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

February 1, 2016

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

Notice of Exempt Modification
60 Adams Street, Manchester, CT 06042
41.7940481 N
-72.55536 W
AT&T #: 10035244_LTE

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 125-foot level of the existing 140-foot Monopole Tower at 60 Adams Street. The tower is owned by SBA Towers V, LLC. The property is owned by Pom-Pam Gali, LLC. AT&T now intends to swap three (3) existing GSM antennas with three (3) new LTE/GSM antennas. These antennas would be installed at the 125-foot level of the tower. AT&T also intends to:

Remove:

- None

Remove and Replace:

- Remove (3) KMW AM-X-CD Panel Antennas and replace with (3) new CCI OPA-65R Panel Antennas

Install:

- (1) Raycap DC6 Surge Suppressor
- (3) Ericsson RRUS-32 Remote Radio Unit
- (6) Kathrein 782 combiner
- (1) 1/2" Fiber Cable
- (2) 3/4" DC Power Cable

Existing Equipment to Remain (Entitlements):

- (3) Kathrein 800-10121 Panel Antennas
- (3) KMW AM-X-CD Panel Antennas
- (1) Raycap DC6 Surge Suppressor
- (6) Ericsson RRUS-11 Remote Radio Unit
- (6) CCI DTMABP - TMA/TTA
- (3) Allgon 7120.16 Panel antenna (Reserved Entitlement)

- (12) 1-1/4" Coax Lines
- (1) 2" conduit with fiber/DC power cables listed below:
  - (1) 1/2" Fiber Cable
  - (2) 3/4" DC Power Cable

This facility was approved on 12/17/98 by the Council in Case # TS-BAM/SCLP-077-981208 (CSC) and the Town of Manchester on 4/19/99 with Zoning Permit 99-1764. This approval included the conditions that the fence surrounding the base of the tower be black vinyl chainlink and that the 140' monopole would have two modular buildings. This modification complies with the aforementioned 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 Scott Shaley, General Manager for the Town of Manchester, as well as the property owner, Pom-Pom Gali, 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.

For the foregoing reasons, AT&T 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: Scott Shaley, General Manager–as elected official
Town of Manchester, 41 Center Street, Manchester, CT 06045
Pom-Pom Gali,LLC–as property owner
79 Boston Post Road, Willimantic, CT 06226

POWER DENSITY

AT&T Site Inventory and Power Data

Sector:	A
Antenna #:	1
Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd
Height (AGL):	125 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6
Total TX Power(W):	180
ERP (W):	4,105.06
Antenna A1 MPE%	**1.20**
Antenna #:	2
Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	12.45 / 15.45 dBd
Height (AGL):	125 feet
Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4
Total TX Power(W):	180
ERP (W):	5,263.78
Antenna A2 MPE%	**1.54**
Antenna #:	3
Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 / 15.25 dBd
Height (AGL):	125 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4
Total TX Power(W):	240
ERP (W):	6,614.85
Antenna A3 MPE%	**2.43**

Sector:	B
Antenna #:	1
Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd
Height (AGL):	125 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6
Total TX Power(W):	180
ERP (W):	4,105.06
Antenna B1 MPE%	**1.20**
Antenna #:	2
Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	12.45 / 15.45 dBd
Height (AGL):	125 feet
Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4
Total TX Power(W):	180
ERP (W):	5,263.78
Antenna B2 MPE%	**1.54**
Antenna #:	3
Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 / 15.25 dBd
Height (AGL):	125 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4
Total TX Power(W):	240
ERP (W):	6,614.85
Antenna B3 MPE%	**2.43**

Sector:	C
Antenna #:	1
Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd
Height (AGL):	125 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6
Total TX Power(W):	180
ERP (W):	4,105.06
Antenna C1 MPE%	**1.20**
Antenna #:	2
Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	12.45 / 15.45 dBd
Height (AGL):	125 feet
Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4
Total TX Power(W):	180
ERP (W):	5,263.78
Antenna C2 MPE%	**1.54**
Antenna #:	3
Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 / 15.25 dBd
Height (AGL):	125 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4
Total TX Power(W):	240
ERP (W):	6,614.85
Antenna C3 MPE%	**2.43**

Site Composite MPE%	
Carrier	MPE%
AT&T – Max per sector	**4.76**
Nextel	0.57 %
PageNet	0.40 %
Verizon Wireless	16.87 %
Clearwire	0.14 %
Sprint	0.07 %
Site Total MPE %:	**22.81 %**

AT&T Sector 1 Total:	4.76 %
AT&T Sector 2 Total:	4.76 %
AT&T Sector 3 Total:	4.76 %
Site Total:	22.81 %

AT&T _ 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
AT&T 850 MHz UMTS	2	418.91	125	2.13	850	567	0.38 %
T&T 1900 MHz (PCS) UMTS	4	816.81	125	8.29	1900	1000	0.83 %
AT&T 850 MHz GSM	2	527.37	125	2.68	850	567	0.47 %
T&T 2300 MHz (WCS) LTE	2	2104.51	125	10.69	2300	1000	1.07 %
AT&T 700 MHz LTE	2	1297.63	125	6.59	700	467	1.41 %
AT&T 1900 MHz (PCS) LTE	2	2009.79	125	10.20	1900	1000	1.02 %
						Total:	5.18 %

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

AT&T Existing Facility

Site ID: CT1080

Manchester Sand & Gravel
60 Adams Street
Manchester, CT 06040

January 4, 2016

EBI Project Number: 6216000017

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	22.81 %

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

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January 4, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT1080 – Manchester Sand & Gravel**

EBI Consulting was directed to analyze the proposed AT&T facility located at **60 Adams Street, Manchester, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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 public 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 public 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 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) 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 AT&T Wireless antenna facility located at **60 Adams Street, Manchester, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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, 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) 4 UMTS channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (WCS Band – 2300 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (700 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 (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

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

9) The antennas used in this modeling are the **Kathrein 800-10121** for 1900 MHz (PCS) and 850 MHz channels, the **CCI OPA-65R-LCUU-H6** for 850 MHz and 2300 MHz (WCS) and the **KMW AM-X-CD-16-65-00T-RET** for 700 MHz and 1900 MHz (PCS). This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerline of the proposed antennas is **125 feet** above ground level (AGL).

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

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

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AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd
Height (AGL):	125 feet	Height (AGL):	125 feet	Height (AGL):	125 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	4,105.06	ERP (W):	4,105.06	ERP (W):	4,105.06
Antenna A1 MPE%	**1.20**	Antenna B1 MPE%	**1.20**	Antenna C1 MPE%	**1.20**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	12.45 / 15.45 dBd	Gain:	12.45 / 15.45 dBd	Gain:	12.45 / 15.45 dBd
Height (AGL):	125 feet	Height (AGL):	125 feet	Height (AGL):	125 feet
Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	5,263.78	ERP (W):	5,263.78	ERP (W):	5,263.78
Antenna A2 MPE%	**1.54**	Antenna B2 MPE%	**1.54**	Antenna C2 MPE%	**1.54**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET	Make / Model:	KMW AM-X-CD-16-65-00T-RET
Gain:	13.35 / 15.25 dBd	Gain:	13.35 / 15.25 dBd	Gain:	13.35 / 15.25 dBd
Height (AGL):	125 feet	Height (AGL):	125 feet	Height (AGL):	125 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	6,614.85	ERP (W):	6,614.85	ERP (W):	6,614.85
Antenna A3 MPE%	**2.43**	Antenna B3 MPE%	**2.43**	Antenna C3 MPE%	**2.43**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**4.76**
Nextel	0.57 %
PageNet	0.40 %
Verizon Wireless	16.87 %
Clearwire	0.14 %
Sprint	0.07 %
Site Total MPE %:	**22.81 %**

AT&T Sector 1 Total:	4.76 %
AT&T Sector 2 Total:	4.76 %
AT&T Sector 3 Total:	4.76 %
Site Total:	22.81 %

AT&T _ 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
AT&T 850 MHz UMTS	2	418.91	125	2.13	850	567	0.38 %
AT&T 1900 MHz (PCS) UMTS	4	816.81	125	8.29	1900	1000	0.83 %
AT&T 850 MHz GSM	2	527.37	125	2.68	850	567	0.47 %
AT&T 2300 MHz (WCS) LTE	2	2104.51	125	10.69	2300	1000	1.07 %
AT&T 700 MHz LTE	2	1297.63	125	6.59	700	467	1.41 %
AT&T 1900 MHz (PCS) LTE	2	2009.79	125	10.20	1900	1000	1.02 %
						Total:	5.18 %

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Summary

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

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

AT&T Sector	Power Density Value (%)
Sector 1:	4.76 %
Sector 2:	4.76 %
Sector 3 :	4.76 %
AT&T Maximum Total (per sector):	4.76 %
Site Total:	22.81 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **22.81%** of the allowable FCC established general public 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.

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

Structural Analysis Report

Existing 141 ft. Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT16504-A

Customer Site Name: Manchester 12, CT

Carrier Name: AT&T

Carrier Site ID / Name: CT1080 Fixed Asset # 10035244

Site Location: 60 Adams Street

Manchester, Connecticut 06042

Hartford County

Latitude: 41.794100

Longitude: -72.555300

Analysis Result:

Max Structural Usage: 99.8% [Pass]

Max Foundation Usage: 75.0% [Pass]

Report Prepared By : Kyle Wyant

Introduction

The purpose of this report is to summarize the analysis results on the 141 ft. 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	FDH Velocitel, Inc., "Monopole Mapping Report," Project No. 15BRLA1500, dated June 15, 2015
Foundation Drawing	FDH Velocitel, Inc., "Dispersive Wave Propagation Testing and Rebar Investigation of an Existing Tower Foundation," Project No. 15BRLC1500, dated June 16, 2015
Geotechnical Report	FDH Velocitel, Inc., "Geotechnical Evaluation of Subsurface Conditions," Project No. 15BRNG1600, dated June 17, 2015
Modification Drawings	N/A

Analysis Criteria

The analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F**.** 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.

Basic Wind Speed Used in the Analysis:	80.0 mph (Fastest Mile)
Basic Wind Speed with Ice:	69 mph (Fastest Mile) with 1/2" Radial Ice Concurrent
Operational Wind Speed:	50 mph + 0" Radial Ice
Standard/Codes:	ANSI/TIA/EIA-222-F / 2005 Connecticut State Building Code

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 [1]	Owner
1	139.0	-	-	(2) 3.5' Standoffs w/ (2) 2.4" x 5.0' Pipe Mounts	-	N/A
2	132.5	-	-	(1) 5.0' Standoff w/ (1) 2.4" x 3.0' Pipe Mount	-	
-	129.5	1	Raycap DC6-48-60-18-8F	Direct Mount	(12) 1 1/4" (1) 2 1/8" F.C. [2] (1) Fiber [2] (2) Power [2]	AT&T
-	124.0	6	CCI DTMABP7819VG12A	Platform w/ Hand Rails		
-		3	Ericsson RRUS 11 B12			
-		3	Ericsson RRUS 11 B2			
-		3	Kathrein 800 10121 - Panel			
-		6	KMW AM-X-CD-16-65-00T-RET - Panel			
18	118.5	1	Andrew VHLP1-23-DW1 - Dish	Low Profile Platform	(2) 5/8" (2) 2 1/8" F.C.	Clearwire
19		1	Andrew VHLP2-23-DW1 - Dish			
20	114.5	3	Argus LLPX310R-V1 - Panel			
21	114.0	1	20" x 18" x 9" Junction Box			
22	113.0	3	Samsung SPI-22132825WB			
23	117.0	3	RFS APXVTM14 - Panel		(1) 3/4" (3) 1 1/4"	Sprint
24		3	Alcatel Lucent RRH8x20-25-FEU - RRU			
25		3	Alcatel Lucent RRH1900-4X45 - RRU			
26	115.0	3	RFS APXVSPP18 - Panel			
27	112.5	3	Alcatel Lucent RRH2X50-800 - RRU			
28	104.0	-	-	(2) 4.0' Standoffs w/ (1) 1.5" x 2.0' Pipe Mount	-	N/A
29	90.0	3	Swedcom SLCP 2x6014 - Panel	Platform w/ Hand Rails	(12) 1 5/8" Coax (2) 1 5/8" Hybrid	Verizon
30		3	Alcatel Lucent RRH2X60-700 - RRU			
31		3	Alcatel Lucent RRH2X60-AWS - RRU			
32		3	Alcatel Lucent RRH2X60-PCS - RRU			
33		3	Antel BXA-70063-6CF-EDIN-x - Panel			
34		6	Commscope SBNHH-1D65B - Panel			
35		1	RFS DB-T1-6Z-8AB-0Z – Distribution Box			

1. Transmission lines are installed inside of the pole shafts unless otherwise noted.
2. AT&T currently has (2) Power cables and (1) Fiber running inside of the (1) 2 1/8" F.C. on the inside of the pole shafts.

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
9	125.0	3	Allgon 7120.16 - Panel	Platform w/ Hand Rails	(12) 1 1/4" Coax (1) 2" Conduit (4) 0.625" DC (2) 0.40" Fiber	AT&T
10		3	Kathrein 800-10121 - Panel			
11		3	CCI OPA-65R-LCUU-H6 - Panel			
12		3	KMW AM-X-CD-16-65-00T-RET - Panel			
13		6	CCI DTMABP7819VG12A - TMA/TTA			
14		6	Kathrein 782-10250 - RET			
15		3	Ericsson RRUS-32 - RRU			
16		6	Ericsson RRUS-11 - RRU			
17		2	Raycap DC6-48-60-18-8F - Surge Supressor			

All transmission lines are considered running inside of the pole shafts. AT&T's proposed (4) 0.625" DC and (2) 0.40" Fiber lines are to be installed inside of the (1) 2" Conduit on the 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:	**99.8%**	**91.2%**	**73.0%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	2230.9	22.4	35.4

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):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA-222-F for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 2.5921 degrees under the operational wind speed as specified in the Analysis Criteria.

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-F Standard and the 2005 Connecticut State Building Code 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 or/and 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 Stress 99.8% at 0.0ft

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)			Page: 1	

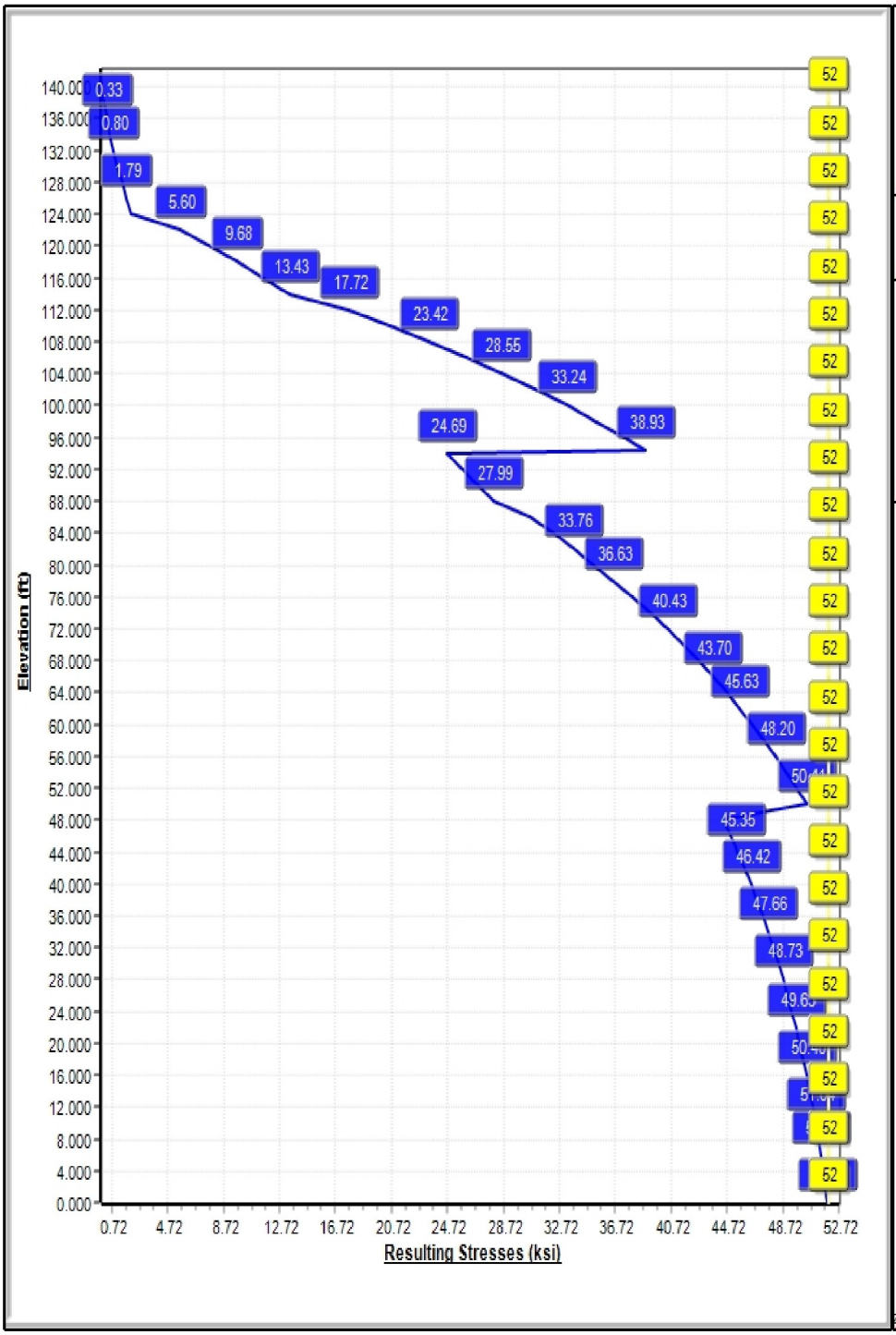
Tower Engineering Solutions

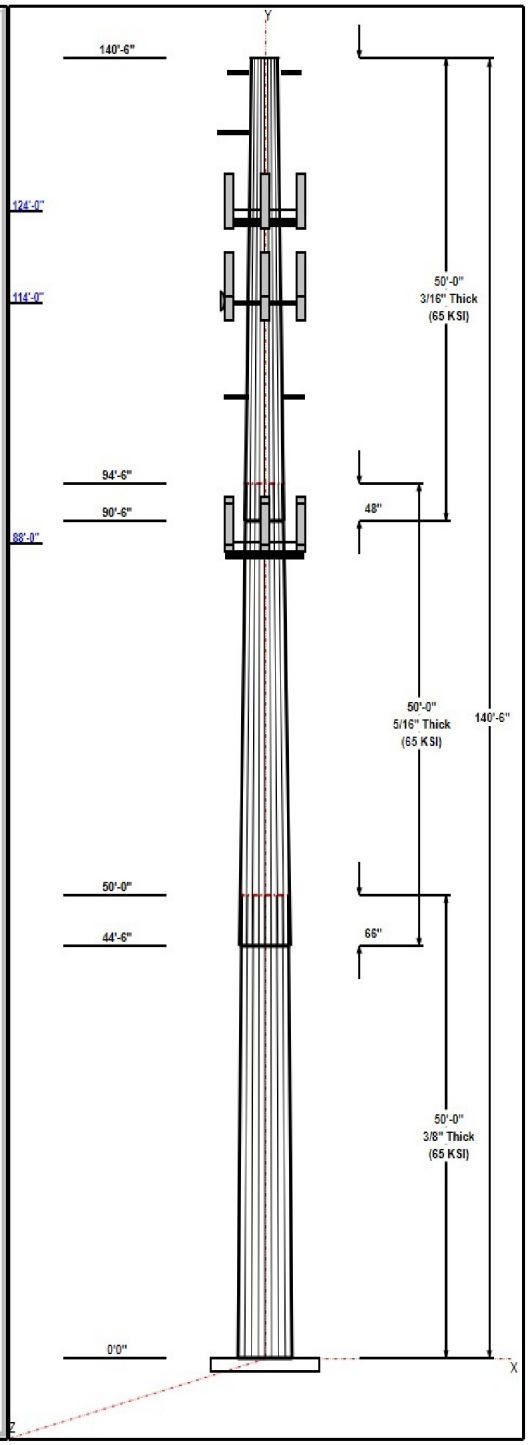
Dead Load Factor: 1.00
Wind Load Factor: 1.00

52 Alllowable Stress
52 Resulting Stress

Load Case : 80 mph Wind with 0 in Ice

Iterations: 31





Structure: CT16504-A-SBA

Type: Tapered
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.18206

11/3/2015

Tower Engineering Solutions

Shaft Properties

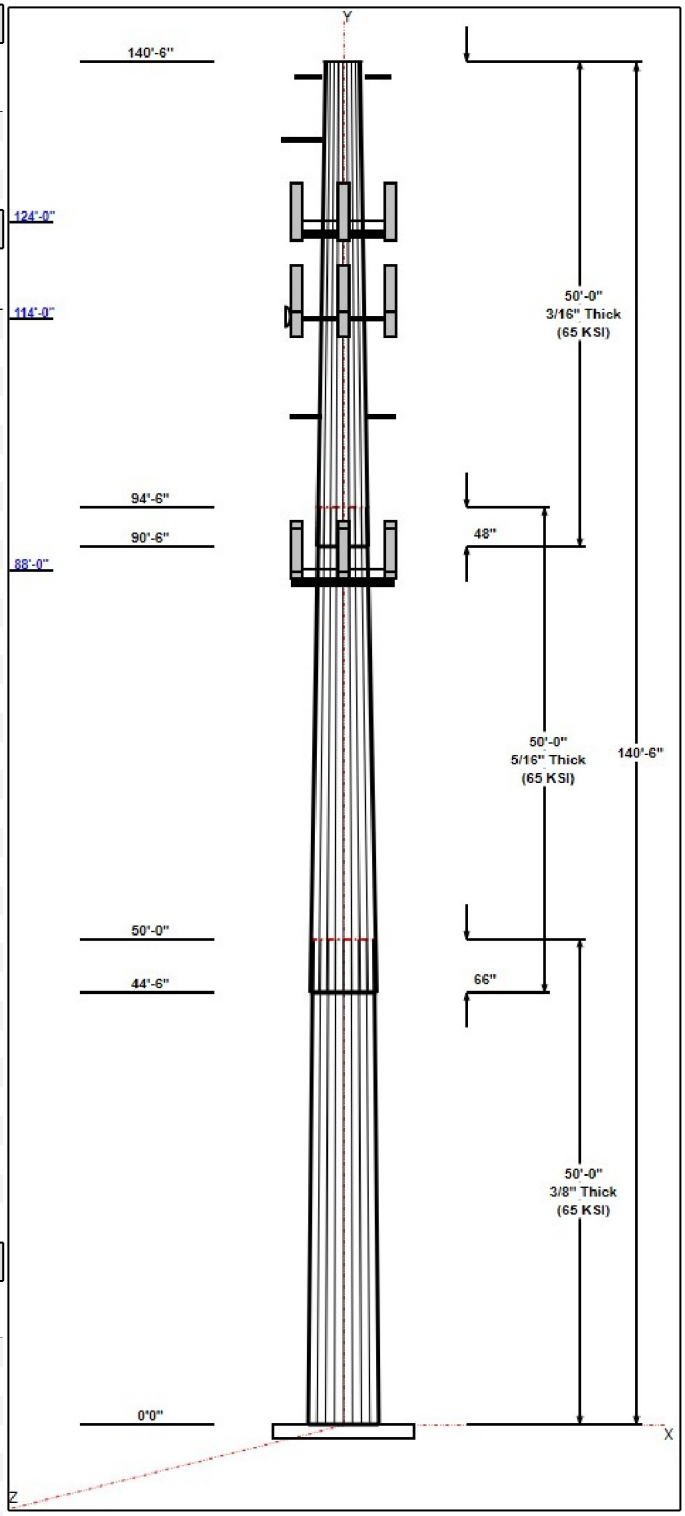
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	50.00	33.44	42.54	0.375		0.18206	65
2	50.00	25.96	35.06	0.313	Slip	0.18206	65
3	50.00	17.96	27.06	0.188	Slip	0.18206	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
139.00	139.00	2	3.5' Standoff Mount	N/A
132.50	132.50	1	5' Standoff Mount	N/A
124.00	125.00	3	Allgon 7120.16	AT&T
124.00	125.00	6	CCI DTMABP7819VG12A	AT&T
124.00	125.00	3	CCI OPA-65R-LCUU-H6	AT&T
124.00	125.00	6	Ericsson RRUS-11	AT&T
124.00	125.00	3	Ericsson RRUS-32	AT&T
124.00	125.00	6	Kathrein 782 10250	AT&T
124.00	125.00	3	Kathrein 800-10121	AT&T
124.00	125.00	3	KMW	AT&T
124.00	124.00	1	Platform w/ Hand Rails	AT&T
124.00	125.00	2	Raycap DC6-48-60-18-8F	AT&T
114.00	114.00	1	20" x 18" x 9" Junction Box	Clearwire
114.00	117.00	3	Alcatel Lucent	Sprint
114.00	112.50	3	Alcatel Lucent	Sprint
114.00	117.00	3	Alcatel Lucent	Sprint
114.00	118.50	1	Andrew VHLP1-23-DW1	Clearwire
114.00	118.50	1	Andrew VHLP2-23-DW1	Clearwire
114.00	114.50	3	Argus LLPX310R-V1	Clearwire
114.00	114.00	1	Low Profile Platform	Sprint
114.00	115.00	3	RFS APXVSPP18	Sprint
114.00	117.00	3	RFS APXVTM14	Sprint
114.00	113.00	3	Samsung	Clearwire
104.00	104.00	2	4' Standoff Mount	N/A
88.00	90.00	3	Alcatel Lucent	Verizon
88.00	90.00	3	Alcatel Lucent	Verizon
88.00	90.00	3	Alcatel Lucent	Verizon
88.00	90.00	3	Antel	Verizon
88.00	90.00	6	Commscope	Verizon
88.00	90.00	1	Platform w/ Hand Rails	Verizon
88.00	90.00	1	RFS DB-T1-6Z-8AB-0Z	Verizon
88.00	90.00	3	Swedcom SLCP 2x6014	Verizon

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	124.00	Inside	0.40" Fiber	AT&T
0.00	124.00	Inside	0.625" DC	AT&T
0.00	124.00	Inside	1 1/4" Coax	AT&T
0.00	124.00	Inside	2" Conduit	AT&T
0.00	114.00	Inside	1-1/4"	Sprint
0.00	114.00	Inside	2 1/8" F.C.	Clearwire
0.00	114.00	Inside	3/4"	Sprint
0.00	114.00	Inside	5/8"	Clearwire
0.00	90.00	Inside	1 5/8" Coax	Verizon
0.00	90.00	Inside	1 5/8" Hybrid	Verizon



Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.7500	57.0	60.0	Round

Reactions

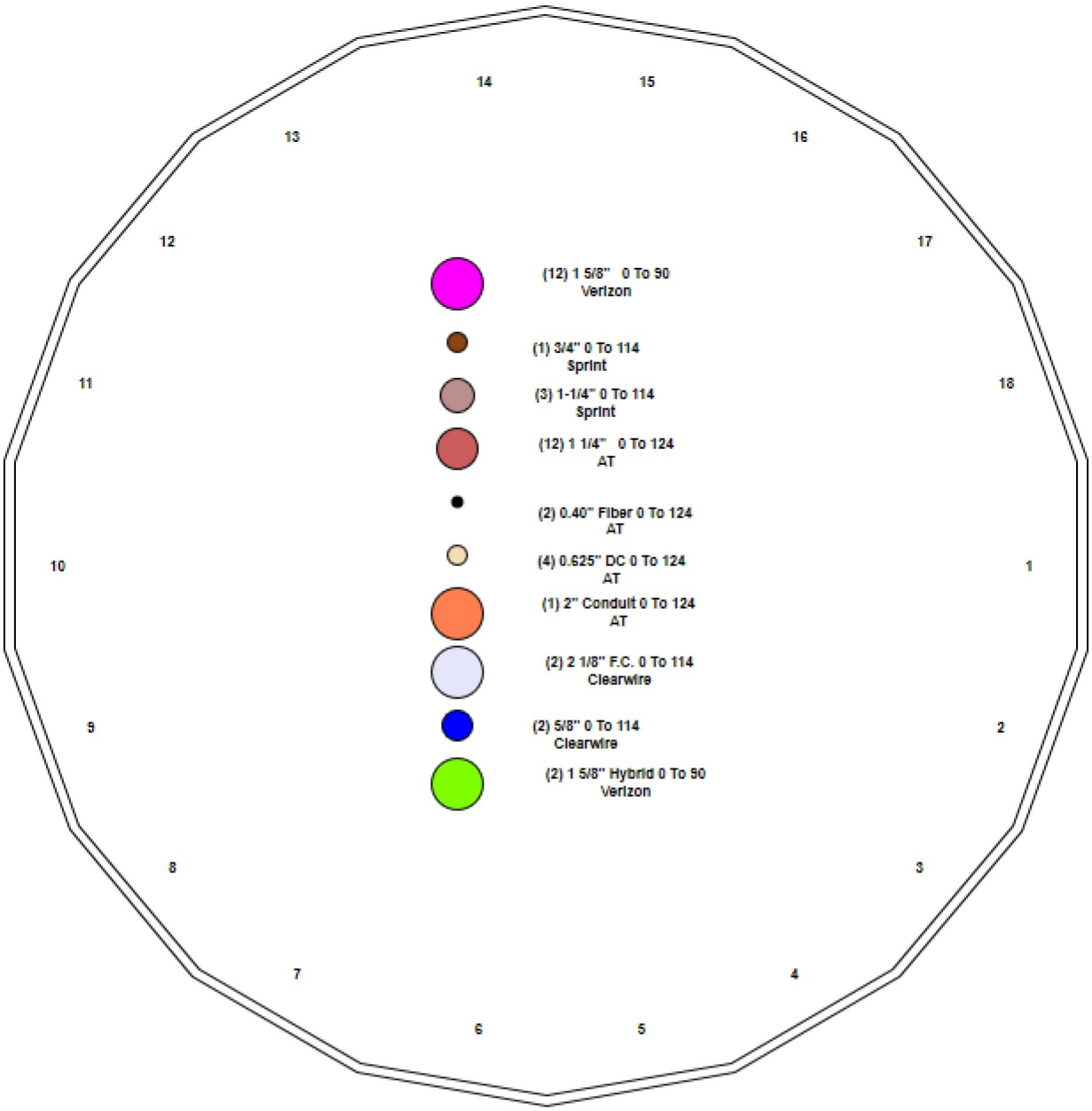
Load Case	Moment	Shear	Axial
80 mph Wind with 0" Ice	2230.9	22.4	29.0
69.28 mph Wind with 0.5" Ice	2049.2	19.9	35.4
50 mph Wind with 0" Ice	872.9	8.7	29.0

Structure: CT16504-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Manchester 12, CT
Height: 140.50 (ft)

11/3/2015

Tower Engineering Solutions



Shaft Properties

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**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	50.000	0.3750	65		0.00	7,617
2	18	50.000	0.3125	65	Slip	66.00	5,096
3	18	50.000	0.1875	65	Slip	48.00	2,260
					Total Shaft Weight:		**14,973**

	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	42.54	0.00	50.19	11272.80	18.59	113.4	33.44	50.00	39.35	5434.44	14.31	89.16	0.182064
2	35.06	44.50	34.47	5258.76	18.37	112.2	25.96	94.50	25.44	2114.11	13.23	83.07	0.182064
3	27.06	90.50	15.99	1459.57	24.03	144.3	17.96	140.5	10.58	422.08	15.47	95.78	0.182064

Loading Summary

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

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	139.0	3.5' Standoff Mount	2	50.00	3.00	0.75	75.00	4.000	0.80	0.00	0.00
2	132.5	5' Standoff Mount	1	50.00	3.25	0.75	75.00	4.000	0.80	0.00	0.00
3	124.0	Allgon 7120.16	3	16.00	3.58	1.22	46.00	4.340	1.19	0.00	1.00
4	124.0	CCI DTMABP7819VG12A	6	19.00	0.39	0.50	24.55	0.480	0.58	0.00	1.00
5	124.0	CCI OPA-65R-LCUU-H6	3	73.00	10.36	0.76	126.70	10.85	0.86	0.00	1.00
6	124.0	Ericsson RRUS-11	6	54.00	2.94	0.50	69.31	3.140	0.77	0.00	1.00
7	124.0	Ericsson RRUS-32	3	77.00	4.04	0.50	100.44	4.290	0.85	0.00	1.00
8	124.0	Kathrein 782 10250	6	6.40	0.52	0.50	10.00	0.690	0.81	0.00	1.00
9	124.0	Kathrein 800-10121	3	44.10	5.46	0.80	74.10	6.230	0.94	0.00	1.00
10	124.0	KMW AM-X-CD-16-65-00T-RET	3	48.50	8.26	0.78	91.70	8.730	0.90	0.00	1.00
11	124.0	Platform w/ Hand Rails	1	2000.00	32.00	1.00	2500.00	40.00	1.00	0.00	0.00
12	124.0	Raycap DC6-48-60-18-8F	2	32.80	1.47	1.00	50.50	1.670	1.00	0.00	1.00
13	114.0	20" x 18" x 9" Junction Box	1	20.00	3.50	0.90	38.00	3.510	0.95	0.00	0.00
14	114.0	Alcatel Lucent RRH1900-4X45	3	60.00	2.61	0.50	83.10	2.820	0.50	0.00	3.00
15	114.0	Alcatel Lucent RRH2X50-800	3	64.00	2.25	0.50	86.10	2.430	0.50	0.00	-1.50
16	114.0	Alcatel Lucent RRH8x20-25-FEU	3	70.00	1.70	0.50	92.00	1.890	0.50	0.00	3.00
17	114.0	Andrew VHLP1-23-DW1	1	14.00	1.61	0.80	24.10	1.820	0.80	0.00	4.50
18	114.0	Andrew VHLP2-23-DW1	1	31.00	4.69	0.80	59.00	5.050	0.80	0.00	4.50
19	114.0	Argus LLPX310R-V1	3	50.70	5.32	0.81	84.50	5.840	0.85	0.00	0.50
20	114.0	Low Profile Platform	1	1800.00	22.00	1.00	2200.00	26.60	1.00	0.00	0.00
21	114.0	RFS APXVSPP18	3	125.30	9.14	0.96	193.00	9.860	0.99	0.00	1.00
22	114.0	RFS APXVTM14	3	116.70	7.86	0.90	172.20	8.530	0.93	0.00	3.00
23	114.0	Samsung SPI-22132825WB	3	33.10	1.82	0.80	45.60	2.100	0.85	0.00	-1.00
24	104.0	4' Standoff Mount	2	50.00	1.50	0.90	75.00	4.000	1.00	0.00	0.00
25	88.00	Alcatel Lucent RRH2X60-700	3	90.00	4.53	0.50	120.60	5.050	0.91	0.00	2.00
26	88.00	Alcatel Lucent RRH2X60-AWS	3	90.00	4.53	0.50	120.60	5.050	0.91	0.00	2.00
27	88.00	Alcatel Lucent RRH2X60-PCS	3	55.00	2.57	0.50	70.90	2.760	0.92	0.00	2.00
28	88.00	Antel BXA-70063-6CF-EDIN-x	3	42.60	7.95	0.75	94.50	8.500	0.92	0.00	2.00
29	88.00	Commscope SBNHH-1D65B	6	76.40	8.49	0.84	134.70	9.050	0.95	0.00	2.00
30	88.00	Platform w/ Hand Rails	1	2000.00	40.00	1.00	2400.00	42.82	1.00	0.00	2.00
31	88.00	RFS DB-T1-6Z-8AB-0Z	1	44.00	5.60	0.76	0.00	6.080	0.77	0.00	2.00
32	88.00	Swedcom SLCP 2x6014	3	45.60	7.73	0.89	102.20	8.320	1.00	0.00	2.00
		Totals:	**89**	**10,464.20**			**14,241.18**				

Linear Appurtenances

			No Ice		Ice		
Bottom Elev. (ft)	Top Elev. (ft)	Description	Weight (lb/ft)	CaAa (sf/ft)	Weight (lb/ft)	CaAa (sf/ft)	Exposed
0.00	124.0	(2) 0.40" Fiber	0.16	0.00	0.16	0.00	Inside
0.00	124.0	(4) 0.625" DC	1.60	0.00	1.60	0.00	Inside
0.00	124.0	(12) 1 1/4" Coax	7.92	0.00	7.92	0.00	Inside
0.00	124.0	(1) 2" Conduit	1.61	0.00	1.61	0.00	Inside
0.00	114.0	(3) 1-1/4"	2.86	0.00	2.86	0.00	Inside
0.00	114.0	(2) 2 1/8" F.C.	3.22	0.00	3.22	0.00	Inside
0.00	114.0	(1) 3/4"	0.40	0.00	0.40	0.00	Inside

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)
0.00	114.0	(2) 5/8"		1.04	0.00		1.04	0.00	Inside		
0.00	90.00	(12) 1 5/8" Coax		12.48	0.00		12.48	0.00	Inside		
0.00	90.00	(2) 1 5/8" Hybrid		2.20	0.00		2.20	0.00	Inside		
			Totals:	**3,578.67**			**3,578.44**				

Shaft Section Properties

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

Increment Length: 2 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
0.00		0.3750	42.540	50.185	11272.8	18.59	113.44	65	52	0.0
2.00		0.3750	42.176	49.752	10983.3	18.42	112.47	65	52	340.1
4.00		0.3750	41.812	49.318	10698.7	18.25	111.50	65	52	337.1
6.00		0.3750	41.448	48.885	10419.2	18.08	110.53	65	52	334.2
8.00		0.3750	41.083	48.452	10144.5	17.91	109.56	65	52	331.2
10.00		0.3750	40.719	48.018	9874.7	17.74	108.58	65	52	328.3
12.00		0.3750	40.355	47.585	9609.7	17.56	107.61	65	52	325.3
14.00		0.3750	39.991	47.151	9349.6	17.39	106.64	65	52	322.4
16.00		0.3750	39.627	46.718	9094.1	17.22	105.67	65	52	319.4
18.00		0.3750	39.263	46.285	8843.4	17.05	104.70	65	52	316.5
20.00		0.3750	38.899	45.851	8597.3	16.88	103.73	65	52	313.5
22.00		0.3750	38.535	45.418	8355.8	16.71	102.76	65	52	310.6
24.00		0.3750	38.170	44.984	8118.9	16.54	101.79	65	52	307.6
26.00		0.3750	37.806	44.551	7886.5	16.37	100.82	65	52	304.7
28.00		0.3750	37.442	44.118	7658.5	16.19	99.85	65	52	301.7
30.00		0.3750	37.078	43.684	7435.0	16.02	98.87	65	52	298.8
32.00		0.3750	36.714	43.251	7215.9	15.85	97.90	65	52	295.8
34.00		0.3750	36.350	42.817	7001.2	15.68	96.93	65	52	292.9
36.00		0.3750	35.986	42.384	6790.7	15.51	95.96	65	52	289.9
38.00		0.3750	35.622	41.951	6584.5	15.34	94.99	65	52	287.0
40.00		0.3750	35.257	41.517	6382.6	15.17	94.02	65	52	284.0
42.00		0.3750	34.893	41.084	6184.8	15.00	93.05	65	52	281.1
44.00		0.3750	34.529	40.651	5991.1	14.83	92.08	65	52	278.1
44.50	Bot - Section 2	0.3750	34.438	40.542	5943.3	14.78	91.84	65	52	69.1
46.00		0.3750	34.165	40.217	5801.5	14.65	91.11	65	52	381.3
48.00		0.3750	33.801	39.784	5616.0	14.48	90.14	65	52	503.7
50.00	Top - Section 1	0.3125	34.062	33.474	4817.1	17.81	109.00	65	52	498.3
52.00		0.3125	33.698	33.113	4662.9	17.60	107.83	65	52	226.6
54.00		0.3125	33.334	32.752	4512.0	17.40	106.67	65	52	224.1
56.00		0.3125	32.969	32.390	4364.4	17.19	105.50	65	52	221.7
58.00		0.3125	32.605	32.029	4220.0	16.99	104.34	65	52	219.2
60.00		0.3125	32.241	31.668	4078.8	16.78	103.17	65	52	216.7
62.00		0.3125	31.877	31.307	3940.9	16.58	102.01	65	52	214.3
64.00		0.3125	31.513	30.946	3806.1	16.37	100.84	65	52	211.8
66.00		0.3125	31.149	30.585	3674.3	16.16	99.68	65	52	209.4
68.00		0.3125	30.785	30.223	3545.7	15.96	98.51	65	52	206.9
70.00		0.3125	30.421	29.862	3420.1	15.75	97.35	65	52	204.5
72.00		0.3125	30.056	29.501	3297.5	15.55	96.18	65	52	202.0
74.00		0.3125	29.692	29.140	3177.9	15.34	95.02	65	52	199.5
76.00		0.3125	29.328	28.779	3061.2	15.14	93.85	65	52	197.1
78.00		0.3125	28.964	28.418	2947.4	14.93	92.68	65	52	194.6
80.00		0.3125	28.600	28.057	2836.4	14.73	91.52	65	52	192.2
82.00		0.3125	28.236	27.695	2728.3	14.52	90.35	65	52	189.7
84.00		0.3125	27.872	27.334	2623.0	14.32	89.19	65	52	187.3
86.00		0.3125	27.507	26.973	2520.4	14.11	88.02	65	52	184.8
88.00		0.3125	27.143	26.612	2420.5	13.90	86.86	65	52	182.3
90.00		0.3125	26.779	26.251	2323.2	13.70	85.69	65	52	179.9
90.50	Bot - Section 3	0.3125	26.688	26.160	2299.4	13.65	85.40	65	52	44.6
92.00		0.3125	26.415	25.890	2228.7	13.49	84.53	65	52	214.1
94.00		0.3125	26.051	25.528	2136.7	13.29	83.36	65	52	282.0
94.50	Top - Section 2	0.1875	26.335	15.560	1344.1	23.36	140.45	65	52	69.9
96.00		0.1875	26.062	15.398	1302.4	23.10	139.00	65	52	79.0

Increment Length: **2 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
98.00		0.1875	25.698	15.181	1248.2	22.76	137.05	65	52	104.1
100.00		0.1875	25.334	14.965	1195.5	22.41	135.11	65	52	102.6
102.00		0.1875	24.969	14.748	1144.3	22.07	133.17	65	52	101.1
104.00		0.1875	24.605	14.531	1094.6	21.73	131.23	65	52	99.6
106.00		0.1875	24.241	14.314	1046.4	21.39	129.29	65	52	98.2
108.00		0.1875	23.877	14.098	999.6	21.04	127.34	65	52	96.7
110.00		0.1875	23.513	13.881	954.2	20.70	125.40	65	52	95.2
112.00		0.1875	23.149	13.664	910.2	20.36	123.46	65	52	93.7
114.00		0.1875	22.785	13.448	867.6	20.02	121.52	65	52	92.3
116.00		0.1875	22.421	13.231	826.3	19.67	119.58	65	52	90.8
118.00		0.1875	22.056	13.014	786.4	19.33	117.63	65	52	89.3
120.00		0.1875	21.692	12.798	747.7	18.99	115.69	65	52	87.8
122.00		0.1875	21.328	12.581	710.4	18.65	113.75	65	52	86.4
124.00		0.1875	20.964	12.364	674.3	18.30	111.81	65	52	84.9
126.00		0.1875	20.600	12.148	639.5	17.96	109.87	65	52	83.4
128.00		0.1875	20.236	11.931	605.9	17.62	107.92	65	52	81.9
130.00		0.1875	19.872	11.714	573.5	17.28	105.98	65	52	80.5
132.00		0.1875	19.508	11.497	542.2	16.93	104.04	65	52	79.0
132.50		0.1875	19.417	11.443	534.6	16.85	103.55	65	52	19.5
134.00		0.1875	19.143	11.281	512.1	16.59	102.10	65	52	58.0
136.00		0.1875	18.779	11.064	483.2	16.25	100.16	65	52	76.0
138.00		0.1875	18.415	10.847	455.3	15.91	98.21	65	52	74.6
139.00		0.1875	18.233	10.739	441.8	15.74	97.24	65	52	36.7
140.00		0.1875	18.051	10.631	428.6	15.56	96.27	65	52	36.4
140.50		0.1875	17.960	10.576	422.1	15.48	95.79	65	52	18.0
										14973.2

Wind Loading - Shaft

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

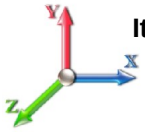
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 31

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		0.00	1.00	16.384	27.69	283.60	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
2.00		0.00	1.00	16.384	27.69	281.17	0.650	0.000	2.00	7.060	4.59	127.1	0.0	340.1
4.00		0.00	1.00	16.384	27.69	278.74	0.650	0.000	2.00	6.999	4.55	126.0	0.0	337.1
6.00		0.00	1.00	16.384	27.69	276.32	0.650	0.000	2.00	6.938	4.51	124.9	0.0	334.2
8.00		0.00	1.00	16.384	27.69	273.89	0.650	0.000	2.00	6.878	4.47	123.8	0.0	331.2
10.00		0.00	1.00	16.384	27.69	271.46	0.650	0.000	2.00	6.817	4.43	122.7	0.0	328.3
12.00		0.00	1.00	16.384	27.69	269.03	0.650	0.000	2.00	6.756	4.39	121.6	0.0	325.3
14.00		0.00	1.00	16.384	27.69	266.61	0.650	0.000	2.00	6.696	4.35	120.5	0.0	322.4
16.00		0.00	1.00	16.384	27.69	264.18	0.650	0.000	2.00	6.635	4.31	119.4	0.0	319.4
18.00		0.00	1.00	16.384	27.69	261.75	0.650	0.000	2.00	6.574	4.27	118.3	0.0	316.5
20.00		0.00	1.00	16.384	27.69	259.32	0.650	0.000	2.00	6.513	4.23	117.2	0.0	313.5
22.00		0.00	1.00	16.384	27.69	256.90	0.650	0.000	2.00	6.453	4.19	116.1	0.0	310.6
24.00		0.00	1.00	16.384	27.69	254.47	0.650	0.000	2.00	6.392	4.15	115.0	0.0	307.6
26.00		0.00	1.00	16.384	27.69	252.04	0.650	0.000	2.00	6.331	4.12	114.0	0.0	304.7
28.00		0.00	1.00	16.384	27.69	249.61	0.650	0.000	2.00	6.271	4.08	112.9	0.0	301.7
30.00		0.00	1.00	16.384	27.69	247.19	0.650	0.000	2.00	6.210	4.04	111.8	0.0	298.8
32.00		0.00	1.00	16.384	27.69	244.76	0.650	0.000	2.00	6.149	4.00	110.7	0.0	295.8
34.00		0.00	1.01	16.524	27.93	243.37	0.650	0.000	2.00	6.089	3.96	110.5	0.0	292.9
36.00		0.00	1.03	16.796	28.39	242.91	0.650	0.000	2.00	6.028	3.92	111.2	0.0	289.9
38.00		0.00	1.04	17.058	28.83	242.31	0.650	0.000	2.00	5.967	3.88	111.8	0.0	287.0
40.00		0.00	1.06	17.310	29.25	241.60	0.650	0.000	2.00	5.907	3.84	112.3	0.0	284.0
42.00		0.00	1.07	17.553	29.66	240.78	0.650	0.000	2.00	5.846	3.80	112.7	0.0	281.1
44.00		0.00	1.09	17.788	30.06	239.85	0.650	0.000	2.00	5.785	3.76	113.0	0.0	278.1
44.50	Bot - Section 2	0.00	1.09	17.845	30.16	239.61	0.650	0.000	0.50	1.437	0.93	28.2	0.0	69.1
46.00		0.00	1.10	18.015	30.45	238.83	0.650	0.000	1.50	4.366	2.84	86.4	0.0	381.3
48.00		0.00	1.11	18.235	30.82	237.73	0.650	0.000	2.00	5.768	3.75	115.5	0.0	503.7
50.00	Top - Section 1	0.00	1.13	18.449	31.18	236.54	0.650	0.000	2.00	5.707	3.71	115.7	0.0	498.3
52.00		0.00	1.14	18.657	31.53	239.73	0.650	0.000	2.00	5.647	3.67	115.7	0.0	226.6
54.00		0.00	1.15	18.859	31.87	238.42	0.650	0.000	2.00	5.586	3.63	115.7	0.0	224.1
56.00		0.00	1.16	19.056	32.21	237.04	0.650	0.000	2.00	5.525	3.59	115.7	0.0	221.7
58.00		0.00	1.17	19.248	32.53	235.60	0.650	0.000	2.00	5.465	3.55	115.5	0.0	219.2
60.00		0.00	1.19	19.436	32.85	234.10	0.650	0.000	2.00	5.404	3.51	115.4	0.0	216.7
62.00		0.00	1.20	19.619	33.16	232.55	0.650	0.000	2.00	5.343	3.47	115.2	0.0	214.3
64.00		0.00	1.21	19.797	33.46	230.94	0.650	0.000	2.00	5.282	3.43	114.9	0.0	211.8
66.00		0.00	1.22	19.972	33.75	229.27	0.650	0.000	2.00	5.222	3.39	114.6	0.0	209.4
68.00		0.00	1.23	20.143	34.04	227.56	0.650	0.000	2.00	5.161	3.35	114.2	0.0	206.9
70.00		0.00	1.24	20.311	34.33	225.80	0.650	0.000	2.00	5.100	3.32	113.8	0.0	204.5
72.00		0.00	1.25	20.475	34.60	224.00	0.650	0.000	2.00	5.040	3.28	113.4	0.0	202.0
74.00		0.00	1.26	20.636	34.87	222.15	0.650	0.000	2.00	4.979	3.24	112.9	0.0	199.5
76.00		0.00	1.27	20.794	35.14	220.27	0.650	0.000	2.00	4.918	3.20	112.3	0.0	197.1
78.00		0.00	1.28	20.949	35.40	218.34	0.650	0.000	2.00	4.858	3.16	111.8	0.0	194.6
80.00		0.00	1.29	21.101	35.66	216.38	0.650	0.000	2.00	4.797	3.12	111.2	0.0	192.2
82.00		0.00	1.30	21.250	35.91	214.38	0.650	0.000	2.00	4.736	3.08	110.6	0.0	189.7
84.00		0.00	1.31	21.397	36.16	212.34	0.650	0.000	2.00	4.676	3.04	109.9	0.0	187.3
86.00		0.00	1.31	21.541	36.40	210.27	0.650	0.000	2.00	4.615	3.00	109.2	0.0	184.8
88.00	Appurtenance(s)	0.00	1.32	21.683	36.64	208.17	0.650	0.000	2.00	4.554	2.96	108.5	0.0	182.3
90.00		0.00	1.33	21.823	36.88	206.04	0.650	0.000	2.00	4.494	2.92	107.7	0.0	179.9
90.50	Bot - Section 3	0.00	1.33	21.858	36.94	205.50	0.650	0.000	0.50	1.114	0.72	26.7	0.0	44.6

Wind Loading - Shaft

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

92.00	0.00	1.34	21.960	37.11	203.88	0.650	0.000	1.50	3.366	2.19	81.2	0.0	214.1
94.00	0.00	1.35	22.096	37.34	201.69	0.650	0.000	2.00	4.435	2.88	107.6	0.0	282.0
94.50 Top - Section 2	0.00	1.35	22.129	37.40	201.13	0.650	0.000	0.50	1.099	0.71	26.7	0.0	69.9
96.00	0.00	1.36	22.229	37.57	202.38	0.650	0.000	1.50	3.275	2.13	80.0	0.0	79.0
98.00	0.00	1.36	22.360	37.79	200.14	0.650	0.000	2.00	4.313	2.80	105.9	0.0	104.1
100.00	0.00	1.37	22.490	38.01	197.87	0.650	0.000	2.00	4.253	2.76	105.1	0.0	102.6
102.00	0.00	1.38	22.617	38.22	195.58	0.650	0.000	2.00	4.192	2.72	104.1	0.0	101.1
104.00 Appurtenance(s)	0.00	1.39	22.743	38.44	193.27	0.650	0.000	2.00	4.131	2.69	103.2	0.0	99.6
106.00	0.00	1.40	22.867	38.65	190.92	0.650	0.000	2.00	4.071	2.65	102.3	0.0	98.2
108.00	0.00	1.40	22.990	38.85	188.56	0.650	0.000	2.00	4.010	2.61	101.3	0.0	96.7
110.00	0.00	1.41	23.111	39.06	186.17	0.650	0.000	2.00	3.949	2.57	100.3	0.0	95.2
112.00	0.00	1.42	23.230	39.26	183.76	0.650	0.000	2.00	3.888	2.53	99.2	0.0	93.7
114.00 Appurtenance(s)	0.00	1.43	23.348	39.46	181.33	0.650	0.000	2.00	3.828	2.49	98.2	0.0	92.3
116.00	0.00	1.43	23.464	39.65	178.87	0.650	0.000	2.00	3.767	2.45	97.1	0.0	90.8
118.00	0.00	1.44	23.579	39.85	176.40	0.650	0.000	2.00	3.706	2.41	96.0	0.0	89.3
120.00	0.00	1.45	23.692	40.04	173.90	0.650	0.000	2.00	3.646	2.37	94.9	0.0	87.8
122.00	0.00	1.45	23.805	40.23	171.39	0.650	0.000	2.00	3.585	2.33	93.7	0.0	86.4
124.00 Appurtenance(s)	0.00	1.46	23.915	40.42	168.85	0.650	0.000	2.00	3.524	2.29	92.6	0.0	84.9
126.00	0.00	1.47	24.025	40.60	166.30	0.650	0.000	2.00	3.464	2.25	91.4	0.0	83.4
128.00	0.00	1.47	24.133	40.79	163.73	0.650	0.000	2.00	3.403	2.21	90.2	0.0	81.9
130.00	0.00	1.48	24.241	40.97	161.14	0.650	0.000	2.00	3.342	2.17	89.0	0.0	80.5
132.00	0.00	1.49	24.347	41.15	158.53	0.650	0.000	2.00	3.282	2.13	87.8	0.0	79.0
132.50 Appurtenance(s)	0.00	1.49	24.373	41.19	157.88	0.650	0.000	0.50	0.811	0.53	21.7	0.0	19.5
134.00	0.00	1.49	24.451	41.32	155.91	0.650	0.000	1.50	2.410	1.57	64.7	0.0	58.0
136.00	0.00	1.50	24.555	41.50	153.27	0.650	0.000	2.00	3.160	2.05	85.2	0.0	76.0
138.00	0.00	1.50	24.658	41.67	150.61	0.650	0.000	2.00	3.100	2.01	84.0	0.0	74.6
139.00 Appurtenance(s)	0.00	1.51	24.709	41.76	149.27	0.650	0.000	1.00	1.527	0.99	41.4	0.0	36.7
140.00	0.00	1.51	24.759	41.84	147.93	0.650	0.000	1.00	1.512	0.98	41.1	0.0	36.4
140.50	0.00	1.51	24.785	41.89	147.26	0.650	0.000	0.50	0.750	0.49	20.4	0.0	18.0
							Totals:	**140.50**			**7,610.5**		**14,973.2**

Discrete Appurtenance Forces

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	139.00	3.5' Standoff Mount	2	24.709	41.758	0.75	4.50	100.00	0.000	0.000	187.91	0.00	0.00
2	132.50	5' Standoff Mount	1	24.373	41.190	0.75	2.44	50.00	0.000	0.000	100.40	0.00	0.00
3	124.00	Allgon 7120.16	3	23.970	40.510	1.22	13.10	48.00	0.000	1.000	530.79	0.00	530.79
4	124.00	CCI DTMABP7819VG12A	6	23.970	40.510	0.50	1.17	114.00	0.000	1.000	47.40	0.00	47.40
5	124.00	CCI OPA-65R-LCUU-H6	3	23.970	40.510	0.76	23.62	219.00	0.000	1.000	956.88	0.00	956.88
6	124.00	Ericsson RRUS-11	6	23.970	40.510	0.50	8.82	324.00	0.000	1.000	357.30	0.00	357.30
7	124.00	Ericsson RRUS-32	3	23.970	40.510	0.50	6.06	231.00	0.000	1.000	245.49	0.00	245.49
8	124.00	Kathrein 782 10250	6	23.970	40.510	0.50	1.56	38.40	0.000	1.000	63.20	0.00	63.20
9	124.00	Kathrein 800-10121	3	23.970	40.510	0.80	13.10	132.30	0.000	1.000	530.84	0.00	530.84
10	124.00	KMW	3	23.970	40.510	0.78	19.33	145.50	0.000	1.000	782.99	0.00	782.99
11	124.00	Platform w/ Hand Rails	1	23.915	40.417	1.00	32.00	2000.00	0.000	0.000	1293.35	0.00	0.00
12	124.00	Raycap DC6-48-60-18-8F	2	23.970	40.510	1.00	2.94	65.60	0.000	1.000	119.10	0.00	119.10
13	114.00	Samsung SPI-22132825WB	3	23.289	39.359	0.80	4.37	99.30	0.000	-1.000	171.92	0.00	-171.92
14	114.00	RFS APXVTM14	3	23.522	39.752	0.90	21.22	350.10	0.000	3.000	843.61	0.00	2530.83
15	114.00	RFS APXVSPP18	3	23.406	39.556	0.96	26.32	375.90	0.000	1.000	1041.25	0.00	1041.25
16	114.00	Low Profile Platform	1	23.348	39.458	1.00	22.00	1800.00	0.000	0.000	868.07	0.00	0.00
17	114.00	Argus LLPX310R-V1	3	23.377	39.507	0.81	12.93	152.10	0.000	0.500	510.73	0.00	255.37
18	114.00	Andrew VHLP1-23-DW1	1	23.607	39.897	0.80	1.29	14.00	0.000	4.500	51.39	0.00	231.24
19	114.00	Alcatel Lucent	3	23.522	39.752	0.50	2.55	210.00	0.000	3.000	101.37	0.00	304.10
20	114.00	Alcatel Lucent RRH2X50-800	3	23.260	39.309	0.50	3.38	192.00	0.000	-1.500	132.67	0.00	-199.00
21	114.00	Alcatel Lucent	3	23.522	39.752	0.50	3.92	180.00	0.000	3.000	155.63	0.00	466.88
22	114.00	20" x 18" x 9" Junction Box	1	23.348	39.458	0.90	3.15	20.00	0.000	0.000	124.29	0.00	0.00
23	114.00	Andrew VHLP2-23-DW1	1	23.607	39.897	0.80	3.75	31.00	0.000	4.500	149.69	0.00	673.62
24	104.00	4' Standoff Mount	2	22.743	38.436	0.90	2.70	100.00	0.000	0.000	103.78	0.00	0.00
25	88.00	Alcatel Lucent	3	21.823	36.881	0.50	6.79	270.00	0.000	2.000	250.61	0.00	501.21
26	88.00	Alcatel Lucent	3	21.823	36.881	0.50	3.85	165.00	0.000	2.000	142.18	0.00	284.35
27	88.00	Antel	3	21.823	36.881	0.75	17.89	127.80	0.000	2.000	659.71	0.00	1319.41
28	88.00	Alcatel Lucent RRH2X60-700	3	21.823	36.881	0.50	6.79	270.00	0.000	2.000	250.61	0.00	501.21
29	88.00	Swedcom SLCP 2x6014	3	21.823	36.881	0.89	20.64	136.80	0.000	2.000	761.19	0.00	1522.37
30	88.00	Commscope SBNHH-1D65B	6	21.823	36.881	0.84	42.79	458.40	0.000	2.000	1578.12	0.00	3156.23
31	88.00	Platform w/ Hand Rails	1	21.823	36.881	1.00	40.00	2000.00	0.000	2.000	1475.23	0.00	2950.47
32	88.00	RFS DB-T1-6Z-8AB-0Z	1	21.823	36.881	0.76	4.26	44.00	0.000	2.000	156.96	0.00	313.93
						Totals:		**10,464.20**			**14,744.64**		

Total Applied Force Summary

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

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
2.00		127.06	407.05	0.00	0.00
4.00		125.97	404.10	0.00	0.00
6.00		124.87	401.15	0.00	0.00
8.00		123.78	398.20	0.00	0.00
10.00		122.69	395.25	0.00	0.00
12.00		121.60	392.30	0.00	0.00
14.00		120.50	389.35	0.00	0.00
16.00		119.41	386.40	0.00	0.00
18.00		118.32	383.45	0.00	0.00
20.00		117.23	380.50	0.00	0.00
22.00		116.14	377.55	0.00	0.00
24.00		115.04	374.60	0.00	0.00
26.00		113.95	371.65	0.00	0.00
28.00		112.86	368.70	0.00	0.00
30.00		111.77	365.75	0.00	0.00
32.00		110.67	362.80	0.00	0.00
34.00		110.52	359.86	0.00	0.00
36.00		111.22	356.91	0.00	0.00
38.00		111.82	353.96	0.00	0.00
40.00		112.31	351.01	0.00	0.00
42.00		112.72	348.06	0.00	0.00
44.00		113.04	345.11	0.00	0.00
44.50		28.17	85.82	0.00	0.00
46.00		86.40	431.58	0.00	0.00
48.00		115.54	570.70	0.00	0.00
50.00		115.67	565.30	0.00	0.00
52.00		115.73	293.56	0.00	0.00
54.00		115.72	291.11	0.00	0.00
56.00		115.66	288.65	0.00	0.00
58.00		115.54	286.19	0.00	0.00
60.00		115.37	283.73	0.00	0.00
62.00		115.15	281.27	0.00	0.00
64.00		114.88	278.82	0.00	0.00
66.00		114.56	276.36	0.00	0.00
68.00		114.20	273.90	0.00	0.00
70.00		113.80	271.44	0.00	0.00
72.00		113.35	268.98	0.00	0.00
74.00		112.87	266.53	0.00	0.00
76.00		112.35	264.07	0.00	0.00
78.00		111.79	261.61	0.00	0.00
80.00		111.19	259.15	0.00	0.00
82.00		110.56	256.70	0.00	0.00
84.00		109.90	254.24	0.00	0.00
86.00		109.20	251.78	0.00	0.00
88.00	(23) appurtenances	5383.07	3721.32	0.00	10549.18
90.00		107.72	246.86	0.00	0.00
90.50		26.75	53.99	0.00	0.00
92.00		81.20	242.27	0.00	0.00

Total Applied Force Summary

Structure: CT16504-A-SB
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

94.00		107.64	319.59	0.00	0.00
94.50		26.72	79.28	0.00	0.00
96.00		79.97	107.23	0.00	0.00
98.00		105.95	141.68	0.00	0.00
100.00		105.06	140.20	0.00	0.00
102.00		104.15	138.73	0.00	0.00
104.00	(2) appurtenances	206.99	237.25	0.00	0.00
106.00		102.25	135.78	0.00	0.00
108.00		101.27	134.30	0.00	0.00
110.00		100.26	132.83	0.00	0.00
112.00		99.23	131.35	0.00	0.00
114.00	(25) appurtenances	4248.79	3554.28	0.00	5132.37
116.00		97.10	113.36	0.00	0.00
118.00		96.00	111.89	0.00	0.00
120.00		94.88	110.41	0.00	0.00
122.00		93.75	108.94	0.00	0.00
124.00	(36) appurtenances	5019.93	3425.26	0.00	3633.99
126.00		91.41	83.41	0.00	0.00
128.00		90.21	81.93	0.00	0.00
130.00		89.00	80.46	0.00	0.00
132.00		87.77	78.98	0.00	0.00
132.50	(1) appurtenances	122.11	69.52	0.00	0.00
134.00		64.73	57.99	0.00	0.00
136.00		85.24	76.03	0.00	0.00
138.00		83.96	74.56	0.00	0.00
139.00	(2) appurtenances	229.36	136.73	0.00	0.00
140.00		41.12	36.36	0.00	0.00
140.50		20.43	18.04	0.00	0.00
	Totals:	**22,355.10**	**29,016.02**	**0.00**	**19,315.55**

Resulting Forces and Deflections

Structure: CT16504-A-SB
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00

Iterations: 31

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-22.383	-28.993	0.000	0.000	0.000	-2230.9	0.000	0.000	0.000	0.000	0.000
2.00	-22.312	-28.543	0.000	0.000	0.000	-2186.1	-0.024	0.000	0.024	-0.111	0.000
4.00	-22.240	-28.096	0.000	0.000	0.000	-2141.5	-0.095	0.000	0.095	-0.224	0.000
6.00	-22.167	-27.651	0.000	0.000	0.000	-2097.0	-0.213	0.000	0.213	-0.336	0.000
8.00	-22.095	-27.210	0.000	0.000	0.000	-2052.7	-0.379	0.000	0.379	-0.450	0.000
10.00	-22.022	-26.772	0.000	0.000	0.000	-2008.5	-0.592	0.000	0.592	-0.564	0.000
12.00	-21.949	-26.338	0.000	0.000	0.000	-1964.4	-0.853	0.000	0.853	-0.678	0.000
14.00	-21.876	-25.906	0.000	0.000	0.000	-1920.5	-1.161	0.000	1.161	-0.793	0.000
16.00	-21.802	-25.477	0.000	0.000	0.000	-1876.8	-1.519	0.000	1.519	-0.909	0.000
18.00	-21.728	-25.052	0.000	0.000	0.000	-1833.2	-1.924	0.000	1.924	-1.025	0.000
20.00	-21.654	-24.629	0.000	0.000	0.000	-1789.7	-2.379	0.000	2.379	-1.141	0.000
22.00	-21.580	-24.210	0.000	0.000	0.000	-1746.4	-2.882	0.000	2.882	-1.258	0.000
24.00	-21.505	-23.794	0.000	0.000	0.000	-1703.3	-3.435	0.000	3.435	-1.376	0.000
26.00	-21.430	-23.382	0.000	0.000	0.000	-1660.3	-4.036	0.000	4.036	-1.494	0.000
28.00	-21.355	-22.972	0.000	0.000	0.000	-1617.4	-4.688	0.000	4.688	-1.612	0.000
30.00	-21.279	-22.566	0.000	0.000	0.000	-1574.7	-5.388	0.000	5.388	-1.730	0.000
32.00	-21.203	-22.162	0.000	0.000	0.000	-1532.1	-6.139	0.000	6.139	-1.849	0.000
34.00	-21.126	-21.763	0.000	0.000	0.000	-1489.7	-6.939	0.000	6.939	-1.968	0.000
36.00	-21.047	-21.366	0.000	0.000	0.000	-1447.5	-7.789	0.000	7.789	-2.088	0.000
38.00	-20.966	-20.973	0.000	0.000	0.000	-1405.4	-8.690	0.000	8.690	-2.207	0.000
40.00	-20.883	-20.583	0.000	0.000	0.000	-1363.5	-9.640	0.000	9.640	-2.327	0.000
42.00	-20.798	-20.196	0.000	0.000	0.000	-1321.7	-10.640	0.000	10.640	-2.447	0.000
44.00	-20.696	-19.830	0.000	0.000	0.000	-1280.1	-11.691	0.000	11.691	-2.566	0.000
44.50	-20.684	-19.723	0.000	0.000	0.000	-1269.7	-11.961	0.000	11.961	-2.597	0.000
46.00	-20.613	-19.259	0.000	0.000	0.000	-1238.7	-12.792	0.000	12.792	-2.687	0.000
48.00	-20.510	-18.651	0.000	0.000	0.000	-1197.5	-13.943	0.000	13.943	-2.806	0.000
50.00	-20.403	-18.050	0.000	0.000	0.000	-1156.5	-15.143	0.000	15.143	-2.925	0.000
52.00	-20.312	-17.718	0.000	0.000	0.000	-1115.7	-16.394	0.000	16.394	-3.044	0.000
54.00	-20.221	-17.387	0.000	0.000	0.000	-1075.0	-17.698	0.000	17.698	-3.178	0.000
56.00	-20.129	-17.059	0.000	0.000	0.000	-1034.6	-19.057	0.000	19.057	-3.311	0.000
58.00	-20.035	-16.734	0.000	0.000	0.000	-994.40	-20.472	0.000	20.472	-3.443	0.000
60.00	-19.940	-16.412	0.000	0.000	0.000	-954.33	-21.943	0.000	21.943	-3.575	0.000
62.00	-19.844	-16.094	0.000	0.000	0.000	-914.45	-23.467	0.000	23.467	-3.705	0.000
64.00	-19.746	-15.779	0.000	0.000	0.000	-874.76	-25.046	0.000	25.046	-3.834	0.000
66.00	-19.647	-15.467	0.000	0.000	0.000	-835.27	-26.679	0.000	26.679	-3.962	0.000
68.00	-19.548	-15.159	0.000	0.000	0.000	-795.98	-28.365	0.000	28.365	-4.088	0.000
70.00	-19.447	-14.855	0.000	0.000	0.000	-756.88	-30.104	0.000	30.104	-4.213	0.000
72.00	-19.344	-14.554	0.000	0.000	0.000	-717.99	-31.894	0.000	31.894	-4.336	0.000
74.00	-19.241	-14.257	0.000	0.000	0.000	-679.30	-33.734	0.000	33.734	-4.456	0.000
76.00	-19.137	-13.963	0.000	0.000	0.000	-640.82	-35.625	0.000	35.625	-4.574	0.000
78.00	-19.032	-13.674	0.000	0.000	0.000	-602.55	-37.565	0.000	37.565	-4.690	0.000
80.00	-18.925	-13.388	0.000	0.000	0.000	-564.48	-39.552	0.000	39.552	-4.803	0.000
82.00	-18.818	-13.106	0.000	0.000	0.000	-526.63	-41.585	0.000	41.585	-4.912	0.000
84.00	-18.710	-12.829	0.000	0.000	0.000	-489.00	-43.664	0.000	43.664	-5.018	0.000
86.00	-18.601	-12.555	0.000	0.000	0.000	-451.58	-45.786	0.000	45.786	-5.120	0.000
88.00	-12.919	-9.313	0.000	0.000	0.000	-403.83	-47.949	0.000	47.949	-5.218	0.000
90.00	-12.799	-9.064	0.000	0.000	0.000	-377.99	-50.152	0.000	50.152	-5.310	0.000
90.50	-12.774	-9.003	0.000	0.000	0.000	-371.59	-50.708	0.000	50.708	-5.333	0.000
92.00	-12.682	-8.752	0.000	0.000	0.000	-352.43	-52.393	0.000	52.393	-5.400	0.000

Resulting Forces and Deflections

Structure: CT16504-A-SB | **Code:** EIA/TIA-222-F | 11/3/2015

Site Name: Manchester 12, CT | **Exposure:** C

Height: 140.50 (ft) | **Gh:** 1.69

Base Elev: 0.000 (ft) | **Struct Class:** II

Tower Engineering Solutions

94.00	-12.553	-8.433	0.000	0.000	0.000	-327.07	-54.670	0.000	54.670	-5.486	0.000
94.50	-12.525	-8.347	0.000	0.000	0.000	-320.79	-55.245	0.000	55.245	-5.508	0.000
96.00	-12.449	-8.227	0.000	0.000	0.000	-302.00	-56.983	0.000	56.983	-5.571	0.000
98.00	-12.347	-8.070	0.000	0.000	0.000	-277.11	-59.341	0.000	59.341	-5.697	0.000
100.00	-12.245	-7.916	0.000	0.000	0.000	-252.41	-61.751	0.000	61.751	-5.818	0.000
102.00	-12.142	-7.765	0.000	0.000	0.000	-227.92	-64.209	0.000	64.209	-5.932	0.000
104.00	-11.925	-7.529	0.000	0.000	0.000	-203.64	-66.714	0.000	66.714	-6.040	0.000
106.00	-11.821	-7.385	0.000	0.000	0.000	-179.79	-69.261	0.000	69.261	-6.139	0.000
108.00	-11.717	-7.245	0.000	0.000	0.000	-156.15	-71.849	0.000	71.849	-6.231	0.000
110.00	-11.612	-7.108	0.000	0.000	0.000	-132.72	-74.473	0.000	74.473	-6.313	0.000
112.00	-11.507	-6.975	0.000	0.000	0.000	-109.49	-77.128	0.000	77.128	-6.385	0.000
114.00	-6.891	-3.912	0.000	0.000	0.000	-81.349	-79.812	0.000	79.812	-6.446	0.000
116.00	-6.785	-3.805	0.000	0.000	0.000	-67.566	-82.518	0.000	82.518	-6.495	0.000
118.00	-6.680	-3.700	0.000	0.000	0.000	-53.996	-85.243	0.000	85.243	-6.537	0.000
120.00	-6.575	-3.598	0.000	0.000	0.000	-40.637	-87.983	0.000	87.983	-6.571	0.000
122.00	-6.470	-3.498	0.000	0.000	0.000	-27.487	-90.736	0.000	90.736	-6.597	0.000
124.00	-1.090	-0.673	0.000	0.000	0.000	-10.913	-93.498	0.000	93.498	-6.614	0.000
126.00	-0.989	-0.600	0.000	0.000	0.000	-8.733	-96.265	0.000	96.265	-6.622	0.000
128.00	-0.891	-0.529	0.000	0.000	0.000	-6.754	-99.034	0.000	99.034	-6.629	0.000
130.00	-0.793	-0.460	0.000	0.000	0.000	-4.973	-101.80	0.000	101.806	-6.635	0.000
132.00	-0.697	-0.391	0.000	0.000	0.000	-3.387	-104.58	0.000	104.580	-6.639	0.000
132.50	-0.567	-0.336	0.000	0.000	0.000	-3.039	-105.27	0.000	105.274	-6.640	0.000
134.00	-0.496	-0.286	0.000	0.000	0.000	-2.188	-107.35	0.000	107.355	-6.642	0.000
136.00	-0.403	-0.221	0.000	0.000	0.000	-1.195	-110.13	0.000	110.132	-6.644	0.000
138.00	-0.311	-0.156	0.000	0.000	0.000	-0.389	-112.90	0.000	112.909	-6.645	0.000
139.00	-0.067	-0.047	0.000	0.000	0.000	-0.079	-114.29	0.000	114.297	-6.645	0.000
140.00	-0.022	-0.016	0.000	0.000	0.000	-0.011	-115.68	0.000	115.686	-6.645	0.000
140.50	-0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	116.380	-6.645	0.000

Resulting Stresses

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 80 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.58	0.90	0.00	0.00	0.00	51.29	51.89	52.0	0.998
2.00	0.57	0.90	0.00	0.00	0.00	51.15	51.74	52.0	0.995
4.00	0.57	0.91	0.00	0.00	0.00	50.99	51.58	52.0	0.992
6.00	0.57	0.91	0.00	0.00	0.00	50.82	51.41	52.0	0.989
8.00	0.56	0.92	0.00	0.00	0.00	50.65	51.23	52.0	0.986
10.00	0.56	0.92	0.00	0.00	0.00	50.46	51.04	52.0	0.982
12.00	0.55	0.93	0.00	0.00	0.00	50.26	50.84	52.0	0.978
14.00	0.55	0.94	0.00	0.00	0.00	50.05	50.63	52.0	0.974
16.00	0.55	0.94	0.00	0.00	0.00	49.83	50.40	52.0	0.970
18.00	0.54	0.95	0.00	0.00	0.00	49.59	50.16	52.0	0.965
20.00	0.54	0.95	0.00	0.00	0.00	49.34	49.90	52.0	0.960
22.00	0.53	0.96	0.00	0.00	0.00	49.07	49.63	52.0	0.955
24.00	0.53	0.96	0.00	0.00	0.00	48.79	49.35	52.0	0.949
26.00	0.52	0.97	0.00	0.00	0.00	48.49	49.05	52.0	0.944
28.00	0.52	0.98	0.00	0.00	0.00	48.18	48.73	52.0	0.937
30.00	0.52	0.98	0.00	0.00	0.00	47.85	48.39	52.0	0.931
32.00	0.51	0.99	0.00	0.00	0.00	47.50	48.04	52.0	0.924
34.00	0.51	0.99	0.00	0.00	0.00	47.13	47.66	52.0	0.917
36.00	0.50	1.00	0.00	0.00	0.00	46.73	47.27	52.0	0.909
38.00	0.50	1.01	0.00	0.00	0.00	46.32	46.86	52.0	0.901
40.00	0.50	1.01	0.00	0.00	0.00	45.89	46.42	52.0	0.893
42.00	0.49	1.02	0.00	0.00	0.00	45.43	45.96	52.0	0.884
44.00	0.49	1.03	0.00	0.00	0.00	44.95	45.47	52.0	0.875
44.50	0.49	1.03	0.00	0.00	0.00	44.83	45.35	52.0	0.872
46.00	0.48	1.03	0.00	0.00	0.00	44.45	44.96	52.0	0.865
48.00	0.47	1.04	0.00	0.00	0.00	43.91	44.42	52.0	0.855
50.00	0.54	1.23	0.00	0.00	0.00	49.82	50.41	52.0	0.970
52.00	0.54	1.24	0.00	0.00	0.00	49.12	49.71	52.0	0.956
54.00	0.53	1.24	0.00	0.00	0.00	48.39	48.97	52.0	0.942
56.00	0.53	1.25	0.00	0.00	0.00	47.62	48.20	52.0	0.927
58.00	0.52	1.26	0.00	0.00	0.00	46.81	47.38	52.0	0.912
60.00	0.52	1.27	0.00	0.00	0.00	45.96	46.53	52.0	0.895
62.00	0.51	1.28	0.00	0.00	0.00	45.07	45.63	52.0	0.878
64.00	0.51	1.29	0.00	0.00	0.00	44.13	44.69	52.0	0.860
66.00	0.51	1.29	0.00	0.00	0.00	43.14	43.70	52.0	0.841
68.00	0.50	1.30	0.00	0.00	0.00	42.10	42.67	52.0	0.821
70.00	0.50	1.31	0.00	0.00	0.00	41.02	41.58	52.0	0.800
72.00	0.49	1.32	0.00	0.00	0.00	39.87	40.43	52.0	0.778
74.00	0.49	1.33	0.00	0.00	0.00	38.67	39.23	52.0	0.755
76.00	0.49	1.34	0.00	0.00	0.00	37.41	37.96	52.0	0.730
78.00	0.48	1.35	0.00	0.00	0.00	36.08	36.63	52.0	0.705
80.00	0.48	1.36	0.00	0.00	0.00	34.68	35.23	52.0	0.678
82.00	0.47	1.37	0.00	0.00	0.00	33.21	33.76	52.0	0.650
84.00	0.47	1.38	0.00	0.00	0.00	31.66	32.22	52.0	0.620
86.00	0.47	1.39	0.00	0.00	0.00	30.03	30.59	52.0	0.588
88.00	0.35	0.98	0.00	0.00	0.00	27.59	27.99	52.0	0.539
90.00	0.35	0.98	0.00	0.00	0.00	26.55	26.94	52.0	0.518

Resulting Stresses

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

90.50	0.34	0.98	0.00	0.00	0.00	26.28	26.68	52.0	0.513
92.00	0.34	0.99	0.00	0.00	0.00	25.45	25.84	52.0	0.497
94.00	0.33	0.99	0.00	0.00	0.00	24.30	24.69	52.0	0.475
94.50	0.54	1.62	0.00	0.00	0.00	38.29	38.93	52.0	0.749
96.00	0.53	1.63	0.00	0.00	0.00	36.82	37.46	52.0	0.721
98.00	0.53	1.64	0.00	0.00	0.00	34.76	35.40	52.0	0.681
100.00	0.53	1.65	0.00	0.00	0.00	32.59	33.24	52.0	0.639
102.00	0.53	1.66	0.00	0.00	0.00	30.30	30.96	52.0	0.596
104.00	0.52	1.65	0.00	0.00	0.00	27.89	28.55	52.0	0.549
106.00	0.52	1.66	0.00	0.00	0.00	25.38	26.05	52.0	0.501
108.00	0.51	1.68	0.00	0.00	0.00	22.73	23.42	52.0	0.451
110.00	0.51	1.69	0.00	0.00	0.00	19.93	20.65	52.0	0.397
112.00	0.51	1.70	0.00	0.00	0.00	16.97	17.72	52.0	0.341
114.00	0.29	1.03	0.00	0.00	0.00	13.02	13.43	52.0	0.258
116.00	0.29	1.03	0.00	0.00	0.00	11.17	11.60	52.0	0.223
118.00	0.28	1.03	0.00	0.00	0.00	9.23	9.68	52.0	0.186
120.00	0.28	1.04	0.00	0.00	0.00	7.18	7.68	52.0	0.148
122.00	0.28	1.04	0.00	0.00	0.00	5.03	5.60	52.0	0.108
124.00	0.05	0.18	0.00	0.00	0.00	2.07	2.14	52.0	0.041
126.00	0.05	0.16	0.00	0.00	0.00	1.71	1.79	52.0	0.034
128.00	0.04	0.15	0.00	0.00	0.00	1.37	1.44	52.0	0.028
130.00	0.04	0.14	0.00	0.00	0.00	1.05	1.11	52.0	0.021
132.00	0.03	0.12	0.00	0.00	0.00	0.74	0.80	52.0	0.015
132.50	0.03	0.10	0.00	0.00	0.00	0.67	0.72	52.0	0.014
134.00	0.03	0.09	0.00	0.00	0.00	0.50	0.55	52.0	0.010
136.00	0.02	0.07	0.00	0.00	0.00	0.28	0.33	52.0	0.006
138.00	0.01	0.06	0.00	0.00	0.00	0.10	0.15	52.0	0.003
139.00	0.00	0.01	0.00	0.00	0.00	0.02	0.03	52.0	0.001
140.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	0.000
140.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	0.000

Wind Loading - Shaft

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

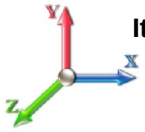
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 31

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		0.00	1.00	12.287	20.77	245.60	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
2.00		0.00	1.00	12.287	20.77	243.50	0.650	0.500	2.00	7.226	4.70	97.5	52.7	392.7
4.00		0.00	1.00	12.287	20.77	241.39	0.650	0.500	2.00	7.166	4.66	96.7	52.2	389.3
6.00		0.00	1.00	12.287	20.77	239.29	0.650	0.500	2.00	7.105	4.62	95.9	51.8	385.9
8.00		0.00	1.00	12.287	20.77	237.19	0.650	0.500	2.00	7.044	4.58	95.1	51.3	382.5
10.00		0.00	1.00	12.287	20.77	235.09	0.650	0.500	2.00	6.984	4.54	94.3	50.9	379.1
12.00		0.00	1.00	12.287	20.77	232.98	0.650	0.500	2.00	6.923	4.50	93.4	50.4	375.7
14.00		0.00	1.00	12.287	20.77	230.88	0.650	0.500	2.00	6.862	4.46	92.6	50.0	372.3
16.00		0.00	1.00	12.287	20.77	228.78	0.650	0.500	2.00	6.802	4.42	91.8	49.5	368.9
18.00		0.00	1.00	12.287	20.77	226.68	0.650	0.500	2.00	6.741	4.38	91.0	49.1	365.5
20.00		0.00	1.00	12.287	20.77	224.58	0.650	0.500	2.00	6.680	4.34	90.2	48.6	362.1
22.00		0.00	1.00	12.287	20.77	222.47	0.650	0.500	2.00	6.619	4.30	89.3	48.2	358.7
24.00		0.00	1.00	12.287	20.77	220.37	0.650	0.500	2.00	6.559	4.26	88.5	47.7	355.3
26.00		0.00	1.00	12.287	20.77	218.27	0.650	0.500	2.00	6.498	4.22	87.7	47.3	352.0
28.00		0.00	1.00	12.287	20.77	216.17	0.650	0.500	2.00	6.437	4.18	86.9	46.8	348.6
30.00		0.00	1.00	12.287	20.77	214.06	0.650	0.500	2.00	6.377	4.14	86.1	46.4	345.2
32.00		0.00	1.00	12.287	20.77	211.96	0.650	0.500	2.00	6.316	4.11	85.3	45.9	341.8
34.00		0.00	1.01	12.393	20.94	210.76	0.650	0.500	2.00	6.255	4.07	85.2	45.5	338.4
36.00		0.00	1.03	12.597	21.29	210.36	0.650	0.500	2.00	6.195	4.03	85.7	45.0	335.0
38.00		0.00	1.04	12.793	21.62	209.84	0.650	0.500	2.00	6.134	3.99	86.2	44.6	331.6
40.00		0.00	1.06	12.982	21.94	209.22	0.650	0.500	2.00	6.073	3.95	86.6	44.1	328.2
42.00		0.00	1.07	13.164	22.25	208.51	0.650	0.500	2.00	6.013	3.91	86.9	43.7	324.8
44.00		0.00	1.09	13.340	22.54	207.71	0.650	0.500	2.00	5.952	3.87	87.2	43.2	321.4
44.50	Bot - Section 2	0.00	1.09	13.383	22.62	207.50	0.650	0.500	0.50	1.478	0.96	21.7	10.8	79.9
46.00		0.00	1.10	13.510	22.83	206.83	0.650	0.500	1.50	4.491	2.92	66.6	32.7	414.0
48.00		0.00	1.11	13.676	23.11	205.87	0.650	0.500	2.00	5.935	3.86	89.2	43.1	546.8
50.00	Top - Section 1	0.00	1.13	13.836	23.38	204.85	0.650	0.500	2.00	5.874	3.82	89.3	42.7	541.0
52.00		0.00	1.14	13.992	23.65	207.61	0.650	0.500	2.00	5.813	3.78	89.4	42.2	268.8
54.00		0.00	1.15	14.144	23.90	206.47	0.650	0.500	2.00	5.753	3.74	89.4	41.8	265.9
56.00		0.00	1.16	14.291	24.15	205.28	0.650	0.500	2.00	5.692	3.70	89.4	41.3	263.0
58.00		0.00	1.17	14.435	24.40	204.03	0.650	0.500	2.00	5.631	3.66	89.3	40.9	260.1
60.00		0.00	1.19	14.576	24.63	202.73	0.650	0.500	2.00	5.571	3.62	89.2	40.4	257.2
62.00		0.00	1.20	14.713	24.87	201.39	0.650	0.500	2.00	5.510	3.58	89.1	40.0	254.3
64.00		0.00	1.21	14.847	25.09	199.99	0.650	0.500	2.00	5.449	3.54	88.9	39.5	251.3
66.00		0.00	1.22	14.978	25.31	198.55	0.650	0.500	2.00	5.388	3.50	88.7	39.1	248.4
68.00		0.00	1.23	15.107	25.53	197.07	0.650	0.500	2.00	5.328	3.46	88.4	38.6	245.5
70.00		0.00	1.24	15.232	25.74	195.55	0.650	0.500	2.00	5.267	3.42	88.1	38.2	242.6
72.00		0.00	1.25	15.355	25.95	193.98	0.650	0.500	2.00	5.206	3.38	87.8	37.7	239.7
74.00		0.00	1.26	15.476	26.15	192.39	0.650	0.500	2.00	5.146	3.34	87.5	37.3	236.8
76.00		0.00	1.27	15.594	26.35	190.75	0.650	0.500	2.00	5.085	3.31	87.1	36.8	233.9
78.00		0.00	1.28	15.711	26.55	189.08	0.650	0.500	2.00	5.024	3.27	86.7	36.4	231.0
80.00		0.00	1.29	15.825	26.74	187.38	0.650	0.500	2.00	4.964	3.23	86.3	35.9	228.1
82.00		0.00	1.30	15.937	26.93	185.65	0.650	0.500	2.00	4.903	3.19	85.8	35.5	225.2
84.00		0.00	1.31	16.047	27.12	183.89	0.650	0.500	2.00	4.842	3.15	85.4	35.0	222.3
86.00		0.00	1.31	16.155	27.30	182.10	0.650	0.500	2.00	4.782	3.11	84.9	34.6	219.4
88.00	Appurtenance(s)	0.00	1.32	16.262	27.48	180.28	0.650	0.500	2.00	4.721	3.07	84.3	34.1	216.5
90.00		0.00	1.33	16.366	27.66	178.43	0.650	0.500	2.00	4.660	3.03	83.8	33.7	213.6
90.50	Bot - Section 3	0.00	1.33	16.392	27.70	177.97	0.650	0.500	0.50	1.156	0.75	20.8	8.4	53.0

Wind Loading - Shaft

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

92.00	0.00	1.34	16.469	27.83	176.56	0.650	0.500	1.50	3.491	2.27	63.2	25.3	239.3
94.00	0.00	1.35	16.571	28.00	174.66	0.650	0.500	2.00	4.601	2.99	83.8	33.2	315.2
94.50 Top - Section 2	0.00	1.35	16.596	28.05	174.18	0.650	0.500	0.50	1.141	0.74	20.8	8.3	78.2
96.00	0.00	1.36	16.671	28.17	175.26	0.650	0.500	1.50	3.400	2.21	62.3	24.6	103.6
98.00	0.00	1.36	16.769	28.34	173.32	0.650	0.500	2.00	4.480	2.91	82.5	32.3	136.4
100.00	0.00	1.37	16.866	28.50	171.36	0.650	0.500	2.00	4.419	2.87	81.9	31.9	134.5
102.00	0.00	1.38	16.962	28.67	169.37	0.650	0.500	2.00	4.359	2.83	81.2	31.4	132.5
104.00 Appurtenance(s)	0.00	1.39	17.056	28.83	167.37	0.650	0.500	2.00	4.298	2.79	80.5	31.0	130.6
106.00	0.00	1.40	17.150	28.98	165.34	0.650	0.500	2.00	4.237	2.75	79.8	30.5	128.7
108.00	0.00	1.40	17.241	29.14	163.29	0.650	0.500	2.00	4.177	2.71	79.1	30.1	126.8
110.00	0.00	1.41	17.332	29.29	161.22	0.650	0.500	2.00	4.116	2.68	78.4	29.6	124.8
112.00	0.00	1.42	17.421	29.44	159.14	0.650	0.500	2.00	4.055	2.64	77.6	29.2	122.9
114.00 Appurtenance(s)	0.00	1.43	17.510	29.59	157.03	0.650	0.500	2.00	3.994	2.60	76.8	28.7	121.0
116.00	0.00	1.43	17.597	29.74	154.90	0.650	0.500	2.00	3.934	2.56	76.0	28.3	119.1
118.00	0.00	1.44	17.683	29.88	152.76	0.650	0.500	2.00	3.873	2.52	75.2	27.8	117.1
120.00	0.00	1.45	17.768	30.03	150.60	0.650	0.500	2.00	3.812	2.48	74.4	27.4	115.2
122.00	0.00	1.45	17.852	30.17	148.42	0.650	0.500	2.00	3.752	2.44	73.6	26.9	113.3
124.00 Appurtenance(s)	0.00	1.46	17.936	30.31	146.23	0.650	0.500	2.00	3.691	2.40	72.7	26.5	111.4
126.00	0.00	1.47	18.018	30.45	144.02	0.650	0.500	2.00	3.630	2.36	71.9	26.0	109.5
128.00	0.00	1.47	18.099	30.59	141.79	0.650	0.500	2.00	3.570	2.32	71.0	25.6	107.5
130.00	0.00	1.48	18.179	30.72	139.55	0.650	0.500	2.00	3.509	2.28	70.1	25.1	105.6
132.00	0.00	1.49	18.259	30.86	137.29	0.650	0.500	2.00	3.448	2.24	69.2	24.7	103.7
132.50 Appurtenance(s)	0.00	1.49	18.279	30.89	136.72	0.650	0.500	0.50	0.853	0.55	17.1	6.1	25.7
134.00	0.00	1.49	18.337	30.99	135.02	0.650	0.500	1.50	2.535	1.65	51.1	18.2	76.2
136.00	0.00	1.50	18.415	31.12	132.73	0.650	0.500	2.00	3.327	2.16	67.3	23.8	99.8
138.00	0.00	1.50	18.492	31.25	130.43	0.650	0.500	2.00	3.266	2.12	66.3	23.3	97.9
139.00 Appurtenance(s)	0.00	1.51	18.530	31.32	129.27	0.650	0.500	1.00	1.610	1.05	32.8	11.6	48.3
140.00	0.00	1.51	18.568	31.38	128.11	0.650	0.500	1.00	1.595	1.04	32.5	11.4	47.8
140.50	0.00	1.51	18.587	31.41	127.53	0.650	0.500	0.50	0.792	0.51	16.2	5.7	23.7
							Totals:	**140.50**			**5,902.3**		**17,629.4**

Discrete Appurtenance Forces

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	139.00	3.5' Standoff Mount	2	18.530	31.316	0.80	6.40	150.00	0.000	0.000	200.42	0.00	0.00
2	132.50	5' Standoff Mount	1	18.279	30.891	0.80	3.20	75.00	0.000	0.000	98.85	0.00	0.00
3	124.00	Allgon 7120.16	3	17.977	30.381	1.19	15.49	138.00	0.000	1.000	470.71	0.00	470.71
4	124.00	CCI DTMABP7819VG12A	6	17.977	30.381	0.58	1.68	147.30	0.000	1.000	50.92	0.00	50.92
5	124.00	CCI OPA-65R-LCUU-H6	3	17.977	30.381	0.86	27.96	380.10	0.000	1.000	849.46	0.00	849.46
6	124.00	Ericsson RRUS-11	6	17.977	30.381	0.77	14.45	415.86	0.000	1.000	439.01	0.00	439.01
7	124.00	Ericsson RRUS-32	3	17.977	30.381	0.85	10.93	301.32	0.000	1.000	331.96	0.00	331.96
8	124.00	Kathrein 782 10250	6	17.977	30.381	0.81	3.35	60.00	0.000	1.000	101.88	0.00	101.88
9	124.00	Kathrein 800-10121	3	17.977	30.381	0.94	17.57	222.30	0.000	1.000	533.75	0.00	533.75
10	124.00	KMW	3	17.977	30.381	0.90	23.44	275.10	0.000	1.000	712.13	0.00	712.13
11	124.00	Platform w/ Hand Rails	1	17.936	30.311	1.00	40.00	2500.00	0.000	0.000	1212.44	0.00	0.00
12	124.00	Raycap DC6-48-60-18-8F	2	17.977	30.381	1.00	3.34	101.00	0.000	1.000	101.47	0.00	101.47
13	114.00	Samsung SPI-22132825WB	3	17.466	29.517	0.85	5.36	136.80	0.000	-1.000	158.06	0.00	-158.06
14	114.00	RFS APXVTM14	3	17.640	29.812	0.93	23.72	516.60	0.000	3.000	707.20	0.00	2121.60
15	114.00	RFS APXVSPP18	3	17.554	29.666	0.99	29.25	579.00	0.000	1.000	867.85	0.00	867.85
16	114.00	Low Profile Platform	1	17.510	29.592	1.00	26.60	2200.00	0.000	0.000	787.14	0.00	0.00
17	114.00	Argus LLPX310R-V1	3	17.532	29.629	0.85	14.87	253.50	0.000	0.500	440.71	0.00	220.36
18	114.00	Andrew VHLP1-23-DW1	1	17.705	29.921	0.80	1.46	24.10	0.000	4.500	43.56	0.00	196.04
19	114.00	Alcatel Lucent	3	17.640	29.812	0.50	2.83	276.00	0.000	3.000	84.52	0.00	253.55
20	114.00	Alcatel Lucent RRH2X50-800	3	17.444	29.480	0.50	3.65	258.30	0.000	-1.500	107.45	0.00	-161.18
21	114.00	Alcatel Lucent	3	17.640	29.812	0.50	4.23	249.30	0.000	3.000	126.10	0.00	378.31
22	114.00	20" x 18" x 9" Junction Box	1	17.510	29.592	0.95	3.33	38.00	0.000	0.000	98.67	0.00	0.00
23	114.00	Andrew VHLP2-23-DW1	1	17.705	29.921	0.80	4.04	59.00	0.000	4.500	120.88	0.00	543.96
24	104.00	4' Standoff Mount	2	17.056	28.825	1.00	8.00	150.00	0.000	0.000	230.60	0.00	0.00
25	88.00	Alcatel Lucent	3	16.366	27.659	0.91	13.80	361.80	0.000	2.000	381.74	0.00	763.48
26	88.00	Alcatel Lucent	3	16.366	27.659	0.92	7.58	212.70	0.000	2.000	209.78	0.00	419.56
27	88.00	Antel	3	16.366	27.659	0.92	23.49	283.50	0.000	2.000	649.59	0.00	1299.17
28	88.00	Alcatel Lucent RRH2X60-700	3	16.366	27.659	0.91	13.80	361.80	0.000	2.000	381.74	0.00	763.48
29	88.00	Swedcom SLCP 2x6014	3	16.366	27.659	1.00	24.96	306.60	0.000	2.000	690.37	0.00	1380.74
30	88.00	Commscope SBNHH-1D65B	6	16.366	27.659	0.95	51.86	808.20	0.000	2.000	1434.30	0.00	2868.60
31	88.00	Platform w/ Hand Rails	1	16.366	27.659	1.00	42.82	2400.00	0.000	2.000	1184.36	0.00	2368.72
32	88.00	RFS DB-T1-6Z-8AB-0Z	1	16.366	27.659	0.77	4.66	0.00	0.000	2.000	128.82	0.00	257.63
						Totals:		**14,241.18**			**13,936.45**		

Total Applied Force Summary

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

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
2.00		97.54	459.72	0.00	0.00
4.00		96.72	456.32	0.00	0.00
6.00		95.90	452.92	0.00	0.00
8.00		95.08	449.52	0.00	0.00
10.00		94.26	446.13	0.00	0.00
12.00		93.44	442.73	0.00	0.00
14.00		92.62	439.33	0.00	0.00
16.00		91.80	435.93	0.00	0.00
18.00		90.98	432.53	0.00	0.00
20.00		90.17	429.13	0.00	0.00
22.00		89.35	425.73	0.00	0.00
24.00		88.53	422.33	0.00	0.00
26.00		87.71	418.93	0.00	0.00
28.00		86.89	415.54	0.00	0.00
30.00		86.07	412.14	0.00	0.00
32.00		85.25	408.74	0.00	0.00
34.00		85.15	405.34	0.00	0.00
36.00		85.72	401.94	0.00	0.00
38.00		86.20	398.54	0.00	0.00
40.00		86.61	395.14	0.00	0.00
42.00		86.94	391.74	0.00	0.00
44.00		87.22	388.34	0.00	0.00
44.50		21.74	96.60	0.00	0.00
46.00		66.65	464.25	0.00	0.00
48.00		89.15	613.81	0.00	0.00
50.00		89.28	607.96	0.00	0.00
52.00		89.35	335.77	0.00	0.00
54.00		89.38	332.87	0.00	0.00
56.00		89.36	329.96	0.00	0.00
58.00		89.30	327.05	0.00	0.00
60.00		89.19	324.14	0.00	0.00
62.00		89.05	321.24	0.00	0.00
64.00		88.87	318.33	0.00	0.00
66.00		88.66	315.42	0.00	0.00
68.00		88.41	312.51	0.00	0.00
70.00		88.13	309.61	0.00	0.00
72.00		87.82	306.70	0.00	0.00
74.00		87.48	303.79	0.00	0.00
76.00		87.11	300.89	0.00	0.00
78.00		86.71	297.98	0.00	0.00
80.00		86.29	295.07	0.00	0.00
82.00		85.83	292.16	0.00	0.00
84.00		85.36	289.26	0.00	0.00
86.00		84.86	286.35	0.00	0.00
88.00	(23) appurtenances	5145.01	5018.04	0.00	10121.37
90.00		83.78	280.53	0.00	0.00
90.50		20.81	62.38	0.00	0.00
92.00		63.15	267.54	0.00	0.00

Total Applied Force Summary

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

94.00		83.76	352.83	0.00	0.00
94.50		20.80	87.56	0.00	0.00
96.00		62.26	131.82	0.00	0.00
98.00		82.53	174.01	0.00	0.00
100.00		81.88	172.09	0.00	0.00
102.00		81.21	170.17	0.00	0.00
104.00	(2) appurtenances	311.13	318.24	0.00	0.00
106.00		79.82	166.32	0.00	0.00
108.00		79.10	164.39	0.00	0.00
110.00		78.36	162.47	0.00	0.00
112.00		77.61	160.54	0.00	0.00
114.00	(25) appurtenances	3618.99	4749.22	0.00	4262.43
116.00		76.04	141.65	0.00	0.00
118.00		75.23	139.73	0.00	0.00
120.00		74.41	137.80	0.00	0.00
122.00		73.57	135.88	0.00	0.00
124.00	(36) appurtenances	4876.45	4674.94	0.00	3591.29
126.00		71.85	109.45	0.00	0.00
128.00		70.97	107.53	0.00	0.00
130.00		70.07	105.60	0.00	0.00
132.00		69.16	103.68	0.00	0.00
132.50	(1) appurtenances	115.97	100.66	0.00	0.00
134.00		51.06	76.18	0.00	0.00
136.00		67.30	99.83	0.00	0.00
138.00		66.35	97.91	0.00	0.00
139.00	(2) appurtenances	233.20	198.29	0.00	0.00
140.00		32.54	47.81	0.00	0.00
140.50		16.17	23.74	0.00	0.00
	Totals:	**19,838.71**	**35,449.25**	**0.00**	**17,975.08**

Resulting Forces and Deflections

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-19.870	-35.431	0.000	0.000	0.000	-2049.2	0.000	0.000	0.000	0.000	0.000
2.00	-19.835	-34.936	0.000	0.000	0.000	-2009.4	-0.022	0.000	0.022	-0.102	0.000
4.00	-19.799	-34.444	0.000	0.000	0.000	-1969.7	-0.087	0.000	0.087	-0.206	0.000
6.00	-19.763	-33.956	0.000	0.000	0.000	-1930.1	-0.196	0.000	0.196	-0.309	0.000
8.00	-19.726	-33.471	0.000	0.000	0.000	-1890.6	-0.348	0.000	0.348	-0.414	0.000
10.00	-19.689	-32.989	0.000	0.000	0.000	-1851.2	-0.544	0.000	0.544	-0.518	0.000
12.00	-19.651	-32.511	0.000	0.000	0.000	-1811.8	-0.784	0.000	0.784	-0.624	0.000
14.00	-19.613	-32.037	0.000	0.000	0.000	-1772.5	-1.068	0.000	1.068	-0.730	0.000
16.00	-19.574	-31.566	0.000	0.000	0.000	-1733.3	-1.397	0.000	1.397	-0.837	0.000
18.00	-19.535	-31.098	0.000	0.000	0.000	-1694.1	-1.771	0.000	1.771	-0.944	0.000
20.00	-19.495	-30.634	0.000	0.000	0.000	-1655.1	-2.190	0.000	2.190	-1.052	0.000
22.00	-19.455	-30.173	0.000	0.000	0.000	-1616.1	-2.654	0.000	2.654	-1.160	0.000
24.00	-19.414	-29.716	0.000	0.000	0.000	-1577.2	-3.163	0.000	3.163	-1.269	0.000
26.00	-19.372	-29.262	0.000	0.000	0.000	-1538.3	-3.718	0.000	3.718	-1.378	0.000
28.00	-19.330	-28.812	0.000	0.000	0.000	-1499.6	-4.319	0.000	4.319	-1.488	0.000
30.00	-19.288	-28.365	0.000	0.000	0.000	-1460.9	-4.966	0.000	4.966	-1.598	0.000
32.00	-19.245	-27.922	0.000	0.000	0.000	-1422.3	-5.659	0.000	5.659	-1.708	0.000
34.00	-19.200	-27.482	0.000	0.000	0.000	-1383.9	-6.398	0.000	6.398	-1.819	0.000
36.00	-19.154	-27.046	0.000	0.000	0.000	-1345.5	-7.184	0.000	7.184	-1.929	0.000
38.00	-19.106	-26.614	0.000	0.000	0.000	-1307.2	-8.016	0.000	8.016	-2.041	0.000
40.00	-19.056	-26.185	0.000	0.000	0.000	-1268.9	-8.895	0.000	8.895	-2.152	0.000
42.00	-19.004	-25.760	0.000	0.000	0.000	-1230.8	-9.820	0.000	9.820	-2.263	0.000
44.00	-18.932	-25.353	0.000	0.000	0.000	-1192.8	-10.792	0.000	10.792	-2.375	0.000
44.50	-18.931	-25.239	0.000	0.000	0.000	-1183.4	-11.043	0.000	11.043	-2.403	0.000
46.00	-18.887	-24.746	0.000	0.000	0.000	-1155.0	-11.811	0.000	11.811	-2.487	0.000
48.00	-18.817	-24.100	0.000	0.000	0.000	-1117.2	-12.877	0.000	12.877	-2.598	0.000
50.00	-18.745	-23.460	0.000	0.000	0.000	-1079.6	-13.989	0.000	13.989	-2.710	0.000
52.00	-18.688	-23.091	0.000	0.000	0.000	-1042.1	-15.148	0.000	15.148	-2.821	0.000
54.00	-18.631	-22.722	0.000	0.000	0.000	-1004.7	-16.356	0.000	16.356	-2.946	0.000
56.00	-18.573	-22.357	0.000	0.000	0.000	-967.48	-17.616	0.000	17.616	-3.070	0.000
58.00	-18.513	-21.996	0.000	0.000	0.000	-930.34	-18.929	0.000	18.929	-3.194	0.000
60.00	-18.452	-21.638	0.000	0.000	0.000	-893.31	-20.293	0.000	20.293	-3.317	0.000
62.00	-18.390	-21.283	0.000	0.000	0.000	-856.41	-21.708	0.000	21.708	-3.439	0.000
64.00	-18.325	-20.933	0.000	0.000	0.000	-819.63	-23.174	0.000	23.174	-3.560	0.000
66.00	-18.260	-20.585	0.000	0.000	0.000	-782.98	-24.690	0.000	24.690	-3.680	0.000
68.00	-18.193	-20.242	0.000	0.000	0.000	-746.46	-26.256	0.000	26.256	-3.798	0.000
70.00	-18.124	-19.902	0.000	0.000	0.000	-710.08	-27.871	0.000	27.871	-3.915	0.000
72.00	-18.055	-19.567	0.000	0.000	0.000	-673.83	-29.535	0.000	29.535	-4.030	0.000
74.00	-17.983	-19.235	0.000	0.000	0.000	-637.72	-31.247	0.000	31.247	-4.143	0.000
76.00	-17.911	-18.907	0.000	0.000	0.000	-601.75	-33.005	0.000	33.005	-4.254	0.000
78.00	-17.837	-18.583	0.000	0.000	0.000	-565.93	-34.809	0.000	34.809	-4.363	0.000
80.00	-17.761	-18.263	0.000	0.000	0.000	-530.26	-36.658	0.000	36.658	-4.468	0.000
82.00	-17.684	-17.947	0.000	0.000	0.000	-494.74	-38.551	0.000	38.551	-4.571	0.000
84.00	-17.606	-17.636	0.000	0.000	0.000	-459.37	-40.486	0.000	40.486	-4.671	0.000
86.00	-17.526	-17.329	0.000	0.000	0.000	-424.16	-42.461	0.000	42.461	-4.767	0.000
88.00	-11.998	-12.742	0.000	0.000	0.000	-378.99	-44.476	0.000	44.476	-4.858	0.000
90.00	-11.902	-12.458	0.000	0.000	0.000	-354.99	-46.527	0.000	46.527	-4.945	0.000
90.50	-11.885	-12.389	0.000	0.000	0.000	-349.04	-47.046	0.000	47.046	-4.966	0.000
92.00	-11.814	-12.113	0.000	0.000	0.000	-331.21	-48.615	0.000	48.615	-5.029	0.000

Resulting Forces and Deflections

Structure: CT16504-A-SB | **Code:** EIA/TIA-222-F | 11/3/2015

Site Name: Manchester 12, CT | **Exposure:** C

Height: 140.50 (ft) | **Gh:** 1.69

Base Elev: 0.000 (ft) | **Struct Class:** II | Page: 25

Tower Engineering Solutions

94.00	-11.710	-11.759	0.000	0.000	0.000	-307.58	-50.737	0.000	50.737	-5.111	0.000
94.50	-11.690	-11.665	0.000	0.000	0.000	-301.73	-51.272	0.000	51.272	-5.131	0.000
96.00	-11.634	-11.521	0.000	0.000	0.000	-284.20	-52.892	0.000	52.892	-5.190	0.000
98.00	-11.559	-11.332	0.000	0.000	0.000	-260.93	-55.089	0.000	55.089	-5.309	0.000
100.00	-11.483	-11.146	0.000	0.000	0.000	-237.81	-57.336	0.000	57.336	-5.423	0.000
102.00	-11.406	-10.964	0.000	0.000	0.000	-214.85	-59.628	0.000	59.628	-5.531	0.000
104.00	-11.084	-10.659	0.000	0.000	0.000	-192.03	-61.964	0.000	61.964	-5.632	0.000
106.00	-11.004	-10.484	0.000	0.000	0.000	-169.87	-64.340	0.000	64.340	-5.726	0.000
108.00	-10.924	-10.312	0.000	0.000	0.000	-147.86	-66.754	0.000	66.754	-5.812	0.000
110.00	-10.842	-10.145	0.000	0.000	0.000	-126.01	-69.203	0.000	69.203	-5.890	0.000
112.00	-10.760	-9.981	0.000	0.000	0.000	-104.33	-71.682	0.000	71.682	-5.959	0.000
114.00	-6.670	-5.630	0.000	0.000	0.000	-78.552	-74.187	0.000	74.187	-6.017	0.000
116.00	-6.583	-5.492	0.000	0.000	0.000	-65.213	-76.714	0.000	76.714	-6.065	0.000
118.00	-6.497	-5.357	0.000	0.000	0.000	-52.047	-79.259	0.000	79.259	-6.105	0.000
120.00	-6.411	-5.224	0.000	0.000	0.000	-39.053	-81.819	0.000	81.819	-6.138	0.000
122.00	-6.325	-5.095	0.000	0.000	0.000	-26.231	-84.392	0.000	84.392	-6.163	0.000
124.00	-0.975	-0.971	0.000	0.000	0.000	-9.989	-86.973	0.000	86.973	-6.179	0.000
126.00	-0.891	-0.870	0.000	0.000	0.000	-8.040	-89.558	0.000	89.558	-6.186	0.000
128.00	-0.809	-0.771	0.000	0.000	0.000	-6.257	-92.146	0.000	92.146	-6.193	0.000
130.00	-0.728	-0.673	0.000	0.000	0.000	-4.638	-94.736	0.000	94.736	-6.198	0.000
132.00	-0.649	-0.578	0.000	0.000	0.000	-3.181	-97.328	0.000	97.328	-6.202	0.000
132.50	-0.522	-0.490	0.000	0.000	0.000	-2.857	-97.976	0.000	97.976	-6.203	0.000
134.00	-0.463	-0.420	0.000	0.000	0.000	-2.073	-99.921	0.000	99.921	-6.204	0.000
136.00	-0.386	-0.328	0.000	0.000	0.000	-1.146	-102.51	0.000	102.516	-6.206	0.000
138.00	-0.309	-0.238	0.000	0.000	0.000	-0.375	-105.11	0.000	105.110	-6.207	0.000
139.00	-0.056	-0.066	0.000	0.000	0.000	-0.065	-106.40	0.000	106.408	-6.207	0.000
140.00	-0.019	-0.022	0.000	0.000	0.000	-0.009	-107.70	0.000	107.705	-6.207	0.000
140.50	-0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	108.354	-6.207	0.000

Resulting Stresses

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 69.28 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 31

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.71	0.80	0.00	0.00	0.00	47.11	47.84	52.0	0.920
2.00	0.70	0.80	0.00	0.00	0.00	47.01	47.73	52.0	0.918
4.00	0.70	0.81	0.00	0.00	0.00	46.90	47.62	52.0	0.916
6.00	0.69	0.81	0.00	0.00	0.00	46.78	47.50	52.0	0.914
8.00	0.69	0.82	0.00	0.00	0.00	46.65	47.36	52.0	0.911
10.00	0.69	0.83	0.00	0.00	0.00	46.51	47.22	52.0	0.908
12.00	0.68	0.83	0.00	0.00	0.00	46.36	47.06	52.0	0.905
14.00	0.68	0.84	0.00	0.00	0.00	46.19	46.89	52.0	0.902
16.00	0.68	0.84	0.00	0.00	0.00	46.02	46.71	52.0	0.899
18.00	0.67	0.85	0.00	0.00	0.00	45.83	46.52	52.0	0.895
20.00	0.67	0.86	0.00	0.00	0.00	45.62	46.32	52.0	0.891
22.00	0.66	0.86	0.00	0.00	0.00	45.41	46.10	52.0	0.887
24.00	0.66	0.87	0.00	0.00	0.00	45.18	45.86	52.0	0.882
26.00	0.66	0.88	0.00	0.00	0.00	44.93	45.61	52.0	0.878
28.00	0.65	0.88	0.00	0.00	0.00	44.67	45.35	52.0	0.872
30.00	0.65	0.89	0.00	0.00	0.00	44.39	45.06	52.0	0.867
32.00	0.65	0.90	0.00	0.00	0.00	44.09	44.76	52.0	0.861
34.00	0.64	0.90	0.00	0.00	0.00	43.78	44.45	52.0	0.855
36.00	0.64	0.91	0.00	0.00	0.00	43.44	44.11	52.0	0.849
38.00	0.63	0.92	0.00	0.00	0.00	43.09	43.75	52.0	0.842
40.00	0.63	0.93	0.00	0.00	0.00	42.71	43.37	52.0	0.834
42.00	0.63	0.93	0.00	0.00	0.00	42.31	42.97	52.0	0.827
44.00	0.62	0.94	0.00	0.00	0.00	41.89	42.54	52.0	0.818
44.50	0.62	0.94	0.00	0.00	0.00	41.78	42.43	52.0	0.816
46.00	0.62	0.95	0.00	0.00	0.00	41.44	42.09	52.0	0.810
48.00	0.61	0.95	0.00	0.00	0.00	40.97	41.61	52.0	0.800
50.00	0.70	1.13	0.00	0.00	0.00	46.51	47.25	52.0	0.909
52.00	0.70	1.14	0.00	0.00	0.00	45.88	46.62	52.0	0.897
54.00	0.69	1.15	0.00	0.00	0.00	45.22	45.96	52.0	0.884
56.00	0.69	1.16	0.00	0.00	0.00	44.53	45.26	52.0	0.871
58.00	0.69	1.16	0.00	0.00	0.00	43.79	44.53	52.0	0.857
60.00	0.68	1.17	0.00	0.00	0.00	43.02	43.75	52.0	0.842
62.00	0.68	1.18	0.00	0.00	0.00	42.21	42.93	52.0	0.826
64.00	0.68	1.19	0.00	0.00	0.00	41.35	42.07	52.0	0.809
66.00	0.67	1.20	0.00	0.00	0.00	40.44	41.17	52.0	0.792
68.00	0.67	1.21	0.00	0.00	0.00	39.49	40.21	52.0	0.774
70.00	0.67	1.22	0.00	0.00	0.00	38.48	39.20	52.0	0.754
72.00	0.66	1.23	0.00	0.00	0.00	37.42	38.14	52.0	0.734
74.00	0.66	1.24	0.00	0.00	0.00	36.30	37.03	52.0	0.712
76.00	0.66	1.25	0.00	0.00	0.00	35.12	35.85	52.0	0.690
78.00	0.65	1.27	0.00	0.00	0.00	33.88	34.61	52.0	0.666
80.00	0.65	1.28	0.00	0.00	0.00	32.58	33.30	52.0	0.641
82.00	0.65	1.29	0.00	0.00	0.00	31.20	31.92	52.0	0.614
84.00	0.65	1.30	0.00	0.00	0.00	29.74	30.47	52.0	0.586
86.00	0.64	1.31	0.00	0.00	0.00	28.20	28.94	52.0	0.557
88.00	0.48	0.91	0.00	0.00	0.00	25.89	26.42	52.0	0.508
90.00	0.47	0.91	0.00	0.00	0.00	24.93	25.45	52.0	0.490

Resulting Stresses

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

90.50	0.47	0.92	0.00	0.00	0.00	24.68	25.21	52.0	0.485
92.00	0.47	0.92	0.00	0.00	0.00	23.92	24.44	52.0	0.470
94.00	0.46	0.92	0.00	0.00	0.00	22.85	23.36	52.0	0.449
94.50	0.75	1.51	0.00	0.00	0.00	36.02	36.86	52.0	0.709
96.00	0.75	1.52	0.00	0.00	0.00	34.65	35.49	52.0	0.683
98.00	0.75	1.53	0.00	0.00	0.00	32.73	33.58	52.0	0.646
100.00	0.74	1.55	0.00	0.00	0.00	30.70	31.56	52.0	0.607
102.00	0.74	1.56	0.00	0.00	0.00	28.56	29.43	52.0	0.566
104.00	0.73	1.54	0.00	0.00	0.00	26.30	27.16	52.0	0.523
106.00	0.73	1.55	0.00	0.00	0.00	23.98	24.85	52.0	0.478
108.00	0.73	1.56	0.00	0.00	0.00	21.52	22.41	52.0	0.431
110.00	0.73	1.57	0.00	0.00	0.00	18.92	19.84	52.0	0.382
112.00	0.73	1.59	0.00	0.00	0.00	16.17	17.12	52.0	0.329
114.00	0.42	1.00	0.00	0.00	0.00	12.57	13.10	52.0	0.252
116.00	0.42	1.00	0.00	0.00	0.00	10.78	11.33	52.0	0.218
118.00	0.41	1.01	0.00	0.00	0.00	8.89	9.47	52.0	0.182
120.00	0.41	1.01	0.00	0.00	0.00	6.90	7.52	52.0	0.145
122.00	0.40	1.01	0.00	0.00	0.00	4.80	5.49	52.0	0.106
124.00	0.08	0.16	0.00	0.00	0.00	1.89	1.99	52.0	0.038
126.00	0.07	0.15	0.00	0.00	0.00	1.58	1.67	52.0	0.032
128.00	0.06	0.14	0.00	0.00	0.00	1.27	1.36	52.0	0.026
130.00	0.06	0.13	0.00	0.00	0.00	0.98	1.06	52.0	0.020
132.00	0.05	0.11	0.00	0.00	0.00	0.70	0.77	52.0	0.015
132.50	0.04	0.09	0.00	0.00	0.00	0.63	0.69	52.0	0.013
134.00	0.04	0.08	0.00	0.00	0.00	0.47	0.53	52.0	0.010
136.00	0.03	0.07	0.00	0.00	0.00	0.27	0.32	52.0	0.006
138.00	0.02	0.06	0.00	0.00	0.00	0.09	0.15	52.0	0.003
139.00	0.01	0.01	0.00	0.00	0.00	0.02	0.03	52.0	0.001
140.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	0.000
140.50	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	0.000

Wind Loading - Shaft

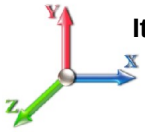
Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 30

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		0.00	1.00	6.400	10.82	177.25	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
2.00		0.00	1.00	6.400	10.82	175.73	0.650	0.000	2.00	7.060	4.59	49.6	0.0	340.1
4.00		0.00	1.00	6.400	10.82	174.22	0.650	0.000	2.00	6.999	4.55	49.2	0.0	337.1
6.00		0.00	1.00	6.400	10.82	172.70	0.650	0.000	2.00	6.938	4.51	48.8	0.0	334.2
8.00		0.00	1.00	6.400	10.82	171.18	0.650	0.000	2.00	6.878	4.47	48.4	0.0	331.2
10.00		0.00	1.00	6.400	10.82	169.66	0.650	0.000	2.00	6.817	4.43	47.9	0.0	328.3
12.00		0.00	1.00	6.400	10.82	168.15	0.650	0.000	2.00	6.756	4.39	47.5	0.0	325.3
14.00		0.00	1.00	6.400	10.82	166.63	0.650	0.000	2.00	6.696	4.35	47.1	0.0	322.4
16.00		0.00	1.00	6.400	10.82	165.11	0.650	0.000	2.00	6.635	4.31	46.6	0.0	319.4
18.00		0.00	1.00	6.400	10.82	163.60	0.650	0.000	2.00	6.574	4.27	46.2	0.0	316.5
20.00		0.00	1.00	6.400	10.82	162.08	0.650	0.000	2.00	6.513	4.23	45.8	0.0	313.5
22.00		0.00	1.00	6.400	10.82	160.56	0.650	0.000	2.00	6.453	4.19	45.4	0.0	310.6
24.00		0.00	1.00	6.400	10.82	159.04	0.650	0.000	2.00	6.392	4.15	44.9	0.0	307.6
26.00		0.00	1.00	6.400	10.82	157.53	0.650	0.000	2.00	6.331	4.12	44.5	0.0	304.7
28.00		0.00	1.00	6.400	10.82	156.01	0.650	0.000	2.00	6.271	4.08	44.1	0.0	301.7
30.00		0.00	1.00	6.400	10.82	154.49	0.650	0.000	2.00	6.210	4.04	43.7	0.0	298.8
32.00		0.00	1.00	6.400	10.82	152.97	0.650	0.000	2.00	6.149	4.00	43.2	0.0	295.8
34.00		0.00	1.01	6.455	10.91	152.10	0.650	0.000	2.00	6.089	3.96	43.2	0.0	292.9
36.00		0.00	1.03	6.561	11.09	151.82	0.650	0.000	2.00	6.028	3.92	43.4	0.0	289.9
38.00		0.00	1.04	6.663	11.26	151.44	0.650	0.000	2.00	5.967	3.88	43.7	0.0	287.0
40.00		0.00	1.06	6.762	11.43	151.00	0.650	0.000	2.00	5.907	3.84	43.9	0.0	284.0
42.00		0.00	1.07	6.857	11.59	150.48	0.650	0.000	2.00	5.846	3.80	44.0	0.0	281.1
44.00		0.00	1.09	6.948	11.74	149.91	0.650	0.000	2.00	5.785	3.76	44.2	0.0	278.1
44.50	Bot - Section 2	0.00	1.09	6.971	11.78	149.75	0.650	0.000	0.50	1.437	0.93	11.0	0.0	69.1
46.00		0.00	1.10	7.037	11.89	149.27	0.650	0.000	1.50	4.366	2.84	33.7	0.0	381.3
48.00		0.00	1.11	7.123	12.04	148.58	0.650	0.000	2.00	5.768	3.75	45.1	0.0	503.7
50.00	Top - Section 1	0.00	1.13	7.207	12.18	147.84	0.650	0.000	2.00	5.707	3.71	45.2	0.0	498.3
52.00		0.00	1.14	7.288	12.32	149.83	0.650	0.000	2.00	5.647	3.67	45.2	0.0	226.6
54.00		0.00	1.15	7.367	12.45	149.01	0.650	0.000	2.00	5.586	3.63	45.2	0.0	224.1
56.00		0.00	1.16	7.444	12.58	148.15	0.650	0.000	2.00	5.525	3.59	45.2	0.0	221.7
58.00		0.00	1.17	7.519	12.71	147.25	0.650	0.000	2.00	5.465	3.55	45.1	0.0	219.2
60.00		0.00	1.19	7.592	12.83	146.32	0.650	0.000	2.00	5.404	3.51	45.1	0.0	216.7
62.00		0.00	1.20	7.664	12.95	145.34	0.650	0.000	2.00	5.343	3.47	45.0	0.0	214.3
64.00		0.00	1.21	7.733	13.07	144.34	0.650	0.000	2.00	5.282	3.43	44.9	0.0	211.8
66.00		0.00	1.22	7.802	13.18	143.30	0.650	0.000	2.00	5.222	3.39	44.8	0.0	209.4
68.00		0.00	1.23	7.869	13.30	142.23	0.650	0.000	2.00	5.161	3.35	44.6	0.0	206.9
70.00		0.00	1.24	7.934	13.41	141.13	0.650	0.000	2.00	5.100	3.32	44.5	0.0	204.5
72.00		0.00	1.25	7.998	13.52	140.00	0.650	0.000	2.00	5.040	3.28	44.3	0.0	202.0
74.00		0.00	1.26	8.061	13.62	138.85	0.650	0.000	2.00	4.979	3.24	44.1	0.0	199.5
76.00		0.00	1.27	8.123	13.73	137.67	0.650	0.000	2.00	4.918	3.20	43.9	0.0	197.1
78.00		0.00	1.28	8.183	13.83	136.46	0.650	0.000	2.00	4.858	3.16	43.7	0.0	194.6
80.00		0.00	1.29	8.242	13.93	135.24	0.650	0.000	2.00	4.797	3.12	43.4	0.0	192.2
82.00		0.00	1.30	8.301	14.03	133.99	0.650	0.000	2.00	4.736	3.08	43.2	0.0	189.7
84.00		0.00	1.31	8.358	14.13	132.71	0.650	0.000	2.00	4.676	3.04	42.9	0.0	187.3
86.00		0.00	1.31	8.415	14.22	131.42	0.650	0.000	2.00	4.615	3.00	42.7	0.0	184.8
88.00	Appurtenance(s)	0.00	1.32	8.470	14.31	130.11	0.650	0.000	2.00	4.554	2.96	42.4	0.0	182.3
90.00		0.00	1.33	8.525	14.41	128.78	0.650	0.000	2.00	4.494	2.92	42.1	0.0	179.9
90.50	Bot - Section 3	0.00	1.33	8.538	14.43	128.44	0.650	0.000	0.50	1.114	0.72	10.4	0.0	44.6

Wind Loading - Shaft

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

92.00	0.00	1.34	8.578	14.50	127.42	0.650	0.000	1.50	3.366	2.19	31.7	0.0	214.1
94.00	0.00	1.35	8.631	14.59	126.05	0.650	0.000	2.00	4.435	2.88	42.0	0.0	282.0
94.50 Top - Section 2	0.00	1.35	8.644	14.61	125.71	0.650	0.000	0.50	1.099	0.71	10.4	0.0	69.9
96.00	0.00	1.36	8.683	14.67	126.49	0.650	0.000	1.50	3.275	2.13	31.2	0.0	79.0
98.00	0.00	1.36	8.735	14.76	125.09	0.650	0.000	2.00	4.313	2.80	41.4	0.0	104.1
100.00	0.00	1.37	8.785	14.85	123.67	0.650	0.000	2.00	4.253	2.76	41.0	0.0	102.6
102.00	0.00	1.38	8.835	14.93	122.24	0.650	0.000	2.00	4.192	2.72	40.7	0.0	101.1
104.00 Appurtenance(s)	0.00	1.39	8.884	15.01	120.79	0.650	0.000	2.00	4.131	2.69	40.3	0.0	99.6
106.00	0.00	1.40	8.933	15.10	119.33	0.650	0.000	2.00	4.071	2.65	39.9	0.0	98.2
108.00	0.00	1.40	8.980	15.18	117.85	0.650	0.000	2.00	4.010	2.61	39.6	0.0	96.7
110.00	0.00	1.41	9.028	15.26	116.36	0.650	0.000	2.00	3.949	2.57	39.2	0.0	95.2
112.00	0.00	1.42	9.074	15.34	114.85	0.650	0.000	2.00	3.888	2.53	38.8	0.0	93.7
114.00 Appurtenance(s)	0.00	1.43	9.120	15.41	113.33	0.650	0.000	2.00	3.828	2.49	38.3	0.0	92.3
116.00	0.00	1.43	9.166	15.49	111.80	0.650	0.000	2.00	3.767	2.45	37.9	0.0	90.8
118.00	0.00	1.44	9.211	15.57	110.25	0.650	0.000	2.00	3.706	2.41	37.5	0.0	89.3
120.00	0.00	1.45	9.255	15.64	108.69	0.650	0.000	2.00	3.646	2.37	37.1	0.0	87.8
122.00	0.00	1.45	9.299	15.71	107.12	0.650	0.000	2.00	3.585	2.33	36.6	0.0	86.4
124.00 Appurtenance(s)	0.00	1.46	9.342	15.79	105.53	0.650	0.000	2.00	3.524	2.29	36.2	0.0	84.9
126.00	0.00	1.47	9.385	15.86	103.94	0.650	0.000	2.00	3.464	2.25	35.7	0.0	83.4
128.00	0.00	1.47	9.427	15.93	102.33	0.650	0.000	2.00	3.403	2.21	35.2	0.0	81.9
130.00	0.00	1.48	9.469	16.00	100.71	0.650	0.000	2.00	3.342	2.17	34.8	0.0	80.5
132.00	0.00	1.49	9.510	16.07	99.08	0.650	0.000	2.00	3.282	2.13	34.3	0.0	79.0
132.50 Appurtenance(s)	0.00	1.49	9.521	16.09	98.67	0.650	0.000	0.50	0.811	0.53	8.5	0.0	19.5
134.00	0.00	1.49	9.551	16.14	97.44	0.650	0.000	1.50	2.410	1.57	25.3	0.0	58.0
136.00	0.00	1.50	9.592	16.21	95.79	0.650	0.000	2.00	3.160	2.05	33.3	0.0	76.0
138.00	0.00	1.50	9.632	16.28	94.13	0.650	0.000	2.00	3.100	2.01	32.8	0.0	74.6
139.00 Appurtenance(s)	0.00	1.51	9.652	16.31	93.30	0.650	0.000	1.00	1.527	0.99	16.2	0.0	36.7
140.00	0.00	1.51	9.672	16.35	92.46	0.650	0.000	1.00	1.512	0.98	16.1	0.0	36.4
140.50	0.00	1.51	9.681	16.36	92.04	0.650	0.000	0.50	0.750	0.49	8.0	0.0	18.0
							Totals:	**140.50**			**2,972.8**		**14,973.2**

Discrete Appurtenance Forces

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 30

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	139.00	3.5' Standoff Mount	2	9.652	16.312	0.75	4.50	100.00	0.000	0.000	73.40	0.00	0.00
2	132.50	5' Standoff Mount	1	9.521	16.090	0.75	2.44	50.00	0.000	0.000	39.22	0.00	0.00
3	124.00	Allgon 7120.16	3	9.363	15.824	1.22	13.10	48.00	0.000	1.000	207.34	0.00	207.34
4	124.00	CCI DTMABP7819VG12A	6	9.363	15.824	0.50	1.17	114.00	0.000	1.000	18.51	0.00	18.51
5	124.00	CCI OPA-65R-LCUU-H6	3	9.363	15.824	0.76	23.62	219.00	0.000	1.000	373.78	0.00	373.78
6	124.00	Ericsson RRUS-11	6	9.363	15.824	0.50	8.82	324.00	0.000	1.000	139.57	0.00	139.57
7	124.00	Ericsson RRUS-32	3	9.363	15.824	0.50	6.06	231.00	0.000	1.000	95.89	0.00	95.89
8	124.00	Kathrein 782 10250	6	9.363	15.824	0.50	1.56	38.40	0.000	1.000	24.69	0.00	24.69
9	124.00	Kathrein 800-10121	3	9.363	15.824	0.80	13.10	132.30	0.000	1.000	207.36	0.00	207.36
10	124.00	KMW	3	9.363	15.824	0.78	19.33	145.50	0.000	1.000	305.86	0.00	305.86
11	124.00	Platform w/ Hand Rails	1	9.342	15.788	1.00	32.00	2000.00	0.000	0.000	505.21	0.00	0.00
12	124.00	Raycap DC6-48-60-18-8F	2	9.363	15.824	1.00	2.94	65.60	0.000	1.000	46.52	0.00	46.52
13	114.00	Samsung SPI-22132825WB	3	9.097	15.374	0.80	4.37	99.30	0.000	-1.000	67.16	0.00	-67.16
14	114.00	RFS APXVTM14	3	9.188	15.528	0.90	21.22	350.10	0.000	3.000	329.54	0.00	988.61
15	114.00	RFS APXVSPP18	3	9.143	15.452	0.96	26.32	375.90	0.000	1.000	406.74	0.00	406.74
16	114.00	Low Profile Platform	1	9.120	15.413	1.00	22.00	1800.00	0.000	0.000	339.09	0.00	0.00
17	114.00	Argus LLPX310R-V1	3	9.132	15.432	0.81	12.93	152.10	0.000	0.500	199.50	0.00	99.75
18	114.00	Andrew VHLP1-23-DW1	1	9.222	15.585	0.80	1.29	14.00	0.000	4.500	20.07	0.00	90.33
19	114.00	Alcatel Lucent	3	9.188	15.528	0.50	2.55	210.00	0.000	3.000	39.60	0.00	118.79
20	114.00	Alcatel Lucent RRH2X50-800	3	9.086	15.355	0.50	3.38	192.00	0.000	-1.500	51.82	0.00	-77.73
21	114.00	Alcatel Lucent	3	9.188	15.528	0.50	3.92	180.00	0.000	3.000	60.79	0.00	182.38
22	114.00	20" x 18" x 9" Junction Box	1	9.120	15.413	0.90	3.15	20.00	0.000	0.000	48.55	0.00	0.00
23	114.00	Andrew VHLP2-23-DW1	1	9.222	15.585	0.80	3.75	31.00	0.000	4.500	58.47	0.00	263.13
24	104.00	4' Standoff Mount	2	8.884	15.014	0.90	2.70	100.00	0.000	0.000	40.54	0.00	0.00
25	88.00	Alcatel Lucent	3	8.525	14.407	0.50	6.79	270.00	0.000	2.000	97.89	0.00	195.79
26	88.00	Alcatel Lucent	3	8.525	14.407	0.50	3.85	165.00	0.000	2.000	55.54	0.00	111.07
27	88.00	Antel	3	8.525	14.407	0.75	17.89	127.80	0.000	2.000	257.70	0.00	515.39
28	88.00	Alcatel Lucent RRH2X60-700	3	8.525	14.407	0.50	6.79	270.00	0.000	2.000	97.89	0.00	195.79
29	88.00	Swedcom SLCP 2x6014	3	8.525	14.407	0.89	20.64	136.80	0.000	2.000	297.34	0.00	594.68
30	88.00	Commscope SBNHH-1D65B	6	8.525	14.407	0.84	42.79	458.40	0.000	2.000	616.45	0.00	1232.90
31	88.00	Platform w/ Hand Rails	1	8.525	14.407	1.00	40.00	2000.00	0.000	2.000	576.26	0.00	1152.53
32	88.00	RFS DB-T1-6Z-8AB-0Z	1	8.525	14.407	0.76	4.26	44.00	0.000	2.000	61.31	0.00	122.63
						Totals:		**10,464.20**			**5,759.62**		

Total Applied Force Summary

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 31	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 30

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
2.00		49.63	407.05	0.00	0.00
4.00		49.21	404.10	0.00	0.00
6.00		48.78	401.15	0.00	0.00
8.00		48.35	398.20	0.00	0.00
10.00		47.93	395.25	0.00	0.00
12.00		47.50	392.30	0.00	0.00
14.00		47.07	389.35	0.00	0.00
16.00		46.65	386.40	0.00	0.00
18.00		46.22	383.45	0.00	0.00
20.00		45.79	380.50	0.00	0.00
22.00		45.37	377.55	0.00	0.00
24.00		44.94	374.60	0.00	0.00
26.00		44.51	371.65	0.00	0.00
28.00		44.09	368.70	0.00	0.00
30.00		43.66	365.75	0.00	0.00
32.00		43.23	362.80	0.00	0.00
34.00		43.17	359.86	0.00	0.00
36.00		43.45	356.91	0.00	0.00
38.00		43.68	353.96	0.00	0.00
40.00		43.87	351.01	0.00	0.00
42.00		44.03	348.06	0.00	0.00
44.00		44.16	345.11	0.00	0.00
44.50		11.00	85.82	0.00	0.00
46.00		33.75	431.58	0.00	0.00
48.00		45.13	570.70	0.00	0.00
50.00		45.18	565.30	0.00	0.00
52.00		45.21	293.56	0.00	0.00
54.00		45.20	291.11	0.00	0.00
56.00		45.18	288.65	0.00	0.00
58.00		45.13	286.19	0.00	0.00
60.00		45.07	283.73	0.00	0.00
62.00		44.98	281.27	0.00	0.00
64.00		44.88	278.82	0.00	0.00
66.00		44.75	276.36	0.00	0.00
68.00		44.61	273.90	0.00	0.00
70.00		44.45	271.44	0.00	0.00
72.00		44.28	268.98	0.00	0.00
74.00		44.09	266.53	0.00	0.00
76.00		43.88	264.07	0.00	0.00
78.00		43.67	261.61	0.00	0.00
80.00		43.43	259.15	0.00	0.00
82.00		43.19	256.70	0.00	0.00
84.00		42.93	254.24	0.00	0.00
86.00		42.66	251.78	0.00	0.00
88.00	(23) appurtenances	2102.76	3721.32	0.00	4120.77
90.00		42.08	246.86	0.00	0.00
90.50		10.45	53.99	0.00	0.00
92.00		31.72	242.27	0.00	0.00

Total Applied Force Summary

Structure: CT16504-A-SB
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

94.00		42.05	319.59	0.00	0.00
94.50		10.44	79.28	0.00	0.00
96.00		31.24	107.23	0.00	0.00
98.00		41.39	141.68	0.00	0.00
100.00		41.04	140.20	0.00	0.00
102.00		40.68	138.73	0.00	0.00
104.00	(2) appurtenances	80.86	237.25	0.00	0.00
106.00		39.94	135.78	0.00	0.00
108.00		39.56	134.30	0.00	0.00
110.00		39.16	132.83	0.00	0.00
112.00		38.76	131.35	0.00	0.00
114.00	(25) appurtenances	1659.68	3554.28	0.00	2004.83
116.00		37.93	113.36	0.00	0.00
118.00		37.50	111.89	0.00	0.00
120.00		37.06	110.41	0.00	0.00
122.00		36.62	108.94	0.00	0.00
124.00	(36) appurtenances	1960.91	3425.26	0.00	1419.53
126.00		35.71	83.41	0.00	0.00
128.00		35.24	81.93	0.00	0.00
130.00		34.77	80.46	0.00	0.00
132.00		34.28	78.98	0.00	0.00
132.50	(1) appurtenances	47.70	69.52	0.00	0.00
134.00		25.29	57.99	0.00	0.00
136.00		33.30	76.03	0.00	0.00
138.00		32.80	74.56	0.00	0.00
139.00	(2) appurtenances	89.59	136.73	0.00	0.00
140.00		16.06	36.36	0.00	0.00
140.50		7.98	18.04	0.00	0.00
	Totals:	**8,732.46**	**29,016.02**	**0.00**	**7,545.14**

Resulting Forces and Deflections

Structure:	CT16504-A-SB	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 33	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 30

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-8.743	-29.013	0.000	0.000	0.000	-872.94	0.000	0.000	0.000	0.000	0.000
2.00	-8.715	-28.599	0.000	0.000	0.000	-855.45	-0.009	0.000	0.009	-0.044	0.000
4.00	-8.687	-28.188	0.000	0.000	0.000	-838.02	-0.037	0.000	0.037	-0.087	0.000
6.00	-8.659	-27.780	0.000	0.000	0.000	-820.65	-0.083	0.000	0.083	-0.132	0.000
8.00	-8.631	-27.376	0.000	0.000	0.000	-803.33	-0.148	0.000	0.148	-0.176	0.000
10.00	-8.602	-26.974	0.000	0.000	0.000	-786.07	-0.232	0.000	0.232	-0.221	0.000
12.00	-8.574	-26.575	0.000	0.000	0.000	-768.87	-0.334	0.000	0.334	-0.265	0.000
14.00	-8.546	-26.179	0.000	0.000	0.000	-751.72	-0.455	0.000	0.455	-0.310	0.000
16.00	-8.517	-25.786	0.000	0.000	0.000	-734.63	-0.594	0.000	0.594	-0.356	0.000
18.00	-8.489	-25.397	0.000	0.000	0.000	-717.59	-0.753	0.000	0.753	-0.401	0.000
20.00	-8.460	-25.010	0.000	0.000	0.000	-700.62	-0.931	0.000	0.931	-0.447	0.000
22.00	-8.431	-24.626	0.000	0.000	0.000	-683.70	-1.128	0.000	1.128	-0.492	0.000
24.00	-8.402	-24.245	0.000	0.000	0.000	-666.84	-1.344	0.000	1.344	-0.538	0.000
26.00	-8.374	-23.867	0.000	0.000	0.000	-650.03	-1.580	0.000	1.580	-0.585	0.000
28.00	-8.345	-23.492	0.000	0.000	0.000	-633.28	-1.835	0.000	1.835	-0.631	0.000
30.00	-8.315	-23.120	0.000	0.000	0.000	-616.60	-2.109	0.000	2.109	-0.677	0.000
32.00	-8.286	-22.751	0.000	0.000	0.000	-599.96	-2.403	0.000	2.403	-0.724	0.000
34.00	-8.257	-22.385	0.000	0.000	0.000	-583.39	-2.716	0.000	2.716	-0.770	0.000
36.00	-8.226	-22.022	0.000	0.000	0.000	-566.88	-3.049	0.000	3.049	-0.817	0.000
38.00	-8.195	-21.662	0.000	0.000	0.000	-550.43	-3.401	0.000	3.401	-0.864	0.000
40.00	-8.163	-21.305	0.000	0.000	0.000	-534.04	-3.774	0.000	3.774	-0.911	0.000
42.00	-8.131	-20.951	0.000	0.000	0.000	-517.71	-4.165	0.000	4.165	-0.958	0.000
44.00	-8.091	-20.603	0.000	0.000	0.000	-501.45	-4.577	0.000	4.577	-1.005	0.000
44.50	-8.087	-20.514	0.000	0.000	0.000	-497.40	-4.683	0.000	4.683	-1.017	0.000
46.00	-8.060	-20.077	0.000	0.000	0.000	-485.27	-5.008	0.000	5.008	-1.052	0.000
48.00	-8.020	-19.501	0.000	0.000	0.000	-469.15	-5.458	0.000	5.458	-1.099	0.000
50.00	-7.979	-18.930	0.000	0.000	0.000	-453.11	-5.929	0.000	5.929	-1.145	0.000
52.00	-7.944	-18.631	0.000	0.000	0.000	-437.16	-6.419	0.000	6.419	-1.192	0.000
54.00	-7.910	-18.333	0.000	0.000	0.000	-421.27	-6.929	0.000	6.929	-1.244	0.000
56.00	-7.874	-18.039	0.000	0.000	0.000	-405.45	-7.462	0.000	7.462	-1.296	0.000
58.00	-7.839	-17.746	0.000	0.000	0.000	-389.70	-8.016	0.000	8.016	-1.348	0.000
60.00	-7.802	-17.457	0.000	0.000	0.000	-374.02	-8.592	0.000	8.592	-1.400	0.000
62.00	-7.766	-17.170	0.000	0.000	0.000	-358.42	-9.190	0.000	9.190	-1.451	0.000
64.00	-7.729	-16.886	0.000	0.000	0.000	-342.89	-9.808	0.000	9.808	-1.501	0.000
66.00	-7.691	-16.604	0.000	0.000	0.000	-327.43	-10.448	0.000	10.448	-1.552	0.000
68.00	-7.653	-16.325	0.000	0.000	0.000	-312.05	-11.109	0.000	11.109	-1.601	0.000
70.00	-7.614	-16.048	0.000	0.000	0.000	-296.75	-11.790	0.000	11.790	-1.650	0.000
72.00	-7.575	-15.774	0.000	0.000	0.000	-281.52	-12.492	0.000	12.492	-1.698	0.000
74.00	-7.536	-15.503	0.000	0.000	0.000	-266.37	-13.213	0.000	13.213	-1.745	0.000
76.00	-7.496	-15.234	0.000	0.000	0.000	-251.30	-13.955	0.000	13.955	-1.792	0.000
78.00	-7.456	-14.969	0.000	0.000	0.000	-236.30	-14.715	0.000	14.715	-1.837	0.000
80.00	-7.415	-14.705	0.000	0.000	0.000	-221.39	-15.494	0.000	15.494	-1.881	0.000
82.00	-7.374	-14.445	0.000	0.000	0.000	-206.56	-16.291	0.000	16.291	-1.924	0.000
84.00	-7.333	-14.187	0.000	0.000	0.000	-191.81	-17.107	0.000	17.107	-1.966	0.000
86.00	-7.291	-13.932	0.000	0.000	0.000	-177.15	-17.939	0.000	17.939	-2.006	0.000
88.00	-5.065	-10.284	0.000	0.000	0.000	-158.45	-18.787	0.000	18.787	-2.044	0.000
90.00	-5.018	-10.037	0.000	0.000	0.000	-148.32	-19.651	0.000	19.651	-2.080	0.000
90.50	-5.008	-9.982	0.000	0.000	0.000	-145.81	-19.869	0.000	19.869	-2.089	0.000
92.00	-4.973	-9.738	0.000	0.000	0.000	-138.30	-20.530	0.000	20.530	-2.115	0.000

Resulting Forces and Deflections

Structure: CT16504-A-SB
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

94.00	-4.922	-9.418	0.000	0.000	0.000	-128.35	-21.423	0.000	21.423	-2.149	0.000
94.50	-4.912	-9.338	0.000	0.000	0.000	-125.89	-21.649	0.000	21.649	-2.158	0.000
96.00	-4.883	-9.229	0.000	0.000	0.000	-118.52	-22.331	0.000	22.331	-2.183	0.000
98.00	-4.843	-9.085	0.000	0.000	0.000	-108.76	-23.256	0.000	23.256	-2.232	0.000
100.00	-4.804	-8.943	0.000	0.000	0.000	-99.077	-24.201	0.000	24.201	-2.280	0.000
102.00	-4.765	-8.802	0.000	0.000	0.000	-89.469	-25.166	0.000	25.166	-2.325	0.000
104.00	-4.680	-8.565	0.000	0.000	0.000	-79.940	-26.149	0.000	26.149	-2.367	0.000
106.00	-4.640	-8.428	0.000	0.000	0.000	-70.580	-27.149	0.000	27.149	-2.406	0.000
108.00	-4.600	-8.293	0.000	0.000	0.000	-61.300	-28.165	0.000	28.165	-2.442	0.000
110.00	-4.559	-8.159	0.000	0.000	0.000	-52.101	-29.195	0.000	29.195	-2.474	0.000
112.00	-4.519	-8.028	0.000	0.000	0.000	-42.982	-30.237	0.000	30.237	-2.502	0.000
114.00	-2.706	-4.549	0.000	0.000	0.000	-31.940	-31.291	0.000	31.291	-2.526	0.000
116.00	-2.665	-4.436	0.000	0.000	0.000	-26.528	-32.353	0.000	32.353	-2.545	0.000
118.00	-2.623	-4.325	0.000	0.000	0.000	-21.198	-33.423	0.000	33.423	-2.562	0.000
120.00	-2.582	-4.216	0.000	0.000	0.000	-15.952	-34.499	0.000	34.499	-2.575	0.000
122.00	-2.542	-4.109	0.000	0.000	0.000	-10.787	-35.580	0.000	35.580	-2.586	0.000
124.00	-0.428	-0.775	0.000	0.000	0.000	-4.285	-36.664	0.000	36.664	-2.592	0.000
126.00	-0.389	-0.694	0.000	0.000	0.000	-3.429	-37.750	0.000	37.750	-2.595	0.000
128.00	-0.350	-0.613	0.000	0.000	0.000	-2.652	-38.838	0.000	38.838	-2.598	0.000
130.00	-0.311	-0.535	0.000	0.000	0.000	-1.953	-39.926	0.000	39.926	-2.600	0.000
132.00	-0.274	-0.457	0.000	0.000	0.000	-1.330	-41.016	0.000	41.016	-2.602	0.000
132.50	-0.223	-0.390	0.000	0.000	0.000	-1.193	-41.288	0.000	41.288	-2.602	0.000
134.00	-0.195	-0.333	0.000	0.000	0.000	-0.859	-42.105	0.000	42.105	-2.603	0.000
136.00	-0.158	-0.259	0.000	0.000	0.000	-0.469	-43.195	0.000	43.195	-2.604	0.000
138.00	-0.122	-0.186	0.000	0.000	0.000	-0.153	-44.286	0.000	44.286	-2.604	0.000
139.00	-0.026	-0.053	0.000	0.000	0.000	-0.031	-44.831	0.000	44.831	-2.604	0.000
140.00	-0.009	-0.018	0.000	0.000	0.000	-0.004	-45.376	0.000	45.376	-2.604	0.000
140.50	-0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	45.649	-2.604	0.000

Resulting Stresses

Structure:	CT16504-A-SBA	**Code:**	EIA/TIA-222-F	11/3/2015	
Site Name:	Manchester 12, CT	**Exposure:**	C		
Height:	140.50 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 35	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 30

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.58	0.35	0.00	0.00	0.00	20.07	20.66	52.0	0.397
2.00	0.57	0.35	0.00	0.00	0.00	20.01	20.60	52.0	0.396
4.00	0.57	0.35	0.00	0.00	0.00	19.95	20.53	52.0	0.395
6.00	0.57	0.36	0.00	0.00	0.00	19.89	20.47	52.0	0.394
8.00	0.57	0.36	0.00	0.00	0.00	19.82	20.40	52.0	0.392
10.00	0.56	0.36	0.00	0.00	0.00	19.75	20.32	52.0	0.391
12.00	0.56	0.36	0.00	0.00	0.00	19.67	20.24	52.0	0.389
14.00	0.56	0.37	0.00	0.00	0.00	19.59	20.15	52.0	0.388
16.00	0.55	0.37	0.00	0.00	0.00	19.50	20.07	52.0	0.386
18.00	0.55	0.37	0.00	0.00	0.00	19.41	19.97	52.0	0.384
20.00	0.55	0.37	0.00	0.00	0.00	19.31	19.87	52.0	0.382
22.00	0.54	0.37	0.00	0.00	0.00	19.21	19.76	52.0	0.380
24.00	0.54	0.38	0.00	0.00	0.00	19.10	19.65	52.0	0.378
26.00	0.54	0.38	0.00	0.00	0.00	18.99	19.53	52.0	0.376
28.00	0.53	0.38	0.00	0.00	0.00	18.86	19.41	52.0	0.373
30.00	0.53	0.38	0.00	0.00	0.00	18.73	19.27	52.0	0.371
32.00	0.53	0.39	0.00	0.00	0.00	18.60	19.14	52.0	0.368
34.00	0.52	0.39	0.00	0.00	0.00	18.45	18.99	52.0	0.365
36.00	0.52	0.39	0.00	0.00	0.00	18.30	18.83	52.0	0.362
38.00	0.52	0.39	0.00	0.00	0.00	18.14	18.67	52.0	0.359
40.00	0.51	0.40	0.00	0.00	0.00	17.97	18.50	52.0	0.356
42.00	0.51	0.40	0.00	0.00	0.00	17.80	18.32	52.0	0.352
44.00	0.51	0.40	0.00	0.00	0.00	17.61	18.13	52.0	0.349
44.50	0.51	0.40	0.00	0.00	0.00	17.56	18.08	52.0	0.348
46.00	0.50	0.40	0.00	0.00	0.00	17.41	17.92	52.0	0.345
48.00	0.49	0.41	0.00	0.00	0.00	17.20	17.71	52.0	0.341
50.00	0.57	0.48	0.00	0.00	0.00	19.52	20.10	52.0	0.387
52.00	0.56	0.48	0.00	0.00	0.00	19.25	19.83	52.0	0.381
54.00	0.56	0.49	0.00	0.00	0.00	18.96	19.54	52.0	0.376
56.00	0.56	0.49	0.00	0.00	0.00	18.66	19.24	52.0	0.370
58.00	0.55	0.49	0.00	0.00	0.00	18.34	18.92	52.0	0.364
60.00	0.55	0.50	0.00	0.00	0.00	18.01	18.58	52.0	0.358
62.00	0.55	0.50	0.00	0.00	0.00	17.66	18.23	52.0	0.351
64.00	0.55	0.50	0.00	0.00	0.00	17.30	17.86	52.0	0.344
66.00	0.54	0.51	0.00	0.00	0.00	16.91	17.48	52.0	0.336
68.00	0.54	0.51	0.00	0.00	0.00	16.51	17.07	52.0	0.328
70.00	0.54	0.51	0.00	0.00	0.00	16.08	16.64	52.0	0.320
72.00	0.53	0.52	0.00	0.00	0.00	15.63	16.19	52.0	0.312
74.00	0.53	0.52	0.00	0.00	0.00	15.16	15.72	52.0	0.302
76.00	0.53	0.52	0.00	0.00	0.00	14.67	15.23	52.0	0.293
78.00	0.53	0.53	0.00	0.00	0.00	14.15	14.70	52.0	0.283
80.00	0.52	0.53	0.00	0.00	0.00	13.60	14.16	52.0	0.272
82.00	0.52	0.54	0.00	0.00	0.00	13.02	13.58	52.0	0.261
84.00	0.52	0.54	0.00	0.00	0.00	12.42	12.97	52.0	0.250
86.00	0.52	0.54	0.00	0.00	0.00	11.78	12.33	52.0	0.237
88.00	0.39	0.38	0.00	0.00	0.00	10.83	11.23	52.0	0.216
90.00	0.38	0.39	0.00	0.00	0.00	10.42	10.82	52.0	0.208

Resulting Stresses

Structure: CT16504-A-SBA
Site Name: Manchester 12, CT
Height: 140.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/3/2015

Tower Engineering Solutions

90.50	0.38	0.39	0.00	0.00	0.00	10.31	10.71	52.0	0.206
92.00	0.38	0.39	0.00	0.00	0.00	9.99	10.38	52.0	0.200
94.00	0.37	0.39	0.00	0.00	0.00	9.53	9.93	52.0	0.191
94.50	0.60	0.64	0.00	0.00	0.00	15.03	15.67	52.0	0.301
96.00	0.60	0.64	0.00	0.00	0.00	14.45	15.09	52.0	0.290
98.00	0.60	0.64	0.00	0.00	0.00	13.64	14.28	52.0	0.275
100.00	0.60	0.65	0.00	0.00	0.00	12.79	13.44	52.0	0.258
102.00	0.60	0.65	0.00	0.00	0.00	11.89	12.54	52.0	0.241
104.00	0.59	0.65	0.00	0.00	0.00	10.95	11.59	52.0	0.223
106.00	0.59	0.65	0.00	0.00	0.00	9.96	10.61	52.0	0.204
108.00	0.59	0.66	0.00	0.00	0.00	8.92	9.58	52.0	0.184
110.00	0.59	0.66	0.00	0.00	0.00	7.82	8.49	52.0	0.163
112.00	0.59	0.67	0.00	0.00	0.00	6.66	7.34	52.0	0.141
114.00	0.34	0.41	0.00	0.00	0.00	5.11	5.49	52.0	0.106
116.00	0.34	0.41	0.00	0.00	0.00	4.39	4.77	52.0	0.092
118.00	0.33	0.41	0.00	0.00	0.00	3.62	4.02	52.0	0.077
120.00	0.33	0.41	0.00	0.00	0.00	2.82	3.23	52.0	0.062
122.00	0.33	0.41	0.00	0.00	0.00	1.97	2.41	52.0	0.046
124.00	0.06	0.07	0.00	0.00	0.00	0.81	0.88	52.0	0.017
126.00	0.06	0.06	0.00	0.00	0.00	0.67	0.74	52.0	0.014
128.00	0.05	0.06	0.00	0.00	0.00	0.54	0.60	52.0	0.012
130.00	0.05	0.05	0.00	0.00	0.00	0.41	0.47	52.0	0.009
132.00	0.04	0.05	0.00	0.00	0.00	0.29	0.34	52.0	0.007
132.50	0.03	0.04	0.00	0.00	0.00	0.26	0.31	52.0	0.006
134.00	0.03	0.03	0.00	0.00	0.00	0.20	0.23	52.0	0.004
136.00	0.02	0.03	0.00	0.00	0.00	0.11	0.14	52.0	0.003
138.00	0.02	0.02	0.00	0.00	0.00	0.04	0.07	52.0	0.001
139.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	52.0	0.000
140.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.0	0.000
140.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	52.0	0.000

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
80 mph Wind with 0" Ice	22.4	0.00	28.99	0.00	0.00	2230.92
69.28 mph Wind with 0.5" Ice	19.9	0.00	35.43	0.00	0.00	2049.21
50 mph Wind with 0" Ice	8.7	0.00	29.01	0.00	0.00	872.94

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
80 mph Wind with 0" Ice	0.58	0.90	0.00	0.00	0.00	51.29	51.89	52.0	0.00	0.998
69.28 mph Wind with 0.5" Ice	0.71	0.80	0.00	0.00	0.00	47.11	47.84	52.0	0.00	0.920
50 mph Wind with 0" Ice	0.58	0.35	0.00	0.00	0.00	20.07	20.66	52.0	0.00	0.397

Pier Foundation Design For Monopole

			Date: 11/3/2015
Customer Name:	**AT&T**	**EIA/TIA Standard:**	EIA-222-F
Site Name:	Manchester 12, CT	**Structure Height (Ft.):**	140.5
Site Number:	CT16504-A-SBA	**Engineer Name:**	K. Wyant
Engr. Number:	18448	**Engineer Login ID:**	

Foundation Info Obtained from: Mapping Operation

Structure Type: Monopole

Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	29.0	Shear Force (Kips):	22.4
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2230.9

Foundation Geometries:

Mods required -Yes/No ?:	No			ft.
Diameter of Pier (ft.):	6.0	Depth of Base B. G. S. :	30.0	ft.
Pier Height A. G. (ft.):	0.30			

Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield strength:	40	ksi
Vertical Rebar Size #:	10	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	22	Tie Spacing:	12.0	in.
Concrete Cover (in.):	4	Concrete unit weight:	150.0	pcf

Soil Design Parameters:

Water Table B.G.S. (ft):	27.0	Unit weight of water:	62.4	psf
Ratio of Uplift/Axial Skin Friction:	1.0	Pullout failure Angle:	30	(°)

Skin Frictions are to be obtained from: Calculations

Please Enter Allowable End Bearing Pressure (psf): 11600

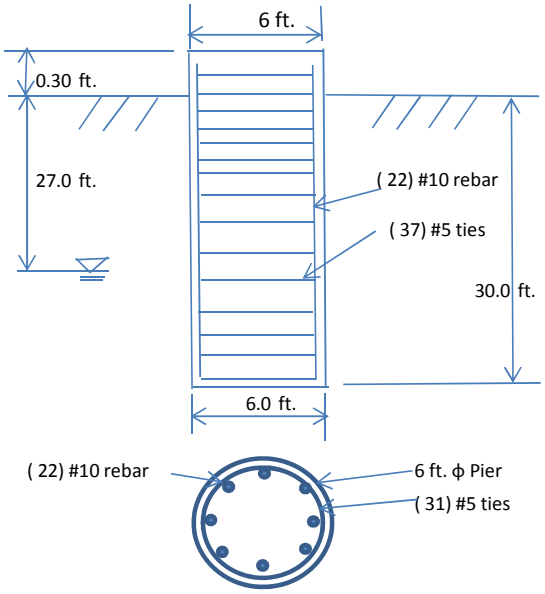
Kc = 1.15 For Sand

Kc = 1.0 Silt/Clay

Kt = 0.7 For Sand and Silt

Kt = 0.85 For Clay

Friction δ Between Pier & Soil = 0.95



Monopole Pier Foundation

Depth of Layers (ft) Top	Bottom	γ_{soil} (pcf)	ϕ (°)	Cohesion (psf)			Soil Types	Allow. Uplift Skin Friction (psf)	Allow. Axial Skin Friction (psf)	Kc	Kt	α
0.0	1.0	100	0	0		0	Sand			1.15	0.70	
1.0	5.0	135	40	0		0	Sand	87.5	143.8	1.15	0.70	
5.0	7.0	120	33	0		0	Sand	93.8	154.1	1.15	0.70	
7.0	10.0	130	38	0		0	Sand	162.1	266.3	1.15	0.70	
10.0	15.0	128	37	0		0	Sand	235.4	386.6	1.15	0.70	
15.0	30.0	132	39	0		11600	Sand	494.4	812.3	1.15	0.70	
30.0	35.0	127	36	0		11600	Sand	491.0	806.7	1.15	0.70	

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

Foundation Analysis and Design:

Total Dry Soil Volume from Conical Failure (cu. Ft.):	14255	Dry Soil Weight from Conical Failure:	1845	Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	58	Buoyant Soil Weight from Conical Failure (K	5	Kips
Total Dry Concrete Volume (cu. Ft.):	772	Total Dry Concrete Weight:	115.8	Kips
Total Buoyant Concrete Volume (cu. Ft.):	84.8	Total Buoyant Concrete Weight:	7.43	Kips
Total Effective Concrete Weight (Kips):	123.2	Total Effective Soil Weight:	1849.7	Kips
Total Effective Vertical Load on Base (Kips):	46.1			

Check Soil Capacities:

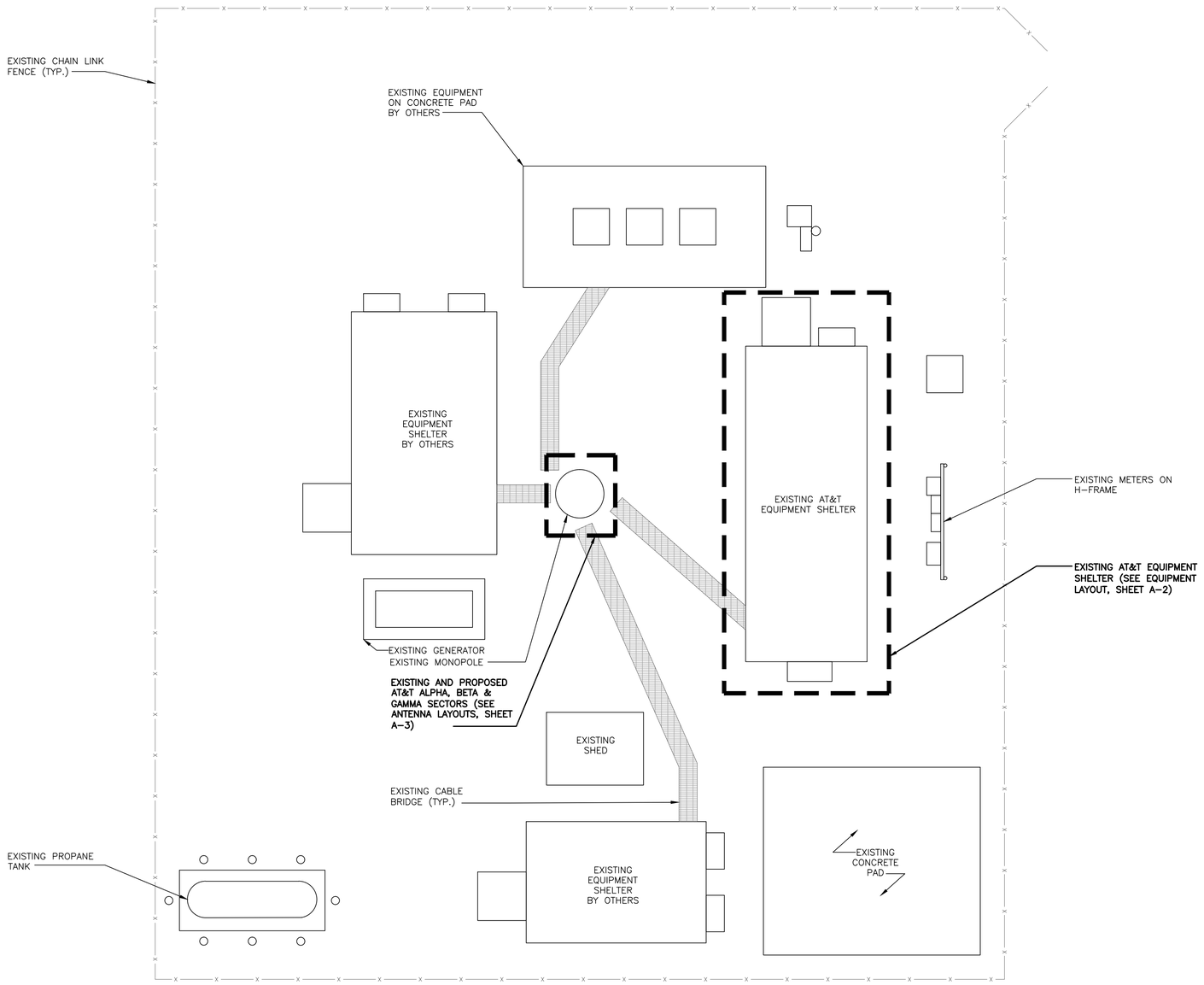
					Usage	
Allowable Foundation Overturning Resistance (kips-ft.):	10774.5	>	Applied Momont (kips-ft):	2697	0.25	OK!
Factor of Safety of Passive Soil Resistance against Moment:	7.99	OK!				

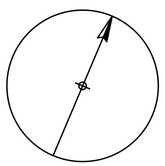
Check the capacities of Reinforceing Concrete:

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:	1.30	

Reinforcing Concrete Pier:

					Usage	
Vertical Steel Rebar Area (sq. in./each):	1.27		Tie / Stirrup Area (sq. in./each):	0.31		
Calculated Moment Capacity (Mn,Kips-Ft):	3931.4	>	Design Factored Moment (Mu, K-Ft):	2966.5	0.75	OK!
Calculated Shear Capacity (Kips):	707.8	>	Design Factored Shear (Kips):	251.7	0.36	OK!
Calculated Tension Capacity (Tn, Kips):	1508.8	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	5362	>	Design Factored Axial Load (Pu Kips):	37.7	0.01	OK!
Moment & Axial Strength Combination:	0.75	OK!	Max. Allowable Tie/Stirrup Spacing:	12.00	in.	
Pier Reinforcement Ratio:	0.007	Reinforcement Ratio is satisfied per ACI				





NORTH

COMPOUND LAYOUT

SCALE: 3/16" = 1'-0"

0 2'-8" 5'-4" 10'-8"

GRAPHIC SCALE: 3/16"=1'-0"

NOTE:
CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA AND SUBMIT TO THE ENGINEER ANY DISCREPANCIES FROM THE DRAWINGS.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1080
SITE NAME: MANCHESTER SAND GRAVEL

60 ADAMS STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

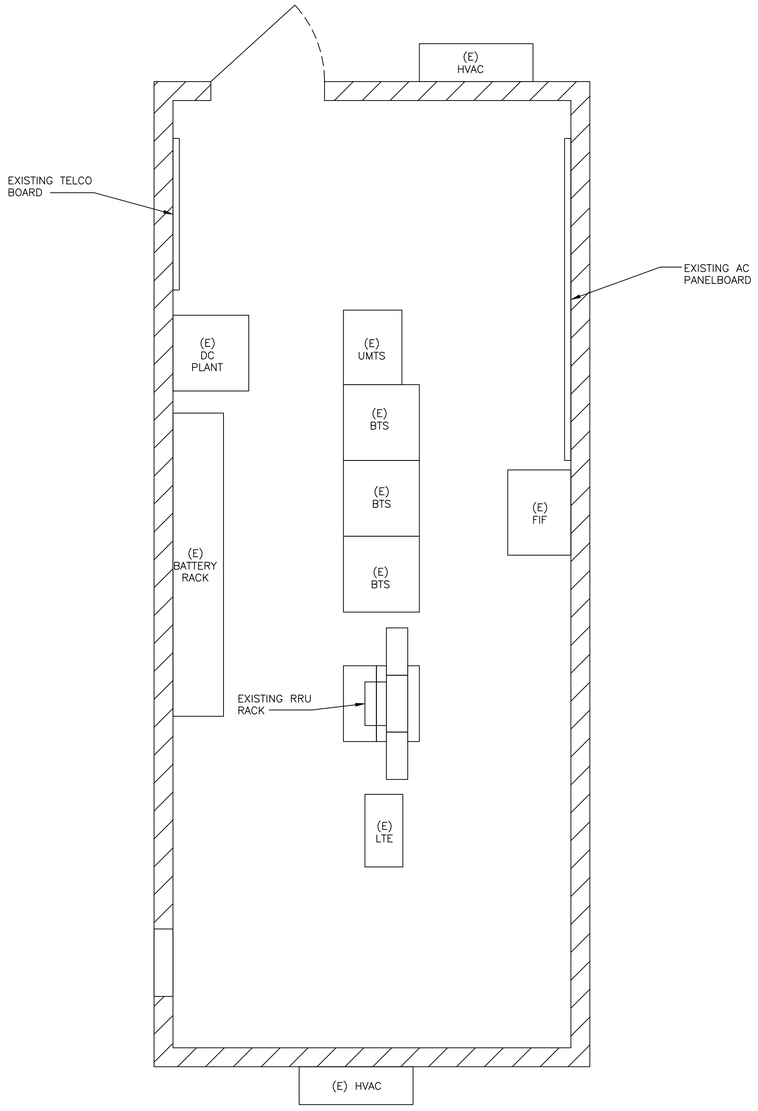
SEAL:

STATE OF CONNECTICUT
DOUGLAS D. BAKER
LICENSED PROFESSIONAL ENGINEER
PRINCIPAL ENGINEER
CT PROFESSIONAL ENGINEER LIC. NO. 23643

AT&T

DRAWING TITLE:
COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15102-EMP	A-1	0

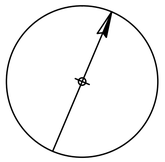


EXISTING EQUIPMENT LAYOUT

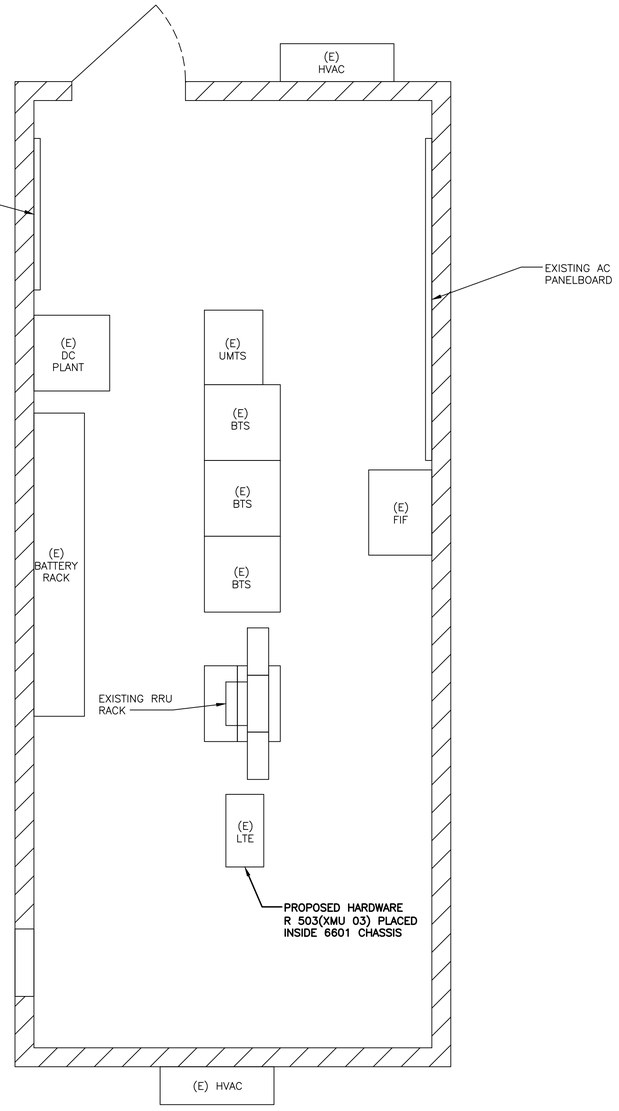
SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot



NORTH

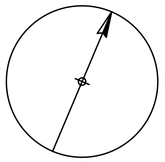


PROPOSED EQUIPMENT LAYOUT

SCALE: 1" = 2'-0"

2 0 1 2 4 8

(IN FEET)
1/2 Inch = 1 Foot



NORTH

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NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL:

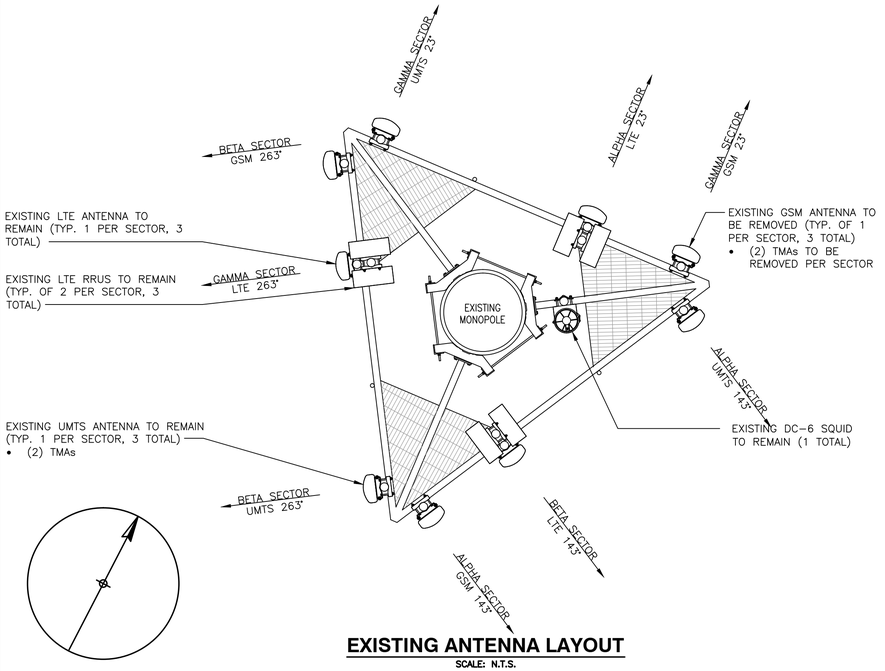
STATE OF CONNECTICUT
DOUGLAS G. BAILEY
LICENSED PROFESSIONAL ENGINEER

DOUGLAS G. BAILEY
PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

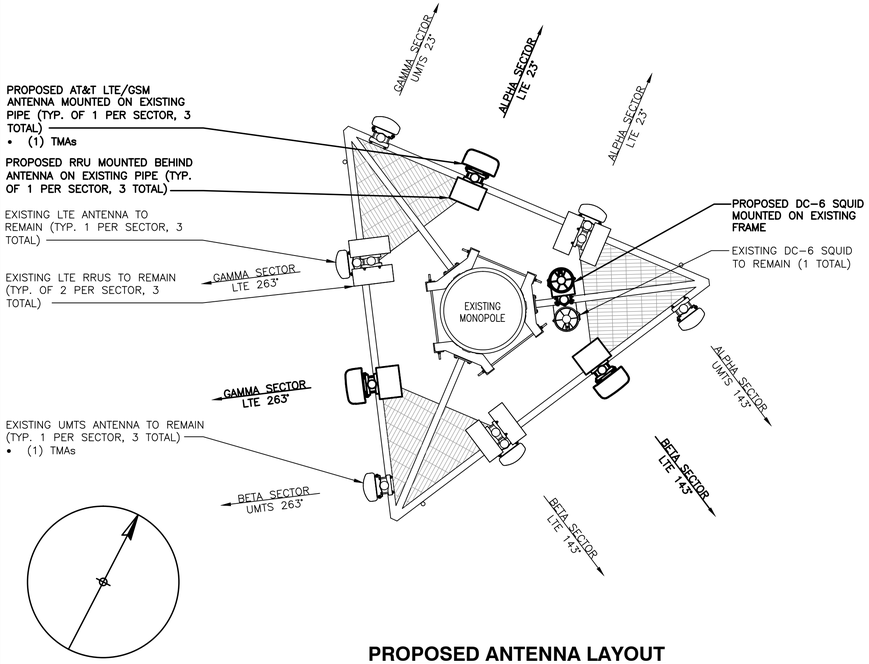
DRAWING TITLE:
EQUIPMENT LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
15102-EMP	A-2	0



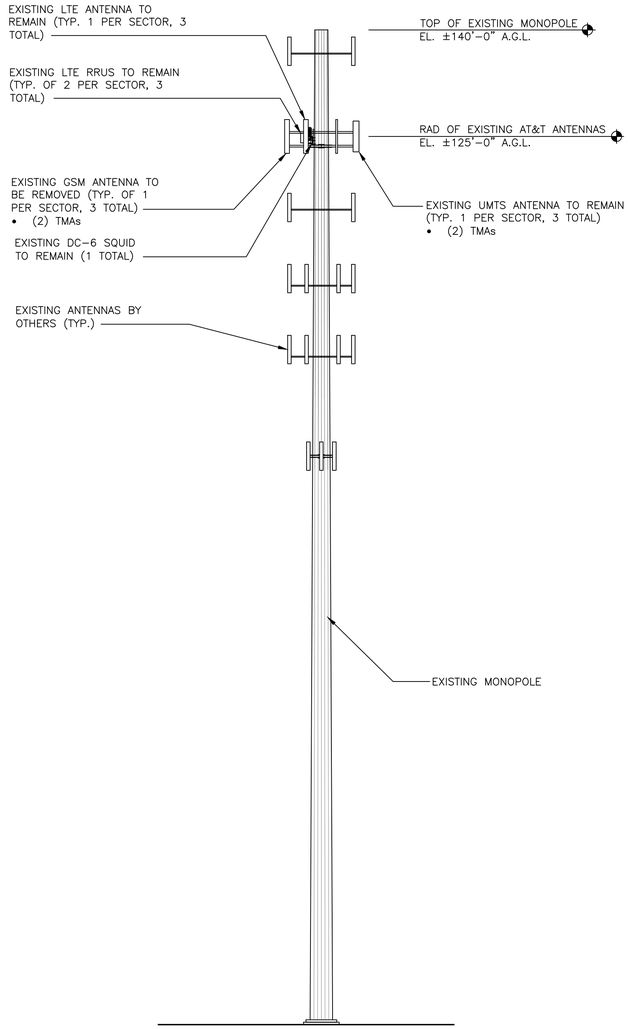
EXISTING ANTENNA LAYOUT

SCALE: N.T.S.



PROPOSED ANTENNA LAYOUT

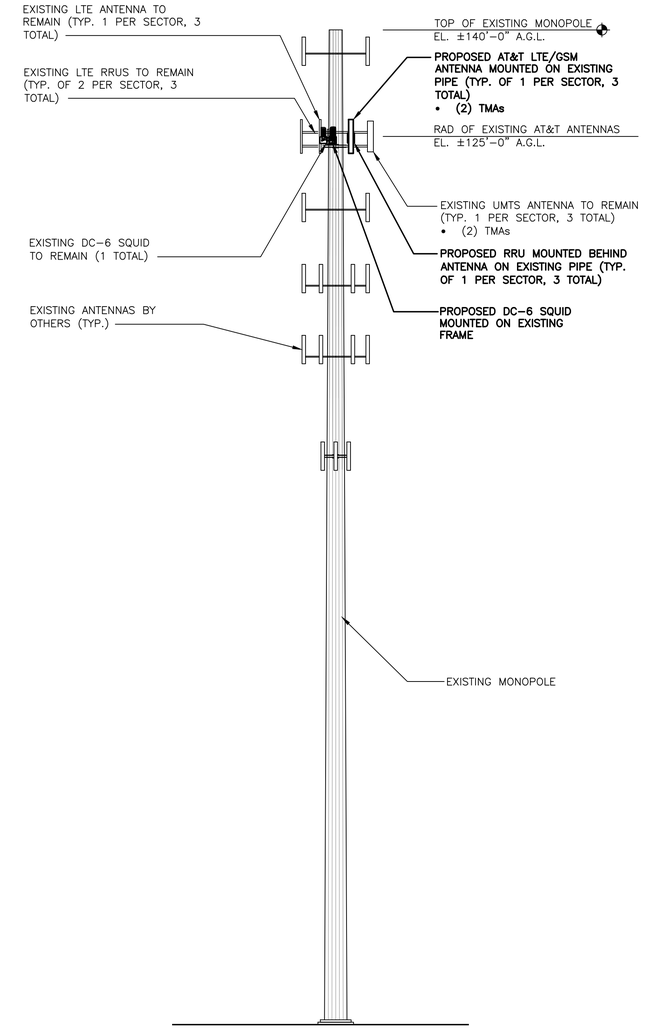
SCALE: N.T.S.



EXISTING TOWER ELEVATION

SCALE: NTS

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.



PROPOSED TOWER ELEVATION

SCALE: NTS

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16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT1080
SITE NAME: MANCHESTER SAND GRAVEL

60 ADAMS STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	01/27/16	ISSUED AS FINAL	NJM	NDB	NDB

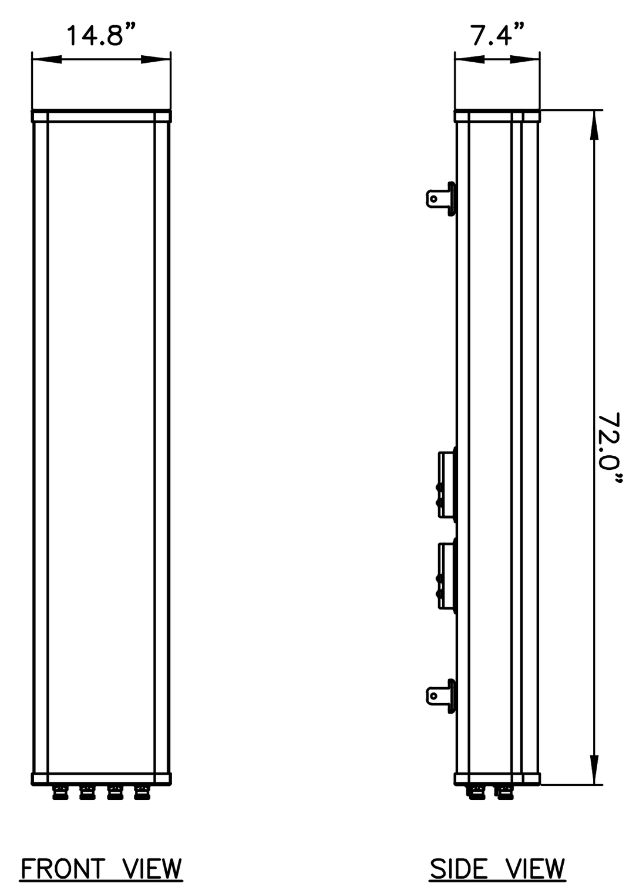
SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

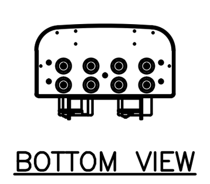
SEAL: STATE OF CONNECTICUT — NICHOLAS D. BARONE — LICENSED PROFESSIONAL ENGINEER — CT — 28643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
15102-EMP	A-3	0

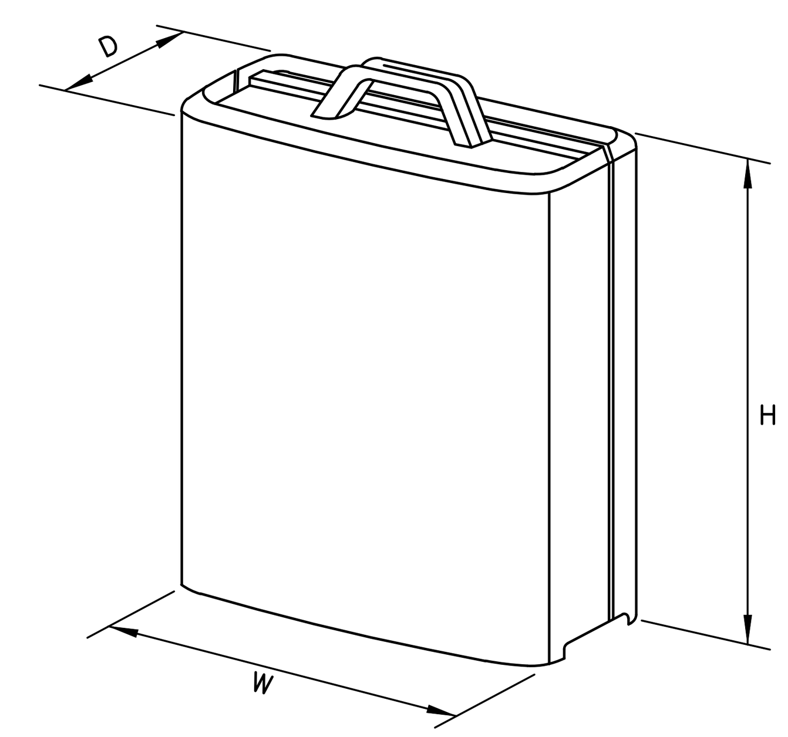




MANUFACTURER	CCI
MODEL	OPA-65R-LCUU-H6
WEIGHT	73 LBS

LTE ANTENNA DETAIL

SCALE: N.T.S.

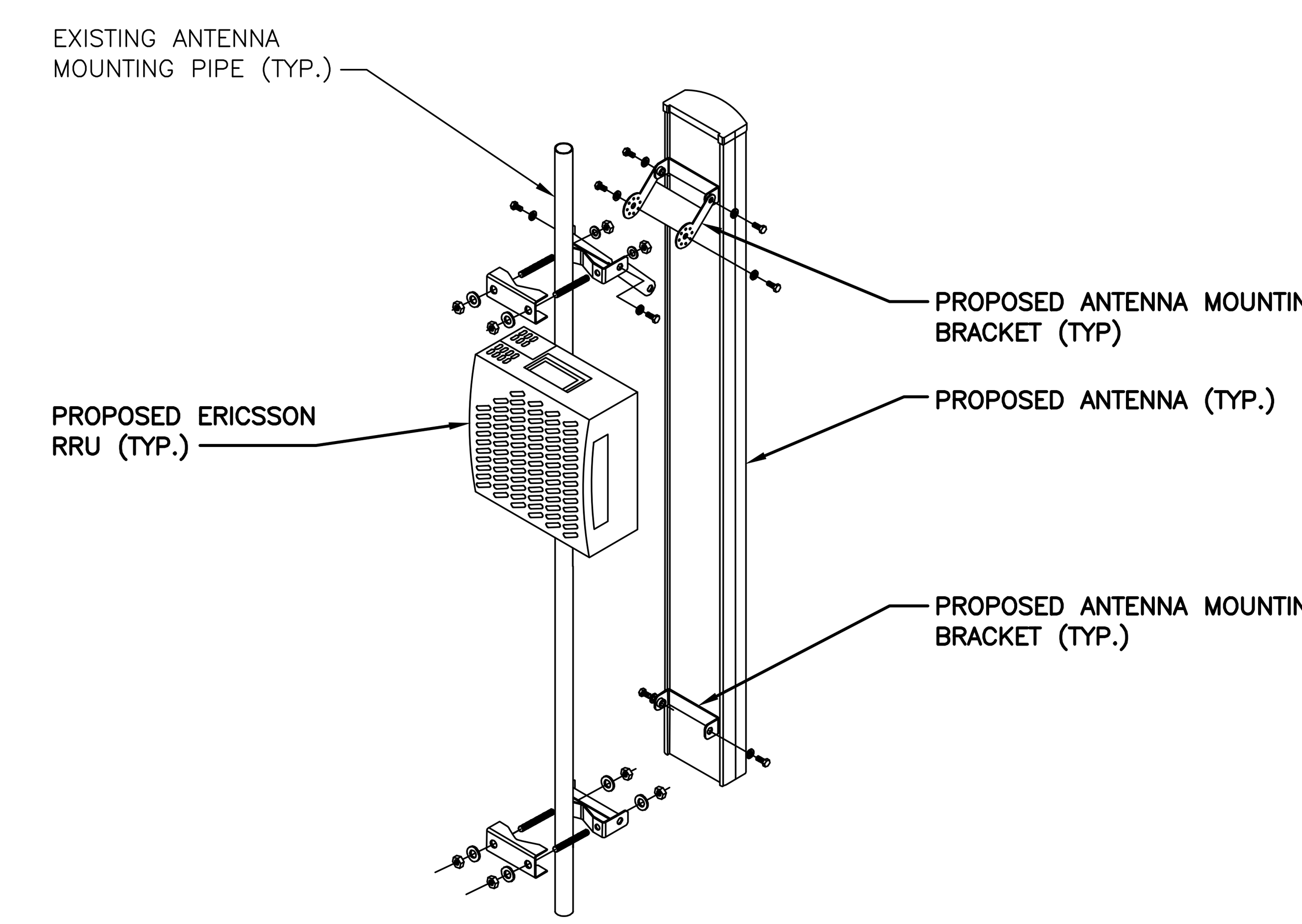


MODEL	L x W x H	WEIGHT
*RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-32	29.9"x13.3"x9.5"	77 LBS

*DENOTES EXISTING.

RRUS DETAIL

SCALE: N.T.S.



ANTENNA AND RRU MOUNTING DETAIL

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	KATHREIN	800-10121	54.5"x10.3"x5.9"
	A2	–	–	–
	A3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	A4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
BETA	B1	KATHREIN	800-10121	54.5"x10.3"x5.9"
	B2	–	–	–
	B3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	B4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
GAMMA	G1	KATHREIN	800-10121	54.5"x10.3"x5.9"
	G2	–	–	–
	G3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	G4	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"

FINAL ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	KATHREIN	800-10121	54.5"x10.3"x5.9"
	A2	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	A3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	A4	–	–	–
BETA	B1	KATHREIN	800-10121	54.5"x10.3"x5.9"
	B2	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	B3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	B4	–	–	–
GAMMA	G1	KATHREIN	800-10121	54.5"x10.3"x5.9"
	G2	CCI	OPA-65R-LCUU-H6	72"x14.8"x7.4"
	G3	KMW	AM-X-CD-16-65-00T-RET	72"x11.8"x5.9"
	G4	–	–	–

PROPOSED RRU SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS-32	29.9"x13.3"x9.5"	–	–
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"	–	–
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
BETA	ERICSSON	RRUS-32	29.9"x13.3"x9.5"	–	–
	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x9.5"	–	–
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
GAMMA	ERICSSON	RRUS-32	29.9"x13.3"x9.5"	–	–
	ERICSSON	RRUS-12 (EXISTING)	20.4"x18.5"x9.5"	–	–
	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		

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SCALE: AS SHOWN | DESIGNED BY: NJM | DRAWN BY: NJM

SEAL: STATE OF CONNECTICUT — PROFESSIONAL ENGINEER

AT&T

DRAWING TITLE: DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15102-EMP	A-4	0