Filed by:
Kri Pelletier, Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3804 - kpelletier@sbasite.com

September 12, 2018

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

Notice of Exempt Modification
1 Deerfield Lane, Ansonia, CT 06401
N 41 21 2.7
W -73 2 57.3
T-Mobile #: CTNH209A_L600

Dear Ms. Bachman:

T-Mobile currently maintains nine (10) antennas at the 167-foot level of the existing 169-foot Monopole Tower at 1 Deerfield Lane. The tower is owned by SBA Towers IV, LLC. The property is owned by Macabee Properties, LLC. T-Mobile now intends to remove (1) (dish) antenna and swap three (3) existing panel antennas with three (3) newer panel antennas at the 167-foot level. The full scope of work is as follows:

Remove:

- (1) dish antenna

Remove and Replace:

- Remove: (3) Andrew - LNX-6515DS – Panel Antennas
  - Replace with: (3) RFS - APXVAA24_43-U-A20 – Panel Antennas
- Remove: (3) Ericsson KRY 112 144/1
  - Replace with: (3) Ericsson - KRY 112 144/2 – TMA
- Remove: (3) Ericsson S11B12
  - Replace with: (3) Ericsson - Radio 4449 B71+B12 - RRU

Install:

- (1) 1-1/4" fiber

Existing Equipment to Remain (including Entitlements):

- (3) Ericsson - AIR B2A B4P – Panel Antennas
- (3) Ericsson - AIR B4A B2P – Panel Antennas
- (3) T-Arms / Commscope VSR-MS-B
- (12) 1-5/8" lines
- (1) 1-5/8" fiber

The tower was approved by the CSC in Case/Docket 340 on April 9, 2008, calling for a monopole no taller than necessary to provide proposed telecommunications services, sufficient to accommodate the antennas of T-Mobile and other entities, and not to exceed 170'. The tower was to provide space for any City of Ansonia and Town of Woodbridge public safety services. All antennas were to be attached with T-arms and the Certificate Holder was to provide a recalculated report of RF power density, to be submitted to Council, if there were to be a change in density levels. It is SBA's opinion that this modification complies with all conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Honorable David S. Cassetti, Mayor of the City of Ansonia, David Blackwell, Sr., Zoning Enforcement Officer of the City of Ansonia, as well as the property owner, Macabee Properties, LLC. (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 with certain modifications.

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,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T
508.366.2610 + F
203.446.7700 + C
kpelletier@sbasite.com
Attachments
cc with attachments:

The Honorable David S. Cassetti, Mayor, City of Ansonia
City of Ansonia, 253 Main Street, Ansonia, CT 06401
David Blackwell, Sr., Zoning Enforcement Officer, City of Ansonia
City of Ansonia, 253 Main Street, Ansonia, CT 06401
Macabee Properties, LLC–as property owner
11 Hemlock Hollow Road, Woodbridge, CT 06525

POWER DENSITY

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	167 feet	Height (AGL):	167 feet	Height (AGL):	167 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A1 MPE%	0.52	Antenna B1 MPE%	0.52	Antenna C1 MPE%	0.52
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	167 feet	Height (AGL):	167 feet	Height (AGL):	167 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	80	Total TX Power(W):	80	Total TX Power(W):	80
ERP (W):	3,112.36	ERP (W):	3,112.36	ERP (W):	3,112.36
Antenna A2 MPE%	0.43	Antenna B2 MPE%	0.43	Antenna C2 MPE%	0.43
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20
Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd
Height (AGL):	167 feet	Height (AGL):	167 feet	Height (AGL):	167 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,558.16	ERP (W):	2,558.16	ERP (W):	2,558.16
Antenna A3 MPE%	0.84	Antenna B3 MPE%	0.84	Antenna C3 MPE%	0.84

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	1.79 %
Sprint	3.14 %
Clearwire	0.05 %
Verizon Wireless	2.04 %
MetroPCS	0.40 %
AT&T	3.61 %
Site Total MPE %:	11.03 %

T-Mobile Sector A Total:	1.79 %
T-Mobile Sector B Total:	1.79 %
T-Mobile Sector C Total:	1.79 %
Site Total:	11.03 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	167	2.16	PCS - 1900 MHz	1000.00	0.22%
T-Mobile PCS - 1900 MHz GSM	1	583.57	167	0.81	PCS - 1900 MHz	1000.00	0.08%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	167	2.16	AWS - 2100 MHz	1000.00	0.22%
T-Mobile AWS - 2100 MHz LTE	2	1,556.18	167	4.32	AWS - 2100 MHz	1000.00	0.43%
T-Mobile 600 MHz LTE	2	826.15	167	2.29	600 MHz	400.00	0.57%
T-Mobile 700 MHz LTE	2	452.93	167	1.26	700 MHz	467.00	0.27%
						Total:	1.79

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

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City of Ansonia, CT

Property Listing Report

Map Block Lot 10000020000 | Account 16660

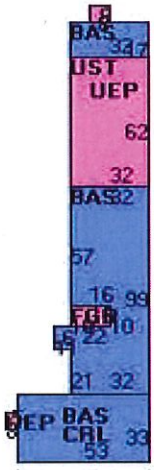
Property Information

Property Location	1 DEERFIELD LA
Owner	MACABEE PROPERTIES LLC
Co-Owner	
Mailing Address	11 HEMLOCK HOLLOW RD WOODBRIDGE CT 06525
Land Use	104 4 Family
Land Class	R
Zoning Code	AA
Census Tract	
Sub Lot	

Neighborhood	
Acreage	16.2
Utilities	Public Water,Septic
Lot Setting/Desc	Level
Survey Map	
Additional Info	

Photo

Sketch



Primary Construction Details

Year Built	1958
Stories	1
Building Style	Family Flat
Building Use	Residential
Building Condition	Average
Floors	Carpet
Total Rooms	12

Bedrooms	8 Bedrooms
Full Bathrooms	4
Half Bathrooms	0
Bath Style	Average
Kitchen Style	Average
Roof Style	Flat
Roof Cover	Tar + Gravel

Exterior Walls	Concr/Cinder
Interior Walls	Plaster
Heating Type	Hot Water
Heating Fuel	Oil
AC Type	None
Gross Bldg Area	9364
Total Living Area	5367

Report Created On 9/10/2018

City of Ansonia, CT

Property Listing Report | Map Block Lot 10000020000 | Account 16660

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	240300	168200
Extras	0	0
Outbuildings	52900	37100
Land	280100	106820
Total	573300	312120

Outbuilding and Extra Items

Type	Description
Cell Tower	1.00 UNITS
Barn 1 St	384.00 S.F.
Stable	800.00 S.F.
Shed	800.00 S.F.
Garage poor	1200.00 S.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
First Floor	5367	5367
Crawl space	1749	0
Garage	160	0
Porch, Enclosed, Unfinished	104	0
Utility, Storage, Unfinished	1984	0
Total Area	9364	5367

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
MACABEE PROPERTIES LLC	435/ 195	12/28/2005	0
GELERTNER JOEL & CHERYL	316/ 863	12/2/1998	235000

Report Created On 9/10/2018

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNH209A

NH209/OptaGelertnerFT
1 Deerfield Lane
Ansonia, CT 06401

August 31, 2018

EBI Project Number: 6218005997

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	11.03 %

EBI Consulting
environmental | engineering | due diligence

August 31, 2018

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

Emissions Analysis for Site: **CTNH209A – NH209/OptaGelertnerFT**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **1 Deerfield Lane, Ansonia, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **1 Deerfield Lane, Ansonia, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

2) 1 UMTS channel (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

7) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

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

10) The antennas used in this modeling are the **Ericsson AIR21 B2A/B4P** & **Ericsson AIR21 B4A/B2P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAA24-43-U-A20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antenna mounting height centerline of the proposed antennas is **167 feet** above ground level (AGL).

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

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	167 feet	Height (AGL):	167 feet	Height (AGL):	167 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	95	Total TX Power(W):	95	Total TX Power(W):	95
ERP (W):	3,695.93	ERP (W):	3,695.93	ERP (W):	3,695.93
Antenna A1 MPE%	**0.52**	Antenna B1 MPE%	**0.52**	Antenna C1 MPE%	**0.52**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	167 feet	Height (AGL):	167 feet	Height (AGL):	167 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	80	Total TX Power(W):	80	Total TX Power(W):	80
ERP (W):	3,112.36	ERP (W):	3,112.36	ERP (W):	3,112.36
Antenna A2 MPE%	**0.43**	Antenna B2 MPE%	**0.43**	Antenna C2 MPE%	**0.43**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20
Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd	Gain:	13.15 / 13.55 dBd
Height (AGL):	167 feet	Height (AGL):	167 feet	Height (AGL):	167 feet
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,558.16	ERP (W):	2,558.16	ERP (W):	2,558.16
Antenna A3 MPE%	**0.84**	Antenna B3 MPE%	**0.84**	Antenna C3 MPE%	**0.84**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**1.79 %**
Sprint	**3.14** %
Clearwire	**0.05** %
Verizon Wireless	**2.04** %
MetroPCS	**0.40** %
AT&T	**3.61** %
Site Total MPE %:	**11.03 %**

T-Mobile Sector A Total:	1.79 %
T-Mobile Sector B Total:	1.79 %
T-Mobile Sector C Total:	1.79 %
Site Total:	11.03 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz UMTS	1	1,556.18	167	2.16	PCS - 1900 MHz	1000.00	0.22%
T-Mobile PCS - 1900 MHz GSM	1	583.57	167	0.81	PCS - 1900 MHz	1000.00	0.08%
T-Mobile AWS - 2100 MHz UMTS	1	1,556.18	167	2.16	AWS - 2100 MHz	1000.00	0.22%
T-Mobile AWS - 2100 MHz LTE	2	1,556.18	167	4.32	AWS - 2100 MHz	1000.00	0.43%
T-Mobile 600 MHz LTE	2	826.15	167	2.29	600 MHz	400.00	0.57%
T-Mobile 700 MHz LTE	2	452.93	167	1.26	700 MHz	467.00	0.27%
						Total:	**1.79**

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:	1.79 %
Sector B:	1.79 %
Sector C:	1.79 %
T-Mobile Maximum MPE % (Per Sector):	1.79 %
Site Total:	11.03 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.03%** 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.

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

Structural Analysis Report

Existing 169 ft. SABRE Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13071-A

Customer Site Name: Woodbridge

Carrier Name: T-Mobile

Carrier Site ID / Name: CTNH209A / NH209/OptaGelertnerFT

Site Location: 1 Deerfield Lane

Ansonia, Connecticut

New Haven County

Latitude: 41.350750

Longitude: -73.049250

8/29/2018

Analysis Result:

Max Structural Usage: 79.6% [Pass]

Max Foundation Usage: 75.0% [Pass]

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

Report Prepared By : Delu Zhou

Introduction

The purpose of this report is to summarize the analysis results on the 169 ft. SABRE 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

Tower Drawings	Sabre, DWG # 08-01016-PE, dated 1/7/2008
Foundation Drawing	Sabre, DWG # 08-01016, dated 1/30/2008
Geotechnical Report	JGI Eastern, Inc., Project # J2085109, dated 1/29/2008
Modification Drawings	TES, Project # 17022, dated 9/1/2015 TES, Project # 19194, dated 12/9/2015 TES, Project # 22848 dated 6/23/2016

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.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 125.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 97.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	B
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft.
Seismic Parameters:	S_S = 0.176g, S_1 = 0.063g

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
-	167.0	3	Ericsson - AIR B2A B4P - Panel	(3) T-Arms/Commscope VSR-MS-B	(12) 1 5/8" (1) 1 5/8" Fiber	T-Mobile
-		3	Ericsson - AIR B4A B2P - Panel			
-		3	Andrew - LNX-6515DS - Panel			
-		3	Ericsson KRY 112 144/1			
-		3	Ericsson S11B12			
6	157.0	3	ALU RRH2X60-AWS RRH	(3) T-Arms	(6) 1 5/8" (12) 1 5/8" (1) 1 5/8" Fiber (1) 1/2"	Verizon[1]
7		3	ALU/900 RRH2X60W - RRH			
8		1	Antel BXA-70063/6CF - Panel			
9		4	Decibel - DB846F65ZAXY - Panel			
10		2	Decibel - DB846H80E-SX - Panel			
11		1	GPS			
12		6	Andrew - HBX-6517DS-VTM - Panel			
13		1	RFS DB T1-6Z-8AB-OZ Distribution Box			
14		2	Swedcom - SLCP 2x6014F - Panel			
15	148.0	3	Powerwave 7770 - Panel	(3) T-Arms w/ (6) 2" STD Steel Pipe Brace Secured Existing Mount & Tower *	(12) 1 5/8" (1) 1/2" Fiber (2) 3/4" DC Power	AT&T
16		1	Cci OPA-65R-LCUU-H6 - Panel			
17		2	Cci OPA-65R-LCUU-H8 - Panel			
18		2	CCI HPA-65R-BUU-H6 - Panel			
19		4	CCI HPA-65R-BUU-H8 - Panel			
20		6	Powerwave LGP21401 TMA			
21		6	Powerwave LGP13519 Diplexer			
22		3	Ericsson RRUS-11 (17.8x17.3x7.2) - RRU			
23		9	Ericsson RRUS 32 - RRU			
24		3	Powerwave 1001940 - Bias-T			
25		2	Raycap DC6-48-60-18-8F - Surge			
26		1	Commscope - WCS-IMFQ-AMT - Filter			
27	137.0	6	APXV18-206517S-C – Panel	(3) T-Arms	(6) 1 5/8"	Metro PCS
28	127.0	3	Nokia AAHC - Panel	(1) SitePro Low Profile Platform w/ handrail (RMQP-4096-HK)	(4) 1/2" Coax (1) 1-5/8" Fiber (4) 1-1/4 Fiber	Sprint Nextel
29		3	Commscope NNVV-65B-R4 - Panel			
30		4	Dragonwave Horizon Duo			
31		3	ALU 1900 Mhz - RRU			
32		6	ALU 800 Mhz - RRU			
33		3	ALU TD-RRH8x20-25 - RRU			
34		3	Andrew VHLP2-11 - Dish			
35		1	Andrew VHLP800-11 - Dish			
36	117.0	1	L-com - HG2409U-PRO - Omni	Chain Mount (Commscope CM-30S-72)	(1) 1 5/8"	Ingenu

*AT&T added mount modifications in this SA.

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
1	167.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) T-Arms/Commscope VSR-MS-B	(12) 1 5/8" (1) 1 5/8" Fiber (1) 1-1/4" Fiber	T-Mobile
2		3	Ericsson - AIR 21 B4A/B2P - Panel			
3		3	RFS - APXVAA24_43-U-A20 - Panel			
4		3	Ericsson - KRY 112 144/2 - TMA			
5		3	Ericsson - Radio 4449 B71+B12 - RRU			

All transmission lines are considered running inside of the pole shafts.

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:	**79.6%**	**72.3%**	**60.2%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	4382.3	34.2	91.7

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)
127.0	Andrew Microwaves - VHLP800-11 - Dish	Sprint Nextel	0.001	1.409

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 analysis is based on the presumption that the tower 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.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. 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.

7. 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.

8. 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.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 79.56% at 105.0ft

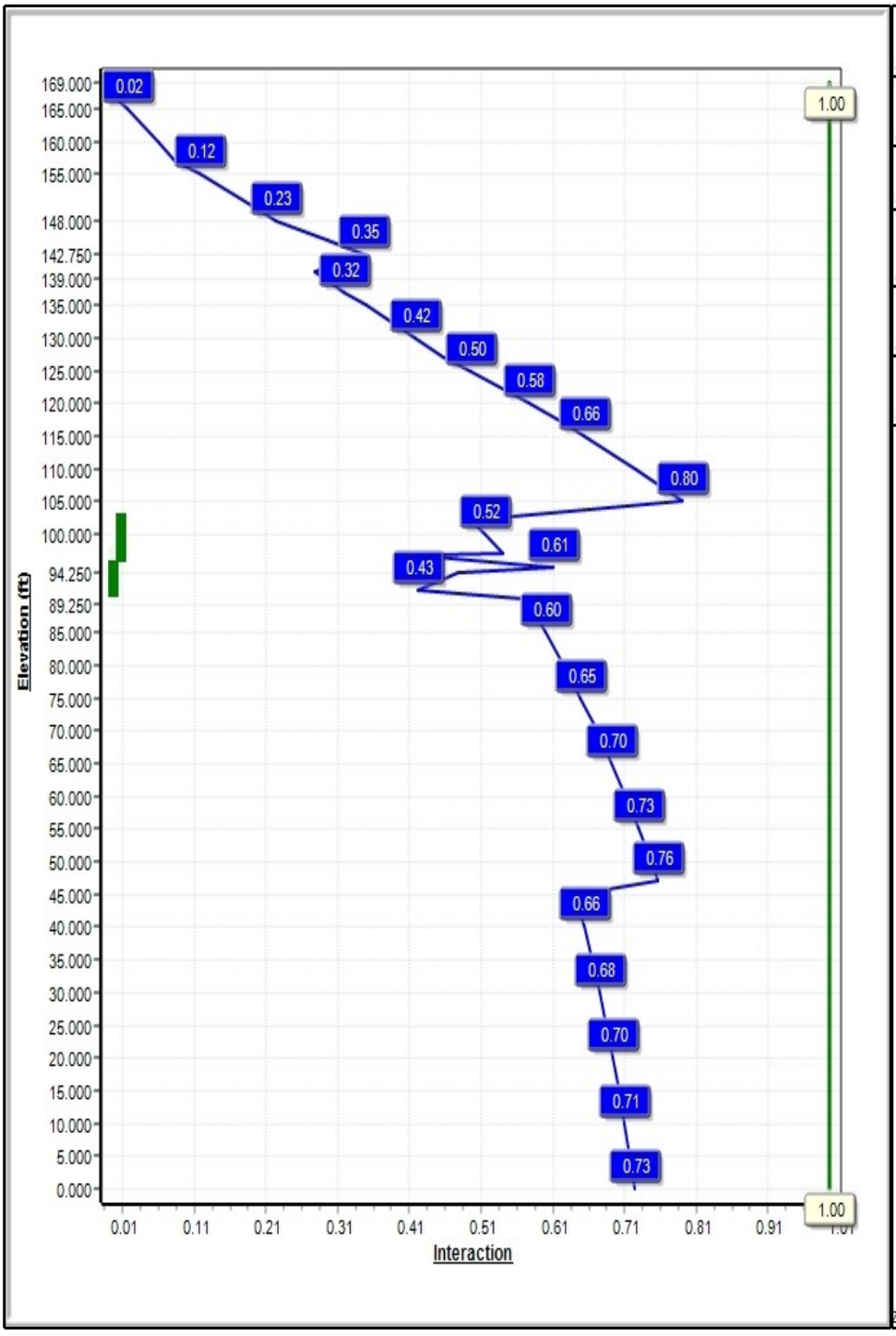
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge	**Exposure:**	B	
Height:	169.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

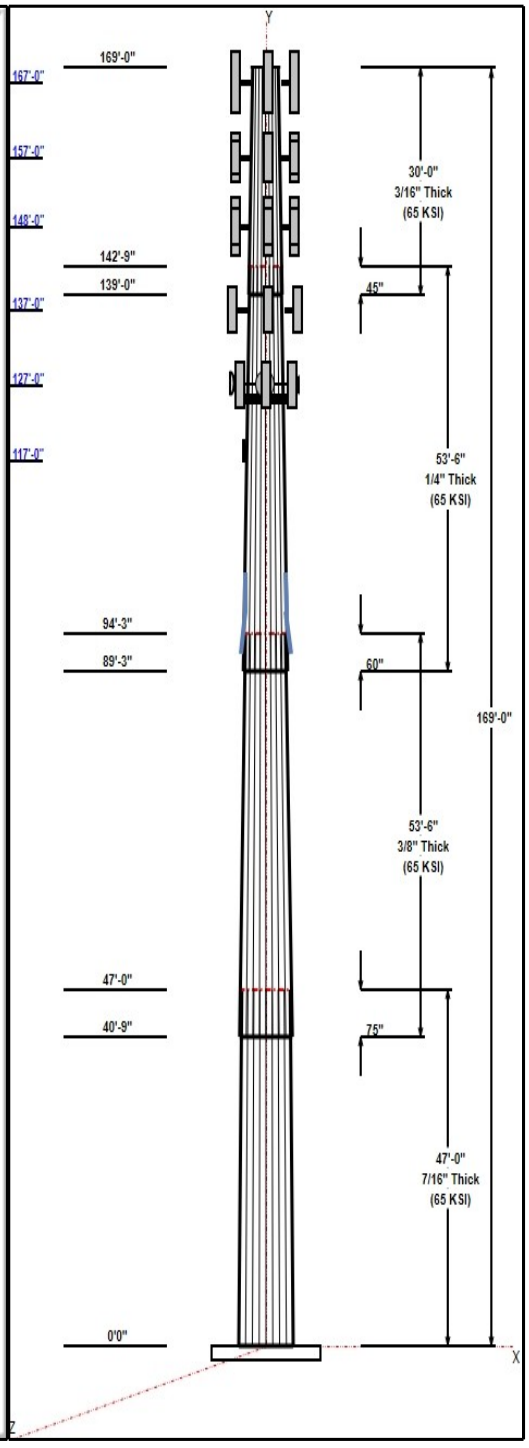
Tower Engineering Solutions

Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 97 mph Wind

Iterations: 27





Structure: CT13071-A-SBA

Type: Tapered
Site Name: Woodbridge
Height: 169.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.20003

8/29/2018

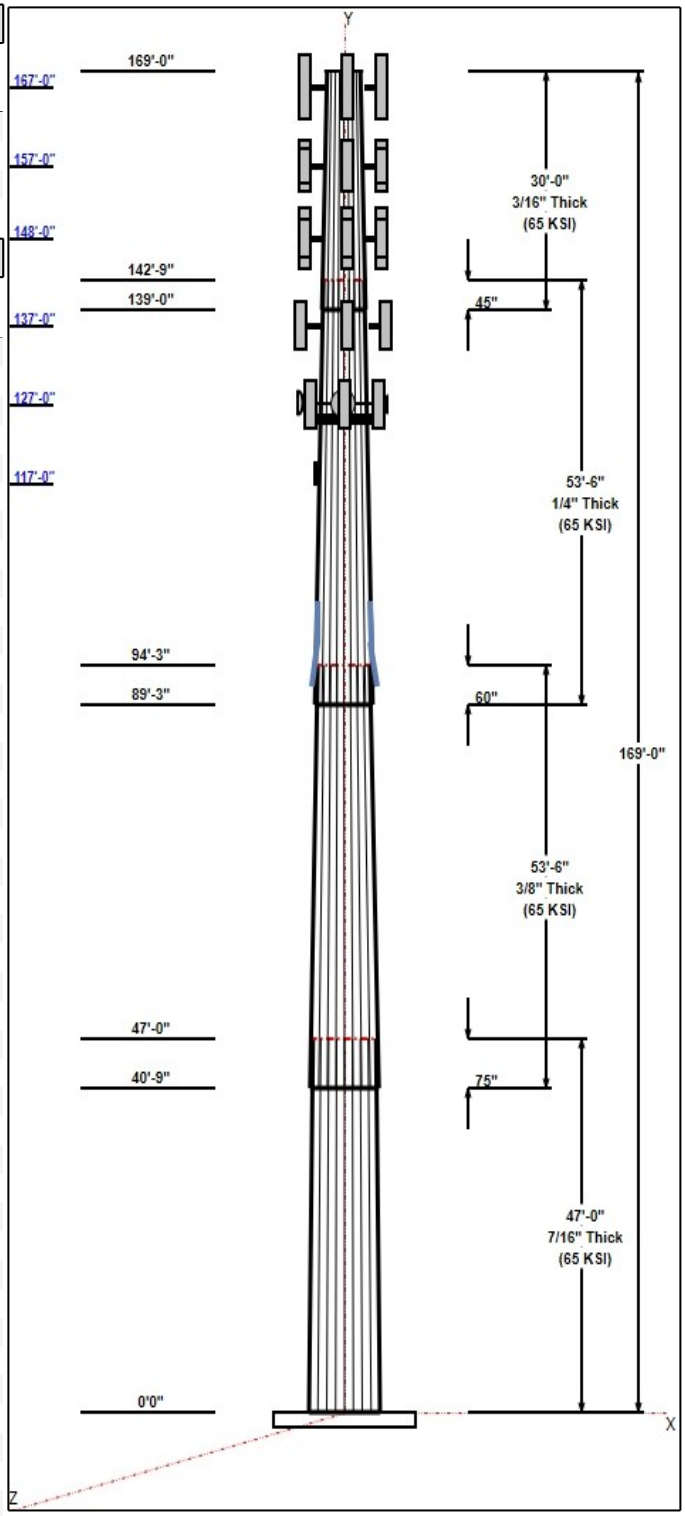
Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	47.00	46.78	56.18	0.438		0.20003	65
2	53.50	38.08	48.78	0.375	Slip	0.20003	65
3	53.50	28.88	39.58	0.250	Slip	0.20003	65
4	30.00	24.00	30.00	0.188	Slip	0.20003	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
167.00	167.50	3	T-Arms/Commscope	T-Mobile
167.00	167.00	3	AIR 21 B2A/B4P	T-Mobile
167.00	167.00	3	AIR 21 B4A/B2P	T-Mobile
167.00	167.00	3	Ericsson - KRY 112 144/2	T-Mobile
167.00	167.00	3	APXVAA24_43-U-A20	T-Mobile
167.00	167.00	3	Ericsson - Radio 4449	T-Mobile
157.00	157.00	1	BXA-70063/6CF	Verizon
157.00	157.00	3	T-Arms	Verizon
157.00	157.00	2	SLCP 2x6014F	Verizon
157.00	157.00	4	DB846F65ZAXY	Verizon
157.00	157.00	2	DB846H80E-SX	Verizon
157.00	157.00	6	HBX-6517DS-VTM	Verizon
157.00	157.00	3	ALU RRH2X60-AWS RRH	Verizon
157.00	157.00	1	RFS DB T1-6Z-8AB-OZ	Verizon
157.00	157.00	1	GPS	Verizon
157.00	157.00	3	ALU/900 RRH2X60W -	Verizon
150.00	150.00	1	Collar Mount	AT&T
148.00	148.00	3	Ericsson RRUS-11-RRU	AT&T
148.00	148.00	2	Raycap	AT&T
148.00	148.00	3	T-Arms w/ Modifications	AT&T
148.00	148.00	3	Powerwave 7770	AT&T
148.00	148.00	6	Powerwave LGP21401	AT&T
148.00	148.00	6	Powerwave LGP13519	AT&T
148.00	148.00	1	Commscope	AT&T
148.00	148.00	1	Cci OPA-65R-LCUU-H6	AT&T
148.00	148.00	2	Cci OPA-65R-LCUU-H8	AT&T
148.00	148.00	2	CCI HPA-65R-BUU-H6	AT&T
148.00	148.00	4	CCI HPA-65R-BUU-H8	AT&T
148.00	148.00	3	Powerwave 1001940-Bias	AT&T
148.00	148.00	9	Ericsson RRUS 32-RRU	AT&T
137.00	137.00	3	T-Arms	Metro PCS
137.00	137.00	6	APXV18-206517S-C	Metro PCS
127.00	127.00	3	VHLP2-11	Sprint Nextel
127.00	127.00	1	VHLP800-11	Sprint Nextel
127.00	127.00	4	Horizon Duo	Sprint Nextel
127.00	127.00	3	1900MHz RRH	Sprint Nextel
127.00	127.00	6	800 MHz RRH	Sprint Nextel
127.00	127.00	3	TD-RRH8x20-25	Sprint Nextel
127.00	127.00	3	AAHC	Sprint Nextel
127.00	127.00	3	NNVV-65B-R4	Sprint Nextel
127.00	127.00	1	RMQP-4096-HK	Sprint Nextel
117.00	118.35	1	HG2409U-PRO	Ingenu
117.00	117.00	1	CM-30S-72	Ingenu



Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	167.00	Inside	1 5/8" Coax	T-Mobile
0.00	167.00	Inside	1 5/8" Fiber	T-Mobile
0.00	167.00	Inside	1-1/4" Fiber	T-Mobile
0.00	157.00	Inside	1 5/8" Coax	Verizon
0.00	157.00	Outside	1 5/8" Coax	Verizon
0.00	157.00	Inside	1 5/8" Fiber	Verizon
0.00	157.00	Inside	1/2" Coax	Verizon
0.00	148.00	Inside	1 5/8" Coax	AT&T
0.00	148.00	Inside	1/2" Fiber	AT&T
0.00	148.00	Inside	3/4" DC	AT&T
0.00	137.00	Inside	1 5/8" Coax	Metro PCS
0.00	127.00	Inside	1 5/8" Fiber	Sprint Nextel
0.00	127.00	Inside	1-1/4" Fiber	Sprint Nextel
0.00	127.00	Inside	1/2" Coax	Sprint Nextel
0.00	117.00	Inside	1 5/8" Coax	Ingenu
99.25	104.50	Outside	1" Reinforcing plate	
89.25	99.25	Outside	1" Reinforcing plate	44 Farms

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
16	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	61.3	60.0	Clipped

Reactions

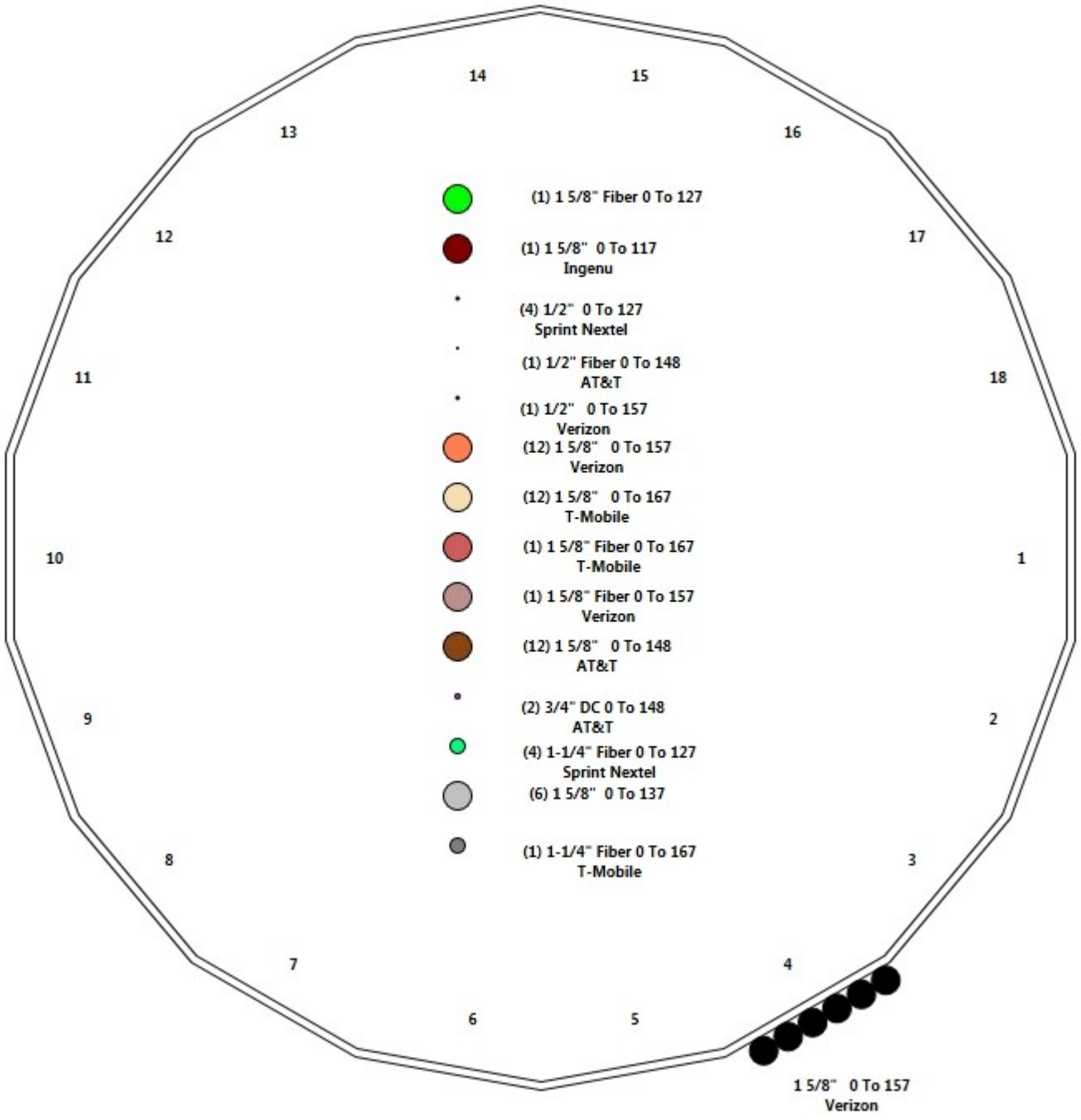
Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 97 mph Wind	4382.3	34.2	58.5
0.9D + 1.6W 97 mph Wind	4321.4	34.2	43.9
1.2D + 1.0Di + 1.0Wi 50 mph Wind	1191.0	9.3	91.7
1.2D + 1.0E	225.0	1.8	58.6
0.9D + 1.0E	221.7	1.8	43.9
1.0D + 1.0W 60 mph Wind	1040.1	8.2	48.8

Structure: CT13071-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Woodbridge
Height: 169.00 (ft)

8/29/2018

Tower Engineering Solutions



Shaft Properties

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	47.000	0.4375	65		0.00	11,335
2	18	53.500	0.3750	65	Slip	75.00	9,329
3	18	53.500	0.2500	65	Slip	60.00	4,908
4	18	30.000	0.1875	65	Slip	45.00	1,629
					Total Shaft Weight:		**27,200**

	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	56.18	0.00	77.40	30386.58	21.23	128.41	46.78	47.00	64.35	17459.0	17.44	106.9	0.200030
2	48.78	40.75	57.61	17053.51	21.53	130.08	38.08	94.25	44.87	8058.91	16.49	101.5	0.200030
3	39.58	89.25	31.21	6097.74	26.50	158.31	28.88	142.75	22.71	2351.56	18.96	115.5	0.200030
4	30.00	139.0	17.74	1992.41	26.80	160.00	24.00	169.00	14.17	1015.22	21.16	128.0	0.200030

Additional Steel

							Intermediate Connectors		Termination Connectors			
Elev From (ft)	**Elev To (ft)**	**Qty**	**Description**	**Fy (ksi)**	**Fu (ksi)**	**Offset (in)**	**Description**	**Spacing (in)**	**Description**	**Spacing (in)**	**Lower Qty**	**Upper Qty**
91.50	97.00	3	LNP LP6X100-G-10TT	65	80	0.00	5/8" Hollo Bolt	23.00	5/8" Hollo Bolt		9	9
96.75	102.2	3	LNP LP6X100-G-10TT	65	80	0.00	5/8" Hollo Bolt	23.00	5/8" Hollo Bolt		9	9

Load Summary

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	167.00	T-Arms/Commscope VSR-MS-B	3	340.00	6.75	0.75	579.91	12.704	0.75	0.00	0.50
2	167.00	AIR 21 B2A/B4P	3	92.00	6.09	0.86	263.11	7.155	0.86	0.00	0.00
3	167.00	AIR 21 B4A/B2P	3	91.50	6.09	0.86	262.32	7.200	0.86	0.00	0.00
4	167.00	Ericsson - KRY 112 144/2	3	11.00	0.41	0.75	21.90	0.890	0.75	0.00	0.00
5	167.00	APXVAA24_43-U-A20	3	128.00	20.24	0.73	561.31	22.187	0.73	0.00	0.00
6	167.00	Ericsson - Radio 4449 B71+B12	3	74.00	1.65	0.75	142.20	2.167	0.75	0.00	0.00
7	157.00	BXA-70063/6CF	1	17.00	7.57	1.00	159.36	10.346	1.00	0.00	0.00
8	157.00	T-Arms	3	350.00	8.00	0.75	595.45	15.013	0.75	0.00	0.00
9	157.00	SLCP 2x6014F	2	20.00	6.49	0.93	197.04	8.575	0.93	0.00	0.00
10	157.00	DB846F65ZAXY	4	21.00	7.05	0.92	219.47	8.287	0.93	0.00	0.00
11	157.00	DB846H80E-SX	2	16.00	5.01	1.10	176.40	6.231	1.10	0.00	0.00
12	157.00	HBX-6517DS-VTM	6	18.70	5.29	0.75	140.62	6.584	0.75	0.00	0.00
13	157.00	ALU RRH2X60-AWS RRH	3	60.00	3.50	0.76	147.69	4.293	0.78	0.00	0.00
14	157.00	RFS DB T1-6Z-8AB-OZ Distribution	1	19.00	3.20	1.00	94.95	4.035	1.00	0.00	0.00
15	157.00	GPS	1	10.00	1.00	1.00	39.45	1.715	1.00	0.00	0.00
16	157.00	ALU/900 RRH2X60W - RRH	3	46.00	1.88	0.76	115.51	2.469	0.78	0.00	0.00
17	150.00	Collar Mount	1	100.00	3.50	1.00	183.77	5.943	1.00	0.00	0.00
18	148.00	Ericsson RRUS-11-RRU	3	50.00	2.52	0.76	140.08	3.220	0.78	0.00	0.00
19	148.00	Raycap DC6-48-60-18-8F-Surge	2	32.80	1.47	0.90	96.48	2.169	0.90	0.00	0.00
20	148.00	T-Arms w/ Modifications	3	450.00	12.00	0.75	763.72	22.457	0.75	0.00	0.00
21	148.00	Powerwave 7770	3	35.00	5.51	0.77	169.93	6.566	0.80	0.00	0.00
22	148.00	Powerwave LGP21401 TMA	6	14.10	1.29	0.75	39.07	2.125	0.77	0.00	0.00
23	148.00	Powerwave LGP13519	6	5.30	0.34	0.75	14.78	0.793	0.77	0.00	0.00
24	148.00	Commscope WCS-IMFQ-AMT -	1	6.60	1.19	1.00	30.81	1.976	1.00	0.00	0.00
25	148.00	Cci OPA-65R-LCUU-H6	1	73.00	9.66	0.79	304.40	11.024	0.79	0.00	0.00
26	148.00	Cci OPA-65R-LCUU-H8	2	88.00	12.75	0.79	373.59	14.593	0.79	0.00	0.00
27	148.00	CCI HPA-65R-BUU-H6	2	51.00	9.66	0.85	298.72	11.024	0.85	0.00	0.00
28	148.00	CCI HPA-65R-BUU-H8	4	68.00	12.98	0.79	358.59	14.593	0.79	0.00	0.00
29	148.00	Powerwave 1001940-Bias Ts	3	2.00	0.07	0.90	9.46	0.300	0.91	0.00	0.00
30	148.00	Ericsson RRUS 32-RRU	9	77.00	1.65	0.70	125.40	2.229	0.72	0.00	0.00
31	137.00	T-Arms	3	242.00	8.19	0.75	446.08	18.359	0.75	0.00	0.00
32	137.00	APXV18-206517S-C	6	26.40	5.17	0.74	118.41	7.523	0.74	0.00	0.00
33	127.00	VHLP2-11	3	27.00	4.68	1.00	123.25	5.933	1.00	0.10	0.00
34	127.00	VHLP800-11	1	48.00	8.43	1.00	219.27	10.108	1.00	0.10	0.00
35	127.00	Horizon Duo	4	7.00	0.59	0.75	22.26	1.143	0.75	0.00	0.00
36	127.00	1900MHz RRH	3	60.00	2.77	0.99	142.06	4.018	0.99	0.00	0.00
37	127.00	800 MHz RRH	6	53.00	2.49	0.92	125.74	3.615	0.92	0.00	0.00
38	127.00	TD-RRH8x20-25	3	70.00	4.05	0.69	178.26	4.849	0.71	0.00	0.00
39	127.00	AAHC	3	103.60	4.21	0.75	207.38	5.008	0.75	0.00	0.00
40	127.00	NNVV-65B-R4	3	77.40	12.27	0.74	358.24	13.702	0.74	0.00	0.00
41	127.00	RMQP-4096-HK	1	2645.00	51.70	1.00	5368.94	89.325	1.00	0.00	0.00
42	117.00	HG2409U-PRO	1	2.80	0.38	1.00	28.28	0.981	1.00	0.00	1.35
43	117.00	CM-30S-72	1	350.00	5.00	1.00	636.00	8.405	1.00	0.00	0.00
		Totals:	**128**	**12,397.50**			**31,194.95**				

Linear Appurtenances

Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	No Ice CaAa Factor	Ice Weight (lb)	Ice CaAa (sf)	Ice CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
Bottom Elev. (ft)	Top Elev. (ft)	Description		Exposed Width	Exposed						
0.00	167.00	(12) 1 5/8" Coax		0.00	Inside						
0.00	167.00	(1) 1 5/8" Fiber		0.00	Inside						
0.00	167.00	(1) 1-1/4" Fiber		0.00	Inside						
0.00	157.00	(12) 1 5/8" Coax		0.00	Inside						
0.00	157.00	(6) 1 5/8" Coax		1.98	Outside						
0.00	157.00	(1) 1 5/8" Fiber		0.00	Inside						
0.00	157.00	(1) 1/2" Coax		0.00	Inside						
0.00	148.00	(12) 1 5/8" Coax		0.00	Inside						
0.00	148.00	(1) 1/2" Fiber		0.00	Inside						
0.00	148.00	(2) 3/4" DC		0.00	Inside						
0.00	137.00	(6) 1 5/8" Coax		0.00	Inside						
0.00	127.00	(1) 1 5/8" Fiber		0.00	Inside						
0.00	127.00	(4) 1-1/4" Fiber		0.00	Inside						
0.00	127.00	(4) 1/2" Coax		0.00	Inside						
0.00	117.00	(1) 1 5/8" Coax		0.00	Inside						
99.25	104.50	(1) 1" Reinforcing plate		1.00	Outside						
89.25	99.25	(1) 1" Reinforcing plate		1.00	Outside						

Shaft Section Properties

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Increment Length: **5 (ft)**

											Additional Reinforcing			
Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Area (in^2)	Ixp (in^4)	Iyp (in^4)	Weight (lb)
0.00		0.4375	56.180	77.403	30386.6	21.23	128.41	65	76	0.0				
5.00		0.4375	55.180	76.014	28780.1	20.83	126.13	65	77	1305.1				
10.00		0.4375	54.180	74.625	27231.3	20.43	123.84	65	77	1281.5				
15.00		0.4375	53.180	73.236	25739.1	20.02	121.55	65	78	1257.8				
20.00		0.4375	52.179	71.848	24302.4	19.62	119.27	65	78	1234.2				
25.00		0.4375	51.179	70.459	22920.2	19.22	116.98	65	79	1210.6				
30.00		0.4375	50.179	69.070	21591.5	18.81	114.70	65	79	1187.0				
35.00		0.4375	49.179	67.681	20315.1	18.41	112.41	65	80	1163.3				
40.00		0.4375	48.179	66.292	19090.0	18.01	110.12	65	80	1139.7				
40.75	Bot - Section 2	0.4375	48.029	66.084	18910.6	17.95	109.78	65	80	168.9				
45.00		0.4375	47.179	64.904	17915.2	17.60	107.84	65	81	1773.0				
47.00	Top - Section 1	0.3750	47.529	56.123	15766.0	20.94	126.74	65	77	823.4				
50.00		0.3750	46.929	55.408	15171.7	20.66	125.14	65	77	569.3				
55.00		0.3750	45.928	54.218	14214.7	20.19	122.48	65	78	932.6				
60.00		0.3750	44.928	53.028	13298.8	19.71	119.81	65	78	912.3				
65.00		0.3750	43.928	51.837	12423.2	19.24	117.14	65	79	892.1				
70.00		0.3750	42.928	50.647	11586.8	18.77	114.47	65	79	871.8				
75.00		0.3750	41.928	49.456	10788.9	18.30	111.81	65	80	851.6				
80.00		0.3750	40.928	48.266	10028.4	17.83	109.14	65	80	831.3				
85.00		0.3750	39.927	47.076	9304.6	17.36	106.47	65	81	811.1				
89.25	Bot - Section 3	0.3750	39.077	46.064	8717.4	16.96	104.21	65	81	673.5				
90.00		0.3750	38.927	45.885	8616.4	16.89	103.81	65	82	196.8				
91.50	RB1	0.3750	38.627	45.528	8416.8	16.75	103.01	65	82	391.4	18.00	4449.0	2805.1	91.9
94.25	Top - Section 2	0.2500	38.577	30.412	5644.2	25.80	154.31	65	71	709.6	18.00	4328.3	2729.4	168.4
95.00		0.2500	38.427	30.293	5578.2	25.69	153.71	65	71	77.5	18.00	4290.5	2703.4	45.9
96.75	RB2	0.2500	38.077	30.015	5426.2	25.45	152.31	65	71	179.6	36.00	7688.0	6129.7	214.4
97.00	RT1	0.2500	38.027	29.975	5404.7	25.41	152.11	65	72	25.5	18.00	3454.8	3454.8	15.3
100.00		0.2500	37.427	29.499	5151.2	24.99	149.71	65	72	303.6	18.00	3350.2	3350.2	183.7
102.25	RT2	0.2500	36.977	29.142	4966.4	24.67	147.91	65	72	224.5	18.00	3272.8	3272.8	137.8
105.00		0.2500	36.427	28.705	4746.6	24.28	145.71	65	73	270.7				
110.00		0.2500	35.427	27.912	4363.7	23.58	141.71	65	74	481.6				
115.00		0.2500	34.427	27.118	4001.9	22.87	137.71	65	75	468.1				
117.00		0.2500	34.027	26.801	3863.0	22.59	136.11	65	75	183.5				
120.00		0.2500	33.426	26.325	3660.8	22.17	133.71	65	75	271.2				
125.00		0.2500	32.426	25.531	3339.6	21.46	129.71	65	76	441.1				
127.00		0.2500	32.026	25.214	3216.6	21.18	128.10	65	76	172.7				
130.00		0.2500	31.426	24.737	3037.7	20.75	125.70	65	77	255.0				
135.00		0.2500	30.426	23.944	2754.7	20.05	121.70	65	78	414.1				
137.00		0.2500	30.026	23.626	2646.6	19.77	120.10	65	78	161.9				
139.00	Bot - Section 4	0.2500	29.626	23.309	2541.3	19.48	118.50	65	78	159.7				
140.00		0.2500	29.426	23.150	2489.7	19.34	117.70	65	79	139.2				
142.75	Top - Section 3	0.1875	29.251	17.296	1845.8	26.10	156.00	65	71	378.0				
145.00		0.1875	28.801	17.028	1761.3	25.67	153.60	65	71	131.4				
148.00		0.1875	28.201	16.671	1652.8	25.11	150.40	65	72	172.0				
150.00		0.1875	27.801	16.433	1583.0	24.73	148.27	65	72	112.6				
155.00		0.1875	26.800	15.837	1417.2	23.79	142.94	65	73	274.5				
157.00		0.1875	26.400	15.599	1354.2	23.42	140.80	65	74	107.0				
160.00		0.1875	25.800	15.242	1263.3	22.85	137.60	65	75	157.4				
165.00		0.1875	24.800	14.647	1121.0	21.91	132.27	65	76	254.3				
167.00		0.1875	24.400	14.409	1067.3	21.54	130.13	65	76	98.9				

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing Area (in^2)	Additional Reinforcing Ixp (in^4)	Additional Reinforcing Iyp (in^4)	Additional Reinforcing Weight (lb)
169.00		0.1875	24.000	14.171	1015.2	21.16	128.00	65	77	97.3				
									Total Weight	**27200.5**				**857.5**

Wind Loading - Shaft

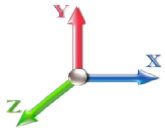
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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	0.70	16.018	17.62	385.81	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	16.018	17.62	378.94	0.650	0.000	5.00	23.558	15.31	431.7	0.0	1566.1
10.00		1.00	0.70	16.018	17.62	372.07	0.650	0.000	5.00	23.135	15.04	423.9	0.0	1537.8
15.00		1.00	0.70	16.018	17.62	365.20	0.650	0.000	5.00	22.712	14.76	416.2	0.0	1509.4
20.00		1.00	0.70	16.018	17.62	358.33	0.650	0.000	5.00	22.288	14.49	408.4	0.0	1481.1
25.00		1.00	0.70	16.018	17.62	351.46	0.650	0.000	5.00	21.865	14.21	400.7	0.0	1452.7
30.00		1.00	0.70	16.031	17.63	344.74	0.650	0.000	5.00	21.442	13.94	393.2	0.0	1424.4
35.00		1.00	0.73	16.753	18.43	345.39	0.650	0.000	5.00	21.019	13.66	402.8	0.0	1396.0
40.00		1.00	0.76	17.405	19.15	344.89	0.650	0.000	5.00	20.596	13.39	410.1	0.0	1367.6
40.75	Bot - Section 2	1.00	0.76	17.497	19.25	344.73	0.650	0.000	0.75	3.053	1.98	61.1	0.0	202.7
45.00		1.00	0.79	18.000	19.80	343.46	0.650	0.000	4.25	17.389	11.30	358.1	0.0	2127.6
47.00	Top - Section 1	1.00	0.80	18.225	20.05	342.67	0.650	0.000	2.00	8.077	5.25	168.4	0.0	988.1
50.00		1.00	0.81	18.551	20.41	346.82	0.650	0.000	3.00	11.989	7.79	254.4	0.0	683.1
55.00		1.00	0.83	19.063	20.97	344.08	0.650	0.000	5.00	19.644	12.77	428.4	0.0	1119.1
60.00		1.00	0.85	19.543	21.50	340.80	0.650	0.000	5.00	19.220	12.49	429.7	0.0	1094.8
65.00		1.00	0.87	19.995	21.99	337.04	0.650	0.000	5.00	18.797	12.22	430.0	0.0	1070.5
70.00		1.00	0.89	20.422	22.46	332.87	0.650	0.000	5.00	18.374	11.94	429.3	0.0	1046.2
75.00		1.00	0.91	20.829	22.91	328.34	0.650	0.000	5.00	17.951	11.67	427.7	0.0	1021.9
80.00		1.00	0.93	21.217	23.34	323.47	0.650	0.000	5.00	17.528	11.39	425.4	0.0	997.6
85.00		1.00	0.94	21.587	23.75	318.32	0.650	0.000	5.00	17.105	11.12	422.4	0.0	973.3
89.25	Bot - Section 3	1.00	0.96	21.890	24.08	313.72	0.650	0.000	4.25	14.206	9.23	355.8	0.0	808.2
90.00		1.00	0.96	21.943	24.14	312.89	0.650	0.000	0.75	2.507	1.63	62.9	0.0	236.2
91.50	RB1	1.00	0.96	22.047	24.25	311.21	0.650	0.000	1.50	4.985	3.24	125.7	0.0	469.6
94.25	Top - Section 2	1.00	0.97	22.234	24.46	308.08	0.650	0.000	2.75	9.041	5.88	230.0	0.0	851.5
95.00		1.00	0.97	22.284	24.51	311.26	0.650	0.000	0.75	2.444	1.59	62.3	0.0	93.0
96.75	RB2	1.00	0.98	22.401	24.64	309.23	0.650	0.000	1.75	5.664	3.68	145.2	0.0	215.5
97.00	RT1	1.00	0.98	22.417	24.66	308.94	0.650	0.000	0.25	0.805	0.52	20.6	0.0	30.6
100.00		1.00	0.99	22.613	24.87	305.39	0.650	0.000	3.00	9.577	6.23	247.8	0.0	364.3
102.25	RT2	1.00	0.99	22.758	25.03	302.68	0.650	0.000	2.25	7.083	4.60	184.4	0.0	269.4
105.00		1.00	1.00	22.931	25.22	299.31	0.650	0.000	2.75	8.541	5.55	224.0	0.0	324.8
110.00		1.00	1.02	23.238	25.56	293.03	0.650	0.000	5.00	15.200	9.88	404.1	0.0	578.0
115.00		1.00	1.03	23.535	25.89	286.57	0.650	0.000	5.00	14.777	9.61	397.9	0.0	561.8
117.00	Appurtenance(s)	1.00	1.03	23.651	26.02	283.94	0.650	0.000	2.00	5.792	3.77	156.7	0.0	220.2
120.00		1.00	1.04	23.823	26.20	279.94	0.650	0.000	3.00	8.562	5.57	233.3	0.0	325.4
125.00		1.00	1.05	24.102	26.51	273.16	0.650	0.000	5.00	13.931	9.06	384.1	0.0	529.4
127.00	Appurtenance(s)	1.00	1.06	24.212	26.63	270.40	0.650	0.000	2.00	5.454	3.55	151.1	0.0	207.2
130.00		1.00	1.07	24.374	26.81	266.22	0.650	0.000	3.00	8.054	5.24	224.6	0.0	305.9
135.00		1.00	1.08	24.638	27.10	259.14	0.650	0.000	5.00	13.085	8.51	368.8	0.0	497.0
137.00	Appurtenance(s)	1.00	1.08	24.742	27.22	256.27	0.650	0.000	2.00	5.115	3.32	144.8	0.0	194.2
139.00	Bot - Section 4	1.00	1.09	24.844	27.33	253.38	0.650	0.000	2.00	5.048	3.28	143.5	0.0	191.7
140.00		1.00	1.09	24.895	27.38	251.93	0.650	0.000	1.00	2.530	1.64	72.1	0.0	167.1
142.75	Top - Section 3	1.00	1.09	25.034	27.54	247.90	0.650	0.000	2.75	6.871	4.47	196.8	0.0	453.6
145.00		1.00	1.10	25.146	27.66	247.81	0.650	0.000	2.25	5.526	3.59	159.0	0.0	157.7
148.00	Appurtenance(s)	1.00	1.11	25.294	27.82	243.36	0.650	0.000	3.00	7.235	4.70	209.4	0.0	206.4
150.00	Appurtenance(s)	1.00	1.11	25.391	27.93	240.37	0.650	0.000	2.00	4.739	3.08	137.6	0.0	135.2
155.00		1.00	1.12	25.630	28.19	232.81	0.650	0.000	5.00	11.551	7.51	338.7	0.0	329.4
157.00	Appurtenance(s)	1.00	1.12	25.724	28.30	229.75	0.650	0.000	2.00	4.502	2.93	132.5	0.0	128.4

Wind Loading - Shaft

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

160.00		1.00	1.13	25.863	28.45	225.14	0.650	0.000	3.00	6.626	4.31	196.0	0.0	188.9
165.00		1.00	1.14	26.092	28.70	217.37	0.650	0.000	5.00	10.704	6.96	319.5	0.0	305.1
167.00	Appurtenance(s)	1.00	1.14	26.182	28.80	214.23	0.650	0.000	2.00	4.163	2.71	124.7	0.0	118.6
169.00		1.00	1.15	26.271	28.90	211.07	0.650	0.000	2.00	4.096	2.66	123.1	0.0	116.7
								Totals:	**169.00**			**13,398.8**		**32,640.6**

Discrete Appurtenance Forces

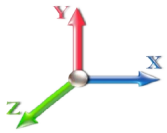
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa 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	167.00	AIR 21 B4A/B2P	3	26.182	28.800	0.77	0.90	14.14	329.40	0.000	0.000	651.61	0.00	0.00
2	167.00	T-Arms/Commscope	3	26.204	28.825	0.56	0.75	11.39	1224.00	0.000	0.500	525.33	0.00	262.66
3	167.00	AIR 21 B2A/B4P	3	26.182	28.800	0.77	0.90	14.14	331.20	0.000	0.000	651.61	0.00	0.00
4	167.00	Ericsson - Radio 4449	3	26.182	28.800	0.60	0.80	2.97	266.40	0.000	0.000	136.86	0.00	0.00
5	167.00	Ericsson - KRY 112 144/2	3	26.182	28.800	0.60	0.80	0.74	39.60	0.000	0.000	34.01	0.00	0.00
6	167.00	APXVAA24_43-U-A20	3	26.182	28.800	0.66	0.90	39.89	460.80	0.000	0.000	1838.27	0.00	0.00
7	157.00	BXA-70063/6CF	1	25.724	28.296	1.00	1.00	7.57	20.40	0.000	0.000	342.72	0.00	0.00
8	157.00	T-Arms	3	25.724	28.296	0.56	0.75	13.50	1260.00	0.000	0.000	611.20	0.00	0.00
9	157.00	SLCP 2x6014F	2	25.724	28.296	0.84	0.90	10.86	48.00	0.000	0.000	491.87	0.00	0.00
10	157.00	DB846F65ZAXY	4	25.724	28.296	0.74	0.80	20.76	100.80	0.000	0.000	939.67	0.00	0.00
11	157.00	DB846H80E-SX	2	25.724	28.296	0.88	0.80	8.82	38.40	0.000	0.000	399.21	0.00	0.00
12	157.00	HBX-6517DS-VTM	6	25.724	28.296	0.60	0.80	19.04	134.64	0.000	0.000	862.20	0.00	0.00
13	157.00	ALU RRH2X60-AWS RRH	3	25.724	28.296	0.61	0.80	6.38	216.00	0.000	0.000	289.03	0.00	0.00
14	157.00	RFS DB T1-6Z-8AB-OZ	1	25.724	28.296	1.00	1.00	3.20	22.80	0.000	0.000	144.88	0.00	0.00
15	157.00	GPS	1	25.724	28.296	1.00	1.00	1.00	12.00	0.000	0.000	45.27	0.00	0.00
16	157.00	ALU/900 RRH2X60W -	3	25.724	28.296	0.61	0.80	3.43	165.60	0.000	0.000	155.25	0.00	0.00
17	150.00	Collar Mount	1	25.391	27.930	1.00	1.00	3.50	120.00	0.000	0.000	156.41	0.00	0.00
18	148.00	Commscope	1	25.294	27.823	1.00	1.00	1.19	7.92	0.000	0.000	52.98	0.00	0.00
19	148.00	CCI HPA-65R-BUU-H8	4	25.294	27.823	0.63	0.80	32.81	326.40	0.000	0.000	1460.75	0.00	0.00
20	148.00	CCI HPA-65R-BUU-H6	2	25.294	27.823	0.68	0.80	13.14	122.40	0.000	0.000	584.84	0.00	0.00
21	148.00	Cci OPA-65R-LCUU-H8	2	25.294	27.823	0.63	0.80	16.12	211.20	0.000	0.000	717.43	0.00	0.00
22	148.00	Cci OPA-65R-LCUU-H6	1	25.294	27.823	0.63	0.80	6.11	87.60	0.000	0.000	271.78	0.00	0.00
23	148.00	Powerwave 7770	3	25.294	27.823	0.61	0.80	10.13	126.00	0.000	0.000	450.94	0.00	0.00
24	148.00	Ericsson RRUS-11-RRU	3	25.294	27.823	0.61	0.80	4.60	180.00	0.000	0.000	204.62	0.00	0.00
25	148.00	Raycap	2	25.294	27.823	0.81	0.90	2.38	78.72	0.000	0.000	106.01	0.00	0.00
26	148.00	T-Arms w/ Modifications	3	25.294	27.823	0.60	0.80	21.60	1620.00	0.000	0.000	961.56	0.00	0.00
27	148.00	Ericsson RRUS 32-RRU	9	25.294	27.823	0.56	0.80	8.32	831.60	0.000	0.000	370.20	0.00	0.00
28	148.00	Powerwave LGP21401	6	25.294	27.823	0.60	0.80	4.64	101.52	0.000	0.000	206.74	0.00	0.00
29	148.00	Powerwave LGP13519	6	25.294	27.823	0.60	0.80	1.22	38.16	0.000	0.000	54.49	0.00	0.00
30	148.00	Powerwave 1001940-Bias	3	25.294	27.823	0.72	0.80	0.15	7.20	0.000	0.000	6.73	0.00	0.00
31	137.00	APXV18-206517S-C	6	24.742	27.216	0.59	0.80	18.36	190.08	0.000	0.000	799.66	0.00	0.00
32	137.00	T-Arms	3	24.742	27.216	0.56	0.75	13.82	871.20	0.000	0.000	601.82	0.00	0.00
33	127.00	Horizon Duo	4	24.212	26.633	0.60	0.80	1.42	33.60	0.000	0.000	60.34	0.00	0.00
34	127.00	VHLP800-11	1	24.212	26.633	1.00	1.00	8.43	57.60	1.455	0.000	359.22	326.67	0.00
35	127.00	1900MHz RRH	3	24.212	26.633	0.74	0.75	6.17	216.00	0.000	0.000	262.93	0.00	0.00
36	127.00	VHLP2-11	3	24.212	26.633	1.00	1.00	14.04	97.20	1.455	0.000	598.28	544.06	0.00
37	127.00	RMQP-4096-HK	1	24.212	26.633	1.00	1.00	51.70	3174.00	0.000	0.000	2203.06	0.00	0.00
38	127.00	800 MHz RRH	6	24.212	26.633	0.69	0.75	10.31	381.60	0.000	0.000	439.27	0.00	0.00
39	127.00	TD-RRH8x20-25	3	24.212	26.633	0.52	0.75	6.29	252.00	0.000	0.000	267.93	0.00	0.00
40	127.00	AAHC	3	24.212	26.633	0.56	0.75	7.10	372.96	0.000	0.000	302.73	0.00	0.00
41	127.00	NNVV-65B-R4	3	24.212	26.633	0.55	0.75	20.43	278.64	0.000	0.000	870.55	0.00	0.00
42	117.00	CM-30S-72	1	23.651	26.016	1.00	1.00	5.00	420.00	0.000	0.000	208.13	0.00	0.00
43	117.00	HG2409U-PRO	1	23.728	26.101	1.00	1.00	0.38	3.36	0.000	1.346	15.87	0.00	21.36
							Totals:		**14,877.00**			**20,714.28**		

Total Applied Force Summary

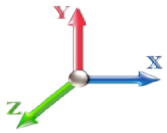
Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 13

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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		431.69	1930.27	0.00	0.00
10.00		423.93	1901.91	0.00	0.00
15.00		416.18	1873.56	0.00	0.00
20.00		408.42	1845.20	0.00	0.00
25.00		400.67	1816.85	0.00	0.00
30.00		393.25	1788.50	0.00	0.00
35.00		402.84	1760.14	0.00	0.00
40.00		410.08	1731.79	0.00	0.00
40.75		61.11	257.32	0.00	0.00
45.00		358.09	2437.11	0.00	0.00
47.00		168.42	1133.71	0.00	0.00
50.00		254.43	901.61	0.00	0.00
55.00		428.38	1483.24	0.00	0.00
60.00		429.70	1458.94	0.00	0.00
65.00		429.97	1434.63	0.00	0.00
70.00		429.28	1410.33	0.00	0.00
75.00		427.74	1386.03	0.00	0.00
80.00		425.43	1361.72	0.00	0.00
85.00		422.42	1337.42	0.00	0.00
89.25		355.76	1117.70	0.00	0.00
90.00		62.93	290.80	0.00	0.00
91.50		125.74	578.87	0.00	0.00
94.25		229.96	1051.79	0.00	0.00
95.00		62.29	147.57	0.00	0.00
96.75		145.16	342.92	0.00	0.00
97.00		20.64	48.83	0.00	0.00
100.00		247.76	582.76	0.00	0.00
102.25		184.40	433.24	0.00	0.00
105.00		224.04	525.06	0.00	0.00
110.00		404.09	942.11	0.00	0.00
115.00		397.86	925.90	0.00	0.00
117.00	(2) attachments	380.72	789.18	0.00	21.36
120.00		233.33	540.13	0.00	0.00
125.00		384.12	887.26	0.00	0.00
127.00	(27) attachments	5515.39	5213.97	870.74	0.00
130.00		224.57	500.69	0.00	0.00
135.00		368.80	821.52	0.00	0.00
137.00	(9) attachments	1546.27	1385.35	0.00	0.00
139.00		143.46	306.50	0.00	0.00
140.00		72.06	224.48	0.00	0.00
142.75		196.77	611.48	0.00	0.00
145.00		158.98	286.88	0.00	0.00
148.00	(45) attachments	5658.43	4117.40	0.00	0.00
150.00	(1) attachments	294.06	338.01	0.00	0.00
155.00		338.67	536.51	0.00	0.00
157.00	(26) attachments	4413.79	2229.84	0.00	0.00

Total Applied Force Summary

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 14

Tower Engineering Solutions

160.00		196.04	241.23	0.00	0.00
165.00		319.51	392.32	0.00	0.00
167.00	(18) attachments	3962.39	2804.93	0.00	262.66
169.00		123.09	116.70	0.00	0.00
	Totals:	**34,113.13**	**58,582.22**	**870.74**	**284.02**

Linear Appurtenance Segment Forces (Factored)

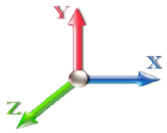
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.035	0.000	16.018	0.00	37.44
10.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.036	0.000	16.018	0.00	37.44
15.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.036	0.000	16.018	0.00	37.44
20.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.037	0.000	16.018	0.00	37.44
25.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.038	0.000	16.018	0.00	37.44
30.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.038	0.000	16.031	0.00	37.44
35.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.039	0.000	16.753	0.00	37.44
40.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.040	0.000	17.405	0.00	37.44
40.75	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.041	0.000	17.497	0.00	5.62
45.00	1 5/8" Coax	Yes	4.25	0.000	1.98	0.70	0.00	0.041	0.000	18.000	0.00	31.82
47.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.042	0.000	18.225	0.00	14.98
50.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.041	0.000	18.551	0.00	22.46
55.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.042	0.000	19.063	0.00	37.44
60.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.043	0.000	19.543	0.00	37.44
65.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.044	0.000	19.995	0.00	37.44
70.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.045	0.000	20.422	0.00	37.44
75.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.046	0.000	20.829	0.00	37.44
80.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.047	0.000	21.217	0.00	37.44
85.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.048	0.000	21.587	0.00	37.44
89.25	1 5/8" Coax	Yes	4.25	0.000	1.98	0.70	0.00	0.049	0.000	21.890	0.00	31.82
90.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.075	0.000	21.943	0.00	5.62
90.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.075	0.000	21.943	0.00	0.00
91.50	1 5/8" Coax	Yes	1.50	0.000	1.98	0.25	0.00	0.076	0.000	22.047	0.00	11.23
91.50	1" Reinforcing plate	Yes	1.50	0.000	1.00	0.13	0.00	0.076	0.000	22.047	0.00	0.00
94.25	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.077	0.000	22.234	0.00	20.59
94.25	1" Reinforcing plate	Yes	2.75	0.000	1.00	0.23	0.00	0.077	0.000	22.234	0.00	0.00
95.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.076	0.000	22.284	0.00	5.62
95.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.076	0.000	22.284	0.00	0.00
96.75	1 5/8" Coax	Yes	1.75	0.000	1.98	0.29	0.00	0.077	0.000	22.401	0.00	13.10
96.75	1" Reinforcing plate	Yes	1.75	0.000	1.00	0.15	0.00	0.077	0.000	22.401	0.00	0.00
97.00	1 5/8" Coax	Yes	0.25	0.000	1.98	0.04	0.00	0.077	0.000	22.417	0.00	1.87
97.00	1" Reinforcing plate	Yes	0.25	0.000	1.00	0.02	0.00	0.077	0.000	22.417	0.00	0.00
100.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.078	0.000	22.613	0.00	22.46
100.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.078	0.000	22.613	0.00	0.00
100.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.078	0.000	22.613	0.00	0.00
102.25	1 5/8" Coax	Yes	2.25	0.000	1.98	0.37	0.00	0.079	0.000	22.758	0.00	16.85
102.25	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.079	0.000	22.758	0.00	0.00
105.00	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.075	0.000	22.931	0.00	20.59
105.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.075	0.000	22.931	0.00	0.00
110.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.054	0.000	23.238	0.00	37.44
115.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.056	0.000	23.535	0.00	37.44
117.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.057	0.000	23.651	0.00	14.98
120.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.058	0.000	23.823	0.00	22.46
125.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.059	0.000	24.102	0.00	37.44
127.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.061	0.000	24.212	0.00	14.98
130.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.061	0.000	24.374	0.00	22.46
135.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.063	0.000	24.638	0.00	37.44

Linear Appurtenance Segment Forces (Factored)

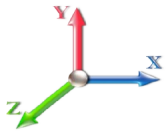
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
137.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.065	0.000	24.742	0.00	14.98
139.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.065	0.000	24.844	0.00	14.98
140.00	1 5/8" Coax	Yes	1.00	0.000	1.98	0.17	0.00	0.066	0.000	24.895	0.00	7.49
142.75	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.067	0.000	25.034	0.00	20.59
145.00	1 5/8" Coax	Yes	2.25	0.000	1.98	0.37	0.00	0.067	0.000	25.146	0.00	16.85
148.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.068	0.000	25.294	0.00	22.46
150.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.070	0.000	25.391	0.00	14.98
155.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.071	0.000	25.630	0.00	37.44
157.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.073	0.000	25.724	0.00	14.98
										Totals:	**0.0**	**1,175.6**

Calculated Forces

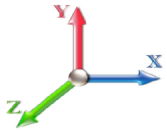
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 27

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	-58.52	-34.22	-0.85	-4382.2	-0.02	4382.25	5324.18	2662.09	12195.0	6106.56	0.00	0.000	0.000	0.729
5.00	-56.47	-33.98	-0.85	-4211.1	-0.02	4211.17	5261.08	2630.54	11832.5	5925.09	0.11	-0.201	0.000	0.722
10.00	-54.45	-33.74	-0.85	-4041.2	-0.02	4041.26	5196.80	2598.40	11472.7	5744.92	0.43	-0.405	0.000	0.714
15.00	-52.46	-33.50	-0.85	-3872.5	-0.02	3872.55	5131.34	2565.67	11115.7	5566.13	0.96	-0.612	0.000	0.706
20.00	-50.50	-33.26	-0.85	-3705.0	-0.02	3705.04	5064.69	2532.35	10761.6	5388.80	1.72	-0.821	0.000	0.698
25.00	-48.57	-33.01	-0.85	-3538.7	-0.02	3538.76	4996.86	2498.43	10410.5	5212.99	2.69	-1.033	0.000	0.689
30.00	-46.66	-32.75	-0.85	-3373.7	-0.02	3373.73	4927.84	2463.92	10062.6	5038.79	3.89	-1.248	0.000	0.679
35.00	-44.79	-32.48	-0.85	-3209.9	-0.02	3209.96	4857.63	2428.82	9718.08	4866.26	5.31	-1.465	0.000	0.669
40.00	-43.00	-32.12	-0.85	-3047.5	-0.02	3047.56	4786.24	2393.12	9377.03	4695.49	6.96	-1.684	0.000	0.658
40.75	-42.68	-32.13	-0.85	-3023.4	-0.02	3023.48	4775.43	2387.72	9326.19	4670.03	7.23	-1.718	0.000	0.657
45.00	-40.18	-31.79	-0.85	-2886.9	-0.02	2886.92	4713.67	2356.83	9039.63	4526.53	8.84	-1.907	0.000	0.646
47.00	-38.99	-31.67	-0.85	-2823.3	-0.02	2823.33	3877.89	1938.95	7512.92	3762.05	9.66	-1.997	0.000	0.761
50.00	-37.99	-31.51	-0.85	-2728.3	-0.02	2728.34	3845.09	1922.55	7353.82	3682.38	10.96	-2.133	-0.001	0.751
55.00	-36.39	-31.18	-0.86	-2570.8	-0.03	2570.81	3789.47	1894.74	7090.51	3550.52	13.33	-2.381	-0.001	0.734
60.00	-34.82	-30.84	-0.86	-2414.9	-0.03	2414.92	3732.67	1866.34	6829.63	3419.89	15.95	-2.631	-0.001	0.716
65.00	-33.27	-30.48	-0.86	-2260.7	-0.03	2260.73	3674.68	1837.34	6571.34	3290.55	18.84	-2.881	-0.001	0.696
70.00	-31.76	-30.12	-0.86	-2108.3	-0.03	2108.32	3615.51	1807.76	6315.78	3162.58	21.99	-3.131	-0.001	0.676
75.00	-30.27	-29.75	-0.86	-1957.7	-0.03	1957.72	3555.15	1777.58	6063.10	3036.06	25.40	-3.381	-0.001	0.654
80.00	-28.81	-29.36	-0.86	-1808.9	-0.04	1808.99	3493.61	1746.80	5813.45	2911.05	29.08	-3.629	-0.001	0.630
85.00	-27.39	-28.96	-0.86	-1662.1	-0.04	1662.17	3430.88	1715.44	5566.98	2787.63	33.01	-3.875	-0.001	0.605
89.25	-26.24	-28.59	-0.86	-1539.0	-0.04	1539.08	3376.63	1688.32	5360.08	2684.02	36.55	-4.083	-0.001	0.581
90.00	-25.92	-28.53	-0.86	-1517.6	-0.04	1517.64	3366.97	1683.48	5323.83	2665.87	37.19	-4.121	-0.001	0.577
91.50	-25.31	-28.40	-0.86	-1474.8	-0.04	1474.85	3347.56	1673.78	5251.55	2629.68	38.50	-4.195	-0.001	0.426
94.25	-24.25	-28.12	-0.86	-1396.7	-0.04	1396.76	1944.87	972.44	3066.99	1535.78	40.94	-4.295	-0.001	0.482
95.00	-24.08	-28.07	-0.86	-1375.6	-0.04	1375.67	1940.65	970.33	3048.28	1526.41	41.62	-4.322	-0.002	0.615
96.75	-23.73	-27.92	-0.86	-1326.5	-0.04	1326.55	1930.70	965.35	3004.67	1504.57	43.22	-4.403	-0.002	0.420
97.00	-23.65	-27.92	-0.86	-1319.5	-0.04	1319.57	1929.27	964.63	2998.44	1501.45	43.45	-4.411	-0.002	0.545
100.00	-23.03	-27.67	-0.86	-1235.8	-0.04	1235.82	1911.84	955.92	2923.84	1464.09	46.26	-4.534	-0.002	0.520
102.25	-22.57	-27.49	-0.86	-1173.5	-0.04	1173.56	1898.49	949.24	2868.04	1436.15	48.41	-4.625	-0.002	0.501
102.25	-22.57	-27.49	-0.86	-1173.5	-0.04	1173.56	1898.49	949.24	2868.04	1436.15	48.41	-4.625	-0.002	0.501
105.00	-21.96	-27.31	-0.86	-1097.9	-0.05	1097.97	1881.84	940.92	2800.02	1402.09	51.11	-4.733	-0.002	0.796
110.00	-20.92	-26.93	-0.87	-961.44	-0.05	961.44	1850.66	925.33	2676.97	1340.48	56.23	-5.042	-0.002	0.729
115.00	-19.94	-26.52	-0.87	-826.78	-0.05	826.78	1818.29	909.14	2554.84	1279.32	61.66	-5.333	-0.003	0.658
117.00	-19.13	-26.12	-0.87	-773.72	-0.05	773.72	1805.01	902.50	2506.28	1255.00	63.92	-5.447	-0.003	0.628
120.00	-18.52	-25.90	-0.87	-695.38	-0.06	695.38	1784.73	892.37	2433.78	1218.70	67.39	-5.609	-0.003	0.582
125.00	-17.60	-25.48	-0.87	-565.89	-0.06	565.89	1749.99	875.00	2313.93	1158.68	73.39	-5.854	-0.003	0.499
127.00	-12.94	-19.48	0.00	-514.93	0.03	514.93	1735.77	867.88	2266.36	1134.86	75.86	-5.946	-0.003	0.462
130.00	-12.41	-19.24	0.00	-456.49	0.02	456.49	1714.07	857.04	2195.44	1099.35	79.63	-6.075	-0.003	0.423
135.00	-11.60	-18.81	0.00	-360.30	0.02	360.30	1676.96	838.48	2078.45	1040.77	86.09	-6.266	-0.003	0.354
137.00	-10.37	-17.13	0.00	-322.68	0.02	322.68	1661.79	830.89	2032.11	1017.57	88.72	-6.337	-0.003	0.324
139.00	-10.07	-16.97	0.00	-288.41	0.02	288.41	1646.42	823.21	1986.05	994.50	91.39	-6.403	-0.003	0.297
140.00	-9.83	-16.88	0.00	-271.44	0.01	271.44	1638.67	819.33	1963.12	983.02	92.73	-6.434	-0.003	0.283
142.75	-9.23	-16.62	0.00	-225.03	0.01	225.03	1100.62	550.31	1316.21	659.08	96.45	-6.512	-0.003	0.351
145.00	-8.94	-16.45	0.00	-187.62	0.01	187.62	1091.20	545.60	1284.61	643.26	99.53	-6.568	-0.003	0.301
148.00	-5.49	-10.36	0.00	-138.29	0.01	138.29	1078.27	539.14	1242.60	622.22	103.67	-6.647	-0.003	0.228
150.00	-5.18	-10.03	0.00	-117.58	0.01	117.58	1069.42	534.71	1214.68	608.24	106.46	-6.691	-0.003	0.199
155.00	-4.68	-9.64	0.00	-67.43	0.00	67.43	1046.45	523.23	1145.25	573.48	113.50	-6.774	-0.003	0.122
157.00	-2.98	-4.99	0.00	-48.16	0.00	48.16	1036.93	518.47	1117.66	559.66	116.34	-6.797	-0.003	0.089

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

160.00	-2.77	-4.77	0.00	-33.19	0.00	33.19	1022.30	511.15	1076.48	539.04	120.61	-6.823	-0.003	0.064
165.00	-2.41	-4.40	0.00	-9.34	0.00	9.34	996.96	498.48	1008.51	505.00	127.75	-6.847	-0.003	0.021
167.00	-0.10	-0.14	0.00	-0.27	0.00	0.27	986.50	493.25	981.58	491.52	130.62	-6.850	-0.003	0.001
169.00	0.00	-0.12	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	133.48	-6.850	-0.003	0.000

Wind Loading - Shaft

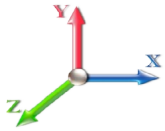
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 27

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	0.70	16.018	17.62	385.81	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	16.018	17.62	378.94	0.650	0.000	5.00	23.558	15.31	431.7	0.0	1174.6
10.00		1.00	0.70	16.018	17.62	372.07	0.650	0.000	5.00	23.135	15.04	423.9	0.0	1153.3
15.00		1.00	0.70	16.018	17.62	365.20	0.650	0.000	5.00	22.712	14.76	416.2	0.0	1132.1
20.00		1.00	0.70	16.018	17.62	358.33	0.650	0.000	5.00	22.288	14.49	408.4	0.0	1110.8
25.00		1.00	0.70	16.018	17.62	351.46	0.650	0.000	5.00	21.865	14.21	400.7	0.0	1089.5
30.00		1.00	0.70	16.031	17.63	344.74	0.650	0.000	5.00	21.442	13.94	393.2	0.0	1068.3
35.00		1.00	0.73	16.753	18.43	345.39	0.650	0.000	5.00	21.019	13.66	402.8	0.0	1047.0
40.00		1.00	0.76	17.405	19.15	344.89	0.650	0.000	5.00	20.596	13.39	410.1	0.0	1025.7
40.75	Bot - Section 2	1.00	0.76	17.497	19.25	344.73	0.650	0.000	0.75	3.053	1.98	61.1	0.0	152.0
45.00		1.00	0.79	18.000	19.80	343.46	0.650	0.000	4.25	17.389	11.30	358.1	0.0	1595.7
47.00	Top - Section 1	1.00	0.80	18.225	20.05	342.67	0.650	0.000	2.00	8.077	5.25	168.4	0.0	741.0
50.00		1.00	0.81	18.551	20.41	346.82	0.650	0.000	3.00	11.989	7.79	254.4	0.0	512.3
55.00		1.00	0.83	19.063	20.97	344.08	0.650	0.000	5.00	19.644	12.77	428.4	0.0	839.3
60.00		1.00	0.85	19.543	21.50	340.80	0.650	0.000	5.00	19.220	12.49	429.7	0.0	821.1
65.00		1.00	0.87	19.995	21.99	337.04	0.650	0.000	5.00	18.797	12.22	430.0	0.0	802.9
70.00		1.00	0.89	20.422	22.46	332.87	0.650	0.000	5.00	18.374	11.94	429.3	0.0	784.6
75.00		1.00	0.91	20.829	22.91	328.34	0.650	0.000	5.00	17.951	11.67	427.7	0.0	766.4
80.00		1.00	0.93	21.217	23.34	323.47	0.650	0.000	5.00	17.528	11.39	425.4	0.0	748.2
85.00		1.00	0.94	21.587	23.75	318.32	0.650	0.000	5.00	17.105	11.12	422.4	0.0	730.0
89.25	Bot - Section 3	1.00	0.96	21.890	24.08	313.72	0.650	0.000	4.25	14.206	9.23	355.8	0.0	606.1
90.00		1.00	0.96	21.943	24.14	312.89	0.650	0.000	0.75	2.507	1.63	62.9	0.0	177.1
91.50	RB1	1.00	0.96	22.047	24.25	311.21	0.650	0.000	1.50	4.985	3.24	125.7	0.0	352.2
94.25	Top - Section 2	1.00	0.97	22.234	24.46	308.08	0.650	0.000	2.75	9.041	5.88	230.0	0.0	638.6
95.00		1.00	0.97	22.284	24.51	311.26	0.650	0.000	0.75	2.444	1.59	62.3	0.0	69.7
96.75	RB2	1.00	0.98	22.401	24.64	309.23	0.650	0.000	1.75	5.664	3.68	145.2	0.0	161.6
97.00	RT1	1.00	0.98	22.417	24.66	308.94	0.650	0.000	0.25	0.805	0.52	20.6	0.0	23.0
100.00		1.00	0.99	22.613	24.87	305.39	0.650	0.000	3.00	9.577	6.23	247.8	0.0	273.2
102.25	RT2	1.00	0.99	22.758	25.03	302.68	0.650	0.000	2.25	7.083	4.60	184.4	0.0	202.0
105.00		1.00	1.00	22.931	25.22	299.31	0.650	0.000	2.75	8.541	5.55	224.0	0.0	243.6
110.00		1.00	1.02	23.238	25.56	293.03	0.650	0.000	5.00	15.200	9.88	404.1	0.0	433.5
115.00		1.00	1.03	23.535	25.89	286.57	0.650	0.000	5.00	14.777	9.61	397.9	0.0	421.3
117.00	Appurtenance(s)	1.00	1.03	23.651	26.02	283.94	0.650	0.000	2.00	5.792	3.77	156.7	0.0	165.1
120.00		1.00	1.04	23.823	26.20	279.94	0.650	0.000	3.00	8.562	5.57	233.3	0.0	244.0
125.00		1.00	1.05	24.102	26.51	273.16	0.650	0.000	5.00	13.931	9.06	384.1	0.0	397.0
127.00	Appurtenance(s)	1.00	1.06	24.212	26.63	270.40	0.650	0.000	2.00	5.454	3.55	151.1	0.0	155.4
130.00		1.00	1.07	24.374	26.81	266.22	0.650	0.000	3.00	8.054	5.24	224.6	0.0	229.5
135.00		1.00	1.08	24.638	27.10	259.14	0.650	0.000	5.00	13.085	8.51	368.8	0.0	372.7
137.00	Appurtenance(s)	1.00	1.08	24.742	27.22	256.27	0.650	0.000	2.00	5.115	3.32	144.8	0.0	145.7
139.00	Bot - Section 4	1.00	1.09	24.844	27.33	253.38	0.650	0.000	2.00	5.048	3.28	143.5	0.0	143.7
140.00		1.00	1.09	24.895	27.38	251.93	0.650	0.000	1.00	2.530	1.64	72.1	0.0	125.3
142.75	Top - Section 3	1.00	1.09	25.034	27.54	247.90	0.650	0.000	2.75	6.871	4.47	196.8	0.0	340.2
145.00		1.00	1.10	25.146	27.66	247.81	0.650	0.000	2.25	5.526	3.59	159.0	0.0	118.3
148.00	Appurtenance(s)	1.00	1.11	25.294	27.82	243.36	0.650	0.000	3.00	7.235	4.70	209.4	0.0	154.8
150.00	Appurtenance(s)	1.00	1.11	25.391	27.93	240.37	0.650	0.000	2.00	4.739	3.08	137.6	0.0	101.4
155.00		1.00	1.12	25.630	28.19	232.81	0.650	0.000	5.00	11.551	7.51	338.7	0.0	247.1
157.00	Appurtenance(s)	1.00	1.12	25.724	28.30	229.75	0.650	0.000	2.00	4.502	2.93	132.5	0.0	96.3

Wind Loading - Shaft

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 20	

160.00		1.00	1.13	25.863	28.45	225.14	0.650	0.000	3.00	6.626	4.31	196.0	0.0	141.7
165.00		1.00	1.14	26.092	28.70	217.37	0.650	0.000	5.00	10.704	6.96	319.5	0.0	228.8
167.00	Appurtenance(s)	1.00	1.14	26.182	28.80	214.23	0.650	0.000	2.00	4.163	2.71	124.7	0.0	89.0
169.00		1.00	1.15	26.271	28.90	211.07	0.650	0.000	2.00	4.096	2.66	123.1	0.0	87.5
								Totals:	**169.00**			**13,398.8**		**24,480.4**

Discrete Appurtenance Forces

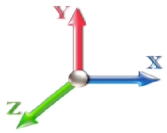
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 27

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa 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	167.00	AIR 21 B4A/B2P	3	26.182	28.800	0.77	0.90	14.14	247.05	0.000	0.000	651.61	0.00	0.00
2	167.00	T-Arms/Commscope	3	26.204	28.825	0.56	0.75	11.39	918.00	0.000	0.500	525.33	0.00	262.66
3	167.00	AIR 21 B2A/B4P	3	26.182	28.800	0.77	0.90	14.14	248.40	0.000	0.000	651.61	0.00	0.00
4	167.00	Ericsson - Radio 4449	3	26.182	28.800	0.60	0.80	2.97	199.80	0.000	0.000	136.86	0.00	0.00
5	167.00	Ericsson - KRY 112 144/2	3	26.182	28.800	0.60	0.80	0.74	29.70	0.000	0.000	34.01	0.00	0.00
6	167.00	APXVAA24_43-U-A20	3	26.182	28.800	0.66	0.90	39.89	345.60	0.000	0.000	1838.27	0.00	0.00
7	157.00	BXA-70063/6CF	1	25.724	28.296	1.00	1.00	7.57	15.30	0.000	0.000	342.72	0.00	0.00
8	157.00	T-Arms	3	25.724	28.296	0.56	0.75	13.50	945.00	0.000	0.000	611.20	0.00	0.00
9	157.00	SLCP 2x6014F	2	25.724	28.296	0.84	0.90	10.86	36.00	0.000	0.000	491.87	0.00	0.00
10	157.00	DB846F65ZAXY	4	25.724	28.296	0.74	0.80	20.76	75.60	0.000	0.000	939.67	0.00	0.00
11	157.00	DB846H80E-SX	2	25.724	28.296	0.88	0.80	8.82	28.80	0.000	0.000	399.21	0.00	0.00
12	157.00	HBX-6517DS-VTM	6	25.724	28.296	0.60	0.80	19.04	100.98	0.000	0.000	862.20	0.00	0.00
13	157.00	ALU RRH2X60-AWS RRH	3	25.724	28.296	0.61	0.80	6.38	162.00	0.000	0.000	289.03	0.00	0.00
14	157.00	RFS DB T1-6Z-8AB-OZ	1	25.724	28.296	1.00	1.00	3.20	17.10	0.000	0.000	144.88	0.00	0.00
15	157.00	GPS	1	25.724	28.296	1.00	1.00	1.00	9.00	0.000	0.000	45.27	0.00	0.00
16	157.00	ALU/900 RRH2X60W -	3	25.724	28.296	0.61	0.80	3.43	124.20	0.000	0.000	155.25	0.00	0.00
17	150.00	Collar Mount	1	25.391	27.930	1.00	1.00	3.50	90.00	0.000	0.000	156.41	0.00	0.00
18	148.00	Commscope	1	25.294	27.823	1.00	1.00	1.19	5.94	0.000	0.000	52.98	0.00	0.00
19	148.00	CCI HPA-65R-BUU-H8	4	25.294	27.823	0.63	0.80	32.81	244.80	0.000	0.000	1460.75	0.00	0.00
20	148.00	CCI HPA-65R-BUU-H6	2	25.294	27.823	0.68	0.80	13.14	91.80	0.000	0.000	584.84	0.00	0.00
21	148.00	Cci OPA-65R-LCUU-H8	2	25.294	27.823	0.63	0.80	16.12	158.40	0.000	0.000	717.43	0.00	0.00
22	148.00	Cci OPA-65R-LCUU-H6	1	25.294	27.823	0.63	0.80	6.11	65.70	0.000	0.000	271.78	0.00	0.00
23	148.00	Powerwave 7770	3	25.294	27.823	0.61	0.80	10.13	94.50	0.000	0.000	450.94	0.00	0.00
24	148.00	Ericsson RRUS-11-RRU	3	25.294	27.823	0.61	0.80	4.60	135.00	0.000	0.000	204.62	0.00	0.00
25	148.00	Raycap	2	25.294	27.823	0.81	0.90	2.38	59.04	0.000	0.000	106.01	0.00	0.00
26	148.00	T-Arms w/ Modifications	3	25.294	27.823	0.60	0.80	21.60	1215.00	0.000	0.000	961.56	0.00	0.00
27	148.00	Ericsson RRUS 32-RRU	9	25.294	27.823	0.56	0.80	8.32	623.70	0.000	0.000	370.20	0.00	0.00
28	148.00	Powerwave LGP21401	6	25.294	27.823	0.60	0.80	4.64	76.14	0.000	0.000	206.74	0.00	0.00
29	148.00	Powerwave LGP13519	6	25.294	27.823	0.60	0.80	1.22	28.62	0.000	0.000	54.49	0.00	0.00
30	148.00	Powerwave 1001940-Bias	3	25.294	27.823	0.72	0.80	0.15	5.40	0.000	0.000	6.73	0.00	0.00
31	137.00	APXV18-206517S-C	6	24.742	27.216	0.59	0.80	18.36	142.56	0.000	0.000	799.66	0.00	0.00
32	137.00	T-Arms	3	24.742	27.216	0.56	0.75	13.82	653.40	0.000	0.000	601.82	0.00	0.00
33	127.00	Horizon Duo	4	24.212	26.633	0.60	0.80	1.42	25.20	0.000	0.000	60.34	0.00	0.00
34	127.00	VHLP800-11	1	24.212	26.633	1.00	1.00	8.43	43.20	1.455	0.000	359.22	326.67	0.00
35	127.00	1900MHz RRH	3	24.212	26.633	0.74	0.75	6.17	162.00	0.000	0.000	262.93	0.00	0.00
36	127.00	VHLP2-11	3	24.212	26.633	1.00	1.00	14.04	72.90	1.455	0.000	598.28	544.06	0.00
37	127.00	RMQP-4096-HK	1	24.212	26.633	1.00	1.00	51.70	2380.50	0.000	0.000	2203.06	0.00	0.00
38	127.00	800 MHz RRH	6	24.212	26.633	0.69	0.75	10.31	286.20	0.000	0.000	439.27	0.00	0.00
39	127.00	TD-RRH8x20-25	3	24.212	26.633	0.52	0.75	6.29	189.00	0.000	0.000	267.93	0.00	0.00
40	127.00	AAHC	3	24.212	26.633	0.56	0.75	7.10	279.72	0.000	0.000	302.73	0.00	0.00
41	127.00	NNVV-65B-R4	3	24.212	26.633	0.55	0.75	20.43	208.98	0.000	0.000	870.55	0.00	0.00
42	117.00	CM-30S-72	1	23.651	26.016	1.00	1.00	5.00	315.00	0.000	0.000	208.13	0.00	0.00
43	117.00	HG2409U-PRO	1	23.728	26.101	1.00	1.00	0.38	2.52	0.000	1.346	15.87	0.00	21.36
							Totals:		**11,157.75**			**20,714.28**		

Total Applied Force Summary

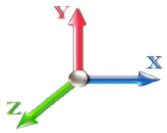
Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 22

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 27

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		431.69	1447.70	0.00	0.00
10.00		423.93	1426.43	0.00	0.00
15.00		416.18	1405.17	0.00	0.00
20.00		408.42	1383.90	0.00	0.00
25.00		400.67	1362.64	0.00	0.00
30.00		393.25	1341.37	0.00	0.00
35.00		402.84	1320.11	0.00	0.00
40.00		410.08	1298.84	0.00	0.00
40.75		61.11	192.99	0.00	0.00
45.00		358.09	1827.84	0.00	0.00
47.00		168.42	850.28	0.00	0.00
50.00		254.43	676.21	0.00	0.00
55.00		428.38	1112.43	0.00	0.00
60.00		429.70	1094.20	0.00	0.00
65.00		429.97	1075.98	0.00	0.00
70.00		429.28	1057.75	0.00	0.00
75.00		427.74	1039.52	0.00	0.00
80.00		425.43	1021.29	0.00	0.00
85.00		422.42	1003.06	0.00	0.00
89.25		355.76	838.27	0.00	0.00
90.00		62.93	218.10	0.00	0.00
91.50		125.74	434.15	0.00	0.00
94.25		229.96	788.84	0.00	0.00
95.00		62.29	110.68	0.00	0.00
96.75		145.16	257.19	0.00	0.00
97.00		20.64	36.62	0.00	0.00
100.00		247.76	437.07	0.00	0.00
102.25		184.40	324.93	0.00	0.00
105.00		224.04	393.80	0.00	0.00
110.00		404.09	706.58	0.00	0.00
115.00		397.86	694.43	0.00	0.00
117.00	(2) attachments	380.72	591.89	0.00	21.36
120.00		233.33	405.10	0.00	0.00
125.00		384.12	665.44	0.00	0.00
127.00	(27) attachments	5515.39	3910.48	870.74	0.00
130.00		224.57	375.52	0.00	0.00
135.00		368.80	616.14	0.00	0.00
137.00	(9) attachments	1546.27	1039.01	0.00	0.00
139.00		143.46	229.88	0.00	0.00
140.00		72.06	168.36	0.00	0.00
142.75		196.77	458.61	0.00	0.00
145.00		158.98	215.16	0.00	0.00
148.00	(45) attachments	5658.43	3088.05	0.00	0.00
150.00	(1) attachments	294.06	253.50	0.00	0.00
155.00		338.67	402.38	0.00	0.00
157.00	(26) attachments	4413.79	1672.38	0.00	0.00

Total Applied Force Summary

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 23

Tower Engineering Solutions

160.00		196.04	180.92	0.00	0.00
165.00		319.51	294.24	0.00	0.00
167.00	(18) attachments	3962.39	2103.70	0.00	262.66
169.00		123.09	87.53	0.00	0.00
	Totals:	**34,113.13**	**43,936.67**	**870.74**	**284.02**

Linear Appurtenance Segment Forces (Factored)

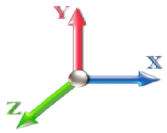
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 27

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.035	0.000	16.018	0.00	28.08
10.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.036	0.000	16.018	0.00	28.08
15.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.036	0.000	16.018	0.00	28.08
20.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.037	0.000	16.018	0.00	28.08
25.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.038	0.000	16.018	0.00	28.08
30.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.038	0.000	16.031	0.00	28.08
35.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.039	0.000	16.753	0.00	28.08
40.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.040	0.000	17.405	0.00	28.08
40.75	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.041	0.000	17.497	0.00	4.21
45.00	1 5/8" Coax	Yes	4.25	0.000	1.98	0.70	0.00	0.041	0.000	18.000	0.00	23.87
47.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.042	0.000	18.225	0.00	11.23
50.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.041	0.000	18.551	0.00	16.85
55.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.042	0.000	19.063	0.00	28.08
60.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.043	0.000	19.543	0.00	28.08
65.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.044	0.000	19.995	0.00	28.08
70.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.045	0.000	20.422	0.00	28.08
75.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.046	0.000	20.829	0.00	28.08
80.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.047	0.000	21.217	0.00	28.08
85.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.048	0.000	21.587	0.00	28.08
89.25	1 5/8" Coax	Yes	4.25	0.000	1.98	0.70	0.00	0.049	0.000	21.890	0.00	23.87
90.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.075	0.000	21.943	0.00	4.21
90.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.075	0.000	21.943	0.00	0.00
91.50	1 5/8" Coax	Yes	1.50	0.000	1.98	0.25	0.00	0.076	0.000	22.047	0.00	8.42
91.50	1" Reinforcing plate	Yes	1.50	0.000	1.00	0.13	0.00	0.076	0.000	22.047	0.00	0.00
94.25	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.077	0.000	22.234	0.00	15.44
94.25	1" Reinforcing plate	Yes	2.75	0.000	1.00	0.23	0.00	0.077	0.000	22.234	0.00	0.00
95.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.076	0.000	22.284	0.00	4.21
95.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.076	0.000	22.284	0.00	0.00
96.75	1 5/8" Coax	Yes	1.75	0.000	1.98	0.29	0.00	0.077	0.000	22.401	0.00	9.83
96.75	1" Reinforcing plate	Yes	1.75	0.000	1.00	0.15	0.00	0.077	0.000	22.401	0.00	0.00
97.00	1 5/8" Coax	Yes	0.25	0.000	1.98	0.04	0.00	0.077	0.000	22.417	0.00	1.40
97.00	1" Reinforcing plate	Yes	0.25	0.000	1.00	0.02	0.00	0.077	0.000	22.417	0.00	0.00
100.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.078	0.000	22.613	0.00	16.85
100.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.078	0.000	22.613	0.00	0.00
100.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.078	0.000	22.613	0.00	0.00
102.25	1 5/8" Coax	Yes	2.25	0.000	1.98	0.37	0.00	0.079	0.000	22.758	0.00	12.64
102.25	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.079	0.000	22.758	0.00	0.00
105.00	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.075	0.000	22.931	0.00	15.44
105.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.075	0.000	22.931	0.00	0.00
110.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.054	0.000	23.238	0.00	28.08
115.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.056	0.000	23.535	0.00	28.08
117.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.057	0.000	23.651	0.00	11.23
120.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.058	0.000	23.823	0.00	16.85
125.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.059	0.000	24.102	0.00	28.08
127.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.061	0.000	24.212	0.00	11.23
130.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.061	0.000	24.374	0.00	16.85
135.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.063	0.000	24.638	0.00	28.08

Linear Appurtenance Segment Forces (Factored)

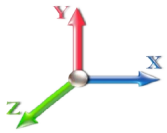
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 27

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
137.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.065	0.000	24.742	0.00	11.23
139.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.065	0.000	24.844	0.00	11.23
140.00	1 5/8" Coax	Yes	1.00	0.000	1.98	0.17	0.00	0.066	0.000	24.895	0.00	5.62
142.75	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.067	0.000	25.034	0.00	15.44
145.00	1 5/8" Coax	Yes	2.25	0.000	1.98	0.37	0.00	0.067	0.000	25.146	0.00	12.64
148.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.068	0.000	25.294	0.00	16.85
150.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.070	0.000	25.391	0.00	11.23
155.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.071	0.000	25.630	0.00	28.08
157.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.073	0.000	25.724	0.00	11.23
										Totals:	**0.0**	**881.7**

Calculated Forces

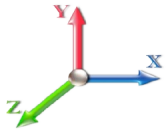
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 27

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	-43.88	-34.19	-0.85	-4321.4	-0.01	4321.44	5324.18	2662.09	12195.0	6106.56	0.00	0.000	0.000	0.716
5.00	-42.31	-33.90	-0.85	-4150.4	-0.01	4150.49	5261.08	2630.54	11832.5	5925.09	0.11	-0.198	0.000	0.709
10.00	-40.77	-33.62	-0.85	-3980.9	-0.01	3980.98	5196.80	2598.40	11472.7	5744.92	0.42	-0.399	0.000	0.701
15.00	-39.25	-33.33	-0.85	-3812.9	-0.01	3812.90	5131.34	2565.67	11115.7	5566.13	0.95	-0.603	0.000	0.693
20.00	-37.75	-33.04	-0.85	-3646.2	-0.01	3646.25	5064.69	2532.35	10761.6	5388.80	1.69	-0.809	0.000	0.684
25.00	-36.27	-32.75	-0.85	-3481.0	-0.02	3481.06	4996.86	2498.43	10410.5	5212.99	2.65	-1.018	0.000	0.675
30.00	-34.82	-32.46	-0.85	-3317.3	-0.02	3317.31	4927.84	2463.92	10062.6	5038.79	3.83	-1.229	0.000	0.666
35.00	-33.39	-32.15	-0.85	-3155.0	-0.02	3155.01	4857.63	2428.82	9718.08	4866.26	5.23	-1.442	0.000	0.655
40.00	-32.04	-31.78	-0.85	-2994.2	-0.02	2994.25	4786.24	2393.12	9377.03	4695.49	6.85	-1.657	0.000	0.645
40.75	-31.78	-31.77	-0.85	-2970.4	-0.02	2970.42	4775.43	2387.72	9326.19	4670.03	7.12	-1.690	0.000	0.643
45.00	-29.89	-31.43	-0.85	-2835.4	-0.02	2835.40	4713.67	2356.83	9039.63	4526.53	8.71	-1.876	0.000	0.633
47.00	-28.99	-31.29	-0.85	-2772.5	-0.02	2772.54	3877.89	1938.95	7512.92	3762.05	9.51	-1.965	0.000	0.745
50.00	-28.22	-31.10	-0.86	-2678.6	-0.02	2678.69	3845.09	1922.55	7353.82	3682.38	10.79	-2.098	-0.001	0.735
55.00	-26.99	-30.75	-0.86	-2523.1	-0.02	2523.18	3789.47	1894.74	7090.51	3550.52	13.12	-2.342	-0.001	0.718
60.00	-25.79	-30.38	-0.86	-2369.4	-0.02	2369.45	3732.67	1866.34	6829.63	3419.89	15.70	-2.587	-0.001	0.700
65.00	-24.60	-30.01	-0.86	-2217.5	-0.02	2217.55	3674.68	1837.34	6571.34	3290.55	18.54	-2.832	-0.001	0.681
70.00	-23.44	-29.62	-0.86	-2067.5	-0.03	2067.53	3615.51	1807.76	6315.78	3162.58	21.64	-3.078	-0.001	0.661
75.00	-22.31	-29.23	-0.86	-1919.4	-0.03	1919.42	3555.15	1777.58	6063.10	3036.06	24.99	-3.322	-0.001	0.639
80.00	-21.19	-28.84	-0.86	-1773.2	-0.03	1773.25	3493.61	1746.80	5813.45	2911.05	28.60	-3.566	-0.001	0.615
85.00	-20.11	-28.43	-0.86	-1629.0	-0.03	1629.07	3430.88	1715.44	5566.98	2787.63	32.46	-3.807	-0.001	0.591
89.25	-19.24	-28.06	-0.86	-1508.2	-0.03	1508.25	3376.63	1688.32	5360.08	2684.02	35.94	-4.011	-0.001	0.568
90.00	-19.00	-28.00	-0.86	-1487.2	-0.03	1487.21	3366.97	1683.48	5323.83	2665.87	36.58	-4.048	-0.001	0.564
91.50	-18.53	-27.87	-0.86	-1445.2	-0.04	1445.21	3347.56	1673.78	5251.55	2629.68	37.86	-4.120	-0.001	0.416
94.25	-17.73	-27.60	-0.86	-1368.5	-0.04	1368.58	1944.87	972.44	3066.99	1535.78	40.26	-4.218	-0.001	0.471
95.00	-17.60	-27.55	-0.86	-1347.8	-0.04	1347.88	1940.65	970.33	3048.28	1526.41	40.92	-4.245	-0.002	0.600
96.75	-17.33	-27.40	-0.86	-1299.6	-0.04	1299.67	1930.70	965.35	3004.67	1504.57	42.49	-4.325	-0.002	0.410
97.00	-17.27	-27.39	-0.86	-1292.8	-0.04	1292.82	1929.27	964.63	2998.44	1501.45	42.72	-4.333	-0.002	0.532
100.00	-16.80	-27.14	-0.86	-1210.6	-0.04	1210.65	1911.84	955.92	2923.84	1464.09	45.48	-4.453	-0.002	0.507
102.25	-16.44	-26.96	-0.86	-1149.5	-0.04	1149.58	1898.49	949.24	2868.04	1436.15	47.60	-4.542	-0.002	0.489
102.25	-16.44	-26.96	-0.86	-1149.5	-0.04	1149.58	1898.49	949.24	2868.04	1436.15	47.60	-4.542	-0.002	0.489
105.00	-15.97	-26.76	-0.87	-1075.4	-0.04	1075.43	1881.84	940.92	2800.02	1402.09	50.24	-4.648	-0.002	0.776
110.00	-15.17	-26.38	-0.87	-941.61	-0.05	941.61	1850.66	925.33	2676.97	1340.48	55.27	-4.950	-0.002	0.711
115.00	-14.42	-25.97	-0.87	-809.71	-0.05	809.71	1818.29	909.14	2554.84	1279.32	60.60	-5.235	-0.003	0.642
117.00	-13.81	-25.57	-0.87	-757.75	-0.05	757.75	1805.01	902.50	2506.28	1255.00	62.82	-5.347	-0.003	0.612
120.00	-13.34	-25.35	-0.87	-681.04	-0.05	681.04	1784.73	892.37	2433.78	1218.70	66.22	-5.506	-0.003	0.567
125.00	-12.64	-24.94	-0.87	-554.30	-0.06	554.30	1749.99	875.00	2313.93	1158.68	72.11	-5.746	-0.003	0.486
127.00	-9.27	-19.07	0.00	-504.43	0.03	504.43	1735.77	867.88	2266.36	1134.86	74.54	-5.836	-0.003	0.450
130.00	-8.87	-18.83	0.00	-447.21	0.02	447.21	1714.07	857.04	2195.44	1099.35	78.24	-5.962	-0.003	0.412
135.00	-8.26	-18.42	0.00	-353.04	0.02	353.04	1676.96	838.48	2078.45	1040.77	84.58	-6.150	-0.003	0.345
137.00	-7.37	-16.78	0.00	-316.20	0.02	316.20	1661.79	830.89	2032.11	1017.57	87.16	-6.219	-0.003	0.316
139.00	-7.14	-16.62	0.00	-282.64	0.02	282.64	1646.42	823.21	1986.05	994.50	89.78	-6.283	-0.003	0.289
140.00	-6.97	-16.53	0.00	-266.03	0.01	266.03	1638.67	819.33	1963.12	983.02	91.10	-6.314	-0.003	0.275
142.75	-6.52	-16.30	0.00	-220.56	0.01	220.56	1100.62	550.31	1316.21	659.08	94.75	-6.390	-0.003	0.341
145.00	-6.30	-16.12	0.00	-183.89	0.01	183.89	1091.20	545.60	1284.61	643.26	97.77	-6.445	-0.003	0.293
148.00	-3.86	-10.15	0.00	-135.53	0.01	135.53	1078.27	539.14	1242.60	622.22	101.84	-6.523	-0.003	0.222
150.00	-3.63	-9.84	0.00	-115.22	0.01	115.22	1069.42	534.71	1214.68	608.24	104.57	-6.566	-0.003	0.193
155.00	-3.26	-9.46	0.00	-66.04	0.00	66.04	1046.45	523.23	1145.25	573.48	111.48	-6.647	-0.003	0.119
157.00	-2.11	-4.88	0.00	-47.12	0.00	47.12	1036.93	518.47	1117.66	559.66	114.27	-6.670	-0.003	0.086

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

160.00	-1.95	-4.67	0.00	-32.48	0.00	32.48	1022.30	511.15	1076.48	539.04	118.46	-6.695	-0.003	0.062
165.00	-1.70	-4.31	0.00	-9.16	0.00	9.16	996.96	498.48	1008.51	505.00	125.47	-6.718	-0.003	0.020
167.00	-0.07	-0.13	0.00	-0.26	0.00	0.26	986.50	493.25	981.58	491.52	128.28	-6.721	-0.003	0.001
169.00	0.00	-0.12	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	131.09	-6.721	-0.003	0.000

Wind Loading - Shaft

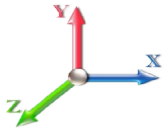
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

IES Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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	0.70	4.256	4.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	4.256	4.68	0.00	1.200	1.242	5.00	24.593	29.51	138.2	439.0	2005.1
10.00		1.00	0.70	4.256	4.68	0.00	1.200	1.331	5.00	24.244	29.09	136.2	462.9	2000.7
15.00		1.00	0.70	4.256	4.68	0.00	1.200	1.386	5.00	23.867	28.64	134.1	473.8	1983.3
20.00		1.00	0.70	4.256	4.68	0.00	1.200	1.427	5.00	23.477	28.17	131.9	479.1	1960.2
25.00		1.00	0.70	4.256	4.68	0.00	1.200	1.459	5.00	23.081	27.70	129.7	481.0	1933.8
30.00		1.00	0.70	4.260	4.69	0.00	1.200	1.486	5.00	22.680	27.22	127.5	480.8	1905.2
35.00		1.00	0.73	4.451	4.90	0.00	1.200	1.509	5.00	22.276	26.73	130.9	479.1	1875.1
40.00		1.00	0.76	4.625	5.09	0.00	1.200	1.529	5.00	21.870	26.24	133.5	476.1	1843.8
40.75	Bot - Section 2	1.00	0.76	4.649	5.11	0.00	1.200	1.532	0.75	3.244	3.89	19.9	71.3	274.0
45.00		1.00	0.79	4.783	5.26	0.00	1.200	1.547	4.25	18.485	22.18	116.7	407.6	2535.2
47.00	Top - Section 1	1.00	0.80	4.843	5.33	0.00	1.200	1.554	2.00	8.595	10.31	54.9	191.1	1179.2
50.00		1.00	0.81	4.929	5.42	0.00	1.200	1.564	3.00	12.771	15.33	83.1	285.0	968.1
55.00		1.00	0.83	5.065	5.57	0.00	1.200	1.579	5.00	20.959	25.15	140.1	469.7	1588.8
60.00		1.00	0.85	5.193	5.71	0.00	1.200	1.592	5.00	20.547	24.66	140.8	464.0	1558.8
65.00		1.00	0.87	5.313	5.84	0.00	1.200	1.605	5.00	20.135	24.16	141.2	457.8	1528.3
70.00		1.00	0.89	5.426	5.97	0.00	1.200	1.617	5.00	19.722	23.67	141.3	451.2	1497.4
75.00		1.00	0.91	5.534	6.09	0.00	1.200	1.628	5.00	19.308	23.17	141.1	444.2	1466.1
80.00		1.00	0.93	5.637	6.20	0.00	1.200	1.639	5.00	18.894	22.67	140.6	436.9	1434.5
85.00		1.00	0.94	5.736	6.31	0.00	1.200	1.649	5.00	18.479	22.17	139.9	429.3	1402.6
89.25	Bot - Section 3	1.00	0.96	5.816	6.40	0.00	1.200	1.657	4.25	15.380	18.46	118.1	359.3	1167.5
90.00		1.00	0.96	5.830	6.41	0.00	1.200	1.658	0.75	2.714	3.26	20.9	64.0	300.2
91.50	RB1	1.00	0.96	5.858	6.44	0.00	1.200	1.661	1.50	5.401	6.48	41.8	127.3	596.9
94.25	Top - Section 2	1.00	0.97	5.908	6.50	0.00	1.200	1.666	2.75	9.805	11.77	76.5	230.9	1082.4
95.00		1.00	0.97	5.921	6.51	0.00	1.200	1.667	0.75	2.652	3.18	20.7	62.8	155.8
96.75	RB2	1.00	0.98	5.952	6.55	0.00	1.200	1.670	1.75	6.152	7.38	48.3	145.5	361.0
97.00	RT1	1.00	0.98	5.956	6.55	0.00	1.200	1.671	0.25	0.875	1.05	6.9	20.8	51.4
100.00		1.00	0.99	6.008	6.61	0.00	1.200	1.676	3.00	10.415	12.50	82.6	246.2	610.5
102.25	RT2	1.00	0.99	6.047	6.65	0.00	1.200	1.680	2.25	7.713	9.26	61.6	183.0	452.4
105.00		1.00	1.00	6.093	6.70	0.00	1.200	1.684	2.75	9.312	11.17	74.9	221.1	545.9
110.00		1.00	1.02	6.174	6.79	0.00	1.200	1.692	5.00	16.610	19.93	135.4	393.3	971.2
115.00		1.00	1.03	6.253	6.88	0.00	1.200	1.699	5.00	16.193	19.43	133.7	384.5	946.2
117.00	Appurtenance(s)	1.00	1.03	6.284	6.91	0.00	1.200	1.702	2.00	6.360	7.63	52.8	152.4	372.5
120.00		1.00	1.04	6.330	6.96	0.00	1.200	1.707	3.00	9.415	11.30	78.7	225.3	550.7
125.00		1.00	1.05	6.404	7.04	0.00	1.200	1.714	5.00	15.359	18.43	129.8	366.4	895.7
127.00	Appurtenance(s)	1.00	1.06	6.433	7.08	0.00	1.200	1.716	2.00	6.026	7.23	51.2	145.1	352.3
130.00		1.00	1.07	6.476	7.12	0.00	1.200	1.720	3.00	8.914	10.70	76.2	214.2	520.2
135.00		1.00	1.08	6.546	7.20	0.00	1.200	1.727	5.00	14.524	17.43	125.5	347.7	844.6
137.00	Appurtenance(s)	1.00	1.08	6.574	7.23	0.00	1.200	1.729	2.00	5.692	6.83	49.4	137.6	331.8
139.00	Bot - Section 4	1.00	1.09	6.601	7.26	0.00	1.200	1.732	2.00	5.625	6.75	49.0	136.0	327.7
140.00		1.00	1.09	6.615	7.28	0.00	1.200	1.733	1.00	2.819	3.38	24.6	68.4	235.5
142.75	Top - Section 3	1.00	1.09	6.652	7.32	0.00	1.200	1.737	2.75	7.667	9.20	67.3	185.3	638.9
145.00		1.00	1.10	6.681	7.35	0.00	1.200	1.739	2.25	6.179	7.41	54.5	149.7	307.3
148.00	Appurtenance(s)	1.00	1.11	6.721	7.39	0.00	1.200	1.743	3.00	8.107	9.73	71.9	196.1	402.5
150.00	Appurtenance(s)	1.00	1.11	6.746	7.42	0.00	1.200	1.745	2.00	5.320	6.38	47.4	129.1	264.3
155.00		1.00	1.12	6.810	7.49	0.00	1.200	1.751	5.00	13.010	15.61	116.9	313.0	642.4
157.00	Appurtenance(s)	1.00	1.12	6.835	7.52	0.00	1.200	1.753	2.00	5.086	6.10	45.9	123.6	252.0

Wind Loading - Shaft

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 29	

160.00		1.00	1.13	6.872	7.56	0.00	1.200	1.757	3.00	7.504	9.00	68.1	181.8	370.7
165.00		1.00	1.14	6.933	7.63	0.00	1.200	1.762	5.00	12.173	14.61	111.4	293.0	598.1
167.00	Appurtenance(s)	1.00	1.14	6.957	7.65	0.00	1.200	1.764	2.00	4.751	5.70	43.6	115.6	234.2
169.00		1.00	1.15	6.980	7.68	0.00	1.200	1.766	2.00	4.684	5.62	43.2	114.0	230.7
								Totals:	**169.00**			**4,450.1**		**46,553.3**

Discrete Appurtenance Forces

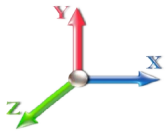
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa 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	167.00	AIR 21 B4A/B2P	3	6.957	7.652	0.77	0.90	16.72	841.87	0.000	0.000	127.93	0.00	0.00
2	167.00	T-Arms/Commscope	3	6.963	7.659	0.56	0.75	21.44	1703.73	0.000	0.500	164.18	0.00	82.09
3	167.00	AIR 21 B2A/B4P	3	6.957	7.652	0.77	0.90	16.61	844.54	0.000	0.000	127.14	0.00	0.00
4	167.00	Ericsson - Radio 4449	3	6.957	7.652	0.60	0.80	3.90	471.00	0.000	0.000	29.85	0.00	0.00
5	167.00	Ericsson - KRY 112 144/2	3	6.957	7.652	0.60	0.80	1.60	62.99	0.000	0.000	12.26	0.00	0.00
6	167.00	APXVAA24_43-U-A20	3	6.957	7.652	0.66	0.90	43.73	1760.74	0.000	0.000	334.63	0.00	0.00
7	157.00	BXA-70063/6CF	1	6.835	7.518	1.00	1.00	10.35	122.16	0.000	0.000	77.79	0.00	0.00
8	157.00	T-Arms	3	6.835	7.518	0.56	0.75	25.33	1786.34	0.000	0.000	190.47	0.00	0.00
9	157.00	SLCP 2x6014F	2	6.835	7.518	0.84	0.90	14.35	301.29	0.000	0.000	107.92	0.00	0.00
10	157.00	DB846F65ZAXY	4	6.835	7.518	0.74	0.80	24.66	894.70	0.000	0.000	185.42	0.00	0.00
11	157.00	DB846H80E-SX	2	6.835	7.518	0.88	0.80	10.97	359.21	0.000	0.000	82.45	0.00	0.00
12	157.00	HBX-6517DS-VTM	6	6.835	7.518	0.60	0.80	23.70	866.16	0.000	0.000	178.19	0.00	0.00
13	157.00	ALU RRH2X60-AWS RRH	3	6.835	7.518	0.62	0.80	8.04	418.76	0.000	0.000	60.42	0.00	0.00
14	157.00	RFS DB T1-6Z-8AB-OZ	1	6.835	7.518	1.00	1.00	4.03	81.95	0.000	0.000	30.34	0.00	0.00
15	157.00	GPS	1	6.835	7.518	1.00	1.00	1.72	33.45	0.000	0.000	12.90	0.00	0.00
16	157.00	ALU/900 RRH2X60W -	3	6.835	7.518	0.62	0.80	4.62	374.13	0.000	0.000	34.75	0.00	0.00
17	150.00	Collar Mount	1	6.746	7.421	1.00	1.00	5.94	-146.23	0.000	0.000	44.11	0.00	0.00
18	148.00	Commscope	1	6.721	7.393	1.00	1.00	1.98	25.23	0.000	0.000	14.61	0.00	0.00
19	148.00	CCI HPA-65R-BUU-H8	4	6.721	7.393	0.63	0.80	36.89	1488.76	0.000	0.000	272.72	0.00	0.00
20	148.00	CCI HPA-65R-BUU-H6	2	6.721	7.393	0.68	0.80	14.99	617.83	0.000	0.000	110.84	0.00	0.00
21	148.00	Cci OPA-65R-LCUU-H8	2	6.721	7.393	0.63	0.80	18.45	782.38	0.000	0.000	136.36	0.00	0.00
22	148.00	Cci OPA-65R-LCUU-H6	1	6.721	7.393	0.63	0.80	6.97	319.00	0.000	0.000	51.51	0.00	0.00
23	148.00	Powerwave 7770	3	6.721	7.393	0.64	0.80	12.54	635.80	0.000	0.000	92.74	0.00	0.00
24	148.00	Ericsson RRUS-11-RRU	3	6.721	7.393	0.62	0.80	6.03	450.24	0.000	0.000	44.56	0.00	0.00
25	148.00	Raycap	2	6.721	7.393	0.81	0.90	3.51	172.69	0.000	0.000	25.98	0.00	0.00
26	148.00	T-Arms w/ Modifications	3	6.721	7.393	0.60	0.80	40.42	2651.15	0.000	0.000	298.83	0.00	0.00
27	148.00	Ericsson RRUS 32-RRU	9	6.721	7.393	0.58	0.80	11.55	1267.24	0.000	0.000	85.41	0.00	0.00
28	148.00	Powerwave LGP21401	6	6.721	7.393	0.62	0.80	7.85	208.73	0.000	0.000	58.05	0.00	0.00
29	148.00	Powerwave LGP13519	6	6.721	7.393	0.62	0.80	2.93	78.87	0.000	0.000	21.68	0.00	0.00
30	148.00	Powerwave 1001940-Bias	3	6.721	7.393	0.73	0.80	0.65	31.38	0.000	0.000	4.84	0.00	0.00
31	137.00	APXV18-206517S-C	6	6.574	7.231	0.59	0.80	26.72	582.54	0.000	0.000	193.24	0.00	0.00
32	137.00	T-Arms	3	6.574	7.231	0.56	0.75	30.98	1306.43	0.000	0.000	224.04	0.00	0.00
33	127.00	Horizon Duo	4	6.433	7.076	0.60	0.80	2.74	77.05	0.000	0.000	19.40	0.00	0.00
34	127.00	VHLP800-11	1	6.433	7.076	1.00	1.00	10.11	179.87	1.455	0.000	71.53	104.08	0.00
35	127.00	1900MHz RRH	3	6.433	7.076	0.74	0.75	8.95	390.47	0.000	0.000	63.33	0.00	0.00
36	127.00	VHLP2-11	3	6.433	7.076	1.00	1.00	17.80	301.94	1.455	0.000	125.96	183.27	0.00
37	127.00	RMQP-4096-HK	1	6.433	7.076	1.00	1.00	89.33	5142.94	0.000	0.000	632.10	0.00	0.00
38	127.00	800 MHz RRH	6	6.433	7.076	0.69	0.75	14.97	691.44	0.000	0.000	105.90	0.00	0.00
39	127.00	TD-RRH8x20-25	3	6.433	7.076	0.53	0.75	7.75	576.79	0.000	0.000	54.81	0.00	0.00
40	127.00	AAHC	3	6.433	7.076	0.56	0.75	8.45	608.99	0.000	0.000	59.80	0.00	0.00
41	127.00	NNVV-65B-R4	3	6.433	7.076	0.55	0.75	22.81	923.77	0.000	0.000	161.44	0.00	0.00
42	117.00	CM-30S-72	1	6.284	6.913	1.00	1.00	8.40	606.00	0.000	0.000	58.10	0.00	0.00
43	117.00	HG2409U-PRO	1	6.305	6.935	1.00	1.00	0.98	28.84	0.000	1.346	6.80	0.00	9.15
							Totals:		**30,923.15**			**4,795.34**		

Total Applied Force Summary

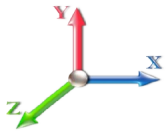
Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 31

TES Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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		138.16	2445.90	0.00	0.00
10.00		136.20	2446.96	0.00	0.00
15.00		134.08	2433.01	0.00	0.00
20.00		131.89	2412.46	0.00	0.00
25.00		129.67	2388.12	0.00	0.00
30.00		127.52	2361.27	0.00	0.00
35.00		130.89	2332.63	0.00	0.00
40.00		133.50	2302.64	0.00	0.00
40.75		19.91	342.90	0.00	0.00
45.00		116.70	2926.22	0.00	0.00
47.00		54.94	1363.36	0.00	0.00
50.00		83.09	1244.76	0.00	0.00
55.00		140.13	2050.94	0.00	0.00
60.00		140.83	2021.80	0.00	0.00
65.00		141.20	1992.14	0.00	0.00
70.00		141.26	1962.01	0.00	0.00
75.00		141.05	1931.47	0.00	0.00
80.00		140.59	1900.58	0.00	0.00
85.00		139.91	1869.36	0.00	0.00
89.25		118.08	1564.65	0.00	0.00
90.00		20.89	373.84	0.00	0.00
91.50		41.76	744.30	0.00	0.00
94.25		76.46	1352.90	0.00	0.00
95.00		20.73	229.53	0.00	0.00
96.75		48.33	533.24	0.00	0.00
97.00		6.88	76.00	0.00	0.00
100.00		82.60	906.09	0.00	0.00
102.25		61.56	674.19	0.00	0.00
105.00		74.90	814.78	0.00	0.00
110.00		135.38	1440.86	0.00	0.00
115.00		133.67	1416.34	0.00	0.00
117.00	(2) attachments	117.65	1195.49	0.00	9.15
120.00		78.67	829.30	0.00	0.00
125.00		129.83	1360.54	0.00	0.00
127.00	(27) attachments	1345.45	9431.53	287.35	0.00
130.00		76.20	779.36	0.00	0.00
135.00		125.50	1277.01	0.00	0.00
137.00	(9) attachments	466.67	2393.79	0.00	0.00
139.00		49.01	485.79	0.00	0.00
140.00		24.61	314.57	0.00	0.00
142.75		67.31	856.45	0.00	0.00
145.00		54.49	485.44	0.00	0.00
148.00	(45) attachments	1290.04	9369.36	0.00	0.00
150.00	(1) attachments	91.49	244.53	0.00	0.00
155.00		116.95	958.93	0.00	0.00
157.00	(26) attachments	1006.54	5616.78	0.00	0.00

Total Applied Force Summary

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 32

Tower Engineering Solutions

160.00		68.07	423.05	0.00	0.00
165.00		111.39	685.31	0.00	0.00
167.00	(18) attachments	839.63	5953.98	0.00	82.09
169.00		43.16	230.65	0.00	0.00
	Totals:	**9,245.44**	**91,747.13**	**287.35**	**91.24**

Linear Appurtenance Segment Forces (Factored)

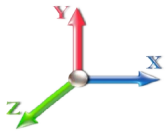
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 33	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	1.98	1.86	0.00	0.035	0.000	4.256	0.00	114.06
10.00	1 5/8" Coax	Yes	5.00	0.000	1.98	1.93	0.00	0.036	0.000	4.256	0.00	119.58
15.00	1 5/8" Coax	Yes	5.00	0.000	1.98	1.98	0.00	0.036	0.000	4.256	0.00	123.04
20.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.01	0.00	0.037	0.000	4.256	0.00	125.61
25.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.04	0.00	0.038	0.000	4.256	0.00	127.66
30.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.06	0.00	0.038	0.000	4.260	0.00	129.38
35.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.08	0.00	0.039	0.000	4.451	0.00	130.87
40.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.10	0.00	0.040	0.000	4.625	0.00	132.19
40.75	1 5/8" Coax	Yes	0.75	0.000	1.98	0.32	0.00	0.041	0.000	4.649	0.00	19.86
45.00	1 5/8" Coax	Yes	4.25	0.000	1.98	1.80	0.00	0.041	0.000	4.783	0.00	113.36
47.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.85	0.00	0.042	0.000	4.843	0.00	53.52
50.00	1 5/8" Coax	Yes	3.00	0.000	1.98	1.28	0.00	0.041	0.000	4.929	0.00	80.66
55.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.14	0.00	0.042	0.000	5.065	0.00	135.41
60.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.15	0.00	0.043	0.000	5.193	0.00	136.31
65.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.16	0.00	0.044	0.000	5.313	0.00	137.16
70.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.17	0.00	0.045	0.000	5.426	0.00	137.94
75.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.18	0.00	0.046	0.000	5.534	0.00	138.68
80.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.19	0.00	0.047	0.000	5.637	0.00	139.38
85.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.20	0.00	0.048	0.000	5.736	0.00	140.04
89.25	1 5/8" Coax	Yes	4.25	0.000	1.98	1.87	0.00	0.049	0.000	5.816	0.00	119.49
90.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.33	0.00	0.075	0.000	5.830	0.00	21.10
90.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.27	0.00	0.075	0.000	5.830	0.00	3.55
91.50	1 5/8" Coax	Yes	1.50	0.000	1.98	0.66	0.00	0.076	0.000	5.858	0.00	42.26
91.50	1" Reinforcing plate	Yes	1.50	0.000	1.00	0.54	0.00	0.076	0.000	5.858	0.00	7.12
94.25	1 5/8" Coax	Yes	2.75	0.000	1.98	1.22	0.00	0.077	0.000	5.908	0.00	77.65
94.25	1" Reinforcing plate	Yes	2.75	0.000	1.00	0.99	0.00	0.077	0.000	5.908	0.00	13.12
95.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.33	0.00	0.076	0.000	5.921	0.00	21.19
95.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.27	0.00	0.076	0.000	5.921	0.00	3.58
96.75	1 5/8" Coax	Yes	1.75	0.000	1.98	0.78	0.00	0.077	0.000	5.952	0.00	49.51
96.75	1" Reinforcing plate	Yes	1.75	0.000	1.00	0.63	0.00	0.077	0.000	5.952	0.00	8.38
97.00	1 5/8" Coax	Yes	0.25	0.000	1.98	0.11	0.00	0.077	0.000	5.956	0.00	7.07
97.00	1" Reinforcing plate	Yes	0.25	0.000	1.00	0.09	0.00	0.077	0.000	5.956	0.00	1.20
100.00	1 5/8" Coax	Yes	3.00	0.000	1.98	1.33	0.00	0.078	0.000	6.008	0.00	85.10
100.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.27	0.00	0.078	0.000	6.008	0.00	3.61
100.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.82	0.00	0.078	0.000	6.008	0.00	10.84
102.25	1 5/8" Coax	Yes	2.25	0.000	1.98	1.00	0.00	0.079	0.000	6.047	0.00	63.94
102.25	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.82	0.00	0.079	0.000	6.047	0.00	10.88
105.00	1 5/8" Coax	Yes	2.75	0.000	1.98	1.23	0.00	0.075	0.000	6.093	0.00	78.31
105.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.82	0.00	0.075	0.000	6.093	0.00	10.93
110.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.23	0.00	0.054	0.000	6.174	0.00	142.91
115.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.24	0.00	0.056	0.000	6.253	0.00	143.41
117.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.90	0.00	0.057	0.000	6.284	0.00	57.44
120.00	1 5/8" Coax	Yes	3.00	0.000	1.98	1.35	0.00	0.058	0.000	6.330	0.00	86.34
125.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.25	0.00	0.059	0.000	6.404	0.00	144.37
127.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.90	0.00	0.061	0.000	6.433	0.00	57.82
130.00	1 5/8" Coax	Yes	3.00	0.000	1.98	1.36	0.00	0.061	0.000	6.476	0.00	86.89
135.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.26	0.00	0.063	0.000	6.546	0.00	145.26

Linear Appurtenance Segment Forces (Factored)

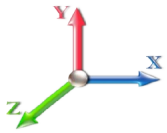
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 34	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
137.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.91	0.00	0.065	0.000	6.574	0.00	58.17
139.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.91	0.00	0.065	0.000	6.601	0.00	58.24
140.00	1 5/8" Coax	Yes	1.00	0.000	1.98	0.45	0.00	0.066	0.000	6.615	0.00	29.14
142.75	1 5/8" Coax	Yes	2.75	0.000	1.98	1.25	0.00	0.067	0.000	6.652	0.00	80.25
145.00	1 5/8" Coax	Yes	2.25	0.000	1.98	1.02	0.00	0.067	0.000	6.681	0.00	65.74
148.00	1 5/8" Coax	Yes	3.00	0.000	1.98	1.37	0.00	0.068	0.000	6.721	0.00	87.80
150.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.91	0.00	0.070	0.000	6.746	0.00	58.60
155.00	1 5/8" Coax	Yes	5.00	0.000	1.98	2.28	0.00	0.071	0.000	6.810	0.00	146.88
157.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.91	0.00	0.073	0.000	6.835	0.00	58.81
										Totals:	**0.0**	**4,381.6**

Calculated Forces

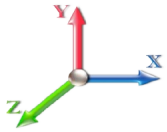
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

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

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 26

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	-91.74	-9.29	-0.29	-1191.0	0.00	1191.03	5324.18	2662.09	12195.0	6106.56	0.00	0.000	0.000	0.212
5.00	-89.29	-9.24	-0.29	-1144.5	0.00	1144.59	5261.08	2630.54	11832.5	5925.09	0.03	-0.055	0.000	0.210
10.00	-86.83	-9.18	-0.29	-1098.4	0.00	1098.41	5196.80	2598.40	11472.7	5744.92	0.12	-0.110	0.000	0.208
15.00	-84.39	-9.12	-0.29	-1052.5	0.00	1052.50	5131.34	2565.67	11115.7	5566.13	0.26	-0.166	0.000	0.206
20.00	-81.97	-9.07	-0.29	-1006.8	0.00	1006.88	5064.69	2532.35	10761.6	5388.80	0.47	-0.223	0.000	0.203
25.00	-79.57	-9.01	-0.29	-961.56	0.00	961.56	4996.86	2498.43	10410.5	5212.99	0.73	-0.281	0.000	0.200
30.00	-77.20	-8.95	-0.29	-916.53	0.00	916.53	4927.84	2463.92	10062.6	5038.79	1.06	-0.339	0.000	0.198
35.00	-74.86	-8.88	-0.29	-871.80	0.00	871.80	4857.63	2428.82	9718.08	4866.26	1.44	-0.398	0.000	0.195
40.00	-72.56	-8.77	-0.29	-827.42	0.00	827.42	4786.24	2393.12	9377.03	4695.49	1.89	-0.457	0.000	0.191
40.75	-72.21	-8.78	-0.29	-820.84	0.00	820.84	4775.43	2387.72	9326.19	4670.03	1.96	-0.467	0.000	0.191
45.00	-69.28	-8.69	-0.29	-783.51	0.00	783.51	4713.67	2356.83	9039.63	4526.53	2.40	-0.518	0.000	0.188
47.00	-67.91	-8.66	-0.29	-766.13	0.00	766.13	3877.89	1938.95	7512.92	3762.05	2.63	-0.543	0.000	0.221
50.00	-66.66	-8.62	-0.29	-740.16	0.00	740.16	3845.09	1922.55	7353.82	3682.38	2.98	-0.579	0.000	0.218
55.00	-64.60	-8.54	-0.29	-697.05	0.00	697.05	3789.47	1894.74	7090.51	3550.52	3.62	-0.647	0.000	0.213
60.00	-62.57	-8.45	-0.29	-654.37	0.00	654.37	3732.67	1866.34	6829.63	3419.89	4.34	-0.714	0.000	0.208
65.00	-60.57	-8.35	-0.29	-612.14	0.00	612.14	3674.68	1837.34	6571.34	3290.55	5.12	-0.782	0.000	0.203
70.00	-58.60	-8.25	-0.29	-570.38	0.00	570.38	3615.51	1807.76	6315.78	3162.58	5.98	-0.850	0.000	0.197
75.00	-56.66	-8.15	-0.29	-529.13	0.00	529.13	3555.15	1777.58	6063.10	3036.06	6.90	-0.917	0.000	0.190
80.00	-54.75	-8.04	-0.29	-488.40	0.00	488.40	3493.61	1746.80	5813.45	2911.05	7.90	-0.984	0.000	0.183
85.00	-52.88	-7.92	-0.29	-448.21	0.00	448.21	3430.88	1715.44	5566.98	2787.63	8.97	-1.051	0.000	0.176
89.25	-51.31	-7.80	-0.29	-414.55	0.00	414.55	3376.63	1688.32	5360.08	2684.02	9.93	-1.107	0.000	0.170
90.00	-50.94	-7.79	-0.29	-408.70	0.00	408.70	3366.97	1683.48	5323.83	2665.87	10.10	-1.117	0.000	0.168
91.50	-50.19	-7.75	-0.29	-397.02	0.00	397.02	3347.56	1673.78	5251.55	2629.68	10.46	-1.137	0.000	0.124
94.25	-48.84	-7.66	-0.29	-375.70	0.00	375.70	1944.87	972.44	3066.99	1535.78	11.12	-1.164	0.000	0.140
95.00	-48.61	-7.65	-0.29	-369.95	0.00	369.95	1940.65	970.33	3048.28	1526.41	11.30	-1.171	-0.001	0.179
96.75	-48.07	-7.60	-0.29	-356.56	0.00	356.56	1930.70	965.35	3004.67	1504.57	11.74	-1.193	-0.001	0.123
97.00	-47.99	-7.61	-0.29	-354.66	0.00	354.66	1929.27	964.63	2998.44	1501.45	11.80	-1.195	-0.001	0.160
100.00	-47.09	-7.53	-0.29	-331.84	0.00	331.84	1911.84	955.92	2923.84	1464.09	12.56	-1.228	-0.001	0.153
102.25	-46.41	-7.47	-0.29	-314.90	-0.01	314.90	1898.49	949.24	2868.04	1436.15	13.14	-1.253	-0.001	0.147
102.25	-46.41	-7.47	-0.29	-314.90	-0.01	314.90	1898.49	949.24	2868.04	1436.15	13.14	-1.253	-0.001	0.147
105.00	-45.59	-7.43	-0.29	-294.34	-0.01	294.34	1881.84	940.92	2800.02	1402.09	13.87	-1.282	-0.001	0.234
110.00	-44.14	-7.32	-0.29	-257.21	-0.01	257.21	1850.66	925.33	2676.97	1340.48	15.26	-1.364	-0.001	0.216
115.00	-42.72	-7.19	-0.29	-220.61	-0.01	220.61	1818.29	909.14	2554.84	1279.32	16.73	-1.442	-0.001	0.196
117.00	-41.53	-7.07	-0.29	-206.22	-0.01	206.22	1805.01	902.50	2506.28	1255.00	17.34	-1.472	-0.001	0.187
120.00	-40.69	-7.01	-0.29	-185.01	-0.01	185.01	1784.73	892.37	2433.78	1218.70	18.28	-1.516	-0.001	0.175
125.00	-39.33	-6.87	-0.29	-149.96	-0.01	149.96	1749.99	875.00	2313.93	1158.68	19.91	-1.581	-0.001	0.152
127.00	-29.94	-5.28	0.00	-136.22	0.00	136.22	1735.77	867.88	2266.36	1134.86	20.57	-1.605	-0.001	0.137
130.00	-29.16	-5.20	0.00	-120.37	0.00	120.37	1714.07	857.04	2195.44	1099.35	21.59	-1.639	-0.001	0.127
135.00	-27.88	-5.06	0.00	-94.35	0.00	94.35	1676.96	838.48	2078.45	1040.77	23.34	-1.689	-0.001	0.107
137.00	-25.50	-4.53	0.00	-84.24	0.00	84.24	1661.79	830.89	2032.11	1017.57	24.05	-1.708	-0.001	0.098
139.00	-25.02	-4.47	0.00	-75.18	0.00	75.18	1646.42	823.21	1986.05	994.50	24.77	-1.725	-0.001	0.091
140.00	-24.70	-4.44	0.00	-70.71	0.00	70.71	1638.67	819.33	1963.12	983.02	25.13	-1.733	-0.001	0.087
142.75	-23.85	-4.36	0.00	-58.49	0.00	58.49	1100.62	550.31	1316.21	659.08	26.14	-1.753	-0.001	0.110
145.00	-23.36	-4.29	0.00	-48.69	0.00	48.69	1091.20	545.60	1284.61	643.26	26.97	-1.768	-0.001	0.097
148.00	-14.03	-2.72	0.00	-35.81	0.00	35.81	1078.27	539.14	1242.60	622.22	28.08	-1.789	-0.001	0.071
150.00	-13.79	-2.62	0.00	-30.37	0.00	30.37	1069.42	534.71	1214.68	608.24	28.84	-1.800	-0.001	0.063
155.00	-12.84	-2.48	0.00	-17.26	0.00	17.26	1046.45	523.23	1145.25	573.48	30.73	-1.821	-0.001	0.042
157.00	-7.26	-1.29	0.00	-12.30	0.00	12.30	1036.93	518.47	1117.66	559.66	31.50	-1.827	-0.001	0.029

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 36	

160.00	-6.83	-1.21	0.00	-8.41	0.00	8.41	1022.30	511.15	1076.48	539.04	32.65	-1.834	-0.001	0.022
165.00	-6.15	-1.08	0.00	-2.34	0.00	2.34	996.96	498.48	1008.51	505.00	34.57	-1.840	-0.001	0.011
167.00	-0.23	-0.05	0.00	-0.10	0.00	0.10	986.50	493.25	981.58	491.52	35.34	-1.840	-0.001	0.000
169.00	0.00	-0.04	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	36.11	-1.841	-0.001	0.000

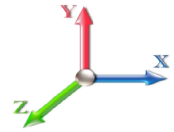
Seismic Segment Forces (Factored)

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 37	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.19	**Iterations**	24
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10	**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.29	**SA**	0.03	**S1**	0.06
						Seismic Importance Factor	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		1305.1	0.00	0.03	0.02	24.03	
10.00		1281.4	0.01	0.05	0.03	34.34	
15.00		1257.8	0.01	0.06	0.04	39.12	
20.00		1234.2	0.03	0.07	0.04	41.24	
25.00		1210.5	0.04	0.07	0.04	42.05	
30.00		1186.9	0.06	0.07	0.04	42.30	
35.00		1163.3	0.08	0.07	0.04	42.36	
40.00		1139.7	0.11	0.07	0.04	42.40	
40.75	Bot - Section 2	168.92	0.11	0.07	0.04	6.30	
45.00		1773.0	0.13	0.07	0.03	67.35	
47.00	Top - Section 1	823.38	0.15	0.07	0.03	31.51	
50.00		569.27	0.17	0.07	0.03	21.99	
55.00		932.58	0.20	0.06	0.02	36.20	
60.00		912.33	0.24	0.06	0.02	34.80	
65.00		892.08	0.28	0.05	0.01	32.16	
70.00		871.83	0.32	0.04	0.01	27.77	
75.00		851.57	0.37	0.03	0.01	21.23	
80.00		831.32	0.42	0.01	0.01	12.44	
85.00		811.07	0.48	-0.01	0.01	1.98	
89.25	Bot - Section 3	673.48	0.53	-0.03	0.01	-6.15	
90.00		196.82	0.54	-0.03	0.01	-2.20	
91.50	RB1	391.36	0.55	-0.04	0.01	-5.93	
94.25	Top - Section 2	709.60	0.59	-0.05	0.01	-15.64	
95.00		77.46	0.60	-0.05	0.01	-1.84	
96.75	RB2	179.56	0.62	-0.06	0.02	-4.96	
97.00	RT1	25.52	0.62	-0.06	0.02	-0.72	
100.00		303.57	0.66	-0.07	0.02	-10.20	
102.25	RT2	224.48	0.69	-0.08	0.03	-8.26	
105.00		270.66	0.73	-0.10	0.04	-10.71	
110.00		481.64	0.80	-0.11	0.05	-19.91	
115.00		468.14	0.88	-0.12	0.08	-18.25	
117.00	Appurtenance(s)	536.27	0.91	-0.12	0.09	-19.80	
120.00		271.16	0.95	-0.12	0.11	-8.85	
125.00		441.13	1.03	-0.10	0.15	-9.89	
127.00	Appurtenance(s)	4225.6	1.07	-0.09	0.17	-72.98	
130.00		254.96	1.12	-0.06	0.20	-2.14	
135.00		414.13	1.21	0.01	0.26	3.88	
137.00	Appurtenance(s)	1046.2	1.24	0.05	0.29	18.37	
139.00	Bot - Section 4	159.71	1.28	0.09	0.32	4.21	
140.00		139.21	1.30	0.12	0.33	4.31	
142.75	Top - Section 3	377.97	1.35	0.19	0.38	16.82	
145.00		131.39	1.39	0.27	0.42	7.42	
148.00	Appurtenance(s)	3287.6	1.45	0.38	0.48	241.95	
150.00	Appurtenance(s)	212.64	1.49	0.47	0.53	18.25	
155.00		274.52	1.59	0.75	0.66	32.74	

Seismic Segment Forces (Factored)

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 38

157.00	Appurtenance(s)	1789.1	1.63	0.88	0.71	239.33	
160.00		157.42	1.69	1.10	0.81	24.68	
165.00		254.27	1.80	1.55	0.98	50.48	
167.00	Appurtenance(s)	2308.3	1.85	1.75	1.06	499.56	
169.00		97.25	1.89	1.98	1.14	22.85	
	Totals:	**39,598.0**				**1,568.0**	**Total Wind:** **34,113.1**

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

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 39	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E							**Iterations**	24
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency**	0.29	**SA**	0.03	**Seismic Importance Factor**			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	-58.58	-1.79	0.00	-225.02	0.00	225.02	5324.18	2662.09	12195.0	6106.56		0.00	0.00	0.048
5.00	-56.65	-1.78	0.00	-216.06	0.00	216.06	5261.08	2630.54	11832.5	5925.09		0.01	-0.01	0.047
10.00	-54.75	-1.75	0.00	-207.18	0.00	207.18	5196.80	2598.40	11472.7	5744.92		0.02	-0.02	0.047
15.00	-52.88	-1.72	0.00	-198.42	0.00	198.42	5131.34	2565.67	11115.7	5566.13		0.05	-0.03	0.046
20.00	-51.03	-1.69	0.00	-189.80	0.00	189.80	5064.69	2532.35	10761.6	5388.80		0.09	-0.04	0.045
25.00	-49.21	-1.66	0.00	-181.36	0.00	181.36	4996.86	2498.43	10410.5	5212.99		0.14	-0.05	0.045
30.00	-47.42	-1.62	0.00	-173.08	0.00	173.08	4927.84	2463.92	10062.6	5038.79		0.20	-0.06	0.044
35.00	-45.66	-1.58	0.00	-164.98	0.00	164.98	4857.63	2428.82	9718.08	4866.26		0.27	-0.08	0.043
40.00	-43.93	-1.54	0.00	-157.06	0.00	157.06	4786.24	2393.12	9377.03	4695.49		0.36	-0.09	0.043
40.75	-43.67	-1.54	0.00	-155.90	0.00	155.90	4775.43	2387.72	9326.19	4670.03		0.37	-0.09	0.043
45.00	-41.24	-1.48	0.00	-149.34	0.00	149.34	4713.67	2356.83	9039.63	4526.53		0.45	-0.10	0.042
47.00	-40.10	-1.45	0.00	-146.39	0.00	146.39	3877.89	1938.95	7512.92	3762.05		0.50	-0.10	0.049
50.00	-39.20	-1.43	0.00	-142.05	0.00	142.05	3845.09	1922.55	7353.82	3682.38		0.56	-0.11	0.049
55.00	-37.72	-1.40	0.00	-134.90	0.00	134.90	3789.47	1894.74	7090.51	3550.52		0.68	-0.12	0.048
60.00	-36.26	-1.37	0.00	-127.90	0.00	127.90	3732.67	1866.34	6829.63	3419.89		0.82	-0.14	0.047
65.00	-34.82	-1.34	0.00	-121.05	0.00	121.05	3674.68	1837.34	6571.34	3290.55		0.97	-0.15	0.046
70.00	-33.41	-1.32	0.00	-114.34	0.00	114.34	3615.51	1807.76	6315.78	3162.58		1.13	-0.16	0.045
75.00	-32.03	-1.30	0.00	-107.75	0.00	107.75	3555.15	1777.58	6063.10	3036.06		1.31	-0.18	0.044
80.00	-30.67	-1.29	0.00	-101.24	0.00	101.24	3493.61	1746.80	5813.45	2911.05		1.50	-0.19	0.044
85.00	-29.33	-1.29	0.00	-94.79	0.00	94.79	3430.88	1715.44	5566.98	2787.63		1.71	-0.20	0.043
89.25	-28.21	-1.29	0.00	-89.30	0.00	89.30	3376.63	1688.32	5360.08	2684.02		1.90	-0.22	0.042
90.00	-27.92	-1.29	0.00	-88.33	0.00	88.33	3366.97	1683.48	5323.83	2665.87		1.93	-0.22	0.041
91.50	-27.34	-1.29	0.00	-86.39	0.00	86.39	3347.56	1673.78	5251.55	2629.68		2.00	-0.22	0.030
94.25	-26.29	-1.29	0.00	-82.84	0.00	82.84	1944.87	972.44	3066.99	1535.78		2.13	-0.23	0.035
95.00	-26.14	-1.29	0.00	-81.87	0.00	81.87	1940.65	970.33	3048.28	1526.41		2.16	-0.23	0.045
96.75	-25.80	-1.29	0.00	-79.62	0.00	79.62	1930.70	965.35	3004.67	1504.57		2.25	-0.23	0.031
97.00	-25.75	-1.29	0.00	-79.29	0.00	79.29	1929.27	964.63	2998.44	1501.45		2.26	-0.24	0.041
100.00	-25.17	-1.29	0.00	-75.42	0.00	75.42	1911.84	955.92	2923.84	1464.09		2.41	-0.24	0.039
102.25	-24.73	-1.29	0.00	-72.51	0.00	72.51	1898.49	949.24	2868.04	1436.15		2.53	-0.25	0.038
102.25	-24.73	-1.29	0.00	-72.51	0.00	72.51	1898.49	949.24	2868.04	1436.15		2.53	-0.25	0.038
105.00	-24.21	-1.30	0.00	-68.96	0.00	68.96	1881.84	940.92	2800.02	1402.09		2.67	-0.25	0.062
110.00	-23.26	-1.30	0.00	-62.47	0.00	62.47	1850.66	925.33	2676.97	1340.48		2.95	-0.27	0.059
115.00	-22.34	-1.30	0.00	-55.98	0.00	55.98	1818.29	909.14	2554.84	1279.32		3.25	-0.29	0.056
117.00	-21.55	-1.30	0.00	-53.37	0.00	53.37	1805.01	902.50	2506.28	1255.00		3.37	-0.30	0.054
120.00	-21.01	-1.30	0.00	-49.47	0.00	49.47	1784.73	892.37	2433.78	1218.70		3.57	-0.31	0.052
125.00	-20.12	-1.30	0.00	-42.96	0.00	42.96	1749.99	875.00	2313.93	1158.68		3.90	-0.33	0.049
127.00	-14.91	-1.27	0.00	-40.36	0.00	40.36	1735.77	867.88	2266.36	1134.86		4.04	-0.34	0.044
130.00	-14.41	-1.27	0.00	-36.54	0.00	36.54	1714.07	857.04	2195.44	1099.35		4.26	-0.35	0.042
135.00	-13.58	-1.27	0.00	-30.17	0.00	30.17	1676.96	838.48	2078.45	1040.77		4.63	-0.36	0.037
137.00	-12.20	-1.24	0.00	-27.63	0.00	27.63	1661.79	830.89	2032.11	1017.57		4.79	-0.37	0.034
139.00	-11.89	-1.24	0.00	-25.15	0.00	25.15	1646.42	823.21	1986.05	994.50		4.94	-0.38	0.033
140.00	-11.67	-1.23	0.00	-23.91	0.00	23.91	1638.67	819.33	1963.12	983.02		5.02	-0.38	0.031
142.75	-11.06	-1.21	0.00	-20.52	0.00	20.52	1100.62	550.31	1316.21	659.08		5.24	-0.39	0.041
145.00	-10.77	-1.20	0.00	-17.80	0.00	17.80	1091.20	545.60	1284.61	643.26		5.43	-0.39	0.038
148.00	-6.65	-0.93	0.00	-14.19	0.00	14.19	1078.27	539.14	1242.60	622.22		5.67	-0.40	0.029
150.00	-6.32	-0.91	0.00	-12.32	0.00	12.32	1069.42	534.71	1214.68	608.24		5.84	-0.40	0.026
155.00	-5.78	-0.88	0.00	-7.75	0.00	7.75	1046.45	523.23	1145.25	573.48		6.27	-0.41	0.019

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 40	

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157.00	-3.55	-0.62	0.00	-5.99	0.00	5.99	1036.93	518.47	1117.66	559.66	6.44	-0.41	0.014
160.00	-3.31	-0.60	0.00	-4.12	0.00	4.12	1022.30	511.15	1076.48	539.04	6.70	-0.42	0.011
165.00	-2.92	-0.54	0.00	-1.13	0.00	1.13	996.96	498.48	1008.51	505.00	7.14	-0.42	0.005
167.00	-0.12	-0.02	0.00	-0.05	0.00	0.05	986.50	493.25	981.58	491.52	7.32	-0.42	0.000
169.00	0.00	-0.02	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	7.50	-0.42	0.000

Seismic Segment Forces (Factored)

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 41	

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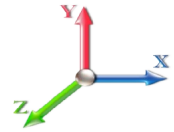
Load Case: 0.9D + 1.0E

Gust Response Factor	1.10			**Sds**	0.19	**Iterations**	24
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10	**Ss**	0.18
Wind Load Factor	0.00	**Structure Frequency**	0.29	**SA**	0.03	**S1**	0.06
						Seismic Importance Factor	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		1305.1	0.00	0.03	0.02	24.03	
10.00		1281.4	0.01	0.05	0.03	34.34	
15.00		1257.8	0.01	0.06	0.04	39.12	
20.00		1234.2	0.03	0.07	0.04	41.24	
25.00		1210.5	0.04	0.07	0.04	42.05	
30.00		1186.9	0.06	0.07	0.04	42.30	
35.00		1163.3	0.08	0.07	0.04	42.36	
40.00		1139.7	0.11	0.07	0.04	42.40	
40.75	Bot - Section 2	168.92	0.11	0.07	0.04	6.30	
45.00		1773.0	0.13	0.07	0.03	67.35	
47.00	Top - Section 1	823.38	0.15	0.07	0.03	31.51	
50.00		569.27	0.17	0.07	0.03	21.99	
55.00		932.58	0.20	0.06	0.02	36.20	
60.00		912.33	0.24	0.06	0.02	34.80	
65.00		892.08	0.28	0.05	0.01	32.16	
70.00		871.83	0.32	0.04	0.01	27.77	
75.00		851.57	0.37	0.03	0.01	21.23	
80.00		831.32	0.42	0.01	0.01	12.44	
85.00		811.07	0.48	-0.01	0.01	1.98	
89.25	Bot - Section 3	673.48	0.53	-0.03	0.01	-6.15	
90.00		196.82	0.54	-0.03	0.01	-2.20	
91.50	RB1	391.36	0.55	-0.04	0.01	-5.93	
94.25	Top - Section 2	709.60	0.59	-0.05	0.01	-15.64	
95.00		77.46	0.60	-0.05	0.01	-1.84	
96.75	RB2	179.56	0.62	-0.06	0.02	-4.96	
97.00	RT1	25.52	0.62	-0.06	0.02	-0.72	
100.00		303.57	0.66	-0.07	0.02	-10.20	
102.25	RT2	224.48	0.69	-0.08	0.03	-8.26	
105.00		270.66	0.73	-0.10	0.04	-10.71	
110.00		481.64	0.80	-0.11	0.05	-19.91	
115.00		468.14	0.88	-0.12	0.08	-18.25	
117.00	Appurtenance(s)	536.27	0.91	-0.12	0.09	-19.80	
120.00		271.16	0.95	-0.12	0.11	-8.85	
125.00		441.13	1.03	-0.10	0.15	-9.89	
127.00	Appurtenance(s)	4225.6	1.07	-0.09	0.17	-72.98	
130.00		254.96	1.12	-0.06	0.20	-2.14	
135.00		414.13	1.21	0.01	0.26	3.88	
137.00	Appurtenance(s)	1046.2	1.24	0.05	0.29	18.37	
139.00	Bot - Section 4	159.71	1.28	0.09	0.32	4.21	
140.00		139.21	1.30	0.12	0.33	4.31	
142.75	Top - Section 3	377.97	1.35	0.19	0.38	16.82	
145.00		131.39	1.39	0.27	0.42	7.42	
148.00	Appurtenance(s)	3287.6	1.45	0.38	0.48	241.95	
150.00	Appurtenance(s)	212.64	1.49	0.47	0.53	18.25	
155.00		274.52	1.59	0.75	0.66	32.74	

Seismic Segment Forces (Factored)

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 42

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157.00	Appurtenance(s)	1789.1	1.63	0.88	0.71	239.33			
160.00		157.42	1.69	1.10	0.81	24.68			
165.00		254.27	1.80	1.55	0.98	50.48			
167.00	Appurtenance(s)	2308.3	1.85	1.75	1.06	499.56			
169.00		97.25	1.89	1.98	1.14	22.85			
	Totals:	**39,598.0**				**1,568.0**	**Total Wind:**	**34,113.1**	

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

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 43	

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Load Case:	0.9D + 1.0E							**Iterations**	24
Gust Response Factor	1.10			**Sds**	0.19			**Ss**	0.18
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.10			**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency**	0.29	**SA**	0.03	**Seismic Importance Factor**			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	-43.94	-1.79	0.00	-221.72	0.00	221.72	5324.18	2662.09	12195.0	6106.56		0.00	0.00	0.045
5.00	-42.49	-1.77	0.00	-212.77	0.00	212.77	5261.08	2630.54	11832.5	5925.09		0.01	-0.01	0.044
10.00	-41.06	-1.75	0.00	-203.91	0.00	203.91	5196.80	2598.40	11472.7	5744.92		0.02	-0.02	0.043
15.00	-39.66	-1.71	0.00	-195.18	0.00	195.18	5131.34	2565.67	11115.7	5566.13		0.05	-0.03	0.043
20.00	-38.27	-1.68	0.00	-186.61	0.00	186.61	5064.69	2532.35	10761.6	5388.80		0.09	-0.04	0.042
25.00	-36.91	-1.64	0.00	-178.22	0.00	178.22	4996.86	2498.43	10410.5	5212.99		0.14	-0.05	0.042
30.00	-35.57	-1.61	0.00	-170.01	0.00	170.01	4927.84	2463.92	10062.6	5038.79		0.20	-0.06	0.041
35.00	-34.25	-1.57	0.00	-161.99	0.00	161.99	4857.63	2428.82	9718.08	4866.26		0.27	-0.07	0.040
40.00	-32.95	-1.53	0.00	-154.15	0.00	154.15	4786.24	2393.12	9377.03	4695.49		0.35	-0.08	0.040
40.75	-32.76	-1.52	0.00	-153.00	0.00	153.00	4775.43	2387.72	9326.19	4670.03		0.36	-0.09	0.040
45.00	-30.93	-1.46	0.00	-146.53	0.00	146.53	4713.67	2356.83	9039.63	4526.53		0.45	-0.10	0.039
47.00	-30.08	-1.43	0.00	-143.61	0.00	143.61	3877.89	1938.95	7512.92	3762.05		0.49	-0.10	0.046
50.00	-29.40	-1.41	0.00	-139.33	0.00	139.33	3845.09	1922.55	7353.82	3682.38		0.55	-0.11	0.045
55.00	-28.29	-1.38	0.00	-132.28	0.00	132.28	3789.47	1894.74	7090.51	3550.52		0.67	-0.12	0.045
60.00	-27.19	-1.35	0.00	-125.40	0.00	125.40	3732.67	1866.34	6829.63	3419.89		0.81	-0.13	0.044
65.00	-26.12	-1.32	0.00	-118.67	0.00	118.67	3674.68	1837.34	6571.34	3290.55		0.95	-0.15	0.043
70.00	-25.06	-1.29	0.00	-112.08	0.00	112.08	3615.51	1807.76	6315.78	3162.58		1.11	-0.16	0.042
75.00	-24.02	-1.27	0.00	-105.62	0.00	105.62	3555.15	1777.58	6063.10	3036.06		1.29	-0.17	0.042
80.00	-23.00	-1.26	0.00	-99.25	0.00	99.25	3493.61	1746.80	5813.45	2911.05		1.48	-0.19	0.041
85.00	-21.99	-1.26	0.00	-92.93	0.00	92.93	3430.88	1715.44	5566.98	2787.63		1.68	-0.20	0.040
89.25	-21.16	-1.26	0.00	-87.56	0.00	87.56	3376.63	1688.32	5360.08	2684.02		1.86	-0.21	0.039
90.00	-20.94	-1.26	0.00	-86.61	0.00	86.61	3366.97	1683.48	5323.83	2665.87		1.90	-0.21	0.039
91.50	-20.50	-1.26	0.00	-84.72	0.00	84.72	3347.56	1673.78	5251.55	2629.68		1.96	-0.22	0.029
94.25	-19.71	-1.26	0.00	-81.24	0.00	81.24	1944.87	972.44	3066.99	1535.78		2.09	-0.22	0.033
95.00	-19.60	-1.26	0.00	-80.29	0.00	80.29	1940.65	970.33	3048.28	1526.41		2.13	-0.23	0.042
96.75	-19.35	-1.26	0.00	-78.09	0.00	78.09	1930.70	965.35	3004.67	1504.57		2.21	-0.23	0.029
97.00	-19.31	-1.26	0.00	-77.77	0.00	77.77	1929.27	964.63	2998.44	1501.45		2.22	-0.23	0.038
100.00	-18.87	-1.26	0.00	-73.98	0.00	73.98	1911.84	955.92	2923.84	1464.09		2.37	-0.24	0.037
102.25	-18.55	-1.26	0.00	-71.14	0.00	71.14	1898.49	949.24	2868.04	1436.15		2.48	-0.24	0.036
102.25	-18.55	-1.26	0.00	-71.14	0.00	71.14	1898.49	949.24	2868.04	1436.15		2.48	-0.24	0.036
105.00	-18.15	-1.27	0.00	-67.66	0.00	67.66	1881.84	940.92	2800.02	1402.09		2.62	-0.25	0.058
110.00	-17.45	-1.27	0.00	-61.33	0.00	61.33	1850.66	925.33	2676.97	1340.48		2.90	-0.27	0.055
115.00	-16.75	-1.27	0.00	-54.98	0.00	54.98	1818.29	909.14	2554.84	1279.32		3.19	-0.29	0.052
117.00	-16.16	-1.27	0.00	-52.44	0.00	52.44	1805.01	902.50	2506.28	1255.00		3.31	-0.30	0.051
120.00	-15.75	-1.27	0.00	-48.63	0.00	48.63	1784.73	892.37	2433.78	1218.70		3.50	-0.31	0.049
125.00	-15.09	-1.27	0.00	-42.27	0.00	42.27	1749.99	875.00	2313.93	1158.68		3.83	-0.32	0.045
127.00	-11.18	-1.25	0.00	-39.73	0.00	39.73	1735.77	867.88	2266.36	1134.86		3.97	-0.33	0.041
130.00	-10.80	-1.25	0.00	-35.98	0.00	35.98	1714.07	857.04	2195.44	1099.35		4.18	-0.34	0.039
135.00	-10.19	-1.24	0.00	-29.73	0.00	29.73	1676.96	838.48	2078.45	1040.77		4.55	-0.36	0.035
137.00	-9.15	-1.22	0.00	-27.24	0.00	27.24	1661.79	830.89	2032.11	1017.57		4.70	-0.36	0.032
139.00	-8.92	-1.22	0.00	-24.80	0.00	24.80	1646.42	823.21	1986.05	994.50		4.85	-0.37	0.030
140.00	-8.75	-1.21	0.00	-23.58	0.00	23.58	1638.67	819.33	1963.12	983.02		4.93	-0.37	0.029
142.75	-8.29	-1.19	0.00	-20.25	0.00	20.25	1100.62	550.31	1316.21	659.08		5.15	-0.38	0.038
145.00	-8.07	-1.18	0.00	-17.57	0.00	17.57	1091.20	545.60	1284.61	643.26		5.33	-0.38	0.035
148.00	-4.99	-0.92	0.00	-14.02	0.00	14.02	1078.27	539.14	1242.60	622.22		5.57	-0.39	0.027
150.00	-4.73	-0.90	0.00	-12.17	0.00	12.17	1069.42	534.71	1214.68	608.24		5.74	-0.40	0.024
155.00	-4.33	-0.87	0.00	-7.66	0.00	7.66	1046.45	523.23	1145.25	573.48		6.16	-0.40	0.018

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 44	

Tower Engineering Solutions

157.00	-2.66	-0.62	0.00	-5.93	0.00	5.93	1036.93	518.47	1117.66	559.66	6.33	-0.41	0.013
160.00	-2.48	-0.59	0.00	-4.08	0.00	4.08	1022.30	511.15	1076.48	539.04	6.58	-0.41	0.010
165.00	-2.19	-0.54	0.00	-1.12	0.00	1.12	996.96	498.48	1008.51	505.00	7.02	-0.41	0.004
167.00	-0.09	-0.02	0.00	-0.05	0.00	0.05	986.50	493.25	981.58	491.52	7.19	-0.41	0.000
169.00	0.00	-0.02	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	7.36	-0.41	0.000

Wind Loading - Shaft

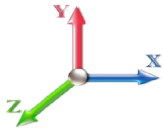
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 45	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

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	0.70	6.129	6.74	238.64	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.70	6.129	6.74	234.39	0.650	0.000	5.00	23.558	15.31	103.2	0.0	1305.1
10.00		1.00	0.70	6.129	6.74	230.15	0.650	0.000	5.00	23.135	15.04	101.4	0.0	1281.5
15.00		1.00	0.70	6.129	6.74	225.90	0.650	0.000	5.00	22.712	14.76	99.5	0.0	1257.8
20.00		1.00	0.70	6.129	6.74	221.65	0.650	0.000	5.00	22.288	14.49	97.7	0.0	1234.2
25.00		1.00	0.70	6.129	6.74	217.40	0.650	0.000	5.00	21.865	14.21	95.8	0.0	1210.6
30.00		1.00	0.70	6.134	6.75	213.24	0.650	0.000	5.00	21.442	13.94	94.0	0.0	1187.0
35.00		1.00	0.73	6.410	7.05	213.65	0.650	0.000	5.00	21.019	13.66	96.3	0.0	1163.3
40.00		1.00	0.76	6.659	7.33	213.33	0.650	0.000	5.00	20.596	13.39	98.1	0.0	1139.7
40.75	Bot - Section 2	1.00	0.76	6.695	7.36	213.23	0.650	0.000	0.75	3.053	1.98	14.6	0.0	168.9
45.00		1.00	0.79	6.887	7.58	212.45	0.650	0.000	4.25	17.389	11.30	85.6	0.0	1773.0
47.00	Top - Section 1	1.00	0.80	6.973	7.67	211.96	0.650	0.000	2.00	8.077	5.25	40.3	0.0	823.4
50.00		1.00	0.81	7.098	7.81	214.53	0.650	0.000	3.00	11.989	7.79	60.8	0.0	569.3
55.00		1.00	0.83	7.294	8.02	212.83	0.650	0.000	5.00	19.644	12.77	102.4	0.0	932.6
60.00		1.00	0.85	7.477	8.22	210.80	0.650	0.000	5.00	19.220	12.49	102.8	0.0	912.3
65.00		1.00	0.87	7.650	8.42	208.48	0.650	0.000	5.00	18.797	12.22	102.8	0.0	892.1
70.00		1.00	0.89	7.814	8.60	205.90	0.650	0.000	5.00	18.374	11.94	102.7	0.0	871.8
75.00		1.00	0.91	7.969	8.77	203.10	0.650	0.000	5.00	17.951	11.67	102.3	0.0	851.6
80.00		1.00	0.93	8.118	8.93	200.09	0.650	0.000	5.00	17.528	11.39	101.7	0.0	831.3
85.00		1.00	0.94	8.260	9.09	196.90	0.650	0.000	5.00	17.105	11.12	101.0	0.0	811.1
89.25	Bot - Section 3	1.00	0.96	8.376	9.21	194.05	0.650	0.000	4.25	14.206	9.23	85.1	0.0	673.5
90.00		1.00	0.96	8.396	9.24	193.54	0.650	0.000	0.75	2.507	1.63	15.0	0.0	196.8
91.50	RB1	1.00	0.96	8.435	9.28	192.50	0.650	0.000	1.50	4.985	3.24	30.1	0.0	391.4
94.25	Top - Section 2	1.00	0.97	8.507	9.36	190.56	0.650	0.000	2.75	9.041	5.88	55.0	0.0	709.6
95.00		1.00	0.97	8.526	9.38	192.53	0.650	0.000	0.75	2.444	1.59	14.9	0.0	77.5
96.75	RB2	1.00	0.98	8.571	9.43	191.28	0.650	0.000	1.75	5.664	3.68	34.7	0.0	179.6
97.00	RT1	1.00	0.98	8.577	9.43	191.10	0.650	0.000	0.25	0.805	0.52	4.9	0.0	25.5
100.00		1.00	0.99	8.652	9.52	188.90	0.650	0.000	3.00	9.577	6.23	59.2	0.0	303.6
102.25	RT2	1.00	0.99	8.707	9.58	187.22	0.650	0.000	2.25	7.083	4.60	44.1	0.0	224.5
105.00		1.00	1.00	8.774	9.65	185.14	0.650	0.000	2.75	8.541	5.55	53.6	0.0	270.7
110.00		1.00	1.02	8.891	9.78	181.26	0.650	0.000	5.00	15.200	9.88	96.6	0.0	481.6
115.00		1.00	1.03	9.005	9.91	177.26	0.650	0.000	5.00	14.777	9.61	95.1	0.0	468.1
117.00	Appurtenance(s)	1.00	1.03	9.049	9.95	175.63	0.650	0.000	2.00	5.792	3.77	37.5	0.0	183.5
120.00		1.00	1.04	9.115	10.03	173.16	0.650	0.000	3.00	8.562	5.57	55.8	0.0	271.2
125.00		1.00	1.05	9.222	10.14	168.96	0.650	0.000	5.00	13.931	9.06	91.9	0.0	441.1
127.00	Appurtenance(s)	1.00	1.06	9.264	10.19	167.26	0.650	0.000	2.00	5.454	3.55	36.1	0.0	172.7
130.00		1.00	1.07	9.326	10.26	164.67	0.650	0.000	3.00	8.054	5.24	53.7	0.0	255.0
135.00		1.00	1.08	9.427	10.37	160.29	0.650	0.000	5.00	13.085	8.51	88.2	0.0	414.1
137.00	Appurtenance(s)	1.00	1.08	9.466	10.41	158.52	0.650	0.000	2.00	5.115	3.32	34.6	0.0	161.9
139.00	Bot - Section 4	1.00	1.09	9.506	10.46	156.73	0.650	0.000	2.00	5.048	3.28	34.3	0.0	159.7
140.00		1.00	1.09	9.525	10.48	155.83	0.650	0.000	1.00	2.530	1.64	17.2	0.0	139.2
142.75	Top - Section 3	1.00	1.09	9.578	10.54	153.34	0.650	0.000	2.75	6.871	4.47	47.1	0.0	378.0
145.00		1.00	1.10	9.621	10.58	153.29	0.650	0.000	2.25	5.526	3.59	38.0	0.0	131.4
148.00	Appurtenance(s)	1.00	1.11	9.678	10.65	150.53	0.650	0.000	3.00	7.235	4.70	50.1	0.0	172.0
150.00	Appurtenance(s)	1.00	1.11	9.715	10.69	148.68	0.650	0.000	2.00	4.739	3.08	32.9	0.0	112.6
155.00		1.00	1.12	9.806	10.79	144.01	0.650	0.000	5.00	11.551	7.51	81.0	0.0	274.5
157.00	Appurtenance(s)	1.00	1.12	9.842	10.83	142.12	0.650	0.000	2.00	4.502	2.93	31.7	0.0	107.0

Wind Loading - Shaft

Structure: CT13071-A-SBA | **Code:** EIA/TIA-222-G | 8/29/2018

Site Name: Woodbridge | **Exposure:** B

Height: 169.00 (ft) | **Crest Height:** 0.00

Base Elev: 0.000 (ft) | **Site Class:** D - Stiff Soil

Gh: 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 46

160.00		1.00	1.13	9.896	10.89	139.26	0.650	0.000	3.00	6.626	4.31	46.9	0.0	157.4
165.00		1.00	1.14	9.983	10.98	134.45	0.650	0.000	5.00	10.704	6.96	76.4	0.0	254.3
167.00	Appurtenance(s)	1.00	1.14	10.017	11.02	132.51	0.650	0.000	2.00	4.163	2.71	29.8	0.0	98.9
169.00		1.00	1.15	10.052	11.06	130.56	0.650	0.000	2.00	4.096	2.66	29.4	0.0	97.3
								Totals:	**169.00**			**3,204.1**		**27,200.5**

Discrete Appurtenance Forces

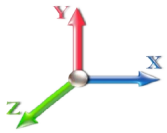
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 47	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa 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	167.00	AIR 21 B4A/B2P	3	10.017	11.019	0.77	0.90	14.14	274.50	0.000	0.000	155.82	0.00	0.00
2	167.00	T-Arms/Commscope	3	10.026	11.029	0.56	0.75	11.39	1020.00	0.000	0.500	125.62	0.00	62.81
3	167.00	AIR 21 B2A/B4P	3	10.017	11.019	0.77	0.90	14.14	276.00	0.000	0.000	155.82	0.00	0.00
4	167.00	Ericsson - Radio 4449	3	10.017	11.019	0.60	0.80	2.97	222.00	0.000	0.000	32.73	0.00	0.00
5	167.00	Ericsson - KRY 112 144/2	3	10.017	11.019	0.60	0.80	0.74	33.00	0.000	0.000	8.13	0.00	0.00
6	167.00	APXVAA24_43-U-A20	3	10.017	11.019	0.66	0.90	39.89	384.00	0.000	0.000	439.59	0.00	0.00
7	157.00	BXA-70063/6CF	1	9.842	10.827	1.00	1.00	7.57	17.00	0.000	0.000	81.96	0.00	0.00
8	157.00	T-Arms	3	9.842	10.827	0.56	0.75	13.50	1050.00	0.000	0.000	146.16	0.00	0.00
9	157.00	SLCP 2x6014F	2	9.842	10.827	0.84	0.90	10.86	40.00	0.000	0.000	117.62	0.00	0.00
10	157.00	DB846F65ZAXY	4	9.842	10.827	0.74	0.80	20.76	84.00	0.000	0.000	224.71	0.00	0.00
11	157.00	DB846H80E-SX	2	9.842	10.827	0.88	0.80	8.82	32.00	0.000	0.000	95.46	0.00	0.00
12	157.00	HBX-6517DS-VTM	6	9.842	10.827	0.60	0.80	19.04	112.20	0.000	0.000	206.18	0.00	0.00
13	157.00	ALU RRH2X60-AWS RRH	3	9.842	10.827	0.61	0.80	6.38	180.00	0.000	0.000	69.12	0.00	0.00
14	157.00	RFS DB T1-6Z-8AB-OZ	1	9.842	10.827	1.00	1.00	3.20	19.00	0.000	0.000	34.64	0.00	0.00
15	157.00	GPS	1	9.842	10.827	1.00	1.00	1.00	10.00	0.000	0.000	10.83	0.00	0.00
16	157.00	ALU/900 RRH2X60W -	3	9.842	10.827	0.61	0.80	3.43	138.00	0.000	0.000	37.13	0.00	0.00
17	150.00	Collar Mount	1	9.715	10.686	1.00	1.00	3.50	100.00	0.000	0.000	37.40	0.00	0.00
18	148.00	Commscope	1	9.678	10.645	1.00	1.00	1.19	6.60	0.000	0.000	12.67	0.00	0.00
19	148.00	CCI HPA-65R-BUU-H8	4	9.678	10.645	0.63	0.80	32.81	272.00	0.000	0.000	349.31	0.00	0.00
20	148.00	CCI HPA-65R-BUU-H6	2	9.678	10.645	0.68	0.80	13.14	102.00	0.000	0.000	139.86	0.00	0.00
21	148.00	Cci OPA-65R-LCUU-H8	2	9.678	10.645	0.63	0.80	16.12	176.00	0.000	0.000	171.56	0.00	0.00
22	148.00	Cci OPA-65R-LCUU-H6	1	9.678	10.645	0.63	0.80	6.11	73.00	0.000	0.000	64.99	0.00	0.00
23	148.00	Powerwave 7770	3	9.678	10.645	0.61	0.80	10.13	105.00	0.000	0.000	107.83	0.00	0.00
24	148.00	Ericsson RRUS-11-RRU	3	9.678	10.645	0.61	0.80	4.60	150.00	0.000	0.000	48.93	0.00	0.00
25	148.00	Raycap	2	9.678	10.645	0.81	0.90	2.38	65.60	0.000	0.000	25.35	0.00	0.00
26	148.00	T-Arms w/ Modifications	3	9.678	10.645	0.60	0.80	21.60	1350.00	0.000	0.000	229.94	0.00	0.00
27	148.00	Ericsson RRUS 32-RRU	9	9.678	10.645	0.56	0.80	8.32	693.00	0.000	0.000	88.53	0.00	0.00
28	148.00	Powerwave LGP21401	6	9.678	10.645	0.60	0.80	4.64	84.60	0.000	0.000	49.44	0.00	0.00
29	148.00	Powerwave LGP13519	6	9.678	10.645	0.60	0.80	1.22	31.80	0.000	0.000	13.03	0.00	0.00
30	148.00	Powerwave 1001940-Bias	3	9.678	10.645	0.72	0.80	0.15	6.00	0.000	0.000	1.61	0.00	0.00
31	137.00	APXV18-206517S-C	6	9.466	10.413	0.59	0.80	18.36	158.40	0.000	0.000	191.22	0.00	0.00
32	137.00	T-Arms	3	9.466	10.413	0.56	0.75	13.82	726.00	0.000	0.000	143.92	0.00	0.00
33	127.00	Horizon Duo	4	9.264	10.190	0.60	0.80	1.42	28.00	0.000	0.000	14.43	0.00	0.00
34	127.00	VHLP800-11	1	9.264	10.190	1.00	1.00	8.43	48.00	1.455	0.000	85.90	124.99	0.00
35	127.00	1900MHz RRH	3	9.264	10.190	0.74	0.75	6.17	180.00	0.000	0.000	62.87	0.00	0.00
36	127.00	VHLP2-11	3	9.264	10.190	1.00	1.00	14.04	81.00	1.455	0.000	143.07	208.17	0.00
37	127.00	RMQP-4096-HK	1	9.264	10.190	1.00	1.00	51.70	2645.00	0.000	0.000	526.82	0.00	0.00
38	127.00	800 MHz RRH	6	9.264	10.190	0.69	0.75	10.31	318.00	0.000	0.000	105.04	0.00	0.00
39	127.00	TD-RRH8x20-25	3	9.264	10.190	0.52	0.75	6.29	210.00	0.000	0.000	64.07	0.00	0.00
40	127.00	AAHC	3	9.264	10.190	0.56	0.75	7.10	310.80	0.000	0.000	72.39	0.00	0.00
41	127.00	NNVV-65B-R4	3	9.264	10.190	0.55	0.75	20.43	232.20	0.000	0.000	208.18	0.00	0.00
42	117.00	CM-30S-72	1	9.049	9.954	1.00	1.00	5.00	350.00	0.000	0.000	49.77	0.00	0.00
43	117.00	HG2409U-PRO	1	9.079	9.987	1.00	1.00	0.38	2.80	0.000	1.346	3.79	0.00	5.11
							Totals:		**12,397.50**			**4,953.46**		

Total Applied Force Summary

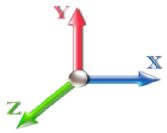
Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 48

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



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		103.23	1608.56	0.00	0.00
10.00		101.38	1584.93	0.00	0.00
15.00		99.52	1561.30	0.00	0.00
20.00		97.67	1537.67	0.00	0.00
25.00		95.81	1514.04	0.00	0.00
30.00		94.04	1490.41	0.00	0.00
35.00		96.33	1466.78	0.00	0.00
40.00		98.06	1443.16	0.00	0.00
40.75		14.61	214.44	0.00	0.00
45.00		85.63	2030.93	0.00	0.00
47.00		40.27	944.76	0.00	0.00
50.00		60.84	751.34	0.00	0.00
55.00		102.44	1236.03	0.00	0.00
60.00		102.76	1215.78	0.00	0.00
65.00		102.82	1195.53	0.00	0.00
70.00		102.66	1175.28	0.00	0.00
75.00		102.29	1155.02	0.00	0.00
80.00		101.73	1134.77	0.00	0.00
85.00		101.01	1114.52	0.00	0.00
89.25		85.07	931.41	0.00	0.00
90.00		15.05	242.33	0.00	0.00
91.50		30.07	482.39	0.00	0.00
94.25		54.99	876.49	0.00	0.00
95.00		14.90	122.98	0.00	0.00
96.75		34.71	285.77	0.00	0.00
97.00		4.94	40.69	0.00	0.00
100.00		59.25	485.64	0.00	0.00
102.25		44.10	361.04	0.00	0.00
105.00		53.58	437.55	0.00	0.00
110.00		96.63	785.09	0.00	0.00
115.00		95.14	771.59	0.00	0.00
117.00	(2) attachments	91.04	657.65	0.00	5.11
120.00		55.80	450.11	0.00	0.00
125.00		91.85	739.38	0.00	0.00
127.00	(27) attachments	1318.91	4344.97	333.15	0.00
130.00		53.70	417.24	0.00	0.00
135.00		88.19	684.60	0.00	0.00
137.00	(9) attachments	369.76	1154.46	0.00	0.00
139.00		34.31	255.42	0.00	0.00
140.00		17.23	187.07	0.00	0.00
142.75		47.05	509.57	0.00	0.00
145.00		38.02	239.07	0.00	0.00
148.00	(45) attachments	1353.12	3431.16	0.00	0.00
150.00	(1) attachments	70.32	281.67	0.00	0.00
155.00		80.99	447.09	0.00	0.00
157.00	(26) attachments	1055.48	1858.20	0.00	0.00

Total Applied Force Summary

Structure:	CT13071-A-SBA		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 49

Tower Engineering Solutions

160.00		46.88	201.02	0.00	0.00
165.00		76.41	326.94	0.00	0.00
167.00	(18) attachments	947.54	2337.44	0.00	62.81
169.00		29.43	97.25	0.00	0.00
	Totals:	**8,157.57**	**48,818.52**	**333.15**	**67.92**

Linear Appurtenance Segment Forces (Factored)

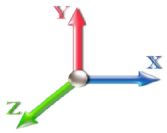
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 50	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.035	0.000	6.129	0.00	31.20
10.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.036	0.000	6.129	0.00	31.20
15.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.036	0.000	6.129	0.00	31.20
20.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.037	0.000	6.129	0.00	31.20
25.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.038	0.000	6.129	0.00	31.20
30.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.038	0.000	6.134	0.00	31.20
35.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.039	0.000	6.410	0.00	31.20
40.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.040	0.000	6.659	0.00	31.20
40.75	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.041	0.000	6.695	0.00	4.68
45.00	1 5/8" Coax	Yes	4.25	0.000	1.98	0.70	0.00	0.041	0.000	6.887	0.00	26.52
47.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.042	0.000	6.973	0.00	12.48
50.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.041	0.000	7.098	0.00	18.72
55.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.042	0.000	7.294	0.00	31.20
60.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.043	0.000	7.477	0.00	31.20
65.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.044	0.000	7.650	0.00	31.20
70.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.045	0.000	7.814	0.00	31.20
75.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.046	0.000	7.969	0.00	31.20
80.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.047	0.000	8.118	0.00	31.20
85.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.048	0.000	8.260	0.00	31.20
89.25	1 5/8" Coax	Yes	4.25	0.000	1.98	0.70	0.00	0.049	0.000	8.376	0.00	26.52
90.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.075	0.000	8.396	0.00	4.68
90.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.075	0.000	8.396	0.00	0.00
91.50	1 5/8" Coax	Yes	1.50	0.000	1.98	0.25	0.00	0.076	0.000	8.435	0.00	9.36
91.50	1" Reinforcing plate	Yes	1.50	0.000	1.00	0.13	0.00	0.076	0.000	8.435	0.00	0.00
94.25	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.077	0.000	8.507	0.00	17.16
94.25	1" Reinforcing plate	Yes	2.75	0.000	1.00	0.23	0.00	0.077	0.000	8.507	0.00	0.00
95.00	1 5/8" Coax	Yes	0.75	0.000	1.98	0.12	0.00	0.076	0.000	8.526	0.00	4.68
95.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.076	0.000	8.526	0.00	0.00
96.75	1 5/8" Coax	Yes	1.75	0.000	1.98	0.29	0.00	0.077	0.000	8.571	0.00	10.92
96.75	1" Reinforcing plate	Yes	1.75	0.000	1.00	0.15	0.00	0.077	0.000	8.571	0.00	0.00
97.00	1 5/8" Coax	Yes	0.25	0.000	1.98	0.04	0.00	0.077	0.000	8.577	0.00	1.56
97.00	1" Reinforcing plate	Yes	0.25	0.000	1.00	0.02	0.00	0.077	0.000	8.577	0.00	0.00
100.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.078	0.000	8.652	0.00	18.72
100.00	1" Reinforcing plate	Yes	0.75	0.000	1.00	0.06	0.00	0.078	0.000	8.652	0.00	0.00
100.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.078	0.000	8.652	0.00	0.00
102.25	1 5/8" Coax	Yes	2.25	0.000	1.98	0.37	0.00	0.079	0.000	8.707	0.00	14.04
102.25	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.079	0.000	8.707	0.00	0.00
105.00	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.075	0.000	8.774	0.00	17.16
105.00	1" Reinforcing plate	Yes	2.25	0.000	1.00	0.19	0.00	0.075	0.000	8.774	0.00	0.00
110.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.054	0.000	8.891	0.00	31.20
115.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.056	0.000	9.005	0.00	31.20
117.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.057	0.000	9.049	0.00	12.48
120.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.058	0.000	9.115	0.00	18.72
125.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.059	0.000	9.222	0.00	31.20
127.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.061	0.000	9.264	0.00	12.48
130.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.061	0.000	9.326	0.00	18.72
135.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.063	0.000	9.427	0.00	31.20

Linear Appurtenance Segment Forces (Factored)

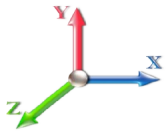
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 51	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 25

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
137.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.065	0.000	9.466	0.00	12.48
139.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.065	0.000	9.506	0.00	12.48
140.00	1 5/8" Coax	Yes	1.00	0.000	1.98	0.17	0.00	0.066	0.000	9.525	0.00	6.24
142.75	1 5/8" Coax	Yes	2.75	0.000	1.98	0.45	0.00	0.067	0.000	9.578	0.00	17.16
145.00	1 5/8" Coax	Yes	2.25	0.000	1.98	0.37	0.00	0.067	0.000	9.621	0.00	14.04
148.00	1 5/8" Coax	Yes	3.00	0.000	1.98	0.49	0.00	0.068	0.000	9.678	0.00	18.72
150.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.070	0.000	9.715	0.00	12.48
155.00	1 5/8" Coax	Yes	5.00	0.000	1.98	0.82	0.00	0.071	0.000	9.806	0.00	31.20
157.00	1 5/8" Coax	Yes	2.00	0.000	1.98	0.33	0.00	0.073	0.000	9.842	0.00	12.48
										Totals:	**0.0**	**979.7**

Calculated Forces

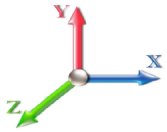
Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 52	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



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	-48.82	-8.18	-0.33	-1040.1	0.00	1040.14	5324.18	2662.09	12195.0	6106.56	0.00	0.000	0.000	0.180
5.00	-47.20	-8.11	-0.33	-999.25	0.00	999.25	5261.08	2630.54	11832.5	5925.09	0.03	-0.048	0.000	0.178
10.00	-45.61	-8.05	-0.33	-958.69	0.00	958.69	5196.80	2598.40	11472.7	5744.92	0.10	-0.096	0.000	0.176
15.00	-44.04	-7.98	-0.33	-918.45	0.00	918.45	5131.34	2565.67	11115.7	5566.13	0.23	-0.145	0.000	0.174
20.00	-42.50	-7.92	-0.33	-878.53	0.00	878.53	5064.69	2532.35	10761.6	5388.80	0.41	-0.195	0.000	0.171
25.00	-40.98	-7.85	-0.33	-838.94	0.00	838.94	4996.86	2498.43	10410.5	5212.99	0.64	-0.245	0.000	0.169
30.00	-39.48	-7.79	-0.33	-799.68	0.00	799.68	4927.84	2463.92	10062.6	5038.79	0.92	-0.296	0.000	0.167
35.00	-38.01	-7.72	-0.33	-760.74	0.00	760.74	4857.63	2428.82	9718.08	4866.26	1.26	-0.347	0.000	0.164
40.00	-36.56	-7.63	-0.33	-722.16	0.00	722.16	4786.24	2393.12	9377.03	4695.49	1.65	-0.399	0.000	0.161
40.75	-36.34	-7.63	-0.33	-716.44	0.00	716.44	4775.43	2387.72	9326.19	4670.03	1.71	-0.407	0.000	0.161
45.00	-34.31	-7.55	-0.33	-684.02	0.00	684.02	4713.67	2356.83	9039.63	4526.53	2.10	-0.452	0.000	0.158
47.00	-33.36	-7.52	-0.33	-668.92	0.00	668.92	3877.89	1938.95	7512.92	3762.05	2.29	-0.474	0.000	0.186
50.00	-32.60	-7.47	-0.33	-646.37	0.00	646.37	3845.09	1922.55	7353.82	3682.38	2.60	-0.506	0.000	0.184
55.00	-31.36	-7.39	-0.33	-609.00	0.00	609.00	3789.47	1894.74	7090.51	3550.52	3.16	-0.565	0.000	0.180
60.00	-30.14	-7.31	-0.33	-572.04	0.00	572.04	3732.67	1866.34	6829.63	3419.89	3.78	-0.624	0.000	0.175
65.00	-28.94	-7.22	-0.33	-535.50	0.00	535.50	3674.68	1837.34	6571.34	3290.55	4.47	-0.683	0.000	0.171
70.00	-27.75	-7.13	-0.33	-499.39	0.00	499.39	3615.51	1807.76	6315.78	3162.58	5.22	-0.742	0.000	0.166
75.00	-26.59	-7.04	-0.33	-463.72	0.00	463.72	3555.15	1777.58	6063.10	3036.06	6.02	-0.801	0.000	0.160
80.00	-25.45	-6.95	-0.33	-428.51	0.00	428.51	3493.61	1746.80	5813.45	2911.05	6.90	-0.860	0.000	0.155
85.00	-24.33	-6.86	-0.33	-393.76	0.00	393.76	3430.88	1715.44	5566.98	2787.63	7.83	-0.918	0.000	0.148
89.25	-23.40	-6.77	-0.33	-364.62	0.00	364.62	3376.63	1688.32	5360.08	2684.02	8.67	-0.968	-0.001	0.143
90.00	-23.16	-6.75	-0.33	-359.55	0.00	359.55	3366.97	1683.48	5323.83	2665.87	8.82	-0.977	-0.001	0.142
91.50	-22.67	-6.72	-0.33	-349.42	0.00	349.42	3347.56	1673.78	5251.55	2629.68	9.13	-0.994	-0.001	0.104
94.25	-21.80	-6.66	-0.33	-330.93	0.00	330.93	1944.87	972.44	3066.99	1535.78	9.71	-1.018	-0.001	0.118
95.00	-21.67	-6.65	-0.33	-325.94	0.00	325.94	1940.65	970.33	3048.28	1526.41	9.87	-1.024	-0.001	0.151
96.75	-21.38	-6.61	-0.33	-314.31	0.00	314.31	1930.70	965.35	3004.67	1504.57	10.25	-1.043	-0.001	0.103
97.00	-21.34	-6.61	-0.33	-312.66	0.00	312.66	1929.27	964.63	2998.44	1501.45	10.30	-1.045	-0.001	0.134
100.00	-20.86	-6.55	-0.33	-292.83	0.00	292.83	1911.84	955.92	2923.84	1464.09	10.97	-1.075	-0.001	0.128
102.25	-20.49	-6.51	-0.33	-278.09	0.00	278.09	1898.49	949.24	2868.04	1436.15	11.48	-1.096	-0.001	0.123
102.25	-20.49	-6.51	-0.33	-278.09	0.00	278.09	1898.49	949.24	2868.04	1436.15	11.48	-1.096	-0.001	0.123
105.00	-20.05	-6.46	-0.33	-260.19	0.00	260.19	1881.84	940.92	2800.02	1402.09	12.12	-1.122	-0.001	0.196
110.00	-19.26	-6.38	-0.33	-227.87	0.00	227.87	1850.66	925.33	2676.97	1340.48	13.34	-1.195	-0.001	0.180
115.00	-18.48	-6.28	-0.33	-195.99	0.00	195.99	1818.29	909.14	2554.84	1279.32	14.63	-1.264	-0.001	0.163
117.00	-17.83	-6.18	-0.33	-183.43	0.00	183.43	1805.01	902.50	2506.28	1255.00	15.16	-1.291	-0.001	0.156
120.00	-17.37	-6.13	-0.33	-164.88	-0.01	164.88	1784.73	892.37	2433.78	1218.70	15.98	-1.329	-0.001	0.145
125.00	-16.63	-6.03	-0.33	-134.22	-0.01	134.22	1749.99	875.00	2313.93	1158.68	17.41	-1.387	-0.001	0.125
127.00	-12.32	-4.62	0.00	-122.15	0.00	122.15	1735.77	867.88	2266.36	1134.86	17.99	-1.409	-0.001	0.115
130.00	-11.90	-4.56	0.00	-108.30	0.00	108.30	1714.07	857.04	2195.44	1099.35	18.89	-1.440	-0.001	0.105
135.00	-11.21	-4.46	0.00	-85.50	0.00	85.50	1676.96	838.48	2078.45	1040.77	20.42	-1.485	-0.001	0.089
137.00	-10.07	-4.06	0.00	-76.58	0.00	76.58	1661.79	830.89	2032.11	1017.57	21.05	-1.502	-0.001	0.081
139.00	-9.81	-4.02	0.00	-68.46	0.00	68.46	1646.42	823.21	1986.05	994.50	21.68	-1.518	-0.001	0.075
140.00	-9.63	-4.00	0.00	-64.43	0.00	64.43	1638.67	819.33	1963.12	983.02	22.00	-1.525	-0.001	0.071
142.75	-9.12	-3.95	0.00	-53.42	0.00	53.42	1100.62	550.31	1316.21	659.08	22.88	-1.543	-0.001	0.089
145.00	-8.88	-3.90	0.00	-44.54	0.00	44.54	1091.20	545.60	1284.61	643.26	23.62	-1.557	-0.001	0.077
148.00	-5.48	-2.46	0.00	-32.83	0.00	32.83	1078.27	539.14	1242.60	622.22	24.60	-1.576	-0.001	0.058
150.00	-5.20	-2.38	0.00	-27.91	0.00	27.91	1069.42	534.71	1214.68	608.24	25.26	-1.586	-0.001	0.051
155.00	-4.76	-2.29	0.00	-16.00	0.00	16.00	1046.45	523.23	1145.25	573.48	26.94	-1.606	-0.001	0.032
157.00	-2.93	-1.18	0.00	-11.42	0.00	11.42	1036.93	518.47	1117.66	559.66	27.61	-1.611	-0.001	0.023

Calculated Forces

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 53	

160.00	-2.73	-1.13	0.00	-7.87	0.00	7.87	1022.30	511.15	1076.48	539.04	28.62	-1.617	-0.001	0.017
165.00	-2.41	-1.05	0.00	-2.22	0.00	2.22	996.96	498.48	1008.51	505.00	30.32	-1.623	-0.001	0.007
167.00	-0.10	-0.03	0.00	-0.06	0.00	0.06	986.50	493.25	981.58	491.52	31.00	-1.624	-0.001	0.000
169.00	0.00	-0.03	0.00	0.00	0.00	0.00	975.84	487.92	954.81	478.11	31.68	-1.624	-0.001	0.000

Final Analysis Summary

Structure:	CT13071-A-SBA	**Code:**	EIA/TIA-222-G	8/29/2018	
Site Name:	Woodbridge	**Exposure:**	B		
Height:	169.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 54	

Tower Engineering Solutions

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 97 mph Wind	34.2	0.00	58.52	0.02	0.85	4382.25
0.9D + 1.6W 97 mph Wind	34.2	0.00	43.88	0.01	0.85	4321.44
1.2D + 1.0Di + 1.0Wi 50 mph Wind	9.3	0.00	91.74	0.00	0.29	1191.03
1.2D + 1.0E	1.8	0.00	58.58	0.00	0.00	225.02
0.9D + 1.0E	1.8	0.00	43.94	0.00	0.00	221.72
1.0D + 1.0W 60 mph Wind	8.2	0.00	48.82	0.00	0.33	1040.14

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 97 mph Wind	-21.96	-27.31	-0.86	-1097.9	-0.05	-1097.9	1881.84	940.92	2800.02	1402.09	105.00	0.796
0.9D + 1.6W 97 mph Wind	-15.97	-26.76	-0.87	-1075.4	-0.04	-1075.4	1881.84	940.92	2800.02	1402.09	105.00	0.776
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-45.59	-7.43	-0.29	-294.34	-0.01	-294.34	1881.84	940.92	2800.02	1402.09	105.00	0.234
1.2D + 1.0E	-24.21	-1.30	0.00	-68.96	0.00	-68.96	1881.84	940.92	2800.02	1402.09	105.00	0.062
0.9D + 1.0E	-18.15	-1.27	0.00	-67.66	0.00	-67.66	1881.84	940.92	2800.02	1402.09	105.00	0.058
1.0D + 1.0W 60 mph Wind	-20.05	-6.46	-0.33	-260.19	0.00	-260.19	1881.84	940.92	2800.02	1402.09	105.00	0.196

Additional Steel Summary

			Intermediate Connectors			Lower Termination				Upper Termination				Max Member			
Elev From (ft)	Elev To (ft)	Member	VQ/I (lb/in)	Vu (kips)	phi Vn (kips)	MQ/I (kips)	phi Vn (kips)	Num Reqd	Num Actual	MQ/I (kips)	phi Vn (kips)	Num Reqd	Num Actual	Pu (kips)	phi Pn (kips)	phi Tn (kips)	Ratio
91.5	97.0	(3) LNP-LP6X100-G-10TT	-378.7	-8.71	25.3	180.2	25.3	8	9	153.2	25.3	7	9	220.61	301.8	292.50	0.754
96.8	102.3	(3) LNP-LP6X100-G-10TT	380.1	8.74	25.3	157.4	25.3	7	9	194.7	25.3	8	9	209.26	301.8	292.50	0.715

Base Plate Summary

Structure:	CT13071-A-SB		**Code:**	EIA/TIA-222-G	8/29/2018
Site Name:	Woodbridge		**Exposure:**	B	
Height:	169.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 55

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Reactions

Original Design

Moment (kip-ft):	4977.00
Axial (kip):	60.20
Shear (kip):	43.70

Analysis

Moment (kip-ft):	4382.25
Axial (kip):	91.74
Shear (kip):	34.22
Moment Design %:	88.05

Base Plate

Yield (ksi):	60.00
Width (in):	61.25
Style:	Clipped
Polygon Sides:	0.00
Clip Length (in):	12.00
Effective Len (in):	8.31
Moment (kip-in):	608.09
Allow Stress (ksi):	81.00
Applied Stress (ksi):	0.00
Stress Ratio:	0.60

Anchor Bolts

Bolt Circle:	62.75
Number Bolts:	16.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00

Compression

Force (kip):	183.80
Allowable (kip):	260.00
Ratio:	0.72

Tension

Force (kip):	172.34
Allowable (kip):	260.00
Ratio:	0.68

Monopole Mat Foundation Design

				Date
				8/29/2018
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	169
Site Number:	CT13071-A-SBA	**Engineer Name:**	D. Zhou
Engr. Number:	59615	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

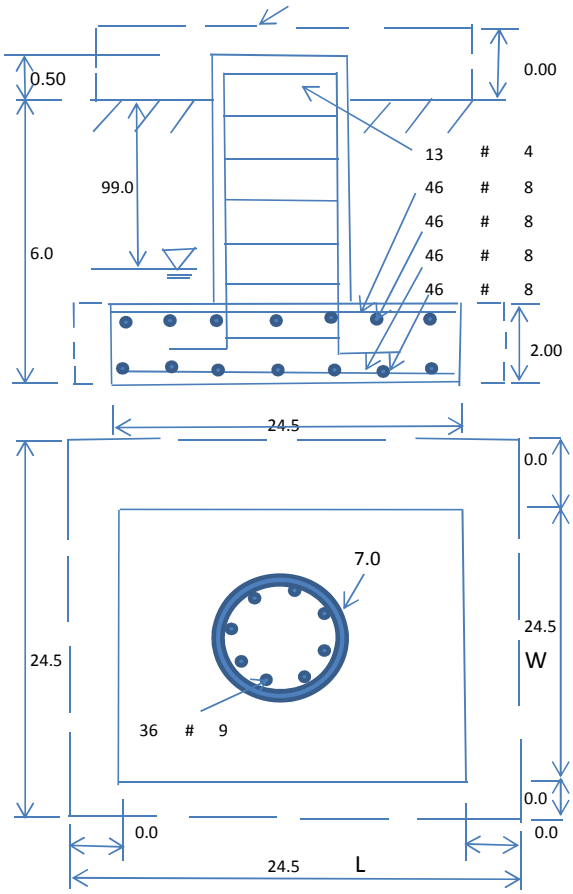
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	91.7	Shear Force (Kips):	34.2
Uplift Force (Kips):	0.0	Moment (Kips-ft):	4382.3
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	6.0
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	2.00
Length of Pad (ft.):	24.5	Width of Pad (ft.):	24.5
Final Length of pad (ft)	24.5	Final width of pad (ft):	24.5
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	9	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	46	Qty. of Rebar in Pad (W):	46	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	46	Qty. of Rebar in Pad (W):	46	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	120.0	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:	30
Ultimate Bearing Pressure (psf):	10000	Ultimate Skin Friction:	200	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
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.):	2247.06	Total Dry Soil Weight (Kips):	269.65
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	269.65	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1373.68	Total Dry Concrete Weight (Kips):	206.05
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	206.05	Total Vertical Load on Base (Kips):	567.40

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	3581	<	Allowable Factored Soil Bearing (psf):	7500	0.48	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	6367.9	>	Design Factored Momont (kips-ft):	4605	0.72	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.38	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00		
				Load/ Capacity Ratio	
(1) Concrete Pier:					
Vertical Steel Rebar Area (sq. in./each):	1.00		Tie / Stirrup Area (sq. in./each):	0.20	
Calculated Moment Capacity (Mn,Kips-Ft):	6026.1	>	Design Factored Moment (Mu, Kips-Ft	4536.2	0.75 OK!
Calculated Shear Capacity (Kips):	794.5	>	Design Factored Shear (Kips):	34.2	0.04 OK!
Calculated Tension Capacity (Tn, Kips):	1944.0	>	Design Factored Tension (Tu Kips):	0.0	0.00 OK!
Calculated Compression Capacity (Pn, Kips):	9734.2	>	Design Factored Axial Load (Pu Kips):	91.7	0.01 OK!
Moment & Axial Strength Combination:	0.75	OK!	Check Tie Spacing (Design/Required):		0.5 OK!
Pier Reinforcement Ratio:	0.006	Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:					
One-Way Design Shear Capacity (L-Direction, Kips):	571.8	>	One-Way Factored Shear (L-D. Kips):	305.8	0.53 OK!
One-Way Design Shear Capacity (W-Direction, Kips):	571.8	>	One-Way Factored Shear (W-D., Kips)	305.8	0.53 OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	645.2	>	One-Way Factored Shear (C-C, Kips):	317.3	0.49 OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0060	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0060	
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	3174.0	>	Moment at Bottom (L-Direct. K-Ft):	1076.8	0.34 OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	3174.0	>	Moment at Bottom (W-Direct. K-Ft):	1076.8	0.34 OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	4424.9	>	Moment at Bottom (C-C Dir. K-Ft):	1522.8	0.34 OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0060	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0060	
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	3174.0	>	Moment at the top (L-Dir Kips-Ft):	349.2	0.11 OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	3174.0	>	Moment at the top (W-Dir Kips-Ft):	349.2	0.11 OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	4424.9	>	Moment at the top (C-C Direc. K-Ft):	496.7	0.11 OK!

CENTEK engineering

Centered on Solutions℠

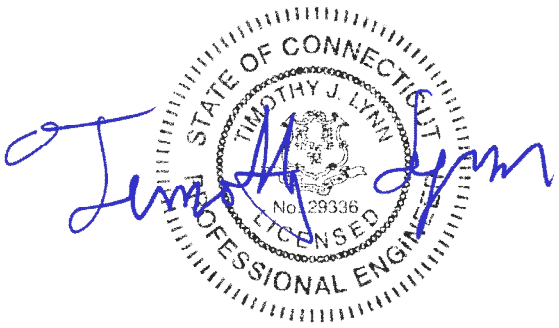
Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTNH209A

1 Deerfield Lane
Ansonia, CT 06401

Centek Project No. 18058.98



Date: June 20, 2018

Max Stress Ratio = 93.1%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

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CENTEK engineering

Centered on Solutions℠

June 20, 2018

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTNH209A
1 Deerfield Lane
Ansonia, CT 06401

Centek Project No. 18058.98

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of three (3) 10-ft T-Arms to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2012 International Building Code as modified by the 2016 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  T-Arms: Three (3) RFS APXVAARR24-43-NA20 panel antennas, six (6) Ericsson AIR21 panel antennas, three (3) TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on three (3) T-Arms with a RAD center elevation of 165/168-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2012 International Building Code as modified by the 2016 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Ansonia as required in Appendix N of the 2016 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

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

Subject: TIA-222-G Loads

Location: Ansonia, CT

Rev. 0: 6/20/18

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 18058.98

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

Wind Speeds

Basic Wind Speed: $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice: $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Pole$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 169$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 165$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.175$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.762$$

Velocity Pressure Coefficient Antennas =

$$Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.406$$

Velocity Pressure w/o Ice Antennas =

$$qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 32.181$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 8.551$$

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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Ansonia, CT
Rev. 0: 6/20/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.98

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 717$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 260$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 19$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 226$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.4$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 101$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 435$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 435$	lbs

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Subject:	TIA-222-G Loads
Location:	Ansonia, CT
Rev. 0: 6/20/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.98

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR21		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56$	in	(User Input)
Antenna Width =	$W_{ant} := 12.1$	in	(User Input)
Antenna Thickness =	$T_{ant} := 7.9$	in	(User Input)
Antenna Weight =	$WT_{ant} := 90$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.29$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 216$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 141$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 79$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 4.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 57$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 90$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5353$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5271$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 171$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 171$	lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model =	Ericsson 4449 B71B12		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 14.9$	in	(User Input)
RRUS Width =	$W_{RRUS} := 13.2$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 10.4$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 74$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 58$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 46$	lbs

Wind Load (with ice)

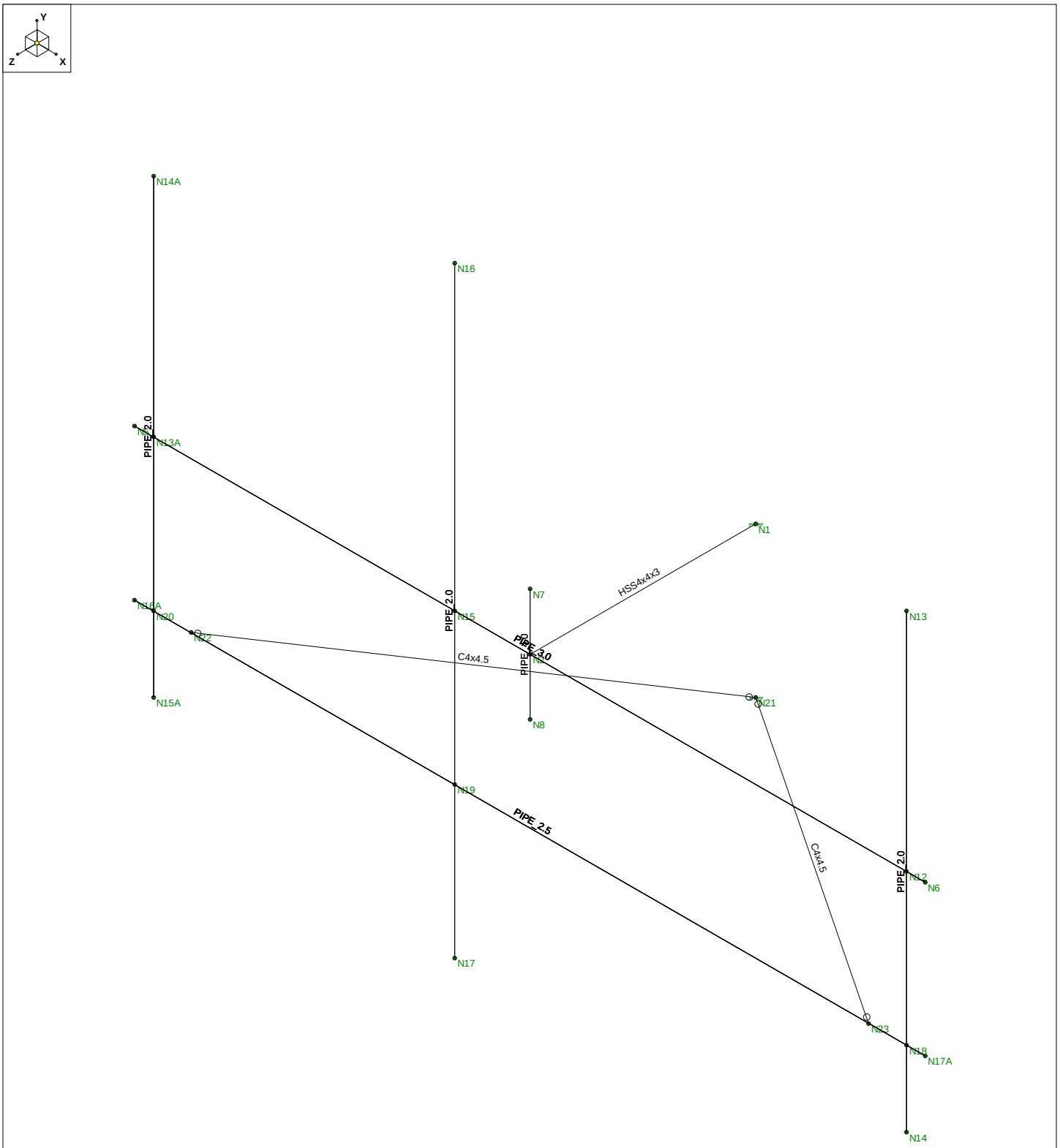
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 24$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 20$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 74$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2245$	
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 73$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 73$	lbs



Envelope Only Solution

Centek		
TJL	CTNH209A - Mount	June 20, 2018 at 2:01 PM
18058.98	Member Framing	Mount.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
	AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4x4x3	Beam	Tube	A500 Gr.46	Typical	2.58	6.21	6.21	10
2	Horz	PIPE_3.0	Beam	Pipe	A36 Gr.36	Typical	2.07	2.85	2.85	5.69
3	Antenna Mast	PIPE_2.0	Beam	Pipe	A53 Grade B	Typical	1.02	.627	.627	1.25
4	Vert	PIPE_4.0	Beam	Pipe	A53 Grade B	Typical	2.96	6.82	6.82	13.6
5	Brace	C4x4.5	Beam	Pipe	A36 Gr.36	Typical	1.38	.289	3.65	.032
6	2.5 Std Pipe	PIPE_2.5	Beam	Pipe	A53 Grade B	Typical	1.61	1.45	1.45	2.89

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Outrigger	3			Lbyy						Lateral
2	M2	Horz	10.5			Lbyy						Lateral
3	M3	Vert	1.5			Lbyy						Lateral
4	M6	Antenna Mast	6			Lbyy						Lateral
5	M7	Antenna Mast	8			Lbyy						Lateral
6	M6A	Antenna Mast	6			Lbyy						Lateral
7	M7A	2.5 Std Pipe	10.5			Lbyy						Lateral
8	M8	Brace	5.408			Lbyy						Lateral
9	M9	Brace	5.408			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N2			Outrigger	Beam	Tube	A500 Gr....	Typical
2	M2	N5	N6			Horz	Beam	Pipe	A36 Gr.36	Typical
3	M3	N7	N8			Vert	Beam	Pipe	A53 Gra...	Typical
4	M6	N14	N13			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
5	M7	N17	N16			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
6	M6A	N15A	N14A			Antenna Mast	Beam	Pipe	A53 Gra...	Typical
7	M7A	N16A	N17A			2.5 Std Pipe	Beam	Pipe	A53 Gra...	Typical
8	M8	N22	N21			Brace	Beam	Pipe	A36 Gr.36	Typical
9	M9	N21	N23			Brace	Beam	Pipe	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	0	0	
2	N2	0	0	3	0	
3	N5	-5.25	0	3	0	
4	N6	5.25	0	3	0	
5	N7	0	.75	3	0	
6	N8	0	-.75	3	0	
7	N12	5	0	3	0	
8	N13	5	3	3	0	
9	N14	5	-3	3	0	
10	N15	-1	0	3	0	
11	N16	-1	4	3	0	
12	N17	-1	-4	3	0	
13	N13A	-5	0	3	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
14	N14A	-5	3	3	0	
15	N15A	-5	-3	3	0	
16	N16A	-5.25	-2	3	0	
17	N17A	5.25	-2	3	0	
18	N18	5	-2	3	0	
19	N19	-1	-2	3	0	
20	N20	-5	-2	3	0	
21	N21	0	-2	0	0	
22	N22	-4.5	-2	3	0	
23	N23	4.5	-2	3	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N21	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Y	-.045	1.5
2	M6A	Y	-.045	1.5
3	M6	Y	-.045	4.5
4	M6A	Y	-.045	4.5
5	M7	Y	-.077	1
6	M7	Y	-.077	7
7	M7	Y	-.074	5

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Y	-.086	1.5
2	M6A	Y	-.086	1.5
3	M6	Y	-.086	4.5
4	M6A	Y	-.086	4.5
5	M7	Y	-.218	1
6	M7	Y	-.218	7
7	M7	Y	-.073	5

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	X	.029	1.5
2	M6A	X	.029	1.5
3	M6	X	.029	4.5
4	M6A	X	.029	4.5
5	M7	X	.051	1
6	M7	X	.051	7
7	M7	X	.02	5

Member Point Loads (BLC 5 : Wind X)

Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]

Member Point Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	X	.071	1.5
2	M6A	X	.071	1.5
3	M6	X	.071	4.5
4	M6A	X	.071	4.5
5	M7	X	.13	1
6	M7	X	.13	7
7	M7	X	.046	5

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Z	.04	1.5
2	M6A	Z	.04	1.5
3	M6	Z	.04	4.5
4	M6A	Z	.04	4.5
5	M7	Z	.113	1
6	M7	Z	.113	7

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M6	Z	.108	1.5
2	M6A	Z	.108	1.5
3	M6	Z	.108	4.5
4	M6A	Z	.108	4.5
5	M7	Z	.359	1
6	M7	Z	.359	7

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.002	.002	0	0
2	M3	X	.002	.002	0	0
3	M7	X	.002	.002	0	0
4	M6	X	.002	.002	0	0
5	M6A	X	.002	.002	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	X	.008	.008	0	0
2	M3	X	.008	.008	0	0
3	M7	X	.008	.008	0	0
4	M6	X	.008	.008	0	0
5	M6A	X	.008	.008	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M2	Z	.002	.002	0	0
2	M3	Z	.002	.002	0	0
3	M7A	Z	.002	.002	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M2	Z	.008	.008	0	0
2	M3	Z	.008	.008	0	0
3	M7A	Z	.008	.008	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	DL		-1						
2	Equipment Weight	None					7			
3	Ice Weight	None					7			
4	Wind w/ Ice X	None					7	5		
5	Wind X	None					7	5		
6	Wind w/ Ice Z	None					6	3		
7	Wind Z	None					6	3		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D + 1.6W (X-d..	Yes	Y		1	1.2	2	1.2	5	1.6														
2	0.9D + 1.6W (X-d..	Yes	Y		1	.9	2	.9	5	1.6														
3	1.2D + 1.0Di + 1....	Yes	Y		1	1.2	2	1.2	3	1	4	1												
4	1.2D + 1.6W (Z-d..	Yes	Y		1	1.2	2	1.2	7	1.6														
5	0.9D + 1.6W (Z-d..	Yes	Y		1	.9	2	.9	7	1.6														
6	1.2D + 1.0Di + 1....	Yes	Y		1	1.2	2	1.2	3	1	6	1												

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.123	6	1.666	3	-.094	2	-1.602	2	-.226	6	-.204	2
2		min	-1.282	2	.605	5	-1.527	4	-4.66	6	-3.721	1	-.572	6
3	N21	max	.092	5	.034	4	.272	3	0	2	0	1	0	2
4		min	-.133	3	.023	2	-.634	5	-.002	4	0	1	-.001	6
5	Totals:	max	0	6	1.694	3	0	3						
6		min	-1.258	2	.631	5	-2.128	4						

Envelope Joint Displacements

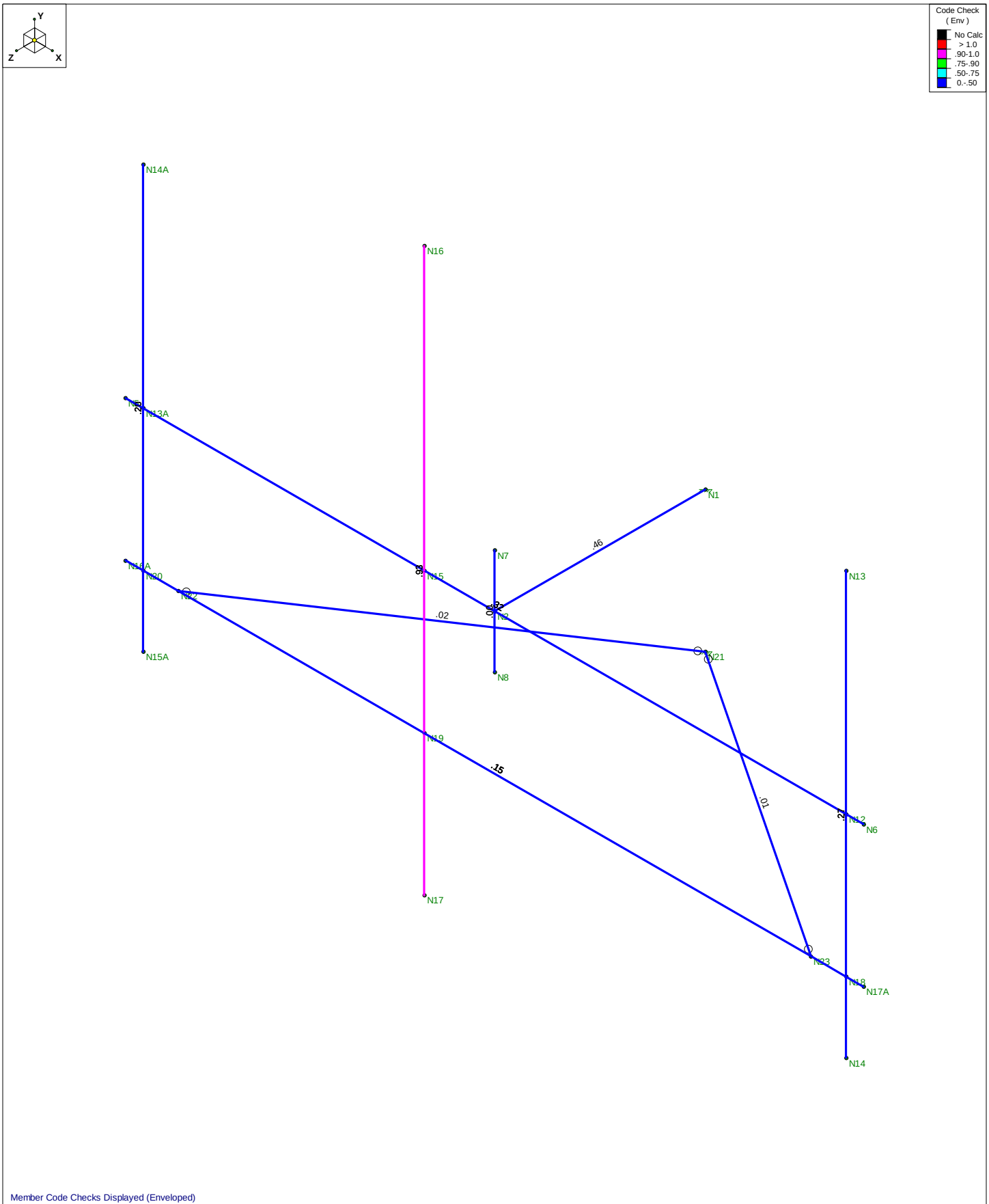
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	2	0	5	0	4	0	6	0	1	0	6
2		min	0	6	0	3	0	2	0	2	0	6	0	2
3	N2	max	.136	1	-.056	2	0	4	6.543e-03	6	5.515e-03	1	2.214e-03	6
4		min	.019	6	-.167	6	0	2	2.102e-03	2	1.233e-03	6	7.918e-04	2
5	N5	max	.137	1	-.169	2	.4	4	8.958e-03	4	7.109e-03	4	3.596e-03	6
6		min	.018	6	-.417	6	.241	6	1.498e-03	2	4.67e-03	3	2.044e-03	2
7	N6	max	.137	1	-.021	2	.003	6	8.007e-03	4	4.468e-03	2	1.524e-03	5
8		min	.019	6	-.158	6	-.3	2	1.358e-03	2	-5.505e-04	6	2.526e-04	3
9	N7	max	.128	2	-.056	2	.059	6	6.543e-03	6	5.515e-03	1	2.214e-03	6
10		min	-.001	6	-.167	6	.019	2	2.102e-03	2	1.233e-03	6	7.91e-04	2
11	N8	max	.145	1	-.056	2	-.019	2	6.542e-03	6	5.515e-03	1	2.214e-03	6
12		min	.038	6	-.167	6	-.059	6	2.102e-03	2	1.233e-03	6	7.926e-04	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
13	N12	max	.137	1	-.024	2	0	6	8.007e-03	4	4.468e-03	2	1.524e-03	5
14		min	.019	6	-.159	6	-.287	2	1.358e-03	2	-5.505e-04	6	2.527e-04	3
15	N13	max	.166	1	-.024	2	.322	4	9.945e-03	4	4.468e-03	2	1.526e-03	5
16		min	.002	5	-.159	6	-.238	2	1.36e-03	2	-5.505e-04	6	-1.136e-03	1
17	N14	max	.213	1	-.024	2	-.163	6	5.012e-03	4	4.595e-03	2	2.116e-03	4
18		min	.1	6	-.159	6	-.331	1	7.734e-04	2	-9.634e-05	6	1.495e-03	2
19	N15	max	.137	1	-.068	2	.068	1	8.153e-03	4	5.836e-03	1	3.782e-03	6
20		min	.018	6	-.207	6	.026	6	1.825e-03	2	2.801e-03	6	1.015e-03	2
21	N16	max	.488	2	-.068	2	1.379	4	3.396e-02	4	5.836e-03	1	3.856e-03	6
22		min	-.166	6	-.207	6	.155	2	1.836e-03	2	2.801e-03	6	-1.001e-02	2
23	N17	max	.273	1	-.068	2	.136	5	2.232e-03	3	5.688e-03	1	3.517e-03	1
24		min	.134	6	-.208	6	-.097	3	-4.86e-03	5	2.824e-03	6	2.198e-03	5
25	N13A	max	.137	1	-.163	2	.379	4	8.958e-03	4	7.109e-03	4	3.596e-03	6
26		min	.018	6	-.406	6	.227	6	1.498e-03	2	4.67e-03	3	2.044e-03	2
27	N14A	max	.116	2	-.163	2	.76	4	1.09e-02	4	7.109e-03	4	3.608e-03	6
28		min	-.112	6	-.406	6	.346	3	1.5e-03	2	4.67e-03	3	2.095e-04	2
29	N15A	max	.221	1	-.163	2	.312	1	4.459e-03	4	6.364e-03	1	3.571e-03	6
30		min	.121	6	-.406	6	.111	6	1.077e-03	2	4.485e-03	6	1.963e-03	2
31	N16A	max	.193	1	-.169	2	.347	1	4.459e-03	4	6.364e-03	1	3.571e-03	6
32		min	.078	6	-.417	6	.156	6	1.077e-03	2	4.485e-03	6	1.942e-03	2
33	N17A	max	.193	1	-.019	2	-.115	6	5.012e-03	4	4.595e-03	2	2.116e-03	4
34		min	.077	6	-.153	6	-.331	1	7.734e-04	2	-9.636e-05	6	1.474e-03	2
35	N18	max	.193	1	-.024	2	-.115	6	5.012e-03	4	4.595e-03	2	2.116e-03	4
36		min	.077	6	-.159	6	-.317	1	7.734e-04	2	-9.634e-05	6	1.474e-03	2
37	N19	max	.193	1	-.068	2	.037	2	2.239e-03	3	5.688e-03	1	2.4e-03	3
38		min	.078	6	-.208	6	-.05	6	-2.021e-03	5	2.824e-03	6	2.136e-03	2
39	N20	max	.193	1	-.163	2	.328	1	4.459e-03	4	6.364e-03	1	3.571e-03	6
40		min	.078	6	-.406	6	.143	6	1.077e-03	2	4.485e-03	6	1.942e-03	2
41	N21	max	0	3	0	2	0	5	0	4	0	1	0	6
42		min	0	5	0	4	0	3	0	2	0	1	0	2
43	N22	max	.193	1	-.151	2	.29	1	3.683e-03	4	6.381e-03	1	4.153e-03	6
44		min	.078	6	-.382	6	.116	6	1.063e-03	2	4.249e-03	5	1.909e-03	2
45	N23	max	.193	1	-.031	2	-.115	6	4.446e-03	4	4.589e-03	2	1.746e-03	4
46		min	.077	6	-.168	6	-.29	1	7.882e-04	2	-4.357e-05	6	1.018e-03	2

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

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc.....	L...		phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M1	HSS4x4x3	.463	0	1	.109	0	y	6	103.013	106.812	12.662	12.662	1...	H1-1b
2	M2	PIPE 3.0	.323	5.25	4	.228	5.25		5	36.549	67.068	5.913	5.913	1...	H1-1b
3	M3	PIPE 4.0	.000	.75	4	.000	.75		4	92.571	93.24	10.631	10.631	1	H1-1b
4	M6	PIPE 2.0	.268	3	3	.087	1		4	20.867	32.13	1.872	1.872	1...	H1-1b
5	M7	PIPE 2.0	.931	4	4	.112	4		5	14.916	32.13	1.872	1.872	1...	H1-1b
6	M6A	PIPE 2.0	.202	3	6	.088	1		4	20.867	32.13	1.872	1.872	1...	H1-1b
7	M7A	PIPE 2.5	.146	4.1...	6	.126	.656		5	20.573	50.715	3.596	3.596	2...	H1-1b
8	M8	C4x4.5	.021	0	3	.005	0	y	4	15.501	44.712	1.149	5.402	1...	H1-1...
9	M9	C4x4.5	.011	0	3	.014	5.4...	y	4	15.501	44.712	1.149	5.402	1...	H1-1...



Centek		
TJL	CTNH209A - Mount	June 20, 2018 at 2:01 PM
18058.98	Unity Check	Mount.r3d

SITE NAME: NH209/OPTAGELERTNERFT

1 DEERFIELD LANE
ANSONIA, CT 06401

SITE NUMBER: CTNH209A

PROJECT: T-MOBILE L600

CONFIGURATION: 67D02C

T-MOBILE TECHNICIAN SITE SAFETY NOTES

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

GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE NORTHEAST, LLC. 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.
2. 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.
3. 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 CONSTRUCTION NOTES

1. TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE TO FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. 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.
3. PROTERRA DESIGN GROUP ASSUMES THAT THE MONOPOLE IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.
4. ANTENNA MOUNT INSTALLATION SHALL BE COMPLETED IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS, (MSA) PREPARED BY OTHERS PRIOR TO INSTALLING ANY RF EQUIPMENT SHOWN IN THESE PLANS.

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION
ZONING JURISDICTION:	SPECIAL ZONING NOTE (ELIGIBLE FACILITY REQUEST): BASED ON INFORMATION PROVIDED BY T-MOBILE REGULATORY COMPLIANCE PROFESSIONALS 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(A), 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:	1 DEERFIELD LANE ANSONIA, CT 06401
LATITUDE:	41° 21' 02.70" N (41.3508°) (FROM SBA RECORD)
LONGITUDE:	73° 02' 57.30" W (-73.0492°) (FROM SBA RECORD)
JURISDICTION:	CITY OF ANSONIA/CT SITING COUNCIL
BUILDING CODE:	2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS. (IBC 2012 BASED)
ELECTRICAL CODE:	2014 NATIONAL ELECTRICAL CODE WITH AMENDMENTS
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SBA TOWERS IV, LLC
SBA SITE ID:	CT13071-A
SBA SITE NAME:	WOODRIDGE
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539-4920

APPROVALS

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

DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1-888-344-7233

CALL BEFORE YOU DIG
(CT): 1-800-922-4455

UNDERGROUND SERVICE ALERT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
GN-1	GENERAL NOTES	0
A-1	COMPOUND & ELEVATION PLAN	0
A-2	EXISTING & PROPOSED ANTENNA PLAN	0
A-3	DETAILS	0
A-4	DETAILS	0
E-1	ONE-LINE DIAGRAM & GROUNDING DETAILS	0

T-MOBILE NORTHEAST LLC
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BLOOMFIELD, CT 06002

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134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 (413) 320-4918

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
8/29/18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	08/29/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CTNH209A
SITE NAME:
NH209/OPTAGELERTNERFT
SITE ADDRESS:
1 DEERFIELD LANE
ANSONIA, CT 06401

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

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) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'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 AND 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 SURCUITS 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 BTS 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 ELECTRICL 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 BONDING FITTINGS OR BY BONDING 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 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, 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 MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED 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, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. 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, CUR\BS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE 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 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 OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (FY = 35 KSI). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH UMTS 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, ALL 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 OF 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.

    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), STEEL CONSTRUCTION MANUAL, 14TH 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, METHODS 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	EQ	EQUAL	RAN	RADIO ACCESS NETWORK
AWG	AMERICAN WIRE GAUGE	G.C.	GENERAL CONTRACTOR	REF	REFERENCE
BTCW	BARE TINNED SOLID COPPER WIRE	GRC	GALVANIZED RIGID CONDUIT	REQ	REQUIRED
		MSA	MOUNT STRUCTURAL ANALYSIS	RF	RADIO FREQUENCY
BGR	BURIED GROUND RING	MGB	MASTER GROUND BAR	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	MIN	MINIMUM	TBR	TO BE REMOVED
EXISTING	EXISTING OR (E)	PROPOSED	NEW OR (P)	TBRR	TO BE REMOVED AND REPLACED
EGB	EQUIPMENT GROUND BAR	N.T.S.	NOT TO SCALE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	RAD	RADIATION CENTERLINE (ANTENNA)	VIF	VERIFY IN FIELD

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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ProTerra DESIGN GROUP, LLC
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
8/29/18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
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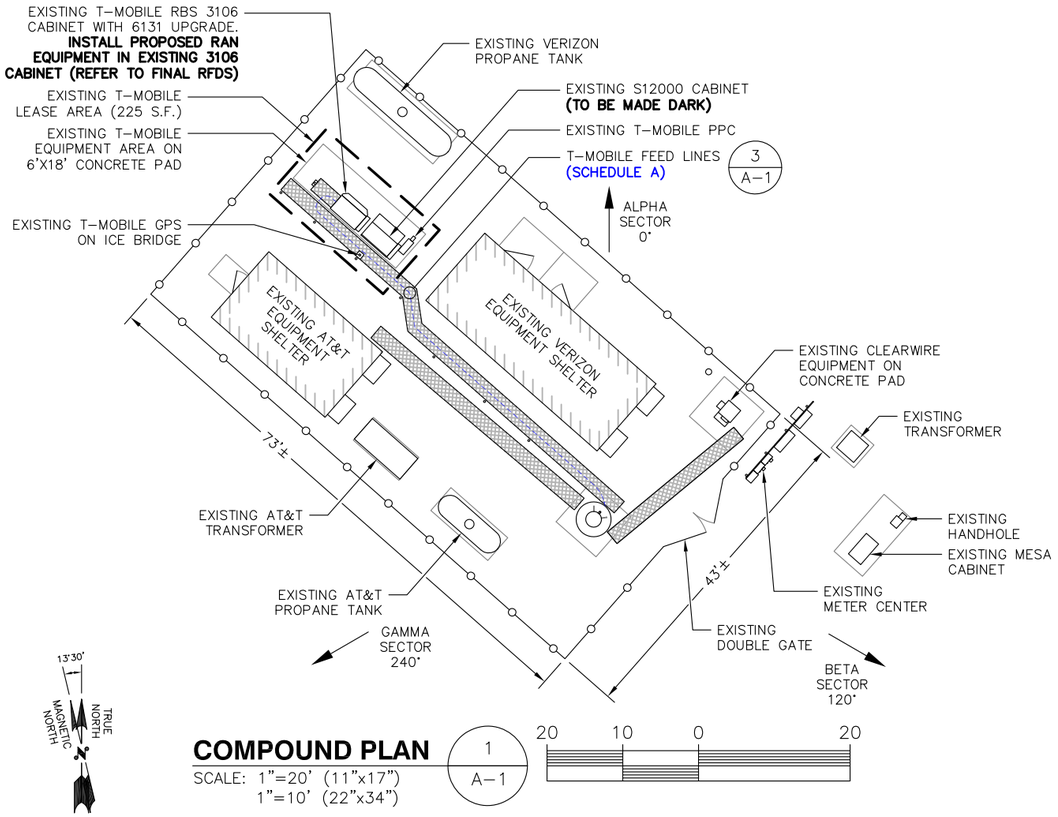
SITE NUMBER:
CTNH209A
SITE NAME:
NH209/OPTAGELERTNERFT
SITE ADDRESS:
1 DEERFIELD LANE
ANSONIA, CT 06401

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1



COMPOUND PLAN

SCALE: 1"=20' (11"x17")
1"=10' (22"x34")

1 / A-1

IMAGE SOURCE: PROTERRA 05/26/2018

EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

2 / A-1

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO BE REMAIN: (12) 1⅝" COAX AND (1) 1¼" HYBRID TO 167' RAD	UP INSIDE MONOPOLE TO RAD

NOTE: EXISTING T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON THE RFDS & RECORD INFORMATION. FEEDLINE LEASING ENTITLEMENTS AND FIELD CONDITIONS MAY DIFFER

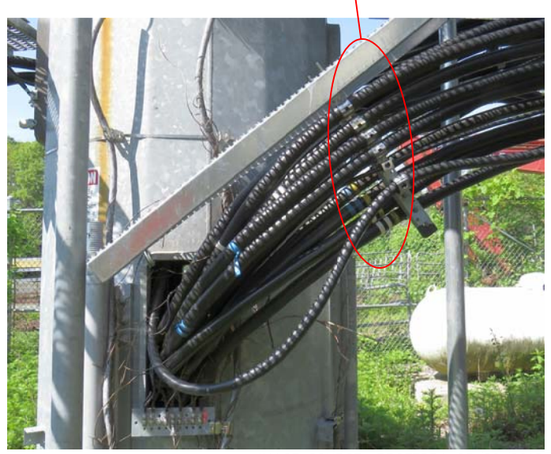


IMAGE SOURCE: PROTERRA 05/26/2018

FEEDLINE PHOTO DETAIL AT TOWER BASE

SCALE: N.T.S.

3 / A-1

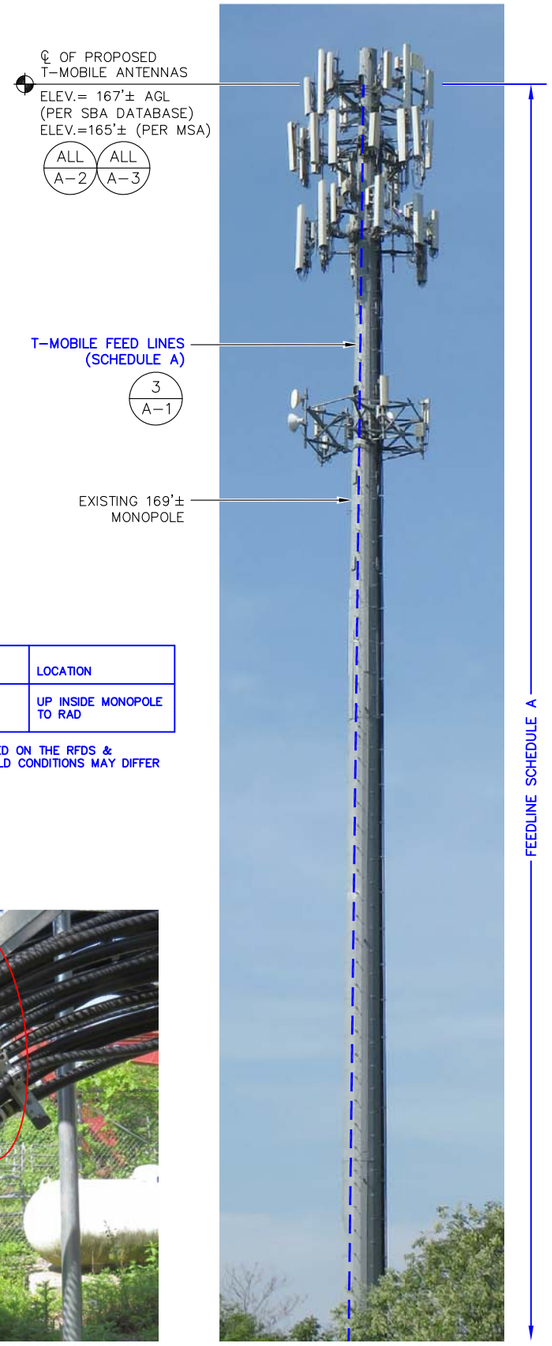


IMAGE SOURCE: PROTERRA 05/26/2018

PARTIAL ELEVATION PHOTO DETAIL

SCALE: N.T.S.

4 / A-1

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COMPOUND & ELEVATION PLAN

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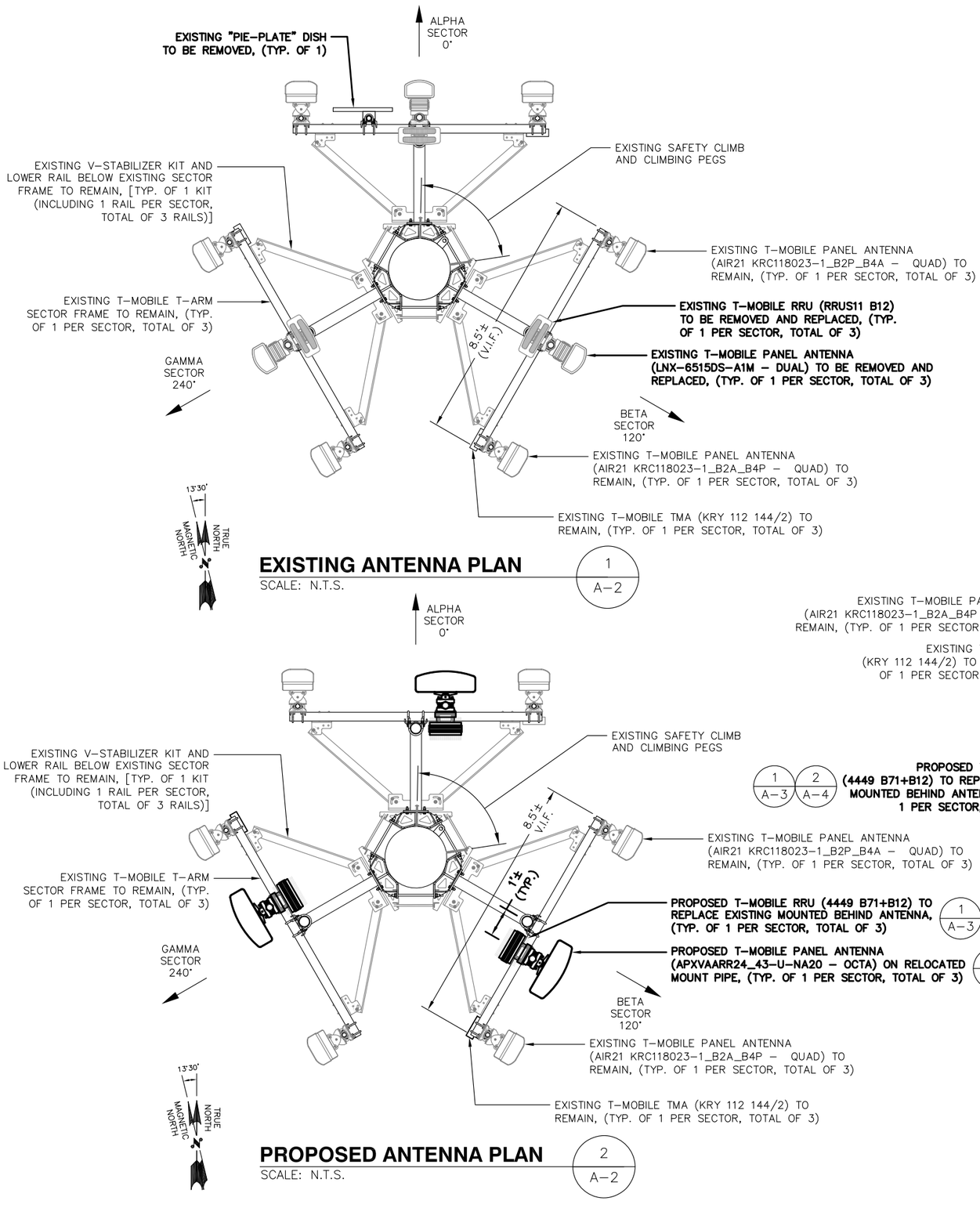
A-1



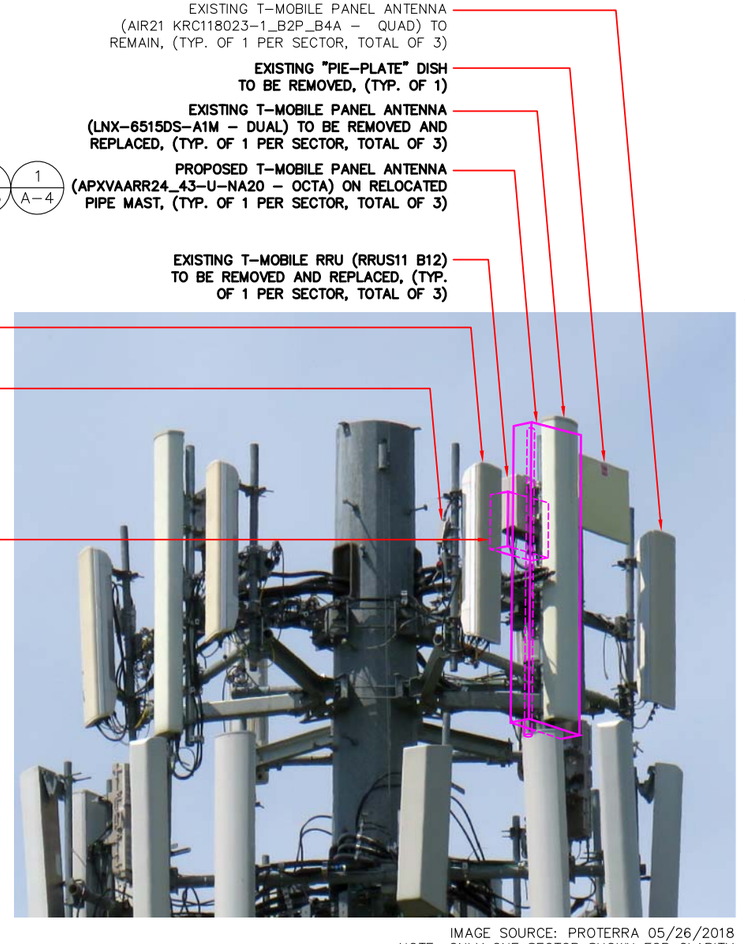


IMAGE SOURCE: PROTERRA 05/26/2018
NOTE: ONLY ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL
SCALE: N.T.S.
3 A-2

T-MOBILE NORTHEAST LLC
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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
8/29/18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

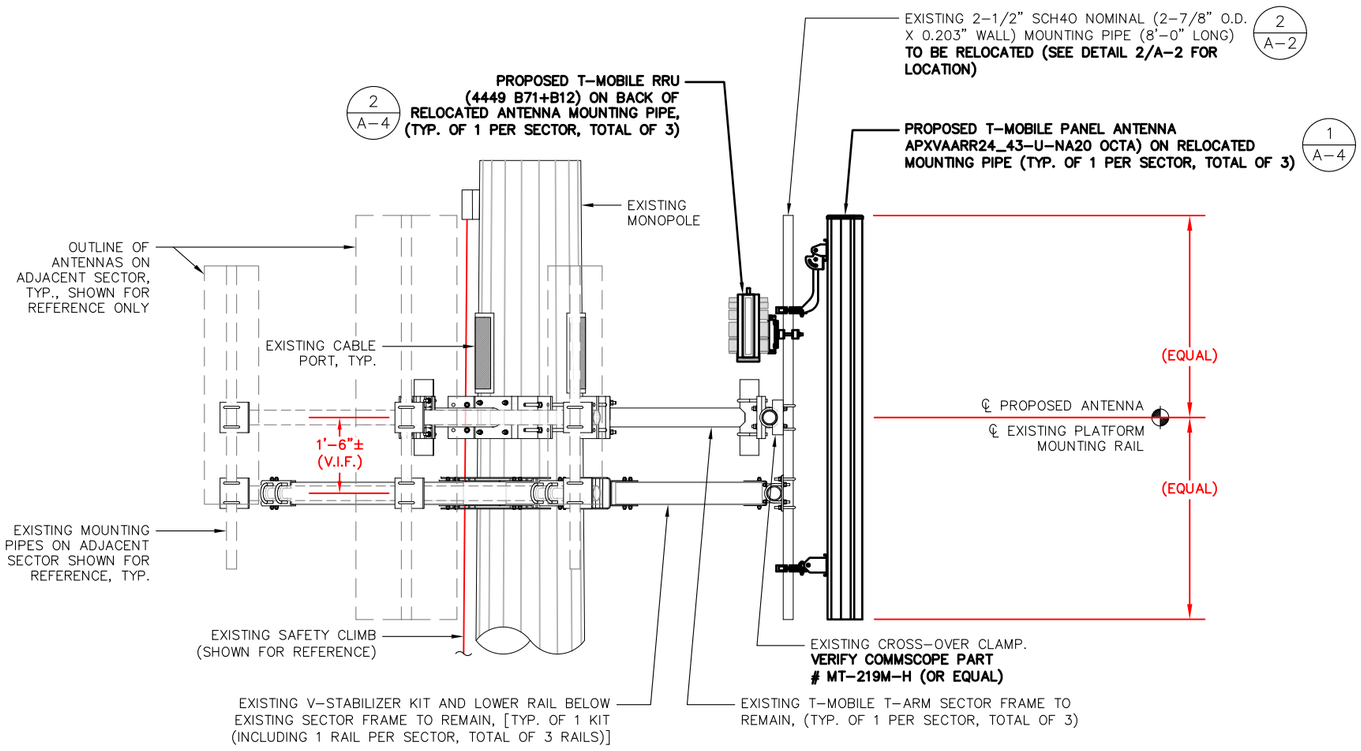
REV.	DATE	DESCRIPTION	BY
0	08/29/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CTNH209A
SITE NAME:
NH209/OPTAGELERTNERFT

SITE ADDRESS:
1 DEERFIELD LANE
ANSONIA, CT 06401

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

SHEET NUMBER
A-2



PROPOSED ANTENNA (APXVAARR24_43-U-NA20 OCTA) MOUNTING DETAIL

1/A-3

SCALE: N.T.S.

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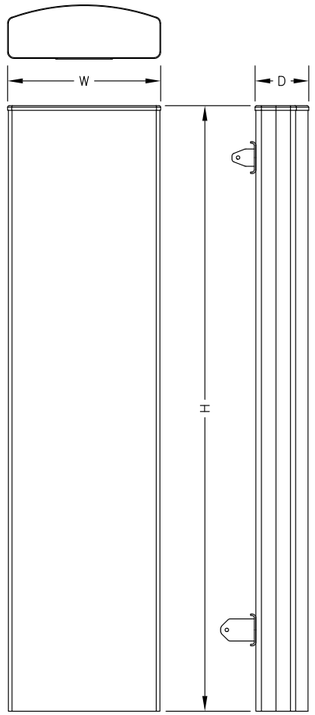
SHEET TITLE
DETAILS

SHEET NUMBER
A-3

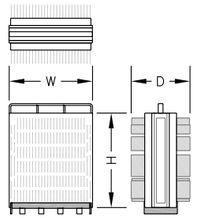


APXVAARR24_43-U-NA20 (OCTA) ANTENNA SPECIFICATIONS	
MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20 (OCTA)
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128± LBS.

ANTENNA DETAIL (APXVAARR24_43-U-NA20 OCTA) 1 / A-4

SCALE: N.T.S.

RRU SPECIFICATIONS	
MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.



REMOTE RADIO UNIT (RRU) DETAIL (4449 B71+B12) 2 / A-4

SCALE: N.T.S.

ANTENNA CONFIGURATION

SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (SBA DATABASE)	AZIMUTH	RADIOS	CABLE FEED LINES
ALPHA	G1900 U1900 U2100	ERICSSON – AIR21 KRC118023-1-B2A_B4P	167'±	0°	EXISTING (1) KRY 112 144/2	EXISTING (2) 1-5/8" COAX
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	167'±	0°	PROPOSED (1) 4449 B71+B12 RRU,	EXISTING (1) SHARED HYBRID CABLE TRUNK
	L2100	ERICSSON – AIR21 KRC118023-1-B2P_B4A (QUAD)	167'±	0°	–	EXISTING (1) SHARED HYBRID CABLE TRUNK
BETA	G1900 U1900 U2100	ERICSSON – AIR21 KRC118023-1-B2A_B4P	167'±	120°	EXISTING (1) KRY 112 144/2	EXISTING (2) 1-5/8" COAX
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	167'±	120°	PROPOSED (1) 4449 B71+B12 RRU,	EXISTING (1) SHARED HYBRID CABLE TRUNK
	L2100	ERICSSON – AIR21 KRC118023-1-B2P_B4A (QUAD)	167'±	120°	–	EXISTING (1) SHARED HYBRID CABLE TRUNK
GAMMA	G1900 U1900 U2100	ERICSSON – AIR21 KRC118023-1-B2A_B4P	167'±	240°	EXISTING (1) KRY 112 144/2	EXISTING (2) 1-5/8" COAX
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	167'±	240°	PROPOSED (1) 4449 B71+B12 RRU,	EXISTING (1) SHARED HYBRID CABLE TRUNK
	L2100	ERICSSON – AIR21 KRC118023-1-B2P_B4A (QUAD)	167'±	240°	–	EXISTING (1) SHARED HYBRID CABLE TRUNK

REFER TO FINAL RFDS AND FINAL COLLO-APPLICATION FOR FINAL CONFIGURATION AND QUANTITIES.

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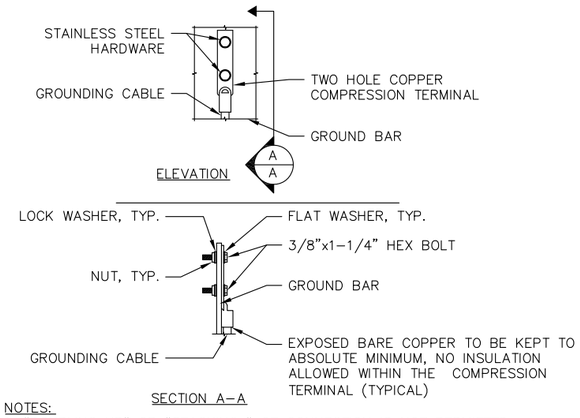
SHEET TITLE
DETAILS

SHEET NUMBER
A-4

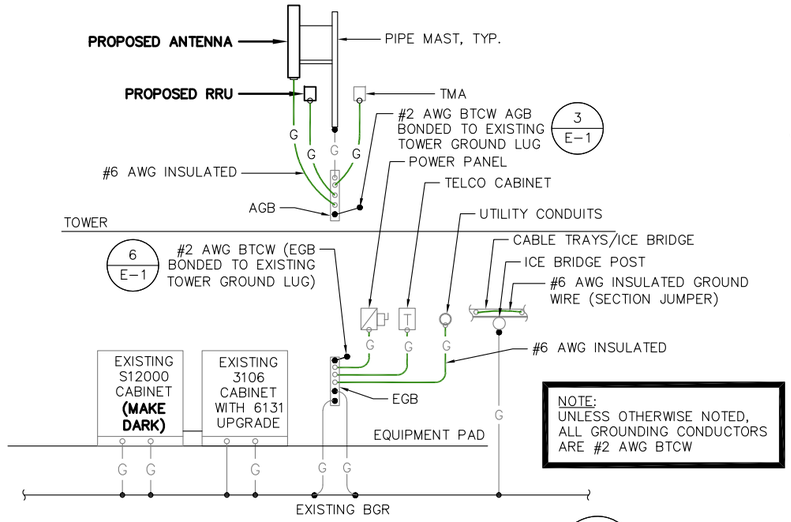


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S.

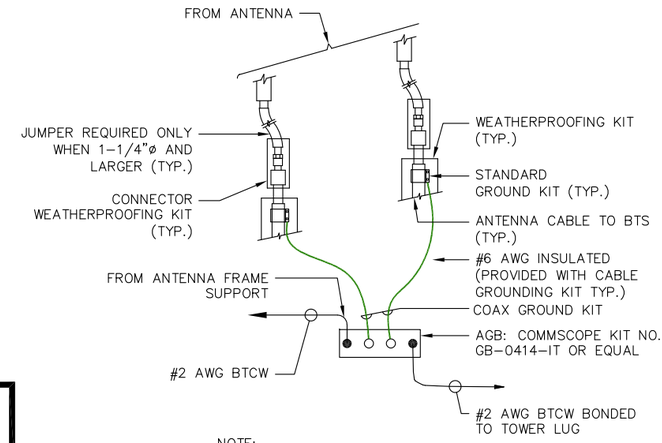


NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

TYPICAL GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S.

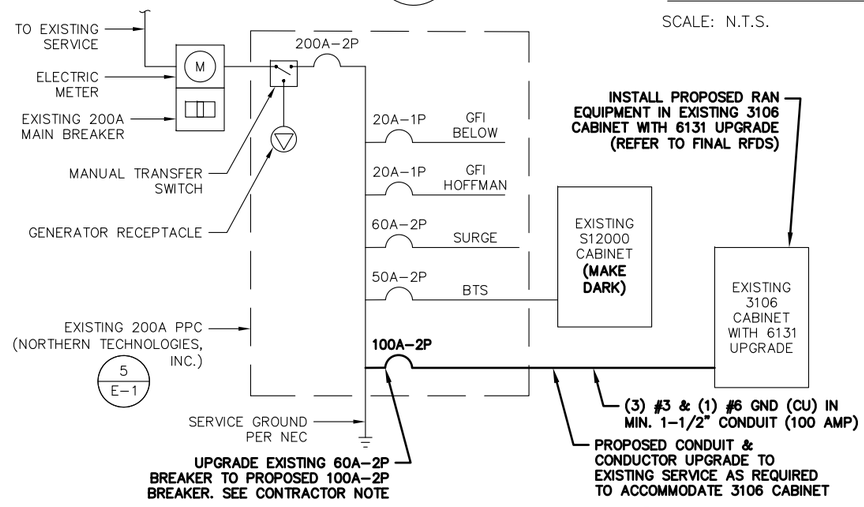


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.



ONE LINE POWER SCHEMATIC

4 / E-1

SCALE: N.T.S.

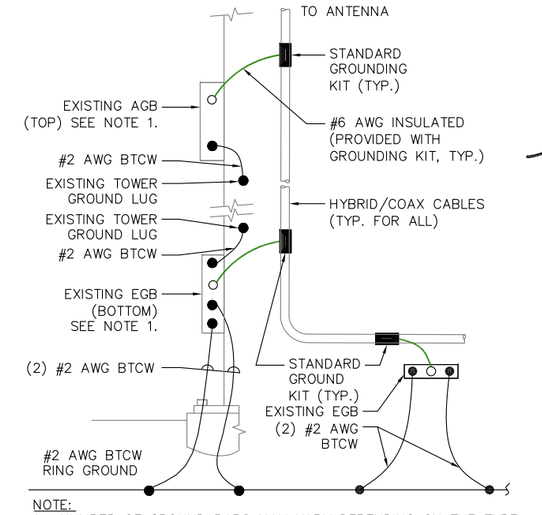
IMAGE SOURCE: PROTERRA 05/26/2018

IMAGE SOURCE: PROTERRA 05/26/2018

PHOTO DETAIL: PPC PANEL

5 / E-1

SCALE: N.T.S.



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

TOWER BOTTOM CABLE GROUNDING DETAIL

6 / E-1

SCALE: N.T.S.

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
MGB	GROUND
	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x10' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

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

ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2014 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. 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.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. 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.
9. 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.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. 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.
14. 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.
15. 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.
16. 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).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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ONE-LINE DIAGRAM & GROUNDING DETAILS

SHEET NUMBER
E-1