October 15, 2015

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

RE: Notice of Exempt Modification
940 Meriden Road
Waterbury, CT 06705
N 41.55318
W 72.99339
T-Mobile Site #: CTNH331B_L700

Members of the Siting Council:

On behalf of T-Mobile, SBA Communications is submitting an exempt modification application to the Connecticut Siting council for modification of existing equipment at a tower facility located at 940 Meriden Rd., Waterbury, CT.

The 940 Meriden Rd. facility consists of a 119' Monopole Tower owned and operated by SBA Infrastructure, LLC. In order to accommodate technological changes and enhance system performance in the State of Connecticut, T-Mobile plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located, Mayor Neil O'Leary, as well as the property owner, Pine Grove Cemetery Association, Inc.

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

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

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

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

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

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

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

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

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

Thank you,

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

T-Mobile

Equipment Modification

940 Meriden Rd., Waterbury, CT
Site number CTNH331B_L700

Tower Owner: SBA Infrastructure, LLC

Equipment Configuration: Monopole

Current and/or approved:

- (3) Ericsson - AIR 21 B2A B4P - Panel
- (3) Ericsson - AIR 21 B4A B2P - Panel
- (3) Ericsson - KRY 112 144/1 - TMA/TTA
- (12) 1-5/8" Lines
- (1) 1-5/8" Fiber

Final Configuration:

- (6) RFS - APX16DWV-16DWVS - Panel
- (3) Commscope - LNX-6515DS-VTM - Panel
- (3) Ericsson - Double TMA 17/21 - TMA/TTA
- (3) RFS - ATMAA1412D-1A20 - TMA/TTA
- (3) Kathrein - 782 11056 - Bias T's
- (18) 1-5/8" lines
- (1) 1-5/8" Fiber

Structural Information:

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

Power Density:

The anticipated Maximum Composite contributions from the T-Mobile facility are 3.69% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 11.97% of the allowable FCC established general public limit sampled at the ground level.

Site Composite MPE%	
Carrier	MPE%
T-Mobile (Per Sector Max)	3.69 %
Nextel	0.33 %
Clearwire	0.14 %
MetroPCS	2.05 %
Verizon Wireless	5.76 %
Site Total MPE %:	11.97 %

October 15, 2015

Neil O'Leary, Mayor
City of Waterbury
City Hall Building
235 Grand Street
Waterbury, CT 06702

RE: Telecommunications Facility @ 940 Meriden Rd., Waterbury, CT

Dear Mayor O'Leary,

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

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

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

Thank you,

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

October 15, 2015

Pine Grove Cemetery Association, Inc.
850 Meriden Rd.
Waterbury, CT 06705

RE: Telecommunications Facility @ 940 Meriden Rd., Waterbury, CT

To Whom It May Concern:

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

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

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

T-Mobile Existing Facility

Site ID: CTNH331B

NH331/OPTA Pine Grove
940 Meriden Road
Waterbury, CT 06705

October 14, 2015

EBI Project Number: 6215005190

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	11.97 %

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October 14, 2015

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

Emissions Analysis for Site: **CTNH331B – NH331/OPTA Pine Grove**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **940 Meriden Road, Waterbury, 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 (mW/cm2). The number of mW/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 (μW/cm^2). The general population exposure limit for the 700 MHz Band is approximately 467 μW/cm^2, and the general population exposure limit for the PCS and AWS bands is 1000 μW/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 **940 Meriden Road, Waterbury, 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) Since the radios are ground mounted there are additional cabling losses accounted for. For each RF path the following losses were calculated. 1.42 dB of additional cable loss for all 1900 MHz Channels, 1.46 dB of additional cable loss for all 2100 MHz channels and 0.77 dB of additional cable loss at 700 MHz. This is based on manufacturers Specifications for 138 feet of 1-5/8” coax cable on each path.

6) 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.

7) 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.

8) The antennas used in this modeling are the **RFS APX16DWV-16DWVS-E-A20** 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 **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its 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.

9) The antenna mounting height centerline of the proposed antennas is **99 feet** above ground level (AGL).

10) 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:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
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	6	Channel Count	6	# PCS Channels:	6
Total TX Power:	240	Total TX Power:	240	# AWS Channels:	240
ERP (W):	7,331.86	ERP (W):	7,331.86	ERP (W):	7,331.86
Antenna A1 MPE%	3.05	Antenna B1 MPE%	3.05	Antenna C1 MPE%	3.05
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
Frequency Bands	Dormant Antenna	Frequency Bands	Dormant Antenna	Frequency Bands	Dormant Antenna
Channel Count	0	Channel Count	0	Channel Count	0
Total TX Power:	0	Total TX Power:	0	Total TX Power:	0
ERP (W):	0	ERP (W):	0	ERP (W):	0
Antenna A2 MPE%	0	Antenna B2 MPE%	0	Antenna C2 MPE%	0
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):	99	Height (AGL):	99	Height (AGL):	99
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):	724.64	ERP (W):	724.64	ERP (W):	724.64
Antenna A3 MPE%	0.64	Antenna B3 MPE%	0.64	Antenna C3 MPE%	0.64

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.69 %**
Nextel	0.33 %
Clearwire	0.14 %
MetroPCS	2.05 %
Verizon Wireless	5.76 %
Site Total MPE %:	**11.97 %**

T-Mobile Sector 1 Total:	3.69 %
T-Mobile Sector 2 Total:	3.70 %
T-Mobile Sector 3 Total:	3.70 %
Site Total:	11.97 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (mW/cm^2)	Frequency (MHz)	Allowable MPE (mW/cm^2)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	**2**	**1828.74**	**99**	**15.20**	**2100**	**1000**	**1.52 %**
T-Mobile 700 MHz LTE	**1**	**724.64**	**99**	**3.01**	**700**	**467**	**0.64 %**
T-Mobile 1900 MHz (PCS) GSM/UMTS	**2**	**922.83**	**99**	**7.67**	**1900**	**1000**	**0.77 %**
T-Mobile 2100 MHz (AWS) UMTS	**2**	**914.37**	**99**	**7.60**	**2100**	**1000**	**0.76 %**
						Total:	**3.69%**

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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:	3.69 %
Sector 2:	3.70 %
Sector 3 :	3.70 %
T-Mobile Per Sector Maximum:	3.69 %
Site Total:	11.97 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.97%** 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

Structural Analysis Report

Existing 119 ft SABRE Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT13070-A

Customer Site Name: Waterbury 4, CT

Carrier Name: T-Mobile

Carrier Site Number: CTNH331B

Carrier Site Name: Pine Grove Cemetary

Site Location: 940 Meriden Road

Waterbury, Connecticut

New Haven County

Latitude: 41.553278

Longitude: -72.993361

Analysis Result:

Max Structural Usage: 53.5% [Pass]

Max Foundation Usage: 53% [Pass]

Report Prepared By : Jarryd Tibbetts

Introduction

The purpose of this report is to summarize the analysis results on the 119 ft SABRE Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Tower Drawing prepared by Sabre, Job #07-03039 dated 4/23/07 Structural Analysis prepared by FDH, Project #12-06C54E S2 dated 6/17/11
Foundation Drawing	Foundation Drawing prepared by Sabre, Job #03039 dated 4/23/07
Geotechnical Report	Geotechnical Report prepared by Gemini Geotechnical Associates, Project #07023CT dated 3/13/07
Modification Drawings	Modification Drawing prepared by FDH, Project #09-01077E S3 dated 10/13/09

Analysis Criteria

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

Basic Wind Speed Used in the Analysis:	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

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	120.0	2	Andrew - VHLP2.5-11 - Dish	(3) Standoffs	(3) 5/16” (2) 1/2" (3) 5/8” (3) 3/4”	Clearwire
2	118.0	3	Argus - LLPX310R - Panel			
3		3	Samsung - 2.5GHz - RRH			
4	99.0	3	Ericsson - AIR 21 B2A B4P - Panel	Low Profile Platform	(12) 1 5/8” (1) 1 5/8" Fiber	T-Mobile
6		3	Ericsson - AIR 21 B4A B2P - Panel			
9		3	Ericsson - KRY 112 144/1 - TMA/TTA			
12	87.0	6	Antel - LPA-80063-4CF - Panel	Low Profile Platform	(18) 1 5/8" (1) 1 5/8" Hybrid	Verizon
13		3	Antel - BXA-171063-8BF - Panel			
14		3	Antel - BXA-70063-6CF - Panel			
15	77.0	3	RFS - APXV18-206517S-C - Panel	Pipe	(6) 1 5/8"	Metro PCS

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

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

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
5	99.0	6	RFS - APX16DWV-16DWVS - Panel	Low Profile Platform	(18) 1 5/8" (1) 1 5/8” Fiber	T-Mobile
7		3	Commscope - LNX-6515DS-VTM - Panel			
8		3	Ericsson - Double TMA 17/21 - TMA/TTA			
10		3	RFS - ATMAA1412D-1A20 - TMA/TTA			
11		3	Kathrein - 782 11056 - Bias T’s			

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:	**47.3%**	**53.5%**	**35.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	3142.0	29.0	42.0
Analysis Reactions	1419.8	17.8	28.9
% of Design Reactions	45.2%	61.5%	68.8%

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

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-F for the installed antennas. Maximum twist/sway at the elevation of the proposed equipment is 0.6212 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

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

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

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

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

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed or/and ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

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

Usage Diagram - Max Stress 47.3% at 0.0ft

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69	Page: 1	
Base Elev:	0.000 (ft)				

Tower Engineering Solutions

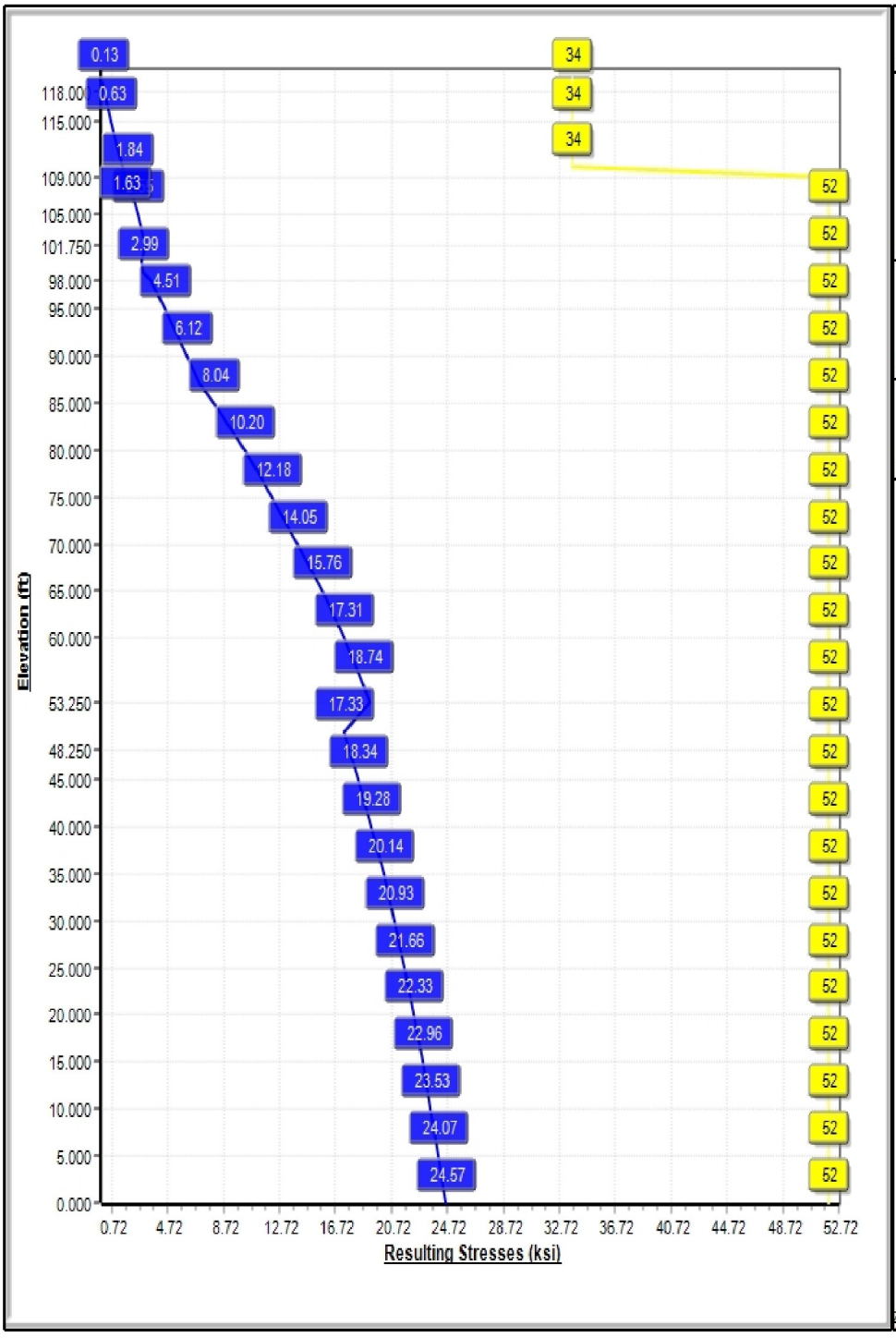
Dead Load Factor:	1.00
Wind Load Factor:	1.00

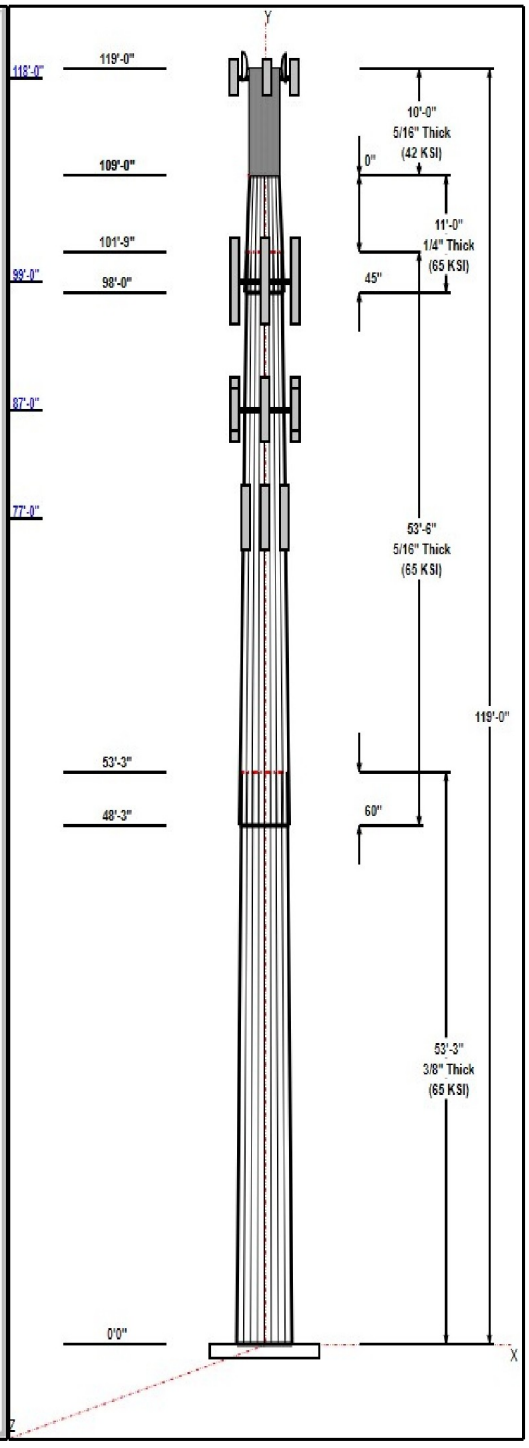
52 Alllowable Stress

25 Resulting Stress

Load Case : 85 mph Wind with 0 in Ice

Iterations: 21





Structure: CT13070-A-SBA

Type: Custom
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.21408

10/7/2015

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	37.99	49.39	0.375		0.21408	65
2	53.50	28.23	39.69	0.313	Slip	0.21408	65
3	11.00	27.18	29.53	0.250	Slip	0.21408	65
4	10.00	26.00	26.00	0.312	Butt	0.00000	42

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
119.00	120.00	2	VHLP2.5-11	Clearwire
118.00	118.00	3	2.5GHz RRH	Clearwire
118.00	118.00	3	3 ft Standoff	Clearwire
118.00	118.00	3	LLPX310R	Clearwire
99.00	99.00	3	782 11056	T-Mobile
99.00	99.00	6	APX16DWV-16DWV-S-E-	T-Mobile
99.00	99.00	3	ATMAA1412D-1A20	T-Mobile
99.00	99.00	3	Double TMA 17/21	T-Mobile
99.00	99.00	3	LNX-6515DS-VTM	T-Mobile
99.00	99.00	1	Low Profile Platform	T-Mobile
87.00	87.00	3	BXA-171063-8BF	Verizon
87.00	87.00	3	BXA-70063-6CF	Verizon
87.00	87.00	1	Low Profile Platform	Verizon
87.00	87.00	6	LPA-80063-4CF	Verizon
77.00	77.00	3	APXV18-206517S-C	Metro PCS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	118.00	Inside	1/2" Coax	Clearwire
0.00	118.00	Inside	3/4" DC	Clearwire
0.00	118.00	Inside	5/16" Coax	Clearwire
0.00	118.00	Inside	5/8" Coax	Clearwire
0.00	99.00	Inside	1 5/8" Coax	T-Mobile
0.00	99.00	Inside	1 5/8" Hybrid	T-Mobile
0.00	87.00	Inside	1 5/8" Coax	Verizon
0.00	87.00	Inside	1 5/8" Hybrid	Verizon
0.00	77.00	Inside	1 5/8" Coax	Metro PCS

Anchor Bolts

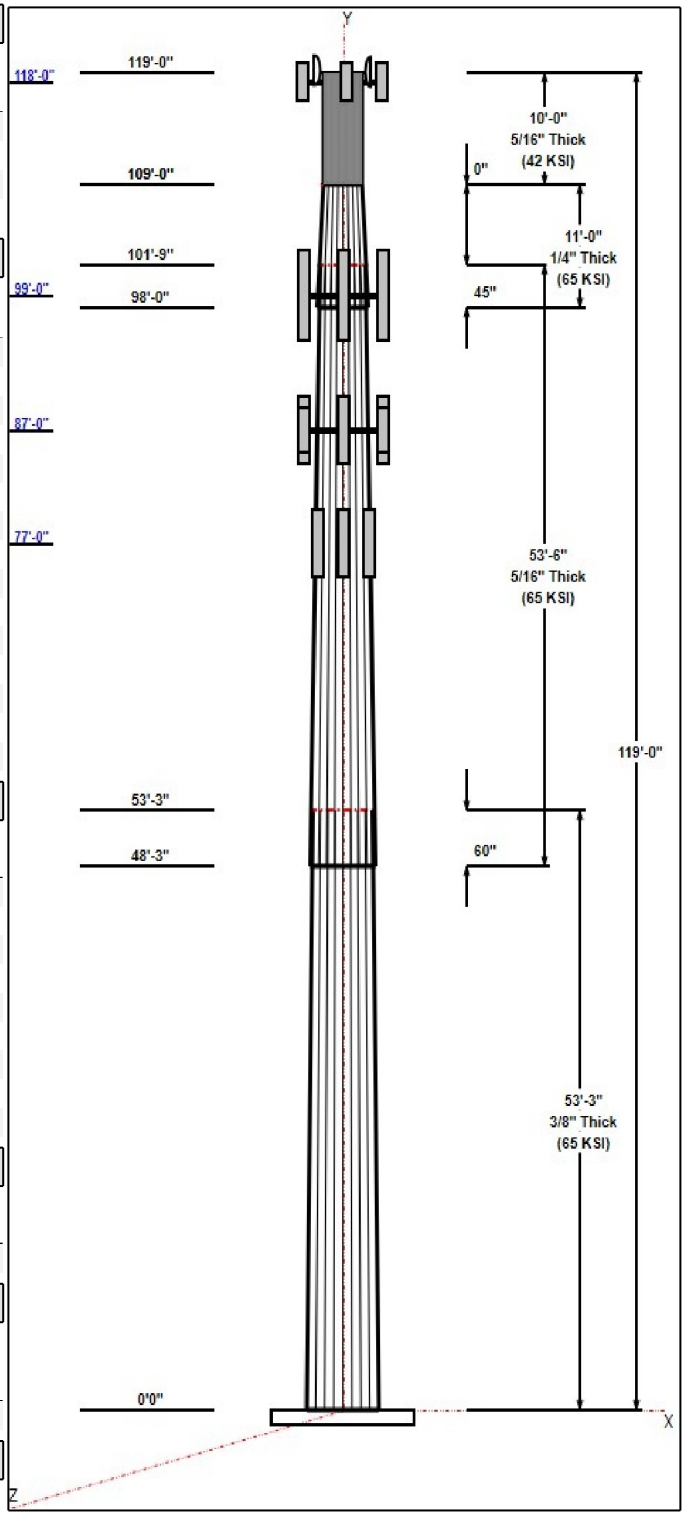
Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	53.3	60.0	Clipped

Reactions

Load Case	Moment	Shear	Axial
85 mph Wind with 0" Ice	1419.8	17.8	24.5
73.61 mph Wind with 0.5" Ice	1176.2	14.5	28.9
50 mph Wind with 0" Ice	491.3	6.2	24.5

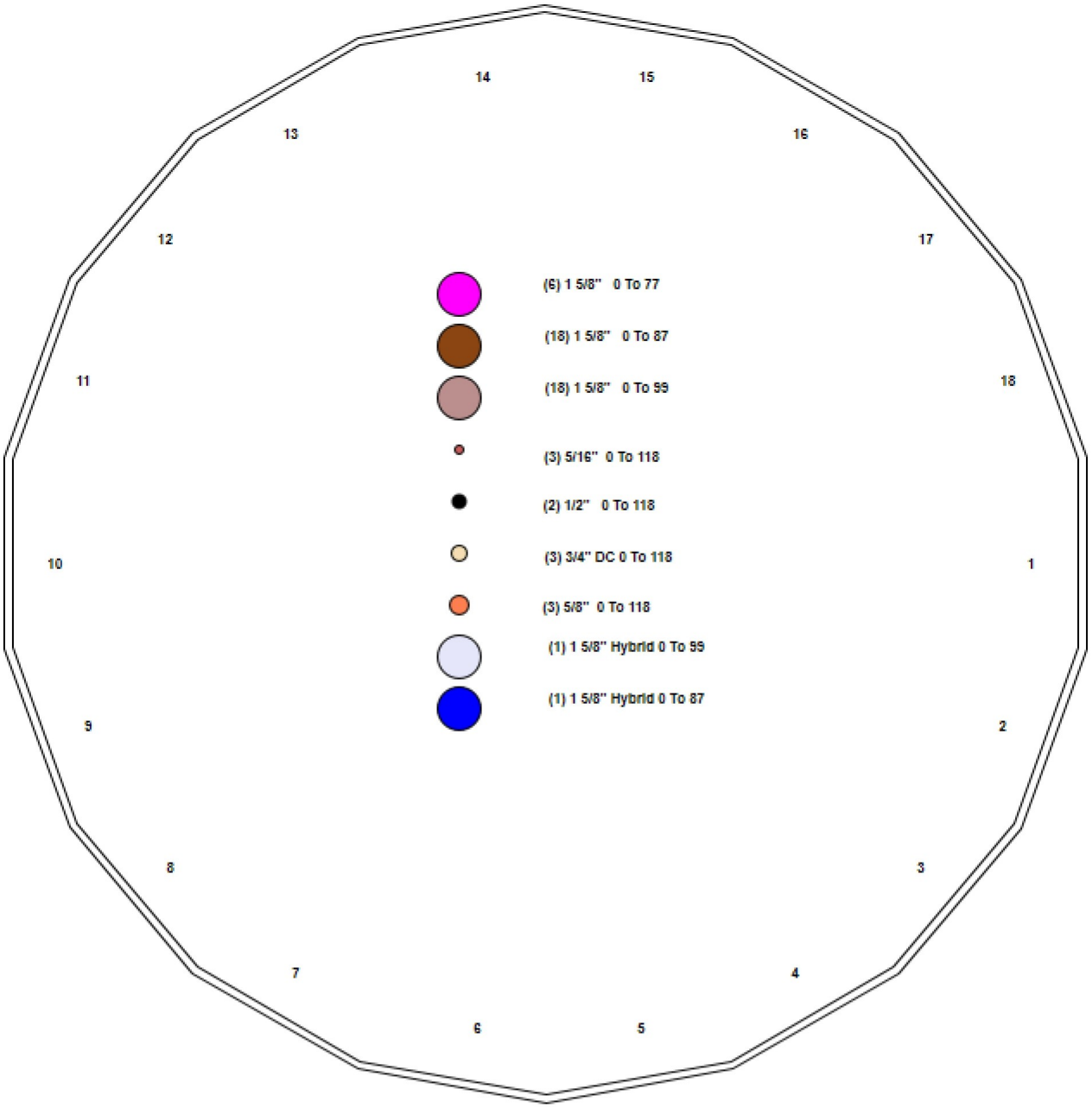


Structure: CT13070-A-SBA - Coax Line Placement

Type: Monopole
Site Name: Waterbury 4, CT
Height: 119.00 (ft)

10/7/2015

Tower Engineering Solutions



Shaft Properties

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 4	

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	53.250	0.3750	65		0.00	9,341
2	18	53.500	0.3125	65	Slip	60.00	6,075
3	18	11.000	0.2500	65	Slip	45.00	835
4	R	10.000	0.3120	42	Flange	0.00	857
					Total Shaft Weight:		**17,108**

	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	49.39	0.00	58.34	17707.72	21.81	131.7	37.99	53.25	44.77	8003.18	16.45	101.3	0.214083
2	39.69	48.25	39.05	7648.75	20.98	126.9	28.23	101.7	27.69	2727.23	14.51	90.34	0.214083
3	29.53	98.00	23.24	2517.77	19.42	118.1	27.18	109.0	21.37	1957.91	17.75	108.7	0.214083
4	26.00	109.0	25.18	2078.44	0	83.33	26.00	119.0	25.18	2078.44	0	83.33	0.000000

Loading Summary

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 5	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	119.0	VHLP2.5-11	2	47.60	8.43	1.00	97.00	8.920	1.00	0.00	1.00
2	118.0	2.5GHz RRH	3	33.00	1.82	0.73	44.90	2.090	0.75	0.00	0.00
3	118.0	3 ft Standoff	3	40.00	2.63	0.75	63.00	4.340	0.75	0.00	0.00
4	118.0	LLPX310R	3	28.60	4.83	0.69	54.50	5.360	0.71	0.00	0.00
5	99.00	782 11056	3	1.80	0.17	0.78	2.83	0.230	0.82	0.00	0.00
6	99.00	APX16DWV-16DWV-S-E-ACU	6	40.70	7.23	0.65	71.92	7.620	0.66	0.00	0.00
7	99.00	ATMAA1412D-1A20	3	13.00	1.17	0.70	18.75	1.290	0.72	0.00	0.00
8	99.00	Double TMA 17/21	3	11.00	0.41	0.72	13.14	0.490	0.75	0.00	0.00
9	99.00	LNX-6515DS-VTM	3	50.30	11.45	0.84	112.11	11.92	0.84	0.00	0.00
10	99.00	Low Profile Platform	1	1500.00	22.00	1.00	1800.00	27.00	1.00	0.00	0.00
11	87.00	BXA-171063-8BF	3	10.50	2.94	0.84	29.30	3.410	0.85	0.00	0.00
12	87.00	BXA-70063-6CF	3	17.00	7.73	0.73	0.00	8.540	0.75	0.00	0.00
13	87.00	Low Profile Platform	1	1500.00	22.00	1.00	1800.00	27.00	1.00	0.00	0.00
14	87.00	LPA-80063-4CF	6	20.00	7.00	0.93	72.40	7.620	0.94	0.00	0.00
15	77.00	APXV18-206517S-C	3	26.40	5.16	0.74	53.00	5.840	0.76	0.00	0.00
		Totals:	**46**	**4,154.20**			**5,834.51**				

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	118.0	(2) 1/2" Coax	0.48	0.00	0.00	0.00	Inside
0.00	118.0	(3) 3/4" DC	1.20	0.00	0.00	0.00	Inside
0.00	118.0	(3) 5/16" Coax	0.16	0.00	0.00	0.00	Inside
0.00	118.0	(3) 5/8" Coax	0.45	0.00	0.00	0.00	Inside
0.00	99.00	(18) 1 5/8" Coax	18.72	0.00	0.00	0.00	Inside
0.00	99.00	(1) 1 5/8" Hybrid	3.30	0.00	0.00	0.00	Inside
0.00	87.00	(18) 1 5/8" Coax	3.12	0.00	0.00	0.00	Inside
0.00	87.00	(1) 1 5/8" Hybrid	3.30	0.00	0.00	0.00	Inside
0.00	77.00	(6) 1 5/8" Coax	3.12	0.00	0.00	0.00	Inside
		Totals:	**3,248.98**		**0.00**		

Shaft Section Properties

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)
0.00		0.3750	49.390	58.338	17707.7	21.81	131.71	65	52	0.0
5.00		0.3750	48.320	57.064	16572.7	21.31	128.85	65	52	981.7
10.00		0.3750	47.249	55.790	15487.3	20.81	126.00	65	52	960.0
15.00		0.3750	46.179	54.516	14450.4	20.30	123.14	65	52	938.4
20.00		0.3750	45.108	53.242	13460.8	19.80	120.29	65	52	916.7
25.00		0.3750	44.038	51.968	12517.4	19.30	117.43	65	52	895.0
30.00		0.3750	42.968	50.694	11619.2	18.79	114.58	65	52	873.3
35.00		0.3750	41.897	49.420	10765.0	18.29	111.73	65	52	851.7
40.00		0.3750	40.827	48.146	9953.7	17.79	108.87	65	52	830.0
45.00		0.3750	39.756	46.872	9184.3	17.28	106.02	65	52	808.3
48.25	Bot - Section 2	0.3750	39.061	46.044	8706.0	16.96	104.16	65	52	513.8
50.00		0.3750	38.686	45.598	8455.5	16.78	103.16	65	52	504.3
53.25	Top - Section 1	0.3125	38.615	37.990	7041.7	20.38	123.57	65	52	923.6
55.00		0.3125	38.240	37.618	6837.1	20.17	122.37	65	52	225.1
60.00		0.3125	37.170	36.557	6274.4	19.56	118.94	65	52	631.0
65.00		0.3125	36.100	35.495	5743.5	18.96	115.52	65	52	612.9
70.00		0.3125	35.029	34.433	5243.4	18.35	112.09	65	52	594.9
75.00		0.3125	33.959	33.372	4773.2	17.75	108.67	65	52	576.8
77.00		0.3125	33.531	32.947	4593.3	17.51	107.30	65	52	225.7
80.00		0.3125	32.888	32.310	4332.0	17.15	105.24	65	52	333.1
85.00		0.3125	31.818	31.248	3918.8	16.54	101.82	65	52	540.7
87.00		0.3125	31.390	30.824	3761.2	16.30	100.45	65	52	211.2
90.00		0.3125	30.748	30.187	3532.8	15.94	98.39	65	52	311.4
95.00		0.3125	29.677	29.125	3173.0	15.33	94.97	65	52	504.6
98.00	Bot - Section 3	0.3125	29.035	28.488	2969.3	14.97	92.91	65	52	294.1
99.00		0.3125	28.821	28.276	2903.4	14.85	92.23	65	52	175.4
100.00		0.3125	28.607	28.063	2838.5	14.73	91.54	65	52	174.1
101.75	Top - Section 2	0.2500	28.732	22.600	2316.3	18.85	114.93	65	52	301.5
105.00		0.2500	28.036	22.048	2150.7	18.36	112.15	65	52	246.9
109.00	Top - Section 3	0.0000	0.000	0.000	0.0	NAN	NAN	0	0	295.5
109.00	Bot - Section 4	0.2500	27.180	21.368	1957.9	17.76	108.72	65	52	
110.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	85.7
115.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	428.4
118.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	257.0
119.00		0.3120	26.000	25.179	2078.4	0.00	83.33	42	34	85.7
										17108.3

Wind Loading - Shaft

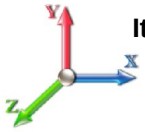
Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations: 21

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	18.496	31.26	349.85	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	342.26	0.650	0.000	5.00	20.356	13.23	413.6	0.0	981.7
10.00		0.00	1.00	18.496	31.26	334.68	0.650	0.000	5.00	19.910	12.94	404.5	0.0	960.0
15.00		0.00	1.00	18.496	31.26	327.10	0.650	0.000	5.00	19.464	12.65	395.5	0.0	938.4
20.00		0.00	1.00	18.496	31.26	319.52	0.650	0.000	5.00	19.018	12.36	386.4	0.0	916.7
25.00		0.00	1.00	18.496	31.26	311.94	0.650	0.000	5.00	18.572	12.07	377.3	0.0	895.0
30.00		0.00	1.00	18.496	31.26	304.35	0.650	0.000	5.00	18.126	11.78	368.3	0.0	873.3
35.00		0.00	1.02	18.810	31.79	299.28	0.650	0.000	5.00	17.680	11.49	365.3	0.0	851.7
40.00		0.00	1.06	19.541	33.02	297.25	0.650	0.000	5.00	17.234	11.20	369.9	0.0	830.0
45.00		0.00	1.09	20.210	34.15	294.36	0.650	0.000	5.00	16.788	10.91	372.7	0.0	808.3
48.25	Bot - Section 2	0.00	1.11	20.617	34.84	292.11	0.650	0.000	3.25	10.673	6.94	241.7	0.0	513.8
50.00		0.00	1.13	20.827	35.20	290.78	0.650	0.000	1.75	5.760	3.74	131.8	0.0	504.3
53.25	Top - Section 1	0.00	1.15	21.206	35.84	288.13	0.650	0.000	3.25	10.552	6.86	245.8	0.0	923.6
55.00		0.00	1.16	21.402	36.17	291.38	0.650	0.000	1.75	5.604	3.64	131.8	0.0	225.1
60.00		0.00	1.19	21.941	37.08	286.76	0.650	0.000	5.00	15.711	10.21	378.7	0.0	631.0
65.00		0.00	1.21	22.449	37.94	281.71	0.650	0.000	5.00	15.265	9.92	376.4	0.0	612.9
70.00		0.00	1.24	22.929	38.75	276.26	0.650	0.000	5.00	14.819	9.63	373.2	0.0	594.9
75.00		0.00	1.26	23.386	39.52	270.47	0.650	0.000	5.00	14.373	9.34	369.2	0.0	576.8
77.00	Appurtenance(s)	0.00	1.27	23.562	39.82	268.07	0.650	0.000	2.00	5.624	3.66	145.6	0.0	225.7
80.00		0.00	1.29	23.821	40.26	264.37	0.650	0.000	3.00	8.302	5.40	217.2	0.0	333.1
85.00		0.00	1.31	24.237	40.96	257.99	0.650	0.000	5.00	13.480	8.76	358.9	0.0	540.7
87.00	Appurtenance(s)	0.00	1.32	24.399	41.23	255.37	0.650	0.000	2.00	5.267	3.42	141.2	0.0	211.2
90.00		0.00	1.33	24.636	41.63	251.36	0.650	0.000	3.00	7.767	5.05	210.2	0.0	311.4
95.00		0.00	1.35	25.020	42.28	244.49	0.650	0.000	5.00	12.588	8.18	346.0	0.0	504.6
98.00	Bot - Section 3	0.00	1.36	25.243	42.66	240.26	0.650	0.000	3.00	7.339	4.77	203.5	0.0	294.1
99.00	Appurtenance(s)	0.00	1.37	25.316	42.78	238.84	0.650	0.000	1.00	2.452	1.59	68.2	0.0	175.4
100.00		0.00	1.37	25.389	42.91	237.40	0.650	0.000	1.00	2.434	1.58	67.9	0.0	174.1
101.75	Top - Section 2	0.00	1.38	25.515	43.12	234.88	0.650	0.000	1.75	4.217	2.74	118.2	0.0	301.5
105.00		0.00	1.39	25.745	43.51	234.30	0.650	0.000	3.25	7.687	5.00	217.4	0.0	246.9
109.00	Top - Section 3	0.00	1.41	26.022	43.98	228.36	0.650	0.000	4.00	9.203	5.98	263.1	0.0	295.5
110.00		0.00	1.41	26.090	44.09	218.73	0.590	0.000	1.00	2.167	1.28	56.4	0.0	85.7
115.00		0.00	1.43	26.423	44.66	220.12	0.590	0.000	5.00	10.833	6.39	285.4	0.0	428.4
118.00	Appurtenance(s)	0.00	1.44	26.618	44.99	220.93	0.590	0.000	3.00	6.500	3.83	172.5	0.0	257.0
119.00	Appurtenance(s)	0.00	1.44	26.683	45.09	221.20	0.590	0.000	1.00	2.167	1.28	57.6	0.0	85.7
								Totals:	**119.00**			**8,631.5**		**17,108.3**

Discrete Appurtenance Forces

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	26.747	45.202	1.00	16.86	95.20	0.000	1.000	762.10	0.00	762.10
2	118.00	LLPX310R	3	26.618	44.985	0.69	10.00	85.80	0.000	0.000	449.77	0.00	0.00
3	118.00	3 ft Standoff	3	26.618	44.985	0.75	5.92	120.00	0.000	0.000	266.20	0.00	0.00
4	118.00	2.5GHz RRH	3	26.618	44.985	0.73	3.99	99.00	0.000	0.000	179.30	0.00	0.00
5	99.00	Low Profile Platform	1	25.316	42.784	1.00	22.00	1500.00	0.000	0.000	941.26	0.00	0.00
6	99.00	LNX-6515DS-VTM	3	25.316	42.784	0.84	28.72	150.90	0.000	0.000	1228.62	0.00	0.00
7	99.00	Double TMA 17/21	3	25.316	42.784	0.72	0.89	33.00	0.000	0.000	37.94	0.00	0.00
8	99.00	ATMAA1412D-1A20	3	25.316	42.784	0.70	2.46	39.00	0.000	0.000	105.12	0.00	0.00
9	99.00	APX16DWV-16DWV-S-E-AC	6	25.316	42.784	0.65	28.15	244.20	0.000	0.000	1204.53	0.00	0.00
10	99.00	782 11056	3	25.316	42.784	0.78	0.40	5.40	0.000	0.000	17.04	0.00	0.00
11	87.00	LPA-80063-4CF	6	24.399	41.234	0.93	39.06	120.00	0.000	0.000	1610.59	0.00	0.00
12	87.00	Low Profile Platform	1	24.399	41.234	1.00	22.00	1500.00	0.000	0.000	907.14	0.00	0.00
13	87.00	BXA-70063-6CF	3	24.399	41.234	0.73	16.93	51.00	0.000	0.000	698.03	0.00	0.00
14	87.00	BXA-171063-8BF	3	24.399	41.234	0.84	7.41	31.50	0.000	0.000	305.49	0.00	0.00
15	77.00	APXV18-206517S-C	3	23.562	39.820	0.74	11.46	79.20	0.000	0.000	456.15	0.00	0.00
						Totals:		**4,154.20**			**9,169.28**		

Total Applied Force Summary

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		413.59	1150.97	0.00	0.00
10.00		404.53	1129.29	0.00	0.00
15.00		395.47	1107.62	0.00	0.00
20.00		386.41	1085.94	0.00	0.00
25.00		377.35	1064.26	0.00	0.00
30.00		368.28	1042.59	0.00	0.00
35.00		365.31	1020.91	0.00	0.00
40.00		369.95	999.24	0.00	0.00
45.00		372.71	977.56	0.00	0.00
48.25		241.72	623.79	0.00	0.00
50.00		131.79	563.54	0.00	0.00
53.25		245.81	1033.65	0.00	0.00
55.00		131.75	284.36	0.00	0.00
60.00		378.66	800.25	0.00	0.00
65.00		376.42	782.19	0.00	0.00
70.00		373.24	764.13	0.00	0.00
75.00		369.22	746.06	0.00	0.00
77.00	(3) appurtenances	601.71	372.57	0.00	0.00
80.00		217.25	425.27	0.00	0.00
85.00		358.91	694.34	0.00	0.00
87.00	(13) appurtenances	3662.42	1975.18	0.00	0.00
90.00		210.20	384.34	0.00	0.00
95.00		345.98	626.11	0.00	0.00
98.00		203.51	367.00	0.00	0.00
99.00	(19) appurtenances	3602.71	2172.17	0.00	0.00
100.00		67.90	176.35	0.00	0.00
101.75		118.21	305.48	0.00	0.00
105.00		217.41	254.32	0.00	0.00
109.00		263.06	304.63	0.00	0.00
110.00		56.36	87.97	0.00	0.00
115.00		285.42	439.84	0.00	0.00
118.00	(9) appurtenances	1067.79	568.70	0.00	0.00
119.00	(2) appurtenances	819.75	180.88	0.00	762.10
	Totals:	**17,800.81**	**24,511.48**	**0.00**	**762.10**

Resulting Forces and Deflections

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-17.825	-24.494	0.000	0.000	0.000	-1419.8	0.000	0.000	0.000	0.000	0.000
5.00	-17.455	-23.310	0.000	0.000	0.000	-1330.6	-0.060	0.000	0.060	-0.110	0.000
10.00	-17.090	-22.149	0.000	0.000	0.000	-1243.4	-0.235	0.000	0.235	-0.221	0.000
15.00	-16.729	-21.011	0.000	0.000	0.000	-1157.9	-0.526	0.000	0.526	-0.331	0.000
20.00	-16.374	-19.896	0.000	0.000	0.000	-1074.3	-0.933	0.000	0.933	-0.441	0.000
25.00	-16.023	-18.805	0.000	0.000	0.000	-992.44	-1.454	0.000	1.454	-0.550	0.000
30.00	-15.677	-17.737	0.000	0.000	0.000	-912.33	-2.089	0.000	2.089	-0.659	0.000
35.00	-15.330	-16.692	0.000	0.000	0.000	-833.95	-2.836	0.000	2.836	-0.765	0.000
40.00	-14.974	-15.671	0.000	0.000	0.000	-757.30	-3.695	0.000	3.695	-0.871	0.000
45.00	-14.607	-14.678	0.000	0.000	0.000	-682.43	-4.663	0.000	4.663	-0.973	0.000
48.25	-14.367	-14.046	0.000	0.000	0.000	-634.96	-5.349	0.000	5.349	-1.040	0.000
50.00	-14.237	-13.473	0.000	0.000	0.000	-609.82	-5.737	0.000	5.737	-1.075	0.000
53.25	-13.981	-12.432	0.000	0.000	0.000	-563.55	-6.492	0.000	6.492	-1.140	0.000
55.00	-13.859	-12.133	0.000	0.000	0.000	-539.08	-6.917	0.000	6.917	-1.174	0.000
60.00	-13.483	-11.317	0.000	0.000	0.000	-469.78	-8.203	0.000	8.203	-1.279	0.000
65.00	-13.107	-10.522	0.000	0.000	0.000	-402.37	-9.597	0.000	9.597	-1.378	0.000
70.00	-12.729	-9.748	0.000	0.000	0.000	-336.84	-11.090	0.000	11.090	-1.469	0.000
75.00	-12.349	-9.000	0.000	0.000	0.000	-273.19	-12.675	0.000	12.675	-1.552	0.000
77.00	-11.743	-8.637	0.000	0.000	0.000	-248.49	-13.332	0.000	13.332	-1.583	0.000
80.00	-11.522	-8.207	0.000	0.000	0.000	-213.26	-14.341	0.000	14.341	-1.626	0.000
85.00	-11.148	-7.516	0.000	0.000	0.000	-155.66	-16.079	0.000	16.079	-1.687	0.000
87.00	-7.431	-5.647	0.000	0.000	0.000	-133.36	-16.790	0.000	16.790	-1.707	0.000
90.00	-7.212	-5.265	0.000	0.000	0.000	-111.07	-17.872	0.000	17.872	-1.735	0.000
95.00	-6.850	-4.647	0.000	0.000	0.000	-75.009	-19.711	0.000	19.711	-1.773	0.000
98.00	-6.636	-4.285	0.000	0.000	0.000	-54.460	-20.831	0.000	20.831	-1.790	0.000
99.00	-2.967	-2.226	0.000	0.000	0.000	-47.825	-21.207	0.000	21.207	-1.795	0.000
100.00	-2.894	-2.052	0.000	0.000	0.000	-44.858	-21.583	0.000	21.583	-1.800	0.000
101.75	-2.766	-1.750	0.000	0.000	0.000	-39.794	-22.244	0.000	22.244	-1.807	0.000
105.00	-2.541	-1.502	0.000	0.000	0.000	-30.803	-23.478	0.000	23.478	-1.819	0.000
109.00	-2.269	-1.205	0.000	0.000	0.000	-20.638	-25.008	0.000	25.008	-1.833	0.000
110.00	-2.210	-1.119	0.000	0.000	0.000	-18.369	-25.393	0.000	25.393	-1.835	0.000
115.00	-1.911	-0.688	0.000	0.000	0.000	-7.319	-27.320	0.000	27.320	-1.844	0.000
118.00	-0.825	-0.154	0.000	0.000	0.000	-1.587	-28.479	0.000	28.479	-1.846	0.000
119.00	-0.820	0.000	0.000	0.000	0.000	-0.762	0.000	0.000	28.866	-1.846	0.000

Resulting Stresses

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 85 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

	Applied Stresses								
Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)		f/Fb Stress Ratio
0.00	0.42	0.62	0.00	0.00	0.00	24.13	24.57	52.0		0.473
5.00	0.41	0.62	0.00	0.00	0.00	23.64	24.07	52.0		0.463
10.00	0.40	0.62	0.00	0.00	0.00	23.11	23.53	52.0		0.453
15.00	0.39	0.62	0.00	0.00	0.00	22.55	22.96	52.0		0.442
20.00	0.37	0.62	0.00	0.00	0.00	21.93	22.33	52.0		0.430
25.00	0.36	0.62	0.00	0.00	0.00	21.27	21.66	52.0		0.417
30.00	0.35	0.62	0.00	0.00	0.00	20.56	20.93	52.0		0.403
35.00	0.34	0.63	0.00	0.00	0.00	19.77	20.14	52.0		0.387
40.00	0.33	0.63	0.00	0.00	0.00	18.92	19.28	52.0		0.371
45.00	0.31	0.63	0.00	0.00	0.00	18.00	18.34	52.0		0.353
48.25	0.31	0.63	0.00	0.00	0.00	17.36	17.70	52.0		0.340
50.00	0.30	0.63	0.00	0.00	0.00	17.00	17.33	52.0		0.333
53.25	0.33	0.74	0.00	0.00	0.00	18.83	19.20	52.0		0.369
55.00	0.32	0.74	0.00	0.00	0.00	18.37	18.74	52.0		0.360
60.00	0.31	0.74	0.00	0.00	0.00	16.96	17.31	52.0		0.333
65.00	0.30	0.74	0.00	0.00	0.00	15.41	15.76	52.0		0.303
70.00	0.28	0.75	0.00	0.00	0.00	13.71	14.05	52.0		0.270
75.00	0.27	0.75	0.00	0.00	0.00	11.84	12.18	52.0		0.234
77.00	0.26	0.72	0.00	0.00	0.00	11.05	11.38	52.0		0.219
80.00	0.25	0.72	0.00	0.00	0.00	9.86	10.20	52.0		0.196
85.00	0.24	0.72	0.00	0.00	0.00	7.70	8.04	52.0		0.155
87.00	0.18	0.49	0.00	0.00	0.00	6.78	7.02	52.0		0.135
90.00	0.17	0.48	0.00	0.00	0.00	5.89	6.12	52.0		0.118
95.00	0.16	0.47	0.00	0.00	0.00	4.27	4.51	52.0		0.087
98.00	0.15	0.47	0.00	0.00	0.00	3.24	3.49	52.0		0.067
99.00	0.08	0.21	0.00	0.00	0.00	2.89	2.99	52.0		0.058
100.00	0.07	0.21	0.00	0.00	0.00	2.75	2.85	52.0		0.055
101.75	0.08	0.25	0.00	0.00	0.00	3.01	3.11	52.0		0.060
105.00	0.07	0.23	0.00	0.00	0.00	2.45	2.55	52.0		0.049
109.00	0.06	0.21	0.00	0.00	0.00	1.75	1.84	52.0		0.035
109.00	0.06	0.21	0.00	0.00	0.00	1.75	1.84	52.0		0.031
110.00	0.04	0.18	0.00	0.00	0.00	1.38	1.46	33.6	33.6	0.043
115.00	0.03	0.15	0.00	0.00	0.00	0.55	0.63	33.6	33.6	0.019
118.00	0.01	0.07	0.00	0.00	0.00	0.12	0.17	33.6	33.6	0.005
119.00	0.00	0.07	0.00	0.00	0.00	0.06	0.13	33.6	33.6	0.004

Wind Loading - Shaft

Structure: CT13070-A-SBA
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

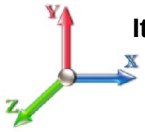
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

10/7/2015

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 21

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	13.871	23.44	302.97	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	296.40	0.650	0.500	5.00	20.773	13.50	316.5	149.1	1130.8
10.00		0.00	1.00	13.871	23.44	289.83	0.650	0.500	5.00	20.327	13.21	309.7	145.8	1105.9
15.00		0.00	1.00	13.871	23.44	283.27	0.650	0.500	5.00	19.881	12.92	302.9	142.6	1080.9
20.00		0.00	1.00	13.871	23.44	276.70	0.650	0.500	5.00	19.435	12.63	296.1	139.3	1056.0
25.00		0.00	1.00	13.871	23.44	270.14	0.650	0.500	5.00	18.989	12.34	289.3	136.0	1031.0
30.00		0.00	1.00	13.871	23.44	263.57	0.650	0.500	5.00	18.543	12.05	282.5	132.8	1006.1
35.00		0.00	1.02	14.106	23.84	259.17	0.650	0.500	5.00	18.097	11.76	280.4	129.5	981.2
40.00		0.00	1.06	14.655	24.77	257.42	0.650	0.500	5.00	17.651	11.47	284.2	126.2	956.2
45.00		0.00	1.09	15.156	25.61	254.92	0.650	0.500	5.00	17.205	11.18	286.4	123.0	931.3
48.25	Bot - Section 2	0.00	1.11	15.462	26.13	252.97	0.650	0.500	3.25	10.944	7.11	185.9	78.5	592.3
50.00		0.00	1.13	15.620	26.40	251.82	0.650	0.500	1.75	5.906	3.84	101.3	42.6	546.9
53.25	Top - Section 1	0.00	1.15	15.903	26.88	249.52	0.650	0.500	3.25	10.823	7.04	189.1	77.7	1001.3
55.00		0.00	1.16	16.051	27.13	252.33	0.650	0.500	1.75	5.750	3.74	101.4	41.4	266.5
60.00		0.00	1.19	16.455	27.81	248.34	0.650	0.500	5.00	16.127	10.48	291.5	115.1	746.1
65.00		0.00	1.21	16.836	28.45	243.96	0.650	0.500	5.00	15.681	10.19	290.0	111.8	724.7
70.00		0.00	1.24	17.196	29.06	239.24	0.650	0.500	5.00	15.235	9.90	287.8	108.5	703.4
75.00		0.00	1.26	17.538	29.64	234.23	0.650	0.500	5.00	14.789	9.61	284.9	105.2	682.1
77.00	Appurtenance(s)	0.00	1.27	17.671	29.86	232.15	0.650	0.500	2.00	5.791	3.76	112.4	41.6	267.2
80.00		0.00	1.29	17.865	30.19	228.95	0.650	0.500	3.00	8.552	5.56	167.8	61.2	394.3
85.00		0.00	1.31	18.177	30.72	223.42	0.650	0.500	5.00	13.897	9.03	277.5	98.7	639.4
87.00	Appurtenance(s)	0.00	1.32	18.298	30.92	221.15	0.650	0.500	2.00	5.434	3.53	109.2	39.0	250.2
90.00		0.00	1.33	18.476	31.22	217.68	0.650	0.500	3.00	8.017	5.21	162.7	57.3	368.7
95.00		0.00	1.35	18.764	31.71	211.73	0.650	0.500	5.00	13.005	8.45	268.1	92.2	596.7
98.00	Bot - Section 3	0.00	1.36	18.931	31.99	208.07	0.650	0.500	3.00	7.589	4.93	157.8	54.1	348.2
99.00	Appurtenance(s)	0.00	1.37	18.986	32.09	206.83	0.650	0.500	1.00	2.536	1.65	52.9	18.2	193.6
100.00		0.00	1.37	19.041	32.18	205.59	0.650	0.500	1.00	2.518	1.64	52.7	18.1	192.1
101.75	Top - Section 2	0.00	1.38	19.135	32.34	203.40	0.650	0.500	1.75	4.363	2.84	91.7	31.2	332.7
105.00		0.00	1.39	19.308	32.63	202.90	0.650	0.500	3.25	7.958	5.17	168.8	56.7	303.5
109.00	Top - Section 3	0.00	1.41	19.515	32.98	197.76	0.650	0.500	4.00	9.536	6.20	204.4	67.6	363.1
110.00		0.00	1.41	19.566	33.07	189.42	0.590	0.500	1.00	2.250	1.33	43.9	16.2	101.9
115.00		0.00	1.43	19.816	33.49	190.63	0.590	0.500	5.00	11.250	6.64	222.3	80.9	509.3
118.00	Appurtenance(s)	0.00	1.44	19.963	33.74	191.33	0.590	0.500	3.00	6.750	3.98	134.4	48.6	305.6
119.00	Appurtenance(s)	0.00	1.44	20.011	33.82	191.56	0.590	0.500	1.00	2.250	1.33	44.9	16.2	101.9
								Totals:	**119.00**			**6,651.6**		**19,811.1**

Discrete Appurtenance Forces

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	119.00	VHLP2.5-11	2	20.059	33.899	1.00	17.84	194.00	0.000	1.000	604.76	0.00	604.76
2	118.00	LLPX310R	3	19.963	33.737	0.71	11.42	163.50	0.000	0.000	385.17	0.00	0.00
3	118.00	3 ft Standoff	3	19.963	33.737	0.75	9.77	189.00	0.000	0.000	329.44	0.00	0.00
4	118.00	2.5GHz RRH	3	19.963	33.737	0.75	4.70	134.70	0.000	0.000	158.65	0.00	0.00
5	99.00	Low Profile Platform	1	18.986	32.086	1.00	27.00	1800.00	0.000	0.000	866.33	0.00	0.00
6	99.00	LNX-6515DS-VTM	3	18.986	32.086	0.84	30.04	336.33	0.000	0.000	963.82	0.00	0.00
7	99.00	Double TMA 17/21	3	18.986	32.086	0.75	1.10	39.42	0.000	0.000	35.19	0.00	0.00
8	99.00	ATMAA1412D-1A20	3	18.986	32.086	0.72	2.77	56.25	0.000	0.000	89.03	0.00	0.00
9	99.00	APX16DWV-16DWV-S-E-AC	6	18.986	32.086	0.66	29.99	431.52	0.000	0.000	962.34	0.00	0.00
10	99.00	782 11056	3	18.986	32.086	0.82	0.56	8.49	0.000	0.000	18.07	0.00	0.00
11	87.00	LPA-80063-4CF	6	18.298	30.923	0.94	42.98	434.40	0.000	0.000	1328.99	0.00	0.00
12	87.00	Low Profile Platform	1	18.298	30.923	1.00	27.00	1800.00	0.000	0.000	834.93	0.00	0.00
13	87.00	BXA-70063-6CF	3	18.298	30.923	0.75	19.21	0.00	0.000	0.000	594.19	0.00	0.00
14	87.00	BXA-171063-8BF	3	18.298	30.923	0.85	8.70	87.90	0.000	0.000	268.89	0.00	0.00
15	77.00	APXV18-206517S-C	3	17.671	29.863	0.76	13.32	159.00	0.000	0.000	397.63	0.00	0.00
						Totals:		**5,834.51**			**7,837.45**		

Total Applied Force Summary

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Iterations: 21

Dead Load Factor 1.00

Wind Load Factor 1.00

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		316.53	1300.08	0.00	0.00
10.00		309.73	1275.13	0.00	0.00
15.00		302.93	1250.19	0.00	0.00
20.00		296.14	1225.24	0.00	0.00
25.00		289.34	1200.30	0.00	0.00
30.00		282.55	1175.35	0.00	0.00
35.00		280.42	1150.41	0.00	0.00
40.00		284.15	1125.46	0.00	0.00
45.00		286.45	1100.52	0.00	0.00
48.25		185.88	702.33	0.00	0.00
50.00		101.34	606.09	0.00	0.00
53.25		189.08	1111.31	0.00	0.00
55.00		101.38	325.77	0.00	0.00
60.00		291.51	915.31	0.00	0.00
65.00		290.01	893.98	0.00	0.00
70.00		287.79	872.65	0.00	0.00
75.00		284.92	851.31	0.00	0.00
77.00	(3) appurtenances	510.04	493.94	0.00	0.00
80.00		167.83	486.46	0.00	0.00
85.00		277.49	793.05	0.00	0.00
87.00	(13) appurtenances	3136.23	2633.94	0.00	0.00
90.00		162.72	441.60	0.00	0.00
95.00		268.06	718.28	0.00	0.00
98.00		157.82	421.12	0.00	0.00
99.00	(19) appurtenances	2987.67	2889.89	0.00	0.00
100.00		52.66	194.43	0.00	0.00
101.75		91.72	336.73	0.00	0.00
105.00		168.79	310.97	0.00	0.00
109.00		204.43	372.26	0.00	0.00
110.00		43.90	104.16	0.00	0.00
115.00		222.29	520.78	0.00	0.00
118.00	(9) appurtenances	1007.61	799.67	0.00	0.00
119.00	(2) appurtenances	649.66	295.87	0.00	604.76
	Totals:	**14,489.06**	**28,894.59**	**0.00**	**604.76**

Resulting Forces and Deflections

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (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: 21

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-14.512	-28.883	0.000	0.000	0.000	-1176.1	0.000	0.000	0.000	0.000	0.000
5.00	-14.239	-27.560	0.000	0.000	0.000	-1103.6	-0.049	0.000	0.049	-0.092	0.000
10.00	-13.968	-26.263	0.000	0.000	0.000	-1032.4	-0.195	0.000	0.195	-0.183	0.000
15.00	-13.700	-24.993	0.000	0.000	0.000	-962.59	-0.436	0.000	0.436	-0.275	0.000
20.00	-13.435	-23.748	0.000	0.000	0.000	-894.09	-0.774	0.000	0.774	-0.366	0.000
25.00	-13.173	-22.529	0.000	0.000	0.000	-826.92	-1.207	0.000	1.207	-0.457	0.000
30.00	-12.913	-21.336	0.000	0.000	0.000	-761.06	-1.734	0.000	1.734	-0.547	0.000
35.00	-12.652	-20.169	0.000	0.000	0.000	-696.49	-2.356	0.000	2.356	-0.637	0.000
40.00	-12.383	-19.028	0.000	0.000	0.000	-633.23	-3.070	0.000	3.070	-0.725	0.000
45.00	-12.104	-17.916	0.000	0.000	0.000	-571.32	-3.876	0.000	3.876	-0.811	0.000
48.25	-11.921	-17.208	0.000	0.000	0.000	-531.98	-4.448	0.000	4.448	-0.866	0.000
50.00	-11.822	-16.595	0.000	0.000	0.000	-511.12	-4.771	0.000	4.771	-0.896	0.000
53.25	-11.626	-15.479	0.000	0.000	0.000	-472.69	-5.400	0.000	5.400	-0.950	0.000
55.00	-11.535	-15.143	0.000	0.000	0.000	-452.35	-5.754	0.000	5.754	-0.979	0.000
60.00	-11.249	-14.216	0.000	0.000	0.000	-394.67	-6.827	0.000	6.827	-1.067	0.000
65.00	-10.960	-13.312	0.000	0.000	0.000	-338.43	-7.989	0.000	7.989	-1.150	0.000
70.00	-10.670	-12.432	0.000	0.000	0.000	-283.63	-9.236	0.000	9.236	-1.227	0.000
75.00	-10.376	-11.579	0.000	0.000	0.000	-230.28	-10.560	0.000	10.560	-1.296	0.000
77.00	-9.861	-11.091	0.000	0.000	0.000	-209.53	-11.109	0.000	11.109	-1.323	0.000
80.00	-9.690	-10.601	0.000	0.000	0.000	-179.94	-11.952	0.000	11.952	-1.359	0.000
85.00	-9.399	-9.810	0.000	0.000	0.000	-131.49	-13.404	0.000	13.404	-1.410	0.000
87.00	-6.201	-7.252	0.000	0.000	0.000	-112.69	-13.999	0.000	13.999	-1.428	0.000
90.00	-6.031	-6.812	0.000	0.000	0.000	-94.095	-14.904	0.000	14.904	-1.451	0.000
95.00	-5.747	-6.098	0.000	0.000	0.000	-63.941	-16.442	0.000	16.442	-1.483	0.000
98.00	-5.579	-5.681	0.000	0.000	0.000	-46.700	-17.380	0.000	17.380	-1.498	0.000
99.00	-2.517	-2.870	0.000	0.000	0.000	-41.121	-17.694	0.000	17.694	-1.502	0.000
100.00	-2.460	-2.677	0.000	0.000	0.000	-38.604	-18.009	0.000	18.009	-1.506	0.000
101.75	-2.359	-2.342	0.000	0.000	0.000	-34.300	-18.562	0.000	18.562	-1.512	0.000
105.00	-2.183	-2.035	0.000	0.000	0.000	-26.632	-19.595	0.000	19.595	-1.523	0.000
109.00	-1.969	-1.668	0.000	0.000	0.000	-17.901	-20.877	0.000	20.877	-1.535	0.000
110.00	-1.922	-1.565	0.000	0.000	0.000	-15.932	-21.198	0.000	21.198	-1.537	0.000
115.00	-1.686	-1.050	0.000	0.000	0.000	-6.321	-22.812	0.000	22.812	-1.545	0.000
118.00	-0.657	-0.278	0.000	0.000	0.000	-1.262	-23.784	0.000	23.784	-1.546	0.000
119.00	-0.650	0.000	0.000	0.000	0.000	-0.605	0.000	0.000	24.107	-1.546	0.000

Resulting Stresses

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 73.61 mph Wind with 0.5" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 21

Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)		f/Fb Stress Ratio
0.00	0.50	0.50	0.00	0.00	0.00	19.99	20.50	52.0		0.394
5.00	0.48	0.50	0.00	0.00	0.00	19.60	20.11	52.0		0.387
10.00	0.47	0.50	0.00	0.00	0.00	19.19	19.68	52.0		0.379
15.00	0.46	0.51	0.00	0.00	0.00	18.74	19.22	52.0		0.370
20.00	0.45	0.51	0.00	0.00	0.00	18.25	18.72	52.0		0.360
25.00	0.43	0.51	0.00	0.00	0.00	17.72	18.18	52.0		0.350
30.00	0.42	0.51	0.00	0.00	0.00	17.15	17.59	52.0		0.338
35.00	0.41	0.52	0.00	0.00	0.00	16.52	16.95	52.0		0.326
40.00	0.40	0.52	0.00	0.00	0.00	15.82	16.24	52.0		0.313
45.00	0.38	0.52	0.00	0.00	0.00	15.07	15.48	52.0		0.298
48.25	0.37	0.52	0.00	0.00	0.00	14.54	14.94	52.0		0.287
50.00	0.36	0.52	0.00	0.00	0.00	14.25	14.64	52.0		0.282
53.25	0.41	0.62	0.00	0.00	0.00	15.79	16.24	52.0		0.312
55.00	0.40	0.62	0.00	0.00	0.00	15.41	15.85	52.0		0.305
60.00	0.39	0.62	0.00	0.00	0.00	14.24	14.67	52.0		0.282
65.00	0.38	0.62	0.00	0.00	0.00	12.96	13.38	52.0		0.257
70.00	0.36	0.62	0.00	0.00	0.00	11.54	11.95	52.0		0.230
75.00	0.35	0.63	0.00	0.00	0.00	9.98	10.39	52.0		0.200
77.00	0.34	0.60	0.00	0.00	0.00	9.32	9.71	52.0		0.187
80.00	0.33	0.60	0.00	0.00	0.00	8.32	8.71	52.0		0.168
85.00	0.31	0.61	0.00	0.00	0.00	6.50	6.90	52.0		0.133
87.00	0.24	0.41	0.00	0.00	0.00	5.73	6.01	52.0		0.116
90.00	0.23	0.40	0.00	0.00	0.00	4.99	5.26	52.0		0.101
95.00	0.21	0.40	0.00	0.00	0.00	3.64	3.91	52.0		0.075
98.00	0.20	0.39	0.00	0.00	0.00	2.78	3.06	52.0		0.059
99.00	0.10	0.18	0.00	0.00	0.00	2.49	2.61	52.0		0.050
100.00	0.10	0.18	0.00	0.00	0.00	2.37	2.48	52.0		0.048
101.75	0.10	0.21	0.00	0.00	0.00	2.59	2.72	52.0		0.052
105.00	0.09	0.20	0.00	0.00	0.00	2.12	2.23	52.0		0.043
109.00	0.08	0.19	0.00	0.00	0.00	1.51	1.62	52.0		0.031
109.00	0.08	0.19	0.00	0.00	0.00	1.51	1.62	52.0		0.028
110.00	0.06	0.15	0.00	0.00	0.00	1.20	1.29	33.6	33.6	0.038
115.00	0.04	0.13	0.00	0.00	0.00	0.47	0.57	33.6	33.6	0.017
118.00	0.01	0.05	0.00	0.00	0.00	0.09	0.14	33.6	33.6	0.004
119.00	0.00	0.05	0.00	0.00	0.00	0.05	0.10	33.6	33.6	0.003

Wind Loading - Shaft

Structure: CT13070-A-SBA
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.000 (ft)

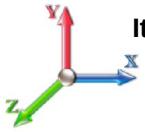
Code: EIA/TIA-222-F
Exposure: C
Gh: 1.69
Struct Class: II

10/7/2015

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations: 20

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		0.00	1.00	6.400	10.82	205.79	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	201.33	0.650	0.000	5.00	20.356	13.23	143.1	0.0	981.7
10.00		0.00	1.00	6.400	10.82	196.87	0.650	0.000	5.00	19.910	12.94	140.0	0.0	960.0
15.00		0.00	1.00	6.400	10.82	192.41	0.650	0.000	5.00	19.464	12.65	136.8	0.0	938.4
20.00		0.00	1.00	6.400	10.82	187.95	0.650	0.000	5.00	19.018	12.36	133.7	0.0	916.7
25.00		0.00	1.00	6.400	10.82	183.49	0.650	0.000	5.00	18.572	12.07	130.6	0.0	895.0
30.00		0.00	1.00	6.400	10.82	179.03	0.650	0.000	5.00	18.126	11.78	127.4	0.0	873.3
35.00		0.00	1.02	6.509	11.00	176.04	0.650	0.000	5.00	17.680	11.49	126.4	0.0	851.7
40.00		0.00	1.06	6.762	11.43	174.85	0.650	0.000	5.00	17.234	11.20	128.0	0.0	830.0
45.00		0.00	1.09	6.993	11.82	173.16	0.650	0.000	5.00	16.788	10.91	129.0	0.0	808.3
48.25	Bot - Section 2	0.00	1.11	7.134	12.06	171.83	0.650	0.000	3.25	10.673	6.94	83.6	0.0	513.8
50.00		0.00	1.13	7.207	12.18	171.05	0.650	0.000	1.75	5.760	3.74	45.6	0.0	504.3
53.25	Top - Section 1	0.00	1.15	7.338	12.40	169.49	0.650	0.000	3.25	10.552	6.86	85.1	0.0	923.6
55.00		0.00	1.16	7.406	12.52	171.40	0.650	0.000	1.75	5.604	3.64	45.6	0.0	225.1
60.00		0.00	1.19	7.592	12.83	168.68	0.650	0.000	5.00	15.711	10.21	131.0	0.0	631.0
65.00		0.00	1.21	7.768	13.13	165.71	0.650	0.000	5.00	15.265	9.92	130.2	0.0	612.9
70.00		0.00	1.24	7.934	13.41	162.51	0.650	0.000	5.00	14.819	9.63	129.1	0.0	594.9
75.00		0.00	1.26	8.092	13.68	159.10	0.650	0.000	5.00	14.373	9.34	127.8	0.0	576.8
77.00	Appurtenance(s)	0.00	1.27	8.153	13.78	157.69	0.650	0.000	2.00	5.624	3.66	50.4	0.0	225.7
80.00		0.00	1.29	8.242	13.93	155.51	0.650	0.000	3.00	8.302	5.40	75.2	0.0	333.1
85.00		0.00	1.31	8.387	14.17	151.76	0.650	0.000	5.00	13.480	8.76	124.2	0.0	540.7
87.00	Appurtenance(s)	0.00	1.32	8.442	14.27	150.22	0.650	0.000	2.00	5.267	3.42	48.8	0.0	211.2
90.00		0.00	1.33	8.525	14.41	147.86	0.650	0.000	3.00	7.767	5.05	72.7	0.0	311.4
95.00		0.00	1.35	8.657	14.63	143.82	0.650	0.000	5.00	12.588	8.18	119.7	0.0	504.6
98.00	Bot - Section 3	0.00	1.36	8.735	14.76	141.33	0.650	0.000	3.00	7.339	4.77	70.4	0.0	294.1
99.00	Appurtenance(s)	0.00	1.37	8.760	14.80	140.49	0.650	0.000	1.00	2.452	1.59	23.6	0.0	175.4
100.00		0.00	1.37	8.785	14.85	139.65	0.650	0.000	1.00	2.434	1.58	23.5	0.0	174.1
101.75	Top - Section 2	0.00	1.38	8.829	14.92	138.16	0.650	0.000	1.75	4.217	2.74	40.9	0.0	301.5
105.00		0.00	1.39	8.908	15.06	137.82	0.650	0.000	3.25	7.687	5.00	75.2	0.0	246.9
109.00	Top - Section 3	0.00	1.41	9.004	15.22	134.33	0.650	0.000	4.00	9.203	5.98	91.0	0.0	295.5
110.00		0.00	1.41	9.028	15.26	128.66	0.590	0.000	1.00	2.167	1.28	19.5	0.0	85.7
115.00		0.00	1.43	9.143	15.45	129.48	0.590	0.000	5.00	10.833	6.39	98.8	0.0	428.4
118.00	Appurtenance(s)	0.00	1.44	9.211	15.57	129.96	0.590	0.000	3.00	6.500	3.83	59.7	0.0	257.0
119.00	Appurtenance(s)	0.00	1.44	9.233	15.60	130.12	0.590	0.000	1.00	2.167	1.28	19.9	0.0	85.7
								Totals:	**119.00**			**2,986.7**		**17,108.3**

Discrete Appurtenance Forces

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 20

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	119.00	VHLP2.5-11	2	9.255	15.641	1.00	16.86	95.20	0.000	1.000	263.70	0.00	263.70
2	118.00	LLPX310R	3	9.211	15.566	0.69	10.00	85.80	0.000	0.000	155.63	0.00	0.00
3	118.00	3 ft Standoff	3	9.211	15.566	0.75	5.92	120.00	0.000	0.000	92.11	0.00	0.00
4	118.00	2.5GHz RRH	3	9.211	15.566	0.73	3.99	99.00	0.000	0.000	62.04	0.00	0.00
5	99.00	Low Profile Platform	1	8.760	14.804	1.00	22.00	1500.00	0.000	0.000	325.69	0.00	0.00
6	99.00	LNX-6515DS-VTM	3	8.760	14.804	0.84	28.72	150.90	0.000	0.000	425.13	0.00	0.00
7	99.00	Double TMA 17/21	3	8.760	14.804	0.72	0.89	33.00	0.000	0.000	13.13	0.00	0.00
8	99.00	ATMAA1412D-1A20	3	8.760	14.804	0.70	2.46	39.00	0.000	0.000	36.37	0.00	0.00
9	99.00	APX16DWV-16DWV-S-E-AC	6	8.760	14.804	0.65	28.15	244.20	0.000	0.000	416.79	0.00	0.00
10	99.00	782 11056	3	8.760	14.804	0.78	0.40	5.40	0.000	0.000	5.90	0.00	0.00
11	87.00	LPA-80063-4CF	6	8.442	14.268	0.93	39.06	120.00	0.000	0.000	557.30	0.00	0.00
12	87.00	Low Profile Platform	1	8.442	14.268	1.00	22.00	1500.00	0.000	0.000	313.89	0.00	0.00
13	87.00	BXA-70063-6CF	3	8.442	14.268	0.73	16.93	51.00	0.000	0.000	241.53	0.00	0.00
14	87.00	BXA-171063-8BF	3	8.442	14.268	0.84	7.41	31.50	0.000	0.000	105.71	0.00	0.00
15	77.00	APXV18-206517S-C	3	8.153	13.779	0.74	11.46	79.20	0.000	0.000	157.84	0.00	0.00
						Totals:		**4,154.20**			**3,172.76**		

Total Applied Force Summary

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 50 mph Wind with 0" Ice

Dead Load Factor 1.00

Wind Load Factor 1.00

Iterations: 20

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		143.11	1150.97	0.00	0.00
10.00		139.98	1129.29	0.00	0.00
15.00		136.84	1107.62	0.00	0.00
20.00		133.71	1085.94	0.00	0.00
25.00		130.57	1064.26	0.00	0.00
30.00		127.43	1042.59	0.00	0.00
35.00		126.41	1020.91	0.00	0.00
40.00		128.01	999.24	0.00	0.00
45.00		128.96	977.56	0.00	0.00
48.25		83.64	623.79	0.00	0.00
50.00		45.60	563.54	0.00	0.00
53.25		85.06	1033.65	0.00	0.00
55.00		45.59	284.36	0.00	0.00
60.00		131.02	800.25	0.00	0.00
65.00		130.25	782.19	0.00	0.00
70.00		129.15	764.13	0.00	0.00
75.00		127.76	746.06	0.00	0.00
77.00	(3) appurtenances	208.21	372.57	0.00	0.00
80.00		75.17	425.27	0.00	0.00
85.00		124.19	694.34	0.00	0.00
87.00	(13) appurtenances	1267.27	1975.18	0.00	0.00
90.00		72.73	384.34	0.00	0.00
95.00		119.72	626.11	0.00	0.00
98.00		70.42	367.00	0.00	0.00
99.00	(19) appurtenances	1246.61	2172.17	0.00	0.00
100.00		23.49	176.35	0.00	0.00
101.75		40.90	305.48	0.00	0.00
105.00		75.23	254.32	0.00	0.00
109.00		91.02	304.63	0.00	0.00
110.00		19.50	87.97	0.00	0.00
115.00		98.76	439.84	0.00	0.00
118.00	(9) appurtenances	369.48	568.70	0.00	0.00
119.00	(2) appurtenances	283.65	180.88	0.00	263.70
	Totals:	**6,159.45**	**24,511.48**	**0.00**	**263.70**

Resulting Forces and Deflections

Structure:	CT13070-A-SB	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (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: 20

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	-6.167	-24.509	0.000	0.000	0.000	-491.30	0.000	0.000	0.000	0.000	0.000
5.00	-6.039	-23.354	0.000	0.000	0.000	-460.46	-0.021	0.000	0.021	-0.038	0.000
10.00	-5.913	-22.221	0.000	0.000	0.000	-430.27	-0.081	0.000	0.081	-0.076	0.000
15.00	-5.788	-21.110	0.000	0.000	0.000	-400.70	-0.182	0.000	0.182	-0.115	0.000
20.00	-5.665	-20.021	0.000	0.000	0.000	-371.76	-0.323	0.000	0.323	-0.153	0.000
25.00	-5.544	-18.953	0.000	0.000	0.000	-343.44	-0.503	0.000	0.503	-0.190	0.000
30.00	-5.424	-17.908	0.000	0.000	0.000	-315.72	-0.723	0.000	0.723	-0.228	0.000
35.00	-5.304	-16.884	0.000	0.000	0.000	-288.60	-0.982	0.000	0.982	-0.265	0.000
40.00	-5.181	-15.882	0.000	0.000	0.000	-262.08	-1.279	0.000	1.279	-0.301	0.000
45.00	-5.055	-14.903	0.000	0.000	0.000	-236.17	-1.614	0.000	1.614	-0.337	0.000
48.25	-4.971	-14.278	0.000	0.000	0.000	-219.74	-1.851	0.000	1.851	-0.360	0.000
50.00	-4.926	-13.713	0.000	0.000	0.000	-211.04	-1.985	0.000	1.985	-0.372	0.000
53.25	-4.838	-12.679	0.000	0.000	0.000	-195.03	-2.247	0.000	2.247	-0.394	0.000
55.00	-4.796	-12.393	0.000	0.000	0.000	-186.57	-2.394	0.000	2.394	-0.406	0.000
60.00	-4.666	-11.590	0.000	0.000	0.000	-162.59	-2.839	0.000	2.839	-0.443	0.000
65.00	-4.536	-10.807	0.000	0.000	0.000	-139.26	-3.321	0.000	3.321	-0.477	0.000
70.00	-4.405	-10.041	0.000	0.000	0.000	-116.58	-3.838	0.000	3.838	-0.508	0.000
75.00	-4.274	-9.295	0.000	0.000	0.000	-94.554	-4.387	0.000	4.387	-0.537	0.000
77.00	-4.064	-8.924	0.000	0.000	0.000	-86.006	-4.614	0.000	4.614	-0.548	0.000
80.00	-3.988	-8.498	0.000	0.000	0.000	-73.814	-4.963	0.000	4.963	-0.563	0.000
85.00	-3.859	-7.804	0.000	0.000	0.000	-53.875	-5.565	0.000	5.565	-0.584	0.000
87.00	-2.572	-5.841	0.000	0.000	0.000	-46.158	-5.811	0.000	5.811	-0.591	0.000
90.00	-2.496	-5.457	0.000	0.000	0.000	-38.443	-6.185	0.000	6.185	-0.601	0.000
95.00	-2.371	-4.832	0.000	0.000	0.000	-25.961	-6.822	0.000	6.822	-0.613	0.000
98.00	-2.297	-4.466	0.000	0.000	0.000	-18.849	-7.209	0.000	7.209	-0.620	0.000
99.00	-1.027	-2.307	0.000	0.000	0.000	-16.552	-7.339	0.000	7.339	-0.621	0.000
100.00	-1.001	-2.131	0.000	0.000	0.000	-15.525	-7.470	0.000	7.470	-0.623	0.000
101.75	-0.957	-1.826	0.000	0.000	0.000	-13.773	-7.699	0.000	7.699	-0.625	0.000
105.00	-0.880	-1.572	0.000	0.000	0.000	-10.661	-8.126	0.000	8.126	-0.629	0.000
109.00	-0.785	-1.269	0.000	0.000	0.000	-7.143	-8.655	0.000	8.655	-0.634	0.000
110.00	-0.765	-1.181	0.000	0.000	0.000	-6.358	-8.788	0.000	8.788	-0.635	0.000
115.00	-0.661	-0.742	0.000	0.000	0.000	-2.533	-9.455	0.000	9.455	-0.638	0.000
118.00	-0.286	-0.178	0.000	0.000	0.000	-0.549	-9.857	0.000	9.857	-0.639	0.000
119.00	-0.284	0.000	0.000	0.000	0.000	-0.264	0.000	0.000	9.990	-0.639	0.000

Resulting Stresses

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (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: 20

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	0.42	0.21	0.00	0.00	0.00	8.35	8.78	52.0		0.169
5.00	0.41	0.21	0.00	0.00	0.00	8.18	8.60	52.0		0.165
10.00	0.40	0.21	0.00	0.00	0.00	8.00	8.40	52.0		0.162
15.00	0.39	0.21	0.00	0.00	0.00	7.80	8.20	52.0		0.158
20.00	0.38	0.21	0.00	0.00	0.00	7.59	7.97	52.0		0.153
25.00	0.36	0.22	0.00	0.00	0.00	7.36	7.74	52.0		0.149
30.00	0.35	0.22	0.00	0.00	0.00	7.11	7.48	52.0		0.144
35.00	0.34	0.22	0.00	0.00	0.00	6.84	7.19	52.0		0.138
40.00	0.33	0.22	0.00	0.00	0.00	6.55	6.89	52.0		0.133
45.00	0.32	0.22	0.00	0.00	0.00	6.23	6.56	52.0		0.126
48.25	0.31	0.22	0.00	0.00	0.00	6.01	6.33	52.0		0.122
50.00	0.30	0.22	0.00	0.00	0.00	5.88	6.20	52.0		0.119
53.25	0.33	0.26	0.00	0.00	0.00	6.52	6.86	52.0		0.132
55.00	0.33	0.26	0.00	0.00	0.00	6.36	6.70	52.0		0.129
60.00	0.32	0.26	0.00	0.00	0.00	5.87	6.20	52.0		0.119
65.00	0.30	0.26	0.00	0.00	0.00	5.33	5.65	52.0		0.109
70.00	0.29	0.26	0.00	0.00	0.00	4.75	5.06	52.0		0.097
75.00	0.28	0.26	0.00	0.00	0.00	4.10	4.40	52.0		0.085
77.00	0.27	0.25	0.00	0.00	0.00	3.83	4.12	52.0		0.079
80.00	0.26	0.25	0.00	0.00	0.00	3.41	3.70	52.0		0.071
85.00	0.25	0.25	0.00	0.00	0.00	2.67	2.95	52.0		0.057
87.00	0.19	0.17	0.00	0.00	0.00	2.35	2.55	52.0		0.049
90.00	0.18	0.17	0.00	0.00	0.00	2.04	2.24	52.0		0.043
95.00	0.17	0.16	0.00	0.00	0.00	1.48	1.67	52.0		0.032
98.00	0.16	0.16	0.00	0.00	0.00	1.12	1.31	52.0		0.025
99.00	0.08	0.07	0.00	0.00	0.00	1.00	1.09	52.0		0.021
100.00	0.08	0.07	0.00	0.00	0.00	0.95	1.04	52.0		0.020
101.75	0.08	0.09	0.00	0.00	0.00	1.04	1.13	52.0		0.022
105.00	0.07	0.08	0.00	0.00	0.00	0.85	0.93	52.0		0.018
109.00	0.06	0.07	0.00	0.00	0.00	0.60	0.68	52.0		0.013
109.00	0.06	0.07	0.00	0.00	0.00	0.60	0.68	52.0		0.011
110.00	0.05	0.06	0.00	0.00	0.00	0.48	0.53	33.6	33.6	0.016
115.00	0.03	0.05	0.00	0.00	0.00	0.19	0.24	33.6	33.6	0.007
118.00	0.01	0.02	0.00	0.00	0.00	0.04	0.06	33.6	33.6	0.002
119.00	0.00	0.02	0.00	0.00	0.00	0.02	0.04	33.6	33.6	0.001

Final Analysis Summary

Structure:	CT13070-A-SBA	**Code:**	EIA/TIA-222-F	10/7/2015	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Gh:**	1.69		
Base Elev:	0.000 (ft)	**Struct Class:**	II	Page: 22	

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	t MZ (ft-kips)
85 mph Wind with 0" Ice	17.8	0.00	24.49	0.00	0.00	1419.80
73.61 mph Wind with 0.5" Ice	14.5	0.00	28.88	0.00	0.00	1176.19
50 mph Wind with 0" Ice	6.2	0.00	24.51	0.00	0.00	491.30

Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
85 mph Wind with 0" Ice	0.42	0.62	0.00	0.00	0.00	24.13	24.57	52.0	0.00	0.473
73.61 mph Wind with 0.5" Ice	0.50	0.50	0.00	0.00	0.00	19.99	20.50	52.0	0.00	0.394
50 mph Wind with 0" Ice	0.42	0.21	0.00	0.00	0.00	8.35	8.78	52.0	0.00	0.169

Monopole Mat Foundation Design

			Date: 10/7/2015
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-F
Site Name:	Waterbury 4, CT	**Structure Height (Ft.):**	119
Site Number:	CT13070-A-SBA	**Engineer Name:**	J. Tibbetts
Engr. Number:	17888	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

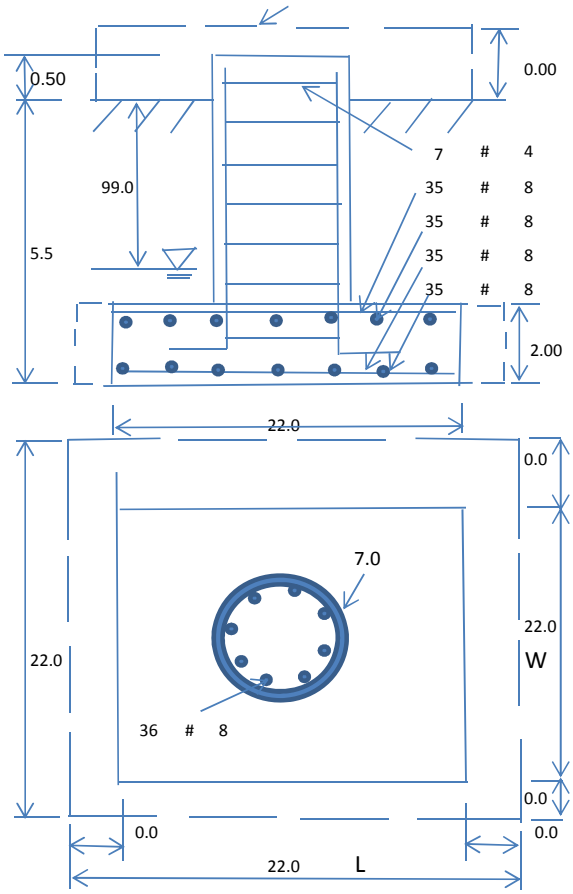
Analysis or Design? Analysis

Base Reactions (Unfactored)

Axial Load (Kips):	24.5	Shear Force (Kips):	17.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1419.8
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	5.5
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	2.00
Length of Pad (ft.):	22	Width of Pad (ft.):	22
Final Length of pad (ft)	22.0	Final width of pad (ft):	22.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
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):	16000	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.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design:

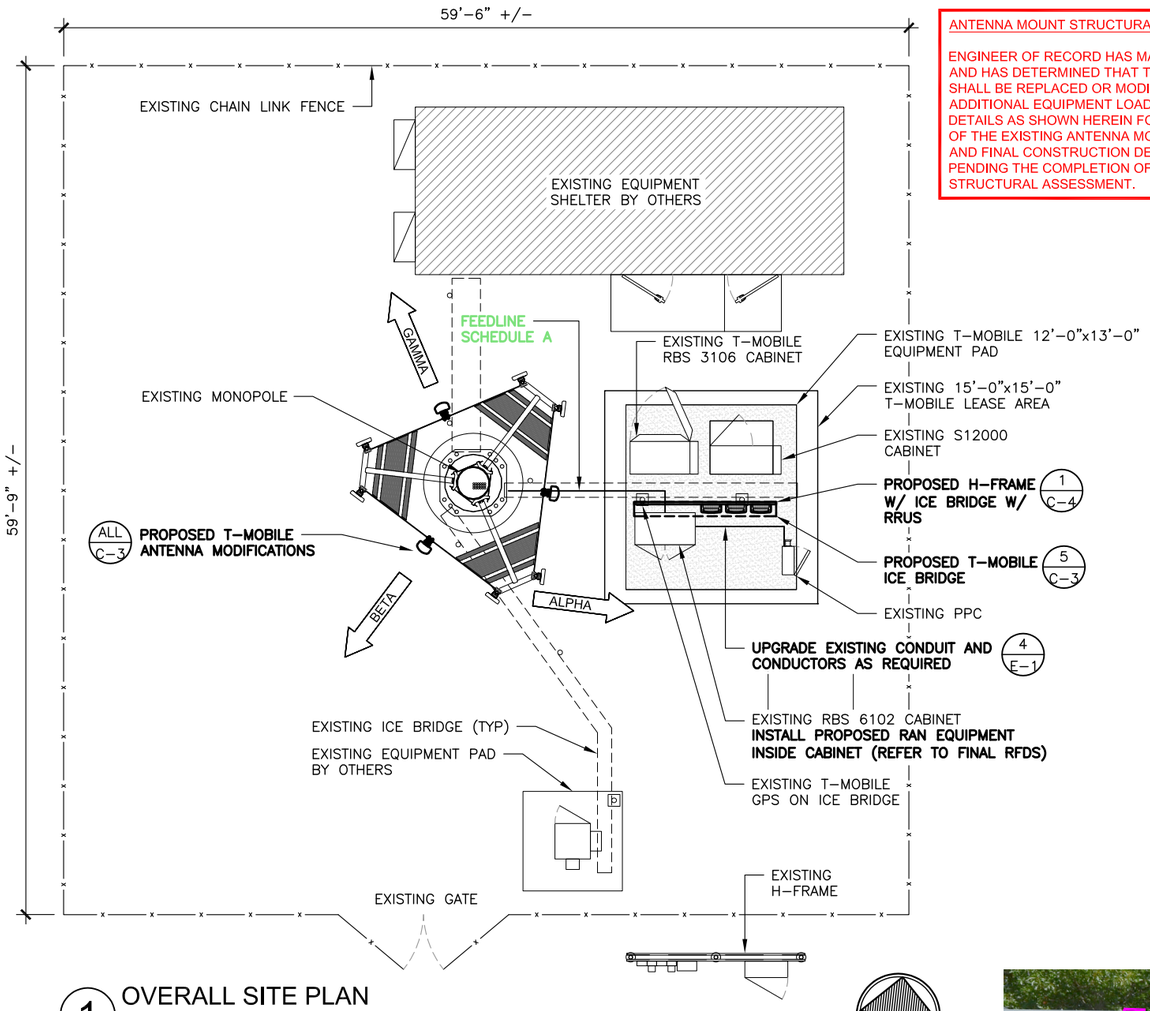
Total Dry Soil Volume (cu. Ft.):	1559.30	Total Dry Soil Weight (Kips):	202.71
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	202.71	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1121.94	Total Dry Concrete Weight (Kips):	168.29
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	168.29	Total Vertical Load on Base (Kips):	395.49

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1311	<	Allowable Soil Bearing (psf): 16000	0.08	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	2900.3	>	Applied Momont (kips-ft): 1527	0.53	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.85	OK!			

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75			
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.30			
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	4845.7	>	Design Factored Moment (Mu, Kips-Ft	1491.0	0.31	OK!
Calculated Shear Capacity (Kips):	660.1	>	Design Factored Shear (Kips):	23.1	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	1535.8	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9747.6	>	Design Factored Axial Load (Pu Kips):	31.8	0.00	OK!
Moment & Axial Strength Combination:	0.31	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	513.4	>	One-Way Factored Shear (L-D. Kips):	121.7	0.24	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	513.4	>	One-Way Factored Shear (W-D., Kips)	121.7	0.24	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	562.7	>	One-Way Factored Shear (C-C, Kips):	167.0	0.30	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0051	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0051		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7	>	Moment at Bottom (L-Direct. K-Ft):	271.1	0.11	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7	>	Moment at Bottom (W-Direct. K-Ft):	271.1	0.11	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3397.4	>	Moment at Bottom (C-C Dir. K-Ft):	383.4	0.11	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0051	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0051		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7	>	Moment at the top (L-Dir Kips-Ft):	49.8	0.02	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7	>	Moment at the top (W-Dir Kips-Ft):	49.8	0.02	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3397.4	>	Moment at the top (C-C Direc. K-Ft):	301.8	0.09	OK!



1 OVERALL SITE PLAN

SCALE: 11x17 SCALE: 3/32"=1'-0"
22x34 SCALE: 3/16"=1'-0"
0' 5' 10' 15' 25'

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.

STRUCTURAL NOTES:

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

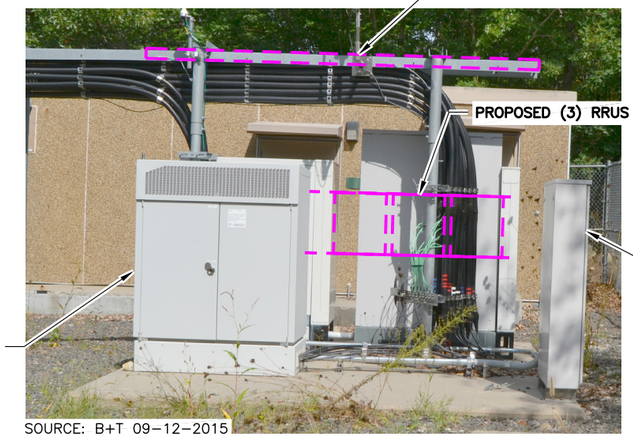
FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (18) 1 5/8" COAX TO T-MOBILE RAD @ 99'	INSIDE POLE
EXISTING T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER		

EXISTING (18) LINES OF 1 5/8" COAX TO 99' TO REMAIN.
(6) EXISTING COAX TO BE CONSOLIDATED FOR NEW ANTENNA.
(REFER TO SBA PROVIDED STRUCTURAL ANALYSIS FOR SPECIAL CABLE INSTALLATION REQUIREMENTS, BUNDLING, SHIELDING, MOUNTING AND RELOCATION OF EXISTING CABLES)

SOURCE: B+T 09-12-2015

2A FEEDLINE PHOTO DETAIL @ TOWER BASE

SCALE: N.T.S.



SOURCE: B+T 09-12-2015

2B EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

SOURCE: B+T 09-12-2015

3 ELEVATION PHOTO DETAIL

SCALE: N.T.S.

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CTNH331B

NH331/OPTA PINE GROVE

940 MERIDEN ROAD
WATERBURY, CT 06705

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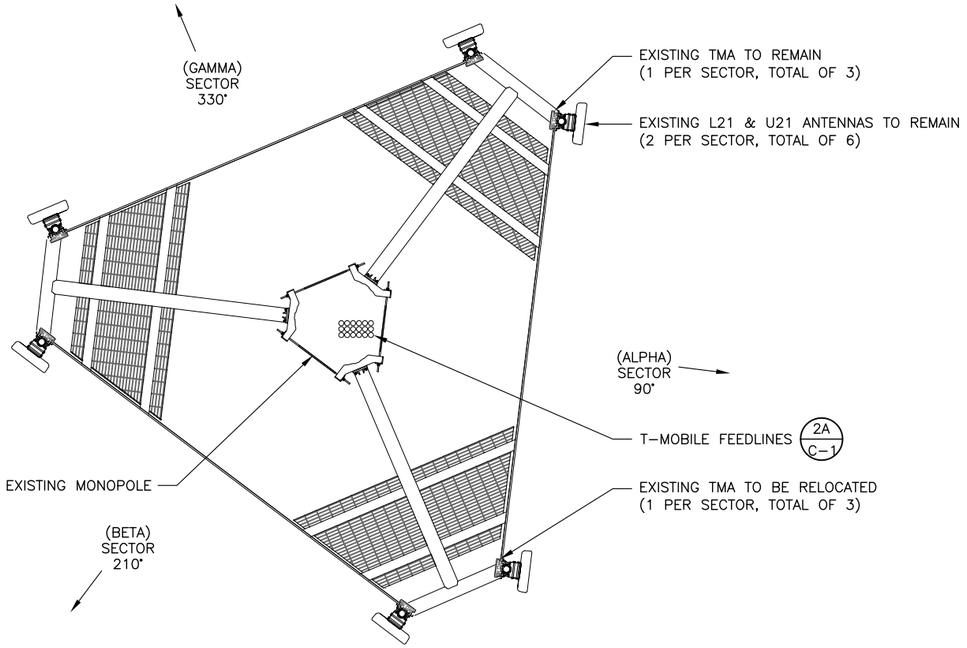
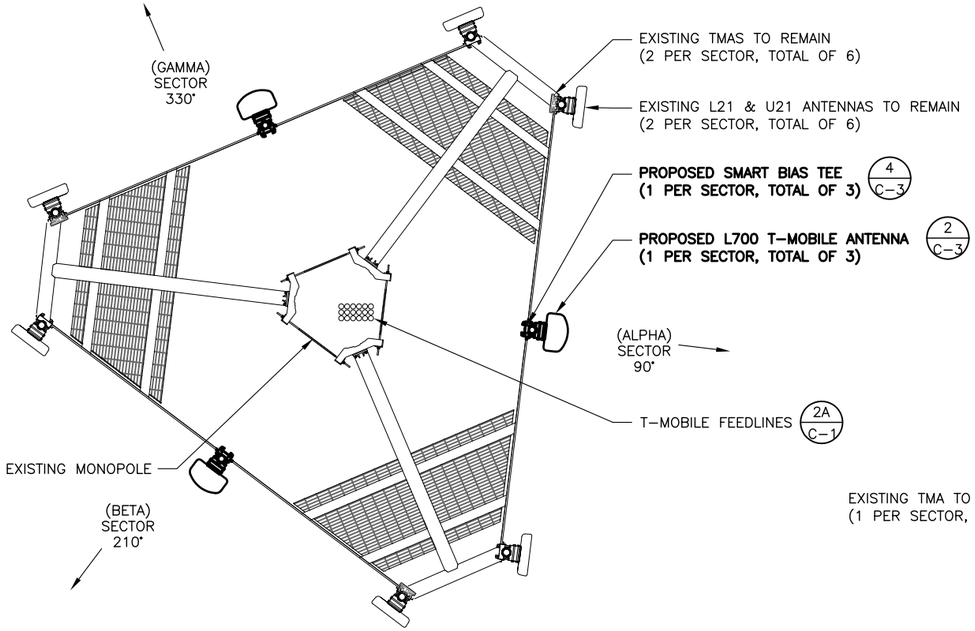


1A EXISTING ANTENNA PLAN

SCALE: 0' 1' 4' 10' — 11x17 SCALE: 1/4"=1'–0" / 22x34 SCALE: 1/2"=1'–0"

N



1B PROPOSED ANTENNA PLAN

SCALE: 0' 1' 4' 10' — 11x17 SCALE: 1/4"=1'–0" / 22x34 SCALE: 1/2"=1'–0"

N

STRUCTURAL NOTES:

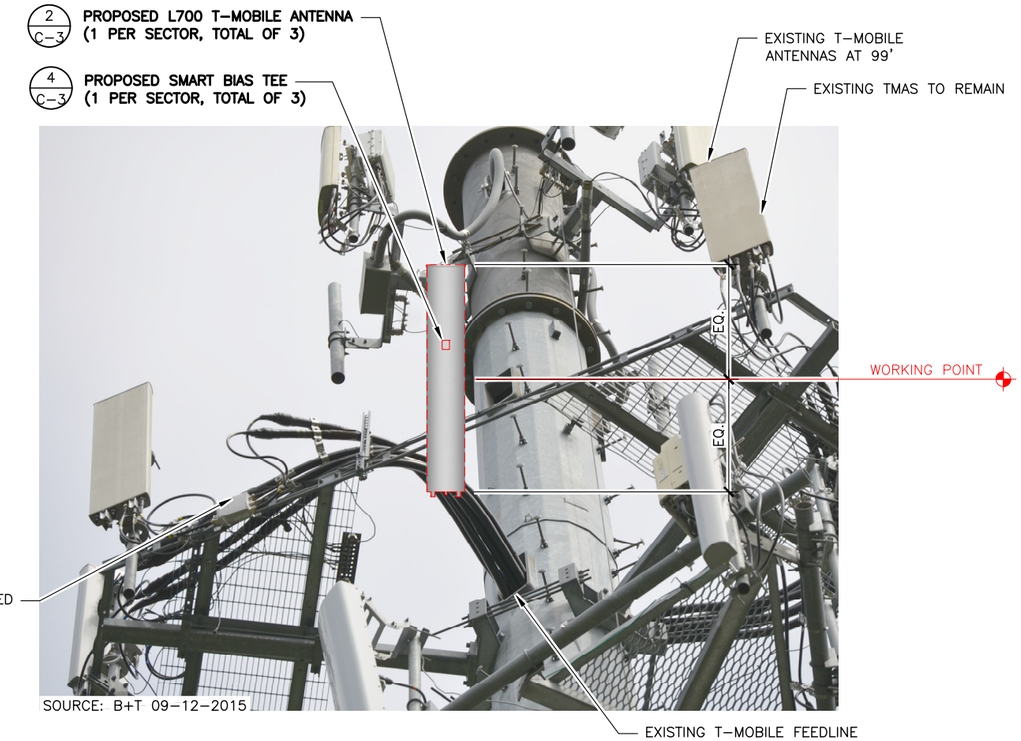
PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO TOWER STRUCTURAL ANALYSIS PROVIDED BY SBA TO DETERMINE IF THERE ARE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS FOR TOWER TOP EQUIPMENT AND FOR CABLE BUNDLING, SHIELDING, MOUNTING OR RELOCATION ARRANGEMENTS.

SPECIAL WORK NOTE:

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

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.



SOURCE: B+T 09–12–2015

2 ANTENNA MOUNT PHOTO DETAIL

SCALE: N.T.S.

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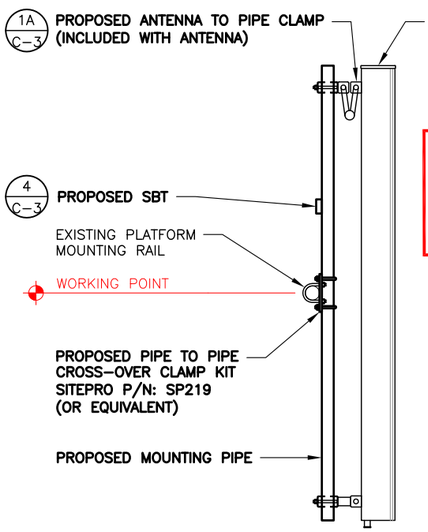
SHEET NUMBER: C-2
REVISION: 0

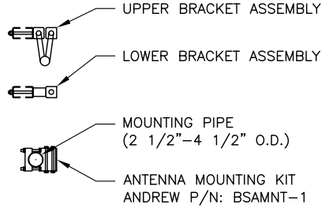


1 PROPOSED L700 ANTENNA & RRU MOUNTING DETAIL

SCALE: N.T.S.

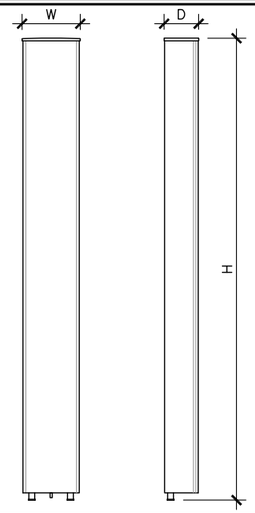
ANTENNA INSTALLATION SPECIAL WORK NOTE:

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.



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.

ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:

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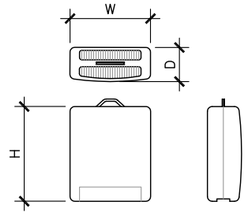

RRU SPECIFICATIONS	
MANUFACTURER	ERICSSON
MODEL #	RRUS11 B12
WIDTH	17"
DEPTH	7"
HEIGHT	20"
WEIGHT	50.6 LBS

3 REMOTE RADIO UNIT (RRU)

SCALE: N.T.S.

STRUCTURAL NOTES:

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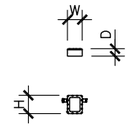
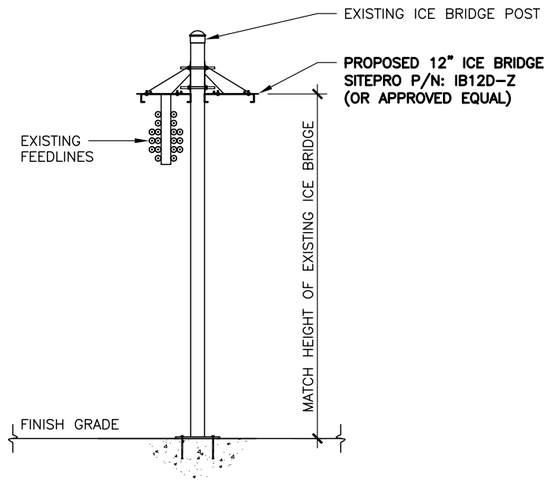


SBT SPECIFICATIONS	
MANUFACTURER	KATHREIN
MODEL #	78211054
WIDTH	3.2"
DEPTH	1.8"
HEIGHT	5.5"
WEIGHT	1.8 LBS

4 SMART BIAS TEE (SBT)

SCALE: N.T.S.



5 ICE BRIDGE DETAIL

SCALE: N.T.S.

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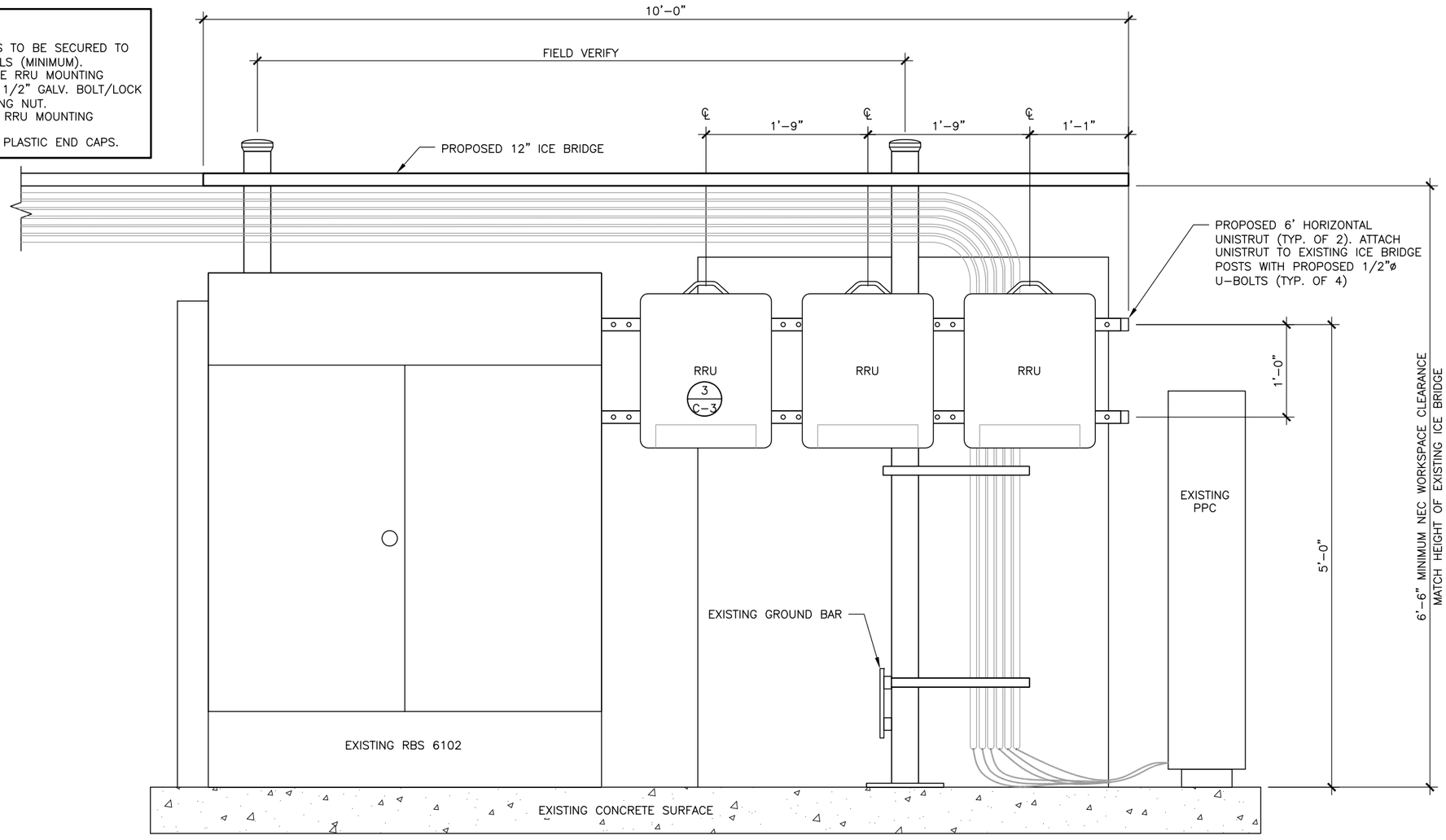
CONSTRUCTION NOTES:

1. 1/2" RF COAX JUMPERS TO BE SECURED TO RACK AT 2'-0" INTERVALS (MINIMUM).
2. CONTRACTOR TO PROVIDE RRU MOUNTING HARDWARE: (4) 1/4"x1 1/2" GALV. BOLT/LOCK WASHER/UNISTRUT SPRING NUT.
3. CONTRACTOR TO VERIFY RRU MOUNTING BRACKET SPACING.
4. ALL UNISTRUT TO HAVE PLASTIC END CAPS.



1 RRU MOUNTING DETAIL
SCALE: N.T.S.

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