



June 26, 2015

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

RE: Notice of Exempt Modification  
35 South Bartlett Road, Waterford, CT 06375  
N 41° 25' 03.55"  
W -72° 06' 24.22"  
T-Mobile Site No.: CTNL021D\_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 35 South Bartlett Road, Waterford, CT 06375.

The 35 South Bartlett Road facility consists of a 180' Self Support Tower owned and operated by SBA Towers II, 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.

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 other than the new equipment cabinets.
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@sbsite.com](mailto:kpelletier@sbsite.com)



## T-Mobile Equipment Modification

35 South Bartlett Road, Waterford, CT 06375  
Site number CTNLO21D\_L700

**Tower Owner:** SBA Towers II LLC

**Equipment Configuration:** Self Support Tower

### Current and/or approved:

- (3) Ericsson Air 21 B2A/B4P
- (3) Ericsson Air 21 B4A/B2P
- (3) Ericsson KRY 112 144/1
- (12) 1-5/8" feed lines
- (1) 1-5/8" fiber

### Planned Modifications:

- (3) Ericsson Air 21 B2A/B4P
- (3) Ericsson Air B4A/B2P
- (3) Commscope LNX-6515DS
- (3) Ericsson RRUS 11 B12
- (3) Ericsson KRY 112 144/1
- (12) 1-5/8" feed 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 5.82% of the allowable FCC established general public limit. The anticipated composite MPE value for this site assuming all carriers present is 7.37% of the allowable FCC established general public limit sampled at the ground level.

Site Composite MPE%	
Carrier	MPE%
T-Mobile	5.82
MetroPCS	1.55 %
<b>Site Total MPE %:</b>	<b>7.37 %</b>



June 26, 2015

Mr. Dan Steward  
First Selectman  
Town of Waterford  
15 Rope Ferry Road  
Waterford, CT 06385

RE: Telecommunications Facility @ 35 South Bartlett Road, Waterford, CT 06375

Dear Mr. Steward,

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,

A handwritten signature in black ink, appearing to read "Kri Pelletier", is positioned above the typed name.

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@sbsite.com](mailto:kpelletier@sbsite.com)

# SBA Network Services, LLC

To: CONNECTICUT SITING COUNCIL

129986

Check Number: 2097105

Date: 06/25/2015

Invoice Number	Invoice Date	Description	Gross Amount	Taxes Withheld	Net Amount
PRSF06241508	06/25/2015	BP related fee CTNL021D_L700	\$625.00	\$0.00	\$625.00

\$625.00      \$0.00      \$625.00

**SBA Network Services, LLC**  
8051 Congress Avenue  
Boca Raton, FL 33487-1307  
(561) 995-7670

**Wells Fargo Bank**

**2097105**

061209756

129986

DATE

AMOUNT

Six Hundred Twenty Five Dollars And 00 Cents

06/25/2015

\$625.00

Void After 120 Days

Pay to the Order of:

CONNECTICUT SITING COUNCIL  
ACCOUNTS RECEIVABLE  
TEN FRANKLIN SQUARE

NEW BRITAIN, CT 06051

*Brian Lazarus*

⑈ 2097105⑈ ⑆ 06 ⑆ 209756⑆ 2079900424566⑈

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

T-Mobile Existing Facility

Site ID: CTNL021D

NL021/ SBA Waterford FT  
35 South Bartlett Road  
Waterford, CT 06375

**June 19, 2015**

**EBI Project Number: 6215003540**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general public allowable limit:	<b>7.37 %</b>

June 19, 2015

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

Emissions Analysis for Site: **CTNL021D – NL021/ SBA Waterford FT**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **35 South Bartlett Road, Waterford, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limit for the 700 MHz Band is  $467 \mu\text{W}/\text{cm}^2$ , and the general population exposure limit for the PCS and AWS bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 **35 South Bartlett Road, Waterford, 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 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 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 **150 feet** above ground level (AGL).
- 9) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

**T-Mobile Site Inventory and Power Data**

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz(PCS) / 2100 MHz (AWS)
Channel Count	2	Channel Count	2	# 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%	0.81	Antenna B1 MPE%	0.81	Antenna C1 MPE%	0.81
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P	Make / Model:	Ericsson AIR21 B4A/B2P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	150	Height (AGL):	150	Height (AGL):	150
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%	0.81	Antenna B2 MPE%	0.81	Antenna C2 MPE%	0.81
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):	150	Height (AGL):	150	Height (AGL):	150
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%	0.32	Antenna B3 MPE%	0.32	Antenna C3 MPE%	0.32

Site Composite MPE%	
Carrier	MPE%
T-Mobile	5.82
MetroPCS	1.55 %
<b>Site Total MPE %:</b>	<b>7.37 %</b>

T-Mobile Sector 1 Total:	1.94 %
T-Mobile Sector 2 Total:	1.94 %
T-Mobile Sector 3 Total:	1.94 %
<b>Site Total:</b>	<b>7.37 %</b>

## 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:	1.94 %
Sector 2:	1.94 %
Sector 3 :	1.94 %
T-Mobile Total:	5.82 %
Site Total:	7.37 %
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **7.37%** 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



ENGINEERING INNOVATION

FDH Velocitel, 6521 Meridien Drive Raleigh, NC 27616, Ph. 919.755.1012

**Structural Analysis for  
SBA Network Services, Inc.**

**180' Self-Support Tower**

**SBA Site Name: Rogers Hill  
SBA Site ID: CT09680-S-02  
T-Mobile Site ID: CTNL021**

FDH Velocitel Project Number 15BTCZ1400

**Analysis Results**

Tower Components	78.3%	Sufficient
Foundation	68.8%	Sufficient

Prepared By:

Tyler Ferguson  
Project Engineer I

Reviewed By:

Dennis D. Abel  
Director of Structural Engineering  
CT PE License No. 23247

**Velocitel, Inc., d.b.a. FDH Velocitel**

6521 Meridien Drive  
Raleigh, NC 27616  
(919) 755-1012  
info@fdh-inc.com



June 15, 2015

Prepared pursuant to TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the 2005 Connecticut State Building Code

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## EXECUTIVE SUMMARY

At the request of SBA Network Services, Inc., FDH Velocitel performed a structural analysis of the existing self-supported tower located in Quaker Hill, CT to determine whether the tower is structurally adequate to support both the existing and proposed loads pursuant to the *Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, TIA/EIA-222-F* and the *2005 Connecticut State Building Code (CSBC)*. Information pertaining to the existing/proposed antenna loading, current tower geometry, the member sizes, geotechnical data, and foundation dimensions was obtained from:

- World Tower Company, Inc. (Drawing No. Q071062) original design drawings dated December 5, 2007
- Clarence Welti Associates, Inc. (Site Name: Rogers Hill) Geotechnical Study for Proposed Communications Tower dated December 17, 2007
- SBA Network Services, Inc.

The *basic design wind speed* per the *TIA/EIA-222-F* standards and the *2005 CSBC* is 85 mph without ice and 38 mph with 3/4" radial ice. Ice is considered to increase in thickness with height.

## Conclusions

With the existing and proposed antennas from T-Mobile in place at 150 ft, the tower meets the requirements of the *TIA/EIA-222-F* standards and the *2005 CSBC* provided the **Recommendations** listed below are satisfied. Furthermore, provided the foundation was designed and constructed to support the original design reactions (see World Tower Company, Inc. Drawing No. Q071062), the foundation should have the necessary capacity to support the existing and proposed loading. For a more detailed description of the analysis of the tower, see the **Results** section of this report.

Our structural analysis has been performed assuming all information provided to FDH Velocitel is accurate (i.e., the steel data, tower layout, existing antenna loading, and proposed antenna loading) and that the tower has been properly erected and maintained per the original design drawings.

## Recommendations

To ensure the requirements of the *TIA/EIA-222-F* standards and the *2005 CSBC* are met with the existing and proposed loading in place, we have the following recommendations:

1. Feed lines should be installed as shown in **Figure 1**.
2. The existing TMAs should be installed directly behind the existing and proposed antennas.
3. RRU/RRH Stipulation: The equipment may be installed in any arrangement as determined by the client.

## APPURTENANCE LISTING

The proposed and existing antennas with their corresponding cables/coax lines are shown in **Table 1**. *If the actual layout determined in the field deviates from the layout, FDH Velocitel should be contacted to perform a revised analysis.*

**Table 1 - Appurtenance Loading**

### Existing Loading:

Antenna Elevation (ft)	Description	Feed Lines	Carrier	Mount Elevation (ft)	Mount Type
185	(2) Sinclair SC488-HF2LNF (1) Telewave ANT150F2 (1) 9" x 13.25" x 21.25" TMA	(3) 1-5/8"	Town of Waterford	180	(3) Standoffs
150	(3) Ericsson Air 21 B2A/B4P (3) Ericsson Air 21 B4A/B2P (3) Ericsson KRY 112 144/1	(12) 1-5/8" (1) 1-5/8" Fiber	T-Mobile	150	(3) T-Frames
120	(12) Commscope SBNHH-1D65B (3) Alcatel Lucent RRH 2x60W-1900MHz (3) Alcatel Lucent RRH 2x60 AWS (3) Alcatel Lucent RRH 2x60 LTE (2) RFS DB-T1-6Z-8AB-0Z	(10) 1-5/8" (2) 1-5/8" Fiber	Verizon	120	(3) Sector Frames (Commscope P/N SF-QV12-B)

### Proposed Carrier - Final Loading:

Antenna Elevation (ft)	Description	Feed Lines	Carrier	Mount Elevation (ft)	Mount Type
150	(3) Ericsson Air 21 B2A/B4P (3) Ericsson Air B4A/B2P (3) Commscope LNX-6515DS (3) Ericsson RRUS 11 B12 (3) Ericsson KRY 112 144/1	(12) 1-5/8" (1) 1-5/8" Fiber	T-Mobile	150	(3) T-Frames

## RESULTS

The following yield strength of steel for individual members was used for analysis:

**Table 2 - Material Strength**

Member Type	Yield Strength
Legs	50 ksi
Bracing	36 ksi

**Table 3** displays the summary of the ratio (as a percentage) of force in the member to their capacities. Values greater than 100% indicate locations where the maximum force in the member exceeds its capacity. *Note: Capacities up to 105% are considered acceptable.* **Table 4** displays the maximum foundation reactions.

If the assumptions outlined in this report differ from actual field conditions, FDH Velocitel should be contacted to perform a revised analysis. Furthermore, as no information pertaining to the allowable twist and sway requirements for the existing or proposed appurtenances was provided, deflection and rotation were not taken into consideration when performing this analysis.

See the **Appendix** for detailed modeling information.

**Table 3 - Summary of Working Percentage of Structural Components**

Section No.	Elevation (ft)	Component Type	Size	% Capacity	Pass Fail
T1	180 - 160	Leg	1 1/2	23.0	Pass
		Diagonal	1	28.7	Pass
		Horizontal	1	2.9	Pass
		Top Girt	1	1.9	Pass
		Bottom Girt	1	7.2	Pass
T2	160 - 140	Leg	2	41.8	Pass
		Diagonal	1 1/4	45.4	Pass
		Horizontal	1	14.9	Pass
		Top Girt	1	9.2	Pass
		Bottom Girt	1	20.8	Pass
T3	140 - 120	Leg	2 3/4	42.8	Pass
		Diagonal	L2x2x3/16	28.2 45.3 (b)	Pass
		Top Girt	L2x2x1/8	12.1 17.4 (b)	Pass
T4	120 - 100	Leg	3	56.1	Pass
		Diagonal	L2x2x1/4	40.0 59.4 (b)	Pass
T5	100 - 80	Leg	3 1/2	50.3	Pass
		Diagonal	L2x2x1/4	51.7 55.8 (b)	Pass
T6	80 - 60	Leg	3 1/2	62.2	Pass
		Diagonal	L3x3x3/16	57.6 68.3 (b)	Pass
		Secondary Horizontal	L2x2x1/8	58.6 62.2 (b)	Pass



Section No.	Elevation (ft)	Component Type	Size	% Capacity	Pass Fail
T7	60 - 40	Leg	3 3/4	61.4	Pass
		Diagonal	L3x3x3/16	66.8 68.1 (b)	Pass
		Secondary Horizontal	L2x2x3/16	64.3	Pass
T8	40 - 20	Leg	4	59.8	Pass
		Diagonal	L3x3x3/16	78.3	Pass
		Secondary Horizontal	L2 1/2x2 1/2x3/16	48.0	Pass
T9	20 - 0	Leg	4	67.1	Pass
		Diagonal	L3x3x1/4	72.4	Pass
		Secondary Horizontal	L2 1/2x2 1/2x3/16	67.9	Pass

**Table 4 - Maximum Base Reactions**

Load Type	Direction	Current Analysis (TIA/EIA-222-F)	Original Design (TIA/EIA-222-F)
Individual Foundation	Horizontal	20 k	43 k
	Uplift	228 k	333 k
	Compression	259 k	386 k
Overturing Moment	---	3,116 k-ft	4,527 k-ft

## **GENERAL COMMENTS**

This engineering analysis is based upon the theoretical capacity of the structure. It is not a condition assessment of the tower and its foundation. It is the responsibility of SBA Network Services, Inc. to verify that the tower modeled and analyzed is the correct structure (with accurate antenna loading information) modeled. If there are substantial modifications to be made or the assumptions made in this analysis are not accurate, FDH Velocitel should be notified immediately to perform a revised analysis.

## **LIMITATIONS**

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of this report. All opinions and conclusions are subject to revision based upon receipt of new or additional/updated information. All services are provided exercising a level of care and diligence equivalent to the standard and care of our profession. No other warranty or guarantee, expressed or implied, is offered. Our services are confidential in nature and we will not release this report to any other party without the client's consent. The use of this engineering work is limited to the express purpose for which it was commissioned and it may not be reused, copied, or distributed for any other purpose without the written consent of FDH Velocitel.

## **APPENDIX**

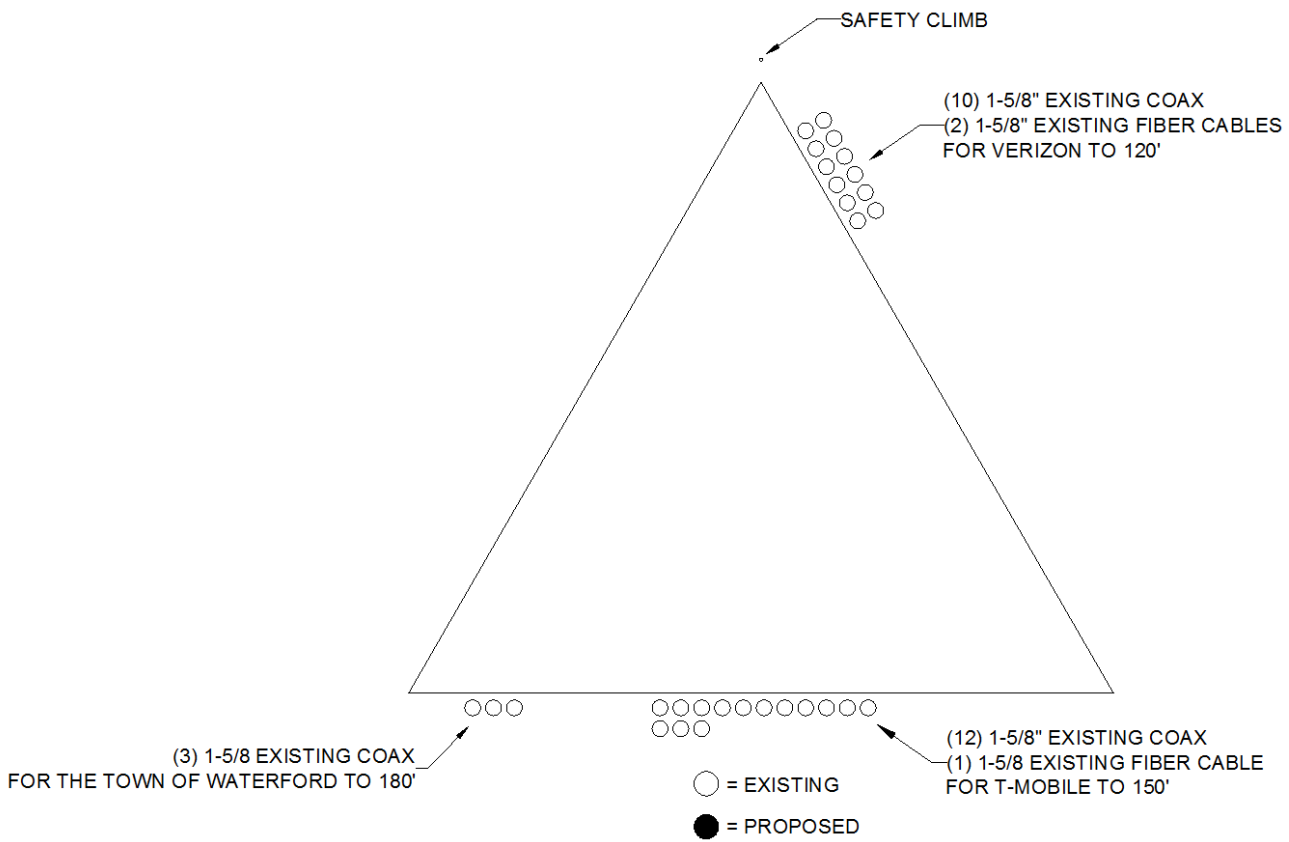


Figure 1 - Assumed Coax Layout

**DESIGNED APPURTENANCE LOADING**

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	180	KRY 112 144/1 TMA	150
SC488-HF2LNF Omni	178	KRY 112 144/1 TMA	150
SC488-HF2LNF Omni	178	(3) T-Frames	150
ANT150F2 Omni	178	(4) SBNHH-1D65B w/ Mount Pipe	120
9' x 13.25' x 21.25' TMA	178	(4) SBNHH-1D65B w/ Mount Pipe	120
(3) Standoffs	178	(4) SBNHH-1D65B w/ Mount Pipe	120
AIR 21 B2A/B4P	150	RRH 2x60W-1900MHz	120
AIR 21 B2A/B4P	150	RRH 2x60W-1900MHz	120
AIR 21 B2A/B4P	150	RRH 2x60W-1900MHz	120
AIR 21 B4A/B2P	150	RRH 2x60-AWS	120
AIR 21 B4A/B2P	150	RRH 2x60-AWS	120
AIR 21 B4A/B2P	150	RRH 2x60-AWS	120
LNX-6515DS w/ Mount Pipe	150	RRH 2x60 LTE	120
LNX-6515DS w/ Mount Pipe	150	RRH 2x60 LTE	120
LNX-6515DS w/ Mount Pipe	150	RRH 2x60 LTE	120
RRUS 11 B12	150	DB-T1-6Z-8AB-0Z	120
RRUS 11 B12	150	DB-T1-6Z-8AB-0Z	120
RRUS 11 B12	150	(3) Sector Frames (Commscope P/N SF-QV12-B)	120
KRY 112 144/1 TMA	150		

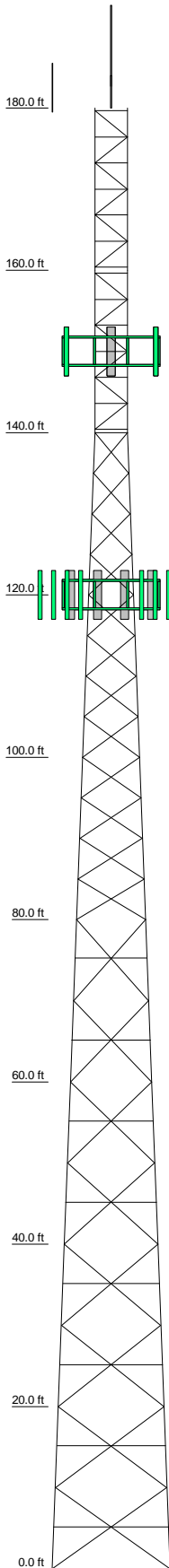
**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

**TOWER DESIGN NOTES**

1. Tower is located in New London County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 78.3%

Section	T0	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11
Legs	SR 3 3/4	SR 3 1/2	SR 3 1/2	SR 2 3/4	SR 3	SR 3 1/2	SR 3 1/2	SR 3 3/4	SR 4	SR 3 3/4	SR 3 3/4	SR 1 1/2
Leg Grade						A572-50						SR 1
Diagonals	L3x3x1/4	L2x2x1/4	L2x2x1/4	L2x2x3/16	L2x2x1/4	A36		L3x3x3/16	L3x3x1/4	L2x2x3/16	L2x2x1/8	SR 1
Diagonal Grade												SR 1
Top Girts												SR 1
Bottom Girts												SR 1
Horizontals												SR 1
Sec. Horizontals	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16	L2 1/2x2 1/2x3/16
Face Width (ft)	14.5	13	11.5	10	8.5	7	5.5	4				
# Panels @ (ft)			8 @ 10									12 @ 3.20833
Weight (K)	21.5	3.8	3.5	3.1	2.7	2.7	2.1	1.6	1.3	0.8		



**MAX. CORNER REACTIONS AT BASE:**  
 DOWN: 259 K  
 SHEAR: 20 K

UPLIFT: -228 K  
 SHEAR: 18 K

AXIAL 59 K  
 SHEAR 9 K  
 MOMENT 935 kip-ft

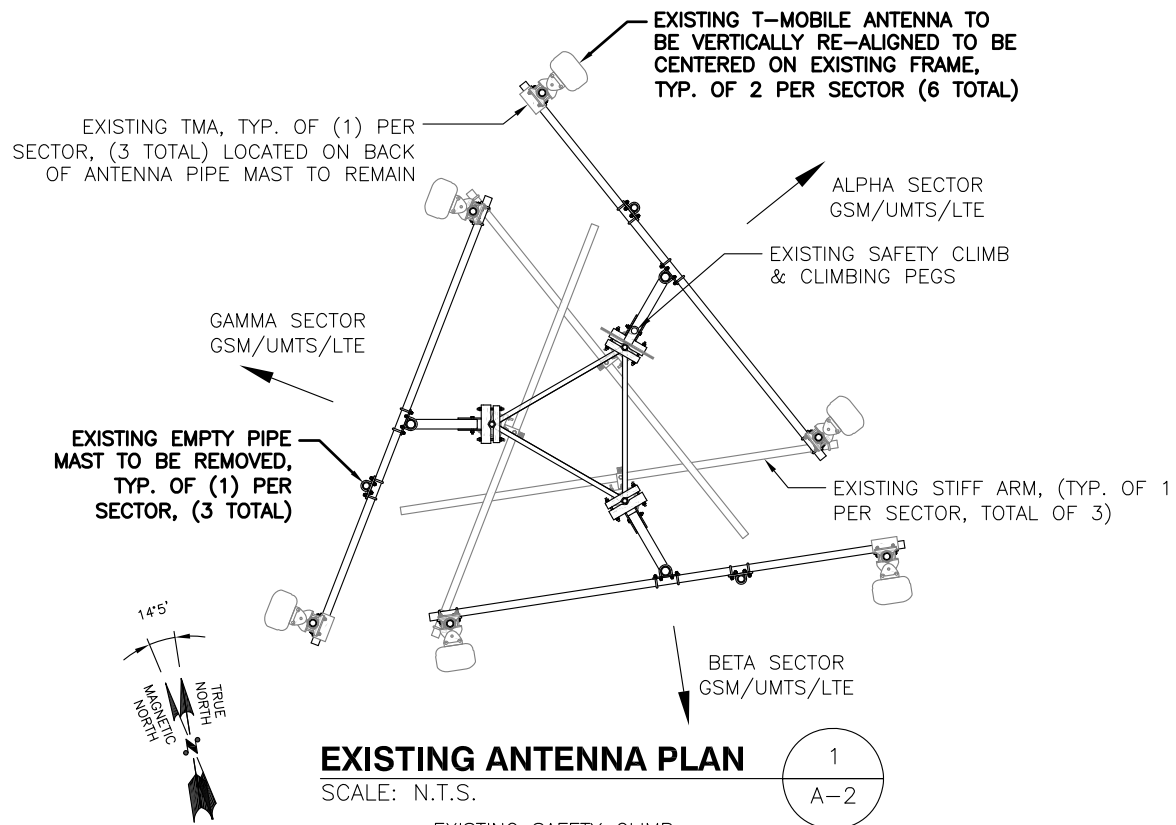
TORQUE 1 kip-ft  
 38 mph WIND - 0.7500 in ICE

AXIAL 33 K  
 SHEAR 32 K  
 MOMENT 3116 kip-ft

TORQUE 8 kip-ft  
 REACTIONS - 85 mph WIND

<p>FDH VELOCITEL VELOCITEL DIVISION</p>	<p><b>Velocitel, Inc., d.b.a. FDH Velocitel</b></p> <p>6521 Meridian Drive, Suite 107                  Raleigh, North Carolina 27616                  Phone: 9197551012                  FAX: 9197551031</p>		<p><b>Job: Rogers Hill, CT09680-S-02</b></p> <p>Project: 15BTCZ1400</p>	
	<p>Tower Analysis</p>	<p>Client: SBA Network Services, Inc.</p> <p>Code: TIA/EIA-222-F</p> <p>Path:</p>	<p>Drawn by: Tyler Ferguson</p> <p>Date: 06/15/15</p>	<p>App'd:</p> <p>Scale: NTS</p> <p>Dwg No. E-1</p>



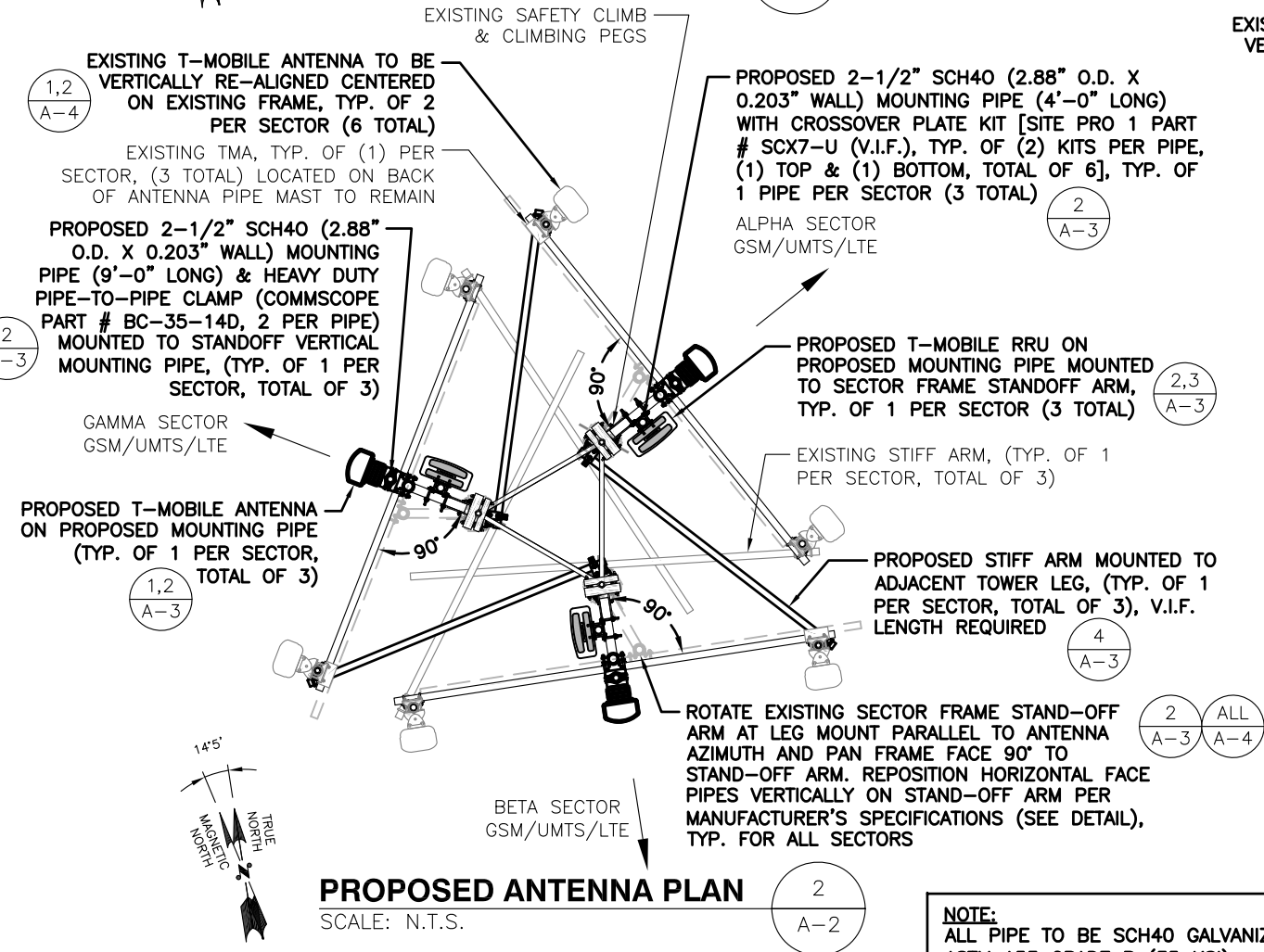


**ANTENNA MOUNT STRUCTURAL ASSESSMENT REQUIREMENT:**

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

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

**SPECIAL WORK NOTE:**  
VERTICALLY CENTER THE SECTOR FRAME HORIZONTAL MEMBERS, PIPE MAST AND EXISTING AND PROPOSED ANTENNAS ON THE EXISTING SECTOR FRAME, NO EXCEPTIONS.



1,2  
A-3  
PROPOSED T-MOBILE ANTENNA ON PROPOSED MOUNTING PIPE (TYP. OF 1 PER SECTOR, TOTAL OF 3)

2  
A-3  
PROPOSED 2-1/2" SCH40 (2.88" O.D. X 0.203" WALL) MOUNTING PIPE (9'-0" LONG) & HEAVY DUTY PIPE-TO-PIPE CLAMP (COMMSCOPE PART # BC-35-14D, 2 PER PIPE) MOUNTED TO STANDOFF VERTICAL MOUNTING PIPE, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

2,3  
A-3  
PROPOSED T-MOBILE RRU ON PROPOSED MOUNTING PIPE MOUNTED TO SECTOR FRAME STANDOFF ARM, TYP. OF 1 PER SECTOR (3 TOTAL)

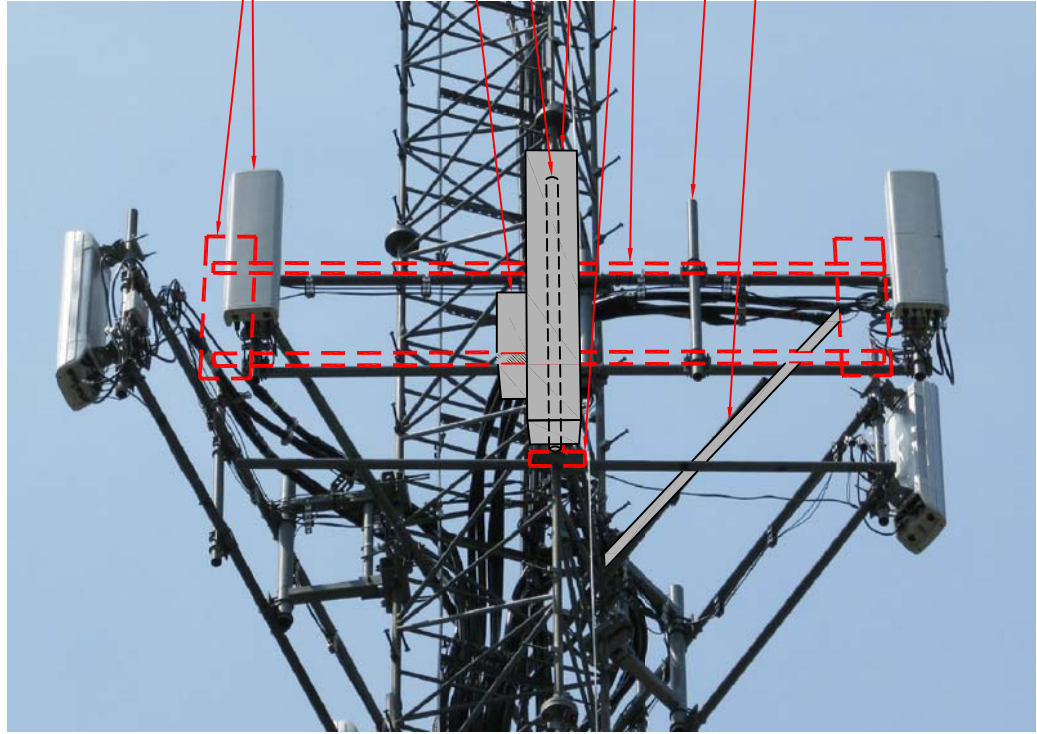
1,2  
A-4  
EXISTING T-MOBILE ANTENNA TO BE VERTICALLY RE-ALIGNED CENTERED ON EXISTING FRAME, TYP. OF 2 PER SECTOR (6 TOTAL)

2  
A-3  
ROTATE EXISTING SECTOR FRAME STAND-OFF ARM AT LEG MOUNT PARALLEL TO ANTENNA AZIMUTH AND PAN FRAME FACE 90° TO STAND-OFF ARM. REPOSITION HORIZONTAL FACE PIPES VERTICALLY ON STAND-OFF ARM PER MANUFACTURER'S SPECIFICATIONS (SEE DETAIL), TYP. FOR ALL SECTORS

2  
A-3  
EXISTING EMPTY PIPE MAST TO BE REMOVED, TYP. OF (1) PER SECTOR, (3 TOTAL)

4  
A-3  
PROPOSED STIFF ARM MOUNTED TO ADJACENT TOWER LEG, (TYP. OF 1 PER SECTOR, TOTAL OF 3), V.I.F. LENGTH REQUIRED

2  
A-4  
ALL  
A-4

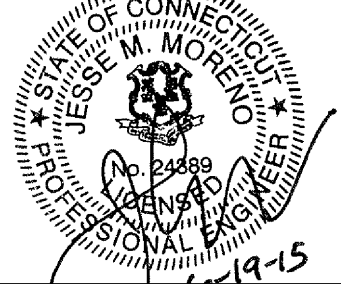


NOTE: ONE SECTOR SHOWN FOR CLARITY  
IMAGE SOURCE: PROTERRA 06/12/15

**ANTENNA PHOTO DETAIL**  
SCALE: N.T.S.

3  
A-2

**NOTE:**  
ALL PIPE TO BE SCH40 GALVANIZED ASTM A53 GRADE B (35 KSI)



APPROVALS

CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING/SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE
PROJECT NO:	15-001
DRAWN BY:	TBD/JEB
CHECKED BY:	TEJ/JMM
06/19/15	ISSUED FOR CONSTRUCTION

SITE NUMBER: CTNL021D  
SITE NAME:  
NL021 / SBA WATERFORD FT  
35 SOUTH BARTLETT ROAD  
QUAKER HILL, CT 06375  
NEW LONDON COUNTY

SHEET TITLE  
EXISTING & PROPOSED  
ANTENNA PLAN  
SHEET NUMBER  
A-2

