Filed by:
Kri Pelletier, Property Specialist - SBA Communications
33 Boston Post Road West, Ste 320, Marlborough, MA 01751
508.251.0720 x 3804 - kpelletier@sbasite.com

November 24, 2015

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

Notice of Exempt Modification
67 Fairchild Road, Middletown, CT 06457
41.5450 N
72.6209 W
T-Mobile#: CTHA537A_L700

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 100-foot level of the existing 130-foot monopole tower at 67 Fairchild Road in Middletown, CT. The tower is owned by SBA Infrastructure, LLC. The property is owned by Stephen and Barbara Borrelli. T-Mobile now intends to install three (3) new L700MHz antennas. These antennas would be installed at the 100-foot level of the tower. T-Mobile also intends to:

Remove:

- N/A

Remove and Replace:

- N/A

Install:

- (3) Commscope LNX-6515DS Panel Antennas
- (3) Commscope Smart Bias-T

Existing Equipment to Remain (Entitlements):

- (1) 6201 ODE Equipment cabinet
- (1) 6101 Equipment cabinet
- (6) 1-5/8" Coax Lines
- (1) 1-5/8" Hybrid line
- (6) Ericsson AIR antennas
- (3) Tower Mounted Amplifiers (Reserved)

This facility was originally approved by the Council in Docket 316 on November 14, 2006. The original approval included the condition that all antennas be flush-mounted. Docket 316 was reopened, and the Decision rescinded, on August 25, 2011 with the Council reissuing a Certificate of Environmental Compatibility and Public Need eliminating the requirement that all antennas be flush-mounted. (Docket 316A.) This modification complies with the conditions of the aforementioned Docket 316A.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. §16.50j-72(b)(2). In accordance with R.C.S.A. § 16.50j-73, a copy of this letter is being sent to the Honorable Daniel T. Drew, Mayor of the Town of Middletown, as well as the property owner. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

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

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

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

Sincerely,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
33 Boston Post Road West Suite 320
Marlborough MA 01752

508.251.0720 x3804 + T
508.251.1755 + F
203.446.7700 + C
kpelletier@sbasite.com

Attachments

cc: The Honorable Daniel T. Drew–as elected official
Town of Middletown, City Hall, 245 deKoven Drive, Middletown, CT 06457
Stephen G. and Barbara L. Borrelli–as property owners
67 Fairchild Road, Middletown CT 06457

POWER DENSITY

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 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):	100	Height (AGL):	100	Height (AGL):	100
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%	1.90	Antenna B1 MPE%	1.90	Antenna C1 MPE%	1.90
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	100	Height (AGL):	100	Height (AGL):	100
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%	1.90	Antenna B2 MPE%	1.90	Antenna C2 MPE%	1.90
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):	100	Height (AGL):	100	Height (AGL):	100
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%	0.75	Antenna B3 MPE%	0.75	Antenna C3 MPE%	0.75

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	4.55 %
Nextel	0.44 %
AT&T	0.80 %
Clearwire	0.23 %
Verizon Wireless	2.82 %
Site Total MPE %:	**8.84 %**

T-Mobile Sector 1 Total:	4.55 %
T-Mobile Sector 2 Total:	4.55 %
T-Mobile Sector 3 Total:	4.55 %
Site Total:	8.84 %

T-Mobile _per sector	# Channels	Watts ERP (Per	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated %
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	100	18.99	2100	1000	1.90 %
T-Mobile 1900 MHz (PCS) GSM/UMTS	2	1167.14	100	9.50	1900	1000	0.95 %
T-Mobile 2100 MHz (AWS) UMTS	2	1167.14	100	9.50	2100	1000	0.95 %
T-Mobile 700 MHz LTE	1	865.21	100	3.52	700	467	0.75 %
						Total:	4.55%

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

T-Mobile Existing Facility

Site ID: CTHA537A

SBA Middletown Monopole
67 Fairchild Road
Middletown, CT 06457

October 29, 2015

EBI Project Number: 6215001054

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.84 %

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

EBI Consulting
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October 29, 2015

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

Emissions Analysis for Site: **CTHA537A – SBA Middletown Monopole**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **67 Fairchild Road, Middletown, 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 **67 Fairchild Road, Middletown, 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 centerline of the proposed antennas is **100 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.

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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):	100	Height (AGL):	100	Height (AGL):	100
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%	1.90	Antenna B1 MPE%	1.90	Antenna C1 MPE%	1.90
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	100	Height (AGL):	100	Height (AGL):	100
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%	1.90	Antenna B2 MPE%	1.90	Antenna C2 MPE%	1.90
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):	100	Height (AGL):	100	Height (AGL):	100
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%	0.75	Antenna B3 MPE%	0.75	Antenna C3 MPE%	0.75

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**4.55 %**
Nextel	0.44 %
AT&T	0.80 %
Clearwire	0.23 %
Verizon Wireless	2.82 %
Site Total MPE %:	**8.84 %**

T-Mobile Sector 1 Total:	4.55 %
T-Mobile Sector 2 Total:	4.55 %
T-Mobile Sector 3 Total:	4.55 %
Site Total:	8.84 %

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**	**100**	**18.99**	**2100**	**1000**	**1.90 %**
T-Mobile 1900 MHz (PCS) GSM/UMTS	**2**	**1167.14**	**100**	**9.50**	**1900**	**1000**	**0.95 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**1167.14**	**100**	**9.50**	**2100**	**1000**	**0.95 %**
T-Mobile 700 MHz LTE	**1**	**865.21**	**100**	**3.52**	**700**	**467**	**0.75 %**
						Total:	**4.55%**

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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 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:	4.55 %
Sector 2:	4.55 %
Sector 3 :	4.55 %
T-Mobile Per Sector Maximum:	4.55 %
Site Total:	8.84 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.84%** 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

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

Post-Mod Structural Analysis Report

Existing 130 ft. Rohn Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13064-A

Customer Site Name: Middletown 2, CT

Carrier Name: T-Mobile

Carrier Site ID/ Name: CTHA537A

Site Location: 67 Fairchild Road

Middletown, Connecticut

Middlesex County

Latitude: 41.545011

Longitude: -72.620766

11/12/15

Analysis Result:

Max Structural Usage: 91.2% [Pass]

Max Foundation Usage: 99% [Pass]

Report Prepared By : Stacey Hesselbein

Introduction

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

The proposed modification by **TES** listed under Sources of Information was considered completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawings prepared by Radian Communication Services, File # 060-3494,57886EH Dated 12/15/2006
Foundation Drawing	Foundation Drawings prepared by Radian Communication Services, File # 060-3494,57886EH Dated 12/15/2006
Geotechnical Report	Geotechnical Report prepared by Gemini Geotechnical Associates Inc., Sire # 999-0049 Dated 11/30/2006
Existing Modification	Modification & 10' Extension Drawings prepared by FDH Engineering, Inc., Project # 11-01248E S1 dated 09/21/2001 Modification Drawings prepared by FDH Engineering, Inc., Job # 12-08192E S2 Dated 11/14/2012 Modification Drawings prepared by FDH Velocitel, Project # 15BVXK1400 Dated 08/06/2015
Proposed Modification	**TES** Job # 18134

Analysis Criteria

The rigorous 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:	Vult = 115 mph (3-Sec. Gust) / Vasd = 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/EIA 222-F / 2005 Connecticut State Building Code
Exposure Category:	C
Crest Height:	0 ft.

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	130.0	6	CCI - OPA-65R-LCUU-H6 - Panel	(1)Platform w/ Hand Rail (Commscope P/N MTC3607R)	(12) 1 5/8" *(2) Fiber *(4) DC	AT&T
2		3	Powerwave - P65-16-XLH-RR - Panel			
3		3	Ericsson - RRUS 11 - RRU			
4		3	Ericsson - RRUS-32 - RRU			
5		3	Ericsson - RRUS-E2 - RRU			
6		3	CCI - DTMABP7819VG12A - TMA			
7		2	Raycap - DC6-48-60-18-8F - SP			
8	111.0	3	Andrew - CBC721-DF - Panel	(3) T-Arms	(12) 1 5/8" (2) 1 5/8" Hybrid	Verizon
9	110.0	6	Andrew - SBNHH-1D65B - Panel			
10		3	Alcatel - RRH2X60-1900A-4R			
11		3	Alcatel - B13 RRH4X30-4R			
12		3	Alcatel - B4 RRH2X60-4R			
13		2	RFS - DB-T1-6Z-8AB-0Z			
14	109.0	3	Andrew - CBC721-DF - Panel			
15	100.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) T-Arms (Site Pro P/N RMV12-3xx)	(6) 1 5/8" (1) 1 5/8" Hybrid	T-Mobile
16		3	Ericsson - AIR 21 B4A/B2P - Panel			
19	94.0	1	1'4"x6.5"x6" Surge Protector	Direct Mount	(3) 5/16" (2) 1/2" (3) 5/8" (3) 1/4"	Clearwire
20	91.0	3	Kathrein - 840 10054 - Panel	(3) T-Arms		
21		3	Samsung - RASSPI-2213-RRH			
22	90.8	1	Andrew - VHLP2-18-1WH - Dish			
23	90.7	1	Andrew - VHLP800-11 - Dish			

* Considered running inside (3) 3" Conduit outside the pole shaft

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
15	100.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) T-Arms (Site Pro P/N RMV12-3xx)	(6) 1 5/8" (1) 1 5/8" Hybrid	T-Mobile
16		3	Ericsson - AIR 21 B4A/B2P - Panel			
17		3	Commscope - LNX-6515DS-A1M - Panel			
18		3	Kathrein - 782 11056 - TMA			

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

Analysis Results

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

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**91.2%**	**74.0%**	**68.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	1864.4	20.1	38.2
Analysis Reactions	2484.3	25.5	33.4

The foundation, with the proposed TES modifications referenced in this analysis included, was analyzed using the supplied documents and soils report and was found adequate.

Operational Condition (Rigidity):

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

Elevation (ft.)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
90.8	Andrew - VHLP2-18-1WH - Dish	Clearwire	0.002	1.459
90.7	Andrew - VHLP800-11 - Dish	Clearwire	0.002	1.459

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

Conclusions

Based on the analysis results, the structure and its foundation will be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the design ANSI/TIA/EIA 222-F standards under a basic wind speed of 85 mph no ice and 74 mph with 1/2" radial ice after the following proposed modification is successfully completed.

- Proposed modification design drawing by **TES** Job # 18134

Pre-Mod Installation Determination

We have also checked this tower to determine if the proposed T-Mobile equipment loading can be installed prior to the completion of the required modifications. We ran a reduced wind loading case as required by TIA-1019 considering a construction period of no more than 6 months.

The tower and foundations passed, so the Carrier can proceed and install their proposed loading prior to the mods completion. Please be aware that this approval is being provided and is based on the method outlined in TIA-1019. This approval is not a blanket approval and there is still a risk that the tower will experience a wind event that cannot be predicted b(y TIA-1019 or our Engineers. In the event of an unforeseen wind event, Tower Engineering Solutions will not be liable nor responsible for damage to the tower or the Carriers equipment. Additionally, the tower cannot go beyond the 6 month construction period without the modifications being completed. If the modifications cannot be completed within 6 months from the completed installation of the Carrier's proposed equipment, TES must be notified immediately for further review.

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 91.2% at 10.0ft

Structure:	CT13064-A-SBA	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)			Page: 1	

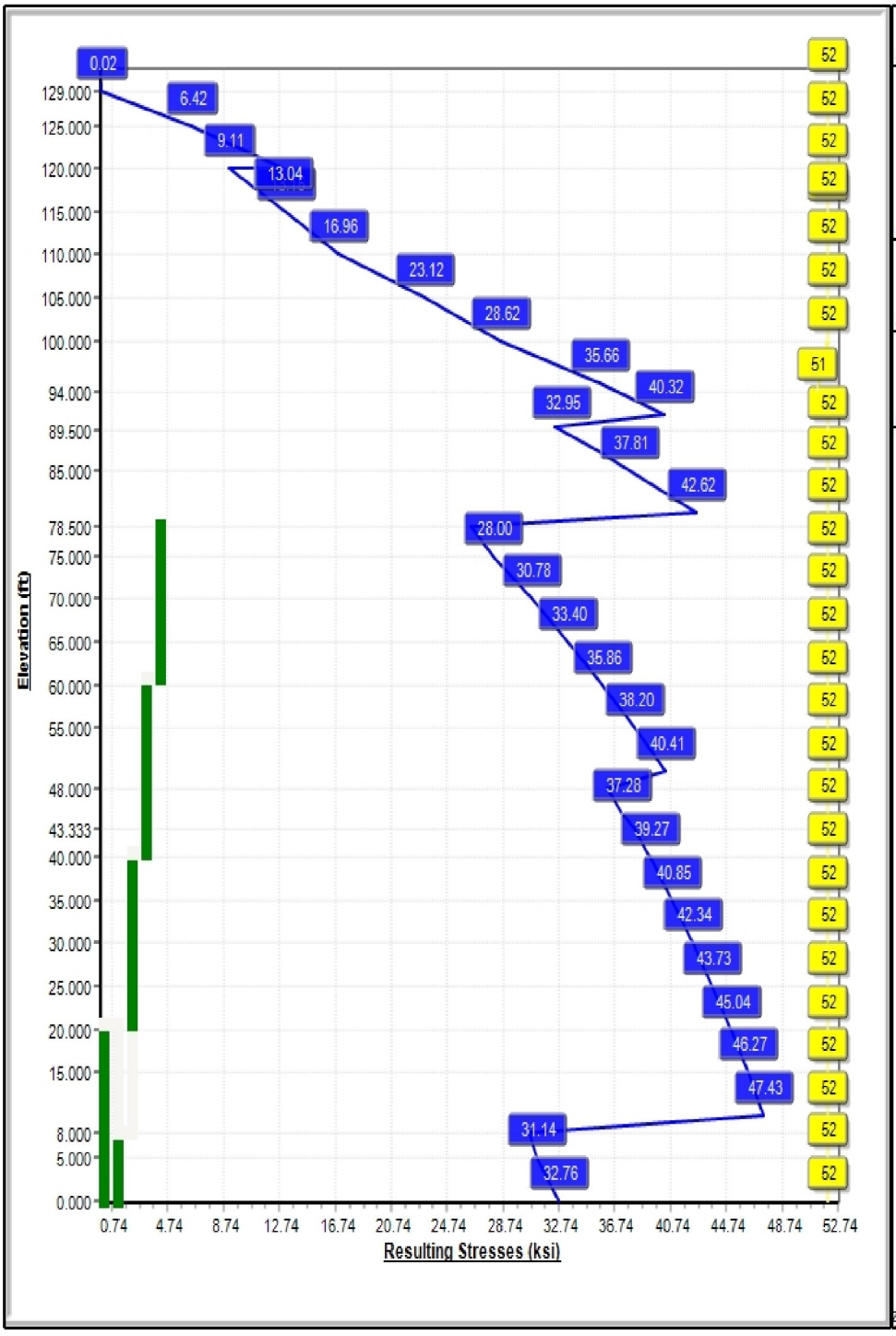
Tower Engineering Solutions

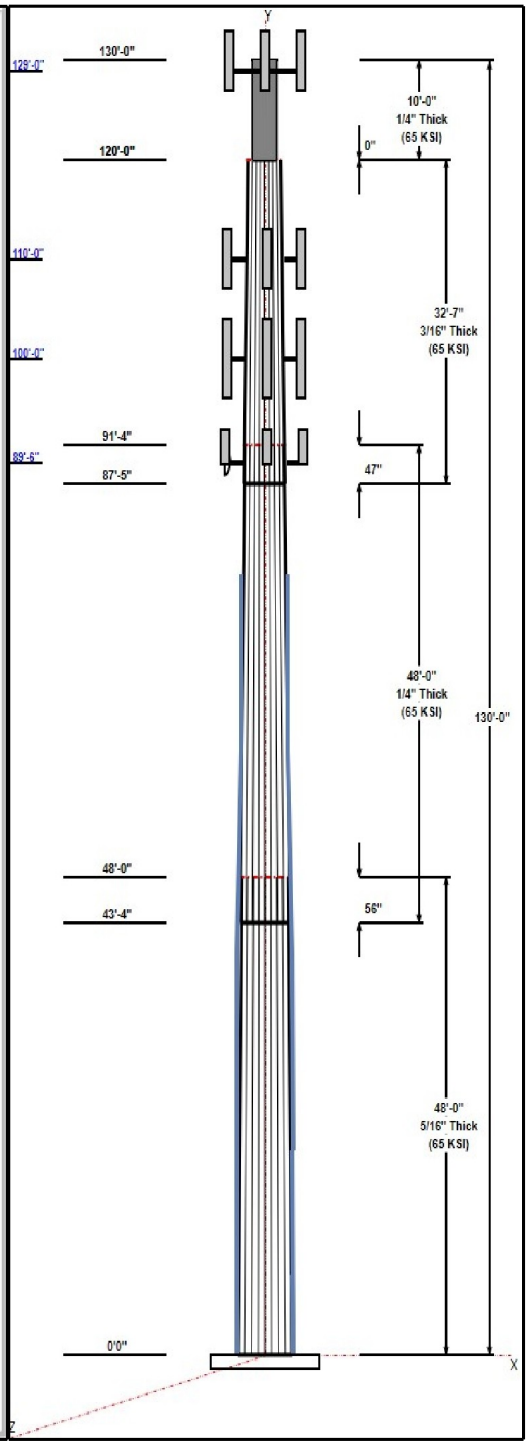
Dead Load Factor: 1.00
Wind Load Factor: 1.00

52 Alllowable Stress
47 Resulting Stress

Load Case : 85 mphWind with 0 in Ice

Iterations: 24





Structure: CT13064-A-SBA

Type: Custom
Site Name: Middletown 2, CT
Height: 130.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.00000

11/12/2015

Tower Engineering Solutions

Shaft Properties

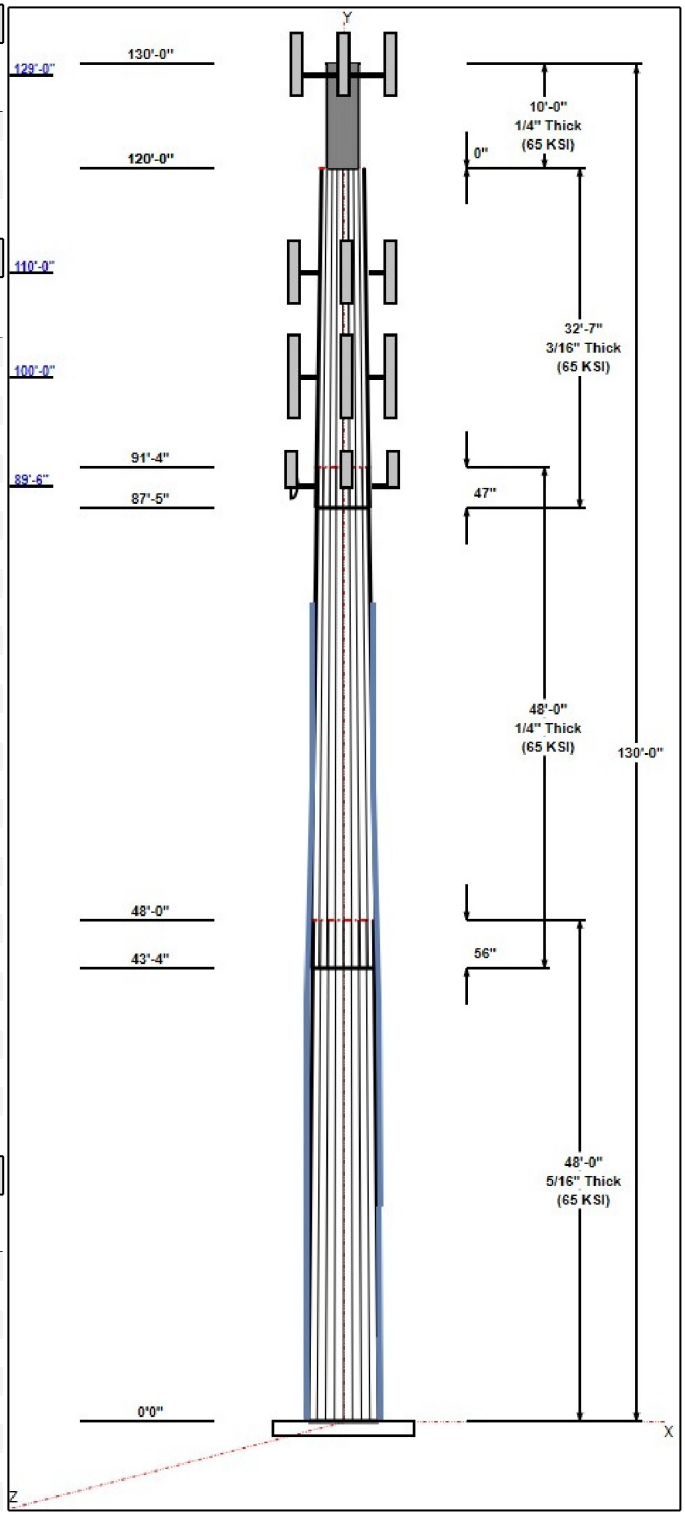
Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	48.00	35.05	42.50	0.313		0.15529	65
2	48.00	28.82	36.27	0.250	Slip	0.15529	65
3	32.58	24.74	29.80	0.188	Slip	0.15529	65
4	10.00	18.00	18.00	0.250	Butt	0.00000	65

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
130.00	130.00	1	6' Lightning rod	T-Mobile
129.00	130.00	2	DC6-48-60-18-8F	AT&T
129.00	130.00	3	DTMABP7819VG12A	AT&T
129.00	130.00	6	OPA-65R-LCUU-H6	AT&T
129.00	130.00	3	P65-16-XLH-RR	AT&T
129.00	129.00	1	Platform w/ Hand Rail	AT&T
129.00	130.00	3	RRUS 11	AT&T
129.00	130.00	3	RRUS-32	AT&T
129.00	130.00	3	RRUS-E2	AT&T
110.00	110.00	3	B13 RRH4X30-4R	Verizon
110.00	110.00	3	B4 RRH2X60-4R	Verizon
110.00	111.00	3	CBC721-DF	Verizon
110.00	109.00	3	CBC721-DF	Verizon
110.00	110.00	2	DB-T1-6Z-8AB-0Z	Verizon
110.00	110.00	3	RRH2X60-1900A-4R	Verizon
110.00	110.00	6	SBNHH-1D65B	Verizon
110.00	110.00	3	T-Arm (Round)	Verizon
100.00	100.00	3	782 11056	T-Mobile
100.00	100.00	3	AIR 21, 1.3M, B2A B4P	T-Mobile
100.00	100.00	3	AIR 21, 1.3M, B4A B2P	T-Mobile
100.00	100.00	3	LNX-6515DS-A1M	T-Mobile
100.00	100.00	3	T-Arm (Round)	T-Mobile
94.00	94.00	1	1'4"x6.5"x6" Surge	Clearwire
89.50	91.00	3	840 10054	Clearwire
89.50	91.00	3	SPI-2213 RRH	Clearwire
89.50	89.50	3	T-Arm (Round)	Clearwire
89.50	90.80	1	VHLP2-18-1WH	Clearwire
89.50	90.70	1	VHLP800-11	Clearwire

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	129.00	Inside	1 5/8" Coax	AT&T
0.00	129.00	Outside	3" Conduit	AT&T
0.00	129.00	Outside	3/4" DC	AT&T
0.00	129.00	Outside	3/8" Fiber	AT&T
0.00	110.00	Inside	1 5/8" Coax	Verizon
0.00	110.00	Inside	1 5/8" Hybrid	Verizon
0.00	100.00	Inside	1 5/8" Coax	T-Mobile
0.00	100.00	Inside	1 5/8" Hybrid	T-Mobile
0.00	89.50	Inside	1/2" Coax	Clearwire
0.00	89.50	Inside	1/4" Coax	Clearwire
0.00	89.50	Inside	5/16" Coax	Clearwire
0.00	89.50	Inside	5/8" Coax	Clearwire
0.00	81.00	Inside	1" Reinforcing plate	



Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
14	1.5" F1554 105	105.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	51.8	50.0	Round

Reactions

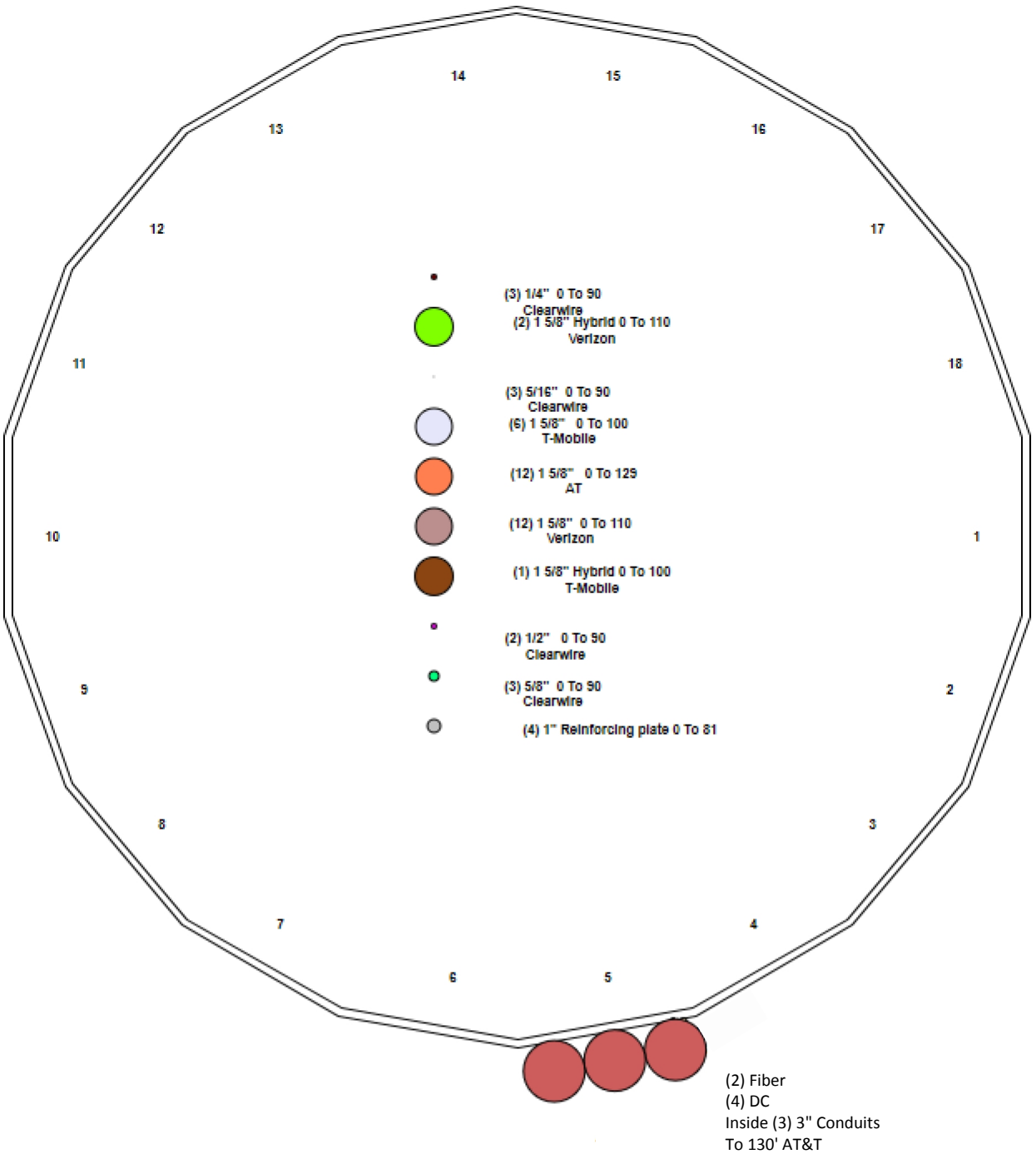
Load Case	Moment	Shear	Axial
85 mphWind with 0" Ice	2484.3	25.5	33.4
73.61 mph Wind with 0.5" Ice	2084.9	21.1	39.2
50 mph Wind with 0" Ice	860.6	8.8	33.5

Structure: CT13064-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Middletown 2, CT
Height: 130.00 (ft)

11/12/2015

Tower Engineering Solutions



Shaft Properties

Structure:	CT13064-A-SBA	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 2, CT	**Exposure:**	C		
Height:	130.00 (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	48.000	0.3125	65		0.00	6,231
2	18	48.000	0.2500	65	Slip	56.00	4,185
3	18	32.583	0.1875	65	Slip	47.00	1,787
4	R	10.000	0.2500	65	Flange	0.00	474
					Total Shaft Weight:		**12,677**

	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	42.50	0.00	41.84	9409.05	22.56	136	35.05	48.00	34.45	5250.98	18.36	112.1	0.155292
2	36.27	43.33	28.58	4685.33	24.17	145.0	28.82	91.33	22.67	2337.03	18.91	115.2	0.155292
3	29.80	87.42	17.62	1952.39	26.61	158.9	24.74	120.0	14.61	1112.84	21.85	131.9	0.155292
4	18.00	120.0	13.94	549.45	0	72	18.00	130.0	13.94	549.45	0	72	0.000000

Additional Steel

							Intermediate Connectors		Termination Connectors			
Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Fu (ksi)	Offset (in)	Description	Spacing (in)	Description	Spacing (in)	Lower Qty	Upper Qty
0.00	20.50	4	PLT 6"x1" (1.25" Hole)	65	80	0.00	AJM20&sleeve	16.00	AJM20&sleeve	3.00	8	8
0.00	8.00	4	PLT 5.5"x1 1/4"(1.25"hol	65	80	0.00	AJM20&sleeve	18.00	AJM20&sleeve	3.00		9
20.50	40.50	4	PLT 6"x1" (1.25" Hole)	65	80	0.00	AJM20&sleeve	16.00	AJM20&sleeve	3.00	8	8
40.50	60.75	4	PLT 6"x1" (1.25" Hole)	65	80	0.00	AJM20&sleeve	16.00	AJM20&sleeve	3.00	8	8
60.75	78.50	4	PLT 6"x1" (1.25" Hole)	65	80	0.00	AJM20&sleeve	16.00	AJM20&sleeve	3.00	8	8

Loading Summary

Structure:	CT13064-A-SBA	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 2, CT	**Exposure:**	C		
Height:	130.00 (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	130.0	6' Lightning rod	1	6.50	0.38	1.00	11.80	0.980	1.00	0.00	0.00
2	129.0	DC6-48-60-18-8F	2	2.77	1.47	1.00	49.50	2.570	1.00	0.00	1.00
3	129.0	DTMABP7819VG12A	3	19.20	1.14	0.67	26.50	1.260	0.69	0.00	1.00
4	129.0	OPA-65R-LCUU-H6	6	80.00	10.60	0.77	134.00	10.85	0.77	0.00	1.00
5	129.0	P65-16-XLH-RR	3	53.00	8.40	0.78	100.20	8.870	0.78	0.00	1.00
6	129.0	Platform w/ Hand Rail (round)	1	1600.00	32.00	1.00	2200.00	40.00	1.00	0.00	0.00
7	129.0	RRUS 11	3	50.70	2.94	0.76	66.00	3.140	0.77	0.00	1.00
8	129.0	RRUS-32	3	77.00	3.87	0.86	103.50	4.110	0.86	0.00	1.00
9	129.0	RRUS-E2	3	75.00	2.50	0.86	103.50	3.200	0.86	0.00	1.00
10	110.0	B13 RRH4X30-4R	3	57.20	2.52	0.86	72.50	2.710	0.88	0.00	0.00
11	110.0	B4 RRH2X60-4R	3	55.00	3.78	0.77	75.40	4.050	0.79	0.00	0.00
12	110.0	CBC721-DF	3	4.40	0.45	0.63	7.10	0.530	0.67	0.00	1.00
13	110.0	CBC721-DF	3	4.40	0.45	0.63	7.10	0.530	0.67	0.00	-1.00
14	110.0	DB-T1-6Z-8AB-0Z	2	18.90	5.60	1.00	46.00	5.870	1.00	0.00	0.00
15	110.0	RRH2X60-1900A-4R	3	46.00	2.19	0.84	58.80	2.370	0.85	0.00	0.00
16	110.0	SBNHH-1D65B	6	40.00	8.40	0.82	86.60	8.870	0.82	0.00	0.00
17	110.0	T-Arm (Round)	3	350.00	8.00	0.75	420.00	10.50	0.75	0.00	0.00
18	100.0	782 11056	3	1.80	0.17	0.78	4.00	0.230	0.82	0.00	0.00
19	100.0	AIR 21, 1.3M, B2A B4P	3	91.50	6.58	0.83	129.20	6.970	0.83	0.00	0.00
20	100.0	AIR 21, 1.3M, B4A B2P	3	90.40	6.58	0.83	128.10	6.970	0.83	0.00	0.00
21	100.0	LNX-6515DS-A1M	3	50.30	11.41	0.84	115.60	11.92	0.84	0.00	0.00
22	100.0	T-Arm (Round)	3	350.00	8.00	0.75	420.00	10.50	0.75	0.00	0.00
23	94.00	1'4"x6.5"x6" Surge Protector	1	53.00	2.50	1.00	66.00	2.690	1.00	0.00	0.00
24	89.50	840 10054	3	35.00	5.18	0.63	59.10	5.500	0.64	0.00	1.50
25	89.50	SPI-2213 RRH	3	33.10	1.82	0.76	45.60	1.980	0.77	0.00	1.50
26	89.50	T-Arm (Round)	3	350.00	9.50	0.75	420.00	10.50	0.75	0.00	0.00
27	89.50	VHLP2-18-1WH	1	31.00	4.69	1.00	59.00	5.050	1.00	1.00	1.30
28	89.50	VHLP800-11	1	48.00	8.43	1.00	97.40	8.920	1.00	1.00	1.20
		Totals:	**78**	**7,883.84**			**11,035.40**				

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	129.0	(12) 1 5/8" Coax	12.48	0.00	6.24	0.00	Inside
0.00	129.0	(3) 3" Conduit	5.34	0.30	5.60	0.40	Outside
0.00	129.0	(4) 3/4" DC	2.40	0.00	2.40	0.00	Outside
0.00	129.0	(2) 3/8" Fiber	0.18	0.00	0.18	0.00	Outside
0.00	110.0	(12) 1 5/8" Coax	12.48	0.00	12.48	0.00	Inside
0.00	110.0	(2) 1 5/8" Hybrid	6.60	0.00	6.60	0.00	Inside
0.00	100.0	(6) 1 5/8" Coax	6.24	0.00	6.24	0.00	Inside
0.00	100.0	(1) 1 5/8" Hybrid	3.30	0.00	3.30	0.00	Inside
0.00	89.50	(2) 1/2" Coax	0.16	0.00	0.16	0.00	Inside
0.00	89.50	(3) 1/4" Coax	0.04	0.00	0.04	0.00	Inside
0.00	89.50	(3) 5/16" Coax	0.24	0.00	0.24	0.00	Inside
0.00	89.50	(3) 5/8" Coax	0.15	0.00	0.15	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	81.00	(4) 1" Reinforcing plate		0.00	0.38		0.00	0.60	Inside		
		Totals:		**5,737.65**			**4,965.78**				

Shaft Section Properties

Structure: CT13064-A-SBA
Site Name: Middletown 2, CT
Height: 130.00 (ft)
Base Elev: 0.000 (ft)

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

11/12/2015

Tower Engineering Solutions

Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing Area (in^2)	Additional Reinforcing Ixp (in^4)	Additional Reinforcing Iyp (in^4)	Additional Reinforcing Weight (lb)
0.00	RB1 RB2	0.3125	42.500	41.843	9409.0	22.57	136.00	65	52	0.0	51.50	14174.7	10484.	0.0
5.00		0.3125	41.724	41.073	8899.0	22.13	133.52	65	52	705.4	51.50	13677.0	10117.	876.2
8.00	RT2	0.3125	41.258	40.611	8602.1	21.87	132.02	65	52	416.9	51.50	13382.6	9900.3	525.7
10.00		0.3125	40.947	40.303	8407.8	21.69	131.03	65	52	275.3	24.00	7053.3	3529.7	163.3
15.00		0.3125	40.171	39.533	7935.0	21.26	128.55	65	52	679.2	24.00	6795.7	3401.4	408.3
20.00		0.3125	39.394	38.763	7480.2	20.82	126.06	65	52	666.1	24.00	6543.0	3275.5	408.3
20.50	RT1 RB3	0.3125	39.317	38.686	7435.7	20.77	125.81	65	52	65.9	24.00	6518.0	3263.1	40.8
25.00		0.3125	38.618	37.993	7043.2	20.38	123.58	65	52	587.1	24.00	6295.0	3152.0	367.5
30.00		0.3125	37.841	37.222	6623.5	19.94	121.09	65	52	639.9	24.00	6051.9	3030.9	408.3
35.00		0.3125	37.065	36.452	6220.8	19.50	118.61	65	52	626.7	24.00	5813.6	2912.3	408.3
40.00		0.3125	36.288	35.682	5834.8	19.06	116.12	65	52	613.6	24.00	5580.1	2796.0	408.3
40.50	RT3 RB4	0.3125	36.211	35.605	5797.1	19.02	115.87	65	52	60.6	24.00	5557.0	2784.5	40.8
43.33	Bot - Section 2	0.3125	35.771	35.169	5586.6	18.77	114.47	65	52	341.2	24.00	5427.1	2719.8	231.4
45.00		0.3125	35.512	34.912	5465.1	18.63	113.64	65	52	360.2	24.00	5498.1	2755.0	136.1
48.00	Top - Section 1	0.2500	35.546	28.006	4408.2	23.66	142.18	65	52	641.8	24.00	5361.3	2686.9	245.0
50.00		0.2500	35.235	27.760	4292.8	23.44	140.94	65	52	189.8	24.00	5269.9	2639.8	163.3
55.00		0.2500	34.459	27.144	4013.3	22.89	137.84	65	52	467.1	24.00	5047.8	2529.4	408.3
60.00		0.2500	33.682	26.528	3746.2	22.35	134.73	65	52	456.6	24.00	4830.6	2421.3	408.3
60.75	RT4 RB5	0.2500	33.566	26.435	3707.2	22.26	134.26	65	52	67.6	24.00	4798.4	2405.3	61.3
65.00		0.2500	32.906	25.912	3491.2	21.80	131.62	65	52	378.5	24.00	4618.1	2315.6	347.1
70.00		0.2500	32.130	25.296	3248.0	21.25	128.52	65	52	435.6	24.00	4410.5	2212.3	408.3
75.00		0.2500	31.353	24.679	3016.5	20.70	125.41	65	52	425.1	24.00	4207.7	2111.4	408.3
78.50	RT5	0.2500	30.810	24.248	2861.1	20.32	123.24	65	52	291.4	24.00	4068.6	2042.3	285.8
80.00		0.2500	30.577	24.063	2796.1	20.16	122.31	65	52	123.3				
85.00		0.2500	29.800	23.447	2586.8	19.61	119.20	65	52	404.2				
87.42	Bot - Section 3	0.2500	29.425	23.149	2489.5	19.34	117.70	65	52	191.6				
89.50		0.2500	29.101	22.893	2407.6	19.11	116.41	65	52	287.4				
90.00		0.2500	29.024	22.831	2388.2	19.06	116.09	65	52	68.5				
91.33	Top - Section 2	0.1875	29.192	17.260	1834.5	26.04	155.69	65	52	181.8				
94.00		0.1875	28.778	17.014	1757.1	25.65	153.48	65	51	155.5				
95.00		0.1875	28.622	16.922	1728.6	25.51	152.65	65	51	57.7				
100.00		0.1875	27.846	16.460	1590.8	24.78	148.51	65	52	284.0				
105.00		0.1875	27.069	15.997	1460.6	24.05	144.37	65	52	276.1				
110.00		0.1875	26.293	15.535	1337.6	23.32	140.23	65	52	268.2				
115.00		0.1875	25.516	15.073	1221.8	22.59	136.09	65	52	260.4				
120.00	Top - Section 3	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	252.5				
120.00	Bot - Section 4	0.1875	24.740	14.611	1112.8	21.86	131.95	65	52					
125.00		0.2500	18.000	13.941	549.4	0.00	72.00	65	52	237.2				
129.00		0.2500	18.000	13.941	549.4	0.00	72.00	65	52	189.8				
130.00		0.2500	18.000	13.941	549.4	0.00	72.00	65	52	47.4				
									Total Weight	**12677.2**				**7159.5**

Wind Loading - Shaft

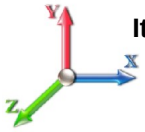
Structure: CT13064-A-SBA
Site Name: Middletown 2, CT
Height: 130.00 (ft)
Base Elev: 0.000 (ft)

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

11/12/2015

Tower Engineering Solutions

Load Case: 85 mphWind with 0" Ice
Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00	RB1 RB2	0.00	1.00	18.496	31.26	301.04	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	295.54	0.650	0.000	5.00	17.547	11.41	356.5	0.0	2457.8
8.00	RT2	0.00	1.00	18.496	31.26	292.24	0.650	0.000	3.00	10.373	6.74	210.8	0.0	1468.4
10.00		0.00	1.00	18.496	31.26	290.04	0.650	0.000	2.00	6.850	4.45	139.2	0.0	602.0
15.00		0.00	1.00	18.496	31.26	284.54	0.650	0.000	5.00	16.900	10.98	343.4	0.0	1495.8
20.00		0.00	1.00	18.496	31.26	279.04	0.650	0.000	5.00	16.576	10.77	336.8	0.0	1482.7
20.50	RT1 RB3	0.00	1.00	18.496	31.26	278.49	0.650	0.000	0.50	1.640	1.07	33.3	0.0	147.6
25.00		0.00	1.00	18.496	31.26	273.54	0.650	0.000	4.50	14.613	9.50	296.9	0.0	1322.1
30.00		0.00	1.00	18.496	31.26	268.04	0.650	0.000	5.00	15.929	10.35	323.6	0.0	1456.5
35.00		0.00	1.02	18.810	31.79	264.76	0.650	0.000	5.00	15.605	10.14	322.4	0.0	1443.4
40.00		0.00	1.06	19.541	33.02	264.20	0.650	0.000	5.00	15.282	9.93	328.0	0.0	1430.3
40.50	RT3 RB4	0.00	1.06	19.611	33.14	264.11	0.650	0.000	0.50	1.510	0.98	32.5	0.0	142.3
43.33	Bot - Section 2	0.00	1.08	19.993	33.79	263.43	0.650	0.000	2.83	8.498	5.52	186.6	0.0	804.0
45.00		0.00	1.09	20.210	34.15	262.94	0.650	0.000	1.67	5.020	3.26	111.4	0.0	632.5
48.00	Top - Section 1	0.00	1.11	20.586	34.79	261.89	0.650	0.000	3.00	8.945	5.81	202.3	0.0	1131.8
50.00		0.00	1.13	20.827	35.20	264.85	0.650	0.000	2.00	5.898	3.83	135.0	0.0	516.4
55.00		0.00	1.16	21.402	36.17	262.56	0.650	0.000	5.00	14.520	9.44	341.4	0.0	1283.7
60.00		0.00	1.19	21.941	37.08	259.86	0.650	0.000	5.00	14.196	9.23	342.2	0.0	1273.2
60.75	RT4 RB5	0.00	1.19	22.019	37.21	259.42	0.650	0.000	0.75	2.102	1.37	50.8	0.0	190.1
65.00		0.00	1.21	22.449	37.94	256.79	0.650	0.000	4.25	11.771	7.65	290.3	0.0	1072.7
70.00		0.00	1.24	22.929	38.75	253.39	0.650	0.000	5.00	13.549	8.81	341.3	0.0	1252.3
75.00		0.00	1.26	23.386	39.52	249.72	0.650	0.000	5.00	13.226	8.60	339.8	0.0	1241.8
78.50	RT5	0.00	1.28	23.692	40.04	247.00	0.650	0.000	3.50	9.065	5.89	235.9	0.0	863.0
80.00		0.00	1.29	23.821	40.26	245.79	0.650	0.000	1.50	3.837	2.49	100.4	0.0	123.3
85.00		0.00	1.31	24.237	40.96	241.63	0.650	0.000	5.00	12.579	8.18	334.9	0.0	404.2
87.42	Bot - Section 3	0.00	1.32	24.432	41.29	239.55	0.650	0.000	2.42	5.964	3.88	160.1	0.0	191.6
89.50	Appurtenance(s)	0.00	1.33	24.597	41.57	237.71	0.650	0.000	2.08	5.146	3.34	139.0	0.0	287.4
90.00		0.00	1.33	24.636	41.63	237.27	0.650	0.000	0.50	1.227	0.80	33.2	0.0	68.5
91.33	Top - Section 2	0.00	1.34	24.740	41.81	236.07	0.650	0.000	1.33	3.255	2.12	88.5	0.0	181.8
94.00	Appurtenance(s)	0.00	1.35	24.944	42.16	236.72	0.650	0.000	2.67	6.441	4.19	176.5	0.0	155.5
95.00		0.00	1.35	25.020	42.28	235.80	0.650	0.000	1.00	2.392	1.55	65.7	0.0	57.7
100.00	Appurtenance(s)	0.00	1.37	25.389	42.91	231.09	0.650	0.000	5.00	11.764	7.65	328.1	0.0	284.0
105.00		0.00	1.39	25.745	43.51	226.22	0.650	0.000	5.00	11.441	7.44	323.6	0.0	276.1
110.00	Appurtenance(s)	0.00	1.41	26.090	44.09	221.19	0.650	0.000	5.00	11.117	7.23	318.6	0.0	268.2
115.00		0.00	1.43	26.423	44.66	216.03	0.650	0.000	5.00	10.794	7.02	313.3	0.0	260.4
120.00	Top - Section 3	0.00	1.45	26.747	45.20	210.73	0.650	0.000	5.00	10.470	6.81	307.6	0.0	252.5
125.00		0.00	1.46	27.060	45.73	154.22	0.590	0.000	5.00	7.500	4.42	202.4	0.0	237.2
129.00	Appurtenance(s)	0.00	1.48	27.305	46.15	154.91	0.590	0.000	4.00	6.000	3.54	163.4	0.0	189.8
130.00	Appurtenance(s)	0.00	1.48	27.365	46.25	155.09	0.590	0.000	1.00	1.500	0.89	40.9	0.0	47.4
								Totals:	**130.00**			**8,396.5**		**26,996.1**

Discrete Appurtenance Forces

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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 mphWind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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	130.00	6' Lightning rod	1	27.365	46.247	1.00	0.38	6.50	0.000	0.000	17.57	0.00	0.00
2	129.00	P65-16-XLH-RR	3	27.365	46.247	0.78	19.66	159.00	0.000	1.000	909.04	0.00	909.04
3	129.00	DC6-48-60-18-8F	2	27.365	46.247	1.00	2.94	5.54	0.000	1.000	135.97	0.00	135.97
4	129.00	DTMABP7819VG12A	3	27.365	46.247	0.67	2.29	57.60	0.000	1.000	105.97	0.00	105.97
5	129.00	OPA-65R-LCUU-H6	6	27.365	46.247	0.77	48.97	480.00	0.000	1.000	2264.83	0.00	2264.83
6	129.00	Platform w/ Hand Rail (round)	1	27.305	46.145	1.00	32.00	1600.00	0.000	0.000	1476.65	0.00	0.00
7	129.00	RRUS 11	3	27.365	46.247	0.76	6.70	152.10	0.000	1.000	310.01	0.00	310.01
8	129.00	RRUS-32	3	27.365	46.247	0.86	9.98	231.00	0.000	1.000	461.76	0.00	461.76
9	129.00	RRUS-E2	3	27.365	46.247	0.86	6.45	225.00	0.000	1.000	298.30	0.00	298.30
10	110.00	T-Arm (Round)	3	26.090	44.092	0.75	18.00	1050.00	0.000	0.000	793.65	0.00	0.00
11	110.00	SBNHH-1D65B	6	26.090	44.092	0.82	41.33	240.00	0.000	0.000	1822.23	0.00	0.00
12	110.00	RRH2X60-1900A-4R	3	26.090	44.092	0.84	5.52	138.00	0.000	0.000	243.33	0.00	0.00
13	110.00	DB-T1-6Z-8AB-0Z	2	26.090	44.092	1.00	11.20	37.80	0.000	0.000	493.83	0.00	0.00
14	110.00	CBC721-DF	3	26.022	43.977	0.63	0.85	13.20	0.000	-1.000	37.40	0.00	-37.40
15	110.00	CBC721-DF	3	26.157	44.206	0.63	0.85	13.20	0.000	1.000	37.60	0.00	37.60
16	110.00	B13 RRH4X30-4R	3	26.090	44.092	0.86	6.50	171.60	0.000	0.000	286.67	0.00	0.00
17	110.00	B4 RRH2X60-4R	3	26.090	44.092	0.77	8.73	165.00	0.000	0.000	385.00	0.00	0.00
18	100.00	AIR 21, 1.3M, B4A B2P	3	25.389	42.907	0.83	16.38	271.20	0.000	0.000	703.00	0.00	0.00
19	100.00	AIR 21, 1.3M, B2A B4P	3	25.389	42.907	0.83	16.38	274.50	0.000	0.000	703.00	0.00	0.00
20	100.00	782 11056	3	25.389	42.907	0.78	0.40	5.40	0.000	0.000	17.07	0.00	0.00
21	100.00	LNX-6515DS-A1M	3	25.389	42.907	0.84	28.75	150.90	0.000	0.000	1233.72	0.00	0.00
22	100.00	T-Arm (Round)	3	25.389	42.907	0.75	18.00	1050.00	0.000	0.000	772.33	0.00	0.00
23	94.00	1'4"x6.5"x6" Surge Protector	1	24.944	42.155	1.00	2.50	53.00	0.000	0.000	105.39	0.00	0.00
24	89.50	VHLP800-11	1	24.691	41.727	1.00	8.43	48.00	2.231	1.200	351.76	784.87	422.11
25	89.50	VHLP2-18-1WH	1	24.698	41.740	1.00	4.69	31.00	2.231	1.300	195.76	436.80	254.49
26	89.50	T-Arm (Round)	3	24.597	41.569	0.75	21.38	1050.00	0.000	0.000	888.53	0.00	0.00
27	89.50	SPI-2213 RRH	3	24.714	41.767	0.76	4.15	99.30	0.000	1.500	173.31	0.00	259.97
28	89.50	840 10054	3	24.714	41.767	0.63	9.79	105.00	0.000	1.500	408.90	0.00	613.36
						Totals:		**7,883.84**			**15,632.60**		

Total Applied Force Summary

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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 mphWind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		403.40	1829.65	0.00	0.00
8.00		238.88	1091.50	0.00	0.00
10.00		157.94	537.90	0.00	0.00
15.00		390.25	1335.57	0.00	0.00
20.00		383.68	1322.47	0.00	0.00
20.50		38.01	131.53	0.00	0.00
25.00		339.10	1177.84	0.00	0.00
30.00		370.53	1296.26	0.00	0.00
35.00		370.13	1283.16	0.00	0.00
40.00		377.58	1270.05	0.00	0.00
40.50		37.51	126.28	0.00	0.00
43.33		215.35	713.14	0.00	0.00
45.00		128.52	579.04	0.00	0.00
48.00		233.58	1035.67	0.00	0.00
50.00		156.07	452.32	0.00	0.00
55.00		395.62	1123.47	0.00	0.00
60.00		397.78	1112.99	0.00	0.00
60.75		59.20	166.04	0.00	0.00
65.00		338.65	936.46	0.00	0.00
70.00		399.40	1092.03	0.00	0.00
75.00		399.04	1081.54	0.00	0.00
78.50		277.98	750.84	0.00	0.00
80.00		118.51	197.72	0.00	0.00
85.00		396.34	652.24	0.00	0.00
87.42		189.99	311.49	0.00	0.00
89.50	(11) appurtenances	2183.28	1724.11	1221.67	1549.93
90.00		39.44	93.02	0.00	0.00
91.33		105.18	247.16	0.00	0.00
94.00	(1) appurtenances	315.60	339.22	0.00	0.00
95.00		78.42	106.76	0.00	0.00
100.00	(15) appurtenances	3821.59	2281.07	0.00	0.00
105.00		388.82	473.51	0.00	0.00
110.00	(26) appurtenances	4484.47	2294.45	0.00	0.19
115.00		380.28	362.39	0.00	0.00
120.00		375.43	354.53	0.00	0.00
125.00		270.96	339.19	0.00	0.00
129.00	(24) appurtenances	6181.25	3181.59	0.00	4485.87
130.00	(1) appurtenances	58.50	53.94	0.00	0.00
	Totals:	**25,496.24**	**33,458.15**	**1,221.67**	**6,035.99**

Resulting Forces and Deflections

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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: 85 mphWind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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	-25.548	-33.419	0.000	-0.012	-1.206	-2484.2	0.000	0.000	0.000	0.000	0.000
5.00	-25.218	-31.529	0.000	-0.008	-1.206	-2356.5	-0.093	0.000	0.093	-0.173	0.000
8.00	-25.020	-30.401	0.000	-0.005	-1.206	-2280.9	-0.235	0.000	0.235	-0.277	0.000
10.00	-24.946	-29.792	0.000	-0.006	-1.207	-2230.8	-0.366	0.000	0.366	-0.347	0.000
15.00	-24.672	-28.349	0.000	-0.005	-1.207	-2106.1	-0.867	0.000	0.867	-0.605	-0.001
20.00	-24.337	-26.972	0.000	-0.001	-1.207	-1982.7	-1.637	0.000	1.637	-0.861	-0.001
20.50	-24.357	-26.787	0.000	-0.003	-1.207	-1970.6	-1.729	0.000	1.729	-0.887	-0.001
25.00	-24.105	-25.514	0.000	-0.003	-1.208	-1861.0	-2.675	0.000	2.675	-1.116	-0.001
30.00	-23.811	-24.123	0.001	-0.003	-1.208	-1740.4	-3.978	0.000	3.978	-1.367	-0.001
35.00	-23.505	-22.749	0.001	-0.003	-1.209	-1621.4	-5.543	0.000	5.543	-1.614	-0.002
40.00	-23.139	-21.438	0.001	-0.002	-1.209	-1503.9	-7.363	0.000	7.363	-1.858	-0.002
40.50	-23.128	-21.280	0.001	-0.003	-1.210	-1492.3	-7.559	0.000	7.559	-1.882	-0.002
43.33	-22.927	-20.532	0.001	-0.003	-1.210	-1426.8	-8.718	0.000	8.718	-2.019	-0.002
45.00	-22.816	-19.913	0.001	-0.004	-1.210	-1388.5	-9.437	0.000	9.437	-2.100	-0.002
48.00	-22.582	-18.841	0.001	-0.005	-1.211	-1320.1	-10.802	0.001	10.802	-2.240	-0.002
50.00	-22.463	-18.328	0.001	-0.007	-1.212	-1274.9	-11.760	0.001	11.760	-2.333	-0.002
55.00	-22.093	-17.128	0.001	-0.008	-1.213	-1162.6	-14.336	0.001	14.336	-2.583	-0.003
60.00	-21.682	-15.984	0.001	-0.008	-1.214	-1052.2	-17.170	0.001	17.170	-2.823	-0.003
60.75	-21.647	-15.776	0.001	-0.010	-1.214	-1035.9	-17.616	0.001	17.616	-2.859	-0.003
65.00	-21.314	-14.782	0.001	-0.013	-1.215	-943.94	-20.250	0.002	20.250	-3.055	-0.004
70.00	-20.905	-13.636	0.001	-0.016	-1.217	-837.37	-23.565	0.002	23.565	-3.273	-0.004
75.00	-20.480	-12.520	0.002	-0.020	-1.218	-732.85	-27.101	0.003	27.101	-3.477	-0.005
78.50	-20.175	-11.755	0.002	-0.023	-1.219	-661.17	-29.700	0.003	29.700	-3.612	-0.005
80.00	-20.081	-11.501	0.002	-0.027	-1.219	-630.91	-30.843	0.004	30.843	-3.668	-0.005
85.00	-19.682	-10.804	0.002	-0.034	-1.221	-530.50	-34.844	0.005	34.844	-3.964	-0.006
87.42	-19.493	-10.465	0.002	-0.038	-1.221	-482.94	-36.884	0.005	36.884	-4.098	-0.006
89.50	-17.201	-8.884	0.002	0.048	0.001	-440.78	-38.697	0.006	38.697	-4.208	-0.007
90.00	-17.162	-8.780	0.002	0.047	0.000	-432.18	-39.139	0.006	39.139	-4.234	-0.007
91.33	-17.053	-8.513	0.002	0.044	0.000	-409.30	-40.330	0.006	40.330	-4.301	-0.007
94.00	-16.726	-8.172	0.002	0.040	0.000	-363.82	-42.767	0.006	42.767	-4.426	-0.007
95.00	-16.662	-8.025	0.002	0.038	0.000	-347.10	-43.700	0.006	43.700	-4.484	-0.007
100.00	-12.693	-6.009	0.001	0.029	0.000	-263.79	-48.532	0.007	48.532	-4.735	-0.007
105.00	-12.283	-5.530	0.001	0.022	0.000	-200.33	-53.602	0.008	53.602	-4.943	-0.007
110.00	-7.624	-3.618	0.001	0.015	0.000	-138.91	-58.866	0.009	58.866	-5.108	-0.007
115.00	-7.219	-3.278	0.001	0.011	0.000	-100.79	-64.280	0.010	64.280	-5.236	-0.007
120.00	-6.817	-2.950	0.001	0.007	0.000	-64.701	-69.811	0.011	69.811	-5.332	-0.007
125.00	-6.517	-2.632	0.001	0.003	0.000	-30.618	-75.424	0.012	75.424	-5.393	-0.007
129.00	-0.063	-0.048	0.000	0.000	0.000	-0.063	-79.956	0.012	79.956	-5.429	-0.007
130.00	-0.058	0.000	0.000	0.000	0.000	0.000	0.000	0.000	81.091	-5.429	-0.007

Resulting Stresses

Structure:	CT13064-A-SBA	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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: 85 mphWind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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	0.80	1.23	0.00	0.02	0.00	31.96	32.76	52.0		0.630
5.00	0.77	1.24	0.00	0.02	0.00	31.14	31.14	52.0		0.599
8.00	0.75	1.24	0.00	0.02	0.00	30.63	30.63	52.0		0.589
10.00	0.74	1.25	0.00	0.02	0.00	47.43	47.43	52.0		0.912
15.00	0.72	1.26	0.00	0.02	0.00	46.27	46.27	52.0		0.890
20.00	0.70	1.27	0.00	0.02	0.00	45.04	45.04	52.0		0.866
20.50	0.69	1.27	0.00	0.02	0.00	44.91	44.91	52.0		0.864
25.00	0.67	1.28	0.00	0.02	0.00	43.73	43.73	52.0		0.841
30.00	0.65	1.29	0.00	0.02	0.00	42.34	42.34	52.0		0.815
35.00	0.62	1.30	0.00	0.02	0.00	40.85	40.85	52.0		0.786
40.00	0.60	1.31	0.00	0.02	0.00	39.27	39.27	52.0		0.755
40.50	0.60	1.31	0.00	0.02	0.00	39.11	39.11	52.0		0.752
43.33	0.58	1.31	0.00	0.02	0.00	38.17	38.17	52.0		0.734
45.00	0.57	1.32	0.00	0.02	0.00	37.28	37.28	52.0		0.717
48.00	0.67	1.63	0.00	0.03	0.00	36.23	36.23	52.0		0.697
50.00	0.66	1.63	0.00	0.03	0.00	40.41	40.41	52.0		0.777
55.00	0.63	1.64	0.00	0.03	0.00	38.20	38.20	52.0		0.735
60.00	0.60	1.65	0.00	0.03	0.00	35.86	35.86	52.0		0.690
60.75	0.60	1.65	0.00	0.03	0.00	35.51	35.51	52.0		0.683
65.00	0.57	1.66	0.00	0.03	0.00	33.40	33.40	52.0		0.643
70.00	0.54	1.67	0.00	0.04	0.00	30.78	30.78	52.0		0.592
75.00	0.51	1.67	0.00	0.04	0.00	28.00	28.00	52.0		0.539
78.50	0.48	1.68	0.00	0.04	0.00	25.97	26.46	52.0		0.509
80.00	0.48	1.68	0.00	0.04	0.00	42.03	42.62	52.0		0.820
85.00	0.46	1.69	0.00	0.04	0.00	37.23	37.81	52.0		0.727
87.42	0.45	1.70	0.00	0.04	0.00	34.78	35.36	52.0		0.680
89.50	0.39	1.51	0.00	0.00	0.00	32.46	32.95	52.0		0.634
90.00	0.38	1.51	0.00	0.00	0.00	32.00	32.49	52.0		0.625
91.33	0.49	1.99	0.00	0.00	0.00	39.68	40.32	52.0		0.776
94.00	0.48	1.98	0.00	0.00	0.00	36.30	36.94	51.3		0.721
95.00	0.47	1.98	0.00	0.00	0.00	35.02	35.66	51.4		0.694
100.00	0.37	1.55	0.00	0.00	0.00	28.13	28.62	52.0		0.551
105.00	0.35	1.55	0.00	0.00	0.00	22.62	23.12	52.0		0.445
110.00	0.23	0.99	0.00	0.00	0.00	16.64	16.96	52.0		0.326
115.00	0.22	0.97	0.00	0.00	0.00	12.83	13.15	52.0		0.253
120.00	0.20	0.94	0.00	0.00	0.00	8.76	9.11	52.0		0.175
120.00	0.20	0.94	0.00	0.00	0.00	8.76	9.11	52.0		0.251
125.00	0.19	0.94	0.00	0.00	0.00	6.02	6.42	52.0	49.6	0.123
129.00	0.00	0.01	0.00	0.00	0.00	0.01	0.02	52.0	49.6	0.000
130.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	52.0	49.6	0.000

Wind Loading - Shaft

Structure: CT13064-A-SBA
Site Name: Middletown 2, CT
Height: 130.00 (ft)
Base Elev: 0.000 (ft)

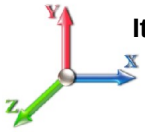
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/12/2015

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 24

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00	RB1 RB2	0.00	1.00	13.871	23.44	260.70	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	255.94	0.650	0.500	5.00	17.963	11.68	273.7	129.0	2586.8
8.00	RT2	0.00	1.00	13.871	23.44	253.08	0.650	0.500	3.00	10.623	6.90	161.9	76.5	1544.9
10.00		0.00	1.00	13.871	23.44	251.18	0.650	0.500	2.00	7.017	4.56	106.9	50.6	652.6
15.00		0.00	1.00	13.871	23.44	246.41	0.650	0.500	5.00	17.316	11.26	263.9	124.2	1620.0
20.00		0.00	1.00	13.871	23.44	241.65	0.650	0.500	5.00	16.993	11.05	258.9	121.8	1604.6
20.50	RT1 RB3	0.00	1.00	13.871	23.44	241.17	0.650	0.500	0.50	1.681	1.09	25.6	12.2	159.7
25.00		0.00	1.00	13.871	23.44	236.89	0.650	0.500	4.50	14.988	9.74	228.4	107.5	1429.6
30.00		0.00	1.00	13.871	23.44	232.12	0.650	0.500	5.00	16.346	10.62	249.1	117.1	1573.6
35.00		0.00	1.02	14.106	23.84	229.28	0.650	0.500	5.00	16.022	10.41	248.3	114.7	1558.2
40.00		0.00	1.06	14.655	24.77	228.80	0.650	0.500	5.00	15.699	10.20	252.7	112.4	1542.7
40.50	RT3 RB4	0.00	1.06	14.707	24.85	228.72	0.650	0.500	0.50	1.552	1.01	25.1	11.2	153.5
43.33	Bot - Section 2	0.00	1.08	14.994	25.34	228.13	0.650	0.500	2.83	8.734	5.68	143.9	62.8	866.7
45.00		0.00	1.09	15.156	25.61	227.70	0.650	0.500	1.67	5.159	3.35	85.9	37.2	669.6
48.00	Top - Section 1	0.00	1.11	15.439	26.09	226.80	0.650	0.500	3.00	9.195	5.98	155.9	66.1	1197.9
50.00		0.00	1.13	15.620	26.40	229.36	0.650	0.500	2.00	6.065	3.94	104.1	43.7	560.1
55.00		0.00	1.16	16.051	27.13	227.38	0.650	0.500	5.00	14.936	9.71	263.4	106.8	1390.5
60.00		0.00	1.19	16.455	27.81	225.04	0.650	0.500	5.00	14.613	9.50	264.1	104.4	1377.7
60.75	RT4 RB5	0.00	1.19	16.513	27.91	224.66	0.650	0.500	0.75	2.164	1.41	39.3	15.6	205.7
65.00		0.00	1.21	16.836	28.45	222.38	0.650	0.500	4.25	12.125	7.88	224.2	86.7	1159.4
70.00		0.00	1.24	17.196	29.06	219.44	0.650	0.500	5.00	13.966	9.08	263.8	99.7	1351.9
75.00		0.00	1.26	17.538	29.64	216.26	0.650	0.500	5.00	13.642	8.87	262.8	97.3	1339.1
78.50	RT5	0.00	1.28	17.768	30.03	213.90	0.650	0.500	3.50	9.357	6.08	182.6	66.9	930.0
80.00		0.00	1.29	17.865	30.19	212.86	0.650	0.500	1.50	3.962	2.58	77.7	28.5	151.8
85.00		0.00	1.31	18.177	30.72	209.25	0.650	0.500	5.00	12.995	8.45	259.5	92.5	496.7
87.42	Bot - Section 3	0.00	1.32	18.323	30.97	207.45	0.650	0.500	2.42	6.165	4.01	124.1	44.2	235.8
89.50	Appurtenance(s)	0.00	1.33	18.447	31.17	205.86	0.650	0.500	2.08	5.319	3.46	107.8	38.1	325.6
90.00		0.00	1.33	18.476	31.22	205.47	0.650	0.500	0.50	1.268	0.82	25.7	9.1	77.6
91.33	Top - Section 2	0.00	1.34	18.554	31.36	204.44	0.650	0.500	1.33	3.366	2.19	68.6	24.2	206.0
94.00	Appurtenance(s)	0.00	1.35	18.707	31.61	205.00	0.650	0.500	2.67	6.663	4.33	136.9	47.7	203.2
95.00		0.00	1.35	18.764	31.71	204.20	0.650	0.500	1.00	2.475	1.61	51.0	17.8	75.5
100.00	Appurtenance(s)	0.00	1.37	19.041	32.18	200.12	0.650	0.500	5.00	12.181	7.92	254.8	86.6	370.5
105.00		0.00	1.39	19.308	32.63	195.90	0.650	0.500	5.00	11.857	7.71	251.5	84.2	360.3
110.00	Appurtenance(s)	0.00	1.41	19.566	33.07	191.55	0.650	0.500	5.00	11.534	7.50	247.9	81.8	350.1
115.00		0.00	1.43	19.816	33.49	187.08	0.650	0.500	5.00	11.210	7.29	244.0	79.5	339.8
120.00	Top - Section 3	0.00	1.45	20.059	33.90	182.49	0.650	0.500	5.00	10.887	7.08	239.9	77.1	329.6
125.00		0.00	1.46	20.294	34.30	133.55	0.590	0.500	5.00	7.917	4.67	160.2	56.5	293.7
129.00	Appurtenance(s)	0.00	1.48	20.478	34.61	134.16	0.590	0.500	4.00	6.333	3.74	129.3	45.2	235.0
130.00	Appurtenance(s)	0.00	1.48	20.523	34.68	134.30	0.590	0.500	1.00	1.583	0.93	32.4	11.3	58.7
								Totals:	**130.00**			**6,495.8**		**29,584.8**

Discrete Appurtenance Forces

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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	130.00	6' Lightning rod	1	20.523	34.684	1.00	0.98	11.80	0.000	0.000	33.99	0.00	0.00
2	129.00	P65-16-XLH-RR	3	20.523	34.684	0.78	20.76	300.60	0.000	1.000	719.88	0.00	719.88
3	129.00	DC6-48-60-18-8F	2	20.523	34.684	1.00	5.14	99.00	0.000	1.000	178.27	0.00	178.27
4	129.00	DTMABP7819VG12A	3	20.523	34.684	0.69	2.61	79.50	0.000	1.000	90.46	0.00	90.46
5	129.00	OPA-65R-LCUU-H6	6	20.523	34.684	0.77	50.13	804.00	0.000	1.000	1738.58	0.00	1738.58
6	129.00	Platform w/ Hand Rail (round)	1	20.478	34.607	1.00	40.00	2200.00	0.000	0.000	1384.28	0.00	0.00
7	129.00	RRUS 11	3	20.523	34.684	0.77	7.25	198.00	0.000	1.000	251.57	0.00	251.57
8	129.00	RRUS-32	3	20.523	34.684	0.86	10.60	310.50	0.000	1.000	367.78	0.00	367.78
9	129.00	RRUS-E2	3	20.523	34.684	0.86	8.26	310.50	0.000	1.000	286.35	0.00	286.35
10	110.00	T-Arm (Round)	3	19.566	33.067	0.75	23.63	1260.00	0.000	0.000	781.21	0.00	0.00
11	110.00	SBNHH-1D65B	6	19.566	33.067	0.82	43.64	519.60	0.000	0.000	1443.06	0.00	0.00
12	110.00	RRH2X60-1900A-4R	3	19.566	33.067	0.85	6.04	176.40	0.000	0.000	199.84	0.00	0.00
13	110.00	DB-T1-6Z-8AB-0Z	2	19.566	33.067	1.00	11.74	92.00	0.000	0.000	388.21	0.00	0.00
14	110.00	CBC721-DF	3	19.515	32.981	0.67	1.07	21.30	0.000	-1.000	35.13	0.00	-35.13
15	110.00	CBC721-DF	3	19.617	33.153	0.67	1.07	21.30	0.000	1.000	35.32	0.00	35.32
16	110.00	B13 RRH4X30-4R	3	19.566	33.067	0.88	7.15	217.50	0.000	0.000	236.57	0.00	0.00
17	110.00	B4 RRH2X60-4R	3	19.566	33.067	0.79	9.60	226.20	0.000	0.000	317.39	0.00	0.00
18	100.00	AIR 21, 1.3M, B4A B2P	3	19.041	32.179	0.83	17.36	384.30	0.000	0.000	558.47	0.00	0.00
19	100.00	AIR 21, 1.3M, B2A B4P	3	19.041	32.179	0.83	17.36	387.60	0.000	0.000	558.47	0.00	0.00
20	100.00	782 11056	3	19.041	32.179	0.82	0.57	12.00	0.000	0.000	18.21	0.00	0.00
21	100.00	LNX-6515DS-A1M	3	19.041	32.179	0.84	30.04	346.80	0.000	0.000	966.60	0.00	0.00
22	100.00	T-Arm (Round)	3	19.041	32.179	0.75	23.63	1260.00	0.000	0.000	760.22	0.00	0.00
23	94.00	1'4"x6.5"x6" Surge Protector	1	18.707	31.615	1.00	2.69	66.00	0.000	0.000	85.04	0.00	0.00
24	89.50	VHLP800-11	1	18.517	31.294	1.00	8.92	97.40	2.231	1.200	279.14	622.83	334.97
25	89.50	VHLP2-18-1WH	1	18.523	31.303	1.00	5.05	59.00	2.231	1.300	158.08	352.72	205.51
26	89.50	T-Arm (Round)	3	18.447	31.175	0.75	23.63	1260.00	0.000	0.000	736.50	0.00	0.00
27	89.50	SPI-2213 RRH	3	18.534	31.323	0.77	4.57	136.80	0.000	1.500	143.27	0.00	214.90
28	89.50	840 10054	3	18.534	31.323	0.64	10.56	177.30	0.000	1.500	330.77	0.00	496.16
						Totals:		**11,035.40**			**13,082.67**		

Total Applied Force Summary

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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

Iterations: 24

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		320.60	1959.92	0.00	0.00
8.00		189.99	1168.81	0.00	0.00
10.00		125.68	589.05	0.00	0.00
15.00		310.74	1461.09	0.00	0.00
20.00		305.81	1445.61	0.00	0.00
20.50		30.31	143.82	0.00	0.00
25.00		270.57	1286.54	0.00	0.00
30.00		295.95	1414.67	0.00	0.00
35.00		295.96	1399.19	0.00	0.00
40.00		302.26	1383.72	0.00	0.00
40.50		30.05	137.63	0.00	0.00
43.33		172.57	776.65	0.00	0.00
45.00		102.96	616.65	0.00	0.00
48.00		187.25	1102.50	0.00	0.00
50.00		125.18	496.50	0.00	0.00
55.00		317.61	1231.55	0.00	0.00
60.00		319.75	1218.69	0.00	0.00
60.75		47.63	181.85	0.00	0.00
65.00		272.61	1024.30	0.00	0.00
70.00		321.93	1192.99	0.00	0.00
75.00		322.11	1180.13	0.00	0.00
78.50		224.67	818.69	0.00	0.00
80.00		95.86	226.58	0.00	0.00
85.00		320.91	746.09	0.00	0.00
87.42		154.02	356.30	0.00	0.00
89.50	(11) appurtenances	1781.53	2160.00	975.56	1251.53
90.00		31.98	102.28	0.00	0.00
91.33		85.33	271.69	0.00	0.00
94.00	(1) appurtenances	255.69	400.61	0.00	0.00
95.00		63.70	124.81	0.00	0.00
100.00	(15) appurtenances	3181.10	3007.65	0.00	0.00
105.00		316.75	559.02	0.00	0.00
110.00	(26) appurtenances	3750.76	3083.08	0.00	0.18
115.00		311.01	443.15	0.00	0.00
120.00		307.68	432.92	0.00	0.00
125.00		228.79	396.99	0.00	0.00
129.00	(24) appurtenances	5201.87	4619.69	0.00	3632.90
130.00	(1) appurtenances	66.39	70.54	0.00	0.00
	Totals:	**21,045.56**	**39,231.96**	**975.56**	**4,884.61**

Resulting Forces and Deflections

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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	-21.096	-39.205	0.000	-0.011	-0.967	-2084.9	0.000	0.000	0.000	0.000	0.000
5.00	-20.848	-37.203	0.000	-0.008	-0.967	-1979.4	-0.078	0.000	0.078	-0.145	0.000
8.00	-20.700	-36.009	0.000	-0.006	-0.967	-1916.8	-0.197	0.000	0.197	-0.233	0.000
10.00	-20.658	-35.370	0.000	-0.006	-0.967	-1875.4	-0.307	0.000	0.307	-0.291	0.000
15.00	-20.465	-33.834	0.000	-0.005	-0.967	-1772.1	-0.728	0.000	0.728	-0.508	0.000
20.00	-20.210	-32.350	0.000	-0.003	-0.967	-1669.8	-1.376	0.000	1.376	-0.724	-0.001
20.50	-20.239	-32.169	0.000	-0.005	-0.967	-1659.7	-1.453	0.000	1.453	-0.746	-0.001
25.00	-20.058	-30.816	0.000	-0.004	-0.968	-1568.6	-2.249	0.000	2.249	-0.939	-0.001
30.00	-19.844	-29.334	0.000	-0.004	-0.968	-1468.4	-3.345	0.000	3.345	-1.151	-0.001
35.00	-19.619	-27.871	0.000	-0.004	-0.968	-1369.1	-4.662	0.000	4.662	-1.359	-0.001
40.00	-19.333	-26.458	0.000	-0.003	-0.968	-1271.0	-6.196	0.000	6.196	-1.565	-0.001
40.50	-19.331	-26.298	0.000	-0.004	-0.969	-1261.4	-6.361	0.000	6.361	-1.586	-0.001
43.33	-19.176	-25.496	0.001	-0.004	-0.969	-1206.6	-7.337	0.000	7.337	-1.701	-0.002
45.00	-19.096	-24.851	0.001	-0.005	-0.969	-1174.7	-7.943	0.000	7.943	-1.769	-0.002
48.00	-18.914	-23.723	0.001	-0.005	-0.969	-1117.4	-9.093	0.000	9.093	-1.888	-0.002
50.00	-18.832	-23.183	0.001	-0.007	-0.970	-1079.5	-9.901	0.000	9.901	-1.967	-0.002
55.00	-18.549	-21.896	0.001	-0.007	-0.971	-985.43	-12.074	0.001	12.074	-2.178	-0.002
60.00	-18.223	-20.655	0.001	-0.007	-0.971	-892.68	-14.464	0.001	14.464	-2.382	-0.003
60.75	-18.203	-20.443	0.001	-0.009	-0.971	-879.02	-14.841	0.001	14.841	-2.413	-0.003
65.00	-17.946	-19.377	0.001	-0.010	-0.972	-801.65	-17.064	0.001	17.064	-2.579	-0.003
70.00	-17.625	-18.145	0.001	-0.012	-0.973	-711.93	-19.864	0.002	19.864	-2.764	-0.003
75.00	-17.287	-16.939	0.001	-0.015	-0.973	-623.80	-22.852	0.002	22.852	-2.938	-0.004
78.50	-17.043	-16.109	0.001	-0.017	-0.974	-563.29	-25.048	0.002	25.048	-3.053	-0.004
80.00	-16.978	-15.843	0.001	-0.019	-0.974	-537.73	-26.015	0.003	26.015	-3.101	-0.004
85.00	-16.663	-15.063	0.001	-0.024	-0.975	-452.84	-29.399	0.003	29.399	-3.353	-0.005
87.42	-16.515	-14.687	0.001	-0.027	-0.975	-412.57	-31.125	0.004	31.125	-3.468	-0.005
89.50	-14.617	-12.625	0.001	0.032	0.000	-376.92	-32.660	0.004	32.660	-3.562	-0.005
90.00	-14.587	-12.515	0.001	0.031	0.000	-369.61	-33.034	0.004	33.034	-3.584	-0.005
91.33	-14.503	-12.228	0.001	0.030	0.000	-350.16	-34.043	0.004	34.043	-3.641	-0.005
94.00	-14.238	-11.826	0.001	0.026	0.000	-311.49	-36.107	0.004	36.107	-3.748	-0.005
95.00	-14.194	-11.672	0.001	0.025	0.000	-297.25	-36.897	0.004	36.897	-3.798	-0.005
100.00	-10.845	-8.851	0.001	0.019	0.000	-226.28	-40.992	0.005	40.992	-4.013	-0.005
105.00	-10.512	-8.287	0.001	0.014	0.000	-172.06	-45.291	0.006	45.291	-4.191	-0.005
110.00	-6.554	-5.477	0.001	0.010	0.000	-119.49	-49.757	0.006	49.757	-4.333	-0.005
115.00	-6.219	-5.049	0.001	0.007	0.000	-86.727	-54.353	0.007	54.353	-4.443	-0.005
120.00	-5.884	-4.634	0.001	0.005	0.000	-55.633	-59.049	0.007	59.049	-4.526	-0.005
125.00	-5.627	-4.253	0.000	0.002	0.000	-26.214	-63.815	0.008	63.815	-4.578	-0.005
129.00	-0.072	-0.065	0.000	0.000	0.000	-0.072	-67.664	0.009	67.664	-4.609	-0.005
130.00	-0.066	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.628	-4.609	-0.005

Resulting Stresses

Structure:	CT13064-A-SBA	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 24

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	0.94	1.02	0.00	0.01	0.00	26.82	27.76	52.0		0.534
5.00	0.91	1.02	0.00	0.01	0.00	26.15	26.15	52.0		0.503
8.00	0.89	1.03	0.00	0.01	0.00	25.74	25.74	52.0		0.495
10.00	0.88	1.03	0.00	0.01	0.00	39.87	39.87	52.0		0.767
15.00	0.86	1.04	0.00	0.01	0.00	38.93	38.93	52.0		0.749
20.00	0.83	1.05	0.00	0.02	0.00	37.93	37.93	52.0		0.730
20.50	0.83	1.05	0.00	0.02	0.00	37.83	37.83	52.0		0.728
25.00	0.81	1.06	0.00	0.02	0.00	36.86	36.86	52.0		0.709
30.00	0.79	1.07	0.00	0.02	0.00	35.72	35.72	52.0		0.687
35.00	0.76	1.08	0.00	0.02	0.00	34.50	34.50	52.0		0.664
40.00	0.74	1.09	0.00	0.02	0.00	33.19	33.19	52.0		0.639
40.50	0.74	1.09	0.00	0.02	0.00	33.06	33.06	52.0		0.636
43.33	0.72	1.10	0.00	0.02	0.00	32.28	32.28	52.0		0.621
45.00	0.71	1.10	0.00	0.02	0.00	31.54	31.54	52.0		0.607
48.00	0.85	1.36	0.00	0.02	0.00	30.67	30.67	52.0		0.590
50.00	0.84	1.37	0.00	0.02	0.00	34.22	34.22	52.0		0.658
55.00	0.81	1.38	0.00	0.03	0.00	32.38	32.38	52.0		0.623
60.00	0.78	1.38	0.00	0.03	0.00	30.43	30.43	52.0		0.585
60.75	0.77	1.39	0.00	0.03	0.00	30.13	30.13	52.0		0.580
65.00	0.75	1.40	0.00	0.03	0.00	28.37	28.37	52.0		0.546
70.00	0.72	1.40	0.00	0.03	0.00	26.17	26.17	52.0		0.503
75.00	0.69	1.41	0.00	0.03	0.00	23.84	23.84	52.0		0.459
78.50	0.66	1.42	0.00	0.03	0.00	22.13	22.79	52.0		0.438
80.00	0.66	1.42	0.00	0.03	0.00	35.83	36.57	52.0		0.704
85.00	0.64	1.43	0.00	0.03	0.00	31.78	32.53	52.0		0.626
87.42	0.63	1.44	0.00	0.04	0.00	29.71	30.45	52.0		0.586
89.50	0.55	1.29	0.00	0.00	0.00	27.76	28.40	52.0		0.546
90.00	0.55	1.29	0.00	0.00	0.00	27.37	28.00	52.0		0.539
91.33	0.71	1.69	0.00	0.00	0.00	33.95	34.78	52.0		0.669
94.00	0.70	1.69	0.00	0.00	0.00	31.08	31.91	51.3		0.622
95.00	0.69	1.69	0.00	0.00	0.00	29.99	30.82	51.4		0.600
100.00	0.54	1.33	0.00	0.00	0.00	24.13	24.78	52.0		0.477
105.00	0.52	1.32	0.00	0.00	0.00	19.43	20.08	52.0		0.386
110.00	0.35	0.85	0.00	0.00	0.00	14.31	14.74	52.0		0.284
115.00	0.33	0.83	0.00	0.00	0.00	11.04	11.46	52.0		0.220
120.00	0.32	0.81	0.00	0.00	0.00	7.54	7.98	52.0		0.153
120.00	0.32	0.81	0.00	0.00	0.00	7.54	7.98	52.0		0.219
125.00	0.31	0.81	0.00	0.00	0.00	5.15	5.63	52.0	49.6	0.108
129.00	0.00	0.01	0.00	0.00	0.00	0.01	0.03	52.0	49.6	0.000
130.00	0.00	0.01	0.00	0.00	0.00	0.00	0.02	52.0	49.6	0.000

Wind Loading - Shaft

Structure: CT13064-A-SBA
Site Name: Middletown 2, CT
Height: 130.00 (ft)
Base Elev: 0.000 (ft)

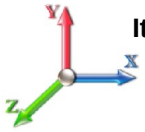
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

11/12/2015

Tower Engineering Solutions

Load Case: 50 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	RB1 RB2	0.00	1.00	6.400	10.82	177.08	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	173.85	0.650	0.000	5.00	17.547	11.41	123.4	0.0	2457.8
8.00	RT2	0.00	1.00	6.400	10.82	171.91	0.650	0.000	3.00	10.373	6.74	72.9	0.0	1468.4
10.00		0.00	1.00	6.400	10.82	170.61	0.650	0.000	2.00	6.850	4.45	48.2	0.0	602.0
15.00		0.00	1.00	6.400	10.82	167.38	0.650	0.000	5.00	16.900	10.98	118.8	0.0	1495.8
20.00		0.00	1.00	6.400	10.82	164.14	0.650	0.000	5.00	16.576	10.77	116.5	0.0	1482.7
20.50	RT1 RB3	0.00	1.00	6.400	10.82	163.82	0.650	0.000	0.50	1.640	1.07	11.5	0.0	147.6
25.00		0.00	1.00	6.400	10.82	160.91	0.650	0.000	4.50	14.613	9.50	102.7	0.0	1322.1
30.00		0.00	1.00	6.400	10.82	157.67	0.650	0.000	5.00	15.929	10.35	112.0	0.0	1456.5
35.00		0.00	1.02	6.509	11.00	155.74	0.650	0.000	5.00	15.605	10.14	111.6	0.0	1443.4
40.00		0.00	1.06	6.762	11.43	155.41	0.650	0.000	5.00	15.282	9.93	113.5	0.0	1430.3
40.50	RT3 RB4	0.00	1.06	6.786	11.47	155.36	0.650	0.000	0.50	1.510	0.98	11.3	0.0	142.3
43.33	Bot - Section 2	0.00	1.08	6.918	11.69	154.96	0.650	0.000	2.83	8.498	5.52	64.6	0.0	804.0
45.00		0.00	1.09	6.993	11.82	154.67	0.650	0.000	1.67	5.020	3.26	38.6	0.0	632.5
48.00	Top - Section 1	0.00	1.11	7.123	12.04	154.05	0.650	0.000	3.00	8.945	5.81	70.0	0.0	1131.8
50.00		0.00	1.13	7.207	12.18	155.79	0.650	0.000	2.00	5.898	3.83	46.7	0.0	516.4
55.00		0.00	1.16	7.406	12.52	154.45	0.650	0.000	5.00	14.520	9.44	118.1	0.0	1283.7
60.00		0.00	1.19	7.592	12.83	152.86	0.650	0.000	5.00	14.196	9.23	118.4	0.0	1273.2
60.75	RT4 RB5	0.00	1.19	7.619	12.88	152.60	0.650	0.000	0.75	2.102	1.37	17.6	0.0	190.1
65.00		0.00	1.21	7.768	13.13	151.05	0.650	0.000	4.25	11.771	7.65	100.4	0.0	1072.7
70.00		0.00	1.24	7.934	13.41	149.06	0.650	0.000	5.00	13.549	8.81	118.1	0.0	1252.3
75.00		0.00	1.26	8.092	13.68	146.89	0.650	0.000	5.00	13.226	8.60	117.6	0.0	1241.8
78.50	RT5	0.00	1.28	8.198	13.85	145.29	0.650	0.000	3.50	9.065	5.89	81.6	0.0	863.0
80.00		0.00	1.29	8.242	13.93	144.58	0.650	0.000	1.50	3.837	2.49	34.7	0.0	123.3
85.00		0.00	1.31	8.387	14.17	142.14	0.650	0.000	5.00	12.579	8.18	115.9	0.0	404.2
87.42	Bot - Section 3	0.00	1.32	8.454	14.29	140.91	0.650	0.000	2.42	5.964	3.88	55.4	0.0	191.6
89.50	Appurtenance(s)	0.00	1.33	8.511	14.38	139.83	0.650	0.000	2.08	5.146	3.34	48.1	0.0	287.4
90.00		0.00	1.33	8.525	14.41	139.57	0.650	0.000	0.50	1.227	0.80	11.5	0.0	68.5
91.33	Top - Section 2	0.00	1.34	8.560	14.47	138.86	0.650	0.000	1.33	3.255	2.12	30.6	0.0	181.8
94.00	Appurtenance(s)	0.00	1.35	8.631	14.59	139.25	0.650	0.000	2.67	6.441	4.19	61.1	0.0	155.5
95.00		0.00	1.35	8.657	14.63	138.71	0.650	0.000	1.00	2.392	1.55	22.7	0.0	57.7
100.00	Appurtenance(s)	0.00	1.37	8.785	14.85	135.94	0.650	0.000	5.00	11.764	7.65	113.5	0.0	284.0
105.00		0.00	1.39	8.908	15.06	133.07	0.650	0.000	5.00	11.441	7.44	112.0	0.0	276.1
110.00	Appurtenance(s)	0.00	1.41	9.028	15.26	130.11	0.650	0.000	5.00	11.117	7.23	110.2	0.0	268.2
115.00		0.00	1.43	9.143	15.45	127.08	0.650	0.000	5.00	10.794	7.02	108.4	0.0	260.4
120.00	Top - Section 3	0.00	1.45	9.255	15.64	123.96	0.650	0.000	5.00	10.470	6.81	106.4	0.0	252.5
125.00		0.00	1.46	9.363	15.82	90.72	0.590	0.000	5.00	7.500	4.42	70.0	0.0	237.2
129.00	Appurtenance(s)	0.00	1.48	9.448	15.97	91.13	0.590	0.000	4.00	6.000	3.54	56.5	0.0	189.8
130.00	Appurtenance(s)	0.00	1.48	9.469	16.00	91.23	0.590	0.000	1.00	1.500	0.89	14.2	0.0	47.4
								Totals:	**130.00**			**2,905.3**		**26,996.1**

Discrete Appurtenance Forces

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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: 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	130.00	6' Lightning rod	1	9.469	16.003	1.00	0.38	6.50	0.000	0.000	6.08	0.00	0.00
2	129.00	P65-16-XLH-RR	3	9.469	16.003	0.78	19.66	159.00	0.000	1.000	314.55	0.00	314.55
3	129.00	DC6-48-60-18-8F	2	9.469	16.003	1.00	2.94	5.54	0.000	1.000	47.05	0.00	47.05
4	129.00	DTMABP7819VG12A	3	9.469	16.003	0.67	2.29	57.60	0.000	1.000	36.67	0.00	36.67
5	129.00	OPA-65R-LCUU-H6	6	9.469	16.003	0.77	48.97	480.00	0.000	1.000	783.68	0.00	783.68
6	129.00	Platform w/ Hand Rail (round)	1	9.448	15.967	1.00	32.00	1600.00	0.000	0.000	510.95	0.00	0.00
7	129.00	RRUS 11	3	9.469	16.003	0.76	6.70	152.10	0.000	1.000	107.27	0.00	107.27
8	129.00	RRUS-32	3	9.469	16.003	0.86	9.98	231.00	0.000	1.000	159.78	0.00	159.78
9	129.00	RRUS-E2	3	9.469	16.003	0.86	6.45	225.00	0.000	1.000	103.22	0.00	103.22
10	110.00	T-Arm (Round)	3	9.028	15.257	0.75	18.00	1050.00	0.000	0.000	274.62	0.00	0.00
11	110.00	SBNHH-1D65B	6	9.028	15.257	0.82	41.33	240.00	0.000	0.000	630.53	0.00	0.00
12	110.00	RRH2X60-1900A-4R	3	9.028	15.257	0.84	5.52	138.00	0.000	0.000	84.20	0.00	0.00
13	110.00	DB-T1-6Z-8AB-0Z	2	9.028	15.257	1.00	11.20	37.80	0.000	0.000	170.88	0.00	0.00
14	110.00	CBC721-DF	3	9.004	15.217	0.63	0.85	13.20	0.000	-1.000	12.94	0.00	-12.94
15	110.00	CBC721-DF	3	9.051	15.296	0.63	0.85	13.20	0.000	1.000	13.01	0.00	13.01
16	110.00	B13 RRH4X30-4R	3	9.028	15.257	0.86	6.50	171.60	0.000	0.000	99.19	0.00	0.00
17	110.00	B4 RRH2X60-4R	3	9.028	15.257	0.77	8.73	165.00	0.000	0.000	133.22	0.00	0.00
18	100.00	AIR 21, 1.3M, B4A B2P	3	8.785	14.847	0.83	16.38	271.20	0.000	0.000	243.25	0.00	0.00
19	100.00	AIR 21, 1.3M, B2A B4P	3	8.785	14.847	0.83	16.38	274.50	0.000	0.000	243.25	0.00	0.00
20	100.00	782 11056	3	8.785	14.847	0.78	0.40	5.40	0.000	0.000	5.91	0.00	0.00
21	100.00	LNX-6515DS-A1M	3	8.785	14.847	0.84	28.75	150.90	0.000	0.000	426.89	0.00	0.00
22	100.00	T-Arm (Round)	3	8.785	14.847	0.75	18.00	1050.00	0.000	0.000	267.24	0.00	0.00
23	94.00	1'4"x6.5"x6" Surge Protector	1	8.631	14.587	1.00	2.50	53.00	0.000	0.000	36.47	0.00	0.00
24	89.50	VHLP800-11	1	8.543	14.438	1.00	8.43	48.00	2.231	1.200	121.72	271.58	146.06
25	89.50	VHLP2-18-1WH	1	8.546	14.443	1.00	4.69	31.00	2.231	1.300	67.74	151.14	88.06
26	89.50	T-Arm (Round)	3	8.511	14.384	0.75	21.38	1050.00	0.000	0.000	307.45	0.00	0.00
27	89.50	SPI-2213 RRH	3	8.552	14.452	0.76	4.15	99.30	0.000	1.500	59.97	0.00	89.96
28	89.50	840 10054	3	8.552	14.452	0.63	9.79	105.00	0.000	1.500	141.49	0.00	212.23
						Totals:		**7,883.84**			**5,409.21**		

Total Applied Force Summary

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 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: 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		139.58	1829.65	0.00	0.00
8.00		82.66	1091.50	0.00	0.00
10.00		54.65	537.90	0.00	0.00
15.00		135.03	1335.57	0.00	0.00
20.00		132.76	1322.47	0.00	0.00
20.50		13.15	131.53	0.00	0.00
25.00		117.33	1177.84	0.00	0.00
30.00		128.21	1296.26	0.00	0.00
35.00		128.07	1283.16	0.00	0.00
40.00		130.65	1270.05	0.00	0.00
40.50		12.98	126.28	0.00	0.00
43.33		74.52	713.14	0.00	0.00
45.00		44.47	579.04	0.00	0.00
48.00		80.83	1035.67	0.00	0.00
50.00		54.00	452.32	0.00	0.00
55.00		136.89	1123.47	0.00	0.00
60.00		137.64	1112.99	0.00	0.00
60.75		20.49	166.04	0.00	0.00
65.00		117.18	936.46	0.00	0.00
70.00		138.20	1092.03	0.00	0.00
75.00		138.07	1081.54	0.00	0.00
78.50		96.19	750.84	0.00	0.00
80.00		41.01	197.72	0.00	0.00
85.00		137.14	652.24	0.00	0.00
87.42		65.74	311.49	0.00	0.00
89.50	(11) appurtenances	755.46	1724.11	422.72	536.31
90.00		13.65	93.02	0.00	0.00
91.33		36.40	247.16	0.00	0.00
94.00	(1) appurtenances	109.21	339.22	0.00	0.00
95.00		27.13	106.76	0.00	0.00
100.00	(15) appurtenances	1322.35	2281.07	0.00	0.00
105.00		134.54	473.51	0.00	0.00
110.00	(26) appurtenances	1551.72	2294.45	0.00	0.07
115.00		131.58	362.39	0.00	0.00
120.00		129.91	354.53	0.00	0.00
125.00		93.76	339.19	0.00	0.00
129.00	(24) appurtenances	2138.84	3181.59	0.00	1552.20
130.00	(1) appurtenances	20.24	53.94	0.00	0.00
	Totals:	**8,822.23**	**33,458.15**	**422.72**	**2,088.58**

Resulting Forces and Deflections

Structure:	CT13064-A-SB	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Load Case: 50 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	-8.839	-33.453	0.000	-0.001	-0.422	-860.55	0.000	0.000	0.000	0.000	0.000
5.00	-8.725	-31.617	0.000	-0.001	-0.422	-816.36	-0.032	0.000	0.032	-0.060	0.000
8.00	-8.657	-30.521	0.000	-0.001	-0.422	-790.18	-0.081	0.000	0.081	-0.096	0.000
10.00	-8.631	-29.974	0.000	-0.001	-0.422	-772.87	-0.127	0.000	0.127	-0.120	0.000
15.00	-8.537	-28.626	0.000	-0.001	-0.422	-729.71	-0.300	0.000	0.300	-0.209	0.000
20.00	-8.421	-27.297	0.000	0.000	-0.422	-687.03	-0.567	0.000	0.567	-0.298	0.000
20.50	-8.429	-27.159	0.000	0.000	-0.422	-682.82	-0.599	0.000	0.599	-0.307	0.000
25.00	-8.342	-25.970	0.000	0.000	-0.422	-644.89	-0.927	0.000	0.927	-0.387	0.000
30.00	-8.241	-24.662	0.000	0.000	-0.422	-603.18	-1.378	0.000	1.378	-0.474	0.000
35.00	-8.136	-23.368	0.000	0.000	-0.422	-561.97	-1.920	0.000	1.920	-0.559	-0.001
40.00	-8.010	-22.093	0.000	0.000	-0.422	-521.29	-2.551	0.000	2.551	-0.644	-0.001
40.50	-8.006	-21.963	0.000	0.000	-0.422	-517.29	-2.619	0.000	2.619	-0.652	-0.001
43.33	-7.937	-21.245	0.000	0.000	-0.422	-494.60	-3.021	0.000	3.021	-0.700	-0.001
45.00	-7.900	-20.662	0.000	0.000	-0.422	-481.37	-3.270	0.000	3.270	-0.728	-0.001
48.00	-7.819	-19.622	0.000	0.000	-0.422	-457.68	-3.743	0.000	3.743	-0.776	-0.001
50.00	-7.779	-19.162	0.000	-0.001	-0.422	-442.04	-4.075	0.000	4.075	-0.808	-0.001
55.00	-7.652	-18.029	0.000	-0.001	-0.422	-403.14	-4.968	0.000	4.968	-0.895	-0.001
60.00	-7.510	-16.913	0.000	-0.001	-0.422	-364.89	-5.951	0.000	5.951	-0.978	-0.001
60.75	-7.499	-16.742	0.000	-0.001	-0.422	-359.25	-6.105	0.000	6.105	-0.991	-0.001
65.00	-7.385	-15.798	0.000	-0.001	-0.422	-327.38	-7.018	0.000	7.018	-1.059	-0.001
70.00	-7.244	-14.700	0.000	-0.002	-0.423	-290.46	-8.168	0.000	8.168	-1.134	-0.001
75.00	-7.098	-13.614	0.000	-0.002	-0.423	-254.24	-9.394	0.000	9.394	-1.205	-0.002
78.50	-6.993	-12.861	0.000	-0.003	-0.423	-229.40	-10.296	0.000	10.296	-1.252	-0.002
80.00	-6.962	-12.657	0.000	-0.003	-0.423	-218.91	-10.692	0.000	10.692	-1.272	-0.002
85.00	-6.825	-11.999	0.000	-0.004	-0.423	-184.10	-12.080	0.001	12.080	-1.374	-0.002
87.42	-6.760	-11.685	0.000	-0.005	-0.423	-167.61	-12.788	0.001	12.788	-1.421	-0.002
89.50	-5.966	-9.978	0.000	0.006	0.000	-152.99	-13.417	0.001	13.417	-1.459	-0.002
90.00	-5.953	-9.883	0.000	0.006	0.000	-150.00	-13.570	0.001	13.570	-1.468	-0.002
91.33	-5.916	-9.634	0.000	0.005	0.000	-142.07	-13.984	0.001	13.984	-1.491	-0.002
94.00	-5.803	-9.294	0.000	0.005	0.000	-126.29	-14.829	0.001	14.829	-1.535	-0.002
95.00	-5.781	-9.183	0.000	0.005	0.000	-120.49	-15.153	0.001	15.153	-1.555	-0.002
100.00	-4.406	-6.933	0.000	0.003	0.000	-91.588	-16.830	0.001	16.830	-1.642	-0.002
105.00	-4.264	-6.459	0.000	0.003	0.000	-69.561	-18.590	0.001	18.590	-1.714	-0.002
110.00	-2.647	-4.211	0.000	0.002	0.000	-48.239	-20.417	0.001	20.417	-1.771	-0.002
115.00	-2.507	-3.851	0.000	0.001	0.000	-35.003	-22.297	0.001	22.297	-1.816	-0.002
120.00	-2.368	-3.500	0.000	0.001	0.000	-22.468	-24.218	0.001	24.218	-1.849	-0.002
125.00	-2.264	-3.163	0.000	0.000	0.000	-10.630	-26.167	0.001	26.167	-1.870	-0.002
129.00	-0.022	-0.053	0.000	0.000	0.000	-0.022	-27.740	0.001	27.740	-1.883	-0.002
130.00	-0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.135	-1.883	-0.002

Resulting Stresses

Structure:	CT13064-A-SBA	**Code:**	EIA/TIA-222-F	11/12/2015	
Site Name:	Middletown 2, CT	**Exposure:**	C		
Height:	130.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case: 50 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	0.80	0.43	0.00	0.01	0.00	11.07	11.87	52.0		0.228
5.00	0.77	0.43	0.00	0.01	0.00	10.79	10.79	52.0		0.208
8.00	0.75	0.43	0.00	0.01	0.00	10.61	10.61	52.0		0.204
10.00	0.74	0.43	0.00	0.01	0.00	16.43	16.43	52.0		0.316
15.00	0.72	0.44	0.00	0.01	0.00	16.03	16.03	52.0		0.308
20.00	0.70	0.44	0.00	0.01	0.00	15.61	15.61	52.0		0.300
20.50	0.70	0.44	0.00	0.01	0.00	15.56	15.56	52.0		0.299
25.00	0.68	0.44	0.00	0.01	0.00	15.15	15.15	52.0		0.292
30.00	0.66	0.45	0.00	0.01	0.00	14.67	14.67	52.0		0.282
35.00	0.64	0.45	0.00	0.01	0.00	14.16	14.16	52.0		0.272
40.00	0.62	0.45	0.00	0.01	0.00	13.61	13.61	52.0		0.262
40.50	0.62	0.45	0.00	0.01	0.00	13.56	13.56	52.0		0.261
43.33	0.60	0.45	0.00	0.01	0.00	13.23	13.23	52.0		0.255
45.00	0.59	0.46	0.00	0.01	0.00	12.93	12.93	52.0		0.249
48.00	0.70	0.56	0.00	0.01	0.00	12.56	12.56	52.0		0.242
50.00	0.69	0.56	0.00	0.01	0.00	14.01	14.01	52.0		0.270
55.00	0.66	0.57	0.00	0.01	0.00	13.25	13.25	52.0		0.255
60.00	0.64	0.57	0.00	0.01	0.00	12.44	12.44	52.0		0.239
60.75	0.63	0.57	0.00	0.01	0.00	12.31	12.31	52.0		0.237
65.00	0.61	0.57	0.00	0.01	0.00	11.58	11.58	52.0		0.223
70.00	0.58	0.58	0.00	0.01	0.00	10.68	10.68	52.0		0.205
75.00	0.55	0.58	0.00	0.01	0.00	9.71	9.71	52.0		0.187
78.50	0.53	0.58	0.00	0.01	0.00	9.01	9.54	52.0		0.184
80.00	0.53	0.58	0.00	0.01	0.00	14.58	15.15	52.0		0.291
85.00	0.51	0.59	0.00	0.01	0.00	12.92	13.47	52.0		0.259
87.42	0.50	0.59	0.00	0.02	0.00	12.07	12.62	52.0		0.243
89.50	0.44	0.53	0.00	0.00	0.00	11.27	11.74	52.0		0.226
90.00	0.43	0.53	0.00	0.00	0.00	11.11	11.58	52.0		0.223
91.33	0.56	0.69	0.00	0.00	0.00	13.77	14.38	52.0		0.277
94.00	0.55	0.69	0.00	0.00	0.00	12.60	13.20	51.3		0.258
95.00	0.54	0.69	0.00	0.00	0.00	12.16	12.75	51.4		0.248
100.00	0.42	0.54	0.00	0.00	0.00	9.77	10.23	52.0		0.197
105.00	0.40	0.54	0.00	0.00	0.00	7.85	8.31	52.0		0.160
110.00	0.27	0.34	0.00	0.00	0.00	5.78	6.08	52.0		0.117
115.00	0.26	0.34	0.00	0.00	0.00	4.45	4.74	52.0		0.091
120.00	0.24	0.33	0.00	0.00	0.00	3.04	3.33	52.0		0.064
120.00	0.24	0.33	0.00	0.00	0.00	3.04	3.33	52.0		0.091
125.00	0.23	0.32	0.00	0.00	0.00	2.09	2.38	52.0	49.6	0.046
129.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	49.6	0.000
130.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	52.0	49.6	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)
85 mphWind with 0" Ice	25.5	0.00	33.42	0.01	1.21	2484.29
73.61 mph Wind with 0.5" Ice	21.1	0.00	39.20	0.01	0.97	2084.91
50 mph Wind with 0" Ice	8.8	0.00	33.45	0.00	0.42	860.56

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 mphWind with 0" Ice	0.74	1.25	0.00	0.02	0.00	47.43	47.43	52.0	10.00	0.912
73.61 mph Wind with 0.5" Ice	0.88	1.03	0.00	0.01	0.00	39.87	39.87	52.0	10.00	0.767
50 mph Wind with 0" Ice	0.74	0.43	0.00	0.01	0.00	16.43	16.43	52.0	10.00	0.316

Additional Steel Summary

			Intermediate Connectors						Upper Termination			Lower Termination			Max Member			
Elev From (ft)	Elev To (ft)	Member	VQ/I (lb/in)	V (kips)	Shear Allow (kips)	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Ta (kips)	Pa (kips)	Ratio
0.0	20.5	(4) PLT-6"x1" (1.25" Hole)	-244.1	-3.91	33.0	237.0	0	8	183.9	0	8	253.4	253.3	280.3	0.895			
0.0	8.0	(4) PLT-5.5"x1 1/4"(1.25"hol	185.8	3.34	33.0	203.2	7	9	212.0	0		212.0	283.3	325.8	0.651			
20.5	40.5	(4) PLT-6"x1" (1.25" Hole)	-265.1	-4.24	33.0	205.2	0	8	237.0	0	8	237.0	253.3	280.3	0.846			
40.5	60.8	(4) PLT-6"x1" (1.25" Hole)	-316.8	-5.07	33.0	181.9	0	8	205.3	0	8	207.7	253.3	280.3	0.741			
60.8	78.5	(4) PLT-6"x1" (1.25" Hole)	-336.6	-5.39	33.0	132.3	5	8	182.0	0	8	182.0	253.3	280.3	0.649			

Monopole Mat Foundation Design

			Date: 10/7/2015
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-F
Site Name:		**Structure Height (Ft.):**	130
Site Number:	CT13064-A-SBA	**Engineer Name:**	S. Hesselbein
Engr. Number:	17887	**Engineer Login ID:**	

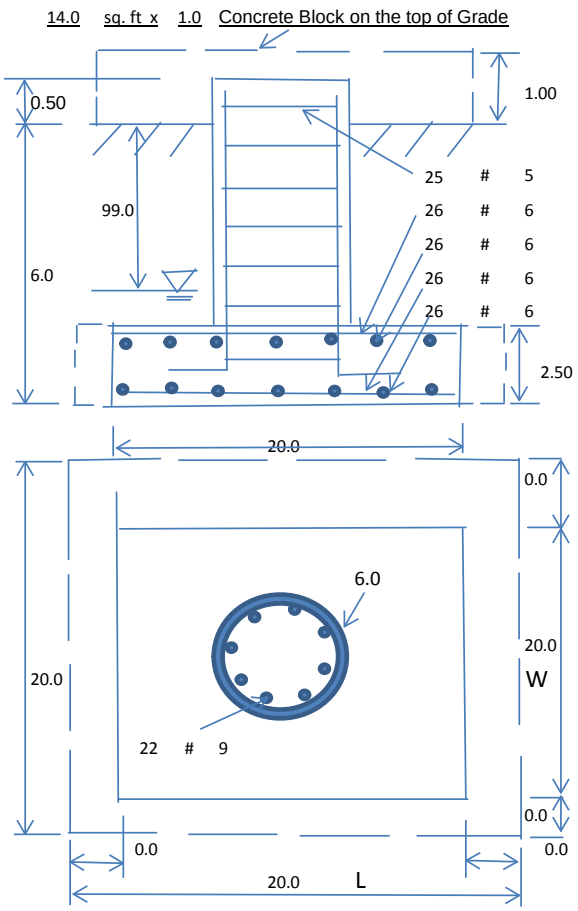
Foundation Info Obtained from:	Drawings/Calculations
Structure Type:	Monopole
Analysis or Design?	Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	33.4	Shear Force (Kips):	25.4
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2484.3
Allowable overstress %:	0.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	Yes
Diameter of Pier (ft.):	6.0	Depth of Base BG (ft.):	6.0
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	2.50
Length of Pad (ft.):	20	Width of Pad (ft.):	20
Add Concrete Width & Length (ft.)	14	Add Concrete Thick. (ft)	1
Final Length of pad (ft)	20.0	Final width of pad (ft):	20.0
Control Value for Cell D18:	14	Control Value for Cell F18:	1



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 #:	5	
Qty. of Vertical Rebars:	22	Tie Spacing (in):	3.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	6	
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):	26	Qty. of Rebar in Pad (W):	26	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	26	Qty. of Rebar in Pad (W):	26	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	130.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Allowable Net Soil Bearing (psf):	8000	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.):	1301.04	Total Dry Soil Weight (Kips):	169.14
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	169.14	Weight from the Concrete Block at Top (K):	27.28
Total Dry Concrete Volume (cu. Ft.):	1294.96	Total Dry Concrete Weight (Kips):	194.24
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	194.24	Total Vertical Load on Base (Kips):	396.80

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	4319	<	Allowable Soil Bearing (psf): 8000	0.54	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	2645.3	>	Applied Momont (kips-ft): 2614	0.99	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.52	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):	0.31		
Calculated Moment Capacity (Mn,Kips-Ft):	3190.2 >	Design Factored Moment (Mu, Kips-Ft	2585.9	0.81	OK!
Calculated Shear Capacity (Kips):	1100.5 >	Design Factored Shear (Kips):	33.0	0.03	OK!
Calculated Tension Capacity (Tn, Kips):	1188.0 >	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7159.5 >	Design Factored Axial Load (Pu Kips):	43.4	0.01	OK!
Moment & Axial Strength Combination:	0.81 OK!	Check Tie Spacing (Design/Required):		0.25	OK!
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:					
One-Way Design Shear Capacity (L-Direction, Kips):	606.2 >	One-Way Factored Shear (L-D. Kips):	265.8	0.44	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	606.2 >	One-Way Factored Shear (W-D., Kips):	265.8	0.44	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	675.4 >	One-Way Factored Shear (C-C, Kips):	454.2	0.67	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0018 OK!	Lower Steel Pad Reinf. Ratio (W-Direct	0.0018		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	1349.0 >	Moment at Bottom (L-Direct. K-Ft):	488.8	0.36	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	1349.0 >	Moment at Bottom (W-Direct. K-Ft):	488.8	0.36	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	1899.5 >	Moment at Bottom (C-C Dir. K-Ft):	691.3	0.36	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0018 OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0018		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	1349.0 >	Moment at the top (L-Dir Kips-Ft):	337.0	0.25	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	1349.0 >	Moment at the top (W-Dir Kips-Ft):	337.0	0.25	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	1899.5 >	Moment at the top (C-C Direc. K-Ft):	580.5	0.31	OK!

MODIFICATION AND DESIGN DRAWINGS FOR AN EXISTING 130' ROHN MONOPOLE

PROPOSED CARRIER: T-MOBILE

SBA SITE: CT13064-A / MIDDLETOWN 2, CT

COORDINATES (LATITUDE: 41.54501°, LONGITUDE: -72.62077°)

COMPLETE FABRICATION DRAWINGS FOR ALL MATERIALS REQUIRED FOR THIS PROJECT ARE AVAILABLE FROM TOWER ENGINEERING SOLUTIONS (TES). PLEASE CONTACT TES FOR MORE INFORMATION.

SHEET	SHEET TITLE	REV
T-1	TITLE SHEET	0
BOM	BILL OF MATERIALS	0
GN-1	GENERAL NOTES	0
A-1	TOWER PROFILE	0
A-2	FOUNDATION MODIFICATION	0
RBL-1	REBAR CHART	0

NOTE:

1. THE MODIFICATION DRAWINGS ARE BASED ON THE **TES** PROJECT NO. 17887, DATED 10/8/15.

TES
Tower Engineering Solutions
8445 FREEPORT PARKWAY, SUITE 375
IRVING, TX 75063
PH: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO: 18134

CUSTOMER SITE NO: CT13064-A

CUSTOMER SITE NAME: MIDDLETOWN 2, CT

67 FAIRCHILD ROAD
MIDDLETOWN, CT 06457

STATE OF CONNECTICUT
HANMING YOU
28931
LICENSED PROFESSIONAL ENGINEER
11/5/15

DRAWN BY:	CH
CHECKED BY:	SH/KMM
DATE:	11/05/15

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	CH	11/05/15

SHEET TITLE: TITLE SHEET

SHEET NUMBER: T-1

REV #: 0

BILL OF MATERIALS

QUANTITY REQUIRED	QUANTITY PROVIDED	PART NUMBER	DESCRIPTION	LENGTH	SHEET LIST	PIECE WEIGHT	WEIGHT (lb)	NOTES
			MATERIAL & HARDWARE					
			SEE SHEET RBL-1		RBL-1			
			CONCRETE VOLUME: 5.93 CUBIC YARDS		A-2			

NOTE: ALL MATERIALS REQUIRED FOR FOUNDATION MODIFICATIONS THAT ARE NOT LISTED IN THE BILL OF MATERIALS WILL BE PROVIDED BY CONTRACTOR. REFERENCE MODIFICATION SHEETS.

TOTAL WEIGHT (lb) =

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Tower Engineering Solutions
8445 FREEPORT PARKWAY, SUITE 375
IRVING, TX 75063
PH: (972) 483-0607

SBA

5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

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18134

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REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	CH	11/05/15

SHEET TITLE:

BILL OF MATERIALS

SHEET NUMBER: BOM

REV #: 0

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE ANSI/TIA-222-G, TIA-1019-A 2012 AND ANY OTHER GOVERNING BUILDING CODES AND OSHA SAFETY REGULATIONS.
2. ALL WORK INDICATED ON THE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TELECOMMUNICATIONS TOWER, POLE AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND FABRICATION OF ALL MISCELLANEOUS PARTS (SUCH AS SHIMS), TEMPORARY SUPPORTS, AND GUYINGS, ETC., PER TIA-1019-A 2001, TO COMPLETE THE ASSEMBLY AS SHOWN IN THE DRAWINGS.
4. CONTRACTOR SHALL PROCEED WITH THE INSTALLATION WORK CAREFULLY SO THE WORK WILL NOT DAMAGE ANY EXISTING CABLE, EQUIPMENT OR THE STRUCTURE.
5. THE USE OF GAS TORCH OR WELDER, ARE NOT ALLOWED ON ANY TOWER STRUCTURE WITHOUT THE CONSENT OF THE TOWER OWNER.

FABRICATION

1. ALL STEEL SHALL MEET OR EXCEED THE MINIMUM STRENGTH AS SPECIFIED IN THE DRAWINGS. IF YIELD STRENGTH WAS NOT NOTED IN THE DRAWINGS, CONTRACTORS SHALL CONTACT TES FOR DIRECTION.
2. ALL FIELD CUT EDGES SHALL BE GROUND SMOOTH. ALL FIELD CUT AND DRILLED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATES OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

WELDING

1. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
2. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING APPROX. 0.5" BEYOND THE PROPOSED FIELD WELD SURFACES.
3. AFTER INSPECTION, ALL FIELD WELDED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

BOLTED ASSEMBLIES AND TIGHTENING OF CONNECTIONS

1. ALL HIGH STRENGTH BOLTS SHALL CONFORM TO THE PROVISIONS OF THE SPECIFICATIONS FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS AS APPROVED BY THE RCSC.
2. FLANGE BOLTS SHALL BE TIGHTENED BY THE AISC "TURN-OF-THE-NUT" METHOD. THE FOLLOWING CHART SHOULD BE USED FOR THE "TURN-OF-THE-NUT" TIGHTENING.
3. SPLICE BOLTS AND ALL OTHER BOLTS IN BEARING TYPE CONNECTIONS SHALL BE TIGHTENED TO A SNUG-TIGHT CONDITION.
4. THE SNUG-TIGHT CONDITION IS DEFINED AS THE TIGHTNESS ATTAINED BY EITHER A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER WITH AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.

WELDING

1. ALL WELDS SHALL BE INSPECTED VISUALLY. A MINIMUM OF 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. 100% OF WELDS SHALL BE INSPECTED IF DEFECTS ARE FOUND.
2. WELD INSPECTIONS SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.

VERIFICATION AND INSPECTION

1. IF APPLICABLE, VERIFICATION INSPECTION TO BE PERFORMED SHALL BE IN ACCORDANCE TO IBC-2012 SECTION 1705 - TABLE 1705.2.2 FOR STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL AND TABLE 1705.3 FOR CONCRETE CONSTRUCTION.

TABLE 8.2 NUT ROTATION FROM SNUG-TIGHT CONDITION FOR TURN-OF-NUT PRETENSIONING [a,b]

BOLT LENGTH[c]	DISPOSITION OF OUTER FACE OF BOLTED PARTS		
	BOTH FACES NORMAL TO BOLT AXIS	ONE FACE NORMAL TO BOLT AXIS, OTHER SLOPED NOT MORE THAN 1:20 [d]	BOTH FACES SLOPED NOT MORE THAN 1:20 FROM NORMAL TO BOLT AXIS [d]
NOT MORE THAN $4d_b$	1/3 TURN	1/2 TURN	2/3 TURN
MORE THAN $4d_b$ BUT NOT MORE THAN $8d_b$	1/2 TURN	2/3 TURN	5/6 TURN
MORE THAN $8d_b$ BUT NOT MORE THAN $12d_b$	2/3 TURN	5/6 TURN	1 TURN

[a] NUT ROTATION IS RELATIVE TO BOLT REGARDLESS OF THE ELEMENT (NUT OR BOLT) BEING TURNED. FOR REQUIRED NUT ROTATIONS OF 1/2 TURN AND LESS, THE TOLERANCE IS PLUS OR MINUS 30 DEGREES; FOR REQUIRED NUT ROTATIONS OF 2/3 TURN AND MORE, THE TOLERANCE IS PLUS OR MINUS 45 DEGREES.

[b] APPLICATION ONLY TO JOINTS IN WHICH ALL MATERIAL WITHIN THE GRIP IS STEEL.

[c] WHEN THE BOLT LENGTH EXCEEDS 12d , THE REQUIRED NUT ROTATION SHALL BE DETERMINED BY ACTUAL TESTING IN A SUITABLE TENSION CALIBRATOR THAT SIMULATES THE CONDITIONS OF SOLIDLY FITTING STEEL.

[d] BEVELED WASHER NOT USED.

SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, JUNE 30, 2004
RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

INSTALLATION TORQUE REQUIRED FOR HOLLO BOLTS AND AJAX BOLTS:

1. M16 HOLLO BOLT: 140 FT-LBS
2. M20 AJAX BOLT: 390 FT-LBS

TES
Tower Engineering Solutions
8445 FREEPORT PARKWAY, SUITE 375
IRVING, TX 75063
PH: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO: 18134

CUSTOMER SITE NO: CT13064-A

CUSTOMER SITE NAME: MIDDLETOWN 2, CT

67 FAIRCHILD ROAD
MIDDLETOWN, CT 06457

DRAWN BY:	CH
CHECKED BY:	SH/KMM
DATE:	11/05/15

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	CH	11/05/15

SHEET TITLE: GENERAL NOTES

SHEET NUMBER: GN-1

REV #: 0

NOTES:

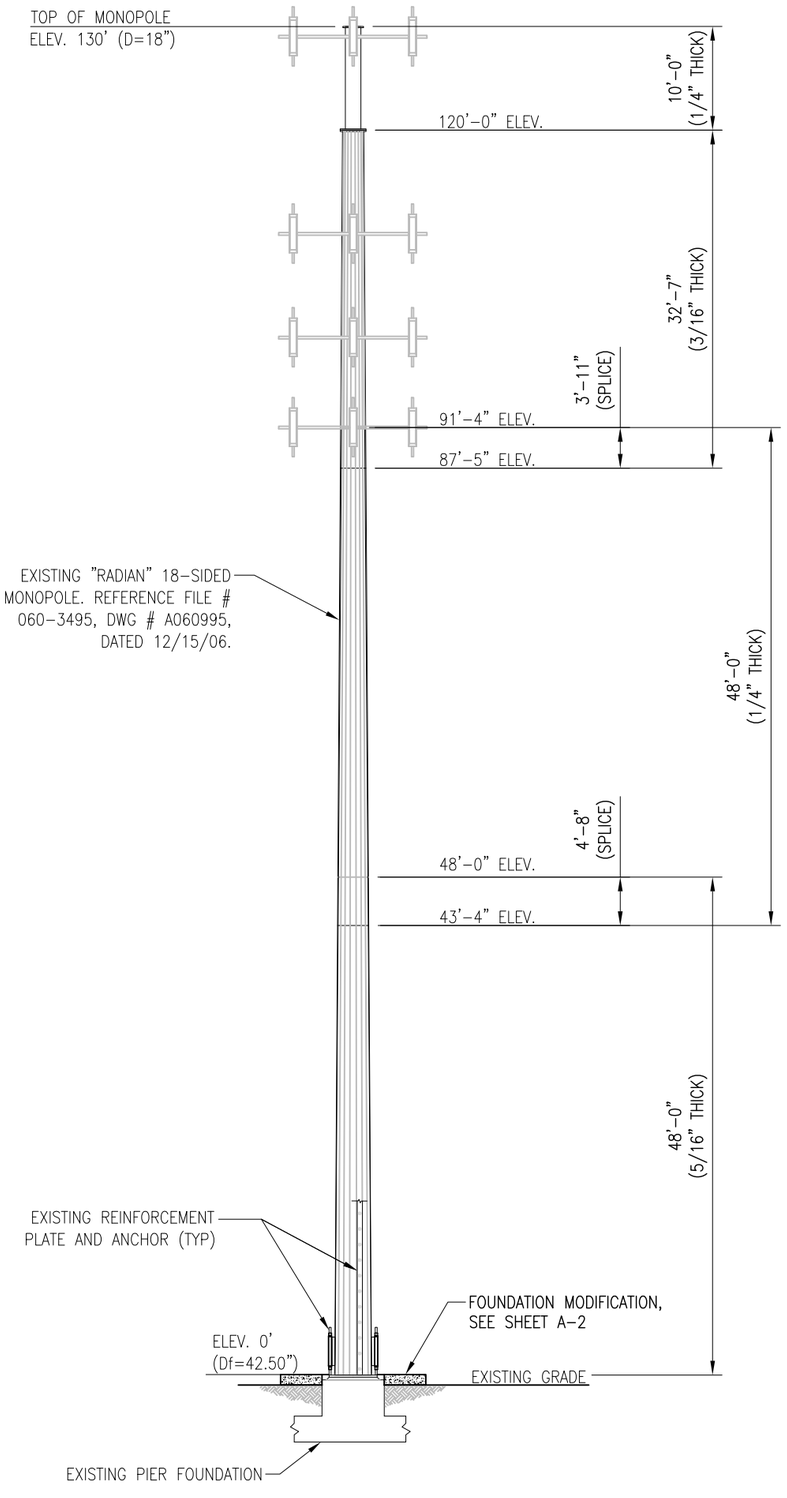
1. TEMPORARILY RELOCATE ANY EXISTING COAX ATTACHED TO THE MONOPOLE AND ANY OTHER MEMBERS WHERE OBSTRUCTION WITH THE PROPOSED MODIFICATION MAY OCCUR.
2. TEMPORARILY RELOCATE EXISTING EQUIPMENT AROUND THE FOUNDATION MAY BE REQUIRED DURING CONSTRUCTION.

PHOTO A

COMPOUND PHOTO 1

COMPOUND PHOTO 2

PHOTO B



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8445 FREEPORT PARKWAY, SUITE 375
IRVING, TX 75063
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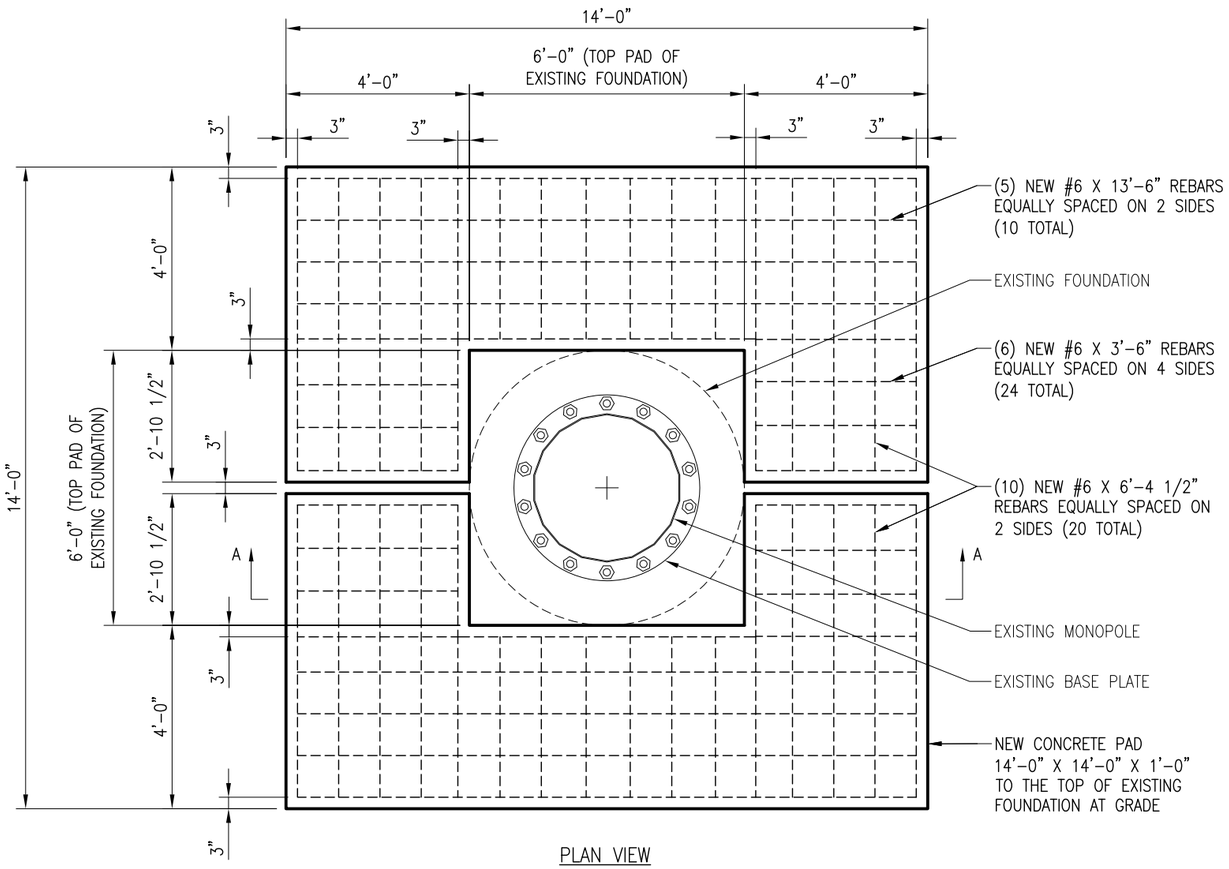
SHEET TITLE:

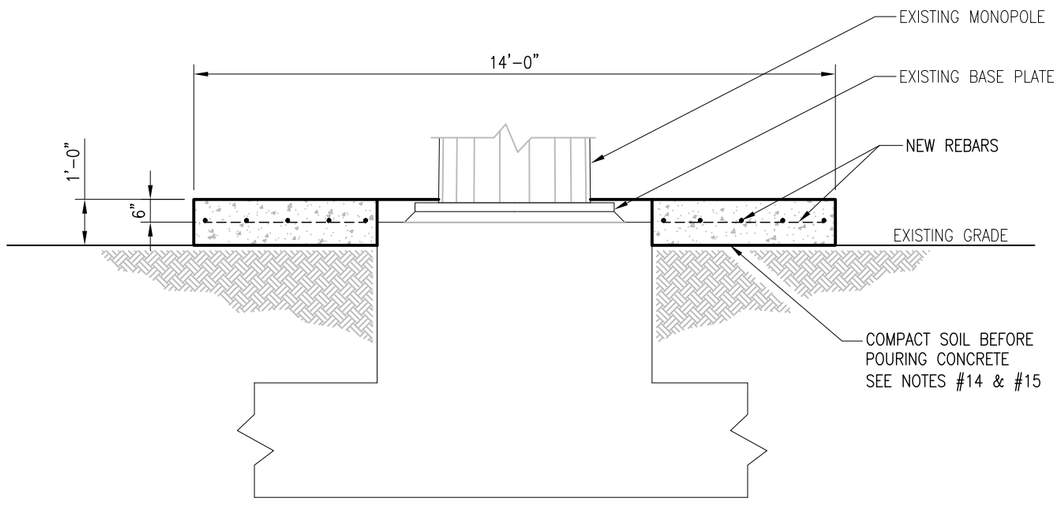
TOWER PROFILE

SHEET NUMBER: A-1

REV #: 0



PLAN VIEW



SECTION "A-A"

NOTES:

1. THE FOUNDATION MODIFICATION DESIGN IS BASED ON THE SOIL REPORT PROVIDED BY GEMINI GEOTECHNICAL ASSOCIATES, INC. (PROJECT # 06161CT, DATED 11/30/2006).
2. CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
3. TEST CYLINDERS SHALL BE MOLDED AND LABORATORY CURED IN ACCORDANCE WITH ASTM C31. THREE PAIRS OF CONCRETE COMPRESSION TEST CYLINDERS SHALL BE MADE FROM EACH TRUCK LOAD OF CONCRETE. TWO CYLINDERS SHALL BE TESTED AT 7 DAYS AND TWO CYLINDERS SHALL BE TESTED AT 28 DAYS. (REMAINING PAIR OF CYLINDERS ARE FOR REDUNDANCY).
4. REINFORCED CONCRETE CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH ACI STANDARDS 318.
5. ALL REBAR SHALL BE SECURELY WIRE TIED TO PREVENT DISPLACEMENT DURING POURING OF CONCRETE.
6. VERTICAL EMBEDMENTS OUT OF PLUMB: 1.0 DEGREE.
7. DEPTH OF FOUNDATION: PLUS 1" OR MINUS 0".
8. CONCRETE DIMENSIONS: PLUS OR MINUS 1/2".
9. REINFORCING STEEL PLACEMENT: PLUS OR MINUS 1/2" INCLUDING CONCRETE COVER.
10. CONCRETE VOLUME: 5.93 CUBIC YARDS.
11. MATERIALS FOR REINFORCING SHALL BE IN ACCORDANCE WITH ASTM SPECIFICATION A615-85.
12. ALL REBAR TO BE GRADE 60 (UNLESS NOTED OTHERWISE).
13. CONCRETE SLUMP: 2"~4".
14. FOUNDATION BASE SHOULD REST ON FIRM AND LEVELED SURFACE.

TES

Tower Engineering Solutions
8445 FREEPORT PARKWAY, SUITE 375
IRVING, TX 75063
PH: (972) 483-0607

SBA

5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
18134

CUSTOMER SITE NO:
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REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	CH	11/05/15

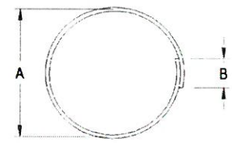
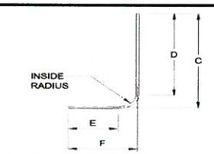
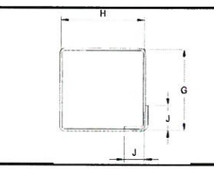
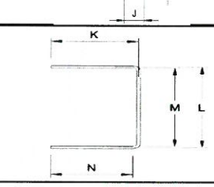
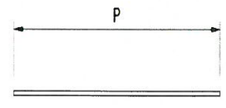
SHEET TITLE:

FOUNDATION MODIFICATION

SHEET NUMBER: A-2

REV #: 0

REBAR CHART

TYPE OF REBAR DIAGRAM	ITEMS	QTY. REQ'D	REBAR SIZE	LENGTH (FT.)	LENGTH REQ'D (FT.)	TOTAL WEIGHT (LBS)	DETAILS OF BAR DIMENSIONS	REBAR DIAGRAM
ROUND TIE		-	-			-	A (FT.) A B B (FT.)	
90° BEND VERTICAL BAR		-	-		-	-	C (FT.) C D (ft) D E F RADIUS	
SQUARE OR RETANGULAR TIE		-	-		-	-	G (FT.) G H (ft) H J RADIUS	
U-SHAPE 90° BEND		-	-		-	-	K (FT.) K L (ft) L M N RADIUS	
STRAIGHT	1	10	6	13.500	13'-6"	202.8	13.500 13'-6"	
	2	24	6	3.500	3'-6"	126.2	3.500 3'-6"	
	3	20	6	6.375	6'-4 1/2"	191.5	6.375 6'-4 1/2"	

MINIMUM SPLICE LENGTHS REQUIRED

BAR SIZE	LENGTH REQ'D
#6	2'-4 3/8"
#7	3'-5 1/2"
#8	3'-11 3/8"
#9	4'-4 1/2"
#10	5'-0"
#11	5'-6"

BILL OF MATERIALS

TYPES OF REBAR CONFIGURATIONS	QTY. REQ'D	REBAR SIZE	LENGTH REQ'D (FT.)	TOTAL WEIGHT (LBS)
STRAIGHT	10	6	13'-6"	202.8
STRAIGHT	24	6	3'-6"	126.2
STRAIGHT	20	6	6'-4 1/2"	191.5
FALSE				
TOTAL STEEL WEIGHT (LBS):	520.4			

Tower Engineering Solutions
8445 FREEPORT PARKWAY, SUITE 375
IRVING, TX 75063
PH: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
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67 FAIRCHILD ROAD
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REV.	DESCRIPTION	BY	DATE
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SHEET TITLE: REBAR CHART

SHEET NUMBER: RBL-1

REV #: 0

SITE NAME: SBA MIDDLETOWN MONOPOLE

67 FAIRCHILD ROAD
MIDDLETOWN, CT 06457
MIDDLESEX COUNTY

SITE NUMBER: CTHA537A

SITE CONFIG: 705A

SPECIAL CONSTRUCTION NOTE:

THE T-MOBILE TOWER TOP WORK IS CONTINGENT UPON COMPLETION OF ALL REQUIRED TOWER STRUCTURAL MODIFICATIONS, ENGINEERING CONSTRUCTION CONTROL INSPECTIONS, FINAL ENGINEERING AFFIDAVIT AND ACCEPTANCE/APPROVAL BY SBA COMMUNICATIONS CORP.

PROJECT NOTES

GENERAL NOTES:

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

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

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

SPECIAL STRUCTURAL NOTES:

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

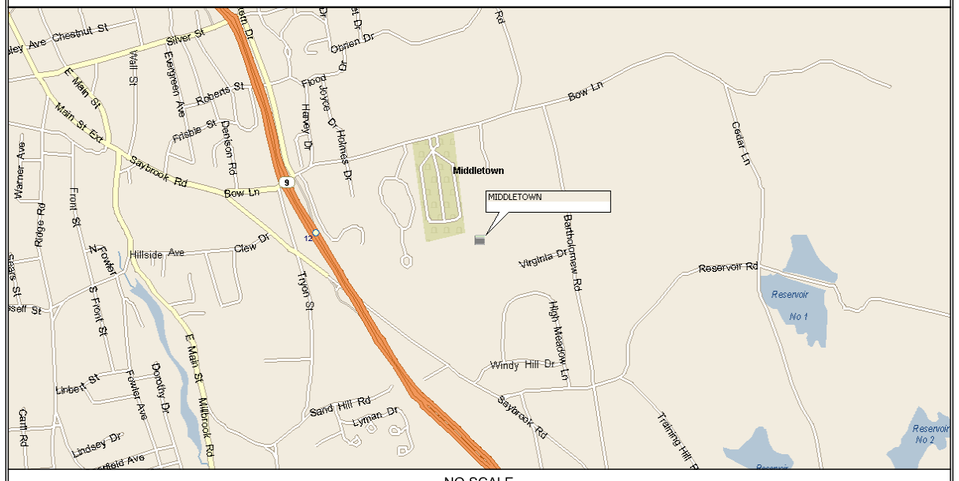
ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND HAS DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO ACCOMMODATE ANY ADDITIONAL EQUIPMENT LOAD. STRUCTURAL DESIGNS AND DETAILS AS SHOWN HEREIN FOR STRUCTURAL MODIFICATIONS OF THE EXISTING ANTENNA MOUNT ARE PRELIMINARY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

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

T-MOBILE TECHNICIAN SITE SAFETY NOTES

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

LOCATION MAP



NO SCALE

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T–MOBILE EQUIPMENT MODERNIZATION
ZONING JURISDICTION: (TOWN OF MIDDLETOWN)	BASED ON INFORMATION PROVIDED BY T–MOBILE, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS AN ELIGIBLE FACILITY UNDER THE TAX RELIEF ACT OF 2012, 47 USC 1455(A) AND IS SUBJECT TO AN EXPEDITED ELIGIBLE FACILITIES REQUEST/REVIEW AND ZONING PRE–EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW).
SITE ADDRESS:	67 FAIRCHILD ROAD MIDDLETOWN, CT 06457
LATITUDE: LONGITUDE:	41.5450° N 72.6208° W
JURISDICTION:	NATIONAL, STATE & LOCAL CODES & ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SBA INFRASTRUCTURE, LLC
SBA SITE ID:	CT13064–A
SBA SITE NAME:	MIDDLETOWN 2 CT
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539–4920 sroth@sbasite.com

APPROVALS

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

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

DRAWING INDEX

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MIDDLETOWN, CT 06457

PROJECT NO:	101034.001
CHECKED BY:	RCM

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0	9/24/15	MEH	CONSTRUCTION
1	10/14/15	MEH	CONSTRUCTION

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CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

SHEET NUMBER:	REVISION:
T-1	1

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI OR NFPA) LIGHTING PROTECTION CODE AND GENERAL COMPLIANCE WITH TELECORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATION OR ADVERSE FINDING TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GE'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 & 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BUS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDED FITTINGS OR BY BINDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20' OR MORE OF 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BAR TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR: SBA COMMUNICATIONS CORP.
   - SUBCONTRACTOR: GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER: T-MOBILE

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALL AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES AND GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY, SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS NOTED OTHERWISE, PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WETHER SHALL BE HOT DIPPED GALVANIZED. TOUCH-UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW, USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, AL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION, EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT IF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
    - BUILDING CODE: IBC 2009
    - ELECTRICAL CODE: NEC 2011

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

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

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

    MANUAL OF STEEL CONSTRUCTION; ASD, FOURTEENTH EDITION

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

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

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

ABBREVIATIONS

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

B+T GRP
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SUITE 300
TULSA, OK 74119
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www.btgrp.com

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BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
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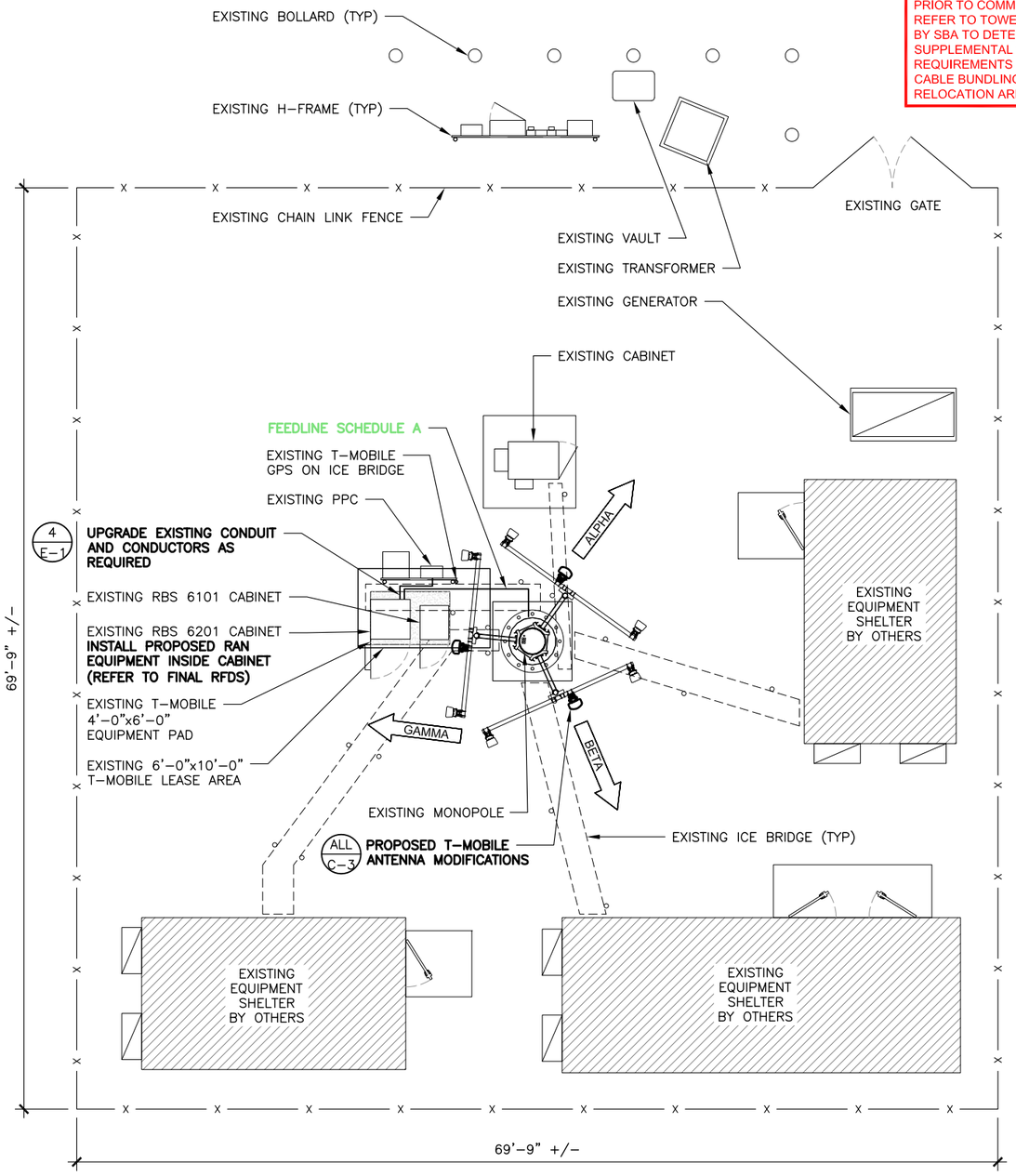

1 OVERALL SITE PLAN

SCALE: 0' 5' 10' 15' 25'

11x17 SCALE: 3/32"=1'–0"
22x34 SCALE: 3/16"=1'–0"

N

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.

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

ENGINEER OF RECORD HAS MADE A VISUAL ASSESSMENT ONLY AND HAS DETERMINED THAT THE EXISTING ANTENNA MOUNT SHALL BE REPLACED OR MODIFIED TO ACCOMMODATE ANY ADDITIONAL EQUIPMENT 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.

SPECIAL CONSTRUCTION NOTE:

THE T-MOBILE TOWER TOP WORK IS CONTINGENT UPON COMPLETION OF ALL REQUIRED TOWER STRUCTURAL MODIFICATIONS, ENGINEERING CONSTRUCTION CONTROL INSPECTIONS, FINAL ENGINEERING AFFIDAVIT AND ACCEPTANCE/APPROVAL BY SBA COMMUNICATIONS CORP.

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (6) 1 5/8" COAX & (1) 1 5/8" HYBRID FIBER TO T–MOBILE RAD @ 100'	INSIDE POLE
EXISTING T–MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER		

SOURCE: B+T 09–11–2015

2A FEEDLINE PHOTO DETAIL @ TOWER BASE

SCALE: N.T.S.

SOURCE: B+T 09–11–2015

SOURCE: B+T 09–11–2015

2B EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

SOURCE: B+T 09–11–2015

3 ELEVATION PHOTO DETAIL

SCALE: N.T.S.

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www.btgrp.com

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35 FRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752

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SHEET NUMBER:	REVISION:
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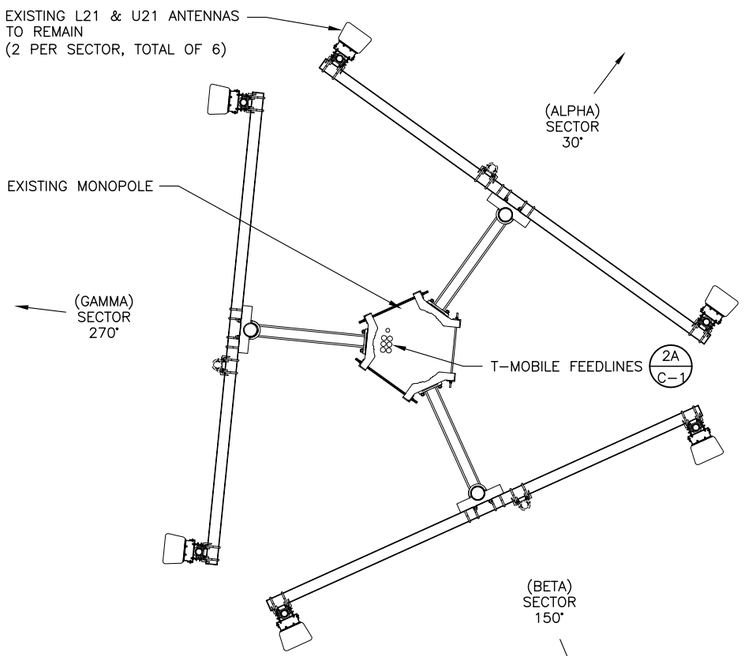
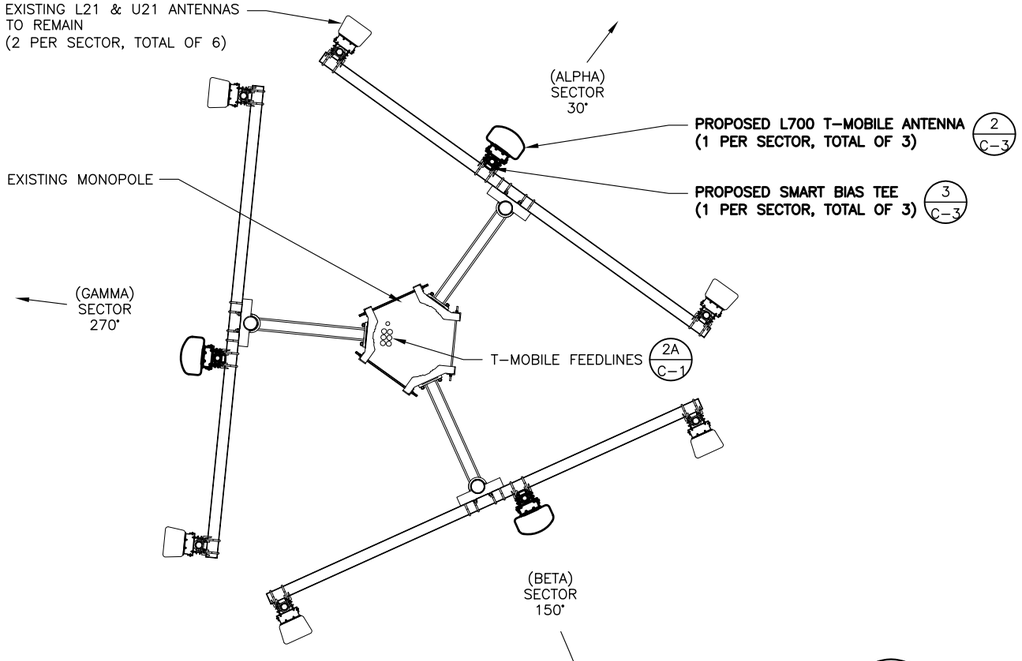


1A EXISTING ANTENNA PLAN

SCALE: 0' 1' 4' 10'

11x17 SCALE: 1/4"=1'-0"
22x34 SCALE: 1/2"=1'-0"



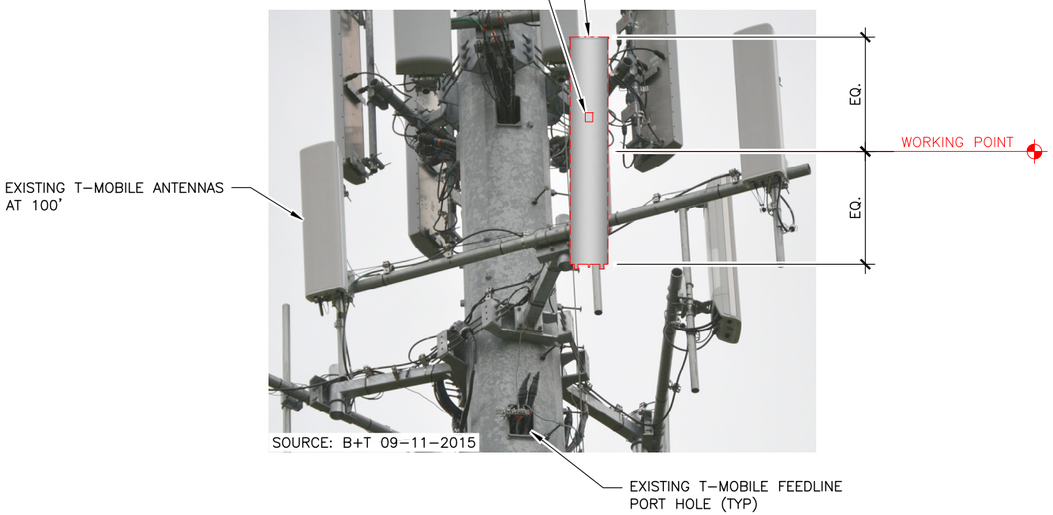
1B PROPOSED ANTENNA PLAN

SCALE: 0' 1' 4' 10'

11x17 SCALE: 1/4"=1'-0"
22x34 SCALE: 1/2"=1'-0"

2 C-3 **PROPOSED L700 T-MOBILE ANTENNA (1 PER SECTOR, TOTAL OF 3)**

3 C-3 **PROPOSED SMART BIAS TEE (1 PER SECTOR, TOTAL OF 3)**



2 ANTENNA MOUNT PHOTO DETAIL

SCALE: N.T.S.

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.

SPECIAL WORK NOTE:

GC AND TOWER CREW SHALL CHECK WITH THE RF ENGINEER FOR LATEST RFDS, RAN SCENARIO AND TOWER TOP EQUIPMENT SPECIFICATIONS.

SPECIAL CONSTRUCTION NOTE:

THE T-MOBILE TOWER TOP WORK IS CONTINGENT UPON COMPLETION OF ALL REQUIRED TOWER STRUCTURAL MODIFICATIONS, ENGINEERING CONSTRUCTION CONTROL INSPECTIONS, FINAL ENGINEERING AFFIDAVIT AND ACCEPTANCE/APPROVAL BY SBA COMMUNICATIONS CORP.

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SUITE 300
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BLOOMFIELD, CT 06002

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SHEET NUMBER: C-2

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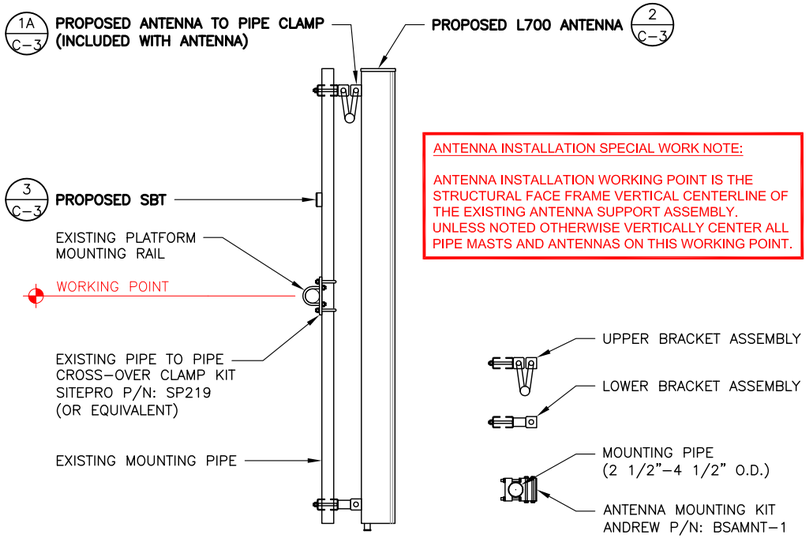


ANTENNA INSTALLATION SPECIAL WORK NOTE:

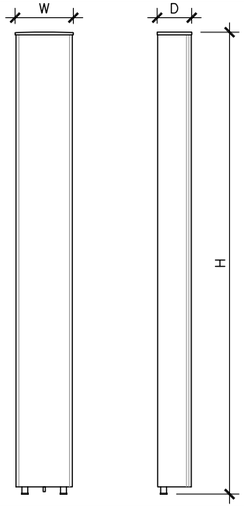
ANTENNA INSTALLATION WORKING POINT IS THE STRUCTURAL FACE FRAME VERTICAL CENTERLINE OF THE EXISTING ANTENNA SUPPORT ASSEMBLY. UNLESS NOTED OTHERWISE VERTICALLY CENTER ALL PIPE MASTS AND ANTENNAS ON THIS WORKING POINT.

1 PROPOSED L700 ANTENNA & RRU MOUNTING DETAIL

SCALE: N.T.S.

1A L700 ANTENNA MOUNTING BRACKET

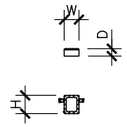
SCALE: N.T.S.



L700 ANTENNA SPECS	
MANUFACTURER	ANDREW
MODEL #	LNX-6515DS
WIDTH	11.9"
DEPTH	7.1"
HEIGHT	96.4"
WEIGHT	50.3 LBS

2 L700 ANTENNA DETAIL

SCALE: N.T.S.



SBT SPECIFICATIONS	
MANUFACTURER	KATHREIN
MODEL #	78211054
WIDTH	3.2"
DEPTH	1.8"
HEIGHT	5.5"
WEIGHT	1.8 LBS

3 SMART BIAS TEE (SBT)

SCALE: N.T.S.

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

ENGINEER OF RECORD HAD 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.

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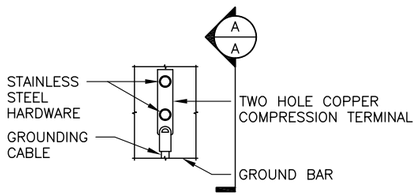
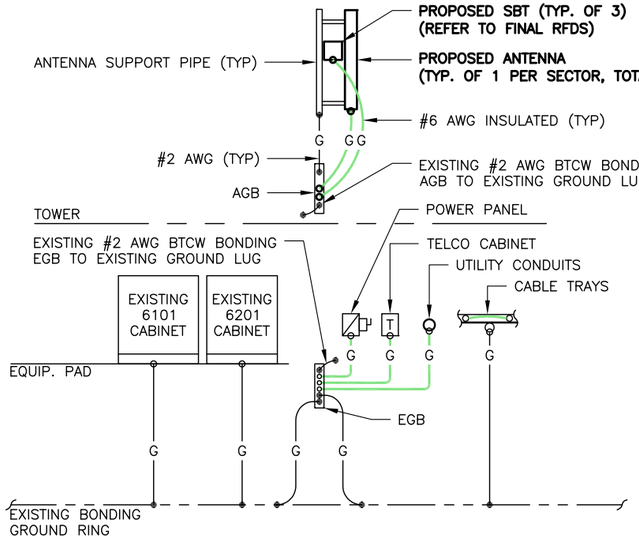
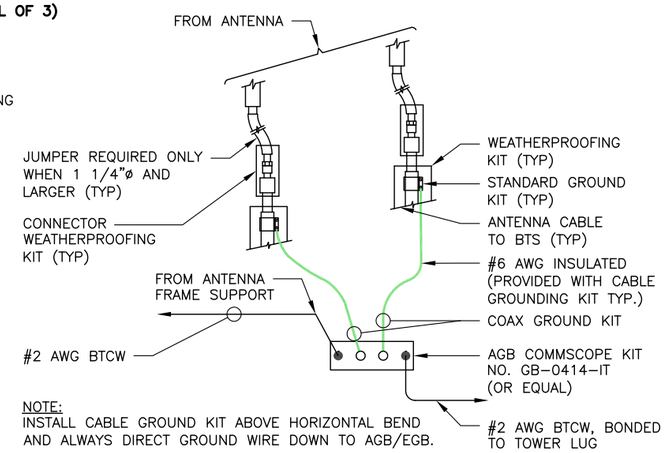


NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

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

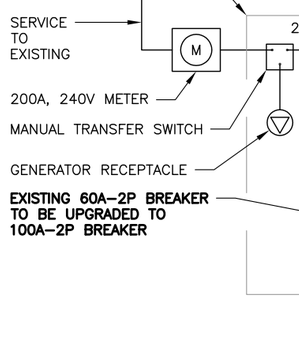


2 TYPICAL GROUNDING RISER DIAGRAM
SCALE: N.T.S.

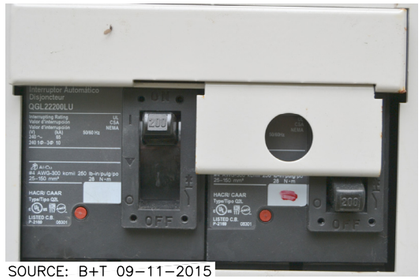


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

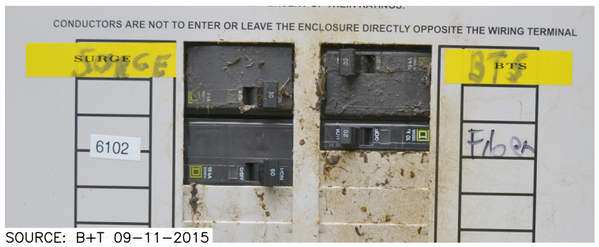
3 TOWER TOP CABLE GROUNDING DETAIL
SCALE: N.T.S.



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

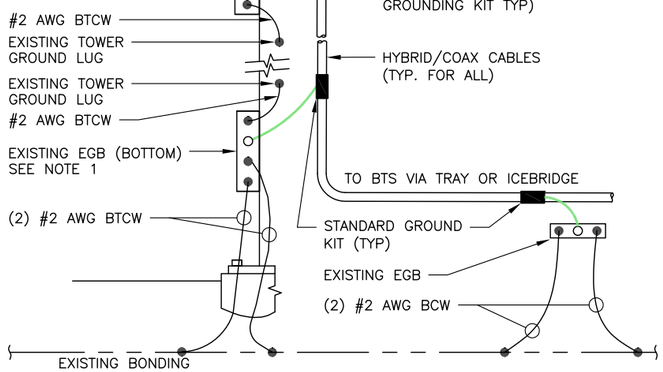


SOURCE: B+T 09-11-2015



SOURCE: B+T 09-11-2015

5 PHOTO DETAIL: PPC PANEL
SCALE: N.T.S.



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

6 TOWER BOTTOM CABLE GROUNDING DETAIL
SCALE: N.T.S.

ELECTRICAL LEGEND

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

ELECTRICAL & GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE NORTHEAST, LLC
35 FRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

SBA COMMUNICATIONS CORP.
33 BOSTON POST ROAD WEST, SUITE 320
MARLBOROUGH, MA 01752

CTHA537A

SBA MIDDLETOWN MONOPOLE

67 FAIRCHILD ROAD
MIDDLETOWN, CT 06457

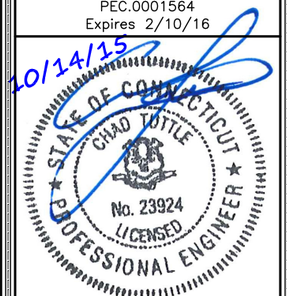
PROJECT NO:	101034.001
CHECKED BY:	RCM

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	9/24/15	MEH	CONSTRUCTION
1	10/14/15	MEH	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/16

10/14/15



SHEET NUMBER:	REVISION:
E-1	1