October 9, 2015

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
237 Sandy Hollow Road
Groton, CT 06355
N 41.37000
W -71.98250
T-Mobile Site #: CTNL053A_L700

Members of the Siting Council:

On behalf of T-Mobile, SBA Communications is submitting an exempt modification application to the Connecticut Siting council for modification of existing equipment at a tower facility located at 237 Sandy Hollow Road, Groton, CT.

The 237 Sandy Hollow Road facility consists of a 130' Monopole Tower owned and operated by SBA Infrastructure, LLC. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located, Town Manager Mark R. Oefinger, as well as the property owner, Mystic River Ambulance Assoc. Inc.

As part of T-Mobile's L700 project, T-Mobile desires to upgrade their equipment to meet the new standards of 4G technology. The new equipment will allow customers to download files and browse the internet at a high rate of speed while also allowing their phones to be compatible with the latest 4G technology.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in T-Mobile's operations at the site along with the required fee of $625.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The overall height of the structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. The changes in radio frequency power density will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, SBA Communications on behalf of T-Mobile, respectfully submits that he proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at 508.251.0720 x 3804 with any questions you may have concerning this matter.

Thank you,

Kri Pelletier
SBA Communications Corporation
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

T-Mobile

Equipment Modification

237 Sandy Hollow Road, Groton, CT 06355
Site number CTNL053A _L700

Tower Owner: SBA Infrastructure, LLC

Equipment Configuration: Monopole

Current and/or approved:

- (3) Ericsson Air21 B2A/B4P - Panel
- (3) Ericsson Air21 B4A/B2P - Panel
- (6) Ericsson KRY 112 144/1 TMAs
- (12) 1-5/8" Lines
- (1) 1-5/8" Fiber

Final Configuration:

At: 129'

- (3) Ericsson Air21 B2A/B4P - Panel
- (3) Ericsson Air21 B4A/B2P - Panel
- (6) Ericsson KRY 112 144/1 TMAs
- (3) Ericsson S11B12 RRUs

At: 127'

- (3) Commscope LNX-6515DS-A1M

- (12) 1-5/8" lines
- (1) 1-5/8" Fiber

Structural Information:

The attached structural analysis demonstrates that the tower and foundation will have adequate structural capacity to accommodate the proposed modifications.

Power Density:

The anticipated Maximum Composite contributions from the T-Mobile facility are 2.56% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 3.02% of the allowable FCC established general public limit sampled at the ground level.

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.67 %**
MetroPCS	0.35 %
Site Total MPE %:	**3.02 %**

October 9, 2015

Mr. Mark R. Oefinger
Town Manager
Town of Groton
45 Fort Hill Rd.
Groton, CT 06340

RE: Telecommunications Facility @ 237 Sandy Hollow Rd., Groton, CT

Dear Mr. Oefinger,

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes T-Mobile's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at 508.251.0720 x 3804.

Thank you,

Kri Pelletier
SBA Communications Company
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

October 9, 2015

Mystic River Ambulance Assoc. Inc.
237 Sandy Hollow Rd
Mystic, CT 06355

RE: Telecommunications Facility @ 237 Sandy Hollow Rd., Groton, CT

To Whom It May Concern:

In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies (R.C.S.A.) Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review T-Mobile's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes T-Mobile's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures, please call me at 508.251.0720 x 3804.

Thank you,

Kri Pelletier
SBA Communications Company
33 Boston Post Road West Suite 320
Marlborough, MA 01752
508-251-0720 x 3804 + T
508-251-1755 + F
203-446-7700 + C
kpelletier@sbasite.com

EBI Consulting
environmental | engineering | due diligence

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

T-Mobile Existing Facility

Site ID: CTNL053A

NL053/ MCF_Ambulance
237 Sandy Hollow Road
West Mystic, CT 06388

October 7, 2015

EBI Project Number: 6215005035

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	3.02 %

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

EBI Consulting
environmental | engineering | due diligence

October 7, 2015

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

Emissions Analysis for Site: **CTNL053A – NL053/ MCF_Ambulance**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **237 Sandy Hollow Road, West Mystic, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general 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 limit for the 700 MHz Band is approximately 467 $\mu W/cm^2$, and the general population exposure limit for the PCS and AWS bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **237 Sandy Hollow Road, West Mystic, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, 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) 2 GSM / 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 (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.

5) 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.

6) 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.

7) The antennas used in this modeling are the **Ericsson AIR21 (B4A/B2P** & **B2A/B4P)** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR21 (B4A/B2P** & **B2A/B4P)** have a maximum gain of **15.9 dBd** at their main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. 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.

8) The antenna mounting height centerlines of the proposed antennas are **127 & 129 feet** above ground level (AGL).

9) 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.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	129	Height (AGL):	129	Height (AGL):	129
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	2	Channel Count	2	# PCS Channels:	2
Total TX Power:	120	Total TX Power:	120	# AWS Channels:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A1 MPE%	1.11	Antenna B1 MPE%	1.11	Antenna C1 MPE%	1.11
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P□	Make / Model:	Ericsson AIR21 B2A/B4P□	Make / Model:	Ericsson AIR21 B2A/B4P□
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	129	Height (AGL):	129	Height (AGL):	129
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power:	120	Total TX Power:	120	Total TX Power:	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	1.11	Antenna B2 MPE%	1.11	Antenna C2 MPE%	1.11
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM	Make / Model:	Commscope LNX-6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	127	Height (AGL):	127	Height (AGL):	127
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX Power:	30	Total TX Power:	30	Total TX Power:	30
ERP (W):	865.21	ERP (W):	865.21	ERP (W):	865.21
Antenna A3 MPE%	0.45	Antenna B3 MPE%	0.45	Antenna C3 MPE%	0.45

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**2.67 %**
MetroPCS	0.35 %
Site Total MPE %:	**3.02 %**

T-Mobile Sector 1 Total:	2.67 %
T-Mobile Sector 2 Total:	2.67 %
T-Mobile Sector 3 Total:	2.67 %
Site Total:	3.02 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**2334.27**	**129**	**11.09**	**2100**	**1000**	**1.11 %**
T-Mobile 700 MHz LTE	**1**	**865.21**	**127**	**2.12**	**700**	**467**	**0.45 %**
T-Mobile 1900 MHz (PCS) GSM/UMTS	**2**	**1167.14**	**129**	**5.55**	**1900**	**1000**	**0.55 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**1167.14**	**129**	**5.55**	**2100**	**1000**	**0.55 %**
						Total:	**2.67 %**

EBI Consulting
environmental | engineering | due diligence

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 T-Mobile 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:

T-Mobile Sector	Power Density Value (%)
Sector 1:	2.67 %
Sector 2:	2.67 %
Sector 3 :	2.67 %
T-Mobile Per Sector Maximum:	2.67 %
Site Total:	3.02 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **3.02%** 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 130 ft. Nudd Corporation Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT11561-A

Customer Site Name: Groton 2, CT

Carrier Name: T-Mobile

Carrier Site Number: CTNL053A

Carrier Site Name: Unknown

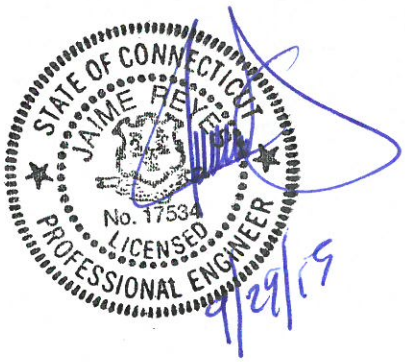
Site Location: 237 Sandy Hollow Road

Groton, Connecticut

New London County

Latitude: 41.369510

Longitude: -71.982463



Analysis Result:

Max Structural Usage: 48.2% [Pass]

Max Foundation Usage: 39.0% [Pass]

Report Prepared By : Walter Velez

Introduction

The purpose of this report is to summarize the analysis results on the 130 ft. Nudd Corporation Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Monopole original shaft section data prepared by Fred. A. Nudd Corp. Dated 05-09-2008. Drawing No 208-13077-1. Monopole previous structural report prepared by FDH Engineering, Inc. Dated 06-17-2015. Project No 15BORZ1400 Rev 1.
Foundation Drawing	Monopole original foundation drawings prepared by Fred. A. Nudd Corp. Dated 05-09-2008. Drawing No 208-13077-1.
Geotechnical Report	Monopole geotechnical report prepared by FDH Engineering, Inc. Dated 03-26-2014. Project No 1424W71600.
Modification Drawings	N/A

Analysis Criteria

The analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA-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:	85.0 mph (fastest mile)
Basic Wind Speed with Ice:	74 mph (fastest mile) with 1/2" radial ice concurrent
Operational Wind Speed:	50 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA-222-F, 2003 IBC & 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	Owner
1	129.0	3	Ericsson Air21 B2A/B4P - Panel	Low Profile Platform	(12) 1 5/8"; (1) 1 5/8" Fiber	T-Mobile
2		3	Ericsson Air21 B4A/B2P - Panel			
3		6	Ericsson KRY 112 144/1 TMAs			
4	117.0	4	Commscope HBX-6513DS-A1M - Panel	Low Profile Platform (Valmont RMQP)	(2) 1 5/8" Fiber	Verizon
5		2	ALU RRH 2x60 AWS			
6		2	ALU RRH 2x60 PCS			

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
7	129.0	3	Ericsson Air21 B2A/B4P - Panel	Low Profile Platform	(12) 1 5/8"; (1) 1 5/8" Fiber	T-Mobile
8		3	Ericsson Air21 B4A/B2P - Panel			
9		6	Ericsson KRY 112 144/1 TMAs			
10		3	Ericsson S11B12 RRUs			
11	127.0	3	Commscope LNX-6515DS-A1M - Panel			

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

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:	**48.2%**	**38.0%**	**26.8%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	2188.8	22.7	27.8
Analysis Reactions	1370.5	15.3	21.2
% of Design Reactions	62.6%	67.3%	76.3%

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-222-F for the installed antennas. Maximum twist/sway at the elevation of the proposed equipment is 0.9325 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-222-G standards, the 2003 IBC & 2005 Connecticut State Building Code under the design basic wind speed 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 48.2% at 0.0ft

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)			Page: 1	

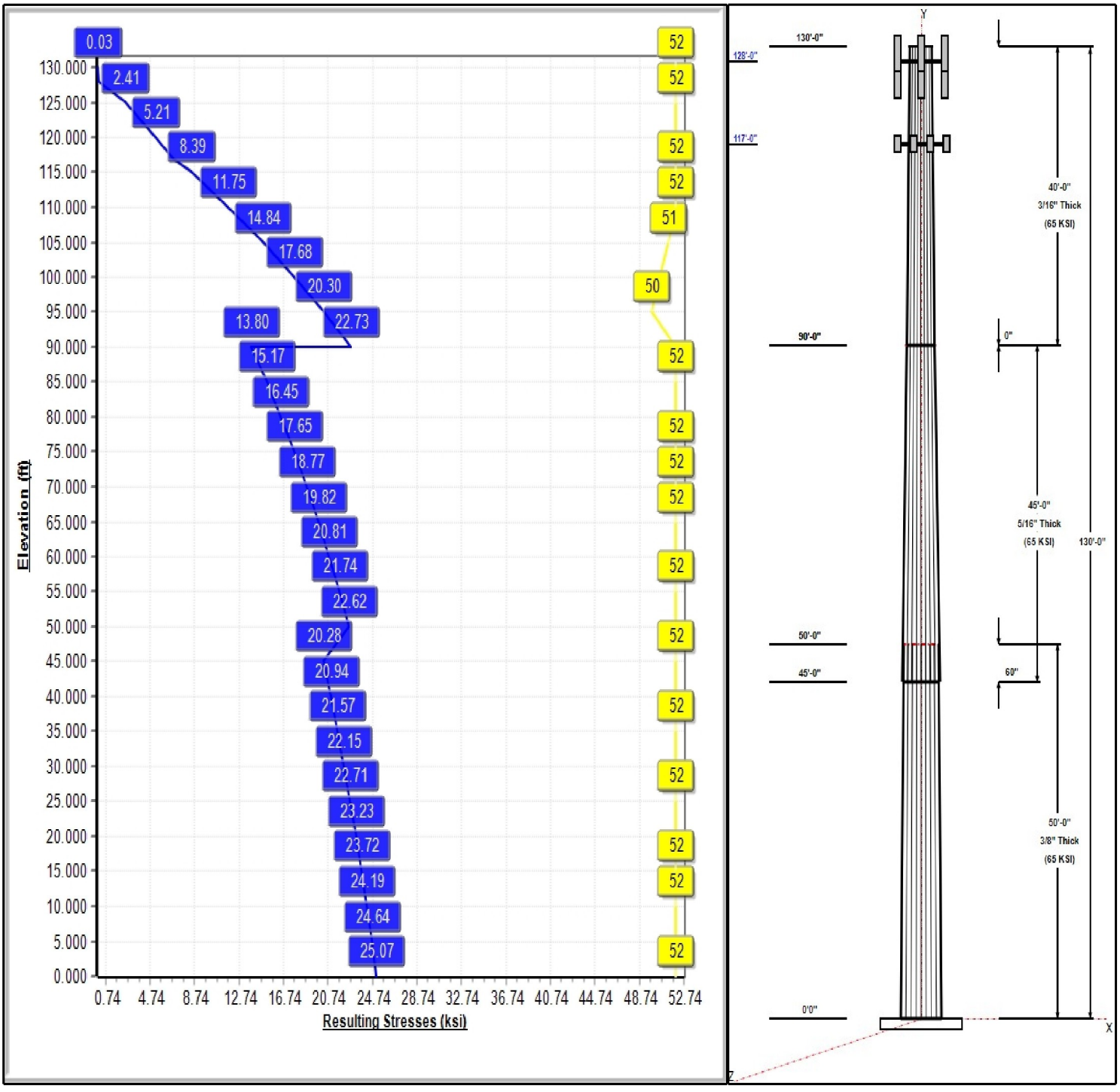
Tower Engineering Solutions

Dead Load Factor: 1.00
Wind Load Factor: 1.00

52 Alllowable Stress
25 Resulting Stress

Load Case : 85 mph Wind with 0 in Ice

Iterations: 22



Structure: CT11561-A-SBA

Type: Tapered
Site Name: Groton 2, CT
Height: 130.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.18942

9/29/2015

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	50.00	38.53	48.00	0.375		0.18942	65
2	45.00	31.58	40.10	0.313	Slip	0.18942	65
3	40.00	24.00	31.58	0.188	Butt	0.18942	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
128.00	127.00	3	Commscope	T-Mobile
128.00	129.00	3	Ericsson Air21 B2A/B4P	T-Mobile
128.00	129.00	3	Ericsson Air21 B4A/B2P	T-Mobile
128.00	129.00	6	Ericsson KRY 112 144/1	T-Mobile
128.00	129.00	3	Ericsson S11B12 RRUs	T-Mobile
128.00	128.00	1	Low Profile Platform	T-Mobile
117.00	117.00	2	ALU RRH 2x60 AWS	Verizon
117.00	117.00	2	ALU RRH 2x60 PCS	Verizon
117.00	117.00	4	Commscope	Verizon
117.00	117.00	1	Low Profile Platform	Verizon

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	128.00	Inside	1 5/8" Fiber	T-Mobile
3.00	128.00	Inside	1 5/8" Coax	T-Mobile
3.00	117.00	Inside	1 5/8" Fiber	Verizon

Anchor Bolts

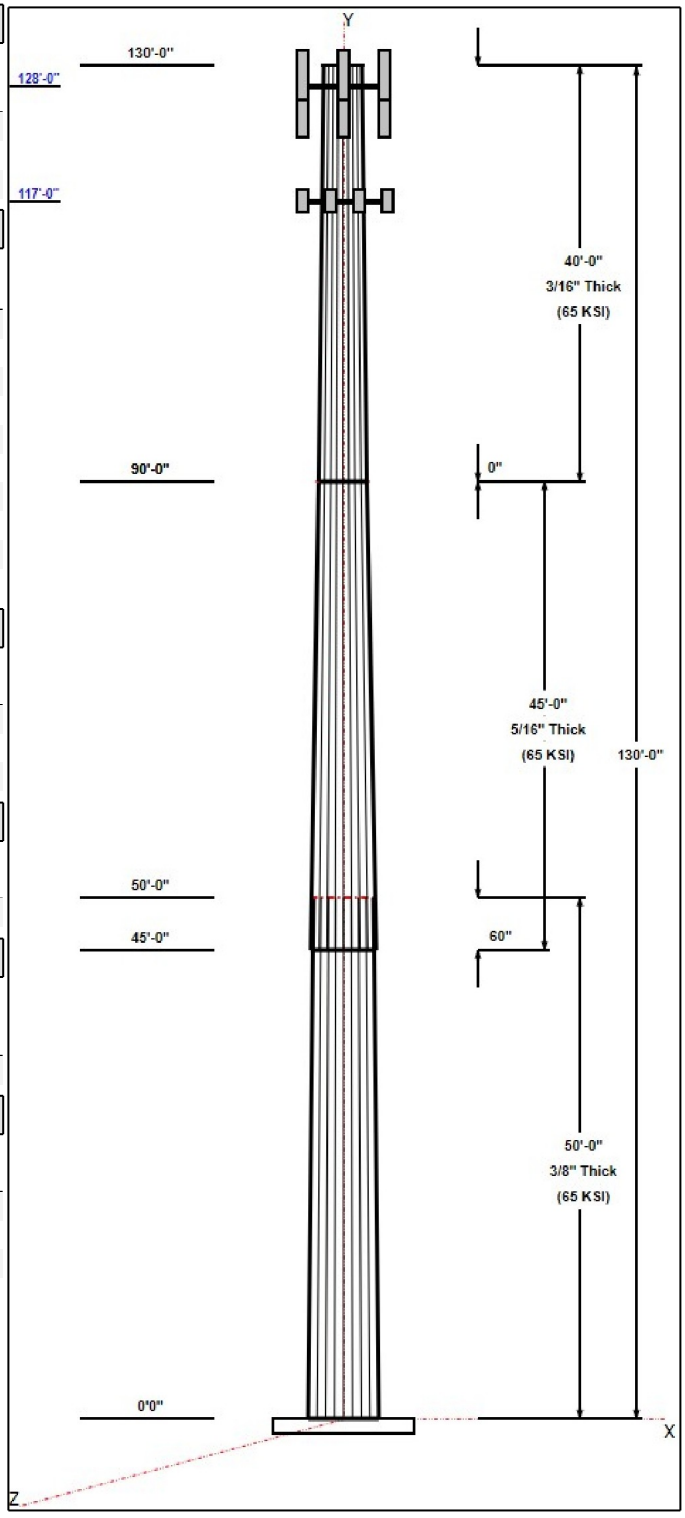
Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" A193 B7	105.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
2.5000	60.0	50.0	Round

Reactions

Load Case	Moment	Shear	Axial
85 mph Wind with 0" Ice	1370.5	15.3	21.2
73.61 mph Wind with 0.5" Ice	1121.2	12.2	25.3
50 mph Wind with 0" Ice	474.3	5.3	21.2



Shaft Properties

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 4	

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	8,685
2	18	45.000	0.3125	65	Slip	60.00	5,396
3	18	40.000	0.1875	65	Flange	0.00	2,236
					Total Shaft Weight:		**16,316**

	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	48.00	0.00	56.68	16243.54	21.15	128	38.53	50.00	45.41	8352.00	16.70	102.7	0.189423
2	40.10	45.00	39.46	7893.43	21.21	128.3	31.58	90.00	31.01	3829.53	16.40	101.0	0.189423
3	31.58	90.00	18.68	2325.39	28.28	168.4	24.00	130.0	14.17	1015.22	21.15	128	0.189423

Loading Summary

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 5	

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	128.0	Commscope LNX-6515DS-A1M	3	49.80	11.41	0.80	115.60	12.34	0.80	0.00	-1.00
2	128.0	Ericsson Air21 B2A/B4P	3	91.50	6.58	0.86	129.20	6.970	0.86	0.00	1.00
3	128.0	Ericsson Air21 B4A/B2P	3	90.30	6.58	0.86	128.10	6.970	0.86	0.00	1.00
4	128.0	Ericsson KRY 112 144/1 TMAs	6	11.00	0.41	0.67	14.10	0.550	0.67	0.00	1.00
5	128.0	Ericsson S11B12 RRUs	3	51.00	3.31	0.67	67.10	3.520	0.67	0.00	1.00
6	128.0	Low Profile Platform	1	1500.00	22.00	1.00	1800.00	27.00	1.00	0.00	0.00
7	117.0	ALU RRH 2x60 AWS	2	60.00	3.96	0.67	80.10	4.230	0.67	0.00	0.00
8	117.0	ALU RRH 2x60 PCS	2	55.00	2.57	0.67	70.90	2.760	0.67	0.00	0.00
9	117.0	Commscope HBX-6513DS-A1M	4	5.70	1.73	0.75	16.30	2.070	0.75	0.00	0.00
10	117.0	Low Profile Platform (Valmont	1	1500.00	22.00	1.00	1800.00	27.00	1.00	0.00	0.00
		Totals:	**28**	**4,166.60**			**5,371.80**				

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	128.0	(1) 1 5/8" Fiber	1.04	0.00	0.00	0.00	Inside
3.00	128.0	(12) 1 5/8" Coax	1.04	0.00	0.00	0.00	Inside
3.00	117.0	(2) 1 5/8" Fiber	4.16	0.00	0.00	0.00	Inside
		Totals:	**737.36**		**0.00**		

Shaft Section Properties

Structure: CT11561-A-SBA
Site Name: Groton 2, CT
Height: 130.00 (ft)
Base Elev: 0.000 (ft)

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

9/29/2015

Tower Engineering Solutions

Increment Length: **5 (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	48.000	56.684	16243.5	21.16	128.00	65	52	0.0
5.00		0.3750	47.053	55.556	15293.6	20.71	125.47	65	52	954.8
10.00		0.3750	46.106	54.429	14381.4	20.27	122.95	65	52	935.6
15.00		0.3750	45.159	53.302	13506.2	19.82	120.42	65	52	916.5
20.00		0.3750	44.212	52.175	12667.3	19.38	117.90	65	52	897.3
25.00		0.3750	43.264	51.047	11863.9	18.93	115.37	65	52	878.1
30.00		0.3750	42.317	49.920	11095.1	18.49	112.85	65	52	858.9
35.00		0.3750	41.370	48.793	10360.3	18.04	110.32	65	52	839.7
40.00		0.3750	40.423	47.666	9658.7	17.60	107.79	65	52	820.6
45.00	Bot - Section 2	0.3750	39.476	46.538	8989.5	17.15	105.27	65	52	801.4
50.00	Top - Section 1	0.3125	39.154	38.524	7343.1	20.68	125.29	65	52	1445.6
55.00		0.3125	38.207	37.585	6818.9	20.15	122.26	65	52	647.5
60.00		0.3125	37.260	36.646	6320.3	19.61	119.23	65	52	631.5
65.00		0.3125	36.312	35.706	5846.6	19.08	116.20	65	52	615.5
70.00		0.3125	35.365	34.767	5397.2	18.54	113.17	65	52	599.5
75.00		0.3125	34.418	33.827	4971.4	18.01	110.14	65	52	583.5
80.00		0.3125	33.471	32.888	4568.6	17.48	107.11	65	52	567.5
85.00		0.3125	32.524	31.949	4188.2	16.94	104.08	65	52	551.6
90.00	Top - Section 2	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	535.6
90.00	Bot - Section 3	0.3125	31.577	31.009	3829.5	16.41	101.05	65	52	
95.00		0.1875	30.630	18.116	2121.2	27.39	163.36	65	50	313.0
100.00		0.1875	29.683	17.553	1929.3	26.50	158.31	65	51	303.4
105.00		0.1875	28.736	16.989	1749.3	25.61	153.26	65	51	293.8
110.00		0.1875	27.788	16.425	1581.0	24.72	148.21	65	52	284.3
115.00		0.1875	26.841	15.862	1423.7	23.83	143.15	65	52	274.7
117.00		0.1875	26.462	15.636	1363.9	23.47	141.13	65	52	107.2
120.00		0.1875	25.894	15.298	1277.3	22.94	138.10	65	52	157.9
125.00		0.1875	24.947	14.735	1141.2	22.05	133.05	65	52	255.5
128.00		0.1875	24.379	14.396	1064.5	21.52	130.02	65	52	148.7
130.00		0.1875	24.000	14.171	1015.2	21.16	128.00	65	52	97.2
										16316.4

Wind Loading - Shaft

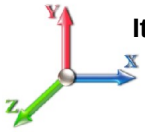
Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 22

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	18.496	31.26	340.00	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	18.496	31.26	333.29	0.650	0.000	5.00	19.803	12.87	402.3	0.0	954.8
10.00		0.00	1.00	18.496	31.26	326.58	0.650	0.000	5.00	19.408	12.62	394.3	0.0	935.6
15.00		0.00	1.00	18.496	31.26	319.87	0.650	0.000	5.00	19.013	12.36	386.3	0.0	916.5
20.00		0.00	1.00	18.496	31.26	313.17	0.650	0.000	5.00	18.619	12.10	378.3	0.0	897.3
25.00		0.00	1.00	18.496	31.26	306.46	0.650	0.000	5.00	18.224	11.85	370.3	0.0	878.1
30.00		0.00	1.00	18.496	31.26	299.75	0.650	0.000	5.00	17.830	11.59	362.3	0.0	858.9
35.00		0.00	1.02	18.810	31.79	295.51	0.650	0.000	5.00	17.435	11.33	360.2	0.0	839.7
40.00		0.00	1.06	19.541	33.02	294.31	0.650	0.000	5.00	17.040	11.08	365.8	0.0	820.6
45.00	Bot - Section 2	0.00	1.09	20.210	34.15	292.29	0.650	0.000	5.00	16.646	10.82	369.5	0.0	801.4
50.00	Top - Section 1	0.00	1.13	20.827	35.20	289.60	0.650	0.000	5.00	16.511	10.73	377.8	0.0	1445.6
55.00		0.00	1.16	21.402	36.17	291.12	0.650	0.000	5.00	16.117	10.48	378.9	0.0	647.5
60.00		0.00	1.19	21.941	37.08	287.45	0.650	0.000	5.00	15.722	10.22	378.9	0.0	631.5
65.00		0.00	1.21	22.449	37.94	283.37	0.650	0.000	5.00	15.328	9.96	378.0	0.0	615.5
70.00		0.00	1.24	22.929	38.75	278.91	0.650	0.000	5.00	14.933	9.71	376.1	0.0	599.5
75.00		0.00	1.26	23.386	39.52	274.13	0.650	0.000	5.00	14.538	9.45	373.5	0.0	583.5
80.00		0.00	1.29	23.821	40.26	269.06	0.650	0.000	5.00	14.144	9.19	370.1	0.0	567.5
85.00		0.00	1.31	24.237	40.96	263.72	0.650	0.000	5.00	13.749	8.94	366.1	0.0	551.6
90.00	Top - Section 2	0.00	1.33	24.636	41.63	258.14	0.650	0.000	5.00	13.354	8.68	361.4	0.0	535.6
95.00		0.00	1.35	25.020	42.28	252.34	0.650	0.000	5.00	12.960	8.42	356.2	0.0	313.0
100.00		0.00	1.37	25.389	42.91	246.33	0.650	0.000	5.00	12.565	8.17	350.4	0.0	303.4
105.00		0.00	1.39	25.745	43.51	240.14	0.650	0.000	5.00	12.170	7.91	344.2	0.0	293.8
110.00		0.00	1.41	26.090	44.09	233.78	0.650	0.000	5.00	11.776	7.65	337.5	0.0	284.3
115.00		0.00	1.43	26.423	44.66	227.25	0.650	0.000	5.00	11.381	7.40	330.4	0.0	274.7
117.00	Appurtenance(s)	0.00	1.44	26.554	44.88	224.59	0.650	0.000	2.00	4.442	2.89	129.6	0.0	107.2
120.00		0.00	1.45	26.747	45.20	220.56	0.650	0.000	3.00	6.545	4.25	192.3	0.0	157.9
125.00		0.00	1.46	27.060	45.73	213.74	0.650	0.000	5.00	10.592	6.88	314.9	0.0	255.5
128.00	Appurtenance(s)	0.00	1.47	27.244	46.04	209.58	0.650	0.000	3.00	6.166	4.01	184.5	0.0	148.7
130.00		0.00	1.48	27.365	46.25	206.78	0.650	0.000	2.00	4.032	2.62	121.2	0.0	97.2
								Totals:	**130.00**			**9,411.2**		**16,316.4**

Discrete Appurtenance Forces

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

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	128.00	Commscope	3	27.183	45.940	0.80	27.38	149.40	0.000	-1.000	1258.02	0.00	-1258.02
2	128.00	Ericsson Air21 B2A/B4P	3	27.305	46.145	0.86	16.98	274.50	0.000	1.000	783.38	0.00	783.38
3	128.00	Ericsson Air21 B4A/B2P	3	27.305	46.145	0.86	16.98	270.90	0.000	1.000	783.38	0.00	783.38
4	128.00	Ericsson KRY 112 144/1	6	27.305	46.145	0.67	1.65	66.00	0.000	1.000	76.06	0.00	76.06
5	128.00	Ericsson S11B12 RRUs	3	27.305	46.145	0.67	6.65	153.00	0.000	1.000	307.01	0.00	307.01
6	128.00	Low Profile Platform	1	27.244	46.043	1.00	22.00	1500.00	0.000	0.000	1012.95	0.00	0.00
7	117.00	ALU RRH 2x60 AWS	2	26.554	44.876	0.67	5.31	120.00	0.000	0.000	238.13	0.00	0.00
8	117.00	ALU RRH 2x60 PCS	2	26.554	44.876	0.67	3.44	110.00	0.000	0.000	154.54	0.00	0.00
9	117.00	Commscope	4	26.554	44.876	0.75	5.19	22.80	0.000	0.000	232.91	0.00	0.00
10	117.00	Low Profile Platform (Valmont	1	26.554	44.876	1.00	22.00	1500.00	0.000	0.000	987.27	0.00	0.00
						Totals:		**4,166.60**			**5,833.65**		

Total Applied Force Summary

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		402.35	970.42	0.00	0.00
10.00		394.33	966.84	0.00	0.00
15.00		386.31	947.66	0.00	0.00
20.00		378.29	928.48	0.00	0.00
25.00		370.28	909.30	0.00	0.00
30.00		362.26	890.12	0.00	0.00
35.00		360.25	870.94	0.00	0.00
40.00		365.78	851.77	0.00	0.00
45.00		369.54	832.59	0.00	0.00
50.00		377.76	1476.85	0.00	0.00
55.00		378.91	678.66	0.00	0.00
60.00		378.94	662.68	0.00	0.00
65.00		377.98	646.69	0.00	0.00
70.00		376.12	630.71	0.00	0.00
75.00		373.47	614.73	0.00	0.00
80.00		370.10	598.75	0.00	0.00
85.00		366.06	582.76	0.00	0.00
90.00		361.41	566.78	0.00	0.00
95.00		356.19	344.22	0.00	0.00
100.00		350.44	334.63	0.00	0.00
105.00		344.20	325.04	0.00	0.00
110.00		337.49	315.46	0.00	0.00
115.00		330.35	305.87	0.00	0.00
117.00	(9) appurtenances	1742.42	1872.46	0.00	0.00
120.00		192.29	164.13	0.00	0.00
125.00		314.85	265.89	0.00	0.00
128.00	(19) appurtenances	4405.33	2568.73	0.00	691.82
130.00		121.19	97.21	0.00	0.00
	Totals:	**15,244.89**	**21,220.37**	**0.00**	**691.82**

Resulting Forces and Deflections

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

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	-15.267	-21.204	0.000	0.000	0.000	-1370.4	0.000	0.000	0.000	0.000	0.000
5.00	-14.905	-20.204	0.000	0.000	0.000	-1294.1	-0.063	0.000	0.063	-0.117	0.000
10.00	-14.547	-19.209	0.000	0.000	0.000	-1219.6	-0.248	0.000	0.248	-0.234	0.000
15.00	-14.193	-18.234	0.000	0.000	0.000	-1146.8	-0.556	0.000	0.556	-0.351	0.000
20.00	-13.843	-17.280	0.000	0.000	0.000	-1075.9	-0.986	0.000	0.986	-0.468	0.000
25.00	-13.498	-16.347	0.000	0.000	0.000	-1006.7	-1.538	0.000	1.538	-0.585	0.000
30.00	-13.157	-15.434	0.000	0.000	0.000	-939.22	-2.214	0.000	2.214	-0.701	0.000
35.00	-12.815	-14.542	0.000	0.000	0.000	-873.43	-3.011	0.000	3.011	-0.817	0.000
40.00	-12.463	-13.671	0.000	0.000	0.000	-809.36	-3.929	0.000	3.929	-0.933	0.000
45.00	-12.105	-12.821	0.000	0.000	0.000	-747.04	-4.968	0.000	4.968	-1.048	0.000
50.00	-11.721	-11.329	0.000	0.000	0.000	-686.52	-6.126	0.000	6.126	-1.161	0.000
55.00	-11.350	-10.635	0.000	0.000	0.000	-627.92	-7.402	0.000	7.402	-1.273	0.000
60.00	-10.977	-9.957	0.000	0.000	0.000	-571.17	-8.803	0.000	8.803	-1.398	0.000
65.00	-10.602	-9.298	0.000	0.000	0.000	-516.28	-10.333	0.000	10.333	-1.520	0.000
70.00	-10.227	-8.657	0.000	0.000	0.000	-463.27	-11.990	0.000	11.990	-1.640	0.000
75.00	-9.851	-8.034	0.000	0.000	0.000	-412.14	-13.770	0.000	13.770	-1.755	0.000
80.00	-9.476	-7.430	0.000	0.000	0.000	-362.88	-15.668	0.000	15.668	-1.866	0.000
85.00	-9.103	-6.843	0.000	0.000	0.000	-315.50	-17.679	0.000	17.679	-1.971	0.000
90.00	-8.733	-6.275	0.000	0.000	0.000	-269.98	-19.797	0.000	19.797	-2.071	0.000
95.00	-8.376	-5.927	0.000	0.000	0.000	-226.32	-22.016	0.000	22.016	-2.163	0.000
100.00	-8.025	-5.588	0.000	0.000	0.000	-184.44	-24.357	0.000	24.357	-2.301	0.000
105.00	-7.678	-5.263	0.000	0.000	0.000	-144.32	-26.834	0.000	26.834	-2.422	0.000
110.00	-7.335	-4.951	0.000	0.000	0.000	-105.92	-29.427	0.000	29.427	-2.524	0.000
115.00	-6.996	-4.654	0.000	0.000	0.000	-69.252	-32.115	0.000	32.115	-2.603	0.000
117.00	-5.171	-2.860	0.000	0.000	0.000	-55.260	-33.211	0.000	33.211	-2.627	0.000
120.00	-4.973	-2.703	0.000	0.000	0.000	-39.747	-34.872	0.000	34.872	-2.657	0.000
125.00	-4.647	-2.450	0.000	0.000	0.000	-14.883	-37.673	0.000	37.673	-2.688	0.000
128.00	-0.126	-0.091	0.000	0.000	0.000	-0.251	-39.365	0.000	39.365	-2.694	0.000
130.00	-0.121	0.000	0.000	0.000	0.000	0.000	0.000	0.000	40.493	-2.694	0.000

Resulting Stresses

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 22

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	0.37	0.54	0.00	0.00	0.00	24.67	25.07	52.0	0.482
5.00	0.36	0.54	0.00	0.00	0.00	24.26	24.64	52.0	0.474
10.00	0.35	0.54	0.00	0.00	0.00	23.82	24.19	52.0	0.465
15.00	0.34	0.54	0.00	0.00	0.00	23.36	23.72	52.0	0.456
20.00	0.33	0.53	0.00	0.00	0.00	22.88	23.23	52.0	0.447
25.00	0.32	0.53	0.00	0.00	0.00	22.37	22.71	52.0	0.437
30.00	0.31	0.53	0.00	0.00	0.00	21.82	22.15	52.0	0.426
35.00	0.30	0.53	0.00	0.00	0.00	21.25	21.57	52.0	0.415
40.00	0.29	0.53	0.00	0.00	0.00	20.64	20.94	52.0	0.403
45.00	0.28	0.52	0.00	0.00	0.00	19.99	20.28	52.0	0.390
50.00	0.29	0.61	0.00	0.00	0.00	22.30	22.62	52.0	0.435
55.00	0.28	0.61	0.00	0.00	0.00	21.44	21.74	52.0	0.418
60.00	0.27	0.60	0.00	0.00	0.00	20.51	20.81	52.0	0.400
65.00	0.26	0.60	0.00	0.00	0.00	19.54	19.82	52.0	0.381
70.00	0.25	0.59	0.00	0.00	0.00	18.49	18.77	52.0	0.361
75.00	0.24	0.59	0.00	0.00	0.00	17.38	17.65	52.0	0.340
80.00	0.23	0.58	0.00	0.00	0.00	16.20	16.45	52.0	0.317
85.00	0.21	0.57	0.00	0.00	0.00	14.93	15.17	52.0	0.292
90.00	0.20	0.57	0.00	0.00	0.00	13.56	13.80	52.0	0.266
90.00	0.20	0.57	0.00	0.00	0.00	13.56	13.80	52.0	0.437
95.00	0.33	0.93	0.00	0.00	0.00	19.91	20.30	49.8	0.408
100.00	0.32	0.92	0.00	0.00	0.00	17.29	17.68	50.5	0.350
105.00	0.31	0.91	0.00	0.00	0.00	14.44	14.84	51.3	0.289
110.00	0.30	0.90	0.00	0.00	0.00	11.34	11.75	52.0	0.226
115.00	0.29	0.89	0.00	0.00	0.00	7.95	8.39	52.0	0.161
117.00	0.18	0.67	0.00	0.00	0.00	6.53	6.81	52.0	0.131
120.00	0.18	0.66	0.00	0.00	0.00	4.91	5.21	52.0	0.100
125.00	0.17	0.64	0.00	0.00	0.00	1.98	2.41	52.0	0.046
128.00	0.01	0.02	0.00	0.00	0.00	0.04	0.05	52.0	0.001
130.00	0.00	0.02	0.00	0.00	0.00	0.00	0.03	52.0	0.001

Wind Loading - Shaft

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 12	

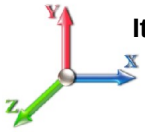
Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 21

Dead Load Factor 1.00

Wind Load Factor 1.00



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	13.871	23.44	294.44	0.650	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	13.871	23.44	288.63	0.650	0.500	5.00	20.219	13.14	308.1	146.7	1101.6
10.00		0.00	1.00	13.871	23.44	282.82	0.650	0.500	5.00	19.825	12.89	302.1	143.8	1079.5
15.00		0.00	1.00	13.871	23.44	277.01	0.650	0.500	5.00	19.430	12.63	296.1	140.9	1057.4
20.00		0.00	1.00	13.871	23.44	271.20	0.650	0.500	5.00	19.035	12.37	290.1	138.0	1035.2
25.00		0.00	1.00	13.871	23.44	265.39	0.650	0.500	5.00	18.641	12.12	284.0	135.0	1013.1
30.00		0.00	1.00	13.871	23.44	259.58	0.650	0.500	5.00	18.246	11.86	278.0	132.1	991.0
35.00		0.00	1.02	14.106	23.84	255.91	0.650	0.500	5.00	17.852	11.60	276.6	129.2	968.9
40.00		0.00	1.06	14.655	24.77	254.87	0.650	0.500	5.00	17.457	11.35	281.0	126.3	946.8
45.00	Bot - Section 2	0.00	1.09	15.156	25.61	253.12	0.650	0.500	5.00	17.062	11.09	284.1	123.4	924.7
50.00	Top - Section 1	0.00	1.13	15.620	26.40	250.80	0.650	0.500	5.00	16.928	11.00	290.5	122.4	1568.0
55.00		0.00	1.16	16.051	27.13	252.11	0.650	0.500	5.00	16.533	10.75	291.5	119.4	766.9
60.00		0.00	1.19	16.455	27.81	248.93	0.650	0.500	5.00	16.139	10.49	291.7	116.5	748.0
65.00		0.00	1.21	16.836	28.45	245.40	0.650	0.500	5.00	15.744	10.23	291.2	113.6	729.1
70.00		0.00	1.24	17.196	29.06	241.54	0.650	0.500	5.00	15.350	9.98	289.9	110.7	710.2
75.00		0.00	1.26	17.538	29.64	237.40	0.650	0.500	5.00	14.955	9.72	288.1	107.7	691.3
80.00		0.00	1.29	17.865	30.19	233.01	0.650	0.500	5.00	14.560	9.46	285.7	104.8	672.4
85.00		0.00	1.31	18.177	30.72	228.38	0.650	0.500	5.00	14.166	9.21	282.8	101.9	653.5
90.00	Top - Section 2	0.00	1.33	18.476	31.22	223.55	0.650	0.500	5.00	13.771	8.95	279.5	99.0	634.6
95.00		0.00	1.35	18.764	31.71	218.53	0.650	0.500	5.00	13.376	8.69	275.7	96.1	409.1
100.00		0.00	1.37	19.041	32.18	213.33	0.650	0.500	5.00	12.982	8.44	271.5	93.1	396.6
105.00		0.00	1.39	19.308	32.63	207.96	0.650	0.500	5.00	12.587	8.18	267.0	90.2	384.1
110.00		0.00	1.41	19.566	33.07	202.45	0.650	0.500	5.00	12.193	7.93	262.1	87.3	371.5
115.00		0.00	1.43	19.816	33.49	196.80	0.650	0.500	5.00	11.798	7.67	256.8	84.4	359.0
117.00	Appurtenance(s)	0.00	1.44	19.914	33.65	194.50	0.650	0.500	2.00	4.609	3.00	100.8	33.3	140.5
120.00		0.00	1.45	20.059	33.90	191.01	0.650	0.500	3.00	6.795	4.42	149.7	48.9	206.8
125.00		0.00	1.46	20.294	34.30	185.10	0.650	0.500	5.00	11.009	7.16	245.4	78.5	334.0
128.00	Appurtenance(s)	0.00	1.47	20.432	34.53	181.50	0.650	0.500	3.00	6.416	4.17	144.0	46.1	194.8
130.00		0.00	1.48	20.523	34.68	179.07	0.650	0.500	2.00	4.198	2.73	94.6	30.2	127.4
								Totals:	**130.00**			**7,258.8**		**19,215.9**

Discrete Appurtenance Forces

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

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	128.00	Commscope	3	20.386	34.453	0.80	29.62	346.80	0.000	-1.000	1020.36	0.00	-1020.36
2	128.00	Ericsson Air21 B2A/B4P	3	20.478	34.607	0.86	17.98	387.60	0.000	1.000	622.33	0.00	622.33
3	128.00	Ericsson Air21 B4A/B2P	3	20.478	34.607	0.86	17.98	384.30	0.000	1.000	622.33	0.00	622.33
4	128.00	Ericsson KRY 112 144/1	6	20.478	34.607	0.67	2.21	84.60	0.000	1.000	76.52	0.00	76.52
5	128.00	Ericsson S11B12 RRUs	3	20.478	34.607	0.67	7.08	201.30	0.000	1.000	244.85	0.00	244.85
6	128.00	Low Profile Platform	1	20.432	34.530	1.00	27.00	1800.00	0.000	0.000	932.32	0.00	0.00
7	117.00	ALU RRH 2x60 AWS	2	19.914	33.655	0.67	5.67	160.20	0.000	0.000	190.76	0.00	0.00
8	117.00	ALU RRH 2x60 PCS	2	19.914	33.655	0.67	3.70	141.80	0.000	0.000	124.47	0.00	0.00
9	117.00	Commscope	4	19.914	33.655	0.75	6.21	65.20	0.000	0.000	209.00	0.00	0.00
10	117.00	Low Profile Platform (Valmont	1	19.914	33.655	1.00	27.00	1800.00	0.000	0.000	908.68	0.00	0.00
						Totals:		**5,371.80**			**4,951.61**		

Total Applied Force Summary

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 21

Dead Load Factor 1.00

Wind Load Factor 1.00

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		308.09	1117.15	0.00	0.00
10.00		302.08	1110.65	0.00	0.00
15.00		296.07	1088.55	0.00	0.00
20.00		290.05	1066.45	0.00	0.00
25.00		284.04	1044.35	0.00	0.00
30.00		278.03	1022.25	0.00	0.00
35.00		276.62	1000.14	0.00	0.00
40.00		281.03	978.04	0.00	0.00
45.00		284.08	955.94	0.00	0.00
50.00		290.46	1599.21	0.00	0.00
55.00		291.52	798.10	0.00	0.00
60.00		291.72	779.19	0.00	0.00
65.00		291.17	760.29	0.00	0.00
70.00		289.95	741.38	0.00	0.00
75.00		288.12	722.48	0.00	0.00
80.00		285.73	703.57	0.00	0.00
85.00		282.85	684.67	0.00	0.00
90.00		279.50	665.76	0.00	0.00
95.00		275.71	440.28	0.00	0.00
100.00		271.53	427.77	0.00	0.00
105.00		266.97	415.26	0.00	0.00
110.00		262.06	402.75	0.00	0.00
115.00		256.82	390.23	0.00	0.00
117.00	(9) appurtenances	1533.73	2320.14	0.00	0.00
120.00		149.72	213.00	0.00	0.00
125.00		245.42	344.41	0.00	0.00
128.00	(19) appurtenances	3662.69	3405.59	0.00	545.66
130.00		94.65	127.45	0.00	0.00
	Totals:	**12,210.38**	**25,325.04**	**0.00**	**545.66**

Resulting Forces and Deflections

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 21

Dead Load Factor 1.00

Wind Load Factor 1.00

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	-12.231	-25.315	0.000	0.000	0.000	-1121.2	0.000	0.000	0.000	0.000	0.000
5.00	-11.962	-24.178	0.000	0.000	0.000	-1060.0	-0.051	0.000	0.051	-0.096	0.000
10.00	-11.696	-23.048	0.000	0.000	0.000	-1000.2	-0.203	0.000	0.203	-0.191	0.000
15.00	-11.432	-21.942	0.000	0.000	0.000	-941.77	-0.455	0.000	0.455	-0.287	0.000
20.00	-11.171	-20.858	0.000	0.000	0.000	-884.61	-0.808	0.000	0.808	-0.384	0.000
25.00	-10.912	-19.798	0.000	0.000	0.000	-828.76	-1.261	0.000	1.261	-0.480	0.000
30.00	-10.656	-18.760	0.000	0.000	0.000	-774.20	-1.815	0.000	1.815	-0.576	0.000
35.00	-10.398	-17.746	0.000	0.000	0.000	-720.91	-2.470	0.000	2.470	-0.672	0.000
40.00	-10.133	-16.755	0.000	0.000	0.000	-668.92	-3.225	0.000	3.225	-0.767	0.000
45.00	-9.861	-15.787	0.000	0.000	0.000	-618.26	-4.079	0.000	4.079	-0.862	0.000
50.00	-9.569	-14.177	0.000	0.000	0.000	-568.95	-5.033	0.000	5.033	-0.956	0.000
55.00	-9.286	-13.368	0.000	0.000	0.000	-521.11	-6.084	0.000	6.084	-1.049	0.000
60.00	-9.002	-12.578	0.000	0.000	0.000	-474.68	-7.238	0.000	7.238	-1.153	0.000
65.00	-8.716	-11.809	0.000	0.000	0.000	-429.67	-8.500	0.000	8.500	-1.254	0.000
70.00	-8.428	-11.060	0.000	0.000	0.000	-386.09	-9.867	0.000	9.867	-1.354	0.000
75.00	-8.139	-10.332	0.000	0.000	0.000	-343.95	-11.337	0.000	11.337	-1.450	0.000
80.00	-7.851	-9.623	0.000	0.000	0.000	-303.26	-12.905	0.000	12.905	-1.542	0.000
85.00	-7.562	-8.936	0.000	0.000	0.000	-264.00	-14.569	0.000	14.569	-1.631	0.000
90.00	-7.275	-8.268	0.000	0.000	0.000	-226.19	-16.322	0.000	16.322	-1.714	0.000
95.00	-6.999	-7.824	0.000	0.000	0.000	-189.82	-18.159	0.000	18.159	-1.791	0.000
100.00	-6.728	-7.393	0.000	0.000	0.000	-154.82	-20.098	0.000	20.098	-1.907	0.000
105.00	-6.459	-6.976	0.000	0.000	0.000	-121.18	-22.152	0.000	22.152	-2.009	0.000
110.00	-6.191	-6.575	0.000	0.000	0.000	-88.891	-24.303	0.000	24.303	-2.094	0.000
115.00	-5.925	-6.190	0.000	0.000	0.000	-57.935	-26.534	0.000	26.534	-2.160	0.000
117.00	-4.306	-3.928	0.000	0.000	0.000	-46.086	-27.444	0.000	27.444	-2.181	0.000
120.00	-4.150	-3.719	0.000	0.000	0.000	-33.169	-28.822	0.000	28.822	-2.206	0.000
125.00	-3.892	-3.384	0.000	0.000	0.000	-12.421	-31.148	0.000	31.148	-2.231	0.000
128.00	-0.099	-0.124	0.000	0.000	0.000	-0.199	-32.552	0.000	32.552	-2.236	0.000
130.00	-0.095	0.000	0.000	0.000	0.000	0.000	0.000	0.000	33.488	-2.236	0.000

Resulting Stresses

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

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	0.45	0.43	0.00	0.00	0.00	20.19	20.65	52.0	0.397
5.00	0.44	0.43	0.00	0.00	0.00	19.87	20.32	52.0	0.391
10.00	0.42	0.43	0.00	0.00	0.00	19.54	19.97	52.0	0.384
15.00	0.41	0.43	0.00	0.00	0.00	19.18	19.61	52.0	0.377
20.00	0.40	0.43	0.00	0.00	0.00	18.81	19.23	52.0	0.370
25.00	0.39	0.43	0.00	0.00	0.00	18.41	18.82	52.0	0.362
30.00	0.38	0.43	0.00	0.00	0.00	17.99	18.38	52.0	0.354
35.00	0.36	0.43	0.00	0.00	0.00	17.54	17.92	52.0	0.345
40.00	0.35	0.43	0.00	0.00	0.00	17.06	17.42	52.0	0.335
45.00	0.34	0.43	0.00	0.00	0.00	16.54	16.90	52.0	0.325
50.00	0.37	0.50	0.00	0.00	0.00	18.48	18.87	52.0	0.363
55.00	0.36	0.50	0.00	0.00	0.00	17.79	18.17	52.0	0.349
60.00	0.34	0.50	0.00	0.00	0.00	17.05	17.41	52.0	0.335
65.00	0.33	0.49	0.00	0.00	0.00	16.26	16.61	52.0	0.320
70.00	0.32	0.49	0.00	0.00	0.00	15.41	15.75	52.0	0.303
75.00	0.31	0.48	0.00	0.00	0.00	14.51	14.84	52.0	0.285
80.00	0.29	0.48	0.00	0.00	0.00	13.54	13.85	52.0	0.267
85.00	0.28	0.48	0.00	0.00	0.00	12.49	12.80	52.0	0.246
90.00	0.27	0.47	0.00	0.00	0.00	11.36	11.66	52.0	0.224
90.00	0.27	0.47	0.00	0.00	0.00	11.36	11.66	52.0	0.369
95.00	0.43	0.78	0.00	0.00	0.00	16.70	17.18	49.8	0.345
100.00	0.42	0.77	0.00	0.00	0.00	14.51	14.99	50.5	0.297
105.00	0.41	0.77	0.00	0.00	0.00	12.13	12.61	51.3	0.246
110.00	0.40	0.76	0.00	0.00	0.00	9.52	10.01	52.0	0.193
115.00	0.39	0.75	0.00	0.00	0.00	6.65	7.16	52.0	0.138
117.00	0.25	0.55	0.00	0.00	0.00	5.45	5.78	52.0	0.111
120.00	0.24	0.55	0.00	0.00	0.00	4.10	4.44	52.0	0.085
125.00	0.23	0.53	0.00	0.00	0.00	1.65	2.10	52.0	0.040
128.00	0.01	0.01	0.00	0.00	0.00	0.03	0.04	52.0	0.001
130.00	0.00	0.01	0.00	0.00	0.00	0.00	0.02	52.0	0.000

Wind Loading - Shaft

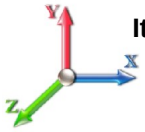
Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 21

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	200.00	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	196.05	0.650	0.000	5.00	19.803	12.87	139.2	0.0	954.8
10.00		0.00	1.00	6.400	10.82	192.11	0.650	0.000	5.00	19.408	12.62	136.4	0.0	935.6
15.00		0.00	1.00	6.400	10.82	188.16	0.650	0.000	5.00	19.013	12.36	133.7	0.0	916.5
20.00		0.00	1.00	6.400	10.82	184.21	0.650	0.000	5.00	18.619	12.10	130.9	0.0	897.3
25.00		0.00	1.00	6.400	10.82	180.27	0.650	0.000	5.00	18.224	11.85	128.1	0.0	878.1
30.00		0.00	1.00	6.400	10.82	176.32	0.650	0.000	5.00	17.830	11.59	125.3	0.0	858.9
35.00		0.00	1.02	6.509	11.00	173.83	0.650	0.000	5.00	17.435	11.33	124.7	0.0	839.7
40.00		0.00	1.06	6.762	11.43	173.12	0.650	0.000	5.00	17.040	11.08	126.6	0.0	820.6
45.00	Bot - Section 2	0.00	1.09	6.993	11.82	171.93	0.650	0.000	5.00	16.646	10.82	127.9	0.0	801.4
50.00	Top - Section 1	0.00	1.13	7.207	12.18	170.35	0.650	0.000	5.00	16.511	10.73	130.7	0.0	1445.6
55.00		0.00	1.16	7.406	12.52	171.25	0.650	0.000	5.00	16.117	10.48	131.1	0.0	647.5
60.00		0.00	1.19	7.592	12.83	169.09	0.650	0.000	5.00	15.722	10.22	131.1	0.0	631.5
65.00		0.00	1.21	7.768	13.13	166.69	0.650	0.000	5.00	15.328	9.96	130.8	0.0	615.5
70.00		0.00	1.24	7.934	13.41	164.07	0.650	0.000	5.00	14.933	9.71	130.1	0.0	599.5
75.00		0.00	1.26	8.092	13.68	161.25	0.650	0.000	5.00	14.538	9.45	129.2	0.0	583.5
80.00		0.00	1.29	8.242	13.93	158.27	0.650	0.000	5.00	14.144	9.19	128.1	0.0	567.5
85.00		0.00	1.31	8.387	14.17	155.13	0.650	0.000	5.00	13.749	8.94	126.7	0.0	551.6
90.00	Top - Section 2	0.00	1.33	8.525	14.41	151.85	0.650	0.000	5.00	13.354	8.68	125.1	0.0	535.6
95.00		0.00	1.35	8.657	14.63	148.43	0.650	0.000	5.00	12.960	8.42	123.2	0.0	313.0
100.00		0.00	1.37	8.785	14.85	144.90	0.650	0.000	5.00	12.565	8.17	121.3	0.0	303.4
105.00		0.00	1.39	8.908	15.06	141.26	0.650	0.000	5.00	12.170	7.91	119.1	0.0	293.8
110.00		0.00	1.41	9.028	15.26	137.52	0.650	0.000	5.00	11.776	7.65	116.8	0.0	284.3
115.00		0.00	1.43	9.143	15.45	133.67	0.650	0.000	5.00	11.381	7.40	114.3	0.0	274.7
117.00	Appurtenance(s)	0.00	1.44	9.188	15.53	132.11	0.650	0.000	2.00	4.442	2.89	44.8	0.0	107.2
120.00		0.00	1.45	9.255	15.64	129.74	0.650	0.000	3.00	6.545	4.25	66.5	0.0	157.9
125.00		0.00	1.46	9.363	15.82	125.73	0.650	0.000	5.00	10.592	6.88	108.9	0.0	255.5
128.00	Appurtenance(s)	0.00	1.47	9.427	15.93	123.28	0.650	0.000	3.00	6.166	4.01	63.9	0.0	148.7
130.00		0.00	1.48	9.469	16.00	121.64	0.650	0.000	2.00	4.032	2.62	41.9	0.0	97.2
								Totals:	**130.00**			**3,256.5**		**16,316.4**

Discrete Appurtenance Forces

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

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	128.00	Commscope	3	9.406	15.896	0.80	27.38	149.40	0.000	-1.000	435.30	0.00	-435.30
2	128.00	Ericsson Air21 B2A/B4P	3	9.448	15.967	0.86	16.98	274.50	0.000	1.000	271.07	0.00	271.07
3	128.00	Ericsson Air21 B4A/B2P	3	9.448	15.967	0.86	16.98	270.90	0.000	1.000	271.07	0.00	271.07
4	128.00	Ericsson KRY 112 144/1	6	9.448	15.967	0.67	1.65	66.00	0.000	1.000	26.32	0.00	26.32
5	128.00	Ericsson S11B12 RRUs	3	9.448	15.967	0.67	6.65	153.00	0.000	1.000	106.23	0.00	106.23
6	128.00	Low Profile Platform	1	9.427	15.932	1.00	22.00	1500.00	0.000	0.000	350.50	0.00	0.00
7	117.00	ALU RRH 2x60 AWS	2	9.188	15.528	0.67	5.31	120.00	0.000	0.000	82.40	0.00	0.00
8	117.00	ALU RRH 2x60 PCS	2	9.188	15.528	0.67	3.44	110.00	0.000	0.000	53.48	0.00	0.00
9	117.00	Commscope	4	9.188	15.528	0.75	5.19	22.80	0.000	0.000	80.59	0.00	0.00
10	117.00	Low Profile Platform (Valmont	1	9.188	15.528	1.00	22.00	1500.00	0.000	0.000	341.62	0.00	0.00
						Totals:		**4,166.60**			**2,018.56**		

Total Applied Force Summary

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		139.22	970.42	0.00	0.00
10.00		136.45	966.84	0.00	0.00
15.00		133.67	947.66	0.00	0.00
20.00		130.90	928.48	0.00	0.00
25.00		128.12	909.30	0.00	0.00
30.00		125.35	890.12	0.00	0.00
35.00		124.65	870.94	0.00	0.00
40.00		126.57	851.77	0.00	0.00
45.00		127.87	832.59	0.00	0.00
50.00		130.71	1476.85	0.00	0.00
55.00		131.11	678.66	0.00	0.00
60.00		131.12	662.68	0.00	0.00
65.00		130.79	646.69	0.00	0.00
70.00		130.15	630.71	0.00	0.00
75.00		129.23	614.73	0.00	0.00
80.00		128.06	598.75	0.00	0.00
85.00		126.66	582.76	0.00	0.00
90.00		125.05	566.78	0.00	0.00
95.00		123.25	344.22	0.00	0.00
100.00		121.26	334.63	0.00	0.00
105.00		119.10	325.04	0.00	0.00
110.00		116.78	315.46	0.00	0.00
115.00		114.31	305.87	0.00	0.00
117.00	(9) appurtenances	602.91	1872.46	0.00	0.00
120.00		66.54	164.13	0.00	0.00
125.00		108.95	265.89	0.00	0.00
128.00	(19) appurtenances	1524.33	2568.73	0.00	239.38
130.00		41.94	97.21	0.00	0.00
	Totals:	**5,275.05**	**21,220.37**	**0.00**	**239.38**

Resulting Forces and Deflections

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 20	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

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	-5.282	-21.218	0.000	0.000	0.000	-474.31	0.000	0.000	0.000	0.000	0.000
5.00	-5.157	-20.244	0.000	0.000	0.000	-447.90	-0.022	0.000	0.022	-0.040	0.000
10.00	-5.033	-19.274	0.000	0.000	0.000	-422.12	-0.086	0.000	0.086	-0.081	0.000
15.00	-4.911	-18.323	0.000	0.000	0.000	-396.95	-0.192	0.000	0.192	-0.121	0.000
20.00	-4.790	-17.392	0.000	0.000	0.000	-372.40	-0.341	0.000	0.341	-0.162	0.000
25.00	-4.670	-16.480	0.000	0.000	0.000	-348.45	-0.532	0.000	0.532	-0.202	0.000
30.00	-4.553	-15.587	0.000	0.000	0.000	-325.10	-0.766	0.000	0.766	-0.243	0.000
35.00	-4.434	-14.713	0.000	0.000	0.000	-302.33	-1.042	0.000	1.042	-0.283	0.000
40.00	-4.313	-13.859	0.000	0.000	0.000	-280.16	-1.360	0.000	1.360	-0.323	0.000
45.00	-4.189	-13.025	0.000	0.000	0.000	-258.60	-1.719	0.000	1.719	-0.363	0.000
50.00	-4.056	-11.546	0.000	0.000	0.000	-237.66	-2.120	0.000	2.120	-0.402	0.000
55.00	-3.928	-10.865	0.000	0.000	0.000	-217.37	-2.562	0.000	2.562	-0.441	0.000
60.00	-3.799	-10.201	0.000	0.000	0.000	-197.73	-3.047	0.000	3.047	-0.484	0.000
65.00	-3.670	-9.553	0.000	0.000	0.000	-178.74	-3.577	0.000	3.577	-0.526	0.000
70.00	-3.540	-8.921	0.000	0.000	0.000	-160.39	-4.150	0.000	4.150	-0.568	0.000
75.00	-3.410	-8.305	0.000	0.000	0.000	-142.69	-4.766	0.000	4.766	-0.607	0.000
80.00	-3.280	-7.706	0.000	0.000	0.000	-125.64	-5.424	0.000	5.424	-0.646	0.000
85.00	-3.151	-7.122	0.000	0.000	0.000	-109.24	-6.120	0.000	6.120	-0.682	0.000
90.00	-3.023	-6.555	0.000	0.000	0.000	-93.489	-6.853	0.000	6.853	-0.717	0.000
95.00	-2.900	-6.211	0.000	0.000	0.000	-78.373	-7.622	0.000	7.622	-0.749	0.000
100.00	-2.779	-5.876	0.000	0.000	0.000	-63.873	-8.432	0.000	8.432	-0.797	0.000
105.00	-2.659	-5.551	0.000	0.000	0.000	-49.979	-9.290	0.000	9.290	-0.838	0.000
110.00	-2.540	-5.236	0.000	0.000	0.000	-36.685	-10.188	0.000	10.188	-0.874	0.000
115.00	-2.423	-4.931	0.000	0.000	0.000	-23.984	-11.119	0.000	11.119	-0.901	0.000
117.00	-1.791	-3.068	0.000	0.000	0.000	-19.138	-11.498	0.000	11.498	-0.910	0.000
120.00	-1.722	-2.904	0.000	0.000	0.000	-13.766	-12.074	0.000	12.074	-0.920	0.000
125.00	-1.609	-2.640	0.000	0.000	0.000	-5.154	-13.044	0.000	13.044	-0.930	0.000
128.00	-0.043	-0.097	0.000	0.000	0.000	-0.087	-13.629	0.000	13.629	-0.933	0.000
130.00	-0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	14.020	-0.933	0.000

Resulting Stresses

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

	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	0.37	0.19	0.00	0.00	0.00	8.54	8.92	52.0	0.172
5.00	0.36	0.19	0.00	0.00	0.00	8.40	8.77	52.0	0.169
10.00	0.35	0.19	0.00	0.00	0.00	8.25	8.61	52.0	0.166
15.00	0.34	0.19	0.00	0.00	0.00	8.09	8.44	52.0	0.162
20.00	0.33	0.19	0.00	0.00	0.00	7.92	8.26	52.0	0.159
25.00	0.32	0.18	0.00	0.00	0.00	7.74	8.07	52.0	0.155
30.00	0.31	0.18	0.00	0.00	0.00	7.55	7.87	52.0	0.151
35.00	0.30	0.18	0.00	0.00	0.00	7.36	7.66	52.0	0.147
40.00	0.29	0.18	0.00	0.00	0.00	7.14	7.44	52.0	0.143
45.00	0.28	0.18	0.00	0.00	0.00	6.92	7.21	52.0	0.139
50.00	0.30	0.21	0.00	0.00	0.00	7.72	8.03	52.0	0.154
55.00	0.29	0.21	0.00	0.00	0.00	7.42	7.72	52.0	0.148
60.00	0.28	0.21	0.00	0.00	0.00	7.10	7.39	52.0	0.142
65.00	0.27	0.21	0.00	0.00	0.00	6.76	7.04	52.0	0.135
70.00	0.26	0.21	0.00	0.00	0.00	6.40	6.67	52.0	0.128
75.00	0.25	0.20	0.00	0.00	0.00	6.02	6.27	52.0	0.121
80.00	0.23	0.20	0.00	0.00	0.00	5.61	5.85	52.0	0.113
85.00	0.22	0.20	0.00	0.00	0.00	5.17	5.40	52.0	0.104
90.00	0.21	0.20	0.00	0.00	0.00	4.70	4.92	52.0	0.095
90.00	0.21	0.20	0.00	0.00	0.00	4.70	4.92	52.0	0.156
95.00	0.34	0.32	0.00	0.00	0.00	6.89	7.26	49.8	0.146
100.00	0.33	0.32	0.00	0.00	0.00	5.99	6.35	50.5	0.126
105.00	0.33	0.32	0.00	0.00	0.00	5.00	5.36	51.3	0.104
110.00	0.32	0.31	0.00	0.00	0.00	3.93	4.28	52.0	0.082
115.00	0.31	0.31	0.00	0.00	0.00	2.75	3.11	52.0	0.060
117.00	0.20	0.23	0.00	0.00	0.00	2.26	2.49	52.0	0.048
120.00	0.19	0.23	0.00	0.00	0.00	1.70	1.93	52.0	0.037
125.00	0.18	0.22	0.00	0.00	0.00	0.69	0.95	52.0	0.018
128.00	0.01	0.01	0.00	0.00	0.00	0.01	0.02	52.0	0.000
130.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	52.0	0.000

Final Analysis Summary

Structure:	CT11561-A-SBA	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
85 mph Wind with 0" Ice	15.3	0.00	21.20	0.00	0.00	1370.47
73.61 mph Wind with 0.5" Ice	12.2	0.00	25.31	0.00	0.00	1121.22
50 mph Wind with 0" Ice	5.3	0.00	21.22	0.00	0.00	474.32

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
85 mph Wind with 0" Ice	0.37	0.54	0.00	0.00	0.00	24.67	25.07	52.0	0.00	0.482
73.61 mph Wind with 0.5" Ice	0.45	0.43	0.00	0.00	0.00	20.19	20.65	52.0	0.00	0.397
50 mph Wind with 0" Ice	0.37	0.19	0.00	0.00	0.00	8.54	8.92	52.0	0.00	0.172

Base Plate Summary

Structure:	CT11561-A-SB	**Code:**	EIA/TIA-222-F	9/29/2015	
Site Name:	Groton 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Reactions

Original Design

Moment (kip-ft):	2188.80
Axial (kip):	27.80
Shear (kip):	22.70

Analysis

Moment (kip-ft):	1370.47
Axial (kip):	25.31
Shear (kip):	15.27
Moment Design %:	62.61

Base Plate

Yield (ksi):	50.00
Width (in):	60.00
Style:	Round
Polygon Sides:	0.00
Clip Length (in):	0.00
Effective Len (in):	22.31
Moment (kip-in):	310.88
Allow Stress (ksi):	50.00
Applied Stress (ksi):	13.38
Stress Ratio:	0.27

Anchor Bolts

Bolt Circle:	54.00
Number Bolts:	12.00
Bolt Type:	2.25" A193 B7
Bolt Diameter (in):	2.25
Yield (ksi):	105.00
Ultimate (ksi):	125.00
Arrangement:	Radial
Cluster Dist (in):	0.00
Start Angle (deg):	30.00

Compression

Force (kip):	103.63
Allowable (kip):	272.99
Ratio:	0.38

Tension

Force (kip):	99.41
Allowable (kip):	218.68
Ratio:	0.45

Monopole Mat Foundation Design

			Date: 9/29/2015
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-F
Site Name:	Groton 2, CT	**Structure Height (Ft.):**	130
Site Number:	CT11561-A-SBA	**Engineer Name:**	W. Velez
Engr. Number:	17801	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

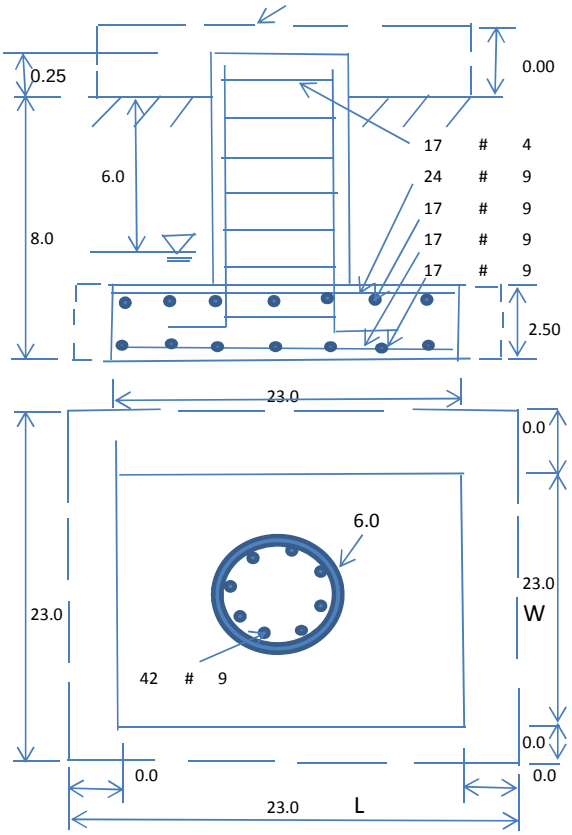
Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	21.2	Shear Force (Kips):	15.3
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1370.5
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	6.0	Depth of Base BG (ft.):	8.0
Pier Height A. G. (ft.):	0.25	Thickness of Pad (ft):	2.50
Length of Pad (ft.):	23	Width of Pad (ft.):	23
Final Length of pad (ft)	23.0	Final width of pad (ft):	23.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	9	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	42	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	9	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	24	Qty. of Rebar in Pad (W):	24	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	17	Qty. of Rebar in Pad (W):	17	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	58.6	Pcf		
Water Table B.G.S. (ft):	6.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Allowable Net Soil Bearing (psf):	15000	Allowable Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hori. force for O.T.M.:	Yes	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design:

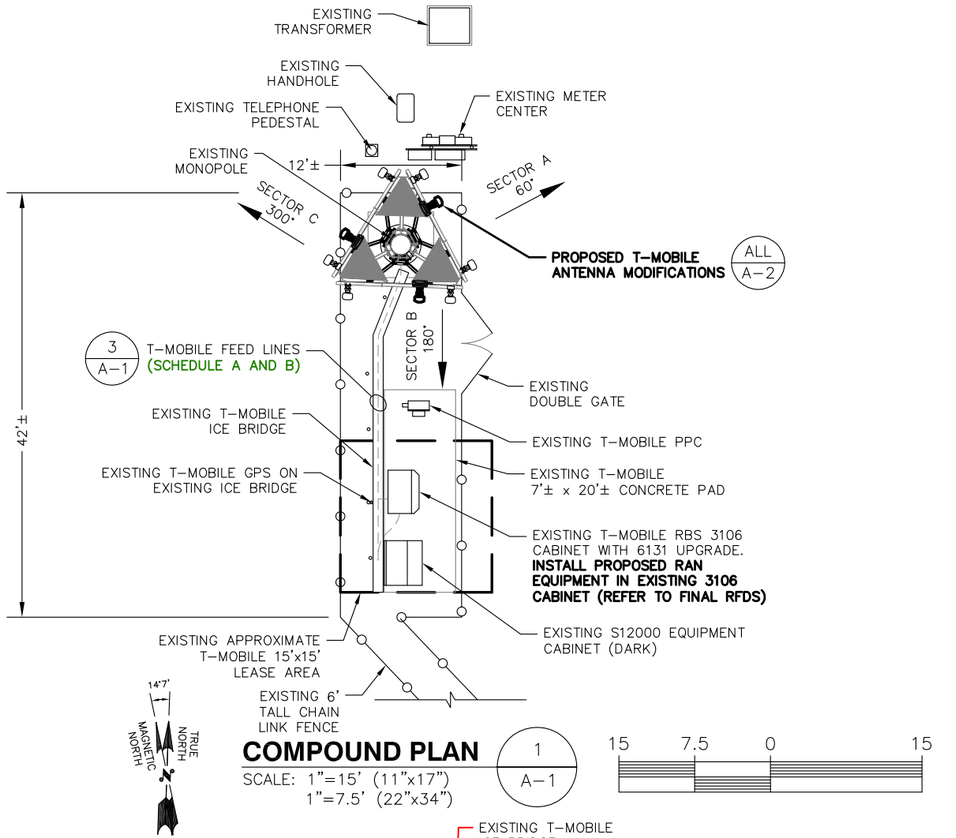
Total Dry Soil Volume (cu. Ft.):	2753.99	Total Dry Soil Weight (Kips):	302.94
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	302.94	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	427.08	Total Dry Concrete Weight (Kips):	64.06
Total Buoyant Concrete Volume (cu. Ft.):	1058.00	Total Buoyant Concrete Weight (Kips):	92.68
Total Effective Concrete Weight (Kips):	156.74	Total Vertical Load on Base (Kips):	480.88

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1325	<	Allowable Soil Bearing (psf):	15000	0.09	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	3686.8	>	Applied Momont (kips-ft):	1437	0.39	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.85	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		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	1.00		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	5713.0	>	Design Factored Moment (Mu, Kips-Ft	1458.4	0.26	OK!
Calculated Shear Capacity (Kips):	616.7	>	Design Factored Shear (Kips):	19.9	0.03	OK!
Calculated Tension Capacity (Tn, Kips):	2268.0	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7124.2	>	Design Factored Axial Load (Pu Kips):	27.6	0.00	OK!
Moment & Axial Strength Combination:	0.26	OK!	Check Tie Spacing (Design/Required):		0.5	OK!
Pier Reinforcement Ratio:	0.010	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	692.2	>	One-Way Factored Shear (L-D. Kips):	150.9	0.22	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	692.2	>	One-Way Factored Shear (W-D., Kips)	150.9	0.22	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	798.4	>	One-Way Factored Shear (C-C, Kips):	221.0	0.28	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0033	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0033		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2772.4	>	Moment at Bottom (L-Direct. K-Ft):	365.4	0.13	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2772.4	>	Moment at Bottom (W-Direct. K-Ft):	365.4	0.13	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3894.2	>	Moment at Bottom (C-C Dir. K-Ft):	516.8	0.13	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0023	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0023		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	1980.9	>	Moment at the top (L-Dir Kips-Ft):	60.6	0.03	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	1980.9	>	Moment at the top (W-Dir Kips-Ft):	60.6	0.03	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	2788.1	>	Moment at the top (C-C Direc. K-Ft):	250.2	0.09	OK!



COMPOUND PLAN

SCALE: 1"=15' (11"x17")
1"=7.5' (22"x34")

1 / A-1

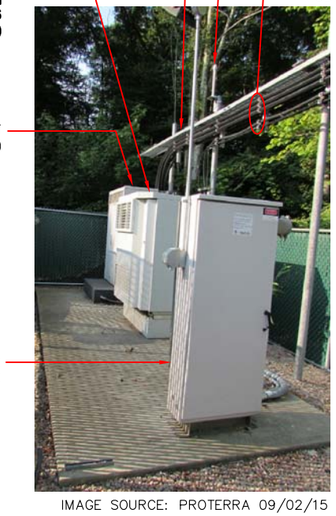


IMAGE SOURCE: PROTERRA 09/02/15

EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

2 / A-1

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

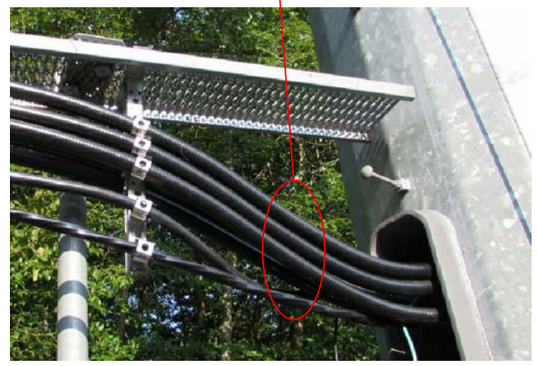
ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO ACCOMMODATE ANY ADDITIONAL EQUIPMENT LOADS. STRUCTURAL DESIGNS AND DETAILS AS SHOWN HEREIN FOR STRUCTURAL MODIFICATIONS OF THE EXISTING ANTENNA MOUNT ARE PRELIMINARY ONLY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

STRUCTURAL NOTES:

PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS PROVIDED BY SBA TO DETERMINE IF THERE ARE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS FOR TOWER TOP EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING: TO REMAIN (6) 1-5/8" COAX; TO REMAIN (1) LMU; TO REMAIN (1) HYBRID TO 129' RAD	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: USE EXISTING	UP INSIDE MONOPOLE TO RAD

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



EXISTING (6) 1-5/8" COAX, (1) LMU, & (1) HYBRID FIBER CABLE ACROSS EXISTING ICE BRIDGE & UP INSIDE MONOPOLE, **ALL TO REMAIN (REFER TO SBA-PROVIDED STRUCTURAL ANALYSIS FOR SPECIAL FEEDLINE INSTALLATION REQUIREMENTS, STACKING, BUNDLING, SHIELDING, MOUNTING AND RELOCATION OF EXISTING OR PROPOSED FEEDLINES)**

IMAGE SOURCE: PROTERRA 09/02/15

FEEDLINE PHOTO DETAIL AT TOWER BASE

SCALE: N.T.S.

3 / A-1

℄ OF EXISTING T-MOBILE ANTENNAS
ELEV.= 129'± AGL (SBA DATABASE)
ALL A-2 ALL A-3

EXISTING 130'± MONOPOLE
3 A-1 T-MOBILE FEED LINES

FEEDLINE SCHEDULE A
FEEDLINE SCHEDULE B

IMAGE SOURCE: PROTERRA 09/02/15

PARTIAL ELEVATION PHOTO DETAIL

SCALE: N.T.S.

4 / A-1

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
TEL: (860) 648-1116

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752 TEL: (508) 251-0720

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

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
9-28-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

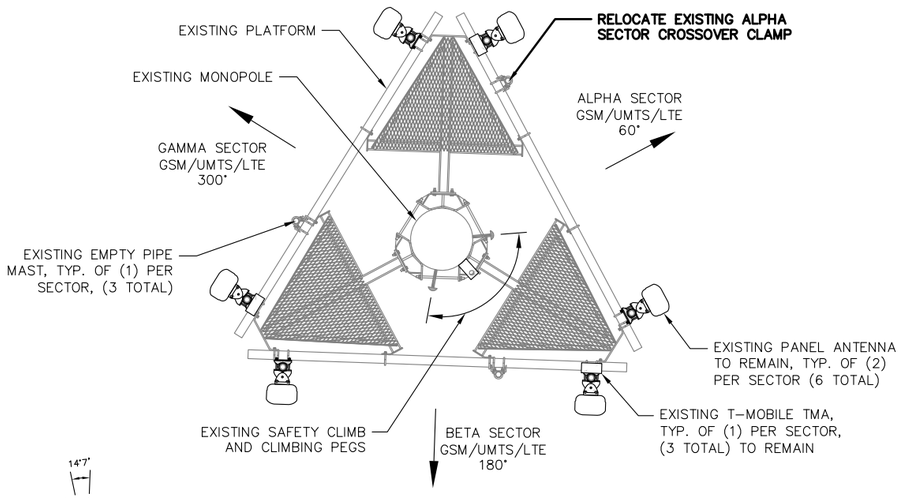
REV.	DATE	DESCRIPTION	BY
0	09/28/15	ISSUED FOR CONSTRUCTION	BLM

SITE NUMBER:
CTNL053A
SITE NAME:
NL053 / MCF_AMBULANCE

SITE ADDRESS:
237 SANDY HOLLOW ROAD
GROTON, CT 06355
NEW LONDON COUNTY

SHEET TITLE
COMPOUND & ELEVATION PLAN

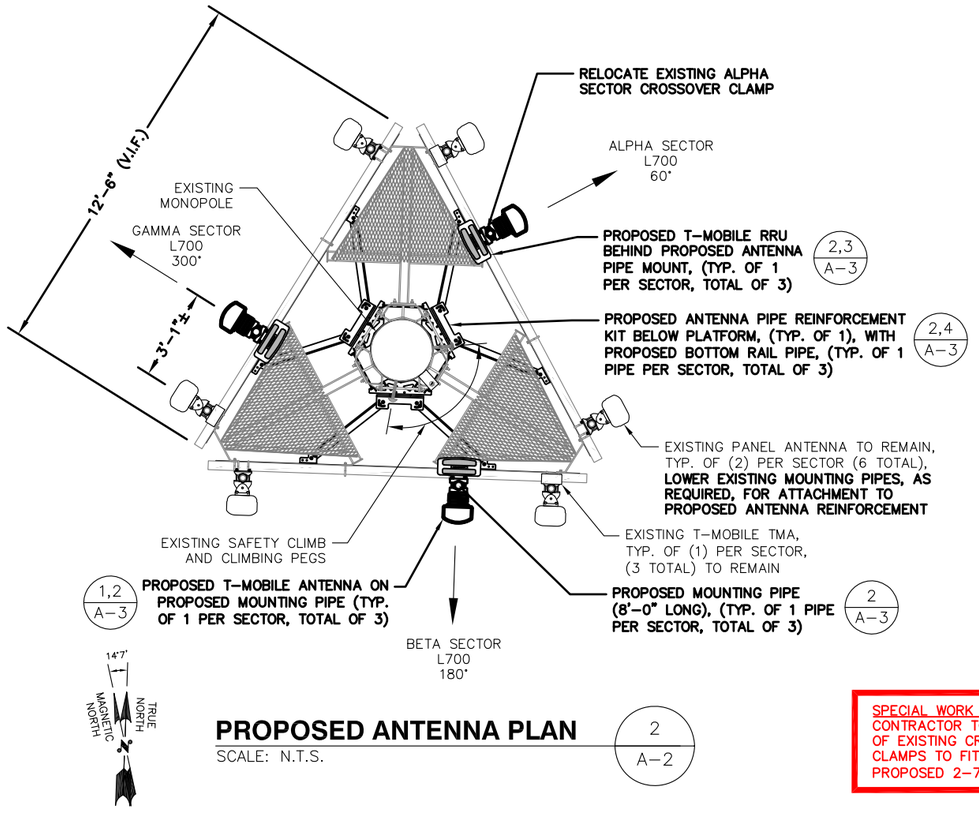
SHEET NUMBER
A-1



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-2

SPECIAL WORK NOTE:
CONTRACTOR TO V.I.F. SIZE OF EXISTING CROSSOVER CLAMPS TO FIT THE PROPOSED 2-7/8" O.D. PIPE.

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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

STRUCTURAL NOTES:

PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS PROVIDED BY SBA TO DETERMINE IF THERE ARE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS FOR TOWER TOP EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING, OR RELOCATION ARRANGEMENTS

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

SPECIAL WORK NOTE:
MATCH ANTENNA TIP HEIGHTS (PER TMO REQUIREMENT)

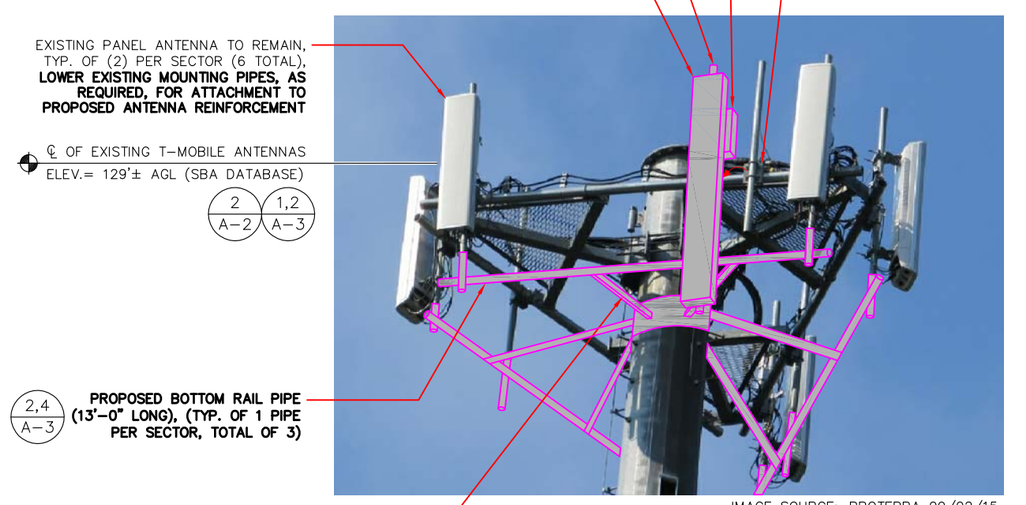


IMAGE SOURCE: PROTERRA 09/02/15
NOTE: ONE SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 / A-2

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
TEL: (860) 648-1116

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752 TEL: (508) 251-0720

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

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED
PROFESSIONAL ENGINEER
9-28-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

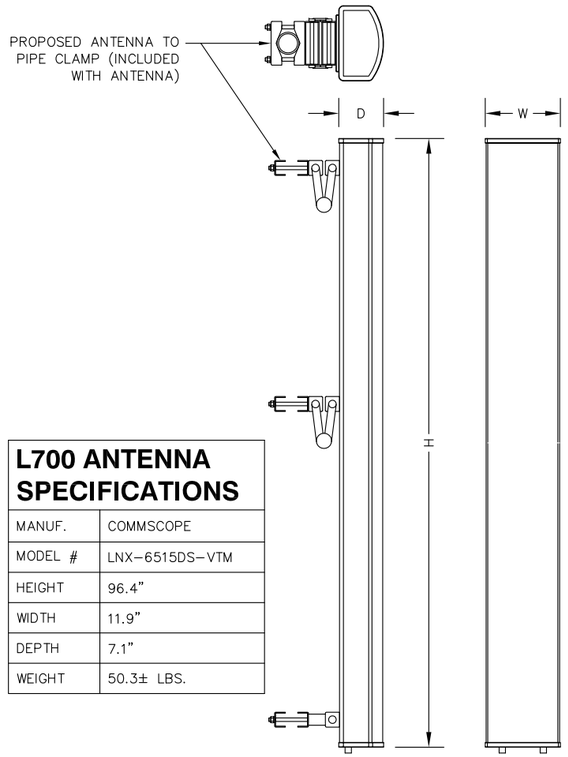
REV.	DATE	DESCRIPTION	BY
0	09/28/15	ISSUED FOR CONSTRUCTION	BLM

SITE NUMBER:
CTNL053A
SITE NAME:
NL053 / MCF_AMBULANCE

SITE ADDRESS:
237 SANDY HOLLOW ROAD
GROTON, CT 06355
NEW LONDON COUNTY

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

SHEET NUMBER
A-2



L700 ANTENNA SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	LNX-6515DS-VTM
HEIGHT	96.4"
WIDTH	11.9"
DEPTH	7.1"
WEIGHT	50.3± LBS.

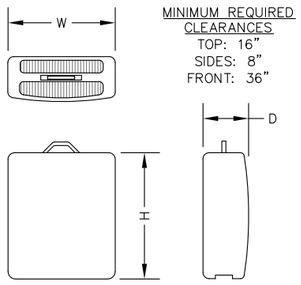
L700 ANTENNA DETAIL

1 / A-3

SCALE: N.T.S.

RRU SPECIFICATIONS

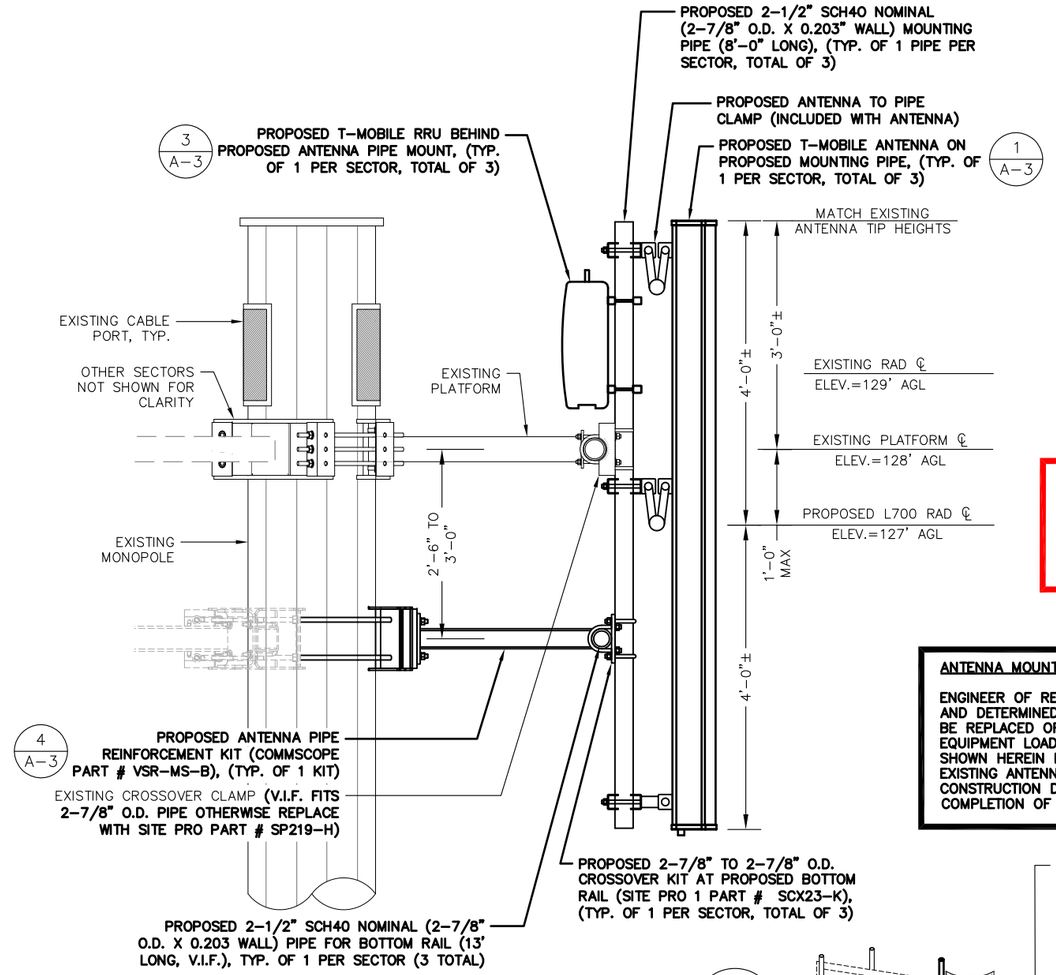
MANUF.	ERICSSON
MODEL #	RRUS11 B12
HEIGHT	20"
WIDTH	17"
DEPTH	7"
WEIGHT	50.7 LBS.



REMOTE RADIO UNIT (RRU)

3 / A-3

SCALE: N.T.S.



SPECIAL WORK NOTE:
1. MATCH ANTENNA TIP HEIGHTS (PER TMO REQUIREMENT)
2. CONTRACTOR TO V.I.F. SIZE OF EXISTING CROSSOVER CLAMPS TO FIT THE PROPOSED 2-7/8" O.D. PIPE.

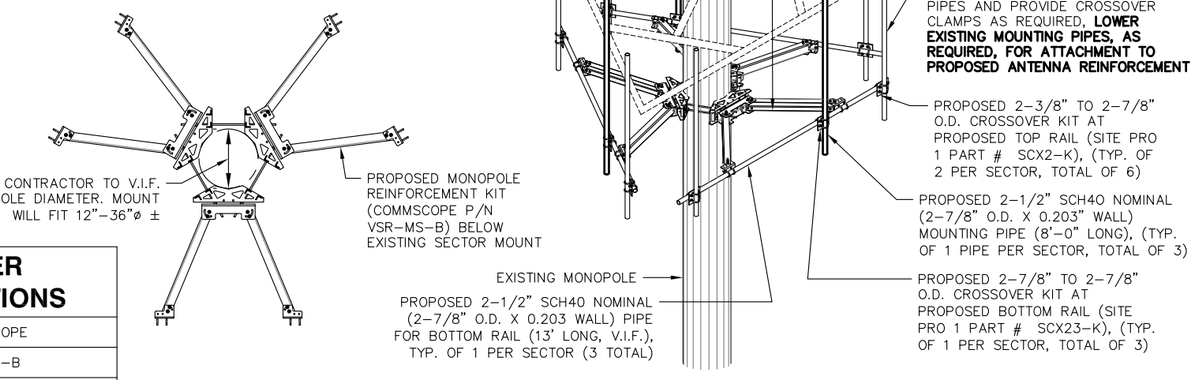
ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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

PROPOSED ANTENNA MOUNTING DETAIL

2 / A-3

SCALE: N.T.S.



V-STABILIZER SPECIFICATIONS

MANUF.	COMMSCOPE
MODEL #	VSR-MS-B
WEIGHT	421.1± LBS.

MONOPOLE REINFORCEMENT KIT

4 / A-3

SCALE: N.T.S.

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
TEL: (860) 648-1116

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752 TEL: (508) 251-0720

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

STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
9-28-15

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
0	09/28/15	ISSUED FOR CONSTRUCTION	BLM

SITE NUMBER:
CTNL053A
SITE NAME:
NL053 / MCF_AMBULANCE
SITE ADDRESS:
237 SANDY HOLLOW ROAD
GROTON, CT 06355
NEW LONDON COUNTY

SHEET TITLE
DETAILS

SHEET NUMBER
A-3