.29 %
Site Total:	3.88 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **3.88 %** 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.



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